



STATE OF WISCONSIN
Department of Employee Trust Funds
 Robert J. Conlin
 SECRETARY

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Correspondence Memorandum

Date: June 10, 2016
To: Employee Trust Funds Board
From: Robert C. Willett, CPA
 Chief Trust Finance Officer
Subject: WRS Active Lives Valuation & Gain / Loss Analysis

Staff requests that the Employee Trust Funds Board (Board) approve the Thirty-Fifth Annual Actuarial Valuation and Gain/Loss Analysis as of December 31, 2015.

Gabriel Roeder Smith & Company (GRS) has completed the actuarial valuation of non-retired members of the Wisconsin Retirement System. The results of the study are summarized below (millions \$):

	December 31,	
	2015	2014
Actuarial Accrued Liability	\$ 91,526.5	\$ 89,392.1
Actuarial Value of Assets	91,502.4	89,360.4
Unfunded Actuarial Accrued Liability	24.1	31.7
Funded Ratio	99.97%	99.96%

GRS is recommending the following adjustments to contribution rates for 2017.

	General, Teachers, Executive and Elected Officials		Protective Occupations			
			With Social Security		Without Social Security	
	2017	2016	2017	2016	2017	2016
Employer Normal Cost	6.80%	6.60%	10.60%	9.40%	14.9%	13.2%
Participant Normal Cost	6.80%	6.60%	6.80%	6.60%	6.80%	6.60%
Total Normal Cost	13.6%	13.2%	17.4%	16.0%	21.7%	19.8%

Actuaries from GRS will be at the Board meeting to present their report and to answer any questions.

Attachment: Thirty-Fifth Annual Actuarial Valuation and Gain/Loss Analysis

Reviewed and approved by Robert J. Conlin, Secretary Electronically Signed 6/10/16

Board	Mtg Date	Item #
JM	6.23.16	3B
ETF	6.23.16	4B

WISCONSIN RETIREMENT SYSTEM

**THIRTY-FIFTH ANNUAL ACTUARIAL VALUATION AND
GAIN/LOSS ANALYSIS**

DECEMBER 31, 2015

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June 10, 2016

Employee Trust Funds Board
Wisconsin Department of Employee
Trust Funds
801 West Badger Road
Madison, Wisconsin 53713

Ladies and Gentlemen:

The results of the **December 31, 2015 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 2017 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 Fund 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 normal cost rates from last year are shown below:

<u>General and Executive/Elected</u>	<u>Protective with SS</u>	<u>Protective without SS</u>
0.4%	1.4%	1.9%

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 H 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.

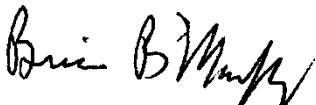
Actuarial valuations are based upon assumptions regarding future activity in specific risk areas including the rates of investment return and payroll growth, eligibility for the various classes of benefits, and longevity among retired lives. The Board adopts these assumptions after considering the advice 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, 2015 valuations were based upon assumptions that were recommended in connection with a study of experience during 2012-2014 and benefit provisions in effect on December 31, 2015.

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.

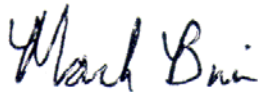
To the best of our knowledge, this report is complete and accurate and was made in accordance with generally recognized actuarial methods. Brian B. Murphy, Mark Buis, and James D. Anderson are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy 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.

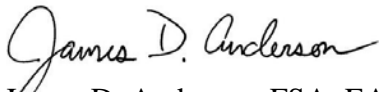
Respectfully submitted,



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



Mark Buis, FSA, EA, FCA, MAAA



James D. Anderson, FSA, EA, MAAA

BBM/MB/JDA:ah

SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

1. Required Employer Contributions to Support Retirement Benefits

	General, Executive & Elected Officials*		Protective Occupation			
			With Soc. Sec.		Without Soc. Sec.	
	2017	2016	2017	2016	2017	2016
Employer Normal Cost	6.80%	6.60%	10.60%	9.40%	14.90%	13.20%
Participant Normal Cost	6.80%	6.60%	6.80%	6.60%	6.80%	6.60%
Total Normal Cost	13.6%	13.2%	17.4%	16.0%	21.7%	19.8%
Unfunded Actuarial Accrued Liability (UAAL)^	0.07%	0.00%	0.08%	0.00%	0.14%	0.20%
WRS Average Total	13.7%	13.2%	17.5%	16.0%	21.8%	20.0%

* Beginning with calendar year 2017, contribution rates for the General and Executive & Elected groups were combined. The 2016 contribution rates shown above are for the General Group only, please refer to the December 31, 2014 valuation report for the Executive and Elected Officials 2016 contribution rate.

^ Method for reporting the average UAL rate was revised from prior year. Actual employer contributions did not change.

Under Section 40.05 of the Wisconsin statutes updated for Act 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. Act 10 of 2011 eliminated the benefit adjustment contribution.

Rates shown for UAAL are weighted averages of rates that vary by employer units based on amounts paid in the prior year. Each affected employer unit has a separately determined UAL rate. 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 predict future occurrences. The third is the difference during the year between the plan's actual experience and what the assumptions predicted.

There were no legislated benefit changes reported to the actuary for the year ended December 31, 2015. However, now that the member contribution rate is set equal to half of the total contribution rate, any increase in the member rate will result in an increased benefit amount (and vice-versa). This is due to the fact that when the member rate increases, the money purchase benefit will also increase (and vice-versa). It is referred to as "Effect of Money Purchase Benefit" in the chart below. Assumption changes were described in the recently completed 3-year experience study.

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.
2015 Normal Cost Rate	13.20%	16.00%	19.80%
Effect of Asset Performance	0.10%	0.15%	0.25%
Effect of Assumption Change	0.30%	1.10%	1.20%
Effect of Salary Experience	(0.05)%	0.07%	0.15%
Demographic and Other Experience	0.01%	0.05%	0.27%
Effect of Money Purchase Benefit	0.04%	0.03%	0.03%
2016 Normal Cost Rate	13.60%	17.40%	21.70%

Please note that although the investment income is allocated proportionately for 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 changes in actuarial assumptions and unfavorable investment performance from prior years flowing through the Market Recognition Account (MRA).

In total, during 2015, investment return was below the assumed 2015 level of 7.20% 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 6.3% return on an Actuarial Value of Assets basis in the Core Fund. The Actuarial Value of Assets exceeds the Market Value of Assets by approximately 4% as of the valuation date. The statutory asset valuation method will recognize all of the differences between actuarial value and market value of \$3.4 billion over four future years.

This valuation includes liabilities for future claims under the Long Term Disability Insurance (LTDI) program that became operational late in 1992. Inter-fund transfers between WRS and the LTDI program to support claims currently payable are addressed in a separate report to the Group Insurance and Employee Trust Funds Boards.

Conclusion. Based upon the results of the December 31, 2015 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 7.2% 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 future service 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 market 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 a 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.

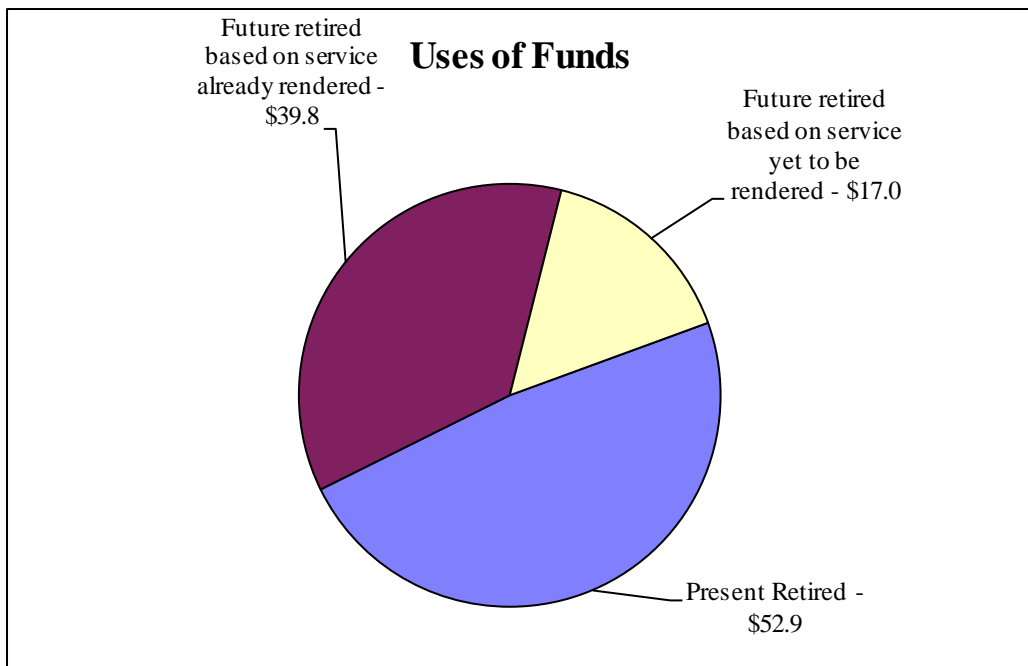
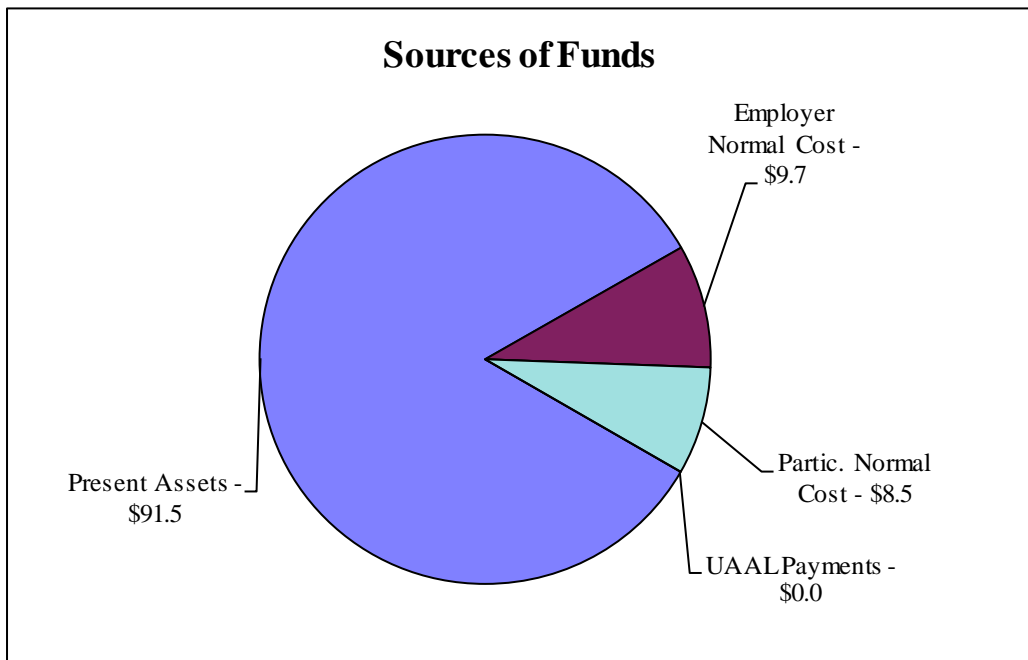
SECTION B

FUNDING RESULTS

**DEVELOPMENT OF CONTRIBUTION RATES
FOR CALENDAR YEAR 2017**

	General, Executives & Elected Officials	Protective Occupation		Average/ Total
		With Soc. Sec	Without Soc. Sec.	
\$ Millions				
Total Reported Earnings	\$ 11,893.7	\$ 1,170.9	\$ 208.5	\$ 13,273.1
Present Value of Future Earnings	112,696.0	11,893.9	2,101.9	126,691.8
Present Value of Future Benefits	49,223.1	6,078.7	1,403.8	56,705.6
Non-Retired Assets	33,596.4	3,949.6	934.6	38,480.6
Unfunded Liability	17.1	1.8	5.1	24.0
Present Value of Future Normal Costs				
Future Service Portion	14,622.4	1,931.1	437.5	16,991.0
Exp. Amort. Res. Portion	987.2	196.2	26.6	1,210.0
Total	15,609.6	2,127.3	464.1	18,201.0
Normal Cost Amortization Years				
Future Service Portion	12.0	13.1	13.0	12.1
Exp. Amort. Res. Portion	20.0	20.0	20.0	
% 's of Active Member Payroll				
Normal Cost				
Future Service Portion	13.0 %	16.2 %	20.8 %	13.4 %
Exp. Amort. Res. Portion	0.6 %	1.2 %	0.9 %	0.7 %
Total	13.6 %	17.4 %	21.7 %	14.1 %
2017 Normal Cost Rates				
Employer Normal Cost	6.80 %	10.60 %	14.90 %	7.30 %
Participant Normal Cost	6.80 %	6.80 %	6.80 %	6.80 %
Total Normal Cost	13.60 %	17.40 %	21.70 %	14.10 %
Average Unfunded Liability Amortization	0.07 %	0.08 %	0.14 %	0.07 %
Average Total Rate	13.7 %	17.5 %	21.8 %	14.2 %

**FINANCING \$109.7 BILLION* OF BENEFIT PROMISES
FOR PRESENT ACTIVE AND RETIRED PARTICIPANTS
DECEMBER 31, 2015**



* Present value of future benefits; all divisions combined.

DEVELOPMENT OF ACTUARIAL PRESENT VALUES
DECEMBER 31, 2015
(\$ MILLIONS)

Present Value of Future Benefits for	General, Executives & Elected Officials	Protectives		Total
		With Soc. Sec.	Without Soc. Sec.	
Active Participants				
Service Retirement	\$39,728.5	\$5,284.6	\$ 1,286.1	\$ 46,299.2
Withdrawal	2,784.5	232.2	22.6	3,039.3
Death-in-Service	458.7	49.2	10.6	518.5
Disability	602.3	45.2	24.2	671.7
Total Active	43,574.0	5,611.2	1,343.5	50,528.7
Inactive Participants	5,385.1	439.7	55.3	5,880.1
Variable Adjustment	264.0	27.8	5.0	296.8
Active and Inactive	49,223.1	6,078.7	1,403.8	56,705.6
Additional Contributions Present Retired				170.0 52,851.8
Actuarial Present Value of Future Benefits				\$109,727.4

Computing the actuarial present value of future benefits is the first step in the actuarial valuation process. If the WRS had assets equal to that value, and if future experience were exactly in accordance with assumptions, then the present assets together with future investment income on those assets would be sufficient to pay promised benefits to all present participants, retirees and beneficiaries. *There is no need for the Retirement System to have \$109,727.4 million immediately. What is needed, however, is a plan for obtaining the money in an orderly fashion. That is the purpose of the remainder of the actuarial valuation.*

EXPERIENCE AMORTIZATION RESERVE (EAR)

Actuarial gains or losses arising from the difference between actual and assumed experience are reflected in the determination of the normal cost. The computed normal cost is made up of two parts: (i) the pure Entry-Age Normal Cost (EANC) determined without regard to past gains or losses, and (ii) 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, 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. A positive EAR indicates amortization of gains. A negative EAR indicates amortization of losses.

