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## Chapter One

# AUDITOR GENERAL'S SUMMARY

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## 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.

On August 31, 2017, Public Act 100-0465 was signed into law, which added a sixth retirement system to be reviewed by the State Actuary. The Illinois Pension Code was revised to require the Chicago Teachers' Pension Fund (CTPF) to submit information to the State Actuary similar to the requirement for the other State-funded retirement systems.

### Review of Actuarial Assumptions

Cheiron reviewed the actuarial assumptions used in each of the six systems' actuarial valuations for the year ended June 30, 2018, and **concluded that they generally were reasonable. Cheiron did not recommend any changes to the assumptions used in the June 30, 2018 actuarial valuations.**

The combined total of the required Fiscal Year 2020 State contribution for the six retirement systems was \$9,385,203,696. 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. For TRS, Cheiron recommended a small change in method regarding the calculation of federal funds contributions so that federal funds contributions would be treated in the same manner as other School District contributions.

### Additional Disclosures and Changes for Future Valuations

Cheiron also made recommendations for additional disclosures for the 2018 valuations and recommended changes for future valuations. Recommendations included the following:

- The Boards of SERS, JRS, and GARS should periodically retain the services of an independent actuary to conduct a full scope actuarial audit. 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.

- Cheiron continues to recommend the Boards annually review the economic assumptions (interest rate and inflation) prior to commencing the valuation work and adjust assumptions accordingly. All of the systems complied with this recommendation prior to conducting the 2018 actuarial valuations.

### **Public Act 100-0023 Statutory Funding Changes**

Public Act 100-0023, effective July 6, 2017, modified the State's funding policy to require that the contribution impact of all assumption changes be phased-in over a 5-year period. This Act applied to five of the systems but did not apply to CTPF. The actuaries for the retirement systems interpreted the new requirement in two different ways but both methods were reasonable interpretations of the language contained in Public Act 100-0023.

### **State Mandated Funding Method**

The Illinois Pension Code (for TRS, SURS, SERS, JRS, and GARS) establishes a method that does not adequately fund the systems. This law requires the actuaries to calculate the employer contribution as the level percentage of projected payroll that would accumulate assets equal to 90% of the actuarial accrued liability in the year 2045 if all assumptions are met. This contribution level does not conform to generally accepted actuarial principles and practices. Generally accepted actuarial funding methods target the accumulation of assets equal to 100% of the actuarial accrued liability, not 90%. Cheiron continues to recommend that the funding method be changed to fully fund plan benefits and discontinue the systematic underfunding of the systems.

According to the systems' 2018 actuarial valuation reports, the funded ratio of the retirement systems ranged from 47.9% (CTPF) to 15.3% (GARS), based on the actuarial value of assets as a ratio to the actuarial liability. If there is a significant market downturn, the unfunded actuarial liability and the required State contribution rate could both increase significantly, putting the sustainability of the systems further into question. Cheiron recommended the systems include stress testing within the valuation reports to better understand these risks.

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## INTRODUCTION AND BACKGROUND

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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 following State-funded retirement systems:

- 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 100-0465**

On August 31, 2017, Public Act 100-0465 was signed into law, which added a sixth retirement system to be reviewed by the State Actuary. The Illinois Pension Code was revised to require the Chicago Teachers' Pension Fund (CTPF) submit information to the State Actuary similar to the requirement for the other State-funded retirement systems. Public Act 100-0465 specified the following regarding the Chicago Teachers' Pension Fund:

- For State fiscal year 2018, the State shall contribute \$221,300,000 for the employer normal cost.
- Beginning in State fiscal year 2019, the State shall contribute an amount equal to the employer normal cost for that fiscal year.
- On or before November 1 of each year, beginning November 1, 2017, the Board shall submit to the State Actuary, the Governor, and the General Assembly a proposed certification of the amount of the required State contribution to the Fund 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 of each year, beginning January 1, 2018, the State Actuary shall issue a preliminary report concerning the proposed certification and identifying, if necessary, recommended changes in actuarial assumptions that the Board must consider before finalizing its certification of the required State contributions.
- On or before January 15, 2018, and each January 15 thereafter, the 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.

