STATE OF ILLINOIS

OFFICE OF THE AUDITOR GENERAL

STATE ACTUARY'S REPORT

THE ACTUARIAL ASSUMPTIONS AND VALUATIONS OF THE FIVE STATE-FUNDED RETIREMENT SYSTEMS

DECEMBER 2014

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OFFICE OF THE AUDITOR GENERAL
WILLIAM G. HOLLAND

To the Speaker and Minority Leader of the House of Representatives, the President and Minority Leader of the Senate, the members of the General Assembly, and the Governor:

This is our 2014 report on the actuarial assumptions and valuations of the five State-funded retirement systems.

This report was conducted pursuant to Public Act 097-0694 which amended the Illinois State Auditing Act by adding a requirement for the Auditor General to annually review assumptions and valuations prepared by the actuaries of the five State-funded retirement systems. The report is based on reports prepared by Cheiron, the State Actuary, on each of the State-funded retirement systems.

The report is transmitted in conformance with Section 5/2-8.1(c) of the Illinois State Auditing Act.

WILLIAM G. HOLLAND
Auditor General

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GLOSSARY OF TERMS

Actuarial Assumptions – Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, interest rate (also called the investment return or discount rate) and inflation. Demographic assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (interest rate and inflation) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Gain (Loss) – The difference between actual experience and actuarial assumed experience during the period between two actuarial valuation dates, as determined in accordance with a particular actuarial funding method.

Actuarial Liability – The Actuarial Liability is the present value of all benefits accrued as of the valuation date using the methods and assumptions of the valuation. It is also referred to by some actuaries as the "accrued liability" or "actuarial liability."

Actuarial Present Value – The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.

Actuarial Value of Assets – The Actuarial Value of Assets equals the Market Value of Assets adjusted according to the smoothing method in accordance with Illinois Law. The smoothing method is intended to smooth out the short-term volatility of investment returns in order to stabilize contribution rates and the funded status.

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

Asset Smoothing Method – A method of asset valuation where the annual fluctuation in the market value of assets is averaged over a period of years. See Actuarial Value of Assets above.

Entry Age Normal (EAN) – A method under which the Present Value of Future Benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this Present Value of Future Benefits allocated to a valuation year is called the Normal Cost. The portion of this Present Value of Future Benefits not provided for at a valuation date by the Present Value of Future Normal Costs is called the Actuarial Liability.

GLOSSARY OF TERMS

Funded Status – The Actuarial Value of Assets divided by the Actuarial Liability. The Funded Status represents the percentage of assets in the Plan compared to the Actuarial Liability. The Funded Status can also be calculated using the Market Value of Assets.

Governmental Accounting Standards Board – The Governmental Accounting Standards Board (GASB) defines the accounting and financial reporting requirements for governmental entities. GASB Statement No. 67 defines the plan accounting and financial reporting for governmental pension plans, and GASB Statement No. 68 defines the employer accounting and financial reporting for participating in a governmental pension plan.

Market Value of Assets – The fair value of the Plan's assets assuming that all holdings are liquidated on the measurement date.

Net Pension Obligation – The cumulative difference between annual pension cost and the employer's contributions to the plan.

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

Present Value of Future Benefits – The Actuarial Present Value of all benefits promised in the future to current members of the Plan assuming all Actuarial Assumptions are met.

Present Value of Future Normal Costs – The Actuarial Present Value of retirement system benefits allocated to future years of service.

Projected Unit Credit (PUC) – A method under which the benefits of each individual included in an actuarial valuation are allocated by a consistent formula to the years in which they are earned. The Actuarial Present Value of benefits allocated to a valuation year is called the Normal Cost. The Actuarial Present Value of benefits allocated to all periods prior to a valuation year is called the Actuarial Liability.

Unfunded Actuarial Liability (UAL) – The difference between the actuarial accrued liability and valuation of assets. Sometimes referred to as "unfunded accrued liability."

Chapter One

AUDITOR GENERAL'S SUMMARY

REPORT CONCLUSIONS

On June 18, 2012, Public Act 097-0694 was signed into law which directed the Auditor General to contract with or hire an actuary to serve as the State Actuary. Cheiron was selected as the State Actuary. The Public Act directed the State Actuary to:

- Review assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems;

- Issue preliminary reports to the boards of trustees of the State-funded retirement systems concerning proposed certifications of required State contributions submitted to the State Actuary by those boards; and

- Identify recommended changes to actuarial assumptions that the boards must consider before finalizing their certifications of the required State contributions.

Cheiron reviewed the actuarial assumptions used in each of the five systems' actuarial valuations for the year ended June 30, 2014 and **concluded that they generally were reasonable. Cheiron did not recommend any changes to the assumptions used in the June 30, 2014 actuarial valuations.**

Cheiron made recommendations for additional disclosures for the 2014 valuations and recommended changes for future valuations. Recommendations included the following:

- The Boards periodically should undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary.

- Cheiron continues to recommend the Boards annually review the interest rate and inflation assumptions as opposed to waiting for the completion of a formal experience study.

- The systems' actuaries, in future valuations, should consider establishing a corridor that would limit the maximum spread between the actuarial value of assets (smoothed value) and the market value of assets so that the actuarial value of assets, in any year, would be no more than 120 percent of market value or no less than 80 percent of market value. A move to this approach would have no impact on the 2014 actuarial valuation results as the actuarial value of assets for all five systems is currently within the 80 percent to 120 percent corridor. The systems have indicated that the current method is prescribed in statute and that a change would require legislative action.

- The systems should consider the use of generational mortality improvement assumptions if they are not already in place.

Cheiron verified the arithmetic calculations made by the systems' actuaries to develop the required State contribution and reviewed the assumptions on which the calculations were based.

The Illinois Pension Code requires that the systems' actuaries calculate the required State contribution using a prescribed funding method that achieves 90 percent funding in the year 2045. Cheiron concluded that **this funding method does not meet generally acceptable actuarial principles because the systems are not targeted to be funded at 100 percent and the funding of the plans is pushed back to later years. At a minimum, future plan benefit accruals should be fully funded, to avoid continued systematic underfunding of the systems. Continuing the practice of deferring contributions that are needed to fully fund annual benefit accruals increases the risk of the plans becoming unsustainable.**

Based on the systems' 2014 actuarial valuation reports, the funded ratio of the systems ranged from 42.3 percent (SURS) to 16.0 percent (GARS), based on the actuarial value of assets as a ratio over the actuarial liability. Cheiron has concerns about the solvency of the systems if there is a significant market downturn. **Cheiron suggests the Boards always use the conservative end of any range of assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with the State mandated funding method. Cheiron also recommended stress testing be done or be expanded to demonstrate the likelihood there will be sufficient assets to pay benefits if there is a significant market downturn.**

Information presented in this report is based on State statutes in effect at June 30, 2014 and does not take into consideration any effect of Public Act 98-0599, signed into law on December 5, 2013. The implementation of the law was suspended in a ruling May 14, 2014 by the Seventh Judicial Circuit Court. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Due to the legal status of Illinois Public Act 098-0599, this report, and the valuation reports of the retirement systems, do not specifically reflect the reforms of Public Act 098-0599.

INTRODUCTION AND BACKGROUND

On June 18, 2012, Public Act 097-0694 was signed into law which directed the Auditor General to contract with or hire an actuary to serve as the State Actuary. The Public Act amended the Illinois State Auditing Act as well as sections of the Illinois Pension Code for each of the five State-funded retirement systems. The five State-funded retirement systems are:

- The Teachers' Retirement System (TRS);
- The State Universities Retirement System (SURS);
- The State Employees' Retirement System (SERS);
- The Judges' Retirement System (JRS); and

- The General Assembly Retirement System (GARS).

Requirements of Public Act 097-0694

Public Act 097-0694 requires the State Actuary to conduct an annual review of the valuations prepared by the actuaries of the State-funded retirement systems. Specifically the Act requires the State Actuary to:

- Review assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems;

- Issue preliminary reports to the boards of trustees of the State-funded retirement systems concerning proposed certifications of required State contributions submitted to the State Actuary by those boards; and

- Identify recommended changes to actuarial assumptions that the boards must consider before finalizing their certifications of the required State contributions.

On or before November 1 of each year, beginning November 1, 2012, the boards of each of the systems must submit to the State Actuary a proposed certification of the amount of the required State contribution to the system for the next fiscal year, along with all of the actuarial assumptions, calculations, and data upon which that proposed certification is based.

On or before January 1, 2013, and each January 1 thereafter, the Auditor General shall submit a written report to the General Assembly and Governor documenting the initial assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems, any changes recommended by the State Actuary in the actuarial assumptions, and the responses of each board to the State Actuary's recommendations.

On or before January 15, 2013, and every January 15 thereafter, each Board shall certify to the Governor and the General Assembly the amount of the required State contribution for the next fiscal year. The Board's certification must note any deviations from the State Actuary's recommended changes, the reason or reasons for not following the State Actuary's recommended changes, and the fiscal impact of not following the State Actuary's recommended changes on the required State contribution.

Requirements of Public Act 098-0599

Illinois Public Act 098-0599 was signed into law in December 2013 to become effective as of June 1, 2014. It made significant changes to statutes governing the statewide pension plans. This Act modified eligibility and benefits of participants, changed the actuarial cost method used to calculate liability, expanded requirements of the State Actuary, and changed the funding method of the System. The implementation of the law was suspended in a ruling May 14, 2014 by the Seventh Judicial Circuit Court. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Due to the legal status of Illinois Public Act 098-0599, this report, and the valuation reports of the retirement systems, do not specifically reflect the reforms of Public Act 098-0599.

Contracting with the State Actuary

On July 12, 2012, the Office of the Auditor General issued a Request for Proposals for the services of a State Actuary. On August 24, 2012, the contract was awarded to Cheiron. Cheiron is a full-service actuarial and consulting firm with offices in nine locations throughout the United States. Cheiron has experience working with multiple public pension plans around the country.

REVIEW OF THE ACTUARIAL ASSUMPTIONS

Cheiron reviewed each of the actuarial assumptions used in each of the five systems' actuarial valuations for the year ended June 30, 2014 and **concluded that they generally were reasonable. Cheiron did not recommend any changes to the assumptions used in the June 30, 2014 actuarial valuations.**

Cheiron did recommend additional disclosures for the 2014 valuations and also recommended changes for future valuations. In their responses to Cheiron's preliminary reports, systems indicated that they were planning to add to their 2014 valuations many of the additional disclosures recommended by Cheiron. The systems' responses to Cheiron's preliminary reports can be found in Appendix C of this report.

Exhibit 1-1 summarizes the recommendations made to the retirement systems. At the end of each of the reports located in Chapters Two through Six is a chart summarizing the status of recommendations made by the State Actuary in the 2013 report.

Exhibit 1-1
RECOMMENDATIONS TO THE RETIREMENT SYSTEMS

Recommendations	TRS	SURS	SERS	JRS	GARS
Recommended Changes to Actuarial Assumptions used in the 2014 Actuarial Valuations:					
Cheiron reviewed the actuarial assumptions and concluded that they were reasonable. Consequently, Cheiron did not have any recommended changes to assumptions this year.					
Recommended Additional Disclosures for the 2014 Actuarial Valuations:					
• Include the statutory State contribution development in the Executive Summary	X				
• Revise the term *Generally Accepted Actuarial Standards* with reference to a particular funding method	X				
• Explain the rationale of using different assumptions between the two Tier 2 rates for COLA and pay cap increases	X				
• Add additional years and a narrative to a table in the valuation report that shows experience gains and losses by source	X				
• Demonstrate the implications of using the prior year's data on the measurement of liabilities and plan costs	X				
• Include changes made as a result of the State Actuary review in its valuation report (rather than in a supplement)	X				
• Disclose whether the recommended mortality tables sufficiently cover anticipated increases through 2045		X			
• Indicate when and how stress testing will be done			X		
• Analyze and disclose liability loss due to payroll increases in the past year			X		
• Clarify the payroll basis applicable to the required State contribution rate			X	X	X
Recommended Changes for Future Actuarial Valuations:					
• Annually review the economic assumptions (interest rate and inflation rate) and adjust assumptions accordingly	X	X	X	X	X
• Consider establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited	X	X	X	X	X
• Include historic development of assets without General Obligation Bonds	X	X	X	X	X
• Include a comparison of the projected contributions and funded ratios under the alternative measurements discussed in the valuation report	X				
• Include sample mortality rates in a tabular format	X				
• Consider the use of generational mortality improvement assumptions		X	X	X	X
• Request investment consultants provide longer term market expectations		X	X	X	X

Exhibit 1-1
RECOMMENDATIONS TO THE RETIREMENT SYSTEMS

Recommendations	TRS	SURS	SERS	JRS	GARS
• Provide evidence that the constant population assumptions and payroll assumption are reasonable				X	X
• Other minor recommendations					
• Full disclosure of assumptions with respect to 415(b) limits and 401(a)(17) limits			X	X	X
• Consider if additional revisions to demographic assumptions for Tier 2 members are appropriate			X	X	X
• Consider using actual data rather than an assumption for the spousal continuance benefit				X	X
• Provide additional clarity on the payrolls used to allow for a more complete evaluation by an actuary				X	X
Other Recommendations:					
• Periodically undertake a full scope actuarial audit in which the results of the valuation are fully replicated by a reviewing actuary	X	X	X	X	X
• Use the conservative end of any range of assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with the State mandated funding method	X	X	X	X	X
• Continue and/or expand stress testing of the system	X	X	X	X	X

Source: OAG summary of Cheiron's preliminary reports to the five State-funded retirement systems.

The following sections discuss some of the key assumptions and recommendations. Further details on the assumptions and recommendations, including those not discussed in this summary chapter, are contained in the State Actuary's preliminary reports for each of the five systems, found in Chapters Two through Six of this report.

Economic Assumptions

Cheiron reviewed the economic assumptions utilized in the actuarial valuations for each of the five State-funded retirement systems. The following sections discuss two of those assumptions – the interest rate assumption and the inflation assumption.

Interest Rate Assumption

The interest rate assumption (also called the investment return or discount rate) is the most impactful assumption affecting the required State contribution amount. This assumption is used to value liabilities for funding purposes. The retirement systems use varying interest rate assumptions. Exhibit 1-2 shows the interest rate assumptions for each of the five State-funded retirement systems. As can be seen in the exhibit, three of the systems lowered their interest rate assumption for this year's actuarial valuation.

Exhibit 1-2
INTEREST RATE ASSUMPTIONS
FOR THE FIVE STATE-FUNDED RETIREMENT SYSTEMS
June 30, 2014 Valuation

System	Interest Rate	Notes
Teachers' Retirement System	7.50%	Lowered from 8.00% for the June 30, 2014 actuarial valuation
State Universities Retirement System	7.25%	Lowered from 7.75% for the June 30, 2014 actuarial valuation
State Employees' Retirement System	7.25%	Lowered from 7.75% for the June 30, 2014 actuarial valuation
Judges' Retirement System	7.00%	Lowered from 8.00% for the June 30, 2010 actuarial valuation
General Assembly Retirement System	7.00%	Lowered from 8.00% for the June 30, 2011 actuarial valuation

Source: Retirement system actuarial reports and experience studies.

In last year's report, Cheiron concluded that it was not comfortable with the interest rate assumptions used by three of the systems (TRS, SURS, and SERS) and urged the Boards to lower the interest rate assumption for the June 30, 2014 actuarial valuation. Each of the Boards lowered the interest rate assumption:

- **TRS – Lowered its interest rate assumption from 8.00% to 7.50%.** The Board, along with the TRS actuary, made this change based on a measured and documented process conducted this past spring. TRS' actuary issued a report to TRS in May 2014 on economic assumptions and recommended changes in a subsequent letter dated June 17, 2014.

- **SURS – Lowered its interest rate assumption from 7.75% to 7.25%.** In June 2014, SURS' actuary presented an Economic Assumption Review covering the period July 1, 2009 through June 30, 2013. In that review, the actuary provided the Board with a recommendation, based on detailed expectations from eight investment consultants, to lower the rate to either 7.00% or 7.25%. The Board elected to lower the rate to 7.25%.

- **SERS – Lowered its interest rate assumption from 7.75% to 7.25%.** In April 2014, SERS' actuary presented its Experience Review covering the period July 1, 2009, through June 30, 2013. In that review, the actuary provided the Board with a recommendation, based on detailed expectations from eight investment consultants, to lower the rate to either 7.50% or 7.25%. The Board elected to lower the rate to 7.25%.

More detail on the analysis used by each of the systems in deciding to lower their rates can be found in Chapters Two through Four. **Cheiron supports the lowering of the interest rate assumptions and continues to recommend that the Boards for all five systems review**

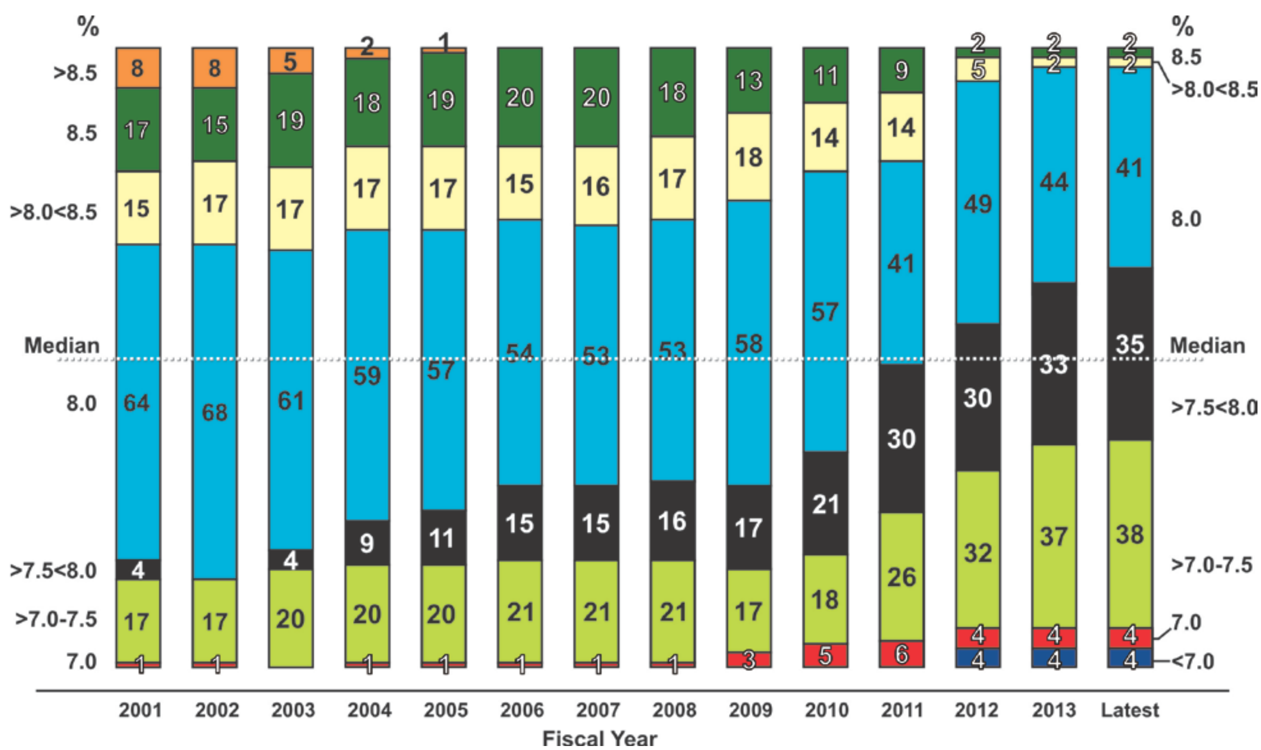
the economic assumptions annually. Cheiron offered several rationales for supporting lowering the interest rate assumptions. These included:

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize interest assumptions that are based on short-term and mid-term bond rates, which are very low.

- Moody's, an organization that provides bond rating information for private investors, compares the financial viability of public sector pension plans by using interest rate assumptions significantly lower than the assumptions used by most public sector pension plans.

Cheiron also discussed the nationwide movement among pension plans to lower the interest rate assumption. The National Association of State Retirement Administrators (NASRA) conducts the Public Fund Survey which is an online compendium of key characteristics covering 126 public pension plans. Exhibit 1-3 shows the change in the interest rate assumptions, since the inception of the Public Fund Survey in 2001, for 126 public pension plans.

Exhibit 1-3
CHANGE IN INTEREST RATE ASSUMPTIONS SINCE 2001
126 PENSION PLANS IN THE NATION'S LARGEST PUBLIC RETIREMENT SYSTEMS



Source: NASRA Public Fund Survey.

The exhibit shows the shift to lower interest rate assumptions. In 2001, 104 of the 126 plans (83%) used an interest rate assumption of 8.0 percent or higher. The most recent data shows that this number has dropped to only 45 of 126 plans (36%) that use an interest rate of 8.0 percent or higher. The median assumption has fallen below 8.0 percent. Also, four plans have adopted a rate below 7.0 percent.

Inflation Assumption

The inflation assumption primarily impacts the salary increase assumption. The five State-funded retirement systems use inflation assumptions ranging from 2.75 percent to 3.00 percent. TRS lowered its inflation assumption from 3.25% to 3.00% for the June 30, 2014 actuarial valuation. Exhibit 1-4 shows the inflation assumptions for each of the five systems.

Exhibit 1-4
INFLATION ASSUMPTIONS
FOR THE FIVE STATE-FUNDED RETIREMENT SYSTEMS
June 30, 2014 Valuation

System	Inflation Rate	Notes
Teachers' Retirement System	3.00%	Lowered from 3.25% for the June 30, 2014 actuarial valuation
State Universities Retirement System	2.75%	Lowered from 3.75% for the June 30, 2011 actuarial valuation
State Employees' Retirement System	3.00%	Lowered from 3.50% for the June 30, 2002 actuarial valuation
Judges' Retirement System	3.00%	Lowered from 4.00% for the June 30, 2011 actuarial valuation
General Assembly Retirement System	3.00%	Lowered from 4.00% for the June 30, 2011 actuarial valuation

Source: Retirement system actuarial reports and experience studies.

Cheiron concluded that the inflation assumptions used by the five State-funded retirement systems were reasonable. Cheiron's rationale for concurring with the inflation assumptions included:

- The 2014 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years) inflation will average somewhere between 2.0% and 3.4%.
- Cheiron's comparison of other public sector retirement systems' inflation assumptions as shown by a study published by the National Conference on Public Employee Retirement Systems (NCPERS). The study shows that the 3.0% assumption used by four of the five State-funded systems is a prevalent assumption while the 2.75% assumption, which SURS uses, is on the lower end of inflation assumptions. The average rate amongst the 187 systems who responded to the study was 3.2%.

Demographic Assumptions

The retirement systems utilize a number of demographic assumptions such as mortality rates, disability rates, and termination rates. Cheiron reviewed the demographic assumptions and concluded that they were reasonable. Cheiron did, however, make a number of recommendations for additional disclosures for the 2014 valuations and recommended changes for future valuations concerning various demographic assumptions.

Cheiron made recommendations involving the mortality assumptions for all five systems. Cheiron recommended SURS disclose in its 2014 valuation whether the mortality tables sufficiently cover anticipated increases through 2045. For TRS' future valuations, Cheiron recommended the specific table used for active mortality be disclosed in the report to comply with the Actuarial Standards of Practice. For SURS, SERS, JRS, and GARS, Cheiron recommended the systems consider the use of generational mortality improvement assumptions.

Cheiron added additional analysis in its reports on each of the five systems. Cheiron collected data from past valuation reports dating back to 2009 and presented a historical review of past demographic and salary increase experience gains and losses. Results were presented in a chart which showed the pattern of annual gains and losses attributable to different sources. These charts can be found in Chapters Two through Six. Different measures were used for each system depending on the information available but sources used included:

- Active and retiree mortality;
- Disability;
- New entrant;
- Benefit recipient;
- Salary increases;
- Retirement; and
- Terminations.

An examination of these trends can be used to determine if adjustments need to be made to assumptions or if additional disclosures need to be made in the actuarial valuation reports. As shown previously, Exhibit 1-1 summarizes the recommendations made for the various retirement systems. Additional details on the demographic assumptions examined can be found in the chapters for each of the five State-funded retirement systems.

PROPOSED CERTIFICATION OF REQUIRED STATE CONTRIBUTION

As required by Public Act 097-0694, each of the five State-funded retirement systems submitted to the State Actuary a proposed certification of the amount of the required State contribution for that system. **Cheiron verified the arithmetic calculations made by the systems' actuaries to develop the required State contribution and reviewed the assumptions on which the calculations were based.** Exhibit 1-5 shows the amounts of proposed State contributions submitted by the systems for Fiscal Year 2016.

Exhibit 1-5
AMOUNTS OF STATUTORILY REQUIRED STATE CONTRIBUTIONS

System	State Contribution (for Fiscal Year 2016)
Teachers' Retirement System	$ 3,742,702,194
State Universities Retirement System	1,601,480,000
State Employees' Retirement System	2,044,877,000
Judges' Retirement System	132,060,000
General Assembly Retirement System	16,073,000
Total	**$7,537,192,194**

Source: 2014 retirement system actuarial valuation reports.

Cheiron noted that, in accordance with 30 ILCS 5/2-8.1, its review does not include a replication of the actuarial valuation results. Given the size of the Plans (TRS, SURS, and SERS), the Plans' low funded ratios, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, **Cheiron recommended that the Boards periodically undertake a full scope actuarial audit**, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plans' actuaries. While some systems have had limited scope audits in the past, these audits did not include independent calculations by individual member to confirm the accuracy of the valuation results.

ACTUARIAL METHODS

Actuarial methods consist of three components: (1) the funding method, which is the attribution of total costs to past, current, and future years; (2) the method of calculating the actuarial value of assets (i.e., asset smoothing); and (3) the amortization basis of the Unfunded Actuarial Liability (UAL). The amortization basis is discussed under the State Mandated Funding Method in the next section.

Funding Method

All of the five State-funded retirement systems use the Projected Unit Credit (PUC) cost method to assign costs to years of service. This method is required under the Illinois Pension Code. Cheiron had no objection to using the PUC cost method as it is an acceptable method that is used by other public sector pension funds. However, Cheiron would prefer the Entry Age

Normal (EAN) funding method as it is more consistent with the Pension Code's requirement for level percent of pay funding.

Public Act 098-0599 amended the Illinois Pension Code to require the five State-funded plans to calculate the required State contribution using the entry age normal actuarial cost method beginning with the Fiscal Year 2016 State contribution. However, the Illinois Circuit Court granted a temporary restraining order and a preliminary injunction stopping the implementation of Public Act 098-0599. Consequently, the systems continued to calculate the required State contribution as the law existed prior to Public Act 98-0599.

Under the PUC method, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over their later years of service than over their earlier ones.

As a result of this pattern of benefit values increasing, while the PUC method is not an unreasonable method, more plans use the EAN funding method to mitigate this effect. It should also be noted that the EAN method will be the required method to calculate liability for the new Governmental Accounting Standards Board Statements 67 and 68.

Asset Smoothing Method

The actuarial value of assets for the systems is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that the fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. Cheiron concurred with the use of the asset smoothing method noting that smoothing the market gains and losses over a period of five years to determine the actuarial value of assets is a generally accepted approach in determining actuarial cost.

Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets (smoothed value) and the market value of assets. Many public sector pension plans limit the actuarial value of assets to be in any year no more than 120 percent of market value, or no less than 80 percent of market value. In fact, the Internal Revenue Service (IRS) mandates this "corridor" for private sector pension plans (a 90%-110% corridor is mandated). Even though it is not mandated for public plans, Cheiron believes that the use of this type of corridor is a much sounder actuarial practice. According to Actuarial Standard of Practice No. 44 *Selection and Use of Asset Valuation Methods for Pension Valuations* 3.3(b)(1), the actuarial value of assets should ". . . fall within a reasonable range around the corresponding market values."

Therefore, Cheiron recommended that the Boards consider moving to this approach in future valuations. Cheiron also noted that a move to this approach would have no impact on the

2014 actuarial valuation results as the actuarial value of assets for all five systems is currently within the 80 percent to 120 percent corridor. The systems have indicated that the current method is prescribed in statute and that a change would require legislative action.

OTHER ISSUES

Cheiron raised two other issues in its reports to the retirement systems. The first issue related to the State mandated funding method and the second issue related to the State mandated projection method.

State Mandated Funding Method

The Illinois Pension Code requires that the systems' actuaries base the required contribution using a prescribed funding method that achieves 90 percent funding in the year 2045. In the actuarial valuation reports, the systems' actuaries discuss their concerns with this funding method.

- In TRS's June 30, 2014 Actuarial Valuation Report, TRS' actuary offers commentary on the statutory funding method from an actuarial point of view. It describes two alternatives to the statutory funding method: one intended to represent more generally accepted practices and the other targeted specifically to ensure the unfunded liability does not increase. It contrasts these methods with the current statutory method and notes that the statutory policy produces a back-loaded contribution projection, where contributions are significantly deferred into the future.
- In SURS' June 30, 2014 Actuarial Valuation Report, SURS' actuary comments that the current funding policy defers funding which puts the system at risk that benefit obligations will not be met. They recommend a funding policy based on 100 percent funding by 2045 or earlier.
- In the actuarial valuations for SERS, GARS, and JRS, the actuary advises "strengthening the current statutory funding policy" and provides the following examples:
    - Increasing the 90 percent funding target;
    - Reducing the projection period needed to reach 90 percent funding;
    - Separating the financing of benefits for members hired before and after December 31, 2010; and
    - Changing to an Annual Required Contribution based funding approach with an appropriate amortization policy for each respective tiered benefit structure.

Cheiron concluded that the Pension Code funding method does not meet generally acceptable actuarial principles because the systems are not targeted to be funded at 100 percent and the funding of the plans is pushed too far into the future. At a minimum, future plan benefit accruals should be fully funded to avoid continued systematic underfunding of the systems. Continuing the practice of deferring contributions that are needed to fully fund annual benefit accruals increases the risk of the plans becoming unsustainable.

Based on the systems' 2014 actuarial valuation reports, the funded ratio of the systems ranged from 42.3 percent (SURS) to 16.0 percent (GARS) based on the actuarial value of assets as a ratio to the actuarial liability. Cheiron has concerns about the solvency of the systems if there is a significant market downturn.

Cheiron suggests the Boards always use the conservative end of any range of assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with the State mandated funding method. The potential for continued underfunding of the plan during the projection period increases the uncertainty and inherent risks in determining the State required contributions to the systems and the measurement of plan obligations. Actuarial Standards of Practice requires consideration of the plan's funding policy and the uncertainty or risk inherent in the measurement of pension obligations and these should be factors when selecting actuarial assumptions.

Cheiron also recommended stress testing be done or be expanded to demonstrate the likelihood there will be sufficient assets to pay benefits if there is a significant market downturn.

State Mandated Projection Method

Cheiron noted that under the Pension Code, the actuarial methodologies utilized in performing the 2045 projection of the systems' funded status assume that the future earnings rate is applied to the actuarial value of assets (smoothed value) rather than the market value of assets. Cheiron believes that basing the projected future earnings of the System on starting market values of assets (rather than a smoothed value) would provide a more realistic expectation of the future direction of the contribution level.

RESPONSES TO THE RECOMMENDATIONS

Each of the five State-funded retirement systems provided responses to Cheiron's recommendations contained in the preliminary reports. The systems generally agreed with Cheiron's recommendations. The complete responses are in Appendix C.

Chapter Two

PRELIMINARY REPORT ON THE TEACHERS' RETIREMENT SYSTEM

In accordance with 30 ILCS 5/2-8.1, Cheiron, the State Actuary, submitted a preliminary report to the Board of Trustees of the Teachers' Retirement System (TRS) concerning proposed certifications of required State contributions submitted to Cheiron by the Board. The preliminary report was submitted to TRS on December 2, 2014. The preliminary report was based on Cheiron's review of actuarial assumptions included in TRS' 2014 Actuarial Valuation Report.

Following is Cheiron's final preliminary report on the Teachers' Retirement System. TRS' written response, provided on December 15, 2014, can be found in Appendix C.

December 19, 2014

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, Illinois 62703

Board of Trustees
Teachers' Retirement System of the State of Illinois
2815 West Washington Street
Springfield, Illinois 62702

Dear Ladies and Gentlemen:

In accordance with the Illinois State Auditing Act (30 ILCS 5/2-8.1), Cheiron is submitting this preliminary report concerning the proposed certification prepared by Buck Consultants (Buck) of the required State contribution to the Teachers' Retirement System of the State of Illinois (TRS or System) for Fiscal Year 2016.

In summary, we believe that the assumptions and methods used in the June 30, 2014, Actuarial Valuation Report, which are used to determine the required Fiscal Year 2016 State contribution, represent a significant improvement over the assumptions and methods used the previous two years. As a result, the certified contributions, notwithstanding the State funding requirements that do not conform to Actuarial Standards of Practice, are more likely to meet the obligations of the System with less cost deferral to future years. In both our 2012 and 2013 report to the Auditor General and TRS, we recommended that the TRS Board consider lowering the interest rate for the 2013 and 2014 valuations. In 2013, the Board decided not to lower the rate. In this 2014 actuarial valuation, the Board did agree with Buck's recommendation to lower its discount rate from 8.00% to 7.50% and made other economic assumption changes. With respect to the balance of the individual assumptions and actuarial methods employed in this year's valuation, we comment on and recommend possible changes for the Board to consider in future valuations. Details of our recommendations can be found in this report. Please provide written responses to us for this year's valuation recommendations by close of business on December 15, 2014.

Section I of this report describes the review process undertaken by Cheiron. Section II summarizes our findings. Section III provides the supporting analysis for those findings, and presents more details on our assessment of the actuarial assumptions and methods employed in Buck's actuarial certification, as well as our assessment of Buck's determination of the Required State Contribution for Fiscal Year 2016. Section III also includes comments on other issues impacting the funding of the Teachers' Retirement System, including the implications of Article 16 of the Illinois Pension Code, which establishes the statutory funding requirements for the System. **In our opinion, the statutory mandated minimum funding requirements call for inadequate funding and do not meet Actuarial Standards of Practice (ASOPs).**

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In preparing this report, we relied on information (some oral and some written) supplied by TRS and Buck. This information includes actuarial assumptions and methods adopted by the TRS Board, plan provisions, summarized census data, the draft 2014 Actuarial Valuation Report, 2011 formal Experience Study, June 30, 2014, Investment Performance Review, 2013 CAFR, and various studies and memos prepared by the System's advisors and Executive Director. A detailed description of all information provided for this review is contained in the body of our report.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared exclusively for the Office of the Auditor General and the Teachers' Retirement System of the State of Illinois for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Kenneth A. Kent, FSA, FCA, EA, MAAA
Principal Consulting Actuary

Gene Kalwarski, FSA, FCA, EA, MAAA
Principal Consulting Actuary

SECTION I - REPORT SCOPE

Illinois Public Act 097-0694 (the Act) amended the Illinois State Auditing Act (30 ILCS 5/2-8.1) and requires Cheiron, as the State Actuary, to review the actuarial assumptions and valuation of the Teachers' Retirement System of the State of Illinois (TRS or System) and to issue to the TRS Board this preliminary report on the proposed certification prepared by Buck Consultants (Buck) of the required State contribution for Fiscal Year (FY) 2016. The purpose of this review is to identify any recommended changes to the actuarial assumptions and methods for the TRS Board to consider before Buck, the TRS actuary, finalizes its certification of the required State contributions to TRS for FY 2016.

While the Act states that just the actuarial assumptions and valuation are to be reviewed, we have also reviewed the actuarial methodologies (funding and asset smoothing methods) employed in preparing the actuarial certification, as these methods can have a material effect on the amount of the State contribution being certified. Finally, we have offered our opinion on the implications of Article 16-158 of the Illinois Pension Code, which impacts the contribution amount certified by Buck.

Illinois Public Act 098-0599 was signed into law in December 2013 to become effective as of June 1, 2014. It made significant changes to statutes governing TRS and the other statewide pension plans. This act modified eligibility and benefits of participants, changed the actuarial cost method used to calculate liability, expanded requirements of the State Actuary, and changed the funding method of the System. The implementation of the law was suspended in a ruling May 14, 2014, by the Seventh Judicial Circuit Court. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Due to the legal status of Illinois Public Act 098-0599, this report and the valuation report of the System do not specifically reflect the reforms of PA 098-0599.

In conducting this review, Cheiron reviewed the draft June 30, 2014, actuarial valuation prepared by Buck, as well as Buck's Experience Study that included experience investigation of the demographic and economic experience for TRS for the period July 1, 2006, through June 30, 2011, and various presentations made to the Board. The materials we reviewed are listed in Appendix B.

In addition to reviewing the actuarial certification of the required State contribution to TRS, the Act requires the State Actuary to conduct a review of the "actuarial practices" of the Board. While the term "actuarial practices" was not defined in the Act, we continue to interpret this language to mean that we reviewed: (1) the use of a qualified actuary (as defined in the Qualification Standards of the American Academy of Actuaries) to prepare the annual actuarial valuation for determining the required State contribution; and, (2) the conduct of periodic formal experience studies to justify the assumptions used in the actuarial valuation. In addition, we have included comments on actuarial communication and compliance with Actuarial Standards of Practice (ASOPs) reflected in the draft June 30, 2014, actuarial valuation.

Finally, we have mentioned in past reports that in future reports we may examine additional actuarial practices of the Board. For this year's report we want to suggest an additional practice

SECTION I - REPORT SCOPE

for the Board to consider. In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. Given the size of the TRS Plan, the Plan's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary. We comment further on this point in our recommendations that follow.

SECTION II - SUMMARY OF RECOMMENDATIONS

This section summarizes recommendations from our review of the actuarial assumptions and methods employed in the draft June 30, 2014, Actuarial Valuation Report of TRS as well as the "actuarial practices" of the TRS Board. Section III of this report provides detailed analysis and rationale for these recommendations.

Proposed Certification of the Required State Contribution

Buck has determined that the FY 2016 required State contribution calculated under the current statutory funding plan is $3,742,702,194. We have verified the arithmetic calculations made by Buck to develop this required State contribution and have reviewed the assumptions on which it is based. As such, we have accepted Buck's annual projections of future payroll, total normal costs, employee contributions, combined benefit payments and expenses, and total contributions.

In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. We understand that the System has had limited scope audits in the past, but these audits did not include independent calculations by individual member to confirm the accuracy of the valuation results. Given the size of the TRS Plan, the Plan's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary.

1) **We recommend that the TRS Board consider conducting an independent actuarial audit in which the results of the valuation are replicated by the audit actuary and any deviations are noted and reconciled.**

State Mandated Funding Method

The current statutory funding plan calculates the minimum contribution for TRS for each fiscal year as the amount sufficient to cause the total assets of the System to equal 90% of the total liabilities of the System by the end of Fiscal Year 2045. **This funding method does not meet generally acceptable actuarial principles because the System is not targeted for 100% funding and funding of the Plan is pushed too far into the future. As stated in Buck's report, at a minimum, future plan benefit accruals should be fully funded to avoid continued systematic underfunding of TRS. Continuing the practice of deferring contributions that are needed to fully fund annual benefit accruals increases the risk of the Plan becoming unsustainable.**

2) Based on the draft 2014 Actuarial Valuation Report, the funded ratio, measured as the ratio of the actuarial value of assets to the actuarial liability, is currently at 40.6%. We have concerns about the solvency of the System especially if there is a significant market downturn. We have suggested and continue to suggest that the TRS Board always use the conservative end of any range of assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with the State mandated funding method.

SECTION II - SUMMARY OF RECOMMENDATIONS

3) We have previously recommended stress testing be done to determine whether there will be sufficient assets to pay benefits if there is a significant market downturn. Buck has provided limited stress testing in the Executive Summary of the draft June 30, 2014, report. Because the statutory minimum funding is highly dependent on a level cost as a percent of pay, **we recommend that Buck expand the stress testing of the System to demonstrate the long-term impact of a significant market downturn as well as a long-term decline in active payroll.**

Assessment of Actuarial Assumptions Used in the 2014 Valuation:

30 ILCS 5/2-8.1 requires the State Actuary to identify recommended changes in actuarial assumptions that the TRS Board must consider before finalizing its certification of the required State contribution. We have reviewed all the actuarial assumptions used in the Teachers' Retirement System's draft 2014 Actuarial Valuation Report and compared them to the 2014 Buck experience review results, and **we conclude that the assumptions are reasonable in general based on the evidence provided to us.**

Recommended Additional Disclosures for the 2014 Valuation:

With the expansion of the Executive Summary and the projection values provided in Section 4 of Buck's June 30, 2014, Actuarial Valuation Report, we find that all the details requested in our previous reports have been included. This allows for the tracking of future payroll, normal costs by tier, and liabilities by participant categories. This additional information also allows insight into the growing risks of TRS under the statutory minimum funding as one can track the growth of liabilities, assets, and expected future contribution amounts to determine if the amounts expected from the State are reasonable and sustainable.