Development of EAR as of December 31, 2015

	General, Executives & Elected Officials	Protective Occupation		Total
		With Soc. Sec	Without Soc. Sec.	
\$ Millions				
1. Present Value of Future Benefits for Non-Retired	\$49,223.1	\$6,078.7	\$1,403.8	\$56,705.6
2. Present Value of Future Entry Age Normal Costs	14,622.5	1,931.1	437.5	16,991.1
3. Entry Age Accrued Liability: (1)-(2)	34,600.6	4,147.6	966.3	39,714.5
4. Non-Retired Assets -WRS	33,625.7	3,957.5	935.9	38,519.1
-LTDI	(29.3)	(7.9)	(1.3)	(38.5)
-Total	33,596.4	3,949.6	934.6	38,480.6
5. Entry Age Unfunded Accrued Liability: (3)-(4)	1,004.2	198.0	31.7	1,233.9
6. WRS Frozen Unfunded Accrued Liability	17.1	1.8	5.1	24.1
7. EAR: (6)-(5)	\$ (987.1)	\$ (196.2)	\$ (26.6)	\$ (1,209.8)
8. Prior Year EAR	\$ (410.7)	\$ (8.1)	\$ 16.9	\$ (401.9)

LTDI reserves provided by Milliman

**UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL)
DECEMBER 31, 2015**

	General, Executives & Elected Officials	Protective Occupation		Totals
		With Soc. Sec	Without Soc. Sec	
Balance January 1, 2015	\$24,063,894	\$2,645,907	\$ 5,040,054	\$31,749,855
Plus: New Employers	0	0	0	0
Less: Adjustments	0	0	0	0
Less: Payments	(8,070,797)	(941,407)	(281,587)	(9,293,791)
Plus: Interest	1,151,503	122,724	342,610	1,616,837
Balance December 31, 2015	\$17,144,600	\$1,827,224	\$ 5,101,077	\$24,072,901

The UAAL is amortized as a level percent of payroll. A separate calculation is made for each affected employer.

COMPARATIVE STATEMENT OF COMPUTED CONTRIBUTION RATES

Valuation 12/31	Rate Effective 1/1	General				Executive and Elected			
		Participant	Benefit Adj. Contr.	Employer ¹	Total	Participant	Benefit Adj. Contr.	Employer ¹	Total
1991	1993	5.0 %	1.2 %	6.2 %	12.4 %	5.5 %	0.1 %	12.0 %	17.6 %
1992	1994	5.0 %	1.2 %	6.1 %	12.3 %	5.5 %	0.1 %	12.0 %	17.6 %
1993	1995	5.0 %	1.2 %	6.1 %	12.3 %	5.5 %	0.1 %	12.0 %	17.6 %
1994	1996	5.0 %	1.5 %	6.4 %	12.9 %	4.6 %	0.0 %	11.1 %	15.7 %
1995	1997	5.0 %	1.4 %	6.3 %	12.7 %	4.7 %	0.0 %	11.2 %	15.9 %
1996	1998	5.0 %	1.2 %	6.1 %	12.3 %	4.7 %	0.0 %	11.2 %	15.9 %
1997	1999	5.0 %	0.8 %	5.8 %	11.6 %	4.3 %	0.0 %	10.8 %	15.1 %
1998	2000	5.0 %	0.5 %	5.5 %	11.0 %	4.1 %	0.0 %	10.6 %	14.7 %
1999	2001	5.0 %	0.2 %	5.1 %	10.3 %	3.9 %	0.0 %	10.4 %	14.3 %
2000	2002	5.0 %	0.2 %	5.1 %	10.3 %	3.1 %	0.0 %	9.6 %	12.7 %
2001 ²	2003	5.0 %	0.4 %	5.2 %	10.6 %	2.6 %	0.0 %	9.1 %	11.7 %
2002	2004	5.0 %	0.6 %	5.2 %	10.8 %	2.6 %	0.0 %	8.9 %	11.5 %
2003	2005	5.0 %	0.8 %	4.7 %	10.5 %	2.8 %	0.0 %	8.4 %	11.2 %
2004	2006	5.0 %	0.9 %	4.7 %	10.6 %	2.9 %	0.0 %	8.5 %	11.4 %
2005	2007	5.0 %	1.0 %	4.8 %	10.8 %	3.0 %	0.0 %	8.6 %	11.6 %
2006	2008	5.0 %	1.0 %	4.8 %	10.8 %	3.0 %	0.0 %	8.6 %	11.6 %
2007	2009	5.0 %	0.9 %	4.7 %	10.6 %	3.0 %	0.0 %	8.5 %	11.5 %
2008	2010	5.0 %	1.2 %	5.0 %	11.2 %	3.2 %	0.0 %	8.7 %	11.9 %
2009	2011	5.0 %	1.5 %	5.2 %	11.7 %	3.9 %	0.0 %	9.4 %	13.3 %
2010	2012	5.0 %	1.6 %	5.3 %	11.9 %	4.3 %	0.0 %	9.8 %	14.1 %
2011 ³	2013	6.7 %	N/A	6.8 %	13.4 %	7.0 %	N/A	7.0 %	14.0 %
2012	2014	7.0 %	N/A	7.0 %	14.0 %	7.8 %	N/A	7.8 %	15.5 %
2013	2015	6.8 %	N/A	6.8 %	13.6 %	7.7 %	N/A	7.7 %	15.4 %
2014	2016	6.6 %	N/A	6.6 %	13.2 %	7.8 %	N/A	7.8 %	15.6 %
2015 ⁴	2017	6.8 %	N/A	6.9 %	13.7 %	6.8 %	N/A	6.9 %	13.7 %

¹ Employer normal cost plus weighted average of unfunded actuarial accrued liability contribution rates.

² Act 11 of 1999 was implemented in 2001.

³ Act 10 and Act 32 were implemented in 2011.

⁴ Contribution rates for General and Executive and Elected Officials groups were combined beginning with the 2015 valuation.

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 ¹	Total	Participant	Benefit Adj. Contr.	Employer ¹	Total
1991	1993	6.0 %	0.6 %	10.7 %	17.3 %	7.5 %		16.4 %	23.9 %
1992	1994	6.0 %	0.6 %	10.7 %	17.3 %	7.5 %		16.3 %	23.8 %
1993	1995	6.0 %	0.5 %	10.6 %	17.1 %	7.2 %		16.0 %	23.2 %
1994	1996	6.0 %	0.1 %	10.2 %	16.3 %	6.8 %		15.7 %	22.5 %
1995	1997	5.8 %	0.0 %	9.8 %	15.6 %	6.2 %		15.1 %	21.3 %
1996	1998	5.4 %	0.0 %	9.4 %	14.8 %	5.8 %		14.6 %	20.4 %
1997	1999	4.9 %	0.0 %	8.9 %	13.8 %	5.4 %		14.3 %	19.7 %
1998	2000	4.1 %	0.0 %	8.0 %	12.1 %	4.4 %		13.3 %	17.7 %
1999	2001	3.8 %	0.0 %	7.6 %	11.4 %	3.3 %		12.2 %	15.5 %
2000	2002	4.0 %	0.0 %	7.8 %	11.8 %	3.0 %		11.9 %	14.9 %
2001 ²	2003	4.0 %	0.0 %	7.7 %	11.7 %	2.4 %		11.3 %	13.7 %
2002	2004	4.5 %	0.0 %	8.0 %	12.5 %	3.2 %		11.8 %	15.0 %
2003	2005	4.9 %	0.0 %	8.1 %	13.0 %	3.3 %		11.3 %	14.6 %
2004	2006	5.0 %	0.0 %	8.2 %	13.2 %	3.3 %		11.1 %	14.4 %
2005	2007	5.1 %	0.0 %	8.3 %	13.4 %	3.4 %		11.2 %	14.6 %
2006	2008	5.1 %	0.0 %	8.3 %	13.4 %	3.4 %		11.2 %	14.6 %
2007	2009	5.0 %	0.0 %	8.2 %	13.2 %	3.2 %		10.9 %	14.1 %
2008	2010	5.5 %	0.0 %	8.6 %	14.1 %	3.9 %		11.6 %	15.5 %
2009	2011	5.8 %	0.0 %	8.9 %	14.7 %	4.8 %		12.5 %	17.3 %
2010	2012	5.9 %	0.0 %	9.0 %	14.9 %	4.9 %		12.6 %	17.5 %
2011 ³	2013	6.7 %	N/A	9.8 %	16.4 %	6.7 %		12.7 %	19.3 %
2012	2014	7.0 %	N/A	10.1 %	17.1 %	7.0 %		14.0 %	21.0 %
2013	2015	6.8 %	N/A	9.5 %	16.3 %	6.8 %		13.4 %	20.2 %
2014	2016	6.6 %	N/A	9.4 %	16.0 %	6.6 %		13.4 %	20.0 %
2015	2017	6.8 %	N/A	10.7 %	17.5 %	6.8 %		15.0 %	21.8 %

¹ Employer normal cost plus weighted average of unfunded actuarial accrued liability contribution rates.

² Act 11 of 1999 was implemented in 2001.

³ Act 10 and Act 32 were implemented in 2011.

SECTION C
FUND ASSETS

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, 2014	\$14,751,143,675	\$1,492,195,247	\$16,243,338,922	\$20,505,128,808	\$1,487,378,885	\$21,992,507,693	\$38,235,846,615
Closing Adjustments	(684,516)	159,760	(524,756)	4,319,175	5,074,598	9,393,773	8,869,017
Beginning Balance January 1, 2015	14,750,459,159	1,492,355,007	16,242,814,166	20,509,447,983	1,492,453,483	22,001,901,466	38,244,715,632
Revenues:							
Employer Contributions	-	-	-	878,992,051	99,948,629	978,940,680	978,940,680
Participant Contributions	826,408,591	100,677,365	927,085,957	-	-	-	927,085,957
Total Revenues	826,408,591	100,677,365	927,085,957	878,992,051	99,948,629	978,940,680	1,906,026,637
Expenses:							
Separations	34,886,749	2,517,901	37,404,650	-	-	-	37,404,650
Retirement Single Sums	21,382,252	707,968	22,090,220	23,981,127	661,372	24,642,499	46,732,719
Death Benefits	18,040,275	1,743,556	19,783,831	11,250,782	216,988	11,467,770	31,251,600
Disability Insurance	-	-	-	43,296,474	-	43,296,474	43,296,474
	74,309,276	4,969,425	79,278,701	78,528,383	878,360	79,406,743	158,685,443
Transfers:							
Earnings Allocation	875,534,577	1,614,903	877,149,480	1,271,296,276	-	1,271,296,276	2,148,445,756
Annuities Awarded	(1,343,137,358)	(86,396,969)	(1,429,534,327)	(2,095,287,416)	(95,895,430)	(2,191,182,846)	(3,620,717,173)
Intra-Fund Transfers	(1,024,694)	12,135	(1,012,559)	256,400	39,130	295,530	(717,029)
Inter-Fund Transfers	44,195,529	(44,195,529)	-	36,569,966	(36,569,966)	-	-
	(424,431,945)	(128,965,461)	(553,397,406)	(787,164,774)	(132,426,266)	(919,591,040)	(1,472,988,446)
Ending December 31, 2015	\$15,078,126,529	\$1,459,097,486	\$16,537,224,016	\$20,522,746,877	\$1,459,097,486	\$21,981,844,363	\$38,519,068,379
Internal Rate of Return	6.0%	0.1%	5.5%	6.4%	0.0%	6.0%	5.8%

**RESERVES FOR NON-RETIRED PARTICIPANTS
BALANCES BY VALUATION GROUP**

	Reserve for Year Ended			
	December 31, 2015			December 31, 2014 (Total in \$ Millions)
	Participant	Employer	Total *	
General, Executives & Elected	\$14,962,633,678	\$18,663,107,291	\$33,625,740,969	\$33,364.6
Protective with Soc. Sec.	1,307,584,571	2,649,892,478	3,957,477,049	3,928.7
Protective w/o Soc. Sec.	267,005,767	668,844,592	935,850,359	942.5
Total	\$16,537,224,016	\$21,981,844,361	\$38,519,068,377	\$38,235.8

* Totals differ slightly from page C-1 due to rounding.

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.

CORE INVESTMENT TRUST: MARKET RECOGNITION ACCOUNT

	For the Year Ended December 31						
	2013	2014	2015	2016	2017	2018	2019
Beginning of year							
a. Funding value	\$76,023,146,068	\$81,635,165,224	\$86,109,303,264	\$88,673,713,483	\$88,833,842,834	\$88,200,703,697	\$86,614,143,384
b. Market value	78,474,591,615	86,355,982,436	88,649,071,976	85,270,319,670	85,270,319,670	85,270,319,670	85,270,319,670
End of year							
c. Market value	86,355,982,436	88,649,071,976	85,270,319,670				
d. Non-investment cash flow (contributions minus benefits)	(2,277,395,348)	(2,288,570,809)	(2,760,138,582)				
e. Investment income							
e1. Total investment income	10,158,786,169	4,581,660,350	(618,613,725)				
e2. Assumed rate	7.2%	7.2%	7.2%				
e3. Amount for immediate recognition	5,391,680,284	5,795,343,347	6,100,504,846	-	-	-	-
e4. Amount for phased-in recognition: e1-e3	4,767,105,884	(1,213,682,997)	(6,719,118,571)	-	-	-	-
f. Phased-in recognition of investment income							
f1. Current year: 0.2 x e4	953,421,177	(242,736,599)	(1,343,823,714)	-	-	-	-
f2. First prior year	793,268,488	953,421,177	(242,736,599)	(1,343,823,714)	-	-	-
f3. Second prior year	(936,085,396)	793,268,488	953,421,177	(242,736,599)	(1,343,823,714)	-	-
f4. Third prior year	399,497,833	(936,085,396)	793,268,488	953,421,177	(242,736,599)	(1,343,823,714)	-
f5. Fourth prior year	1,287,632,117	399,497,833	(936,085,396)	793,268,488	953,421,177	(242,736,599)	(1,343,823,714)
f6. Total MRA recognition	2,497,734,219	967,365,503	(775,956,045)	160,129,351	(633,139,137)	(1,586,560,314)	(1,343,823,714)
f7. Amount for MRA recognition	-	-	-	-	-	-	-
f8. Total recognized gain (loss)	2,497,734,219	967,365,503	(775,956,045)	160,129,351	(633,139,137)	(1,586,560,314)	(1,343,823,714)
g. Total recognized investment income: e3 + f8	7,889,414,504	6,762,708,850	5,324,548,801	160,129,351	(633,139,137)	(1,586,560,314)	(1,343,823,714)
h. Funding value end of year: a + d + e3 + f8	81,635,165,224	86,109,303,264	88,673,713,483	88,833,842,834	88,200,703,697	86,614,143,384	85,270,319,670
i. Difference between market and funding values	4,720,817,212	2,539,768,712	(3,403,393,814)	(3,563,523,165)	(2,930,384,028)	(1,343,823,714)	-
j. Recognized rate of return	10.5%	8.4%	6.3%				
k. Market rate of return	13.1%	5.4%	(0.7)%				

SECTION D
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 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.