### **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 eight locations throughout the United States. Cheiron has experience working with multiple public pension plans around the country.

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## **REVIEW OF THE ACTUARIAL ASSUMPTIONS**

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Cheiron reviewed the actuarial assumptions used in each of the six systems’ actuarial valuations for the year ended June 30, 2018, and **concluded that they generally were reasonable. Cheiron did not recommend any additional changes to the assumptions used in the June 30, 2018 actuarial valuations.**

Cheiron did recommend additional disclosures for the 2018 valuations and also recommended changes for future valuations. 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 Seven is a chart summarizing the status of recommendations made by the State Actuary in last year’s 2017 report. This year’s report contains 26 recommendations compared to 33 recommendations made in last year’s report.

Exhibit 1-1 RECOMMENDATIONS TO THE RETIREMENT SYSTEMS						
Recommendations	TRS	SURS	SERS	JRS	GARS	CTPF
<b>Recommended Changes to Actuarial Assumptions used in the 2018 Actuarial Valuations:</b>						
Cheiron reviewed the actuarial assumptions and concluded that they were reasonable. Consequently, Cheiron did not have any recommended changes to assumptions this year.						
<b>Recommended Additional Disclosures for the 2018 Actuarial Valuations:</b>						
• Expand/include stress testing of the System within the valuation report	X	X	X	X	X	
• Add an explanation of the primary sources of the \$983 million experience loss that is currently unexplained	X					
• Include a more detailed explanation of how the new entrant assumption was developed and how the assumed salaries for new entrants change from year to year	X					
• Disclose the difference between the total normal cost disclosed in two different places in the valuation report						X
<b>Recommended Changes for Future Actuarial Valuations:</b>						
• Annually review the economic assumptions (interest rate and inflation rate) and adjust assumptions accordingly	X	X	X	X	X	X
• Consider reducing the salary increase assumption in future valuations or provide additional analysis to support the increased assumption	X					
• Provide additional information about the population used in the projection such as the average age and service of the population each year	X					
• Continue to monitor the two assumption changes not adopted by the Board based on the Chicago Public Schools' request						X
<b>Other Recommendations:</b>						
• Periodically retain the services of an independent actuary to conduct a full scope actuarial audit in which the results of the valuation are fully replicated			X	X	X	
• Change the funding method to fully fund plan benefits and discontinue the systematic underfunding of the system	X	X	X	X	X	
• Treat the federal funds contributions in the same manner as other School District contributions when calculating the FY 2020 State contribution rate	X					
Source: OAG summary of Cheiron's preliminary reports to the six 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 retirement systems, found in Chapters Two through Seven of this report.

### Economic Assumptions

Cheiron reviewed the economic assumptions utilized in the actuarial valuations for each of the six 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 six retirement systems. As can be seen in the exhibit, the interest rate assumption was lowered by two of the systems for the 2018 actuarial valuations.

Exhibit 1-2 INTEREST RATE ASSUMPTIONS June 30, 2018 Valuation		
System	Interest Rate	Notes
Teachers' Retirement System	7.00%	Lowered from 7.50% for the June 30, 2016 actuarial valuation
State Universities Retirement System	6.75%	Lowered from 7.25% for the June 30, 2018 actuarial valuation
State Employees' Retirement System	7.00%	Lowered from 7.25% for the June 30, 2016 actuarial valuation
Judges' Retirement System	6.75%	Lowered from 7.00% for the June 30, 2016 actuarial valuation
General Assembly Retirement System	6.75%	Lowered from 7.00% for the June 30, 2016 actuarial valuation
Chicago Teachers' Pension Fund	7.00%	Lowered from 7.25% for the June 30, 2018 actuarial valuation

Source: Retirement system actuarial reports.

Cheiron concluded that the interest rate assumptions for the six systems were reasonable. The actuary for TRS recommended lowering the interest rate assumption from 7.00% to 6.75%. However, the Board did not lower the assumption. Cheiron concurred with TRS’s actuary’s recommendation to lower the interest rate assumption but also concluded that the use of 7.00% was reasonable.

