

# Wisconsin Retirement System

Forty-First Annual Actuarial Valuation and  
Gain/Loss Analysis  
December 31, 2021



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June 2, 2022

Employee Trust Funds Board  
Wisconsin Department of Employee  
Trust Funds  
4822 Madison Yards Way  
Madison, Wisconsin 53705

Ladies and Gentlemen:

The results of the December 31, 2021 **annual actuarial valuations of non-retired members covered by the Wisconsin Retirement System** are presented in this report. The valuations establish contribution rates for the 2023 calendar year in conformance with Chapter 40 of the Wisconsin Statutes. This report should not be relied upon for any other purpose. This report may be distributed to parties other than the ETF Board and Staff only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different. The change in the total normal cost rates from last year are shown below:

<b>General, Executive &amp; Elected</b>	<b>Protective with SS</b>	<b>Protective without SS</b>
0.6%	1.5%	2.0%

The valuations are based upon our understanding of the main plan provisions related to General, Executive and Elected, and Protective Occupation employment with and without Social Security coverage. The plan provisions evaluated are summarized in Section G of this report. Please advise us of any material misstatements in the summary and do not rely on this report until such are resolved.

The individual member statistical data required for the valuations was furnished by the Department of Employee Trust Funds (DETF), together with pertinent data on financial operations. The cooperation of DETF staff in furnishing these materials is acknowledged with appreciation. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by others.

Actuarial valuations are based upon assumptions regarding future activity in specific risk areas including the rates of investment return and payroll growth, eligibility for the various classes of benefits, and longevity among retired lives. The Board adopts these assumptions after considering the advice of the actuary and other professionals. Each actuarial valuation takes into account all prior differences between actual and assumed experience in each risk area and adjusts the contribution rates as needed. The December 31, 2021 valuations were based upon assumptions that were recommended in connection with a study of experience during 2018-2020 and benefit provisions in effect on December 31, 2021.

Future actuarial measurements may differ significantly from those presented in this report due to such factors as experience differing from that anticipated by actuarial assumptions, changes in plan provisions, actuarial assumptions/methods or applicable law. Due to the limited scope of this assignment, we did not perform an analysis of the potential range of future measurements.

This report includes various risk factors, but does not include an assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. However, an additional assessment of risk including stress testing for the Wisconsin Retirement System was conducted in the fall of 2019 in conjunction with the State of Wisconsin Investment Board and a separate study commissioned in the fall of 2020 by the Department of Employee Trust Funds. Additional discussion of various risk factors is included on pages B-9 to B-12 of this report.

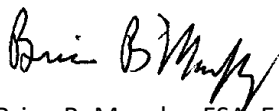
**This report reflects the impact of COVID-19 experience through December 31, 2021. It does not reflect the ongoing impact of COVID-19, which is likely to influence demographic and economic experience, at least in the short-term. We will continue to monitor these developments and their impact on the Wisconsin Retirement System. Actual future experience will be reflected in each subsequent annual valuation, as experience emerges.**

This report was prepared using our proprietary valuation model and related software which, in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

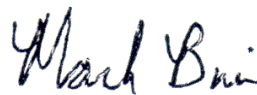
To the best of our knowledge, this report is complete and accurate and was made in accordance with generally recognized actuarial methods. Brian B. Murphy, Mark Buis, and James D. Anderson are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

The valuations were completed by qualified actuaries in accordance with accepted actuarial procedures as prescribed by the Actuarial Standards Board. It is our opinion that the Wisconsin Retirement System is operating in accordance with actuarial principles of level percent-of-payroll financing.

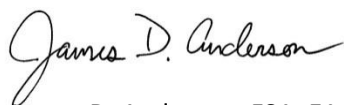
Respectfully submitted,  
Gabriel, Roeder, Smith & Company



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD



Mark Buis, FSA, EA, FCA, MAAA



James D. Anderson, FSA, EA, FCA, MAAA

BBM/MB/JDA:bd



## **SECTION A**

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### **EXECUTIVE SUMMARY**

# Executive Summary

## 1. Required Employer Contributions to Support Retirement System Benefits

	General, Executive & Elected Officials		Protective Occupation				Average 2023
			With Soc. Sec.		Without Soc. Sec.		
	2023	2022	2023	2022	2023	2022	
Employer Normal Cost	6.80%	6.50%	13.20%	12.00%	18.10%	16.40%	7.65%
Participant Normal Cost	6.80%	6.50%	6.80%	6.50%	6.80%	6.50%	6.80%
<b>Total Normal Cost</b>	<b>13.6%</b>	<b>13.0%</b>	<b>20.0%</b>	<b>18.5%</b>	<b>24.9%</b>	<b>22.9%</b>	<b>14.45%</b>

All employers are required to contribute the employer normal cost shown above. Certain employers are required to make additional contributions to fund their “Frozen Initial Liability” which are liabilities that they either brought on when they joined the WRS, or when they increased their prior service percentage. Related information is provided on page B-2.

Under Section 40.05 of the Wisconsin statutes updated for Acts 10 and 32 of 2011, contribution rates are split evenly between the employer normal cost and the participant normal cost for both General Participants and Executive and Elected Officials. For protective occupations, the participant normal cost is set equal to the participant normal cost for General Participants.

Contributions to support the Section 40.65 Duty Disability Program and the Accumulated Sick Leave Conversion Credit Program are in addition to the WRS rates shown above.

## Executive Summary

### 2. Reasons for Change

There are three general reasons why contribution rates change from one valuation to the next. The first is a change in the benefits or eligibility conditions of the plan. The second is a change in the valuation assumptions used to project future occurrences. The third is the difference during the year between the plan's actual experience and what the assumptions predicted.

In Wisconsin, there is a fourth reason. When the contribution rate changes for any of the first three reasons, the effect of the change is split evenly between employers and participants, except for protective occupation participants. When the participant normal cost changes, projected future participant account balances also change. By statute, the value of the participant retirement benefits must be at least equal to twice the account balance at retirement. This then changes the value of the retirement benefit, which then changes the total normal cost, which is then split between employers and participants. This final effect on normal cost is referred to as the "Money Purchase Effect."

In total, changes in the contribution rate are illustrated on the following chart. Additional detail on gains and losses can be found in Section D of this report.

	General, Executive & Elected Officials	Protective with Soc. Sec.	Protective without Soc. Sec.
2022 Normal Cost Rate	13.00%	18.50%	22.90%
Effect of Benefit Change	0.00%	0.00%	0.00%
Effect of Assumption Change	1.00%	2.60%	2.90%
Effect of Asset Performance	(0.45)%	(0.92)%	(1.12)%
Effect of Salary Experience	(0.04)%	(0.32)%	(0.04)%
Effect of Money Purchase Benefit	0.10%	0.10%	0.10%
Demographic and Other Experience	(0.01)%	0.04%	0.16%
2023 Normal Cost Rate	13.60%	20.00%	24.90%

Although the investment income is allocated proportionately to each group, the effect on the contribution rate will be different because the ratio of assets to payroll is different for each group.

# Executive Summary

## 3. General Comments

Based upon this valuation, normal cost contribution rates increased for all groups primarily due to updated actuarial assumptions partially offset by favorable investment performance from prior years flowing through the Market Recognition Account (MRA). In addition, all of the groups experienced gains from lower pay increases than expected.

In total, during 2021, investment return was above the assumed 2021 level of 7.00% on a market value basis. Under the asset valuation method (using the MRA), gains and losses are phased-in over a five-year period, resulting in a 12.5% return on an Actuarial Value of Assets basis in the Core Fund. The Market Value of Assets exceeds the Actuarial Value of Assets by approximately 14.9% as of the valuation date. The statutory asset valuation method will recognize all of the differences between actuarial value and market value of \$17.7 billion over four future years putting downward pressure on future contribution rates, given that all assumptions are realized.

**Conclusion.** Based upon the results of the December 31, 2021 regular annual actuarial valuation, it is our opinion that *the Wisconsin Retirement System continues to operate in accordance with actuarial principles of level percent-of-payroll financing.*





## Other Observations

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

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 6.80% on the actuarial value of assets), it is expected that:

- (1) The normal cost as a percentage of pay will decrease to the level of the entry age normal cost as time passes.
- (2) The unfunded liability will decrease in dollar amount until it is fully funded.
- (3) The funded status of the plan will remain very close to a 100% funded ratio.

### Limitations of Funded Status Measurements

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

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

### Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.



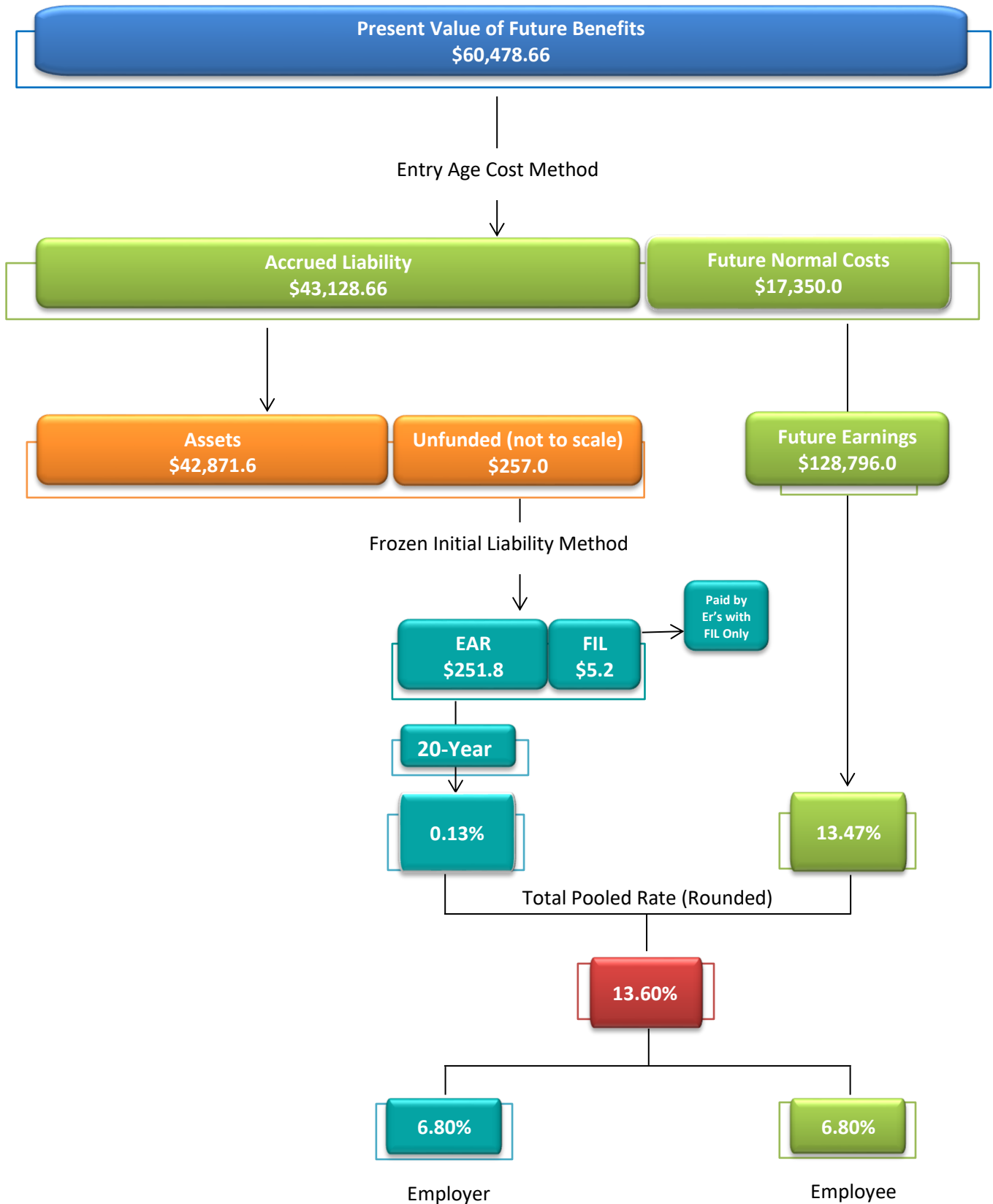
## **SECTION B**

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### **VALUATION RESULTS**

# Actuarial Valuation Process (Illustration for General/Elected Group)

\$ Millions -- %'s of Payroll



# Wisconsin Retirement System

## December 31, 2021 Valuation Overview

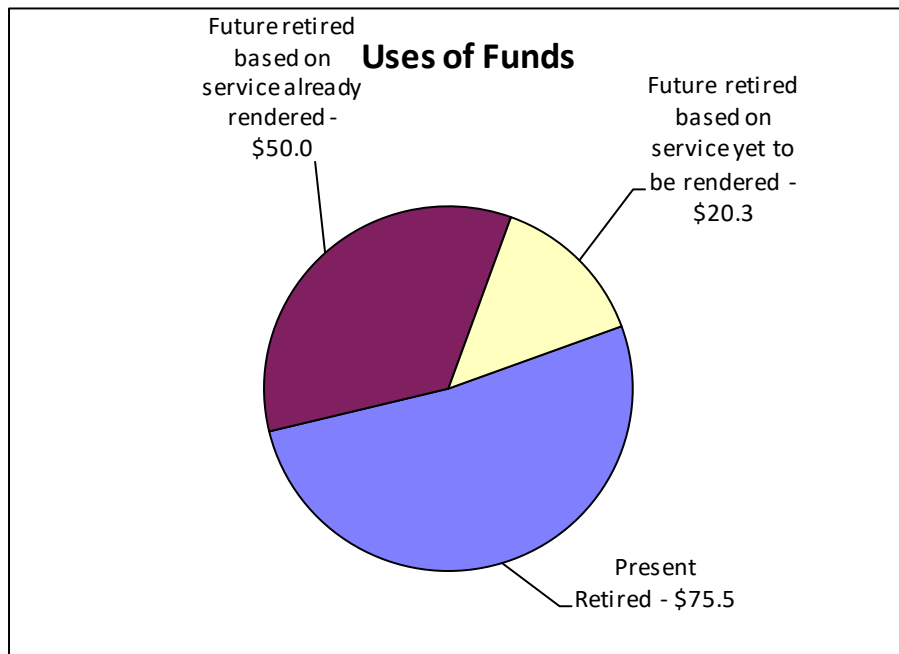
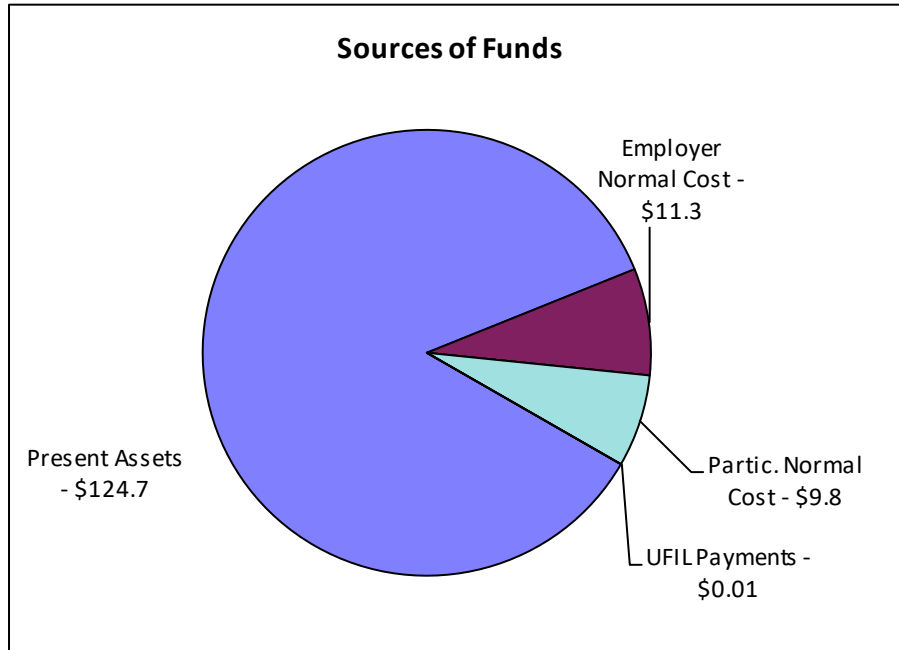
		\$ Millions					
		Non-Retired					
		Protective		Unallocated			
		General, Executives & Elected Officials	With Soc. Sec.	Without Soc. Sec.	Add'l Contribs	Retired	Total/Average
1	Number of People						
	a. Active	235,746	19,175	2,762			257,683
	b. Inactive, not retired	166,652	7,862	285			174,799
	c. Total	402,398	27,037	3,047		228,161	660,643
2	Current Earnings	\$13,759.5	\$1,404.6	\$245.9			\$15,410.0
3	<b>Present Values of</b>						
	Future Benefits for						
	a. Active	\$50,991.5	\$6,899.2	\$1,671.8			\$59,562.5
	b. Inactive, not retired	\$8,010.2	\$730.0	\$75.6			\$8,815.8
	c. Variable Adjustment	\$1,476.9	\$134.7	\$29.0			\$1,640.6
	d. Total	\$60,478.6	\$7,763.9	\$1,776.4	\$268.2	\$75,528.7	\$145,815.8
4	Future Entry Age Normal Costs	\$17,350.0	\$2,400.7	\$577.1			\$20,327.8
5	Future Earnings	\$128,796.0	\$13,727.1	\$2,554.1			\$145,077.2
6	<b>Pooled Entry Age Normal Cost (4/5)</b>	<b>13.47%</b>	<b>17.49%</b>	<b>22.60%</b>			<b>14.01%</b>
7	Entry Age Accrued Liability (3d-4)	\$43,128.6	\$5,363.2	\$1,199.3	\$268.2	\$75,528.7	\$125,488.0
8	Assets	\$42,871.6	\$4,877.2	\$1,119.7	\$268.2	\$75,528.7	\$124,665.4
9	<b>Total Entry Age Unfunded Liability (7-8)</b>	<b>\$257.0</b>	<b>\$486.0</b>	<b>\$79.6</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$822.6</b>
10	Frozen Initial Liability Portion	\$5.2	\$0.6	\$0.0	\$0.0	\$0.0	\$5.8
11	Pooled Unfunded Liability (EAR) (9-10)	\$251.8	\$485.4	\$79.6	\$0.0	\$0.0	\$816.8
12	20-year amortization factor	14.0212	14.0212	14.0212			14.0212
13	<b>Pooled Amortization % (11/12/2)</b>	<b>0.13%</b>	<b>2.46%</b>	<b>2.31%</b>			<b>0.38%</b>
14	<b>Total Pooled Rate Rounded (6+13)</b>	<b>13.6%</b>	<b>20.0%</b>	<b>24.9%</b>			<b>14.4%</b>
15	<b>2023 F-I-L Normal Cost Rates</b>						
16	Participant (0.5x14 (Gen'l))	6.80%	6.80%	6.80%			6.80%
17	Employer (14-16)	6.80%	13.20%	18.10%			7.65%
18	<b>Total (16+17)</b>	<b>13.6%</b>	<b>20.0%</b>	<b>24.9%</b>			<b>14.45%</b>
19	Entry Age Funded Ratio (8/7)	99.4%	90.9%	93.4%	100.0%	100.0%	99.3%

		Unfunded Frozen Initial Liability (UFIL)			
		Protective			
		General, Executives & Elected Officials	With Soc. Sec.	Without Soc Sec	Total
	Balance January 1, 2021	\$4,534,395	\$915,183	\$380,672	\$5,830,250
	New Employers	\$0	\$0	\$0	\$0
	Payments and Adjustments	\$294,240	\$(354,601)	\$(380,672)	\$(441,033)
	Interest	\$328,347	\$38,119	\$0	\$366,466
	<b>Balance December 31, 2021</b>	<b>\$5,156,982</b>	<b>\$598,701</b>	<b>\$0</b>	<b>\$5,755,683</b>
	<b>WRS Average UFIL Contribution</b>	<b>0.00%</b>	<b>0.03%</b>	<b>0.00%</b>	<b>0.00%</b>

Each employer contributes the Employer Normal Cost shown in line 16 above. Each participant contributes an identical percentage of pay as indicated. Some employers have an unfunded Frozen Initial Liability and contribute an additional amount to amortize that liability. The retirement system provides the information regarding the remaining unfunded frozen initial liability.



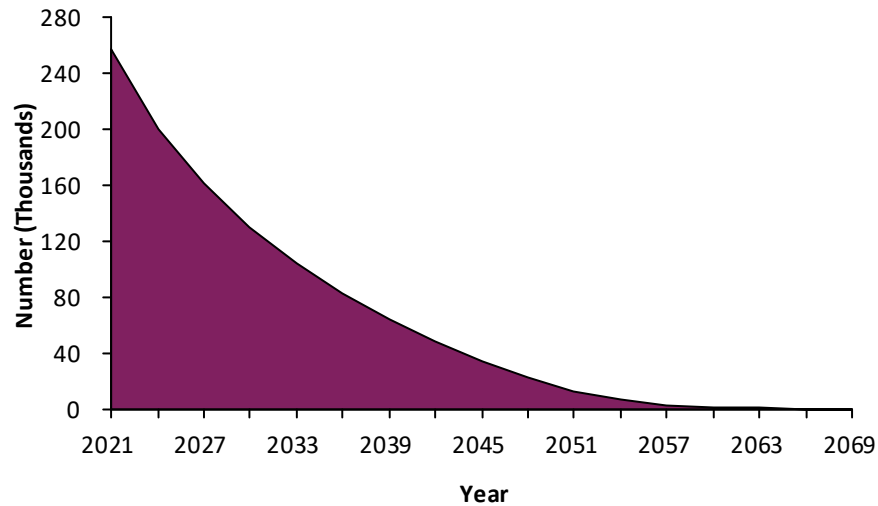
# Financing \$145.7 Billion\* of Benefit Promises for Present Active and Retired Participants December 31, 2021



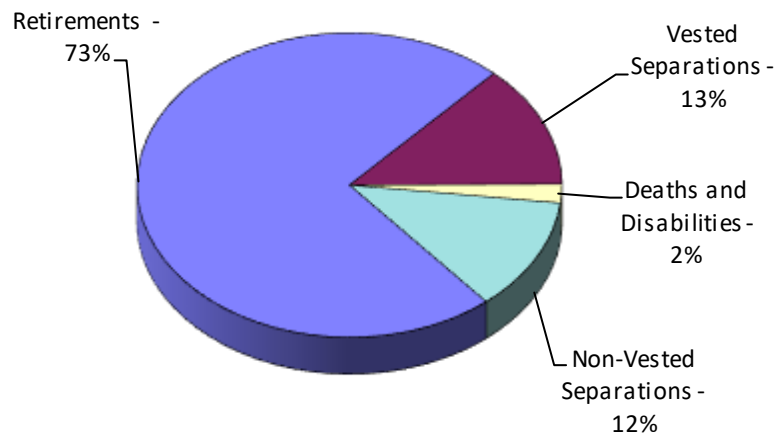
\* Present value of future benefits; all divisions combined.

# Expected Development of Present Population December 31, 2021

## Closed Group Active Population Projection



## Expected Terminations from Active Employment for Current Active Members



The charts above show the expected future development of the present population in simplified terms. The retirement system presently covers 257,683 active members. Eventually, 12% of the population is expected to terminate covered employment prior to retirement and forfeit eligibility for a monthly benefit. About 86% of the present population is expected to receive monthly retirement benefits either by retiring directly from active service, or by retiring from vested deferred status. The remaining 2% of the present population is expected to become eligible for death-in-service or disability benefits. Within 10 years, over half of the covered membership is expected to consist of new hires.

