GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

MINNESOTA STATE RETIREMENT SYSTEM

STATE PATROL RETIREMENT FUND

ACTUARIAL VALUATION REPORT AS OF JULY 1, 2013

GRS

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November 27, 2013

Minnesota State Retirement System
State Patrol Retirement Fund
St. Paul, Minnesota

Dear Board of Directors:

The results of the July 1, 2013 annual actuarial valuation of the State Patrol Retirement Fund are presented in this report. This report was prepared at the request of the Board and is intended for use by the Board and staff and those designated or approved by the Board. This report may be provided to parties other than the Fund only in its entirety. GRS is not responsible for the consequences of any unauthorized use of this report.

The purpose of the valuation is to measure the Fund's funding progress, to determine the required contribution rate for the fiscal year beginning July 1, 2013, and to determine the actuarial information required by Governmental Accounting Standards Board (GASB) Statement No. 25. Note that we have not attempted to quantify the impact of GASB Statements No. 67 and No. 68 in this report.

The valuation was based upon information furnished by the Minnesota State Retirement System (MSRS), concerning benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by MSRS.

Actuarial assumptions, including discount rates, mortality tables and others identified in this report, are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the Board of Directors. These parties are responsible for selecting the plan's funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in the Actuarial Basis of this report. MSRS is solely responsible for communicating to GRS any changes required thereto.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

This report should not be relied on for any purpose other than the purpose described herein. Determinations of the financial results associated with the benefits described in this report in a manner other than the intended purpose may produce significantly different results.

The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

Brian B. Murphy and Bonita J. Wurst are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. In addition, Mr. Murphy meets the requirements of "approved actuary" under Minnesota Statutes Section 356.215, Subdivision 1, Paragraph (c).

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge and belief the information contained in this report is accurate and fairly presents the actuarial position of the State Patrol Retirement Fund as of the valuation date and was performed in accordance with the requirements of Minnesota Statutes Section 356.215, and the requirements of the Standards for Actuarial Work established by the LCPR. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

We are available to answer any questions or provide further details.

Respectfully submitted,

Brian B. Murphy

Brian B. Murphy, FSA, EA, MAAA

Bonita J. Wurst

Bonita J. Wurst, ASA, EA, MAAA

BBM/BJW:sc

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Summary of Valuation Results

Contributions

The following table summarizes important contribution information as described in the Development of Costs section.

Contributions	Actuarial Valuation as of July 1, 2013	Actuarial Valuation as of July 1, 2012
Statutory Contributions - Chapter 352B (% of Payroll)	32.56%	31.00%
Required Contributions - Chapter 356 (% of Payroll)	41.24%	42.52%
Sufficiency / (Deficiency)	(8.68)%	(11.52)%

The contribution deficiency decreased from (11.52)% of payroll to (8.68)% of payroll. The primary reasons for the decreased contribution deficiency are the significant changes in plan provisions. See page 3 for additional detail about these changes. Lower than expected salary increases resulted in a liability gain but also increased the payment on the unfunded actuarial accrued liability as a percent of payroll. Member and employer contribution rates are scheduled to increase an additional 5% of payroll in total over the next four fiscal years. However, a significant contribution deficiency remains.

Based on the actuarial value of assets and scheduled contribution rates, statutory contributions are not sufficient to fully amortize the unfunded actuarial accrued liability over the statutory amortization period of 24 years. However, based on the market value of assets and a postretirement benefit increase assumption of 1% for all years, scheduled contributions, including the additional 5% of payroll and the $1 million annual state contribution, appear to close the gap. Postretirement benefit increases above the assumed rate of 1% would require additional funding sources.

The Plan Assets section provides detail on the plan assets used for the valuation including a development of the actuarial value of assets (AVA). The market value of assets (MVA) earned approximately 14.3% for the plan year ending June 30, 2013. The AVA earned approximately 5.8% for the plan year ending June 30, 2013 as compared to the assumed rate of 8.0%. The assumed rate is a prescribed assumption mandated by Minnesota Statutes.

Participant reconciliation and statistics are detailed in the Membership Data section. The Actuarial Basis section includes a summary of plan provisions and actuarial methods and assumptions used for the calculations in this report.

The Plan Accounting sections detail the required accounting information for the Plan under GASB No. 25 (as amended by GASB No. 50). Statements No. 67 and No. 68, issued in June 2012, replace the requirements of Statements No. 25 and No. 27, respectively. Statement No. 68, effective for the fiscal year beginning July 1, 2014, sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67, effective for the fiscal year beginning July 1, 2013, sets the rules for the systems themselves. Accounting information prepared according to Statements No. 67 and No. 68 will be provided in a separate report beginning with the July 1, 2014 valuation.

Summary of Valuation Results

A summary of principal valuation results from the current valuation and the prior valuation follows. Any changes in plan provisions, actuarial assumptions or valuation methods and procedures between the two valuations are described after the summary.

	Actuarial Valuation as of	
	July 1, 2013	**July 1, 2012**
Contributions (*% of Payroll*)		
Statutory - Chapter 352B	32.56%	31.00%
Required - Chapter 356	41.24%	42.52%
Sufficiency / (Deficiency)	(8.68)%	(11.52)%
Funding Ratios (*dollars in thousands*)		
Assets		
- Current assets (AVA)	$ 552,319	$ 554,244
- Current assets (MVA)	593,201	549,956
Accrued Benefit Funding Ratio		
- Current benefit obligations	$ 722,827	$ 738,123
- Funding ratio (AVA)	76.41%	75.09%
- Funding ratio (MVA)	82.07%	74.51%
Accrued Liability Funding Ratio		
- Actuarial accrued liability	$ 741,850	$ 760,955
- Funding ratio (AVA)	74.45%	72.84%
- Funding ratio (MVA)	79.96%	72.27%
Projected Benefit Funding Ratio		
- Current and expected future assets	$ 772,336	$ 769,002
- Current and expected future benefit obligations	853,902	884,313
- Projected benefit funding ratio (AVA)	90.45%	86.96%
Participant Data		
Active members		
- Number	845	823
- Projected annual earnings *(000s)*	64,136	66,592
- Average projected annual earnings	75,901	80,914
- Average age	41.9	42.1
- Average service	12.6	12.8
Service retirements	748	733
Survivors	185	182
Disability retirements	50	48
Deferred retirements	41	40
Terminated other non-vested	18	15
Total	**1,887**	**1,841**

Summary of Valuation Results

Effects of Changes

The following changes in plan provisions were recognized as of July 1, 2013:

- Member contributions as a percent of pay will increase from 12.4% to 13.4% beginning July 1, 2014 and to 14.4% beginning July 1, 2016. Employer contributions will increase from 18.6% to 20.1% beginning July 1, 2014 and to 21.6% beginning July 1, 2016.

- State contributions of $1 million will be made annually on October 1st beginning in 2013. Contributions continue until both the Public Employees Retirement Association Police and Fire Plan and the State Patrol Plan reach 90% funding (on a Market Value of Assets basis).

- Vesting for retirement benefits is ten years for members hired after June 30, 2013 (was five years for members hired after June 30, 2010).

- Vesting for survivor benefits is five years for members hired after June 30, 2013 (was five years for members hired after June 30, 2010).