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 3-year investigation of experience (the most recent 3-year investigation covered the period January 1, 2012 to December 31, 2014). It is the results of the 3-year investigation that lead to recommendations for changes in the actuarial assumptions.

Overall Experience

Overall experience resulted in a net actuarial loss of \$175 million for the 2015 calendar year. The loss was primarily attributable to unfavorable investment performance. The net result was an increase in the overall 2017 contribution rate of 0.4% of payroll.

POPULATION DEVELOPMENT DURING CALENDAR YEAR 2015

	General	Executive & Elected	Protective		Total	Expected
			With S.S.	Without S.S.		
Beginning Census	232,433	1,401	19,533	2,733	256,100	
(-) Normal Retirement	3,495	54	534	86	4,169	4,123
(-) Early Retirement	3,768	18	97	7	3,890	4,241
(-) Death	116	2	7	1	126	253
(-) Disability Retirement						
-Total disabilities approved	113	0	12	2	127	195
-Less pending at beginning of year	24	0	5	0	29	
-Net new from active status	89	0	7	2	98	
(-) Other Separations	13,640	57	774	40	14,511	12,025
(-) Transfers Out	1,287	35	256	8	1,586	
(+) Transfers In	1,273	57	220	36	1,586	
(+) New Entrants	20,320	88	1,195	105	21,708	
Ending Census	231,631	1,380	19,273	2,730	255,014	

This schedule reconciles the active member populations reported in connection with the December 31, 2015 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.)

COMMENTS

Population Results

Normal Retirements varied by group and gender. Overall normal retirements were slightly higher than expected. In general, more normal retirements than assumed often creates a loss. 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.

Early Retirements were lower than expected, overall producing a small loss.

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

Disabilities were less than expected and produced a gain. This means that the reserves needed for the disability benefit were slightly smaller than the reserves that had been held for retirement benefits.

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) produced gains and losses that almost entirely offset each other, producing a small net loss during 2015.

Economic Results

On a market value basis **investment return** was (0.7)% and investment activity produced a loss for all groups due to continuous recognition of past activity in the MRA. The recognized investment loss of \$538 million was partially offset by a \$336 million loss in the combined value of variable excess benefits and money purchase benefits (as shown on page D-10), resulting in a net investment loss of about \$202 million.

Pay Increases were overall less than expected, producing a gain.

COMMENTS

Other Analysis

The schedule on page D-8 analyzes gains or losses due to sources other than the demographic and economic areas. The **Reserve difference** produced a loss of about \$22 million. This is primarily attributable to adjustments related to estimated annuities for which final computations have now been made. 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 \$57 million.

**ACTUAL VS. EXPECTED CHANGES IN UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL) -
CALENDAR YEAR DECEMBER 31, 2015
(\$ MILLIONS)**

	Year Ended December 31, 2015				
	General	Executive & Elected	Protective		Total
			With S.S.	Without S.S.	
(1) Entry Age UAAL at start of year	\$ 380.3	\$ 54.5	\$ 10.7	\$ (11.9)	\$ 433.6
(2) Normal cost from last valuation (Total)	1,573.1	15.2	193.7	43.6	1,825.6
(3) Actual contributions	1,650.6	17.4	195.7	42.3	1,906.0
(4) Interest	24.6	3.8	0.7	(0.8)	28.3
(5) Expected UAAL before changes: (1) + (2) - (3) + (4)	327.4	56.1	9.4	(11.4)	381.5
(6) Change in actuarial assumptions	504.0	4.2	133.3	20.1	661.6
(7) Other changes	0.0	0.0	0.0	0.0	0.0
(8) Expected UAAL after changes: (5) + (6) + (7)	831.4	60.3	142.7	8.7	1,043.1
(9) Actual Entry Age UAAL at end of year	930.7	61.5	194.7	31.1	1,218.0
(10) Gain (loss): (8) - (9)	\$ (99.3)	\$ (1.2)	\$ (52.0)	\$ (22.4)	\$ (174.9)

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 added to the Experience Amortization Reserve (EAR). When the EAR increases "unexpectedly," this is favorable experience and downward pressure is exerted on contribution rates. Similarly, an unexpected decrease in the EAR is unfavorable experience and upward pressure is exerted on contribution rates. In addition to the gain or loss described in line 10, non-recurring changes in lines 6 and 7 also may affect 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.

**GAIN/LOSS ANALYSIS
2015 EXPERIENCE
DIVISIONS COMBINED**



ACTUARIAL GAINS & LOSSES DURING CALENDAR YEAR 2015
(\$ MILLIONS)

Type of Activity	General	Executive & Elected	Protective		Total
			With S.S.	Without S.S.	
Decrement Risk Areas					
Normal Retirement	\$ (7.7)	\$ 2.2	\$ (14.6)	\$ (1.9)	\$ (22.0)
Early Retirement	(25.6)	0.0	(1.3)	0.1	(26.8)
Disability Retirement	13.5	0.1	0.6	0.2	14.4
Death with Benefit	(3.0)	0.1	0.1	0.2	(2.6)
Other Separations	23.8	(1.3)	1.3	(1.6)	22.2
Economic Risk Areas					
Salary Increases	74.5	2.8	(11.1)	(5.5)	60.7
Investment Return	(163.0)	(0.7)	(30.3)	(7.8)	(201.8)
Other Activity	(11.8)	(4.4)	3.3	(6.1)	(19.0)
Total Gain (Loss)	\$ (99.3)	\$ (1.2)	\$ (52.0)	\$ (22.4)	\$(174.9)
-% of Accrued Liability	(0.3)%	(0.5)%	(1.3)%	(2.4)%	(0.5)%

ANALYSIS OF OTHER ACTIVITY
(\$ MILLIONS)

	General	Executive & Elected	Protective		Total
			With S.S.	Without S.S.	
Expected Reserve Transfers					
Normal Retirement	\$1,664	\$28	\$ 299	\$82	\$2,073
Early Retirement	1,121	5	55	5	1,186
Death	19	0	2	0	21
Disability Retirement	35	0	4	2	41
Deferred Retirement	295	3	26	9	333
Expected Total Reserve Transfers	3,134	36	386	98	3,654
Actual Reserve Transfer (From Retiree Report)	3,114	41	377	100	3,632
Reserve Difference	20	(5)	9	(2)	22
Expected Refunds	53	0	2	0	55
Actual Refunds	34	0	3	1	38
Refund Difference	19	0	(1)	(1)	17
Re-established Liability	(49)	(1)	(6)	(1)	(57)
Total Explained Difference	(10)	(6)	2	(4)	(18)
Unknown Difference	(2)	2	1	(2)	(1)
Total Other Activity	(12)	(4)	3	(6)	(19)
Other Activity as % of Liabilities	(0.04)%	(1.72)%	0.08 %	(0.64)%	(0.05)%

This schedule analyzes reserve transfers and contribution refunds and shows the portion of “other” activity that can be explained by those sources. Amounts may not sum due to rounding.

**COMPARATIVE SCHEDULE OF EXPERIENCE
5-YEAR HISTORY OF GAINS AND LOSSES
(\$ MILLIONS)**

Year	Retmt.	Disability Retmt.	Other Separations*	Salary Increases	Investment Return	Other	Total
GENERAL							
2011	\$ (126.8)	\$ 16.9	\$ (2.0)	\$ 270.1	\$ (1,247.5)	\$ (125.6)	\$ (1,214.9)
2012	(35.6)	15.2	20.7	610.0	(1,058.3)	(82.8)	(530.8)
2013	(32.2)	16.8	27.2	250.8	624.2	(125.0)	761.8
2014	(25.5)	18.1	24.5	14.5	269.0	(111.0)	189.6
2015	(33.3)	13.5	20.8	74.5	(163.0)	(11.8)	(99.3)
EXECUTIVE & ELECTED							
2011	\$ (2.0)	\$ 0.1	\$ 1.4	\$ 5.2	\$ (10.2)	\$ (7.2)	\$ (12.7)
2012	2.0	0.1	(1.9)	1.4	(13.0)	4.3	(7.1)
2013	(1.1)	0.1	-	1.6	2.1	(1.4)	1.3
2014	1.8	0.1	(0.7)	(0.7)	2.1	(6.4)	(3.8)
2015	2.2	0.1	(1.2)	2.8	(0.7)	(4.4)	(1.2)
PROTECTIVE WITH SOCIAL SECURITY							
2011	\$ (21.7)	\$ 1.4	\$ (3.5)	\$ 30.6	\$ (183.5)	\$ (20.4)	\$ (197.1)
2012	(14.6)	1.5	(0.8)	100.8	(154.4)	(10.0)	(77.5)
2013	(8.6)	1.6	1.0	52.2	106.1	(7.5)	144.8
2014	(6.1)	1.5	0.3	13.0	42.6	(14.9)	36.4
2015	(15.9)	0.6	1.4	(11.1)	(30.3)	3.3	(52.0)
PROTECTIVE WITHOUT SOCIAL SECURITY							
2011	\$ 1.0	\$ 0.6	\$ (1.3)	\$ 7.9	\$ (50.9)	\$ (5.9)	\$ (48.6)
2012	(0.6)	0.6	(1.3)	6.2	(40.3)	(3.7)	(39.1)
2013	(2.6)	0.6	(1.7)	3.6	31.5	(3.7)	27.7
2014	(0.3)	0.6	(0.7)	(3.3)	11.8	(7.4)	0.7
2015	(1.8)	0.2	(1.4)	(5.5)	(7.8)	(6.1)	(22.4)

* Includes separation due to death.

GAIN (LOSS) FROM INVESTMENT INCOME DURING CALENDAR YEAR
(\$ MILLIONS)

	General	Executive & Elected	Protective		Total
			With SS	Without SS	
(1) Beginning of Year Active Participant Assets					
(a) Participant Accumulation Reserve	\$14,615.3	\$ 58.4	\$1,287.7	\$282.0	\$16,243.4
(b) PAR Closing Adjustment	(0.5)	0.0	0.0	0.0	(0.5)
(c) Employer Accumulation Reserve	18,506.4	184.5	2,641.1	660.5	21,992.5
(d) EAR Closing Adjustment	6.0	(0.1)	2.9	0.6	9.4
(e) Total	33,127.2	242.8	3,931.7	943.1	38,244.8
(2) End of Year Active Participant Assets					
(a) Participant Accumulation Reserve	14,910.3	52.3	1,307.6	267.0	16,537.2
(b) Employer Accumulation Reserve	18,482.8	180.3	2,649.9	668.8	21,981.8
(c) Total	33,393.1	232.6	3,957.5	935.8	38,519.0
(3) Investment Earnings Credited					
(a) Participant Accumulation Reserve	792.8	2.9	67.2	14.2	877.1
(b) Employer Accumulation Reserve	1,065.9	11.2	154.8	39.5	1,271.4
(c) Total	1,858.7	14.1	222.0	53.7	2,148.5
(4) Average Balance: $.5 \times \{(1e)+(2c)-(3c)\}$	32,330.8	230.7	3,833.6	912.6	37,307.7
(5) Expected Earnings: $.072 \times (4)$	2,327.8	16.6	276.0	65.7	2,686.1
(6) Gain (Loss) for Year from Investment Experience: $(3c)-(5)$	(469.1)	(2.5)	(54.0)	(12.0)	(537.6)
(7) Portion applied to Change in Variable Excess Reserve and Money Purchase Minimum Benefit	(306.1)	(1.8)	(23.7)	(4.2)	(335.7)
(8) Remaining Gain (Loss): (6)-(7)	\$ (163.0)	\$ (0.7)	\$ (30.3)	\$(7.8)	\$ (201.9)

SECTION E
CENSUS DATA

ACTIVE PARTICIPANTS INCLUDED IN VALUATIONS
DECEMBER 31, 2015

Active participants included in the valuations totaled 255,014 with an annual payroll totaling \$13,273.1 million, as follows:

Valuation Group	Number	Annual Earnings (\$Millions)	Group Averages			
			Earnings	Age	Years of Service	Contribs.
General	231,631	\$11,785.7	\$50,881	45.7	11.5	\$53,670
Executive Group & Elected Officials	1,380	108.0	78,230	55.2	13.7	100,731
Protective Occupation with Social Security	19,273	1,170.9	60,755	40.6	12.9	63,246
Protective Occupation without Social Security	2,730	208.5	76,376	41.1	14.2	77,683
Total Active Participants	255,014	\$13,273.1	\$52,048	45.3	11.7	\$54,906
Prior Year	256,100	\$13,037.4	\$50,907	45.5	11.7	\$53,731

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

**INACTIVE PARTICIPANTS INCLUDED IN VALUATIONS
DECEMBER 31, 2015**

Inactive participants included in the valuations totaled 158,240 as follows:

Valuation Group	Number	Group Averages		
		Age	Service	Money Purchase Balance
General	151,840	47.5	3.2	\$13,926
Executive Group & Elected Officials	623	54.8	4.5	29,945
Protective Occupation with Social Security	5,555	41.9	4.1	17,492
Protective Occupation without Social Security	222	43.6	7.8	43,910
Total Inactive Participants	158,240	47.3	3.2	\$14,156
Prior Year	154,286	47.2	3.2	\$13,564

The valuations also included 4,015 QDRO cases whose average age was 52.0 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, 2015
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	80							80	\$ 1,631,527
20-24	4,503	10						4,513	139,209,114
25-29	17,446	1,612	14					19,072	749,545,103
30-34	12,747	9,591	1,588	19				23,945	1,082,865,436
35-39	9,629	7,134	8,772	1,701	13			27,249	1,387,499,998
40-44	7,854	5,214	5,788	7,779	1,008	17		27,660	1,505,364,618
45-49	7,605	5,378	5,395	6,700	6,338	1,283	12	32,711	1,803,862,987
50-54	6,512	5,368	5,502	5,905	5,285	5,576	1,257	35,405	1,922,311,181
55	1,210	1,037	1,153	1,255	955	1,147	879	7,636	409,704,371
56	1,086	922	1,090	1,186	927	969	896	7,076	379,804,146
57	950	943	1,070	1,137	866	987	929	6,882	373,853,332
58	965	777	1,009	1,104	753	779	837	6,224	328,340,077
59	855	794	892	1,006	789	720	808	5,864	306,255,617
60	771	615	805	853	659	606	746	5,055	263,817,280
61	673	620	777	829	670	528	676	4,773	249,962,760
62	613	519	573	725	557	471	581	4,039	212,134,037
63	474	406	525	556	449	372	452	3,234	168,132,329
64	413	370	424	468	357	298	373	2,703	140,097,743
65	347	296	275	347	274	207	315	2,061	104,863,663
66	238	201	224	227	151	137	205	1,383	72,606,534
67	196	146	122	144	89	86	123	906	45,407,866
68	190	104	85	107	80	66	99	731	36,841,124
69	167	91	93	82	65	50	89	637	31,084,300
70	110	46	46	47	29	29	57	364	17,006,446
71	90	47	31	28	29	29	48	302	13,173,071
72	89	37	29	22	14	12	32	235	9,474,182
73	78	38	26	21	19	15	32	229	9,256,526
74	58	27	18	15	8	4	15	145	4,843,312
75 & Up	216	105	36	43	26	27	64	517	16,747,008
Totals	76,165	42,448	36,362	32,306	20,410	14,415	9,525	231,631	\$11,785,695,688