## Comparative Statement of Computed Contribution Rates

Valuation 12/31	Rate Effective 1/1	General				Executive and Elected			
		Participant	Benefit Adj. Contr.	Employer <sup>1</sup>	Total	Participant	Benefit Adj. Contr.	Employer <sup>1</sup>	Total
1997	1999	5.00 %	0.80 %	5.80 %	11.60 %	4.30 %	0.00 %	10.80 %	15.10 %
1998	2000	5.00 %	0.50 %	5.50 %	11.00 %	4.10 %	0.00 %	10.60 %	14.70 %
1999	2001	5.00 %	0.20 %	5.10 %	10.30 %	3.90 %	0.00 %	10.40 %	14.30 %
2000	2002	5.00 %	0.20 %	5.10 %	10.30 %	3.10 %	0.00 %	9.60 %	12.70 %
2001 <sup>2</sup>	2003	5.00 %	0.40 %	5.23 %	10.63 %	2.60 %	0.00 %	9.06 %	11.66 %
2002	2004	5.00 %	0.60 %	5.22 %	10.82 %	2.60 %	0.00 %	8.91 %	11.51 %
2003	2005	5.00 %	0.80 %	4.70 %	10.50 %	2.80 %	0.00 %	8.40 %	11.20 %
2004	2006	5.00 %	0.90 %	4.73 %	10.63 %	2.90 %	0.00 %	8.47 %	11.37 %
2005	2007	5.00 %	1.00 %	4.81 %	10.81 %	3.00 %	0.00 %	8.56 %	11.56 %
2006	2008	5.00 %	1.00 %	4.79 %	10.79 %	3.00 %	0.00 %	8.56 %	11.56 %
2007	2009	5.00 %	0.90 %	4.68 %	10.58 %	3.00 %	0.00 %	8.55 %	11.55 %
2008	2010	5.00 %	1.20 %	4.95 %	11.15 %	3.20 %	0.00 %	8.75 %	11.95 %
2009	2011	5.00 %	1.50 %	5.22 %	11.72 %	3.90 %	0.00 %	9.45 %	13.35 %
2010	2012	5.00 %	1.60 %	5.30 %	11.90 %	4.30 %	0.00 %	9.80 %	14.10 %
2011 <sup>3</sup>	2013	6.65 %	N/A	6.75 %	13.40 %	7.00 %	N/A	7.00 %	14.00 %
2012	2014	7.00 %	N/A	7.00 %	14.00 %	7.75 %	N/A	7.75 %	15.50 %
2013	2015	6.80 %	N/A	6.80 %	13.60 %	7.70 %	N/A	7.70 %	15.40 %
2014	2016	6.60 %	N/A	6.60 %	13.20 %	7.80 %	N/A	7.80 %	15.60 %
2015 <sup>4</sup>	2017	6.80 %	N/A	6.87 %	13.67 %	6.80 %	N/A	6.87 %	13.67 %
2016	2018	6.70 %	N/A	6.73 %	13.43 %	6.70 %	N/A	6.73 %	13.43 %
2017	2019	6.55 %	N/A	6.57 %	13.12 %	6.55 %	N/A	6.57 %	13.12 %
2018	2020	6.75 %	N/A	6.79 %	13.54 %	6.75 %	N/A	6.79 %	13.54 %
2019	2021	6.75 %	N/A	6.78 %	13.53 %	6.75 %	N/A	6.78 %	13.53 %
2020	2022	6.50 %	N/A	6.50 %	13.00 %	6.50 %	N/A	6.50 %	13.00 %
2021	2023	6.80 %	N/A	6.80 %	13.60 %	6.80 %	N/A	6.80 %	13.60 %

<sup>1</sup> Employer normal cost plus weighted average of unfunded Frozen Initial liability contribution rates.

<sup>2</sup> Act 11 of 1999 was implemented in 2001.

<sup>3</sup> Act 10 and Act 32 were implemented in 2011.

<sup>4</sup> Contribution rates for General and Executive and Elected Officials groups were combined beginning with the 2015 valuation. Actual 2016 Participant and Employer contribution rates for the Executive and Elected Officials group were each 6.6% respectively.



## Comparative Statement of Computed Contribution Rates

Valuation 12/31	Rate Effective 1/1	Protective with Social Security				Protective without Social Security			
		Participant	Benefit Adj. Contr.	Employer <sup>1</sup>	Total	Participant	Benefit Adj. Contr.	Employer <sup>1</sup>	Total
1997	1999	4.90 %	0.00 %	8.90 %	13.80 %	5.40 %		14.30 %	19.70 %
1998	2000	4.10 %	0.00 %	8.00 %	12.10 %	4.40 %		13.30 %	17.70 %
1999	2001	3.80 %	0.00 %	7.60 %	11.40 %	3.30 %		12.20 %	15.50 %
2000	2002	4.00 %	0.00 %	7.80 %	11.80 %	3.00 %		11.90 %	14.90 %
2001 <sup>2</sup>	2003	4.00 %	0.00 %	7.68 %	11.68 %	2.40 %		11.28 %	13.68 %
2002	2004	4.50 %	0.00 %	8.02 %	12.52 %	3.20 %		11.81 %	15.01 %
2003	2005	4.90 %	0.00 %	8.10 %	13.00 %	3.30 %		11.30 %	14.60 %
2004	2006	5.00 %	0.00 %	8.19 %	13.19 %	3.30 %		11.11 %	14.41 %
2005	2007	5.10 %	0.00 %	8.28 %	13.38 %	3.40 %		11.16 %	14.56 %
2006	2008	5.10 %	0.00 %	8.27 %	13.37 %	3.40 %		11.17 %	14.57 %
2007	2009	5.00 %	0.00 %	8.15 %	13.15 %	3.20 %		10.89 %	14.09 %
2008	2010	5.50 %	0.00 %	8.64 %	14.14 %	3.90 %		11.56 %	15.46 %
2009	2011	5.80 %	0.00 %	8.94 %	14.74 %	4.80 %		12.46 %	17.26 %
2010	2012	5.90 %	0.00 %	9.00 %	14.90 %	4.90 %		12.60 %	17.50 %
2011 <sup>3</sup>	2013	6.65 %	N/A	9.75 %	16.40 %	6.65 %		12.65 %	19.30 %
2012	2014	7.00 %	N/A	10.10 %	17.10 %	7.00 %		14.00 %	21.00 %
2013	2015	6.80 %	N/A	9.50 %	16.30 %	6.80 %		13.40 %	20.20 %
2014	2016	6.60 %	N/A	9.40 %	16.00 %	6.60 %		13.40 %	20.00 %
2015	2017	6.80 %	N/A	10.70 %	17.50 %	6.80 %		15.00 %	21.80 %
2016	2018	6.70 %	N/A	10.73 %	17.43 %	6.70 %		14.95 %	21.65 %
2017	2019	6.55 %	N/A	10.55 %	17.10 %	6.55 %		15.04 %	21.59 %
2018	2020	6.75 %	N/A	11.66 %	18.41 %	6.75 %		16.27 %	23.02 %
2019	2021	6.75 %	N/A	11.76 %	18.51 %	6.75 %		16.36 %	23.11 %
2020	2022	6.50 %	N/A	12.02 %	18.52 %	6.50 %		17.36 %	23.86 %
2021	2023	6.80 %	N/A	13.23 %	20.03 %	6.80 %		18.10 %	24.90 %

<sup>1</sup> Employer normal cost plus weighted average of unfunded Frozen Initial liability contribution rates.

<sup>2</sup> Act 11 of 1999 was implemented in 2001.

<sup>3</sup> Act 10 and Act 32 were implemented in 2011.





## Schedule of Funding Progress & Accrued Liabilities (\$ Millions)

### Frozen Initial Liability Method

Valuation Date Dec. 31	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Frozen Entry Age (b)	Unfunded AAL (UAAL) (b) - (a)	Funded Ratio (a)/(b)	Covered Payroll* (c)	UAAL as a Percent of Covered Payroll [(b) - (a)] / (c)
2012	\$ 78,613.0	\$ 78,682.7	\$ 69.7	99.9 %	\$ 12,627.6	0.6 %
2013	85,276.1	85,328.7	52.6	99.9 %	12,884.8	0.4 %
2014	89,360.4	89,392.1	31.7	100.0 %	13,219.5	0.2 %
2015	91,502.4	91,526.5	24.1	100.0 %	13,530.5	0.2 %
2016	95,396.2	95,414.0	17.8	100.0 %	13,706.0	0.1 %
2017	100,802.5	100,819.3	16.8	100.0 %	13,943.1	0.1 %
2018	101,410.5	101,422.3	11.8	100.0 %	14,301.4	0.1 %
2019	106,524.4	106,532.4	8.0	100.0 %	14,832.5	0.1 %
2020	114,259.2	114,265.0	5.8	100.0 %	15,359.9	0.0 %
2021	124,665.4	124,671.2	5.8	100.0 %	15,780.8	0.0 %

### Entry Age Method

Valuation Date Dec. 31	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b) - (a)	Funded Ratio (a)/(b)	Covered Payroll* (c)	UAAL as a Percent of Covered Payroll [(b) - (a)] / (c)
2012	\$ 78,613.0	\$ 80,225.3	\$ 1,612.3	98.0 %	\$ 12,627.6	12.8 %
2013	85,276.1	86,055.0	778.9	99.1 %	12,884.8	6.0 %
2014	89,360.4	89,794.0	433.6	99.5 %	13,219.5	3.3 %
2015	91,502.4	92,736.3	1,233.9	98.7 %	13,530.5	9.1 %
2016	95,396.2	96,351.2	955.0	99.0 %	13,706.0	7.0 %
2017	100,802.5	101,321.9	519.4	99.5 %	13,943.1	3.7 %
2018	101,410.5	102,823.3	1,412.8	98.6 %	14,301.4	9.9 %
2019	106,524.4	108,053.7	1,529.3	98.6 %	14,832.5	10.3 %
2020	114,259.2	115,250.3	991.1	99.1 %	15,359.9	6.5 %
2021	124,665.4	125,488.0	822.6	99.3 %	15,780.8	5.2 %

\* As reported by ETF staff. This figure is intended to represent the total pay upon which contributions were based during the year ended on the valuation date and does not necessarily match other figures in this report.

## Funding Metrics (\$ Millions)

### Frozen Initial Liability Method

Valuation Date Dec. 31	Actuarial Value of Assets	F-I-L Accrued Liability for				Percent Funded for			
		Annuitants and Beneficiaries	Member Contribs.	Active & Inactive Members	Total	Annuitants and Beneficiaries	Participant Contributions	Active & Inactive Members	Total
2012	\$78,613.0	\$44,055.5	\$14,401.1	\$20,226.1	\$78,682.7	100.0%	100.0%	99.7%	99.9%
2013	85,276.1	48,460.5	15,559.2	21,309.0	85,328.7	100.0%	100.0%	99.8%	99.9%
2014	89,360.4	51,131.1	16,259.3	22,001.7	89,392.1	100.0%	100.0%	99.9%	100.0%
2015	91,502.4	52,851.8	16,707.2	21,967.5	91,526.5	100.0%	100.0%	99.9%	100.0%
2016	95,396.2	55,764.0	17,361.7	22,288.3	95,414.0	100.0%	100.0%	99.9%	100.0%
2017	100,802.5	59,224.9	18,434.4	23,160.0	100,819.3	100.0%	100.0%	99.9%	100.0%
2018	101,410.5	60,242.9	18,455.6	22,723.9	101,422.3	100.0%	100.0%	99.9%	100.0%
2019	106,524.4	63,657.8	19,487.0	23,387.6	106,532.4	100.0%	100.0%	100.0%	100.0%
2020	114,259.2	68,759.8	20,884.4	24,620.8	114,265.0	100.0%	100.0%	100.0%	100.0%
2021	124,665.4	75,528.7	22,737.5	26,405.0	124,671.2	100.0%	100.0%	100.0%	100.0%

### Entry Age Method

Valuation Date Dec. 31	Actuarial Value of Assets	Entry Age Accrued Liability for				Percent Funded for			
		Annuitants and Beneficiaries	Member Contribs.	Active & Inactive Members	Total	Annuitants and Beneficiaries	Participant Contributions	Active & Inactive Members	Total
2012	\$78,613.0	\$44,055.5	\$14,401.1	\$21,768.7	\$80,225.3	100.0%	100.0%	92.6%	98.0%
2013	85,276.1	48,460.5	15,559.2	22,035.3	86,055.0	100.0%	100.0%	96.5%	99.1%
2014	89,360.4	51,131.1	16,259.3	22,403.6	89,794.0	100.0%	100.0%	98.1%	99.5%
2015	91,502.4	52,851.8	16,707.2	23,177.3	92,736.3	100.0%	100.0%	94.7%	98.7%
2016	95,396.2	55,764.0	17,361.7	23,225.5	96,351.2	100.0%	100.0%	95.9%	99.0%
2017	100,802.5	59,224.9	18,434.4	23,662.6	101,321.9	100.0%	100.0%	97.8%	99.5%
2018	101,410.5	60,242.9	18,455.6	24,124.8	102,823.3	100.0%	100.0%	94.1%	98.6%
2019	106,524.4	63,657.8	19,487.0	24,908.9	108,053.7	100.0%	100.0%	93.9%	98.6%
2020	114,259.2	68,759.8	20,884.4	25,606.1	115,250.3	100.0%	100.0%	96.1%	99.1%
2021	124,665.4	75,528.7	22,737.5	27,221.8	125,488.0	100.0%	100.0%	97.0%	99.3%



## Discussion of Risk/Maturity Measures

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. GRS investigates gains or losses due to economic and demographic experience explicitly as they arise each year in this Annual Actuarial Valuation and Gain/Loss Analysis Report. The results of each valuation report then serves as the underlying basis for the three-year experience study, which investigates and adjusts assumptions so that future gains and losses are minimized. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; 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. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. **Investment Risk** – actual investment returns may differ from the expected returns;
2. **Asset/Liability Mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements; because of the way most public retirement systems invest, this tends to be synonymous with investment risk;
3. **Contribution Risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. **Salary and Payroll Risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. **Longevity Risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. **Other Demographic Risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise, if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The contribution rates shown on page A-1 and A-2 may be considered as minimum contribution rates that comply with the Board's funding policy and statutes. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.



# Discussion of Risk/Maturity Measures

## PLAN MATURITY MEASURES

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following: ratio of the market value of assets to total payroll, ratio of actuarial accrued liability to payroll, ratio of actives to retirees and beneficiaries, and the ratio of net cash flow to market value of assets.

### RATIO OF MARKET VALUE OF ASSETS TO PAYROLL

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll. In the WRS, this volatility is mitigated by the extensive risk sharing features that are present in the plan.

### RATIO OF ACTUARIAL ACCRUED LIABILITY TO PAYROLL

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. In the WRS, this volatility is mitigated by the extensive risk sharing features that are present in the plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time. The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

### RATIO OF ACTIVES TO RETIREES AND BENEFICIARIES

A young plan with many active members and few retirees will have a high ratio of actives to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

### RATIO OF NET CASH FLOW TO MARKET VALUE OF ASSETS

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

## ADDITIONAL RISK ASSESSMENT

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability. Additional assessment of risk including stress testing for the Wisconsin Retirement System was conducted in the fall of 2019 in conjunction with the State of Wisconsin Investment Board and a separate study commissioned in the fall of 2020 by the Department of Employee Trust Funds.



## Risk/Maturity Measures

\$ Millions									
Valuation Date	(1) Entry Age Accrued Liabilities (AAL)	(2) Market Value of Assets	(3) (Overfunded)/ Unfunded AAL (1) - (2)	(4) Valuation Payroll	(5) Change in Valuation Payroll	(6) Funded Ratio (2)/(1)	(7) Annuitant Liabilities (AnnLiab)	(8) AnnLiab/ AAL (7)/(1)	(9) AAL/ Valuation Payroll (1)/(4)
2017	\$101,321.9	\$104,159.6	\$(2,837.7)	\$13,720.5	1.7%	102.8%	\$59,224.9	58.5%	738.5%
2018	102,823.3	96,734.3	6,089.0	14,041.3	2.3%	94.1%	60,242.9	58.6%	732.3%
2019	108,053.7	112,098.6	(4,044.9)	14,583.7	3.9%	103.7%	63,657.8	58.9%	740.9%
2020	115,250.3	124,966.8	(9,716.5)	15,065.6	3.3%	108.4%	68,759.8	59.7%	765.0%
2021	125,488.0	141,847.8	(16,359.8)	15,410.0	2.3%	113.0%	75,528.7	60.2%	814.3%

*These Risk Measures were based on assumptions in place on the valuation date. For the current valuation, this includes 6.8% future investment return, Entry Age Normal accrued liabilities and Market Value of Assets.*

*The Risk/Maturity measures shown on this page and on the following page have been developed in response to Actuarial Standard of Practice ("ASOP") No. 51 entitled "Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions." In a maturing plan, the ratio of retiree liabilities to total liabilities increases, and the ratios of both assets and liabilities to payroll increases, and contribution rates tend to become increasingly volatile. The risk/maturity measures and associated commentary are intended to help keep stakeholders informed of some of the risks that the plan faces, and the potential contribution rate volatility. In the WRS, however, contribution volatility is mitigated by the extensive risk sharing features of the plan, including the dividend process, the Money Purchase Effect, the sharing of contribution rate changes, etc. Thus, these measures, while interesting, have somewhat less meaning for the WRS than they do for most systems.*

### Notes:

The measures shown above provide information in accordance with Actuarial Standard of Practice No. 51.

Columns (1) to (4). These columns provide various items for comparison in Columns 5 through 16.

Column (5). When payroll grows at or faster than the assumed rate of 3.0%, funding of unfunded accrued liabilities is likely to proceed at least at the scheduled rate. Payroll growing slower than the assumed rate can lead to underfunding of the plan because expected contributions for unfunded liability may not be received.

Column (6). The Funded ratio is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.

Columns (7) and (8). The ratio of Annuitant liabilities to total accrued liabilities gives an indication of the maturity of the system. As the ratio increases, cash flow needs increase, and the investment policy may need to change. A ratio on the order of 50% indicates a maturing system. Ratios near or above 50% are common today.

Column (9). The ratio of liabilities to payroll gives an indication of both maturity and volatility. Many systems have ratios between 500% and 700%. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of payroll. In the WRS, this potential difficulty is mitigated by the many risk sharing features inherent in the plan design since liabilities are impacted by the dividend process and the impact on money purchase benefits.

## Risk/Maturity Measures (Concluded)

\$ Millions								
Valuation Date	(10) Assets/ Payroll (2)/(4)	(11) Core Trust Fund Portfolio StdDev	(12) Std Dev % of Pay (10)x(11)	(13) Unfunded/ Payroll (3)/(4)	(14) Net External Cash Flow (NECF)	(15) NECF/ Assets (14)/(2)	(16) Core Trust Fund NOF Return	(17) Ratio of Actives to Retirees
2017	759.2%	12.0%	91.1%	-	\$(3,055.1)	-2.9%	15.8%	1.26
2018	688.9%	11.8%	81.3%	43.4%	(3,282.2)	-3.4%	-3.6%	1.18
2019	768.7%	11.8%	90.7%	-	(3,481.2)	-3.1%	16.8%	1.19
2020	829.5%	11.8%	97.9%	-	(3,484.9)	-2.8%	15.0%	1.16
2021	920.5%	11.8%	108.6%	-	(3,854.1)	-2.7%	16.9%	1.13

**Notes:**

Column (10). The ratio of assets to payroll gives an indication of both maturity and volatility. Many systems have ratios between 500% and 700%. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of payroll. In the WRS, this potential difficulty is mitigated by the many risk sharing features inherent in the plan design.

Columns (11) and(12). The portfolio standard deviation measures the volatility of investment return. When multiplied by the ratio of assets to payroll it gives the effect of a one standard deviation asset move as a percent of payroll. This figure helps users understand the difficulty of dealing with investment volatility and the challenges volatility brings to sustainability. In the WRS, the potential threat to sustainability is mitigated by the many risk sharing features inherent in the plan design. The portfolio standard deviation represents the standard deviation of the Core Trust Fund.

Column (13). The ratio of unfunded liability to payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A ratio above approximately 300% or 400% may indicate difficulty in discharging the unfunded liability within a reasonable time frame.

Columns (14) and (15). The ratio of Net External Cash Flow to assets is an important measure of sustainability. Negative ratios are common and expected for a maturing system. In the longer term, this ratio should be on the order of approximately -4%. A ratio that is significantly more negative than that for an extended period could be a leading indicator of potential exhaustion of assets.

Column (16). Investment return is probably the largest single risk that most systems face. The year by year return gives an indicator of the performance of the portfolio versus the system's assumed return.

Column (17). In the 1970's and 1980's it was common for the ratio of actives to retirees to be 3 or 4 to 1. As plans mature, this ratio can drop significantly. Ratios below 2 are common today. A ratio significantly below 1 usually indicates a closed plan, a shrinking workforce or other special situation.

## Employer Contributions Required and Contributions Made

Year Ended December 31	Annual Required Contribution (\$ millions)	Percent Contributed*
2012	\$ 826.1	100.0%
2013	912.4	100.0%
2014	977.1	100.0%
2015	966.5	100.0%
2016	954.2	100.0%
2017	1,014.9	100.0%
2018	1,028.4	100.0%
2019	1,045.0	100.0%
2020	1,131.5	100.0%
2021	1,162.8	100.0%

\* Includes additional UAAL payments when amount is greater than 100%.

**SECTION C**

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**FUND ASSETS**



## Total Valuation Assets (Reserves)

	Valuation Assets at December 31	
	2021	2020
Non Retired		
Participant Statutory		
Core	\$ 19,875,869,565	\$ 18,370,790,487
Variable	2,593,403,602	2,279,305,344
Total Statutory	22,469,273,167	20,650,095,831
Additional*	268,165,692	234,282,851
Total Participant Employer	22,737,438,859	20,884,378,682
Core	23,805,813,383	22,335,663,804
Variable	2,593,403,602	2,279,305,344
Total Employer	26,399,216,985	24,614,969,148
<b>Total Non Retired</b>	<b>49,136,655,844</b>	<b>45,499,347,830</b>
Retired Assets		
Core	69,910,653,744	63,805,846,296
Variable	5,617,979,671	4,954,007,486
<b>Total Retired Assets</b>	<b>75,528,633,415</b>	<b>68,759,853,782</b>
<b>Total Assets used in Valuation</b>	<b>124,665,289,259</b>	<b>114,259,201,612</b>

	Valuation Assets at December 31	
	2021	2020
Core Assets	\$ 113,841,176,183	\$ 104,729,606,191
Variable Assets	10,824,113,076	9,529,595,421
<b>Total Assets</b>	<b>124,665,289,259</b>	<b>114,259,201,612</b>

\* Includes employer, employee, and tax deferred additional contributions.

