2018 Actuarial Valuation Report on the Louisiana School Employees' Retirement System

Actuarial Valuation as of
June 30, 2018
Issued December 2018

LOUISIANA LEGISLATIVE AUDITOR
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2018 ACTUARIAL VALUATION REPORT

LOUISIANA SCHOOL EMPLOYEES' RETIREMENT SYSTEM

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LOUISIANA LEGISLATIVE AUDITOR
DARYL G. PURPERA, CPA, CFE

December 20, 2018

The Honorable John A. Alario, Jr.,
President of the Senate
The Honorable Taylor Barras,
Speaker of the House of Representatives

Dear Senator Alario and Representative Barras:

This report provides the results of an actuarial valuation of the Louisiana School Employees' Retirement System as of June 30, 2018, as required under R.S. 11:127(C).

The report contains our findings, conclusions, and recommendations. I hope this report will benefit you in your legislative decision-making process.

Sincerely,

Daryl G. Purpera, CPA, CFE
Legislative Auditor

DGP:NE:ch

LSERS 2018 VALUATION

SUMMARY AND CONCLUSIONS

As required by Louisiana law, this actuarial valuation report was prepared by the actuary for the Louisiana Legislative Auditor (LLA) and is hereby submitted to the Public Retirement Systems' Actuarial Committee (PRSAC) for its consideration

PUBLIC DOCUMENT

This valuation report is a public document. This report has been prepared for the following users:

Potential Users*	Definitions*	Identified Persons
Principal	A client or employer of the actuary.	The Legislative Auditor.
Intended Users	Any person who the actuary identifies as able to rely on the findings of the report.	The Louisiana Legislature and staff, PRSAC and LSERS.
Other Users	Any recipient of the report who is not an intended user.	Other interested government entities or employees and the public.

* As defined by the Actuarial Standards of Practice (ASOP) No. 41.

CHANGES IN ASSUMPTIONS AND METHODS

This actuarial valuation implements a few significant changes as compared to the last PRSAC-accepted valuation.

- This valuation implements the changes in various demographic assumptions that result from the recent experience study and which were recommended by the System's actuary and adopted by the retirement board. Refer to Appendix A for more details.

- This valuation changes the inflation assumption to 2.30% from the 2.625% assumption in the last PRSAC-accepted valuation. Refer to Appendix B for more details.

- This valuation lowers the return assumption to 6.80% from the 7.125% assumption in the last PRSAC-accepted valuation. Refer to Appendices C through E for more details.

- This valuation recognizes the expected costs of the System's future gain-sharing cost-of-living (COLA) benefits, while the last PRSAC-accepted valuation only recognized one future permanent benefit increase. Refer to Appendix F for more details.

BRIEF SUMMARY COMPARING NEW ASSUMPTIONS/METHODS TO OLD ASSUMPTIONS/METHODS

	After Changes	Before Changes (with System Change)	
Valuation Date	June 30, 2018	June 30, 2018	June 30, 2017
Census Summary: Active Members	12,033	12,033	12,055
Retired Members and Survivors	13,482	13,482	13,354
DROP Participants	631	631	622
Terminated Due a Deferred Benefit	339	339	311
Terminated Due a Refund	4,475	4,475	4,268
Payroll:	$ 288,861,936	$ 288,861,936	$ 284,075,888
Benefits in Payment:	$ 171,928,421	$ 171,928,421	$ 167,428,812
Present Value of Future Benefits:	$ 3,063,420,453	$ 2,881,296,730	$ 2,834,673,526
Actuarial Accrued Liability (EAN)*:	$ 2,822,343,374	$ 2,643,090,832	$ 2,562,633,003
Unfunded Actuarial Accrued Liability:	$872,436,720	$693,184,178	$ 662,303,876
Experience Account:	$ 4,911,217	$ 4,911,217	$ 4,562,632
Amortization Conversion Account:	$ 6,838,575	$ 6,838,575	$ 11,106,470
Net Valuation Assets*:	$ 1,949,906,654	$ 1,949,906,654	$ 1,900,329,127
Market Value of Assets (Includes Experience Account):	$ 1,946,113,040	$ 1,946,113,040	$ 1,922,705,998
Ratio of Net Valuation Assets to Actuarial Accrued Liability:	69.09%	73.77%	74.16%
	Fiscal 2018	Fiscal 2018	Fiscal 2017
Market Rate of Return (Excluding Money Market DROP funds):	6.41%	6.41%	14.14%
Actuarial Rate of Return (Excluding Money Market DROP funds):	7.64%	7.64%	8.47%
Non-Money Market DROP Account Interest Credit Rate:	7.14%	7.14%	7.97%
	Fiscal 2019	Fiscal 2019	Fiscal 2018
Employers' Normal Cost (Mid-year):	$ 23,601,909	$ 22,404,650	$ 25,214,102
Amortization Cost (Mid-Year):	$ 75,366,060	$ 60,782,839	$ 55,646,290
Projected Administrative Expenses:	$ 4,792,189	$ 4,792,189	$ 4,853,555
Amortization Conversion Account Supplement:	$ (2,278,309)	$ (2,278,309)	$ (4,267,895)
Net Direct Employer Actuarially Required Contributions:	$ 101,481,849	$ 85,701,369	$ 81,446,048
Projected Payroll:	$ 292,662,231	$ 292,662,231	$ 292,667,381
Actuarially Required Net Direct Employer Contribution Rate:	34.7%	29.3%	27.8%
Actual Employee Contribution Rate:			
Employees whose first state service occurred before July 1, 2010:	7.5%	7.5%	7.5%
Employees whose first state service occurred on or after July 1, 2010:	8.0%	8.0%	8.0%
Actual Net Direct Employer Contribution Rate:	28.0%	28.0%	27.6%
	Fiscal 2020	Fiscal 2020	Fiscal 2019
Minimum Recommended Net Direct Employer Cont. Rate:	37.1%	30.4%	28.0%

* Beginning in fiscal 2017, valuation assets and accrued liability include the Experience Account and exclude the Amortization Conversion Account.

BRIEF SUMMARY COMPARING FINAL SELECTED RETURN ASSUMPTION TO MOST APPROPRIATE RETURN ASSUMPTION

		Final	Most Appropriate
Investment Return		6.80%	6.30%
Valuation Date		June 30, 2018	June 30, 2018
Census Summary:	Active Members	12,033	12,033
	Retired Members and Survivors	13,482	13,482
	DROP Participants	631	631
	Terminated Due a Deferred Benefit	339	339
	Terminated Due a Refund	4,475	4,475
Payroll:		$ 288,861,936	$ 288,861,936
Benefits in Payment:		$ 171,928,421	$ 171,928,421
Present Value of Future Benefits:		$ 3,063,420,453	$ 3,230,311,604
Actuarial Accrued Liability (EAN)*:		$ 2,822,343,374	$ 2,957,168,131
Unfunded Actuarial Accrued Liability:		$ 872,436,720	$ 1,007,261,477
Experience Account:		$ 4,911,217	$ 4,911,217
Amortization Conversion Account:		$ 6,838,575	$ 6,838,575
Net Valuation Assets*:		$ 1,949,906,654	$ 1,949,906,654
Market Value of Assets (Includes Experience Account):		$ 1,946,113,040	$ 1,946,113,040
Ratio of Net Valuation Assets to Actuarial Accrued Liability:		69.09%	65.94%
		Fiscal 2018	Fiscal 2018
Market Rate of Return (Excluding Money Market DROP funds):		6.41%	6.41%
Actuarial Rate of Return (Excluding Money Market DROP funds):		7.64%	7.64%
Non-Money Market DROP Account Interest Credit Rate:		7.14%	7.14%
		Fiscal 2019	Fiscal 2019
Employers' Normal Cost (Mid-year):		$ 23,601,909	$ 27,947,517
Amortization Cost (Mid-Year):		$ 75,366,060	$ 88,227,312
Projected Administrative Expenses:		$ 4,792,189	$ 4,792,189
Amortization Conversion Account Supplement:		$ (2,278,309)	$ (2,278,309)
Net Direct Employer Actuarially Required Contributions:		$ 101,481,849	$ 118,688,709
Projected Payroll:		$ 292,662,231	$ 292,662,231
Actuarially Required Net Direct Employer Contribution Rate:		34.7%	40.6%
Actual Employee Contribution Rate:			
Employees whose first state service occurred before July 1, 2010:		7.5%	7.5%
Employees whose first state service occurred on or after July 1, 2010:		8.0%	8.0%
Actual Net Direct Employer Contribution Rate:		28.0%	28.0%
		Fiscal 2020	Fiscal 2020
Minimum Recommended Net Direct Employer Cont. Rate:		37.1%	44.3%

* Valuation assets and accrued liability include the Experience Account and exclude the Amortization Conversion Account.

DISCUSSION OF CHANGES IN ASSUMPTIONS AND METHODS

The following sections provide a brief explanation of the new assumptions and methods and the rationale. More details concerning the selection of these assumptions can be found in the Appendices.

Demographic Assumptions (Rates of Mortality, Turnover, Retirement, etc.)

This valuation revised the various rates of mortality, turnover, retirement and other demographic assumptions that were used in the 2017 valuation adopted by PRSAC.

The System's most recent experience study covered the period July 1, 2012 through June 30, 2017. The results are presented in a report prepared by LSERS' actuary (dated May 3, 2018). The LLA's actuary reviewed the report for reasonableness and found it to produce appropriately revised demographic assumptions. Concerning mortality, the methodology presented in the experience study report to develop new base mortality tables made use of the System's own actuarially credible mortality experience and applied appropriate actuarial methods. Furthermore, the experience study appropriately recommended the use of generational mortality improvements as published by the Society of Actuaries to be applied to the base table.

All these new demographic assumptions were adopted by the LSERS Board of Trustees for use in the actuary's June 30, 2018 actuarial valuation report.

Refer to Appendix A for more information concerning the demographic changes.

The table on page 6 presents the effect of changes in demographic assumptions (as well as other changes) on the unfunded accrued liability as of June 30, 2018 and on the minimum recommended net direct employer contribution rate for FYE 2020.

Economic Assumptions (Inflation and Investment Return)

LSERS' actuarial calculations and disclosures as of June 30, 2017 and as of June 30, 2018 were developed by its actuary using an investment return assumption of 7.125% and of 7.0625%, respectively.

Based on the research conducted by the LLA's actuary, among many independent national experts in forecasting inflation and investment returns, the LLA's actuary has determined that 6.80% is an acceptable return assumption and which is used for all purposes in this actuarial valuation. This is the very upper end of a range of reasonableness around the *most appropriate* return assumption determined to be 6.30% and inflation assumption to be 2.30%.

All users of this valuation report should read the following Appendices for an understanding of how this revised return assumption was derived and why it constitutes an improvement:

- Appendix B – Basis for Inflation Assumption
- Appendix C – Basis for Net Investment Return Assumption
- Appendix D – Horizon for the Net Investment Return Assumption
- Appendix E – A Reasonable Range around the Most Appropriate Net Investment Return Assumption

- Appendix H – Press Clippings for Other Retirement Systems Lowering Their Return Assumptions (2015-2018).

The table on page 6 presents the effect of the change in the economic assumptions (as well as other changes) on the unfunded accrued liability as of June 30, 2018 and on the minimum recommended net direct employer contribution rate for FYE 2020.

Method for Gain-sharing COLA Benefits

This actuarial valuation employs an explicit method of recognizing the expected cost of future gain-sharing COLA benefits of the plan. The future gain-sharing COLA benefits are actuarially equivalent to an annual fixed COLA of approximately 0.50%. This was approximated using stochastic (simulation) modeling techniques. The System's gain-sharing COLA program is complex and must be approximated within an actuarial valuation.