4) We recommend the inclusion of the statutory State contribution development in the Executive Summary to emphasize the makeup of the State's funding obligation.

5) We recommend Buck revise the term *Generally Accepted Actuarial Standards* with reference to a particular funding method. There are no such standards, nor is there a single generally accepted actuarial method of funding. While the funding approach so described is included in the report to illustrate a more rational funding approach than the State mandated method, the title could mislead the public into thinking that such a method is codified within the Actuarial Standards of Practice (ASOPs).

6) In coordination with the lowering of the inflation assumption from 3.25% to 3.00%, the Tier 2 pay cap increase and COLA increase assumptions were changed. For these two inflation dependent benefit structures, the assumption was lowered from 1.625% to 1.50% and 1.40% respectively. It is unclear why the assumptions would be different if both represent 50% of inflation. We recommend Buck explain in this year's report the rationale for an assumption that is less than 50% of the inflation assumption for the COLA increase assumption.

7) We recommend adding additional years and a narrative to the table in Section 1.4 of the valuation report, which for the first time provides a detailed description of experience gains

and losses by source. This information is fundamental in assessing the effectiveness of the individual assumptions. A brief description of the reason for significant gains or losses and discussion of the impact of assumption changes will provide insight into potential risks in the system.

8) Given the delay in the data used for the 2014 valuation, we continue to recommend that Buck provide discussion and quantification of the impact such a delay has on the measurement of liabilities and plan costs.

9) We recommend Buck provide a draft report for this review process and include changes subsequent to the State Actuary's review in the final report instead of a supplement, so that any future users of the report will have the benefit of the changes included within a single document.

Recommended Changes for Future Valuations:

10) We continue to recommend that the TRS Board annually review the economic assumptions (interest rate and inflation) prior to commencing the valuation work and adjust assumptions accordingly as they did prior to this year's valuation.

11) We recommend again, as we did last year, that TRS consider in future valuations establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited, given the use of the actuarial value of assets in the projection methodology in accordance with 40 ILCS 5/16-158 (k). While this change would have no impact on the System for the June 30, 2014, valuation, we believe it would be better to establish this corridor before it is actually applicable.

12) Since the development of assets without the General Obligation Bonds (GOB) directly impacts the required State contribution, it is important to verify that these assets have been historically developed accurately. We recommend that prior to the completion of the June 30, 2015, draft valuation report, that Buck provide a verification of the hypothetical assets without the GOB.

13) We recommend that in the demonstration of alternative funding methods, Buck include projections of the contribution requirement and funded status of each method. The projections would show the effectiveness of these methods to meet the long-term goals of the system.

14) We recommend that Buck include sample mortality rates in a tabular format to comply with the ASOPs.

SECTION III - SUPPORTING ANALYSIS

In this section we provide detailed analysis and supporting rationale for the recommendations that were presented in Section II of this report.

A. Proposed Certification of the Required State Contribution

As required by 40 ILCS 5/16-158, in determining the required State contribution under State law, the System's actuary must determine what level of future contributions is needed to make a projection of the System's funded status in 2045 be at 90%. In prior reports, we made recommendations regarding additional information we needed to be able to make comments on the reasonableness of TRS's determination of the Required State Contribution. Such information included more details on new entrant assumptions and more breakouts on projected benefit payments. We have verified the arithmetic calculations made by Buck to develop this required State contribution and have reviewed the assumptions on which it is based. As such, we have accepted Buck's annual projections of future payroll, total normal costs, benefits, expenses, and total contributions.

In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. Given the size of the TRS Plan, the Plan's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full replication audit. Such an audit fully replicates the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary. Results are compared in a detailed fashion to measure the liabilities for each benefit form and feature. A replication audit will uncover any potential problems in the processing and certification of valuation results.

We recommend that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary (Recommendation #1).

B. State Mandated Methods

1. *State Mandated Funding Method:*

   In its draft 2014 Actuarial Valuation Report on pages 12-22, Buck offers commentary on the statutory funding method from an actuarial point of view. It describes two alternatives to the statutory funding method: one intended to represent more generally accepted practices and the other targeted specifically to ensure the unfunded liability does not increase. It contrasts these methods with the current statutory method and notes that the statutory policy produces a back-loaded contribution projection, where contributions are significantly deferred into the future. Buck includes projections of future funded ratios and unfunded actuarial accrued liability under the current statutory method to demonstrate the progress anticipated in paying down this liability (see pages 17-19 of the valuation report). Buck offers no specific recommendations but highlights the problems inherent in the current required methodology. Its discussion includes the following:

SECTION III - SUPPORTING ANALYSIS

- Demonstration that Tier 2 member contribution rates will cover more than the cost of their benefits, representing a subsidy for the State in paying down the unfunded actuarial accrued liability;
- Demonstration that much of the contributions anticipated to be paid over the next 30 years will be used to pay down the pension debt; and,
- Demonstration that the statutory contribution is less than the interest on the unfunded actuarial accrued liability, and the unfunded actuarial accrued liability is therefore projected to increase until 2030 if the State makes the required contribution.

The Illinois Pension Code (40 ILCS 5/16-158) is limited in meeting the risks of the System. This law requires that the actuary base the required contribution using a prescribed funding method that achieves a 90% funding in the year 2045.

We concur with Buck's representations of the flaws inherent in the law and the distribution of the funding into the future. Either of the two alternative methods for funding: 1) paying down the unfunded actuarial accrued liability over 30 years as a level percent of pay; or 2) paying the cost of the annual benefits accrued (normal cost) plus interest as a minimum, would be far more appropriate to demonstrate a willingness to fund these benefits and deter the possibility of insolvency.

TRS should include a comparison of the projected contributions and funded ratios under the alternative measurements discussed in the actuarial valuation report as demonstration of the financial implications of these alternatives (Recommendation #13)**.**

We suggest the TRS Board always use the conservative end of any range of assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with the State mandated funding method (Recommendation #2)**.** The potential for continued underfunding of the plan during the projection period increases the uncertainty and inherent risks in determining the State required contributions to the System and the measurement of plan obligations. ASOP 4 requires consideration of the plan's funding policy and the uncertainty or risk inherent in the measurement of pension obligations and these should be factors when selecting actuarial assumptions.

The draft June 30, 2014, actuarial valuation includes limited stress testing on the projected funded ratios and contributions over the next 15 years. **We recommend that Buck expand the stress testing to demonstrate the long-term impact of a significant market downturn as well as a long-term decline in active payroll** (Recommendation #3)**.**

2. *State Mandated Projection Method*:

Under 40 ILCS 5/16-158 (k), the actuarial methodologies utilized in performing the 2045 projection of the System's funded status assume the future earnings rate (currently at 7.50%) is applied to the actuarial value of assets (AVA) rather than the market value of assets (MVA). We believe that basing the projected future earnings of the System on starting market values of assets (rather than a smoothed value) would provide a more realistic expectation of the future direction of the contribution level.

SECTION III - SUPPORTING ANALYSIS

C. Economic Assumptions

1. *The Interest Rate:*

The interest rate assumption (also called the investment return or discount rate) is the most impactful assumption affecting the required State contribution amount. This assumption, which is used to value liabilities for funding purposes, was changed to 7.50% from 8.00% as adopted by the Board for the June 30, 2014, valuation. The Board, along with the TRS actuary, made this change based on a measured and documented process conducted this past spring. We have reviewed the reports provided to the Board and agree that the results support the Board's actions at the recommendation of Buck Consultants.

Cheiron supports the lowering of the discount rate from 8.00% to 7.50%. We continue to recommend that the Board review the economic assumptions annually (Recommendation #10)**.**

Our rationale for this recommendation is as follows:

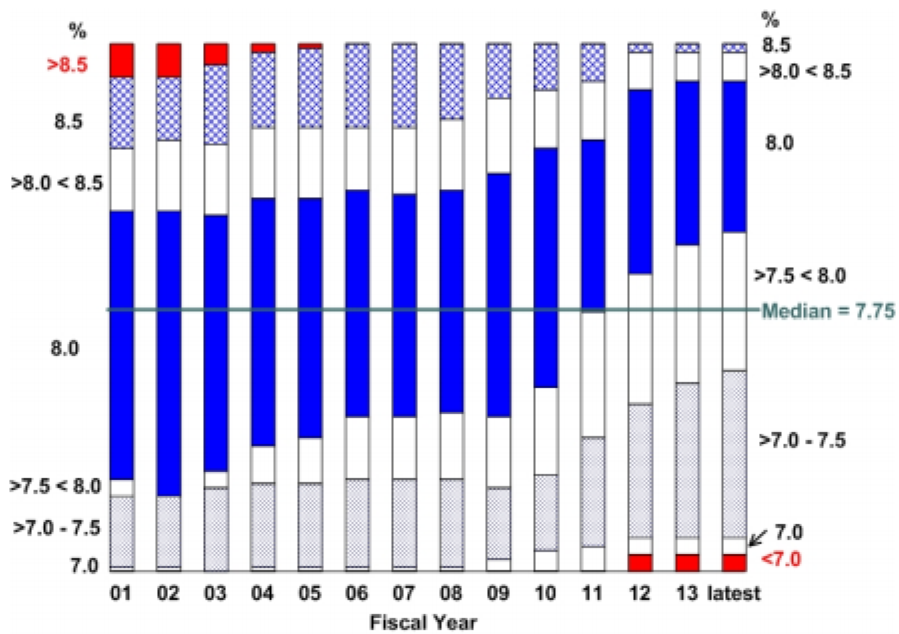
- We reviewed the asset liability modeling and asset allocation reports of RV Kuhns dated April and May 2014, respectively. We also reviewed Buck's report on economic assumptions in May 2014 and its subsequent letter of recommended economic assumption changes dated June 17, 2014. All of the documents provide appropriate support for the economic assumptions adopted by the Board for the June 30, 2014, Actuarial Valuation. The assumption changes, as we understand them, represented in aggregate an increase in liabilities of $6.4 billion and include:
  - lowering the investment return from 8.00% to 7.50%;
  - lowering the inflation assumption to 3.00% from 3.25%;
  - lowering all rates of salary increase by 0.25%;
  - lowering Tier 2 pay cap increases from 1.625% to 1.50%; and,
  - lowering Tier 2 COLA increases from 1.625% to 1.40%.

The balance of this section provides background and benchmarking information around the changes in the economic assumptions adopted by the Board.

- The National Association of State Retirement Administrators (NASRA) conducts an annual survey of public funds. The latest Public Fund Survey covers 126 large retirement plans. The following chart shows the distribution of investment return assumptions for the last 13 years of its survey. The latest data includes results collected through October 2014.

SECTION III - SUPPORTING ANALYSIS

Figure 4: Change in distribution of public pension investment return assumptions, FY 01 through October 2014



Source: Compiled by NASRA based on Public Fund Survey, Oct. 2014

Over the period shown in the latest survey, there continues to be a pattern of reducing investment return assumptions. Forty-eight of the 126 plans have reduced the interest rate assumption since Fiscal Year 2011. For these 48 plans the average reduction is 0.37%. The survey is consistent with the experience of other Cheiron clients with which there has been a significant trend to reduce the investment return assumptions in the last several years.

- New GASB 67 and 68 pronouncements will require many public pension plans, such as TRS, to use a lower interest rate for accounting disclosures and pension expense determinations in fiscal years 2014 and 2015, respectively. It's important to note, however, that the new standards do not define funding requirements for a plan.

- Moody's, an organization that provides bond rating information for private investors, compares the financial viability of public sector pension plans by using interest rate assumptions significantly lower than the assumption used by most public sector pension plans.

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize interest assumptions that are based on short-term and mid-term bond rates, which are very low.

SECTION III - SUPPORTING ANALYSIS

2. *Inflation Assumption:*

The inflation assumption, which primarily impacts the salary increase assumption and Tier 2 COLA and pay assumptions used by TRS, was changed to 3.00% from 3.25% for the plan year ending June 30, 2014.

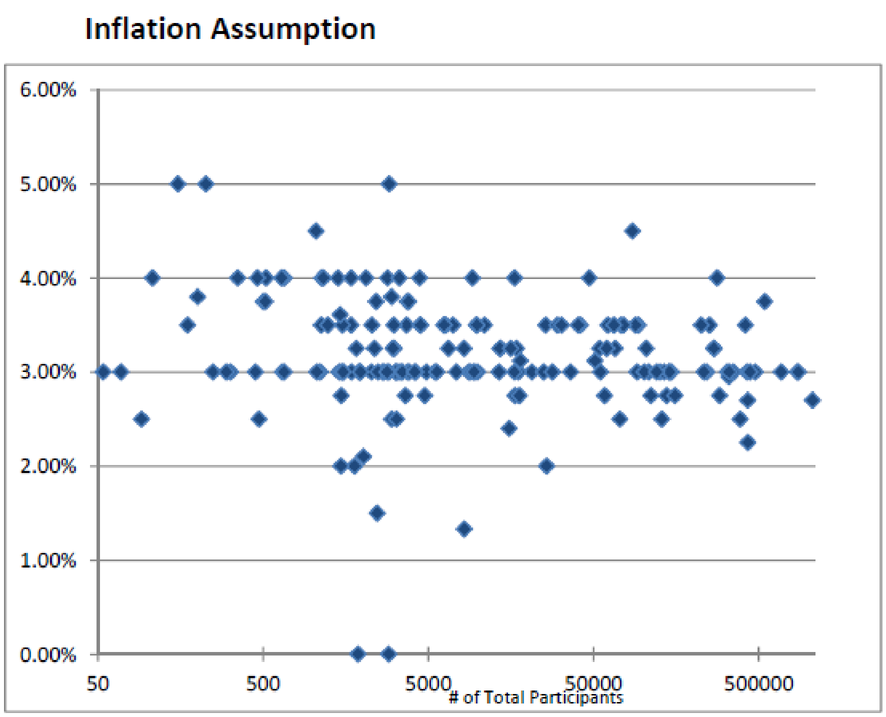
We find that Buck's recommended reduction of this assumption from 3.25% to 3.00%, used in certifying the required State contribution, is reasonable.

Our rationale for concurring with the 3.00% assumption is as follows:

- The 2014 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years) inflation will average somewhere between 2.0% and 3.4%.

- As shown on page 9 of Buck's August 23, 2012, presentation to the TRS Board, recent experience (2007 through 2011) has been 2.2%.

- The *National Conference on Public Employers Retirement Systems* (NCPERS) 2014 study provides the following graphic of respondents' inflation assumptions:



This shows that the 3.0% assumption, which TRS uses, is a prevalent inflation assumption amongst the 187 systems who responded to this study, with 3.2% as the average.

SECTION III - SUPPORTING ANALYSIS

3. *Salary (Annual Compensation) Increase Assumption:*

For the June 30, 2014, actuarial valuation, the total salary scale increase assumption was decreased by 0.25%. This change is supported by both the change in the underlying inflation assumption by 0.25% and the gains from salary increases shown in the valuation.

Salary Component	**Amount**
Inflation	3.00%
Real Wage Growth	0.75%
Career Scale	1.75%*
Employment Type and Status Changes	0.25%*
Total Salary Increase Assumption	**5.75%**

*Estimated, not explicitly broken out in the report

Buck includes the following listing of salary increases by age and included the requested merit or seniority components.

Age Male and Female	Salary Increase	Merit/Seniority Component
20	9.90%	6.15%
25	9.00%	5.25%
30	7.20%	3.45%
40	6.00%	2.25%
50	4.75%	1.00%
55	4.75%	1.00%
60	4.75%	1.00%
65	4.75%	1.00%

We find that the overall 0.25% reduction, in accord with the reduction in the inflation assumption, is reasonable.

Our rationale for concurring with Buck's recommended salary increase assumption:

- In our own experience with our public sector pension plans (about 60 large plans), we have witnessed a consistent recent trend of declining salary increases for public sector employees that was addressed when the assumption was changed effective for the June 30, 2014, valuation.

  The reduction in the rates is a reflection of the repeated material gains from salary growth over the past two years. We believe this assumption should be reviewed again specifically to see if the changes address the consistent gains from this source and evaluate if it should be decreased further (Recommendation #10).

SECTION III - SUPPORTING ANALYSIS

4. Cost of Living for Tier 2 Assumption:

For Tier 2 participants, benefits are increased annually equal to 50% of the consumer price index urban rates with a maximum of 3.0%. With the reduction of the inflation assumption to 3.00%, the assumption for COLAs was decreased from 1.625% to 1.40%. This is not an unreasonable assumption based on the assumption that when inflation is below 3.00%, the COLA will be less than 1.50%. However, this is a change in the previous approach for setting this assumption because the same rationale would hold true under the previous inflation assumption. While Buck's letter of recommendations to the Board of June 17, 2014, implies the difference is a function of treating the COLA as applied on a simple basis (not compounding the increase each year), it is unclear why this treatment is different from the way the assumption was set in the past. **We recommend Buck explain the reason for a different assumption between the two Tier 2 rates (for COLA and pay cap increases)** (Recommendation #6).

We find the assumption and the basis for setting it as reasonable as long as Buck provides the rationale for the difference between Tier 2 COLA and pay cap increases.

5. Tier 2 Capped Pay Assumption:

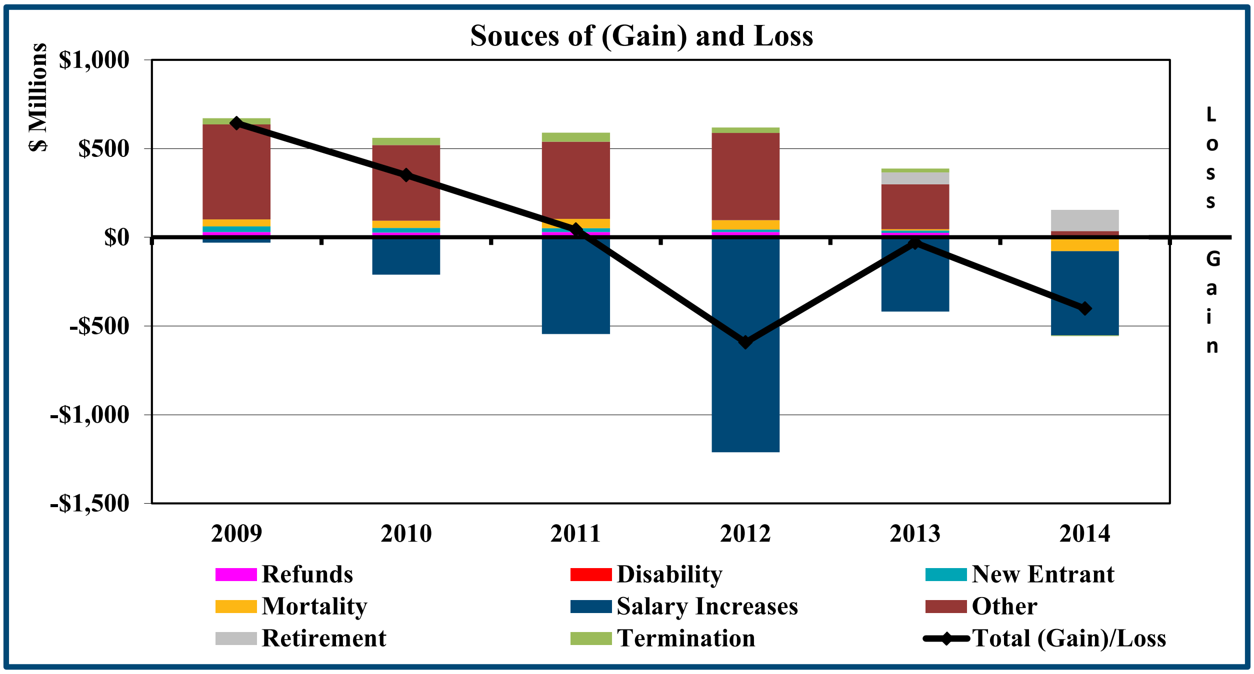
Benefits for members hired after January 1, 2011, are calculated using pay that is capped under 40 ILCS 5/1-160. The pay cap is shown on page 9 of the June 30, 2014, valuation to be $110,631 for 2014.

We find the assumption and the basis for setting it as reasonable.

D. Demographic Assumptions

In its annual actuarial valuation reports, TRS regularly reports sources of liability gains and losses. In the 2014 report, these are shown in Section 1.4 on page 33. In the chart below, we have collected similar data from TRS's past valuation reports dating back to 2009 and presented a historical review of past demographic and salary increase experience gains and losses.

SECTION III - SUPPORTING ANALYSIS



This chart shows the pattern of annual gains and losses attributable to eight different sources as shown in the legend above. When the colored bar slices appear above zero on the Y axis, that represents an experience loss, and below zero represents an experience gain for that year.

Key observations from this chart are as follows:

1. In every year since 2009 up until 2014 there were significant losses under "Other." In past reports, we identified our concern that a large loss was not being fully explored. This trend has reversed itself in 2014, and we expect with the additional disclosures this will not be a problem going forward. However, the significant reduction this year should be discussed.

2. The other apparent consistent trend is with the salary increases producing gains. This should be addressed with the change in the assumption this year of decreasing the rates by 0.25%, but it should continue to be monitored to determine if the assumption change was sufficient to avoid continued gains from this source (Recommendation #10).

Out of the demographic assumptions, we have recommendations for additional disclosure for two.

1. *Data Reconciliation:*

   The 2014 Actuarial Valuation Report includes a breakdown of gains and losses including those attributable to demographic changes as recommended in last year's report. We found this helpful in reconciling the changes in the unfunded liability from 2013 to 2014.

SECTION III - SUPPORTING ANALYSIS

We recommend the report contain a demonstration of how the prior year's data is brought forward for valuation purposes to substantiate that there is no material distortion of the results, in particular with respect to Tier 2 participants (Recommendation #8)**.**

2. *Recurring Loss:*

   The improved disclosure of liability gains and losses by source provided in Section 1.4 of the valuation report is much more informative and concerns or trends resulting from the data can be identified. There are two areas that should be explained further: 1) the shift in the other sources from the $251 million loss last year to the $2.8 million gain this year, and 2) the two consecutive and material losses due to *Retirements other than expected* and whether this is a short-term and anticipated phenomenon or an emerging trend that will be reviewed in the upcoming experience analysis (Recommendation #7).

Below, we summarize all the demographic assumptions that we reviewed and we've concluded all are reasonable and meet the requirements of ASOP No. 35, section 3.3.4. We have identified areas where additional disclosure is appropriate in accordance with our recommendations.

1. **Rates of Termination:**

	Males		Females	
Age	Non-vested	Vested	Non-vested	Vested
20	12.00%	8.00%	18.00%	10.00%
25	7.00	6.00	7.80	9.00
30	8.60	3.70	10.60	6.00
40	11.10	1.50	10.00	2.20
50	12.00	1.40	10.00	1.40
55	16.00	4.00	15.00	3.10
60	21.00	4.00	14.00	4.00
65	21.00	4.00	40.00	4.00
70	-	-	-	-

SECTION III - SUPPORTING ANALYSIS

2. Rates of Mortality:

One of the areas we looked at closely this year was the mortality assumption. Recently changed Actuarial Standards of Practice (ASOP No. 35) now require that actuaries at least consider projections of mortality improvements, and if there is not such an assumption for improvement, the actuary must disclose the basis for not making the assumption. Based on the current assumptions, mortality improvements are both being projected and reflect application of generational mortality improvements that meet the ASOP requirements. For TRS, we confirm that Buck is using both projection scales for nine years and generational mortality from 2009 that appears to make this an appropriate assumption until the next experience analysis is performed, given the high proportion of non-active participants in the System.

a. Death before Retirement at Selected Ages (number of deaths per 100 members)*:

Age	Males	Females
20	0.023	0.011
25	0.029	0.011
30	0.035	0.013
40	0.061	0.031
50	0.122	0.069
55	0.183	0.116
60	0.303	0.219
65	0.531	0.395
70	-	-

We recommend the specific table used for active mortality be disclosed in the report to comply with the ASOPs (Recommendation #14).

b. Death after Retirement: For annuitants, the RP-2000 White Collar Table projected nine years using scale AA, with a two-year age setback for men and no age setback for women. Rates for women are further adjusted for ages 63-77 by 65% and ages 78-87 by 85%.

For beneficiaries, the RP-2000 blended table projected nine years using scale AA, with a one-year age setback for both men and women.

For the period after disability retirement, the RP-2000 Disabled Table projected nine years using scale AA, with a one-year age setback for both men and women.

Future generational rates are projected from 2009 based on scale AA.

SECTION III - SUPPORTING ANALYSIS

3. Rates of Disability (per 100 members)*:

Age	Males	Females
20	0.029	0.045
25	0.029	0.045
30	0.026	0.117
40	0.051	0.162
50	0.094	0.172
55	0.111	0.197
60	0.170	0.144
65	0.510	0.287
70	-	-

* *A 2% load was placed on disability benefits to account for Occupational Disability benefits being greater than standard disability.*

4. Rates of Retirement:

a. For Members Hired before January 1, 2011 (per 100 members):

			Service*		
Age**	5 - 18	19 - 30	31	32-33	34+
54	-	6	12	38	40
55	-	10	20	38	40
56	-	7	16	38	32
57	-	7	16	38	32
58	-	7	13	38	32
59	-	25	34	45	31
60	14	27	45	45	31
61	14	24	30	45	31
62-63	14	26	36	45	31
64	20	33	36	45	31
65-67	23	33	45	45	31
68-69	27	33	45	45	31
70	100	100	100	100	100

* *Active member service rounded to nearest year on June 30 prior to retirement.*
** *Age rounded to nearest year on June 30 prior to retirement.*

SECTION III - SUPPORTING ANALYSIS

b. For Members Hired on or after January 1, 2011 (per 100 members):

	Service*				
Age**	9 - 18	19 - 30	31	32-33	34+
≤ 61	-	-	-	-	-
62	13	15	20	25	25
63	8	10	15	20	20
64	8	10	15	20	20
65	8	10	15	20	20
66	20	10	15	20	20
67	20	40	70	70	70
68	20	40	40	40	40
69	20	40	40	40	40
70	100	100	100	100	100

* *Active member service rounded to nearest year on June 30 prior to retirement.*
** *Age rounded to nearest year on June 30 prior to retirement.*

c. Utilization of Early Retirement Option (ERO) among All Active Service Retirees* (per 100 members):**

	Service*			
Age**	19 - 30	31	32	33
54	68	90	49	22
55	75	79	53	25
56	66	75	45	17
57	63	71	48	15
58	64	69	46	14
59	23	27	28	13

* *Active member service rounded to nearest year on June 30 prior to retirement.*
** *Age rounded to nearest year on June 30 prior to retirement.*
*** *ERO Utilization Rates are applied only to members who have less than 35 years of total service at the assumed retirement date (including assumed sick leave and optional service purchased at retirement). Based on the sick leave and optional service assumptions, the majority of members with 33 years of service at the beginning of the year of retirement will not be assumed to retire on ERO because they will be assumed to have at least 35 years of service at retirement. In addition, ERO Utilization Rates are not applied to members whose pension under the ERO program would be less than their money purchase benefit.*

5. **Marital Data:** It is assumed that 85% of members are married and that the female spouse is three years younger than the male spouse. (Adopted effective June 30, 1993.)

SECTION III - SUPPORTING ANALYSIS

6. **Growth in Active Membership:** For purposes of the projection required by State funding law, it is assumed that the active membership of the System will remain constant in number with no change in the size of either the full-time/part-time group or the hourly/substitute group. (Adopted effective June 30, 1994.)

7. **Severance Pay:** For members hired before January 1, 2011, the percent of retirees from active service assumed to receive severance payments, and the amount of such severance payments, are assumed to be as follows:

Percent of Retirees Who Receive Severance Pay	Severance Pay as a Percent of Other Pensionable Earnings in the Last Year of Employment
20%	6%

8. **Optional Service Purchases:** The pension benefit obligation for retirement benefits for active members who have not previously purchased optional service is increased to cover the employer cost of out-of-system service purchased in the last two years prior to retirement. The amount purchased varies by the amount of regular service at retirement. Representative amounts purchased at retirement, and other assumptions used, are as follows:

Regular Service at Retirement	Maximum Service Purchased
10 years	0.473 years
20 years	0.835 years
25 years	1.360 years
30 years	1.040 years
34 or more	None

a. Actual optional service credit for each current member is provided by TRS;
b. No additional service purchases will be assumed for members who currently have optional service credit;
c. Members will not purchase service if it does not improve their pension benefit; and,
d. When optional service is purchased within the last two years prior to retirement, 25% of the cost is covered by member payments and the remaining cost is the responsibility of the employer.

The PBO covered by future member payments is not included in the liability on the valuation date, but is brought into projected liabilities as those payments are brought into the assets.

SECTION III - SUPPORTING ANALYSIS

9. **Unused and Uncompensated Sick Leave Service at Retirement:** Such credit varies by the amount of regular service at retirement. Representative assumed amounts of unused and uncompensated sick leave service are as follows:

Regular Service at Retirement	Sick Leave Service Credit
20 years	1.035 years
25 years	1.847 years
30 years	1.454 years
34 years	1.000 years
35 or more	None

10. **Administrative Expenses:** The administrative staff of the System estimates the expected administrative expenses for the fiscal year following the valuation. Total payroll for the same year is projected based on valuation assumptions and the expected administrative expenses are then expressed as a percent of total payroll. Administrative expenses in future years are then assumed to remain constant as a percent of total payroll. (Adopted effective June 30, 1994.)

11. **2.2 Upgrade Assumption:** For those active members who have already made a payment to upgrade past service prior to June 30, 1998 their benefits are based on their upgrading at the valuation date. For all other active members, they are assumed to upgrade at retirement. (Adopted effective June 30, 1999.)

12. **Liability Adjustment:** The current actuarial valuation was based on the latest membership data available, which were submitted by the System for active, inactive, and retired members as of the prior valuation date. In projecting results to account for the one-year difference in the census date and the valuation date, we made use of the valuation assumptions. To the extent that changes have occurred in the census from the date the census information is determined and the valuation date, Buck will work with TRS staff to determine if additional adjustments need to be made. Otherwise, any change in liability due to changes in census between the collection date of the census information and the valuation date will be captured in the next actuarial valuation.

    The implications of the use of the prior year's data brought forward to represent the current year's data in the report should be numerically demonstrated to allow for the evaluation of the significance to the resulting liabilities and plan costs (Recommendation #8).

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13. **Future Payroll Assumption:** Future payroll is projected using the assumed decrements for the members in the system and the new entrant profile as described below:

   a. **Distribution of New Entrants is as follows (based on 6/30/2009-6/30/2011 new hire counts):**

Age Group	Full Time/ Part Time			Hourly/ Substitute		
	Males	Females	Total	Males	Females	Total
20 – 24	5.4%	26.2%	31.6%	6.9%	18.1%	25.0%
25 – 29	7.7	24.6	32.3	8.2	15.1	23.3
30 – 34	3.6	10.3	13.9	2.7	6.0	8.7
35 – 39	1.8	5.6	7.4	2.0	6.6	8.6
40 – 44	1.4	3.9	5.3	2.7	9.4	12.1
45 – 49	0.8	3.3	4.1	1.8	6.2	8.0
50 – 54	0.6	2.0	2.6	1.6	3.9	5.5
55 – 59	0.6	1.3	1.9	1.7	2.7	4.4
60 – 64	0.3	0.4	0.7	1.4	1.6	3.0
65 – 69	0.1	0.1	0.2	0.6	0.5	1.1
70	0.0	0.0	0.0	0.2	0.1	0.3
Total	22.3%	77.7%	100.0%	29.8%	70.2%	100.0%

   b. **Service Credit Earned in Each Future Year (Full Time/Part Time based on 6/30/2009-6/30/2011 new hire service credits and Hourly/Substitutes based on 6/30/2011 new hire service credits):**

Age Group	Full Time/ Part Time			Hourly/ Substitute		
	Males	Females	Total	Males	Females	Total
20 – 24	0.917	0.923	0.922	0.311	0.336	0.335
25 – 29	0.947	0.934	0.937	0.309	0.298	0.298
30 – 34	0.909	0.915	0.913	0.340	0.276	0.297
35 – 39	0.930	0.916	0.920	0.288	0.301	0.300
40 – 44	0.931	0.901	0.908	0.252	0.308	0.298
45 – 49	0.900	0.905	0.904	0.304	0.317	0.312
50 – 54	0.888	0.928	0.919	0.321	0.338	0.334
55 – 59	0.972	0.903	0.926	0.353	0.345	0.346
60 – 64	0.893	1.113	1.010	0.328	0.330	0.327
65 – 69	-	-	-	0.315	0.304	0.308
70	-	-	-	0.285	0.255	0.268
Average	0.928	0.924	0.924	0.313	0.315	0.314

SECTION III - SUPPORTING ANALYSIS

c. Projected Annual Rate of Pay at 6/30/2012*
(for one year of service credit – Full Time/Part Time based on 6/30/2009-6/30/2011 new hire pay normalized to 6/30/2012 and Hourly/Substitutes based on 6/30/2011 new hire pay)

Age	Full Time/ Part Time			Hourly/ Substitute		
Group	Males	Females	Total	Males	Females	Total
20 – 24	$ 46,349	$ 45,029	$ 45,254	$ 17,475	$ 18,053	$ 17,893
25 – 29	47,771	48,290	48,167	17,467	17,374	17,407
30 – 34	55,110	52,482	53,163	17,704	16,908	17,155
35 – 39	57,001	54,980	55,472	16,839	16,595	16,652
40 – 44	64,467	55,424	57,812	16,616	15,919	16,075
45 – 49	68,190	55,885	58,286	16,348	16,192	16,227
50 – 54	74,055	56,203	60,323	16,806	16,281	16,434
55 – 59	68,428	68,443	68,438	16,095	16,233	16,180
60 – 64	77,237	58,749	66,672	15,935	16,183	16,067
65 – 69	-	52,933	26,466	15,841	15,565	15,716
70	-	47,386	-	15,783	14,993	15,520
Total	$ 52,582	$ 49,509	$ 50,195	$ 17,074	$ 16,989	$ 17,014

* *The rate of pay profile will increase by the inflation and real wage growth assumptions.*

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E. Actuarial Methods

Actuarial methods consist of three components: (1) the funding method, which is the attribution of total costs to past, current, and future years; (2) the method of calculating the actuarial value of assets (i.e. asset smoothing); and, (3) the amortization basis of the Unfunded Actuarial Liability (UAL). Since the amortization basis is governed by State law, we do not comment on it here.

1. *Cost Method:*

   The System uses the projected unit credit cost method (PUC) to assign costs to years of service, as required under the Pension Code (40 ILCS 5/16). **We have no objections with respect to using the PUC method, although we, as Buck does, would prefer the Entry Age Normal (EAN) funding method as it is more consistent with the requirement in 40 ILCS 5/16 -158 for level percent of pay funding**. Public Act 098-0599 amended the Pension Code (40 ILCS 5/16-158) to require TRS to calculate the required State contribution using the entry age normal actuarial cost method beginning with the Fiscal Year 2016 State contribution. However, the Illinois Seventh Judicial Circuit Court granted a temporary restraining order and a preliminary injunction stopping the implementation of Public Act 098-0599. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Consequently, TRS continued to calculate the required State contribution as the law existed prior to Public Act 98-599.

   Under the PUC method, which is used by some public sector pension funds, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over his or her later years of service than over his or her earlier ones. As a result of this pattern of benefit value increasing, while the PUC method is not an unreasonable method, more plans use the EAN funding method to mitigate this effect. It should also be noted that the EAN method will be the required method to calculate liability for GASB 67 & GASB 68.

2. *Asset Smoothing Method:*

   The actuarial value of assets for the System is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that the fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. **Smoothing the market gains and losses over a period of five**

SECTION III - SUPPORTING ANALYSIS

years to determine the actuarial value of assets is a generally accepted approach in determining actuarial cost, and we concur with its use.

Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets and the market value of assets. Many public sector pension plans limit the actuarial value of assets to be in any year no more than 120% of market value, or no less than 80% of market value. In fact the Internal Revenue Service (IRS) mandates this "corridor" for private sector pension plans (a 90%-110% corridor is mandated). Even though it is not mandated for public plans, we believe that the use of this type of corridor is a much sounder actuarial practice, and according to ASOP No. 44 in Section 3.3 b. 1, the actuarial value of assets should "...fall within a reasonable range around the corresponding market value." **Therefore, we recommend that the TRS Board consider moving to this approach in future valuations** (Recommendation #11). It's important to note that currently a move to this corridor approach would have no impact on the 2014 actuarial valuation results, as the actuarial value of assets is already within the 80%-120% corridor.

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

Response to recommendations in 2013:

In the State Actuary's Preliminary Report on the Teachers' Retirement System of Illinois presented December 19, 2013, Cheiron made several recommendations. Below we summarize how these recommendations were reflected in this year's valuation report.

Teachers' Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
Recommended Changes to Actuarial Assumptions Used in the 2013 Valuation:		
1. We now urge the Board to lower the assumption for the upcoming June 30, 2014, actuarial valuation. If the Board concludes that a reduction is not needed, we request TRS provide substantial justification for maintaining the current interest rate.	Implemented	After an analysis was performed and presented in the spring of 2014, the Board this summer voted to lower the rate from 8.00% to 7.50%.
Recommended Additional Disclosures for the 2013 Valuation:		
2. We recommend that Buck include the normal cost development in all projections. These projections should show normal cost by Tier.	Implemented	Addressed on pages 55 through 65 of the actuarial valuation report
3. We recommend Buck disclose in the valuation report a detailed breakdown of the actuarial liabilities separately for each participant class among participants in pay status, those inactive participants with deferred vested benefits, and active participants in their June 30, 2013, report. We also believe this information should be further broken down by Tier.	Implemented	Addressed on page 25 of the actuarial valuation report by participant class and by Tiers on page 59.
4. We recommend Buck include a reconciliation in this year's report of the implication of the census data lag recommended in its September 6, 2013, letter and adopted by the Board for the inactive data. It is our understanding that the inactive data used for this valuation was the same data used in the 2012 valuation and brought forward in a similar manner as applied for active data that was already subject to the lag.	Not Implemented	This should still be discussed to confirm to the user the potential material or immaterial implication of using data that is a full year older than would be expected. **Recommendation repeated.**

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

Teachers' Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
5. The change in the treatment of Federal Funds contribution rate should be expanded to allow any users of this report to clearly understand the rationale and implications of this change.	Implemented	Throughout the actuarial valuation report and in the development of the costs on pages 27 through 29, this measurement is clear.
6. For several consecutive years, there have been significant losses identified in the item *Loss due to all other causes* in the gain loss section of the report. We believe that additional analysis and more thorough disclosure is required and will help determine the source of these losses. The source should be quantified and addressed within the assumptions.	Implemented	Page 33 of the actuarial valuation report contains a detailed and comparative breakdown of the liability gains and losses by source.
7. The active participant mortality table should be more completely described and the administrative expense rate should be specifically identified in the assumptions for the year.	Implemented	These assumptions are discussed in the valuation report on pages 96 for mortality and 98 for expenses.
Recommended Changes for Future Valuations:		
8. We recommend that the TRS Board annually review economic assumptions (interest rate and inflation) each year prior to the valuation work and adjust assumptions accordingly.	Implemented	Studies and reports by RV Kuhns, TRS Staff and Buck presented in April and May – see Appendix B for a list of these.
9. We recommend again, as we did last year, that Buck consider, in future valuations, establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited given the use of the actuarial value of assets in the projection methodology in accordance with Public 40 ILCS 5/16-158 (k).	Not Implemented	**Recommendation repeated**
10. We recommend Buck provide a draft report for this review process and include changes subsequent to the State Actuary's review in the final report instead of a supplement, so that any future users of the report will have	To be determined	**This was not done last year and recommendation has been repeated this year.**

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

Teachers' Retirement System
Status of Previous Recommendations

Recommendation from 2013 Report	Status	Comments
the benefit of the changes included within a single document.		
11. We have several minor recommendations to the report including full disclosure of assumptions with respect to applicability of 415(b) benefit limits and 401(a)(17) compensation limits applicable to Tier 1 participants, in performance of the valuation.	Implemented	Explanation of the treatment of these two Federal limits is discussed on page 98 of the actuarial valuation report.
Proposed Certification of the Required State Contribution:		
12. We continue to recommend that Buck disclose in the June 30, 2014, valuation an explicit development of the required State contribution for FY 2016, showing all sub-components.	Implemented	The demonstration is provided on pages 25 through 31 of the actuarial valuation report.
We recommend that Buck disclose in the June 30, 2014, valuation and later valuations the following items in order for us to perform a more comprehensive analysis of the required State contribution in the future:		
• Projections by year of future benefit payouts for actives and current inactives (i.e., retirees, survivors, disabled, and deferred vested).	Implemented	Projections of all the components requested are included on pages 52 through 65 of the actuarial valuation report.
• Projections by year of future gross TRS normal costs and member contributions in dollar amounts by year and by Tier.	Implemented	Information by Tier of the normal cost is provided on pages 61 through 64 of the actuarial valuation report.
• Projection by year of the expenses.	Implemented	Found on page 63 of the actuarial valuation report.
• The present value of future benefits as of the valuation date for actives, terminated vested, retirees and beneficiaries, and disabled members by Tier.	Partially Implemented	Can potentially be derived from projection information on pages 59 and 60 of the actuarial valuation report.
• All projections should show the active member information split into three distinct groups: current actives hired	Implemented	Provided on pages 61 through 65 of the actuarial valuation report.