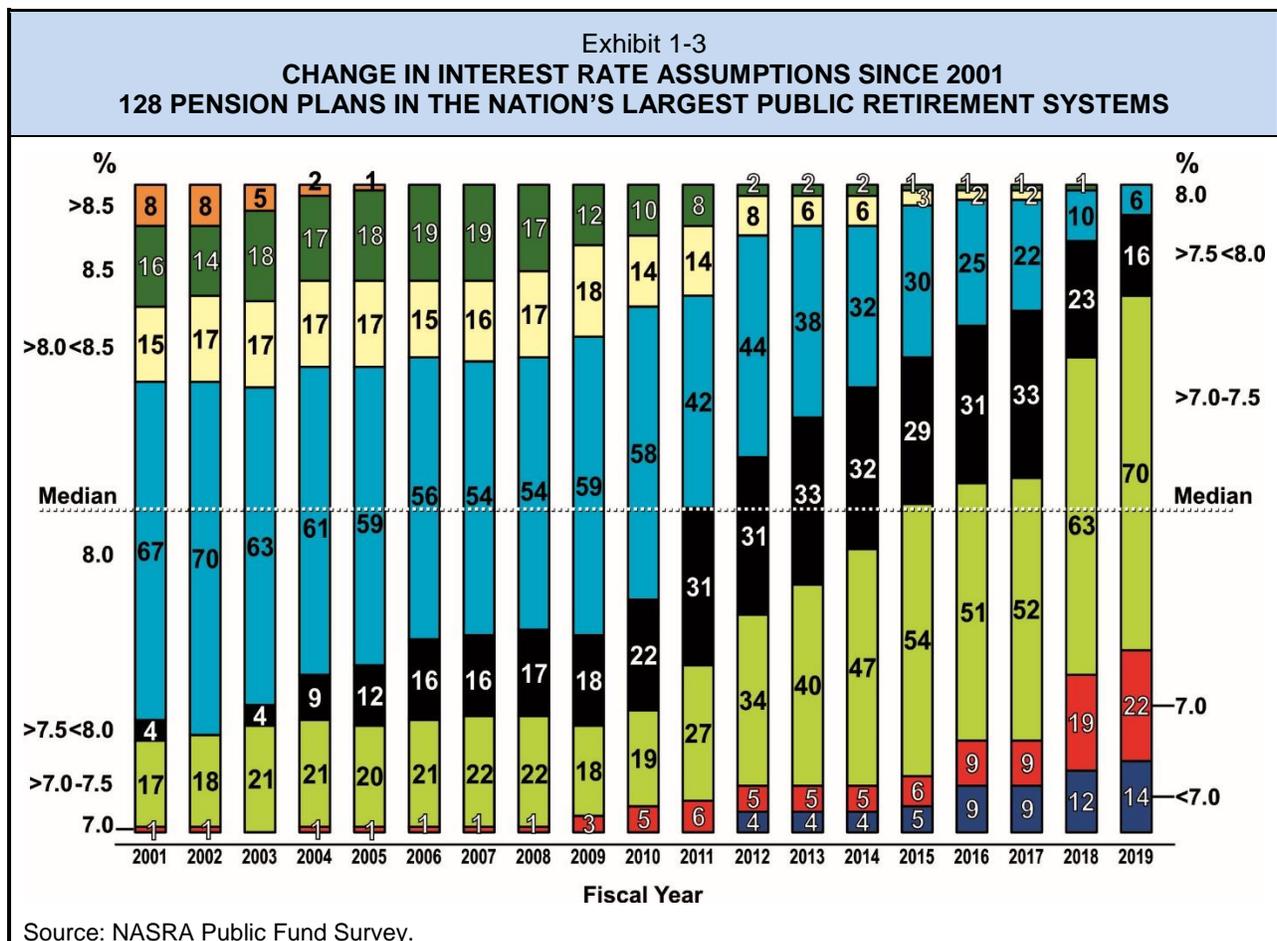
As it did in last year’s report, Cheiron again recommended that the Boards annually review the economic assumptions (interest rate and inflation) prior to commencing the valuation work and adjust assumptions accordingly. All of the systems complied with this recommendation prior to conducting the 2018 actuarial valuations.

