

# THREE: APPENDICES

## RETIREMENT RATES

### Methodology

The retirement rates assumption represents our expected probability of retirement for eligible members. We compared the actual rate of retirement against what we expected to determine the accuracy of our retirement rates assumption over the study period. For each year and retirement plan, we counted the members who met the eligibility requirements at the beginning of the year (exposures) and the members who retired and started receiving retirement benefits during the year (retirements). We divided the number of retirements by the number of exposures to arrive at the actual rate of retirement. We compared the actual rate to the expected rate of retirement over the full period and on an annual basis. This helped us identify trends in the data where our assumption differed from what actually happened.

We developed new retirement rate assumptions by adjusting the old assumptions to more closely reflect historical experience. We analyzed the relation of actual to expected retirement rates in light of economic and demographic trends and applied our professional judgment to set new assumptions. In most cases, we did not develop a new assumption to perfectly replicate the study period. We targeted a smaller move than the study experience would indicate to account for future experience not exactly matching the past. We also considered simplifications to the assumption where we believe the additional complexity does not offer a significant increase in the modeling accuracy.

### Analysis

We divided our analysis into the following two sections:

**Review of Historical Data** – Relying on historical data to set forward-looking retirement assumptions requires us to consider if that historical experience will be a good indicator of the future. In other words, if we believe historical data represents an outlier compared to what we think future retirement experience will be, we would consider excluding it from the study. In this assessment, we considered data from 1995-2017 to include in the study.

**Review of Key Demographic Factors** – With the historical data period selected, we considered population demographics that could influence retirement behavior. Some of the demographics we studied included amount of service, gender, and retirement plan selection. We developed rates for a specific population if we determined that a demographic factor had a large impact on retirement rates. In certain cases, we considered simplifying our assumption by removing specific rates for a demographic factor if we determined the factor did not significantly impact retirement behavior.

To review the historical data and demographic factors, we compared the actual number of retirements to our old expectation. We calculated an A/E ratio to help us determine trends in the data. An A/E ratio less than 1.00 generally indicates members are retiring later or at lower rates than the old assumption projects. While an A/E ratio of greater than 1.00 tells us members are retiring earlier or at higher rates than we assume. We developed a new assumption so that the A/E ratio moved closer to 1.00. Please see the **Exhibits** section for a comparison of A/E ratio between the old and new assumptions for each system.

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The following sections summarize our observations of the review of historical data and key demographic factors.

### **Review of Historical Data**

We looked at different periods of data to determine how the systems have changed over time and what data we would include in the study. As noted in the **Summary** section, we excluded data for 2001 and 2007 because the valuation date changed in those years.

### **Plans 1 – PERS, TRS, LEOFF.**

PERS and TRS Plan 1 show a trend of decreasing A/E ratios moving from 1995 toward 2017. In more recent years, LEOFF 1 members have retired at almost identical rates to our old assumption.

Plan 1 Retirement Experience by Year									
Year	PERS 1			TRS 1			LEOFF 1		
	Actual	Expected	A/E	Actual	Expected	A/E	Actual	Expected	A/E
1995-2012*	26,373	26,558	0.99	16,986	17,650	0.96	1,503	1,663	0.90
2013-2017	3,997	4,920	0.81	2,233	2,482	0.90	146	146	1.00
<b>Total</b>	<b>30,370</b>	<b>31,478</b>	<b>0.96</b>	<b>19,219</b>	<b>20,131</b>	<b>0.95</b>	<b>1,649</b>	<b>1,809</b>	<b>0.91</b>

\*Does not include data from 2001 and 2007 because of changing valuation dates.

As of June 30, 2017, there were 2,597 PERS, 698 TRS 1, and 40 LEOFF 1 active members. We believe these members will likely act more similarly to recent retirees that have delayed retirement beyond our expectation. With this in mind, we developed the Plan 1 assumptions using the last five years of data (2013-2017).

### **Plans 2/3 – PERS, TRS, SERS.**

In addition to excluding 2001 and 2007 data from the study, we also removed 2000 data from SERS. The Legislature created SERS in the year 2000 for school employees that were previously members of PERS. This year of data shows a large dip in the number of SERS actual retirements, which we believe is an outlier. We were able to gather SERS data prior to 2000 by selectively pulling data for PERS members employed at school districts that would have been eligible for SERS.

The prior experience study ([2007-2012 Experience Study](#)) used data from 1995-2006 to set assumptions for the Plans 2/3. We removed the 2008-2012 data from the prior study because of the large impact the Great Recession appeared to have on retirement behavior. In order to include this data, we needed additional experience to show either the system’s recovery from the recession or a continued trend of later retirements. As of the current study (2013-2018 Experience Study), this data is now available, and it indicates the general trend of later retirements has continued through 2013-2017. Plans 2/3 are still relatively young plans and we are just now beginning to observe retirements for longer service employees (i.e., with at least 30 years of service). The inclusion of 2008-2017 is approximately 80 percent of the observed retirement experience for the entire study period.

Plan 2/3 Retirement Experience by Year									
Year	PERS 2/3			TRS 2/3			SERS 2/3		
	Actual	Expected	A/E	Actual	Expected	A/E	Actual	Expected	A/E
1995-2006*	7,050	7,187	0.98	1,432	1,786	0.80	2,887	2,988	0.97
2008-2012	9,518	12,690	0.75	2,638	5,903	0.45	3,318	5,708	0.58
2013-2017	16,320	21,235	0.77	5,745	11,331	0.51	6,159	9,710	0.63
<b>Total</b>	<b>32,888</b>	<b>41,113</b>	<b>0.80</b>	<b>9,815</b>	<b>19,020</b>	<b>0.52</b>	<b>12,364</b>	<b>18,407</b>	<b>0.67</b>

\*Does not include data from 2001 and 2007 because of changing valuation dates. SERS 2/3 analysis also excludes the plan creation year 2000.

We observed a trend of decreasing A/E ratios when comparing the 1995-2006 period to the 2008-2012 and 2013-2017 periods for the Plans 2/3. We saw a consistent trend of fewer retirees than expected since 2008. With this in mind, we chose to set an assumption using data from 1995-2017 to address the observed trend of later retirements.

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### Public Safety Plans – LEOFF 2, WSPRS 1/2, PSERS 2.