- Allowable service used to determine benefits is limited to 33 years, with a refund of employee contributions for excess years of service. Members with at least 28 years of service as of July 1, 2013 are not subject to this service limit.

- For retirements after June 30, 2015, reduction for early retirement is 0.34% for each month that the member is under age 55 at the time of retirement.

- Post-retirement increases were reduced from 1.5% per year to 1.0% per year until an 85% funding ratio is reached. Increases revert to 2.5% when a 90% funding ratio is reached (funding ratio calculated using Market Value of Assets).

Refer to the Actuarial Basis section of this report for a complete description of these changes.

Summary of Valuation Results

Effects of Changes (Concluded)

The combined impact of the above changes was to decrease the accrued liability by $29.5 million and decrease the required contribution by 4.1% of pay, as follows:

	Before Plan Changes	Reflecting Plan Changes
Normal Cost Rate, % of Pay	21.7%	20.8%
Amortization of Unfunded Accrued Liability, % of pay	23.3%	20.1%
Expenses (% of Pay)	0.3%	0.3%
Total Required Contribution, % of Pay	45.3%	41.2%
Accrued Liability Funding Ratio	71.6%	74.5%
Projected Benefit Funding Ratio	87.7%	90.4%
Unfunded Accrued Liability (in millions)	$219.0	$189.5

The results in this report are based on prescribed retirement rates that were adopted as a result of the most recent experience study, dated February 2012. These rates do not reflect behavior changes that may occur as a result of the changes described above. In particular, the early retirement factor change may result in more retirements initially, and fewer early retirements after the new reduction factors are in effect. Experience that differs from the assumptions will create actuarial losses or gains that will increase or decrease the cost of the plan over time. We recommend regular experience studies for all plans, especially when there have been major changes in plan provisions.

Summary of Valuation Results

Valuation of Future Annual Post-Retirement Benefit Increases

A very important assumption affecting the valuation results is the expectation of future annual post-retirement benefit increases. The plan's accrued liability funding ratio (on a market value of assets basis and assuming 1.0% postretirement benefit increases in all future years) is currently 80.0%. If the plan reaches a funding ratio of 85% in the future, post-retirement increases will increase to 1.5%. If the plan reaches a funding ratio of 90% in the future, post-retirement increases will revert to the 2.5% level. Funded ratio is determined on a market value of assets basis.

We performed a projection of liabilities and assets, using the 2013 valuation results as a baseline and assuming future experience follows the valuation assumptions (including future investment returns of 8.0% for four years and 8.5% thereafter). In addition, the projection utilized the following methods and assumptions:

- Liabilities and normal cost assume future annual benefit increases at 2.5% level payable for all years.
- Cash flow assuming future annual benefit increases at current 1.0% level.
- Level normal cost as a percent of pay (assuming total payroll increases as assumed in the valuation for purposes of amortizing the unfunded liability).
- Current statutory contribution levels (i.e., including scheduled increases through 2016 but not including potential contribution increases under the contribution stabilizer statutes).

Based on these assumptions and methods, the projection indicates that the funded status of this plan is not expected to reach 85% within the next 15 years of the projection. The liabilities in this report are based on the assumption that the post-retirement benefit increase will remain at the reduced level of 1.0% indefinitely. If we assumed future post-retirement benefit increases of 2.5% instead of 1.0%, the actuarial accrued liability would be $859.3 million instead of $741.9 million, resulting in a funded ratio of 69.0% (on a market value basis) as of July 1, 2013.

Supplemental Information

The remainder of the report includes information supporting the results presented in the previous sections.

- **Plan assets** presents information about the plan's assets as reported by the Minnesota State Retirement System. The assets represent the portion of total fund liabilities that has been funded.

- **Membership data** presents and describes the membership data used in the valuation.

- **Development of costs** shows the liabilities for plan benefits and the derivation of the contribution amount.

- **Actuarial basis** describes the plan provisions, as well as the methods and assumptions used to value the plan. The valuation is based on the premise that the plan is ongoing.

- **Plan accounting under GASB No. 25 (as amended by GASB No. 50)** shows the disclosures required by GASB Statement No. 25 as amended by GASB Statement No. 50.

- **Glossary** defines the terms used in this report.

Plan Assets

Statement of Fiduciary Net Position *(Dollars in Thousands)*

	Market Value	
Assets	**June 30, 2013**	**June 30, 2012**
Cash, equivalents, short term securities	$ 15,451	$ 11,074
Fixed income	136,228	122,482
Equity	441,300	416,362
Other*	57,861	49,953
Total Cash, Investments, and Other Assets	**$ 650,840**	**$ 599,871**
Amounts receivable	590	584
Total Assets	**$ 651,430**	**$ 600,455**
Amounts payable*	(58,229)	(50,499)
Net Position Restricted for Pensions	**$ 593,201**	**$ 549,956**

** Includes $57,861 in Securities Lending Collateral as of June 30, 2013 and $49,953 as of June 30, 2012.*

Plan Assets

Reconciliation of Plan Assets *(Dollars in Thousands)*

The following exhibit shows the revenue, expenses and resulting assets of the Fund as reported by the Minnesota State Retirement System for the Plan's prior two fiscal years.

Change in Assets	**Market Value**	
Year Ending	**June 30, 2013**	**June 30, 2012**
1. Fund balance at market value at beginning of year	**$ 549,956**	**$ 568,279**
2. Contributions		
a. Member	7,703	7,753
b. Employer	11,482	11,620
c. Other sources	0	0
d. Total contributions	$ 19,185	$ 19,373
3. Investment income		
a. Investment income/(loss)	77,129	13,494
b. Investment expenses	(814)	(750)
c. Net investment income/(loss)	76,315	12,744
4. Other	0	0
5. Total income: *(2.d.) + (3.c.) + (4.)*	**$ 95,500**	**$ 32,117**
6. Benefits Paid		
a. Annuity benefits	(52,057)	(50,007)
b. Refunds	(7)	(275)
c. Total benefits paid	(52,064)	(50,282)
7. Expenses		
a. Other	(1)	0
b. Administrative	(190)	(158)
c. Total expenses	(191)	(158)
8. Total disbursements: *(6.c.) + (7.c.)*	**(52,255)**	**(50,440)**
9. Fund balance at market value at end of year: *(1.) + (5.) + (8.)*	**$ 593,201**	**$ 549,956**
10. Approximate return on market value of assets	14.3%	2.3%

Plan Assets

Actuarial Asset Value *(Dollars in Thousands)*

			June 30, 2013		**June 30, 2012**	
1. Market value of assets available for benefits			**$ 593,201**		**$ 549,956**	
2. Determination of average balance						
a. Total assets available at beginning of year			549,956		568,279	
b. Total assets available at end of year			593,201		549,956	
c. Net investment income for fiscal year			76,315		12,744	
d. Average balance *[a. + b. - c.] / 2*			533,421		552,746	
3. Expected return* *[8.0% x 2.d.] (8.5% in 2012)*			42,674		46,983	
4. Actual return			76,315		12,744	
5. Current year asset gain/(loss) *[4. - 3.]*			33,641		(34,239)	
6. Unrecognized asset returns						
	Original Amount	**Unrecognized Amount %**	**Unrecognized Amount $**	**Unrecognized Amount %**	**Unrecognized Amount $**	
a. Year ended June 30, 2013	$ 33,641	80%	$ 26,913		N/A	
b. Year ended June 30, 2012	(34,239)	60%	(20,543)	80%	$ (27,391)	
c. Year ended June 30, 2011	70,693	40%	28,277	60%	42,416	
d. Year ended June 30, 2010	31,175	20%	6,235	40%	12,470	
e. Year ended June 30, 2009	(158,914)		N/A	20%	(31,783)	
f. Unrecognized return adjustment			**$ 40,882**		**$ (4,288)**	
7. **Actuarial value at end of year** *(1. - 6.f.)*			**$ 552,319**		**$ 554,244**	
8. Approximate return on actuarial value of assets during fiscal year			5.8%		4.0%	
9. Ratio of actuarial value of assets to market value of assets			0.93		1.01	