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

Teachers' Retirement System
Status of Previous Recommendations

Recommendation from 2013 Report	Status	Comments
prior to January 1, 2011; current actives hired on or after January 1, 2011; and, new entrants after the valuation date.		
• We recommend Buck include historic details on the projections of the maximum contribution calculation without General Obligation Bonds (GOB) in order for us to verify the numbers.	Partially Implemented	The development of the costs with and without GOB is clearly presented on pages 26 through 31 of the Actuarial Valuation Report. We would still like the historical details of the development of assets without GOB to be included in the valuation.
State Mandated Funding Method:		
13. We do, however, call for the TRS Board to take the steps it can to strengthen the funded status within the Illinois Pension Code by always using the conservative end of any range of assumptions recommended by Buck.	Partially Implemented	This is a continuous process that has been addressed through the changes in a number of the economic assumptions summarized on page 2 of the Actuarial Valuation Report and some sensitivity analysis shown on pages 21 and 22. **Recommendation repeated.**
14. We also recommend stress testing be done to determine whether there will be sufficient assets to pay benefits if there is a significant market downturn.	Partially Implemented	We recommend that Buck expand the stress testing to demonstrate the long-term impact of a significant market downturn as well as a long-term decline in active payroll. **Recommendation repeated.**

Chapter Three

PRELIMINARY REPORT ON THE STATE UNIVERSITIES RETIREMENT SYSTEM

In accordance with 30 ILCS 5/2-8.1, Cheiron, the State Actuary, submitted a preliminary report to the Board of Trustees of the State Universities Retirement System (SURS) concerning proposed certifications of required State contributions submitted to Cheiron by the Board. The preliminary report was submitted to SURS on December 2, 2014. The preliminary report was based on Cheiron's review of actuarial assumptions included in SURS' 2014 Actuarial Valuation Report.

Following is Cheiron's final preliminary report on the State Universities Retirement System. SURS' written response, provided on December 15, 2014, can be found in Appendix C.

December 19, 2014

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, Illinois 62703

Board of Trustees
State Universities Retirement System of Illinois
1901 Fox Drive
P.O. Box 2710
Champaign, Illinois 61825-2710

Dear Ladies and Gentlemen:

In accordance with the Illinois State Auditing Act (30 ILCS 5/2-8.1), Cheiron is submitting this preliminary report concerning the proposed certification prepared by Gabriel, Roeder, Smith & Company (GRS), of the required State contribution to the State Universities Retirement System of Illinois (SURS or System) for Fiscal Year 2016.

In summary, we believe that the assumptions and methods used in the June 30, 2014, Actuarial Valuation Report, which are used to determine the required Fiscal Year 2016 State contribution, represent a significant improvement over the assumptions and methods used the previous two years. As a result, the certified contributions, notwithstanding the State funding requirements that do not conform to Actuarial Standards of Practice, are more likely to meet the obligations of the System with less cost deferral to future years. In both our 2012 and 2013 reports to the Auditor General and SURS, we recommended the SURS Board consider lowering the interest rate for the 2013 and 2014 valuations. In 2013, the Board decided not to lower the rate. In this 2014 actuarial valuation, however, based on the recommendation from GRS, the Board lowered the assumption from 7.75% to 7.25%. With respect to the individual methods and assumptions, we comment on and recommend possible changes for the Board to consider in future valuations. Details of our recommendations can be found in this report. Please provide written responses to us by close of business on December 15, 2014.

Section I of this report describes the review process undertaken by Cheiron. Section II summarizes our findings. Section III provides the supporting analysis for those findings, and presents more details on our assessment of the actuarial assumptions and methods employed in GRS's actuarial certification, as well as our assessment of GRS's determination of the Required State Contribution for Fiscal Year 2016. Section III also includes comments on other issues impacting the funding of the State Universities Retirement System, including the implications of Article 15 of the Illinois Pension Code, which establishes the statutory funding requirements for the System. **In our opinion, the statutory mandated minimum funding requirements call for inadequate funding and do not meet Actuarial Standards of Practice (ASOPs).**

In preparing this report, we relied on information (some oral and some written) supplied by SURS and GRS. This information includes actuarial assumptions and methods adopted by the SURS Board, plan provisions, summarized census data, the draft 2014 Actuarial Valuation Report, the April 2014 Asset Liability Study by NEPC, the June 2014 Economic Assumption Review by GRS, the 2010 formal Experience Study, and various studies and memos prepared by the System's advisors, staff, and Executive Director. A detailed description of all information provided for this review is contained in the body of our report.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared exclusively for the State Universities Retirement System of Illinois and the Office of the Auditor General for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Michael J. Noble, FSA, FCA, EA, MAAA
Principal Consulting Actuary

Gene Kalwarski, FSA, FCA, EA, MAAA
Principal Consulting Actuary

SECTION I - REPORT SCOPE

Illinois Public Act 097-0694 (the Act) amended the Illinois State Auditing Act (30 ILCS 5/2-8.1) and requires Cheiron, as the State Actuary, to review the actuarial assumptions and valuation of the State Universities Retirement System of Illinois (SURS or System), and to issue to the SURS Board this preliminary report on the proposed certification prepared by Gabriel, Roeder, Smith & Company (GRS) of the required State contributions for Fiscal Year (FY) 2016. The purpose of this review is to identify any recommended changes to the actuarial assumptions for the SURS Board to consider before GRS, the SURS actuary, finalizes its certification of the required State contributions to SURS for FY 2016.

While the Act states that just the actuarial assumptions and valuation are to be reviewed, we have also reviewed the actuarial methodologies (funding and asset smoothing methods) employed in preparing the actuarial certification, as these methods can have a material effect on the amount of the State contribution being certified. Finally, we have offered our opinion on the implications of Article 15-155 of the Illinois Pension Code, which impacts the contribution amount certified by GRS.

Illinois Public Act 098-0599 was signed into law in December 2013 to become effective as of June 1, 2014. It made significant changes to statues governing SURS and the other statewide pension plans. This act modified eligibility and benefits of participants, changed the actuarial cost method used to calculate liability, expanded requirements of the State Actuary, and changed the funding method of the System. The implementation of the law was suspended in a ruling May 14, 2014, by the Seventh Judicial Circuit Court. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Due to the legal status of Illinois Public Act 098-0599, this report and the valuation report of the System do not specifically reflect the reforms of PA 098-0599.

In conducting this review, Cheiron reviewed the draft June 30, 2014, actuarial valuation prepared by GRS, as well as the April 2014 Asset Liability Study by NEPC, the 2014 Economic Assumption Review by GRS, the Experience Study that included investigation of the demographic and economic experience for the SURS for the period July 1, 2005 through June 30, 2010, and minutes of the 2014 Board of Trustees meetings. The materials we reviewed are listed in Appendix B.

In addition to reviewing the actuarial certification of the required State contribution to SURS, the Act requires the State Actuary to conduct a review of the "actuarial practices" of the Board. While the term "actuarial practices" was not defined in the Act, we continue to interpret this language to mean that we review: (1) the use of a qualified actuary (as defined in the Qualification Standards of the American Academy of Actuaries) to prepare the annual actuarial valuation for determining the required State contribution; and (2) the conduct of periodic formal experience studies to justify the assumptions used in the actuarial valuation. In addition, we have included comments on actuarial communication and compliance with Actuarial Standards of Practice (ASOPs) reflected in the draft June 30, 2014, actuarial valuation.

SECTION I - REPORT SCOPE

Finally, we have mentioned in past reports that in future reports we may examine additional actuarial practices of the Board. For this year's report we want to suggest an additional practice for the Board to consider. In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. Given the size of the SURS Plan, the Plan's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary. We comment further on this point in our recommendations that follow.

SECTION II - SUMMARY OF RECOMMENDATIONS

This section summarizes recommendations from our review of the actuarial assumptions and methods employed in the draft June 30, 2014, Actuarial Valuation Report of SURS as well as the "actuarial practices" of the SURS Board. Section III of this report provides detailed analysis and rationale for these recommendations.

Proposed Certification of the Required State Contribution:

GRS has determined that the FY 2016 required State contribution calculated under the current statutory funding plan is $1,601,480,000. We have verified the arithmetic calculations made by GRS to develop this required State contribution and have reviewed the assumptions on which it is based. As such, we have accepted GRS's annual projections of future payroll, total normal costs, benefits, expenses, and total contributions.

In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. We understand that the System has had limited scope audits in the past, but these audits did not include independent calculations by individual member to confirm the accuracy of the valuation results. Given the size of the SURS Plan, the Plan's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary.

1) **We recommend that the SURS Board consider conducting in independent actuarial audit in which the results of the valuation are replicated by the audit actuary and any deviations are noted and reconciled.**

State Mandated Funding Method:

The current statutory funding plan calculates the minimum contribution to SURS for each fiscal year as the amount sufficient to cause the total assets of the System to equal 90% of the total liabilities of the System by the end of Fiscal Year 2045. **This funding method does not meet generally acceptable actuarial principles because the System is not targeted to be funded at 100% and the funding of the Plan is pushed too far into the future. At a minimum, future plan benefit accruals should be fully funded to avoid continued systematic underfunding of SURS. Continuing the practice of deferring contributions that are needed to fully fund annual benefit accruals increases the risk of the Plan becoming unsustainable.**

2) Based on the draft 2014 Actuarial Valuation Report, the funded ratio, measured as the ratio of the actuarial value of assets to the actuarial liability, is currently at 42.3%. We have concerns about the solvency of the System if there is a significant market downturn. We concur with GRS's comments on the implication to the System of the State Mandated Funding method and have suggested and continue to suggest, the SURS Board always use

SECTION II - SUMMARY OF RECOMMENDATIONS

the conservative end of any range of assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with this method. We note that for this June 30, 2014, actuarial valuation, GRS recommended to the SURS Board that the prior discount rate of 7.75% be lowered to either 7.25% or 7.00%. The Board elected the higher end of the recommended range.

3) We have previously recommended stress testing be done to determine whether there will be sufficient assets to pay benefits if there is a significant market downturn. GRS has provided a supplemental projection based on volatile asset returns that demonstrates the large changes in required contributions that may be required by the State mandated method. This demonstrates some of the risk faced by the System due to volatile returns on assets. The System may also have risks involving population growth or decline, salary increases, retirement spikes, and inadequate State funding. **We recommend that GRS expand the stress testing of the System to involve a variety of stressors and the potential that a significant market downturn will have ripple effects in areas beyond asset returns.**

Assessment of Actuarial Assumptions Used in the 2014 Valuation:

30 ILCS 5/2-8.1 requires the State Actuary to identify recommended changes in actuarial assumptions that the SURS Board must consider before finalizing its certification of the required State contribution. We have reviewed all the actuarial assumptions used in the State Universities Retirement System's draft 2014 Actuarial Valuation Report and **conclude that the assumptions are reasonable in general, based on the evidence provided to us.**

Recommended Additional Disclosures for the 2014 Valuation:

4) The system currently uses the RP 2000 Combined Mortality table, projected with Scale AA to 2017, with factors to adjust the mortality rates to this population. GRS states in the Draft June 30, 2014, Actuarial valuation that the "current mortality assumption has an estimated margin of 10% for future mortality improvements." Since the statutory funding requirement is significantly dependent on what the actuarial liability is projected to be 31 years from now, GRS may want to further elaborate on this issue. GRS should disclose whether or not the recommended tables sufficiently cover anticipated increases through 2045.

Recommended Changes for Future Valuations:

5) We concur with GRS's recommendation, and recommend again, as we did last year, a corridor be established around the market value of assets of 80% to 120% beyond which the actuarial value is limited given the use of the actuarial value of assets in the projection methodology in accordance with 40 ILCS 5/15-155 (m). While this change would have no impact on the System for the June 30, 2014, valuation, we believe it would be better to establish this corridor before it is actually applicable.

SECTION II - SUMMARY OF RECOMMENDATIONS

6) We continue to recommend the Board annually review the economic assumptions (interest rate and inflation) prior to commencing the valuation work and adjust assumptions accordingly as it did prior to this year's valuation.

7) GRS should consider for next year's valuation the use of a generational mortality table. Generational mortality tables, which assume that mortality rates at each age decline over time, are increasingly being implemented within pension plans. Given the significant dependence of the statutory funding requirements on new hires over the next 30 years, generational mortality is of greater significance here than for a typical public pension plan that bases its contributions on just the current plan membership. We recommend that GRS consider using a fully generational mortality table so that future mortality improvements will continue to impact new entrants throughout the projection period ending in 2045.

8) We recommend that in future experience studies, GRS specifically request the investment consultants referenced in developing market expectations to provide longer term market expectations (30+ years) and that GRS also obtain the specific expectations of the investment consultant serving the SURS.

9) In our prior two reports, we also asked for a historic development of assets without the General Obligation Bonds (GOB) issued in 2004 but we have yet to obtain such information. Since the development of assets without the GOB directly impacts the required State contribution, it is important to verify that these assets have been historically developed accurately. We recommend that prior to the completion of the June 30, 2015 draft Actuarial Valuation Report, GRS provide a verification of the hypothetical assets developed without the GOB bonds.

SECTION III - SUPPORTING ANALYSIS

In this section we provide detailed analysis and supporting rationale for the recommendations that were presented in Section II of this report.

A. Proposed Certification of the Required State Contribution

As required by 40 ILCS 5/15-155, in determining the required State contribution under State law, the System's actuary must determine what level of future contributions is needed to make a projection of the System's funded status in 2045 be at 90%. We have verified the arithmetic calculations made by GRS to develop this required State contribution and have reviewed the assumptions on which it is based. As such, we have accepted GRS's annual projections of future payroll, total normal costs, benefits, expenses, and total contributions.

In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. Given the size of the SURS Plan, the Plan's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full replication audit. Such an audit fully replicates the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary. Results are compared in a detailed fashion to measure the liabilities for each benefit form and feature. A replication audit will uncover any potential problems in the processing and certification of valuation results.

We recommend that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary (Recommendation #1).

B. State Mandated Methods

1. *State Mandated Funding Method:*

   In the Summary of the draft 2014 Actuarial Valuation Report, GRS clearly states its criticism that the required State contribution to the SURS, defined by Illinois Pension Code (40 ILCS 5/15-155), is currently underfunding the system. This law, as reflected in this valuation, requires that the actuary base the required contribution using a prescribed funding method that achieves a 90% funding in the year 2045. GRS comments that the current funding policy defers funding which puts the system at risk that benefit obligations will not be met. It recommends a funding policy based on 100% funding within 30 years in accordance with GASB 25, as well as Actuarial Standards of Practice. **We concur with GRS's comments on the implication to the System of the State Mandated Funding method, and suggest the SURS Board always use the conservative end of any range of assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with this method** (Recommendation #2)**.** The potential for continued underfunding of the plan during the projection period increases the uncertainty and inherent risks in determining the State required contributions to the System and the measurement of plan obligations. ASOP 4 requires consideration of the plan's funding policy and the uncertainty or risk inherent in the measurement of pension obligations and these should be factors when selecting actuarial assumptions**.**

We recommend that GRS expand the stress testing of the System to involve a variety of stressors and the potential that a significant market downturn will have ripple effects in areas beyond asset returns (Recommendation #3)**.**

2. *State Mandated Projection Method*:

   Under 40 ILCS 5/15-155 (m), the actuarial methodologies utilized in performing the 2045 projection of the System's funded status assume the future earnings rate (currently at 7.25%) is applied to the actuarial value of assets (AVA) rather than the market value of assets (MVA). We believe that basing the projected future earnings of the System on starting market values of assets (rather than a smoothed value) would provide a more realistic expectation of the future direction of the contribution level.

C. Economic Assumptions

1. *The Interest Rate:*

   The interest rate assumption (also called the investment return or discount rate), is the most impactful assumption affecting the required State contribution amount. This assumption, which is used to value liabilities for funding purposes, was changed to 7.25% from 7.75% for this June 30, 2014, actuarial valuation.

   In Cheiron's 2012 and 2013 report to the Auditor General and SURS Board, we recommended that the Board consider lowering this interest rate further. In June 2014, GRS presented an Economic Assumption Review covering the period July 1, 2009 through June 30, 2013. In that review GRS provided the Board with a recommendation, based on detailed expectations from eight investment consultants, to lower the rate to either 7.00% or 7.25%. The Board elected to lower the rate to 7.25%.

   Cheiron supports the lowering of the discount rate to 7.25% and continues to recommend that the Board review the economic assumptions annually (Recommendation #6)**.**

   Our rationale for this recommendation is as follows:

   - The April 2014 Asset Liability Study by NEPC, LLC shows an expected geometric return on the System's revised asset portfolio to be 6.5% over a 5- to 7-year time horizon. This expected return has declined 45 basis points since the 2013 Review of Asset Allocation by Callan Associates. The 30-year expected return of this portfolio is expected to be 7.8%.

SECTION III - SUPPORTING ANALYSIS

- In GRS's 2014 Economic Assumption Review (GRS Review), GRS presented the opinions of eight independent investment consultants on the future expected earnings of the System and then adjusted the expected nominal return to the system's inflation assumption and net plan incurred expenses. The net adjusted expected nominal returns varied from 6.62% to 8.40% on an arithmetic basis. The average adjusted expected nominal return net of expenses was 7.51% (page 9 of GRS Review).

- The GRS Review also included a table showing the 20-year geometric average of net nominal return based on each of the eight investment consultant's expectations. The average of the 50th percentile expectations is 6.7%, and the probability of exceeding 7.25% investment return each year is 42.7% which can be seen in the bottom row of the GRS Chart below (page 9 of GRS Review). Therefore, it can be inferred there is a higher likelihood of investment loss than gain and the expected average return rate based on the current asset allocation is lower than 7.25%. While this is certainly greater than the 36.1% chance of meeting the prior assumption of 7.75%, this suggests the Board may want to consider in future years lowering the rate even further.

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return 25th	50th	75th	Probability of exceeding 7.75% *	Probability of exceeding 7.50%	Probability of exceeding 7.25%	Probability of exceeding 7.00%	Probability of exceeding 6.75%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	4.0%	5.9%	7.8%	25.1%	28.1%	31.2%	34.4%	37.8%
2	4.2%	6.0%	7.9%	26.9%	29.9%	33.1%	36.4%	39.9%
3	4.4%	6.3%	8.3%	30.8%	33.8%	37.0%	40.3%	43.7%
4	4.8%	6.6%	8.4%	32.8%	36.3%	39.8%	43.4%	47.1%
5	5.1%	7.1%	9.1%	41.0%	44.3%	47.6%	50.9%	54.2%
6	5.5%	7.3%	9.1%	43.6%	47.3%	51.0%	54.7%	58.3%
7	5.0%	7.1%	9.2%	41.6%	44.6%	47.8%	50.9%	54.1%
8	5.6%	7.5%	9.6%	47.3%	50.6%	54.0%	57.3%	60.6%
Average	**4.8%**	**6.7%**	**8.7%**	**36.1%**	**39.4%**	**42.7%**	**46.0%**	**49.5%**

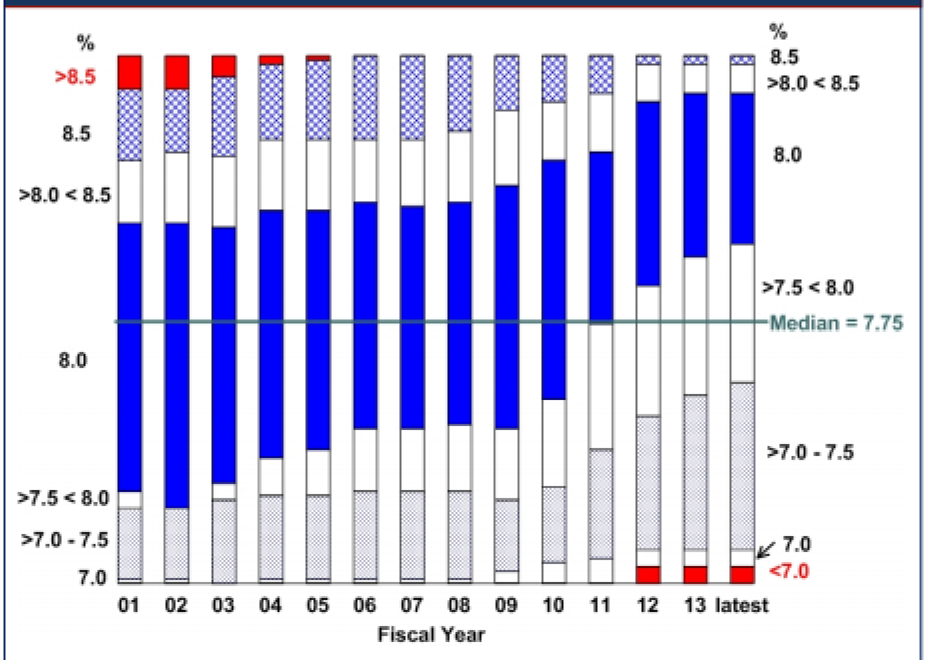
In our opinion, the use of 7.25% is justified for this 2014 valuation because we believe that the "long term" outlook of the eight investment consultants that GRS surveyed most likely had a shorter time horizon than the time horizon applicable to the investment assumptions (30+ years). In our experience, we find that investment consultants view 10 years as a long time horizon. We would expect that had GRS requested these eight consultants to provide 20+ year outlooks that their longer term outlooks would be higher and thus more supportive of the 7.25% investment assumption. **We recommend that in future valuations, GRS specifically request these eight investment consultants to provide longer term market expectations** (Recommendation #8).

SECTION III - SUPPORTING ANALYSIS

- A review of the interest and inflation rates does not involve the collection of significant data and can be updated annually. In addition, it keeps the Board focused more closely on these very important assumptions.

- The National Association of State Retirement Administrators (NASRA) conducts an annual survey of public funds. The latest Public Fund Survey covers 126 large retirement plans. The following chart shows the distribution of investment return assumptions for the last 13 years of the survey. The latest data includes results collected through October 2014.

Figure 4: Change in distribution of public pension investment return assumptions, FY 01 through October 2014



Source: Compiled by NASRA based on Public Fund Survey, Oct. 2014

Over the period shown in the latest survey, there continues to be a pattern of reducing investment return assumptions. Forty-eight of the 126 plans have reduced the interest rate assumption since Fiscal Year 2011. For these 48 plans, the average reduction is 0.37%. The survey is consistent with the experience of other Cheiron clients, with which there has been a significant trend to reduce the investment return assumptions in the last several years.

- New GASB 67 and 68 pronouncements may subject many public pension plans, such as SURS, to effectively use a lower interest rate for accounting disclosures and pension expense determinations in fiscal years 2014 and 2015, respectively. It is important to note, however, that the new standards do not define funding requirements for a plan.

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- Moody's, an organization that provides bond rating information for private investors, compares the financial viability of public sector pension plans by using interest rate assumptions significantly lower than the assumptions used by most public sector pension plans.

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize interest assumptions that are based on short-term and mid-term bond rates, which are very low.

2. *Inflation Assumption:*

The inflation assumption of 2.75%, which primarily impacts the salary increase assumption, used in the 2014 actuarial valuation by GRS is reasonable.
Our rationale for concurring with the 2.75% assumption:

- The 2014 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years) inflation will average somewhere between 2.0% and 3.4%.

- As shown on pages 5 and 6 of the GRS Review, there continues to be support for this assumption as a long-term rate even though the historic short-term averages are being lowered by the current historically low rates.

- The *National Conference on Public Employers Retirement Systems* (NCPERS) 2014 study provides the following graphic of respondents' inflation assumptions:

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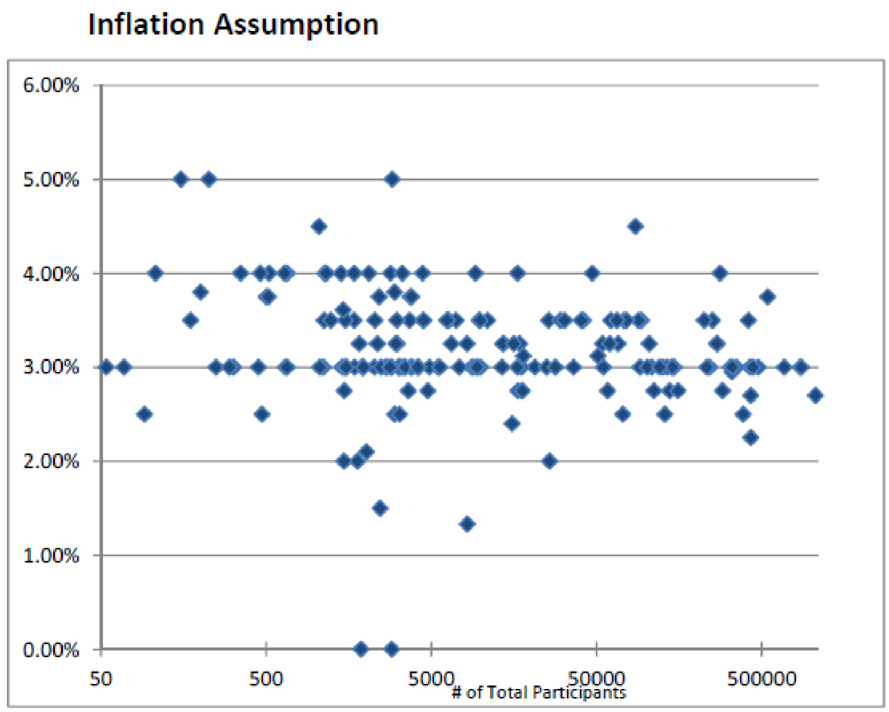

This shows that the 2.75% assumption, which SURS uses, is on the lower end of the inflation assumptions used amongst the 187 systems who responded to this study, with 3.2% as the average.

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3. *Salary (Annual Compensation) Increase Assumption:*

For the draft June 30, 2014, actuarial valuation, the salary scale assumption, which remains the same as it was in 2013, is shown in the table below.

Salary Increase

Illustrative rates of increase per individual employee per annum, compounded annually:

Service Year	Annual Increase
0	12.00%
1	10.00%
2	8.50%
3	7.25%
4	6.50%
5	6.25%
6	6.00%
7	5.75%
8	5.50%
9-13	5.00%
14-19	4.75%
19-33	4.25%
34+	3.75%

These increases include a component for inflation of 2.75% per annum and 1.00% standard of living increase.

This assumption was developed following the 2010 GRS Experience Study and first implemented in the 2011 valuation. This assumption was reevaluated in the 2014 GRS Economic Review and GRS recommended that the assumption be maintained.

We find the assumption and the basis for setting it as reasonable.

Our rationale for concurring with GRS's recommended salary increase assumption:

- The 2014 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (between 2025 and 2088) real wage differential will average somewhere between 0.52% and 1.76%.

- This assumption, which is employer specific, is supported by credible data as shown on pages 11-14 of the 2010 Experience Study performed by GRS.

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- During the year ending June 30, 2014, there was again a small experience gain from this assumption (i.e., salary increases were less than assumed) as shown on page 17 of the draft June 30, 2014, GRS Actuarial Valuation Report. The table on page 17 shows there have been gains due to salary increases for the last four years. However, this alone should not be a consideration for changing this assumption long term, and may be more indicative of the state of the current economy.

4. *Cost of Living Adjustment Assumption:*

   Benefits are increased annually as described on page 36 of the 2014 valuation. Annual increases are 3% for those hired prior to January 1, 2011 and based upon ½ of the Consumer Price Index for those hired on or after January 1, 2011, which is 1.375% based on the inflation assumption of 2.75%.

   We find the assumption and the basis for setting it as reasonable.

5. *Capped Pay Assumption:*

   Benefits for members hired after January 1, 2011 are calculated using pay that is capped under 40 ILCS 5/1-160. The pay cap is shown on page 44 of the June 30, 2014, valuation to be $110,631.26 for 2014 and $109,971 for 2013.

   We find the assumption and the basis for setting it as reasonable.

6. *Effective Rate of Interest:*

   The Effective Rate of Interest is the interest rate that is applied to member contribution balances. For purposes other than determining the money purchase benefit, this rate is determined by the Board annually. Member accounts are assumed to be credited with an effective rate of interest of 7.00% for the June 30, 2014, valuation.

   We find the assumption and the basis for setting it as reasonable.

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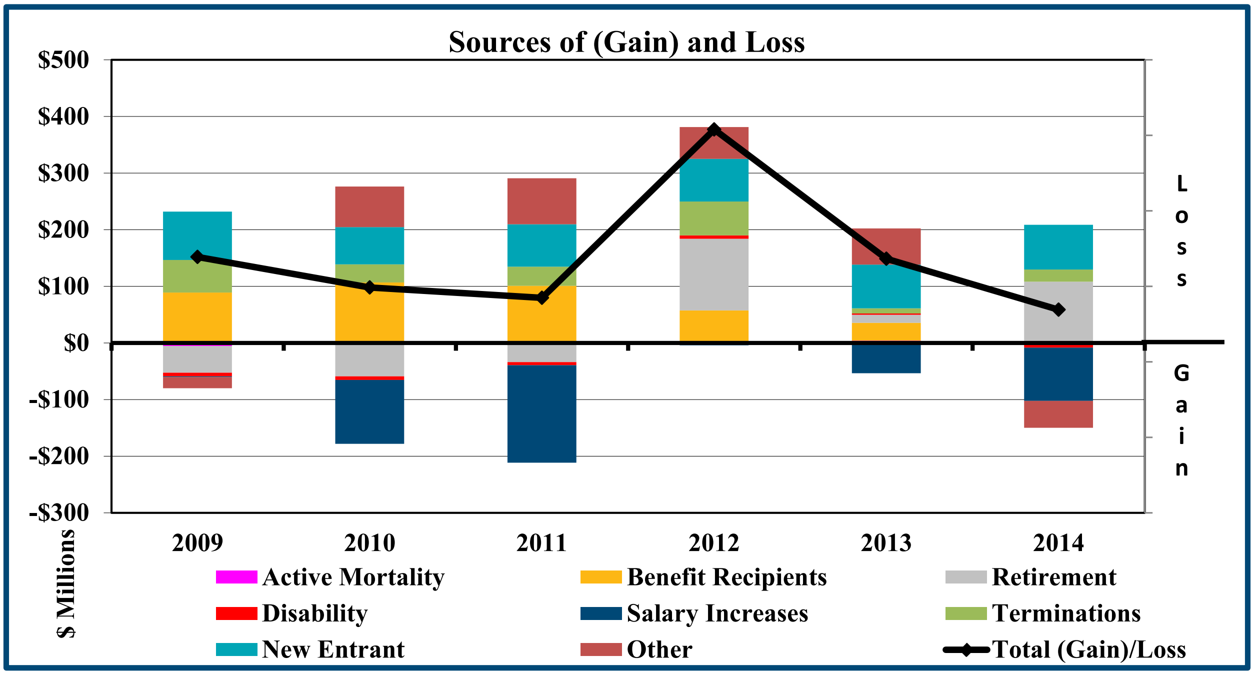
D. Demographic Assumptions

For the June 30, 2014, Actuarial Valuation, GRS has maintained the same assumption changes used in the prior valuation and first adopted in the June 30, 2011 actuarial valuation. This includes modifications recommended in the 2010 Experience Study.

In its annual actuarial valuation reports, GRS regularly reports sources of liability gains and losses. In the 2014 report, these are shown on page 17. In the chart below we have collected similar data from GRS's past valuation reports dating back to 2009 and presented a historical review of past demographic and salary increase experience gains and losses.



This chart shows the pattern of annual gains and losses attributable to eight different sources as shown in the legend above. When the colored bar slices appear above zero on the Y axis, that represents an experience loss, and below zero represents an experience gain for that year.

Key observations from this chart are as follows:

1. In every year since 2009 there have been experience losses attributable to new entrants joining SURS. New entrant losses are expected because participants are hired and accrue service between valuations. There is also an offsetting gain to the assets due to contributions from these new entrants. This is not a reason for concern unless the new entrant loss is more than expected for participants hired in the last year.

2. For 2009 through 2013, there were consistent losses attributable to SURS benefit recipients. GRS addressed this with staff and determined that much of this loss was due to unexpected changes in benefit amounts paid. This may occur when initial benefits are based on estimates

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which are later adjusted based on finalized information. Starting in 2013, GRS has received additional data from SURS to better measure expected benefits, and the loss is significantly less this year.

3. A trend of salary gains is evident in the period shown. However, as we discussed in the salary assumption section, this is likely to be a reflection of the general economic environment since 2009 rather than a problem with the long term assumption.

4. Termination from employment experience has consistently shown a small loss. This should be reexamined in the next demographic experience study, which GRS has recommended to cover the period ending June 30, 2014.

5. Disability and active mortality experience are too small to be noticed on the chart, given their insignificant size relative to other experience items. Since there have been both gains and losses in each of these areas during the period shown, they are not an immediate area of concern.

6. The total liability (gain)/loss is shown by the black line on the graph above. This total (gain)/loss as a percent of liability is shown above the bars. While there is a pattern of consistent losses, the percent is generally quite small.

Out of the demographic assumptions, there is one assumption that should be more closely reviewed.

1. Mortality:

Post-Retirement Mortality

The mortality assumption for retirees, beneficiaries and disabilities is based on the RP2000 Combined Healthy mortality table, sex distinct, with rates projected to 2017 with scale AA, with rates multiplied by 0.80 for males and 0.85 for females. No adjustment is made for post-disabled mortality. The mortality table used is a static table with the provision for future mortality improvement in the projection to 2017.

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Pre-Retirement Mortality

85% for males and 60% for females of post-retirement mortality.

Sample Mortality Rates				
	Postretirement		Preretirement	
Age	Males	Females	Males	Females
35	0.0568%	0.0335%	0.0483%	0.0201%
40	0.0753%	0.0464%	0.0640%	0.0278%
45	0.0966%	0.0726%	0.0821%	0.0436%
50	0.1256%	0.1064%	0.1068%	0.0639%
55	0.2093%	0.2015%	0.1779%	0.1209%
60	0.4103%	0.3946%	0.3488%	0.2367%
65	0.8018%	0.7576%	0.6815%	0.4546%
70	1.3740%	1.3068%	1.1679%	0.7841 %
75	2.3817%	2.0841%	2.0244%	1.2505%

Recently changed Actuarial Standards of Practice (ASOP No. 35) now requires that actuaries at least consider projections of mortality improvements, and if there is not such an assumption for improvement, the actuary must disclose the basis for not making the assumption. GRS has stated that the most recent Experience Study indicates that the current mortality assumption has an estimated margin of 10% for future mortality improvements. **For the current valuation GRS should disclose whether or not the recommended tables sufficiently cover anticipated increases through 2045** (Recommendation #4). **We recommend using a fully generational mortality table for future valuations. A fully generational mortality table has mortality improvements automatically built-in for new members entering the System, which is important given that open group projections through 2045 provide the basis for the calculated contribution rates** (Recommendation #7).

Below we summarize all remaining demographic assumptions that we reviewed, and we have concluded all are reasonable and meet the requirements of ASOP No. 35, section 3.3.4.

1. Marriage Assumption

Members are assumed to be married in the following proportions:

Age	Males	Females
20	25%	40%
30	70	75
40	80	80
50	85	80
60	85	70

2. Self-Managed Plan Election

Fifteen percent of total future hires will elect to participate in the Self-Managed Plan.

3. Termination

Illustrative rates of withdrawal from the System are as follows:

Years of Service	All Members
0	22.0%
1	22.0
2	16.0
3	14.0
4	12.0
5	10.5
6	9.0
7	7.5
8	6.5
9	6.0
10	5.5
11	4.5
12	4.0
13	3.7
14	3.2
15	3.0
16	2.6
17	2.3
18	2.1
19	2.0
20	1.7
21	1.5
22	1.5
23	1.5
24	1.5
25	1.5
26	1.5
27	1.5
28	1.5
29	1.5

Part-time members with less than three years of service (all members classified as part-time for valuation purposes) are assumed to terminate at the valuation date.

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Members that terminate with at least five years of service are assumed to elect the most valuable option on a present value basis, either refund of contributions or a deferred benefit.

4. Retirement

Upon eligibility, active members are assumed to retire as follows:

	Members Hired before January 1, 2011 and Eligible for		Members Hired on or after January 1, 2011 and Eligible for	
Age	Normal Retirement	Early Retirement	Normal Retirement	Early Retirement
Under 50	40.0%	-	-	-
50	38.0	-	-	-
51	38.0	-	-	-
52	38.0	-	-	-
53	38.0	-	-	-
54	34.0	-	-	-
55	32.0	7.0%	-	-
56	26.0	5.0	-	-
57	26.0	4.5	-	-
58	26.0	5.5	-	-
59	26.0	6.0	-	-
60	11.0	-	-	-
61	11.0	-	-	-
62	13.0	-	-	35.0%
63	13.0	-	-	15.0
64	13.0	-	-	15.0
65	17.0	-	-	15.0
66	15.0	-	-	15.0
67	15.0	-	50.0%	-
68	15.0	-	35.0	-
69	15.0	-	30.0	-
70-79	30.0	-	30.0	-
80+	100.0	-	100.0	-

Members that retire are assumed to elect the most valuable option on a present value basis, either refund of contributions (or portable lump sum retirement, if applicable) or a retirement annuity.

SECTION III - SUPPORTING ANALYSIS

5. Disability

A table of disability incidence with sample rates follows:

Age	Males/ Females	Age	Males/ Females	Age	Males/ Females
20	0.050%	40	0.145%	60	0.420%
21	0.053%	41	0.155%	61	0.435%
22	0.055%	42	0.165%	62	0.450%
23	0.058%	43	0.175%	63	0.465%
24	0.060%	44	0.185%	64	0.480%
25	0.063%	45	0.195%	65	0.495%
26	0.065%	46	0.210%	66	0.510%
27	0.068%	47	0.225%	67	0.525%
28	0.070%	48	0.240%	68	0.540%
29	0.073%	49	0.255%	69	0.555%
30	0.075%	50	0.270%	70	0.570%
31	0.078%	51	0.285%	71	0.570%
32	0.080%	52	0.300%	72	0.570%
33	0.083%	53	0.315%	73	0.570%
34	0.085%	54	0.330%	74	0.570%
35	0.095%	55	0.345%	75	0.570%
36	0.105%	56	0.360%	76	0.570%
37	0.115%	57	0.375%	77	0.570%
38	0.125%	58	0.390%	78	0.570%
39	0.135%	59	0.405%	79	0.570%

Disability rates apply during the retirement eligibility period.

6. Operational Expenses

The amount of operational expenses for administration incurred in the latest fiscal year are supplied by SURS staff and incorporated in the Normal Cost.

7. Spouse's Age

The female spouse is assumed to be three years younger than the male spouse.

8. Missing Data

Members with an unknown gender are assumed to be female. Active and inactive members with an unknown date of birth are assumed to be 30-years-old at the valuation. An assumed spouse date of birth is calculated for current service retirees in the traditional plan for purposes of calculating future survivor benefits. Seventy percent of current total male retirees and 80% of current total female retirees in the traditional plan that have not elected a survivor refund are assumed to have a spouse at the valuation date.

9. Benefit Commencement Age

Inactive members eligible for a deferred benefit are assumed to commence benefits at their earliest normal retirement age. For Tier 1 members this is age 62 with at least five years of service, age 60 with at least eight years of service, or immediately with at least 30 years of service.

10. Load on Final Average Salary

No load is assumed to account for higher than assumed pay increases in final years of employment before retirement.