The prior experience study (2007-2012 Experience Study) used data from 1995-2012 to set assumptions for LEOFF 2 and WSPRS 1/2. Unlike Plans 2/3, we did not exclude 2008-2012 because we did not observe a change in retirement behavior resulting from the Great Recession. The following table summarizes how the retirement behavior has changed since the prior experience study

Public Safety Retirement Experience by Year									
Year	LEOFF 2			WSPRS 1/2			PSERS 2		
	Actual	Expected	A/E	Actual	Expected	A/E	Actual	Expected	A/E
1995-2006*	522	705	0.74	352	329	1.07	0	0	0.00
2008-2012	1,089	1,440	0.76	127	118	1.07	15	6	2.45
2013-2017	2,122	2,115	1.00	226	173	1.31	117	77	1.52
<b>Total</b>	<b>3,733</b>	<b>4,260</b>	<b>0.88</b>	<b>705</b>	<b>621</b>	<b>1.14</b>	<b>132</b>	<b>83</b>	<b>1.59</b>

\*Does not include data from 2001 and 2007 because of changing valuation dates.

We observed more retirements in public safety plans than we had expected from 2013-2017. We believe this most recent data may represent a new trend in retirement behavior and is reasonable to include in our new assumption.

PSERS 2 opened July 1, 2006, and provided the option for eligible PERS 2/3 members to move into the new system. PSERS experienced 132 retirements during the study period. This experience represents insufficient data to set standalone PSERS retirement rates. Instead, we relied on PERS 2 to help inform our PSERS 2 retirement rates assumption and made subsequent adjustments to reflect differences in plan designs between the two systems. We will continue to monitor the appropriateness of the PSERS 2 retirement rates going forward and will make any necessary adjustments when needed.

## Review of Key Demographic Factors

### 1. Male versus Female Retirement Experience.

We previously assumed gender-specific retirement rates for all plans in PERS, TRS, SERS, and PSERS. The prior experience study (2007-12 Experience Study) had shown a trend of females typically retiring earlier than males.

#### Plans 1 – PERS, TRS, LEOFF.

The remaining Plan 1 active members are generally older than past retirees. Moving forward, we expect age to be the best indicator of retirement behavior and do not believe Plan 1 males and females will have different retirement behavior. Additionally, future retirements will have a small impact on the system funding due to the relatively small number of active members in the plans. We opted for a simplified approach of blending Plan 1 male and female rates and experience.

#### Plans 2/3 – PERS, TRS, SERS.

The new Plan 2/3 data indicated the difference in male and female rates is narrowing or even reversing compared to prior studies. The following table contains the average retirement age for 1995-2007 and 2008-2017.

Plan 2/3 Average Retirement Ages									
Year	TRS 2/3			PERS 2/3			SERS 2/3		
	Male	Female	Difference	Male	Female	Difference	Male	Female	Difference
1995-2007	62.9	62.6	0.35	64.9	64.7	0.18	65.4	63.7	1.73
2008-2017	63.4	63.9	-0.48	64.3	64.3	-0.02	66.1	64.8	1.28

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In the future, we expect males and females to have similar retirement behavior and believe other population demographics are more indicative of retirement behavior. For purposes of assumption setting, we combined male and female data to set a gender-neutral set of retirement rates.

### **Public Safety Plans – LEOFF 2, WSPRS 1/2, PSERS 2.**

We maintained the single set of gender-neutral retirement rates in LEOFF 2 and WSPRS 1/2 because of the heavy population weighting of the systems toward males. At this time, we do not have sufficient data to set gender-specific rates. We also created gender-neutral rates for PSERS 2 for consistency with PERS rates.

### **2. Plan 2 versus Plan 3 Retirement Experience.**

We studied retirement experience for Plan 2 and Plan 3 individually. The plans have fundamental differences in design, which we expected would lead to different retirement behavior. Plan 2 is a defined benefit plan, while Plan 3 is a hybrid of defined benefit and defined contribution. In prior studies, we had observed a difference in rates by plan, but lacked sufficient experience to set credible plan-specific rates.

Plan 2 vs. Plan 3 Retirement Experience (1995-2017)*									
Year	TRS 2/3			PERS 2/3			SERS 2/3		
	Actual	Expected	A/E	Actual	Expected	A/E	Actual	Expected	A/E
Plan 2	3,147	4,056	0.78	29,959	36,610	0.82	6,566	7,635	0.86
Plan 3	6,668	14,964	0.45	2,929	4,503	0.65	5,798	10,772	0.54
<b>Total</b>	<b>9,815</b>	<b>19,020</b>	<b>0.52</b>	<b>32,888</b>	<b>41,113</b>	<b>0.80</b>	<b>12,364</b>	<b>18,407</b>	<b>0.67</b>

\*Does not include data from 2001 and 2007 because of changing valuation date. SERS 2/3 analysis also excludes the plan creation year 2000.

We observed Plan 3 members retiring later than Plan 2 members for all three systems. This trend also persists across almost every year of data in the study period. Given this strong trend, we developed separate retirement rates for Plan 2 and Plan 3 due to the different retirement behavior.

### **3. LEOFF 2 Law Enforcement Officer and Firefighter Retirement Experience.**

Experience indicates slightly different retirement behavior between law enforcement officers and firefighters. Both professions have the same options for normal and early retirement eligibility within the LEOFF 2 retirement plan. On average, firefighters were observed to retire later during our study period (1995-2017). We considered separate rates for each group but felt a blended retirement rates assumption applied to both populations remains reasonable.

Average Retirement Age by Profession	
LEOFF 2	
Law Enforcement Officer	56.6
Fire Fighter	57.3

*Note: Average retirement ages from 1995-2017 excluding 2001 and 2007 because of changing valuation dates.*

### **4. Service-Based Retirement Experience.**

Members at different service levels may exhibit different retirement behavior. We typically observe higher retirement rates once members qualify for subsidized early retirement. We set retirement rates in the following ways for the systems below.

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### **Plans 1 – PERS, TRS, LEOFF.**

We currently have retirement rates in TRS and LEOFF Plan 1 for members with 30 years of service and separate rates for members with greater than 30 years of service. The current average Plan 1 member is 65 or older and beyond the normal retirement age. Based on this older and longer service population, we believe that age is now a better indicator of future behavior than level of service. As a result, we removed retirement rates by service level and will use a single set of rates applied to members of all service levels. There was no change to PERS 1 as the old assumption already uses a single set of rates. This simplification in the Plans 1 assumptions had a small impact because of the high levels of service and the relatively smaller number of remaining active members in these closed plans.