** The expected return is 8.5% prior to fiscal year 2013; beginning with fiscal year 2013 the expected return is 8.0%.*

Membership Data

Distribution of Active Members

	Years of Service as of June 30, 2013									
Age	**<3***	**3 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35+**	**Total**
< 25	11									**11**
Avg. Earnings	20,003									**20,003**
25 - 29	41	23	7							**71**
Avg. Earnings	39,945	59,564	66,278							**48,897**
30 - 34	29	19	40	7						**95**
Avg. Earnings	48,172	56,895	71,042	74,302						**61,471**
35 - 39	12	11	66	52	12					**153**
Avg. Earnings	45,789	61,564	72,420	77,669	82,451					**72,122**
40 - 44	5	7	55	63	48	2				**180**
Avg. Earnings	58,869	66,001	75,521	76,566	78,936	84,289				**76,062**
45 - 49	1	3	13	35	41	43	11			**147**
Avg. Earnings	51,088	58,988	75,455	74,869	78,409	81,213	82,122			**77,821**
50 - 54	4		14	13	33	24	43	9		**140**
Avg. Earnings	63,336		80,467	79,069	78,805	81,835	84,305	83,864		**81,088**
55 - 59	2		11	6	6	7	6	9		**47**
Avg. Earnings	85,282		77,424	81,904	76,589	84,361	84,605	87,574		**82,117**
60 - 64								1		**1**
Avg. Earnings								75,806		**75,806**
65 - 69										
Avg. Earnings										
70+										
Avg. Earnings										
Total	**105**	**63**	**206**	**176**	**140**	**76**	**60**	**19**		**845**
Avg. Earnings	**43,558**	**59,796**	**73,777**	**76,831**	**78,952**	**81,780**	**83,935**	**85,198**		**72,171**

* *This exhibit does not reflect service earned in other MSRS or Combined Service Annuity benefits. It should not be relied upon as an indicator of non-vested status.*

In each cell, the top number is the count of active participants for the age/service combination and the bottom number is average valuation earnings for the fiscal year ending on the valuation date.

Membership Data

Distribution of Service Retirements

	Years Retired as of June 30, 2013							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
<50								
Avg. Benefit								
50 - 54	8	15						**23**
Avg. Benefit	43,627	47,927						**46,432**
55 - 59	21	74	28					**123**
Avg. Benefit	59,895	61,670	45,312					**57,644**
60 - 64	1	26	91	23				**141**
Avg. Benefit	3,353	58,848	53,868	49,962				**53,791**
65 - 69		3	25	115	7			**150**
Avg. Benefit		27,000	57,366	56,021	52,817			**55,515**
70 - 74			4	38	76	2		**120**
Avg. Benefit			54,046	61,592	64,447	60,198		**63,125**
75 - 79				9	19	44		**72**
Avg. Benefit				67,702	73,977	67,098		**68,989**
80 - 84					1	20	40	**61**
Avg. Benefit					80,203	72,362	64,753	**67,501**
85 - 89						1	34	**35**
Avg. Benefit						69,891	67,656	**67,720**
90+						1	22	**23**
Avg. Benefit						64,289	62,449	**62,529**
Total	**30**	**118**	**148**	**185**	**103**	**68**	**96**	**748**
Avg. Benefit	**53,672**	**58,420**	**52,845**	**56,981**	**65,568**	**68,443**	**65,253**	**59,543**

In each cell, the top number is the count of retired participants for the age/years retired combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Survivors

	Years Since Death as of June 30, 2013							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
<45			6	5	2			**13**
Avg. Benefit			16,562	10,837	11,411			**13,568**
45 - 49				1				**1**
Avg. Benefit				31,539				**31,539**
50 - 54		3	1	1	1			**6**
Avg. Benefit		9,099	15,759	13,844	60,518			**19,570**
55 - 59	4	2	3	2				**11**
Avg. Benefit	24,641	16,077	43,945	26,878				**28,755**
60 - 64		2	8	1	2		1	**14**
Avg. Benefit		26,053	22,117	26,389	50,400		12,412	**26,332**
65 - 69	2	3	10	6	3	1		**25**
Avg. Benefit	29,497	30,842	24,841	36,372	27,077	31,797		**29,248**
70 - 74	1	3	7	4	4			**19**
Avg. Benefit	54,451	27,851	44,529	43,274	41,973			**41,616**
75 - 79	3	2	1	3	1	4	1	**15**
Avg. Benefit	33,892	61,787	16,938	40,014	33,231	14,217	40,284	**32,841**
80 - 84	2	3	9	8	1	3	7	**33**
Avg. Benefit	37,783	32,505	40,324	42,035	33,764	21,208	33,176	**36,421**
85 - 89		4	8	5	2	5	4	**28**
Avg. Benefit		29,286	43,235	40,132	42,238	32,271	62,186	**41,366**
90+		4	6	3	2	3	2	**20**
Avg. Benefit		26,589	24,187	30,145	24,783	39,988	28,180	**28,390**
Total	**12**	**26**	**59**	**39**	**18**	**16**	**15**	**185**
Avg. Benefit	**32,438**	**28,163**	**31,439**	**33,807**	**35,239**	**27,100**	**39,335**	**32,177**

In each cell, the top number is the count of survivors for the age/years since death combination and the bottom number is the average annual benefit amount.

Membership Data

Distribution of Disability Retirements

	Years Disabled as of June 30, 2013							
Age	**<1**	**1 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25+**	**Total**
< 45		1	2					**3**
Avg. Benefit		36,712	29,930					**32,190**
45 - 49	1	1	3	1				**6**
Avg. Benefit	38,161	40,726	48,954	30,055				**42,634**
50 - 54	1	4	2					**7**
Avg. Benefit	53,202	54,715	50,563					**53,313**
55 - 59	1	1	2	2	2			**8**
Avg. Benefit	40,142	52,034	45,441	34,104	31,985			**39,405**
60 - 64			3	3	1	1		**8**
Avg. Benefit			46,039	28,432	46,801	41,938		**39,019**
65 - 69			2	5	1	1		**9**
Avg. Benefit			43,384	39,110	60,584	51,335		**43,804**
70 - 74					1	1	2	**4**
Avg. Benefit					66,555	24,483	43,868	**44,694**
75+						2	3	**5**
Avg. Benefit						61,997	46,777	**52,865**
Total	**3**	**7**	**14**	**11**	**5**	**5**	**5**	**50**
Avg. Benefit	**43,835**	**49,762**	**44,544**	**34,465**	**47,582**	**48,350**	**45,613**	**43,806**

In each cell, the top number is the count of disabled participants for the age/years since disability combination and the bottom number is the average annual benefit amount.