Cheiron noted that the systems are, or will be, experiencing negative cash flows which may impact the interest rate returns that are realized. Negative cash flow is measured as contributions less benefits and expenses. TRS, SURS, GARS, and CTPF are experiencing

negative cash flows while SERS and JRS are projected to begin having negative cash flows in the near future. Negative cash flows result in actuarial returns (i.e., “dollar weighted” returns) being less than “time weighted” returns.

Cheiron also noted that declining interest rates have forced pension plans to either reduce their discount rates, increase their exposure to investment risk, or some combination of the two. For example, in 2001 the yield on ten-year Treasury bonds (a proxy for a risk free investment) was 5.3%. To achieve an assumed return of 8.0%, a system’s investments had to outperform the yield on the ten-year Treasury by 2.7%. As of June 30, 2018, the yield on the ten-year Treasury is now 2.9%, and to achieve an assumed return of 6.75%, a system’s investments need to exceed the ten-year Treasury yield by 3.85%. So, even though, in this example, a system reduced its assumption by 125 basis points, it still has to take more investment risk in 2018 to meet its assumption than it did in 2001.

Cheiron 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 128 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 128 public pension plans.



The exhibit shows the shift to lower interest rate assumptions. In 2001, 106 of the 128 plans (83%) used an interest rate assumption of 8.0% or higher. The most recent data, which includes results collected through November 2018, shows that this number has dropped to only 6 of 128 plans (5%) that use an interest rate of 8.0% or higher. The median assumption has fallen below 7.5%. Since Fiscal Year 2012, 105 of the 128 plans have reduced the interest rate assumption with an average reduction of 0.54%. In addition, 36 plans have adopted a rate of 7.0% or lower.

### **Inflation Assumption**

The six retirement systems use inflation assumptions ranging from 2.25% to 2.50%. Exhibit 1-4 shows the inflation assumptions for each of the systems. Four of the systems lowered the inflation assumption for the 2018 valuations.

Cheiron concluded that the inflation assumptions used by the six retirement systems were reasonable. Cheiron’s rationale for concurring with the inflation assumptions included:

- The June 2018 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 3.2%. Under the intermediate cost projection, the Social Security Administration uses an assumption of 2.6%.
- The National Conference on Public Employee Retirement Systems (NCPERS) compared public sector retirement systems’ inflation assumptions in a study published in December 2017. The study shows that the 2.25% assumption used by SURS, and the 2.50% assumption used by the remaining systems, are lower than the average rate of 2.9% for the 164 systems who responded to the study.

<b>Exhibit 1-4 INFLATION ASSUMPTIONS June 30, 2018 Valuation</b>		
<b>System</b>	<b>Inflation Rate</b>	<b>Notes</b>
Teachers’ Retirement System	2.50%	Lowered from 3.00% for the June 30, 2016 actuarial valuation
State Universities Retirement System	2.25%	Lowered from 2.75% for the June 30, 2018 actuarial valuation
State Employees’ Retirement System	2.50%	Lowered from 2.75% for the June 30, 2018 actuarial valuation
Judges’ Retirement System	2.50%	Lowered from 2.75% for the June 30, 2018 actuarial valuation
General Assembly Retirement System	2.50%	Lowered from 2.75% for the June 30, 2018 actuarial valuation
Chicago Teachers’ Pension Fund	2.50%	Lowered from 2.75% for the June 30, 2017 actuarial valuation

Source: Retirement system actuarial reports and experience studies.

The inflation assumption primarily impacts the salary increase assumption. The salary increase assumption is generally comprised of the inflation assumption and a productivity, or real wage growth assumption. The systems that lowered their inflation assumptions also lowered their salary increase assumptions. TRS, however, increased its salary increase assumption based on experience over the prior three years. Cheiron was concerned that the analysis performed for the salary increase assumptions resulted in an assumption for salary increases that is at the very high end of a reasonable range. Cheiron recommended the TRS Board consider reducing the salary increase assumption in future valuations or provide additional analysis to support the increased assumption.