### **Plans 2/3 – PERS, TRS, SERS.**

Between the ages of 55 and 65, we observed higher rates of retirement for members of the Plans 2/3 with at least 30 years of service. A Plan 2/3 member is eligible for subsidized early retirement if they accrue 30 years of service and are at least 55 years of age. Plan experience confirms our assumption of separate rates by service greater than or equal to 30 and less than 30.

Average Retirement Age by Service Level			
	PERS	TRS	SERS
Service < 30	64.9	64.1	65.1
Service >= 30	61.8	61.9	63.9

*Note: Average retirement ages from 1995-2017 excluding 2001 and 2007 because of changing valuation dates.*

Our old assumption assumes an additional set of rates at service equal to 30 for TRS 2/3. We removed this set of rates because we did not observe a significant increase in TRS retirements at 30 years of service. Additionally, the data is limited at this service level because the members first became eligible for subsidized early retirement in 2007.

TRS 2/3 Average Retirement Age and Observations		
	Retirement Age	Observations
Service = 30	62.0	492
Service > 30	61.9	1,727

*Note: Average retirement ages from 1995-2017 excluding 2001 and 2007 because of changing valuation dates.*

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### **Public Safety Plans – LEOFF 2, WSPRS 1/2.**

Members of the public safety plans have access to retirement eligibility at earlier ages than Plans 2/3. LEOFF 2 members are eligible for subsidized early retirement at 20 years of service and age 50. WSPRS members are eligible for normal retirement at 25 years of service or age 55. However, data is limited for members who retire with low service. We believe it is reasonable to continue with one set of retirement rates applied to all amounts of service for both LEOFF 2 and WSPRS 1/2.

Public Safety Retirements by Service	
LEOFF 2	
Service < 20	672
Service >= 20	3,061
WSPRS 1/2	
Service < 25	31
Service >= 25	674

*Note: Average retirement ages from 1995-2017 excluding 2001 and 2007 because of changing valuation dates.*

### **New Assumptions**

#### **Plans 1 – PERS, TRS, LEOFF.**

We believe our old assumptions reasonably approximated more recent plan experience. We believe recent plan experience is a good indicator for future plan member retirement behavior. We applied our professional judgment and blended the male and female rates. Please see the individual system tables in the **Exhibits** section for comparisons between the new and old rates.

New Plan 1 Retirement Rates			
	TRS 1	PERS 1	LEOFF 1
Age	Male/Female		
55	0.15	0.20	0.20
56	0.15	0.15	0.20
57	0.15	0.10	0.20
58	0.15	0.10	0.20
59	0.15	0.15	0.20
60	0.15	0.15	0.25
61	0.15	0.15	0.25
62	0.25	0.20	0.25
63	0.25	0.15	0.25
64	0.25	0.15	0.25
65	0.35	0.30	0.25
66	0.35	0.35	0.25
67	0.35	0.25	0.25
68	0.35	0.25	0.25
69	0.35	0.25	0.25
70-79	0.35	0.25	1.00
80	1.00	1.00	1.00

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### **Plans 2/3 – PERS, TRS, SERS.**

For developing rates, we assume Plan 2 members would have similar retirement behavior across PERS, TRS, and SERS. We assumed the same for Plan 3 members across these systems. For this reason, we relied on the plan with the most plan experience to develop a plan-specific retirement rates assumption across PERS, TRS, and SERS. This led us to developing rates for Plan 2 from PERS experience and Plan 3 from TRS experience. We considered and reviewed combining all Plan 2 or Plan 3 data across systems to set plan-specific rates. We found that rates under this approach were similar to rates developed from the method outlined above.

We then compared the new PERS or TRS plan-specific assumption to the other system’s matching plan to review fit. In general, we observed that the new rates fit well for each system’s plan experience. The only exception occurred when we compared the new assumption to the plans with the smallest amount of experience. This led to the rates underestimating retirements for the study period. This occurred in PERS Plan 3 and SERS/TRS Plan 2 with service greater than 30. However, we believe the fit of the new rates is still within an acceptable range. Please see the individual system tables in the **Exhibits** section for comparisons between the new and old rates.

New PERS, TRS, and SERS Plan 2/3 Retirement Rates				
MS<30			MS>=30	
Male & Females			Male & Females	
Age	Plan 2	Plan 3	Plan 2	Plan 3
55	0.01	0.01	0.08	0.04
56	0.01	0.01	0.08	0.04
57	0.02	0.01	0.08	0.04
58	0.02	0.01	0.08	0.05
59	0.04	0.02	0.10	0.10
60	0.05	0.02	0.15	0.12
61	0.08	0.06	0.20	0.15
62	0.15	0.12	0.40	0.35
63	0.20	0.12	0.30	0.25
64	0.40	0.20	0.35	0.30
65	0.35	0.35	0.45	0.45
66	0.30	0.30	0.40	0.40
67	0.27	0.27	0.30	0.30
68-79	0.25	0.25	0.30	0.30
80	1.00	1.00	1.00	1.00

Members hired after May 1, 2013, do not receive the same level of subsidized early retirement benefit at 30 years of service as members hired before this date. We believe the lower benefit will create a lower incentive for these members to retire prior to the normal retirement age. We do not have retirement experience for this group, so we made a downward adjustment to our new retirement rates for members with at least 30 years of service and hired before May 1.

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PERS, TRS, and SERS Plan 2/3 Retirement New Rates—MS>=30				
Hired Before May 1, 2013			Hired After May 1, 2013	
Male & Females			Male & Females	
Age	Plan 2	Plan 3	Plan 2	Plan 3
55	0.08	0.04	0.01	0.01
56	0.08	0.04	0.02	0.01
57	0.08	0.04	0.03	0.02
58	0.08	0.05	0.03	0.02
59	0.10	0.10	0.06	0.04
60	0.15	0.12	0.10	0.08
61	0.20	0.15	0.12	0.10
62	0.40	0.35	0.20	0.17
63	0.30	0.25	0.25	0.20
64	0.35	0.30	0.35	0.30
65	0.45	0.45	0.45	0.45
66	0.40	0.40	0.40	0.40
67	0.30	0.30	0.30	0.30
68-79	0.30	0.30	0.30	0.30
80	1.00	1.00	1.00	1.00

### **Public Safety Plans – LEOFF 2, WSPRS 1/2, PSERS 2.**

The public safety plans saw modest changes to their retirement rates assumptions. For WSPRS 1/2, we increased rates for ages 46-54 to reflect additional members retiring once they reach 25 years of service. We observed delayed retirements for ages 60 and beyond. We believe this was related to recently passed legislation that added an occupational retention salary increase and voluntary overtime into a member’s pension calculation. We do not anticipate these bills to have a long-term impact on retirement behavior when members have access to these benefits through the majority of their working careers.