Membership Data

Reconciliation of Members

		Terminated		Recipients			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on 7/1/2012	**823**	**40**	**15**	**733**	**48**	**182**	**1,841**
New Members	57	0	0	0	0	0	**57**
Return to active	0	0	0	0	0	0	**0**
Terminated non-vested	(2)	0	2	0	0	0	**0**
Service retirements	(26)	(3)	0	29	0	0	**0**
Terminated deferred	(4)	4	0	0	0	0	**0**
Terminated refund/transfer	0	0	0	0	0	0	**0**
Deaths	0	0	(2)	(15)	(1)	(9)	**(27)**
New beneficiary	0	0	0	0	0	12	**12**
Disabled	(3)	0	0	0	3	0	**0**
Data correction	0	0	3	1	0	0	**4**
Net change	22	1	3	15	2	3	**46**
Members on 6/30/2013	**845**	**41**	**18**	**748**	**50**	**185**	**1,887**

Terminated Member Statistics on June 30, 2013	Deferred Retirement	Other Non-Vested	Total
Number	41	18	59
Average age	44.8	38.4	42.8
Average service	7.7	0.7	5.6
Average annual benefit, with augmentation to Normal Retirement Date and 30% CSA load	$ 27,375	N/A	$27,375
Average refund value, with 30% CSA load	$ 90,384	$5,333	$64,436

Development of Costs

Actuarial Valuation Balance Sheet *(Dollars in Thousands)*

The actuarial balance sheet is based on the principle that the long-term projected benefit obligations of the plan should be ideally equal to the long-term resources available to fund those obligations. The resources available to meet projected obligations for current members consist of current fund assets plus the present value of anticipated future contributions intended to fund benefits for current members. In the exhibit below, B.2 is the estimated present value of contributions to fund the normal cost rate for current members until their respective termination dates. Item B.1 is the present value of the total 32.56% statutory contribution net of normal cost and anticipated plan expenses during the period from the valuation date to the statutory unfunded amortization date.

The contributions made in excess of amounts required for current benefit payments are accumulated as a reserve to help meet benefit payments in later years. It is this reserve system which permits the establishment of a level rate of contribution each year.

			June 30, 2013
A. Actuarial Value of Assets			$ 552,319
B. Expected Future Assets			
1. Present value of expected future statutory supplemental contributions			107,965
2. Present value of future normal cost contributions*			112,052
3. Total expected future assets: *(1.) + (2.)*			$ 220,017
C. Total Current and Expected Future Assets			$ 772,336
D. Current Benefit Obligations**			
1. Benefit recipients	**Non-Vested**	**Vested**	**Total**
a. Service retirements	$ 0	$ 439,129	$ 439,129
b. Disability retirements	0	24,210	24,210
c. Survivors	0	43,666	43,666
2. Deferred retirements with augmentation	0	6,711	6,711
3. Former members without vested rights***	60	0	60
4. Active members	1,455	207,596	209,051
5. Total Current Benefit Obligations	$ 1,515	$ 721,312	$ 722,827
E. Expected Future Benefit Obligations			$ 131,075
F. Total Current and Expected Future Benefit Obligations****			$ 853,902
G. Unfunded Current Benefit Obligations: *(D.5.) - (A.)*			$ 170,508
H. Unfunded Current and Future Benefit Obligations: *(F.) - (C.)*			$ 81,566
I. Accrued Benefit Funding Ratio: *(A.)/(D.5.)*			76.41%
J. Projected Benefit Funding Ratio: *(C.)/(F.)*			90.45%

* *Includes $1,000,000 state contribution; excludes future scheduled contribution increases*

** *Present value of credited projected benefits (projected compensation, current service)*

*** *Former members who have not satisfied vesting requirements and have not collected a refund of member contributions as of the valuation date*

**** *Present value of projected benefits (projected compensation, projected service)*

Development of Costs

Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate (*Dollars in Thousands)*

	Actuarial Present Value of Projected Benefits	Actuarial Present Value of Future Normal Costs	Actuarial Accrued Liability
A. Determination of Actuarial Accrued Liability (AAL)			
1. Active members			
a. Retirement annuities	$ 315,759	$ 96,978	$ 218,781
b. Disability benefits	16,487	8,839	7,648
c. Survivor's benefits	4,133	2,760	1,373
d. Deferred retirements	3,485	2,871	614
e. Refunds*	262	604	(342)
f. Total	$ 340,126	$ 112,052	$ 228,074
2. Deferred retirements with future augmentation	6,711	0	6,711
3. Former members without vested rights	60	0	60
4. Benefit recipients	507,005	0	507,005
5. Total	$853,902	$ 112,052	$ 741,850
B. Determination of Unfunded Actuarial Accrued Liability (UAAL)			
1. Actuarial accrued liability			$ 741,850
2. Current assets (AVA)			552,319
3. Unfunded actuarial accrued liability			$ 189,531
C. Determination of Supplemental Contribution Rate**			
1. Present value of future payrolls through the amortization date of June 30, 2037			$ 939,640
2. Supplemental contribution rate: *(B.3.) / (C.1.)*			20.17% ***

* *Includes non-vested refunds and non-married survivor benefits only.*

** *The amortization of the unfunded actuarial accrued liability (UAAL) using the current amortization method results in initial payments less than the "interest only" payment on the UAAL. Payments less than the interest only amount will result in the UAAL increasing for an initial period of time.*

*** *The amortization factor as of June 30, 2013 is 14.650746.*

Development of Costs

Changes in Unfunded Actuarial Accrued Liability (UAAL) *(Dollars in Thousands)*

	Year Ending June 30, 2013		
	Actuarial Accrued Liability	**Current Assets**	**Unfunded Actuarial Accrued Liability**
A. Unfunded Actuarial Accrued Liability at beginning of year	$ 760,955	$ 554,244	$ 206,711
B. Changes due to interest requirements and current rate of funding			
1. Normal cost and expenses	$ 14,594	$ 0	$ 14,594
2. Benefit payments	(52,064)	(52,064)	0
3. Contributions	0	19,185	(19,185)
4. Interest on A., B.1., B.2. and B.3.	61,975	43,024	18,951
5. Total *(B.1. + B.2. + B.3. + B.4.)*	24,505	10,145	14,360
C. Expected Unfunded Actuarial Accrued Liability at end of year *(A. + B.5.)*			$ 221,071
D. Increase (decrease) due to actuarial losses (gains) because of experience deviations from expected			
1. Age and service retirements			$ (232)
2. Disability retirements			(42)
3. Death-in-service benefits			(177)
4. Withdrawals			96
5. Salary increases			(14,364)
6. Investment income			12,070
7. Mortality of annuitants			2,554
8. Other items			(1,965)
9. Total			(2,060)
E. Unfunded Actuarial Accrued Liability at end of year before plan amendments and changes in actuarial assumptions *(C. + D.9.)*			$ 219,011
F. Change in Unfunded Actuarial Accrued Liability due to changes in plan provisions			(29,480)
G. Change in Unfunded Actuarial Accrued Liability due to changes in actuarial assumptions			0
H. Change in Unfunded Actuarial Accrued Liability due to changes in decrement timing and miscellaneous methodology			0
I. Unfunded Actuarial Accrued Liability at end of year *(E. + F. + G. + H.)**			$ 189,531

** The Unfunded Actuarial Accrued Liability on a market value of assets basis is $148,649.*

Development of Costs

Determination of Contribution Sufficiency/(Deficiency) *(Dollars in Thousands)*

The required contribution is defined in statutes as the sum of normal cost, a supplemental contribution to amortize the UAAL, and an allowance for expenses.