## Reserves for Non-Retired Participants Balances by Valuation Group

	Reserve for Year Ended			
	December 31, 2021			December 31, 2020
	Participant (Statutory)	Employer	Total *	Total
General, Executives & Elected	\$20,759,078,177	\$22,112,455,737	\$42,871,533,914	\$39,623,620,111
Protective with Soc. Sec.	1,473,391,244	3,403,853,161	4,877,244,405	4,587,676,686
Protective w/o Soc. Sec.	236,803,746	882,908,087	1,119,711,833	1,053,768,182
<b>Total</b>	<b>\$22,469,273,167</b>	<b>\$26,399,216,985</b>	<b>\$48,868,490,152</b>	<b>\$45,265,064,979</b>

\* Totals differ slightly from page C-1 due to rounding and additional contributions.

The above schedule shows the distribution of Participant and Employer reserves among the valuation groups according to WRS accounting records. This separation of assets is needed because the valuation groups are separately experience rated. The assets are pooled for investment purposes.

## Development of Participant and Employer Reserves During the Year

	Participant Accumulation			Employer Accumulation			Grand Total
	Core	Variable	Total	Core	Variable	Total	
Ending Balance December 31, 2020	\$18,370,790,487	\$2,279,305,344	\$20,650,095,831	\$22,335,663,804	\$2,279,305,344	\$24,614,969,148	\$45,265,064,979
Closing Adjustments	1,496,139	2,790	1,498,929	2,229,636	2,790	2,232,426	3,731,355
Beginning Balance January 1, 2021	18,372,286,626	2,279,308,134	20,651,594,760	22,337,893,440	2,279,308,134	24,617,201,574	45,268,796,334
<b>Revenues:</b>							
Employer Contributions	-	-	-	1,075,549,399	88,508,468	1,164,057,867	1,164,057,867
Participant Contributions	980,463,083	88,893,599	1,069,356,682	-	-	-	1,069,356,682
Total Revenues	980,463,083	88,893,599	1,069,356,682	1,075,549,399	88,508,468	1,164,057,867	2,233,414,549
<b>Expenditures</b>							
Separations	40,061,410	1,918,014	41,979,424	-	-	-	41,979,424
Retirement Single Sums	34,652,611	1,298,774	35,951,385	34,452,812	1,298,774	35,751,586	71,702,971
Death Benefits	19,609,813	2,072,752	21,682,565	11,818,411	1,438,175	13,256,586	34,939,151
Disability Benefits	-	-	-	3,453	-	3,453	3,453
Total Expenditures	94,323,834	5,289,540	99,613,374	46,274,676	2,736,949	49,011,625	148,624,999
<b>Transfers:</b>							
Earnings Allocation	2,176,004,086	420,299,555	2,596,303,641	2,812,963,522	410,428,013	3,223,391,535	5,819,695,176
Annuities Awarded	(1,613,358,594)	(133,756,832)	(1,747,115,426)	(2,401,282,212)	(151,288,753)	(2,552,570,965)	(4,299,686,391)
Intra-Fund Transfers	(1,221,047)	(32,069)	(1,253,116)	(3,874,498)	23,097	(3,851,401)	(5,104,517)
Inter-Fund Transfers	56,019,245	(56,019,245)	-	55,887,108	(55,887,108)	-	-
Variable Equalization Transfer	-	-	-	(25,048,700)	25,048,700	-	-
Net Transfers	617,443,690	230,491,409	847,935,099	438,645,220	228,323,949	666,969,169	1,514,904,268
<b>Ending December 31, 2021</b>	<b>\$19,875,869,565</b>	<b>\$2,593,403,602</b>	<b>\$22,469,273,167</b>	<b>\$23,805,813,383</b>	<b>\$2,593,403,602</b>	<b>\$26,399,216,985</b>	<b>\$48,868,490,152</b>
Internal Rate of Return	12.1%	18.9%	12.8%	13.0%	18.4%	13.5%	13.2%

This page does not include additional contributions.



## Development of Retiree Reserves During the Year

	<b>Core</b>	<b>Variable</b>	<b>Total</b>
Balance December 31, 2020	\$ 63,805,846,296	\$ 4,954,007,486	\$ 68,759,853,782
Closing Adjustments	2,337,439	(1,776,303)	561,136
Variable Terminations	65,660,552	(65,660,552)	-
Beginning Balance	63,873,844,287	4,886,570,631	68,760,414,918
Additions			-
Reserve transfers	\$ 4,028,312,237	\$ 285,629,391	\$ 4,313,941,628
Earnings	7,759,852,709	936,329,945	8,696,182,654
Other	-	-	-
Total Additions	11,788,164,946	1,221,959,336	13,010,124,282
Subtractions			-
Annuities and Lump Sums	\$ 5,750,764,586	\$ 490,550,296	\$ 6,241,314,882
Credit reestablishments	590,903	-	590,903
Other	-	-	-
Total Subtractions	5,751,355,489	490,550,296	6,241,905,785
Ending Balance December 31, 2021	\$ 69,910,653,744	\$ 5,617,979,671	\$ 75,528,633,415

## Statement of Net Plan Assets (\$ Thousands) (Market Value)

	2021	2020
<b>Assets</b>		
Cash and Cash Equivalents	\$ 6,816,816	\$ 6,401,203
Securities Lending Collateral	396,434	810,685
Prepaid Expenses	19,752	14,284
<b>Total Short Term Assets</b>	<b>7,233,002</b>	<b>7,226,172</b>
<b>Receivables</b>		
Contributions	230,826	221,908
Prior Service Contributions	5,789	6,909
Benefits Overpayment	2,095	2,185
Due from Other Trust Funds	1,541	2,811
Miscellaneous	102	(462)
Securities Lending	3,344	2,865
Interest and Dividends	450,913	387,889
Investment Sales	10,869,737	11,232,245
<b>Total Receivables</b>	<b>11,564,347</b>	<b>11,856,350</b>
<b>Investments at Fair Value</b>		
Fixed Income	48,219,267	42,352,502
Financial Futures Contracts	76,789	32,221
Preferred Securities	703,312	607,671
Convertible Securities	2,153	1,156
Stocks	83,778,809	72,347,226
Options	(1,946)	(8,402)
Limited Partnerships	26,573,553	16,889,530
Real Estate	0	1,379,939
Foreign Currency Contracts	3,794	15,131
Multi Asset Investments	6,227,923	5,967,126
Swaps	25,690	107,239
To Be Announced Securities	2,899,255	(652,174)
<b>Total Investments</b>	<b>168,508,599</b>	<b>139,039,165</b>
<b>Capital Assets</b>	<b>4,865</b>	<b>2,671</b>
<b>Total Assets</b>	<b>187,310,813</b>	<b>158,124,359</b>
<b>Liabilities</b>		
Core Investment Due Other Programs	4,957,050	4,407,220
Variable Investment Due Other Programs	19,611	22,115
Obligation Under Reverse Repo Agreement	17,012,077	10,658,824
Short Sell Obligations	8,050,666	6,479,968
Securities Lending Collateral Liability	1,157,434	810,685
Collateral Due to Counterparty	125,917	199,498
Benefits Payable	455,788	421,435
Unearned Revenue	11	14
Due to Other Trust Funds	4,926	9,624
Miscellaneous Payables	146,575	136,651
Investment Payables	13,532,952	10,011,503
<b>Total Liabilities</b>	<b>45,463,007</b>	<b>33,157,537</b>
<b>Net Assets in Trust for Pension Benefits</b>	<b>\$141,847,806</b>	<b>\$124,966,822</b>



## Statement of Changes in Assets (\$ Thousands) (Market Value)

	Activity During Year	
	2021	2020
Additions:		
Contributions:		
Employer Contributions	\$ 1,164,586	\$ 1,133,316
Employee Contributions	1,086,782	1,053,243
Total Contributions	2,251,368	2,186,559
Investment Income:		
Net Appreciation (Depreciation) in Fair Value of Investments	19,625,644	15,892,746
Interest and Dividends	2,564,884	2,106,774
Securities Lending Income	47,080	33,499
Other	0	0
Less		
Current Income Distributed	(742,564)	(594,709)
SWIB Investment Expense	(435,466)	(741,562)
Investment Income Distributed to Securities Lending Rebates and Fees	(3,282)	1,791
Net Investment Income	21,056,296	16,698,539
Interest on Prior Service Receivable	366	381
Miscellaneous Income	118	64
Total Additions	23,308,148	18,885,543
Deductions:		
Benefits and Refunds:		
Retirement, Disability, and Beneficiary	6,352,709	5,939,366
Separation Benefits	42,042	38,857
Total Benefits and Refunds	6,394,751	5,978,223
ETF Administrative Expenses	31,625	32,844
Other Expenses	361	412
Total Deductions	6,426,737	6,011,479
Net Increase (Decrease)	16,881,411	12,874,064
Net Assets Held in Trust:		
Beginning of Year*	\$124,966,394	\$112,092,758
<b>End of Year</b>	<b>\$141,847,806</b>	<b>\$124,966,822</b>

\* Report uses preliminary financial statements due to timing of valuation. Any change between the prior year ending balance and the current year beginning balance reflects differences between preliminary and final financial statements.

The figures on this page do not always reconcile exactly to the amounts used in the valuation.



## Core Investment Trust: Market Recognition Account

	For the Year Ended December 31						
	2019	2020	2021	2022	2023	2024	2025
Beginning of year							
a. Funding value	\$98,081,742,712	\$101,741,893,719	\$108,808,559,030	\$118,321,158,397	\$122,744,859,075	\$129,217,301,571	\$133,485,649,937
b. Market value	93,165,775,399	107,454,203,938	119,878,132,107	135,980,640,291	135,980,640,291	135,980,640,291	135,980,640,291
End of year							
c. Market value	107,454,203,938	119,878,132,107	135,980,640,291				
d. Non-investment cash flow (contributions minus benefits)	(3,476,100,580)	(3,444,245,848)	(3,854,147,553)				
e. Investment income							
e1. Total investment income	17,764,529,119	15,868,174,017	19,956,655,737				
e2. Assumed rate	7.0%	7.0%	7.0%				
e3. Amount for immediate recognition	6,744,058,470	7,001,383,956	7,481,703,968	-	-	-	-
e4. Amount for phased-in recognition: e1-e3	11,020,470,649	8,866,790,061	12,474,951,769	-	-	-	-
f. Phased-in recognition of investment income							
f1. Current year: 0.2 x e4	2,204,094,130	1,773,358,012	2,494,990,354	-	-	-	-
f2. First prior year	(2,048,741,818)	2,204,094,130	1,773,358,012	2,494,990,354	-	-	-
f3. Second prior year	1,461,342,274	(2,048,741,818)	2,204,094,130	1,773,358,012	2,494,990,354	-	-
f4. Third prior year	119,474,605	1,461,342,274	(2,048,741,818)	2,204,094,130	1,773,358,012	2,494,990,354	-
f5. Fourth prior year	(1,343,976,073)	119,474,605	1,461,342,274	(2,048,741,818)	2,204,094,130	1,773,358,012	2,494,990,354
f6. Total MRA recognition	392,193,118	3,509,527,203	5,885,042,952	4,423,700,678	6,472,442,496	4,268,348,366	2,494,990,354
f7. Amount for MRA recognition	-	-	-	-	-	-	-
f8. Total recognized gain (loss)	392,193,118	3,509,527,203	5,885,042,952	4,423,700,678	6,472,442,496	4,268,348,366	2,494,990,354
g. Total recognized investment income: e3 + f8	7,136,251,587	10,510,911,159	13,366,746,920	4,423,700,678	6,472,442,496	4,268,348,366	2,494,990,354
h. Funding value end of year: a + d + e3 + f8	101,741,893,719	108,808,559,030	118,321,158,397	122,744,859,075	129,217,301,571	133,485,649,937	135,980,640,291
i. Difference between market and funding values	5,712,310,218	11,069,573,077	17,659,481,894	13,235,781,216	6,763,338,720	2,494,990,354	-
j. Recognized rate of return: g / (a + 0.5 * d)	7.4%	10.5%	12.5%				
k. Market rate of return (net of fee): e1 / (b + 0.5 * d)	19.4%	15.0%	16.9%				

The Core Investment Trust includes all WRS core assets, as well as the assets of certain other programs. The Market Recognition Account is a statutory method applicable to all assets invested in the Core Trust. Considerable additional information would be required to reconcile these figures to other asset figures in this report. Note that the market rate of return is calculated by GRS and may differ from rates of return calculated by SWIB and ETF.



## SECTION D

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**GAIN/LOSS**



## Active Member Gain/Loss Analysis

**Purpose of Gain/Loss Analysis.** Regular actuarial valuations provide information about the composite change in computed contribution rates and total liabilities -- whether or not the rates and related liabilities are increasing or decreasing, and by how much. However, valuations do not show the portion of the change attributable to each risk area within the Wisconsin Retirement System financial mechanism: the rate of recognized investment income on plan assets; the rates of withdrawal of active participants who leave covered employment; the rates of mortality; the rates of disability; the rates of salary increases; and the assumed ages at actual retirement. In an actuarial valuation, assumptions are made as to what these rates will be for the next year and for decades in the future.

Assumptions should be carefully chosen and continually monitored. A poor initial choice of assumptions or continued use of outdated assumptions can lead to understated costs resulting in either an inability to pay benefits when due, or sharp increases in required contributions at some point in the future or overstated costs resulting in either benefit levels that are kept below the level that could be supported by the computed rate or an unnecessarily large burden on the current generation of participants, employers and taxpayers. The actuarial assumptions for the Wisconsin Retirement System are reviewed and updated as necessary every three years in an experience study. This triennial review is intended to manage the potential for future gains and losses.

***The objective of a gain and loss analysis is to determine the portion of the change that is attributable to each risk area.***

The fact that actual experience differs from assumed experience should be expected. The future cannot be predicted with complete precision. Further, year-to-year statistical fluctuations occur, even in very large groups. This year's report reflects just a single year's experience. Changes in the valuation assumed experience for a risk area should be made only when the differences between assumed and actual experience have been observed to be sizable and persistent. One year's gain and loss analysis may or may not be indicative of ***long-term trends, which are the basis of actuarial assumptions.*** However, a persistent series of gains and losses can indicate a need for an assumption change or a method change, even if on a demographic basis, the assumptions appear to model reality well. In the Wisconsin Retirement System, longer term trends are reviewed in connection with the regular three-year investigation of experience (the most recent three-year investigation covered the period January 1, 2018 to December 31, 2020). It is the results of the three-year investigation that lead to recommendations for changes in the actuarial assumptions.

### Overall Experience

Overall experience resulted in a net actuarial gain of \$1,171 million for the 2021 calendar year. The development of this figure is shown on the following page. Investment and pay gains were partially offset by losses from demographic and other experience.



## Development of Total Actuarial Gain (Loss) Calendar Year December 31, 2021 (\$ Millions)

	Year Ended December 31, 2021				
	General	Executive & Elected	Protective		Total
			With S.S.	Without S.S.	
(1) Entry Age UAAL at start of year	\$ 381.0	\$ 105.4	\$ 445.3	\$ 59.4	\$ 991.1
(2) Entry Age Normal cost from last valuation	1,772.0	14.6	240.8	52.8	2,080.2
(3) Actual contributions	1,890.4	16.8	268.7	57.6	2,233.5
(4) Interest	22.5	7.3	30.2	4.0	64.0
(5) Expected UAAL before changes: (1) + (2) - (3) + (4)	285.1	110.5	447.6	58.6	901.8
(6) Change in actuarial assumptions	745.3	9.5	280.3	57.1	1,092.2
(7) Other changes	0.0	0.0	0.0	0.0	0.0
(8) Expected UAAL after changes: (5) + (6) + (7)	1,030.4	120.0	727.9	115.7	1,994.0
(9) Actual Entry Age UAAL at end of year	125.4	131.6	486.0	79.6	822.6
<b>(10) Gain (loss): (8) - (9)</b>	<b>\$ 905.0</b>	<b>\$ (11.6)</b>	<b>\$ 241.9</b>	<b>\$ 36.1</b>	<b>\$ 1,171.4</b>

The gain/loss analysis is intended to explain the financial effect of differences between actual and assumed experience in basic risk areas: investment income, pay increases, retirement rates, turnover rates, etc. In order for the gain/loss analysis to proceed, the change in the Entry Age Unfunded Actuarial Accrued Liabilities from one year to the next is analyzed to remove the effect of expected changes. The table above develops this year's gain or loss (line 10) which is subtracted from the Experience Amortization Reserve (EAR). When the EAR decreases "unexpectedly," this is favorable experience and downward pressure is exerted on contribution rates. Similarly, an unexpected increase in the EAR is unfavorable experience and upward pressure is exerted on contribution rates.

By measuring gains and losses each year and, to the extent possible, determining the "responsible" assumptions, insight is gained into how well the actuarial assumptions estimate WRS liabilities. Such information aids in understanding financial effects of emerging trends and is particularly useful during preparation of the WRS experience study.



## Population Development During Calendar Year 2021

	General	Executive & Elected	Protective		Total	Expected
			With S.S.	Without S.S.		
<b>Beginning Census</b>	234,628	1,280	19,676	2,754	258,338	
(-) Normal Retirement	3,870	67	569	94	4,600	4,911
(-) Reduced Retirement	3,525	18	151	9	3,703	4,145
(-) Death	125	1	3	0	129	279
(-) Disability Retirement						
-Total disabilities approved	219	0	19	5	243	158
-Less pending at beginning of year	73	0	8	3	84	
-Net new from active status	146	0	11	2	159	
(-) Other Separations	16,392	62	1,137	55	17,646	13,724
(-) Transfers Out	1,720	26	251	17	2,014	
(+) Transfers In	1,610	81	281	42	2,014	
(+) New Entrants	24,034	65	1,340	143	25,582	
<b>Ending Census</b>	234,494	1,252	19,175	2,762	257,683	

This schedule reconciles the active member populations reported in connection with the December 31, 2021 and the prior year valuations. Assumptions related to population development are a primary focus of the gain/loss analysis. They generally tend to be more stable than economic assumptions, and therefore, measurements have more meaning. Please note also that the table above represents changes in actual and expected counts of members. Beginning with the 2009 valuations, some of the actuarial assumptions (retirement, turnover, etc.) are based on liability weighted rates. Therefore, comparing actual to expected number counts alone may not form the basis for our conclusions.

Transfers for the General group include transfer between subgroups (teachers, university, general employees, etc.). Please note that the number of new retirees shown in the table above may include a small cohort of retirees (primarily members retiring during the end of December) that were not included in the Retired Lives Valuation. This is due to the lag in reporting dates and they will be included in the following year Retired Lives Valuation.

# Gain (Loss) Overview

## Population Results

**Normal Retirements** varied by group and gender. Overall normal retirements were less than expected. In general, fewer normal retirements than assumed often creates a gain. However, looking at counts alone is not always an accurate predictor of whether a gain or loss occurs. If there are fewer retirements in shorter service, lower paid groups and more retirements than expected in longer service, higher paid groups, there will be a net loss to the System even if the actual total counts might be equal to or less than expected. In order to account for this, retirement rates are now developed partially on a liability weighted methodology. The net result for this past year was a small loss.

**Reduced Retirements** were less than expected, overall producing a small loss.

**Disabilities** were close to expected and overall produced a small gain.

**Deaths** among active participants were less than expected. The net result for the past year was a small loss.

**Other Separations** varied by group, gender, and service but were overall higher than expected. The net result for the past year was a small gain.

**In total**, the population risk areas (retirement, death, disability, and other separations) varied by decrement, producing a net loss during 2021.

## Economic Results

On a market recognition account basis net of fee **investment return** was 12.5% and investment activity produced a gain for all groups due to the combined effect of this year's gain and the continued recognition of prior gains and losses. The total recognized investment gain of \$2,729 million was partially offset by a \$1,599 million increase in the combined value of variable excess benefits and money purchase benefits (as shown on page D-7), resulting in a net recognized investment gain of about \$1,129 million.

**Pay Increases** were overall lower than expected, producing a gain.



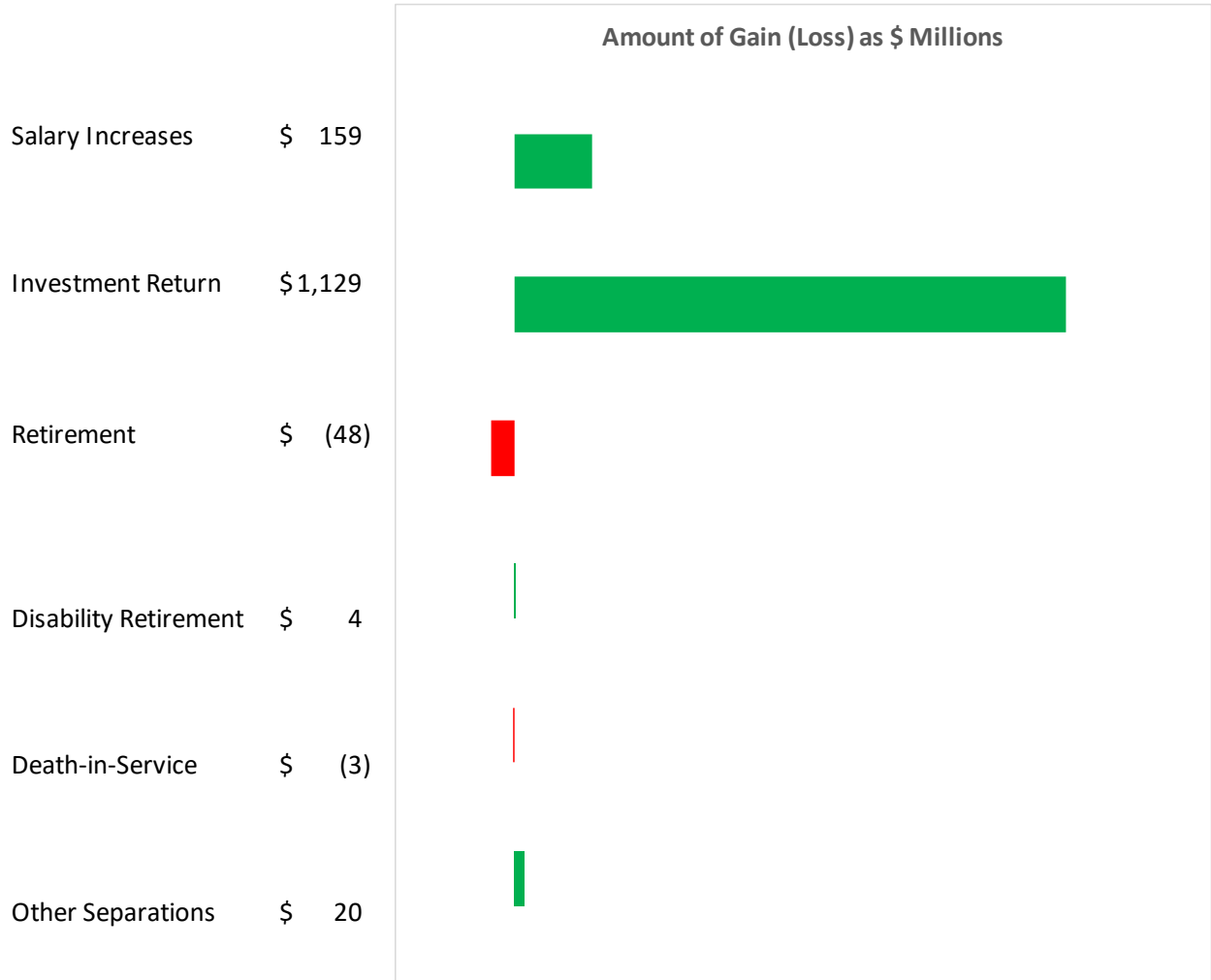
## Gain (Loss) Detail (\$ Millions)

Type of Activity	General	Executive & Elected	Protective		Total	Prior Year
			With S.S.	Without S.S.		
<b>Decrement Risk Areas</b>						
Normal Retirement	\$ (3.9)	\$ (0.4)	\$ (19.2)	\$ (3.9)	\$ (27.4)	\$ (33.5)
Reduced Retirement	(21.1)	0.2	(0.2)	0.2	(20.9)	(22.7)
Disability Retirement	3.7	0.0	0.1	0.4	4.2	(10.5)
Death with Benefit	(2.4)	0.0	(0.4)	(0.2)	(3.0)	(1.7)
Other Separations	13.3	(0.4)	6.6	0.6	20.1	(40.4)
<b>Economic Risk Areas</b>						
Salary Increases	89.1	2.9	65.8	1.5	159.3	(439.1)
Investment Return	899.8	1.4	187.9	40.2	1,129.3	1,198.7
<b>Other Activity</b>	(73.5)	(15.3)	1.3	(2.7)	(90.2)	(149.0)
<b>Total Gain (Loss)</b>	<b>\$ 905.0</b>	<b>\$ (11.6)</b>	<b>\$ 241.9</b>	<b>\$ 36.1</b>	<b>\$ 1,171.4</b>	<b>\$ 501.8</b>
<b>-% of Accrued Liability</b>	<b>2.1%</b>	<b>(7.1)%</b>	<b>5.0%</b>	<b>3.2%</b>	<b>2.4%</b>	<b>1.1%</b>

Page D-8 presents a partial explanation of the other activity shown in this schedule.