For LEOFF 2, we observed members deferring retirement in their early and mid-50’s. We made a downward adjustment to the old rates for ages 50-58 to reflect this experience.

We do not have enough data to set a PSERS 2 assumption from plan experience since the plan opened in 2007. Instead, we relied on PERS 2 rates to inform the PSERS 2 rates and made subsequent adjustments to reflect differences in plan designs between the two systems. We believe this approach is reasonable because PSERS 2 and PERS 2 plan provisions provide similar retirement benefits.

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We believe retirement behavior will be similar for PERS 2 and PSERS members dependent upon their retirement eligibility:

- ❖ **Eligible for Subsidized Early Retirement<sup>1</sup>** – Members eligible for subsidized early retirement for PERS 2 and PSERS receive similar reductions in retirement benefits. We relied on the PERS 2 subsidized early retirement rates and shifted them forward two years to account for the earlier PSERS subsidized early retirement provision.
- ❖ **Not Eligible for Subsidized Early Retirement<sup>2</sup>** – PERS 2 and PSERS members not eligible for subsidized early retirement also receive similar retirement benefits, however PSERS provisions allow for earlier retirement. To account for this difference in plan provisions, we shifted the PERS rates forward four years to reflect the earlier retirement eligibility of PSERS members.
- ❖ **Age 65 and Beyond** – For PSERS rates beyond age 65, we assume they follow the respective PERS rates for normal or subsidized retirement.

We relied on our professional judgment and lowered the new PSERS rates for ages 53-64. We believe fewer PSERS members will retire at these ages relative to the corresponding older PERS rates. PSERS members retiring earlier will have a lower overall benefit from fewer years of service and must wait longer until Medicare and Social Security eligibility. Please see the individual system tables in the **Exhibits** section for comparisons between the new and old rates.

<sup>1</sup>PERS 2 subsidized early retirement defined as at least 30 years of service and age 55. PSERS subsidized early retirement defined as at least 20 years of service and age 53.

<sup>2</sup>PERS 2 normal retirement defined as at least five years of service and age 65. PSERS members may retire with ten years of PSERS service and age 60 or five years of total service and age 65.

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New Public Safety Retirement Rates				
Age	WSPRS 1/2	LEOFF 2	PSERS 2	
			MS<20	MS>=20
	Male/Female			
45	0.50	N/A	N/A	N/A
46	0.38	N/A	N/A	N/A
47	0.38	N/A	N/A	N/A
48	0.38	N/A	N/A	N/A
49	0.33	N/A	N/A	N/A
50	0.33	0.03	N/A	N/A
51	0.27	0.03	N/A	N/A
52	0.27	0.05	N/A	N/A
53	0.27	0.09	N/A	0.06
54	0.27	0.09	N/A	0.06
55	0.20	0.09	N/A	0.06
56	0.20	0.09	N/A	0.06
57	0.20	0.10	N/A	0.08
58	0.20	0.14	N/A	0.12
59	0.33	0.15	N/A	0.16
60	0.33	0.15	0.32	0.32
61	0.33	0.19	0.24	0.24
62	0.33	0.23	0.28	0.28
63	0.33	0.20	0.22	0.24
64	0.50	0.20	0.20	0.24
65	1.00	0.30	0.25	0.30
66-69	N/A	0.30	0.25	0.30
70+	N/A	1.00	1.00	1.00

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### Exhibits

#### PERS

PERS Retirement Experience by Year—Old Assumptions						
Age	Plan 1 (Males & Females)			Plan 2/3 (Males & Females)		
	Actual	Expected	A/E	Actual	Expected	A/E
1995	1,576	1,378	1.144	311	243	1.282
1996	1,604	1,404	1.143	329	271	1.213
1997	1,749	1,465	1.194	377	313	1.203
1998	1,806	1,545	1.169	441	367	1.202
1999	2,018	1,656	1.219	545	462	1.180
2000	2,129	1,723	1.235	568	516	1.100
2001						
2002	2,124	1,823	1.165	670	711	0.942
2003	1,905	1,840	1.035	790	850	0.929
2004	1,832	1,864	0.983	901	966	0.933
2005	1,811	1,930	0.939	1,005	1,153	0.871
2006	1,713	1,912	0.896	1,113	1,335	0.834
2007						
2008	1,345	1,844	0.729	1,264	1,773	0.713
2009	1,241	1,735	0.715	1,548	2,156	0.718
2010	1,272	1,626	0.782	1,867	2,511	0.743
2011	1,201	1,464	0.821	2,338	2,902	0.806
2012	1,047	1,351	0.775	2,501	3,348	0.747
2013	945	1,243	0.760	2,955	3,734	0.791
2014	884	1,115	0.792	3,325	4,009	0.829
2015	838	995	0.842	3,274	4,264	0.768
2016	722	845	0.854	3,389	4,514	0.751
2017	608	721	0.843	3,377	4,715	0.716
<b>Total</b>	<b>30,370</b>	<b>31,478</b>	<b>0.965</b>	<b>32,888</b>	<b>41,113</b>	<b>0.800</b>

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### PERS (continued)

PERS 1 Retirement Experience by Age Old Assumptions*			
Plan 1 (Males & Females)			
Age	Actual	Expected	A/E
45-49	0	0	N/A
50-54	12	24	0.508
55-59	332	518	0.641
60-64	1,864	2,642	0.706
65-69	1,493	1,443	1.035
70-75	237	218	1.086
75-79	46	51	0.909
80+	13	25	0.520
<b>Total</b>	<b>3,997</b>	<b>4,920</b>	<b>0.812</b>

\*Data summarized for years 2013-2017.