	Percent of Payroll	Dollar Amount
A. Statutory contributions - Chapter 353E		
1. Employee contributions	12.40%	$ 7,953
2. Employer contributions	18.60%	11,929
3. State contributions***	1.56%	1,000
4. Total	32.56%	$ 20,882
B. Required contributions - Chapter 356		
1. Normal cost		
a. Retirement benefits	17.96%	$ 11,518
b. Disability benefits	1.69%	1,084
c. Survivors	0.54%	346
d. Deferred retirement benefits	0.48%	308
e. Refunds*	0.11%	71
f. Total	20.78%	$ 13,327
2. Supplemental contribution amortization of Unfunded Actuarial Accrued Liability by June 30, 2037	20.17%	$ 12,936
3. Allowance for expenses	0.29%	$ 186
4. Total	41.24% **	$ 26,449
C. Contribution Sufficiency/(Deficiency) *(A.4. - B.4.)*	(8.68)%	$ (5,567)

Note: Projected annual payroll for fiscal year beginning on the valuation date: $64,136.

** Includes non-vested refunds and non-married survivor benefits only.*

*** The required contribution on a Market Value of Assets basis is 36.89% of payroll.*

**** Contributions paid until both the Public Employees Retirement Association Police and Fire Plan and the State Patrol Plan reach 90% funding (on a Market Value of Assets basis).*

Actuarial Basis

Actuarial Methods

All actuarial methods are prescribed by Minnesota Statutes, the Legislative Commission on Pensions and Retirement, or the MSRS Board of Directors. Different methodologies may also be reasonable and results based on other methodologies would be different.

Actuarial Cost Method

Actuarial Accrued Liability and required contributions in this report are computed using the Entry Age Normal Cost Method. This method is prescribed by Minnesota statute. Under this method, a normal cost is developed by amortizing the actuarial value of benefits expected to be received by each active participant (as a level percentage of pay) over the total working lifetime of that participant, from hire to termination. Age as of the valuation date was calculated based on the dates of birth provided by the Fund. Entry age for valuation purposes was calculated as the age on the valuation date minus the provided years of service on the valuation date.

To the extent that current assets and future normal costs do not support participants' expected future benefits, an Unfunded Actuarial Accrued Liability ("UAAL") develops. The UAAL is amortized over the statutory amortization period using level percent of payroll assuming payroll increases. The total contribution developed under this method is the sum of normal cost, expenses, and the payment toward the UAAL.

Select and Ultimate Discount Rate Methodology

Based on direction from the LCPR's actuary, the select and ultimate discount rate methodology was applied to the entry age normal results as follows:

1. The present value of projected benefits was calculated using the prescribed select and ultimate discount rates.
2. An equivalent single interest rate that produced approximately the same present value of projected benefits was determined.
3. The equivalent single interest rate was used to determine the entry age normal accrued liability and normal cost.

The equivalent single interest rate used in this valuation was 8.37% (8.35% last year).

Funding Objective

The fundamental financing objective of the fund is to establish contribution rates which, when expressed as a percentage of active member payroll, will remain approximately level from generation to generation and meet the required deadline for full funding.

Decrement Timing

All decrements are assumed to occur mid-fiscal year.

Actuarial Basis

Actuarial Methods (Concluded)

Asset Valuation Method

The assets are valued based on a five-year moving average of expected and market values (five-year average actuarial value) determined as follows:

- At the end of each plan year, an average asset value is calculated as the average of the market asset value at the beginning and end of the fiscal year net of investment income for the fiscal year;
- The investment gain or (loss) is taken as the excess of actual investment income over the expected investment income based on the average asset value as calculated above;
- The investment gain or (loss) so determined is recognized over five years at 20% per year;
- The asset value is the sum of the market asset value plus the scheduled recognition of investment gains or (losses) during the current and the preceding four fiscal years.

The Minnesota Post Retirement Investment Fund (MPRIF) was dissolved on June 30, 2009. For the purpose of determining the actuarial value of assets, the MPRIF asset loss for the fiscal year ending June 30, 2009 was recognized incrementally over five years at 20% per year, similar to the smoothing described above. Prior to June 30, 2009, MPRIF asset gains and losses were not smoothed.

Payment on the Unfunded Actuarial Accrued Liability

Payment equals a level percentage of payroll each year to the statutory amortization date of June 30, 2037 assuming payroll increases of 3.75% per annum. If there is a negative Unfunded Actuarial Accrued Liability, the surplus amount is amortized over 30 years as a level percentage of payroll. If the unfunded liability increases due to changes in benefits, assumptions, or methods, the statutory amortization date will be re-determined. Projected payroll is multiplied by 0.959 in the determination of the present value of future payroll to account for timing differences (as required by the Standards for Actuarial Work).

Changes in Methods since Prior Valuation

None.

Actuarial Basis

Summary of Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the plan. All actuarial assumptions are prescribed by Minnesota Statutes, the Legislative Commission on Pensions and Retirement (LCPR), or the MSRS Board of Directors. These parties are responsible for selecting the assumptions used for this valuation. The assumptions prescribed are based on the last experience study, dated February 2012, prepared by a former actuary.

The Allowance for Combined Service Annuity was also based on a recommendation by a former actuary. We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of the assignment.

Investment return	Select and Ultimate Rates: July 1, 2013 to June 30, 2017 7.00% per annum post-retirement 8.00% per annum pre-retirement July 1, 2017 and later 7.50% per annum post-retirement 8.50% per annum pre-retirement
Benefit increases after retirement	Payment of 1.00% annual benefit increases after retirement are accounted for by using the 7.50% post-retirement assumption (7.00% during 4-year select period), as required by Minnesota Statute. Mathematically, this assumption funds a post-retirement benefit increase of 0.9% instead of 1.0%. This valuation does not reflect any potential additional benefit increases payable if the plan's funding ratio exceeds 85%.
Salary increases	Reported salary at valuation date increased according to the rate table, to current fiscal year and annually for each future year. Prior fiscal year salary is annualized for members with less than one year of service.
Inflation	3.00% per year.
Payroll growth	3.75% per year.
Mortality rates	
Healthy Pre-retirement	RP-2000 employee generational mortality table projected with mortality improvement scale AA, white collar adjustment.
Healthy Post-retirement	RP-2000 annuitant generational mortality table projected with mortality improvement scale AA, white collar adjustment, set back two years for males and set forward one year for females. The RP-2000 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 15 to 70 and the annuitant mortality table contains mortality rates for ages 50 to 95. We have applied the annuitant mortality table for active members beyond age 70 until the assumed retirement age and the employee mortality table for annuitants younger than age 50.
Disabled	RP-2000 annuitant generational mortality table projected with mortality improvement scale AA, white collar adjustment, set back two years for males and set forward one year for females.
Retirement	Members retiring from active status are assumed to retire according to the age related rates shown in the rate table. Members who have attained the highest assumed retirement age are assumed to retire in one year.