11. Load on Liabilities for Service Retirees with Non-finalized Benefits

A load of 10% on liabilities for service retirees whose benefits have not been finalized as of the valuation date is assumed to account for finalized benefits that on average are 10% higher than 100% of the preliminary estimated benefit.

12. Valuation of Inactives

An annuity benefit is estimated based on information provided by staff for Tier 1 inactive members with five or more years of service and Tier 2 members with 10 or more years of service.

13. Reciprocal Service

Reciprocal service is included for current inactive members for purposes of determining vesting eligibility and eligibility age to commence benefits. The recently updated actuarial assumptions (including retirement and termination rates) were based on SURS service only.

Therefore, reciprocal service was not included for current active members. Reciprocal service will be collected and analyzed in the future and will be considered in the next Experience Study.

14. Other Projection Assumptions

The number of total active members will remain the same as the total number of active members in the current valuation throughout the projection period.

New entrants have an average age of 37.4 and average capped pay of $37,110 and average uncapped pay of $38,446 (2014 dollars). These values are based on the average age and average pay of current members. The range profile is based on the age at hire and assumed pay at hire (using the actuarial assumptions, inflated to 2014 dollars) of current active members with service between one and four years.

15. Self-Managed Plan (SMP) Contribution Assumptions

The projected SMP contributions are equal to 7.6% of SMP payroll, plus estimated SMP expenses minus SMP employer forfeitures. Estimated SMP expenses for FY 2015 are $486,184 and SMP employer forfeitures used to reduce the certified contributions for FY 2016 are $3,451,060. Estimated SMP expenses for FY 2016 and after are assumed to increase by 2.75%. Estimated SMP employer forfeitures used to reduce the certified contributions for FY 2017 and after are assumed to be 7.5% of the gross SMP employer contribution.

E. Actuarial Methods

Actuarial methods consist of three components: (1) the funding method, which is the attribution of total costs to past, current, and future years; (2) the method of calculating the actuarial value of assets (i.e. asset smoothing); and (3) the amortization basis of the Unfunded Actuarial Liability (UAL). Since the amortization basis is governed by State law, we do not comment on it here.

1. Cost Method:

The System uses the projected unit credit cost method (PUC) to assign costs to years of service, as required under the Pension Code (40 ILCS 5/15). **We have no objections with respect to using the PUC method, although we would prefer the Entry Age Normal (EAN) funding method as it is more consistent with the requirement in 40 ILCS 5/15 - 155 requirement for level percent of pay funding**. Public Act 098-0599 amended the Pension Code (40 ILCS 5/15-155) to require SURS to calculate the required State contribution using the entry age normal actuarial cost method beginning with the Fiscal Year 2016 State contribution. However, the Illinois Seventh Judicial Circuit Court granted a temporary restraining order and a preliminary injunction stopping the implementation of Public Act 098-0599. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Consequently, SURS continued to calculate the required State contribution as the law existed prior to Public Act 98-599.

Under the PUC method, which is used by some public sector pension funds, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over his later years of service than over his earlier ones. As a result of this pattern of benefit values increasing, while the PUC method is not an unreasonable method, more plans use the Entry Age Normal (EAN) funding method to

SECTION III - SUPPORTING ANALYSIS

mitigate this effect. It should also be noted that the EAN method will be the required method to calculate liability for GASB 67 & GASB 68.

2. *Asset Smoothing Method:*

The actuarial value of assets for the System is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that the fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. **Smoothing the market gains and losses over a period of five years to determine the actuarial value of assets is a generally accepted approach in actuarial cost, and we concur with its use.**

Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets and the market value of assets. Many public sector pension plans limit the actuarial value of assets to be in any year no more than 120% of market value, or no less than 80% of market value. In fact, the Internal Revenue Service (IRS) mandates this "corridor" for private sector pension plans (a 90%-110% corridor is mandated). Even though it is not mandated for public plans, we believe that the use of this type of corridor is a much sounder actuarial practice, and according to ASOP No. 44 in Section 3.3 b 1, the actuarial value of assets should "...fall within a reasonable range around the corresponding market value." **Therefore, we concur with GRS's recommendation that the SURS Board consider moving to this approach in future valuations** (Recommendation #5). It's important to note that currently a move to this corridor approach would have no impact on the 2014 actuarial valuation results, as the actuarial value of assets is already within the 80%-120% corridor.

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

Response to recommendations in 2013:

In the State Actuary's Preliminary Report on the State Universities Retirement System of Illinois presented December 19, 2013, Cheiron made several recommendations. Below we summarize how these recommendations were reflected in this year's valuation report.

State Universities Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
Assessment of Actuarial Assumptions Used in the 2013 Valuation:		
1. Cheiron urged the SURS Board to consider lowering the interest rate to 7.25% or lower.	Implemented	GRS recommended the Board lower the interest rate to 7.00% or 7.25%. The Board elected to lower rate to 7.25% for the June 30, 2014, actuarial valuation.
Recommended Additional Disclosures for the 2013 Valuation:		
2. We recommend additional analysis and more thorough disclosure of the recurring loss for benefit recipients and adjustment to assumptions if the loss persists. We strongly recommend the source for this loss be explained and, if possible, prefunded through an appropriate assumption.	Implemented	Addressed on page 17 of the 2013 valuation report.
3. We recommend an explanation of the rationale to lower the Effective Rate of Interest be included in the June 30, 2013 Actuarial Valuation Report.	Implemented	Addressed on page 45 of the 2013 valuation report.
Recommended Changes for Future Valuations:		
4. We concur with GRS's recommendation to establish a corridor around the market value of assets beyond which the actuarial value is limited given the use of the actuarial asset value in the projection methodology in accordance with 40 ILCS 5/15 – 155 (m).	Not Implemented	**Recommendation repeated.**
5. We recommend the Board annually review the interest rate and inflation assumption.	Implemented	The Board reviewed the interest rate assumption and lowered the rate; however, we recommend this be an ongoing annual review of all economic assumptions. **Recommendation repeated.**

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

State Universities Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
6. We recommend that GRS consider using a fully generational mortality table so that future mortality improvements will continue to impact new entrants throughout the projection period ending in 2045.	Not Implemented	**Recommendation repeated.**
7. We recommend the description of Annual Compensation Increases be changed in the Actuarial Valuation Report.	Implemented	Addressed on page 36 of the 2014 valuation report.
Proposed Certification of the Required State Contribution:		
8. We recommend that GRS continue to disclose in future valuations the items listed below in order for us to continue to perform an analysis of the required State contribution.		
• Annual projections of future payroll, total normal costs, benefits, expenses, and total contributions.	Implemented	Addressed in section E of 2014 valuation report.
• We recommend GRS include the historic development of assets without General Obligation Bonds (GOB) in future reports.	Partially Implemented	Partially addressed on pages 31-32 of the 2014 valuation. The report demonstrated the development of the actuarial value of assets without the GOB for future years, but we again request historic development of assets back to the issuance of the GOB. **Recommendation repeated.**
• We also request GRS include a more detailed explanation of the selection of the current new entrant profile.	Implemented	Addressed on page 42 of the 2014 valuation report.
State Mandated Funding Method:		
9. We also recommend stress testing be done to determine whether there will be sufficient assets to pay benefits if there is a significant market downturn.	Partially Implemented	GRS provided supplemental projections based on volatile asset returns. We recommend that GRS expand the stress testing to involve a variety of

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

State Universities Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
		potential stressors. **Recommendation repeated.**
10. Due to the systematic underfunding of the System, we recommend that the Board always use the conservative end of any range of assumptions recommended by GRS.	Partially Implemented	This is a continuous process that has been partially addressed in lowering the interest rate for the current valuation. GRS recommended an interest rate of 7.0% or 7.25% and the Board elected a 7.25% rate, which is less conservative than 7.00%. **Recommendation repeated.**

Chapter Four

PRELIMINARY REPORT ON THE STATE EMPLOYEES' RETIREMENT SYSTEM

In accordance with 30 ILCS 5/2-8.1, Cheiron, the State Actuary, submitted a preliminary report to the Board of Trustees of the State Employees' Retirement System (SERS) concerning proposed certifications of required State contributions submitted to Cheiron by the Board. The preliminary report was submitted to SERS on December 3, 2014. The preliminary report was based on Cheiron's review of actuarial assumptions included in SERS' 2014 Actuarial Valuation Report.

Following is Cheiron's final preliminary report on the State Employees' Retirement System. SERS' written response, provided on December 15, 2014, can be found in Appendix C.

December 19, 2014

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, Illinois 62703

Board of Trustees
State Employees' Retirement System of Illinois
2101 South Veterans Parkway
P.O. Box 19255
Springfield, Illinois 62794-9255

Dear Ladies and Gentlemen:

In accordance with the Illinois State Auditing Act (30 ILCS 5/2-8.1), Cheiron is submitting this preliminary report concerning the proposed certification prepared by Gabriel Roeder Smith & Company (GRS), of the required State contribution to the State Employees' Retirement System of Illinois (SERS or System) for Fiscal Year 2016.

In summary, we believe that the assumptions and methods used in the June 30, 2014, Actuarial Valuation Report, which are used to determine the required Fiscal Year 2016 State contribution, represent a significant improvement over the assumptions and methods used in the previous two years. As a result, the certified contributions, notwithstanding the State funding requirements that do not conform to Actuarial Standards of Practice, are more likely to meet the obligations of the System with less cost deferral to future years. In both our 2012 and 2013 reports to the Auditor General and SERS, we recommended that the SERS Board consider lowering the interest rate for the 2013 and 2014 valuations. In 2013 the Board decided not to lower the rate. In this 2014 actuarial valuation, the Board did agree with GRS's recommendation to lower its discount rate, and decided to move the rate from 7.75% to 7.25%. With respect to the individual methods and assumptions, we comment on and recommend possible changes for the Board to consider in future valuations. Details on our recommendations can be found in this report. Please provide written responses to our recommendations by close of business on December 15, 2014.

Section I of this report describes the review process undertaken by Cheiron. Section II summarizes our findings. Section III provides the supporting analysis for those findings and presents more details on our assessment of the actuarial assumptions and methods employed in GRS's actuarial certification, as well as our assessment of GRS's determination of the required State contribution for Fiscal Year 2016. Section III also includes comments on other issues impacting the funding of the State Employees' Retirement System, including the implications of Article 14 of the Illinois Pension Code, which establishes the statutory funding requirements for the System. **In our opinion, the statutory mandated minimum funding requirements call for inadequate funding, and do not meet Actuarial Standards of Practice.**

In preparing this report, we relied on information (some oral and some written) supplied by SERS and GRS. This information includes actuarial assumptions and methods adopted by the SERS Board, System provisions, summarized census data, the draft 2014 Actuarial Valuation Report, 2014 minutes of the SERS Board of Trustee meetings, and an April 2014 GRS Experience Review covering the years July 1, 2009, to June 30, 2013. A detailed description of all information provided for this review is contained in Appendix B.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared exclusively for the Office of the Auditor General and the State Employees' Retirement System of Illinois for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Gene Kalwarski, FSA, FCA, EA, MAAA	Michael J. Noble, FSA, FCA, EA, MAAA
Principal Consulting Actuary	Principal Consulting Actuary

SECTION I - REPORT SCOPE

Illinois Public Act 097-0694 (the Act) amended the Illinois State Auditing Act (30 ILCS 5/2-8.1) and requires Cheiron, as the State Actuary, to review the actuarial assumptions and valuation of the State Employees Retirement System of Illinois (SERS or System) and to issue to the SERS Board this preliminary report on the proposed certification prepared by Gabriel, Roeder, Smith & Company (GRS) of the required State contributions for Fiscal Year (FY) 2016. The purpose of this review is to identify any recommended changes to the actuarial assumptions for the SERS Board to consider before GRS, the SERS actuary, finalizes its certification of the required State contributions to SERS for FY 2016.

While the Act states that just the actuarial assumptions and valuation are to be reviewed, we have also reviewed the actuarial methodologies (funding and asset smoothing methods) employed in preparing the actuarial certification, as these methods can have a material effect on the amount of the State contribution being certified. Finally, we have offered our opinion on the implications of Article 14-131 of the Illinois Pension Code, which impacts the contribution amount certified by GRS.

Illinois Public Act 098-0599 was signed into law in December 2013 to become effective as of June 1, 2014. It made significant changes to statutes governing SERS and the other statewide pension plans. This act modified eligibility and benefits of participants, changed the actuarial cost method used to calculate liability, expanded requirements of the State Actuary, and changed the funding method of the System. The implementation of the law was suspended in a ruling May 14, 2014, by the Seventh Judicial Circuit Court. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Due to the legal status of Illinois Public Act 098-0599, this report and the valuation report of the System do not specifically reflect the reforms of PA 098-0599.

In conducting this review, Cheiron reviewed the draft June 30, 2014, actuarial valuation prepared by GRS, the GRS 2014 Experience Study that included investigation of the demographic and economic experience for the SERS for the period July 1, 2009, through June 30, 2013, and minutes of the 2014 Board of Trustees meetings. The materials we reviewed are listed in Appendix B.

In addition to reviewing the actuarial certification of the required State contribution to SERS, the Act requires the State Actuary to conduct a review of the "actuarial practices" of the Board. While the term "actuarial practices" was not defined in the Act, we continue to interpret this language to mean that we review: (1) the use of a qualified actuary (as defined by the Qualifications Standards of the American Academy of Actuaries) to prepare the annual actuarial valuation for determining the required State contribution; and (2) the conduct of periodic formal experience studies to justify the assumptions used in the actuarial valuation. In addition, we have included comments on actuarial communication and compliance with Actuarial Standards of Practice (ASOPs) reflected in the draft June 30, 2014, actuarial valuation.

Finally, we have mentioned in past reports that in future reports we may examine additional actuarial practices of the Board. For this year's report we want to suggest an additional practice

SECTION I - REPORT SCOPE

for the Board to consider. In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. Given the size of the SERS Plan, the Plan's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary. We comment further on this point in our recommendations that follow.

SECTION II - SUMMARY OF RECOMMENDATIONS

This section summarizes recommendations from our review of the actuarial assumptions and methods employed in the draft June 30, 2014, Actuarial Valuation Report of SERS as well as the "actuarial practices" of the SERS Board. Section III of this report contains detailed analysis and rationale for these recommendations.

Proposed Certification of the Required State Contribution

GRS has determined that the FY 2016 required State contribution calculated under the current statutory funding plan is $2,044,877,000. We have verified the arithmetic calculations made by GRS to develop this required State contribution and have reviewed the assumptions on which it was based. As such, we have accepted GRS's annual projections of future payroll, total normal costs, employee contributions, combined benefit payments and expenses, and total contributions.

In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. Given the size of the SERS Plan, the Plan's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary.

1. **We recommend that the SERS Board consider conducting an independent actuarial audit in which the results of the valuation are replicated by an auditing actuary and any deviations are noted and reconciled.**

State Mandated Funding Method

The current statutory funding plan calculates the minimum contribution to SERS for each fiscal year as the amount sufficient to cause the total assets of the System to equal 90% of the total liabilities of the System by the end of Fiscal Year 2045. **This funding method does not meet generally acceptable actuarial principles because the System is not targeted to be funded to 100% and the funding of the Plan is pushed too far into the future. At a minimum, future plan benefit accruals should be fully funded to avoid continued systematic underfunding of SERS. Continuing the practice of deferring contributions that are needed to fully fund annual benefit accruals increases the risk of the Plan becoming unsustainable.**

2. Based on the draft 2014 Actuarial Valuation Report, the funded ratio, measured as the ratio of the actuarial value of assets to the actuarial liability, is currently at 33.7%. We have concerns about the solvency of the System if there is a significant market downturn. We concur with GRS's comments on the implication to the System of the State Mandated Funding method and have suggested and continue to suggest that the SERS Board always use the conservative end of any range of assumptions recommended by the actuary or other

SECTION II - SUMMARY OF RECOMMENDATIONS

advisors due to the uncertainty and risks associated with this method. We note that for this June 30, 2014, actuarial valuation, GRS recommended to the SERS Board that the prior discount rate of 7.75% be lowered to either 7.50% or 7.25%. The Board elected the lower end of the recommended range.

3. We have previously recommended stress testing be done to determine whether there will be sufficient assets to pay benefits if there is a significant market downturn. After the draft 2014 Actuarial Valuation Report was completed, GRS provided stress testing to the Board in a separate report November 14, 2014. **We recommend future valuation reports include the stress testing provided this year in the supplementary report.**

<u>Assessment of Actuarial Assumptions Used in the 2014 Valuation:</u>

30ILCS 5/2-8.1 requires the State Actuary to identify recommended changes in actuarial assumptions that the SERS Board must consider before finalizing its certification of the required State contribution. We have reviewed all the actuarial assumptions used in the draft 2014 SERS Actuarial Valuation Report and **conclude that the assumptions are reasonable in general, based on the evidence provided to us.**

<u>Recommended Additional Disclosures for the 2014 Valuation:</u>

4. We recommend GRS indicate when and how they will stress test the 2014 valuation results before the 2015 valuation efforts commence.

5. With respect to the assumptions used in the 2014 valuation, we noticed that there had been consistent gains due to salary increases each year from 2009 through 2013. Accordingly, GRS recommended in its 2014 Experience Review that the salary increase assumptions be lowered. However, for the fiscal year ending June 30, 2014, there was a loss due to salary increases of $356 million with no explanation offered in the valuation report.

   We recommend GRS analyze and disclose in general terms how there was a 2014 liability loss of $356 million due to payroll increases in the past year, when in the previous five years there were only gains. Our concern is that this may be attributable to large pay increases in the year of retirement.

6. GRS also determined that the FY 2016 required State contribution rate calculated under the current statutory funding plan is 43.88%. However, they did not include the basis to which this rate applies. Therefore, we recommend that GRS clarify to what payroll this required rate is to apply.

SECTION II - SUMMARY OF RECOMMENDATIONS

Recommended Changes for Future Valuations:

7. We recommend again, as we did last year, that GRS consider in future valuations establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited, given the use of the actuarial value of assets in the projection methodology in accordance with 40 ILCS 5/14-131(h). While this change would have no impact on the System for the June 30, 2014, valuation, we believe it would be better to establish this corridor before it is actually applicable.

8. We continue to recommend the Board annually review the economic assumptions (interest rate and inflation) prior to commencing the valuation work, and adjust assumptions accordingly.

9. Since the statutory funding requirement is significantly dependent on the projected actuarial liability 31 years from now, we recommend that GRS consider the use of generational mortality improvement assumptions in future valuations. In the event that GRS does not choose to use such assumptions, then we recommend it disclose its rationale and whether or not the recommended mortality tables sufficiently cover anticipated life expectancy increases through 2045.

10. We continue to have the following two minor recommendations to future reports and GRS continues to not provide this information:

    a. Full disclosure of assumptions with respect to 415(b) limits and 401(a)(17) limits.
    b. Consider whether additional revisions to the demographic assumptions, specifically the termination assumption, for Tier 2 members are appropriate to their benefit structure and consistent with the revised retirement rates already implemented.

11. We recommend that in future experience studies, GRS specifically request that the investment consultants referenced in developing market expectations provide longer-term market expectations (30+ years) and that GRS also obtain the specific expectations of the investment consultant serving the SERS and the Illinois State Board of Investment (ISBI).

12. In our prior two reports, we also asked for a historic development of assets without the General Obligation Bonds (GOB) issued in 2004 but we have yet to obtain such information. Since the development of assets without the GOB directly impacts the required State contribution, it is important to verify that these assets have been historically developed accurately. We recommend that prior to the completion of the June 30, 2015, draft Actuarial Valuation Report, GRS provide a verification of the hypothetical assets developed without the GOB bonds.

SECTION III - SUPPORTING ANALYSIS

In this section we provide detailed analysis and supporting rationale for the recommendations that were presented in Section II of this report.

A. Proposed Certification of the Required State Contribution

As required by the 40 ILCS 5/14-131, in determining the required State contribution under State law, the System's actuary must determine what level of future contributions is necessary to make a projection of the System's funded status in 2045 be at 90%. We have verified the arithmetic calculations made by GRS to develop this State required contribution and have reviewed the assumptions on which it is based. As such, we have accepted GRS's annual projections of future payroll, total normal costs, benefits, expenses, and total contributions.

In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. Given the size of the SERS Plan, the Plan's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary. Results are compared in a detailed fashion to measure the liabilities for each benefit form and feature. A replication audit will uncover any potential problems in the processing and certification of valuation results.

We recommend that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary (Recommendation #1).

B. State Mandated Methods

1. *State Mandated Funding Method:*

   GRS offers commentary on the statutory funding method from an actuarial point of view on pages 11-13 of its draft 2014 Actuarial Valuation Report. It describes the Annual Required Contribution (ARC) under GASB 25 and 27 as a method designed to finance benefits for current participants to a 100% funding target over a projected period not to exceed 30 years, and describes it as an often used de facto funding method. It contrasts the ARC funding method with the current statutory method and notes that the statutory policy produces a back-loaded contribution projection, where contributions are significantly deferred into the future. It also indicates that this policy "tends to back-load and defer contributions."

   GRS advises "strengthening the current statutory funding policy," and provides the following examples:

   a. Reducing the projection period needed to reach 90 percent funding;

b. Increasing the 90 percent funding target;
c. Separating the financing of benefits for members hired before and after December 31, 2010; and
d. Changing to an ARC based funding approach with an appropriate amortization policy for each respective tiered benefit structure.

The Illinois Pension Code (40 ILCS 5/14-131) is limited in meeting the risks of the System. This law requires that the actuary base the required contribution using a prescribed funding method that achieves a 90% funding in the year 2045.

We concur with the GRS recommendations to increase the 90% funding target and to reduce the projection period, in accordance with generally accepted actuarial practices and suggest the SERS Board always use the conservative end of any range of assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with this method (Recommendation #2)**.** The potential for continued underfunding of the plan during the projection period increases the uncertainty and inherent risks in determining the State required contributions to the System and the measurement of plan obligations. ASOP 4 requires consideration of the plan's funding policy and the uncertainty or risk inherent in the measurement of pension obligations and these should be factors when selecting actuarial assumptions**.**

We recommend future valuation reports include the stress testing provided this year in the supplementary report (Recommendation #3)**.**

2. *State Mandated Projection Method*:

   Under 40 ILCS 5/14-131(h), the actuarial methodologies utilized in performing the 2045 projection of the System's funded status assume the future earnings rate (currently at 7.25%) is applied to the actuarial value of assets (AVA) rather than the market value of assets (MVA). GRS included an illustration of projected AVA with a phase-in of the asset smoothing method gains and losses. We agree that this approach provides a more realistic expectation of the future direction of the contribution level.

C. Economic Assumptions

1. *The Interest Rate:*

   The interest rate assumption (also called the investment return or discount rate) is the most impactful assumption affecting the required State contribution. This assumption, which is used to value liabilities for funding purposes, was changed in the June 30, 2014, actuarial valuation to 7.25% from 7.75%.

   In Cheiron's 2012 and 2013 report to the Auditor General and SERS Board, we recommended that the Board consider lowering this interest rate further. In April 2014, GRS presented its Experience Review covering the period July 1, 2009, through June 30, 2013. In that review, GRS provided the Board with a recommendation, based on detailed expectations from eight investment consultants, to lower the rate to either 7.50% or 7.25%. The Board elected to lower the rate to 7.25%.

Cheiron supports the lowering of the discount rate to 7.25% and continues to recommend that the Board review this assumption annually, and further recommends that the inflation rate assumption also be part of the annual review. This is opposed to the current process of waiting for the completion of a formal Experience Review study (Recommendation #8)**.**

Our rationale for this recommendation is as follows:

- A review of the interest and inflation rates does not involve the collection of significant data and can be updated annually. In addition, it keeps the Board focused more closely on these critical assumptions.

- In GRS's April 2014 Experience Review, it presented the opinions of eight independent investment consultants on the future expected earnings of the System and concluded that, adjusting for GRS's assumed rate of inflation, the expected arithmetic mean of the SERS portfolio is 7.52%. (See pages 10 and 11 GRS April 2014 Experience Review Report.) GRS then converted this arithmetic mean to what it refers to as a geometric rate of return of 6.82% that can be seen in the bottom row of the GRS chart below in the 50th percentile column. These figures show that SERS has only a 42.3% chance of meeting the revised assumption of 7.25% (see the far right column, bottom row). While this is certainly greater than the 34% chance of meeting the prior assumption of 7.75%, this suggests the Board may want to consider in future years lowering the rate even further.

Investment Consultant	Distribution of 30-Year Average Geometric Net Nominal Return 25th	50th	75th	Probability of exceeding 7.75%	Probability of exceeding 7.50%	Probability of exceeding 7.25%
(1)	(2)	(3)	(4)	(5)	(5)	(5)
1	4.53%	6.01%	7.51%	21.7%	25.2%	28.8%
2	4.60%	6.11%	7.64%	23.5%	27.0%	30.8%
3	4.80%	6.27%	7.77%	25.2%	28.9%	32.9%
4	5.63%	6.84%	8.07%	30.9%	35.9%	41.1%
5	5.46%	6.88%	8.33%	34.2%	38.6%	43.2%
6	5.38%	6.93%	8.50%	36.2%	40.3%	44.5%
7	6.14%	7.63%	9.14%	47.9%	52.3%	56.8%
8	6.27%	7.90%	9.55%	52.4%	56.5%	60.5%
Average	**5.35%**	**6.82%**	**8.31%**	**34.0%**	**38.1%**	**42.3%**

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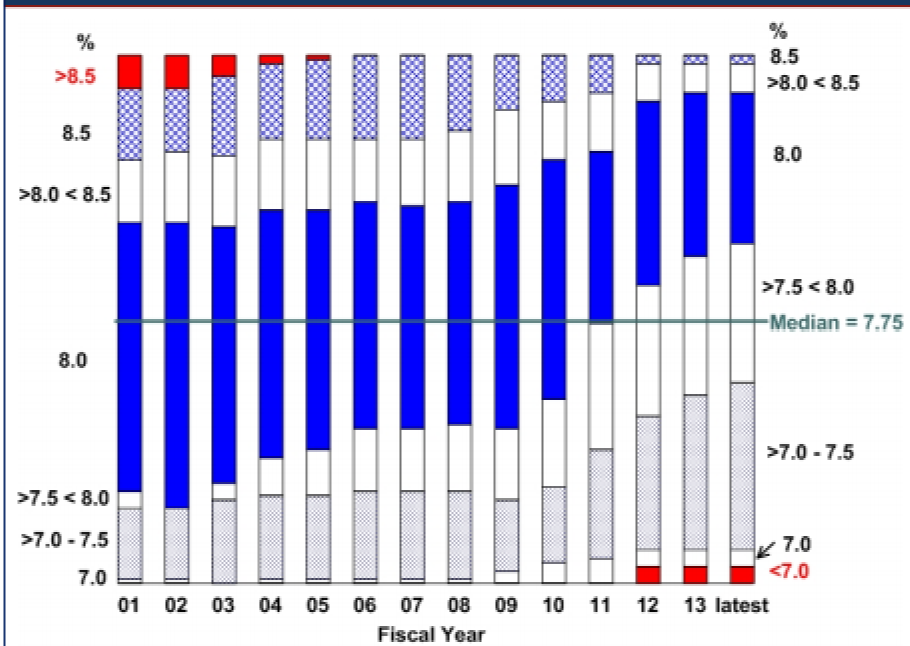
In our opinion, the use of 7.25% is justified for this 2014 valuation because we believe that the "long-term" outlook of the eight investment consultants that GRS surveyed most likely had a shorter time horizon than the time horizon applicable to the investment assumptions (30+ years). In our experience we find that investment consultants view 10 years as a long time horizon. We would expect that had GRS requested these eight consultants to provide 30+ year outlooks that their longer term outlooks would be higher and thus more supportive of the 7.25% investment assumption. In any event **we recommend that in future valuations GRS specifically request these eight investment consultants to provide longer-term market expectations and that they obtain the specific expectations of the investment consultant serving the SERS and the Illinois State Board of Investment (ISBI)** (See Recommendation #11).

- The National Association of State Retirement Administrators (NASRA) conducts an annual survey of public funds. The latest Public Fund Survey covers 126 large retirement plans. The following chart shows the distribution of investment return assumptions for the last 13 years of the survey. The latest data includes results collected through October 2014.

Figure 4: Change in distribution of public pension investment return assumptions, FY 01 through October 2014



Source: Compiled by NASRA based on Public Fund Survey, Oct. 2014

Over the period shown in the latest survey, there continues to be a pattern of reducing investment return assumptions. Forty-eight of the 126 plans have reduced the interest rate assumption since Fiscal Year 2011. For these 48 plans the average reduction is 0.37%.

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The survey is consistent with experience of other Cheiron clients, with which there has been a significant trend to reduce the investment return assumptions in the last several years.

- New GASB 67 and 68 pronouncements may subject many public pension plans, such as SERS, to effectively use a lower interest rate for accounting disclosures and pension expense determinations in fiscal years 2014 and 2015, respectively. It is important to note, however, that the new standards do not define funding requirements for a plan.

- Moody's, an organization that provides bond rating information for private investors, compares the financial viability of public sector pension plans by using interest rate assumptions significantly lower than the assumptions used by most public sector pension plans.

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize interest assumptions that are based on short-term and mid-term bond rates, which are very low.

2. *Inflation Assumption:*

We find the inflation assumption of 3.00%, which primarily impacts the salary increase assumption, used in the 2014 actuarial valuation by GRS in certifying the required State contribution is reasonable.

Our rationale for concurring with the 3.00% assumption:

- The 2014 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years) inflation will average somewhere between 2.0% and 3.4%.

- As shown on pages 7 and 8 of the GRS April 2014 Experience Review study, there continues to be support for this assumption as a long-term rate even though the historic short-term averages are being lowered by the current historically low rates.

- The *National Conference on Public Employers Retirement Systems* (NCPERS) 2014 study, provides the following graphic of respondents' inflation assumptions:

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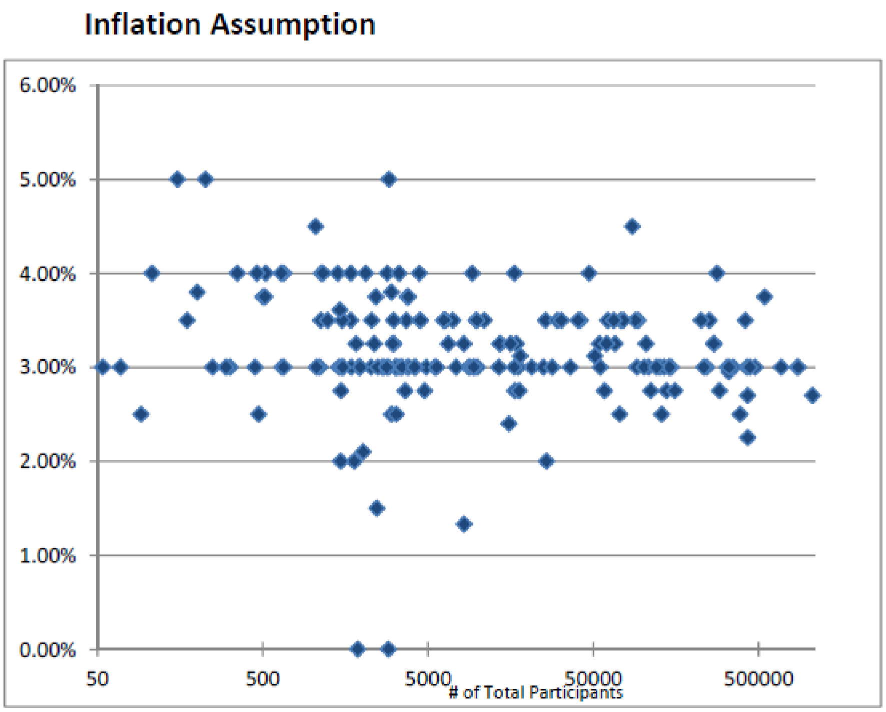

This shows that the 3.0% assumption, which SERS uses, is a prevalent inflation assumption among the 187 systems who responded to this study, with 3.2% as the average.

3. *Salary (Annual Compensation) Increase Assumption:*

For the draft June 30, 2014, actuarial valuation, the salary scale assumption, which has been lowered since the June 30, 2013, valuation, is shown in the table below.

Illustrative rates of increase per individual employee per annum, compounded annually:

Age	Annual Increase
25	7.92%
30	6.45%
35	5.55%
40	5.22%
45	4.83%
50	4.51%
55	4.30%
60	4.10%
65	3.72%
70	3.50%

These increases include a component for inflation of 3.0% per annum and overall payroll growth (inflation plus productivity) has been lowered from 4.0% to 3.5%.

We find the assumption and the basis for setting it as reasonable as long as GRS can confirm that the sudden $356 million loss sue to salary increases can be accurately attributable to a one-time event, and not attributable to high pay increases in the year of retirement (Recommendation #5).

Our rationale for concurring with GRS's recommended salary increase assumption:

- This assumption, which is employer specific, is supported by credible data as shown on pages 12-15 of the April 2014 Experience Review study performed by GRS.

- During the years ending June 30, 2009, through 2013, there were accumulative experience gains of nearly $600 million from this assumption (i.e., salary increases were less than assumed). However, for the year just ending June 30, 2014, there was a salary experience loss of $365 million (see page 19 of the GRS June 30, 2014, valuation report). Subject to our caveat in bold above, this one-year experience loss is not necessarily a reason to question GRS's decision to lower the payroll increase assumption because this information came after the results of the April 2014 Experience Review was completed. In addition, it's not uncommon in the public sector to see a one-year trend reversal like this, which might be explained as a "catch-up" pay increase for several years of low increases (2009 through 2013).

- In our own experience with our public sector pension plans (about 60 large plans), we have witnessed a consistent recent trend of declining salary increases for public sector employees.

We continue to recommend that GRS disclose the additional economic assumptions relating to the 415(b) limits and 401(a)(17) limits (Recommendation #10a).

D. Demographic Assumptions

In its annual actuarial valuation reports, GRS regularly reports sources of liability gains and losses. In the 2014 report, these are shown on page 19. In the chart below, we have collected similar data from GRS's past valuation reports dating back to 2009 and presented a historical review of past demographic and salary increase experience gains and losses.

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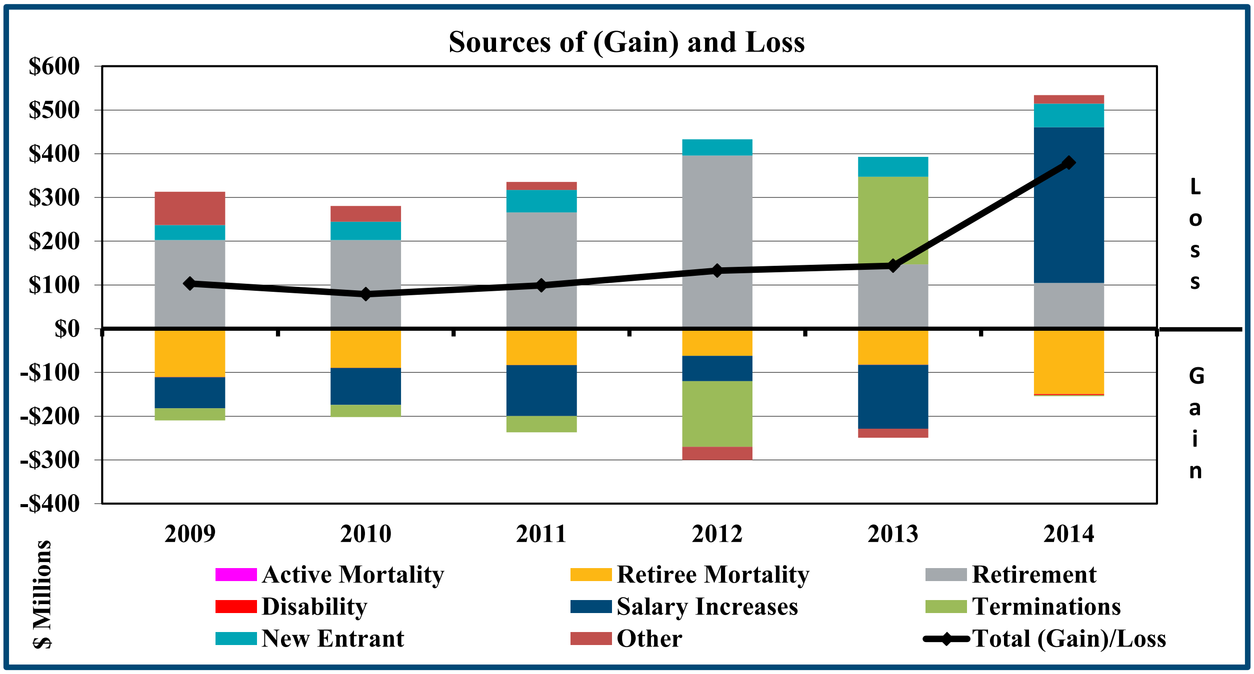

This chart shows the pattern of annual gains and losses attributable to eight different sources as shown in the legend above. When the colored bar slices appear above zero on the Y axis, that represents an experience loss, and below zero represents an experience gain for that year.

Key observations from this chart are as follows:

1. In every year since 2009 there have been experience losses attributable to retirements and new entrants joining SERS.

    a. The retirement losses have been significant and growing from 2009 through 2012, and have declined since then. GRS in its 2014 valuation disclosed that the Board adopted increased rates of retirement (see page 20 in GRS's valuation report) and that will serve to lower if not eliminate this source of loss. We concur that the assumption change should at a minimum lower this annual loss, but we will monitor the retirement experience annually.

    b. The continuing source of losses due to new entrants commonly is expected for most pension plans. This is because members who are hired after the valuation date may earn a partial year service credit that doesn't show up until the following valuation, and at that point the extra liabilities are treated as a liability loss. These losses, however, are largely offset by asset gains attributable to contributions made on behalf of these new members that were also not anticipated.

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2. Since 2009, there have been consistent gains attributable to SERS retirees but there have been insignificant gains or losses attributable to active members. This means that there have been more deaths than anticipated for retirees and deaths for actives were largely as anticipated. **Despite the greater than expected deaths for retirees found in this study, we maintain our recommendation (#9) to consider generational mortality tables because, by 2045, the target 90% actuarial liability will consist almost entirely of today's current active members and a significant number of new hires.**

3. There has been a steady trend of salary gains up until 2014 when a significant loss occurred. This issue was covered in the section just preceding this discussion of demographic experience and we **found the assumption and the basis for setting it as reasonable as long as GRS can confirm that the sudden $356 million loss due to salary increases can be accurately attributable to a one-time event, and not attributable to high pay increases in the year of retirement** (Recommendation #5).

4. Termination from employment experience has been irregular, showing gains in several years followed by a significant loss in 2013, then a break even in 2014. This is not surprising as termination from employment rates are commonly volatile as short-term changes in the economy, anticipated plan changes, employment opportunities elsewhere, etc., all impact this behavior.

5. Disability experience is too small to be noticed on the chart, given its insignificant size relative to other experience items, but we do note that GRS did follow up on our recommendation to increase the disability load which determines the annual cost for this benefit. The prior load of 1% of normal cost was increased to 1.63%.

For the draft June 30, 2014, actuarial valuation, GRS has incorporated several revised demographic assumptions reflective of the results from its April 2014 Experience Review study. The balance of this section presents our analysis of these assumptions.

Out of the demographic assumptions, there are two assumptions that should be more closely reviewed.

1. *Mortality Assumption*

Post-Retirement Mortality

105% of the RP2014 Healthy Annuitant mortality table, sex distinct, with rates projected to 2015. No adjustment is made for post-disabled mortality. While a fully generational mortality table was considered as part of the most recent experience study, the mortality table used is a static table and provides an estimated margin of 20% for future mortality improvement based on the experience study report of the State Employees' Retirement System for the period from July 1, 2009 to June 30, 2013.

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Pre-Retirement Mortality, including terminated vested members prior to attaining age 50

Based on a percentage of 90% for males and 110% for females of the RP2014 Total Employee mortality table. Five percent of deaths among active employees are assumed to be in the performance of their duty.

Despite the fact that the SERS Board has adopted the latest mortality table recently published by the Society of Actuaries (SOA), referred to as the RP 2014 mortality table, GRS should consider for next year's valuation generational mortality improvement as well. Generational mortality tables, which assume that mortality rates at each age decline over time, are increasingly being implemented. Given the significant dependence of the statutory funding requirements on new hires over the next 30 years, generational mortality is of greater significance here than for a typical public pension plan that bases its contributions on just the current plan membership.

GRS stated in its April 2014 Experience Review Report that the reason it was comfortable not moving to a generational mortality improvement approach was because it "believes that the recommended mortality tables contain a sufficient level of conservatism to cover any increases in life expectancy in the near future."