PERS 1 Retirement Experience by Age New Assumptions*			
Plan 1 (Males & Females)			
Age	Actual	Expected	A/E
45-49	0	0	N/A
50-54	12	0	0.000
55-59	332	328	1.013
60-64	1,864	1,866	0.999
65-69	1,493	1,522	0.981
70-75	237	248	0.956
75-79	46	58	0.800
80+	13	25	0.520
<b>Total</b>	<b>3,997</b>	<b>4,047</b>	<b>0.988</b>

\*Data summarized for years 2013-2017

PERS 2 Retirement Experience by Age Old Assumptions*			
Plan 2 (Males & Females)			
Age	Actual	Expected	A/E
55-59	2,414	4,516	0.535
60-64	10,997	15,397	0.714
65-69	14,309	14,137	1.012
70-75	1,819	1,820	1.000
75-79	332	373	0.890
80+	88	363	0.242
<b>Total</b>	<b>29,959</b>	<b>36,606</b>	<b>0.818</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

PERS 3 Retirement Experience by Age Old Assumptions*			
Plan 3 (Males & Females)			
Age	Actual	Expected	A/E
55-59	572	1,000	0.572
60-64	1,289	2,330	0.553
65-69	952	1,021	0.933
70-75	97	112	0.865
75-79	14	25	0.566
80+	5	18	0.278
<b>Total</b>	<b>2,929</b>	<b>4,506</b>	<b>0.650</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

PERS 2 Retirement Experience by Age New Assumptions*			
Plan 2 (Males & Females)			
Age	Actual	Expected	A/E
55-59	2,414	2,793	0.864
60-64	10,997	12,634	0.870
65-69	14,309	14,420	0.992
70-75	1,819	1,915	0.950
75-79	332	392	0.847
80+	88	363	0.242
<b>Total</b>	<b>29,959</b>	<b>32,518</b>	<b>0.921</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

PERS 3 Retirement Experience by Age New Assumptions*			
Plan 3 (Males & Females)			
Age	Actual	Expected	A/E
55-59	572	384	1.489
60-64	1,289	1,220	1.056
65-69	952	1,041	0.915
70-75	97	117	0.826
75-79	14	26	0.544
80+	5	18	0.278
<b>Total</b>	<b>2,929</b>	<b>2,806</b>	<b>1.044</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### PERS (continued)

PERS Plan 1 Retirement Rates			
PERS 1			
	Old*		New
Age	Male	Female	Male/Female
55	0.17	0.28	0.20
56	0.17	0.16	0.15
57	0.17	0.16	0.10
58	0.17	0.16	0.10
59	0.20	0.30	0.15
60	0.16	0.16	0.15
61	0.23	0.21	0.15
62	0.30	0.26	0.20
63	0.22	0.20	0.15
64	0.28	0.28	0.15
65	0.34	0.36	0.30
66	0.30	0.22	0.35
67	0.26	0.22	0.25
68-79	0.22	0.22	0.25
80	1.00	1.00	1.00

*\*Please see our website for old rates prior to age 55.*

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### PERS (continued)

PERS Plan 2/3 Retirement Rates								
Age	Old—MS<30 Plan 2 & Plan 3		New—MS<30 Male & Females		Old—MS>=30 Plan 2 & Plan 3		New—MS>=30 Male & Females	
	Males	Females	Plan 2	Plan 3	Males	Females	Plan 2	Plan 3
	55	0.02	0.02	0.01	0.01	0.12	0.12	0.08
56	0.03	0.02	0.01	0.01	0.12	0.12	0.08	0.04
57	0.04	0.02	0.02	0.01	0.12	0.12	0.08	0.04
58	0.05	0.02	0.02	0.01	0.12	0.12	0.08	0.05
59	0.06	0.04	0.04	0.02	0.16	0.24	0.10	0.10
60	0.07	0.06	0.05	0.02	0.12	0.12	0.15	0.12
61	0.08	0.13	0.08	0.06	0.20	0.20	0.20	0.15
62	0.24	0.20	0.15	0.12	0.28	0.28	0.40	0.35
63	0.22	0.18	0.20	0.12	0.26	0.26	0.30	0.25
64	0.56	0.56	0.40	0.20	0.56	0.56	0.35	0.30
65	0.40	0.40	0.35	0.35	0.40	0.40	0.45	0.45
66	0.24	0.24	0.30	0.30	0.24	0.24	0.40	0.40
67	0.24	0.24	0.27	0.27	0.24	0.24	0.30	0.30
68-79	0.24	0.24	0.25	0.25	0.24	0.24	0.30	0.30
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

PERS, TRS, and SERS Plan 2/3 Retirement New Rates—MS>=30				
Age	Hired Before May 1, 2013 Male & Females		Hired After May 1, 2013 Male & Females	
	Plan 2	Plan 3	Plan 2	Plan 3
	55	0.08	0.04	0.01
56	0.08	0.04	0.02	0.01
57	0.08	0.04	0.03	0.02
58	0.08	0.05	0.03	0.02
59	0.10	0.10	0.06	0.04
60	0.15	0.12	0.10	0.08
61	0.20	0.15	0.12	0.10
62	0.40	0.35	0.20	0.17
63	0.30	0.25	0.25	0.20
64	0.35	0.30	0.35	0.30
65	0.45	0.45	0.45	0.45
66	0.40	0.40	0.40	0.40
67	0.30	0.30	0.30	0.30
68-79	0.30	0.30	0.30	0.30
80	1.00	1.00	1.00	1.00

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### TRS

TRS Retirement Experience by Year—Old Assumptions						
Age	Plan 1 (Males & Females)			Plan 2/3 (Males & Females)		
	Actual	Expected	A/E	Actual	Expected	A/E
1995	980	966	1.014	20	19	1.041
1996	988	1,010	0.979	28	25	1.134
1997	1,043	1,084	0.962	42	32	1.296
1998	1,346	1,154	1.166	56	57	0.983
1999	1,376	1,204	1.143	98	84	1.174
2000	1,469	1,282	1.146	124	113	1.099
2001						
2002	1,469	1,050	1.399	146	165	0.885
2003	1,233	1,078	1.144	143	208	0.686
2004	1,319	1,187	1.112	218	291	0.750
2005	1,247	1,208	1.032	256	360	0.711
2006	1,179	1,173	1.005	301	432	0.697
2007						
2008	286	1,124	0.255	228	632	0.361
2009	861	1,177	0.732	404	898	0.450
2010	628	1,073	0.586	451	1,163	0.388
2011	854	1,010	0.846	733	1,467	0.500
2012	708	870	0.814	822	1,743	0.472
2013	602	739	0.815	969	2,000	0.484
2014	548	613	0.893	1,202	2,189	0.549
2015	456	482	0.946	1,279	2,310	0.554
2016	370	371	0.999	1,274	2,385	0.534
2017	257	277	0.927	1,021	2,447	0.417
<b>Total</b>	<b>19,219</b>	<b>20,131</b>	<b>0.955</b>	<b>9,815</b>	<b>19,020</b>	<b>0.516</b>

# THREE: APPENDICES

## RETIREMENT RATES

continued

### TRS (continued)

TRS 1 Retirement Experience by Age Old Assumptions*			
Plan 1 (Males & Females)			
Age	Actual	Expected	A/E
47-49	0	0	N/A
50-54	0	0	N/A
55-59	107	174	0.614
60-64	1,125	1,352	0.832
65-69	866	838	1.034
70-75	114	86	1.322
75-79	18	14	1.261
80+	3	17	0.176
<b>Total</b>	<b>2,233</b>	<b>2,482</b>	<b>0.900</b>

\*Data summarized for years 2013-2017.