Actuarial Basis

Summary of Actuarial Assumptions (Continued)

Withdrawal	Select and Ultimate rates based on actual experience. Ultimate rates after the third year are shown in rate table. Select rates in the first three years are: Year — Select Withdrawal Rates 1 — 5% 2 — 2% 3 — 2%
Disability	Age-related rates based on experience; see table of sample rates. All incidences are assumed to be duty-related.
Allowance for combined service annuity	Liabilities for former members are increased by 30.00% to account for the effect of some participants having eligibility for a Combined Service Annuity.
Administrative expenses	Prior year administrative expenses expressed as percentage of prior year projected payroll.
Refund of contributions	All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit. Account balances for deferred members accumulate interest until normal retirement date and are discounted back to the valuation date.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at age 55.
Percentage married	85% of active members are assumed to be married. Actual marital status is used for members in payment status.
Age of spouse	Females are assumed to be two years younger than their male spouses.
Eligible children	Each member may have two dependent children depending on member's age. Assumed first born child born at member's age 28 and second born child at member's age 31.
Form of payment	Married members retiring from active status are assumed to elect subsidized joint and survivor form of annuity as follows: Males: 15% elect 50% Joint & Survivor option 25% elect 75% Joint & Survivor option 35% elect 100% Joint & Survivor option Females: 25% elect 50% Joint & Survivor option 30% elect 75% Joint & Survivor option 5% elect 100% Joint & Survivor option Remaining married members and unmarried members are assumed to elect the Straight Life option.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement operation	Withdrawal decrements do not operate during retirement eligibility.
Service credit accruals	It is assumed that members accrue one year of service credit per year.

Actuarial Basis

Summary of Actuarial Assumptions (Continued)

Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided. There are no members reported with missing gender or birth dates. In cases where submitted data was missing or incomplete, the following assumptions were applied: Data for active members: There were no members reported with missing salary and no members reported with missing service. Data for terminated members: There were two members reported without a benefit. We calculated benefits for these members using the reported Average Salary, credited service and termination date. Data for members receiving benefits: There were no members reported without a benefit. There were no survivors reported with an expired benefit. There were no retirees reported with a bounce back annuity and an unreasonable reduction factor.
Changes in actuarial assumptions	The post-retirement investment return assumption was changed from 7.0% (6.5% for the select period ending June 30, 2017 to 7.5% (7.0% for the select period ending June 30, 2017) to reflect the post-retirement change from 1.5% to 1.0%.

Actuarial Basis

Summary of Actuarial Assumptions (Continued)

	Rate (%)*					
	Healthy Post-Retirement Mortality**		Healthy Pre-Retirement Mortality**		Disability Mortality*	
Age	Male	Female	Male	Female	Male	Female
20	0.03%	0.02%	0.03%	0.02%	0.03%	0.02%
25	0.04	0.02	0.04	0.02	0.04	0.02
30	0.04	0.03	0.04	0.03	0.04	0.03
35	0.05	0.05	0.06	0.05	0.05	0.05
40	0.08	0.07	0.09	0.06	0.08	0.07
45	0.11	0.11	0.13	0.10	0.11	0.11
50	0.17	0.25	0.20	0.16	0.17	0.25
55	0.57	0.39	0.27	0.24	0.57	0.39
60	0.57	0.61	0.43	0.38	0.57	0.61
65	0.92	1.01	0.67	0.59	0.92	1.01
70	1.58	1.69	0.98	0.88	1.58	1.69

* *Generally, mortality rates are expected to increase as age increases. Due to the combination of pre-retirement rates, post-retirement rates, the white collar adjustment, and Projection Scale AA, the prescribed mortality tables have a few ages where assumed mortality decreases slightly instead of increases. We have used the rates as prescribed, but note that the prescribed assumption may not be reasonable at every age. If the rates were reasonably adjusted so that they decreased at all ages, we would not expect the valuation results to be materially different.*

** *These rates were adjusted for mortality improvements using projection scale AA.*

	Withdrawal Rates After Third Year		Disability Retirement	
Age	Male	Female	Male	Female
20	1.47%	1.47%	0.03%	0.03%
25	1.13	1.13	0.05	0.05
30	0.80	0.80	0.06	0.06
35	0.47	0.47	0.09	0.09
40	0.40	0.40	0.14	0.14
45	0.40	0.40	0.23	0.23
50	0.00	0.00	0.40	0.40
55	0.00	0.00	0.70	0.70
60	0.00	0.00	1.13	1.13
65	0.00	0.00	0.00	0.00

Actuarial Basis

Summary of Actuarial Assumptions (Concluded)

Age	Retirement		Salary Scale Year	Salary Scale Increase
50	7 %		1	8.00%
51	6		2	7.50
52	6		3	7.00
53	6		4	6.75
54	3		5	6.50
55	65		6	6.25
56	50		7	6.00
57	30		8	5.85
58	20		9	5.70
59	20		10	5.55
60+	100		11	5.40
			12	5.25
			13	5.10
			14	4.95
			15	4.80
			16	4.65
			17	4.50
			18	4.35
			19	4.20
			20	4.05
			21+	4.00

Actuarial Basis

Summary of Plan Provisions

Following is a summary of the major plan provisions used in the valuation of this report. MSRS is solely responsible for the validity, accuracy and comprehensiveness of this information. If any of the plan provisions shown below are not accurate and complete, the valuation results may differ significantly from those shown in this report and may require a revision of this report.

Plan year	July 1 through June 30
Eligibility	State troopers, conservation officers, certain crime bureau and gambling enforcement officers, and certain other persons listed in Minnesota Statutes 352B.011 subdivision 10.
Contributions	Percent of Salary **<u>Effective Date</u>** — **<u>Member</u>** — **<u>Employer</u>** July 1, 2011 – June 30, 2014 — 12.40% — 18.60% July 1, 2014 – June 30, 2016 — 13.40% — 20.10% July 1, 2016 and later — 14.40% — 21.60% Member contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).
State Contributions	$1 million paid annually on October 1 until both the Public Employees Retirement Association Police and Fire Plan and the State Patrol Plan become 90% funded (on a Market Value of Assets basis).
Allowable service	Service during which member contributions were deducted. Includes period receiving temporary Worker's Compensation and reduced salary from employer. See Normal Retirement benefit definition below for information about service limits.
Salary	Salaries excluding lump sum payments at separation.
Average salary	Average of the five highest years of Salary. Average Salary is based on all Allowable Service if less than five years. Average Salary is based on all years without regard to any service limits.
Retirement	
<u>Normal retirement benefit</u>	
Age/Service requirement	Age 55 and three years (ten years if first hired after June 30, 2013) of Allowable Service.
Amount	3.00% of Average Salary for each year of Allowable Service up to 33 years. Members with at least 28 years of service as of July 1, 2013 are not subject to this service limit. Member contributions made after the service cap will be refunded at retirement.
<u>Early retirement benefit</u>	
Age/Service requirement	Age 50 and three years (ten years if first hired after June 30, 2013) of Allowable Service.
Amount	Normal Retirement Benefit based on Allowable Service and Average Salary at retirement reduced by 1/10% for each month that the member is under age 55. If the effective date of retirement is after June 30, 2015, the reduction is 0.34% for each month that the member is under age 55 at the time of retirement.
<u>Form of payment</u>	Life annuity. Actuarially equivalent options are: 50%, 75%, or 100% Joint and Survivor, or 15-year certain. If a Joint and Survivor benefit is elected and the beneficiary predeceases the annuitant, the annuitant's benefit increases to the Life Annuity amount. This "bounce back" is subsidized by the plan.