The System and its actuary only recognize one future permanent benefit increase. It is the opinion of the actuary for the LLA that recognizing only one future permanent benefit increase fails to measure the cost of the plan's COLA program properly. Future COLAs are highly likely to be allowed by the statutory template and highly likely to be granted by the Legislature. Their likelihood is as predictable (or more so) that are disabilities or turnover. Therefore, they should be actuarially measured, just as other future benefits which are likely to be provided.

Users of this actuarial valuation report should read the Appendix F for an understanding of *how* and *why* this change in method was derived and implemented and why it is an improvement.

The table on page 6 presents the effect of advance-recognizing gain-sharing COLA benefits (as well as other changes) on the unfunded accrued liability as of June 30, 2018 and on the minimum recommended net direct employer contribution rate for FYE 2020.

BRIEF SUMMARY OF THE EFFECTS OF ASSUMPTION/METHOD CHANGES

The following table presents (a) the unfunded accrued liability as of July 30, 2018 and (b) the associated minimum recommended net direct employer contribution rate for FYE 2020, for each of the new assumptions/methods described above. The entries below isolate the effect of each new assumption/method individually and cumulatively.

The Effects of Changes in Assumptions and Methods	Unfunded Accrued Liability as of 6/30/2018 ($ Millions)	Minimum Recommended Net Direct Employer Contribution Rate for FYE 2020 (as Pct of Projected Covered Pay)
(1) Without Any Changes in Assumptions or Methods *(benchmark values)*	$630.10	27.9%
(2) Change in Method for Actuarial Valuation System *(effect of change in Actuarial Valuation System against benchmark)*	$693.20	30.4%
a. Effect of this Change: (2)-(1)	$63.10	2.5%
(3) Change in Demographic Assumptions *(combined effect of the change above and in Demographic Assumptions against benchmark)*	$724.10	30.8%
a. Effect of this Additional Change: (3)-(2)	$30.90	0.4%
(4) Change in Economic Assumptions *(combined effect of all changes above and in Investment Return and Inflation Assumptions against benchmark)*	$796.60	34.2%
a. Effect of this Additional Change: (4)-(3)	$72.50	3.4%
(5) Change in Method for Gain-sharing COLA Benefits *(combined effect of all changes above and in Method for Gain-sharing COLA against benchmark)*	$872.40	37.1%
a. Effect of this Additional Change: (5)-(4)	$75.80	2.9%
b. Combined Effect of All Changes: 2a+3a+4a+5a = (5)-(1)	$242.30	9.2%

Source: *Developed by LLA's actuary.*

(1) Benchmark values have been developed using assumptions employed in the determination of the 6/30/2017 Unfunded Accrued Liabilities and FYE 2018 Actuarially Determined Employer Contribution rate without regard to assumption and method changes adopted after 6/30/17.

(2) Change in method for actuarial valuation system.

(3) Change in demographic assumptions (i.e., rates of retirement, termination, disability, mortality, salary merit scale, etc.) adopted by the Board of Trustees effective 6/30/2018 pursuant to the most recent experience study, which covered the 5-year period from 7/1/2012 through 6/30/2017.

(4) Change in inflation and net investment return assumption used in the 6/30/2018 actuarial valuation: for annual rate of inflation, from LSER rate of 2.50% to LLA's rate of 2.30%; and for annual rate of net investment return, from LSERS' rate of and 7.125% and to LLA's rate of 6.80% per annum.

(5) Change in method for gain-sharing COLA increases from LSERS' recognition of only one future increase to LLA's explicit single equivalent 0.50% COLA approximating all future COLA benefits.

QUALIFICATIONS, DISCLOSURES, AND CERTIFICATION

This valuation has been prepared as of June 30, 2018, based on plan provisions for the Louisiana School Employees' Retirement System (LSERS) as documented in Title 11 of Louisiana Revised Statutes (R.S.), Sections 1001 through 1206.

This report was prepared at the request of the Louisiana Legislative Auditor (LLA) and is intended for use by the Public Employees Retirement Systems' Actuarial Committee (PRSAC) and those designated or approved by the LLA and PRSAC. This report may be provided to parties other than PRSAC only in its entirety and only with the permission of the LLA. GRS is not responsible for unauthorized use of this report.

The purposes of the valuation are to measure the System's funding progress, to determine the unfunded actuarial liability as of June 30, 2018, and to determine the actuarially-determined contribution rate for the fiscal year ending June 30, 2020. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results associated with the benefits described in this report for purposes other than those identified above may be significantly different.

The contribution rates shown on page 2 may be considered minimum contribution rates that comply with the statutes' funding policy. Users of this report should be aware that contributions made at these rates do not guarantee benefit security. Given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in this report be considered.

The contribution rates in this report are determined using the actuarial assumptions and methods disclosed in Section III of this report. This report does not include a robust assessment of the risks of future experience not meeting the actuarial assumptions, as the assessment of these risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the System's financial condition.

The findings in this report are based on census and financial data and other information through June 30, 2018. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the System's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

This valuation assumed the continuing ability of the plan sponsors to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsors are actually able to do so is outside our scope of expertise and was not performed.

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

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge, the information contained in this report is accurate and fairly presents the actuarial position of the System as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board, and with applicable statutes.

James J. Rizzo and Piotr Krekora are members of the American Academy of Actuaries. These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor and the System.

This actuarial valuation and contribution determination was prepared and completed by us or under our direct supervision, and we acknowledge responsibility for the results. To the best of our knowledge, the results are complete and accurate. In our opinion, the techniques and assumptions used are reasonable, meet the requirements and intent of relevant Louisiana Statutes, and are based on generally accepted actuarial principles and practices. There is no benefit or expense to be provided by the System and/or paid from the System's assets for which liabilities or current costs have not been established or otherwise taken into account in the valuation. All known events or trends which may require a material increase in plan costs or required contribution rates have been taken into account in the valuation.

The actuary for the Legislative Auditor will be pleased to review this valuation report with PRSAC and to answer any questions pertaining to the valuation.

Respectfully submitted,

ACTUARY FOR THE LOUISIANA LEGISLATIVE AUDITOR

Gabriel, Roeder, Smith & Company

By: James J. Rizzo, ASA, MAAA

By: Piotr Krekora, ASA, MAAA, PhD

Date: December 18, 2018

SECTION I:
DEVELOPMENT OF EMPLOYER CONTRIBUTIONS

1. Analysis of Actuarially Required Contributions

1. Normal Cost of Retirement Benefits	$	30,619,765
2. Normal Cost of Death Benefits	$	1,128,189
3. Normal Cost of Disability Benefits	$	3,868,494
4. Normal Cost of Deferred Retirement Benefits	$	8,725,751
5. Normal Cost of Contribution Refunds	$	-
6. TOTAL Normal Cost as of July 1, 2018 (1+2+3+4+5)	$	44,342,199
7. TOTAL Normal Cost Interest Adjusted for Midyear Payment	$	45,825,040
8. Adjustment to Total Normal Cost for Employee Portion	$	22,223,131
9. Employer Normal Cost Adjusted for Midyear Payment (7-8)	$	23,601,909
10. Amortization Payments on Unfunded Accrued Liability at Midyear	$	75,366,060
11. Projected Administrative Expenses for Fiscal 2019	$	4,792,189
12. Gross Employer Required Contribution (9+10+11)	$	103,760,158
13. Amortization Conversion Account Supplement for Fiscal 2019	$	(2,278,309)
14. Net Direct Actuarially Required Employer Contribution for Fiscal 2019 (12+13)	$	101,481,849
15. Projected Payroll for Contributing Members (Fiscal 2019)	$	292,662,231
16. Net Direct Actuarially Required Employer Contribution as a Percentage of Projected Opayroll for Fiscal 2019 (14÷15)		34.7%
17. Actual Net Direct Employer Contribution rate for Fiscal 2019		28.0%
18. Projected Fiscal 2019 Contribution Loss (Gain) as a % of Payroll (16-17)		6.7%
19. Projected Fiscal 2019 Employer Contribution Shortfall (Surplus) (15 x 18)	$	19,608,369
20. Estimated Amortization of Fiscal 2019 Employer Contribution Shortfall (Surplus) Based on Midyear Payment in Fiscal 2020	$	4,756,717
21. Estimated Fiscal 2020 Employer Normal Cost Adjusted for Midyear Payment	$	23,912,418
22. Estimated Fiscal 2020 Amortization Payments based on Fiscal 2019 UAL	$	76,942,062
23. Estimated Fiscal 2020 Administrative Expenses	$	4,911,994
24. Amortization Conversion Account Supplement for Fiscal 2020	$	(622,474)
25. Estimated Actuarially Required Net Direct Employer Contributions for Fiscal 2020 (20+21+22+23+24)	$	109,900,717
26. Projected Payroll for Contributing Members (Fiscal 2020)	$	296,512,523
27. Minimum Recommended Net Direct Employer Contribution Rate for Fiscal 2020 (25÷26, Rounded to nearest 0.10%)		37.1%

2. Present Value of Future Benefits

PRESENT VALUE OF FUTURE BENEFITS FOR ACTIVE MEMBERS		
Retirement Benefits	$ 1,083,938,748	
Survivor Benefits	16,161,915	
Disability Benefits	68,272,519	
Vested Termination Benefits (including Refunds of Contributions)	140,413,512	
TOTAL Present Value of Future Benefits for Active Members		$ 1,308,786,694
PRESENT VALUE OF FUTURE BENEFITS FOR TERMINATED MEMBERS		
Terminated Vested Members Due Benefits at Retirement	$ 23,709,570	
Terminated Members with Reciprocals Due Benefits at Retirement	271,484	
Terminated Members Due a Refund	7,236,203	
TOTAL Present Value of Future Benefits for Active Members		$ 31,217,257
PRESENT VALUE OF FUTURE BENEFITS FOR RETIREES		
Regular Retirees	1,512,906,118	
Disability Retirees	22,870,802	
Survivors & Widows	156,939,267	
Liability Attributable to the Experience Account	0	
DROP Account Balances Payable to Retirees	29,514,273	
IBRP Account Balance	1,186,042	
TOTAL Present Value of Future Benefits for Retirees & Survivors		$ 1,723,416,502
TOTAL Present Value of Future Benefits		$ 3,063,420,453

3a. Market Value of Assets

CURRENT ASSETS:		
Cash in Banks	$ 51,848,421	
Contributions Receivable	15,419,849	
Accrued interest and dividends	2,458,603	
Investment Receivable	967,131	
Other Current Assets	1,748,441	
TOTAL CURRENT ASSETS		$ 72,442,445
Property Plant & Equipment		$ 3,238,751
INVESTMENTS:		
Cash Equivalents	$ 25,384,396	
Equities	1,106,668,997	
Fixed Income	493,094,320	
Real Estate	166,802,172	
Alternative Investments	89,799,167	
Collateral for Securities Lending	109,782,579	
Derivatives	318,358	
TOTAL INVESTMENTS		$ 1,991,849,989
DEFERRED OUTFLOWS OF RESOURCES		$ 217,499
TOTAL ASSETS		$ 2,067,748,684
CURRENT LIABILITIES		
Accounts Payable	$ 547,508	
Benefits Payable	2,391,070	
Refunds Payable	579,429	
Investments Payable	874,580	
Securities Lending Obligations	109,782,579	
Other Post-Employment Benefits	7,086,024	
TOTAL CURRENT LIABILITIES		$ 121,261,190
DEFERRED INFLOWS OF RESOURCES		$ 374,454
MARKET VALUE OF ASSETS		$ 1,946,113,040

3b. Actuarial Value of Assets

Excess/(Shortfall) of invested income for current and previous 4 years: *		
Fiscal Year 2018	$	(13,290,517)
Fiscal Year 2017		118,660,351
Fiscal Year 2016		(139,840,706)
Fiscal Year 2015		(76,298,518)
Fiscal Year 2014		153,829,757
Total for five years	$	43,060,367
Deferral of Excess/(Shortfall) of invested income:		
Fiscal Year 2018 (80%)	$	(10,632,414)
Fiscal Year 2017 (60%)		71,196,211
Fiscal Year 2016 (40%)		(55,936,282)
Fiscal Year 2015 (20%)		(15,259,704)
Fiscal Year 2014 (0%)		-
Total deferred for year	$	(10,632,189)
Market value of plan net assets, end of year	$	1,946,113,040
Preliminary actuarial value of plan assets, end of year	$	1,956,745,229
Actuarial value of assets corridor		
85% of market value, end of year	$	1,654,196,084
115% of market value, end of year	$	2,238,029,996
Actuarial Value of Plan Assets, end of year	$	1,956,745,229
Amortization Conversion Account Balance, end of year	$	(6,838,575)
Net Valuation Assets, end of year	$	1,949,906,654

***** Excess (shortfall) of actual investment income versus expected investment income is calculated based on assets and income adjusted to exclude the money market DROP accounts.