TRS 1 Retirement Experience by Age New Assumptions*			
Plan 1 (Males & Females)			
Age	Actual	Expected	A/E
45-49	0	0	N/A
50-54	0	0	N/A
55-59	107	111	0.960
60-64	1,125	1,137	0.990
65-69	866	864	1.002
70-75	114	121	0.944
75-79	18	23	0.768
80+	3	17	0.176
<b>Total</b>	<b>2,233</b>	<b>2,273</b>	<b>0.982</b>

\*Data summarized for years 2013-2017.

TRS 2 Retirement Experience by Age Old Assumptions*			
Plan 2 (Males & Females)			
Age	Actual	Expected	A/E
55-59	231	514	0.450
60-64	1,269	1,852	0.685
65-69	1,494	1,540	0.970
70-75	130	143	0.911
75-79	21	21	0.982
80+	2	2	1.325
<b>Total</b>	<b>3,147</b>	<b>4,071</b>	<b>0.773</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

TRS 3 Retirement Experience by Age Old Assumptions*			
Plan 3 (Males & Females)			
Age	Actual	Expected	A/E
55-59	913	3,887	0.235
60-64	3,023	7,940	0.381
65-69	2,560	2,864	0.894
70-75	157	183	0.859
75-79	14	19	0.747
80+	1	1	0.909
<b>Total</b>	<b>6,668</b>	<b>14,894</b>	<b>0.448</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

TRS 2 Retirement Experience by Age New Assumptions*			
Plan 2 (Males & Females)			
Age	Actual	Expected	A/E
55-59	231	260	0.888
60-64	1,269	1,415	0.897
65-69	1,494	1,341	1.114
70-75	130	110	1.178
75-79	21	14	1.463
80+	2	6	0.333
<b>Total</b>	<b>3,147</b>	<b>3,147</b>	<b>1.000</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

TRS 3 Retirement Experience by Age New Assumptions*			
Plan 3 (Males & Females)			
Age	Actual	Expected	A/E
55-59	913	1,249	0.731
60-64	3,023	3,958	0.764
65-69	2,560	2,520	1.016
70-75	157	141	1.111
75-79	14	13	1.107
80+	1	5	0.200
<b>Total</b>	<b>6,668</b>	<b>7,886</b>	<b>0.846</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### TRS (continued)

TRS Plan 1 Retirement Rates					
Age	Old*				New
	MS < 30		MS = 30		Male/Female
	Male	Female	Male	Female	
55	0.22	0.20	0.36	0.30	0.15
56	0.22	0.20	0.36	0.30	0.15
57	0.22	0.20	0.36	0.30	0.15
58	0.22	0.20	0.39	0.30	0.15
59	0.22	0.26	0.42	0.30	0.15
60	0.22	0.20	0.42	0.30	0.15
61	0.22	0.23	0.42	0.40	0.15
62	0.35	0.26	0.56	0.50	0.25
63	0.30	0.22	0.48	0.46	0.25
64	0.25	0.29	0.40	0.46	0.25
65	0.36	0.36	0.70	0.55	0.35
66	0.36	0.36	0.70	0.55	0.35
67	0.32	0.28	0.70	0.55	0.35
68	0.28	0.28	0.70	0.55	0.35
69	0.28	0.28	0.70	0.55	0.35
70	0.22	0.28	1.00	0.55	0.35
71	0.22	0.28	1.00	0.55	0.35
72-79	0.22	0.21	1.00	1.00	0.35
80	1.00	0.21	1.00	1.00	1.00

\*Please see our website for old rates prior to age 55.

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### TRS (continued)

TRS Plan 2/3 Retirement Rates						
Age	Old—MS<30 Plan 2 & Plan 3		New—MS<30 Male & Females		Old—MS=30 Plan 2 & Plan 3	
	Males	Females	Plan 2	Plan 3	Males	Females
55	0.02	0.02	0.01	0.01	0.22	0.19
56	0.02	0.03	0.01	0.01	0.22	0.21
57	0.02	0.04	0.02	0.01	0.22	0.23
58	0.02	0.05	0.02	0.01	0.28	0.25
59	0.04	0.06	0.04	0.02	0.34	0.27
60	0.06	0.07	0.05	0.02	0.41	0.29
61	0.14	0.15	0.08	0.06	0.48	0.41
62	0.22	0.23	0.15	0.12	0.55	0.53
63	0.20	0.21	0.20	0.12	0.50	0.49
64	0.55	0.48	0.40	0.20	0.55	0.53
65	0.48	0.40	0.35	0.35	0.48	0.40
66	0.41	0.32	0.30	0.30	0.41	0.32
67	0.34	0.24	0.27	0.27	0.34	0.24
68	0.27	0.24	0.25	0.25	0.27	0.24
69	0.27	0.42	0.25	0.25	0.27	0.42
70	0.27	0.30	0.25	0.25	0.27	0.30
71	0.41	0.30	0.25	0.25	0.41	0.30
72-79	0.55	0.30	0.25	0.25	0.55	0.30
80	1.00	1.00	1.00	1.00	1.00	1.00

