

Preliminary Experience Study Report

Attachment A**Mortality**

Mortality Rates for Active Employees and Retirees Without Disabilities								
Plan	Mortality Rates	New			Old			
		Projection*	Male Age Offset	Female Age Offset	Mortality Rates	Projection**	Male Age Offset	Female Age Offset
PERS 1	RP 2000 H	Scale BB	(1)	(1)	RP 2000 H	2018	(1)	(1)
PERS 2/3	RP 2000 H	Scale BB	(1)	(1)	RP 2000 H	2031	(1)	(1)
TRS 1	RP 2000 H	Scale BB	(3)	(2)	RP 2000 H	2018	(2)	(2)
TRS 2/3	RP 2000 H	Scale BB	(3)	(2)	RP 2000 H	2036	(2)	(2)
SERS	RP 2000 H	Scale BB	(1)	(1)	RP 2000 H	2030	0	(2)
PSERS	RP 2000 H	Scale BB	(1)	(1)	RP 2000 H	2038	(1)	(1)
LEOFF 1	RP 2000 H	Scale BB	(1)	1	RP 2000 H	2019	(1)	1
LEOFF 2	RP 2000 H	Scale BB	(1)	1	RP 2000 H	2034	(1)	1
WSPRS	RP 2000 H	Scale BB	(1)	1	RP 2000 H	2028	(1)	1

Mortality Rates for Retirees With Disabilities								
Plan	Mortality Rates	New			Old			
		Projection*	Male Age Offset	Female Age Offset	Mortality Rates	Projection**	Male Age Offset	Female Age Offset
PERS 1	RP 2000 D	Scale BB	0	0	RP 2000 D	2018	0	0
PERS 2/3	RP 2000 D	Scale BB	0	0	RP 2000 D	2031	0	0
TRS 1	RP 2000 D	Scale BB	0	0	RP 2000 D	2018	0	0
TRS 2/3	RP 2000 D	Scale BB	0	0	RP 2000 D	2036	0	0
SERS	RP 2000 D	Scale BB	0	0	RP 2000 D	2030	0	0
PSERS	RP 2000 D	Scale BB	0	0	RP 2000 D	2038	0	0
LEOFF 1	RP 2000 H	Scale BB	2	2	RP 2000 H	2019	2	2
LEOFF 2	RP 2000 D	Scale BB	0	0	RP 2000 D	2034	0	0
WSPRS	RP 2000 D	Scale BB	0	0	RP 2000 D	2028	0	0

*Projection uses 100% of Scale BB on a generational basis.

**Projection uses 50% of Scale AA to a static projection year.

RP 2000 H is the Combined Healthy Mortality Table published by the Society of Actuaries (SOA) in the year 2000.

RP 2000 D is the Combined Disabled Mortality Table published by the SOA in the same year.

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The following tables provide a sample of the New and Old mortality rates by system. The New mortality rates have been projected to the year 2034 using 100 percent of Scale BB, whereas the Old mortality rates have been projected to the year 2034 using 50 percent of Scale AA.

We chose the year 2034 for illustration purposes only. The 2013 Actuarial Valuation will use the New mortality rates on a generational basis. Comparatively, the prior valuations used the Old mortality rates projected to a specified static year that was unique to each retirement plan.

Sample of Healthy Male Mortality Rates by Age (Projected to 2034)								
Plan	PERS/PSERS		TRS		SERS		LEOFF/WSPRS	
Type	New	Old	New	Old	New	Old	New	Old
20	0.000311	0.000249	0.000311	0.000249	0.000311	0.000249	0.000311	0.000249
25	0.000339	0.000317	0.000330	0.000315	0.000339	0.000317	0.000339	0.000317
30	0.000372	0.000378	0.000345	0.000361	0.000372	0.000408	0.000372	0.000378
35	0.000634	0.000645	0.000507	0.000580	0.000634	0.000710	0.000634	0.000645
40	0.000922	0.000891	0.000816	0.000841	0.000922	0.000942	0.000922	0.000891
45	0.001261	0.001119	0.001097	0.001041	0.001261	0.001208	0.001261	0.001119
50	0.001801	0.001467	0.001566	0.001368	0.001801	0.001572	0.001801	0.001467
55	0.002886	0.002310	0.002408	0.002108	0.002886	0.002620	0.002886	0.002310
60	0.004682	0.004524	0.003696	0.004013	0.004682	0.005135	0.004682	0.004524
65	0.007482	0.008883	0.005809	0.007885	0.007482	0.010031	0.007482	0.008883
70	0.011845	0.015330	0.009616	0.013835	0.011845	0.017191	0.011845	0.015330
75	0.020278	0.026698	0.016319	0.023931	0.020278	0.029796	0.020278	0.026698
80	0.034651	0.048850	0.028058	0.043956	0.034651	0.054282	0.034651	0.048850
85	0.059686	0.088566	0.048145	0.079636	0.059686	0.098310	0.059686	0.088566
90	0.114256	0.155469	0.093401	0.140681	0.114256	0.171339	0.114256	0.155469
95	0.204305	0.242309	0.176525	0.225847	0.204305	0.258545	0.204305	0.242309
100	0.298141	0.330207	0.270734	0.315296	0.298141	0.344556	0.298141	0.330207
105	0.392003	0.392003	0.371685	0.383040	0.392003	0.397886	0.392003	0.392003
110	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000

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Sample of Healthy Female Mortality Rates by Age (Projected to 2034)								
Plan	PERS/PSERS		TRS		SERS		LEOFF/WSPRS	
Type	New	Old	New	Old	New	Old	New	Old
20	0.000172	0.000145	0.000172	0.000145	0.000172	0.000145	0.000173	0.000146
25	0.000181	0.000158	0.000178	0.000155	0.000181	0.000155	0.000193	0.000169
30	0.000224	0.000209	0.000212	0.000198	0.000224	0.000198	0.000277	0.000259
35	0.000393	0.000361	0.000356	0.000327	0.000393	0.000327	0.000464	0.000426
40	0.000585	0.000502	0.000540	0.000463	0.000585	0.000463	0.000699	0.000599
45	0.000929	0.000783	0.000846	0.000713	0.000929	0.000713	0.001104	0.000931
50	0.001399	0.001160	0.001295	0.001073	0.001399	0.001073	0.001672	0.001385
55	0.002044	0.002115	0.001861	0.001926	0.002044	0.001926	0.002606	0.002696
60	0.003156	0.004079	0.002788	0.003603	0.003156	0.003603	0.004131	0.005340
65	0.005717	0.007916	0.005073	0.007024	0.005717	0.007024	0.007266	0.010060
70	0.009857	0.013648	0.008919	0.012348	0.009857	0.012348	0.012324	0.017063
75	0.016887	0.022215	0.015237	0.020044	0.016887	0.020044	0.020541	0.027021
80	0.027533	0.036842	0.024938	0.033370	0.027533	0.033370	0.033684	0.045073
85	0.046113	0.062766	0.041463	0.056436	0.046113	0.056436	0.057297	0.077988
90	0.081806	0.113225	0.073669	0.101964	0.081806	0.101964	0.099278	0.137409
95	0.148974	0.176685	0.138896	0.164733	0.148974	0.164733	0.167376	0.198510
100	0.208917	0.231387	0.202200	0.223947	0.208917	0.223947	0.221058	0.244834
105	0.279055	0.279055	0.266044	0.266044	0.279055	0.266044	0.307811	0.307811
110	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000

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Sample of Disabled Male Mortality Rates by Age (Projected to 2034)				
Plan	All Systems Except LEOFF 1		LEOFF 1 (Healthy)	
Type	New	Old	New	Old
20	0.020379	0.016316	0.000330	0.000265
25	0.020379	0.019034	0.000345	0.000322
30	0.020379	0.020730	0.000507	0.000516
35	0.020379	0.020730	0.000816	0.000830
40	0.020379	0.019696	0.001097	0.001060
45	0.020379	0.018082	0.001566	0.001389
50	0.026161	0.021307	0.002408	0.001961
55	0.032000	0.025619	0.004237	0.003392
60	0.033110	0.031995	0.006897	0.006664
65	0.033282	0.039514	0.010663	0.012660
70	0.037436	0.048450	0.016319	0.021120
75	0.049091	0.064631	0.028058	0.036941
80	0.065424	0.092234	0.048145	0.067874
85	0.084704	0.125690	0.081378	0.120755
90	0.125919	0.171339	0.148711	0.202352
95	0.217995	0.258545	0.244368	0.289823
100	0.311097	0.344556	0.335591	0.371685
105	0.397886	0.397886	0.400000	0.400000
110	1.000000	1.000000	1.000000	1.000000

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Sample of Disabled Female Mortality Rates by Age (Projected to 2034)				
Plan	All Systems Except LEOFF 1		LEOFF 1 (Healthy)	
Type	New	Old	New	Old
20	0.006727	0.005670	0.000175	0.000148
25	0.006727	0.005867	0.000201	0.000176
30	0.006727	0.006283	0.000316	0.000295
35	0.006727	0.006176	0.000500	0.000459
40	0.006727	0.005768	0.000769	0.000660
45	0.006727	0.005670	0.001197	0.001009
50	0.010415	0.008629	0.001822	0.001510
55	0.013952	0.014436	0.002933	0.003035
60	0.015518	0.020057	0.004730	0.006114
65	0.018591	0.025739	0.008068	0.011171
70	0.024965	0.034565	0.013708	0.018979
75	0.034646	0.045576	0.022623	0.029760
80	0.047967	0.064186	0.037342	0.049968
85	0.066469	0.090472	0.063904	0.086982
90	0.096151	0.133080	0.108213	0.149775
95	0.158517	0.188004	0.175412	0.208041
100	0.214407	0.237467	0.229784	0.254498
105	0.293116	0.293116	0.322725	0.322725
110	1.000000	1.000000	1.000000	1.000000

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Description Of Approach To Analyzing Mortality

Setting A Mortality Improvement Assumption

Experience indicates that the use of 100 percent of Scale BB would be prudent. Primarily we focused the analysis on PERS and TRS, noting that the remaining systems accounted for less than 10 percent of deaths across all timeframes studied, but all systems were reviewed as part of the analysis. Mortality improvement was studied by age. Certain ages were excluded if limited data led us to believe the results were unreliable. The table below summarizes the observed mortality improvement, as a percent of Scale AA and Scale BB, split into four data windows.

	% of Scale AA	% of Scale BB
1984-2012	109%	78%
1990-2012	152%	97%
1996-2012	204%	127%
2001-2012	143%	136%

For PERS, TRS, SERS, PSERS, LEOFF, and WSPRS Combined.

Use Of Standard Mortality Table

We believe we have sufficient data to develop our own mortality tables by fitting a standard table to the observed experience. The latest experience supports the continued use of the RP-2000 Combined Healthy Mortality (with age adjustments where warranted) for the healthy populations and projected improvements in mortality. We do not believe a separate table is required for actives and retirees. We believe the continued use of the combined table is appropriate because of the early retirement ages in our plans. Many early retirees (healthy) from these plans start collecting their plan benefit, but do not retire from the workforce. As such, we believe active mortality is a better predictor of future mortality for these early retirees than an annuitant based mortality table.

Development Of Age Offsets

When age offsets are negative, it means people of a given age are expected to be generally healthier than others their age. In other words, their mortality experience is expected to be similar to younger people. Conversely, a positive age offset means mortality experience for a given age is expected to match that of a higher age in the general population.

In terms of establishing age offsets, we extended the study period to 12 years of data (2001-2012) for purposes of minimizing the volatility in our analysis. Generally, the new age offset assumptions did not change by more than one year since the last experience study.

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We believe we have insufficient data to set system specific mortality tables for SERS and PSERS. As a result, we decided to rely on PERS experience for purposes of setting SERS and PSERS offsets. Given the nature of most SERS and PSERS jobs, we might see slightly higher rates of mortality for these plans than for PERS in the future. However, the use of PERS mortality provides a reasonable amount of conservatism given the uncertainty in this area. Similarly, we relied on LEOFF experience when setting this assumption for WSPRS.

Analysis Of Disabled Mortality

Given the use of Scale BB with the Healthy mortality tables and the observed disabled mortality experience from our latest study, we decided to apply Scale BB for disabled mortality improvements. We also believe the same factors that improve mortality for populations without disabilities will apply to populations with disabilities. Otherwise, we did not make any changes to the disabled mortality assumptions since the last experience study. We will continue to use the RP-2000 Combined Disabled Mortality table for all plans (except LEOFF 1 which relies on the combined healthy table). We will also maintain the zero age offset assumption for males and females in all plans (except LEOFF 1 which uses a +2 age offset).

Application Of Mortality Assumptions In Valuation Software

Lastly, we simplified the approach to applying mortality improvement and age offset assumptions from the last study. Specifically, we applied age offsets directly to the RP-2000 tables and used generational mortality improvements to project mortality rates every year thereafter. The old methodology projected the RP-2000 table to the mid-point of the experience study period, applied the age offsets, then further projected the table to a static year in the future for purposes of approximating the liability impact of using generational mortality improvements. The projection to a future static year for this approximation is no longer necessary when we project improvements on a generational basis.

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Attachment B**Retirement Rates****High-Level Takeaways**

In general, we continue to observe members retiring later than expected. When members work longer, we see fewer observed retirements per year. As a result, we lowered existing retirement rate assumptions (as developed in the prior study) toward the level of observed retirements.

We saw that the data during the Great Recession reduced the ratio of actual-to-expected retirements in some systems by approximately half. Given the magnitude of the Great Recession's impact on observed retirement rates, and the fact that it is likely a once-in-a-lifetime event, we chose to remove those data years for PERS 2/3, TRS 2/3, and SERS 2/3.

However, we chose not to exclude the Great Recession data for the Plans 1 (PERS 1 and TRS 1) or the Public Safety systems (LEOFF, PSERS, and WSPRS). In the public safety plans, we observed that actual retirement rates appeared to return to pre-recession levels much faster. We suspect this is due to higher incomes and/or benefit adequacy.

All-Plan Summary

Generally, we made modest changes to the retirement rates; nudging the actual-to-expected ratios closer to one. The notable exception is LEOFF 2, where actual retirements have been consistently and significantly lower than expected.

Summary of Actual to Expected Ratios			
Under Old Assumptions		Under New Assumptions	
PERS 1	0.954	PERS 1	0.995
PERS 2/3	0.958	PERS 2/3	0.992
TRS 1	0.933	TRS 1	0.991
TRS 2/3	0.714	TRS 2/3	0.789
SERS 2/3	0.893	SERS 2/3	0.970
PSERS	N/A	PSERS	N/A
LEOFF 1	0.798	LEOFF 1	0.908
LEOFF 2	0.601	LEOFF 2	0.726
WSPRS	1.093	WSPRS	1.061

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PERS**Observed Experience**

Fewer PERS members retired during the study period than expected. The following tables show the actual and expected retirements for PERS 1 and PERS 2/3 by age using the Old assumptions.

PERS 1 Retirement Experience by Age			
Age	Plan 1 (Males & Females)		
	Observed	Expected	Ratio
47-49	502	467	1.075
50-54	4,403	4,719	0.933
55-59	7,456	7,618	0.979
60-64	10,039	10,789	0.930
65-69	3,244	3,240	1.001
70-75	510	466	1.094
75-79	145	132	1.102
80+	43	189	0.228
Total	26,342	27,620	0.954

Omitted 2001 and 2007 due to odd-length valuation periods. Totals and ratios may not agree due to rounding.

PERS 2/3 Retirement Experience by Age			
Age	Plan 2/3 (Males & Females)		
	Observed	Expected	Ratio
55-59	455	712	0.639
60-64	2,701	2,653	1.018
65-69	3,319	3,386	0.980
70-75	452	415	1.088
75-79	97	92	1.050
80+	26	99	0.263
Total	7,050	7,358	0.958

Omitted 2001 and 2007 due to odd-length valuation periods. Also omitted 2008-12 due to the Great Recession. Totals and ratios may not agree due to rounding.

Old And New PERS Retirement Rates

The table below shows the actual retirement rates over the experience study period (1995-2012), and the Old and New retirement assumptions by plan and by gender.