Actuarial Basis

Summary of Plan Provisions (Continued)

Retirement (Concluded)	
Benefit increases	Benefit recipients receive future annual 1.0% benefit increases. When the funding ratio reaches 85%, the benefit increase will increase to 1.5%; the benefit will revert to 2.5% when the funding ratio reaches 90% (funding ratio is determined using Market Value of Assets). A benefit recipient who has been receiving a benefit for at least 12 full months as of June 30 will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of June 30 will receive a pro rata increase.
Disability	
Occupational disability benefit	
Age/Service requirement	Member who cannot perform his duties as a direct result of a disability relating to an act of duty.
Amount	60% of Average Salary plus 3.00% of Average Salary for each year in excess of 20 years of Allowable Service (pro rata for completed months). Payments cease at age 65 or earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability.
Non-duty disability benefit	
Age/Service requirement	At least one year of Allowable Service and disability not related to covered employment.
Amount	Normal Retirement Benefit based on Allowable Service (minimum of 15 years) and Average Salary at disability without reduction for commencement before age 55. Payments cease at age 65 or earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability.
Retirement after disability	
Age/Service requirement	Age 65 with continued disability.
Amount	Optional annuity continues. Otherwise, normal retirement benefit equal to the disability benefit paid, or an actuarially equivalent option.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement.

Actuarial Basis

Summary of Plan Provisions (Continued)

Death

Surviving spouse benefit

Age/Service requirement	Member who is active or receiving a disability benefit or former member.
Amount	50% of Average Salary if member was active or occupational disability and either had less than three years (five years if first hired after June 30, 2013) of Allowable Service or was under age 55. Annuity is paid for life. Surviving spouse receives the 100% joint and survivor benefit commencing on the member's 55th birthday if member was active or a disability with three years (five years if first hired after June 30, 2013) of Allowable Service. A spouse who had been receiving the 50% benefit shall be entitled to the greater benefit. The surviving spouse of a former member receives the 100% joint and survivor benefit commencing on the member's 55th birthday if former member had three years (five years if first hired after June 30, 2013) of Allowable Service.
Benefit increases	Same as for retirement

Surviving dependent children's benefit

Age/Service requirement	Member who is active or receiving a disability benefit. Child must be unmarried, under age 18 (or 23 if full-time student) and dependent upon the member.
Amount	10% of Average Salary for each child and $20 per month prorated among all dependent children. Benefit must not be less than 50% nor exceed 70% of Average Salary.
Benefit increases	Same as for retirement.

Refund of contributions

Age/Service requirement	Member dies before receiving any retirement benefits and survivor benefits are not payable.
Amount	Member contributions with 6.00% interest compounded daily until June 30, 2011 and 4.00% thereafter.

Actuarial Basis

Summary of Plan Provisions (Continued)

Termination	
Refund of contributions	
Age/service requirement	Termination of state service.
Amount	Member contributions with 6.00% interest compounded daily to June 30, 2011 and 4.00% thereafter. If a member is vested, a deferred annuity may be elected in lieu of a refund.
Deferred benefit	
Age/service requirement	Three years (ten years if first hired after June 30, 2013) of Allowable Service.
Amount	Benefit is computed under law in effect at termination and increased by the following annual augmentation percentage: (a.) 0.00% before July 1, 1971; (b.) 5.00% from July 1, 1971 to January 1, 1981; (c.) 3.00% thereafter (2.50% if hired after June 30, 2006) until January 1, 2012; and (d.) 2.00% after December 31, 2011 until the annuity begins. Amount is payable at normal or early retirement. If a member terminated employment prior to July 1, 1997 but was not eligible to commence their pension before July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Optional form conversion factors	Actuarially equivalent factors based on RP-2000 for healthy annuitants, white collar adjustment, projected to 2027 using scale AA, set back two years for males and set forward one year for females, blended 95% males, and 7.0% interest.
Combined service annuity	Members are eligible for combined service benefits if they: (a.) Have sufficient allowable service in total that equals or exceeds the applicable service credit vesting requirement of the retirement plan with the longest applicable service credit vesting requirement; and (b.) Have at least six months of allowable service credit in each plan worked under; and (c.) Are not in receipt of a benefit from another plan, or have applied for benefits with an effective date within one year. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans are combined in order to determine eligibility for early retirement. (b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.

Actuarial Basis

Summary of Plan Provisions (Concluded)

Changes in plan provisions	Member contributions as a percent of pay will increase from 12.4% to 13.4% beginning July 1, 2014 and to 14.4% beginning July 1, 2016. Employer contributions will increase from 18.6% to 20.1% beginning July 1, 2014 and to 21.6% beginning July 1, 2016. State contributions of $1 million will be made annually on October 1 beginning in 2013. Contributions continue until both PERA P&F and MSRS State Patrol reach 90% funding (on a Market Value of Assets basis). Vesting for retirement benefits is ten years for members hired after June 30, 2013 (was five years for members hired after June 30, 2010). Vesting for survivor benefits is five years for members hired after June 30, 2013 (was five years for members hired after June 30, 2010). Allowable service used to determine benefits is limited to 33 years, with a refund of employee contributions for excess years of service. Members with at least 28 years of service as of July 1, 2013 are not subject to this service limit. For retirements after June 30, 2015, reduction for early retirement is 0.34% for each month that the member is under age 55 at the time of retirement. Post-retirement increases were reduced from 1.5% per year to 1.0% per year until an 85% funding ratio is reached. Increases revert to 2.5% when a 90% funding ratio is reached (funding ratio calculated using Market Value of Assets).

Plan Accounting Under GASB No. 25 (as amended by GASB No. 50)

Provided below is information required under GASB Statement No. 25 as amended by GASB Statement No. 50 - Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans as amended by GASB Statement No. 50.