4. Present Value of Future Contributions

Employee Contributions to the Annuity Savings Fund	$ 120,485,207
Employer Normal Contributions to the Pension Accumulation Fund	120,591,872
Employer Amortization Payments to the Pension Accumulation Fund	872,436,720
TOTAL PRESENT VALUE OF FUTURE CONTRIBUTIONS	$ 1,113,513,799

5a. Actuarial Accrued Liability

LIABILITY FOR ACTIVE MEMBERS		
Accrued Liability for Retirement Benefits	$ 922,623,936	
Accrued Liability for Survivor Benefits	9,798,647	
Accrued Liability for Disability Benefits	45,720,692	
Accrued Liability for Vested Termination Benefits (including Refunds of Contributions)	89,566,340	
TOTAL Actuarial Accrued Liability for Active Members		$ 1,067,709,615
LIABILITY FOR TERMINATED VESTED MEMBERS		$ 31,217,257
LIABILITY FOR RETIREES AND SURVIVORS		$ 1,723,416,502
TOTAL ACTUARIAL ACCRUED LIABILITY		$ 2,822,343,374
ACTUARIAL VALUE OF ASSETS		$1,949,906,654
UNFUNDED ACTUARIAL ACCRUED LIABILITY		$ 872,436,720

5b. Change in Unfunded Actuarial Accrued Liability

PRIOR YEAR UNFUNDED ACCRUED LIABILITY		$ 662,303,876
Interest on Unfunded Accrued Liability	$ 47,189,151	
Liability Assumption/Method Change Loss	242,320,776	
Contribution Shortfall with Accrued Interest	4,655,410	
Gains Allocated to Experience Account	0	
TOTAL Additions to UAL		$ 294,165,337
Asset Experience Gain	10,056,996	
Liability Experience Gain	16,380,918	
Contribution Excess with accrued Interest	0	
Interest Adjusted Amortization Payments	57,594,579	
TOTAL Reductions to UAL		$ 84,032,493
NET Change in Unfunded Accrued Liability		$ 210,132,844
CURRENT YEAR UNFUNDED ACCRUED LIABILITY		$ 872,436,720

5c. Amortization of Unfunded Actuarial Accrued Liability

Fiscal Year	Description	Amortization Period	Initial Balance	Years Remaining		Remaining Balance	Amortization Payments
2014	Cumulative Bases	30	$ 904,498,330	26	*	$ 803,780,564	$ 67,060,635
2014	Asset Experience Gain (Act 399 of 2014)	5	(7,500,000)	1		(1,713,212)	(1,713,212)
2014	Liability Experience Gain	30	(81,635,532)	26		(77,875,827)	(6,052,560)
2014	Contribution Loss	5	823,919	1		188,207	188,207
2015	Change in Data/Model Loss	30	(42,073,134)	27		(40,661,694)	(3,116,466)
2015	Liability Assumption Loss	30	53,611,596	27		51,813,072	3,971,150
2015	Asset Experience Gain	30	(32,513,380)	27		(31,422,645)	(2,408,351)
2015	Liability Experience Gain	30	(29,473,558)	27		(28,484,800)	(2,183,183)
2015	Contribution Gain	5	(3,883,540)	2		(1,714,345)	(885,358)
2016	Asset Experience Loss	30	7,620,492	28		7,457,118	564,222
2016	Liability Experience Gain	30	(366,508)	28		(358,651)	(27,136)
2016	Contribution Gain	5	(4,417,900)	3		(2,830,664)	(1,006,264)
2016	Liability Assumption Gain	30	(29,907,056)	28		(29,265,884)	(2,214,321)
2016	Asset Assumption Loss	30	211,528	28		206,992	15,661
2017	Gross Asset Experience Gain	20	(24,634,307)	19		(24,041,558)	(2,145,433)
2017	Gains Allocated to Experience Account	10	3,875,934	9		3,597,055	512,557
2017	Priority Excess Allocation	20	15,932,442	19		15,549,077	1,387,577
2017	Liability Experience Gain	20	(19,955,111)	19		(19,474,952)	(1,737,916)
2017	Contribution Loss	5	3,079,929	4		2,545,692	700,533
2017	Liability Assumption Loss	20	20,126,949	19		19,642,655	1,752,881
2017	Asset Assumption Gain	20	(4,562,632)	19		(4,452,847)	(397,365)
2018	Liability Experience Gain	20	(16,380,918)	20		(16,380,918)	(1,425,365)
2018	Asset Experience Gain	20	(10,056,996)	20		(10,056,996)	(875,097)
2018	Contribution Loss	5	4,655,410	5		4,655,410	1,057,432
2018	Gains Allocated to Experience Account	10	0	10		0	0
2018	Priority Excess Allocation	20	9,415,089	20		9,415,089	819,242
2018	Actuarial System Method Change	20	63,068,239	20		63,068,239	5,487,803
2018	Demographic Assumption Changes	20	30,925,400	20		30,925,400	2,690,935
2018	Economic Assumption Changes	20	72,507,857	20		72,507,857	6,309,180
2018	COLA Method Change	20	75,819,286	20		75,819,286	6,597,320
	TOTAL Unfunded Actuarial Liability					$ 872,436,720	
	TOTAL Fiscal 2019 Amortization Payments at Beginning of Year						$ 72,927,308
	TOTAL Fiscal 2019 Amortization Payments adjusted to Mid-Year						$ 75,366,060

* Balance reduced by application of investment gains assigned by Act 399 of 2014.

5d. Cumulative Amortization Base Adjustment

2014 Initial Cumulative Amortization Base	$	905,696,581
2014 Applied Base Reduction for Privatization Liability		(1,198,251)
2014 Priority Excess Interest Applied to Base		(7,500,000)
2014 PBI Cap Excess Applied to Base		(3,252,257)
2014 Adjusted Initial Amortization Base	$	893,746,073
2015 Amortization Payment (Beginning of Year)		(69,677,675)
2015 Interest on Amortization Base net of Amortization Payment		59,744,957
2015 Priority Excess Interest Applied to Base		(15,000,000)
Net Balance as of June 30, 2015 on 2014 Cumulative Base	$	868,813,355
2016 Amortization Payment (Beginning of Year)		(68,153,884)
2016 Interest on Amortization Base net of Amortization Payment		56,046,163
2016 Priority Excess Interest Applied to Base		0
Net Balance as of June 30, 2016 on 2014 Cumulative Base	$	856,705,634
2017 Amortization Payment (Beginning of Year)		(68,897,690)
2017 Interest on Amortization Base net of Amortization Payment		56,131,316
2017 Priority Excess Interest Applied to Base		(15,932,442)
Net Balance as of June 30, 2017 on 2014 Cumulative Base	$	828,006,818
2018 Amortization Payment (Beginning of Year)		(68,897,690)
2018 Interest on Amortization Base net of Amortization Payment		54,086,525
2018 Priority Excess Interest Applied to Base		(9,415,089)
Net Balance as of June 30, 2018 on 2014 Cumulative Base	$	803,780,564

6. Analysis of Change in Assets

Actuarial Value of Assets (June 30, 2017)		$ 1,900,329,127
Prior Period Adjustment		$ (3,670,610)
Actuarial Value of Assets (June 30, 2017)		$ 1,896,658,517
INCOME:		
Member Contributions	$ 22,140,933	
Employer Contributions	80,258,243	
Irregular Contributions	1,553,367	
Total Contributions		$ 103,952,543
INVESTMENTS:		
Net Appreciation of Investments	$ 110,658,549	
Interest & Dividends	13,467,156	
Alternative Investment Income	4,526,102	
Miscellaneous Income	369,618	
Investment Expense	(10,881,258)	
Net Investment Income		118,140,167
TOTAL Income		222,092,710
EXPENSES:		
Retirement Benefits	$ 185,260,310	
Refunds of Contributions	4,843,590	
Transfers to Other Systems	536,882	
Administrative Expenses	4,374,276	
TOTAL EXPENSES:		$ 195,015,058
Net Market Value Income for Fiscal 2018 (Income - Expenses)		$ 27,077,652
Unadjusted Fund Balance as of June 30, 2018 (Fund Balance Previous Year + Net Income)		$ 1,923,736,169
Income Adjustment for Actuarial Smoothing		$ 21,902,590
Change in Side Fund Balances		4,267,895
Actuarial Value of Assets (June 30, 2018)		$ 1,949,906,654

7. Experience Account

1. Experience Account Balance -- June 30, 2017	$	4,562,632
2. Investment Gain, if any	$	9,415,089
3. Priority Excess Interest Allocated to Reduce UAL	$	16,348,102
4. Residual Investment Gain, if any (2 - 3)	$	-
5. Investment Gain to Alllocate to the Experience Account (50% × 4)	$	-
6. Credit for Investment Earnings based on AVA rate of return, if positive	$	348,585
7. Total Preliminary Credits to be Allocated to Experience Account (5 + 6)	$	348,585
8. Debit for Investment Losses based on AVA rate of return, if negative	$	-
9. Present Value of Permanent Benefit Increase Paid July 1, 2018	$	-
10. Total Preliminary Debits to be Allocated to Experience Account (8 + 9)	$	-
11. Total Net Credit/Debit to be Allocated to Experience Account (7 + 10)	$	348,585
12. Limit to the Experience Account Balance -- June 30, 2018 (Present Value of PBI at CPI-U for Fiscal 2017 or 2.00%)	$	25,249,913
13. Experience Account Balance -- June 30, 2018 (Lesser of 1.+11. & 12. - at least 0)	$	4,911,217

8. Amortization Conversion Account

Amortization Conversion Account Balance as of June 30, 2017		$ 11,106,470
Fiscal Year Supplemental Contributions to be funded by the Amortization Conversion Account:		
2014-15	$ 560,927	
2015-16	3,359,318	
2016-17	4,613,318	
2017-18	4,267,895	
2018-19	2,278,309	
Total	$ 15,079,767	
Residual balance as of June 30, 2019 to be amortized as a gain	$4,560,266	
Amortization Conversion Account Balance as of June 30, 2018		$ 6,838,575