Since the statutory funding requirement is significantly dependent on the actuarial liability projected 31 years from now, and GRS believes the newly adopted mortality tables are sufficient to cover life expectancy increases in the near future, **GRS should disclose whether or not the recommended tables sufficiently cover anticipated increases through 2045** (Recommendation #9).

2. *Termination*

The termination assumption for Tier 2 members is the same as for Tier 1. Given that GRS has revised retirement rates for Tier 2 it should consider whether the termination rates should vary by Tier as well (Recommendation #10b).

Illustrative rates of withdrawal from the Plan are as follows:

	Service Based Withdrawal			
Service (Beginning	Regular Formula Employees		Alternative Formula Employees	
of Year)	Males	Females	Males	Females
0	0.2300	0.2300	0.0325	0.0600
1	0.1200	0.1200	0.0325	0.0450
2	0.0950	0.0850	0.0325	0.0450
3	0.0700	0.0650	0.0200	0.0400
4	0.0625	0.0500	0.0175	0.0300
5	0.0425	0.0475	0.0175	0.0300
6	0.0425	0.0350	0.0175	0.0300

7	0.0350	0.0350	0.0175	0.0200
8	0.0300	0.0300	0.0150	0.0200
9	0.0250	0.0250	0.0150	0.0200
10	0.0250	0.0250	0.0150	0.0200
11	0.0200	0.0200	0.0125	0.0175
12	0.0200	0.0200	0.0125	0.0175
13	0.0200	0.0200	0.0100	0.0150
14	0.0150	0.0150	0.0100	0.0150
15	0.0150	0.0150	0.0100	0.0150
16	0.0150	0.0150	0.0100	0.0150
17	0.0150	0.0150	0.0100	0.0150
18	0.0150	0.0150	0.0100	0.0150
19	0.0150	0.0150	0.0100	0.0150
20	0.0150	0.0100	0.0100	0.0150
21	0.0150	0.0100	0.0100	0.0150
22	0.0150	0.0100	0.0100	0.0150
23	0.0150	0.0100	0.0100	0.0150
24	0.0150	0.0100	0.0100	0.0150
25	0.0150	0.0100	0.0100	0.0150
26	0.0150	0.0100	0.0100	0.0150
27	0.0150	0.0100	0.0100	0.0150
28	0.0150	0.0100	0.0100	0.0150
29	0.0150	0.0100	0.0100	0.0150
30+	0.0150	0.0100	0.0100	0.0150

It is assumed that terminated employees will not be rehired. The rates apply only to employees who have not fulfilled the service requirement necessary for retirement at any given age.

With the exception to the comments just made relating to the historical experience gain loss chart, termination, and mortality improvement, we have concluded that all remaining demographic assumptions are reasonable and meet the requirements of ASOP No. 35, section 3.3.4.

1. Marriage Assumption

85.0% of active male participants and 65.0% of active female participants are assumed to be married. Actual marital status at benefit commencement is used for retirees.

2. Social Security Offset for Survivor Benefits

There is no offset assumption for male surviving spouses because it is assumed their own primary insurance amount (PIA) is as great as their spouses' PIA. 60% of married male members are assumed to have a dual income household. For the dual income household, it is assumed the offset at age 60 is 45.0 percent of the original survivor benefit. It is assumed the offset at age 62 is 10.0% of the original survivor benefit. Furthermore, it is assumed that 50% of retirees on or after July 1, 2009, will elect to remove the offset provision. In exchange for the removal, the member's retirement annuity is reduced by 3.825% monthly as mandated by Statutes (40 ILCS 5/14-121).

3. Retirement

Employees are assumed to retire in accordance with the rates shown below. The rates apply only to employees who have fulfilled the service requirement necessary for retirement at any given age.

Retirement Rates for Regular Formula Employees

	Males	Females
50	15.00%	25.00%
51	15.00%	25.00%
52	25.00%	30.00%
53	25.00%	25.00%
54	20.00%	20.00%
55	17.50%	16.00%
56	17.50%	16.00%
57	15.00%	16.00%
58	15.00%	16.00%
59	15.00%	16.00%
60	10.00%	16.00%
61	10.00%	12.50%
62	20.00%	20.00%
63	17.50%	17.50%
64	15.00%	17.50%
65	20.00%	25.00%
66	25.00%	20.00%
67	20.00%	20.00%
68	20.00%	20.00%
69	17.50%	20.00%
70	17.50%	20.00%
71	17.50%	15.00%
72	15.00%	20.00%
73	17.50%	20.00%
74	20.00%	20.00%
75	100.00%	100.00%

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Early Retirement Rates for General Formula Employees		
	Males	Females
55	4.50%	4.50%
56	6.00%	4.00%
57	5.00%	7.00%
58	7.50%	9.50%
59	9.50%	12.00%

Retirement Rates for Alternative Formula Employees				
	Eligible for Alternate Formula Benefits Only		Eligible for Regular Formula Benefits Only	
Age	Males	Females	Males	Females
50	60.00%	40.00%	N/A	N/A
51	45.00%	40.00%	N/A	N/A
52	45.00%	35.00%	N/A	N/A
53	40.00%	30.00%	N/A	N/A
54	40.00%	25.00%	N/A	N/A
55	35.00%	30.00%	N/A	N/A
56	35.00%	25.00%	N/A	N/A
57	27.50%	20.00%	N/A	N/A
58	30.00%	20.00%	N/A	N/A
59	25.00%	25.00%	N/A	N/A
60	30.00%	30.00%	5.00%	8.00%
61	25.00%	20.00%	5.00%	8.00%
62	45.00%	45.00%	10.00%	8.00%
63	40.00%	35.00%	10.00%	12.50%
64	30.00%	40.00%	10.00%	12.50%
65	55.00%	40.00%	20.00%	17.50%
66	50.00%	60.00%	20.00%	15.00%
67	50.00%	50.00%	20.00%	40.00%
68	30.00%	15.00%	17.50%	30.00%
69	35.00%	35.00%	17.50%	20.00%
70	50.00%	60.00%	17.50%	25.00%
71	30.00%	50.00%	17.50%	30.00%
72	100.00%	100.00%	100.00%	100.00%

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Retirement rates for Tier 2 members eligible for regular formula benefits account for the change in retirement age, as follows:

Age	Members Eligible for Normal Retirement	Age	Members Eligible for Early Retirement
67	50.0%	62	30.0%
68	35.0	63	15.0
69	35.0	64	15.0
70	35.0	65	15.0
71	20.0	66	15.0
72	20.0		
73	20.0		
74	20.0		
75	100.0		

Members hired after December 31, 2010, eligible for the alternate formula benefits will retire according to the age-based retirement rates used in the most recent valuation as follows:

Age	Male Members Eligible for Normal Retirement	Female Members Eligible for Normal Retirement
60	50.0%	50.0%
61	25.0	20.0
62	45.0	45.0
63	40.0	35.0
64	30.0	40.0
65	55.0	40.0
66	50.0	60.0
67	50.0	50.0
68	30.0	15.0
69	35.0	35.0
70	50.0	60.0
71	30.0	50.0
72	100.0	100.0

4. Expenses

As estimated and advised by SERS staff, assumed plan expenses are based on current expenses and are expected to increase in relation to the projected capped payroll.

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5. Spouse's Age

The female spouse is assumed to be three years younger than the male spouse.

6. Children

It is assumed that married members have 2.2 children, one year apart in age.

The age of the youngest child of a deceased employee at his or her date of death is assumed to be as follows:

Age at Death of Employee	Age of Youngest Child	Age at Death of Employee	Age of Youngest Child
20	2	40	6
25	3	45	8
30	4	50	10
35	5	55	12
		60	14

7. Overtime and Shift Differentials

Reported earnings include base pay alone. It is assumed that overtime and shift differentials will increase total payroll by 3.5% over reported earnings.

8. Missing Data

If year-to-date earnings are not available, then the monthly pay rate is used. If both year-to-date earnings and the monthly pay rate are not available, the annual rate of pay is assumed to be the rate of pay for the population as a whole on the valuation date. For members with less than a year of service, the annual rate of pay is based on the greater of year-to-date earnings or annualized pay rate. If a birth date was not available, the member was assumed to be age 35.

9. Decrement Timing

All decrements are assumed to occur mid-year.

10. Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

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11. Decrement Operation

Disability and turnover decrements do not operate after member reaches retirement eligibility.

12. Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

13. Interest

7.25% per annum, compounded annually, net of investment expenses.

14. General Inflation

3.00 percent per annum, compounded annually.

This assumption serves as the basis for the determination of Tier 2 annual increases that are equal to the lesser of 3.0 percent or one-half of the annual increase in the consumer price index-u during the preceding 12-month calendar year and are not compounded.

15. Disability

Because members who receive disability benefits typically spend less than one year on disability, they are considered active members. Therefore, a load of 1.63% of pay on the normal cost is applied to reflect the near-term cash flow. This assumption is based on 110% of the most recent disability benefit payment information as a percent of payroll and will be updated at each valuation date as experience emerges.

16. Load for Inactive Members Eligible for Deferred Vested Pension Benefits

Load of 15 percent to the liability attributable to inactive members eligible for deferred vested pension benefits for increase in final average salary due to participation in a reciprocal system after termination.

SECTION III - SUPPORTING ANALYSIS

17. Population Projection

For purposes of determining annual appropriation as a percent of total covered payroll, the size of the active group is assumed to remain level at the number of actives as of the valuation date. New entrants are assumed to enter with an average age and an average pay as disclosed below. New entrants are assumed to have the same demographic profile as new entrants in the 15 years prior to the valuation date. The average increase in uncapped payroll for the projection period is 3.5% per annum.

	New Entrant Benefit Groups													
Age Group	New Entrants Eligible for Regular Formula Benefits that are Covered by Social Security		New Entrants Eligible for Regular Formula Benefits that are not Covered by Social Security		New Entrants in Positions Formerly Eligible for Alternate Formula Benefits that are Covered by Social Security that are now Eligible for Regular Formula Benefits		New Entrants Eligible for Alternate Formula Benefits that are Covered by Social Security		New Entrants in Positions Formerly Eligible for Alternate Formula Benefits that are Covered by Social Security that are now Eligible for Regular Formula Benefits		New Entrants Eligible for Alternate Formula Benefits that are not Covered by Social Security		Total	
	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary
Under 20	97	2,938,393			11	526,038	23	1,012,785			1	36,684	132	4,513,900
20-24	2,240	87,655,113	8	294,269	442	22,466,925	1,032	51,188,357	59	3,347,145	260	15,359,006	4,041	180,310,815
25-29	3,642	165,376,585	23	1,156,937	568	30,522,854	1,235	65,701,065	117	7,269,226	390	23,534,952	5,975	293,561,619
30-34	3,141	157,821,736	24	1,267,052	481	28,522,007	856	49,632,449	82	5,251,346	169	11,074,334	4,753	253,568,924
35-39	2,840	148,895,792	14	681,212	427	25,853,842	629	38,134,444	49	3,260,917	47	3,143,122	4,006	219,948,329
40-44	2,799	152,993,652	20	1,104,247	388	23,923,409	469	29,576,244	26	1,695,610	8	504,071	3,710	209,797,233
45-49	2,377	132,688,486	13	737,034	329	20,689,787	330	21,599,705	13	815,786	5	347,765	3,067	176,878,563
50-54	1,911	107,199,526	11	586,975	246	16,242,542	170	11,652,962	14	1,052,000	1	21,307	2,353	136,755,312
55-59	1,157	64,492,603	16	983,901	138	9,186,077	60	4,074,142	8	611,643			1,379	79,348,366
60-64	408	21,771,708	4	288,140	44	2,736,313	19	1,454,434	3	227,255			478	26,477,850
65-69	34	2,224,565			5	277,821	1	77,637					40	2,580,023
70 & Over														
Total	20,646	1,044,058,159	133	7,099,767	3,079	180,947,615	4,824	274,083,224	371	23,530,928	881	54,021,241	29,934	1,583,740,934
Avg. Salary		50,570		53,382		58,768		56,817		63,426		61,318		52,908
Avg. Age		37.62		39.61		36.33		32.22		32.27		27.46		36.26
Percent Male		44%		59%		81%		75%		93%		88%		54%

SECTION III - SUPPORTING ANALYSIS

E. Actuarial Methods

Actuarial methods consist of three components: (1) the funding method, which is the attribution of total costs to past, current, and future years; (2) the method of calculating the actuarial value of assets (i.e., asset smoothing); and (3) the amortization basis of the Unfunded Actuarial Liability (UAL). Since the amortization basis is governed by State law, we do not comment on it here.

1. *Cost Method:*

   The System uses the projected unit credit cost method (PUC) to assign costs to years of service, as required under the Pension Code (40 ILCS 5/14). **We have no objections with respect to using the PUC method, although we would prefer the Entry Age Normal (EAN) funding method as it is more consistent with the requirement in 40 ILCS 5/14-131 for level percent of pay funding.** Public Act 098-0599 amended the Pension Code (40 ILCS 5/14-131) to require SERS to calculate the required State contribution using the entry age normal actuarial cost method beginning with the Fiscal Year 2016 State contribution. However, the Illinois Seventh Judicial Circuit Court granted a temporary restraining order and a preliminary injunction stopping the implementation of Public Act 098-0599. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Consequently, SERS continued to calculate the required State contribution as the law existed prior to Public Act 98-599.

   Under the PUC method, which is used by some public sector pension funds, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over his or her later years of service than over his or her earlier ones. As a result of this pattern of benefit value increasing, while the PUC method is not an unreasonable method, more plans use the Entry Age Normal (EAN) funding method to mitigate this effect. It should also be noted that the EAN method will be the required method to calculate liability for GASB 67 & GASB 68.

2. *Asset Smoothing Method:*

   The actuarial value of assets for the System is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. **Smoothing the market gains and losses over a period of five years to**

determine the actuarial value of assets is a generally accepted approach in actuarial cost, and we concur with its use.

Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets and the market value of assets. Many public sector pension plans limit the actuarial value of assets to be in any year no more than 120% of market value, or no less than 80% of market value. In fact the Internal Revenue Service (IRS) mandates this "corridor" for private sector pension plans (a 90%-110% corridor is mandated). Even though it is not mandated for public plans, we believe that the use of this type of corridor is a much sounder actuarial practice, and according to ASOP No. 44 in Section 3.3 b. 1, the actuarial value of assets should "...fall within a reasonable range around the corresponding market value." **Therefore, we recommend that the SERS Board consider moving to this approach in future valuations** (Recommendation #7)**.** It's important to note that currently a move to this corridor approach would have no impact on the 2014 actuarial valuation results, as the actuarial value of assets is already within the 80%-120% corridor.

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

Response to recommendations in 2013:

In the State Actuary's Preliminary Report on the State Employees' Retirement System of Illinois presented December 19, 2013. Cheiron made several recommendations. Below we summarize how these recommendations were reflected in this year's valuation report.

State Employees' Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
Recommended Changes to Actuarial Assumptions Used in the 2013 Valuation:		
1. We now urge the Board to lower the assumption to 7.25% or lower for the upcoming June 30, 2014, actuarial valuation. If the Board concludes that this reduction is not needed, we request that SERS provide substantial justification for using a higher interest rate.	Implemented	This has been addressed on page 2 of the 2014 actuarial valuation report. The Board reviewed the interest rate assumption and lowered the rate to 7.25%. **Cheiron supports the lowering of the discount rate to 7.25%.**
Recommended Additional Disclosures for the 2013 Valuation:		
2. For several consecutive years, there have been significant losses due to retirees from active status, which GRS has explained as being an "extraordinary event which would be difficult to predict." Given that this event has happened for at least six consecutive years, we believe that additional analysis and more thorough disclosure is required to help determine the source of these losses.	Partially Implemented	This has been addressed on page 20 of the 2014 actuarial valuation report. Increased retirement rates were adopted in 2014 to help lower, if not eliminate, the source of loss from retirement. **We concur but will monitor this annually.** **One concern we have is that the "other" source of loss that was occurring until 2014 might have been attributable to increases in salary on the year of retirement. We suspect these types of salary increases would not show up in analyzing salary increases in the prior GRS Experience Reviews as those salary increases were likely observed only amongst active members, and not for a member that just retired. In any event we have asked GRS for further analysis of this issue.**

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

State Employees' Retirement System
Status of Previous Recommendations

Recommendation from 2013 Report	Status	Comments
Recommended Changes for Future Valuations:		
3. We recommend again, as we did last year that GRS consider, in future valuations, increasing the 1% of salary load for disability benefits to tie into the trend demonstrated in the 2010 Experience Review study and better cover the cash outflows for disability benefit payments.	Implemented	This has been addressed on page 41 of the 2014 actuarial valuation report. The salary load for disability benefits was increased to 1.63%.
4. We recommend again, as we did last year that GRS consider in future valuations establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited, given the use of the actuarial value of assets in the projection methodology in accordance with Public Act 96-0043. While this change would have no impact on the System for the June 30, 2013, valuation, we believe it would be better to establish this corridor before it is actually applicable.	Not Implemented	This has not been addressed in the 2014 valuation. **Recommendation repeated.**
5. We recommend the Board annually review the economic assumptions (interest rate and inflation) each year prior to commencing the valuation work, and adjust assumptions accordingly.	Implemented for 2014	**SERS did review these assumptions in 2014 and we continue to recommend that the Board review these assumptions annually in the future, and further recommend that the inflation rate assumption also be part of the annual review.**
6. We recommend that GRS consider using a fully generational mortality table so that future mortality improvements will continue to impact new entrants throughout the projection period ending in 2045.	Partially Implemented	This has been partially addressed on page 39 of the 2014 valuation. **We maintain our recommendation of considering generational mortality tables because by 2045, the target 90% actuarial liability will consist almost entirely of today's current active members and a significant number of new hires.**

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

State Employees' Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
7. We have several minor recommendations to future reports. These include:		
a. Full disclosure of assumptions with respect to 415(b) limits and 401(a)(17) limits.	Not Implemented	This has not been addressed in the 2014 valuation. **Recommendation repeated.**
b. Consider whether additional revisions to the demographic assumptions, specifically the termination assumption, for Tier 2 members are appropriate to their benefit structure and consistent with the revised retirement rates already implemented.	Not Implemented	This has not been addressed in the 2014 valuation. **Recommendation repeated.**
c. Disclosure of additional information as to how the New Entrant Profile is developed. Specifically, we recommend GRS include all relevant information for each New Entrant Profile group such as age and salary distributions, and gender. This to better comply with ASOP No. 41 dealing with actuarial communications.	Implemented	This has been addressed on page 42 of the 2014 valuation.
Proposed Certification of the Required State Contribution:		
8. We recommend that GRS continue to disclose in future valuations the above items in order for us to continue to perform an analysis of the required State contribution.		
• Projections by year of future benefit payouts split by actives and current inactives (i.e. retirees, survivors, disabled, and deferred vested), separate from expenses.	Implemented	This has been addressed in Tables 7-10 of the 2014 valuation.
• A historic development of assets without General Obligation Bonds (GOBs).	Not Implemented	Because it is are required to evaluate the maximum contribution we again request historic development of assets back to the issuance of the GOB.

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

State Employees' Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
		Recommendation repeated.
• All projections should show the active member information split into three distinct groups: current actives hired prior to January 1, 2011; current actives hired on or after January 1, 2011; and new entrants after the valuation date.	Implemented	This has been addressed in Tables 7-10 of the 2014 valuation.
State Mandated Funding Method:		
9. We also recommend stress testing be done to determine whether there will be sufficient assets to pay benefits if there is a significant market downturn.	Not Implemented	In the 2014 valuation GRS strongly recommends stress testing be performed, but does not indicate when and how such stress testing will be completed. **Recommendation repeated.**
10. Due to the systematic underfunding of the System, we recommend that the Board always use the conservative end of any range of assumptions recommended by GRS.	Partially Implemented	This is a continuous process that has been partially addressed in lowering the interest rate for the current valuation. GRS recommend an interest rate between 7.50% or 7.25% and the Board elected a 7.25% rate, which is on the conservative side of the recommendation. **Recommendation repeated**

Chapter Five

PRELIMINARY REPORT ON THE JUDGES' RETIREMENT SYSTEM

In accordance with 30 ILCS 5/2-8.1, Cheiron, the State Actuary, submitted a preliminary report to the Board of Trustees of the Judges' Retirement System (JRS) concerning proposed certifications of required State contributions submitted to Cheiron by the Board. The preliminary report was submitted to JRS on December 3, 2014. The preliminary report was based on Cheiron's review of actuarial assumptions included in JRS' 2014 Actuarial Valuation Report.

Following is Cheiron's final preliminary report on the Judges' Retirement System. JRS' written response, provided on December 15, 2014, can be found in Appendix C.

December 19, 2014

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, Illinois 62703

Board of Trustees
Judges' Retirement System of Illinois
2101 South Veterans Parkway
P.O. Box 19255
Springfield, Illinois 62794-9255

Dear Ladies and Gentlemen:

In accordance with the Illinois State Auditing Act (30 ILCS 5/2-8.1), Cheiron is submitting this preliminary report concerning the proposed certification prepared by Gabriel Roeder Smith & Company (GRS), of the required State contribution to the Judges' Retirement System of Illinois (JRS or System) for Fiscal Year 2016.

In summary, we believe that the set of assumptions and methods used in the June 30, 2014, Actuarial Valuation Report, which were used to determine the required Fiscal Year 2016 State contribution, are reasonable, both individually and in the aggregate. However, we have some recommended changes for the JRS Board to consider for future valuations. The report that follows details our recommendations. Please provide written responses to the recommendations by the close of business on December 15, 2014.

Section I of this report describes the review process undertaken by Cheiron. Section II summarizes our findings. Section III provides the supporting analysis for those findings and presents more details on our assessment of the actuarial assumptions and methods employed in GRS's actuarial certification, as well as our assessment of GRS's determination of the required State contribution for Fiscal Year 2016. Section III also includes comments on other issues affecting the funding of JRS, including the implications of Article 18 of the Illinois Pension Code, which establishes the statutory funding requirements for the System. **In our opinion, the statutory mandated minimum funding requirements call for inadequate funding, and do not meet Actuarial Standards of Practice.**

In preparing this report, we relied on information, some oral and some written, supplied by JRS and GRS. This information includes actuarial assumptions and methods adopted by the JRS Board, System provisions, summarized census data, the draft 2014 Actuarial Valuation Report, the March 29, 2013, GRS Experience Review presentation, the GRS April 2014 Experience Study for State Employees' Retirement System of Illinois (SERS), and the minutes of the JRS Board of Trustee meetings. A detailed description of all information provided for this review is contained in Appendix B.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared exclusively for the Office of the Auditor General and the Judges' Retirement System of Illinois for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Elizabeth Wiley, FSA, FCA, EA, MAAA	Michael J. Noble, FSA, FCA, EA, MAAA
Consulting Actuary	Principal Consulting Actuary

SECTION I - REPORT SCOPE

Illinois Public Act 097-0694 (the Act) amended the Illinois State Auditing Act (30 ILCS 5/2-8.1) and requires Cheiron, as the State Actuary, to review the actuarial assumptions and valuation of the Judges' Retirement System of Illinois (JRS or System) and to issue to the JRS Board this preliminary report on the proposed certification prepared by Gabriel Roeder Smith & Company (GRS) of the required State contribution for Fiscal Year (FY) 2016. The purpose of this review is to identify any recommended changes to the actuarial assumptions for the JRS Board to consider before GRS, the JRS actuary, finalizes its certification of the required State contribution to the JRS Board for FY 2016.

While the Act states that just the actuarial assumptions and valuation are to be reviewed, we have also reviewed the actuarial methodologies (funding and asset smoothing methods) employed in preparing the actuarial certification, as these methods can have a material effect on the amount of the State contribution being certified. Finally, we have offered our opinion on the implications of Article 18-131 of the Illinois Pension Code, which impacts the contribution amount certified by GRS.

Illinois Public Act 098-0599 was signed into law in December 2013 to become effective as of June 1, 2014. It made significant changes to statutes governing JRS and the other statewide pension plans. This act modified eligibility and benefits of participants, changed the actuarial cost method used to calculate liability, expanded requirements of the State Actuary, and changed the funding method of the System. The implementation of the law was suspended in a ruling May 14, 2014, by the Seventh Judicial Circuit Court. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Due to the legal status of Illinois Public Act 098-0599, this report and the valuation report of the System do not specifically reflect the reforms of PA 098-0599.

In conducting this review, Cheiron reviewed the draft June 30, 2014, Actuarial Valuation Report prepared by GRS, the March 29, 2013, GRS Experience Review presentation, the GRS April 2014 Experience Study for State Employees' Retirement System of Illinois (SERS), and the minutes of the Board of Trustee meetings. The materials we reviewed are listed in Appendix B.

In addition to reviewing the actuarial certification of the required State contribution to JRS, the Act requires the State Actuary to conduct a review of the "actuarial practices" of the JRS Board. While the term "actuarial practices" was not defined in the Act, we continue to interpret this language to mean that we review: (1) the use of a qualified actuary (as defined in the Qualification Standards of the American Academy of Actuaries) to prepare the annual actuarial valuation for determining the required State contribution; and (2) the conduct of periodic formal experience studies to justify the assumptions used in the actuarial valuation. In addition, we have included comments on actuarial communication and compliance with Actuarial Standards of Practice (ASOPs) reflected in the draft June 30, 2014, Actuarial Valuation.

Finally, we have mentioned in past reports that in future reports we may examine additional actuarial practices of the Board. For this year's report, we want to suggest an additional practice for the Board to consider. In accordance with 30 ILCS 5/2-8.1, our review does not include a

SECTION I - REPORT SCOPE

replication of the actuarial valuation results. Given the System's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the System's actuary. We comment further on this point in our recommendations that follow.

SECTION II - SUMMARY OF RECOMMENDATIONS

This section summarizes recommendations from our review of the actuarial assumptions and methods employed in the draft June 30, 2014, Actuarial Valuation Report of JRS as well as the "actuarial practices" of the JRS Board. Section III of this report contains detailed analysis and rationale for these recommendations.

Proposed Certification of the Required State Contribution

GRS has determined that the FY 2016 required State contribution calculated under the current statutory funding plan is $132,060,000. We have verified the arithmetic calculations made by GRS to develop this required State contribution and have reviewed the assumptions on which it was based. As such, we have accepted GRS's annual projections of future payroll, total normal costs, employee contributions, combined benefit payments and expenses, and total contributions.

In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. Given the System's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the System's actuary.

1) **We recommend that the JRS Board consider conducting an independent actuarial audit in which the results of the valuation are replicated by an audit actuary and any deviations are noted and reconciled.**

State Mandated Funding Method

The current statutory funding plan calculates the minimum contribution to JRS for each fiscal year as the amount sufficient to cause the total assets of the System to equal 90% of the total liabilities of the System by the end of Fiscal Year 2045. **This funding method does not meet generally acceptable actuarial principles because the System is not targeted to be funded to 100% and the funding of the Plan is pushed too far into the future. At a minimum, future plan benefit accruals should be fully funded to avoid systematic underfunding of JRS. Continuing the practice of deferring contributions that are needed to fully fund annual benefit accruals increases the risk of the Plan becoming unsustainable.**

2) Based on the draft 2014 Actuarial Valuation Report, the funded ratio, measured as the ratio of the actuarial value of assets to the actuarial liability, is currently at 31.6%. We have concerns about the solvency of the System if there is a significant market downturn. **We have suggested, and continue to suggest, that the JRS Board always use the conservative end of any range of assumptions recommended by the actuary or other**

advisors due to the uncertainty and risks associated with the State Mandated Funding method.

3) We have also previously recommended stress testing be done to determine whether there will be sufficient assets to pay benefits if there is a significant market downtown. After the draft 2014 Actuarial Valuation Report was completed, GRS provided stress testing to the Board in a separate report November 18, 2014. **We recommend future valuation reports include the stress testing provided this year in the supplementary report.**

<u>Assessment of Actuarial Assumptions Used in the 2014 Valuation:</u>

30 ILCS 5/2-8.1 requires the State Actuary to identify recommended changes in actuarial assumptions that the JRS Board must consider before finalizing its certification of the required State contribution. We have reviewed all the actuarial assumptions used in the draft 2014 JRS Actuarial Valuation Report and **we conclude that the assumptions are reasonable in general, based on the evidence provided to us**.

<u>Recommended Additional Disclosures for the 2014 Valuation:</u>

4) GRS determined that the FY 2016 required State contribution rate calculated under the current statutory funding plan is 80.072%. However, it did not include the basis to which this rate applies. Therefore, we recommend that GRS add clarity to this letter by making clear to what this required rate is to apply.

<u>Recommended Changes for Future Valuations:</u>

5) We recommend again, as we did last year, that GRS consider in future valuations establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited, given the use of the actuarial value of assets in the projection methodology in accordance with 40 ILCS 5/18-131(d). While this change would have no impact on the System for the June 30, 2014, valuation, we believe it would be better to establish this corridor before it is actually applicable.

6) We continue to recommend that the Board annually review the economic assumptions (interest rate and inflation) prior to commencing the valuation work, and adjust assumptions accordingly. We further recommend that the Boards of the three systems whose assets are commingled, JRS, the General Assembly Retirement System (GARS), and the State Employees' Retirement System (SERS), consider whether different economic assumptions for these systems need to be used.

7) Since the statutory funding requirement is significantly dependent on the projected actuarial liability 31 years from now, we recommend that GRS consider the use of generational mortality improvement assumptions in future valuations. In the event that GRS does not choose to use such assumptions, then we recommend it disclose its rationale and whether or

SECTION II - SUMMARY OF RECOMMENDATIONS

not the recommended mortality tables sufficiently cover anticipated life expectancy increases through 2045.

8) With respect to the assumptions used in the 2014 draft Actuarial Valuation Report, we noticed that there have been consistent gains due to salary increases each year from 2009 through 2014. GRS continues to develop the statutory funding contributions based on a constant population assumption and continued payroll growth, both in the short-term and long-term. GRS should provide evidence that these assumptions are reasonable.

9) In our prior two reports, we also asked for a historic development of assets without the General Obligation Bonds (GOB) issued in 2004, but we have yet to obtain such information. Since the development of assets without the GOB directly impacts the required State contribution, it is important to verify that these assets have been historically developed accurately. We recommend that prior to the completion of the June 30, 2015, draft valuation report, that GRS provide a verification of the hypothetical assets without the GOB.

10) We continue to have several minor recommendations for future reports, and GRS continues to not provide this information.

    a. We recommend that GRS disclose the additional economic assumptions that it utilizes in its actuarial valuation, along with the growth rates for these. GRS added a disclosure for the assumption for the COLA for Tier 2 this year, but disclosures relating to the 415(b) and 401(a)(17) limits are still not made.
    b. We recommend again, as we have the previous two years, that GRS consider using the actual data available rather than an assumption for determining if a member will choose the spousal continuance benefit option that provided a survivor annuity. We further continue to recommend that GRS provide details regarding the election of this provision by the current inactive members in the Participant Data section. If there are material limits in the data preventing this, GRS should note this.
    c. We recommend that GRS provide additional clarity on the payrolls used in its valuation throughout its report to allow for a more complete evaluation by another qualified actuary as required by Actuarial Standards of Practice.
    d. We recommend that GRS consider whether additional revisions to the demographic assumptions, specifically the termination and salary scale assumptions, for Tier 2 are appropriate to its benefit structure and consistent with the revised retirement rates already implemented.

11) We recommend that in future experience studies, GRS specifically request the investment consultants referenced in developing market expectations to provide longer-term market expectations (30+ years) and that GRS also obtain the specific expectations of the investment consultant serving the JRS and the Illinois State Board of Investment (ISBI).

SECTION III – SUPPORTING ANALYSIS

In this section, we provide detailed analysis and supporting rationale for the recommendations that were presented in Section II of this report.

A. Proposed Certification of the Required State Contribution

As required by 40 ILCS 5/18-131, in determining the required State contribution under State law, the System's actuary must determine what level of future contributions is necessary to make a projection of the System's funded status in 2045 be at 90%. We have verified the arithmetic calculations made by GRS to develop this State required contribution and have reviewed the assumptions on which it is based. As such, we have accepted GRS's annual projections of future payroll, total normal costs, benefits, expenses, and total contributions.

In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. Given the Plan's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary. Results are compared in a detailed fashion to measure the liabilities for each benefit form and feature. A replication audit will uncover any potential problems in the processing and certification of valuation results.

We recommend that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary (Recommendation #1).

B. State Mandated Methods

1. *State Mandated Funding Method*

   In its draft 2014 Actuarial Valuation Report on pages 11-13, GRS offers commentary on the statutory funding method from an actuarial point of view. It describes the Annual Required Contribution (ARC) under GASB 25 and 27 as a method designed to finance benefits for current participants to a 100% funding target over a projected period not to exceed 30 years, and describes it as an often used as a de facto funding method. They contrast the ARC funding method with the current statutory method and note that the statutory policy produces a back-loaded contribution projection, where contributions are significantly deferred into the future.

   GRS advises "strengthening the current statutory funding policy," and provides the following examples:

- Reducing the projection period needed to reach 90 percent funding;
- Increasing the 90 percent funding target;

SECTION III – SUPPORTING ANALYSIS

- Separating the financing of benefits for members hired before and after December 31, 2010; and
- Changing to an ARC based funding approach with an appropriate amortization policy for each respective tiered benefit structure.

The Illinois Pension Code (40 ILCS 5/18-131) is limited in meeting the risks of the System. This law requires that the actuary base the required contribution using a prescribed funding method that achieves a 90% funding in the year 2045.

We concur with the GRS recommendations to increase the 90% funding target and to reduce the projection period, in accordance with generally accepted actuarial practices and have suggested and continue to suggest that the JRS Board always use the conservative end of any range of assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with this method (Recommendation #2)**.** The potential for continued underfunding of the plan during the projection period increases the uncertainty and inherent risks in determining the State required contributions to the System and the measurement of plan obligations. ASOP 4 requires consideration of the plan's funding policy and the uncertainty or risk inherent in the measurement of pension obligations and these should be factors when selecting actuarial assumptions**.**

We recommend future valuation reports include the stress testing provided this year in the supplementary report (Recommendation #3).

2. *State Mandated Projection Method*

Under 40 ILCS 5/18-131(e), the actuarial methodologies utilized in performing the 2045 projection of the System's funded status assume the future earnings rate (currently at 7.00%) is applied to the actuarial value of assets (AVA) rather than the market value of assets (MVA). GRS included an illustration of projected AVA with a phase-in of the asset smoothing method gains and losses. We agree that this approach provides a more realistic expectation of the future direction of the contribution level.

C. Economic Assumptions

1. *Interest Rate:*

The interest rate assumption (also called the investment return or discount rate) is the most impactful assumption affecting the required State contribution. This assumption, which is used to value liabilities for funding purposes, was maintained at 7.00% for the 2014 actuarial valuation.

After reviewing all the materials (see Appendix B of this report) that were made available, Cheiron concludes that the use of 7.00% for this valuation is reasonable. We recommend that the Board annually review the interest and inflation rate

SECTION III – SUPPORTING ANALYSIS

assumptions and further recommend that the Board consider whether different economic assumptions are appropriate for all of the three systems whose assets are commingled, JRS, GARS, and SERS (Recommendation #6).

Our rationale for this recommendation is as follows:

- Based on GRS's March 29, 2013, Experience Review, the average 50th percentile of the 30-year expected average geometric net nominal return for eight investment consultants surveyed by GRS is 7.09%.

- Due to the nature of the population of JRS, the duration of the cash-flow is shorter than other retirement systems, supporting a lower interest rate.

- GRS's survey also estimated that the middle 50% of the probable distribution of the System's returns is between 5.23% and 8.97%. This approach satisfies ASOP No. 27.

- GRS's survey also found the average expected nominal return net of expenses for a single year to be 7.83%.

- In addition to the March 29, 2013, Experience Review that GRS prepared for JRS, it also developed information on this assumption for SERS in April 2014. Since JRS's funds are commingled with SERS, along with GARS, considering this information is also reasonable. In this Experience Review, GRS presented the opinion of eight independent investment consultants on the future expected earnings of SERS and concluded that, adjusting for GRS's assumed rate of inflation, the expected arithmetic mean of the SERS portfolio, that JRS is commingled with, is 7.52%. They then converted this arithmetic mean to a geometric rate of return of 6.82%. They did not provide probabilities of exceeding 7.00%, but did note that there is a 42.3% of exceeding 7.25%.

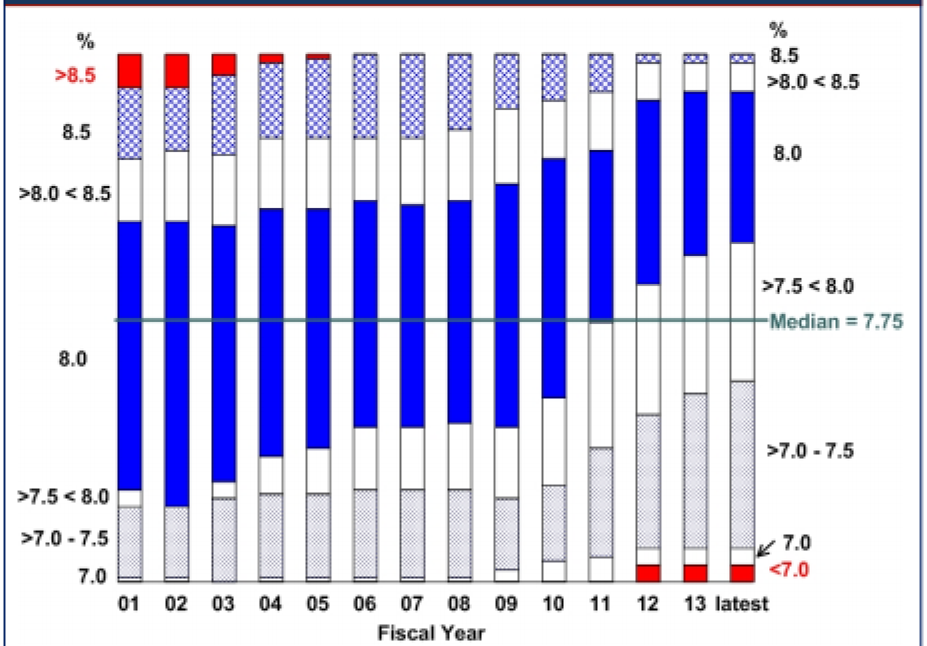
- In our opinion, the use of 7.00% is justified for this 2014 valuation because we believe that the "long-term" outlook of the eight investment consultants that GRS surveyed most likely had a shorter time horizon than the time horizon applicable to the investment assumptions (30+ years). In our experience, we find that investment consultants view 10 years as a long time horizon. We would expect that had GRS requested those eight consultants to provide 30+ year outlooks that their longer-term outlooks would be higher and thus more supportive of the 7.00% investment assumption. In any event, **we recommend that in future experience reviews, GRS specifically request its referenced investment consultants to provide longer-term market expectations and that they obtain the specific expectations of the investment consultant serving the JRS and the Illinois State Board of Investment (ISBI)** (see Recommendation #11).

SECTION III – SUPPORTING ANALYSIS

- A review of the interest and inflation rates does not involve the collection of significant data, and can easily be updated annually. In addition, it keeps the Board focused more closely on these critical assumptions.

- The National Association of State Retirement Administrators (NASRA) conducts an annual survey of public funds. The latest Public Fund Survey covers 126 large retirement plans. The following chart shows the distribution of investment return assumptions for the last 13 years of its survey. The latest data includes results collected through October 2014.

Figure 4: Change in distribution of public pension investment return assumptions, FY 01 through October 2014



Source: Compiled by NASRA based on Public Fund Survey, Oct. 2014

Over the period shown in the latest survey, there continues to be a pattern of reducing investment return assumptions. Forty-eight of the 126 plans have reduced the interest rate assumption since Fiscal Year 2011. For these 48 plans, the average reduction is 0.37%. The survey is consistent with experience of other Cheiron clients, with which there has been a significant trend to reduce the investment return assumptions in the last several years.

- New GASB 67 and 68 pronouncements may subject many public pension plans, such as JRS, to effectively use a lower interest rate for accounting disclosures and pension expense determinations in fiscal years 2014 and 2015, respectively. It is important to note, however, that the new standards do not define funding requirements for a plan.

SECTION III – SUPPORTING ANALYSIS

- Moody's, an organization that provides bond rating information for private investors, compares the financial viability of public sector pension plans by using interest rate assumptions significantly lower than the assumptions used by most public sector pension plans.

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize interest rate assumptions based on short-term and mid-term bond rates, which are very low.