# Gain/Loss Analysis 2021 Experience Divisions Combined



## Gain (Loss) from Investment Income During Calendar Year 2021 (\$ Millions)

	General	Executive & Elected	Protective		Total
			With SS	Without SS	
(1) Beginning of Year Active Participant Assets					
(a) Participant Accumulation Reserve	\$18,959.5	\$ 21.6	\$1,427.8	\$241.2	\$20,650.1
(b) PAR Closing Adjustment	1.4	0.0	0.1	0.0	1.5
(c) Employer Accumulation Reserve	20,485.7	156.6	3,159.8	813.0	24,615.1
(d) EAR Closing Adjustment	1.8	0.0	0.3	0.1	2.2
(e) Total	39,448.4	178.2	4,588.0	1,054.3	45,268.9
(2) End of Year Active Participant Assets					
(a) Participant Accumulation Reserve	20,749.4	9.6	1,473.4	236.8	22,469.2
(b) Employer Accumulation Reserve	21,959.4	153.0	3,403.9	882.9	26,399.2
(c) Total	42,708.8	162.6	4,877.3	1,119.7	48,868.4
(3) Investment Earnings Credited					
(a) Participant Accumulation Reserve	2,386.3	1.4	178.5	30.2	2,596.4
(b) Employer Accumulation Reserve	2,687.3	19.7	410.9	105.4	3,223.3
(c) Total	5,073.6	21.1	589.4	135.6	5,819.7
(4) Average Balance: $.5 \times \{(1e)+(2c)-(3c)\}$	38,541.8	159.9	4,438.0	1,019.2	44,158.9
(5) Expected Earnings: $.070 \times (4)$	2,697.9	11.2	310.7	71.3	3,091.1
(6) Gain (Loss) for Year from Investment Experience: $(3c)-(5)$	2,375.7	9.9	278.7	64.3	2,728.6
(7) Portion applied to Change in Variable Excess Reserve and Money Purchase Minimum Benefit	1,475.9	8.5	90.8	24.1	1,599.3
<b>(8) Remaining Gain (Loss): (6)-(7)</b>	<b>\$ 899.8</b>	<b>\$ 1.4</b>	<b>\$ 187.9</b>	<b>\$ 40.2</b>	<b>\$ 1,129.3</b>

## Analysis of “Other” Activity (\$ Millions)

“Other” activity refers to gain or loss activity that is not directly related to the main actuarial assumptions. Other activity this year resulted in a loss of \$90.2 million as shown on page D-5. The schedule below analyzes this activity. The **Reserve Difference** produced a loss of about \$35 million. There are two identifiable sources for this loss. The first relates to cases where the service credit or final average salary at retirement differed from what was expected based upon the prior valuation. The second relates to final computations of annuities that were originally based on estimates. The **Re-established Liability** represents the liability for new or rehired active members who were not active in the prior year. Typically, it is expected that a new hire will have very little liability. However, often new members appear with more than one year of service or with liability greater than contributions made on their behalf. Although this amount is difficult to determine accurately due to the timing of contribution amounts, we estimate the Re-established Liability loss at about \$72 million.

	General	Executive & Elected	Protective		Total
			With S.S.	Without S.S.	
Expected Reserve Transfers					
Normal Retirement	\$1,939	\$37	\$ 426	\$109	\$2,511
Reduced Retirement	1,177	3	98	8	1,286
Death	17	0	0	0	17
Disability Retirement	47	0	5	1	53
Deferred Retirement	360	4	38	10	412
Expected Total Reserve Transfers	3,540	44	567	128	4,279
Actual Reserve Transfer (From Retiree Report)	3,581	53	555	125	4,314
<b>Reserve Difference</b>	(41)	(9)	12	3	(35)
Expected Refunds	79	0	6	0	85
Actual Refunds	39	0	3	0	42
<b>Refund Difference</b>	40	0	3	0	43
<b>Re-established Liability</b>	(61)	(1)	(8)	(2)	(72)
Total Explained Difference	(62)	(10)	7	1	(64)
Unknown Difference	(11)	(5)	(5)	(4)	(26)
Total Other Activity	(73)	(15)	2	(3)	(90)
Other Activity as % of Liabilities	(0.17)%	(9.22)%	0.04 %	(0.27)%	(0.18)%





## Comparative Schedule of Experience 5-Year History of Gains and Losses (\$ Millions)

Year	Retmt.	Disability Retmt.	Other Separations*	Salary Increases	Investment Return	Other	Total
<b>GENERAL</b>							
2017	\$ (19.0)	\$ 14.3	\$ 34.1	\$ 114.0	\$ 287.8	\$ (91.8)	\$ 339.4
2018	(21.5)	(7.7)	(13.8)	322.0	(583.3)	(80.2)	(384.5)
2019	(11.6)	(3.3)	(17.2)	(32.6)	117.7	(111.4)	(58.4)
2020	(35.1)	(6.5)	(34.4)	(264.0)	1,012.9	(113.3)	559.6
<b>2021</b>	<b>(25.0)</b>	<b>3.7</b>	<b>10.9</b>	<b>89.1</b>	<b>899.8</b>	<b>(73.5)</b>	<b>905.0</b>
<b>EXECUTIVE &amp; ELECTED</b>							
2017	\$ (2.5)	\$ 0.1	\$ 0.3	\$ (14.7)	\$ 0.1	\$ (8.2)	\$ (24.9)
2018	0.6	0.1	0.2	1.7	(0.7)	(2.1)	(0.2)
2019	(0.8)	(0.1)	1.3	(1.8)	(1.3)	(4.5)	(7.2)
2020	(0.8)	0.1	(0.4)	(3.3)	4.1	(5.5)	(5.8)
<b>2021</b>	<b>(0.2)</b>	<b>-</b>	<b>(0.4)</b>	<b>2.9</b>	<b>1.4</b>	<b>(15.3)</b>	<b>(11.6)</b>
<b>PROTECTIVE WITH SOCIAL SECURITY</b>							
2017	\$ (17.6)	\$ 0.8	\$ 1.3	\$ 3.9	\$ 48.6	\$ (10.3)	\$ 26.7
2018	(11.0)	-	(2.3)	(5.4)	(89.9)	(7.1)	(115.7)
2019	(22.0)	(2.6)	(1.0)	(26.6)	34.6	(4.9)	(22.5)
2020	(17.5)	(3.4)	(6.6)	(150.5)	145.7	(23.6)	(55.9)
<b>2021</b>	<b>(19.4)</b>	<b>0.1</b>	<b>6.2</b>	<b>65.8</b>	<b>187.9</b>	<b>1.3</b>	<b>241.9</b>
<b>PROTECTIVE WITHOUT SOCIAL SECURITY</b>							
2017	\$ (1.3)	\$ 0.7	\$ (0.7)	\$ (2.2)	\$ 12.5	\$ (12.1)	\$ (3.1)
2018	(0.9)	(0.1)	(0.8)	(0.7)	(23.1)	0.7	(24.9)
2019	(4.0)	0.5	(0.3)	(4.5)	9.2	(1.3)	(0.4)
2020	(2.8)	(0.7)	(0.7)	(21.3)	36.0	(6.6)	3.9
<b>2021</b>	<b>(3.7)</b>	<b>0.4</b>	<b>0.4</b>	<b>1.5</b>	<b>40.2</b>	<b>(2.7)</b>	<b>36.1</b>

\* Includes separation due to death.

**SECTION E**

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**CENSUS DATA**

## Total Participants Included in Valuations December 31, 2021

Valuation Group	Number	Average Annual Earnings/Benefits*
Actives	257,683	\$59,802
Inactives	174,799	\$20,059
Retirees & Beneficiaries	228,161	\$27,810
<b>Total Participants</b>	<b>660,643</b>	

\* For inactives, average money purchase balance.

## Active Participants Included in Valuations December 31, 2021

**Active participants** included in the valuations totaled 257,683 with an annual payroll totaling \$15,410.0 million, as follows:

Valuation Group	Number	Annual Earnings (\$ Millions)	Group Averages			
			Earnings	Age	Years of Service	Contribs.
General	234,494	\$13,642.5	\$58,179	45.0	11.0	\$68,140
Executive Group & Elected Officials	1,252	117.0	93,428	54.9	14.0	126,882
Protective Occupation with Social Security	19,175	1,404.6	73,249	39.7	12.0	80,525
Protective Occupation without Social Security	2,762	245.9	89,016	40.4	13.5	99,281
<b>Total Active Participants</b>	<b>257,683</b>	<b>\$15,410.0</b>	<b>\$59,802</b>	<b>44.6</b>	<b>11.1</b>	<b>\$69,680</b>
Prior Year	258,338	\$15,065.6	\$58,317	44.8	11.2	\$64,823

Group averages are not used in the valuation, but are shown here for their general interest.

## Inactive Participants Included in Valuations December 31, 2021

Inactive participants included in the valuations totaled 174,799 as follows:

Valuation Group	Number	Group Averages		
		Age	Service	Money Purchase Balance
General	166,072	47.0	3.4	\$19,772
Executive Group & Elected Officials	580	54.6	4.6	37,587
Protective Occupation with Social Security	7,862	41.1	4.0	23,881
Protective Occupation without Social Security	285	42.7	6.5	46,307
<b>Total Inactive Participants</b>	<b>174,799</b>	<b>46.8</b>	<b>3.4</b>	<b>\$20,059</b>
Prior Year	169,166	47.0	3.4	\$18,228

The valuations also included 3,509 Qualified Domestic Relations Order cases whose average age was 52.6 years. These accounts for divorced spouses of WRS participants have been established in accordance with Wisconsin Domestic Relations Law.

## General Participants as of December 31, 2021 by Attained Age and Years of Service

Attained Ages	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
15-19	193							193	\$ 5,119,070
20-24	6,383	17						6,400	226,018,432
25-29	17,383	2,255	10					19,648	880,740,478
30-34	12,791	11,547	1,361	6				25,705	1,325,231,564
35-39	10,873	9,214	7,797	1,266	15			29,165	1,644,871,135
40-44	9,439	7,192	6,006	7,654	1,575	8		31,874	1,939,349,353
45-49	7,172	5,664	4,454	4,934	7,461	913	6	30,604	1,963,167,048
50-54	6,380	5,409	4,259	4,321	6,142	5,952	1,087	33,550	2,174,936,115
55	1,046	944	794	817	1,057	1,031	883	6,572	422,218,094
56	1,058	898	807	816	1,031	823	906	6,339	402,640,257
57	995	909	729	778	919	732	882	5,944	374,314,827
58	984	893	763	772	876	615	767	5,670	349,978,890
59	913	815	706	734	768	591	707	5,234	315,839,156
60	883	782	673	725	716	535	658	4,972	296,423,476
61	822	705	643	662	733	461	651	4,677	275,858,790
62	676	660	542	603	644	392	530	4,047	234,674,230
63	547	500	500	487	542	273	459	3,308	195,485,737
64	525	449	336	420	413	270	384	2,797	163,668,031
65	355	353	324	291	312	202	325	2,162	129,177,224
66	296	251	185	213	190	111	211	1,457	88,376,014
67	187	165	120	118	131	77	147	945	58,920,493
68	187	125	110	72	77	61	107	739	42,350,154
69	151	94	63	76	58	30	93	565	32,557,507
70	137	63	48	56	48	34	78	464	25,985,666
71	93	59	44	31	29	22	59	337	19,617,651
72	92	50	34	27	24	17	35	279	14,251,287
73	60	25	24	18	20	13	27	187	9,184,115
74	55	28	13	14	14	8	23	155	7,974,426
75 & Up	156	121	51	36	34	28	79	505	23,584,125
<b>Totals</b>	<b>80,832</b>	<b>50,187</b>	<b>31,396</b>	<b>25,947</b>	<b>23,829</b>	<b>13,199</b>	<b>9,104</b>	<b>234,494</b>	<b>\$13,642,513,345</b>



**Executive Group and Elected Officials  
as of December 31, 2021  
by Attained Age and Years of Service**

Attained Ages	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
20-24	2							2	\$ 105,508
25-29	5							5	299,025
30-34	15	11						26	1,881,566
35-39	24	31	19	5				79	6,783,291
40-44	43	24	39	17	6			129	12,190,906
45-49	30	23	21	27	25	2		128	13,144,965
50-54	42	33	31	26	36	31	7	206	20,055,145
55	6	9	7	8	7	4	5	46	4,664,588
56	6	10	8	4	10	3	6	47	4,913,985
57	6	13	3	6	8	2	6	44	4,034,569
58	8	9	4	9	9	5	8	52	5,163,282
59	8	9	5	5	7	10	5	49	4,812,479
60	9	13	6	4	3	7	10	52	4,910,970
61	10	5	6	4	5	7	11	48	4,404,619
62	6	9	4	6	6	5	9	45	4,812,091
63	10	6	7	4	4	3	14	48	4,583,889
64	7	6	3	2	7	4	8	37	3,932,853
65	5	4	1	4	4		6	24	2,059,435
66	7	3	3	2	4	1	5	25	2,636,145
67	6	6	5			1	5	23	1,982,946
68	4	1	2	4	1	2	3	17	1,419,573
69	4	2	2		3	2	2	15	1,578,234
70	6	3	4	2	2	2	2	21	1,380,130
71	4	3		1	1	1	2	12	784,073
72	3	1	2	1	2		1	10	738,942
73	3	1	2		2			8	618,141
74	5	3	1	2		1		12	626,450
75 & Up	13	14	4	1	4	1	5	42	2,454,018
<b>Totals</b>	<b>297</b>	<b>252</b>	<b>189</b>	<b>144</b>	<b>156</b>	<b>94</b>	<b>120</b>	<b>1,252</b>	<b>\$116,971,818</b>

**Protective Occupation Participants with Social Security  
as of December 31, 2021  
by Attained Age and Years of Service**

Attained Ages	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
15-19	12							12	\$ 424,714
20-24	921	7						928	47,524,708
25-29	2,148	630						2,778	174,972,371
30-34	1,011	1,647	330	5				2,993	207,833,806
35-39	554	821	1,134	432	12			2,953	219,712,071
40-44	352	382	559	1,029	548	4		2,874	220,723,941
45-49	197	197	273	496	1,287	310		2,760	221,524,166
50	43	31	33	74	182	229	8	600	49,979,811
51	37	30	48	91	194	234	25	659	54,444,501
52	32	38	29	65	144	217	40	565	47,188,095
53	38	25	29	52	111	147	41	443	36,119,806
54	26	17	34	32	64	82	38	293	23,600,690
55	19	24	20	31	51	56	31	232	19,020,039
56	18	15	22	34	40	41	28	198	15,520,430
57	18	10	18	30	40	27	22	165	13,229,354
58	16	10	13	25	21	19	16	120	9,101,676
59	18	15	14	25	29	19	20	140	10,303,214
60	7	13	19	24	20	15	18	116	8,652,567
61	8	10	12	16	16	7	12	81	6,218,530
62	11	7	5	18	15	7	10	73	5,245,666
63	4	4	4	16	11	2	7	48	3,559,118
64	6	3	5	11	13	4	6	48	3,420,627
65	5	1	3	5	6	3	3	26	1,928,725
66	1	2	6	6	2	1	6	24	1,757,125
67	1	1	2	2	1	1	4	12	1,062,344
68	3	5	2	3			1	14	872,261
69	1		1		2		1	5	322,550
70 & Up	6	6		1	1		1	12	288,009
<b>Totals</b>	<b>5,513</b>	<b>3,951</b>	<b>2,615</b>	<b>2,523</b>	<b>2,810</b>	<b>1,425</b>	<b>338</b>	<b>19,175</b>	<b>\$1,404,550,915</b>



**Protective Occupation Participants without Social Security  
as of December 31, 2021  
by Attained Age and Years of Service**

Attained Ages	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
20-24	92							92	\$ 5,327,193
25-29	202	75	1					278	19,251,149
30-34	171	227	68	1				467	37,485,925
35-39	65	160	202	64				491	42,189,466
40-44	28	56	117	172	72			445	40,397,035
45-49	9	17	49	85	230	41		431	41,954,194
50		4	8	14	43	30	2	101	10,452,465
51	1	1	4	14	26	40	5	91	9,572,690
52			4	14	32	37	17	104	11,132,546
53	3		1	9	25	25	7	70	7,341,039
54		1	2	6	13	8	7	37	3,908,018
55	4	2	1	4	20	8	6	45	4,720,062
56		1		5	10	13	3	32	3,449,599
57	1			2	4	7	7	21	2,330,782
58		1		1	2	8	6	18	1,919,967
59	1	1	1	2	2	3	3	13	1,503,539
60			2		2	3		7	907,868
61				1	2			3	335,135
62		1			1	4		6	642,745
63			1	1		1	2	5	560,288
64						1		1	105,517
66	1							1	10,262
67							1	1	124,833
68							1	1	139,138
70 & Up							1	1	100,785
<b>Totals</b>	<b>578</b>	<b>547</b>	<b>461</b>	<b>395</b>	<b>484</b>	<b>229</b>	<b>68</b>	<b>2,762</b>	<b>\$245,862,240</b>

## Active Participants as of December 31, 2021 by Years of Service and Gender

Completed Years of Service	Males	Females	Totals	Valuation Payroll	
				Total	Average
0	7,164	15,834	22,998	\$ 757,172,071	\$32,923
1	5,888	11,893	17,781	775,398,801	43,608
2	6,240	11,068	17,308	844,138,184	48,772
3	5,396	9,791	15,187	766,865,186	50,495
4	5,027	8,919	13,946	737,210,416	52,862
5	4,836	8,119	12,955	715,571,917	55,235
6	4,285	7,183	11,468	649,487,570	56,635
7	4,120	6,962	11,082	645,960,905	58,289
8	3,794	6,400	10,194	610,488,622	59,887
9	3,631	5,607	9,238	564,414,464	61,097
10	2,996	4,963	7,959	497,209,724	62,471
11	2,484	4,105	6,589	422,279,112	64,088
12	2,187	3,965	6,152	397,619,894	64,633
13	2,568	4,355	6,923	459,858,663	66,425
14	2,678	4,360	7,038	477,001,552	67,775
15 & Up	32,921	47,944	80,865	6,089,221,237	75,301
<b>Totals</b>	<b>96,215</b>	<b>161,468</b>	<b>257,683</b>	<b>\$15,409,898,318</b>	<b>\$59,802</b>

Average

Age	44.7	44.5	44.6
Service	11.8	10.7	11.1



## Comparative Statement of Active Participants in Valuations

Valuation 12/31	General				Executive and Elected			
	No.	Earnings			No.	Earnings		
		\$ Millions	Average	% Incr.		\$ Millions	Average	% Incr.
1997	222,888	\$ 7,128	\$ 31,980	2.6%	1,455	\$ 71	\$48,881	6.3 %
1998	227,017	7,457	32,847	2.7%	1,450	73	50,664	3.6 %
1999*	229,657	7,704	34,445	4.9%	1,468	77	53,263	5.1 %
2000	234,076	8,335	35,610	3.4%	1,486	83	55,582	4.4 %
2001	238,944	8,746	36,605	2.8%	1,486	85	57,060	2.7 %
2002	240,990	9,007	37,377	2.1%	1,476	87	58,865	3.2 %
2003	239,696	9,273	38,686	3.5%	1,468	86	58,336	(0.9)%
2004	238,943	9,501	39,764	2.8%	1,469	89	60,379	3.5 %
2005	237,501	9,661	40,678	2.3%	1,452	90	61,788	2.3 %
2006	236,877	9,933	41,935	3.1%	1,436	93	64,480	4.4 %
2007	237,124	10,278	43,344	3.4%	1,427	95	66,320	2.9 %
2008**	238,994	10,806	45,216	4.3%	1,430	101	70,316	6.0 %
2009	240,401	11,098	46,165	2.1%	1,427	101	70,786	0.7 %
2010	239,959	11,195	46,655	1.1%	1,418	101	71,394	0.9 %
2011	232,518	10,947	47,080	0.9%	1,393	99	70,802	(0.8)%
2012	231,765	11,041	47,639	1.2%	1,408	104	73,968	4.5 %
2013	231,973	11,270	48,584	2.0%	1,397	106	76,125	2.9 %
2014	232,433	11,574	49,794	2.5%	1,401	109	77,998	2.5 %
2015	231,631	11,786	50,881	2.2%	1,380	108	78,230	0.3 %
2016	232,684	11,964	51,417	1.1%	1,347	106	78,667	0.6 %
2017	232,874	12,167	52,249	1.6%	1,335	107	80,366	2.2 %
2018	233,462	12,445	53,307	2.0%	1,302	108	82,986	3.3 %
2019	235,645	12,926	54,855	2.9%	1,302	112	86,269	4.0 %
2020**	234,628	13,295	56,663	3.3%	1,280	116	90,894	5.4 %
2021	234,494	13,643	58,179	2.7%	1,252	117	93,428	2.8 %

\* After change in method of calculating average pay.

\*\* Some groups had a 27-period payroll during 2008 and 2020.