9. Year-to-Year Comparison

	Fiscal 2018	Fiscal 2017	Fiscal 2016	Fiscal 2015
Number of Active Members	12,033	12,055	12,075	12,061
Number of Retirees & Survivors	13,482	13,354	13,148	13,024
DROP Participants	631	622	676	660
Number of Terminated Due Deferred Benefits	339	311	275	276
Number Terminated Due Refunds	4,475	4,268	3,898	3,940
Active Lives Payroll (excludes DROP participants)	$ 288,861,936	$ 284,075,888	$ 284,835,111	$ 276,949,800
Retiree Benefits in Payment	$ 171,928,421	$ 167,428,815	$ 159,448,329	$ 154,831,625
Market Value of Assets (Includes Experience Account)	$ 1,946,113,040	$ 1,922,705,998	$ 1,767,810,247	$ 1,851,456,181
Ratio of Net Valuation Assets to Actuarial Accrued Liability	69.09%	74.16%	72.54%	70.71%
Actuarial Accrued Liability (EAN)	$ 2,822,343,374	$ 2,562,633,003	$ 2,522,157,498	$ 2,485,583,187
Net Valuation Assets* (Includes Experience Account)	$ 1,949,906,654	$ 1,900,329,127	$ 1,829,595,670	$ 1,757,432,206
UAL (Funding Excess)	$ 872,436,720	$ 662,303,876	$ 692,561,828	$ 728,150,981
Experience Account	$ 4,911,217	$ 4,562,632	$ 633,076	$ 23,058,055
Amortization Conversion Account	$ 6,838,575	$ 11,106,470	$ 15,719,788	$ 19,079,106

	Fiscal 2019	Fiscal 2018	Fiscal 2017	Fiscal 2016
Employee Contribution Rate For Employees Hired Before July 1, 2010	7.50%	7.50%	7.50%	7.50%
Employee Contribution Rate For Employees Hired On Or After July 1, 2010	8.00%	8.00%	8.00%	8.00%
Actuarially Required Employer Contribution as a Percentage of Projected Payroll (based on current valuation)	34.7%	27.8%	27.9%	28.7%
Actual Employer Contribution as a Percentage of Projected Payroll (approved by PRSAC based on prior valuation)	28.0%	27.6%	27.3%	30.2%

* Beginning in fiscal 2017, valuation assets and accrued liability include the Experience Account and exclude the Amortization Conversion Account.

Development of Employer Contributions

Fiscal 2014	Fiscal 2013	Fiscal 2012	Fiscal 2011	Fiscal 2010	Fiscal 2009
12,054	12,184	12,416	12,854	13,166	13,265
12,711	13,369	12,930	12,717	12,450	12,290
537	559	612	619	599	508
413	355	339	351	355	361
3,793	N/A	N/A	N/A	N/A	N/A
$ 274,347,650	$ 290,013,756	$ 277,191,001	$ 296,693,950	$ 306,332,902	$ 315,400,539
$ 146,084,220	$ 142,752,516	$ 134,573,580	$ 128,989,260	$ 123,992,280	$ 120,719,868
$ 1,857,367,056	$ 1,641,164,883	$ 1,497,109,136	$ 1,516,634,590	$ 1,285,582,191	$ 1,203,687,757
66.92%	62.10%	61.60%	59.88%	61.00%	65.49%
$ 2,438,251,413	$ 2,404,014,249	$ 2,278,472,127	$ 2,254,351,456	$ 2,213,362,198	$ 2,153,359,512
$ 1,631,618,702	$ 1,492,914,745	$ 1,403,463,883	$ 1,349,829,757	$ 1,350,072,547	$ 1,410,315,974
$ 806,632,711	$ 911,099,504	$ 875,008,244	$ 904,521,699	$ 863,289,651	$ 743,043,538
$ 20,787,326	$ 31,668,697	$ 11,641,275	$ -	$ -	$ -
$ 19,640,033	$ -	$ -	$ -	$ -	

Fiscal 2015	Fiscal 2014	Fiscal 2013	Fiscal 2012	Fiscal 2011	Fiscal 2010
7.50%	7.50%	7.50%	7.50%	7.50%	7.50%
8.00%	8.00%	8.00%	8.00%	8.00%	N/A
32.0%	32.6%	31.6%	30.1%	28.0%	23.3%
33.0%	32.3%	30.8%	28.6%	24.3%	17.6%

SECTION II
VALUATION OF THE GAIN-SHARING/COLA PROGRAM

1. Actuarial Basis for the Valuation of the Gain-sharing/COLA Program

A. Challenges in Interpreting Louisiana Law

The current gain sharing COLA program was originally enacted during the 2007 legislative session (Act 333). The program contained two components:

1. **Gain-sharing** – A portion of investment gains (and investment losses) was to be transferred from the pool of assets otherwise reserved for regular retirement benefits to the Experience Account, which would be used to fund COLAs. Funds would remain in the Experience Account until a COLA was granted. The law limited the amount of assets that could be held in the Experience Account to no more than two times the cost of a full COLA. Whenever a COLA was granted, assets equal to the present value of the COLA benefits granted were then transferred back to the regular pool of assets to cover the COLA liabilities that had been created.

2. **COLAs** – COLAs would be granted if specified conditions were satisfied and if there were sufficient assets in the Experience Account to cover the additional liability created by the COLA grant.

Although the program has been modified by Act 399 of 2014, the basic format has remained unchanged; there is a gain sharing component and a COLA grant component.

The gain-sharing component is a legislative mandate. Transfers to the Experience Account occur automatically. No approvals are necessary; if the conditions are satisfied, a transfer must occur unless the Experience Account has been capped out.

The COLA component is not a legislative mandate. Historically and currently, a COLA can be granted only if specified conditions are satisfied, there are sufficient assets in the Experience Account to pay for the COLA, and the COLA-grant is approved by the System's board and the legislature.

The structure of the gain sharing COLA program creates an actuarial dilemma. If the COLA component is assumed not part of current law, then the only liability that must be accounted for are transfers to the Experience Account. However, if COLA grants are not part of current law, then the Experience Account will reach its limit and no additional transfers will occur. The only additional liability that will be incurred by the System is the difference between the Experience Account limit and the amount already in the Experience Account.

Alternatively, if the COLA component is assumed part of current law, the frequency for which the board will recommend and the legislature will enact a COLA payment when all other conditions necessary for a COLA grant have been satisfied must be assumed. Simulations produce estimates of the average annual transfer to the Experience Account.

Following is a table that illustrates the recent history of when LSERS' COLAs were allowed to be granted and how much was granted. This information has been extracted from Title 11 of Revised Statutes and from information reported in LSERS' annual actuarial valuation reports.

The Automatic Mechanism for Allowing COLAs is Actuarially Measurable The Pattern of Experience, Legislative History, and Politics Expect COLA Approvals Whenever Allowed					
Actuarial Valuation Date	**Legislative Session**	**Amount Allowed By Statutory Template**	**Amount Granted by Legislature and Approved by Governor**	**Date COLA Paid**	**Comments**
6/30/2018	2019	None[1]	None	NA	Insufficient balance
6/30/2017	2018	None[2]	None	NA	Insufficient balance
6/30/2016	2017	None[3]	None	NA	Granted in prior year and insufficient funds
6/30/2015	2016	0.1%	1.9%[4]	7/1/16 (Act No. 512)	Legislature granted additional COLA outside the template; Governor signed it
6/30/2014	2015	None	None	NA	Legislature voted to grant a COLA outside the template; but Governor vetoed it
6/30/2013	2014	1.5%	1.5%[5]	6/30/14 (Act No. 103)	Legislature granted a full COLA as permitted
6/30/2012	2013	3.15%	3.15%[6]	7/1/13 (Act No. 297)	Legislature granted a COLA for a select group of retirees
6/30/2011	2012	None	None	NA	Empty Experience Account due to Great Recession investment losses phased in over time
6/30/2010	2011	None	None	NA	
6/30/2009	2010	None	None	NA	

During the last nine years, the Legislature and Governor approved COLAs all three times they were permitted by the statutory template to do so. Similarly, there were no cases when a template COLA was allowed but the Legislature or Governor failed to grant it. The evidence leads us to conclude, based on the historical pattern inherent in the data, a COLA was granted every year that the statutory mechanism allowed the Legislature to grant one, and that a COLA was not granted for years when the statutory mechanism did not otherwise permit the Legislature to grant one.

[1] The funds in the Experience Account were not sufficient to grant a full COLA. According to the statutory mechanism, partial COLA's are not permitted except for very narrow set of circumstances.

[2] The funds in the Experience Account were not sufficient to grant a full COLA. According to the statutory mechanism, partial COLA's are not permitted except for very narrow set of circumstances.

[3] The funds in the experience account were not sufficient to grant a full COLA. According to the statutory mechanism, even if there are funds in the Experience Account, the Board of Trusties is not permitted to recommend to the Legislature that a partial COLA be granted to be effective July 1, 2017 (based on the 2016 Experience Account balance).

[4] The application of the statutory mechanism available to the 2016 Legislature would have allowed only a 0.1% COLA due to the limitation of the Consumer Price Index. However, the 2016 Legislature overrode the template (Act 93) and allowed for a 2% COLA but not to exceed the percentage that could be purchased by the balance in the Experience Account at June 30, 2016. The balance could purchase a 1.9% increase.

[5] In Act 399 the 2014 Legislature adopted a template limiting the frequency and level of COLAs to be recommended while the Plan us less than 80% funded or when the actual actuarial rate of return is below 7.25%. Act 103 of 2014 granted a 1.5% COLA in accordance with that newly adopted template.

[6] Act 297 of 2013 authorized a COLA of up to 3.75% but not to exceed the level that could be purchased by the funds in the Experience Account.

The 2016 Legislature decided that the statutory mechanism did not allow *enough* of an increase; so it granted *more* through an amendment outside the established statutory template for COLAs. The main point is that the pattern that emerges from the application of the statutory template has been "to grant a template COLA whenever the template allows it, and possibly to grant a non-template COLA even when the template disallows it." We do not find a sufficient pattern of non-template COLAs being granted, but do find a sufficient pattern for template-driven COLAs.

In light of this discussion set forth above, future gain-sharing COLA benefits are recognized in this valuation in accordance with the following assumptions and methods.

1. The COLA component is part of current law that must be valued based on actuarial likelihood.

2. The Board and the legislature will grant a COLA if there are sufficient funds in the Experience Account and if all other necessary conditions have been satisfied.

It is clear that recognizing only one year's transfer to the Experience Account (and that no future COLA benefits would be granted) does not reflect the likelihood that COLAs will be granted in the future. Thus, in this valuation, all actuarially expected future COLA benefits are assumed to be granted in accordance with the statutory template. This is a change in the actuarial assumptions from the previous PRSAC-adopted valuations. Refer to Appendix F for more details in support of this change in assumption.

Stochastic modeling techniques can determine the single fixed annual COLA that would approximate or be equivalent to what is actuarially expected from current statutory mechanism. This single equivalent fixed annual COLA rate can then be modeled within the regular annual actuarial valuation. In this valuation's calculations, it has been determined that the single equivalent fixed COLA assumption should be a 0.50% annual COLA for the gain-sharing COLA program. This is the current best estimate. However, this estimate may change for future valuations as circumstances change.

B. Gains and Losses Associated with the Gain-Sharing/COLA Account

If the automatic COLA used to value plan liabilities is 0.50% per year, then funding for the gain-sharing COLA program has been accounted for actuarially, and done so in a transparent and explicit manner. An *experience gain* will occur if no COLA is granted (or no transfer is made) or if a smaller COLA than 0.50% is granted with funds in the Experience Account (or if a smaller than expected transfer is made). An *experience loss* will occur if a COLA is granted (or a transfer is made) that is larger than 0.50% of the present value of currently eligible payees. This is the normal way in which actuarial experience gains and losses with respect to any benefits are measured.