**EXECUTIVE GROUP AND ELECTED OFFICIALS
AS OF DECEMBER 31, 2015
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	1							1	\$ 27,273
20-24									
25-29	14	3						17	915,614
30-34	24	6	1					31	1,939,772
35-39	20	16	15	4				55	3,651,881
40-44	44	20	26	27				117	9,096,420
45-49	57	28	30	25	22	4	1	167	12,726,961
50-54	63	36	26	31	28	24	4	212	16,944,662
55	13	11	4	8	10	8	8	62	5,212,327
56	15	2	8	8	3	12	9	57	4,779,201
57	16	5	5	11	3	10	10	60	5,143,915
58	15	7	6	11	6	6	11	62	5,132,974
59	10	2	3	4	3	10	12	44	3,532,809
60	12	4	3	5	9	6	11	50	5,177,925
61	10	9	3	3	3	4	10	42	2,892,524
62	16	11	3	9	6	7	13	65	5,400,680
63	8	5	4	3	9	5	3	37	3,618,078
64	13	5	4	9	4	6	16	57	4,564,974
65	2	6	3	5	7	5	9	37	3,328,160
66	6	7	3	5	1	6	2	30	2,434,737
67	11	4	3	3		2	4	27	2,035,131
68	7	8	4	2	1	2	5	29	2,468,296
69	3	6	3	3	3	1	6	25	2,187,905
70	7		1			2	1	11	723,958
71	5	3		1	1		2	12	963,671
72	2	3	2		1	2	2	12	872,656
73	5	4	3	2	1		1	16	756,291
74	2	1		1	1			5	227,826
75 & Up	17	15		2	2		4	40	1,200,836
Totals	418	227	163	182	124	122	144	1,380	\$107,957,457

**PROTECTIVE OCCUPATION PARTICIPANTS WITH SOCIAL SECURITY
AS OF DECEMBER 31, 2015
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	7							7	\$ 201,373
20-24	688	1						689	27,131,913
25-29	1,895	427	9					2,331	115,933,923
30-34	957	1,438	538	15				2,948	167,959,197
35-39	423	655	1,228	627	9			2,942	176,840,530
40-44	233	321	661	1,445	404	6		3,070	198,393,508
45-49	179	225	433	894	1,288	368	2	3,389	227,352,590
50	17	34	70	110	153	173	7	564	38,814,762
51	19	27	72	78	123	181	13	513	35,736,736
52	20	27	48	66	115	153	33	462	31,614,200
53	28	24	51	63	87	131	55	439	30,321,033
54	22	27	48	59	70	90	39	355	23,532,562
55	15	24	41	49	65	58	48	300	20,022,573
56	13	10	33	36	47	43	43	225	15,185,046
57	6	18	45	29	36	25	44	203	13,489,130
58	8	19	34	27	26	21	27	162	10,226,742
59	10	14	32	23	20	19	34	152	9,282,678
60	10	16	22	27	21	17	22	135	7,712,302
61	11	8	26	17	20	12	26	120	7,129,346
62	3	4	19	7	13	10	11	67	3,853,402
63	9	4	13	11	8	5	9	59	3,056,081
64	4	2	9	6	4	14	8	47	2,618,929
65	1	6	7	7	7	3	4	35	1,879,038
66	3	2	3		3		2	13	599,265
67	2	2	2	5	3	2	1	17	893,775
68	3		1	2		1		7	255,713
69	2		2			1	1	6	323,482
70 & Up	7	2	2	3	1		1	16	568,805
Totals	4,595	3,337	3,449	3,606	2,523	1,333	430	19,273	\$1,170,928,634

**PROTECTIVE OCCUPATION PARTICIPANTS WITHOUT SOCIAL SECURITY
AS OF DECEMBER 31, 2015
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	65							65	\$ 3,126,138
25-29	206	80						286	17,640,545
30-34	142	195	59	1				397	27,018,227
35-39	47	143	176	82				448	32,798,734
40-44	17	45	99	249	48	1		459	36,353,627
45-49	7	16	65	172	163	61		484	40,015,548
50	1	3	5	27	32	26	2	96	8,257,021
51			6	15	31	31	5	88	7,282,602
52		2	5	6	28	41	10	92	7,805,370
53	4	2	1	9	17	31	11	75	6,654,531
54		1	3	12	13	29	12	70	6,425,134
55		1	1	4	13	14	15	48	4,263,653
56		1		8	8	12	9	38	3,327,786
57	1	1	2	3	8	9	3	27	2,395,669
58			1	1	3	7	4	16	1,427,301
59	3			1	3	2	2	11	988,830
60					1	2	1	4	370,131
61				1	2	5	2	10	891,283
62		1	1		6	3	2	13	1,191,399
63	1					1		2	185,836
64									
65							1	1	87,292
Totals	494	491	424	591	376	275	79	2,730	\$208,506,657

**ACTIVE PARTICIPANTS
AS OF DECEMBER 31, 2015
BY YEARS OF SERVICE AND GENDER**

Completed Years of Service	Males	Females	Totals	Valuation Payroll	
				Total	Average
0	6,675	13,570	20,245	\$ 591,014,116	\$29,193
1	6,769	12,247	19,016	710,991,147	37,389
2	5,882	10,662	16,544	672,597,595	40,655
3	5,296	8,730	14,026	598,455,066	42,668
4	4,267	7,574	11,841	524,951,958	44,333
5	3,379	6,282	9,661	438,304,301	45,368
6	2,878	5,775	8,653	401,582,443	46,410
7	3,431	6,355	9,786	478,631,009	48,910
8	3,468	6,108	9,576	487,390,183	50,897
9	3,144	5,683	8,827	457,187,757	51,794
10	2,788	5,412	8,200	430,660,466	52,520
11	2,796	5,085	7,881	427,707,560	54,271
12	2,593	4,838	7,431	405,877,529	54,620
13	2,822	5,189	8,011	455,537,272	56,864
14	3,519	5,356	8,875	516,650,860	58,214
15 & Up	36,599	49,842	86,441	5,675,549,173	65,658
Totals	96,306	158,708	255,014	\$13,273,088,435	\$52,048

Average			
Age	45.4	45.3	45.3
Service	12.4	11.2	11.7

COMPARATIVE STATEMENT OF ACTIVE PARTICIPANTS IN VALUATIONS

Valuation 12/31	General				Executive and Elected			
	No.	Earnings			No.	Earnings		
		\$ Millions	Average	% Incr.		\$ Millions	Average	% Incr.
1991	202,048	\$ 5,357	\$ 26,517	5.1%	1,496	56	37,535	6.7 %
1992	207,882	5,747	27,643	4.2%	1,463	58	39,598	5.5 %
1993	210,627	6,084	28,886	4.5%	1,452	60	41,476	4.7 %
1994	214,280	6,342	29,595	2.5%	1,450	63	43,528	4.9 %
1995	216,434	6,597	30,479	3.0%	1,475	67	45,135	3.7 %
1996	219,265	6,832	31,160	2.2%	1,459	67	45,967	1.8 %
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 %

* After change in method of calculating average pay.

** Some groups had a 27 period payroll during 2008.

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.
1991	11,666	\$ 357	\$ 30,606	2.9%	2,585	92	35,650	5.5 %
1992	12,160	390	32,049	4.7%	2,622	100	38,007	6.6 %
1993	12,388	408	32,928	2.7%	2,611	103	39,371	3.6 %
1994	12,825	436	34,005	3.3%	2,612	106	40,633	3.2 %
1995	13,434	467	34,747	2.2%	2,630	112	42,478	4.5 %
1996	13,820	495	35,807	3.1%	2,625	116	44,063	3.7 %
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 %

* After change in method of calculating average pay.

** Some groups had a 27 period payroll during 2008.

SECTION F

FINANCIAL REPORTING

GASB 67 and 68 Information is provided in a separate report.

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

Valuation Date	December 31, 2015
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	
Net Investment Rate of Return	5.5%
Weighted based on assumed rate for:	
Retired participants	5.0%
Post-retirement active participants	5.0%
Pre-retirement active participants	7.2%
Projected Salary Increases*	3.3% to 8.8%
Payroll Growth Rate	3.2%
Population Growth Rate	0.0%

* Includes merit and seniority increases that vary by service plus wage inflation of 3.2%/year.

STATEMENT OF NET PLAN ASSETS (\$ THOUSANDS)

	2015	2014
Assets		
Cash and Cash Equivalents	\$ 4,322,086	\$ 3,346,728
Securities Lending Collateral	1,177,769	833,501
Prepaid Expenses	29,173	27,577
Total Short Term Assets	5,529,028	4,207,806
Receivables		
Contributions	180,850	164,907
Prior Service Contributions	25,978	33,239
Benefits Overpayment	2,277	2,507
Due from Other Trust Funds	248,957	10,526
Miscellaneous	4,580	3,558
Interest and Dividends	226,886	233,061
Investment Sales	1,041,414	527,889
Total Receivables	1,730,942	975,687
Investments at Fair Value		
Fixed Income	24,955,170	27,139,271
Financial Futures Contracts	(247)	(326)
Preferred Securities	178,666	221,385
Convertible Securities	0	3,779
Stocks	47,185,252	50,725,324
Options	(1,179)	(1,616)
Limited Partnerships	10,679,849	10,554,585
Real Estate	1,119,024	1,017,433
Foreign Currency Contracts	3,274	(10,916)
Multi Asset Investments	4,102,892	3,906,834
Investment in Core Fund	0	0
Investment in External Pool	9,754	(28)
Total Investments	88,232,455	93,555,725
Capital Assets	6,392	2,411
Total Assets	95,498,817	98,741,629
Liabilities:		
Fixed Investment Due Other Programs	3,617,847	3,660,577
Variable Investment Due Other Programs	21,664	21,058
Obligation Under Reverse Repo Agreement	809,678	820,516
Short Sell Obligations	166,161	473,539
Securities Lending Collateral Liability	1,177,769	833,501
Collateral Due to Counterparty	21,870	0
Benefits Payable	372,011	314,965
Unearned Revenue	75	115
Due to Other Trust Funds	283,682	43,286
Miscellaneous Payables	187,056	118,191
Investment Payables	333,649	309,109
Total Liabilities	6,991,462	6,594,857
Net Assets in Trust for Pension Benefits	\$88,507,355	\$92,146,772

STATEMENT OF CHANGES IN ASSETS (\$ THOUSANDS)

	Activity During Year	
	2015	2014
Additions:		
Contributions:		
Employer Contributions	\$ 977,734	\$ 987,793
Employee Contributions	937,225	941,903
Total Contributions	1,914,959	1,929,696
Investment Income:		
Net Appreciation (Depreciation) in Fair Value of Investments	(2,328,202)	3,167,373
Interest	550,054	665,878
Dividends	1,206,311	1,354,765
Securities Lending Income	35,068	28,453
Other	188,537	221,680
Less		
Current Income Distributed	26,710	(190,690)
SWIB Investment Expense	(350,036)	(356,811)
Investment Income Distributed to Securities Lending Rebates and Fees	(2,867)	(2,407)
Net Investment Income	(674,425)	4,888,241
Interest on Prior Service Receivable	1,617	2,133
Miscellaneous Income	17	642
Total Additions	1,242,168	6,820,712
Deductions:		
Benefits and Refunds:		
Retirement, Disability, and Beneficiary	4,780,079	4,497,945
Separation Benefits	37,642	34,401
Total Benefits and Refunds	4,817,721	4,532,346
ETF Administrative Expenses	20,567	24,037
Other Expenses	43,296	42,303
Total Deductions	4,881,584	4,598,686
Net Increase (Decrease)	(3,639,416)	2,222,026
Net Assets Held in Trust:		
Beginning of Year	\$92,146,772	\$89,924,747
End of Year	\$88,507,355	\$92,146,772

SCHEDULE OF FUNDING PROGRESS & ACCRUED LIABILITIES
\$ MILLIONS

Valuation Date Dec. 31	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Frozen Entry Age (b)	Unfunded AAL (UAAL) (b) - (a)	Funded Ratio		Covered Payroll (c)	UAAL as a Percent of Covered Payroll [(b) - (a)] / (c)
				F-I-L (a)/(b)	Entry Age		
2003*	\$ 62,685.3	\$ 63,211.7	\$ 526.4	99.2 %		\$ 10,502.4	5.0 %
2004	66,209.4	66,622.3	412.9	99.4 %		10,897.6	3.8 %
2005	68,615.1	68,987.5	372.5	99.5 %		10,973.4	3.4 %
2006	73,415.3	73,735.8	320.5	99.6 %		11,308.2	2.8 %
2007	79,791.9	80,079.7	287.8	99.6 %		11,720.2	2.5 %
2008	77,159.4	77,412.0	252.6	99.7 %		12,289.6	2.1 %
2009	78,911.3	79,104.6	193.3	99.8 %		12,622.2	1.5 %
2010	80,626.9	80,758.8	131.9	99.8 %		12,744.0	1.0 %
2011	78,940.0	79,039.3	99.3	99.9 %		12,855.6	0.8 %
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 %	99.5 %	13,219.5	0.2 %
2015	91,502.4	91,526.5	24.1	100.0 %	98.7 %	13,530.5	0.2 %

* Affected by prepayment of UAAL in connection with Pension Obligation Bond issued by the state and various local government employers.