## Comparative Statement of Active Participants in Valuations

Valuation 12/31	Protective with Social Security				Protective without Social Security			
	No.	Earnings			No.	Earnings		
		\$ Millions	Average	% Incr.		\$ Millions	Average	% Incr.
1997	14,232	\$ 536	\$ 37,625	5.1%	2,654	\$121	\$45,568	3.4 %
1998	14,810	570	38,509	2.3%	2,658	127	47,733	4.8 %
1999*	16,483	649	39,864	3.5%	2,691	131	48,947	2.5 %
2000	16,970	717	42,263	6.0%	2,685	135	50,423	3.0 %
2001*	17,981	772	42,914	1.5%	2,715	142	52,339	3.8 %
2002	18,325	804	43,871	2.2%	2,709	148	54,603	4.3 %
2003	18,660	856	45,891	4.6%	2,714	154	56,673	3.8 %
2004	18,964	896	47,266	3.0%	2,709	159	58,546	3.3 %
2005	19,036	920	48,330	2.3%	2,689	162	60,241	2.9 %
2006	19,297	977	50,622	4.7%	2,692	167	62,153	3.2 %
2007	19,757	1,036	52,419	3.5%	2,695	174	64,449	3.7 %
2008**	20,038	1,099	54,859	4.7%	2,724	181	66,502	3.2 %
2009	20,205	1,124	55,636	1.4%	2,733	189	69,149	4.0 %
2010	20,019	1,125	56,184	1.0%	2,754	189	68,559	(0.9)%
2011	19,610	1,119	57,065	1.6%	2,711	189	69,898	2.0 %
2012	19,353	1,105	57,104	0.1%	2,727	193	70,949	1.5 %
2013	19,290	1,121	58,127	1.8%	2,736	197	71,960	1.4 %
2014	19,533	1,151	58,916	1.4%	2,733	204	74,487	3.5 %
2015	19,273	1,171	60,755	3.1%	2,730	209	76,376	2.5 %
2016	19,431	1,203	61,924	1.9%	2,746	213	77,553	1.5 %
2017	19,431	1,227	63,145	2.0%	2,743	219	79,753	2.8 %
2018	19,399	1,263	65,113	3.1%	2,770	225	81,206	1.8 %
2019	19,528	1,314	67,310	3.4%	2,759	231	83,619	3.0 %
2020**	19,676	1,415	71,893	6.8%	2,754	240	87,136	4.2 %
2021	19,175	1,405	73,249	1.9%	2,762	246	89,016	2.2 %

\* After change in method of calculating average pay.

\*\* Some groups had a 27-period payroll during 2008 and 2020.



## Core Annuities Being Paid Tabulated by Attained Ages

Attained Ages	Regular		Disability		Death-in-Service		Totals	
	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount
Under 20	0	\$ 0	0	\$ 0	7	\$ 49,634	7	\$ 49,634
20-24	0	0	5	68,187	12	131,237	17	199,424
25-29	0	0	8	120,585	17	126,764	25	247,349
30-34	0	0	17	260,035	28	191,737	45	451,772
35-39	1	4,838	59	1,387,709	32	233,564	92	1,626,111
40-44	4	35,053	154	3,519,069	43	441,306	201	3,995,428
45-49	41	509,261	257	5,986,791	41	368,359	339	6,864,411
50-54	1,570	52,736,000	562	13,954,887	75	1,009,346	2,207	67,700,233
55-59	12,391	380,757,644	1,057	27,053,734	124	2,051,478	13,572	409,862,856
60-64	28,999	775,033,992	1,590	37,279,702	204	3,155,239	30,793	815,468,933
65-69	46,701	1,180,586,642	1,189	29,400,479	235	4,787,112	48,125	1,214,774,233
70-74	51,388	1,353,044,695	1,117	26,925,845	242	4,996,900	52,747	1,384,967,440
75-79	34,850	875,389,687	803	18,123,062	145	2,821,722	35,798	896,334,471
80-84	21,278	505,508,137	557	11,343,077	96	1,706,659	21,931	518,557,873
85-89	12,741	305,615,950	328	6,160,442	65	771,324	13,134	312,547,716
90-94	5,944	142,561,157	128	2,244,646	33	504,045	6,105	145,309,848
95 & Up	1,708	36,256,289	30	384,178	19	331,437	1,757	36,971,904
Certain Only*	1,230	26,065,915	0	9,409	36	580,513	1,266	26,655,837
<b>Totals</b>	<b>218,846</b>	<b>\$5,634,105,260</b>	<b>7,861</b>	<b>\$184,221,837</b>	<b>1,454</b>	<b>\$24,258,376</b>	<b>228,161</b>	<b>\$5,842,585,473</b>

Averages in Years

Age at retirement	59.9	50.8	51.8	59.6
Attained age	71.5	64.8	67.0	71.3

\* Certain Only category consists of continuations of 5-, 10- and 15-year certain and life annuities to beneficiaries of deceased annuitants.



## Variable Annuities Being Paid Tabulated by Attained Ages

Attained Ages	Regular		Disability		Death-in-Service		Totals	
	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount	No.	Annual Amount
Under 20	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0
20-24	0	0	1	1,458	3	4,297	4	5,755
25-29	0	0	5	12,205	3	3,961	8	16,166
30-34	0	0	6	11,900	5	4,629	11	16,529
35-39	0	0	10	26,476	3	2,539	13	29,015
40-44	1	369	24	105,731	11	31,698	36	137,798
45-49	16	111,741	31	167,411	14	59,969	61	339,121
50-54	352	2,881,885	59	361,479	22	128,312	433	3,371,676
55-59	2,598	23,844,846	153	778,716	30	185,604	2,781	24,809,166
60-64	5,047	36,769,389	197	937,337	56	357,950	5,300	38,064,676
65-69	7,963	55,388,886	234	974,574	50	308,851	8,247	56,672,311
70-74	9,508	95,406,549	190	1,418,275	62	346,792	9,760	97,171,616
75-79	6,752	104,191,658	152	1,694,490	36	464,654	6,940	106,350,802
80-84	3,812	79,293,081	98	1,230,308	23	311,435	3,933	80,834,824
85-89	2,529	55,454,169	73	708,271	19	253,073	2,621	56,415,513
90-94	1,352	27,612,539	26	266,678	13	134,572	1,391	28,013,789
95 & Up	457	8,535,068	4	35,644	9	111,727	470	8,682,439
Certain Only*	237	1,656,640	0	0	5	10,088	242	1,666,728
<b>Totals</b>	<b>40,624</b>	<b>\$491,146,820</b>	<b>1,263</b>	<b>\$8,730,953</b>	<b>364</b>	<b>\$2,720,151</b>	<b>42,251</b>	<b>\$502,597,924</b>

Averages in Years

Age at retirement	59.2	52.6	52.2	59.0
Attained age	71.5	66.5	67.9	71.3

\* Certain Only category consists of continuations of 5-, 10- and 15-year certain and life annuities to beneficiaries of deceased annuitants.



## **SECTION F**

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### **METHODS AND ASSUMPTIONS**

# Summary of Actuarial Assumptions and Methods

Valuation Date	December 31, 2021
Actuarial Cost Method	Frozen Entry Age
Amortization Method	Level Percent -- Closed Period
Amortization Period	30-Year closed from date of participation in WRS
Asset Valuation Method	5-Year Smoothed Market (Closed)

## Actuarial Assumptions

### Assumed Rates of Investment Return for:

Retired participants	5.0%
Post-retirement active participants	5.0%
Pre-retirement active participants	6.8%
Weighted Average Investment Rate of Return	5.4%
Projected Salary Increases*	3.1% to 8.6%
Payroll Growth Rate	3.0%
Population Growth Rate	0.0%

\* Includes merit and seniority increases that vary by service plus wage inflation of 3.0%/year.





# Financial Principles and Operational Techniques of the Wisconsin Retirement System

**Benefit Promises Made Which Must Be Paid For.** A retirement program is an orderly means of handing out, keeping track of, and financing contingent retirement promises. As each participant of the Retirement System acquires a unit of service credit he is, in effect, handed an "IOU" which reads: "The Wisconsin Retirement System promises to pay you one unit of annuity benefits, payments in cash commencing when you retire."

The principal related financial question is: ***When shall the money required to cover the "IOU" be contributed?*** This year, when the benefit of the participant's unit of service is received? Or, some future year, when the "IOU" becomes a cash demand?

***The law governing the Wisconsin Retirement System financing intends that the money to cover an "IOU" is contributed in the year the "IOU" is handed out.*** In this way contribution rates expressed as percents of participant payroll can be determined so as to remain approximately level from year to year and decade to decade as long as the basic experience and make-up of the group of participants does not change significantly. This means that for equivalent benefits each generation of Wisconsin taxpayers will contribute at approximately the same payroll rates.

Translated into actuarial terminology, the level percent-of-payroll contribution objective means that the contribution rate must total at least:

**Normal Cost** (the current discounted value of benefits likely to be paid on account of participants' service rendered in the current year)

... plus ...

**Amortization of any Unfunded Frozen Initial Liabilities (UFIL)**

If contributions to the system are less than the preceding amount, the difference, **plus investment earnings not realized thereon**, will have to be contributed at some later time, or benefits will have to be reduced, to satisfy the fundamental equation under which all retirement programs must operate; that is:

$$B = C + I - E$$

Benefit payments to any group of participants and their beneficiaries cannot exceed

Contributions received on behalf of the group  
... plus ...  
Interest earnings on those contributions  
... minus ...  
Expenses incurred in operating the program.

There are retirement programs (Social Security is an example) designed to defer the bulk of contributions far into the future. The present contribution rate for such systems is artificially low, but is destined to increase relentlessly to a level which may be greatly in excess of the level percent-of-payroll rate.

A by-product of a level percent-of-payroll contribution objective is the accumulation of invested assets for varying periods of time. Investment income becomes the third and largest contributor to the retirement system and the amount is directly related to the amount of contributions and investment performance.

**Computing Contribution Rates to Finance Benefits.** From a given schedule of benefits and from the data furnished, the actuary calculates the contribution rates **by means of an actuarial valuation** – the technique of assigning monetary values to the risks assumed in operating a retirement program.

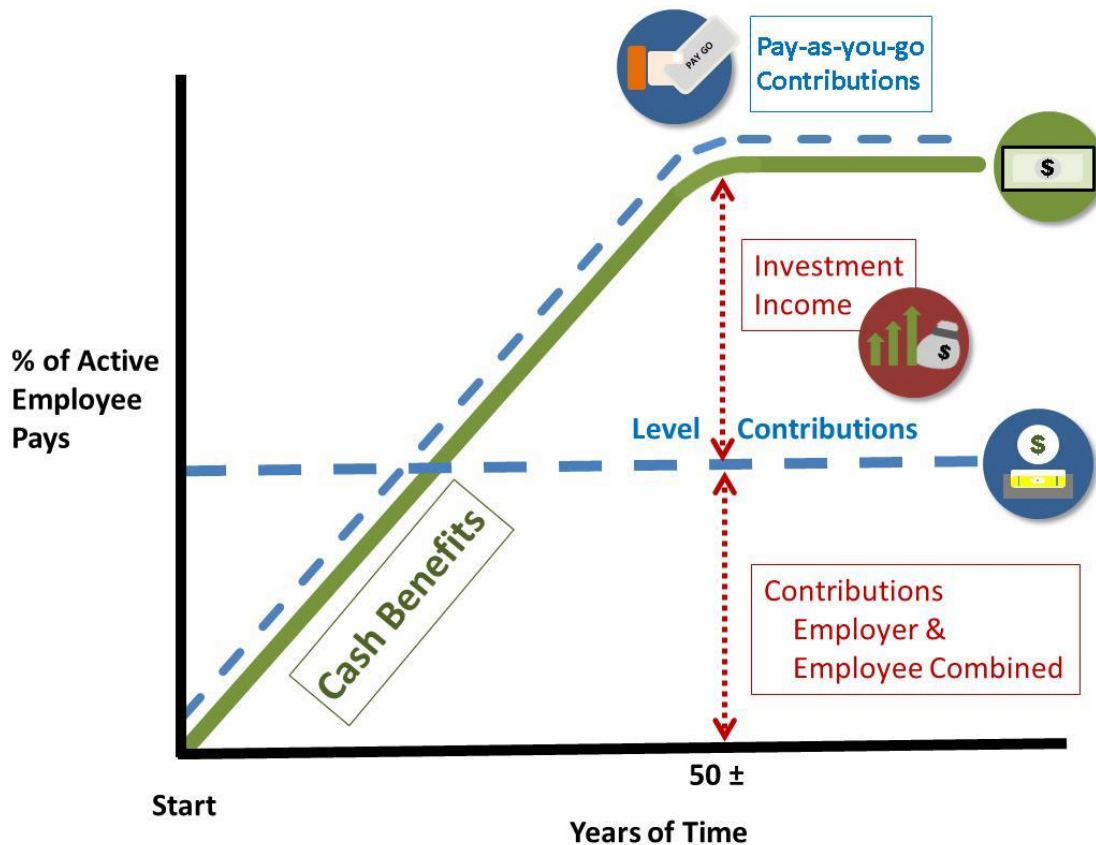
# Actuarial Method and Assumptions Used in Valuations

The principal actuarial assumptions relate to:

- Long-term ***rates of investment income*** likely to be generated by system assets;
- ***Rates of mortality*** among participants, retirants and beneficiaries;
- ***Rates of withdrawal*** of active participants;
- ***Rates of disability*** among participants;
- ***Patterns of salary increases*** to be experienced by participants; and
- The age and service ***distribution of actual retirements***.

In an actuarial valuation, the actuary projects the monetary effect of each assumption for each distinct experience group, for the next year and for each year over the next half-century or longer.

Once actual risk experience has occurred and been observed, it will not coincide exactly with assumed risk experience, regardless of the skill of the actuary, the completeness of the data, and the precision of the calculations. Each valuation provides a complete recalculation of assumed future risk experience and takes into account all past differences between assumed and actual risk experience. The result is a continual series of small adjustments to the computed contribution rate. From time to time it becomes necessary to adjust the package of risk measurements to reflect basic experience trends – but not random year-to-year fluctuations.



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

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

- **Economic Areas**
  - Rates of investment return
  - Rates of pay increase
  - Changes in active member group size
- **Non-Economic Areas**
  - Ages at actual retirement
  - Rates of mortality
  - Rates of withdrawal of active members (turnover)
  - Rates of disability

## Actuarial Valuation Method

The actuarial funding method prescribed in the statute for WRS is the Frozen Entry Age Method which is also referred to as the Frozen Initial Liability (FIL) method in this report. Under this method, the amount of remaining unfunded actuarial accrued liabilities at any valuation date is affected only by the monthly amortization payments, compound interest, the added liability created by new employer units, and any added liabilities caused by changes in benefit provisions.

Actuarial gains or losses arising from the difference between actual and assumed experience are reflected in the determination of the normal cost. In this manner, experience gains or losses in any year are amortized (spread) over the average future working lifetime of the active participant group - a period of approximately 12 years. Hence, the computed normal cost is made up of two parts:

- The pure entry-age normal cost (EANC) determined without regard to past gains or losses; and
- An experience amortization component.

Section 40.04(1) of the Wisconsin Statutes provides authority to maintain accounts and reserves determined to be “useful in achieving the funds’ purposes - -”. A fundamental WRS objective is stable contribution rates. Accordingly, based on the authority granted under Section 40.04, the experience portion of the normal cost is separately calculated each year and the amortization period is varied upward or downward in order to minimize short-term rate fluctuations. The policy regarding the EAR amortization period is described below:

- The standard period is set 20 years.
- The standard period is reconsidered as part of each triennial experience study (no changes were made with the most recent experience study).
- Temporary interim changes in the period are made only when there are large, but mostly offsetting market gains and losses known to be flowing through the MRA that would otherwise result in contribution rate volatility. Large changes would be defined as those which, over a 2-year period, were expected to result in contribution rate changes of at least 0.4% of payroll.
- The minimum and maximum EAR amortization periods are 10 years and 30 years respectively.
- The amortization policy will be applied in the same manner to market gains and losses flowing through the MRA.
- For 2021, a 20-year period was used.

## Asset Valuation Method

An essential step in the valuation process is comparing valuation assets with computed liabilities. Computed liabilities result from actuarial calculations involving the covered population, the benefits, and actuarial assumptions. Valuation assets are those assets that are recognized and available to fund the System's liabilities. WRS assets are invested in the Core Investment Trust, and in the Variable Investment Trust, both of which are managed by the State of Wisconsin Investment Board (SWIB). Assets in the Variable Investment Trust are marked to market each year. Assets in the Core Investment Trust (most of the assets) are valued (or recognized) using an "asset valuation method."

Asset valuation methods are distinguished by the timing of the recognition of investment return. Total investment return is the sum of ordinary income and capital value changes. Under a book value approach, ordinary income is recognized immediately and capital gains (or losses) are recognized only when securities are sold. Book value investment return is directly affected by the timing of sales activity and underlying experience may be distorted. Under a pure market value approach, ordinary investment income and all capital value changes are recognized immediately. Because of market volatility, use of pure market values in retirement funding can result in volatile contribution rates and unstable financial ratios, contrary to WRS objectives.

The asset valuation method used for WRS valuations is statutory, and is referred to as the "Market Recognition Account" or MRA. Act 11 of 1999 closed the former Transaction Amortization Account (TAA) and created the Market Recognition Account (MRA). The MRA recognizes assumed returns fully each year. Differences between actual and assumed returns are phased-in over a closed five-year period. The objective is to give recognition to long-term changes in asset values while minimizing the effect of short-term fluctuations in the capital markets. In accordance with its smoothing objective, the MRA will tend to exceed the market value when the markets are doing poorly, and will fall short of the market value when markets are doing well. Some retirement systems set limits on the amount by which the recognized value of assets can differ from the market value.

# Annual Actuarial Valuations Assumptions Adopted by ETF Board after Consulting with Actuary

## ECONOMIC ASSUMPTIONS

The rationale for these assumptions is based upon an experience study covering the period 2018-2020. Beginning with the December 31, 2021 actuarial valuation, separate demographic assumptions were developed and used for State and Non-State employees.

For determining plan liabilities, the discount rate is 5.0% for retired participants, 5.0% for active and inactive participants following retirement, and 6.8% for active and inactive participants prior to their retirement. A valuation performed assuming a 5.4% discount rate for all participants at all stages of life, reproduces the results of an actuarial valuation using the 5.0% post-retirement and 6.8% pre-retirement assumptions. Thus, it can be said that **the net discount rate assumed in the valuations was 5.4% per year, compounded annually (net after administrative expenses).**

The **Wage Inflation Rate** assumed in this valuation was 3.0% per year. The wage inflation rate is defined to be the portion of total pay increases for an individual that are due to macroeconomic forces including productivity, price inflation, and labor market conditions. The wage inflation rate does not include pay changes rated to individual merit and seniority effects.

No specific **Price Inflation** assumption is required to perform this valuation. The price inflation assumption used to evaluate the investment return assumption is 2.4%.

The assumed **Real Rate of Return** over wage inflation is defined to be the portion of total investment return that is more than the assumed total wage growth rate. Considering other economic assumptions, the 6.8% pre-retirement investment return rate translates to an assumed real rate of return over wage inflation of 3.8%. The assumed real rate of return over price inflation is 4.4% considering an inflation assumption of 2.4%.

**Merit and Longevity pay increase assumptions** for individual active members are shown for sample services below. An additional 3.0% recognizes wage inflation, including price inflation, productivity increases, and other macroeconomic forces.

Service	% Merit Increases in Salaries Next Year								
	General Non-State (Not Including Schools)	General State (Not Including Schools)	Executive & Elected Non-State	Executive & Elected State	University Teachers State	Public School Teachers Non-State	Protective With SS Non-State	Protective With SS State	Protective Without SS Non-State
1	3.5%	3.5%	2.5%	2.5%	3.0%	5.6%	4.8%	4.8%	5.5%
2	3.5%	3.5%	2.5%	2.5%	3.0%	5.6%	4.8%	4.8%	5.5%
3	3.1%	3.1%	2.0%	2.0%	2.9%	5.2%	4.1%	4.1%	4.7%
4	2.8%	2.8%	1.6%	1.6%	2.8%	4.7%	3.5%	3.5%	3.8%
5	2.5%	2.5%	1.1%	1.1%	2.7%	4.3%	2.8%	2.8%	3.0%
10	1.5%	1.5%	0.2%	0.2%	2.2%	2.6%	1.1%	1.1%	0.9%
15	1.1%	1.1%	0.2%	0.2%	1.7%	1.4%	0.8%	0.8%	0.5%
20	0.9%	0.9%	0.2%	0.2%	1.2%	0.6%	0.7%	0.7%	0.4%
25	0.6%	0.6%	0.2%	0.2%	0.9%	0.3%	0.6%	0.6%	0.3%
30	0.4%	0.4%	0.2%	0.2%	0.7%	0.2%	0.5%	0.5%	0.2%

## Decrement Probabilities

The Active Member Population is assumed to remain constant. For purposes of financing the unfunded liabilities and amortizing the EAR, total payroll is assumed to grow at the wage inflation rate – 3.00% per year.

**The mortality table** used was the 2020 WRS Experience Tables adopted by the Board in connection with the 2018-2020 Experience Study. The rates in this table were based on actual WRS experience adjusted for future mortality improvements using the MP-2021 fully generational improvement scale from a base year of 2010. Sample retirement values from this table are shown below. This assumption is used to measure the probabilities of participants dying before retirement and the probabilities of each benefit payment being made after retirement.

### Single Life Retirement Values 2020 WRS Experience Table with 5% Interest

Sample Attained Ages in 2021	Present Value of \$1 Monthly for Life*		Future Life Expectancy (years)*		Mortality Rates*	
	Males	Females	Males	Females	Males	Females
40	\$216.52	\$219.63	47.0	49.1	0.000624	0.000421
45	208.53	212.28	41.8	43.9	0.000806	0.000543
50	198.37	202.89	36.6	38.7	0.001221	0.000875
55	185.83	191.37	31.5	33.5	0.002452	0.002269
60	170.94	177.94	26.6	28.6	0.004216	0.003514
65	153.52	161.82	21.9	23.9	0.006822	0.004991
70	133.38	142.38	17.5	19.2	0.011338	0.007968
75	110.84	119.89	13.3	14.9	0.020755	0.015244
80	87.27	95.94	9.7	11.0	0.039700	0.030501
85	64.78	72.65	6.7	7.7	0.076354	0.059821

\* With a fully generational mortality table, the mortality rate depends on the year of birth. Later years of birth will correspond to a lower mortality rate at a given age.

The values shown above are for non-disabled participants in 2021. For disabled participants, the following table was used:

Sample Attained Ages in 2021	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)		Mortality Rates*	
	Males	Females	Males	Females	Males	Females
40	\$175.27	\$182.00	32.1	34.8	0.009569	0.008549
45	164.66	172.22	28.1	30.8	0.012119	0.011138
50	152.97	161.70	24.4	27.0	0.017187	0.016021
55	141.07	151.41	21.1	23.6	0.023250	0.020479
60	129.40	141.24	18.1	20.5	0.029559	0.023946
65	117.53	129.37	15.4	17.5	0.035076	0.025249
70	104.23	113.85	12.7	14.3	0.041335	0.029616
75	88.61	95.50	10.1	11.2	0.053057	0.041768
80	71.78	76.74	7.7	8.4	0.075851	0.065016
85	55.79	59.91	5.7	6.2	0.114120	0.103637

\* With a fully generational mortality table, the mortality rate depends on the year of birth. Later years of birth will correspond to a lower mortality rate at a given age.



## Active Participant Mortality Rates

Sample Attained Ages in 2021	Mortality Rates*	
	Males	Females
20	0.000398	0.000164
25	0.000213	0.000128
30	0.000345	0.000222
35	0.000500	0.000318
40	0.000624	0.000421
45	0.000806	0.000543
50	0.001189	0.000789
55	0.001891	0.001258
60	0.003118	0.001971
65	0.005013	0.003022
70	0.007513	0.005019
75	0.011006	0.009610
80	0.021987	0.019764

\* With a fully generational mortality table, the mortality rate depends on the year of birth. Later years of birth will correspond to a lower mortality rate at a given age.