The Louisiana Constitution provides the following.

> *F) Benefit Provisions; Legislative Enactment. Benefit provisions for members of any public retirement system, plan, or fund that is subject to legislative authority shall be altered only by legislative enactment. No such benefit provisions having an actuarial cost shall be enacted unless approved by two-thirds of the elected members of each house of the legislature. Furthermore, no such benefit provision for any member of a state retirement system having an actuarial cost shall be approved by the legislature unless a funding source providing new or additional funds sufficient to pay all such actuarial cost within ten years of the effective date of the benefit provision is identified in such enactment. This Paragraph shall be implemented as provided by law.* [Underlining for emphasis.]

For the purpose of this valuation, it is assumed that the constitutional language applies only if the COLA approved by the legislature exceeds that which would have been granted under current law. Therefore, an additional liability is created only to the extent that the cost of the COLA grant exceeds the cost of the COLA grant that otherwise would be available under current law. Such an increase would be subject to 10-year amortization.

C. Experience Account Transfers for the June 30, 2018 Valuation

There were no investment gains were transferred to the Experience Account on June 30, 2018 since the investment gains for FYE 2018 were less than the roughly $16.3 million threshold applicable for FYE 2018. Calculations associated with this analysis are shown in Section I(7).

Refer to Appendix F for more details and support concerning the actuarial measurement of gain-sharing COLA benefits.

2. Summary of Benefit Provisions for the Gain-sharing/COLA Program

Benefit and funding provisions associated with the LSERS gain-sharing COLA program are contained in R.S. 11:102.3 and R.S. 11:1145 - 11:1145.3. According to R.S. 11:1145.1, a special account, called the Experience Account, is established and maintained to fund COLAs. Experience Account rules have changed several times since the Account's inception and additional changes were made to Experience Account rules by Act 399 of the 2014 session. Provisions associated with the gain sharing COLA program as amended through Act 399 are summarized below.

A. Experience Account Provisions

Rules pertaining to debits and credits to the Experience Account are summarized below.

1. The first transaction on June 30 of a given year is the transfer of assets from the Experience Account, if any, to the regular pool of assets to offset the liability associated with any COLA grant that becomes effective on the next day, July 1.

2. The second transaction is the transfer of investment earnings on the balance in the Experience Account on the July 1 prior to the valuation date. Assets in the Experience Account are invested in the same manner as assets in the regular pool of assets. The Experience Account is credited with investment earnings based on the actuarial rate of return on assets for the system as a whole. The following rules apply.

    a. If the Experience Account balance on the prior July 1 plus investment earnings for the FYE on the valuation date is less than the maximum amount allowed in the Experience Account on the valuation date, then all investment earnings on the July 1 balance may be credited.

    b. If the Experience Account balance on the prior July 1 plus investment earnings for the FYE on the valuation date equals or exceeds the maximum amount allowed in the Experience Account on the valuation date, then investment earnings on the Experience Account balance will be reduced sufficiently to restrict the Experience Account balance on the valuation date to the maximum limit.

    c. Any investment earnings not credited to the Experience Account are transferred to or retained by the regular pool of assets.

    d. These credits, if any, occur on the June 30 valuation date.

3. The third transaction is the transfer of the allocation of investment gains as calculated in accordance with LSERS' interpretation of the law. On each valuation date, LSERS calculates the amount of investment gain or loss that has occurred during the system's fiscal year. The investment gain for this purpose, based on an interpretation of law made by the legal staff for LSERS, increases the investment gain that otherwise would be calculated. Under LSERS' interpretation, the ***actual*** investment gain is calculated net of investment expenses, but the ***expected*** investment gain is determined as net of investment expenses, net of administrative expenses and net of gain sharing. The following rules apply.

   a. This transaction occurs after items 1 and 2 have been completed.

   b. Fifty percent (50%) of any investment gain as determined by LSERS that exceeds a specified threshold (currently set at $15 million) potentially will be transferred from the regular pool of assets to the Experience Account. The effective date of this transfer is June 30 of the fiscal year in which the investment gain occurs. The $15 million threshold is indexed: the threshold value will increase (but not decrease) in any year by the ratio of the actuarial value of assets at the end of the year to the actuarial value of assets at the beginning of the year. The first such increase may occur no earlier than June 30, 2016.

   c. The transfer amount may not exceed the amounts shown the following table.

Funded Ratio on Valuation Date	**Transfer May Not Exceed:**
At least 80%	The difference between **two** times the cost of a full 3% COLA and the amount already in the Experience Account.
At least 75% but less than 80%	The difference between the cost of a full 2.5% COLA and the amount already in the Experience Account.
At least 65% but less than 75%	The difference between the cost of a full 2.0% COLA and the amount already in the Experience Account.
At least 55% but less than 65%	The difference between the cost of a full 1.5% COLA and the amount already in the Experience Account.
Less than 55%	No transfer is allowed.

   d. If the Experience Account balance (on June 30) plus the investment gain allocation to the Experience Account is less than the maximum amount allowed in the Experience Account, then the full allocation will be transferred from the regular pool of assets and credited to the Experience Account.

   e. If the Experience Account balance plus the investment gain allocation equals or exceeds the maximum amount, then the allocation is reduced sufficiently to restrict the Experience Account on the valuation date to the maximum.

f. Any gain allocation not transferred to the Experience Account is retained by the regular pool of assets.

g. These credits, if any, will occur on the June 30 valuation date.

The value of the Experience Account balance cannot be less than $0, except under special circumstances.

B. Benefit Provisions

Current law provides a legal template that the legislature may choose to adopt in the enactment of cost-of-living adjustment. This template specifies eligibility criteria, which is generally age 60 with one year of retirement, and the basis for the amount of a COLA grant, which is the CPI-U. There is no requirement that COLA legislation follow the template. Nor is there any guarantee that COLAs in the future will even be based on the balance in the Experience Account.

The COLA template contains the following provisions:

1. Eligibility:

   The following retirees and beneficiaries of LSERS will be eligible for a COLA to be paid on the July 1 following the date the board of trustees and the legislature approve a COLA.

   a. Each retiree who satisfies all of the following criteria on the July 1 immediately following the valuation date:

      - Has received a benefit for at least one year, and
      - Has attained at least age 60.

   b. Each non-retiree beneficiary (including each survivor of a deceased active member) receiving a benefit on the July 1 immediately following the valuation date who satisfies all of the following criteria:

      - The deceased member or beneficiary or both combined have received benefits for at least one year, and
      - The deceased member would have been at least age 60 had he lived.

   c. Each disability retiree and each beneficiary who is receiving benefits based on the death of a disability retiree, who also on the valuation date has been receiving benefits for at least one year.

2. COLAs:

   a. The maximum COLA that may be granted on the July 1 immediately following the valuation date is equal to the lesser of:

      i. 3% x the benefit payable on the valuation date,

      ii. The increase in the CPI-U for the calendar year immediately prior to the valuation date (December to December) x the benefit payable on the valuation date.

   b. If the rate of return on the actuarial value of assets for the FYE on the June 30 prior to the valuation date is less than 7.25% (7.25% is hard coded into the law), then a COLA may be granted on July 1. However, the maximum COLA that may be granted is the lesser of:

      i. 2% x the benefit payable on the valuation date,

      ii. The increase in the CPI-U for the calendar year immediately prior to the valuation date (December to December) x the benefit payable on the valuation date.

   c. If the balance in the Experience Account is less than the actuarial present value of the full COLA determined above, then no COLA may be granted.

   d. COLAs will be based on the portion of a retiree's benefit on the valuation date that is less than $60,000. This limit is indexed to the CPI-U.

3. The amount of COLA that may be granted in a single year also depends on the funded ratio of the system (see Table 2 below).

Table 2

Funded Percentage of the System	Maximum COLA Percentage
At least 80%	3.00%
At least 75% but less than 80%	2.50%
At least 65% but less than 75%	2.00%
At least 55% but less than 65%	1.50%
Less than 55%	No COLA

C. Approval Process

As discussed on previous pages, no permanent benefit increase or COLA can be implemented by the System's board unless a legislative bill authorizing such increase is introduced by the legislature, passes both houses with a two-thirds majority and is signed into law by the governor. It is assumed that whenever the conditions set out by the statutory template described above are satisfied, such a bill will be successfully introduced resulting in a permanent benefit increase or COLA grant.

This is not to be construed as a legal opinion. It is merely an assumption made for the purpose of this valuation based on information available during the preparation of this report.

This valuation has recognized a liability associated with automatic transfers of investment gains to the Experience Account.

3. Compliance with Actuarial Standards of Practice

The method employed for recognizing the gain-sharing COLA benefits as described in Section II(1)(A) and (B) complies with Actuarial Standards of Practice.

According to Section 3.5.3 of Actuarial Standards of Practice No. 4:

> *Plan Provisions that are Difficult to Measure – Some **plan provisions** may create pension obligations that are difficult to appropriately measure using traditional valuation procedures. Examples of such **plan provisions** include the following:*
>
> *a. gain sharing provisions that trigger benefit increases when investment returns are favorable but do not trigger benefit decreases when investment returns are unfavorable;*
> *b. floor-offset provisions that provide a minimum defined benefit in the event a **participant's** account balance in a separate plan falls below some threshold;*
> *c. benefit provisions that are tied to an external index, but subject to a floor or ceiling, such as certain cost of living adjustment provisions and cash balance crediting provisions; and*
> *d. benefit provisions that may be triggered by an event such as a plan shutdown or a change in control of the plan sponsor.*
>
> *For such **plan provisions**, the actuary **should consider** using alternative valuation procedures, such as stochastic modeling, option-pricing techniques, or deterministic procedures in conjunction with assumptions that are adjusted to reflect the impact of variations in experience from year to year. When selecting alternative valuation procedures for such **plan provisions**, the actuary should use professional judgment based on the purpose of the measurement and other relevant factors.*

According to Section 2.1 of Actuarial Standards of Practice No. 1:

> *The words "must" and "should" are used to provide guidance in the ASOPs. "Must" as used in the ASOPs means that the ASB does not anticipate that the actuary will have any reasonable alternative but to follow a particular course of action. In contrast, the word "should" indicates what is normally the appropriate practice for an actuary to follow when rendering actuarial services. Situations may arise where the actuary applies professional judgment and concludes that complying with this practice would be inappropriate, given the nature and purpose of the assignment and the principal's needs, or that under the circumstances it would not be reasonable or practical to follow the practice.*
>
> *Failure to follow a course of action denoted by either the term "must" or "should" constitutes a deviation from the guidance of the ASOP. In either event, the actuary is directed to ASOP No. 41, Actuarial Communications.*
>
> *The terms "must" and "should" are generally followed by a verb or phrase denoting action(s), such as "disclose," "document," "consider," or "take into account." For example, the phrase "should consider" is often used to suggest potential courses of*

action. If, after consideration, in the actuary's professional judgment an action is not appropriate, the action is not required and failure to take this action is not a deviation from the guidance in the standard.

Bold and underline have been added for emphasis and identification.

SECTION III
BASIS FOR THE VALUATION

1. Introduction

The June 30, 2018 valuation is used to determine actuarial liabilities as of June 30, 2018, the actuarially required employer contribution for FYE 2019, and the minimum recommended net direct employer contribution rate for FYE 2020. Census data, actuarial methods, and actuarial assumptions used in the preparation of June 30, 2018 assets, liabilities, and employer contribution requirements for FYE 2019 are shown in this section of the report. Additional information is provided with respect to changes made in actuarial systems, assumptions and methods since the June 30, 2017 valuation.