TRS Plan 2/3 Retirement Rates (Continued)				
Age	Old—MS>30 Plan 2 & Plan 3		New—MS>=30 Male & Females	
	Males	Females	Plan 2	Plan 3
55	0.13	0.12	0.08	0.04
56	0.15	0.14	0.08	0.04
57	0.17	0.16	0.08	0.04
58	0.19	0.18	0.08	0.05
59	0.21	0.22	0.10	0.10
60	0.23	0.20	0.15	0.12
61	0.25	0.22	0.20	0.15
62	0.36	0.32	0.40	0.35
63	0.33	0.30	0.30	0.25
64	0.55	0.49	0.35	0.30
65	0.48	0.40	0.45	0.45
66	0.41	0.32	0.40	0.40
67	0.34	0.24	0.30	0.30
68	0.27	0.24	0.30	0.30
69	0.27	0.42	0.30	0.30
70	0.27	0.30	0.30	0.30
71	0.41	0.30	0.30	0.30
72-79	0.55	0.30	0.30	0.30
80	1.00	1.00	1.00	1.00

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### SERS

SERS Retirement Experience by Year Old Assumptions			
Plan 2/3 (Males & Females)			
Age	Actual	Expected	A/E
1995	109	87	1.259
1996	153	110	1.385
1997	148	114	1.293
1998	198	138	1.432
1999	181	157	1.152
2000			
2001			
2002	308	350	0.879
2003	368	405	0.909
2004	462	478	0.966
2005	467	534	0.875
2006	493	615	0.802
2007			
2008	461	799	0.577
2009	538	954	0.564
2010	550	1,120	0.491
2011	822	1,318	0.624
2012	947	1,518	0.624
2013	1,076	1,676	0.642
2014	1,189	1,821	0.653
2015	1,337	1,959	0.682
2016	1,348	2,064	0.653
2017	1,209	2,190	0.552
<b>Total</b>	<b>12,364</b>	<b>18,407</b>	<b>0.672</b>

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### SERS (continued)

SERS 2 Retirement Experience by Age Old Assumptions*			
Plan 2 (Males & Females)			
Age	Actual	Expected	A/E
55-59	272	422	0.645
60-64	2,028	2,929	0.692
65-69	3,500	3,495	1.001
70-75	574	522	1.100
75-79	147	116	1.264
80+	45	140	0.321
<b>Total</b>	<b>6,566</b>	<b>7,624</b>	<b>0.861</b>

\*Data summarized for years 1995-2017 excluding data for 2000, 2001, and 2007 consistent with our analysis.

SERS 3 Retirement Experience by Age Old Assumptions*			
Plan 3 (Males & Females)			
Age	Actual	Expected	A/E
55-59	519	1,442	0.360
60-64	2,290	5,983	0.383
65-69	2,522	2,904	0.868
70-75	376	346	1.087
75-79	73	62	1.181
80+	18	58	0.310
<b>Total</b>	<b>5,798</b>	<b>10,794</b>	<b>0.537</b>

\*Data summarized for years 1995-2017 excluding data for 2000, 2001, and 2007 consistent with our analysis.

SERS 2 Retirement Experience by Age New Assumptions*			
Plan 2 (Males & Females)			
Age	Actual	Expected	A/E
55-59	272	299	0.909
60-64	2,028	2,335	0.868
65-69	3,500	3,831	0.914
70-75	574	705	0.814
75-79	147	175	0.840
80+	45	140	0.321
<b>Total</b>	<b>6,566</b>	<b>7,485</b>	<b>0.877</b>

\*Data summarized for years 1995-2017 excluding data for 2000, 2001, and 2007 consistent with our analysis.

SERS 3 Retirement Experience by Age New Assumptions*			
Plan 3 (Males & Females)			
Age	Actual	Expected	A/E
55-59	519	634	0.818
60-64	2,290	2,942	0.778
65-69	2,522	3,198	0.789
70-75	376	463	0.812
75-79	73	93	0.789
80+	18	58	0.310
<b>Total</b>	<b>5,798</b>	<b>7,388</b>	<b>0.785</b>

\*Data summarized for years 1995-2017 excluding data for 2000, 2001, and 2007 consistent with our analysis.

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### SERS (continued)

SERS Plan 2/3 Retirement Rates								
Age	Old—MS<30 Plan 2 & Plan 3		New—MS<30 Male & Females		Old—MS>=30 Plan 2 & Plan 3		New—MS>=30 Male & Females	
	Males	Females	Plan 2	Plan 3	Males	Females	Plan 2	Plan 3
55	0.01	0.02	0.01	0.01	0.12	0.12	0.08	0.04
56	0.02	0.02	0.01	0.01	0.12	0.12	0.08	0.04
57	0.03	0.02	0.02	0.01	0.12	0.12	0.08	0.04
58	0.04	0.03	0.02	0.01	0.12	0.12	0.08	0.05
59	0.05	0.04	0.04	0.02	0.16	0.25	0.10	0.10
60	0.06	0.05	0.05	0.02	0.12	0.12	0.15	0.12
61	0.15	0.13	0.08	0.06	0.21	0.20	0.20	0.15
62	0.24	0.21	0.15	0.12	0.30	0.28	0.40	0.35
63	0.22	0.20	0.20	0.12	0.28	0.26	0.30	0.25
64	0.56	0.52	0.40	0.20	0.57	0.48	0.35	0.30
65	0.39	0.36	0.35	0.35	0.39	0.36	0.45	0.45
66	0.22	0.24	0.30	0.30	0.22	0.24	0.40	0.40
67	0.22	0.23	0.27	0.27	0.22	0.23	0.30	0.30
68	0.22	0.22	0.25	0.25	0.22	0.22	0.30	0.30
69	0.22	0.21	0.25	0.25	0.22	0.21	0.30	0.30
70	0.22	0.20	0.25	0.25	0.22	0.20	0.30	0.30
71	0.20	0.19	0.25	0.25	0.20	0.19	0.30	0.30
72	0.18	0.18	0.25	0.25	0.18	0.18	0.30	0.30
73-79	0.16	0.17	0.25	0.25	0.16	0.17	0.30	0.30
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### LEOFF