SOLVENCY TEST (\$MILLIONS)

Valuation Date Dec. 31	Valuation 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
2002	\$57,861.9	\$26,041.7	\$14,022.9	\$19,554.2	\$59,618.8	100.0%	100.0%	91.0%	97.1%
2003	62,685.3	28,707.8	14,503.1	20,000.8	63,211.7	100.0%	100.0%	97.4%	99.2%
2004	66,209.4	30,829.9	15,050.3	20,742.1	66,622.3	100.0%	100.0%	98.0%	99.4%
2005	68,615.1	32,668.0	15,155.3	21,164.2	68,987.5	100.0%	100.0%	98.2%	99.5%
2006	73,415.3	35,774.7	15,902.4	22,058.7	73,735.8	100.0%	100.0%	98.5%	99.6%
2007	79,791.9	39,675.1	16,795.4	23,609.2	80,079.7	100.0%	100.0%	98.8%	99.6%
2008	77,159.4	38,372.6	16,045.3	22,994.1	77,412.0	100.0%	100.0%	98.9%	99.7%
2009	78,911.3	39,734.2	16,156.6	23,213.8	79,104.6	100.0%	100.0%	99.2%	99.8%
2010	80,626.9	41,139.0	16,253.6	23,366.2	80,758.8	100.0%	100.0%	99.4%	99.8%
2011	78,940.0	43,609.4	14,434.4	20,995.5	79,039.3	100.0%	100.0%	99.5%	99.9%
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%

CONTRIBUTIONS REQUIRED AND CONTRIBUTIONS MADE

Year Ended December 31	Annual Required Contribution	Percent Contributed *
2002	\$426.9	99.8%
2003	462.7	334.0%
2004	497.6	121.0%
2005	535.6	108.0%
2006	569.0	104.0%
2007	614.0	105.0%
2008	644.8	105.0%
2009	699.3	108.0%
2010	686.7	108.0%
2011	784.1	104.0%
2012	826.1	100.0%
2013	912.4	100.0%
2014	977.1	100.0%
2015	966.5	100.0%

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

Employers did not make the full actuarially required contribution for 2000 through 2002. In lieu of the full contribution, employers were allowed to recognize a credit due to a distribution from the TAA in accordance with the provisions of Act 11 of 1999. 2003 percent contributed includes pension obligation proceeds.

SECTION G

METHODS AND ASSUMPTIONS

ACTUARIAL VALUATION METHOD

The actuarial funding method prescribed in the statute for WRS is the **Frozen Entry Age Method**. 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 20 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 2015, 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 5-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.

**SUMMARY OF ASSUMPTIONS
USED FOR ANNUAL ACTUARIAL VALUATIONS
ASSUMPTIONS ADOPTED BY ETF BOARD AFTER
CONSULTING WITH ACTUARY**

ECONOMIC ASSUMPTIONS

For determining plan liabilities, the discount rate is 5.0% for retired participants, 5.0% for active and inactive participants following retirement, and 7.2% for active participants prior to their retirement. A valuation performed assuming a 5.5% discount rate for all participants at all stages of life, reproduces the results of an actuarial valuation using the 5.0% post-retirement and 7.2% pre-retirement assumptions. Thus, it can be said that **the net discount rate assumed in the valuations was 5.5% per year, compounded annually (net after administrative expenses).**

The **Wage Inflation Rate** assumed in this valuation was 3.2% per year. The wage inflation rate is defined to be the portion of total pay increases for an individual that are due to macro economic 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 2.7%.

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 7.2% pre-retirement investment return rate translates to an assumed real rate of return over wage inflation of 4.0%. The assumed real rate of return over price inflation is 4.5% considering an inflation assumption of 2.7%.

Pay increase assumptions for individual active members are shown for sample services below. Part of the assumption for each age is for merit and/or seniority increase, and the other 3.2% recognizes wage inflation, including price inflation, productivity increases, and other macro economic forces.

% Merit and Longevity Increase Next Year						
Service	Gen.	University Teachers	Public School Teachers	Protective		Exec. & Elec.
				With S.S.	W/O S.S.	
1	3.5 %	3.0 %	5.6 %	4.8 %	5.5 %	2.5 %
2	3.5 %	3.0 %	5.6 %	4.8 %	5.5 %	2.5 %
3	3.1 %	2.9 %	5.2 %	4.1 %	4.7 %	2.0 %
4	2.8 %	2.8 %	4.7 %	3.5 %	3.8 %	1.6 %
5	2.5 %	2.7 %	4.3 %	2.8 %	3.0 %	1.1 %
10	1.5 %	2.2 %	2.6 %	1.1 %	0.9 %	0.2 %
15	1.1 %	1.7 %	1.4 %	0.8 %	0.5 %	0.2 %
20	0.9 %	1.2 %	0.6 %	0.7 %	0.4 %	0.2 %
25	0.6 %	0.9 %	0.3 %	0.6 %	0.3 %	0.2 %
30	0.4 %	0.7 %	0.2 %	0.5 %	0.2 %	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 – 3.20% per year.

The mortality table used to measure mortality for retired participants was the Wisconsin 2012 Mortality Table. The rates in this table were based on actual WRS experience adjusted for future mortality improvements using the MP-2015 fully generational improvement scale (multiplied by 50%). This mortality assumption was adopted by the Board in connection with the 2012-2014 Experience Study. 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 Wisconsin 2012 Mortality Table with 5% Interest

Sample Attained Ages in 2015	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)	
	Males	Females	Males	Females
40	\$212.10	\$217.24	44.6	47.8
45	203.48	209.77	39.6	42.8
50	192.71	200.54	34.6	37.8
55	179.86	189.35	29.8	32.9
60	165.48	176.01	25.2	28.1
65	148.22	159.83	20.8	23.5
70	128.60	140.64	16.6	19.0
75	106.86	118.97	12.7	14.8
80	84.12	95.73	9.3	11.0
85	62.91	72.64	6.5	7.7

The values shown above are for non-disabled participants in 2015. For disabled participants, the following table was used:

Sample Attained Ages in 2015	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)	
	Males	Females	Males	Females
40	\$198.57	\$207.38	37.1	41.4
45	186.57	197.56	32.2	36.4
50	172.73	185.67	27.4	31.5
55	156.72	171.51	22.9	26.8
60	138.06	154.59	18.6	22.2
65	117.55	134.77	14.6	17.8
70	95.28	112.57	10.9	13.7
75	72.99	89.09	7.8	10.0
80	53.57	66.61	5.4	7.0
85	37.90	48.58	3.6	4.8

ACTIVE PARTICIPANT MORTALITY RATES

Sample Attained Ages in 2015	Mortality Rates	
	Males	Females
20	0.000138	0.000079
25	0.000165	0.000088
30	0.000206	0.000118
35	0.000359	0.000210
40	0.000485	0.000298
45	0.000642	0.000466
50	0.000866	0.000690
55	0.002011	0.001221
60	0.002854	0.001755
65	0.004354	0.002683
70	0.007198	0.004555
75	0.012242	0.008257
80	0.022508	0.015445

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	General		Public School		University		Protective*		Exec. & Elected
	Male	Female	Male	Female	Male	Female	With S.S.	W/O S.S.	
50							6%	4%	
51							7%	4%	
52							9%	5%	
53							23%	17%	
54							19%	25%	
55							19%	21%	
56							19%	27%	
57	18%	15%	36%	28%	12%	14%	19%	30%	12%
58	18%	15%	31%	28%	12%	12%	18%	30%	12%
59	18%	15%	24%	28%	12%	10%	16%	30%	12%
60	18%	15%	30%	28%	12%	12%	20%	26%	12%
61	18%	15%	28%	28%	12%	16%	20%	15%	12%
62	25%	25%	37%	36%	12%	14%	22%	20%	12%
63	30%	25%	32%	30%	12%	19%	26%	40%	12%
64	25%	25%	27%	27%	12%	13%	17%	40%	12%
65	25%	28%	29%	35%	15%	18%	30%	40%	12%
66	32%	32%	33%	35%	17%	22%	25%	40%	20%
67	26%	26%	27%	30%	16%	17%	30%	40%	15%
68	19%	22%	24%	30%	16%	16%	30%	40%	15%
69	19%	20%	24%	30%	16%	14%	30%	40%	10%
70	19%	20%	20%	35%	16%	18%	100%	100%	10%
71	19%	20%	20%	30%	18%	18%	100%	100%	10%
72	19%	20%	20%	22%	14%	18%	100%	100%	15%
73	19%	20%	20%	22%	14%	18%	100%	100%	15%
74	19%	20%	20%	22%	10%	18%	100%	100%	15%
75	100%	100%	100%	100%	100%	100%	100%	100%	100%

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

Reduced Retirement

Age	% Retiring Next Year						Exec. & Elected
	General		Public School		University		
	Male	Female	Male	Female	Male	Female	
55	9.0%	7.0%	13.0%	12.0%	4.0%	5.5%	3.0%
56	9.0%	7.0%	13.0%	12.0%	3.0%	5.5%	3.0%
57	4.8%	5.0%	12.0%	12.0%	2.5%	4.0%	3.0%
58	5.8%	6.0%	13.0%	12.0%	2.5%	5.5%	3.0%
59	6.5%	6.0%	14.0%	13.0%	3.0%	6.5%	3.0%
60	8.5%	8.5%	14.0%	17.0%	4.3%	8.0%	5.0%
61	8.5%	8.5%	15.0%	17.0%	5.0%	6.0%	5.0%
62	16.0%	16.0%	21.0%	23.0%	6.0%	12.0%	
63	17.0%	16.0%	21.0%	23.0%	7.0%	12.0%	
64	17.0%	16.0%	21.0%	23.0%	7.0%	12.0%	

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 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 5 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 Terminating								
		Protective		Public Schools		University		Exec. & Elected	General	
		With Soc. Sec.	Without Soc. Sec.							
		Males	Females	Males	Females	Males	Females			
	0	17.0%	4.0%	18.3%	16.0%	16.0%	16.0%	18.0%	16.8%	20.0%
	1	8.0%	3.5%	11.0%	10.8%	14.0%	15.0%	14.0%	12.7%	14.1%
	2	5.0%	1.5%	7.8%	7.7%	12.0%	13.0%	12.0%	9.0%	11.0%
	3	4.3%	1.3%	5.9%	5.8%	10.0%	10.0%	10.0%	7.3%	8.9%
	4	3.8%	1.2%	4.9%	5.0%	8.5%	9.9%	10.0%	7.0%	8.5%
	5	3.1%	1.1%	3.6%	4.3%	8.0%	8.4%	8.0%	4.8%	6.7%
	6	3.0%	1.0%	3.2%	3.8%	7.5%	6.4%	7.0%	4.3%	5.6%
	7	2.9%	0.9%	2.6%	3.4%	5.7%	5.7%	6.0%	4.2%	5.0%
	8	2.5%	0.8%	2.6%	2.8%	4.6%	4.7%	6.0%	3.4%	4.7%
	9	2.2%	0.7%	2.4%	2.5%	4.0%	4.2%	6.0%	3.1%	4.5%
25	10 & Over	2.0%	0.7%	1.3%	2.2%	4.0%	5.0%	6.0%	2.5%	4.5%
30		1.8%	0.7%	1.3%	1.9%	3.9%	4.6%	5.1%	2.5%	4.3%
35		1.6%	0.7%	1.3%	1.6%	3.6%	4.2%	4.3%	2.4%	3.5%
40		1.3%	0.6%	1.3%	1.3%	3.1%	3.4%	4.1%	2.1%	2.7%
45		1.1%	0.6%	1.3%	1.1%	2.3%	2.6%	3.2%	1.8%	2.2%
50		1.0%	0.5%	1.3%	1.0%	1.9%	2.1%	2.5%	1.5%	1.9%
55		1.0%	0.5%	1.3%	1.0%	1.8%	2.0%	2.4%	1.5%	1.8%
60		1.0%	0.5%	1.3%	1.0%	1.8%	2.0%	2.4%	1.5%	1.8%

Disability Rates

Age	% of Active Participants Becoming Disabled									
	Protective		Public Schools		University		Exec. & Elected		General	
	With SS	W/O SS	Males	Females	Males	Females	Males	Females	Males	Females
20	0.01%	0.04%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
25	0.01%	0.04%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
30	0.01%	0.04%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%
35	0.02%	0.04%	0.01%	0.01%	0.00%	0.02%	0.01%	0.01%	0.01%	0.03%
40	0.02%	0.06%	0.01%	0.02%	0.01%	0.03%	0.01%	0.01%	0.03%	0.04%
45	0.03%	0.11%	0.03%	0.05%	0.01%	0.03%	0.01%	0.01%	0.06%	0.06%
50	0.06%	0.64%	0.08%	0.10%	0.02%	0.06%	0.02%	0.02%	0.13%	0.09%
55	0.87%	0.48%	0.16%	0.14%	0.05%	0.09%	0.09%	0.09%	0.24%	0.16%
60	1.46%	0.14%	0.26%	0.21%	0.07%	0.13%	0.11%	0.11%	0.43%	0.23%

MISCELLANEOUS AND TECHNICAL ASSUMPTIONS

Expenses:	Assumed investment return is net of administrative and investment expenses.
Marriage Assumption:	80% of males and 70% 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.
Pay Increase Timing:	Beginning of (calendar) year for most people. Middle of calendar year for teachers.
Pay Annualization:	Reported pay for members with less than twelve contributing months was annualized by the ratio of 12 to the number of contributing months in the year.
Final Average Salary:	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.
Decrement Timing:	Decrements of all types are assumed to occur mid-year.
Decrement Operation:	Disability operates during the retirement pattern.
Decrement Relativity:	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
Eligibility Testing:	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.
Benefit Service:	Exact fractional service on the decrement date is used to determine the amount of benefit payable.
Non-Benefit Service:	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 was formerly 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.
Service Credit Accruals:	It is assumed that members accrue one year of service credit per year.

MISCELLANEOUS AND TECHNICAL ASSUMPTIONS (CONCLUDED)

Incidence of Contributions:	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.
Assumed Retirement for Deferred Members:	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.
Normal Form of Benefit:	The assumed normal form of benefit is a straight life benefit, except where otherwise noted.
Disability Valuation:	<p>The Post-10/15/92 Disability benefit consists of one benefit payable to age 65 (10% of FAE) plus another benefit payable on and after age 65 (WRS benefit accrued to date of disability plus 7% of FAE during disability). For valuation purposes, the 7% of FAE portion of the post 65 benefit was added to the 40% of FAE benefit prior to age 65.</p> <p>Additionally, there are certain cases in which the disability benefit at the member's normal retirement age is larger than the member's benefit under the normal retirement benefit formula. To account for this, an adjustment is made to the member's normal retirement benefit present value calculation which is equal to 15% of the difference between the present values of the LTDI benefit and the normal retirement benefit.</p>
Variable Excess Benefits:	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.)
Liability Adjustments:	Final Average Salaries were increased 2.5% (3.0% for Executive and Elected and 3.5% for Protectives) to account for additional contingencies in actual benefit amount calculated at the time of retirement.
Amortization Payoff Reserve:	Additional reserves in the amount of \$25,708,603 (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.

SECTION H
PLAN PROVISIONS

**SUMMARY OF BENEFIT PROVISIONS EVALUATED
DECEMBER 31, 2015 ACTUARIAL VALUATION**

Normal Retirement Eligibility

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

General		Protective		Executive & Elected	
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 5 calendar years.

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 and 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 3 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.

Reduced Retirement. Any participant who has attained age 55 and any Protective occupation participant who has attained age 50 may apply for an early 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 Annuity. Eligibility: generally total and permanent incapacity to engage in gainful employment. Participant must have completed at least 6 months of creditable service (in at least 5 out of the last 7 calendar years) preceding application for disability. Service requirement is waived if disability is from service-related causes.

For Protective occupations, eligibility also can be met if a member has 15 years of service, is between the ages of 50 and 55 and unable to safely and efficiently perform one's duties.

Disability Amounts. Amounts payable in case of disability depend upon the plan from which payment is made and are described below.