2. Census Data

Census data used in the preparation of the June 30, 2018 valuation is summarized below. The census data was provided by LSERS. A comparison with census summaries prepared by the LSERS' actuary confirmed the reasonability of the census data used in preparing this report.

Membership Reconciliation

	Active	Terminated with Funds on Deposit	DROP	Retired	Total
Number of Members as of June 30, 2017	**12,055**	**4,579**	**622**	**13,354**	**30,610**
Additions to Census					
Initial Membership	1,280	129	0	0	1,409
Omitted in error last year	0	1	0	0	1
Death of another member	0	0	(2)	133	131
Adjustment for multiple records	0	0	0	6	6
Total Additions	**1,280**	**130**	**(2)**	**139**	**1,547**
Change in Status during the Year					
Active terminating service	(487)	487	0	0	0
Active who retired	(384)	0	0	384	0
Active entering DROP	(218)	(35)	253	0	0
Terminated members rehired	60	(60)	0	0	0
Terminated members who retire	0	(29)	0	29	0
Retirees who are rehired	2	0	0	(2)	0
Refunded who are rehired	18	2	0	0	20
DROP participants retiring	0	0	(131)	131	0
DROP returned to work	104	0	(104)	0	0
Omitted in error last year	0	0	0	0	0
Total Changes	**(905)**	**365**	**18**	**542**	**20**
Eliminated from Census					
Refund of contributions	(357)	(239)	0	0	(596)
Deaths	(40)	(21)	(7)	(550)	(618)
Included in error last year	0	0	0	(1)	(1)
Adjustment for multiple records	0	0	0	(2)	(2)
Total Eliminated	**(397)**	**(260)**	**(7)**	**(553)**	**(1,217)**
Number of Members as of June 30, 2018	**12,033**	**4,814**	**631**	**13,482**	**30,960**

Actives Census by Age

Ages	Number Male	Number Female	Total Number	Average Salary	Total Salary
[16-20)	14	6	20	18,345	366,904
[21-25)	85	61	146	22,330	3,260,158
[26-30)	194	184	378	22,572	8,532,289
[31-35)	236	338	574	22,944	13,169,846
[36-40)	297	545	842	23,072	19,427,031
[41-45)	365	714	1,079	23,723	25,597,011
[46-50)	568	1,001	1,569	24,130	37,860,618
[51-55)	918	1,461	2,379	25,118	59,754,567
[56-60)	1,018	1,427	2,445	24,674	60,328,260
[61-65)	702	699	1,401	23,496	32,918,320
[66-70)	396	349	745	23,190	17,276,686
[71-75)	164	153	317	23,301	7,386,572
[76-80)	62	53	115	22,125	2,544,359
[81-85)	12	7	19	19,051	361,966
[86-90)	2	2	4	19,337	77,349
TOTAL	5,033	7,000	12,033	24,006	288,861,936

DROP Participants

Ages	Number Male	Number Female	Total Number	Average Salary	Total Salary
[51-55)	13	11	24	28,980	695,518
[56-60)	85	110	195	20,646	4,026,067
[61-65)	136	220	356	14,267	5,078,902
[66-70)	16	19	35	6,566	229,809
[71-75)	8	6	14	5,550	77,703
[76-80)	3	4	7	5,704	39,931
TOTAL	261	370	631	16,082	10,147,930

Regular Retirees

Ages	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
[41-45)	3	0	3	14,601	43,802
[46-50)	12	5	17	12,453	213,234
[51-55)	76	40	116	20,559	2,384,842
[56-60)	357	255	612	21,301	13,036,287
[61-66)	759	944	1,703	16,759	28,540,205
[66-70)	1,046	1,353	2,399	15,007	36,002,952
[71-75)	902	1,400	2,302	12,791	29,445,577
[76-80)	754	1,220	1,974	10,358	20,446,921
[81-85)	510	804	1,314	9,680	12,719,704
[86-90)	275	414	689	9,438	6,502,686
[91-99)	120	136	256	10,807	2,766,489
TOTAL	4,814	6,571	11,385	13,360	152,102,699

Disability Retirees

Ages	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
[41-45)	1	2	3	8,368	25,105
[46-50)	8	18	26	8,974	233,311
[51-55)	24	44	68	9,730	661,669
[56-60)	34	77	111	8,455	938,492
[61-66)	0	0	0	0	0
[66-70)	0	0	0	0	0
[71-75)	1	0	1	4,368	4,368
TOTAL	68	141	209	8,914	1,862,945

Survivors

Ages	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
[0-25)	25	21	46	10,969	504,588
[26-30)	4	4	8	10,230	81,842
[31-35)	3	1	4	8,789	35,157
[36-40)	4	11	15	7,712	115,679
[41-45)	5	13	18	6,667	120,006
[46-50)	12	23	35	10,784	377,440
[51-55)	12	52	64	10,850	694,392
[56-60)	24	96	120	11,281	1,353,697
[61-66)	25	135	160	11,660	1,865,619
[66-70)	42	205	247	10,595	2,617,062
[71-75)	48	239	287	9,469	2,717,541
[76-80)	61	248	309	8,974	2,772,956
[81-85)	43	254	297	7,945	2,359,626
[86-90)	21	168	189	8,428	1,592,921
[91-99)	4	85	89	8,475	754,252
TOTAL	333	1,555	1,888	9,514	17,962,778

Active Members

Member Count
Total Salary

Age/Service	0	1	2	3	4	[5-9)	[10-14)	[15-19)	[20-24)	[25-29)	[30+)	TOTAL
[0-20)	20											20
	18,345											18,345
[21-25)	75	25	28	10	7	1						146
	22,256	22,176	23,744	21,121	20,905	14,166						22,330
[26-30)	115	95	59	38	26	41	4					378
	21,249	21,983	21,952	22,675	25,610	25,670	31,284					22,572
[31-35)	113	95	80	67	45	119	52	3				574
	20,038	21,904	22,649	22,996	22,662	25,135	25,860	38,826				22,944
[36-40)	139	92	110	73	86	181	133	28				842
	21,301	21,123	21,386	21,709	22,235	23,230	27,225	30,282				23,072
[41-45)	137	103	99	106	63	247	203	92	27	2		1,079
	20,732	21,077	21,858	22,983	21,883	23,482	24,660	29,089	36,997	62,875		23,723
[46-50)	161	137	99	105	89	339	294	204	104	36	1	1,569
	20,498	22,531	21,136	21,894	21,837	23,572	25,019	27,064	29,013	34,441	13,904	24,130
[51-55)	184	189	116	141	119	435	484	344	255	107	5	2,379
	21,877	21,634	22,386	23,267	24,706	24,248	25,486	25,615	28,761	33,259	47,071	25,118
[56-60)	186	138	136	139	121	470	492	386	308	47	22	2,445
	21,508	22,908	21,141	22,452	23,461	23,975	25,041	25,777	28,291	29,914	30,628	24,674
[61-65)	101	92	114	92	94	314	215	144	100	88	47	1,401
	20,258	21,174	20,903	21,351	21,857	23,731	24,272	25,240	25,182	26,945	28,266	23,496
[66-70)	62	40	44	40	29	144	110	86	88	57	45	745
	19,438	20,089	20,254	19,858	19,620	20,805	23,231	25,762	26,968	28,006	28,379	23,190
[71+)	21	18	22	27	26	68	73	47	49	35	69	455
	18,646	23,436	18,324	21,246	18,341	21,242	23,206	23,894	24,774	24,048	25,887	22,792
TOTAL	1,314	1,024	907	838	705	2,359	2,060	1,334	931	372	189	12,033
	20,939	21,825	21,532	22,276	22,618	23,638	25,037	26,159	28,109	29,945	28,121	24,006

Terminated Members Due a Deferred Retirement Benefit

Member Count
Annual Benefits

Age/Service	0	1	2	3	4	[5-9)	[10-14)	[15-19)	[20-24)	[25-29)	[30+)	TOTAL
[0-25)												0
												0
[26-30)											2	2
											4,327	4,327
[31-35)										8		8
										6,483		6,483
[36-40)									21			21
									8,559			8,559
[41-45)								22				22
								8,309				8,309
[46-50)							53					53
							9,334					9,334
[51-55)		2				85						87
		16,478				9,923						10,074
[56-60)	16	33	19	19	11							98
	11,858	9,265	9,549	11,151	10,588							10,258
[61-65)	27											27
	7,704											7,704
[66-70)	10											10
	5,924											5,924
[71-75)	8											8
	4,586											4,586
[76-80)	2											2
	3,869											3,869
[81-85)	1											1
	1,115											1,115
[86+)												0
												0
TOTAL	64	35	19	19	11	85	53	22	21	8	2	339
	7,852	9,677	9,549	11,151	10,588	9,923	9,334	8,309	8,559	6,483	4,327	9,180

Service Retirees

Member Count
Annual Benefits

Age/Service	0	1	2	3	4	[5-9)	[10-14)	[15-19)	[20-24)	[25-29)	[30+)	TOTAL
[0-50)	9	2	1	1	2	4				1		20
	14,442	23,934	7,753	15,247	10,071	7,575				5,750		12,852
[51-55)	19	20	18	13	8	23	10	3	2			116
	30,423	17,461	24,527	24,138	22,233	17,430	8,756	8,929	4,601			20,559
[56-60)	97	73	54	59	45	131	108	35	7	1	2	612
	24,167	23,331	26,419	25,483	27,988	22,238	14,167	8,461	5,514	6,674	7,382	21,301
[61-65)	225	197	183	165	112	423	280	87	21	6	4	1703
	14,825	15,958	15,765	18,418	17,936	20,570	16,239	8,141	5,333	5,711	6,427	16,759
[66-70)	105	148	153	177	185	783	609	153	52	26	8	2399
	12,624	13,649	14,409	15,405	15,875	14,789	17,862	11,701	6,178	6,566	6,109	15,007
[71-75)	47	63	46	53	74	555	962	356	94	42	10	2302
	13,139	13,222	11,256	12,538	14,189	13,219	13,619	11,737	8,646	6,570	5,800	12,791
[76-80)	15	29	26	29	29	205	593	713	252	59	24	1974
	7,167	12,328	11,908	14,605	14,869	12,294	10,318	9,861	10,082	7,777	6,164	10,358
[81-85)	4	3	9	9	11	65	137	443	456	133	44	1314
	8,314	19,964	15,411	12,619	10,923	12,639	10,021	8,929	9,413	10,510	9,413	9,680
[86-90)		1		4		13	35	84	239	260	53	689
		30,391		13,375		10,171	11,754	8,042	9,009	9,597	10,401	9,438
[91+)						1	5	8	25	85	132	256
						5,015	12,929	8,981	10,295	10,309	11,298	10,807
TOTAL	521	536	490	510	466	2203	2739	1882	1148	613	277	11,385
	16,260	15,942	16,187	17,359	17,177	15,634	13,914	9,954	9,179	9,334	9,935	13,360

Disability Retirees

Member Count
Annual Benefits

Age/Service	0	1	2	3	4	[5-9)	[10-14)	[15-19)	[20-24)	[25-29)	[30+)	TOTAL
[0-40)												0
												0
[41-45)	1	1				1						3
	7,165	12,380				5,560						8,368
[46-50)	2	3	4	3	4	9	1					26
	9,744	9,665	8,793	8,728	11,017	7,377	13,007					8,973
[51-55)	3	11	8	7	6	22	8	3				68
	7,630	14,181	10,025	11,803	11,918	8,464	5,689	5,573				9,730
[56-60)	11	17	11	11	10	39	11	1				111
	9,004	9,646	9,660	8,868	8,708	8,268	5,127	5,729				8,455
[61-65)												0
												0
[66-70)												0
												0
[71-75)								1				1
								4,368				4,368
[76+)												0
												0
TOTAL	17	32	23	21	20	71	20	5	0	0	0	209
	8,740	11,292	9,636	9,827	10,133	8,178	5,746	5,363	0	0	0	8,914