This assumption is used to measure the probability of participants dying while in service.

# Rates of Retirement for Those Eligible to Retire

## Normal Retirement

Age	% of Active Participants Retiring												
	General Non-State		General State		Executive & Elected Non-State	Executive & Elected State	University State		Public Schools Non-State		Protective		
	Male	Female	Male	Female			Male	Female	Male	Female	With SS Non-State *	With SS State *	Without SS Non-State*
50											6.0%	7.5%	3.0%
51											8.0%	9.0%	3.5%
52											11.0%	11.0%	4.5%
53											34.0%	25.0%	17.0%
54											32.0%	20.0%	24.0%
55											26.0%	20.0%	29.0%
56											23.0%	20.0%	32.0%
57	20.0%	17.0%	19.0%	19.0%	10.0%	12.0%	12.0%	10.0%	31.0%	27.5%	27.0%	20.0%	23.0%
58	20.0%	18.0%	19.0%	19.0%	10.0%	12.0%	16.0%	20.0%	29.0%	27.5%	21.0%	20.0%	27.0%
59	20.0%	14.0%	19.0%	19.0%	10.0%	12.0%	9.0%	12.0%	28.0%	26.0%	23.0%	20.0%	40.0%
60	20.0%	20.0%	19.0%	21.0%	10.0%	12.0%	15.0%	14.0%	27.0%	29.0%	22.0%	20.0%	25.0%
61	20.0%	18.0%	19.0%	25.0%	10.0%	12.0%	9.0%	13.0%	26.0%	27.0%	30.0%	20.0%	25.0%
62	30.0%	24.0%	28.0%	29.0%	10.0%	18.0%	10.0%	15.0%	39.0%	36.0%	35.0%	25.0%	31.0%
63	30.0%	29.0%	30.0%	28.0%	10.0%	18.0%	11.0%	19.0%	33.0%	31.0%	27.0%	25.0%	40.0%
64	30.0%	23.0%	25.0%	31.0%	15.0%	18.0%	15.5%	17.0%	30.0%	30.0%	30.0%	36.0%	40.0%
65	30.0%	35.0%	27.0%	31.0%	15.0%	18.0%	15.5%	21.0%	32.0%	38.5%	34.0%	38.0%	40.0%
66	40.0%	39.0%	35.0%	36.0%	15.0%	18.0%	21.0%	25.0%	35.0%	44.0%	35.0%	38.0%	100.0%
67	32.0%	33.0%	32.0%	33.0%	15.0%	18.0%	18.0%	25.0%	31.0%	31.0%	35.0%	38.0%	100.0%
68	32.0%	30.0%	21.0%	25.0%	10.0%	18.0%	19.0%	18.0%	28.0%	30.0%	35.0%	38.0%	100.0%
69	28.0%	22.0%	21.0%	27.0%	10.0%	18.0%	14.0%	16.5%	20.0%	30.0%	35.0%	38.0%	100.0%
70	28.0%	26.0%	21.0%	29.0%	10.0%	18.0%	21.0%	22.0%	30.0%	32.0%	100.0%	100.0%	100.0%
71	28.0%	28.0%	21.0%	34.0%	10.0%	15.0%	24.0%	16.5%	25.0%	25.0%	100.0%	100.0%	100.0%
72	28.0%	30.0%	21.0%	33.0%	10.0%	15.0%	24.0%	17.0%	25.0%	25.0%	100.0%	100.0%	100.0%
73	18.0%	30.0%	30.0%	24.0%	20.0%	15.0%	24.0%	21.0%	25.0%	25.0%	100.0%	100.0%	100.0%
74	18.0%	16.0%	30.0%	18.0%	20.0%	15.0%	24.0%	14.0%	25.0%	25.0%	100.0%	100.0%	100.0%
75	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

\* Includes reduced retirements for Protective with 20+ years of service.

## Reduced Retirement

Age	% of Active Participants Retiring									
	General Non-State		General State		Executive & Elected Non-State	Executive & Elected State	University State		Public Schools Non-State	
	Male	Female	Male	Female			Male	Female	Male	Female
55	7.3%	7.0%	5.5%	6.0%	2.5%	6.0%	3.3%	5.0%	12.0%	11.0%
56	6.0%	7.0%	6.5%	8.0%	2.5%	6.0%	3.3%	5.0%	13.0%	13.0%
57	5.2%	5.5%	5.5%	6.0%	2.5%	6.0%	4.0%	5.0%	13.0%	12.0%
58	5.6%	6.5%	5.5%	9.0%	2.5%	6.0%	4.0%	5.5%	12.0%	13.0%
59	5.9%	7.0%	6.5%	7.5%	2.5%	6.0%	4.4%	6.0%	14.3%	13.5%
60	9.3%	9.5%	9.0%	10.0%	5.0%	6.0%	4.8%	7.5%	16.0%	17.0%
61	8.0%	9.5%	12.5%	11.0%	5.0%	6.0%	4.8%	9.0%	16.0%	17.0%
62	19.0%	16.0%	16.0%	18.0%	1.0%	6.0%	7.0%	11.0%	23.0%	24.0%
63	20.0%	18.0%	17.0%	19.5%	1.0%	3.0%	8.3%	12.0%	21.0%	24.0%
64	18.0%	18.0%	21.0%	18.0%	1.0%	3.0%	11.5%	14.5%	21.0%	24.0%



The assumed rates of separation from employment prior to service retirement due to disability and other causes are shown below for sample ages. For other terminations it was assumed that a percentage, depending on age of participants terminating after age 35 with 5 or more years of service, will leave their contributions on deposit and be paid a benefit at normal retirement age and that the remaining participants would take a separation benefit. The percentage taking a separation benefit is 25% at age 35, grading downward to 0% at retirement eligibility. All participants terminating prior to normal retirement age with less than five years of service were assumed to take a separation benefit.

### Assumed Termination Rates by Attained Age and Years of Service

Age	Service	% of Active Participants Withdrawing												
		General Non-State		General State		Executive & Elected Non-State	Executive & Elected State	University State		Public Schools Non-State		Protective		
		Male	Female	Male	Female			Male	Female	Male	Female	With SS Non-State	With SS State	Without SS Non-State
Under 30	0-1	17.7%	20.0%	17.2%	19.5%	25.0%	19.0%	14.0%	14.1%	12.6%	12.0%	15.6%	18.8%	4.5%
	1-2	12.5%	15.0%	12.9%	15.5%	20.0%	16.0%	13.8%	14.0%	11.6%	10.0%	9.4%	15.5%	4.0%
	2-3	9.0%	11.5%	9.5%	12.5%	17.0%	13.0%	12.6%	12.7%	8.5%	8.5%	5.3%	10.5%	2.0%
	3-4	7.1%	9.6%	7.4%	10.0%	16.0%	12.5%	11.0%	10.0%	6.0%	6.2%	4.4%	6.5%	1.8%
	4-5	6.6%	9.0%	7.3%	8.7%	13.0%	12.0%	8.6%	9.3%	5.6%	5.8%	4.2%	5.5%	1.7%
	5-6	5.3%	7.4%	6.1%	7.8%	4.0%	6.0%	8.5%	8.1%	4.5%	4.8%	3.3%	5.0%	1.3%
	6-7	4.8%	6.3%	5.2%	6.9%	4.0%	6.0%	7.0%	7.0%	3.7%	4.1%	3.2%	4.5%	1.2%
	7-8	4.6%	6.0%	5.1%	6.0%	4.0%	6.0%	5.6%	5.6%	2.9%	3.5%	3.0%	4.0%	0.9%
	8-9	4.1%	5.7%	4.5%	5.6%	4.0%	6.0%	4.6%	4.9%	2.6%	3.4%	2.7%	3.5%	0.8%
	9-10	4.0%	5.0%	3.6%	5.5%	4.0%	6.0%	4.3%	4.3%	2.5%	3.0%	2.3%	3.3%	0.7%
10 & Up	3-2	3.2%	4.9%	3.1%	4.8%	4.5%	4.5%	4.2%	4.0%	2.0%	2.2%	2.1%	2.9%	0.7%
	3-5	2.8%	4.1%	2.7%	3.9%	4.5%	4.5%	4.0%	4.0%	1.6%	1.9%	1.8%	2.4%	0.6%
	4-0	2.4%	3.2%	2.6%	3.0%	4.2%	4.5%	3.4%	3.7%	1.4%	1.6%	1.5%	1.8%	0.6%
	4-5	2.0%	2.9%	2.4%	2.7%	3.7%	4.2%	2.8%	3.2%	1.4%	1.4%	1.4%	1.4%	0.5%
	5-0	1.7%	2.5%	1.9%	2.1%	3.2%	3.7%	2.3%	2.7%	1.3%	1.2%	1.3%	1.2%	0.5%
5-4	1.6%	2.2%	1.7%	1.8%	3.0%	3.5%	2.2%	2.5%	1.3%	1.2%	1.3%	1.2%	0.5%	

### Disability Rates

Age	% of Active Participants Becoming Disabled													
	General Non-State		General State		Executive & Elected Non-State	Executive & Elected State	University State		Public Schools Non-State		Protective			
	Male	Female	Male	Female			Male	Female	Male	Female	With SS Non-State	With SS State	Without SS Non-State	
20	0.01%	0.00%	0.01%	0.01%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.03%
25	0.01%	0.00%	0.01%	0.01%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.03%
30	0.01%	0.02%	0.01%	0.04%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.03%
35	0.01%	0.02%	0.01%	0.05%	0.01%	0.01%	0.00%	0.03%	0.01%	0.01%	0.01%	0.03%	0.03%	0.03%
40	0.03%	0.03%	0.03%	0.07%	0.01%	0.01%	0.01%	0.04%	0.01%	0.02%	0.04%	0.05%	0.05%	0.05%
45	0.06%	0.05%	0.06%	0.10%	0.01%	0.01%	0.02%	0.04%	0.03%	0.05%	0.05%	0.07%	0.10%	0.10%
50	0.13%	0.07%	0.13%	0.16%	0.02%	0.02%	0.03%	0.07%	0.08%	0.10%	0.09%	0.11%	0.55%	0.55%
55	0.24%	0.13%	0.24%	0.29%	0.09%	0.09%	0.08%	0.11%	0.14%	0.14%	1.39%	1.73%	0.41%	0.41%
60	0.43%	0.18%	0.43%	0.41%	0.11%	0.11%	0.11%	0.17%	0.24%	0.21%	2.34%	2.92%	0.12%	0.12%

## Miscellaneous and Technical Assumptions

<b>Amortization Payoff Reserve:</b>	Additional reserves in the amount of \$5,432,175 (discounted from the year 2029 to the current valuation date) were added to general group liabilities to account for the possibility that some non-state employers may never be able to pay off their unfunded actuarial accrued liability.
<b>Assumed Retirement for Deferred Members:</b>	Members with a deferred vested benefit were assumed to retire at age 65 for General members, age 54 for Protective members and age 62 for Executive and Elected members.
<b>Benefit Service:</b>	Exact fractional service on the decrement date is used to determine the amount of benefit payable.
<b>Decrement Operation:</b>	Disability operates during the retirement pattern.
<b>Decrement Relativity:</b>	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
<b>Decrement Timing:</b>	Decrements of all types are assumed to occur mid-year.
<b>Eligibility Testing:</b>	Eligibility for benefits is determined based upon the age nearest birthday and total service (in all benefit groups) nearest whole year on the date the decrement is assumed to occur.
<b>Expenses:</b>	Assumed investment return is net of administrative and investment expenses.
<b>Final Average Salary:</b>	For present value of future benefit purposes, final average salary was calculated in accordance with pay increase assumptions, but was not permitted to fall below the final average salary reported in the data.
<b>Incidence of Contributions:</b>	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.
<b>Liability Adjustments:</b>	Final Average Salaries were increased 3.5% (4.0% for Executive and Elected and 4.5% for Protectives) to account for additional contingencies in actual benefit amount calculated at the time of retirement.
<b>Marriage Assumption:</b>	75% of males and 55% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses.



## Miscellaneous and Technical Assumptions (Concluded)

<b>Non-Benefit Service:</b>	Liabilities for service in divisions other than the division in which the individual is currently active are calculated as indexed deferred vested benefits. Benefits are indexed in accordance with the salary adjustment factors for the division where the member is currently employed. People are assumed to retire at the earliest age that full benefits will become available. The liabilities are assigned to the division in which the service was rendered.
<b>Normal Form of Benefit:</b>	The assumed normal form of benefit is a straight life benefit, except where otherwise noted.
<b>Pay Annualization:</b>	Reported pay for members with less than 12 contributing months was annualized by the ratio of 12 to the number of contributing months in the year.
<b>Pay Increase Timing:</b>	Beginning of (calendar) year for most people. Middle of calendar year for teachers.
<b>Service Credit Accruals:</b>	It is assumed that members accrue one year of service credit per year.
<b>Variable Excess Benefits:</b>	These benefits are valued by increasing the otherwise calculated liabilities by an amount equal to twice the value of the variable excess. (The variable excess is the difference between the variable account and the variable at core account, summed over all participants.)

## **SECTION G**

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### **PLAN PROVISIONS**

# Summary of Benefit Provisions Evaluated December 31, 2021 Actuarial Valuation

## Normal Retirement Eligibility

The age a participant becomes eligible for an unreduced age and service annuity is:

General, Public School, & University		Protective		Executive & Elected <sup>#</sup>	
Age	Service	Age	Service	Age	Service
65	Any*	54	Any*	62	Any*
57	30	53	25	57	30

\* Participants first employed after 1989 and terminated before April 24, 1998 must have creditable service in five calendar years.

# These conditions apply to those people hired on or before December 31, 2016. For others, the General eligibility conditions apply.

## Normal Retirement Annuity

The age and service annuity payable at Normal Retirement Age is based on Final Average Earnings (FAE) and Creditable Service (CS) as follows:

Multiplier for Service Rendered			Group
Before 2000	Between 2000 & 2011	After 2011	
2.165%	2.0%	1.6%	Executive group and elected officials
2.165%	2.0%	2.0%	Protective occupation participants covered by Social Security
2.665%	2.5%	2.5%	Protective occupation participants not covered by Social Security
1.765%	1.6%	1.6%	All other participants

FAE is generally the average of the three highest years of earnings (July 1 - June 30 for teachers, educational support staff, and judges; calendar year for others) preceding retirement. These years do not have to be consecutive. For legislators and state constitutional officers who are ineligible to receive pay increases during their term, FAE is the statutory rate of earnings at termination.

Maximum formula annuity is 85% of FAE for protective occupation participants not covered by Social Security, 65% of FAE for protectives covered by Social Security, and 70% for all other participants. If greater than the formula amount, an annuity equal to the actuarial equivalent of two times the required accumulated contributions is paid in lieu of the formula amount (i.e., the Money Purchase Minimum).



**Reduced Retirement.** Any participant who has attained age 55 and any Protective occupation participant who has attained age 50 may apply for a reduced retirement annuity. The benefit is reduced 0.4% for each month that the annuity effective date precedes the Normal Retirement Age. For Non-Protective participants terminating after 6/30/90, the 0.4% is reduced for months after the attainment of age 57 and before the annuity effective date by .001111% for each month of creditable service.

**Voluntary Termination Before Immediate Benefit Eligibility.** Participant may either (i) receive a refund of accumulated contributions, or (ii) leave contributions on deposit and apply for a retirement annuity on or after the minimum retirement age based upon age and accrued service at time of termination.

**Post-Retirement Adjustments.** Annuities are increased annually if the investment income credited to retired life funds is in excess of the assumed benefit rate (presently 5%), other plan experiences are within projected ranges, and the resulting adjustment would be at least 0.5% (2.0% for the variable fund).

**Disability Benefits.** Generally, disability means the inability to engage in any substantial gainful activity by reason of a medically determinable physical or mental impairment which can be expected to result in death or to be of long-continued and indefinite duration. Disability applicants must be participating employees who are under normal retirement age, have not already taken a WRS benefit and who meet a service requirement.

For this purpose, **normal retirement age** is:

- 65 for general employees and executives and elected officials hired after December 31, 2016
- 62 for executives and elected officials hired on or before December 31, 2016
- 53 for protective occupation employees with 25 or more years of creditable service
- 54 for other protective occupation employees

The **service requirement** is that during the seven years preceding application the individual must have earned:

- At least 6 months of service credit in five of those years or
- A total of five years of service credit.

The service credit requirement may be waived if the disability is work related.

Protective occupation employees who become disabled between the ages of 50 and 55, who have at least 15 years of service, and who can no longer perform the duties of their position may apply for a special disability benefit until age 55.

**Disability Amount:** The disability benefit is the WRS formula benefit based upon service projected to normal retirement age as described above, without regard to the reduced retirement reduction.

**Death-in-Service.**

- (a) Prior to age 50 for Protective participants, age 55 for others, the benefit is the equivalent of twice the accumulated employee contributions required and all additional contributions and employer amounts contributed prior to 1974 for teachers, or 1966 for others.
- (b) After age 50 for Protective participants, age 55 for others, the benefit is the amount that would have been paid if participant had retired and elected 100% survivor option. Benefit is payable to an eligible beneficiary who must be a natural living person. If there is no eligible beneficiary, a refund of contributions is paid to the estate.





**Interest Credits.** For years after 1999, and for people with some active service after 1999, participant core accounts (including the variable at core accounts) are credited with interest at the full (core) effective rate. For others, accounts are credited with interest as follows:

Date of Participation	Rate Credited for Purpose of	
	Money Purchase Minimum	Refunds
Prior to 1982	Actual	Actual
January 1, 1982 & Later	5%	3%

Participant variable accounts are credited with interest based on the earnings in the variable portfolio.

**Contribution Rates.** The financial objective of WRS is to establish and receive contributions that will remain level from year to year and decade to decade.

Statutory required participant contributions prior to July 1, 2011 were as follows:

General, Public School, and University	5.0%
Executives & Elected Officials	5.5
Protectives	
- With Social Security	6.0
- Without Social Security	8.0

Statutory required participant contributions after July 1, 2011 are set equal to one-half of the actuarially determined rate for General participants and Executive and Elected Officials. Participant contributions for Protective participants are set equal to the participant contribution for General members.

**Normal Form of Benefit.** The normal form of benefit is a straight life annuity with no death benefits. Optional forms of benefit which are actuarially reduced are listed below:

- A life annuity with 60 or 180 monthly payments guaranteed.
- A joint survivorship annuity with 75% continued to beneficiary.
- A joint survivorship annuity with 100% continued to beneficiary.
- A joint survivorship annuity reduced 25% upon either your death or your beneficiary's death.
- A joint survivorship annuity with 100% continued to beneficiary combined with 180 monthly payments guaranteed.

For formula benefit calculations, optional forms are calculated at the lower of the current age or age 62 (Normal Retirement Age for Protective occupations). If a retiree (and beneficiary if in receipt of a joint survivorship annuity) dies prior to receiving benefits which, in total, are at least equal to the members contributions, a "residual refund" for the difference is paid.

**Vesting.** Participants hired prior to July 1, 2011 vest immediately. After July 1, 2011, participants vest after five years of service.



## **SECTION H**

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### **GAIN/LOSS STATISTICAL SUMMARY**

# General Males Non-State Withdrawal Experience During Calendar Year 2021

## Male Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	267	1,328	0.2011	0.1770	235
2	512	2,851	0.1796	0.1250	356
3	292	2,530	0.1154	0.0900	228
4	222	2,121	0.1047	0.0710	151
5	138	1,976	0.0698	0.0660	130
6	131	1,692	0.0774	0.0530	90
7	111	1,601	0.0693	0.0480	77
8	81	1,351	0.0600	0.0460	62
9	65	1,212	0.0536	0.0410	50
10	47	1,072	0.0438	0.0400	43
Totals	1,866	17,734	0.1052	0.0802	1,422

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

## Male Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	4	0.0000	0.0350	-
30-34	11	192	0.0573	0.0300	6
35-39	27	777	0.0347	0.0260	20
40-44	51	1,492	0.0342	0.0220	33
45-49	55	1,870	0.0294	0.0180	34
50-54	76	2,629	0.0289	0.0160	42
Over 54	89	6,647	0.0134		89
Totals	309	13,611	0.0227	0.0165	224

# General Males State Withdrawal Experience During Calendar Year 2021

## Male Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	149	568	0.2623	0.1720	98
2	279	1,343	0.2077	0.1290	173
3	168	1,180	0.1424	0.0950	112
4	121	1,033	0.1171	0.0740	76
5	86	1,010	0.0851	0.0730	74
6	67	872	0.0768	0.0610	53
7	61	828	0.0737	0.0520	43
8	51	798	0.0639	0.0510	41
9	50	695	0.0719	0.0450	31
10	35	708	0.0494	0.0360	25
Totals	1,067	9,035	0.1181	0.0804	726

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

## Male Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N\A	0.0350	-
30-34	3	70	0.0429	0.0280	2
35-39	23	476	0.0483	0.0270	13
40-44	25	754	0.0332	0.0260	20
45-49	40	947	0.0422	0.0220	21
50-54	37	1,296	0.0285	0.0170	22
Over 54	33	3,086	0.0107		33
Totals	161	6,629	0.0243	0.0167	111

# General Females Non-State Withdrawal Experience During Calendar Year 2021

## Female Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	988	3,884	0.2544	0.2000	777
2	1,361	7,057	0.1929	0.1500	1,059
3	831	5,549	0.1498	0.1150	638
4	570	4,512	0.1263	0.0960	433
5	396	3,879	0.1021	0.0900	349
6	332	3,261	0.1018	0.0740	241
7	266	2,829	0.0940	0.0630	178
8	178	2,542	0.0700	0.0600	153
9	154	2,198	0.0701	0.0570	125
10	135	1,872	0.0721	0.0500	94
Totals	5,211	37,583	0.1387	0.1077	4,047

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

## Female Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	3	0.0000	0.0500	-
30-34	17	182	0.0934	0.0480	9
35-39	66	1,104	0.0598	0.0360	40
40-44	93	1,933	0.0481	0.0300	58
45-49	87	2,552	0.0341	0.0290	74
50-54	130	3,930	0.0331	0.0220	86
Over 54	260	12,195	0.0213		260
Totals	653	21,899	0.0298	0.0241	527

# General Females State Withdrawal Experience During Calendar Year 2021

## Female Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	378	1,239	0.3051	0.1950	242
2	568	2,561	0.2218	0.1550	397
3	344	2,150	0.1600	0.1250	269
4	229	1,793	0.1277	0.1000	179
5	168	1,837	0.0915	0.0870	160
6	157	1,511	0.1039	0.0780	118
7	97	1,329	0.0730	0.0690	92
8	69	1,128	0.0612	0.0600	68
9	59	1,045	0.0565	0.0560	59
10	45	991	0.0454	0.0550	55
Totals	2,114	15,584	0.1357	0.1052	1,639

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

## Female Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	1	0.0000	0.0500	-
30-34	9	144	0.0625	0.0470	7
35-39	44	841	0.0523	0.0340	29
40-44	54	1,342	0.0402	0.0280	38
45-49	42	1,521	0.0276	0.0260	40
50-54	61	1,916	0.0318	0.0180	34
Over 54	39	4,565	0.0085		39
Totals	249	10,330	0.0241	0.0181	187