	Pre-10/16/1992 WRS Plan	Post-10/15/1992 LTDI Plan
Participants covered	Participants hired before 10/16/1992 who do not elect LTDI coverage.	Participants entering after 10/15/1992 and participants on 10/15/1992 who elect LTDI coverage.
Benefit to age 65*	WRS formula benefit based on service projected to normal retirement age.	40% of FAE for participants covered by Social Security; 50% of FAE for non-covered participants who cannot qualify for Social Security disability benefits.
Benefit at age 65*	Continuation of pre-65 amount.	WRS benefit accrued to date of disability plus 7% of FAE money purchase benefit during disability period, both of which are adjusted in accordance with dividend rate.

* Conversion age is later for participants becoming disabled after age 61.

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 any natural living person.

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	Refunds
	Minimum	
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	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).

Vesting. Participants hired prior to July 1, 2011 vest immediately. After July 1, 2011, participants vest after 5 years of service.

APPENDIX 1

GLOSSARY

GLOSSARY

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.”

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

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.

GLOSSARY (CONCLUDED)

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.

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.

APPENDIX 2

VALUATION PROCESS

FINANCIAL PRINCIPLES & 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 ...

Interest on Unfunded Actuarial Accrued Liabilities (unfunded actuarial accrued liabilities are the difference between (i) the present value of future benefits and (ii) the present value of future normal costs, and reduced by the assets on hand at the valuation date).

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 ...
Ivestment 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

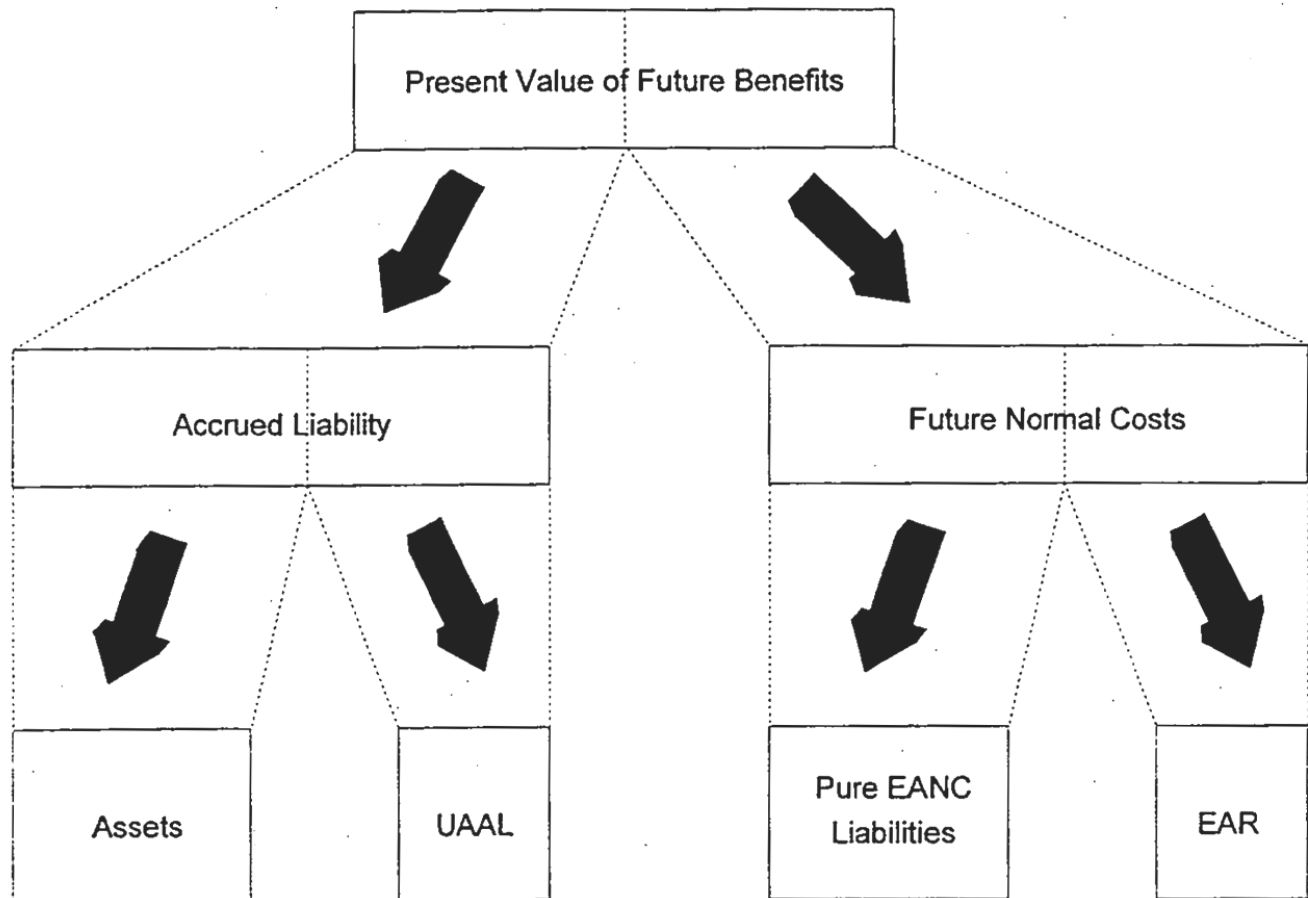
The principal areas of risk assumption are:

- 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
- the age and service *distribution of actual retirements*

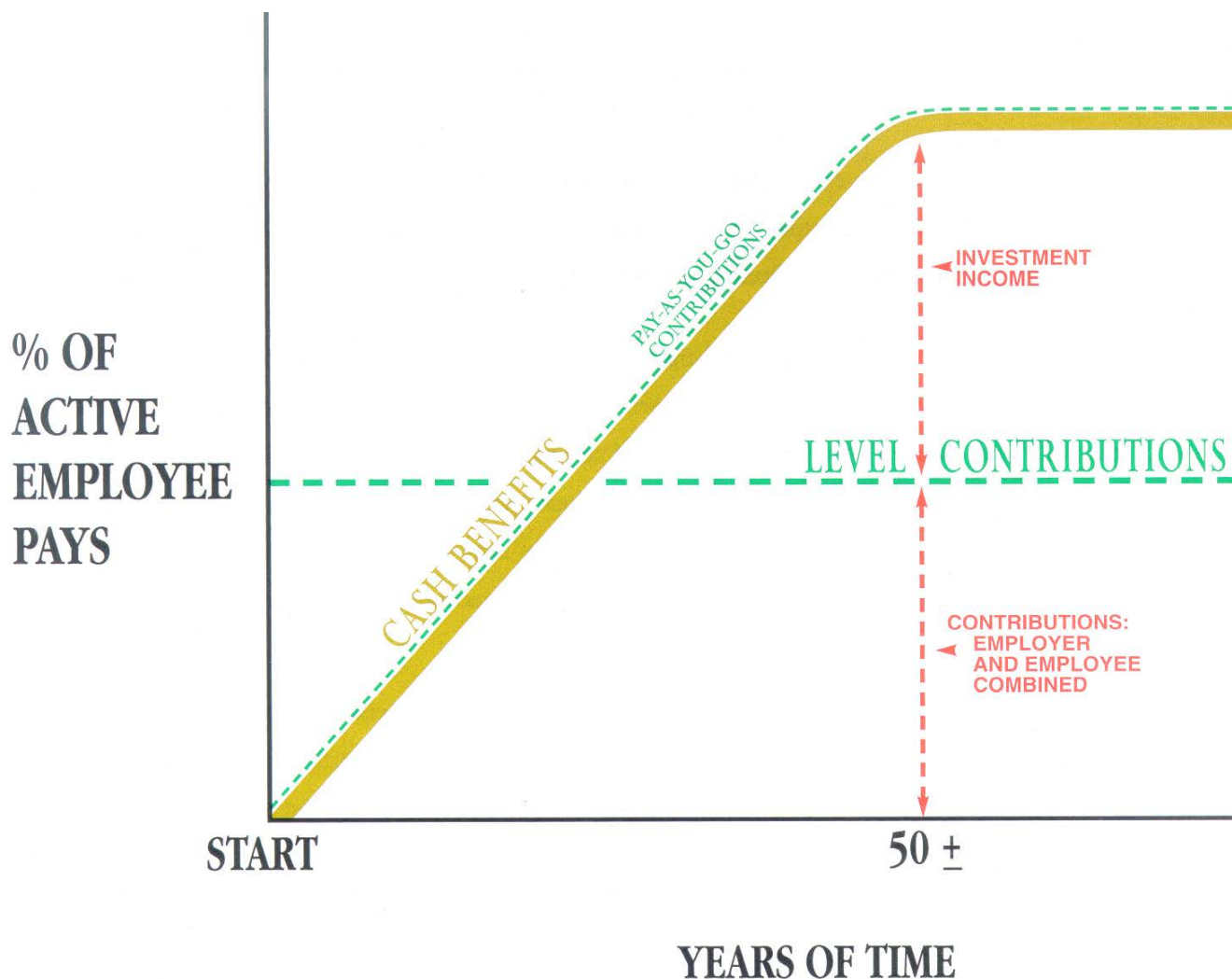
In an actuarial valuation, the actuary projects the monetary effect of each risk assumption for each distinct experience group, for the next year and for each year over the next half-century or longer.

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.

The Actuarial Valuation Process



- UAAL: Unfunded actuarial accrued liabilities are amortized over a fixed period of years.
- Pure EANC: Entry age normal cost liabilities are financed over the working lifetimes of WRS participants.
- EAR: The Experience Amortization Reserve portion of future normal costs is financed over varying periods which are selected to optimize contribution rate stability.



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

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

Economic Risk Areas

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

Non-Economic Risk Areas

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

APPENDIX 3

GAIN/LOSS EXHIBITS

**GENERAL MALES
WITHDRAWAL EXPERIENCE
DURING CALENDAR YEAR 2015**

**Male Service-Based Withdrawals
All Ages**

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	386	2,206	0.1750	0.1680	371
2	532	4,125	0.1290	0.1270	524
3	332	3,343	0.0993	0.0900	301
4	283	2,986	0.0948	0.0730	218
5	171	2,094	0.0817	0.0700	147
6	129	1,569	0.0822	0.0480	75
7	103	1,695	0.0608	0.0430	73
8	94	1,844	0.0510	0.0420	77
9	96	1,645	0.0584	0.0340	56
10	78	1,407	0.0554	0.0310	44
Totals	2,204	22,914	0.0962	0.0823	1,886

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

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	5	0.0000	0.0250	-
30-34	14	311	0.0450	0.0250	8
35-39	44	1,332	0.0330	0.0225	30
40-44	66	2,238	0.0295	0.0200	45
45-49	74	3,645	0.0203	0.0160	58
50-54	137	5,181	0.0264	0.0150	78
Over 54	129	11,255	0.0115		129
Totals	464	23,967	0.0194	0.0145	348

**GENERAL FEMALES
WITHDRAWAL EXPERIENCE
DURING CALENDAR YEAR 2015**

**Female Service-Based Withdrawals
All Ages**

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	942	4,672	0.2016	0.2000	934
2	1,387	8,477	0.1636	0.1410	1,195
3	899	7,005	0.1283	0.1100	771
4	621	5,483	0.1133	0.0890	488
5	385	4,334	0.0888	0.0850	368
6	355	3,699	0.0960	0.0670	248
7	308	3,804	0.0810	0.0560	213
8	225	3,578	0.0629	0.0500	179
9	201	3,393	0.0592	0.0470	159
10	166	3,078	0.0539	0.0450	139
Totals	5,489	47,523	0.1155	0.0988	4,694

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

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	2	14	0.1429	0.0450	1
30-34	28	507	0.0552	0.0420	21
35-39	97	2,121	0.0457	0.0300	64
40-44	137	3,296	0.0416	0.0250	82
45-49	150	5,063	0.0296	0.0200	101
50-54	268	8,141	0.0329	0.0175	142
Over 54	271	19,382	0.0140		271
Totals	953	38,524	0.0247	0.0177	682

**PUBLIC SCHOOLS MALES
WITHDRAWAL EXPERIENCE
DURING CALENDAR YEAR 2015**

**Male Service-Based Withdrawals
All Ages**

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	75	578	0.1298	0.1830	106
2	132	1,098	0.1202	0.1100	121
3	96	1,091	0.0880	0.0780	85
4	67	988	0.0678	0.0590	58
5	57	823	0.0693	0.0490	40
6	35	629	0.0556	0.0360	23
7	34	654	0.0520	0.0320	21
8	31	706	0.0439	0.0260	18
9	26	721	0.0361	0.0260	19
10	27	701	0.0385	0.0240	17
Totals	580	7,989	0.0726	0.0636	508

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

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N/A	0.0125	-
30-34	7	219	0.0320	0.0125	3
35-39	49	1,791	0.0274	0.0125	22
40-44	38	2,535	0.0150	0.0125	32
45-49	52	2,783	0.0187	0.0125	35
50-54	60	2,550	0.0235	0.0125	32
Over 54	36	3,029	0.0119		36
Totals	242	12,907	0.0187	0.0124	160

**PUBLIC SCHOOLS FEMALES
WITHDRAWAL EXPERIENCE
DURING CALENDAR YEAR 2015**

**Female Service-Based Withdrawals
All Ages**

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	172	1,740	0.0989	0.1600	278
2	346	3,363	0.1029	0.1080	363
3	274	3,152	0.0869	0.0770	243
4	168	2,756	0.0610	0.0580	160
5	121	2,286	0.0529	0.0500	114
6	130	2,068	0.0629	0.0430	89
7	97	2,118	0.0458	0.0380	80
8	100	2,338	0.0428	0.0340	79
9	90	2,237	0.0402	0.0280	63
10	86	2,184	0.0394	0.0250	55
Totals	1,584	24,242	0.0653	0.0629	1,524

**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	15	695	0.0216	0.0175	12
35-39	98	4,700	0.0209	0.0150	71
40-44	110	5,898	0.0187	0.0120	71
45-49	140	6,977	0.0201	0.0110	77
50-54	142	6,523	0.0218	0.0100	65
Over 54	96	8,347	0.0115		96
Totals	601	33,140	0.0181	0.0118	392

**UNIVERSITY MALES
WITHDRAWAL EXPERIENCE
DURING CALENDAR YEAR 2015**

**Male Service-Based Withdrawals
All Ages**

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	62	347	0.1787	0.1600	56
2	142	709	0.2003	0.1400	99
3	115	728	0.1580	0.1200	87
4	85	622	0.1367	0.1000	62
5	52	469	0.1109	0.0850	40
6	49	428	0.1145	0.0800	34
7	31	384	0.0807	0.0750	29
8	24	405	0.0593	0.0570	23
9	24	341	0.0704	0.0460	16
10	24	309	0.0777	0.0400	12
Totals	608	4,742	0.1282	0.0966	458