Schedule of Funding Progress[1] *(Dollars in Thousands)*

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a)/(b)	Actual Covered Payroll (Previous FY) (c)	UAAL as a Percentage of Covered Payroll [(b)-(a)]/(c)
7-1-1991	$ 200,068	$ 224,033	$ 23,965	89.30%	$ 32,365	74.05 %
7-1-1992	222,314	233,656	11,342	95.15	32,882	34.49
7-1-1993	244,352	258,202	13,850	94.64	35,765	38.73
7-1-1994	262,570	275,377	12,807	95.35	35,341	36.24
7-1-1995	284,918	283,078	(1,840)	100.65	37,518	(4.90)
7-1-1996	323,868	303,941	(19,927)	106.56	41,476	(48.04)
7-1-1997	375,650	332,427	(43,223)	113.00	41,996	(102.92)
7-1-1998	430,011	371,369	(58,642)	115.79	43,456	(134.95)
7-1-1999	472,687	406,215	(66,472)	116.36	45,333	(146.63)
7-1-2000	528,573	458,384	(70,189)	115.31	48,167	(145.72)
7-1-2001	572,815	489,483	(83,332)	117.02	48,935	(170.29)
7-1-2002	591,383	510,344	(81,039)	115.88	49,278	(164.45)
7-1-2003	591,521	538,980	(52,541)	109.75	54,175	(96.98)
7-1-2004	594,785	545,244	(49,542)	109.09	51,619	(95.98)
7-1-2005	601,220	566,764	(34,456)	106.08	55,142	(62.49)
7-1-2006	618,990	641,479	22,489	96.49	57,765	38.93
7-1-2007	617,901	673,444	55,543	91.75	61,498	90.32
7-1-2008	595,082	693,686	98,604	85.79	60,029	164.26
7-1-2009	584,501	725,334	140,833	80.58	61,511	228.96
7-1-2010	567,211	683,360	116,149	83.00	63,250	183.63
7-1-2011	563,046	700,898	137,852	80.33	63,250	217.95
7-1-2012	554,244	760,955	206,711	72.84	62,524 [2]	330.61
7-1-2013	552,319	741,850	189,531	74.45	62,121 [2]	305.10

[1] *Information prior to 2012 provided by prior actuary. See prior reports for additional detail.*
[2] *Assumed equal to actual member contributions divided by 12.4%.*

Plan Accounting Under GASB No. 25 (as amended by GASB No. 50)

Schedule of Contributions from the Employer and Other Contributing Entities[1]
(Dollars in Thousands)

The GASB Statement No. 25 required and actual contributions are as follows:

Plan Year Ended June 30	Actuarially Required Contribution Rate (a)	Actual Covered Payroll (b)	Actual Member Contributions (c)	Annual Required Contributions [(a)x(b)] - (c) = (d)	Actual Employer Contributions[2] (e)	Percentage Contributed (e)/(d)
1991	22.15%	$ 32,365	$ 2,751	$ 4,418	$ 4,825	109.21%
1992	22.58	32,882	2,795	4,630	4,893	105.68
1993	22.27	35,765	3,040	4,925	5,288	107.37
1994	21.94	35,341	3,004	4,750	5,159	108.61
1995	21.79	37,518	3,189	4,986	5,583	111.97
1996	21.34	41,476	3,484	5,367	5,742	106.99
1997	21.33	41,996	3,746	5,212	6,151	118.02
1998	15.67	43,456	3,634	3,176	5,475	172.39
1999	14.14	45,333	3,850	2,560	5,712	223.13
2000	15.17	48,167	4,044	3,263	6,069	185.99
2001	15.48	48,935	4,145	3,430	6,166	179.77
2002	14.00	49,278	4,215	2,684	6,209	231.33
2003	14.34	54,175	4,555	3,214	6,826	212.38
2004	17.81	51,619	4,493	4,700	6,504	138.39
2005	18.15	55,142	4,517	5,491	6,670	121.47
2006	19.84	57,765	4,719	6,741	7,055	104.66
2007	26.69	61,498	4,987	11,427	7,461	65.30
2008	29.90	60,029	5,594	12,355	8,279	67.01
2009	34.49	61,511	6,216	14,999	9,178	61.19
2010	38.16	63,250	6,726	17,410	10,104	58.04
2011	33.84	63,250	6,578	14,826	9,873	66.59
2012	36.25	62,524 [3]	7,753	14,912	11,620	77.92
2013	42.52	62,121 [3]	7,703	18,711	11,482	61.37
2014	41.24	N/A	N/A	N/A	N/A	N/A

[1] *Information prior to 2012 provided by prior actuary. See prior reports for additional detail.*
[2] *Includes contributions from other sources (if applicable).*
[3] *Assumed equal to actual member contributions divided by 12.4%.*

Glossary of Terms

Accrued Benefit Funding Ratio	The ratio of assets to Current Benefit Obligations.
Accrued Liability Funding Ratio	The ratio of assets to Actuarial Accrued Liability.
Actuarial Accrued Liability (AAL)	The difference between the Actuarial Present Value of Future Benefits, and the Actuarial Present Value of Future Normal Costs.
Actuarial Assumptions	Assumptions about future plan experience that affect costs or liabilities, such as: mortality, withdrawal, disablement, and retirement; future increases in salary; future rates of investment earnings; future investment and administrative expenses; characteristics of members not specified in the data, such as marital status; characteristics of future members; future elections made by members; and other items.
Actuarial Cost Method	A procedure for allocating the Actuarial Present Value of Future Benefits between the Actuarial Present Value of future Normal Costs and the Actuarial Accrued Liability.
Actuarial Equivalent	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV)	The amount of funds required to provide a payment or series of payments in the future. It is determined by discounting the future payments with an assumed interest rate and with the assumed probability each payment will be made.
Actuarial Present Value of Projected Benefits	The Actuarial Present Value of amounts which are expected to be paid at various future times to active members, retired members, beneficiaries receiving benefits, and inactive, non-retired members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB No. 25, such as the Funded Ratio and the Annual Required Contribution (ARC).

Glossary of Terms (Continued)

Actuarial Value of Assets The value of the assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets or a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the actuarially required contribution (ARC).

Amortization Method A method for determining the Amortization Payment. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. The stream of payments increases at the rate at which total covered payroll of all active members is assumed to increase.

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

Amortization Period The period used in calculating the Amortization Payment.

Annual Required Contribution (ARC) The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under GASB No. 25. The ARC consists of the Employer Normal Cost and Amortization Payment.

Augmentation Annual increases to deferred benefits.

Closed Amortization Period A specific number of years that is reduced by one each year, and declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc.

Current Benefit Obligations The present value of benefits earned to the valuation date, based on current service and including future salary increases to retirement.

Employer Normal Cost The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.

Expected Assets The present value of anticipated future contributions intended to fund benefits for current members.

Glossary of Terms (Concluded)

Experience Gain/Loss	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two actuarial valuations. To the extent that actual experience differs from that assumed, Unfunded Actuarial Accrued Liabilities emerge which may be larger or smaller than projected. Gains are due to favorable experience, e.g., the assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, losses are the result of unfavorable experience, i.e., actual results that produce Unfunded Actuarial Accrued Liabilities which are larger than projected.
GASB	Governmental Accounting Standards Board.
GASB No. 25 and GASB No. 27	These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 27 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 25 sets the rules for the systems themselves.
GASB No. 50	The accounting standard governing a state or local governmental employer's accounting for pensions.
GASB No. 67 and GASB No. 68	Statements No. 67 and No. 68, issued in June 2012, replace the requirements of Statements No. 25 and No. 27, respectively. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves. Accounting information prepared according to Statements No. 67 and No. 68 will be provided in a separate report beginning with the July 1, 2014 valuation.
Normal Cost	The annual cost assigned, under the Actuarial Cost Method, to the current plan year.
Projected Benefit Funding Ratio	The ratio of the sum of Actuarial Value of Assets and Expected Assets to the Actuarial Present Value of Projected Benefits.
Unfunded Actuarial Accrued Liability	The difference between the Actuarial Accrued Liability and Actuarial Value of Assets.
Valuation Date	The date as of which the Actuarial Present Value of Future Benefits is determined. The benefits expected to be paid in the future are discounted to this date.