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PERS 1 Retirement Rates						
	Males			Females		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
47	0.483	0.514	0.460	0.580	0.692	0.540
48	0.580	0.643	0.550	0.435	0.500	0.460
49	0.532	0.556	0.500	0.387	0.404	0.380
50	0.532	0.527	0.450	0.338	0.322	0.300
51	0.436	0.432	0.400	0.339	0.317	0.300
52	0.436	0.423	0.400	0.339	0.302	0.300
53	0.436	0.409	0.400	0.300	0.271	0.300
54	0.437	0.409	0.400	0.466	0.405	0.400
55	0.213	0.220	0.170	0.223	0.222	0.280
56	0.175	0.177	0.170	0.175	0.182	0.160
57	0.175	0.166	0.170	0.175	0.162	0.160
58	0.176	0.173	0.170	0.166	0.165	0.160
59	0.216	0.211	0.200	0.324	0.292	0.300
60	0.147	0.148	0.160	0.167	0.159	0.160
61	0.226	0.205	0.230	0.206	0.189	0.210
62	0.325	0.294	0.300	0.285	0.265	0.260
63	0.230	0.220	0.220	0.210	0.208	0.200
64	0.300	0.262	0.280	0.260	0.232	0.280
65	0.400	0.344	0.340	0.390	0.350	0.360
66	0.260	0.312	0.300	0.220	0.263	0.220
67	0.260	0.272	0.260	0.230	0.267	0.220
68	0.200	0.213	0.220	0.220	0.244	0.220
69	0.230	0.226	0.220	0.250	0.252	0.220
70	0.240	0.247	0.220	0.200	0.223	0.220
71	0.200	0.269	0.220	0.200	0.212	0.220
72	0.200	0.232	0.220	0.200	0.217	0.220
73	0.200	0.223	0.220	0.200	0.201	0.220
74	0.200	0.168	0.220	0.200	0.219	0.220
75	0.200	0.266	0.220	0.200	0.189	0.220
76	0.200	0.224	0.220	0.200	0.192	0.220
77	0.200	0.234	0.220	0.200	0.205	0.220
78	0.200	0.290	0.220	0.200	0.215	0.220
79	0.200	0.167	0.220	0.200	0.283	0.220
80	1.000	1.000	1.000	1.000	1.000	1.000

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PERS 2/3 Retirement Rates						
Service < 30 Years						
	Males			Females		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
55	0.030	0.013	0.020	0.030	0.026	0.020
56	0.030	0.012	0.030	0.030	0.019	0.020
57	0.030	0.018	0.040	0.030	0.021	0.020
58	0.070	0.017	0.050	0.030	0.029	0.020
59	0.070	0.036	0.060	0.030	0.034	0.040
60	0.090	0.038	0.070	0.090	0.052	0.060
61	0.090	0.097	0.080	0.120	0.106	0.130
62	0.250	0.181	0.240	0.220	0.162	0.200
63	0.200	0.284	0.220	0.200	0.237	0.180
64	0.550	0.632	0.560	0.550	0.632	0.560
65	0.450	0.436	0.400	0.450	0.428	0.400
66	0.260	0.274	0.240	0.250	0.251	0.240
67	0.200	0.202	0.240	0.220	0.227	0.240
68	0.200	0.201	0.240	0.230	0.225	0.240
69	0.220	0.206	0.240	0.210	0.198	0.240
70	0.200	0.244	0.240	0.230	0.239	0.240
71	0.200	0.230	0.240	0.200	0.192	0.240
72	0.200	0.173	0.240	0.200	0.237	0.240
73	0.200	0.174	0.240	0.200	0.188	0.240
74	0.200	0.237	0.240	0.200	0.298	0.240
75	0.200	0.179	0.240	0.200	0.190	0.240
76	0.200	0.250	0.240	0.200	0.159	0.240
77	0.200	0.297	0.240	0.200	0.250	0.240
78	0.200	0.214	0.240	0.200	0.194	0.240
79	0.200	0.150	0.240	0.200	0.261	0.240
80	1.000	1.000	1.000	1.000	1.000	1.000

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PERS 2/3 Retirement Rates						
Service >= 30 Years						
	Males			Females		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
55	0.130	0.000	0.120	0.140	0.000	0.120
56	0.120	0.000	0.120	0.120	0.000	0.120
57	0.130	0.000	0.120	0.130	0.000	0.120
58	0.140	0.000	0.120	0.130	0.000	0.120
59	0.180	0.000	0.160	0.280	0.000	0.240
60	0.140	0.000	0.120	0.150	0.000	0.120
61	0.220	1.000	0.200	0.200	1.000	0.200
62	0.330	0.000	0.280	0.290	0.000	0.280
63	0.250	0.000	0.260	0.250	0.000	0.260
64	0.600	0.000	0.560	0.600	0.000	0.560
65	0.450	0.000	0.400	0.450	0.000	0.400
66	0.260	0.000	0.240	0.250	0.000	0.240
67	0.200	0.000	0.240	0.220	0.000	0.240
68	0.200	0.000	0.240	0.230	0.000	0.240
69	0.220	0.000	0.240	0.210	0.000	0.240
70	0.200	0.000	0.240	0.230	0.000	0.240
71	0.200	0.000	0.240	0.200	0.000	0.240
72	0.200	0.000	0.240	0.200	0.000	0.240
73	0.200	0.000	0.240	0.200	0.000	0.240
74	0.200	0.000	0.240	0.200	0.000	0.240
75	0.200	0.000	0.240	0.200	0.000	0.240
76	0.200	0.000	0.240	0.200	0.000	0.240
77	0.200	0.000	0.240	0.200	0.000	0.240
78	0.200	0.000	0.240	0.200	0.000	0.240
79	0.200	0.000	0.240	0.200	0.000	0.240
80	1.000	1.000	1.000	1.000	1.000	1.000

The following tables show the actual and expected retirements for PERS 1 and PERS 2/3 by age using the New assumptions.

PERS 1 Under New Assumptions			
Age	Plan 1 (Males & Females)		
	Observed	Expected	Ratio
47-49	502	452	1.111
50-54	4,403	4,266	1.032
55-59	7,456	7,288	1.023
60-64	10,039	10,557	0.951
65-69	3,244	3,085	1.052
70-75	510	500	1.020
75-79	145	145	1.002
80+	43	189	0.228
Total	26,342	26,482	0.995

Totals and ratios may not agree due to rounding.

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PERS 2/3 Under New Assumptions			
Age	Plan 2/3 (Males & Females)		
	Observed	Expected	Ratio
55-59	455	596	0.763
60-64	2,701	2,582	1.046
65-69	3,319	3,229	1.028
70-75	452	487	0.929
75-79	97	111	0.875
80+	26	99	0.263
Total	7,050	7,104	0.992

Totals and ratios may not agree due to rounding.

TRS**Observed Experience**

Fewer TRS members retired during the study period than expected. The following tables show the actual and expected retirements for TRS 1 and TRS 2/3 by age using the Old assumptions.

TRS 1 Retirement Experience by Age			
Age	Plan 1 (Males & Females)		
	Observed	Expected	Ratio
47-49	0	0	N/A
50-54	3,340	2,249	1.485
55-59	6,460	7,608	0.849
60-64	5,326	6,246	0.853
65-69	1,404	1,627	0.863
70-75	139	130	1.072
75-79	16	20	0.784
80+	5	15	0.333
Total	16,690	17,896	0.933

Omitted 2001 and 2007 due to odd-length valuation periods. Totals and ratios may not agree due to rounding.

TRS 2/3 Retirement Experience by Age			
Age	Plan 2/3 (Males & Females)		
	Observed	Expected	Ratio
55-59	280	640	0.437
60-64	657	823	0.798
65-69	455	499	0.912
70-75	31	37	0.836
75-79	10	7	1.429
80+	0	0	N/A
Total	1,433	2,006	0.714

Omitted 2001 and 2007 due to odd-length valuation periods. Also omitted 2008-12 due to the Great Recession. Totals and ratios may not agree due to rounding.

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Old And New TRS Retirement Rates

The table below shows the actual retirement rates over the experience study period (1995-2012), and the Old and New retirement assumptions by plan and by gender.

TRS 1 Retirement Rates						
Service <= 30 Years						
	Males			Females		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
47	0.000	0.000	0.000	0.000	0.000	0.000
48	0.000	0.000	0.000	0.000	0.000	0.000
49	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.500	0.000	0.000	1.000	0.000
51	0.000	0.988	0.000	0.000	0.990	0.000
52	0.000	0.981	0.000	0.000	0.886	0.000
53	0.240	0.522	0.220	0.240	0.382	0.220
54	0.240	0.397	0.220	0.240	0.393	0.220
55	0.240	0.191	0.220	0.240	0.188	0.220
56	0.238	0.199	0.220	0.238	0.171	0.220
57	0.238	0.172	0.220	0.238	0.157	0.220
58	0.238	0.177	0.220	0.238	0.180	0.220
59	0.238	0.202	0.220	0.238	0.249	0.220
60	0.238	0.185	0.220	0.238	0.180	0.220
61	0.238	0.210	0.220	0.238	0.192	0.220
62	0.383	0.324	0.350	0.383	0.237	0.350
63	0.290	0.296	0.300	0.290	0.226	0.300
64	0.270	0.227	0.250	0.270	0.227	0.250
65	0.400	0.326	0.360	0.400	0.315	0.360
66	0.400	0.349	0.360	0.400	0.366	0.360
67	0.330	0.323	0.320	0.330	0.271	0.320
68	0.280	0.264	0.280	0.280	0.269	0.280
69	0.280	0.325	0.280	0.280	0.268	0.280
70	0.230	0.209	0.220	0.230	0.298	0.220
71	0.200	0.303	0.220	0.200	0.368	0.220
72	0.200	0.222	0.220	0.200	0.167	0.220
73	0.200	0.238	0.220	0.200	0.262	0.220
74	0.200	0.333	0.220	0.200	0.130	0.220
75	0.200	0.111	0.220	0.200	0.238	0.220
76	0.200	0.000	0.220	0.200	0.214	0.220
77	0.200	0.667	0.220	0.200	0.222	0.220
78	0.200	0.000	0.220	0.200	0.091	0.220
79	0.200	0.000	0.220	0.200	0.286	0.220
80	1.000	1.000	1.000	1.000	1.000	1.000

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TRS 1 Retirement Rates						
Service = 30 Years						
	Males			Females		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
47	0.000	0.000	0.000	0.000	0.000	0.000
48	0.000	0.000	0.000	0.000	0.000	0.000
49	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	1.000	0.000	0.000	0.000	0.000
51	0.000	1.000	0.000	0.290	0.250	0.300
52	0.381	0.399	0.360	0.328	0.287	0.300
53	0.381	0.374	0.360	0.328	0.327	0.300
54	0.381	0.372	0.360	0.328	0.321	0.300
55	0.381	0.378	0.360	0.328	0.373	0.300
56	0.331	0.345	0.360	0.328	0.306	0.300
57	0.331	0.338	0.360	0.339	0.289	0.300
58	0.381	0.413	0.390	0.339	0.327	0.300
59	0.431	0.427	0.420	0.339	0.342	0.300
60	0.431	0.414	0.420	0.339	0.277	0.300
61	0.484	0.369	0.420	0.438	0.436	0.400
62	0.581	0.534	0.560	0.579	0.523	0.500
63	0.500	0.325	0.480	0.500	0.440	0.460
64	0.500	0.292	0.400	0.500	0.466	0.460
65	0.700	0.692	0.700	0.600	0.444	0.550
66	0.700	0.385	0.700	0.600	0.548	0.550
67	0.700	0.667	0.700	0.600	0.556	0.550
68	0.700	0.667	0.700	0.600	0.294	0.550
69	0.700	0.750	0.700	0.600	0.500	0.550
70	1.000	0.000	1.000	0.450	0.400	0.550
71	1.000	0.000	1.000	0.450	0.500	0.550
72	1.000	0.000	1.000	1.000	0.000	1.000
73	1.000	0.000	1.000	1.000	1.000	1.000
74	1.000	0.000	1.000	1.000	0.000	1.000
75	1.000	0.000	1.000	1.000	0.000	1.000
76	1.000	0.000	1.000	1.000	0.000	1.000
77	1.000	0.000	1.000	1.000	0.000	1.000
78	1.000	0.000	1.000	1.000	0.000	1.000
79	1.000	0.000	1.000	1.000	0.000	1.000
80	1.000	1.000	1.000	1.000	1.000	1.000

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TRS 2/3 Retirement Rates						
Service < 30 Years						
	Males			Females		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
55	0.030	0.008	0.020	0.020	0.009	0.020
56	0.030	0.010	0.020	0.030	0.013	0.030
57	0.030	0.009	0.020	0.070	0.021	0.040
58	0.030	0.020	0.020	0.070	0.025	0.050
59	0.030	0.037	0.040	0.070	0.031	0.060
60	0.110	0.044	0.060	0.090	0.061	0.070
61	0.110	0.097	0.140	0.120	0.102	0.150
62	0.250	0.152	0.220	0.250	0.138	0.230
63	0.200	0.211	0.200	0.250	0.177	0.210
64	0.500	0.543	0.550	0.450	0.496	0.480
65	0.500	0.448	0.480	0.450	0.400	0.400
66	0.400	0.455	0.410	0.300	0.293	0.320
67	0.350	0.350	0.340	0.250	0.179	0.240
68	0.300	0.231	0.270	0.250	0.245	0.240
69	0.300	0.200	0.270	0.400	0.394	0.420
70	0.300	0.167	0.270	0.250	0.282	0.300
71	0.500	0.417	0.410	0.250	0.250	0.300
72	0.500	0.000	0.550	0.250	0.154	0.300
73	0.500	0.667	0.550	0.250	0.100	0.300
74	0.500	0.000	0.550	0.250	0.167	0.300
75	0.500	0.000	0.550	0.250	0.333	0.300
76	0.500	0.000	0.550	0.250	1.000	0.300
77	0.500	0.667	0.550	0.250	0.000	0.300
78	0.500	0.500	0.550	0.250	0.000	0.300
79	0.500	1.000	0.550	0.250	0.000	0.300
80	1.000	1.000	1.000	1.000	1.000	1.000

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TRS 2/3 Retirement Rates						
Service = 30 Years						
	Males			Females		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
55	0.240	0.000	0.220	0.210	0.000	0.190
56	0.230	0.000	0.220	0.230	0.000	0.210
57	0.250	0.000	0.220	0.250	0.000	0.230
58	0.310	0.000	0.280	0.270	0.000	0.250
59	0.380	0.000	0.340	0.290	0.000	0.270
60	0.410	0.000	0.410	0.320	0.000	0.290
61	0.480	0.000	0.480	0.430	0.000	0.410
62	0.600	0.000	0.550	0.600	0.000	0.530
63	0.500	0.000	0.500	0.500	0.000	0.490
64	0.550	0.000	0.550	0.500	0.000	0.530
65	0.500	0.000	0.480	0.450	0.000	0.400
66	0.400	0.000	0.410	0.300	0.000	0.320
67	0.350	0.000	0.340	0.250	0.000	0.240
68	0.300	0.000	0.270	0.250	0.000	0.240
69	0.300	0.000	0.270	0.400	0.000	0.420
70	0.300	0.000	0.270	0.250	0.000	0.300
71	0.500	0.000	0.410	0.250	0.000	0.300
72	0.500	0.000	0.550	0.250	0.000	0.300
73	0.500	0.000	0.550	0.250	0.000	0.300
74	0.500	0.000	0.550	0.250	0.000	0.300
75	0.500	0.000	0.550	0.250	0.000	0.300
76	0.500	0.000	0.550	0.250	0.000	0.300
77	0.500	0.000	0.550	0.250	0.000	0.300
78	0.500	0.000	0.550	0.250	0.000	0.300
79	0.500	0.000	0.550	0.250	0.000	0.300
80	1.000	1.000	1.000	1.000	1.000	1.000

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TRS 2/3 Retirement Rates						
	Service > 30 Years					
	Males			Females		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
55	0.150	0.000	0.130	0.130	0.000	0.120
56	0.170	0.000	0.150	0.150	0.000	0.140
57	0.180	0.000	0.170	0.160	0.000	0.160
58	0.200	0.000	0.190	0.180	0.000	0.180
59	0.210	0.000	0.210	0.240	0.000	0.220
60	0.230	0.000	0.230	0.210	0.000	0.200
61	0.240	0.000	0.250	0.240	0.000	0.220
62	0.400	0.000	0.360	0.350	0.000	0.320
63	0.300	0.000	0.330	0.300	0.000	0.300
64	0.550	0.000	0.550	0.500	0.000	0.490
65	0.500	0.000	0.480	0.450	0.000	0.400
66	0.400	0.000	0.410	0.300	0.000	0.320
67	0.350	0.000	0.340	0.250	0.000	0.240
68	0.300	0.000	0.270	0.250	0.000	0.240
69	0.300	0.000	0.270	0.400	0.000	0.420
70	0.300	0.000	0.270	0.250	0.000	0.300
71	0.500	0.000	0.410	0.250	0.000	0.300
72	0.500	0.000	0.550	0.250	0.000	0.300
73	0.500	0.000	0.550	0.250	0.000	0.300
74	0.500	0.000	0.550	0.250	0.000	0.300
75	0.500	0.000	0.550	0.250	0.000	0.300
76	0.500	0.000	0.550	0.250	0.000	0.300
77	0.500	0.000	0.550	0.250	0.000	0.300
78	0.500	0.000	0.550	0.250	0.000	0.300
79	0.500	0.000	0.550	0.250	0.000	0.300
80	1.000	1.000	1.000	1.000	1.000	1.000

The following tables show the actual and expected retirements for TRS 1 and TRS 2/3 by age using the New assumptions.