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

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N/A	0.0400	-
30-34	2	19	0.1053	0.0375	1
35-39	14	189	0.0741	0.0350	7
40-44	10	446	0.0224	0.0275	12
45-49	28	791	0.0354	0.0200	16
50-54	36	888	0.0405	0.0175	16
Over 54	16	2,715	0.0059		16
Totals	106	5,048	0.0210	0.0135	68

**UNIVERSITY FEMALES
WITHDRAWAL EXPERIENCE
DURING CALENDAR YEAR 2015**

**Female Service-Based Withdrawals
All Ages**

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	72	443	0.1625	0.1600	71
2	143	871	0.1642	0.1500	131
3	141	895	0.1575	0.1300	116
4	86	693	0.1241	0.1000	69
5	68	624	0.1090	0.0990	62
6	50	488	0.1025	0.0840	41
7	46	533	0.0863	0.0640	34
8	36	558	0.0645	0.0570	32
9	37	436	0.0849	0.0470	20
10	17	436	0.0390	0.0420	18
Totals	696	5,977	0.1164	0.0994	594

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

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N/A	0.0500	-
30-34	1	44	0.0227	0.0440	2
35-39	19	298	0.0638	0.0400	12
40-44	20	544	0.0368	0.0300	16
45-49	25	776	0.0322	0.0230	18
50-54	29	955	0.0304	0.0200	19
Over 54	19	2,227	0.0085		19
Totals	113	4,844	0.0233	0.0178	86

**PROTECTIVE WITH SOCIAL SECURITY
WITHDRAWAL EXPERIENCE
DURING CALENDAR YEAR 2015**

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

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	89	515	0.1728	0.1700	88
2	148	1,190	0.1244	0.0800	95
3	75	944	0.0794	0.0500	47
4	43	847	0.0508	0.0430	36
5	32	623	0.0514	0.0380	24
6	33	526	0.0627	0.0310	16
7	43	684	0.0629	0.0300	21
8	41	833	0.0492	0.0290	24
9	32	786	0.0407	0.0250	20
10	22	701	0.0314	0.0220	15
Totals	558	7,649	0.0730	0.0505	386

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

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	4	0.0000	0.0200	-
30-34	18	562	0.0320	0.0170	10
35-39	58	1,923	0.0302	0.0150	29
40-44	58	2,626	0.0221	0.0120	32
45-49	42	2,951	0.0142	0.0110	32
50-54	24	2,263	0.0106	0.0100	23
Over 54	16	1,544	0.0104		16
Totals	216	11,873	0.0182	0.0120	142

**PROTECTIVE WITHOUT SOCIAL SECURITY
WITHDRAWAL EXPERIENCE
DURING CALENDAR YEAR 2015**

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

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	-	22	0.0000	0.0400	1
2	3	108	0.0278	0.0350	4
3	4	113	0.0354	0.0150	2
4	2	100	0.0200	0.0130	1
5	-	92	0.0000	0.0120	1
6	1	101	0.0099	0.0110	1
7	-	90	0.0000	0.0100	1
8	-	104	0.0000	0.0090	1
9	-	87	0.0000	0.0080	1
10	4	108	0.0370	0.0070	1
Totals	14	925	0.0151	0.0151	14

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

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N/A	0.0070	-
30-34	3	56	0.0536	0.0070	-
35-39	1	248	0.0040	0.0065	2
40-44	3	409	0.0073	0.0060	2
45-49	-	460	0.0000	0.0055	3
50-54	10	429	0.0233	0.0050	2
Totals	17	1,602	0.0106	0.0056	9

**EXECUTIVE AND ELECTED MALES
WITHDRAWAL EXPERIENCE
DURING CALENDAR YEAR 2015**

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

Service Index	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
1	7	56	0.1250	0.1800	10
2	3	82	0.0366	0.1400	11
3	11	96	0.1146	0.1200	12
4	5	65	0.0769	0.1000	7
5	7	88	0.0795	0.1000	9
6	3	41	0.0732	0.0800	3
7	1	44	0.0227	0.0700	3
8	-	37	0.0000	0.0600	2
9	2	45	0.0444	0.0600	3
10	-	19	0.0000	0.0600	1
Totals	39	573	0.0681	0.1065	61

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

Age	Withdrawals	Exposure	Crude Rates	Current Rates	Expected Withdrawals
25-29	-	-	N/A	0.0600	-
30-34	-	1	0.0000	0.0450	-
35-39	1	16	0.0625	0.0420	1
40-44	3	60	0.0500	0.0400	2
45-49	3	79	0.0380	0.0260	2
50-54	6	123	0.0488	0.0240	3
Over 54	5	499	0.0100		5
Totals	18	778	0.0231	0.0167	13

**GENERAL
DISABILITY EXPERIENCE
DURING CALENDAR YEAR 2015**

Male Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0001	-
20-24	-	11	0.0000	0.0001	-
25-29	-	459	0.0000	0.0001	-
30-34	-	1,856	0.0000	0.0001	-
35-39	-	2,817	0.0000	0.0002	-
40-44	-	3,374	0.0000	0.0005	2
45-49	2	4,838	0.0004	0.0006	3
50-54	3	6,352	0.0005	0.0017	10
55-59	13	6,122	0.0021	0.0030	18
60-64	11	3,715	0.0030	0.0059	22
65-69	-	932	0.0000	0.0023	2
70-74	-	206	0.0000	0.0020	-
75 and over	-	-	N/A	0.0020	-
Totals	29	30,682	0.0009	0.0019	57

Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0001	-
20-24	-	19	0.0000	0.0001	-
25-29	-	867	0.0000	0.0001	-
30-34	-	3,131	0.0000	0.0002	1
35-39	-	4,537	0.0000	0.0003	1
40-44	-	5,533	0.0000	0.0004	2
45-49	3	8,026	0.0004	0.0006	5
50-54	11	11,641	0.0009	0.0010	12
55-59	17	12,065	0.0014	0.0020	24
60-64	11	7,402	0.0015	0.0025	18
65-69	-	1,775	0.0000	0.0020	4
70-74	-	319	0.0000	0.0017	1
75 and over	-	-	N/A	0.0017	-
Totals	42	55,315	0.0008	0.0012	68

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. The LTDI plan is described in a separate report.

**PUBLIC SCHOOLS
DISABILITY EXPERIENCE
DURING CALENDAR YEAR 2015**

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	-	229	0.0000	0.0001	-
30-34	-	1,660	0.0000	0.0001	-
35-39	-	2,644	0.0000	0.0001	-
40-44	-	2,967	0.0000	0.0002	1
45-49	-	3,064	0.0000	0.0004	1
50-54	4	2,770	0.0014	0.0013	4
55-59	1	1,797	0.0006	0.0017	3
60-64	1	696	0.0014	0.0031	2
65-69	-	147	0.0000	0.0043	1
70-74	-	37	0.0000	0.0045	-
75 and over	-	-	N/A	0.0045	-
Totals	6	16,011	0.0004	0.0007	12

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	-	888	0.0000	0.0001	-
30-34	-	5,370	0.0000	0.0001	-
35-39	-	6,943	0.0000	0.0001	1
40-44	-	7,126	0.0000	0.0002	2
45-49	-	8,129	0.0000	0.0008	7
50-54	3	7,337	0.0004	0.0011	8
55-59	5	5,271	0.0009	0.0017	9
60-64	1	2,185	0.0005	0.0024	5
65-69	-	386	0.0000	0.0014	1
70-74	-	56	0.0000	0.0011	-
75 and over	-	-	N/A	0.0011	-
Totals	9	43,691	0.0002	0.0008	33

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**UNIVERSITY
DISABILITY EXPERIENCE
DURING CALENDAR YEAR 2015**

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	-	36	0.0000	0.0000	-
30-34	-	263	0.0000	0.0000	-
35-39	-	640	0.0000	0.0000	-
40-44	-	937	0.0000	0.0001	-
45-49	-	1,119	0.0000	0.0001	-
50-54	-	1,104	0.0000	0.0002	-
55-59	-	1,095	0.0000	0.0007	1
60-64	2	847	0.0024	0.0007	1
65-69	-	253	0.0000	0.0009	-
70-74	-	44	0.0000	0.0008	-
75 and over	-	-	N/A	0.0008	-
Totals	2	6,338	0.0003	0.0003	2

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	-	83	0.0000	0.0000	-
30-34	-	490	0.0000	0.0000	-
35-39	-	941	0.0000	0.0003	-
40-44	-	1,049	0.0000	0.0004	-
45-49	-	1,166	0.0000	0.0003	-
50-54	-	1,263	0.0000	0.0007	1
55-59	1	1,099	0.0009	0.0010	1
60-64	-	769	0.0000	0.0015	1
65-69	-	192	0.0000	0.0010	-
70-74	-	37	0.0000	0.0009	-
75 and over	-	-	N/A	0.0009	-
Totals	1	7,089	0.0001	0.0004	3

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**PROTECTIVE WITH SOCIAL SECURITY
DISABILITY EXPERIENCE
DURING CALENDAR YEAR 2015**

Male and Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0004	-
20-24	-	2	0.0000	0.0004	-
25-29	-	99	0.0000	0.0004	-
30-34	-	270	0.0000	0.0004	-
35-39	-	398	0.0000	0.0004	-
40-44	-	460	0.0000	0.0007	-
45-49	2	480	0.0042	0.0014	1
50-54	-	318	0.0000	0.0098	3
55-59	-	45	0.0000	0.0014	-
60-64	-	7	0.0000	0.0014	-
65-69	-	-	N/A	0.0014	-
70-74	-	-	N/A	0.0014	-
75 and over	-	-	N/A	0.0014	-
Totals	2	2,079	0.0010	0.0019	4

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**PROTECTIVE WITHOUT SOCIAL SECURITY
DISABILITY EXPERIENCE
DURING CALENDAR YEAR 2015**

Male and Female Disability Experience

Age	Disabilities	Exposure	Crude Rates	Current Rates	Expected Disabilities
Under 20	-	-	N/A	0.0001	-
20-24	-	7	0.0000	0.0001	-
25-29	-	620	0.0000	0.0001	-
30-34	-	2,166	0.0000	0.0001	-
35-39	-	2,639	0.0000	0.0002	1
40-44	-	2,998	0.0000	0.0003	1
45-49	2	3,213	0.0006	0.0004	1
50-54	5	1,997	0.0025	0.0007	1
55-59	-	602	0.0000	0.0140	8
60-64	-	280	0.0000	0.0150	4
65-69	-	61	0.0000	0.0010	-
70-74	-	-	N/A	0.0010	-
75 and over	-	-	N/A	0.0010	-
Totals	7	14,583	0.0005	0.0011	16

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**EXECUTIVE AND ELECTED
DISABILITY EXPERIENCE
DURING CALENDAR YEAR 2015**

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	-	3	0.0000	0.0000	-
30-34	-	8	0.0000	0.0000	-
35-39	-	30	0.0000	0.0001	-
40-44	-	82	0.0000	0.0001	-
45-49	-	114	0.0000	0.0002	-
50-54	-	160	0.0000	0.0003	-
55-59	-	188	0.0000	0.0012	-
60-64	-	131	0.0000	0.0011	-
65-69	-	79	0.0000	0.0009	-
70-74	-	33	0.0000	0.0009	-
75 and over	-	-	N/A	0.0009	-
Totals	-	828	N/A	N/A	-

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**GENERAL
PAY INCREASE ASSUMPTION
DURING CALENDAR YEAR 2015**

Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	38,443	10.32 %	7.45 %
6-10	23,584	4.05 %	5.90 %
11-15	19,307	3.12 %	5.25 %
16-20	15,326	2.49 %	5.00 %
21-25	9,897	2.19 %	4.75 %
26-30	6,837	1.95 %	4.50 %
31-35	3,407	1.79 %	4.30 %
36-40	1,597	1.58 %	4.20 %
Over 40	304	2.15 %	4.10 %
Total	118,702		

**PUBLIC SCHOOLS
PAY INCREASE ASSUMPTION
DURING CALENDAR YEAR 2015**

Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	16,297	11.65 %	9.60 %
6-10	13,593	5.14 %	7.40 %
11-15	13,956	3.81 %	6.10 %
16-20	12,789	2.89 %	5.00 %
21-25	8,669	2.46 %	4.35 %
26-30	5,348	2.13 %	4.20 %
31-35	1,830	1.98 %	4.15 %
36-40	413	2.02 %	4.10 %
Over 40	73	3.25 %	4.05 %
Total	72,968		

**UNIVERSITY
PAY INCREASE ASSUMPTION
DURING CALENDAR YEAR 2015**

Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	5,370	14.20 %	7.00 %
6-10	3,888	3.66 %	6.50 %
11-15	3,217	2.90 %	6.00 %
16-20	2,416	2.35 %	5.50 %
21-25	1,482	1.72 %	4.95 %
26-30	1,081	1.85 %	4.80 %
31-35	594	1.48 %	4.60 %
36-40	220	1.91 %	4.20 %
Over 40	99	1.91 %	4.10 %
Total	18,367		

**PROTECTIVE WITH SOCIAL SECURITY
PAY INCREASE ASSUMPTION
DURING CALENDAR YEAR 2015**

Male and Female Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	3,614	14.66 %	8.75 %
6-10	3,293	4.57 %	5.50 %
11-15	3,533	3.86 %	4.90 %
16-20	3,504	3.34 %	4.80 %
21-25	2,395	3.33 %	4.70 %
26-30	1,147	3.24 %	4.60 %
31-35	293	2.23 %	4.50 %
36-40	68	3.85 %	4.40 %
Over 40	11	1.34 %	4.20 %
Total	17,858		

**PROTECTIVE WITHOUT SOCIAL SECURITY
PAY INCREASE ASSUMPTION
DURING CALENDAR YEAR 2015**

Male and Female Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	422	17.34 %	9.50 %
6-10	485	4.46 %	5.30 %
11-15	421	3.87 %	4.60 %
16-20	566	3.93 %	4.50 %
21-25	383	4.06 %	4.40 %
26-30	255	4.66 %	4.30 %
31-35	53	3.55 %	4.20 %
36-40	4	2.54 %	4.10 %
Over 40	-	N/A	4.05 %
Total	2,589		

**EXECUTIVE AND ELECTED
PAY INCREASE ASSUMPTION
DURING CALENDAR YEAR 2015**

Service-Based Pay Increase Experience

Service Group		Total % Increase	
Beginning of Year	Number	Actual	Expected
1-5	368	6.55 %	6.50 %
6-10	183	2.65 %	4.20 %
11-15	165	2.02 %	4.20 %
16-20	164	1.19 %	4.20 %
21-25	123	1.27 %	4.20 %
26-30	103	3.36 %	4.20 %
31-35	69	1.39 %	4.20 %
36-40	48	1.53 %	4.20 %
Over 40	12	1.17 %	4.20 %
Total	1,235		