Surviving Beneficiaries of Former Members

Member Count
Annual Benefits

Age/Service	0	1	2	3	4	[5-9)	[10-14)	[15-19)	[20-24)	[25-29)	[30+)	TOTAL
[0-20)	2	7	8	2	3	1	7	1				31
	4,730	14,447	12,568	19,180	4,452	7,518	8,863	13,135				11,147
[21-25)			3			7	3	2				15
			7,597			13,404	9,075	7,598				10,603
[26-30)						1	3	1	2	1		8
						26,406	10,327	2,400	9,454	3,146		10,230
[31-35)						1	1	2				4
						7,571	13,138	7,224				8,789
[36-40)				2		3	3	2		2	3	15
				13,119		10,215	5,799	4,084		9,258	4,905	7,712
[41-45)		2	1		2	2	7		2	1	1	18
		5,037	3,943		7,397	6,272	9,103		3,385	4,435	3,725	6,667
[46-50)	1	3	2			6	8	6	5	3	1	35
	27,402	11,473	12,296			14,610	12,191	6,810	6,712	9,853	1,856	10,784
[51-55)	1	2	5		3	10	17	11	8	4	3	64
	38,817	11,584	6,864		30,305	14,795	10,892	7,153	6,507	6,377	5,936	10,850
[56-60)	2	4	6	5	6	23	39	15	15	3	2	120
	16,467	11,671	12,257	12,813	8,323	14,301	12,819	8,904	5,656	7,049	9,050	11,281
[61-65)	1	4	4	11	1	38	37	36	17	9	2	160
	7,394	15,844	23,384	12,480	38,476	14,355	12,514	8,432	7,804	6,250	12,285	11,660
[66-70)	2	2	5	5	3	45	74	57	34	14	6	247
	12,980	10,673	11,345	15,235	10,947	12,985	12,417	8,923	7,270	8,112	5,247	10,595
[71-75)	2	1	3	1	4	36	78	83	51	16	12	287
	8,839	10,931	7,149	22,154	9,768	10,851	10,008	9,184	8,912	7,520	8,158	9,469
[76-80)			1	1	2	18	45	98	81	39	24	309
			4,886	9,734	37,808	8,708	9,345	8,129	9,383	8,922	8,367	8,974
[81-85)			1		2	5	19	75	84	74	37	297
			9,678		12,412	10,367	7,843	7,142	8,332	8,113	7,794	7,945
[86-90)						1	5	12	44	68	59	189
						9,002	12,693	5,847	8,669	8,948	7,803	8,428
[91+)						1	1	5	4	21	57	89
						4,356	11,383	12,090	6,471	8,663	8,250	8,475
TOTAL	11	25	39	27	26	198	347	406	347	255	207	1,888
	14,513	12,445	11,436	13,852	14,609	12,553	10,963	8,236	8,351	8,358	7,874	9,514

3. Plan Provisions

The Louisiana School Employees' Retirement System (LSERS) was established as of July 1, 1947, for the purpose of providing retirement allowances and other benefits as described under R.S. 11:1001 – 11:1206. The following summary of plan provisions covers many of the most important plan provisions covering LSERS, but is not a description of every plan provision and should only be used for general informational purposes. This summary does not constitute a guarantee of benefits. The provisions contained within this section are as of June 30, 2018.

MEMBERSHIP:

Any school bus operator, janitor, custodian, maintenance employee, bus aide, monitor or attendant or other regular school employee helping with the transportation of school children, and who is a legal employee of a parish or city school board of the State of Louisiana along with employees of the system.

CONTRIBUTION RATES:

Employees whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred before July 1, 2010 contribute 7.50% of salary and employees whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or after July 1, 2010 contribute 8.00% of salary. Employers contribute an actuarially determined "normal contribution" rate plus "accrued liability contribution" rate. Members are not required to contribute to the system once they have enough service to have accrued 100% of their final average compensation, but the employer is required to continue to contribute the employer's contribution until the member retires or enters DROP.

CONTRIBUTION REFUNDS:

Upon withdrawal from service, members not entitled to a retirement allowance may receive a refund of accumulated contributions. Refunds are payable ninety days after the effective date of withdrawal from service, if the member's employer has submitted all contributions. (Members who are entitled to a retirement allowance may waive their right to the benefit and accept a refund of accumulated contributions.)

FINAL AVERAGE COMPENSATION:

For members whose first employment making them eligible for membership in the system began on or before June 30, 2006, the final average compensation is based on the 36 highest successive or joined months of employment. The compensation used to determine the final average compensation cannot increase more than 10% per year, unless the raise is due to an increase in compensation by legislative act or city/parish system-wide salary increase.

For members whose first employment making them eligible for membership in the system began on or after July 1, 2006 and whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or before June 30, 2010, the final average compensation is based on the 60 highest successive or joined months of employment. The compensation used to determine the final average compensation cannot increase more than 10% per year, unless the raise is due to an increase in compensation by legislative act or city/parish system-wide salary increase.

For members whose first employment making them eligible for membership in one of Louisiana's state retirement systems began on or after July 1, 2010, the final average compensation is based on the 60 highest successive or joined months of employment. The compensation used to determine the final average compensation cannot increase more than 15% per year, unless the raise is due to an increase in compensation by legislative act or city/parish system-wide salary increase.

VESTED WITHDRAWAL BENEFITS:

Members whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or before June 30, 2010, who have ten or more years of creditable service, may elect to leave accumulated contributions on deposit and after withdrawal from service receive a retirement allowance based on the creditable service and accrual rate for their period of membership upon reaching age sixty.

Members whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or after July 1, 2010 and on or before June 30, 2015, who have five or more years of creditable service, may elect to leave accumulated contributions on deposit and after withdrawal from service receive a retirement allowance based on the creditable service and accrual rate for their period of membership upon reaching age sixty.

Members whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or after July 1, 2015, who have five or more years of creditable service, may elect to leave accumulated contributions on deposit and after withdrawal from service receive a retirement allowance based on the creditable service and accrual rate for their period of membership upon reaching age sixty-two.

NORMAL RETIREMENT BENEFITS:

For members whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or before June 30, 2010, eligibility for normal retirement occurs upon the attainment of age 60 and 10 years of accredited service, or age 55 and 25 years of accredited service, or at any age and 30 years of accredited service. The retirement allowance is equal to three and one-third percent of the member's final average compensation multiplied by his years of creditable service.

For members whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or after July 1, 2010 and on or before June 30, 2015, eligibility for normal retirement occurs upon the attainment of age 60 and 5 years of accredited service. The retirement allowance is equal to two and one-half percent of the member's final average compensation multiplied by his years of creditable service.

For members whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or after July 1, 2015, eligibility for normal retirement occurs upon the attainment of age 62 and 5 years of accredited service. The retirement allowance is equal to two and one-half percent of the member's final average compensation multiplied by his years of creditable service.

In addition to the normal retirement benefits, members receive a supplementary allowance equal to twenty-four dollars per annum, or two dollars per month, for each year of accredited service. The retirement benefits provided by the system cannot annually exceed one hundred percent of average compensation.

EARLY RETIREMENT:

Members are eligible to retire under the early retirement provisions if they have at least twenty (20) years of service credit regardless of attained age, exclusive of military service and unused annual and sick leave.

The early retirement benefit is calculated, inclusive of military service credit and allowable unused annual and sick leave, actuarially reduced from the earliest age that the member would normally become eligible for a regular retirement benefit if they had continued in service to that age.

OPTIONAL ALLOWANCES:

Members may receive their benefits as a life annuity, or in lieu of such receive a reduced benefit according to the option selected which is the actuarial equivalent of the maximum benefit.

Option 1 – If the retiree dies before receiving in annuity payments the present value of their annuity as it was at the time of retirement the balance is paid to his beneficiary.

Option 2 – Upon retirement, the member receives a reduced benefit. Upon the retiree's death, the designated beneficiary will continue to receive the same reduced benefit.

Option 3 – Upon retirement, the member receives a reduced benefit. Upon the retiree's death, the designated beneficiary will receive one-half of the member's reduced benefit.

Option 4 – Upon retirement, the member elects to receive a reduced benefit and to provide a specified benefit to their designated beneficiary, which in total is actuarially equivalent to the maximum benefit. The form of benefit selected under Option 4 must be approved by the Board of Trustees.

NOTE: Under Option 4, the Board of Trustees has approved the "pop up" form of benefit which provides a benefit that reverts to the maximum benefit if the beneficiary predeceases the retiree. This feature requires additional reduction to the member's benefit. (The system refers to the available popup options as option 2A, providing a beneficiary benefit equal to the member's reduced benefit and option 3A, providing a beneficiary benefit equal to one-half of the member's reduced benefit)

SELF-FUNDED COLA OPTIONS:

A member may also elect to receive an actuarially reduced benefit which provides for an automatic 2½% annual compound increase in monthly retirement benefits based on the reduced benefit and commencing on the later of age fifty-five or retirement anniversary; this COLA is in addition to any ad hoc COLAs which are payable.

INITIAL BENEFIT RETIREMENT PLAN (IBRP):

This plan is available only to members who have not participated in the Deferred Retirement Option Plan (DROP) and who meet regular retirement eligibility requirements. Under this plan, members may receive an initial benefit plus a reduced monthly retirement allowance which, when combined, equal the actuarially equivalent amount of the maximum or optional retirement allowance. The reduced monthly retirement allowance can be paid in the form of a maximum benefit or according to options described above. The initial benefit may not exceed an amount equal to thirty-six

payments of the member's maximum retirement allowance. The initial benefit is placed in an account called an "IBRP Account" where interest is credited annually and can be withdrawn as a lump-sum payment, monthly payments, or other periodic payments.

DISABILITY BENEFITS:

Any member who meets the minimum service requirement for disability and who has been officially certified as likely to be totally and permanently incapacitated, either mentally or physically, from the further performance of the duties being performed is entitled to disability benefits.

A member whose first employment making them eligible for membership in LSERS occurred on or before June 30, 2006, may apply for disability benefits if he is not eligible to receive a regular service retirement allowance and has five years of actual credited service. The disability retirement allowance is equal to two and one-half percent of final average compensation multiplied by the years of creditable service, but not less than thirty-three and one-third percent of final average compensation. Such members are not eligible to choose an optional allowance. Upon the death of such disability retiree who leaves a surviving spouse who had been married to the deceased for at least two years prior to death, the spouse receives a benefit equal to 75% of the benefit being received by the disability retiree at death. These benefits are payable for the life of the spouse unless the spouse remarries before age 55. In such a case, the benefit ceases upon the remarriage.

A member whose first employment making them eligible for membership in LSERS occurred on or after July 1, 2006 and whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or before June 30, 2010 may apply for disability benefits if he is not eligible to receive a regular service retirement allowance and has ten years of actual credited service. The disability retirement allowance is equal to three percent of final average compensation multiplied by the years of creditable service. Upon the death of such disability retiree who leaves a surviving spouse who had been married to the deceased for at least two years prior to the death of the disability retiree, the spouse receives a benefit equal to 75% of the benefit being received by the disability retiree at their death. These benefits are payable for the life of the spouse unless the spouse remarries before age 55. In such a case, the benefit ceases upon the remarriage.