TRS 1 Under New Assumptions			
Age	Plan 1 (Males & Females)		
	Observed	Expected	Ratio
47-49	0	0	N/A
50-54	3,340	2,134	1.565
55-59	6,460	7,153	0.903
60-64	5,326	5,895	0.904
65-69	1,404	1,495	0.939
70-75	139	131	1.062
75-79	16	21	0.747
80+	5	15	0.333
Total	16,690	16,844	0.991

Totals and ratios may not agree due to rounding.

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TRS 2/3 Under New Assumptions			
Age	Plan 2/3 (Males & Females)		
	Observed	Expected	Ratio
55-59	280	493	0.568
60-64	657	800	0.821
65-69	455	476	0.957
70-75	31	41	0.760
75-79	10	8	1.258
80+	0	0	N/A
Total	1,433	1,817	0.789

Totals and ratios may not agree due to rounding.

SERS

Observed Experience

Fewer SERS members retired during the study period than expected. The following tables show the actual and expected retirements for SERS 2/3 by age using the Old assumptions.

SERS 2/3 Retirement Experience by Age			
Age	Plan 2/3 (Males & Females)		
	Observed	Expected	Ratio
55-59	307	435	0.706
60-64	1,153	1,226	0.941
65-69	1,205	1,284	0.938
70-75	170	179	0.952
75-79	34	44	0.776
80+	17	63	0.270
Total	2,886	3,230	0.893

Omitted 2001 and 2007 due to odd-length valuation periods. Also omitted 2008-12 due to the Great Recession. Totals and ratios may not agree due to rounding.

Old And New SERS Retirement Rates

The following table shows the actual retirement rates over the experience study period (1995-2012) and the Old and New retirement assumptions by gender.

Preliminary Experience Study Report

SERS 2/3 Retirement Rates						
Service < 30 Years						
	Males			Females		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
55	0.030	0.004	0.010	0.030	0.018	0.020
56	0.030	0.006	0.020	0.030	0.017	0.020
57	0.030	0.013	0.030	0.030	0.016	0.020
58	0.070	0.024	0.040	0.030	0.026	0.030
59	0.070	0.040	0.050	0.030	0.044	0.040
60	0.090	0.035	0.060	0.090	0.050	0.050
61	0.090	0.087	0.150	0.120	0.103	0.130
62	0.250	0.224	0.240	0.220	0.166	0.210
63	0.200	0.276	0.220	0.200	0.202	0.200
64	0.500	0.597	0.560	0.500	0.539	0.520
65	0.450	0.429	0.390	0.450	0.408	0.360
66	0.260	0.208	0.220	0.250	0.256	0.240
67	0.200	0.204	0.220	0.220	0.208	0.230
68	0.200	0.184	0.220	0.230	0.236	0.220
69	0.220	0.220	0.220	0.210	0.193	0.210
70	0.200	0.227	0.220	0.230	0.217	0.200
71	0.200	0.215	0.200	0.200	0.200	0.190
72	0.200	0.188	0.180	0.200	0.159	0.180
73	0.200	0.141	0.160	0.200	0.194	0.170
74	0.200	0.111	0.160	0.200	0.216	0.170
75	0.200	0.207	0.160	0.200	0.238	0.170
76	0.200	0.053	0.160	0.200	0.118	0.170
77	0.200	0.143	0.160	0.200	0.160	0.170
78	0.200	0.091	0.160	0.200	0.053	0.170
79	0.200	0.091	0.160	0.200	0.267	0.170
80	1.000	0.344	1.000	1.000	0.194	1.000

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SERS 2/3 Retirement Rates						
	Service >= 30 Years					
	Males			Females		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
55	0.130	0.000	0.120	0.140	0.000	0.120
56	0.120	0.000	0.120	0.120	0.000	0.120
57	0.130	0.000	0.120	0.130	0.000	0.120
58	0.140	0.000	0.120	0.130	0.000	0.120
59	0.180	0.000	0.160	0.280	0.000	0.250
60	0.140	0.000	0.120	0.150	0.000	0.120
61	0.220	0.000	0.210	0.200	0.000	0.200
62	0.330	0.000	0.300	0.290	0.000	0.280
63	0.250	0.000	0.280	0.250	0.000	0.260
64	0.550	0.000	0.570	0.550	0.000	0.480
65	0.450	0.000	0.390	0.450	0.000	0.360
66	0.260	0.000	0.220	0.250	0.000	0.240
67	0.200	0.000	0.220	0.220	0.000	0.230
68	0.200	0.000	0.220	0.230	0.000	0.220
69	0.220	0.000	0.220	0.210	0.000	0.210
70	0.200	0.000	0.220	0.230	0.000	0.200
71	0.200	0.000	0.200	0.200	0.000	0.190
72	0.200	0.000	0.180	0.200	0.000	0.180
73	0.200	0.000	0.160	0.200	0.000	0.170
74	0.200	0.000	0.160	0.200	0.000	0.170
75	0.200	0.000	0.160	0.200	0.000	0.170
76	0.200	0.000	0.160	0.200	0.000	0.170
77	0.200	0.000	0.160	0.200	0.000	0.170
78	0.200	0.000	0.160	0.200	0.000	0.170
79	0.200	0.000	0.160	0.200	0.000	0.170
80	1.000	0.000	1.000	1.000	0.000	1.000

The following tables show the actual and expected retirements for SERS 2/3 by age using the New assumptions.

SERS 2/3 Under New Assumptions			
Age	Plan 2/3 (Males & Females)		
	Observed	Expected	Ratio
55-59	307	343	0.895
60-64	1,153	1,216	0.948
65-69	1,205	1,151	1.047
70-75	170	165	1.033
75-79	34	36	0.934
80+	17	63	0.270
Total	2,886	2,974	0.970

Totals and ratios may not agree due to rounding.

Preliminary Experience Study Report

PSERS

PSERS 2 opened in 2006, and according to the data, there were only 13 exposures (members eligible to retire) during the experience study period. We observed members deferring retirement in most plans, and based on those observations we lowered the prior PSERS retirement rates by a similar magnitude. We will continue to monitor the appropriateness of these retirement rates for PSERS 2.

The following table shows the Old and New retirement rates for PSERS 2 by gender.

PSERS Retirement Rates						
Age	Males			Females		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
53	0.030	0.000	0.020	0.030	0.000	0.020
54	0.030	0.000	0.020	0.030	0.000	0.020
55	0.030	0.000	0.020	0.030	0.000	0.020
56	0.080	0.000	0.050	0.080	1.000	0.040
57	0.080	0.000	0.080	0.080	0.000	0.060
58	0.150	0.000	0.110	0.110	0.000	0.080
59	0.160	1.000	0.140	0.120	1.000	0.100
60	0.300	1.000	0.300	0.360	0.000	0.340
61	0.260	0.000	0.260	0.260	1.000	0.260
62	0.360	0.000	0.300	0.360	0.000	0.340
63	0.500	0.000	0.500	0.500	1.000	0.520
64	0.890	1.000	0.700	0.890	1.000	0.700
65	0.460	0.000	0.500	0.310	0.000	0.350
66	0.300	0.000	0.300	0.300	0.000	0.350
67	0.220	0.000	0.300	0.260	0.000	0.350
68	0.220	0.000	0.300	0.260	0.000	0.350
69	0.260	0.000	0.300	0.220	0.000	0.350
70	1.000	1.000	1.000	1.000	1.000	1.000

Preliminary Experience Study Report

LEOFF**Observed Experience**

Fewer LEOFF members retired during the study period than expected. The following tables show the actual and expected retirements for LEOFF 1 and LEOFF 2 by age using the Old assumptions.

LEOFF Retirement Experience by Age						
Age	Plan 1 (Males & Females)			Plan 2 (Males & Females)		
	Observed	Expected	Ratio	Observed	Expected	Ratio
49-54	559	589	0.949	631	968	0.652
55-59	495	671	0.738	626	1,212	0.517
60-64	234	334	0.700	267	417	0.641
65-69	35	43	0.819	71	56	1.270
70+	11	34	0.324	5	10	0.500
Total	1,334	1,671	0.798	1,600	2,662	0.601

Omitted 2001 and 2007 due to odd-length valuation periods. Totals and ratios may not agree due to rounding.

Old And New LEOFF Retirement Rates

The table below shows the actual retirement rates over the experience study period (1995-2012), and the Old and New retirement assumptions by plan.

LEOFF Retirement Rates						
Age	Plan 1					
	Service < 30 Years			Service >= 30 Years		
	Old Rates	Observed	New Rates	Old Rates	Observed	New Rates
50	0.070	0.067	0.070	0.140	0.143	0.120
51	0.070	0.066	0.070	0.140	0.024	0.120
52	0.070	0.051	0.070	0.140	0.088	0.120
53	0.070	0.069	0.070	0.150	0.063	0.120
54	0.110	0.098	0.100	0.190	0.135	0.160
55	0.120	0.078	0.100	0.200	0.149	0.200
56	0.120	0.082	0.100	0.210	0.191	0.200
57	0.150	0.096	0.130	0.240	0.182	0.200
58	0.160	0.113	0.130	0.250	0.201	0.200
59	0.160	0.071	0.130	0.260	0.165	0.200
60	0.230	0.235	0.230	0.330	0.253	0.250
61	0.250	0.176	0.230	0.340	0.167	0.250
62	0.250	0.250	0.230	0.330	0.258	0.250
63	0.250	0.000	0.230	0.310	0.244	0.250
64	0.250	0.333	0.230	0.300	0.198	0.250
65	0.250	0.000	0.230	0.300	0.231	0.250
66	0.250	0.000	0.230	0.290	0.303	0.250
67	0.250	0.000	0.230	0.280	0.250	0.250
68	0.250	0.000	0.230	0.270	0.133	0.250
69	0.250	0.000	0.230	0.270	0.231	0.250
70	1.000	1.000	1.000	1.000	1.000	1.000

Preliminary Experience Study Report

LEOFF Retirement Rates			
Age	Plan 2		
	Old Rates	Observed	New Rates
50	0.045	0.015	0.030
51	0.045	0.020	0.040
52	0.044	0.046	0.050
53	0.094	0.066	0.100
54	0.114	0.070	0.100
55	0.143	0.074	0.100
56	0.143	0.069	0.100
57	0.143	0.073	0.100
58	0.192	0.101	0.150
59	0.192	0.107	0.150
60	0.192	0.107	0.150
61	0.241	0.131	0.190
62	0.241	0.206	0.230
63	0.241	0.179	0.200
64	0.241	0.142	0.200
65	0.240	0.269	0.250
66	0.240	0.317	0.250
67	0.240	0.385	0.250
68	0.239	0.250	0.250
69	0.239	0.429	0.250
70	1.000	1.000	1.000

The following tables show the actual and expected retirements for LEOFF 1 and LEOFF 2 by age using the New assumptions.

LEOFF Under New Assumptions						
Age	Plan 1 (Males & Females)			Plan 2 (Males & Females)		
	Observed	Expected	Ratio	Observed	Expected	Ratio
49-54	559	560	0.998	631	912	0.692
55-59	495	577	0.858	626	880	0.711
60-64	234	261	0.898	267	345	0.773
65-69	35	37	0.947	71	58	1.219
70+	11	34	0.324	5	10	0.500
Total	1,334	1,469	0.908	1,600	2,205	0.726

Totals and ratios may not agree due to rounding.

Preliminary Experience Study Report

WSPRS**Observed Experience**

More WSPRS members retired during the study period than expected. The following tables show the actual and expected retirements for WSPRS 1/2 by age using the Old assumptions.

WSPRS Retirement Experience by Age			
Age	Males & Females		
	Observed	Expected	Ratio
44-49	180	154	1.172
50-54	194	176	1.105
55-59	91	95	0.958
60-64	13	13	0.999
65+	0	0	N/A
Total	478	437	1.093

Omitted 2001 and 2007 due to odd-length valuation periods. Totals and ratios may not agree due to rounding.

Old And New WSPRS Retirement Rates

The table below shows the actual retirement rates over the experience study period (1995-2012), and the Old and New retirement assumptions.

WSPRS Retirement Rates			
Age	Males & Females		
	Old Rates	Observed	New Rates
45	0.450	0.600	0.500
46	0.310	0.357	0.330
47	0.310	0.344	0.330
48	0.310	0.326	0.330
49	0.280	0.357	0.300
50	0.280	0.280	0.270
51	0.230	0.219	0.240
52	0.230	0.270	0.240
53	0.230	0.246	0.240
54	0.230	0.328	0.240
55	0.230	0.206	0.200
56	0.230	0.182	0.200
57	0.230	0.218	0.200
58	0.200	0.182	0.200
59	0.230	0.390	0.330
60	0.230	0.423	0.330
61	0.250	0.167	0.330
62	0.250	0.000	0.330
63	0.270	0.000	0.330
64	0.330	0.000	0.330
65	1.000	1.000	1.000

Preliminary Experience Study Report

The following tables show the actual and expected retirements for WSPRS 1/2 by age using the New assumptions.

WSPRS Under New Assumptions			
Age	Males & Females		
	Observed	Expected	Ratio
44-49	180	164	1.096
50-54	194	180	1.080
55-59	91	89	1.019
60-64	13	17	0.743
65+	0	0	N/A
Total	478	451	1.061

Totals and ratios may not agree due to rounding.

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Preliminary Experience Study Report

Attachment C

Termination Rates

High-Level Takeaways

In general, we found the currently assumed termination rates were still reasonable to use for early service years. The majority of terminations occur in early service years so the early service termination assumptions have the largest impact on plan costs. Over 50 percent of terminations occur in the first five service years for PERS, TRS, SERS, and LEOFF.

We observed higher than expected termination rates for Plans 2/3 members with 20 to 30 years of service. These higher than expected termination rates were most noticeable in Plan 3 for PERS, TRS, and SERS.

We are not seeing the residual effects of the Great Recession in the termination rate experience. We expect this is due to the normal budget lag in government. It's also possible that members hang on to jobs more during a depressed economy so this could be offsetting any downsizing one might expect during a recession.

All-Plan Summary

Generally, we made modest changes to the termination rates. The actual-to-expected ratios are moving closer to one.

Summary of Actual to Expected Ratios					
Male			Female		
	Old Assumptions	New Assumptions		Old Assumptions	New Assumptions
PERS	97%	98%	PERS	97%	98%
TRS	105%	101%	TRS	106%	101%
SERS	96%	98%	SERS	103%	103%
LEOFF*	93%	98%	LEOFF	93%	98%
WSPRS*	111%	105%	WSPRS	111%	105%

*LEOFF and WSPRS have unisex termination rates.

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Observed Experience

The following tables show the Actual and Expected termination counts by system and service.

PERS Termination Experience 1995-2010*						
Service	Males			Females		
	Actual	Expected	Ratio	Actual	Expected	Ratio
0-4	37,994	39,123	0.97	51,742	54,012	0.96
5-9	9,560	9,641	0.99	14,141	14,457	0.98
10-14	4,632	4,981	0.93	6,381	6,381	1.00
15-19	2,552	2,784	0.92	3,155	3,254	0.97
20-24	1,124	948	1.19	1,317	1,087	1.21
25-29	312	273	1.14	277	183	1.52
30+	14	12	1.17	22	6	3.62
Total	56,188	57,763	0.97	77,035	79,381	0.97

*Omitted 2001 and 2007 due to odd-length valuation periods.

Totals and ratios may not agree due to rounding.

TRS Termination Experience 1995-2010*						
Service	Males			Females		
	Actual	Expected	Ratio	Actual	Expected	Ratio
0-4	3,978	3,960	1.00	13,181	12,985	1.02
5-9	1,556	1,491	1.04	5,662	5,112	1.11
10-14	761	705	1.08	2,268	2,059	1.10
15-19	427	369	1.16	1,205	1,087	1.11
20-24	310	235	1.32	679	459	1.48
25-29	199	151	1.32	251	184	1.37
30+	17	3	4.89	11	3	3.33
Total	7,248	6,914	1.05	23,257	21,889	1.06

*Omitted 2001 and 2007 due to odd-length valuation periods.