### **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. As it did last year, Cheiron included additional analysis in its reports on each of the systems. Cheiron collected data from past valuation reports dating back to 2012 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 Seven. Different measures were used for each system depending on the information available but sources used included:

- Active and retiree mortality;
- Disability;
- New entrants;
- Benefit recipients;
- 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. Additional details on the demographic assumptions examined can be found in the chapters for each of the six retirement systems.

## PROPOSED CERTIFICATION OF REQUIRED STATE CONTRIBUTION

Each of the six 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 2020. The exhibit also compares the contribution amount to the previous year’s contribution as restated in the 2018 actuarial valuation reports.

Exhibit 1-5 AMOUNTS OF STATUTORILY REQUIRED STATE CONTRIBUTIONS		
System	State Contribution (for Fiscal Year 2019)	State Contribution (for Fiscal Year 2020)
Teachers’ Retirement System	\$4,353,923,925	\$4,813,577,696
State Universities Retirement System	1,659,300,000	\$1,864,976,000
State Employees’ Retirement System	2,136,279,000	\$2,291,249,000
Judges’ Retirement System	140,469,000	\$144,160,000
General Assembly Retirement System	23,221,000	\$25,754,000
Chicago Teachers’ Pension Fund <sup>1</sup>	226,782,000	\$245,487,000
<b>Total</b>	<b>\$8,539,974,925</b>	<b>\$9,385,203,696</b>
<sup>1</sup> The State contribution for CTPF is limited to the employer normal cost for that fiscal year. Source: 2018 Retirement system actuarial valuation reports.		

For TRS, Cheiron recommended a small change in method regarding the calculation of federal funds contributions so that federal funds contributions would be treated in the same manner as other School District contributions. Cheiron estimated that the State contribution for TRS would increase slightly with this change. TRS responded that they will change the methodology for calculating the federal contribution next year.

Cheiron noted that, in accordance with 30 ILCS 5/2-8.1, its review does not include a replication of the actuarial valuation results. Beginning with the December 2014 State Actuary Report, 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 Systems’ actuaries. Two of the systems (TRS and SURS) complied with this recommendation but SERS, JRS, and GARS have not. Given the size of SERS, the Plans’ low funded ratios, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, Cheiron continues to recommend that the Boards at SERS, JRS, and GARS periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary.

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## CONFORMANCE TO STATUTORY FUNDING CHANGES

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Public Act 100-0023, effective July 6, 2017, modified the State’s funding policy to require that the contribution impact of all assumption changes be phased-in over a 5-year period. This Act applied to five of the systems but did not apply to CTPF. The Act requires that the impact of assumption changes “*be implemented in equal annual amounts over a 5-year period beginning in the State fiscal year in which the actuarial change first applies to the required State contribution.*” This amount is then implemented “*at the resulting annual rate in each of the remaining fiscal years in that 5-year period.*”

The actuaries for the retirement systems interpreted this in two different ways:

- The actuary for TRS interpreted this to mean determining the change in the required State contribution, and phasing in the change over five years in **equal dollar amounts**.
- The actuaries for SURS, SERS, JRS, and GARS interpreted this to mean determining the cost impact of the change, converting it to a **percentage of payroll**, and reflecting one-fifth of that percentage change over five years.

While the actuaries for the retirement systems interpreted the new requirement in two different ways, both methods were reasonable interpretations of the language contained in Public Act 100-0023.

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## ACTUARIAL FUNDING METHODS

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Actuarial funding methods consist of three components: (1) the actuarial cost method, which is the attribution of total costs to past, current, and future years; (2) the asset valuation method (i.e., asset smoothing); and (3) the amortization method.

### Actuarial Cost Method

All of the retirement systems use the Projected Unit Credit 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 Projected Unit Credit 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 funding method as it is more consistent with the Pension Code’s requirement for level percentage of pay funding.

Under the Projected Unit Credit 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 present value of these benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the Projected Unit Credit 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 Projected Unit Credit method is not an unreasonable method, more plans use the Entry Age Normal funding method to mitigate this effect. It should also be noted that the Entry Age Normal method is the required method to calculate liability for the Governmental Accounting Standards Board Statements 67 and 68.