2. *Inflation Assumption:*

We find the inflation assumption of 3.00%, which primarily impacts the salary increase assumption, used in the 2014 actuarial valuation by GRS in certifying the required State contribution, is reasonable.

We also noted that GRS added additional language this year under the General Inflation assumption section referencing its use as the basis for Tier 2 pay cap growth, a clarifying enhancement that we agree with.

Our rationale for concurring with the 3.00% assumption:

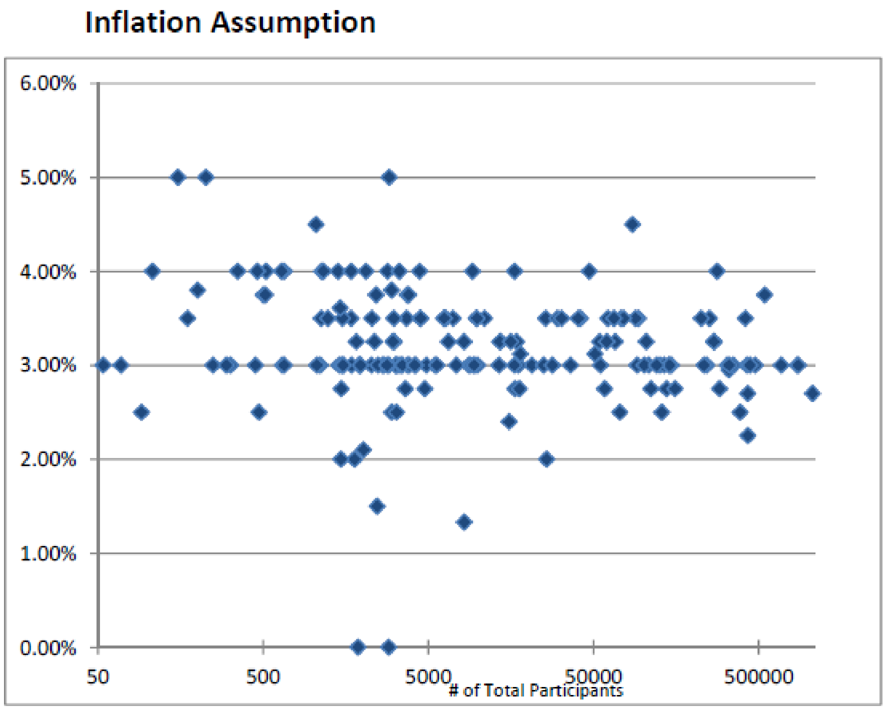
- The 2014 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years), inflation will average somewhere between 2.0% and 3.4%.

- GRS's March 29, 2013, Experience Review presentation shows a range of 2.16% to 3.26% for expectations of future inflation from the eight investment consultants surveyed.

- While GRS did not provide an updated Experience Review for JRS, it provided support on pages 7 and 8 of its April 2014 Experience Review study for SERS for this assumption as a long-term rate.

- The *National Conference on Public Employee Retirement Systems* (NCPERS) 2014 study provides the following graphic of respondents' inflation assumptions:

SECTION III – SUPPORTING ANALYSIS



This shows that the 3.0% assumption, which JRS uses, is a prevalent inflation assumption amongst the 187 systems that responded to this study, with 3.2% as the average.

3. *Salary (Annual Compensation) Increase Assumption:*

For the draft June 30, 2014, Actuarial Valuation, the salary scale assumption is 3.75% per year, compounded annually for all active members, regardless of age or service. It includes components of 3.0% per annum for inflation, 0.60% per annum for productivity, and 0.15% for merit/promotion increases.

This assumption was revised for the 2013 valuation from the 4.0% per year assumption used in the 2011 and 2012 valuations.

We find the assumption and the basis for setting it reasonable. However, we do recommend that GRS consider whether Tier 2 needs separate assumptions for its salary scale from those developed for Tier 1 to reflect the differences in benefit provisions between the two Tiers (Recommendation #10d).

SECTION III – SUPPORTING ANALYSIS

Our rationale for concurring with GRS's revised recommended salary increase assumption:

- GRS's review of the salary history and CPI changes from 2000 to 2012 indicates that the data supports the recommended changes.

- In our own experience with our public sector pension plans (about 60 large plans), we have witnessed a consistent recent trend of declining salary increases for public sector employees.

4. *Other Economic Assumptions:*

   We continue to recommend that GRS disclose the additional economic assumptions that it utilizes, including 415(b) limits and 401(a)(17) limits, along with the growth rates for these (Recommendation #10a).

5. *COLA:*

   While Tier 1 members receive an annual automatic COLA, Tier 2 members receive an annual increase of the lesser of the 3% received by Tier 1 and the annual change in the Consumer Price Index for all Urban Consumers.

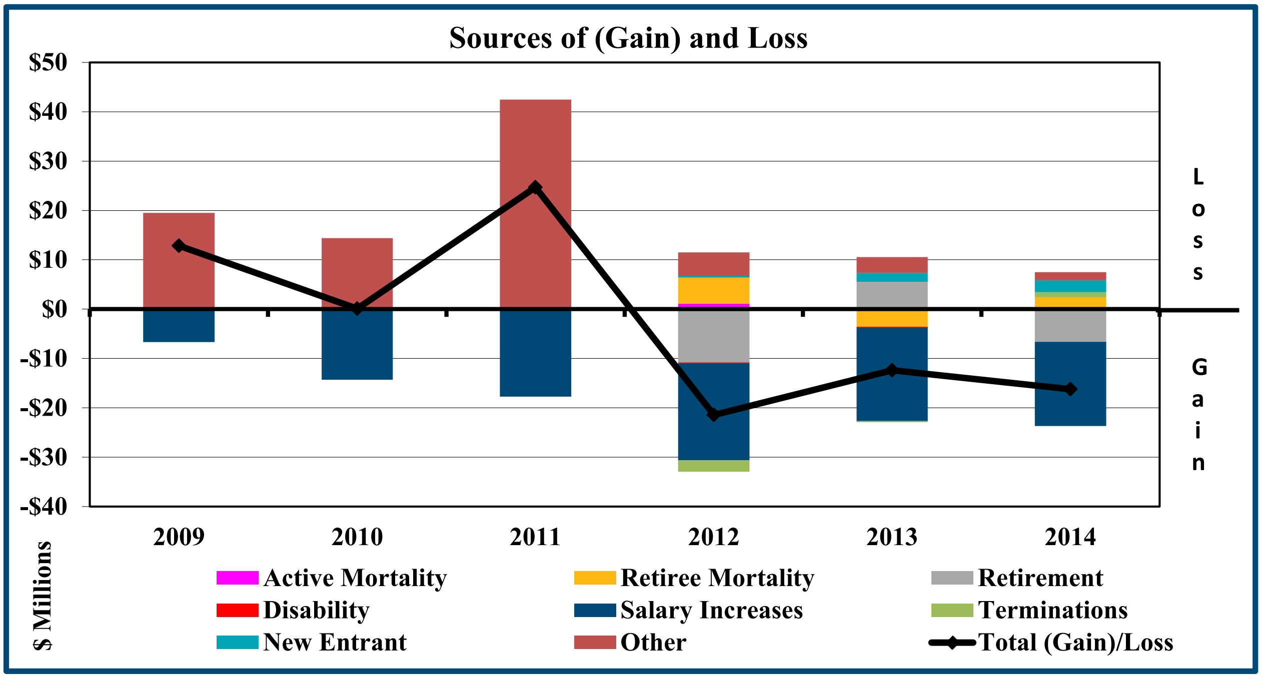
6. *Capped Pay Assumption:*

   GRS states on page 7 of the actuarial valuation report that it is assumed that State contributions are made on capped pay, but it is not clear in the actuarial assumptions if this is true for both tiers. **We recommend that GRS make clear what the pay bases for all contributions presented are** (Recommendation #10c).

D. Demographic Assumptions:

In its annual actuarial valuation reports, GRS regularly reports sources of liability gains and losses. In the draft 2014 Actuarial Valuation Report, these are shown on page 17. In the chart below, we have collected similar data from past valuation reports dating back to 2009 and use these to present a historical review of past demographic and salary increase experience gains and losses. Note that GRS became the actuary with the 2012 report, and the results prior to this year were provided by the prior actuary, Goldstein and Associates.

SECTION III – SUPPORTING ANALYSIS

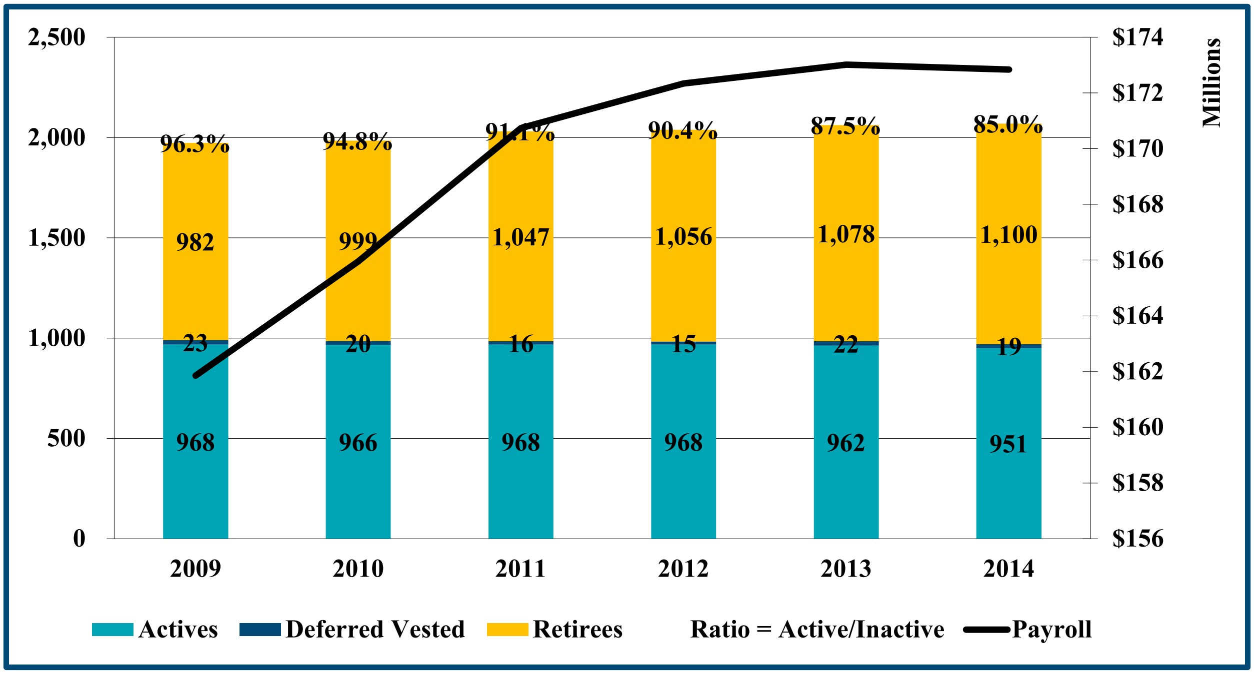


This chart shows the pattern of annual gains and losses attributable to eight different sources as shown in the legend above. When the colored bar slices appear above zero on the Y-axis, that represents an experience loss, and below zero represents an experience gain for that year.

Since the prior actuary did not examine many of these experience sources, observations from this chart are limited, but it can be noted that salary increases have been a cause of an experience gain in every year of the period.

As both actuaries over the period reported on the membership of JRS by category as well as payroll, we can further explore this with a historical review of the membership provided below:

SECTION III – SUPPORTING ANALYSIS



Key observations from these charts are as follows:

1. Retirement experience, retiree mortality, and termination losses have all been volatile over the last three years where experience is provided and have not shown any particular trend.
2. The active population had been staying relatively constant, but has begun to decline in the last two years. GRS has continued to assume that a constant active population over the projection period, so we recommend that it provide support for this assumption (Recommendation #8).
3. There has been a gain due to salary for each of the last six years.
4. Total payroll grew over the first couple years of the period, but since has stayed relatively stable.

While GRS indicated that there were no assumption revisions in its introduction, it indicated in Section F that a number of assumptions were revised:

1. The assumption as to the marital status at benefit commencement for retirees was changed from their actual marital status to assuming that 75% are married.
2. GRS added one of our recommended assumptions, "the employee contribution election," stating that "for purposes of the valuation, it is assumed that all judges elect to contribute only on increases in salary when they become eligible for this provision."

SECTION III – SUPPORTING ANALYSIS

Out of the demographic assumptions, there are four assumptions that are of particular interest.

1. *Mortality:*

   For the current valuation, GRS maintained the post-retirement mortality table as the RP-2000 Combined Healthy Mortality Table, sex distinct, projected to 2015 (static table), setback three years for males and two years for females. It also maintained the pre-retirement mortality to be 85% of the new post-retirement mortality for males and 70% of the new post-retirement mortality for females.

   GRS should consider for next year's valuation generational mortality improvement. Generational mortality tables, which assume that mortality rates at each age decline over time, are increasingly being implemented. Given the significant dependence of the statutory funding requirements on new hires over the next 30 years, generational mortality is of greater significance here than for a typical public pension plan that bases its contributions on just the current plan membership. If GRS believes the mortality tables are sufficient to cover life expectancy increases in the near future, GRS should disclose whether or not the recommended tables sufficiently cover anticipated increases through 2045 (Recommendation #7).

2. *Spousal Continuance Election:*

   JRS members can elect to have spousal continuance and pay an additional 2.5% of pay for this benefit if they do so. They can also elect not to have a continuance benefit, in which case they do not pay the additional 2.5% contribution. GRS provides no disclosure of its assumptions about the election of this option. This assumption determines the form of benefit assumed elected by members at retirement; however, it was not analyzed or mentioned in the most recent experience study. **We recommend that GRS use actual data that is available rather than an assumption to determine the form of benefit payable at retirement and the amount of contributions payable by active members. We further recommend that GRS provide details regarding the election of this provision by the current inactive members in the Participant Data section. Finally, we recommend that GRS, at a minimum, disclose its assumption related to the spousal continuance election even if it does not change the assumption, as the current assumption is not disclosed** (Recommendation #10b).

3. *New Entrant Assumptions:*

   GRS added a new entrant profile this year as recommended, including providing capped salary information. GRS assumes that for purposes of determining the annual appropriation as a level percent of total covered payroll, the size of the active group will remain level at the number of actives as of the valuation date. New entrants are assumed to enter with an average age (46.56) and average pay ($179,898) based on the averages for all current active members. The average increase in uncapped payroll for the projection period is 3.75% per annum. However, the description gives the average increase for uncapped payroll only and the profile provided does not provide the uncapped salaries.

We recommend that GRS consider whether assuming a constant active population over the projection period is reasonable (Recommendation #8).

4. *Termination:*

GRS currently assumes all members have the same termination rates. Illustrative rates of this withdrawal from the System are as follows:

Age Based Termination Rates	
Age	**Male and Female**
30	0.0128
35	0.0110
40	0.0094
45	0.0076
50	0.0058
55	0.0042
60	0.0024
65	0.0007

It is assumed that terminated employees will not be rehired. The rates apply only to employees who have not fulfilled the service requirement necessary for retirement at any given age.

We recommend that GRS consider using a separate set of termination rates for Tier 2 for the same reasons they found adjusting the retirement rates for Tier 2 necessary, the lower benefits available to Tier 2 members. This will improve GRS's compliance with the ASOP No. 35 requirement for consistency within assumptions (Recommendation #10d).

Below we summarize all remaining demographic assumptions, which we reviewed and concluded are reasonable and meet the requirements of ASOP No. 35, Section 3.3.4.

1. Retirement

Employees are assumed to retire in accordance with the rates shown below. The rates apply only to employees who have fulfilled the service requirement necessary for retirement at any given age. Based on the difference in benefit structures between Tier 1 and Tier 2, different rates are assumed for each Tier.

SECTION III – SUPPORTING ANALYSIS

Tier 1 Rates:

Retirement Rates	
Age	**Male and Female**
60	22.0%
61-70	11.0%
71	12.0%
72	14.0%
73	16.0%
74	18.0%
75-79	20.0%
80	100.0%

Early Retirement Rates	
Age	**Male and Female**
55	8.0%
56	8.0%
57	8.0%
58	8.0%
59	8.0%

Tier 2 Rates:

Retirement Rates	
Age	**Male and Female**
62	30.0%
63	10.0%
64	13.0%
65	16.0%
66	20.0%
67	30.0%
68	11.0%
69-71	12.0%
72	14.0%
73	16.0%
74	18.0%
75-79	20.0%
80	100.0%

2. Disability

The assumption of disability was removed by GRS for the 2013 valuation, as we had suggested in our 2012 report.

SECTION III – SUPPORTING ANALYSIS

3. Assets

Assets available for benefits are used as described on page 41 of the most recent valuation report.

4. Expenses

Assumed expenses are estimated and advised by the JRS staff based on current expenses and are expected to increase in relation to the projected capped payroll.

5. Spouse's Age

The female spouse is assumed to be four years younger than the male spouse.

6. Decrement Timing

All decrements are assumed to occur beginning of year.

7. Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

8. Decrement Operation

Turnover decrements do not operate after member reaches retirement eligibility.

9. Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

ASSUMPTIONS AS A RESULT OF PUBLIC ACT 96-0889

Members hired after December 31, 2010, are assumed to contribute on salary up to the final average compensation cap in a given year until this plan provision or administrative procedure is clarified.

State contributions, expressed as a percentage of pay, are calculated based upon capped pay. We recommend that GRS consider providing additional clarity in its report as to the definitions of the various salary terms and values provided.

Retirement rates are also adjusted for Tier 2 members, as detailed previously.

SECTION III – SUPPORTING ANALYSIS

E. Actuarial Methods:

Actuarial methods consist of three components: (1) the funding method, which is the attribution of total costs to past, current, and future years; (2) the method of calculating the actuarial value of assets (i.e., asset smoothing); and (3) the amortization basis of the Unfunded Actuarial Liability (UAL). Since the amortization basis is governed by State law, we do not comment on it here.

1. *Cost Method:*

   The System uses the projected unit credit (PUC) cost method to assign costs to years of service, as required to under the Pension Code (40 ILCS 5/18). **We have no objections with respect to using the PUC method, although we would prefer the entry age normal (EAN) cost method, as it is more consistent with the requirement in 40 ILCS 5/18-131 for level percent of pay funding.** Public Act 098-0599 amended the Pension Code (40 ILCS 5/14-131) to require JRS to calculate the required State contribution using the entry age normal actuarial cost method beginning with the Fiscal Year 2016 State contribution. However, the Illinois Seventh Judicial Circuit Court granted a temporary restraining order and a preliminary injunction stopping the implementation of Public Act 098-0599. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Consequently, JRS continued to calculate the required State contribution as the law existed prior to Public Act 98-599.

   Under the PUC method, which is used by some public sector pension funds, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over their later years of service than over their earlier ones. As a result of this pattern of benefit value increasing, while the PUC method is not an unreasonable method, more plans use the Entry Age Normal (EAN) funding method to mitigate this affect. It should also be noted that the EAN method will be the required method to calculate liability for GASB 67 & GASB 68.

2. *Asset Smoothing Method:*

   The actuarial value of assets for the System is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that fluctuations in the AVA will be less volatile over time than fluctuations in the market value of assets. **Smoothing the market gains and losses over a period of five years to determine the actuarial value of assets is a generally accepted approach in determining actuarial cost, and we concur with its use.**

SECTION III – SUPPORTING ANALYSIS

Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets and the market value of assets. Many public sector pension plans limit the actuarial value of assets to be in any year no more than 120% of market value, or no less than 80% of market value. In fact, the Internal Revenue Service (IRS) mandates this "corridor" for private sector pension plans (a 90%-110% corridor is mandated). Even though it is not mandated for public plans, we believe that the use of this type of corridor is a much sounder actuarial practice, and according to ASOP No. 44 in Section 3.3 b. 1, the actuarial value of assets should "...fall within a reasonable range around the corresponding market value." **Therefore, we recommend that the JRS Board consider moving to this approach in future valuations.** It is important to note that currently a move to this corridor approach would have no impact on the 2014 actuarial valuation results, as the actuarial value of assets is already within the 80%-120% corridor (Recommendation #5).

3. *Payrolls used in Valuation:*

Contributions for Tier 2 are based on capped payroll while those for Tier 1 are uncapped. GRS uses a number of phrases throughout its report relating to the payroll, such as "projected annualized payroll," "covered payroll," and "capped payroll" without making the definition of these terms clear. **We recommend that GRS provide additional clarity on the payrolls used in its valuation throughout its report** (Recommendation #10c). In addition to adding more exposition to the narrative, it can better achieve this goal by adding additional clarity in the sections on Participant Data, Actuarial Methods and Assumptions, and Plan Provisions.

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

Response to recommendations in 2013:

In the State Actuary's Preliminary Report on the Judges' Retirement System of Illinois presented December 10, 2012, Cheiron made several recommendations. Below we summarize how these recommendations were reflected in this year's valuation report.

Judges' Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
Recommended Changes to Actuarial Assumptions Used in the 2013 Valuation:		
Cheiron concluded the assumptions were reasonable and had no recommended changes to the assumptions.		
Recommended Changes for Future Valuations:		
1. We recommend that the JRS Board annually review the economic assumptions (interest rate and inflation) prior to commencing the valuation work, and adjust the assumptions accordingly.	Not Implemented	**We continue to suggest that the JRS Board annually review these assumptions and always use the conservative end of any range of assumptions recommended by GRS due to the systematic underfunding of the System. The experience review relating to the economic assumptions was not updated for the 2014 valuation for this system.**
2. We recommend GRS consider, in future valuations, establishing a corridor around the market value of assets of 80% to 120%, beyond which the actuarial value of assets is limited given the use of the actuarial value of assets in the projection methodology in accordance with the statutory funding method.	Not Implemented	This has not been addressed in the 2014 valuation. **Recommendation repeated.**
3. We recommend that GRS consider using a fully generational mortality table so that future mortality improvements will continue to impact new entrants throughout the projection period ending in 2045.	Not Implemented	Projected to 2015, but not fully generational. **Recommendation repeated.**
4. We recommend that GRS disclose additional information in its valuation report as to how the New Entrant Profile is developed. We recommend GRS include all	Partially Implemented	GRS added a New Entrant Profile, but did not include gender information and only provided capped pay.

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

Judges' Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
relevant information regarding the New Entrant Profile, including the distributions rather than just the average values, in the valuation report in order to better comply with ASOP No. 41 dealing with actuarial communications. We also recommend it include gender information, as the mortality assumption is now sex distinct.		**We recommend further expansion of this profile.**
5. We have several minor recommendations to future reports:		
• We recommend that GRS disclose the additional economic assumptions that it utilizes in its actuarial valuation, including 415(b) limits, 401(a)(17) limits, and the COLA for Tier 2, along with the growth rates for these.	Partially Implemented	GRS added a disclosure for the assumption for the COLA for Tier 2 this year, but disclosures relating to the 415(b) and 401(a)(17) limits are still not made. **Recommendation repeated.**
• We recommend again, as we did last year that GRS consider using the actual data available rather than an assumption for determining if a member will choose the spousal continuance benefit option that provides a survivor annuity. We further recommend that GRS provide details regarding the election of this provision by the current inactive members in the Participant Data section.	Not Implemented	This has not been addressed in the 2014 valuation. If GRS does continue using the assumption, we recommend it provide additional detail in its valuation report to allow another qualified actuary to examine the employee contribution rates produced in the projection tables and assess its consistency with GRS's contribution assumptions. **Recommendation repeated.**
• We recommend GRS make and disclose assumptions relating to the incidence of members electing to either freeze their benefit and discontinue contributions or pay contributions only on salary increases once they are eligible to receive the maximum rate of annuity to satisfy Section 4.1.1. of	Implemented	

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

Judges' Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
ASOP No. 35		
• We recommend that GRS provide additional clarity on the payrolls used in its valuation throughout its report to allow for a more complete evaluation by another qualified actuary as required by Actuarial Standards of Practice	Not Implemented	This has not been addressed in the 2014 valuation. **Recommendation repeated.**
• We recommend that GRS consider whether additional revisions to the demographic assumptions, specifically the termination and salary scale assumptions, for Tier 2 are appropriate to their benefit structure and consistent with the revised retirement rates already implemented.	Not Implemented	This has not been addressed in the 2014 valuation. **Recommendation repeated.**
Proposed Certification of the Required State Contribution:		
6. We recommend that GRS disclose in the June 30, 2014, and later valuations the following items in order for us to continue to perform an analysis of the required State contribution in the future:		
• Projections by year of future benefit payouts split by actives and current inactives (i.e. retirees, survivors, disabled, and deferred vested) separate from expenses;	Partially Implemented	The versions of Table 4 continue to only provide an aggregate number, including expenses.
• A historic development of assets without General Obligation Bonds (GOB).	Not Implemented	Significant questions remain on the projections that are fundamental to the development of the Required State Contributions. **Recommendation repeated.**
• All projections should show the active member information split into three distinct groups: current	Implemented	

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

Judges' Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
actives hired prior to January 1, 2011; current actives hired on or after January 1, 2011; and new entrants after the valuation date.		
State Mandated Funding Method:		
7. We also recommend stress testing be done to determine whether there will be sufficient assets to pay benefits if there is a significant market downturn.	Not Implemented	In the 2014 valuation, GRS strongly recommends stress testing be performed, but does not indicate when and how such stress testing will be completed. **Recommendation repeated.**
8. Due to the systematic underfunding of the System, we recommend that the Board always use the conservative end of any range of assumptions recommended by GRS.	Partially Implemented	This is a continuous process. No change was made in the current valuation, but it needs to be monitored. **Recommendation repeated**

Chapter Six

PRELIMINARY REPORT ON THE GENERAL ASSEMBLY RETIREMENT SYSTEM

In accordance with 30 ILCS 5/2-8.1, Cheiron, the State Actuary, submitted a preliminary report to the Board of Trustees of the General Assembly Retirement System (GARS) concerning proposed certifications of required State contributions submitted to Cheiron by the Board. The preliminary report was submitted to GARS on December 3, 2014. The preliminary report was based on Cheiron's review of actuarial assumptions included in GARS' 2014 Actuarial Valuation Report.

Following is Cheiron's final preliminary report on the General Assembly Retirement System. GARS' written response, provided on December 15, 2014, can be found in Appendix C.

December 19, 2014

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, Illinois 62703

Board of Trustees
General Assembly Retirement System of Illinois
2101 South Veterans Parkway
P.O. Box 19255
Springfield, Illinois 62794-9255

Dear Ladies and Gentlemen:

In accordance with the Illinois State Auditing Act (30 ILCS 5/2-8.1), Cheiron is submitting this preliminary report concerning the proposed certification prepared by Gabriel Roeder Smith & Company (GRS), of the required State contribution to the General Assembly Retirement System of Illinois (GARS or System) for Fiscal Year 2016.

In summary, we believe that the assumptions and methods used in the June 30, 2014, Actuarial Valuation Report, which were used to determine the required Fiscal Year 2016 State contribution, are reasonable both individually and in the aggregate. However, we have some recommended changes for the Board to consider for future valuations. Details on recommendations can be found in the report that follows. Please provide written responses to our recommendations by the close of business on December 15, 2014.

Section I of this report describes the review process undertaken by Cheiron. Section II summarizes our findings. Section III provides the supporting analysis for those findings and presents more details on our assessment of the actuarial assumptions and methods employed in GRS's actuarial certification, as well as our assessment of the GRS's determination of the required State Contribution for Fiscal Year 2016. Section III also includes comments on other issues impacting the funding of GARS, including the implications of Article 2 of the Illinois Pension Code, which establishes the statutory funding requirements for the System. **In our opinion, the statutory mandated minimum funding requirements call for inadequate funding, and do not meet Actuarial Standards of Practice.**

In preparing this report, we relied on information (some oral and some written) supplied by GARS and GRS. This information includes actuarial assumptions and methods adopted by the GARS Board, System provisions, summarized census data, the draft 2014 Actuarial Valuation Report, the April 17, 2013, Experience Review presentation, which includes a review of the investment return assumption, the GRS April 2014 Experience Study for the State Employees' Retirement System (SERS), and the minutes of the GARS Board of Trustee meetings. A detailed description of all information provided for this review is contained in Appendix B.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared exclusively for the Office of the Auditor General and the General Assembly Retirement System of Illinois for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Janet H. Cranna, FSA, FCA, EA, MAAA	Michael J. Noble, FSA, FCA, EA, MAAA
Principal Consulting Actuary	Principal Consulting Actuary

THE STATE ACTUARY'S PRELIMINARY REPORT ON THE GENERAL ASSEMBLY RETIREMENT SYSTEM OF ILLINOIS PURSUANT TO 30 ILCS 5/2-8.1

SECTION I - REPORT SCOPE

Illinois Public Act 097-0694 (the Act) amended the Illinois State Auditing Act (30 ILCS 5/2-8.1) and requires Cheiron, as the State Actuary, to review the actuarial assumptions and valuation of the General Assembly Retirement System of Illinois (GARS or System) and to issue to the GARS Board this preliminary report on the proposed certification prepared by Gabriel Roeder Smith & Company (GRS) of the required State contributions for Fiscal Year (FY) 2016. The purpose of this review is to identify any recommended changes to the actuarial assumptions for the GARS Board to consider before GRS, the GARS actuary, finalizes its certification of the required State contributions to the GARS for FY 2016.

While the Act states that just the actuarial assumptions and valuation are to be reviewed, we have also reviewed the actuarial methodologies (funding and asset smoothing methods) employed in preparing the actuarial certification, as these methods can have a material effect on the amount of the State contribution being certified. Finally, we have offered our opinion on the implications of Article 2-124 of the Illinois Pension Code, which impacts the contribution amount certified by GRS.

Illinois Public Act 098-0599 was signed into law in December 2013 to become effective as of June 1, 2014. It made significant changes to statutes governing GARS and the other statewide pension plans. This act modified eligibility and benefits of participants, changed the actuarial cost method used to calculate liability, expanded requirements of the State Actuary, and changed the funding method of the System. The implementation of the law was suspended in a ruling May 14, 2014, by the Seventh Judicial Circuit Court. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Due to the legal status of Illinois Public Act 098-0599, this report and the valuation report of the System do not specifically reflect the reforms of PA 098-0599.

In conducting this review, Cheiron reviewed the draft June 30, 2014, actuarial valuation, the April 2013 experience review prepared by GRS and the minutes of the 2014 Board of Trustees meetings. The materials we reviewed are listed in Appendix B.

In addition to reviewing the actuarial certification of the required State contribution to GARS, the Act requires the State Actuary to conduct a review of the "actuarial practices" of the Board. While the term "actuarial practices" was not defined in the Act, we continue to interpret this language to mean that we review: (1) the use of a qualified actuary (as defined in the Qualification Standards of the American Academy of Actuaries) to prepare the annual actuarial valuation for determining the required State contribution; and (2) the conduct of periodic formal experience studies to justify the assumptions used in the actuarial valuation. In addition, we have included comments on actuarial communication and compliance with Actuarial Standards of Practice (ASOPs) reflected in the draft June 30, 2014, actuarial valuation.

Finally, we have mentioned in past reports that in future reports we may examine additional actuarial practices of the Board. For this year's report we want to suggest an additional practice for the Board to consider. In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. Given the System's low funded ratio, the recent

SECTION I - REPORT SCOPE

changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the System's actuary. We comment further on this point in our recommendations that follow.

SECTION II - SUMMARY OF RECOMMENDATIONS

This section summarizes recommendations from our review of the actuarial assumptions and methods employed in the draft June 30, 2014, Actuarial Valuation Report of GARS as well as the "actuarial practices" of the GARS Board. Section III of this report contains detailed analysis and rationale for these recommendations.

Proposed Certification of the Required State Contribution:

GRS has determined that the FY 2016 required State contribution calculated under the current statutory funding plan is $16,073,000. We have verified the arithmetic calculations made by GRS to develop this required State contribution and have reviewed the assumptions on which it was based. As such, we have accepted GRS's annual projections of future payroll, total normal costs, employee contributions, combined benefit payments and expenses, and total contributions.

In accordance with 30 ILCS 5/2-8.1, our review did does not include a replication of the actuarial valuation results. Given the System's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the System's actuary.

1) **We recommend that the GARS Board consider conducting an independent actuarial audit in which the results of the valuation are replicated by the audit actuary and any deviations noted and reconciled.**

State Mandated Funding Method

The current statutory funding plan calculates the minimum contribution to GARS for each fiscal year as the amount sufficient to cause the total assets of the System to equal 90% of the total liabilities of the System by the end of Fiscal Year 2045. **This funding method does not meet generally acceptable actuarial principles because the System is not targeted to be funded to 100% and the funding of the Plan is pushed too far into the future. At a minimum, future plan benefit accruals should be fully funded to avoid systematic underfunding of GARS. Continuing the practice of deferring contributions that are needed to fully fund annual benefit accruals increases the risk of the Plan becoming unsustainable.**

2) Based on the draft 2014 Actuarial Valuation Report, the funded ratio, measured as the ratio of the actuarial value of assets to the actuarial liability, is currently at 16.0% and is expected to drop below 8% by 2029 assuming all assumptions are realized. We have concerns about the solvency of the System if there is a market downturn. **We have suggested and continue to suggest that the GARS Board always use the conservative end of any range of**

SECTION II - SUMMARY OF RECOMMENDATIONS

assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with the State Mandated Funding method.

3) We have also previously recommended stress testing be done to determine whether there will be sufficient assets to pay benefits if there is a significant market downturn. After the draft 2014 Actuarial Valuation Report was completed, GRS provided stress testing to the Board in a separate report November 18, 2014. **We recommend future valuation reports include the stress testing provided this year in the supplementary report.**

<u>Assessment of Actuarial Assumptions Used in the 2014 Valuation:</u>

30 ILCS 5/2-8.1 requires the State Actuary to identify recommended changes in actuarial assumptions that the GARS Board must consider before finalizing its certification of the required State contribution. We have reviewed all the actuarial assumptions used in the draft 2014 GARS Actuarial Valuation Report and **we conclude that the assumptions are reasonable in general, based on the evidence provided to us.**

<u>Recommended Additional Disclosures for the 2014 Valuation:</u>

4) GRS determined that the FY 2016 required State contribution rate calculated under the current statutory funding plan is 126.700%. However, it did not include the basis to which this rate applies. Therefore, we recommend that GRS add clarity to this letter by making clear to what this required rate is to apply.

<u>Recommended Changes for Future Valuations:</u>

5) We recommend again, as we did last year, that GRS consider in future valuations establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited, given the use of the actuarial value of assets in the projection methodology in accordance with 40 ILCS 5/2-124(d). While this change would have no impact on the System for the June 30, 2014, valuation, we believe it would be better to establish this corridor before it is actually applicable.

6) We continue to recommend the Board annually review the economic assumptions (interest rate and inflation) prior to commencing the valuation work, and adjust assumptions accordingly. We further recommend that the Boards of the three systems whose assets are commingled, GARS, the Judges' Retirement System (JRS), and the State Employees' Retirement System (SERS), consider whether different economic assumptions for these systems need to be used.

7) Since the statutory funding requirement is significantly dependent on the projected actuarial liability 31 years from now, we recommend that GRS consider the use of generational mortality improvement assumptions in future valuations. In the event that GRS does not choose to use such assumptions, then we recommend it disclose its rationale and whether or

SECTION II - SUMMARY OF RECOMMENDATIONS

not the recommended mortality tables sufficiently cover anticipated life expectancy increases through 2045.

8) GRS projects the State contribution as a percentage of payroll. Total payroll used in the projection appears to be increasing between 3.5% and 3.7% per year. However, both the active population and total payroll have decreased over the last four actuarial valuations and average annual payroll has remained flat over the last four years. We recommend GRS analyze and disclose whether the constant population assumption and payroll assumption used is reasonable.

9) In our prior two reports, we also asked for a historic development of assets without the General Obligation Bonds (GOB) issued in 2004, but we have yet to obtain such information. Since the development of assets without the GOB directly impacts the required State contribution, it is important to verify that these assets have been historically developed accurately. We recommend that prior to the completion of the June 30, 2015, draft valuation report, that GRS provide a verification of the hypothetical assets without the GOB.

10) We continue to have several minor recommendations for future reports and GRS continues to not provide this information:

    a. We recommend full disclosure of assumptions with respect to 415(b) limits, 401(a)(17) limits, and the COLA for Tier 2, along with the growth rates for these.
    b. We recommend again, as we have the previous two years, that GRS consider using the actual data available rather than an assumption for determining if a member will choose the spousal continuance benefit option that provided a survivor annuity. We further continue to recommend that GRS provide details regarding the election of this provision by the current inactive members in the Participant Data section. If there are material limits in the data preventing this, GRS should note this.
    c. We recommend that GRS provide additional clarity on the payrolls used in its valuation throughout its report to allow for a more complete evaluation by another qualified actuary as required by Actuarial Standards of Practice.
    d. We recommend that GRS consider whether additional revisions to the demographic assumptions, specifically the termination and salary scale assumptions, for Tier 2 are appropriate to its benefit structure and consistent with the revised retirement rates already implemented

11) We recommend that in future experience studies, GRS specifically request the investment consultants referenced in developing market expectations to provide longer-term market expectations (30+ years) and that GRS also obtain the specific expectations of the investment consultant serving the GARS and the Illinois State Board of Investment (ISBI).

SECTION III - SUPPORTING ANALYSIS

In this section we provide detailed analysis and supporting rationale for the recommendations that were presented in Section II of this report.

A. Proposed Certification of the Required State Contribution

As required by 40 ILCS 5/2-124, in determining the required State contribution under State law, the System's actuary must determine what level of future contributions is needed to make a projection of the System's funded status in 2045 be at 90%. We have verified the arithmetic calculations made by GRS to develop this State required contribution and have reviewed the assumptions on which it is based. As such, we have accepted GRS's annual projections of future payroll, total normal costs, benefits, expenses, and total contributions.

In accordance with 30 ILCS 5/2-8.1, our review does not include a replication of the actuarial valuation results. Given the Plan's low funded ratio, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, we are recommending that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary. Results are compared in a detailed fashion to measure the liabilities for each benefit form and feature. A replication audit will uncover any potential problems in the processing and certification of valuation results.

We recommend that the Board periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plan's actuary (Recommendation #1).

B. State Mandated Methods

1. *State Mandated Funding Method:*

   In its draft 2014 Actuarial Valuation Report on pages 11-14, GRS offers commentary on the statutory funding method from an actuarial point of view. It describes the Annual Required Contribution (ARC) under GASB 25 and 27 as a method designed to finance benefits for current participants to a 100% funding target over a projected period not to exceed 30 years, and which is often used as a de facto funding method. It contrasts the ARC funding method with the current statutory method and notes that the statutory policy produces a back-loaded contribution projection, where contributions are significantly deferred into the future. GRS also provides a chart on page 12 that "illustrates how significantly the current funding policy defers contributions into the future." **This chart shows the projected funded ratio declining from 16.0% in 2014 to below 8% in 2029.**

   GRS advises "strengthening the current statutory funding policy," and provides the following examples:

SECTION III - SUPPORTING ANALYSIS

- Reducing the projection period needed to reach 90% funding;
- Increasing the 90% funding target;
- Separating the financing of benefits for members hired before and after December 31, 2010; and
- Changing to an ARC based funding approach with an appropriate amortization policy for each respective tiered benefit structure.

The Illinois Pension Code (40 ILCS 5/2-124) is limited in meeting the risks of the System. This law requires that the actuary base the required contribution using a prescribed funding method that achieves a 90% funding in the year 2045.

We concur with the GRS recommendations to increase the 90% funding target and to reduce the projection period, in accordance with generally accepted actuarial practices and have suggested and continue to suggest that the GARS Board always use the conservative end of any range of assumptions recommended by the actuary or other advisors due to the uncertainty and risks associated with this method (Recommendation #2)**.** The potential for continued underfunding of the plan during the projection period increases the uncertainty and inherent risks in determining the State required contributions to the System and the measurement of plan obligations. ASOP 4 requires consideration of the plan's funding policy and the uncertainty or risk inherent in the measurement of pension obligations and these should be factors when selecting actuarial assumptions**.**

We recommend future valuation reports include the stress testing provided this year in the supplementary report (Recommendation #3)**.**

2. *State Mandated Projection Method*:

Under 40 ILCS 5/2-124(e), the actuarial methodologies utilized in performing the 2045 projection of the System's funded status assume the future investment earnings rate (currently at 7.00%) is applied to the actuarial value of assets (AVA) rather than the market value of assets (MVA). GRS included an illustration of projected AVA with a phase-in of the asset smoothing method gains and losses. We agree that this approach provides a more realistic expectation of the future direction of the contribution level.