Totals and ratios may not agree due to rounding.

Preliminary Experience Study Report

SERS Termination Experience 1995-2010*						
Service	Males			Females		
	Actual	Expected	Ratio	Actual	Expected	Ratio
0-4	7,340	7,668	0.96	23,917	23,069	1.04
5-9	1,781	1,841	0.97	7,416	7,070	1.05
10-14	739	786	0.94	3,531	3,627	0.97
15-19	315	342	0.92	1,471	1,705	0.86
20-24	149	102	1.46	457	385	1.19
25-29	36	21	1.74	78	42	1.84
30+	2	2	1.28	2	2	1.04
Total	10,362	10,762	0.96	36,872	35,900	1.03

*Omitted 2000 data due to quality concerns. Omitted 2001 and 2007 due to odd-length valuation periods.

Totals and ratios may not agree due to rounding.

LEOFF Termination Experience 1995-2010*			
Service	Actual	Expected	Ratio
0-4	1,752	1,846	0.95
5-9	796	879	0.91
10-14	512	544	0.94
15-19	267	277	0.96
20-24	123	148	0.83
25-29	23	40	0.57
30+	0	0	0.00
Total	3,473	3,734	0.93

*Omitted 2001 and 2007 due to odd-length valuation periods.

Totals and ratios may not agree due to rounding.

WSPRS Termination Experience 1995-2010*			
Service	Actual	Expected	Ratio
0-4	50	58	0.86
5-9	74	51	1.44
10-14	26	26	1.00
15-19	15	15	1.03
20-24	6	5	1.22
25-29	0	0	0.00
30+	0	0	0.00
Total	171	155	1.11

*Omitted 2001 and 2007 due to odd-length valuation periods.

Totals and ratios may not agree due to rounding.

Preliminary Experience Study Report

New Termination Rates

In each case, we developed new rates that move toward a better fit between observed and expected. The tables below show the actual terminations over the study period compared to the numbers expected under the Old and New assumptions. The ratio shown compares actual terminations to the number expected with the new assumptions.

PERS Termination Experience 1995-2010								
Males					Females			
Service	Actual	Old Assumption	New Assumption	Ratio	Actual	Old Assumption	New Assumption	Ratio
0-4	37,994	39,123	39,123	0.97	51,742	54,012	53,688	0.96
5-9	9,560	9,641	9,565	1.00	14,141	14,457	14,222	0.99
10-14	4,632	4,981	4,821	0.96	6,381	6,381	6,502	0.98
15-19	2,552	2,784	2,612	0.98	3,155	3,254	3,118	1.01
20-24	1,124	948	1,077	1.04	1,317	1,087	1,208	1.09
25-29	312	273	265	1.18	277	183	251	1.10
30+	14	12	10	1.47	22	6	8	2.85
Total	56,188	57,763	57,473	0.98	77,035	79,381	78,997	0.98

Totals and ratios may not agree due to rounding.

Please note: due to a lack of termination experience in PSERS, we continue to use PERS termination assumptions for that system. The new PERS rates will also be used in PSERS.

TRS Termination Experience 1995-2010								
Males					Females			
Service	Actual	Old Assumption	New Assumption	Ratio	Actual	Old Assumption	New Assumption	Ratio
0-4	3,978	3,960	3,969	1.00	13,181	12,985	13,083	1.01
5-9	1,556	1,491	1,540	1.01	5,662	5,112	5,500	1.03
10-14	761	705	753	1.01	2,268	2,059	2,278	1.00
15-19	427	369	421	1.01	1,205	1,087	1,189	1.01
20-24	310	235	297	1.04	679	459	666	1.02
25-29	199	151	180	1.10	251	184	263	0.95
30+	17	3	5	3.35	11	3	6	1.78
Total	7,248	6,914	7,165	1.01	23,257	21,889	22,985	1.01

Totals and ratios may not agree due to rounding.

Preliminary Experience Study Report

SERS Termination Experience 1995-2010								
Males					Females			
Service	Actual	Old Assumption	New Assumption	Ratio	Actual	Old Assumption	New Assumption	Ratio
0-4	7,340	7,668	7,563	0.97	23,917	23,069	23,069	1.04
5-9	1,781	1,841	1,806	0.99	7,416	7,070	7,070	1.05
10-14	739	786	733	1.01	3,531	3,627	3,627	0.97
15-19	315	342	328	0.96	1,471	1,705	1,705	0.86
20-24	149	102	133	1.12	457	385	421	1.09
25-29	36	21	30	1.18	78	42	72	1.08
30+	2	2	3	0.79	2	2	4	0.54
Total	10,362	10,762	10,596	0.98	36,872	35,900	35,968	1.03

Totals and ratios may not agree due to rounding.

LEOFF Termination Experience 1995-2010				
Service	Actual	Old Assumption	New Assumption	Ratio
0-4	1,752	1,846	1,804	0.97
5-9	796	879	788	1.01
10-14	512	544	501	1.02
15-19	267	277	304	0.88
20-24	123	148	131	0.94
25-29	23	40	26	0.88
30+	0	0	0	0.00
Total	3,473	3,734	3,556	0.98

Totals and ratios may not agree due to rounding.

WSPRS Termination Experience 1995-2010				
Service	Actual	Old Assumption	New Assumption	Ratio
0-4	50	58	50	0.99
5-9	74	51	62	1.20
10-14	26	26	31	0.84
15-19	15	15	14	1.05
20-24	6	5	6	1.06
25-29	0	0	0	0.00
30+	0	0	0	0.00
Total	171	155	163	1.05

Totals and ratios may not agree due to rounding.

Preliminary Experience Study Report

The following tables present a sampling of the Actual, Old, and New termination rates by system.

PERS - All Plans - Termination Rates						
Service	Actual		Old Assumption		New Assumption	
	Males	Females	Males	Females	Males	Females
0	0.2612	0.2529	0.2624	0.2677	0.2624	0.2624
1	0.1484	0.1594	0.1545	0.1677	0.1545	0.1677
2	0.0966	0.1140	0.1007	0.1170	0.1007	0.1170
3	0.0719	0.0914	0.0752	0.0929	0.0752	0.0929
4	0.0607	0.0732	0.0631	0.0760	0.0631	0.0760
5	0.0541	0.0659	0.0544	0.0665	0.0544	0.0665
6	0.0462	0.0583	0.0459	0.0607	0.0449	0.0579
7	0.0430	0.0537	0.0430	0.0546	0.0418	0.0533
8	0.0369	0.0480	0.0384	0.0500	0.0389	0.0491
9	0.0357	0.0445	0.0361	0.0445	0.0362	0.0452
10	0.0327	0.0398	0.0341	0.0408	0.0337	0.0417
15	0.0229	0.0289	0.0266	0.0295	0.0236	0.0277
20	0.0166	0.0213	0.0136	0.0173	0.0153	0.0180
25	0.0093	0.0132	0.0069	0.0066	0.0074	0.0094
30	0.0062	0.0120	0.0045	0.0039	0.0036	0.0049

Rates also apply in PSERS.

TRS - All Plans - Termination Rates						
Service	Actual		Old Assumption		New Assumption	
	Males	Females	Males	Females	Males	Females
0	0.1141	0.1138	0.1080	0.1089	0.1110	0.1113
1	0.0879	0.0920	0.0928	0.0971	0.0903	0.0946
2	0.0598	0.0713	0.0597	0.0721	0.0598	0.0717
3	0.0470	0.0634	0.0432	0.0592	0.0451	0.0613
4	0.0414	0.0558	0.0414	0.0503	0.0414	0.0531
5	0.0371	0.0490	0.0366	0.0451	0.0368	0.0471
6	0.0305	0.0444	0.0319	0.0402	0.0295	0.0409
7	0.0280	0.0385	0.0246	0.0342	0.0272	0.0367
8	0.0223	0.0324	0.0224	0.0296	0.0251	0.0330
9	0.0253	0.0277	0.0213	0.0240	0.0231	0.0296
10	0.0187	0.0265	0.0202	0.0230	0.0213	0.0266
15	0.0155	0.0152	0.0124	0.0160	0.0142	0.0160
20	0.0137	0.0154	0.0086	0.0107	0.0100	0.0130
25	0.0111	0.0103	0.0068	0.0069	0.0082	0.0098
30	0.0241	0.0142	0.0040	0.0038	0.0058	0.0072

Preliminary Experience Study Report

SERS - All Plans - Termination Rates						
	Actual		Old Assumption		New Assumption	
Service	Males	Females	Males	Females	Males	Females
0	0.2352	0.1978	0.2560	0.1990	0.2448	0.1990
1	0.1514	0.1366	0.1588	0.1313	0.1588	0.1313
2	0.1194	0.1055	0.1169	0.1029	0.1169	0.1029
3	0.0960	0.0857	0.0995	0.0786	0.0995	0.0786
4	0.0781	0.0749	0.0811	0.0676	0.0811	0.0676
5	0.0647	0.0672	0.0700	0.0624	0.0664	0.0624
6	0.0634	0.0593	0.0610	0.0556	0.0608	0.0556
7	0.0547	0.0550	0.0565	0.0526	0.0556	0.0526
8	0.0472	0.0509	0.0499	0.0497	0.0509	0.0497
9	0.0461	0.0475	0.0477	0.0475	0.0465	0.0475
10	0.0421	0.0452	0.0439	0.0457	0.0426	0.0457
15	0.0294	0.0367	0.0305	0.0427	0.0273	0.0427
20	0.0303	0.0317	0.0181	0.0288	0.0230	0.0300
25	0.0186	0.0231	0.0118	0.0156	0.0159	0.0225
30	0.0104	0.0109	0.0049	0.0073	0.0080	0.0141

LEOFF Termination Experience 1995-2010			
Service	Actual	Old Assumption	New Assumption
0	0.1077	0.1070	0.1070
1	0.0466	0.0481	0.0481
2	0.0237	0.0245	0.0245
3	0.0193	0.0216	0.0194
4	0.0159	0.0204	0.0187
5	0.0180	0.0197	0.0181
6	0.0184	0.0193	0.0174
7	0.0170	0.0192	0.0168
8	0.0153	0.0179	0.0161
9	0.0158	0.0174	0.0155
10	0.0174	0.0170	0.0148
15	0.0120	0.0107	0.0116
20	0.0093	0.0087	0.0083
25	0.0051	0.0066	0.0051
30	0.0000	0.0015	0.0018

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WSPRS Termination Experience 1995-2010			
Service	Actual	Old Assumption	New Assumption
0	0.0452	0.0334	0.0423
1	0.0155	0.0287	0.0200
2	0.0143	0.0256	0.0200
3	0.0262	0.0239	0.0200
4	0.0185	0.0226	0.0200
5	0.0265	0.0159	0.0200
6	0.0239	0.0151	0.0190
7	0.0139	0.0144	0.0170
8	0.0242	0.0138	0.0160
9	0.0157	0.0133	0.0151
10	0.0077	0.0100	0.0134
15	0.0093	0.0070	0.0078
20	0.0000	0.0033	0.0044
25	0.0000	0.0000	0.0000
30	0.0000	0.0000	0.0000

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Preliminary Experience Study Report

Attachment D

Disability Rates

High-Level Takeaways

We set assumptions for disablements to model the payment of future disability benefits. These assumptions model both (a) the incidence of disability and (b) the selection of the disability benefit. The future incidence of disability can be impacted by medical advancements and safety practices whereas the selection of a non-catastrophic disability benefit is a personal choice that can be impacted by economic factors. For example, significant economic downturns can reduce the affordability of certain disability benefits and reduce the number of members who select non-catastrophic disability benefits.

In general, we observed fewer disabilities than expected. As a result, we lowered existing disability assumptions for most plans toward a better actual-to-expected fit.

We saw that the data during the Great Recession reduced the ratio of actual-to-expected disabilities in some systems. Given the magnitude of the Great Recession's impact on observed disability rates, and the fact that it is likely a once-in-a-lifetime event, we chose to remove those data years for PERS 2/3, TRS 2/3, and SERS 2/3.

However, we chose not to exclude the Great Recession data for the Plans 1 (PERS 1 and TRS 1) or the Public Safety systems (LEOFF, PSERS, and WSPRS). In the public safety plans, we observed that actual disability rates appeared to return to pre-recession levels much faster. We suspect this is due to higher incomes and/or benefit adequacy.

PERS

Observed Experience

The actual number of PERS 1 members experiencing disabilities and selecting disability benefits during the study period was slightly lower than the number expected. The following table shows the Actual and Expected disabilities for PERS 1 by gender and age.

Preliminary Experience Study Report

PERS 1 – Disability Experience 1995-2012*						
Age	Male			Female		
	Actual	Expected	Ratio	Actual	Expected	Ratio
20-24	0	0	0.00	0	0	0.00
25-29	0	0	0.00	0	0	0.00
30-34	0	0	0.00	0	0	0.00
35-39	1	1	1.86	0	1	0.00
40-44	13	11	1.15	26	19	1.37
45-49	60	59	1.02	82	69	1.19
50-54	127	150	0.85	182	200	0.91
55-59	164	194	0.85	218	243	0.90
60-64	3	14	0.22	2	8	0.26
65+	0	6	0.00	0	3	0.00
Total	368	434	0.85	510	543	0.94

*Omitted 2001 and 2007 due to odd-length valuation periods.

Totals and ratios may not agree due to rounding.

Actual male and female disability counts for PERS 1 are 85 percent and 94 percent, respectively, of the number of disabilities expected. Based on our observations, we adjusted expected future disability rates slightly.

The following table shows the Actual and Expected disabilities for PERS 2/3 by gender and age.

Preliminary Experience Study Report

PERS 2/3 – Disability Experience 1995-2012*						
Age	Male			Female		
	Actual	Expected	Ratio	Actual	Expected	Ratio
20-24	0	0	0.00	0	0	0.00
25-29	2	4	0.50	2	1	2.52
30-34	5	10	0.51	2	9	0.23
35-39	14	17	0.81	15	26	0.58
40-44	37	35	1.05	30	39	0.77
45-49	76	72	1.05	103	75	1.37
50-54	139	120	1.16	133	134	0.99
55-59	199	187	1.07	201	200	1.01
60-64	203	215	0.95	193	204	0.95
65+	11	23	0.48	2	19	0.10
Total	686	682	1.01	681	707	0.96

*Omitted 2001 and 2007 due to odd-length valuation periods. Also omitted 2008-12 due to the Great Recession.
Totals and ratios may not agree due to rounding.

Actual male and female disability counts for PERS 2/3 are right around 100 percent of the number of disabilities expected. Current assumptions are a good fit to experience data. Using our professional judgment, we adjusted the rates for certain age groups to better reflect future expectations.

PERS New Disability Rates

New disability rates were developed for all Plans in PERS. The table below shows the PERS 1 actual disabilities over the study period compared to the numbers expected under the Old assumptions and under the New assumptions. The ratio shown compares actual disabilities to the number expected under the New assumptions.

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PERS 1 – Disability Experience 1995-2012								
Male					Female			
Age	Actual	Old Assumption	New Assumption	Ratio	Actual	Old Assumption	New Assumption	Ratio
20-24	0	0	0	0.00	0	0	0	0.00
25-29	0	0	0	0.00	0	0	0	0.00
30-34	0	0	0	0.00	0	0	0	0.00
35-39	1	1	1	1.86	0	1	1	0.00
40-44	13	11	11	1.15	26	19	19	1.37
45-49	60	59	59	1.02	82	69	69	1.19
50-54	127	150	150	0.85	182	200	200	0.91
55-59	164	194	187	0.88	218	243	238	0.92
60-64	3	14	6	0.47	2	8	3	0.73
65+	0	6	1	0.00	0	3	0	0.00
Total	368	434	415	0.89	510	543	529	0.96

Totals and ratios may not agree due to rounding.

The table below shows the PERS 2/3 actual disabilities over the study period compared to the numbers expected under the Old assumptions and under the New assumptions.

PERS 2/3 – Disability Experience 1995-2012								
Male					Female			
Age	Actual	Old Assumption	New Assumption	Ratio	Actual	Old Assumption	New Assumption	Ratio
20-24	0	0	0	0.00	0	0	0	0.00
25-29	2	4	4	0.50	2	1	1	2.52
30-34	5	10	10	0.51	2	9	9	0.23
35-39	14	17	17	0.81	15	26	26	0.58
40-44	37	35	35	1.05	30	39	39	0.77
45-49	76	72	72	1.05	103	75	75	1.37
50-54	139	120	120	1.16	133	134	134	0.99
55-59	199	187	197	1.01	201	200	200	1.01
60-64	203	215	224	0.91	193	204	192	1.01
65+	11	23	7	1.63	2	19	5	0.42
Total	686	682	686	1.00	681	707	680	1.00

Totals and ratios may not agree due to rounding.