## Public Schools Males Non-State Withdrawal Experience During Calendar Year 2021

### Male Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	45	432	0.1042	0.1260	54
2	102	985	0.1036	0.1160	114
3	71	870	0.0816	0.0850	74
4	58	888	0.0653	0.0600	53
5	50	810	0.0617	0.0560	45
6	52	818	0.0636	0.0450	37
7	48	836	0.0574	0.0370	31
8	33	773	0.0427	0.0290	22
9	28	787	0.0356	0.0260	20
10	23	762	0.0302	0.0250	19
Totals	510	7,961	0.0641	0.0589	469

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

### Male Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N/A	0.0250	-
30-34	4	178	0.0225	0.0170	3
35-39	23	1,322	0.0174	0.0150	20
40-44	39	2,400	0.0163	0.0140	34
45-49	50	2,634	0.0190	0.0135	36
50-54	38	2,866	0.0133	0.0130	37
Over 54	43	3,042	0.0141		43
Totals	197	12,442	0.0158	0.0139	173

## Public Schools Females Non-State Withdrawal Experience During Calendar Year 2021

### Female Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	145	1,449	0.1001	0.1200	174
2	297	2,836	0.1047	0.1000	284
3	260	2,913	0.0893	0.0850	248
4	239	2,760	0.0866	0.0620	171
5	181	2,600	0.0696	0.0580	151
6	179	2,463	0.0727	0.0480	118
7	167	2,684	0.0622	0.0410	110
8	142	2,587	0.0549	0.0350	91
9	120	2,422	0.0495	0.0340	82
10	86	2,215	0.0388	0.0300	66
Totals	1,816	24,929	0.0728	0.0600	1,495

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

### Female Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N\A	0.0250	-
30-34	5	594	0.0084	0.0200	12
35-39	106	4,039	0.0262	0.0180	73
40-44	112	6,259	0.0179	0.0145	91
45-49	120	6,518	0.0184	0.0130	85
50-54	136	7,515	0.0181	0.0115	86
Over 54	112	8,215	0.0136		112
Totals	591	33,140	0.0178	0.0139	459



# University Males State Withdrawal Experience During Calendar Year 2021

## Male Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	58	298	0.1946	0.1400	42
2	106	710	0.1493	0.1380	98
3	134	807	0.1660	0.1260	102
4	87	671	0.1297	0.1100	74
5	59	608	0.0970	0.0860	52
6	58	513	0.1131	0.0850	44
7	38	450	0.0844	0.0700	32
8	29	463	0.0626	0.0560	26
9	18	476	0.0378	0.0460	22
10	13	406	0.0320	0.0430	17
Totals	600	5,402	0.1111	0.0942	509

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

## Male Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N/A	0.0430	-
30-34	-	17	0.0000	0.0410	1
35-39	11	207	0.0531	0.0385	8
40-44	7	506	0.0138	0.0305	15
45-49	15	779	0.0193	0.0255	20
50-54	17	996	0.0171	0.0220	22
Over 54	17	2,406	0.0071		17
Totals	67	4,911	0.0136	0.0169	83

# University Females State Withdrawal Experience During Calendar Year 2021

## Female Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	69	407	0.1695	0.1410	57
2	175	919	0.1904	0.1400	129
3	155	1,074	0.1443	0.1270	136
4	131	966	0.1356	0.1000	97
5	74	835	0.0886	0.0930	78
6	73	740	0.0986	0.0810	60
7	54	691	0.0781	0.0700	48
8	48	620	0.0774	0.0560	35
9	30	610	0.0492	0.0490	30
10	31	509	0.0609	0.0430	22
Totals	840	7,371	0.1140	0.0939	692

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

## Female Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N/A	0.0400	-
30-34	1	47	0.0213	0.0400	2
35-39	26	372	0.0699	0.0400	15
40-44	39	799	0.0488	0.0350	28
45-49	35	918	0.0381	0.0300	28
50-54	29	1,072	0.0271	0.0250	27
Over 54	11	2,253	0.0049		11
Totals	141	5,461	0.0258	0.0203	111

## Protective with Social Security Non-State Withdrawal Experience During Calendar Year 2021

### Male and Female Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	23	237	0.0970	0.1560	37
2	64	693	0.0924	0.0940	65
3	56	699	0.0801	0.0530	37
4	40	626	0.0639	0.0440	28
5	25	584	0.0428	0.0420	25
6	21	540	0.0389	0.0330	18
7	23	481	0.0478	0.0320	15
8	23	441	0.0522	0.0300	13
9	16	401	0.0399	0.0270	11
10	14	403	0.0347	0.0230	9
Totals	305	5,105	0.0597	0.0505	258

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

### Male and Female Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N\A	0.0220	-
30-34	3	225	0.0133	0.0200	5
35-39	30	1,118	0.0268	0.0160	18
40-44	33	1,355	0.0244	0.0150	20
45-49	37	1,505	0.0246	0.0140	21
50-54	11	1,394	0.0079	0.0130	18
Totals	114	5,597	0.0204	0.0147	82

## Protective with Social Security State Withdrawal Experience During Calendar Year 2021

### Male and Female Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	103	294	0.3503	0.1880	55
2	232	784	0.2959	0.1550	122
3	120	594	0.2020	0.1050	62
4	62	500	0.1240	0.0650	33
5	47	519	0.0906	0.0550	29
6	31	452	0.0686	0.0500	23
7	15	319	0.0470	0.0450	14
8	20	343	0.0583	0.0400	14
9	9	261	0.0345	0.0350	9
10	11	225	0.0489	0.0330	7
Totals	650	4,291	0.1515	0.0858	368

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

### Male and Female Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	1	0.0000	0.0300	-
30-34	4	104	0.0385	0.0280	3
35-39	13	518	0.0251	0.0220	11
40-44	20	807	0.0248	0.0160	13
45-49	17	910	0.0187	0.0130	12
50-54	8	1,066	0.0075	0.0120	13
Totals	62	3,406	0.0182	0.0153	52

## Protective without Social Security Non-State Withdrawal Experience During Calendar Year 2021

### Male and Female Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	-	31	0.0000	0.0450	1
2	10	108	0.0926	0.0400	4
3	5	109	0.0459	0.0200	2
4	6	131	0.0458	0.0180	2
5	2	112	0.0179	0.0170	2
6	3	111	0.0270	0.0130	1
7	1	114	0.0088	0.0120	1
8	1	116	0.0086	0.0090	1
9	1	111	0.0090	0.0080	1
10	3	92	0.0326	0.0070	1
Totals	32	1,035	0.0309	0.0155	16

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

### Male and Female Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	1	0.0000	0.0070	-
30-34	-	68	0.0000	0.0065	-
35-39	2	257	0.0078	0.0060	2
40-44	4	367	0.0109	0.0055	2
45-49	3	418	0.0072	0.0050	2
50-54	11	419	0.0263	0.0045	2
Totals	20	1,530	0.0131	0.0052	8

## Executive and Elected Non-State Withdrawal Experience During Calendar Year 2021

### Male and Female Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	4	16	0.2500	0.2500	4
2	7	33	0.2121	0.2000	7
3	3	31	0.0968	0.1700	5
4	5	27	0.1852	0.1600	4
5	1	32	0.0313	0.1300	4
6	3	19	0.1579	0.0400	1
7	1	21	0.0476	0.0400	1
8	1	8	0.1250	0.0400	-
9	2	31	0.0645	0.0400	1
10	3	11	0.2727	0.0400	-
Totals	30	229	0.1310	0.1179	27

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

### Male and Female Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N/A	0.0450	-
30-34	-	1	0.0000	0.0450	-
35-39	-	2	0.0000	0.0450	-
40-44	-	17	0.0000	0.0400	1
45-49	1	26	0.0385	0.0350	1
50-54	-	50	0.0000	0.0300	2
Over 54	-	199	0.0000		-
Totals	1	295	0.0034	0.0136	4

## Executive and Elected State Withdrawal Experience During Calendar Year 2021

### Male and Female Service-Based Withdrawals All Ages

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	1	8	0.1250	0.2500	2
2	1	20	0.0500	0.2000	4
3	4	51	0.0784	0.1700	9
4	2	19	0.1053	0.1600	3
5	1	32	0.0313	0.1300	4
6	2	23	0.0870	0.0400	1
7	4	46	0.0870	0.0400	2
8	3	17	0.1765	0.0400	1
9	1	33	0.0303	0.0400	1
10	2	27	0.0741	0.0400	1
Totals	21	276	0.0761	0.0000	28

Service index 1 corresponds to service between 0 and 1 years, service index 2 corresponds to service between 1 and 2 years of service, etc. As such, service index 10 corresponds to service between 9 and 10 years of service.

### Male and Female Age-Based Withdrawals 10+ Years of Service

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N/A	0.0450	-
30-34	-	-	N/A	0.0450	-
35-39	1	15	0.0667	0.0450	1
40-44	4	40	0.1000	0.0400	2
45-49	3	52	0.0577	0.0350	2
50-54	2	64	0.0313	0.0300	2
Over 54	-	248	0.0000		-
Totals	10	419	0.0239	0.0167	7

# General Non-State Disability Experience During Calendar Year 2021

## Male Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0001	-
20-24	-	18	0.0000	0.0001	-
25-29	-	437	0.0000	0.0001	-
30-34	-	1,444	0.0000	0.0001	-
35-39	-	2,126	0.0000	0.0002	-
40-44	-	2,682	0.0000	0.0005	1
45-49	3	2,846	0.0011	0.0006	2
50-54	5	3,538	0.0014	0.0017	6
55-59	7	3,600	0.0019	0.0030	11
60-64	10	2,549	0.0039	0.0059	15
65-69	-	-	N\A	0.0023	-
70-74	-	-	N\A	0.0020	-
75 and over	-	-	N/A	0.0020	-
Totals	25	19,240	0.0013	0.0018	35

## Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0000	-
20-24	-	8	0.0000	0.0000	-
25-29	-	536	0.0000	0.0000	-
30-34	-	2,079	0.0000	0.0002	-
35-39	-	3,042	0.0000	0.0002	1
40-44	1	3,786	0.0003	0.0004	1
45-49	2	4,508	0.0004	0.0005	2
50-54	2	6,225	0.0003	0.0009	5
55-59	15	7,166	0.0021	0.0016	12
60-64	13	5,605	0.0023	0.0020	11
65-69	-	-	N\A	0.0016	-
70-74	-	-	N\A	0.0014	-
75 and over	-	-	N/A	0.0014	-
Totals	33	32,955	0.0010	0.0010	32

The people shown on this page are cases involving \$40.63 disability benefits and includes those who were either active or inactive with pending benefits at the beginning of the year.





# General State Disability Experience During Calendar Year 2021

## Male Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0001	-
20-24	-	1	0.0000	0.0001	-
25-29	-	180	0.0000	0.0001	-
30-34	1	957	0.0010	0.0001	-
35-39	-	1,299	0.0000	0.0002	-
40-44	-	1,382	0.0000	0.0005	1
45-49	-	1,396	0.0000	0.0006	1
50-54	2	1,767	0.0011	0.0017	3
55-59	8	1,667	0.0048	0.0030	5
60-64	4	1,165	0.0034	0.0059	7
65-69	-	-	N\A	0.0023	-
70-74	-	-	N\A	0.0020	-
75 and over	-	-	N/A	0.0020	-
Totals	15	9,814	0.0015	0.0017	17

## Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0000	-
20-24	-	5	0.0000	0.0000	-
25-29	-	441	0.0000	0.0000	-
30-34	-	1,740	0.0000	0.0002	-
35-39	2	2,131	0.0009	0.0002	-
40-44	2	2,231	0.0009	0.0004	1
45-49	4	2,264	0.0018	0.0005	1
50-54	6	2,596	0.0023	0.0009	2
55-59	9	2,492	0.0036	0.0016	4
60-64	15	1,785	0.0084	0.0020	4
65-69	-	-	N\A	0.0016	-
70-74	-	-	N\A	0.0014	-
75 and over	-	-	N/A	0.0014	-
Totals	38	15,685	0.0024	0.0008	12

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## Public Schools Non-State Disability Experience During Calendar Year 2021

### Male Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0001	-
20-24	-	-	N/A	0.0001	-
25-29	-	281	0.0000	0.0001	-
30-34	-	1,733	0.0000	0.0001	-
35-39	-	2,299	0.0000	0.0001	-
40-44	-	2,955	0.0000	0.0002	-
45-49	2	3,011	0.0007	0.0003	1
50-54	-	3,150	0.0000	0.0012	4
55-59	4	1,852	0.0022	0.0016	3
60-64	-	638	0.0000	0.0028	2
65-69	-	-	N/A	0.0040	-
70-74	-	-	N/A	0.0041	-
75 and over	-	-	N/A	0.0041	-
Totals	6	15,919	0.0004	0.0006	10

### Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0001	-
20-24	-	-	N/A	0.0001	-
25-29	-	1,387	0.0000	0.0001	-
30-34	-	5,677	0.0000	0.0001	-
35-39	1	6,751	0.0001	0.0001	1
40-44	2	7,800	0.0003	0.0002	2
45-49	2	7,673	0.0003	0.0008	6
50-54	5	8,432	0.0006	0.0011	9
55-59	11	5,070	0.0022	0.0017	9
60-64	4	1,953	0.0020	0.0024	5
65-69	-	-	N/A	0.0014	-
70-74	-	-	N/A	0.0011	-
75 and over	-	-	N/A	0.0011	-
Totals	25	44,743	0.0006	0.0007	32

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# University State Disability Experience During Calendar Year 2021

## Male Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0000	-
20-24	-	-	N/A	0.0000	-
25-29	-	62	0.0000	0.0000	-
30-34	-	354	0.0000	0.0000	-
35-39	-	791	0.0000	0.0000	-
40-44	-	1,126	0.0000	0.0001	-
45-49	1	1,138	0.0009	0.0002	-
50-54	-	1,252	0.0000	0.0004	-
55-59	-	1,039	0.0000	0.0012	1
60-64	2	754	0.0027	0.0011	1
65-69	-	-	N/A	0.0014	-
70-74	-	-	N/A	0.0012	-
75 and over	-	-	N/A	0.0012	-
Totals	3	6,516	0.0005	0.0003	2

## Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0001	-
20-24	-	-	N/A	0.0001	-
25-29	-	135	0.0000	0.0001	-
30-34	-	687	0.0000	0.0001	-
35-39	-	1,175	0.0000	0.0004	-
40-44	1	1,495	0.0007	0.0005	1
45-49	-	1,366	0.0000	0.0004	1
50-54	-	1,385	0.0000	0.0009	1
55-59	-	1,232	0.0000	0.0013	2
60-64	-	783	0.0000	0.0020	2
65-69	-	-	N/A	0.0013	-
70-74	-	-	N/A	0.0011	-
75 and over	-	-	N/A	0.0011	-
Totals	1	8,258	0.0001	0.0008	7

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# Protective without Social Security Non-State Disability Experience During Calendar Year 2021

## Male and Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0003	-
20-24	-	3	0.0000	0.0003	-
25-29	-	101	0.0000	0.0003	-
30-34	-	313	0.0000	0.0003	-
35-39	-	422	0.0000	0.0004	-
40-44	-	427	0.0000	0.0006	-
45-49	-	435	0.0000	0.0012	1
50-54	2	330	0.0061	0.0084	3
55-59	-	-	N/A	0.0012	-
60-64	-	-	N/A	0.0012	-
65-69	-	-	N/A	0.0012	-
70-74	-	-	N/A	0.0012	-
75 and over	-	-	N/A	0.0012	-
Totals	2	2,031	0.0010	0.0020	4

The people shown on this page are cases involving \$40.63 disability benefits and includes those who were either active or inactive with pending benefits at the beginning of the year.

# Protective with Social Security Non-State Disability Experience During Calendar Year 2021

## Male and Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0002	-
20-24	-	2	0.0000	0.0002	-
25-29	-	520	0.0000	0.0002	-
30-34	-	1,379	0.0000	0.0002	-
35-39	-	1,651	0.0000	0.0003	1
40-44	1	1,552	0.0006	0.0004	1
45-49	2	1,602	0.0012	0.0006	1
50-54	1	1,125	0.0009	0.0010	1
55-59	-	-	N/A	0.0224	-
60-64	-	-	N/A	0.0240	-
65-69	-	-	N/A	0.0016	-
70-74	-	-	N/A	0.0016	-
75 and over	-	-	N/A	0.0016	-
Totals	4	7,831	0.0005	0.0005	4

The people shown on this page are cases involving \$40.63 disability benefits and includes those who were either active or inactive with pending benefits at the beginning of the year.

# Protective with Social Security State Disability Experience During Calendar Year 2021

## Male and Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0002	-
20-24	-	10	0.0000	0.0002	-
25-29	-	320	0.0000	0.0002	-
30-34	-	739	0.0000	0.0002	-
35-39	-	920	0.0000	0.0004	-
40-44	1	1,024	0.0010	0.0005	1
45-49	2	1,040	0.0019	0.0008	1
50-54	4	912	0.0044	0.0013	1
55-59	-	-	N\A	0.0280	-
60-64	-	-	N\A	0.0300	-
65-69	-	-	N\A	0.0020	-
70-74	-	-	N/A	0.0020	-
75 and over	-	-	N/A	0.0020	-
Totals	7	4,965	0.0014	0.0006	3

The people shown on this page are cases involving \$40.63 disability benefits and includes those who were either active or inactive with pending benefits at the beginning of the year.

# Executive and Elected Non-State Disability Experience During Calendar Year 2021

## Male and Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0000	-
20-24	-	-	N/A	0.0000	-
25-29	-	-	N/A	0.0000	-
30-34	-	4	0.0000	0.0000	-
35-39	-	8	0.0000	0.0001	-
40-44	-	27	0.0000	0.0001	-
45-49	-	35	0.0000	0.0002	-
50-54	-	67	0.0000	0.0003	-
55-59	-	91	0.0000	0.0012	-
60-64	-	31	0.0000	0.0011	-
65-69	-	-	N/A	0.0009	-
70-74	-	-	N/A	0.0009	-
75 and over	-	-	N/A	0.0009	-
Totals	-	263	N/A	N/A	-

The people shown on this page are cases involving \$40.63 disability benefits and includes those who were either active or inactive with pending benefits at the beginning of the year.

# Executive and Elected State Disability Experience During Calendar Year 2021

## Male and Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0000	-
20-24	-	-	N/A	0.0000	-
25-29	-	1	0.0000	0.0000	-
30-34	-	10	0.0000	0.0000	-
35-39	-	44	0.0000	0.0001	-
40-44	-	54	0.0000	0.0001	-
45-49	-	71	0.0000	0.0002	-
50-54	-	90	0.0000	0.0003	-
55-59	-	107	0.0000	0.0012	-
60-64	-	36	0.0000	0.0011	-
65-69	-	-	N/A	0.0009	-
70-74	-	-	N/A	0.0009	-
75 and over	-	-	N/A	0.0009	-
Totals	-	413	N/A	N/A	-

The people shown on this page are cases involving \$40.63 disability benefits and includes those who were either active or inactive with pending benefits at the beginning of the year.



## General Non-State Pay Increase Assumption During Calendar Year 2021

### Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	29,662	8.05 %	6.45 %
6-10	17,785	3.30 %	4.90 %
11-15	10,334	2.65 %	4.25 %
16-20	8,121	2.32 %	4.00 %
21-25	6,843	1.71 %	3.75 %
26-30	3,465	1.52 %	3.50 %
31-35	1,896	1.57 %	3.30 %
36-40	607	1.08 %	3.20 %
Over 40	233	1.28 %	3.10 %
Total	78,946		

# General State Pay Increase Assumption During Calendar Year 2021

## Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	11,970	11.33 %	6.45 %
6-10	8,967	3.26 %	4.90 %
11-15	4,873	2.28 %	4.25 %
16-20	3,627	2.02 %	4.00 %
21-25	3,314	0.79 %	3.75 %
26-30	1,789	0.21 %	3.50 %
31-35	1,079	(0.51)%	3.30 %
36-40	347	(0.09)%	3.20 %
Over 40	121	(1.26)%	3.10 %
Total	36,087		

# Public Schools Non-State Pay Increase Assumption During Calendar Year 2021

## Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	15,022	11.99 %	8.60 %
6-10	15,370	5.77 %	6.40 %
11-15	11,434	4.63 %	5.10 %
16-20	11,308	3.99 %	4.00 %
21-25	10,555	3.22 %	3.35 %
26-30	6,377	2.43 %	3.20 %
31-35	2,520	2.46 %	3.15 %
36-40	382	2.38 %	3.10 %
Over 40	55	(0.86)%	3.05 %
Total	73,023		

# University State Pay Increase Assumption During Calendar Year 2021

## Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	6,190	22.37 %	6.00 %
6-10	4,994	11.53 %	5.50 %
11-15	3,379	11.17 %	5.00 %
16-20	2,575	10.34 %	4.50 %
21-25	1,942	10.25 %	3.95 %
26-30	922	9.53 %	3.80 %
31-35	527	9.50 %	3.60 %
36-40	192	9.34 %	3.20 %
Over 40	73	10.25 %	3.10 %
Total	20,794		

## Protective with Social Security Non-State Pay Increase Assumption During Calendar Year 2021

### Male and Female Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	2,574	14.60 %	7.75 %
6-10	2,144	3.43 %	4.50 %
11-15	1,657	2.05 %	3.90 %
16-20	1,483	1.90 %	3.80 %
21-25	1,527	1.35 %	3.70 %
26-30	769	2.23 %	3.60 %
31-35	125	0.97 %	3.50 %
36-40	25	2.15 %	3.40 %
Over 40	11	0.74 %	3.20 %
Total	10,315		

## Protective with Social Security State Pay Increase Assumption During Calendar Year 2021

### Male and Female Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	2,061	9.80 %	7.75 %
6-10	1,468	4.02 %	4.50 %
11-15	886	2.76 %	3.90 %
16-20	1,051	3.18 %	3.80 %
21-25	1,138	(0.08)%	3.70 %
26-30	532	(1.96)%	3.60 %
31-35	93	(2.23)%	3.50 %
36-40	6	(4.92)%	3.40 %
Over 40	4	(4.09)%	3.20 %
Total	7,239		

## Protective without Social Security Non-State Pay Increase Assumption During Calendar Year 2021

### Male and Female Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	465	14.46 %	8.50 %
6-10	530	4.89 %	4.30 %
11-15	454	4.18 %	3.60 %
16-20	377	4.31 %	3.50 %
21-25	492	4.13 %	3.40 %
26-30	201	5.71 %	3.30 %
31-35	54	4.56 %	3.20 %
36-40	2	1.87 %	3.10 %
Over 40	2	N/A	3.05 %
Total	2,577		

## Executive and Elected Non-State Pay Increase Assumption During Calendar Year 2021

### Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	138	6.53 %	5.50 %
6-10	85	5.78 %	3.20 %
11-15	54	0.22 %	3.20 %
16-20	49	2.75 %	3.20 %
21-25	59	2.48 %	3.20 %
26-30	42	1.90 %	3.20 %
31-35	24	2.55 %	3.20 %
36-40	14	3.16 %	3.20 %
Over 40	6	2.96 %	3.20 %
Total	471		