LEOFF Retirement Experience by Year—Old Assumptions						
Age	Plan 1 (Males & Females)			Plan 2/3 (Males & Females)		
	Actual	Expected*	A/E	Actual	Expected*	A/E
1995	106	98	1.085	9	12	0.760
1996	107	103	1.042	5	15	0.324
1997	120	114	1.049	15	20	0.742
1998	126	123	1.021	11	24	0.458
1999	115	121	0.952	24	32	0.749
2000	121	121	0.997	25	44	0.568
2001						
2002	95	120	0.790	42	69	0.610
2003	97	120	0.806	61	86	0.710
2004	100	119	0.837	84	108	0.780
2005	104	117	0.889	112	135	0.833
2006	97	112	0.865	134	161	0.833
2007						
2008	84	99	0.845	141	211	0.667
2009	63	86	0.730	170	252	0.674
2010	55	78	0.709	201	289	0.696
2011	52	71	0.729	276	330	0.835
2012	61	59	1.034	301	357	0.844
2013	42	44	0.962	346	378	0.916
2014	25	34	0.727	395	403	0.979
2015	37	29	1.282	412	428	0.963
2016	20	20	0.981	478	448	1.068
2017	22	19	1.167	491	459	1.071
<b>Total</b>	<b>1,649</b>	<b>1,809</b>	<b>0.911</b>	<b>3,733</b>	<b>4,260</b>	<b>0.876</b>

# THREE: APPENDICES

## RETIREMENT RATES

continued

### LEOFF (continued)

LEOFF 1 Retirement Experience by Age Old Assumptions*			
Plan 1 (Males & Females)			
Age	Actual	Expected	A/E
50-54	0	0	N/A
55-59	31	28	1.113
60-64	71	68	1.042
65-69	40	36	1.111
70+	4	14	0.286
<b>Total</b>	<b>146</b>	<b>146</b>	<b>0.999</b>

\*Data summarized for years 2013-2017.

LEOFF 2 Retirement Experience by Age Old Assumptions*			
Plan 2 (Males & Females)			
Age	Actual	Expected	A/E
50-54	1,284	1,583	0.811
55-59	1,500	1,707	0.879
60-64	760	805	0.944
65-69	179	138	1.295
70+	10	27	0.370
<b>Total</b>	<b>3,733</b>	<b>4,260</b>	<b>0.876</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

LEOFF 2 Retirement Experience by Age New Assumptions*			
Plan 2 (Males & Females)			
Age	Actual	Expected	A/E
50-54	1,284	1,433	0.896
55-59	1,500	1,606	0.934
60-64	760	805	0.944
65-69	179	166	1.079
70+	10	27	0.370
<b>Total</b>	<b>3,733</b>	<b>4,037</b>	<b>0.925</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### LEOFF (continued)

LEOFF Plan 1 Retirement Rates			
Age	Old		New
	MS<30	MS>=30	All MS
Male & Females			
50	0.07	0.12	0.12
51	0.07	0.12	0.12
52	0.07	0.12	0.12
53	0.07	0.12	0.12
54	0.10	0.16	0.16
55	0.10	0.20	0.20
56	0.10	0.20	0.20
57	0.13	0.20	0.20
58	0.13	0.20	0.20
59	0.13	0.20	0.20
60-69	0.23	0.25	0.25
70	1.00	1.00	1.00

LEOFF Plan 2 Retirement Rates		
Age	Old	New
	Male & Females	
50	0.03	0.03
51	0.04	0.03
52	0.05	0.05
53	0.10	0.09
54	0.10	0.09
55	0.10	0.09
56	0.10	0.09
57	0.10	0.10
58	0.15	0.14
59	0.15	0.15
60	0.15	0.15
61	0.19	0.19
62	0.23	0.23
63	0.20	0.20
64	0.20	0.20
65-69	0.25	0.30
70	1.00	1.00

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### WSPRS

WSPRS Retirement Experience by Year Old Assumptions			
Plan 1/2 (Males & Females)			
Age	Actual	Expected*	A/E
1995	48	39	1.233
1996	43	32	1.349
1997	27	36	0.754
1998	33	36	0.922
1999	35	37	0.943
2000	34	36	0.956
2001			
2002	23	23	0.996
2003	24	19	1.264
2004	29	23	1.283
2005	36	27	1.310
2006	20	22	0.903
2007			
2008	16	16	0.999
2009	11	17	0.653
2010	21	19	1.104
2011	35	32	1.106
2012	44	35	1.263
2013	54	36	1.515
2014	38	29	1.303
2015	45	34	1.305
2016	55	36	1.549
2017	34	38	0.894
<b>Total</b>	<b>705</b>	<b>621</b>	<b>1.136</b>

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### WSPRS (continued)

WSPRS 1/2 Retirement Experience by Age Old Assumptions*			
Plan 1/2 (Males & Females)			
Age	Actual	Expected	A/E
44-49	265	217	1.222
50-54	283	235	1.202
55-59	130	130	1.000
60-64	24	35	0.680
65+	3	3	1.000
<b>Total</b>	<b>705</b>	<b>621</b>	<b>1.136</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

WSPRS 1/2 Retirement Experience by Age New Assumptions*			
Plan 1/2 (Males & Females)			
Age	Actual	Expected	A/E
44-49	265	245	1.081
50-54	283	271	1.045
55-59	130	130	1.000
60-64	24	37	0.646
65+	3	3	1.000
<b>Total</b>	<b>705</b>	<b>686</b>	<b>1.028</b>

\*Data summarized for years 1995-2017 excluding data for 2001 and 2007 consistent with our analysis.

WSPRS Plan 1/2 Retirement Rates		
Age	Old	New
	Males & Females	
45	0.50	0.50
46	0.33	0.38
47	0.33	0.38
48	0.33	0.38
49	0.30	0.33
50	0.27	0.33
51	0.24	0.27
52	0.24	0.27
53	0.24	0.27
54	0.24	0.27
55	0.20	0.20
56	0.20	0.20
57	0.20	0.20
58	0.20	0.20
59	0.33	0.33
60	0.33	0.33
61	0.33	0.33
62	0.33	0.33
63	0.33	0.33
64	0.33	0.50
65	1.00	1.00

# THREE: APPENDICES

## RETIREMENT RATES

*continued*

### PSERS

PSERS Retirement Rates				
Age	Old		New	
	All Service		MS<20	MS>=20
	Males	Females	Males & Females	
53	0.02	0.02	N/A	0.06
54	0.02	0.02	N/A	0.06
55	0.02	0.02	N/A	0.06
56	0.05	0.04	N/A	0.06
57	0.08	0.06	N/A	0.08
58	0.11	0.08	N/A	0.12
59	0.14	0.10	N/A	0.16
60	0.30	0.34	0.32	0.32
61	0.26	0.26	0.24	0.24
62	0.30	0.34	0.28	0.28
63	0.50	0.52	0.22	0.24
64	0.70	0.70	0.20	0.24
65	0.50	0.35	0.25	0.30
66-69	0.30	0.35	0.25	0.30
70	1.00	1.00	1.00	1.00