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The tables below show a sample of the PERS actual disability rates over the experience study period, along with the Old and New disability assumptions.

PERS 1 – Disability Rates* 1995-2012						
Age	Actual Rate		Old Assumption		New Assumption	
	Male	Female	Male	Female	Male	Female
20	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
30	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
35	0.000000	0.000000	0.000310	0.000319	0.000310	0.000319
40	0.002336	0.001239	0.000762	0.000710	0.000762	0.000710
45	0.002086	0.001389	0.001481	0.001431	0.001481	0.001431
50	0.002203	0.003607	0.002542	0.003023	0.002542	0.003023
55	0.007893	0.007860	0.008240	0.006411	0.008240	0.006411
60	0.003040	0.000000	0.011701	0.006502	0.007541	0.003458
65	0.000000	0.000000	0.011701	0.005495	0.002204	0.000386
70	0.000000	0.000000	0.011701	0.005495	0.000644	0.000043
75	0.000000	0.000000	0.011701	0.005495	0.000188	0.000005
80	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

*We assume 10% of all PERS 1 disabilities will be duty-related.

PERS 2/3 – Disability Rates 1995-2012						
Age	Actual Rate		Old Assumption		New Assumption	
	Male	Female	Male	Female	Male	Female
20	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25	0.000000	0.000000	0.000052	0.000000	0.000052	0.000000
30	0.000081	0.000000	0.000115	0.000056	0.000115	0.000056
35	0.000170	0.000153	0.000156	0.000194	0.000156	0.000194
40	0.000232	0.000297	0.000235	0.000275	0.000235	0.000275
45	0.000420	0.000483	0.000476	0.000467	0.000476	0.000467
50	0.000874	0.001031	0.000922	0.001003	0.000922	0.001003
55	0.002906	0.003207	0.002630	0.002782	0.002630	0.002782
60	0.006717	0.007763	0.007603	0.007681	0.007863	0.007681
65	0.009153	0.000000	0.010244	0.010271	0.006146	0.005257
70	0.000000	0.000000	0.010244	0.010271	0.001358	0.001315
75	0.033898	0.000000	0.010244	0.010271	0.000300	0.000329
80	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

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TRS**Observed Experience**

The actual number of TRS 1 members experiencing disabilities and selecting disability benefits during the study period was slightly lower than the number expected. However, TRS 2/3 observed rates proved to be a good fit to the current TRS 2/3 assumptions. The following table shows the Actual and Expected disabilities for TRS 1 by gender and age.

TRS 1 – Disability Experience 1995-2012*						
Age	Male			Female		
	Actual	Expected	Ratio	Actual	Expected	Ratio
20-24	0	0	0.00	0	0	0.00
25-29	0	0	0.00	0	0	0.00
30-34	0	0	0.00	0	0	0.00
35-39	0	0	0.00	0	0	0.00
40-44	2	2	0.91	7	5	1.41
45-49	14	19	0.74	34	35	0.96
50-54	47	48	0.97	88	92	0.96
55-59	15	15	0.98	56	75	0.75
60-64	0	1	0.00	0	2	0.00
65+	0	0	0.00	0	0	0.00
Total	78	86	0.91	185	209	0.89

*Omitted 2001 and 2007 due to odd-length valuation periods.

Totals and ratios may not agree due to rounding.

Actual male and female disabilities for TRS 1 are 91 percent and 89 percent, respectively, of the number of disabilities expected, which indicates that the old rates are a little bit too high. This would generally suggest a downward adjustment to the assumptions. However, since this is a closed plan with an aging population, the expected disabilities are decreasing rapidly. Most members are very close to normal retirement eligibility and would soon be excluded from disability eligibility. We used professional judgment to adjust the rates slightly for certain age groups to reflect future expectations.

The following table shows the Actual and Expected disabilities for TRS 2/3 by gender and age.

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TRS 2/3 – Disability Experience 1995-2012*						
Age	Male			Female		
	Actual	Expected	Ratio	Actual	Expected	Ratio
20-24	0	0	0.00	0	0	0.00
25-29	0	1	0.00	0	1	0.00
30-34	0	1	0.00	0	3	0.00
35-39	2	2	0.82	4	4	1.02
40-44	1	4	0.24	3	8	0.40
45-49	4	8	0.52	12	16	0.76
50-54	9	10	0.91	23	22	1.03
55-59	13	8	1.66	29	16	1.84
60-64	8	6	1.25	20	12	1.67
65+	0	0	0.00	0	0	0.00
Total	37	41	0.91	91	82	1.12

*Omitted 2001 and 2007 due to odd-length valuation periods. Also omitted 2008-12 due to the Great Recession.
Totals and ratios may not agree due to rounding.

Actual male and female disability counts for TRS 2/3 are 91 percent and 112 percent, respectively, of the number of expected disabilities, which indicates that the expected rates could change. However, overall, the rates proved to be a good fit to the assumptions at 105 percent, so the rates were not changed for this study.

TRS New Disability Rates

New disability rates were developed for TRS Plan 1. The table below shows the TRS 1 actual disabilities over the study period compared to the numbers expected under old assumptions and under New assumptions. The ratio shown compares Actual disabilities to the number Expected with the New assumptions.

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TRS 1 – Disability Experience 1995-2012								
Male					Female			
Age	Actual	Old Assumption	New Assumption	Ratio	Actual	Old Assumption	New Assumption	Ratio
20-24	0	0	0	0.00	0	0	0	0.00
25-29	0	0	0	0.00	0	0	0	0.00
30-34	0	0	0	0.00	0	0	0	0.00
35-39	0	0	0	0.00	0	0	0	0.00
40-44	2	2	2	0.91	7	5	5	1.41
45-49	14	19	19	0.74	34	35	35	0.96
50-54	47	48	48	0.97	88	92	92	0.96
55-59	15	15	15	0.98	56	75	75	0.75
60-64	0	1	1	0.00	0	2	2	0.00
65+	0	0	0	0.00	0	0	0	0.00
Total	78	86	86	0.91	185	209	209	0.89

Totals and ratios may not agree due to rounding.

The table below shows a sample of the TRS 1 actual disability rates over the experience study period, along with the Old and New disability assumptions.

TRS 1 – Disability Rates 1995-2012						
Age	Actual Rate		New Assumption		Old Assumption	
	Male	Female	Male	Female	Male	Female
20	0.000000	0.000000	0.000013	0.000014	0.000013	0.000014
25	0.000000	0.000000	0.000091	0.000092	0.000091	0.000092
30	0.000000	0.000000	0.000187	0.000190	0.000187	0.000190
35	0.000000	0.000000	0.000321	0.000326	0.000321	0.000326
40	0.000000	0.000000	0.000428	0.000434	0.000428	0.000434
45	0.002182	0.000814	0.000944	0.000957	0.000944	0.000957
50	0.001674	0.001677	0.001634	0.001656	0.001634	0.001656
55	0.003895	0.001541	0.003347	0.003393	0.003347	0.003393
60	0.000000	0.000000	0.004686	0.004750	0.004686	0.004750
65	0.000000	0.000000	0.005633	0.005681	0.007213	0.007311
70	0.000000	0.000000	0.001485	0.001486	0.007213	0.007311
75	0.000000	0.000000	0.000391	0.000389	0.007213	0.007311
80	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

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The next table shows a summary of TRS 2/3 observed rates of disability, along with the unchanged TRS 2/3 disability assumptions.

TRS 2/3 – Disability Rates 1995-2012				
Age	Actual Rate		Current Assumption	
	Male	Female	Male	Female
20	0.000000	0.000000	0.000003	0.000003
25	0.000000	0.000000	0.000024	0.000019
30	0.000000	0.000000	0.000048	0.000040
35	0.000000	0.000000	0.000083	0.000068
40	0.000000	0.000000	0.000111	0.000091
45	0.000000	0.000160	0.000244	0.000201
50	0.000459	0.000176	0.000422	0.000347
55	0.002224	0.002138	0.001118	0.000750
60	0.004839	0.003207	0.002500	0.001875
65	0.000000	0.000000	0.002362	0.001552
70	0.000000	0.000000	0.000334	0.000283
75	0.000000	0.000000	0.000047	0.000052
80	0.000000	0.000000	0.000000	0.000000

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SERS**Observed Experience**

The actual number of SERS 2/3 members selecting disability benefits during the study period was lower than the number expected under the old disability assumptions. The following table shows the Actual and Expected disabilities for SERS by gender and age.

SERS 2/3 – Disability Experience 1995-2012*						
Age	Male			Female		
	Actual	Expected	Ratio	Actual	Expected	Ratio
20-24	0	0	0.00	0	0	0.00
25-29	0	0	0.00	0	0	0.00
30-34	0	0	0.00	3	2	1.41
35-39	2	2	1.17	3	10	0.31
40-44	1	6	0.18	8	11	0.74
45-49	9	12	0.74	27	27	0.99
50-54	21	24	0.89	38	73	0.52
55-59	37	42	0.87	71	77	0.92
60-64	53	62	0.85	41	60	0.68
65+	4	6	0.62	1	2	0.47
Total	127	155	0.82	192	262	0.73

*Omitted 2000 data due to quality concerns. Omitted 2001 and 2007 due to odd-length valuation periods. Also omitted 2008-12 due to the Great Recession.

Totals and ratios may not agree due to rounding.

Actual male and female disabilities for SERS are 82 percent and 73 percent, respectively, of the number of disabilities Expected, indicating that the Old assumptions were not a good fit to the experience data.

SERS New Disability Rates

New disability rates were developed for SERS 2/3. The table below shows the SERS Actual disabilities over the study period compared to the numbers Expected under the Old assumptions and under the New assumptions. The ratio shown compares Actual disabilities to the number Expected under the New assumptions.

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SERS 2/3 – Disability Experience 1995-2012								
Male					Female			
Age	Actual	Old Assumption	New Assumption	Ratio	Actual	Old Assumption	New Assumption	Ratio
20-24	0	0	0	0.00	0	0	0	0.00
25-29	0	0	0	0.00	0	0	0	0.00
30-34	0	0	0	0.00	3	2	2	1.41
35-39	2	2	2	1.17	3	10	10	0.31
40-44	1	6	6	0.18	8	11	11	0.74
45-49	9	12	12	0.73	27	27	27	0.99
50-54	21	24	25	0.85	38	73	57	0.66
55-59	37	42	37	0.99	71	77	63	1.12
60-64	53	62	53	0.99	41	60	56	0.73
65+	4	6	4	1.09	1	2	2	0.44
Total	127	155	139	0.91	192	262	229	0.84

Totals and ratios may not agree due to rounding.

The New assumptions show an Actual to Expected fit for males and females of 91 percent and 84 percent, respectively. The table below shows a sample of the SERS 2/3 Actual disability rates over the study period, along with the Old and New disability assumptions.

SERS – Disability Rates 1995-2012						
Age	Actual Rate		Old Assumption		New Assumption	
	Male	Female	Male	Female	Male	Female
25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
30	0.000000	0.000000	0.000000	0.000048	0.000000	0.000048
35	0.000000	0.000000	0.000081	0.000176	0.000081	0.000176
40	0.000000	0.000154	0.000258	0.000164	0.000258	0.000164
45	0.001510	0.000366	0.000568	0.000201	0.000528	0.000214
50	0.000649	0.000206	0.001102	0.000797	0.001213	0.000611
55	0.002889	0.001833	0.003175	0.002166	0.002787	0.001742
60	0.010222	0.002772	0.007200	0.005888	0.006404	0.004971
65	0.007937	0.005682	0.012600	0.004069	0.005928	0.004121
70	0.000000	0.000000	0.001260	0.001538	0.001271	0.001816
75	0.000000	0.000000	0.000126	0.000581	0.000272	0.000800
80	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

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PSERS**Observed Experience**

PSERS opened in 2006 and has very little experience with which to set assumptions. Instead, future expectations, based on the benefit provisions, were used to set these assumptions. The table below shows the Actual and Expected disabilities for PSERS by age.

PSERS 2 – Disability Experience 2008-2012*						
Age	Male			Female		
	Actual	Expected	Ratio	Actual	Expected	Ratio
20-24	0	0	0.00	0	0	0.00
25-29	0	0	0.00	0	0	0.00
30-34	0	0	0.00	0	0	0.00
35-39	0	0	0.00	0	0	0.00
40-44	0	1	0.00	0	0	0.00
45-49	1	1	0.81	0	1	0.00
50-54	0	2	0.00	1	1	1.20
55-59	2	2	1.04	0	1	0.00
60-64	1	1	0.81	0	0	0.00
65+	0	0	0.00	0	0	0.00
Total	4	8	0.50	1	3	0.33

*Omitted 2007 due to odd-length valuation period.

Totals and ratios may not agree due to rounding.

Actual male and female disabilities for PSERS are 50 percent and 33 percent, respectively, of the number of disabilities expected. The Old assumptions were not a good fit to the experience data.

PSERS New Disability Rates

Based on limited experience, new PERS 2/3 disability rates were used for PSERS members with service under ten years. Furthermore, since PSERS members have a relatively more generous benefit once they reach ten years of service, the assumptions were increased for those members. The table below shows the PSERS Actual disabilities over the experience study period compared to the numbers Expected under the Old assumptions and under the New PERS 2/3 assumptions only. The ratio shown compares actual disabilities to the number expected under the New PERS 2/3 assumptions.

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PSERS 2 – Disability Experience 2008-2012								
Male					Female			
Age	Old		New		Old		New	
	Actual	Assumption	Assumption (Service less than 10 Years)	Ratio	Actual	Assumption	Assumption (Service less than 10 Years)	Ratio
20-24	0	0	0	0.00	0	0	0	0.00
25-29	0	0	0	0.00	0	0	0	0.00
30-34	0	0	0	0.00	0	0	0	0.00
35-39	0	0	0	0.00	0	0	0	0.00
40-44	0	1	1	0.00	0	0	0	0.00
45-49	1	1	1	0.81	0	1	1	0.00
50-54	0	2	2	0.00	1	1	1	1.20
55-59	2	2	2	0.99	0	1	1	0.00
60-64	1	1	1	0.78	0	0	0	0.00
65+	0	0	0	0.00	0	0	0	0.00
Total	4	8	8	0.50	1	3	3	0.33

Totals and ratios may not agree due to rounding.

The next table shows a sample of the PSERS 2 actual disability rates over the study period, along with the Old and New disability assumptions.

PSERS – Disability Rates 2008-2012								
Age	Actual Rate		Old Assumption		New Assumption			
	Male	Female	Male	Female	Service Less Than 10 Years		Service Greater Than Or Equal to 10 Years	
	Male	Female	Male	Female	Male	Female	Male	Female
25	0.000000	0.000000	0.000052	0.000000	0.000052	0.000000	0.000052	0.000000
30	0.000000	0.000000	0.000115	0.000056	0.000115	0.000056	0.000115	0.000056
35	0.000000	0.000000	0.000156	0.000194	0.000156	0.000194	0.000158	0.000197
40	0.000000	0.000000	0.000235	0.000275	0.000235	0.000275	0.000298	0.000348
45	0.000000	0.000000	0.000476	0.000467	0.000476	0.000467	0.000607	0.000596
50	0.000000	0.000000	0.000922	0.001003	0.000922	0.001003	0.001182	0.001285
55	0.005882	0.000000	0.002630	0.002782	0.002630	0.002782	0.003409	0.003606
60	0.000000	0.000000	0.007603	0.007681	0.007863	0.007681	0.000000	0.000000
65	0.000000	0.000000	0.010244	0.010271	0.006146	0.005257	0.000000	0.000000
70	0.000000	0.000000	0.010244	0.010271	0.000000	0.000000	0.000000	0.000000
75	0.000000	0.000000	0.010244	0.010271	0.000000	0.000000	0.000000	0.000000
80	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

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LEOFF**Observed Experience**

The Actual number of LEOFF members selecting disability benefits during the study period was less than the number Expected under the Old disability assumptions. The following table shows the Actual and Expected disabilities for LEOFF 1 by age.

LEOFF 1 – Disability Experience 1995-2012*			
Age	Actual	Expected	Ratio
20-24	0	0	0.00
25-29	0	0	0.00
30-34	0	0	0.00
35-39	1	2	0.40
40-44	75	60	1.25
45-49	303	362	0.84
50-54	545	592	0.92
55-59	228	364	0.63
60-64	30	111	0.27
65+	1	11	0.09
Total	1,183	1502	0.79

**Omitted 2001 and 2007 due to odd-length valuation periods.*

Totals and ratios may not agree due to rounding.