### **Asset Valuation Method**

The actuarial value of assets for the systems is a smoothed market value. Unanticipated changes in market value are recognized over five years for all of the systems except CTPF, which smooths over four years. The primary purpose for smoothing out gains and losses over multiple years is so fluctuations in the contributions will be less volatile over time than if based on 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 years to determine the actuarial value of assets is a generally accepted approach in determining actuarial cost.

### **Amortization Method**

The mandated State contribution is based on a determination of the level percentage of payroll that is expected to achieve a 90% funded ratio in 2045. While not a traditional amortization method, this methodology effectively amortizes a portion of the unfunded actuarial liability over the remaining period until 2045, which is currently 27 years.

One of the principles of funding public plans identified by the American Academy of Actuaries is that there should be “a plan to make up for any variations in actual assets from the funding target within a defined and reasonable time period.” Because it only targets 90%, the State method does not include a plan to achieve the funding target over any period of time.

Typical public plan amortization methods are designed to increase each year by expected payroll growth. Under the State mandated method, however, the effective amortization payment increases each year by more than the expected growth in payroll. As a result, the State mandated method defers payments on the unfunded actuarial liability further into the future than under typical public plan amortization methods.

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## **STATE MANDATED FUNDING METHOD**

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The Illinois Pension Code (for TRS, SURS, SERS, JRS, and GARS) establishes a method that does not adequately fund the systems. This law requires the actuaries to calculate the employer contribution as the level percentage of projected payroll that would accumulate assets equal to 90% of the actuarial accrued liability in the year 2045 if all assumptions are met. This contribution level does not conform to generally accepted actuarial principles and practices. Generally accepted actuarial funding methods target the accumulation of assets equal to 100% of the actuarial accrued liability, not 90%. In addition, the State mandated method produces a contribution that results in a significant increase in the unfunded actuarial liabilities over the next decade if all assumptions are met.

Cheiron continues to recommend that the funding method be changed to fully fund plan benefits and discontinue the systematic underfunding of the systems. The funding method should target 100% of the actuarial accrued liability, and contributions should ramp up as quickly as possible to a level that is expected to prevent the unfunded actuarial accrued liability from growing. Continuing the practice of underfunding the systems increases the risk of needing even larger contributions in the future that may make the systems unsustainable.

In the actuarial valuation reports, the systems’ actuaries discuss their concerns with the State mandated funding method. The actuarial valuation reports include recommended funding policies that conform to a goal of full funding within a reasonable time period and conform with generally accepted actuarial principles and practices.

Based on the systems’ 2018 actuarial valuation reports, the funded ratio of the systems ranged from 47.9% (CTPF) to 15.3% (GARS) based on the actuarial value of assets as a ratio to the actuarial liability (see Exhibit 1-6). If there is a significant market downturn, the unfunded actuarial liability and the required State contribution rate could both increase significantly, putting the sustainability of the systems further into question.

For five of the retirement systems (TRS, SURS, SERS, JRS, and GARS), Cheiron recommended stress testing be done or be expanded to better understand risks to the sustainability of the systems. The stress testing should be included within the valuation report and include a thorough explanation of the implications that volatile investment returns and other stressors (e.g., membership declines, lower salary growth) can have on future State costs. In particular, the tests should demonstrate whether or not there is a potential for unsustainable costs during the statutory funding period. Cheiron recommends such stress testing be included in the valuation report because that is the report that most stakeholders of the plan look to for assessing the plan’s financial condition. Supplemental reports may not be publicly identified and therefore not readily accessible.

Exhibit 1-6 SYSTEM FUNDED RATIO (ACTUARIAL VALUE OF ASSETS)	
System	Funded Ratio
Teachers’ Retirement System	40.7%
State Universities Retirement System	42.7%
State Employees’ Retirement System	36.5%
Judges’ Retirement System	37.2%
General Assembly Retirement System	15.3%
Chicago Teachers’ Pension Fund	47.9%
Source: 2018 actuarial valuation reports.	