**GENERAL MALES
NORMAL RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Male Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	64	272	0.2353	0.1800	49
58	56	284	0.1972	0.1800	51
59	49	294	0.1667	0.1800	53
60	52	265	0.1962	0.1800	48
61	51	258	0.1977	0.1800	46
62	61	243	0.2510	0.2500	61
63	65	219	0.2968	0.3000	66
64	48	147	0.3265	0.2500	37
65	146	626	0.2332	0.2500	157
66	127	415	0.3060	0.3200	133
67	90	322	0.2795	0.2600	84
68	48	256	0.1875	0.1900	49
69	37	188	0.1968	0.1900	36
70	19	113	0.1681	0.1900	21
71	7	103	0.0680	0.1900	20
72	9	83	0.1084	0.1900	16
73	13	72	0.1806	0.1900	14
74	4	59	0.0678	0.1900	11
Totals	946	4,219	0.2242	0.2256	952
75 & Over	20	221			221
Totals	966	4,440			1,173

**GENERAL MALES
EARLY RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Male Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	87	1,504	0.0578	0.0900	135
56	74	1,434	0.0516	0.0900	129
57	55	1,184	0.0465	0.0475	56
58	46	1,048	0.0439	0.0580	61
59	49	952	0.0515	0.0650	62
60	68	925	0.0735	0.0850	79
61	68	846	0.0804	0.0850	72
62	128	770	0.1662	0.1600	123
63	112	661	0.1694	0.1700	112
64	91	513	0.1774	0.1700	87
Totals	778	9,837	0.0791	0.0931	916

**GENERAL FEMALES
NORMAL RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	74	384	0.1927	0.1500	58
58	68	392	0.1735	0.1500	59
59	42	314	0.1338	0.1500	47
60	63	303	0.2079	0.1500	45
61	45	277	0.1625	0.1500	42
62	73	252	0.2897	0.2500	63
63	64	197	0.3249	0.2500	49
64	37	158	0.2342	0.2500	40
65	260	1,051	0.2474	0.2800	294
66	200	675	0.2963	0.3200	216
67	127	506	0.2510	0.2600	132
68	76	332	0.2289	0.2200	73
69	49	263	0.1863	0.2000	53
70	38	163	0.2331	0.2000	33
71	23	124	0.1855	0.2000	25
72	19	124	0.1532	0.2000	25
73	14	109	0.1284	0.2000	22
74	1	53	0.0189	0.2000	11
Totals	1,273	5,677	0.2242	0.2267	1,287
75 & Over	41	241			241
Totals	1,314	5,918			1,528

**GENERAL FEMALES
EARLY RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Female Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	119	2,812	0.0423	0.0700	197
56	128	2,759	0.0464	0.0700	193
57	95	2,268	0.0419	0.0500	113
58	119	2,238	0.0532	0.0600	134
59	129	1,988	0.0649	0.0600	119
60	145	1,890	0.0767	0.0850	161
61	149	1,743	0.0855	0.0850	148
62	216	1,523	0.1418	0.1600	244
63	191	1,220	0.1566	0.1600	195
64	199	1,026	0.1940	0.1600	164
Totals	1,490	19,467	0.0765	0.0857	1,668

**PUBLIC SCHOOL MALES
NORMAL RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Male Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	42	125	0.3360	0.3600	45
58	37	113	0.3274	0.3100	35
59	24	73	0.3288	0.2400	18
60	29	89	0.3258	0.3000	27
61	11	46	0.2391	0.2800	13
62	10	36	0.2778	0.3700	13
63	12	34	0.3529	0.3200	11
64	9	24	0.3750	0.2700	6
65	32	109	0.2936	0.2900	32
66	22	78	0.2821	0.3300	26
67	15	55	0.2727	0.2700	15
68	15	56	0.2679	0.2400	13
69	3	30	0.1000	0.2400	7
70	4	26	0.1538	0.2000	5
71	5	26	0.1923	0.2000	5
72	1	9	0.1111	0.2000	2
73	1	10	0.1000	0.2000	2
74	1	7	0.1429	0.2000	1
Totals	273	946	0.2886	0.2918	276
75 & Over	3	25			25
Totals	276	971			301

**PUBLIC SCHOOL MALES
EARLY RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Male Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	49	523	0.0937	0.1300	68
56	48	497	0.0966	0.1300	65
57	38	325	0.1169	0.1200	39
58	37	255	0.1451	0.1300	33
59	22	197	0.1117	0.1400	28
60	19	172	0.1105	0.1400	24
61	28	173	0.1618	0.1500	26
62	26	124	0.2097	0.2100	26
63	15	120	0.1250	0.2100	25
64	27	107	0.2523	0.2100	22
Totals	309	2,493	0.1239	0.1428	356

**PUBLIC SCHOOL FEMALES
NORMAL RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	65	264	0.2462	0.2800	74
58	59	239	0.2469	0.2800	67
59	41	172	0.2384	0.2800	48
60	57	184	0.3098	0.2800	52
61	38	136	0.2794	0.2800	38
62	33	87	0.3793	0.3600	31
63	29	87	0.3333	0.3000	26
64	18	44	0.4091	0.2700	12
65	87	273	0.3187	0.3500	96
66	67	183	0.3661	0.3500	64
67	23	107	0.2150	0.3000	32
68	23	93	0.2473	0.3000	28
69	7	49	0.1429	0.3000	15
70	5	37	0.1351	0.3500	13
71	6	23	0.2609	0.3000	7
72	1	17	0.0588	0.2200	4
73	2	17	0.1176	0.2200	4
74	-	10	0.0000	0.2200	2
Totals	561	2,022	0.2774	0.3032	613
75 & Over	6	47			47
Totals	567	2,069			660

**PUBLIC SCHOOL FEMALES
EARLY RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Female Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	119	1,437	0.0828	0.1200	172
56	145	1,434	0.1011	0.1200	172
57	74	922	0.0803	0.1200	111
58	81	750	0.1080	0.1200	90
59	81	728	0.1113	0.1300	95
60	97	546	0.1777	0.1700	93
61	83	533	0.1557	0.1700	91
62	92	438	0.2100	0.2300	101
63	97	386	0.2513	0.2300	89
64	61	282	0.2163	0.2300	65
Totals	930	7,456	0.1247	0.1447	1,079

**UNIVERSITY MALES
NORMAL RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Male Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	6	26	0.2308	0.1200	3
58	5	31	0.1613	0.1200	4
59	2	38	0.0526	0.1200	5
60	9	43	0.2093	0.1200	5
61	4	51	0.0784	0.1200	6
62	7	54	0.1296	0.1200	6
63	8	51	0.1569	0.1200	6
64	8	67	0.1194	0.1200	8
65	36	186	0.1935	0.1500	28
66	36	143	0.2517	0.1700	24
67	22	107	0.2056	0.1600	17
68	14	105	0.1333	0.1600	17
69	8	77	0.1039	0.1600	12
70	5	55	0.0909	0.1600	9
71	9	48	0.1875	0.1800	9
72	5	33	0.1515	0.1400	5
73	2	23	0.0870	0.1400	3
74	4	21	0.1905	0.1000	2
Totals	190	1,159	0.1639	0.1458	169
75 & Over	9	59			59
Totals	199	1,218			228

**UNIVERSITY MALES
EARLY RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Male Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	8	220	0.0364	0.0400	9
56	9	235	0.0383	0.0300	7
57	8	215	0.0372	0.0250	5
58	7	220	0.0318	0.0250	6
59	6	205	0.0293	0.0300	6
60	12	201	0.0597	0.0425	9
61	14	198	0.0707	0.0500	10
62	13	166	0.0783	0.0600	10
63	14	148	0.0946	0.0700	10
64	18	134	0.1343	0.0700	9
Totals	109	1,942	0.0561	0.0417	81

**UNIVERSITY FEMALES
NORMAL RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	4	22	0.1818	0.1400	3
58	5	24	0.2083	0.1200	3
59	6	37	0.1622	0.1000	4
60	2	33	0.0606	0.1150	4
61	4	36	0.1111	0.1600	6
62	6	30	0.2000	0.1400	4
63	11	48	0.2292	0.1850	9
64	14	40	0.3500	0.1300	5
65	32	125	0.2560	0.1800	23
66	27	103	0.2621	0.2200	23
67	23	74	0.3108	0.1700	13
68	14	56	0.2500	0.1550	9
69	3	29	0.1034	0.1350	4
70	6	35	0.1714	0.1800	6
71	6	18	0.3333	0.1800	3
72	4	14	0.2857	0.1800	3
73	1	10	0.1000	0.1800	2
74	1	9	0.1111	0.1800	2
Totals	169	743	0.2275	0.1696	126
75 & Over	4	22			22
Totals	173	765			148

**UNIVERSITY FEMALES
EARLY RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Female Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	8	258	0.0310	0.0550	14
56	12	261	0.0460	0.0550	14
57	10	189	0.0529	0.0400	8
58	4	203	0.0197	0.0550	11
59	13	188	0.0691	0.0650	12
60	16	176	0.0909	0.0800	14
61	23	204	0.1127	0.0600	12
62	22	159	0.1384	0.1200	19
63	13	113	0.1150	0.1200	14
64	31	117	0.2650	0.1200	14
Totals	152	1,868	0.0814	0.0707	132

**PROTECTIVE WITH SOCIAL SECURITY
NORMAL RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Male and Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
50	33	372	0.0887	0.0575	21
51	34	339	0.1003	0.0700	24
52	40	340	0.1176	0.0900	31
53	80	315	0.2540	0.2300	72
54	75	381	0.1969	0.1900	72
55	64	312	0.2051	0.1900	59
56	46	251	0.1833	0.1900	48
57	32	218	0.1468	0.1900	41
58	36	172	0.2093	0.1750	30
59	34	177	0.1921	0.1600	28
60	22	143	0.1538	0.2000	29
61	21	114	0.1842	0.2000	23
62	25	82	0.3049	0.2200	18
63	24	71	0.3380	0.2600	18
64	16	55	0.2909	0.1700	9
65	22	44	0.5000	0.3000	13
66	11	23	0.4783	0.2500	6
67	7	18	0.3889	0.3000	5
68	3	6	0.5000	0.3000	2
69	1	6	0.1667	0.3000	2
70	1	1	1.0000	1.0000	1
71	1	3	0.3333	1.0000	3
72	1	1	1.0000	1.0000	1
73	-	1	0.0000	1.0000	1
74	1	1	1.0000	1.0000	1
Totals	630	3,446	0.1828	0.1619	558
75 & Over	1	4			4
Totals	631	3,450			562

**PROTECTIVE WITHOUT SOCIAL SECURITY
NORMAL RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Male and Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
50	1	67	0.0149	0.0350	2
51	1	84	0.0119	0.0375	3
52	4	71	0.0563	0.0450	3
53	11	71	0.1549	0.1700	12
54	11	71	0.1549	0.2500	18
55	14	59	0.2373	0.2100	12
56	13	45	0.2889	0.2700	12
57	5	21	0.2381	0.3000	6
58	10	25	0.4000	0.3000	8
59	10	17	0.5882	0.3000	5
60	2	13	0.1538	0.2600	3
61	5	15	0.3333	0.1500	2
62	3	8	0.3750	0.2000	2
63	2	4	0.5000	0.4000	2
64	1	2	0.5000	0.4000	1
65	-	-	N/A	0.4000	-
66	-	-	N/A	0.4000	-
67	-	-	N/A	0.4000	-
68	-	-	N/A	0.4000	-
69	-	-	N/A	0.4000	-
70	-	-	N/A	1.0000	-
71	-	-	N/A	1.0000	-
72	-	-	N/A	1.0000	-
73	-	-	N/A	1.0000	-
74	-	-	N/A	1.0000	-
Totals	93	573	0.1623	0.1588	91
75 & Over	-	-	N/A		-
Totals	93	573			91

**EXECUTIVE AND ELECTED
NORMAL RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Male and Female Age-Based Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
57	-	11	0.0000	0.1200	1
58	1	17	0.0588	0.1200	2
59	1	9	0.1111	0.1200	1
60	2	11	0.1818	0.1200	1
61	2	17	0.1176	0.1200	2
62	4	36	0.1111	0.1200	4
63	5	41	0.1220	0.1200	5
64	7	50	0.1400	0.1200	6
65	5	41	0.1220	0.1200	5
66	7	23	0.3043	0.2000	5
67	3	21	0.1429	0.1500	3
68	-	26	0.0000	0.1500	4
69	6	17	0.3529	0.1000	2
70	4	12	0.3333	0.1000	1
71	2	9	0.2222	0.1000	1
72	1	13	0.0769	0.1500	2
73	1	8	0.1250	0.1500	1
74	1	8	0.1250	0.1500	1
Totals	52	370	0.1405	0.1270	47
75 & Over	2	22			22
Totals	54	392			69

**EXECUTIVE AND ELECTED
EARLY RETIREMENT EXPERIENCE
DURING CALENDAR YEAR 2015**

Male and Female Age-Based Reduced Retirement Experience

Age	Retirements	Exposure	Crude Rates	Current Rates	Expected Retirements
55	5	55	0.0909	0.0300	2
56	2	34	0.0588	0.0300	1
57	2	38	0.0526	0.0300	1
58	-	29	0.0000	0.0300	1
59	-	32	0.0000	0.0300	1
60	4	22	0.1818	0.0500	1
61	4	40	0.1000	0.0500	2
62	-	15	0.0000	0.0200	-
63	-	12	0.0000	0.0200	-
64	-	5	0.0000	0.0200	-
Over 64	1	66	0.0152		
Totals	18	348			9

**DEATH-IN-SERVICE
DURING CALENDAR YEAR 2015**

Male

Age	Deaths	Exposure	Crude Rates	Current Rates	Expected Deaths
Under 20	-	5	0.0000	0.0001	-
20-24	1	1,362	0.0007	0.0002	-
25-29	2	7,171	0.0003	0.0002	1
30-34	1	10,319	0.0001	0.0003	3
35-39	2	11,649	0.0002	0.0004	5
40-44	2	12,376	0.0002	0.0005	7
45-49	5	14,083	0.0004	0.0007	10
50-54	8	14,499	0.0006	0.0012	18
55-59	15	12,967	0.0012	0.0024	32
60-64	14	8,527	0.0016	0.0032	27
65-69	6	2,959	0.0020	0.0054	16
70-74	5	740	0.0068	0.0088	7
75 and over	2	1	2.0000	0.0154	-
Totals	63	96,658	0.0007	0.0013	126

Female

Age	Deaths	Exposure	Crude Rates	Current Rates	Expected Deaths
Under 20	-	27	0.0000	0.0001	-
20-24	-	2,534	0.0000	0.0001	-
25-29	-	13,064	0.0000	0.0001	1
30-34	2	16,465	0.0001	0.0002	3
35-39	1	18,136	0.0001	0.0002	4
40-44	-	19,027	0.0000	0.0004	7
45-49	12	22,618	0.0005	0.0005	12
50-54	13	24,685	0.0005	0.0009	21
55-59	13	23,460	0.0006	0.0014	33
60-64	12	13,995	0.0009	0.0021	29
65-69	5	3,979	0.0013	0.0032	13
70-74	3	775	0.0039	0.0058	4
75 and over	2	-	N/A	0.0106	-
Totals	63	158,765	0.0004	0.0008	127