C. Economic Assumptions

1. The Interest Rate:

The interest rate assumption (also called the investment return or discount rate) is the most impactful assumption affecting the required State contribution amount. This assumption, which is used to value liabilities for funding purposes, was maintained at 7.00% for the 2014 actuarial valuation.

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After reviewing all the materials (see Appendix B of the report) that were made available, Cheiron concludes that the use of 7.00% for this valuation is reasonable. We recommend that the Board annually review the interest and inflation rate assumptions and further recommend that the Board consider whether different economic assumptions are appropriate for all of the three systems whose assets are commingled, JRS, GARS, and SERS (Recommendation #6).

Our rationale for this recommendation is as follows:

- Based on GRS's March 29, 2013, Experience Review, the average 50th percentile of the 30-year expected average geometric net nominal return for eight investment consultants surveyed by GRS is 7.09%.

- GRS, in its June 30, 2014, draft valuation, is reporting a funded ratio (actuarial value of assets over actuarial liabilities) of 16.0%, which in our opinion is at dangerously low levels for a retirement plan. Even though a lower assumption would drop that ratio below 15%, it would also require expedited funding of the System going forward.

- In addition to the April 17, 2013, Experience Review that GRS prepared for GARS, they also developed information on this assumption for SERS in April 2014. Since GARS's funds are commingled with SERS, along with GARS, considering this information is also reasonable. In this Experience Review, GRS presented the opinion of eight independent investment consultants on the future expected earnings of SERS and concluded that, adjusting for GRS's assumed rate of inflation, the expected arithmetic mean of the SERS portfolio, that GARS is commingled with, is 7.52%. They then converted this arithmetic mean to a geometric rate of return of 6.82%. They did not provide probabilities of exceeding 7.00%, but did note that there is a 42.3% of exceeding 7.25%.

- In our opinion, the use of 7.00% is justified for this 2014 valuation because we believe that the "long-term" outlook of the eight investment consultants that GRS surveyed most likely had a shorter time horizon than the time horizon applicable to the investment assumptions (30+ years). In our experience, we find that investment consultants view 10 years as a long time horizon. We would expect that had GRS requested those eight consultants to provide 30+ year outlooks that their longer-term outlooks would be higher and thus more supportive of the 7.00% investment assumption. In any event, **we recommend that in future experience reviews, GRS specifically request its referenced investment consultants to provide longer-term market expectations and that they obtain the specific expectations of the investment consultant serving the GARS and the Illinois State Board of Investment (ISBI)** (Recommendation #11).

- A review of the interest and inflation rates does not involve the collection of significant data, and can easily be updated annually. In addition, it keeps the Board focused more closely on these critical assumptions.

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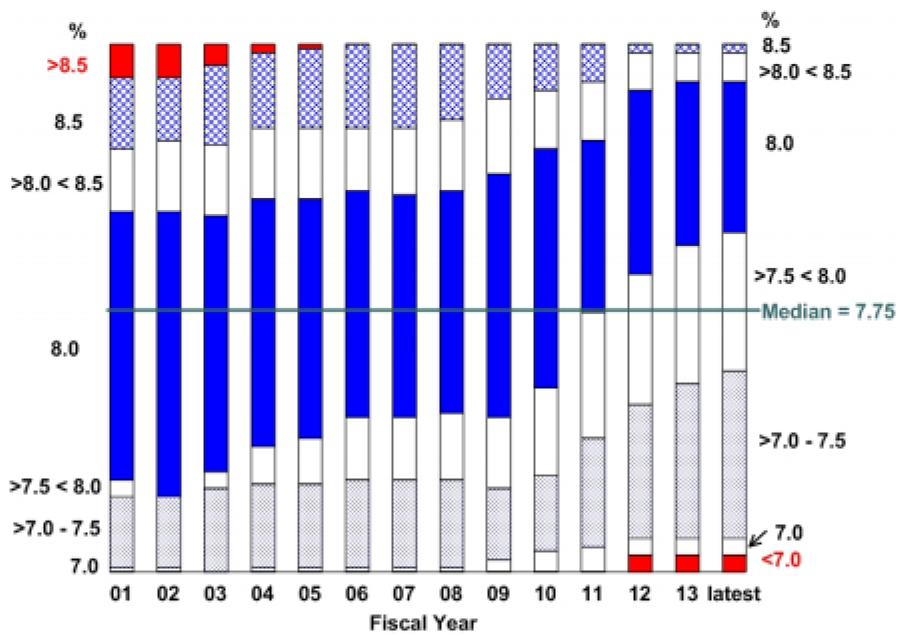
- The National Association of State Retirement Administrators (NASRA) conducts an annual survey of public funds. The latest Public Fund Survey covers 126 large retirement plans. The following chart shows the distribution of investment return assumptions for the last 13 years of the survey. The latest data includes results collected through October 2014.

Figure 4: Change in distribution of public pension investment return assumptions, FY 01 through October 2014



Source: Compiled by NASRA based on Public Fund Survey, Oct. 2014

Over the period shown in the latest survey, there continues to be a pattern of reducing investment return assumptions. Forty-eight of the 126 plans have reduced the interest rate assumption since Fiscal Year 2011. For these 48 plans, the average reduction is 0.37%. The survey is consistent with experience of other Cheiron clients, with which there has been a significant trend to reduce the investment return assumptions in the last several years.

- New GASB 67 and 68 pronouncements may subject many public pension plans, such as GARS, to effectively use a lower interest rate for accounting disclosures and pension expense determinations in fiscal years 2014 and 2015, respectively. It is important to note, however, that the new standards do not define funding requirements for a plan.

- Moody's, an organization that provides bond rating information for private investors, compares the financial viability of public sector pension plans by using interest rate assumptions significantly lower than the assumptions used by most public sector pension plans.

- The federal government, which promulgates minimum funding standards for corporate pension plans, already requires corporate pension plans to utilize interest rate assumptions that are based on short-term and mid-term bond rates, which are very low.

2. *Inflation Assumption:*

We find the inflation assumption of 3.00%, which primarily impacts the salary increase assumption, used in the 2014 actuarial valuation by GRS in certifying the required State contribution, is reasonable.

Our rationale for concurring with the 3.00% assumption:

- The 2014 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years), inflation will average somewhere between 2.0% and 3.4%.

- GRS's 2013 Experience Review shows a range of 2.16% to 3.26% for expectations of future inflation from the eight investment consultants surveyed.

- While GRS did not provide an updated Experience Review for GARS, it provided support on pages 7 and 8 of its April 2014 Experience Review study for SERS for this assumption as a long-term rate.

- The *National Conference on Public Employee Retirement Systems* (NCPERS) 2014 study provides the following graphic of respondents' inflation assumption:

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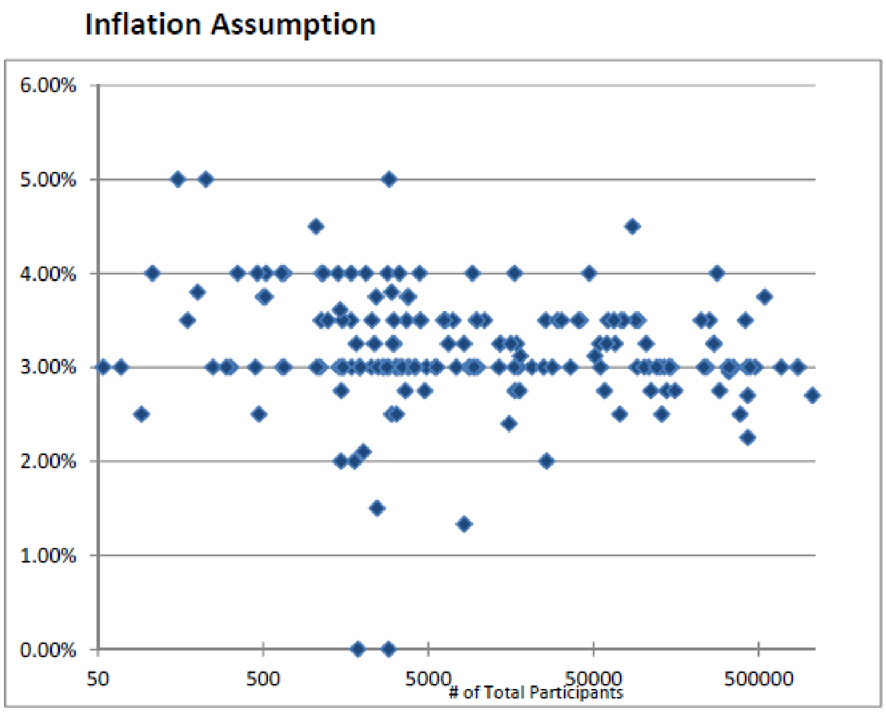

This shows that the 3.0% assumption, which the GARS uses, is a prevalent inflation assumption amongst the 187 systems who responded to this study, with 3.2% as the average.

3. *Salary (Annual Compensation) Increase Assumption:*

In the June 30, 2013, Actuarial Valuation, the salary scale assumption was lowered from 4.0% per year to 3.5% per year, compounded annually for all active members regardless of age or service. It includes components for inflation of 3.0% per annum, productivity of .40% per annum and merit/promotion of .10% per annum. In addition, salaries are assumed to remain at their current levels for fiscal year 2015.

We find the assumption and the basis for setting the assumption reasonable.

Our rationale for concurring with GRS's recommended salary increase assumption:

- The salary increase assumption was based on GRS's review of the report issued by the Legislative Research Unit regarding the history of Illinois Legislator's compensation where the average salary increase from 1991 to 2012 averaged 2.90% per year.

- In our own experience with our public sector pension plans (about 60 large plans), we have witnessed a consistent recent trend of declining salary increases for public sector employees.

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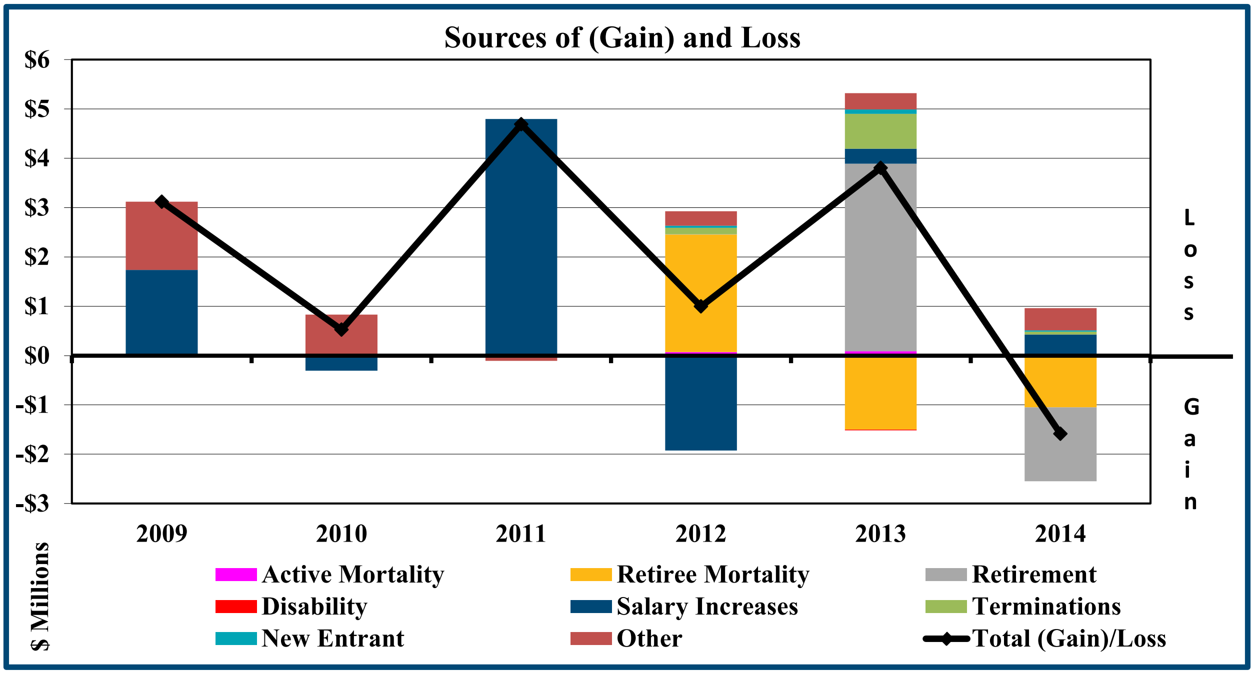
4. Other economic assumptions:

We recommend that GRS disclose the additional economic assumptions that it utilizes, including 415(b) limits, 401(a)(17) limits, and the COLA for Tier 2, along with the growth rates for these (Recommendation #10a).

D. Demographic Assumptions

In its annual actuarial valuation reports, GRS regularly reports sources of liability gains and losses. In the 2014 report, these are shown on page 18. In the chart below, we have collected similar data from GRS past valuation reports dating back to 2009 and presented a historical review of past demographic and salary increase experience gains and losses.



This chart shows the pattern of annual gains and losses attributable to different sources as shown in the legend above. When the colored bar slices appear above zero on the Y axis, that represents an experience loss, and below zero represents an experience gain for that year.

GRS also reports the membership by category and payroll included in the valuation. Below we present a historical review of the membership.

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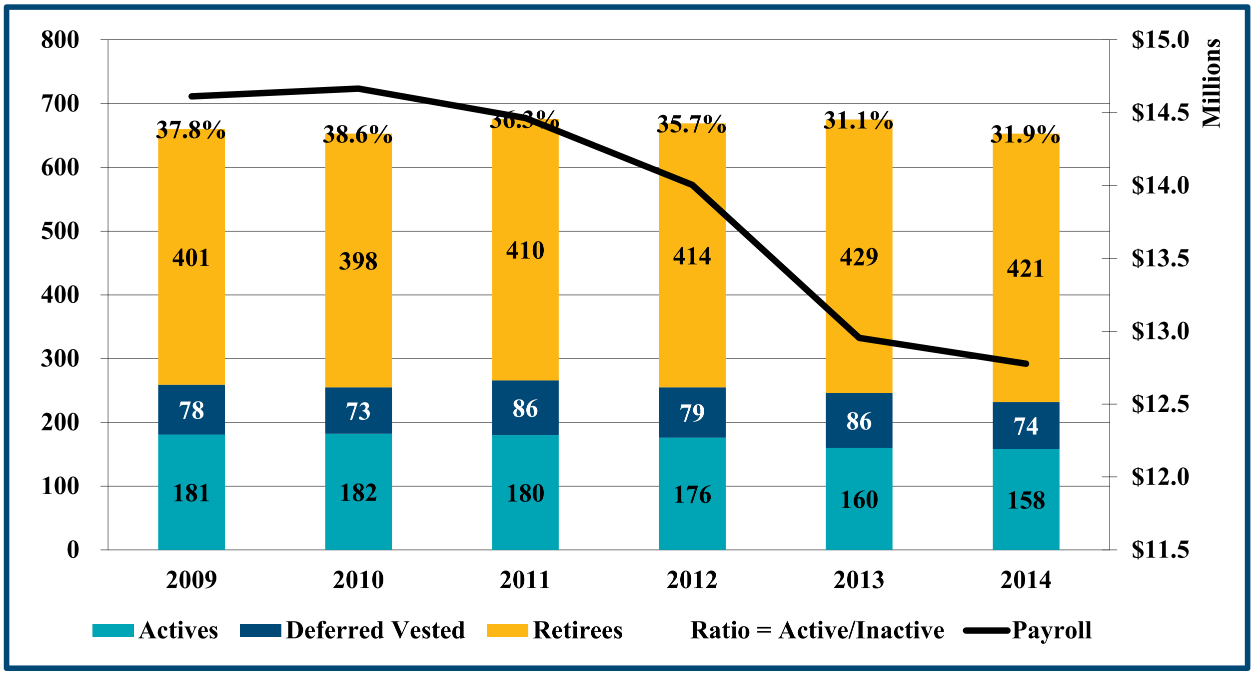

Key observations from these charts are as follows:

1. Only the last three valuations provided a detailed analysis of gains and losses. Prior to the 2012 valuation, only salary experience was provided.
2. Retirement experience has been volatile over the last three years and has not shown any particular trend.
3. There have been gains over the last two years due to retiree mortality. This means there have been more deaths than anticipated for retirees. There have been slight losses due to active mortality indicating there are fewer actives deaths than anticipated.
4. There have been termination losses in each of the last three years.
5. The active population has been declining over the last six years. GRS should consider whether assuming a constant active population over the projection period is reasonable.
6. While there have been both salary gains and losses over the last six years, total payroll has decreased significantly over the period and the average pay has been relatively stable. GRS should consider whether the salary increase assumption and total payroll assumption are reasonable.
7. Certain types of experience, such as disability experience and new entrant experience, are too small to be noticed on the chart, given their insignificant size relative to other experience items.

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The June 30, 2014, Actuarial Valuation was based on the 2013 Experience Review. Based on that review, three assumptions—the mortality, disability, and salary increases for inactive participants—were modified beginning with the June 30, 2013, Actuarial Valuation. There were no changes in assumptions in the draft June 30, 2014, Actuarial Valuation.

***1**. Mortality:*

For post-retirement mortality, the RP-2000 Combined Healthy Mortality Table, sex distinct, projected to 2015 (static table) setback 3 years for males and 2 years for females. The mortality table used is a static table with the provision for future mortality improvement in the projection to 2015, which is in sync with the next scheduled experience study.

Pre-retirement mortality is based on a percentage of 85% for males and 70% for females of post-retirement mortality.

GRS should consider for next year's valuation generational mortality improvement. Generational mortality tables, which assume that mortality rates at each age decline over time, are increasingly being implemented. Given the significant dependence of the statutory funding requirements on new hires over the next 30 years, generational mortality is of greater significance here than for a typical public pension plan that bases its contributions on just the current plan membership. If GRS believes the mortality tables are sufficient to cover life expectancy increases in the near future, **GRS should disclose whether or not the recommended tables sufficiently cover anticipated increases through 2045** (Recommendation #7)**.**

***2.** New entrant assumptions:*

GRS assumes that for purposes of determining the annual appropriation as a level percent of total covered payroll, the size of the active group will remain level at the number of actives as of the valuation date over the next 30 years. New entrants are assumed to enter with an average age and average pay based on the averages for all current active members. The average increase in uncapped payroll for the projection period is 3.5% per annum. However, the active population has been declining over the last six years. In addition, while there have been both salary gains and losses over the last six years, total payroll has decreased significantly over the period and the average pay has been relatively stable.

There are implications of a declining active membership on the System. The ultimate cost of the plan will be lower because fewer members will retire with benefits. However, in the short term, State contributions may increase due to fewer member contributions and a lower total payroll base. **GRS should consider whether assuming a constant active population over the projection period is reasonable** (Recommendation #8).

SECTION III - SUPPORTING ANALYSIS

3. *Other Demographic assumptions*:

GRS should provide the following additional information:

- Full disclosure of assumptions with respect to 415(b) limits, 401(a)(17) limits, and the COLA for Tier 2, along with the growth rates for these (Recommendation #10a) .
- Clarify the payrolls (capped and uncapped) used in its valuation throughout its report to allow for a more complete evaluation by another qualified actuary as required by Actuarial Standards of Practice (Recommendation #10c) .
- There are two additional assumptions which GRS should review: Consider using the actual data available rather than an assumption for determining if a member will choose the spousal continuance benefit option that provides a survivor annuity. We further recommend that GRS provide details regarding the election of this provision by the current inactive members in the Participant Data section (Recommendation #10b).
- Consider whether additional revisions to the demographic assumptions for Tier 2 are appropriate to its benefit structure and consistent with the revised retirement rates already implemented (Recommendation #10d).

Beginning on the next page, we summarize all remaining demographic assumptions, which we reviewed and concluded are reasonable and meet the requirements of ASOP No. 35, section 3.3.4.

SECTION III - SUPPORTING ANALYSIS

1. Marriage Assumption

75.0% of active and retired participants are assumed to be married.

2. Termination

Rates of withdrawal are assumed to be equal to 4.0% for all ages 20 through 65.

It is assumed that terminated employees will not be rehired. The rates apply only to employees who have not fulfilled the service requirement necessary for retirement at any given age.

3. Inactive Member Pay Increases

Ten percent load on inactive vested liabilities to reflect increases in inactive members' pay due to current participation in a reciprocal retirement system.

4. Disability

No assumption for disability.

5. Retirement

Employees are assumed to retire in accordance with the rates shown below. The rates apply only to employees who have fulfilled the service requirement necessary for retirement at any given age.

Retirement Rates	
Age	**Male and Female**
55	10.00%
56-79	8.50%
80	100.00%

6. Assets

Assets available for benefits are used as described on page 40 of the most recent valuation report.

7. Expenses

As estimated and advised by GARS staff, based on current expenses and are expected to increase in relation to the projected capped payroll.

8. Spouse's Age

The female spouse is assumed to be four years younger than the male spouse.

9. Decrement Timing

All decrements are assumed to occur at the beginning of the year.

10. Decrement Relativity

Decrement rates are used directly from the Experience Study without adjustment for multiple decrement table effects.

11. Decrement Operation

Turnover decrements do not operate after member reaches retirement eligibility.

12. Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

ASSUMPTIONS AS A RESULT OF PUBLIC ACT 96-0889

Members hired after December 31, 2010, are assumed to make contributions on salary up to the final average compensation cap in a given year until this plan provision or administrative procedure is clarified.

State contributions, expressed as a percentage of pay, are calculated based upon capped pay.

Retirement rates for Tier 2 members to account for the change in retirement age, as follows:

Retirement Rates	
Age	**Males**
62	40.00%
63	15.00%
64	20.00%
65	25.00%
66	30.00%
67	40.00%
68-79	5.00%
80	100.00%

SECTION III - SUPPORTING ANALYSIS

E. Actuarial Methods

Actuarial methods consist of three components: (1) the funding method, which is the attribution of total costs to past, current, and future years; (2) the method of calculating the actuarial value of assets (i.e. asset smoothing); and (3) the amortization basis of the Unfunded Actuarial Liability (UAL). Since the amortization basis is governed by State law, we do not comment on it here.

1. *Cost Method:*

   The System uses the projected unit credit (PUC) cost method to assign costs to years of service, and is required to under the Pension Code (40 ILCS 5/2). **We have no objections with respect to using the PUC method, although we would prefer the Entry Age Normal (EAN) funding method, as it is more consistent with the requirement in 40 ILCS 5/2-124 for level percent of pay funding.** Public Act 098-0599 amended the Pension Code (40 ILCS 5/14-131) to require GARS to calculate the required State contribution using the entry age normal actuarial cost method beginning with the Fiscal Year 2016 State contribution. However, the Illinois Seventh Judicial Circuit Court granted a temporary restraining order and a preliminary injunction stopping the implementation of Public Act 098-0599. The Court ruled the law unconstitutional November 21, 2014. The ruling is being appealed to the State Supreme Court. Consequently, GARS continued to calculate the required State contribution as the law existed prior to Public Act 98-599.

   Under the PUC method, which is used by some public sector pension funds, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over their later years of service than over their earlier ones. As a result of this pattern of benefit value increasing, while the PUC method is not an unreasonable method, more plans use the Entry Age Normal (EAN) funding method to mitigate this affect. It should also be noted that the EAN method is the required method to calculate liability for GASB 67 and GASB 68.

2. *Asset Smoothing Method:*

   The actuarial value of assets for the System is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. **Smoothing the market gains and losses over a period of five years to**

SECTION III - SUPPORTING ANALYSIS

determine the actuarial value of assets is a generally accepted approach in determining actuarial cost, and we concur with its use.

Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets and the market value of assets. Many public sector pension plans limit the actuarial value of assets to be in any year no more than 120% of market value, or no less than 80% of market value. In fact, the Internal Revenue Service (IRS) mandates this "corridor" for private sector pension plans (a 90%-110% corridor is mandated). Even though it is not mandated for public plans, we believe that the use of this type of corridor is a much sounder actuarial practice, and according to ASOP No. 44 in Section 3.3 b. 1, the actuarial value of assets should "...fall within a reasonable range around the corresponding market value." **Therefore, we recommend that the GARS Board consider moving to this approach in future valuations.** It is important to note that currently a move to this corridor approach would have no impact on the 2014 actuarial valuation results, as the actuarial value of assets is already within the 80%-120% corridor (Recommendation #5).

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

Response to recommendations in 2013:

In the State Actuary's Preliminary Report on the General Assembly Retirement System of Illinois presented December 19, 2013, Cheiron made several recommendations. Below we summarize how these recommendations were reflected in this year's valuation report.

General Assembly Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
Recommended Changes to Actuarial Assumptions Used in the 2013 Valuation		
Cheiron concluded the assumptions were reasonable and had no recommended changes to the assumptions.		
Recommended Changes for Future Valuations:		
1. We recommend GRS consider, in future valuations, establishing a corridor around the market value of assets of 80% to 120% beyond which the actuarial value is limited given the use of the actuarial value of assets in the projection methodology in accordance with 40 ILCS 5/2-124 (d).	Not Implemented	GRS addressed this in the 2014 valuation by noting that the asset method is prescribed by statute and does not appear to allow for a corridor, therefore a corridor was not established. **Recommendation repeated.**
2. We recommend that GRS consider using a fully generational mortality table so that future mortality improvements will continue to impact new entrants throughout the projection period ending in 2045.	Partially Implemented	Projected to 2015 beginning with the 2013 valuation, but not fully-generational. **Recommendation repeated.**
3. We recommend that the GARS Board annually review the economic assumptions (interest rate and inflation) and adjust assumptions accordingly.	Not Implemented	We continue to suggest that the GARS Board annually review these assumptions and always use the conservative end of any range of assumptions recommended by GRS due to the systematic underfunding of the System. The experience review relating to the economic assumptions was not updated for the 2014 valuation for this system. **Recommendation repeated.**
4. We recommend that GRS disclose a complete description as to how the New	Implemented	The complete New Entrant Profile was disclosed in the 2014 valuation

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

General Assembly Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
Entrant Profile assumption was developed.		report.
5. We have several minor recommendations to future reports: a. We recommend that GRS disclose the additional economic assumptions that it utilizes in its actuarial valuation, including 415(b) limits, 401(a)(17) limits, and the COLA for Tier 2, along with the growth rates for these. b. We recommend that GRS consider using the actual data available rather than an assumption for determining if a member will choose the spousal continuance benefit option that provides a survivor annuity. We further recommend that GRS provide details regarding the election of this provision by the current inactive members in the Participant Data section. c. We recommend that GRS provide additional clarity on the payrolls used in its valuation throughout its report to allow for a more complete evaluation by another qualified actuary as required by Actuarial Standards of Practice. d. We recommend that GRS consider whether additional revisions to the demographic assumptions for Tier 2 are appropriate to its benefit structure and consistent with the revised retirement rates already implemented.	Partially Implemented	In the 2013 valuation report, GRS added that the general inflation assumption is the basis for the Tier 2 pay cap growth. The other recommendations were not addressed. **Recommendation repeated.**
Proposed Certification of the Required State Contribution:		
6. We recommend that GRS continue to disclose the following items in order for us to continue to perform an analysis of the required State contribution in the future:		

STATUS OF RECOMMENDATIONS FROM THE 2013 STATE ACTUARY'S REPORT

General Assembly Retirement System Status of Previous Recommendations		
Recommendation from 2013 Report	**Status**	**Comments**
• Projections by year of future benefit payouts split by actives and current inactives (i.e. retirees, survivors, disabled, and deferred vested);	Implemented	GRS addressed this in Table 9 of the 2014 valuation report.
• A historic development of assets without General Obligation Bonds.	Not Implemented	Significant questions remain on the projections that are fundamental to the development of the Required State Contributions. **Recommendation repeated.**
• All projections should show the active member information split into three distinct groups: current actives hired prior to January 1, 2011; current actives hired on or after January 1, 2011; and new entrants after the valuation date.	Implemented	This has been addressed in Tables 7-10 of the 2014 valuation.
State Mandated Funding Method:		
7. We also recommend stress testing be done to determine whether there will be sufficient assets to pay benefits if there is a significant market downturn.	Not Implemented	In the 2014 valuation GRS strongly recommends stress testing be performed, but does not indicate when and how such stress testing will be completed. **Recommendation repeated.**
8. Due to the systematic underfunding of the System, we recommend that the Board always use the conservative end of any range of assumptions recommended by GRS.	Partially Implemented	This is a continuous process. No change was made in the current valuation, but it needs to be monitored. **Recommendation repeated**

APPENDICES

APPENDIX A

Illinois State Auditing Act (30 ILCS 5/2-8.1)

(30 ILCS 5/2-8.1)

Sec. 2-8.1. Actuarial Responsibilities.

(a) The Auditor General shall contract with or hire an actuary to serve as the State Actuary. The State Actuary shall be retained by, serve at the pleasure of, and be under the supervision of the Auditor General and shall be paid from appropriations to the office of the Auditor General. The State Actuary may be selected by the Auditor General without engaging in a competitive procurement process.

(b) The State Actuary shall:

(1) review assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems;

(2) issue preliminary reports to the boards of trustees of the State-funded retirement systems concerning proposed certifications of required State contributions submitted to the State Actuary by those boards;

(3) cooperate with the boards of trustees of the State-funded retirement systems to identify recommended changes in actuarial assumptions that the boards must consider before finalizing their certifications of the required State contributions;

(4) conduct reviews of the actuarial practices of the boards of trustees of the State-funded retirement systems;

(5) make additional reports as directed by joint resolution of the General Assembly; and

(6) perform any other duties assigned by the Auditor General, including, but not limited to, reviews of the actuarial practices of other entities.

(c) On or before January 1, 2013 and each January 1 thereafter, the Auditor General shall submit a written report to the General Assembly and Governor documenting the initial assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems, any changes recommended by the State Actuary in the actuarial assumptions, and the responses of each board to the State Actuary's recommendations.

(d) For the purposes of this Section, "State-funded retirement system" means a retirement system established pursuant to Article 2, 14, 15, 16, or 18 of the Illinois Pension Code.

(Source: P.A. 97-694, eff. 6-18-12.)

APPENDIX B
Materials Reviewed by Cheiron

Appendix B

MATERIALS REVIEWED BY CHEIRON

Following is a listing of information reviewed by Cheiron for each of the five State funded retirement systems. This is the information Cheiron relied upon in preparing the preliminary reports of the retirement systems.

Teachers' Retirement System:

- Illinois Law:
    - Illinois Pension Code (40 ILCS 5/) Article 16: Teachers' Retirement System of the State of Illinois
    - Public Act 088-0593
    - Public Act 093-0002
    - Public Act 093-0839
    - Public Act 094-0004
    - Public Act 096-0043
    - Public Act 096-0889
    - Public Act 097-0694

- Files received from the Teachers' Retirement System:

    Prior to June 30, 2013, State Actuary Report:
    - 09.21.12 Rate of Return Decision Memo
    - AA Presentation RVK Apr 2011 Board FINAL
    - Buck - IL TRS Exp Analysis Report 2007 revised
    - Buck August 2012 Board Meeting Presentation Experience Analysis
    - Buck IL TRS 2007 Valuation Report
    - Buck IL TRS 2008 Valuation Report
    - Buck IL TRS 2009 Valuation Report
    - Buck IL TRS 2010 Valuation Report IL TRS
    - Buck IL TRS 2011 Valuation Report
    - Buck IL TRS Exp Analysis Report 2012 FINAL
    - Buck May 2011 Board Meeting Investment Return Assumption
    - Buck October 2011 Board Meeting Presentation Valuation Results
    - Illinois TRS Investment Assumption History 1939-2012
    - Segal IL TRS Actuarial Audit Report-FINAL
    - TRS total fund net returns FY 1983-2011
    - Morgan Stanley October Memo – Municipal Bond Monthly
    - Illinois TRS - 2013 EROA Analysis Summary

- 2013 09 06 Buck TRS Data Lag Approval
- 2013-10 Presentation – RV Kuhns Investment Performance Review Slides
- Preliminary 9-9-13 TRS Financials
- Buck IL TRS 2013 Draft Valuation Report
- Buck October 2013 Board Meeting Presentation
- Buck 2013 Valuation Results Memo to Board Members
- GASB Implementation email
- Projected Liabilities by Tier
- GAAP Information
- 2013-10-31 TRS Preliminary FY 2015 Certification

Since the June 30, 2013, State Actuary Report:

- 10-30-14 Buck TRS Preliminary Valuation Report as of June 30, 2014
- 10-31-14 TRS Preliminary FY 2016 Certification Exhibit A
- Board Meeting Minutes from 2013 and 2014
- Buck IL TRS spreadsheet with additional details on Section 4 of AVR
- TRS IL spreadsheet with additional details on Funding Projections
- Buck October 2014 Board Presentation - Final
- 2014-04 TRS Retreat Presentation - Final
- 2014-04 TRS AL Executive Summary
- 2014-04 TRS AL Study
- 2014-05 Presentation RVK Asset Allocation
- Buck Letter - Economic Assumptions Recommendation
- Assumed-Rate-Return-Discussion-Final
- Materiality Limit Memo
- Buck IL TRS 2014 Data
- Preliminary TRS Allocation for GASB 67/68

- Files received from the Illinois Office of the Auditor General:

  - VERSIGHT Memo dated 12/9/2011 from Karl K. Oman

- Other:

  - November 2014 *National Conference on Public Employees Retirement Systems* (NCPERS) Public Retirement Systems Study
  - October 2014 Survey published by the National Association of State Retirement Agencies (NASRA)
  - January 2014 Moody's Median Report on *US State Pension Medians Increase in Fiscal 2012*
  - *July 2014 Old-Age, Survivors and Disability Insurance Trustees Report* (OASDI)

<u>State Universities Retirement System</u>

- Illinois Law:

- Illinois Pension Code (40 ILCS 5/) Article 15 : State Universities Retirement System of Illinois
- Public Act 088-0593
- Public Act 093-0002
- Public Act 093-0839
- Public Act 094-0004
- Public Act 096-0043
- Public Act 096-0889
- Public Act 097-0694
- Public Act 098-0599 (not applied for this valuation)

- Files received from the State Universities Retirement System:

  Prior to June 30, 2013 State Actuary Report:
  - SURS 2010 Experience Study
  - SURS June 2012 Investment Update
  - SURS June 2011 Asset Allocation and Liability Study
  - SURS May 2011 Status Update of the Asset/ Liability Study
  - GRS IL SURS 2008 Valuation Report
  - GRS IL SURS 2009 Valuation Report
  - GRS IL SURS 2010 Valuation Report
  - GRS IL SURS 2011 Valuation Report
  - GRS IL SURS 2012 DRAFT Valuation Report
  - GRS IL SURS 2012 Certification of FY 2014 Required State Contribution
  - GRS IL SURS 2012 Data
  - GRS spreadsheet with additional details on Tables 13 and 14
  - IL Department of Insurance Bulletin - Annual Salary Maximum for Pension and Annuity Purposes, and Annual Cost of Living Allowance (COLA) for New Hires on or after January 1, 2011
  - SURS 2nd Quarter 2013 Board Report
  - SURS 2013 Callan Periodic Table
  - SURS 2013 Capital Markets Illinois
  - SURS Compiled FY 2014 Investment Plan
  - SURS June 2013 Investment Update
  - GRS IL SURS 2013 DRAFT Valuation Report
  - GRS IL SURS Proposed 2013 Certification of FY 2015 Required State Contribution
  - GRS IL SURS 2013 Data

  Since the June 30, 2013 State Actuary Report:
  - Board Meeting Minutes from 2013 and 2014
  - Segal IL SURS Limited Scope Audit of the June 30, 2011 Actuarial Valuation
  - SURS Asset Liability Study Memo
  - NEPC IL SURS 2014 Asset Liability Study
  - SURS Economic Assumption Review Recommendation Memo
  - GRS IL SURS 2014 Investment Return Presentation
  - NEPC IL SURS 2014 Asset Allocation Discussion Presentation

- NASRA Investment Return Assumptions Update April 2014
- NCPERS Page 11 from 2013 Public Fund Study
- SURS Recommendation of Experience Study Memo
- GRS IL SURS Public Act 98-0599/Senate Bill 1 Actuarial Impact Analysis
- SURS Response to State Actuary May 21, 2014 Email Request Memo
- GRS IL SURS Economic Assumption Study Report
- GRS IL SURS Senate Bill 1 Study Summary
- GRS IL SURS Proposed 2014 Certification of FY 2016 Required State Contribution
- GRS IL SURS 2014 Draft Valuation Report
- GRS IL SURS 2014 Updated Draft Valuation Report
- GRS IL SURS GASB 67 Plan Reporting and Accounting Schedules
- GRS IL SURS spreadsheet with additional details for 2014 Stress Testing
- SURS IL spreadsheet with additional details on Funding Projections
- GRS IL SURS 2014 Data
- GRS IL SURS spreadsheet with additional details on Tables 13-16, 18-21

- Other:

  - November 2014 *National Conference on Public Employees Retirement Systems* (NCPERS) Public Retirement Systems Study
  - October 2014 Survey published by the National Association of State Retirement Agencies (NASRA)
  - January 2014 Moody's Median Report on *US State Pension Medians Increase in Fiscal 2012*
  - July 2014 *Old-Age, Survivors and Disability Insurance Trustees Report* (OASDI)

State Employees' Retirement System

- Illinois Law:

  - Illinois Pension Code (40 ILCS 5/) Article 14: State Employees' Retirement System of Illinois
  - Public Act 088-0593
  - Public Act 093-0002
  - Public Act 093-0839
  - Public Act 094-0004
  - Public Act 096-0043
  - Public Act 096-0889
  - Public Act 097-0694

- Files received from the State Employees' Retirement System:

  Prior to June 30, 2013 State Actuary Report:
  - SERS Five-Year Experience Analysis for the Period 2006-2010 (GRS – 7/12/2011)
  - SERS Funding Policy Review from GRS on 10/19/2010

- SERS Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2011
- GRS IL SERS 2007 Valuation Report
- GRS IL SERS 2008 Valuation Report
- GRS IL SERS 2009 Valuation Report
- GRS IL SERS 2010 Valuation Report
- GRS IL SERS 2011 Valuation Report
- GRS IL SERS 2012 DRAFT Valuation Report
- GRS IL SERS 2012 Certification
- GRS IL SERS 2012 Data
- SERS Valuation Discount Rate Change Study (GRS – 2/5/2013)
- GRS IL SERS 2013 Valuation Report
- GRS IL SERS 2013 Proposed Certification
- GRS IL SERS 2013 Data

Since the June 30, 2013 State Actuary Report:

- SERS Experience Review for the Years July 1, 2009 to June 30, 2013
- GRS IL SERS 2014 Draft Certification
- GRS IL SERS 2014 Draft Valuation Report
- GRS IL SURS GASB 67 Plan Reporting and Accounting Schedules
- Board Meeting Minutes from 2013 and 2014
- GRS IL SURS spreadsheet with additional details on Tables 4 and 7-10
- SURS IL spreadsheet with additional details on Funding Projections

- Other:
  - November 2014 *National Conference on Public Employees Retirement Systems* (NCPERS) Public Retirement Systems Study
  - October 2014 Survey published by the National Association of State Retirement Agencies (NASRA)
  - January 2014 Moody's Median Report on *US State Pension Medians Increase in Fiscal 2012*
  - July 2014 *Old-Age, Survivors and Disability Insurance Trustees Report* (OASDI)

Judges' Retirement System

- Illinois Law:
  - Illinois Pension Code (40 ILCS 5/) Article 18: Judges' Retirement System of Illinois
  - Public Act 088-0593
  - Public Act 093-0002
  - Public Act 093-0839
  - Public Act 094-0004
  - Public Act 096-0043
  - Public Act 096-0889
  - Public Act 097-0694

- Files received from the Judges' Retirement System:

  Prior to June 30, 2013, State Actuary Report:
  - JRS Experience Study: Five-Year Experience Analysis for the Period 2006-2010 (Goldstein & Associates – 7/18/2011)
  - JRS Investment Return Assumption letter (Goldstein & Associates – 10/6/2010)
  - JRS Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2011
  - Goldstein & Associates JRS 2006 Valuation Report
  - Goldstein & Associates JRS 2007 Valuation Report
  - Goldstein & Associates JRS 2008 Valuation Report
  - Goldstein & Associates JRS 2009 Valuation Report
  - Goldstein & Associates JRS 2010 Valuation Report
  - Goldstein & Associates JRS 2011 Valuation Report
  - GRS IL JRS 2012 Final Valuation Report
  - GRS IL JRS 2012 Certification
  - GRS IL JRS 2012 Data
  - GRS IL JRS March 29, 2013 Experience Review
  - GRS IL JRS 2013 DRAFT Valuation Report
  - GRS IL JRS 2013 Data

  Since the June 30, 2013, State Actuary Report:
  - Board Meeting Minutes from 2013 and 2014
  - GRS IL JRS 2014 Certification Draft
  - GRS IL JRS 2014 DRAFT Valuation Report
  - GRS IL SERS April 2014 Experience Review
  - GRS IL JRS 2013 Final Valuation Report
  - GRS IL JRS GASB 67 Plan Reporting and Accounting Schedules
  - GRS IL JRS spreadsheet with additional details on Tables 4 and 7-10

- Other:
  - November 2014 *National Conference on Public Employees Retirement Systems* (NCPERS) Public Retirement Systems Study
  - October 2014 Survey published by the National Association of State Retirement Agencies (NASRA)
  - January 2014 Moody's Median Report on *US State Pension Medians Increase in Fiscal 2012*
  - July 2014 *Old-Age, Survivors and Disability Insurance Trustees Report* (OASDI)

General Assembly Retirement System

- Illinois Law:

  - Illinois Pension Code (40 ILCS 5/) Article 2: General Assembly Retirement System of Illinois

- Public Act 088-0593
- Public Act 093-0002
- Public Act 093-0839
- Public Act 094-0004
- Public Act 096-0043
- Public Act 096-0889
- Public Act 097-0694

- Files received from the General Assembly Retirement System:

  Prior to June 30, 2013, State Actuary Report:
  - GARS Experience Study: Five-Year Experience Analysis for the Period 2006-2010 (Goldstein & Associates – 8/11/2011)
  - GARS Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2011
  - Goldstein & Associates GARS 2006 Valuation Report
  - Goldstein & Associates GARS 2007 Valuation Report
  - Goldstein & Associates GARS 2008 Valuation Report
  - Goldstein & Associates GARS 2009 Valuation Report
  - Goldstein & Associates GARS 2010 Valuation Report
  - Goldstein & Associates GARS 2011 Valuation Report
  - GRS IL GARS 2012 DRAFT Valuation Report
  - GRS IL GARS 2012 Certification
  - GRS IL GARS 2012 Data
  - GARS IL Experience Review (GRS - April 17, 2013)
  - GRS IL GARS 2013 DRAFT Valuation Report
  - GRS IL GARS 2013 Data

  Since the June 30, 2013, State Actuary Report:
  - Board Meeting Minutes from 2013 and 2014
  - GRS IL GARS 2014 Certification Draft
  - GRS IL GARS 2014 DRAFT Valuation Report
  - GRS IL SERS April 2014 Experience Review
  - GRS IL GARS 2013 Final Valuation Report
  - GRS IL GARS GASB 67 Plan Reporting and Accounting Schedules
  - GRS IL GARS spreadsheet with additional details on Tables 4 and 7-10

- Other:

  - November 2014 *National Conference on Public Employees Retirement Systems* (NCPERS) Public Retirement Systems Study
  - October 2014 Survey published by the National Association of State Retirement Agencies (NASRA)
  - January 2014 Moody's Median Report on US State Pension Medians Increase in Fiscal 2012
  - *July 2014 Old-Age, Survivors and Disability Insurance Trustees Report* (OASDI)

APPENDIX C
Responses from the Retirement Systems

Teachers' Retirement System of the State of Illinois
2815 West Washington Street | P.O. Box 19253 | Springfield, Illinois 62794-9253
Richard W. Ingram, Executive Director
http://trs.illinois.gov
(800) 877-7896 | for the hearing impaired: (866) 326-0087

December 15, 2014

VIA ELECTRONIC MAIL (jbutcher@auditor.illinois.gov)
Mr. Joe Butcher
Office of the Auditor General
740 East Ash Street, First Floor
Springfield, IL 62703

Dear Mr. Butcher:

Thank you for the opportunity to review the preliminary report prepared by the state actuary, Cheiron, on our 2014 preliminary actuarial valuation. We were pleased to see that the state actuary did not recommend any changes in the assumptions used to calculate the FY 2016 state funding requirement, and the TRS board of trustees appreciates the continued focus that Cheiron has placed on responsible and actuarially sound funding.