Actual disability counts for LEOFF 1 are 79 percent of the number of disabilities expected, which indicates that the Old rates are a little bit too high. This would generally suggest a downward adjustment to the assumptions. However, since this is a closed plan with an aging population, the Expected disabilities are decreasing rapidly. Most members are very close to normal retirement eligibility and would soon be excluded from disability eligibility. Therefore, LEOFF 1 disability rates were not changed as part of this experience study.

The next table shows the actual and expected disabilities for LEOFF 2 by age.

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LEOFF 2 – Disability Experience 2005-2012*			
Age	Actual	Expected	Ratio
20-24	0	0	0.00
25-29	1	5	0.22
30-34	2	16	0.12
35-39	11	39	0.28
40-44	16	57	0.28
45-49	22	74	0.30
50-54	56	95	0.59
55-59	41	58	0.71
60-64	16	17	0.94
65+	1	3	0.39
Total	166	364	0.46

*Omitted 2007 due to odd-length valuation period.

Totals and ratios may not agree due to rounding.

Actual disability counts for LEOFF 2 are 46 percent of the number of disabilities Expected, which indicates that the Old rates are too high.

LEOFF Disability Rates

The next table shows a summary of LEOFF 1 observed rates of disability, along with the unchanged LEOFF 1 disability assumptions.

LEOFF 1 – Disability Rates 1995-2012		
Age	Actual Rate	Current Assumption
20	0.000000	0.001000
25	0.000000	0.001000
30	0.000000	0.007968
35	0.000000	0.014888
40	0.006579	0.023471
45	0.030928	0.040000
50	0.069284	0.070000
55	0.069973	0.090000
60	0.029730	0.100000
65	0.000000	0.100000
70	0.000000	0.000000

New disability rates were developed for LEOFF 2. The table below shows the Actual disabilities over the study period compared to the numbers Expected under the Old

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assumptions and under the New assumptions. The ratio shown compares Actual disabilities to the number Expected under the New assumptions.

LEOFF 2 – Disability Experience 2005-2012				
Age	Actual	Old Assumption	New Assumption	Ratio
20-24	0	0	0	0.00
25-29	1	5	3	0.37
30-34	2	16	10	0.21
35-39	11	39	24	0.47
40-44	16	57	34	0.47
45-49	22	74	44	0.50
50-54	56	95	58	0.96
55-59	41	58	44	0.93
60-64	16	17	18	0.90
65+	1	3	2	0.62
Total	166	364	237	0.70

Totals and ratios may not agree due to rounding.

The New assumptions show an Actual to Expected fit of 70 percent. The table below shows a sample of the LEOFF 2 Actual disability rates over the study period, along with the Old and New disability assumptions.

LEOFF 2 – Disability Rates 2005-2012			
Age	Actual Rate	Old Assumption	New Assumption
20	0.000000	0.000124	0.000074
25	0.000904	0.000319	0.000191
30	0.000361	0.000779	0.000467
35	0.000000	0.001345	0.000807
40	0.000210	0.002266	0.001360
45	0.000730	0.002994	0.001796
50	0.001461	0.005635	0.003236
55	0.002573	0.007955	0.005534
60	0.008696	0.010041	0.009462
65	0.000000	0.011769	0.016180
70	0.000000	0.000000	0.000000

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Percent Duty Disabilities

Because LEOFF 2 members with duty-related disabilities receive different benefits than those with non-duty related disabilities, the percentage of future disabilities expected to be duty-related must be estimated. The table below shows a sample of the Actual percentage of duty disabilities observed over the study period, along with the Old and New assumptions.

LEOFF 2 – Percent of Disabilities that are Duty Related			
2005-12			
Age	Actual	Old Assumption	New Assumption
20	0.00%	97.15%	97.25%
25	100.00%	95.71%	95.86%
30	100.00%	94.30%	94.50%
35	0.00%	92.85%	93.11%
40	100.00%	91.45%	91.75%
45	100.00%	88.60%	89.00%
50	80.00%	85.75%	86.25%
55	40.00%	82.90%	83.50%
60	80.00%	82.90%	83.50%
65	0.00%	82.90%	83.50%
70	0.00%	82.90%	83.50%

Percent Total Disabilities

It is currently assumed that 12 percent of all duty disabilities are total, or catastrophic, disabilities. There are no recommended assumption changes for total disability as a result of this experience study.

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WSPRS**Observed Experience**

The Actual number of WSPRS members selecting disability benefits during the study period was lower than the number Expected under the current disability assumptions. The following table shows the Actual and Expected disabilities for WSPRS by age.

WSPRS 1/2 – Disability Experience 1996-2012* Male and Female			
Age	Actual	Expected	Ratio
20-24	0	0	0.00
25-29	1	1	1.41
30-34	1	2	0.59
35-39	0	3	0.00
40-44	2	3	0.63
45-49	4	4	1.13
50-54	1	2	0.41
55-59	0	1	0.00
60-64	0	0	0.00
65+	0	0	0.00
Total	9	15	0.58

**Omitted 1995 due to a reporting change.
Also, omitted 2001 and 2007 due to odd-length valuation periods.
Totals and ratios may not agree due to rounding.*

Actual disabilities for WSPRS are 58 percent of the number of disabilities Expected. The Old assumptions were not a good fit to the experience data.

WSPRS New Disability Rates

New disability rates for WSPRS 1/2 were developed. The table below shows the Actual disabilities over the study period compared to the numbers Expected under the old New assumptions. The ratio shown compares Actual disabilities to the number Expected under the New assumptions.

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WSPRS 1/2 – Disability Experience 1996-2012				
Age	Actual	Old Assumption	New Assumption	Ratio
20-24	0	0	0	0.00
25-29	1	1	0	4.62
30-34	1	2	1	1.50
35-39	0	3	1	0.00
40-44	2	3	2	0.95
45-49	4	4	3	1.32
50-54	1	2	3	0.37
55-59	0	1	1	0.00
60-64	0	0	0	0.00
65+	0	0	0	0.00
Total	9	15	11	0.82

Totals and ratios may not agree due to rounding.

The New assumptions show an Actual to Expected fit of 82 percent. The table below shows a sample of the WSPRS 1/2 Actual disability rates over the experience study period, along with the Old and New disability assumptions.

WSPRS 1/2 – Disability Rates 1996-2012			
Age	Actual Rate	Old Assumption	New Assumption
20	0.000000	0.000256	0.000052
25	0.000000	0.000353	0.000094
30	0.000000	0.000488	0.000169
35	0.000000	0.000675	0.000306
40	0.000000	0.000933	0.000551
45	0.001869	0.001290	0.000995
50	0.000000	0.001783	0.001794
55	0.000000	0.002465	0.003237
60	0.000000	0.003408	0.000560
65	0.000000	0.000000	0.000000

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Preliminary Experience Study Report

Attachment E

Service-Based Salary Increases

High-Level Takeaways

In general, the observed service-based salary increase was lower than the expected service-based salary increase for a member at the beginning of their career. However, the observed service-based salary increase was higher than the expected service-based salary increase near the end of the current service-based salary scale for each system. For some systems, the service based salary increase scale was extended additional steps.

The Great Recession impacted the salary data. However, due to normal government budgeting cycles, there is typically a time lag between the start of the actual downturn and the timing of impacts on budgets and salaries. As a result, the salary data displayed decreased salary from the 2010 valuation through the 2012 valuation. These decreases in salary are the result of the legislature enacting laws (such as furloughs or temporary 3 percent salary decreases) which temporarily reduced active member salaries for teachers, school employees and state government employees. The observed impacts to local government salaries varied by jurisdiction. Given that the Great Recession is likely a once-in-a-lifetime event, the 2010-2012 data was removed from the 2007-12 Demographic Experience Study.

Additionally, the Demographic Experience Study data is consistent with the data studied to develop the general salary growth assumption during the *2013 Economic Experience Study*. The studied time period was kept consistent between service-based salary increase and general salary growth assumptions.

All-Plan Summary

Generally, the changes to the service-based salary increase assumptions were modest.

Summary of Actual to Expected Ratios Total Salary Growth		
	Old Assumptions	New Assumptions
PERS	105%	105%
TRS	105%	106%
SERS	99%	99%
LEOFF	97%	98%
WSPRS	104%	106%

*Due to the lack of data in PSERS, we assume PSERS will have the same service based salary increase assumption as PERS.

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Observed Experience

The following tables show the Actual and Expected salary increases by system and years of service. The Actual salary increases were both higher and lower than Expected depending on the retirement plan and service level.

The Actual and Expected service-based salary growth reflects the salary growth beyond assumed general salary growth (currently assumed at 3.75 percent per year).

PERS Service Based Salary Increases 1984-2009			
Service	Actual	Expected	Ratio
1	6.29%	6.10%	1.03
2	4.88%	4.80%	1.02
3	3.84%	3.80%	1.01
4	3.11%	2.90%	1.07
5	2.48%	2.20%	1.13
6-10	1.31%	0.97%	1.35
11-15	0.57%	0.27%	2.15
16-20	0.33%	0.05%	7.08
21+	0.23%	0.00%	0.00

TRS Service Based Salary Increases 1984-2009			
Service	Actual	Expected	Ratio
1	5.45%	5.80%	0.94
2	4.11%	4.30%	0.96
3	4.05%	4.10%	0.99
4	3.75%	3.50%	1.07
5	3.31%	3.10%	1.07
6-10	2.93%	2.42%	1.21
11-15	1.84%	1.39%	1.33
16-20	0.58%	0.17%	3.49
21+	0.35%	0.06%	6.35

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SERS Service Based Salary Increases 1984-2009

Service	Actual	Expected	Ratio
1	6.29%	6.90%	0.91
2	3.76%	3.90%	0.96
3	2.69%	2.90%	0.93
4	2.16%	2.30%	0.94
5	1.91%	2.20%	0.87
6-10	1.16%	1.19%	0.97
11-15	0.43%	0.40%	1.06
16-20	0.19%	0.09%	2.14
21+	0.17%	0.00%	0.00

**LEOFF Service Based Salary
Increases 1984-2009**

Service	Actual	Expected	Ratio
1	10.75%	11.00%	0.98
2	7.44%	7.70%	0.97
3	5.60%	6.10%	0.92
4	3.66%	4.00%	0.91
5	2.53%	2.80%	0.91
6-10	1.33%	1.65%	0.80
11-15	1.04%	1.30%	0.80
16-20	0.95%	1.10%	0.86
21+	0.27%	0.00%	0.00

**WSPRS Service Based Salary Increases
1984-2009**

Service	Actual	Expected	Ratio
1	9.46%	7.10%	1.33
2	6.72%	5.90%	1.14
3	5.58%	5.20%	1.07
4	5.07%	5.20%	0.98
5	4.97%	5.20%	0.96
6-10	1.42%	1.57%	0.90
11-15	0.45%	0.48%	0.95
16-20	0.76%	0.40%	1.90
21+	0.90%	0.29%	3.09

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Old, Observed, And New Salary Increases

In general, the New service-based salary increases move toward a better fit between observed and expected, but we give some credibility to the Old salary increases as well. Additionally, we give consideration to expectations of future salary increases.

The tables below present a sampling of our Old, Actual, and New service-based salary increases by system.

The Actual salary growth reflects the total salary increase beyond observed general salary growth over the period.

PERS — All Plans (and PSERS)			
Service Based Salary Increase Assumption			
Service	Old	Actual	New
1	6.10%	5.98%	6.00%
2	4.80%	4.58%	4.70%
3	3.80%	3.54%	3.60%
4	2.90%	2.82%	2.90%
5	2.20%	2.18%	2.20%
10	0.50%	0.54%	0.50%
15	0.20%	0.18%	0.20%
20	0.00%	0.00%	0.00%
25	0.00%	0.00%	0.00%
30	0.00%	0.00%	0.00%

TRS — All Plans			
Service Based Salary Increase Assumption			
Service	Old	Actual	New
1	5.80%	5.06%	5.10%
2	4.30%	3.73%	3.90%
3	4.10%	3.67%	3.90%
4	3.50%	3.37%	3.50%
5	3.10%	2.93%	3.00%
10	2.00%	2.23%	2.20%
15	0.80%	0.87%	0.90%
20	0.10%	0.06%	0.10%
25	0.10%	0.00%	0.10%
30	0.00%	0.00%	0.00%

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SERS — All Plans			
Service Based Salary Increase Assumption			
Service	Old	Actual	New
1	6.90%	6.32%	6.60%
2	3.90%	3.79%	3.90%
3	2.90%	2.72%	2.80%
4	2.30%	2.19%	2.30%
5	2.20%	1.94%	2.10%
10	0.80%	0.89%	0.90%
15	0.10%	0.34%	0.20%
20	0.00%	0.16%	0.10%
25	0.00%	0.00%	0.00%
30	0.00%	0.00%	0.00%

LEOFF — All Plans			
Service Based Salary Increase Assumption			
Service	Old	Actual	New
1	11.00%	10.74%	10.70%
2	7.70%	7.42%	7.50%
3	6.10%	5.58%	5.90%
4	4.00%	3.64%	3.70%
5	2.80%	2.52%	2.60%
10	1.70%	1.51%	1.70%
15	1.30%	1.18%	1.20%
20	1.10%	1.22%	1.00%
25	0.00%	0.47%	0.50%
30	0.00%	0.00%	0.00%

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WSPRS — All Plans			
Service Based Salary Increase Assumption			
Service	Old	Actual	New
1	7.10%	9.11%	8.50%
2	5.90%	6.38%	6.00%
3	5.20%	5.24%	5.00%
4	5.20%	4.74%	5.00%
5	5.20%	4.64%	5.00%
10	0.80%	1.00%	0.60%
15	0.40%	0.35%	0.40%
20	0.40%	0.83%	0.40%
25	0.40%	0.57%	0.40%
30	0.00%	0.00%	0.00%

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Preliminary Experience Study Report

Attachment F

Miscellaneous Assumptions

AFC Load

When a member retires from PERS 1, TRS 1, or WSPRS 1, they may be eligible for cash payments that will increase the Average Final Compensation (AFC) used in calculating their retirement benefit. Some of these cash payments may include payouts of accumulated annual leave, overtime, bonuses, or holiday pay. A portion of these cash payments are billed to the employer and have been excluded from this analysis. We model this increase in AFC from the remaining cash payments with a load percentage. In our model, this load increases the value of each active member's prospective retirement benefit.

In addition to the three loads currently modeled, a new load for LEOFF 1 has been introduced based on observed salary growth above the general salary growth assumption during the AFC period.

We relied on retiree records from 1996 through 2012 to study the increase in AFC. The Old and New AFC Load Assumptions, by plan, are as follows.

Plan	Old Assumption	New Assumption
PERS 1	4.50%	4.00%
TRS 1	1.00%	0.75%
LEOFF 1 *	-	4.50%
WSPRS 1	7.50%	7.00%

**Load assumption introduced with the 2007-2012 Demographic Experience Study.*

Age Difference

Our valuation model requires the age of the member's spouse in order to calculate the survivor benefits that are payable for the spouse's life. If this spousal data is missing from our valuation data file, we use an assumption for the age difference between the member and their spouse.

We used service and disability retiree records that elected joint and survivor benefits from our 2005 through 2012 experience study data. The Old and New Age Difference Assumptions are based on the gender of the member as follows.

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Age Difference for All Systems		
Member	Old Assumption	New Assumption
Male	3	3
Female	(2)	(1)

Certain And Life Annuity

In many of the plans, the standard retirement option is a monthly benefit payable for the lifetime of the member. If the member dies in retirement before the total pension payments they have received exceed the value of their accumulated contributions, the difference is paid to their beneficiary. The value of this benefit is calculated using a Certain and Life Annuity — a life annuity with a certain, or guaranteed, payment period.

We used retiree records from the 2010 through 2013 valuation data to study the average ratio of annual retirement benefits to accumulated contributions for Plan 1 members. We used active records from the 2012 valuation data to study expected certain periods for Plan 2 members.

The certain, or guaranteed, period was developed for the standard life annuity retirement option specific to each plan.

Plan	Old Assumption	New Assumption
PERS 1	3	4
PERS 2	4	4
TRS 1*	11	9
TRS 2	5	5
SERS 2	4	4
PSERS 2	4	4
LEOFF 1	3	3
LEOFF 2	5	5
WSPRS 1	3	4
WSPRS 2	4	5

**Assumption only applies to the annuity portion of disability benefits.*

Certified Teacher Bonus

Teachers who obtain or maintain a National Board Certification receive an annual bonus. National Board Certified teachers, who work at any one of the specified “Challenging Schools,” receive an additional annual bonus. These bonuses are included in pensionable compensation.