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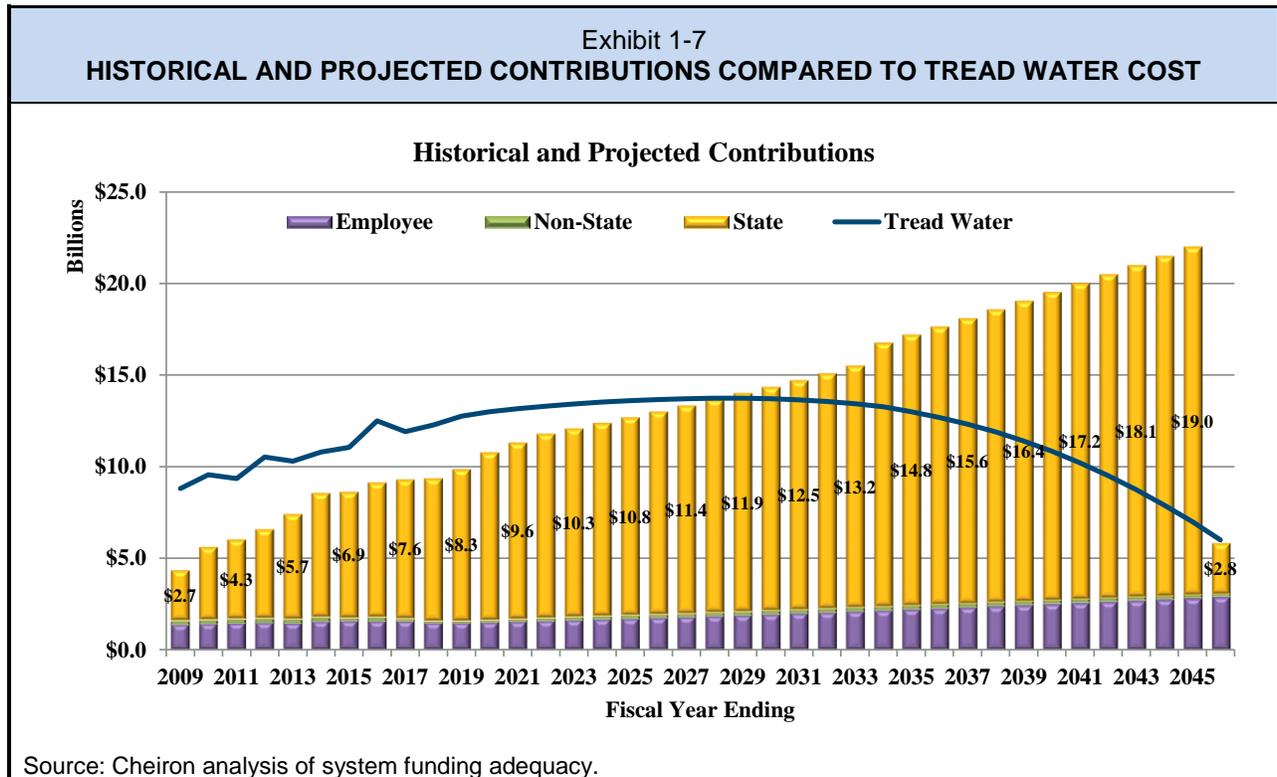
## ANALYSIS OF FUNDING ADEQUACY

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Cheiron examined the adequacy of the funding for the systems, including funded status, the sources of changes in the unfunded actuarial liability, and projections of the unfunded actuarial liability. This analysis is contained in the State Actuary’s preliminary reports for each of the retirement systems, found in Chapters Two through Seven of this report.

One of the persistent sources of the increase in unfunded actuarial liability is due to actual contributions to the System being less than the tread water contribution (the amount needed to prevent the unfunded actuarial liability from increasing if all assumptions are met).

Exhibit 1-7 shows the combined historical and projected contributions for five of the systems (TRS, SURS, SERS, JRS, and GARS). As the chart below shows, actual contributions have been significantly less than the tread water cost, and this trend is projected to continue for several years into the future. Each year that total contributions remain below the tread water cost (blue line), the unfunded actuarial liability is expected to grow. As shown in the graph below the contributions from the State will need to increase significantly before the total contribution reaches the tread water contribution and begins to pay down the unfunded actuarial liability.



## RESPONSES TO THE RECOMMENDATIONS

Each of the six 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.