Listed below are our responses to Cheiron's fourteen recommendations. These responses include those of the system's actuary, Buck Consultants.

Proposed Certification of the Required State Contribution

1) **Cheiron recommends consideration of an independent actuarial audit in which the results of the valuation are replicated by the audit actuary.**

   We understand that the proposed audit would be a full- scale replication of the valuation rather than a limited scope audit. The Government Finance Officers Association (GFOA) now recommends some type of audit every five years instead of every ten, with the extent of the review up to the board of trustees.

   TRS will consider some type of audit in the near future, but we point out that at least partial reviews are conducted every year by outside entities (actuaries for the legislature, outside auditors, and so on). We are not sure that a full scope audit is necessary at this juncture, considering the time and expense that would be required.

In 2000 and 2010, TRS hired outside firms to conduct limited scope audits. We would appreciate a reference to them in the report to avoid leaving the impression that no audits of any kind have ever been done. 1

State Mandated Funding Method

2) Cheiron has concerns about the solvency of TRS due to systematic underfunding. It continues to recommend conservatism when selecting actuarial assumptions.

The TRS board shares this concern. One way it has demonstrated this concern is by certifying alternative state funding requirements that are consistent with standard actuarial practice, beginning with the 2012 actuarial valuation. The board has also directed the next experience analysis to be conducted in 2015 (rather than 2017 as required by statute) as a more proactive means of monitoring the soundness of the assumptions. The board and actuary will continue to exercise professional judgment.

Assessment of Actuarial Assumptions used in the 2014 Valuation

No changes are recommended. Cheiron concludes that the recommendations are reasonable based on the evidence TRS provided.

Recommended Additional Disclosures for the 2014 Valuation

3) Expand stress testing to demonstrate long-term impact of significant downturn as well as a long-term decline in active payroll.

We will discuss expanding the level of stress testing in the 2015 valuation.

We believe that the focus on long-term downturns paints an incomplete picture. While extended downturns represent a significant risk to the fund, yearly contribution volatility is a bigger threat to receiving adequate funds from the state. Expanded stress testing under various scenarios would be an aid to all stakeholders in developing a sound benefits funding policy.

We submitted information on the asset liability modeling study performed this past spring by our investment consultants, R.V. Kuhns, in conjunction with Buck Consultants. That study contained a significant amount of stress testing on the assets.

We are concerned with the possible impact of a long term decline in active payroll. The use of other funding policies which do not relate to increases in salary would help.

4) Expand development of statutory funding requirement in the report's executive summary to emphasize the makeup of the state's funding obligation.

We agree this would be helpful and will include it the 2015 valuation and possibly the 2014 valuation. For FY 2016, over 75 percent of the state's contribution is for the unfunded liability.

5) **Revise the term *Generally Accepted Actuarial Standards* and refer to a specific funding method. No such term is codified within the Actuarial Standards of Practice (ASOPs).**

   We will stop using this term in the 2015 valuation. The board's final funding certification for FY 2016 uses it and for consistency, we will keep it in the 2014 report. However, we will see if it can be better explained this year.

6) **The inflation assumption was lowered from 3.25 percent to 3.00 percent. Under the law, the Tier II pay cap and COLA increases are limited to half the rate of inflation. When the inflation assumption was 3.25 percent, both of the Tier II-related increase assumptions were 1.625 percent. The report should explain why the assumed annual increase for Tier II salary increases is reduced to 1.50 percent but the Tier II COLA cap is reduced to 1.40 percent.**

   The original 1.625 percent assumption was simply one-half of the inflation assumption. The current assumptions are based on stochastic projections using the model that developed the range of the assumed rate of return. Buck applied the specifics of the Tier II pay cap and the COLA to the projection of inflation from the model and elected amounts in the middle of the range for each assumption and then rounded the number to the nearest tenth of a percent.

   We will add more explanation to the 2014 report.

7) **Cheiron recommends adding additional years to the reconciliation of the unfunded liability (Section 1.4 in the report) and additional narrative. These changes would help assess the effectiveness of the assumptions and provide insight into potential risks in the system.**

   We agree that these changes would be helpful and will consider doing it in the 2015 valuation.

8) **TRS uses the prior year's participant data for the current year's actuarial valuation. Cheiron continues to recommend that Buck provide discussion and quantification of the impact of the data lag.**

   Buck will determine whether the description of the liability adjustment in the actuarial assumptions section (Section 6.2) can be improved this year or next.

9) Cheiron recommends that Buck provide a draft report for the review process and include any changes subsequent to the review in the final report rather than in a supplement so everything is included in a single document.

We did this with the 2013 report but did not label the draft and final reports clearly. The 2014 final report will be better labeled, and both will be better identified in 2015.

Recommended Changes for Future Valuations

10) Cheiron continues to recommend that the TRS board annually review economic assumptions (interest and inflation) prior to commencing the valuation, as it did this year.

The review of economic assumptions is educational and quite important, given the impact they have on the valuation results. However, Buck has cautioned against frequent adjustment of key assumptions due to the contribution volatility the adjustments would cause. The current assumptions have been selected so that changes in the expectations of the markets will not require annual changing of the assumption. Absent changes in the investment portfolio, the current assumption review every three years is sufficient. Of course, the economic assumptions will be reviewed each year in the process of analyzing the impact of emerging gains and losses.

11) Consider adding an 80 percent/120 percent corridor around the market value of assets. This was also recommended last year.

We still do not believe that a corridor is needed. Even if we did, a statutory change would be needed before we could proceed. This year, Buck has provided us with guidance taken from "Actuarial Funding Policies and Practices for Public Pension Plans," issued by the Conference of Consulting Actuaries Public Plans Community (CCA PPC) in October 2014. It refers to Actuarial Standard of Practice No. 44 which states that a five-year period is "sufficiently short" to preclude the need for a corridor. Given all the above, we continue to believe that a corridor is unnecessary.

12) Prior to completion of the 2015 valuation, provide a verification of the hypothetical assets that TRS would hold if the 2003 General Obligation Bonds had not been appropriated.

We are not clear how it is possible to verify a hypothetical figure, but Buck could provide more details behind its calculations.

13) Show projections for the alternative funding methods. They would show the effectiveness of these methods in meeting the long-term goals of the system.

We will consider doing this next year. We would note that the issue of meeting the long term funding goals of the system has historically been a lack of funding discipline by the state, without respect to funding methods.

Given the primary purpose of the actuarial valuation report is to determine the amount of the contribution and the current state of the fund, these projections may appear not in the valuation report but under other communications.

Buck Consultants has reviewed alternative funding methods with TRS stakeholders and staff in the past. Given the plethora of white papers on the subject, we will be reviewing funding in the future.

14) Cheiron recommends that Buck include sample mortality rates in a tabular format to comply with Actuarial Standards of Practice.

We will do this. The 2015 valuation will reflect any changes in assumptions that are adopted by the board, so this would be a good time to improve this disclosure.

We would be happy to discuss any of these points with you. Thanks to you and to Cheiron for a very thorough and professional analysis of our 2014 preliminary actuarial valuation.

Sincerely,

Richard W. Ingram
Executive Director

cc: Jim Schlouch, OAG
Paul Usherwood, OAG
Jennie Hamburg, Cheiron
Gene Kalwarski, Cheiron
Ken Kent, Cheiron
Mike Noble, Cheiron
Elizabeth Wiley, Cheiron
Larry Langer, Buck Consultants
Paul Wilkinson, Buck Consultants
Emily Urbaniak, Buck Consultants
Jana Bergschneider, TRS
Kathleen Farney, TRS

SURS
State Universities Retirement System of Illinois
Serving Illinois Community Colleges and Universities
1901 Fox Drive • Champaign, IL 61820-7333
(217) 378-8800 • (217) 378-9802 (FAX)

December 15, 2014

Mr. William G. Holland
Auditor General
740 East Ash Street
Springfield, IL 62703

Re: Response to the State Actuary Report of 2014

Dear Mr. Holland:

This is the official response from the State Universities Retirement System of Illinois (SURS) regarding the December 2014 preliminary report issued by Cheiron – The State Actuary's Preliminary Report on the State Universities Retirement System of Illinois under Public Act 097-694.

What follows is a summary response which also includes a detailed response for each of the recommendations from our actuary, Gabriel Roeder Smith & Company (GRS).

Recommendations

1. **Assessment of Actuarial Assumptions and Methods Used in the 2014 Valuation**

This report issued by the State Actuary, Cheiron, indicates that **"In summary, we believe that the assumptions and methods used in the June 30, 2014, Actuarial Valuation, which are used to determine the required Fiscal year 2016 State contribution, represent a significant improvement over the assumptions and methods used the previous two years. As a result, the certified contribution, notwithstanding the State funding requirements that do not conform to Actuarial Standards of Practice, are more likely to meet the obligations of the System with less cost deferral to future years."**

Response: The Board annually reviews the discount rate and voted to lower the rate on two occasions during the past 4 years. The rate was reduced form 8.5% to 7.75% in 2012 and reduced again during this past year from 7.75% to 7.25%. As a result of these reductions, SURS assumed rate of return is currently below the median of 7.75% for public funds as evidenced by the NASRA 2014 Public Funds Survey found on page 9 of the State Actuary audit report.

2. **Proposed Certification of the Required State Contribution**

In this section, the State Actuary recommends that the Board have an independent full replication actuarial audit be performed.

Response: The SURS Board previously engaged The Segal Company in 2012 to perform a limited
scope (level 2) actuarial audit that found all SURS assumptions to be reasonable. A copy of the audit 1

results report has been provided to Cheiron for their review. Government Finance Officers Association (GFOA) best practices recommend an actuarial audit every 5 years. We will take the recommendation into consideration when planning our 2016 actuarial audit.

3. State Mandated Funding Method

The State Actuary expresses their concern that the Statutory Funding method does not meet Actuarial Standards of Practice.

Response: The funding policy is established by the legislature and is not under the control of the Board. Please note that prior annual valuation reports and the certification letters sent to the State have addressed this concern and we will do so again in this year's communication.

Additionally, the State Actuary recommends that the SURS Board always consider a conservative approach to assumption setting.

Response: We believe that the current assumptions continue to be conservative and reasonable based
upon the actuarial analysis performed by the multiple actuarial experts (GRS and Segal). 2
Furthermore, those assumptions should be based on the best expectations of future anticipated experience such that annual gains and losses net out over time. We have concerns about setting assumptions to generate actuarial gains to compensate for underfunding under the Statutory Method.

4. The State Actuary also recommends additional stress testing

Response: We agree that stress testing can be a good way to assess risk and to develop strategies for the long term management of the risk. We would be pleased to work with the state actuary to develop any further stress tests requested. Since the Board does not set the funding policy or the benefit provisions, and the State bears the contribution risk from the stressors, we recommend that additional stress testing be conducted at the request of and reviewed by the State.

5. Recommended Additional Disclosures for the 2014 Valuation

Cheiron recommends additional analysis concerning the mortality table and expected developments for future mortality improvements.

Response: GRS is in the process of conducting the experience study of the demographic assumptions and is investigating the move to a generational mortality assumption which continuously recognizes mortality improvements for current and future members.

6. Recommended Changes for Future Valuations

Cheiron concurs with the GRS recommendation of a corridor being established around the market value of assets.

Response: The SURS Board does not have the authority to create such a corridor. However, we are more than willing to work with the state actuary to make recommendations to the state legislature concerning the adoption and implementation of a corridor on the actuarial value of assets. This recommendation has been incorporated into our annual certification letter in prior years and will be incorporated again this year.

7. **Cheiron recommends the Board annually review the economic assumptions (interest rate and inflation) each year prior to commencing the valuation work and adjust assumptions accordingly.**

Response: The Board reviewed an analysis of the investment return assumption and the price and wage inflation assumption. The Board decreased the investment assumption from 7.75% to 7.25% prior to the 2014 valuation. The Board reviews the economic assumptions annually and will continue to do so.

Cheiron recommends that GRS consider using a fully generational mortality table so that future mortality improvements will continue to impact new entrants throughout the projection period ending in 2045.

Response: We concur and are looking at a generational mortality assumption for the current experience study on demographic assumptions.

Cheiron recommends requesting longer-term market expectations from SURS investment consultants.

Response: Market expectations from SURS' current investment consultant (NEPC) were included in the GRS analysis. We will request, to the extent available, use of the longer-term market expectations in future experience.

Cheiron has requested the historic development of assets without the General Obligation Bonds.

Response: A full detailed historical development is not available. The detailed annual development of the assets without the General Obligation Bonds has been provided in the actuarial valuation report or addendum since 2012.

Mr. Holland, please call me if you have any questions concerning these responses.

Sincerely yours,

William E. Mabe
Executive Director

Encl: Actuarial Valuation Report
Gabriel Roeder Smith & Company Response to State Actuary Report of 2014

cc: Michael J. Noble, Cheiron
Joseph Butcher, Office of the Auditor General
Thomas L. Kizziah, Office of the Auditor General
Joseph J. Evans, McGladrey LLP

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December 5, 2014

Board of Trustees
State Universities Retirement System of Illinois
1901 Fox Drive
Champaign, Illinois 61820

Re: Response to State Actuary Report of 2014

Dear Members of the Board:

At your request we have reviewed the report issued by Cheiron – The State Actuary's Preliminary Report on the State Universities Retirement System of Illinois ("SURS") Pursuant to 30 ILCS 5/2-8. This report was a review of the June 30, 2014, actuarial valuation.

Assessment of Actuarial Assumptions and Methods Used in the 2014 Valuation

This report issued by the State Actuary, Cheiron, indicates that "**In summary, we believe that the assumptions and methods used in the June 30, 2014, Actuarial Valuation, which are used to determine the required Fiscal Year 2016 State contribution, represent a significant improvement over the assumptions and methods used the previous two years. As a result, the certified contributions, notwithstanding the State funding requirements that do not conform to Actuarial Standards of Practice, are more likely to meet the obligations of the System with less cost deferral to future years.**"

During the course of the year the Board reviewed the discount rate and voted to lower the rate from the previous rate of 7.75% to 7.25%.

Proposed Certification of the Required State Contribution

In this section, the State Actuary recommends that the Board have an independent full replication actuarial audit performed.

The type and timing of actuarial audits is a matter of Board policy, and we will leave the response to the Board. For reference, the Government Finance Officers Association (GFOA) recently updated their Best Practice on Actuarial Audits (http://www.gfoa.org/actuarial-audits).

State Mandated Funding Method

In this section the State Actuary opines on their concern that the Statutory funding method does not meet Actuarial Standards of Practice. The funding policy is not under the Board's control; therefore, no action is required. We note that the annual actuarial valuation reports and the Board have communicated similar concerns to the State over the years. We recommend that Cheiron address this issue to the State and recommend a statutory change.

Item 2) is the State Actuary's statement that the SURS Board always consider a conservative approach to assumption setting. GRS believes that assumptions should be set based on best expectations of future anticipated experience such that annual gains and losses net out over time and that the current assumptions are reasonable. We are currently conducting an experience study on 2
the demographic assumptions. We do not believe it is appropriate under actuarial standards to set assumptions to generate actuarial gains to compensate for underfunding under the statutory method.

Item 3) recommends additional stress testing. We agree stress testing can be a good way to assess risk and develop responses adequate for the long term management of the risk. We would be pleased to work with SURS to develop any stress tests that they request.

Since the Board does not set the funding policy or the benefit provisions, and the State bears the contribution risk from the stressors, we recommend that additional stress testing be conducted at the request of and reviewed by the State, which would be in a position to make decisions to manage the risks shown through the stress testing. We would be pleased to assist and prepare these tests, including providing any recommendations for the sets of assumptions to be used in testing the stressors to the System.

<u>Recommended Additional Disclosures for the 2014 Valuation</u>

Item 4) Cheiron recommends additional analysis concerning the mortality table and expected developments for future mortality improvements. We are in the process of conducting the experience study of the demographic assumptions and are investigating moving to a generational mortality assumption which continuously recognizing mortality improvements for current and future members.

<u>Recommended Changes for Future Valuations</u>

Item 5) Cheiron concurs with the idea of a corridor being established around the market value of assets. We are happy to work with you to make recommendations to the legislature concerning the adoption and implementation of a corridor on the actuarial value of assets. We are concerned that the development of the actuarial value of assets is set in statute and thus requires legislative action for change. It would therefore be beyond the purview of the SURS Board to add such a corridor. (This statement was also in our 2013 response.) We recommend that Cheiron address this issue to the State and recommend a statutory change.

Item 6) Cheiron recommends the Board annually review the economic assumptions (interest rate and inflation) each year prior to commencing the valuation work and adjust assumptions accordingly. The Board reviewed an analysis of the investment return assumption and decreased the assumption from 7.75% to 7.25% prior to the 2014 valuation.

Item 7) Cheiron recommends that GRS consider using a fully generational mortality table so that future mortality improvements will continue to impact new entrants throughout the projection period ending in 2045. GRS concurs and we are looking at a generational mortality assumption for the current experience study on demographic assumptions.

Item 8) Cheiron recommends requesting longer-term market expectations from investment consultants (30+ years) and obtaining specific expectations of the investment consultant serving the SURS. Market expectations from SURS' current investment consultant (NEPC) were included in the GRS analysis. We will request, and to the extent available, use the longer-term market expectations in future experience studies.

Item 9) Cheiron has requested the historic development of the assets without the General Obligation Bonds. A full detailed historical development is not available. The detailed annual development of the assets without the General Obligation Bonds has been provided in the actuarial valuation report or addendum since 2012.

Sincerely,

Leslie Thompson

Leslie Thompson, FSA, EA, MAAA
Senior Consultant

Amy Williams

Amy Williams, ASA, MAAA
Consultant

AW:kb

cc: David Kausch, Gabriel, Roeder, Smith & Company
Lance Weiss, Gabriel, Roeder, Smith & Company
Kristen Brundirks, Gabriel, Roeder, Smith & Company

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December 12, 2014

Board of Trustees
State Employees' Retirement System of Illinois
2101 South Veterans Parkway
P.O. Box 19255
Springfield, IL 62794-9255

Re: Response to State Actuary Report of 2014 - SERS

Dear Members of the Board:

At your request we have reviewed the report issued by Cheiron – The State Actuary's Preliminary Report on the State Employees' Retirement System of Illinois ("SERS") Pursuant to 30 ILCS 5/2-8. This report was a review of the June 30, 2014, actuarial valuation for SERS.

Assessment of Actuarial Assumptions and Methods Used in the 2014 Valuation

This report issued by the State Actuary, Cheiron, indicates that **"In summary, we believe that the assumptions and methods used in the June 30, 2014, Actuarial Valuation Report, which are used to determine the required Fiscal Year 2016 State contribution, represent a significant improvement over the assumptions and methods used the previous two years. As a result, the certified contributions, notwithstanding the State funding requirements that do not conform to Actuarial Standards of Practice, are more likely to meet the obligations of the System with less cost deferral to future years."**

An experience study of SERS for the period from July 1, 2009, to June 30, 2013, was performed. The primary purpose of the study was to compare the demographic and economic experience against the actuarial assumptions used in the valuations. The study was based on the information used to perform the valuations for the period from July 1, 2009, to June 30, 2013. The Board approved the assumption recommendations at their April 2014 meeting. Among those recommendation are the lowering of the discount rate from 7.75 percent to 7.25 percent and a strengthening of the mortality assumptions.

Proposed Certification of the Required State Contribution

In this section, the State Actuary recommends that the Board have an independent full replication actuarial audit performed.

The type and timing of actuarial audits is a matter of Board policy, and we will leave the response to the Board. For reference, the Government Finance Officers Association (GFOA) recently updated their Best Practice on Actuarial Audits (http://www.gfoa.org/actuarial-audits).

State Mandated Funding Method

In this section the State Actuary opines on their concern that the Statutory funding method does not meet Actuarial Standards of Practice. The funding policy is not under the Board's control; therefore, no action is required. We note that the annual actuarial valuation reports and the Board have communicated similar concerns to the State over the years. We recommend that Cheiron address this issue to the State and recommend a statutory change

Item 2) is the State Actuary's statement that the SERS Board always consider a conservative
approach to assumption setting. GRS believes that assumptions should be set based on best
expectations of future anticipated experience such that annual gains and losses net out over time and 2
that the current assumptions are reasonable. We do not believe it is appropriate under actuarial
standards to set assumptions to generate consistent actuarial gains to compensate for underfunding
under the statutory method.

Item 3) concurs with the recommendation found in our valuation report pertaining to stress testing. Subsequent to the valuation, we provided SERS five stress testing scenarios including one scenario that was provided by the State Actuary to the State University Retirement System in letter dated October 27, 2014. The provided stress testing can assist in determining whether there will be sufficient assets to pay benefits if there is a significant market downturn.

Since the Board does not set the funding policy or the benefit provisions, and the State bears the contribution risk from the stressors, we recommend that additional stress testing be conducted at the request of and reviewed by the State, which would be in a position to make decisions to manage the risks shown through the stress testing. We would be pleased to assist and prepare these tests, including providing any recommendations for the sets of assumptions to be used in testing the stressors to the System.

Recommended Additional Disclosures for the 2014 Valuation

Item 4) recommends that we indicate when and how we will stress test the 2014 valuation results. As state above, subsequent to the valuation, we provided SERS five stress testing scenarios including one scenario that was provided by the State Actuary to the State University Retirement System in letter dated October 27, 2014.

Item 5) recommends that we analyze and disclose in general terms the cause of the loss due to salary increases that were higher than anticipated. The loss was measured based on continuing active member salary increases and therefore, is not a result of large pay increases in the year of retirement. In the experience study report, we note that actual salary increases have been lower than expected during the experience period, which lead to consistent gains. We recognized a portion of that experience in the recommended salary increase rates. In the 2014 valuation, pay increases for continuing active members were higher than expected offsetting a portion of the gains that were present in previous valuations. We will continue to monitor the appropriateness of the salary increase assumption in future valuations. We will include a comment in the 2014 report that the salary loss is attributable to higher than expected pay increases for continuing active members and is not a result of large pay increases in the year of retirement.

Item 6) recommends that we clarify the applicable payroll the required FY 2016 State contributions rate of 43.88 percent applies. We will include additional commentary in the valuation report that the certified FY 2016 contribution rate will be applied to actual FY 2016 payroll.

Recommended Changes for Future Valuations

Item 7) recommends a corridor be established around the market value of assets. As stated on page 3 of our 2014 valuation report, there is currently no asset corridor. An asset corridor limits the amount that the actuarial (smoothed) value of assets can deviate from the market value of assets. The asset valuation method is prescribed by statute, and does not appear to allow a corridor. We believe an asset corridor would be reasonable provided it complied with State statues.

We are happy to work with you to make recommendations to the legislature concerning the adoption and implementation of a corridor on the actuarial value of assets. We are concerned that the development of the actuarial value of assets is set in statute and thus requires legislative action for change. As stated in previous responses, it would be beyond the purview of the SERS Board to add such a corridor. We recommend that Cheiron address this issue to the State and recommend a statutory change.

Item 8) recommends the Board annually review the economic assumptions (interest rate and inflation) each year prior to commencing the valuation work and adjust assumptions accordingly. The Board reviewed an analysis of the investment return assumption as part of the most recent experience review and decreased the assumption from 7.75 percent to 7.25 percent prior to the 2014 valuation.

Item 9) recommends that GRS consider using a fully generational mortality table. As stated on page 39 of our valuation report, a fully generational mortality table was considered as part of the most recent experience study. The mortality table used in the valuation is a static table and provides an estimated margin of 20 percent for future mortality improvement based on the experience study report of the State Employees' Retirement System for the period from July 1, 2009, to June 30, 2013. This static table represents a significant improvement over the previously used table. We will review the mortality assumption as part of the next scheduled experience review.

Item 10) recommends two minor changes to future valuation reports. The first is full disclosure of assumptions with respect to 415(b) and 401(a)(17). We will include a comment in the report that no explicit assumption is made with respect to these items. The second is the consideration of revising the Tier II demographic assumptions. We feel that based on the available data, the assumptions are appropriate. These assumptions, as with the rest of the demographic assumptions will be monitored as experience emerges.

Item 11) recommends requesting longer-term market expectations from investment consultants (30 plus years) and obtaining specific expectations of the investment consultant serving SERS and the Illinois State Board of Investments. We will request, and to the extent available, use the longer-term market expectations in future experience studies.

Item 12) requests the historic development of the assets without the General Obligation Bonds. As stated on page 7 of our valuation report, the development of the actuarial smoothed value of assets with GOB proceeds and the hypothetical smoothed value of assets without GOB proceeds are provided in each respective historical valuation report since the GOB proceeds were deposited into the trust.

Respectfully submitted,

Gabriel, Roeder, Smith & Company

Alex Rivera David T Kausch Paul T Wood

Alex Rivera, FSA, EA, MAAA	David Kausch, FSA, EA, MAAA	Paul T. Wood, ASA, MAAA
Senior Consultant	Senior Consultant	Consultant

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December 12, 2014

Board of Trustees
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Springfield, IL 62794-9255

Re: Response to State Actuary Report of 2014 - JRS

Dear Members of the Board:

At your request we have reviewed the report issued by Cheiron – The State Actuary's Preliminary Report on the Judges' Retirement System of Illinois ("JRS") Pursuant to 30 ILCS 5/2-8. This report was a review of the June 30, 2014, actuarial valuation for JRS.

<u>Assessment of Actuarial Assumptions and Methods Used in the 2014 Valuation</u>

This report issued by the State Actuary, Cheiron, indicates that **"In summary, we believe that the assumptions and methods used in the June 30, 2014, Actuarial Valuation Report, which are used to determine the required Fiscal Year 2016 State contribution, are reasonable both individually and in the aggregate."**

<u>Proposed Certification of the Required State Contribution</u>

In this section, the State Actuary recommends that the Board have an independent full replication actuarial audit performed.

The type and timing of actuarial audits is a matter of Board policy, and we will leave the response to the Board. For reference, the Government Finance Officers Association (GFOA) recently updated their Best Practice on Actuarial Audits (http://www.gfoa.org/actuarial-audits).

<u>State Mandated Funding Method</u>

In this section the State Actuary opines on their concern that the Statutory funding method does not meet Actuarial Standards of Practice. The funding policy is not under the Board's control; therefore, no action is required. We note that the annual actuarial valuation reports and the Board have communicated similar concerns to the State over the years. We recommend that Cheiron address this issue to the State and recommend a statutory change

Item 2) is the State Actuary's statement that the JRS Board always consider a conservative approach to assumption setting. GRS believes that assumptions should be set based on best expectations of future anticipated experience such that annual gains and losses net out over time and that the current assumptions are reasonable. We do not believe it is appropriate under actuarial standards to set assumptions to generate consistent actuarial gains to compensate for underfunding under the statutory method. 2

Item 3) concurs with the recommendation found in our valuation report pertaining to stress testing. Subsequent to the valuation, we provided JRS five stress testing scenarios. The provided stress testing can assist in determining whether there will be sufficient assets to pay benefits if there is a significant market downturn.

Since the Board does not set the funding policy or the benefit provisions, and the State bears the contribution risk from the stressors, we recommend that additional stress testing be conducted at the request of and reviewed by the State, which would be in a position to make decisions to manage the risks shown through the stress testing. We would be pleased to assist and prepare these tests, including providing any recommendations for the sets of assumptions to be used in testing the stressors to the System.

Recommended Additional Disclosures for the 2014 Valuation

Item 4) recommends that we clarify the applicable payroll the required FY 2016 State contributions rate of 80.072 percent applies. We will include additional commentary in the valuation report that the certified FY 2016 contribution rate of 80.072 percent is applied to expected FY 2016 payroll. The resulting amount of $132,060,000 is budgeted pursuant to the continuing appropriations process and deposited into the System in FY 2016.

Recommended Changes for Future Valuations

Item 5) recommends a corridor be established around the market value of assets. As stated on page 38 of our 2014 valuation report, there is currently no asset corridor. An asset corridor limits the amount that the actuarial (smoothed) value of assets can deviate from the market value of assets. The asset valuation method is prescribed by statute, and does not appear to allow a corridor. We believe an asset corridor would be reasonable provided it complied with State statues.

We are happy to work with you to make recommendations to the legislature concerning the adoption and implementation of a corridor on the actuarial value of assets. We are concerned that the development of the actuarial value of assets is set in statute and thus requires legislative action for change. As stated in previous responses, it would be beyond the purview of the JRS Board to add such a corridor. We recommend that Cheiron address this issue to the State and recommend a statutory change.

Item 6) recommends the Board annually review the economic assumptions (interest rate and inflation) each year prior to commencing the valuation work and adjust assumptions accordingly. We concur with this recommendation.

Item 7) recommends that GRS consider using a fully generational mortality table. We will review the mortality assumption as part of the next scheduled experience review and will at that time consider the use of fully generational mortality table.

Item 8) recommends that GRS analyze and disclose whether the constant population assumptions and payroll growth assumption used is reasonable. We will monitor the appropriateness of the constant population assumption and will work with JRS to determine if this assumption should be modified in future years.

Item 9) requests the historic development of the assets without the General Obligation Bonds. As stated on page 5 of our valuation report, the development of the actuarial smoothed value of assets with GOB proceeds and the hypothetical smoothed value of assets without GOB proceeds are provided in each respective historical valuation report GRS has produced since the GOB proceeds were deposited into the trust.

Item 10) recommends four minor changes to future valuation reports. The first is full disclosure of assumptions with respect to 415(b) and 401(a)(17). We will include a comment in the report that no explicit assumption is made with respect to these items. The second pertains to the use of actual data for the spousal continuance benefits. This data is not available and we provided some commentary on the basis of the assumption on page 34 of our valuation report. The third is provide additional clarity on the payrolls used in the valuation. We will provide additional clarity in future valuations. The fourth is the consideration of revising the Tier II demographic assumptions. We feel that based on the available data, the assumptions are appropriate. These assumptions, as with the rest of the demographic assumptions will be monitored as experience emerges.

Item 11) recommends requesting longer-term market expectations from investment consultants (30 plus years) and obtaining specific expectations of the investment consultant serving JRS and the Illinois State Board of Investments. We will request, and to the extent available, use the longer-term market expectations in future experience studies.

Respectfully submitted,

Gabriel, Roeder, Smith & Company

Alex Rivera   David T Kausch   Paul T Wood

Alex Rivera, FSA, EA, MAAA	David Kausch, FSA, EA, MAAA	Paul T. Wood, ASA, MAAA
Senior Consultant	Senior Consultant	Consultant

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December 12, 2014

Board of Trustees
General Assembly Retirement System of Illinois
2101 South Veterans Parkway
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Springfield, IL 62794-9255

Re: Response to State Actuary Report of 2014 - GARS

Dear Members of the Board:

At your request we have reviewed the report issued by Cheiron – The State Actuary's Preliminary Report on the General Assembly Retirement System of Illinois ("GARS") Pursuant to 30 ILCS 5/2-8. This report was a review of the June 30, 2014, actuarial valuation for GARS.

Assessment of Actuarial Assumptions and Methods Used in the 2014 Valuation

This report issued by the State Actuary, Cheiron, indicates that **"In summary, we believe that the assumptions and methods used in the June 30, 2014, Actuarial Valuation Report, which are used to determine the required Fiscal Year 2016 State contribution, are reasonable both individually and in the aggregate."**

Proposed Certification of the Required State Contribution

In this section, the State Actuary recommends that the Board have an independent full replication actuarial audit performed.

The type and timing of actuarial audits is a matter of Board policy, and we will leave the response to the Board. For reference, the Government Finance Officers Association (GFOA) recently updated their Best Practice on Actuarial Audits (http://www.gfoa.org/actuarial-audits).

State Mandated Funding Method

In this section the State Actuary opines on their concern that the Statutory funding method does not meet Actuarial Standards of Practice. The funding policy is not under the Board's control; therefore, no action is required. We note that the annual actuarial valuation reports and the Board have communicated similar concerns to the State over the years. We recommend that Cheiron address this issue to the State and recommend a statutory change.

Item 2) is the State Actuary's statement that the GARS Board always consider a conservative approach to assumption setting. GRS believes that assumptions should be set based on best expectations of future anticipated experience such that annual gains and losses net out over time and that the current assumptions are reasonable. We do not believe it is appropriate under actuarial standards to set assumptions to generate consistent actuarial gains to compensate for underfunding under the statutory method.

2

Item 3) concurs with the recommendation found in our valuation report pertaining to stress testing. Subsequent to the valuation, we provided GARS five stress testing scenarios. The provided stress testing can assist in determining whether there will be sufficient assets to pay benefits if there is a significant market downturn.

Since the Board does not set the funding policy or the benefit provisions, and the State bears the contribution risk from the stressors, we recommend that additional stress testing be conducted at the request of and reviewed by the State, which would be in a position to make decisions to manage the risks shown through the stress testing. We would be pleased to assist and prepare these tests, including providing any recommendations for the sets of assumptions to be used in testing the stressors to the System.

Recommended Additional Disclosures for the 2014 Valuation

Item 4) recommends that we clarify the applicable payroll the required FY 2016 State contributions rate of 126.70 percent applies. We will include additional commentary in the valuation report that the certified FY 2016 contribution rate of 126.70 percent is applied to expected FY 2016 payroll. The resulting amount of $15,809,000 is budgeted pursuant to the continuing appropriations process and deposited into the System in FY 2016.

Recommended Changes for Future Valuations

Item 5) recommends a corridor be established around the market value of assets. As stated on page 39 of our 2014 valuation report, there is currently no asset corridor. An asset corridor limits the amount that the actuarial (smoothed) value of assets can deviate from the market value of assets. The asset valuation method is prescribed by statute, and does not appear to allow a corridor. We believe an asset corridor would be reasonable provided it complied with State statues.

We are happy to work with you to make recommendations to the legislature concerning the adoption and implementation of a corridor on the actuarial value of assets. We are concerned that the development of the actuarial value of assets is set in statute and thus requires legislative action for change. As stated in previous responses, it would be beyond the purview of the GARS Board to add such a corridor. We recommend that Cheiron address this issue to the State and recommend a statutory change.

Item 6) recommends the Board annually review the economic assumptions (interest rate and inflation) each year prior to commencing the valuation work and adjust assumptions accordingly. We concur with this recommendation.

Item 7) recommends that GRS consider using a fully generational mortality table. We will review the mortality assumption as part of the next scheduled experience review and will at that time consider the use of fully generational mortality table.

Item 8) recommends that GRS analyze and disclose whether the constant population assumptions and payroll growth assumption used is reasonable. We are aware that new members of the legislature may opt out of participating in GARS. We will monitor the appropriateness of the constant population assumption and will work with GARS to determine if this assumption should be modified in future years.

Item 9) requests the historic development of the assets without the General Obligation Bonds. As stated on page 5 of our valuation report, the development of the actuarial smoothed value of assets with GOB proceeds and the hypothetical smoothed value of assets without GOB proceeds are provided in each respective historical valuation report GRS has produced since the GOB proceeds were deposited into the trust.

Item 10) recommends four minor changes to future valuation reports. The first is full disclosure of assumptions with respect to 415(b) and 401(a)(17). We will include a comment in the report that no explicit assumption is made with respect to these items. The second pertains to the use of actual data for the spousal continuance benefits. This data is not available and we provided some commentary on the basis of the assumption on page 35 of our valuation report. The third is provide additional clarity on the payrolls used in the valuation. We will provide additional clarity in future valuations. The fourth is the consideration of revising the Tier II demographic assumptions. We feel that based on the available data, the assumptions are appropriate. These assumptions, as with the rest of the demographic assumptions will be monitored as experience emerges.

Item 11) recommends requesting longer-term market expectations from investment consultants (30 plus years) and obtaining specific expectations of the investment consultant serving GARS and the Illinois State Board of Investments. We will request, and to the extent available, use the longer-term market expectations in future experience studies.

Respectfully submitted,

Gabriel, Roeder, Smith & Company

Alex Rivera, FSA, EA, MAAA	David Kausch, FSA, EA, MAAA	Paul T. Wood, ASA, MAAA
Senior Consultant	Senior Consultant	Consultant

STATE ACTUARY COMMENTS

1. In their responses, both TRS and SURS referenced limited scope audits that had been done in the past. We added clarifying language regarding these audits in Section II of both of their Preliminary Reports: “We understand that the System has had limited scope audits in the past, but these audits did not include independent calculations by individual member to confirm the accuracy of the valuation results.”

2. After receiving responses from SURS, SERS, JRS, and GARS, we clarified language on taking a conservative approach when setting assumptions. We recommend that the systems always use the conservative end of any range of assumptions recommended by their actuaries or other advisors due to the uncertainty and risks associated with the State mandated funding method.