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The percentage of TRS members that obtain this certification is expected to grow over the next decade before leveling off. Because of the increasing new membership, we expect, on average, teacher salary increases to be slightly higher than normal during that time. An assumption is required to model the impact future bonus payments will have on expected salary growth.

The rates below are added to the general salary growth assumption of 3.75 percent. The New rates are based on projections from the Office of Superintendent of Public Instruction and the Office of the State Actuary.

Year	Prior TRS Plan 1	Prior TRS Plan 2/3	New TRS Plan 1	New TRS Plan 2/3
2013	0.11%	0.12%	0.04%	0.04%
2014	0.10%	0.10%	0.05%	0.05%
2015	0.09%	0.09%	0.10%	0.10%
2016	0.08%	0.08%	0.02%	0.02%
2017	0.07%	0.08%	0.00%	0.00%
2018	0.06%	0.07%	0.00%	0.00%
2019	0.05%	0.06%	0.10%	0.10%
2020	0.05%	0.05%	0.09%	0.09%
2021	0.04%	0.04%	0.08%	0.08%
2022	0.03%	0.03%	0.08%	0.07%
2023	0.02%	0.02%	0.07%	0.07%
2024	0.02%	0.02%	0.06%	0.06%
2025	0.01%	0.01%	0.05%	0.05%
2026	0.00%	0.00%	0.04%	0.04%
2027	0.00%	0.00%	0.03%	0.03%
2028	0.00%	0.00%	0.02%	0.02%
2029	0.00%	0.00%	0.02%	0.02%
2030	0.00%	0.00%	0.00%	0.00%

Duty-Death Benefits

If a member dies while in the course of employment, special benefits are paid to their beneficiary. These include a one-time lump sum of \$150,000, or more depending on the system, and subsidized survivor annuities that are not reduced for early retirement.

Based on data collected from the Department of Retirement Systems, we revised the duty death rates for certain plans as fewer than expected deaths occurred while in the course of employment.

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System	Current Assumption	Updated Assumption
PERS	0.0026%	0.0018%
SERS	0.0026%	0.0018%
PSERS	0.0026%	0.0018%
TRS	0.0008%	0.0008%
LEOFF	0.0376%	0.0350%
WSPRS	0.0200%	0.0200%

If an inactive LEOFF 2 member dies from a disease or infection that was contracted while employed as an active LEOFF 2 member, their survivor will receive a one-time lump sum of \$214,000 in 2008, increased by inflation each year. The survivor may also receive an unreduced annuity.

Since 1996, ten duty-death lump sum payments have been paid to survivors of LEOFF retirees who passed away from a duty related illness or infection. Based on the limited observations, we did not revise any of the valuation assumptions associated with duty-death benefits for inactive members. We will continue to monitor these assumptions. As a reference, the current valuation assumptions for duty death benefits to inactive members are summarized below.

Fire fighters that pass away within a certain extended period of time after they stop working are eligible for duty-death benefits. This extended period of time from termination is three months for each year of service to a maximum of 60 months.

These additional benefits are provided to the member at no cost. Our valuation model requires an assumption about the average length of service for active members who might be eligible for these benefits in the future. There is also an assumption that estimates the percentage of LEOFF Plan 2 members who are fire fighters.

Based on historical active and annuitant valuation data, the following table shows the average years of service for active members and the resulting extended period of time for eligibility of this benefit under the current assumption.

LEOFF Plan 2 Expected Average Length of Service		
Current Assumption		
Status	Years of Service (Unrounded)	Extended Period (In Years)
Disability	16.26	4
Termination	14.20	4
Retirement	27.78	5

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For LEOFF 2 fire fighters going on disability, the valuation assumes a portion of those will die due to occupational disease.

LEOFF Plan 2 Occupational Disease Death Rates for Fire Fighters	
Age	Rate
Less Than 50	0.147415
At least 50	0.273934

The updated percent fire fighter assumption is 45 percent, compared to the current assumption of 43 percent.

Member Salaries

Each year we review the salaries reported in the valuation data for reasonableness and make salary adjustments when necessary. We also set default salaries for data that is not reported or considered unreliable.

We used active records from the 2012 and 2013 valuation data to study member salaries.

Maximum Salaries were capped at \$500,000 for all systems and plans in our prior experience study. Since our valuation software limits benefits using projected Internal Revenue Service maximum salaries (the maximum salary for 2013 was \$255,000), we have removed this salary cap from our data processing checks.

Minimum Salaries are determined by Plan and reflect full time employment. The following table lists the minimum salaries for 2013 and the basis for the calculation.

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Plan	2013 Minimum Salary	Basis for Minimum Salary Calculation
PERS	\$19,000*	Minimum hourly wage in WA multiplied by 2080 hours (8x5x52)
TRS	\$34,000*	WA Teacher's pay schedule, BA degree, zero years experience
SERS	\$13,000*	Minimum hourly wage in WA multiplied by 1440 hours (8x180)
LEOFF	\$47,000	99 percent of all plan salaries exceed this level
PSERS	\$30,000	99 percent of all plan salaries exceed this level
WSPRS 1	\$65,000	99 percent of all plan salaries exceed this level
WSPRS 2	\$43,000	99 percent of all plan salaries exceed this level

*Minimum salaries are adjusted annually.

Low-Service Salary assumption is used to adjust salaries for members that have less than two months of service in the current valuation year. This adjustment is necessary because our valuation model assumes all active members become full-time in the future and salary data for low-service members is not reliable.

For non-SERS members, we find the average salary for actives with one year of service for a given system. We adjust the salary with one year of the general salary increase assumption to bring last year's salary forward to the current valuation year. Then, to reflect that not all members with low service are new members, we adjust this entry salary by our step salary increase scale. There is not a set salary amount for this assumption, but rather a process that takes place to assign a default salary for any given set of circumstances.

For SERS members, we multiply the median hourly pay by the average number of hours worked by all full-time actives. This default salary, for 2012, was \$26,000.

Terminated Vested Salary is used to estimate the average final salary for terminated and vested members when the actual salary data is missing. We estimate this amount by average pay, by system, in various service groups. The salary is adjusted by the general salary increase assumption to reflect the number of years between the date of termination and the date the average salary is determined. The following table shows the 2013 base salaries by system and by service group.

Terminated Vested Base Salaries as of 2013						
Years of Service	LEOFF	PERS	TRS	SERS	PSERS	WSP
Less Than 5	\$75,000	\$45,000	\$52,000	\$22,000	\$46,000	\$58,000
At least 5, Less Than 10	87,000	55,000	57,000	27,000	56,000	69,000
At least 10, Less Than 15	94,000	60,000	67,000	30,000	61,000	77,000
At least 15, Less Than 20	99,000	63,000	75,000	32,000	65,000	79,000
At least 20, Less Than 25	105,000	66,000	77,000	35,000	68,000	82,000
At Least 25	\$113,000	\$69,000	\$79,000	\$42,000	\$71,000	\$85,000

TRS Plan 1 Temporary Disability Salary: We estimate a replacement salary for TRS 1 temporary disabilities because salaries are not reported for these members. We use the Terminated Vested Salary for a member with between 20 and 25 years of service.

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The salary is increased each year with the general salary increase assumption. For 2013, the average salary is \$77,000.

WSPRS Disability Average Final Salary: We estimate salaries to use for survivors of members with disabilities in this system because survivor benefits are based on average salaries at the time of member death, rather than the member's salary at the time of disablement. This salary is estimated using the average annual salary for the plan based on the recent valuation. The salary is increased each year with the general salary increase assumption. For 2013, the average salary is \$81,000.

Percent Male/Female

Our valuation data requires a gender code for each plan member in order to calculate and project benefits accurately. Some assumptions used in the actuarial valuation are gender-based, such as mortality and disability, and occasionally the data we receive is missing gender information. As a result, we make assumptions as to the percent male/female in order to assign a missing gender code.

We used active records from the 1983 through 2012 valuation data to study percent male/female. The following table shows the assumptions by plan.

Percent Male/Female Assumptions			
	Percent Male	Percent Female	Total
PERS	50%	50%	100%
TRS	30%	70%	100%
SERS	20%	80%	100%
PSERS	70%	30%	100%
LEOFF	90%	10%	100%
WSPRS	90%	10%	100%

Percent Of Final Average Salary For Catastrophic Disability Benefit

LEOFF 2 pays 70 percent of final average salary if a member is totally disabled; however the member may be eligible to receive benefits from other sources besides the plan, like Social Security and the Department of Labor and Industries (L&I). The maximum amount of benefits received from all sources cannot exceed 100 percent of a member's final average salary. We estimate the expected amount of offsets from Social Security and L&I to determine the expected percent of final average salary that will be paid from the plan when a catastrophic disability occurs. Twelve percent of all disabilities in LEOFF are assumed to be catastrophic.

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Percent of Final Average Salary Paid By Plan After Catastrophic Disability	
Prior Assumption	Updated Assumption
34%	44%

This assumption relies on the following variables that were estimated based on data provided by LEOFF 2, current valuation data, and additional research.

- Percent of members that are fire fighters versus law enforcement.
- Percent eligible for Social Security.
- Percent eligible for L&I.
- Washington State Average Wage.

The increase is largely due to reviewing the plan benefits of the current 29 members that are in receipt of catastrophic disability benefits. Seven of the 29 are not receiving any compensation from L&I, therefore their plan benefit was higher than previously assumed.

Percent Vested

Members who leave eligible positions, but are not annuitants in the system, are generally considered inactive, or terminated. Some of these members may be vested in their plan and entitled to a future annual benefit. Still other members are not vested, but may return to active employment at some time in the future. Any member who terminates has the right to withdraw their contributions, with interest. Members of Plans 1/2 who make such withdrawals lose their membership service and forfeit their rights to future benefits. Plan 3 members do not lose their service upon withdrawal of their defined contribution accounts.

The Percent Vested assumption models the likelihood that terminated vested members will leave their savings intact and be entitled to deferred retirement benefits.

We used experience study records from 1995-2010 to count terminations, and among those, members who withdraw their savings. The following tables show a sample of the Actual percent vested rates, the Old assumptions, and the New assumptions for each plan by service.

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PERS						
Percent Vested						
Service Years	Actual Rates	Old Assumption	New Assumption	Actual Rates	Old Assumption	New Assumption
	Male & Female					
	Plan 1			Plan 2		
0	0.6412	0.0000	0.0000	0.7694	0.0000	0.0000
5	0.6083	0.4500	0.5000	0.5911	0.4000	0.5500
10	0.6093	0.5250	0.6000	0.6230	0.5000	0.5750
15	0.6772	0.6250	0.6500	0.6781	0.5750	0.6500
20	0.7231	0.6500	0.6750	0.7959	0.6750	0.7500
25	0.8167	0.7250	0.7000	0.8562	0.7750	0.8000
30+	0.0000	0.9250	0.9500	0.8333	0.9500	0.9500

TRS						
Percent Vested						
Service Years	Actual Rates	Old Assumption	New Assumption	Actual Rates	Old Assumption	New Assumption
	Male & Female					
	Plan 1			Plan 2		
0	0.7778	0.0000	0.0000	0.8326	0.0000	0.0000
5	0.9038	0.7250	0.7250	0.7442	0.6500	0.7000
10	0.8852	0.8000	0.8000	0.8306	0.7000	0.7500
15	0.9667	0.8750	0.8750	0.8710	0.7750	0.8500
20	0.9176	0.9000	0.9000	0.9688	0.9250	0.9500
25	0.9794	0.9250	0.9250	1.0000	0.9500	0.9500
30+	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000

SERS			
Percent Vested			
Service Years	Actual Rates	Old Assumption	New Assumption
	Male & Female		
	0	0.8532	0.0000
5	0.6955	0.5500	0.6500
10	0.7512	0.6250	0.7000
15	0.7771	0.7000	0.7500
20	0.8242	0.7750	0.8000
25	0.7857	0.8500	0.8500
30+	1.0000	0.9500	0.9500

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PSERS			
Percent Vested			
	Actual Rates	Old Assumption	New Assumption
Service Years	Male & Female		
0	0.0000	0.0000	0.0000
5	0.0000	0.4000	0.5500
10	0.0000	0.5000	0.5750
15	0.0000	0.5750	0.6500
20	0.0000	0.6750	0.7880
25	0.0000	0.7750	0.8400
30+	0.0000	0.9500	0.9500

LEOFF 1			
Percent Vested			
	Actual Rates	Old Assumption	New Assumption
Service Years	Male & Female		
0	1.0000	0.0000	0.0000
5	0.0000	1.0000	1.0000
10	0.0000	1.0000	1.0000
15	0.0000	1.0000	1.0000
20	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000
30+	0.0000	1.0000	1.0000

LEOFF 2			
Percent Vested			
	Actual Rates	Old Assumption	New Assumption
Service Years	Male & Female		
0	0.6500	0.0000	0.0000
5	0.3756	0.2400	0.3250
10	0.3765	0.2400	0.3750
15	0.4024	0.2700	0.4000
20	0.6957	0.6900	0.6000
25	0.7778	0.9100	0.9000
30+	0.0000	0.9100	0.9500

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WSPRS			
Percent Vested			
	Actual Rates	Old Assumption	New Assumption
Service Years	Male & Female		
0	0.5000	0.0000	0.0000
5	0.6667	0.2750	0.4750
10	0.4286	0.2750	0.4750
15	0.4000	0.4000	0.5000
20	0.0000	0.7750	0.7500
25	0.0000	1.0000	1.0000
30+	0.0000	1.0000	1.0000

Prior Military Service Credit

Members of PERS 1 and WSPRS 1, who earn at least 25 years of service, are eligible to add up to a total of five years of military service credit for both interruptive and non-interruptive military service combined. No member or employer payments are required for this military service credit. The respective systems therefore absorb the cost. The modeled cost is estimated with a load factor for military service credit to all active members' future retirement benefits that attain the service eligibility requirement.

We relied on annuitant records from the 2012 valuation data to determine the percent of members who have at least 25 years of service with military service, and the average months of military service credit. Using these values, we determine an average additional service credit for all plan members who meet, or who are projected to meet, the eligibility requirements. The following tables display the increase factor, by plan, under the Old assumptions and the New assumptions.

Prior Military Service Credit Assumptions		
	PERS 1 Service Credit Load	WSPRS 1 Service Credit Load
Old Assumption		
Males	2.5%	3.7%
Females	0.1%	0.1%
New Assumption		
Males	1.5%	3.0%
Females	0.1%	1.0%

Ratio Of Survivors Of Active Deaths Selecting Annuities

For most plans, this assumption models the ratio of active deaths whose survivors select annuities. The exceptions are LEOFF 1 and WSPRS 1 where the provisions in these plans allow for free survivor benefits. In these plans, we also apply this assumption to current retirees, since spousal information is often unavailable until a member dies.

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We used experience study records from 1995-2012 to count members who die and leave a beneficiary who collects a survivor annuity benefit. To determine the ratio, we set a trend line to the observed rates of survivors selecting annuities. The following tables show a sample of the Actual ratio of survivors selecting annuities, the Old assumptions, and the New assumptions for each plan, by age and by gender.