## Executive and Elected State Pay Increase Assumption During Calendar Year 2021

### Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	121	12.66 %	5.50 %
6-10	130	1.79 %	3.20 %
11-15	118	0.55 %	3.20 %
16-20	76	1.06 %	3.20 %
21-25	85	(0.67)%	3.20 %
26-30	40	0.46 %	3.20 %
31-35	46	2.78 %	3.20 %
36-40	15	(1.26)%	3.20 %
Over 40	4	(1.60)%	3.20 %
Total	635		

## General Males Non-State Normal Retirement Experience During Calendar Year 2021

### Male Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	40	125	0.3200	0.2000	25
58	35	155	0.2258	0.2000	31
59	23	144	0.1597	0.2000	29
60	43	203	0.2118	0.2000	41
61	34	156	0.2179	0.2000	31
62	38	132	0.2879	0.3000	40
63	37	122	0.3033	0.3000	37
64	30	95	0.3158	0.3000	29
65	140	478	0.2929	0.3000	143
66	94	335	0.2806	0.4000	134
67	50	226	0.2212	0.3200	72
68	22	149	0.1477	0.3200	48
69	23	120	0.1917	0.2800	34
70	10	106	0.0943	0.2800	30
71	12	85	0.1412	0.2800	24
72	3	56	0.0536	0.2800	16
73	3	45	0.0667	0.1800	8
74	4	38	0.1053	0.1800	7
Totals	641	2,770	0.2314	0.2812	779
75 & Over	13	139			139
Totals	654	2,909			918

**General Males State  
Normal Retirement Experience  
During Calendar Year 2021**

**Male Age-Based Retirement Experience**

<b>Age</b>	<b>Retirements</b>	<b>Exposure</b>	<b>Crude Rates</b>	<b>Current Rates</b>	<b>Expected Retirements</b>
57	36	82	0.4390	0.1900	16
58	17	74	0.2297	0.1900	14
59	9	55	0.1636	0.1900	10
60	18	85	0.2118	0.1900	16
61	12	84	0.1429	0.1900	16
62	14	61	0.2295	0.2800	17
63	15	54	0.2778	0.3000	16
64	18	54	0.3333	0.2500	14
65	53	242	0.2190	0.2700	65
66	45	149	0.3020	0.3500	52
67	30	135	0.2222	0.3200	43
68	14	72	0.1944	0.2100	15
69	9	67	0.1343	0.2100	14
70	14	51	0.2745	0.2100	11
71	6	43	0.1395	0.2100	9
72	7	36	0.1944	0.2100	8
73	3	17	0.1765	0.3000	5
74	3	23	0.1304	0.3000	7
Totals	323	1,384	0.2334	0.2514	348
75 & Over	9	42			42
Totals	332	1,426			390

## General Males Non-State Reduced Retirement Experience During Calendar Year 2021

### Male Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	47	801	0.0587	0.0730	58
56	48	768	0.0625	0.0600	46
57	25	702	0.0356	0.0520	37
58	36	628	0.0573	0.0560	35
59	38	701	0.0542	0.0590	41
60	49	635	0.0772	0.0930	59
61	46	599	0.0768	0.0800	48
62	85	534	0.1592	0.1900	101
63	77	441	0.1746	0.2000	88
64	49	340	0.1441	0.1800	61
Totals	500	6,149	0.0813	0.0933	574

# General Males State Reduced Retirement Experience During Calendar Year 2021

## Male Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	18	392	0.0459	0.0550	22
56	17	393	0.0433	0.0650	26
57	16	294	0.0544	0.0550	16
58	18	289	0.0623	0.0550	16
59	18	299	0.0602	0.0650	19
60	20	268	0.0746	0.0900	24
61	20	255	0.0784	0.1250	32
62	24	226	0.1062	0.1600	36
63	30	219	0.1370	0.1700	37
64	30	197	0.1523	0.2100	41
Totals	211	2,832	0.0745	0.0950	269

## General Females Non-State Normal Retirement Experience During Calendar Year 2021

### Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	41	171	0.2398	0.1700	29
58	30	175	0.1714	0.1800	32
59	26	165	0.1576	0.1400	23
60	38	176	0.2159	0.2000	35
61	43	168	0.2560	0.1800	30
62	40	167	0.2395	0.2400	40
63	43	136	0.3162	0.2900	39
64	28	112	0.2500	0.2300	26
65	256	902	0.2838	0.3500	316
66	195	596	0.3272	0.3900	232
67	98	356	0.2753	0.3300	117
68	60	258	0.2326	0.3000	77
69	35	202	0.1733	0.2200	44
70	27	161	0.1677	0.2600	42
71	21	105	0.2000	0.2800	29
72	11	90	0.1222	0.3000	27
73	10	65	0.1538	0.3000	20
74	5	64	0.0781	0.1600	10
Totals	1,007	4,069	0.2475	0.2870	1,168
75 & Over	29	206			206
Totals	1,036	4,275			1,374

**General Females State  
Normal Retirement Experience  
During Calendar Year 2021**

**Female Age-Based Retirement Experience**

<b>Age</b>	<b>Retirements</b>	<b>Exposure</b>	<b>Crude Rates</b>	<b>Current Rates</b>	<b>Expected Retirements</b>
57	34	120	0.2833	0.1900	23
58	28	109	0.2569	0.1900	21
59	20	111	0.1802	0.1900	21
60	25	98	0.2551	0.2100	21
61	31	107	0.2897	0.2500	27
62	24	91	0.2637	0.2900	26
63	30	90	0.3333	0.2800	25
64	19	73	0.2603	0.3100	23
65	61	270	0.2259	0.3100	84
66	59	203	0.2906	0.3600	73
67	44	159	0.2767	0.3300	52
68	22	91	0.2418	0.2500	23
69	19	62	0.3065	0.2700	17
70	22	65	0.3385	0.2900	19
71	9	30	0.3000	0.3400	10
72	6	24	0.2500	0.3300	8
73	2	24	0.0833	0.2400	6
74	2	9	0.2222	0.1800	2
Totals	457	1,736	0.2632	0.2771	481
75 & Over	10	31			31
Totals	467	1,767			512

## General Females Non-State Reduced Retirement Experience During Calendar Year 2021

### Female Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	58	1,483	0.0391	0.0700	104
56	72	1,512	0.0476	0.0700	106
57	63	1,392	0.0453	0.0550	77
58	58	1,403	0.0413	0.0650	91
59	91	1,376	0.0661	0.0700	96
60	104	1,380	0.0754	0.0950	131
61	106	1,260	0.0841	0.0950	120
62	167	1,171	0.1426	0.1600	187
63	166	935	0.1775	0.1800	168
64	149	859	0.1735	0.1800	155
Totals	1,034	12,771	0.0810	0.0967	1,235



## General Females State Reduced Retirement Experience During Calendar Year 2021

### Female Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	25	577	0.0433	0.0600	35
56	27	560	0.0482	0.0800	45
57	25	450	0.0556	0.0600	27
58	28	459	0.0610	0.0900	41
59	24	446	0.0538	0.0750	33
60	38	422	0.0900	0.1000	42
61	33	445	0.0742	0.1100	49
62	52	384	0.1354	0.1800	69
63	49	291	0.1684	0.1950	57
64	45	243	0.1852	0.1800	44
Totals	346	4,277	0.0809	0.1033	442

# Public School Males Non-State Normal Retirement Experience During Calendar Year 2021

## Male Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	49	156	0.3141	0.3100	48
58	35	125	0.2800	0.2900	36
59	28	98	0.2857	0.2800	27
60	30	78	0.3846	0.2700	21
61	26	61	0.4262	0.2600	16
62	27	51	0.5294	0.3900	20
63	13	31	0.4194	0.3300	10
64	9	26	0.3462	0.3000	8
65	26	84	0.3095	0.3200	27
66	14	65	0.2154	0.3500	23
67	9	58	0.1552	0.3100	18
68	3	33	0.0909	0.2800	9
69	5	31	0.1613	0.2000	6
70	7	31	0.2258	0.3000	9
71	2	17	0.1176	0.2500	4
72	1	15	0.0667	0.2500	4
73	1	7	0.1429	0.2500	2
74	1	7	0.1429	0.2500	2
Totals	286	974	0.2936	0.2977	290
75 & Over	3	30			30
Totals	289	1,004			320

# Public School Males Non-State Reduced Retirement Experience During Calendar Year 2021

## Male Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	50	609	0.0821	0.1200	73
56	60	538	0.1115	0.1300	70
57	24	289	0.0830	0.1300	38
58	18	211	0.0853	0.1200	25
59	31	205	0.1512	0.1430	29
60	24	180	0.1333	0.1600	29
61	19	134	0.1418	0.1600	21
62	31	131	0.2366	0.2300	30
63	19	113	0.1681	0.2100	24
64	11	80	0.1375	0.2100	17
Totals	287	2,490	0.1153	0.1430	356

## Public School Females Non-State Normal Retirement Experience During Calendar Year 2021

### Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	103	387	0.2661	0.2750	106
58	93	297	0.3131	0.2750	82
59	58	221	0.2624	0.2600	57
60	70	207	0.3382	0.2900	60
61	37	134	0.2761	0.2700	36
62	48	134	0.3582	0.3600	48
63	21	71	0.2958	0.3100	22
64	30	75	0.4000	0.3000	23
65	86	254	0.3386	0.3850	98
66	42	152	0.2763	0.4400	67
67	29	92	0.3152	0.3100	29
68	20	70	0.2857	0.3000	21
69	13	59	0.2203	0.3000	18
70	9	53	0.1698	0.3200	17
71	9	29	0.3103	0.2500	7
72	8	33	0.2424	0.2500	8
73	2	11	0.1818	0.2500	3
74	-	13	0.0000	0.2500	3
Totals	678	2,292	0.2958	0.3076	705
75 & Over	3	42			42
Totals	681	2,334			747

## Public School Females Non-State Reduced Retirement Experience During Calendar Year 2021

### Female Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	156	1,613	0.0967	0.1100	177
56	157	1,361	0.1154	0.1300	177
57	76	781	0.0973	0.1200	94
58	75	698	0.1074	0.1300	91
59	68	617	0.1102	0.1350	83
60	79	519	0.1522	0.1700	88
61	73	502	0.1454	0.1700	85
62	93	392	0.2372	0.2400	94
63	67	323	0.2074	0.2400	78
64	50	217	0.2304	0.2400	52
Totals	894	7,023	0.1273	0.1451	1,019

# University Males State Normal Retirement Experience During Calendar Year 2021

## Male Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	1	17	0.0588	0.1200	2
58	3	18	0.1667	0.1600	3
59	4	29	0.1379	0.0900	3
60	3	27	0.1111	0.1500	4
61	6	29	0.2069	0.0900	3
62	2	34	0.0588	0.1000	3
63	6	44	0.1364	0.1100	5
64	9	60	0.1500	0.1550	9
65	28	170	0.1647	0.1550	26
66	36	153	0.2353	0.2100	32
67	22	111	0.1982	0.1800	20
68	15	87	0.1724	0.1900	17
69	19	69	0.2754	0.1400	10
70	24	74	0.3243	0.2100	16
71	14	52	0.2692	0.2400	12
72	9	36	0.2500	0.2400	9
73	4	28	0.1429	0.2400	7
74	8	22	0.3636	0.2400	5
Totals	213	1,060	0.2009	0.1755	186
75 & Over	19	81			81
Totals	232	1,141			267

# University Males State Reduced Retirement Experience During Calendar Year 2021

## Male Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	6	219	0.0274	0.0330	7
56	11	223	0.0493	0.0330	7
57	10	235	0.0426	0.0400	9
58	9	199	0.0452	0.0400	8
59	7	163	0.0429	0.0440	7
60	13	155	0.0839	0.0480	7
61	13	158	0.0823	0.0480	8
62	14	168	0.0833	0.0700	12
63	15	140	0.1071	0.0830	12
64	9	133	0.0677	0.1150	15
Totals	107	1,793	0.0597	0.0513	92

# University Females State Normal Retirement Experience During Calendar Year 2021

## Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	6	34	0.1765	0.1000	3
58	4	25	0.1600	0.2000	5
59	3	29	0.1034	0.1200	3
60	4	26	0.1538	0.1400	4
61	3	23	0.1304	0.1300	3
62	12	39	0.3077	0.1500	6
63	11	32	0.3438	0.1900	6
64	4	29	0.1379	0.1700	5
65	26	149	0.1745	0.2100	31
66	26	113	0.2301	0.2500	28
67	22	85	0.2588	0.2500	21
68	11	46	0.2391	0.1800	8
69	13	54	0.2407	0.1650	9
70	8	37	0.2162	0.2200	8
71	8	32	0.2500	0.1650	5
72	4	18	0.2222	0.1700	3
73	3	14	0.2143	0.2100	3
74	4	13	0.3077	0.1400	2
Totals	172	798	0.2155	0.1917	153
75 & Over	7	35			35
Totals	179	833			188



# University Females State Reduced Retirement Experience During Calendar Year 2021

## Female Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	3	255	0.0118	0.0500	13
56	15	278	0.0540	0.0500	14
57	14	259	0.0541	0.0500	13
58	7	218	0.0321	0.0550	12
59	16	222	0.0721	0.0600	13
60	14	191	0.0733	0.0750	14
61	15	192	0.0781	0.0900	17
62	23	167	0.1377	0.1100	18
63	13	111	0.1171	0.1200	13
64	26	122	0.2131	0.1450	18
Totals	146	2,015	0.0725	0.0720	145

## Protective with Social Security Non-State Normal Retirement Experience During Calendar Year 2021

### Male and Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
50	28	284	0.0986	0.0600	17
51	37	295	0.1254	0.0800	24
52	29	237	0.1224	0.1100	26
53	73	198	0.3687	0.3400	67
54	56	185	0.3027	0.3200	59
55	43	111	0.3874	0.2600	29
56	24	110	0.2182	0.2300	25
57	21	72	0.2917	0.2700	19
58	20	62	0.3226	0.2100	13
59	12	54	0.2222	0.2300	12
60	14	45	0.3111	0.2200	10
61	6	32	0.1875	0.3000	10
62	7	18	0.3889	0.3500	6
63	1	15	0.0667	0.2700	4
64	5	15	0.3333	0.3000	5
65	6	17	0.3529	0.3400	6
66	7	11	0.6364	0.3500	4
67	2	10	0.2000	0.3500	4
68	1	3	0.3333	0.3500	1
69	2	4	0.5000	0.3500	1
70	1	2	0.5000	1.0000	2
71	-	1	0.0000	1.0000	1
72	-	-	N/A	1.0000	-
73	1	1	1.0000	1.0000	1
74	-	2	0.0000	1.0000	2
Totals	396	1,784	0.2220	0.1951	348
75 & Over	-	3			3
Totals	396	1,787			351

**Protective with Social Security State  
Normal Retirement Experience  
During Calendar Year 2021**

**Male and Female Age-Based Retirement Experience**

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
50	24	197	0.1218	0.0750	15
51	14	206	0.0680	0.0900	19
52	21	168	0.1250	0.1100	18
53	45	154	0.2922	0.2500	39
54	37	155	0.2387	0.2000	31
55	21	134	0.1567	0.2000	27
56	30	117	0.2564	0.2000	23
57	13	94	0.1383	0.2000	19
58	18	87	0.2069	0.2000	17
59	19	91	0.2088	0.2000	18
60	16	69	0.2319	0.2000	14
61	12	61	0.1967	0.2000	12
62	9	46	0.1957	0.2500	12
63	14	45	0.3111	0.2500	11
64	7	32	0.2188	0.3600	12
65	8	18	0.4444	0.3800	7
66	8	17	0.4706	0.3800	6
67	-	10	0.0000	0.3800	4
68	6	9	0.6667	0.3800	3
69	1	1	1.0000	0.3800	-
70	-	2	0.0000	1.0000	2
71	-	-	N/A	1.0000	-
72	-	-	N/A	1.0000	-
73	-	-	N/A	1.0000	-
74	-	-	N/A	1.0000	-
Totals	323	1,713	0.1886	0.1804	309
75 & Over	-	1			1
Totals	323	1,714			310

**Protective without Social Security Non-State  
Normal Retirement Experience  
During Calendar Year 2021**

**Male and Female Age-Based Retirement Experience**

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
50	2	80	0.0250	0.0300	2
51	4	77	0.0519	0.0350	3
52	3	93	0.0323	0.0450	4
53	17	53	0.3208	0.1700	9
54	20	58	0.3448	0.2400	14
55	11	54	0.2037	0.2900	16
56	12	40	0.3000	0.3200	13
57	8	28	0.2857	0.2300	6
58	3	15	0.2000	0.2700	4
59	10	21	0.4762	0.4000	8
60	4	9	0.4444	0.2500	2
61	4	8	0.5000	0.2500	2
62	2	7	0.2857	0.3100	2
63	1	4	0.2500	0.4000	2
64	2	3	0.6667	0.4000	1
65	-	1	0.0000	0.4000	-
66	-	1	0.0000	1.0000	1
67	-	-	N/A	1.0000	-
68	-	1	0.0000	1.0000	1
69	-	-	N/A	1.0000	-
70	-	1	0.0000	1.0000	1
71	-	-	N/A	1.0000	-
72	-	-	N/A	1.0000	-
73	-	-	N/A	1.0000	-
74	-	-	N/A	1.0000	-
Totals	103	554	0.1859	0.1643	91
75 & Over	-	-	N/A		-
Totals	103	554			91

## Executive and Elected Non-State Normal Retirement Experience During Calendar Year 2021

### Male and Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	1	2	0.5000	0.1000	-
58	-	3	0.0000	0.1000	-
59	-	5	0.0000	0.1000	1
60	-	4	0.0000	0.1000	-
61	2	6	0.3333	0.1000	1
62	3	17	0.1765	0.1000	2
63	9	22	0.4091	0.1000	2
64	1	12	0.0833	0.1500	2
65	4	11	0.3636	0.1500	2
66	2	8	0.2500	0.1500	1
67	7	15	0.4667	0.1500	2
68	1	4	0.2500	0.1000	-
69	1	7	0.1429	0.1000	1
70	1	5	0.2000	0.1000	1
71	-	5	0.0000	0.1000	1
72	-	2	0.0000	0.1000	-
73	1	5	0.2000	0.2000	1
74	2	5	0.4000	0.2000	1
Totals	35	138	0.2536	0.1304	18
75 & Over	-	19			19
Totals	35	157			37

## Executive and Elected State Normal Retirement Experience During Calendar Year 2021

### Male and Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	-	2	0.0000	0.1200	-
58	-	3	0.0000	0.1200	-
59	-	5	0.0000	0.1200	1
60	1	6	0.1667	0.1200	1
61	2	9	0.2222	0.1200	1
62	1	21	0.0476	0.1800	4
63	3	22	0.1364	0.1800	4
64	1	19	0.0526	0.1800	3
65	1	14	0.0714	0.1800	3
66	1	14	0.0714	0.1800	3
67	4	11	0.3636	0.1800	2
68	1	11	0.0909	0.1800	2
69	1	11	0.0909	0.1800	2
70	2	8	0.2500	0.1800	1
71	1	8	0.1250	0.1500	1
72	3	4	0.7500	0.1500	1
73	1	4	0.2500	0.1500	1
74	3	6	0.5000	0.1500	1
Totals	26	178	0.1461	0.1742	31
75 & Over	5	16			16
Totals	31	194			47

## Executive and Elected Non-State Reduced Retirement Experience During Calendar Year 2021

### Male and Female Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	2	20	0.1000	0.0250	1
56	1	17	0.0588	0.0250	-
57	1	18	0.0556	0.0250	-
58	1	15	0.0667	0.0250	-
59	1	21	0.0476	0.0250	1
60	2	15	0.1333	0.0500	1
61	4	16	0.2500	0.0500	1
62	1	4	0.2500	0.0100	-
63	-	4	0.0000	0.0100	-
64	-	5	0.0000	0.0100	-
Over 64	1	47	0.0213		
Totals	14	182			4

## Executive and Elected State Reduced Retirement Experience During Calendar Year 2021

### Male and Female Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	1	26	0.0385	0.0600	2
56	-	27	0.0000	0.0600	2
57	-	17	0.0000	0.0600	1
58	1	20	0.0500	0.0600	1
59	1	17	0.0588	0.0600	1
60	-	18	0.0000	0.0600	1
61	1	18	0.0556	0.0600	1
62	-	3	0.0000	0.0600	-
63	-	4	0.0000	0.0300	-
64	-	3	0.0000	0.0300	-
Over 64	-	11	0.0000		
Totals	4	164			9



## Death-in-Service During Calendar Year 2021

### Male

Age	Deaths	Exposure	Crude Rates	Current Rates	Expected Deaths
Under 20	-	27	0.0000	0.0004	-
20-24	-	1,850	0.0000	0.0003	1
25-29	-	7,640	0.0000	0.0002	2
30-34	3	10,873	0.0003	0.0003	3
35-39	4	12,476	0.0003	0.0004	5
40-44	4	13,271	0.0003	0.0006	8
45-49	7	12,764	0.0005	0.0009	12
50-54	11	13,963	0.0008	0.0015	21
55-59	14	11,685	0.0012	0.0023	27
60-64	10	8,036	0.0012	0.0037	29
65-69	10	3,019	0.0033	0.0061	18
70-74	3	835	0.0036	0.0095	8
75 and over	3	2	1.5000	0.0158	-
Totals	69	96,441	0.0007	0.0014	134

### Female

Age	Deaths	Exposure	Crude Rates	Current Rates	Expected Deaths
Under 20	-	69	0.0000	0.0001	-
20-24	1	3,505	0.0003	0.0001	-
25-29	3	14,095	0.0002	0.0001	2
30-34	1	17,998	0.0001	0.0002	3
35-39	5	19,792	0.0003	0.0003	6
40-44	2	21,477	0.0001	0.0004	10
45-49	11	20,738	0.0005	0.0007	14
50-54	10	23,065	0.0004	0.0010	23
55-59	7	21,063	0.0003	0.0015	31
60-64	10	14,278	0.0007	0.0023	33
65-69	5	4,229	0.0012	0.0039	17
70-74	2	906	0.0022	0.0072	6
75 and over	3	-	N/A	0.0139	-
Totals	60	161,215	0.0004	0.0009	145

## **APPENDIX**

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### **GLOSSARY**

## Glossary

**Accrued Service.** The service credited under the plan which was rendered before the date of the actuarial valuation.

**Actuarial Accrued Liability.** The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability.”

**Actuarial Assumptions.** Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

**Actuarial Cost Method.** A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future plan benefits” between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

**Actuarial Equivalent.** A series of payments is called an actuarial equivalent of another series of payments if the two series have the same actuarial present value.

**Actuarial Present Value.** The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

**Amortization.** Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

**Experience 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, in accordance with the actuarial cost method being used.

**Normal Cost.** The annual cost assumed, under the actuarial funding method, for current and subsequent plan years. Sometimes referred to as “current service cost.” Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

**Plan Termination Liability.** The actuarial present value of future plan benefits based on the assumption that there will be no future accruals for future service and salary. The termination liability will generally be less than the liabilities computed on a “going-concern” basis and is not normally determined in a routine actuarial valuation.

**Reserve Account.** An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.



## Glossary (Concluded)

**Unfunded Actuarial Accrued Liability.** The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as “unfunded accrued liability.”

**Valuation Assets.** The value of current plan assets recognized for valuation purposes. Generally based on book value plus a portion of unrealized appreciation or depreciation.