PERS 1						
Ratio of Survivors of Active Deaths Selecting Annuities						
	Actual Rates	Old Assumption	New Assumption	Actual Rates	Old Assumption	New Assumption
Age	Male			Female		
40	0.0000	0.4622	0.2578	0.0000	0.1027	0.0000
45	0.5000	0.5634	0.4799	0.0000	0.3418	0.2631
50	0.3750	0.6140	0.5550	0.6154	0.4853	0.3728
55	0.8065	0.7151	0.6015	0.4706	0.4853	0.4406
60	0.6897	0.7151	0.6352	0.4545	0.4853	0.4899
65	0.7143	0.7481	0.6946	0.5455	0.5183	0.5615
70	0.5000	0.7481	0.7164	0.6667	0.5183	0.5934
75	0.0000	0.7481	0.7164	0.0000	0.5183	0.5934
80	0.5000	0.7481	0.7164	1.0000	0.5183	0.5934

PERS 2						
Ratio of Survivors of Active Deaths Selecting Annuities						
	Actual Rates	Old Assumption	New Assumption	Actual Rates	Old Assumption	New Assumption
Age	Male			Female		
40	0.0000	0.0553	0.0234	0.0000	0.0490	0.0000
45	0.0952	0.1036	0.1468	0.0625	0.0490	0.0638
50	0.2381	0.2968	0.2701	0.1176	0.1330	0.1343
55	0.4444	0.4417	0.3935	0.2558	0.2170	0.2049
60	0.5156	0.5866	0.5169	0.2955	0.2170	0.2754
65	0.5938	0.6196	0.6732	0.2059	0.2500	0.3790
70	0.7143	0.6196	0.7966	0.6000	0.2500	0.4495
75	0.6667	0.6196	0.7966	0.0000	0.2500	0.4495
80	0.6000	0.6196	0.7966	0.0000	0.2500	0.4495

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PERS 3						
Ratio of Survivors of Active Deaths Selecting Annuities						
	Actual Rates	Old Assumption	New Assumption	Actual Rates	Old Assumption	New Assumption
Age	Male			Female		
25	0.0000	0.4365	0.0000	0.0000	0.1214	0.1411
30	0.0000	0.4902	0.0532	0.0000	0.2358	0.1592
35	0.5000	0.4902	0.1533	0.0000	0.2930	0.1774
40	0.0000	0.5439	0.2533	0.0000	0.3502	0.1955
45	0.3333	0.5439	0.3533	0.5000	0.4646	0.2136
50	0.3333	0.6298	0.4534	0.0000	0.5218	0.2317
55	0.4286	0.7049	0.5534	0.2500	0.5790	0.2499
60	1.0000	0.7586	0.6534	0.0000	0.5790	0.2680
65	0.6667	0.7916	0.7865	1.0000	0.6120	0.3191
70	0.0000	0.7916	0.7865	0.0000	0.6120	0.3191
75	0.0000	0.7916	0.7865	0.0000	0.6120	0.3191
80	0.0000	0.7916	0.7865	0.0000	0.6120	0.3191

TRS 1						
Ratio of Survivors of Active Deaths Selecting Annuities						
	Actual Rates	Old Assumption	New Assumption	Actual Rates	Old Assumption	New Assumption
Age	Male			Female		
40	0.0000	0.5977	0.2849	0.0000	0.4075	0.0306
45	0.0000	0.6469	0.5142	1.0000	0.4576	0.3205
50	0.6923	0.6961	0.5918	0.2500	0.4576	0.4186
55	0.5882	0.6961	0.6398	0.5556	0.4576	0.4792
60	0.7500	0.6961	0.6746	0.4286	0.4576	0.5232
65	0.5714	0.7291	0.7349	0.6667	0.4906	0.5908
70	1.0000	0.7291	0.7349	0.0000	0.4405	0.5908
75	0.0000	0.7291	0.7349	0.0000	0.4405	0.5908
80	0.0000	0.7291	0.7349	0.0000	0.4405	0.5908

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TRS 2						
Ratio of Survivors of Active Deaths Selecting Annuities						
	Actual Rates	Old Assumption	New Assumption	Actual Rates	Old Assumption	New Assumption
Age	Male			Female		
50	0.0000	0.1951	0.1830	0.0000	0.1788	0.0992
55	0.6667	0.5243	0.3737	0.0000	0.2934	0.2518
60	0.5000	0.7124	0.5644	0.5556	0.4652	0.4045
65	0.0000	0.7454	0.7881	0.6667	0.5555	0.5901
70	0.0000	0.7454	0.7881	0.0000	0.8419	0.5901
75	0.0000	0.7454	0.7881	0.0000	0.8419	0.5901
80	0.0000	0.7454	0.7881	0.0000	0.8419	0.5901

TRS 3						
Ratio of Survivors of Active Deaths Selecting Annuities						
	Actual Rates	Old Assumption	New Assumption	Actual Rates	Old Assumption	New Assumption
Age	Male			Female		
25	0.0000	0.3454	0.0000	0.0000	0.4550	0.0000
30	0.0000	0.3454	0.1186	0.5000	0.5109	0.2032
35	0.0000	0.4018	0.2507	0.0000	0.5669	0.3067
40	0.0000	0.4582	0.3323	0.5000	0.5109	0.3707
45	0.1667	0.4808	0.3916	0.5000	0.5109	0.4172
50	0.1250	0.5146	0.4381	0.3333	0.4550	0.4537
55	0.4000	0.5146	0.4765	0.5833	0.4550	0.4837
60	0.5714	0.5710	0.5090	0.5556	0.4550	0.5093
65	0.5000	0.6604	0.5704	0.5000	0.4880	0.5645
70	0.0000	0.7168	0.5955	0.0000	0.4880	0.5842
75	0.0000	0.7168	0.5955	0.0000	0.4880	0.5842
80	0.0000	0.7168	0.5955	0.0000	0.4880	0.5842

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SERS 2						
Ratio of Survivors of Active Deaths Selecting Annuities						
	Actual Rates	Old Assumption	New Assumption	Actual Rates	Old Assumption	New Assumption
Age	Male			Female		
40	0.0000	0.0559	0.0000	0.0000	0.0000	0.0000
45	0.0000	0.1538	0.1783	0.0000	0.0396	0.1592
50	0.0000	0.3007	0.3061	0.4444	0.1376	0.2533
55	0.5000	0.3986	0.3851	0.4286	0.2029	0.3115
60	0.4286	0.5944	0.4425	0.6667	0.3008	0.3537
65	0.5000	0.6763	0.5205	0.2857	0.3664	0.4199
70	0.0000	0.7742	0.5576	0.3333	0.3664	0.4472
75	0.0000	0.8721	0.5576	0.0000	0.3664	0.4472
80	1.0000	0.8721	0.5576	0.0000	0.3664	0.4472

SERS 3						
Ratio of Survivors of Active Deaths Selecting Annuities						
	Actual Rates	Old Assumption	New Assumption	Actual Rates	Old Assumption	New Assumption
Age	Male			Female		
35	0.0000	0.0000	0.0000	0.0000	0.3467	0.2464
40	0.0000	0.2392	0.0000	0.0000	0.3467	0.3169
45	0.0000	0.3553	0.2570	0.2000	0.4033	0.3408
50	0.0000	0.4134	0.3888	0.4706	0.4033	0.3555
55	1.0000	0.4715	0.4702	0.3333	0.5732	0.3662
60	0.5000	0.5295	0.5293	0.1667	0.5732	0.3746
65	1.0000	0.5625	0.6088	0.3333	0.6062	0.4146
70	1.0000	0.5625	0.6470	0.0000	0.6062	0.4205
75	0.0000	0.5625	0.6470	0.0000	0.6062	0.4205
80	0.0000	0.5625	0.6470	0.0000	0.6062	0.4205

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PSERS 2						
Ratio of Survivors of Active Deaths Selecting Annuities						
	Actual Rates	Old Assumption	New Assumption	Actual Rates	Old Assumption	New Assumption
Age	Male			Female		
40	0.0000	0.0553	0.1461	0.0000	0.0490	0.0745
45	0.0952	0.1036	0.3016	0.0625	0.0490	0.1736
50	0.2381	0.2968	0.3977	0.1176	0.1330	0.2349
55	0.6254	0.4417	0.4674	0.3632	0.2170	0.2794
60	0.6026	0.5866	0.5222	0.3750	0.2170	0.3144
65	0.5938	0.6196	0.6003	0.2059	0.2500	0.3762
70	0.7143	0.6196	0.6386	0.6000	0.2500	0.4006
75	0.6667	0.6196	0.6386	0.0000	0.2500	0.4006
80	0.6000	0.6196	0.6386	0.0000	0.2500	0.4006

LEOFF 1			
Ratio of Survivors Selecting Annuities			
	Actual Rates	Old Assumption	New Assumption
Age	Male & Female		
40	0.0000	0.5670	0.6370
45	1.0000	0.5670	0.6370
50	1.0000	0.5670	0.6370
55	0.8750	0.5670	0.6370
60	0.8462	0.5670	0.6370
65	0.7500	0.6000	0.6700
70	0.8125	0.6000	0.6700
75	0.6757	0.6000	0.6700
80	0.6333	0.6000	0.6700

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LEOFF 2			
Ratio of Survivors of Active Deaths Selecting Annuities			
	Actual Rates	Old Assumption	New Assumption
Age		Male & Female	
35	0.5000	0.0728	0.2837
40	0.4000	0.1714	0.4310
45	0.5000	0.2701	0.5220
50	0.7143	0.3030	0.5881
55	1.0000	0.4017	0.6400
60	0.7500	0.5332	0.6827
65	0.0000	0.5662	0.7521
70	0.0000	0.5662	0.7521
75	0.0000	0.5662	0.7521
80	0.0000	0.5662	0.7521

WSPRS 1			
Ratio of Survivors Selecting Annuities			
	Actual Rates	Old Assumption	New Assumption
Age	(LEOFF 1)	(LEOFF 1)	(LEOFF 1)
		Male & Female	
40	0.0000	0.5670	0.6370
45	1.0000	0.5670	0.6370
50	1.0000	0.5670	0.6370
55	0.8750	0.5670	0.6370
60	0.8462	0.5670	0.6370
65	0.7500	0.6000	0.6700
70	0.8125	0.6000	0.6700
75	0.6757	0.6000	0.6700

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WSPRS 2			
Ratio of Survivors of Active Deaths Selecting Annuities			
	Actual Rates (LEOFF 2)	Old Assumption (LEOFF 2)	New Assumption (LEOFF 2)
Age	Male & Female		
35	0.5000	0.0728	0.2837
40	0.4000	0.1714	0.4310
45	0.5000	0.2701	0.5220
50	0.7143	0.3030	0.5881
55	1.0000	0.4017	0.6400
60	0.7500	0.5332	0.6827
65	0.0000	0.5662	0.7521
70	0.0000	0.5662	0.7521
75	0.0000	0.5662	0.7521

Terminated Vested Indexed Benefit

Any Plan 3 member that terminates from employment with 20 or more years of service will receive a pre-retirement COLA of 3 percent per year. The COLA is paid on their defined benefit amount until the date they retire. Our valuation model requires an assumption for the number of years that the member will receive pre-retirement COLAs.

If the member has 30 or more years of service at termination, they will be entitled to subsidized early retirement factors. These members are assumed to begin receiving their retirement benefit at the earliest age, 55.

If the member has less than 30 years of service at termination, their benefit will be actuarially reduced for early retirement. Based on reviewing the terminated vested and retiree population in the 2007 valuation data, a graded assumption detailing the likelihood a member will delay their retirement to age 65 was adopted in 2008.

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Probability that Plan 3 Members Will Defer to Age 65	
Age	Current Assumption
55	0.85
56	0.85
57	0.75
58	0.75
59	0.75
60	0.60
61	0.40
62	0.40
63	0.20
64	0.15
65+	0.00

Based on the table above, for terminating active members age 60, 40 percent are assumed to begin receiving their retirement benefit at age 60, the remaining 60 percent are assumed to defer commencement until age 65.

Any LEOFF 2 member that terminates from employment with twenty or more years of service will receive a pre-retirement COLA of 3 percent per year. The COLA is paid on their accrued benefit amount until the date they retire. Our valuation model requires an assumption for the number of years that the member will receive pre-retirement COLAs.

Members with 20 or more years of service have subsidized early retirement reduction factors starting at age 50. As a result, LEOFF 2 members are assumed to retire at age 50.

We chose not to make any adjustments to these assumptions as a result of this experience study.

WSPRS Disabled Life Expectancy

When a disabled member dies, their spouse is entitled to a survivor benefit. The survivor benefit is based on the salary for current active members who hold the same rank the disabled member held when the disability occurred. In order to estimate the future salary, the life expectancy needs to be determined, by gender, for a disabled WSPRS member.

We used inactive records from the 2012 valuation data to determine an average age of disablement of 42. Using the disabled mortality rates developed in this experience study, we calculated a future life expectancy of 23 years for males (to age 65) and 32 years for females (to age 74). The resulting salary increase factors are 1.2 for males and 1.3 for females.

Preliminary Experience Study Report

Attachment G

Preliminary Experience Study Impacts

Contribution rate impacts represent the change in current contribution rates relative to the Preliminary 2013 Actuarial Valuation Report (AVR). LEOFF 1 contribution rate changes don't bring the plan out of surplus and therefore do not have budget impacts.

Preliminary 2015-17 Budget Impacts

	Increase in Budget*			After ExpStudy 7.8% ExpROR (A+B+C)
	Before ExpStudy 7.9% ExpROR (A)	7.8% ExpROR Only (B)	ExpStudy Changes Only (C)	
<i>(Dollars in Millions)</i>				
General Fund	\$125	\$50	\$307	\$482
Non-General Fund	\$26	\$29	\$141	\$196
Total State	\$150	79	\$449	\$678
Local Government	\$108	\$71	\$377	\$556
Total Employer	\$258	\$150	\$826	\$1,233
Total Employee	\$4	\$75	\$328	\$408

*Excludes LEOFF 2.

Totals may not agree due to rounding.

	Member Contribution Rates			
	Current	Before ExpStudy 7.9% ExpROR	Before ExpStudy 7.8% ExpROR	After ExpStudy 7.8% ExpROR
PERS 2	4.92%	4.95%	5.33%	7.00%
TRS 2	4.96%	4.93%	5.25%	6.79%
SERS 2	4.64%	4.85%	5.24%	6.70%
PSERS 2	6.36%	5.99%	6.21%	6.89%
LEOFF 1	0.00%	0.00%	0.00%	0.00%
WSPRS 1/2*	6.59%	6.36%	6.52%	7.19%

*WSPRS maximum member rate is 7.19%.

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Employer Contribution Rates*				
	Current	Before ExpStudy 7.9% ExpROR	Before ExpStudy 7.8% ExpROR	After ExpStudy 7.8% ExpROR
PERS 1 UAAL	4.00%	4.41%	4.51%	5.18%
PERS 2/3 NC	5.03%	5.06%	5.44%	7.11%
TRS 1 UAAL	4.48%	5.90%	5.90%	6.91%
TRS 2/3 NC	5.73%	5.70%	6.02%	7.56%
SERS 2/3 NC	5.64%	5.85%	6.24%	7.70%
PSERS 2 NC	6.36%	5.99%	6.21%	6.89%
LEOFF 1	0.00%	0.00%	0.00%	0.00%
WSPRS 1/2 NC	7.91%	7.68%	7.84%	8.79%

*NC is normal cost. Employers pay the NC and Plan 1 UAAL where applicable.

PERS 1 is currently above the minimum PERS 1 UAAL rate of 3.75 percent (effective July 1, 2015). TRS 1 is currently below the minimum TRS 1 UAAL rate of 5.75 percent (effective September 1, 2015).

Preliminary Budget and Rate Impacts by Assumption Change

The table below displays the itemized budget impacts for each assumption change from the latest experience study. Additionally, we provide the estimated contribution rate impact for each system.

2015-17 Budget Impacts – By Assumption Change							
(Dollars in Millions)	Mortality Only	Retirement Only	Termination Only	Disability Only	Service- Based Salary Only	Misc	Total
General Fund	\$311	(\$1)	(\$8)	\$0	\$4	\$1	\$307
Non-General Fund	141	(1)	0	0	1	2	141
Total State	\$452	(\$2)	(\$8)	\$0	\$4	\$3	\$449
Local Government	379	(3)	(5)	0	3	2	377
Total Employer	\$831	(\$5)	(\$13)	\$0	\$7	\$5	\$826
Total Employee	\$327	(\$2)	(\$4)	\$0	\$3	\$3	\$328

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Member Contribution Rate Impact – By Assumption Change						
	Mortality Only	Retirement Only	Termination Only	Disability Only	Service-Based Salary Only	Misc
PERS 2	1.65%	(0.01%)	0.00%	0.00%	0.01%	0.02%
TRS 2	1.57%	0.04%	(0.11%)	0.00%	0.04%	0.00%
SERS 2	1.52%	(0.06%)	(0.03%)	0.01%	0.03%	(0.01%)
PSERS 2	0.75%	(0.10%)	0.01%	(0.01%)	0.01%	0.02%
LEOFF 1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
WSPRS 1/2	0.70%	0.03%	(0.03%)	0.01%	(0.04%)	0.00%

Employer Contribution Rate Impact – By Assumption Change*						
	Mortality Only	Retirement Only	Termination Only	Disability Only	Service-Based Salary Only	Misc
PERS 1 UAAL	0.68%	(0.01%)	0.00%	0.00%	0.00%	0.00%
PERS 2/3 NC	1.65%	(0.01%)	0.00%	0.00%	0.01%	0.02%
TRS 1 UAAL	1.02%	(0.02%)	0.00%	0.00%	0.00%	0.01%
TRS 2/3 NC	1.57%	0.04%	(0.11%)	0.00%	0.04%	0.00%
SERS 2/3 NC	1.52%	(0.06%)	(0.03%)	0.01%	0.03%	(0.01%)
PSERS 2 NC	0.75%	(0.10%)	0.01%	(0.01%)	0.01%	0.02%
LEOFF 1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
WSPRS 1/2 NC	0.83%	0.03%	(0.03%)	0.01%	(0.04%)	0.15%

*NC is normal cost. Employers pay the NC and Plan 1 UAAL where applicable.