A member whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or after July 1, 2010 may apply for disability benefits if he is not eligible to receive a regular service retirement allowance and has ten years of actual credited service. The disability retirement allowance is equal to the regular retirement formula without reduction by reason of age. A selection of retirement option must be made at the time of retirement and upon the death of the disabled retiree, the option amount selected is paid to the option beneficiary.

SURVIVOR BENEFITS:

For members whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or before June 30, 2010:

In the case of a death of an active member with 5 years of creditable service (at least 2 years earned immediately prior to death) or a member with 20 years of service at the time of death who has a surviving spouse with a minor child or children, the benefit payable is 75% of the deceased member's final average compensation or $300 per month, whichever is greater. One-third of this benefit is designated to the spouse and two-thirds to the minor child or children. Child benefits

cease at attainment of eighteen years, or upon marriage, except that benefits may continue until age twenty-three if the child remains a full-time student at a high school, vocational school, college, or university.

In the case of a death of an active member with 5 years of creditable service (at least 2 years earned immediately prior to death) or a member with 20 years of service at the time of death who has no surviving spouse but has a minor child or children, the benefit payable is 75% of the deceased member's final average compensation or $300 per month, whichever is greater. These benefits are paid to the person having legal custody of the child and benefits cease at attainment of eighteen years, or upon marriage, except that benefits may continue until age twenty-three if the child remains a full-time student at a high school, vocational school, college, or university.

In the case of a death of an active member with 10 years of creditable service (at least 2 years earned immediately prior to death) or a member with 20 years of service at the time of death who has a surviving spouse but has no minor child or children, the benefit payable is 50% of the deceased member's final average compensation or $200 per month, whichever is greater. Such benefits will not be paid to any surviving spouse who has remarried since the death of the member prior to the age of 55 unless the member was eligible for regular retirement or had twenty years of service credit on the date of death.

Any surviving child of a deceased member, regardless of age, who has a total physical or mental disability and is dependent on the surviving spouse or other legal guardian, may continue to receive lifetime surviving child benefits equal to 75% of the deceased member's final average compensation or $300 per month, whichever is greater. The total benefits are reduced to an amount which, when added to the other state assistance being received, does not exceed the maximum survivor benefits payable.

In the event of death of a member with no surviving spouse or child due benefits, the accumulated contributions are payable to the designated beneficiaries, or estate.

For members whose first employment making them eligible for membership in one of Louisiana's state retirement systems occurred on or after July 1, 2010:

In the case of a death of an active member with 5 years of creditable service (at least 2 years earned immediately prior to death) or a member with 20 years of service at the time of death who has a surviving spouse with a minor child or children, a spousal survivor is paid a benefit equal to 50% of the benefit to which the member would have been entitled if he had retired on the date of his death using the member's applicable accrual rate regardless of years of service or age, or $600 per month, whichever is greater.

These benefits are payable for the life of the spouse unless the spouse remarries before age 55. In such a case, the benefit ceases upon the remarriage, and resumes payment upon a subsequent divorce or death of a new spouse.

When all surviving children cease to be eligible for benefits, the surviving spouse is paid the benefits due to a surviving spouse without minor children or disabled children, as described below.

In addition to any benefits payable to a spouse or in cases where only surviving minor or disabled children are due benefits, each surviving eligible child, subject to a maximum of two children, is paid 50% percent of the benefit to which a spouse with children is entitled. These benefits are payable even if a member dies after retirement leaving an eligible minor or disabled child.

Any surviving child of a deceased member, regardless of age, who has a total physical or mental disability and is dependent on the surviving spouse or other legal guardian may continue to receive surviving child benefits. The total benefits paid are reduced to an amount which, when added to the other state assistance being received does not exceed the maximum survivor benefits payable.

In the case of a death of an active member with 10 years of creditable service (at least 2 years earned immediately prior to death) or a member with 20 years of service at the time of death who has a surviving spouse to whom they were married for at least one year prior to their death who has no minor child or children, a spousal survivor benefit equal to the accrued benefit that would have been due under option 2, or $600 per month, whichever is greater, is payable. Unless the member was eligible to retire at the time of death, such spousal benefits cease upon remarriage and resume upon a subsequent divorce or death of the new spouse.

In the event of death of a member with no surviving spouse or child due benefits, the accumulated contributions are payable to the designated beneficiaries, or estate.

DEFERRED RETIREMENT OPTION PLAN (DROP):

In lieu of terminating employment and accepting a service retirement allowance, any member of the system who is eligible to receive a regular retirement allowance may elect to participate in the DROP and defer the receipt of benefits. An election to participate may be made only once and the duration of participation shall be specified and shall not exceed three years. The three year period begins within sixty calendar days after the member reaches eligibility. The participation period must end not more than three years and sixty calendar days from the date the member reaches eligibility. Upon commencement of participation in the plan, active membership in the system terminates and neither the employee nor employer contributions are payable. Compensation and creditable service remain as they existed on the effective date of commencement of participation in the plan and creditable service excludes conversion of sick and annual leave. The monthly retirement benefits that would have been payable, had the member elected to cease employment and receive a service retirement allowance, are paid into the DROP account. Upon termination of employment at the end of the specified period of participation, a participant in the program may receive, at his option, a lump sum payment from the DROP account equal to the payments to the account or systematic disbursements based on the individual's subaccount in any manner approved by the Board. The monthly benefits that were being paid into the fund during the period of participation will begin to be paid to the retiree based on the option selected at DROP entry. If employment is not terminated at the end of the DROP period, payments into the account cease and employee and employer contributions resume. Monthly retirement benefits payable after termination of participation in the plan and employment include a "base benefit" equal to the participant's monthly credit to the account plus conversion of sick and annual leave, if any, based on the final average compensation rate used to calculate the monthly credit and an additional benefit if employment continues. The additional benefit is based on service credit for the period after plan participation. If the participant dies while still employed, the credits and benefits, if any, due beneficiaries are payable as if the member retired immediately prior to death.

NOTE: For anyone eligible to enter DROP prior to January 1, 2004, the DROP Account Balance earns interest at a rate of one-half of one percentage point below the percentage rate of return of the System's investment portfolio as certified by the actuary on an annual basis. For all others, DROP accounts are placed in liquid asset money market investments approved by the Board of Trustees.

COST OF LIVING ADJUSTMENTS:

Act 333 of 2007 established an Experience Account to be used to pay cost of living adjustments (COLAs), or permanent benefit increases (PBIs). The Experience Account is credited with 50% of the investment experience gain in excess of $15 million (indexed based on increases in the actuarial value of assets after June 30, 2015) along with that portion of the net investment income, if any, attributable to the prior year balance, subject to maximum accumulation limitation based upon the Plan's funded percentage. The account is also debited with that portion of the system's net investment loss, if any, attributable to the prior year balance. In no event may the amount in the Experience Account fall below zero. Once the balance of the Experience Account accumulates a sum sufficient to grant retirees a PBI, the Board may recommend the granting of a PBI on benefits up to $60,000 (indexed), not to exceed the lesser of the CPI-U or a percentage determined based on the funded level percentage attained by the system as described in R. S. 11:1145.1(C)(2), provided a PBI had not been granted in the prior year. Benefits are restricted to disability retirees and those retirees and beneficiaries who have attained the age of 60 and have been retired for at least one year. Maximum limitations are outlined in Act 399 of 2014.

4. Funding Policies

LSERS' funding policy is generally described in Section 102 of Title 11 of Louisiana Revised Statutes. LSERS is funded from employee and employer contributions using the Entry Age Normal funding method. The total contribution requirement consists of the normal cost (the value of benefits earned by current active employees allocated to the current year) and the amortization cost (amortization payments necessary to liquidate the unfunded accrued liability). The total contribution percentage is determined as the total contribution requirement divided by the payroll applicable to active members. Employee contribution requirements are set forth in R.S. 11:62. The employer contribution rate is equal to the total contribution rate minus the employee rate.

Employer contribution requirements are determined one year in advance of the fiscal year for which the requirement is used. Differences between projected contributions and actual contributions are defined as a contribution Gain or as a contribution Loss. The contribution process is defined below:

A. **Minimum Recommended Employer Dollar Contribution for FYE 2018** − The June 30, 2016 valuation established the minimum recommended employer contribution rate for FYE 2018. The minimum recommended contribution for FYE 2018 is equal to the minimum recommended net direct employer contribution rate, multiplied by the projected active member payroll for FYE 2018.

B. **Actual Employer Dollar Contribution for FYE 2018** – Actual dollar contributions for FYE 2018 are obtained from system financial statements.

C. **Contribution Gain/Loss** – The difference between the Actual Dollar Contribution for FYE 2018 and the minimum recommended Dollar Contribution that would be for FYE 2018, adjusted for investment earnings, is equal to the Contribution Gain/Loss. A Contribution Gain means that a contribution surplus occurred for FYE 2018. A Contribution Loss indicates a contribution shortfall or deficit.

D. **Actuarially Required Net Direct Employer Contribution Rate for FYE 2019** – The actuarially required net direct employer contribution rate for FYE 2019 is determined by the June 30, 2018 valuation. The normal cost rate for FYE 2019 is equal to the dollar normal cost for FYE 2019 divided by the projected payroll for FYE 2019. The amortization cost rate for FYE 2019 is equal to the sum of all amortization payments for FYE 2019 divided by the projected payroll for FYE 2019. The total contribution rate is the sum of the normal cost rate and the amortization cost rate.

E. **Actuarially Required Employer Dollar Contribution for FYE 2019** – The actuarially required employer dollar contribution for FYE 2019 is determined by the June 30, 2018 actuarial valuation and is equal to the actuarially required net direct employer contribution rate for FYE 2019 multiplied by the projected payroll for FYE 2019.

F. **Minimum Recommended Net Direct Employer Contribution Rate for FYE 2020** − The June 30, 2018 valuation establishes the minimum recommended net direct employer contribution rate for FYE 2020 The rate is equal to the minimum recommended employer dollar contribution for FYE 2020 divided by the projected active member payroll for FYE 2020.

G. **Minimum Recommended Employer Dollar Contribution for FYE 2020** − The June 30, 2018 valuation establishes the minimum recommended employer contribution for FYE 2020. It is equal to the minimum recommended net direct employer contribution rate multiplied by the projected active member payroll for FYE 2020.

5. Actuarial Methods

Cost Method:

The Entry Age Normal (EAN) funding method is the method required under R.S. 11:22 of Louisiana law to produce annual employer contribution requirements. This EAN method generally produces normal costs that are level as a percentage of salary through an individual's working career. The EAN method produces an unfunded accrued liability that changes annually. Various methods were used prior to June 30, 2017, to amortize new credits or debits to the unfunded accrued liability. Unfunded accrued liability charges or credits established on June 30, 2017, or later years, will be amortized in the following manner:

A. Increases or decreases resulting from changes in benefit provisions are amortized with level payments over 10 years.

B. Increase or decreases resulting from decrement gains and losses are amortized with level payments over 20 years.

C. Increases or decreases resulting from changes in actuarial assumptions and methods are amortized with level payments over a 20-year period.

D. Contribution actually made for a given fiscal year will be more or less than the amount actually required. Contribution surpluses or deficits will be amortized with level payments over a 5-year period.

E. Amortization rules pertaining to investment gains and losses are summarized below:

1. Investment losses are amortized with level payments over a 20-year period.

2. Investment gains up to the first investment hurdle ($15 million) are used to reduce the outstanding balance of the Oldest Charge Amortization Base. However, the payment schedule will remain the same and the outstanding balance of the oldest charge amortization base will be paid off sooner than it would otherwise.

3. Investment gains exceeding the hurdle, net of transfer to the Experience Account, will be amortized over 20 years.

F. Previously, increases in the unfunded accrued liability resulting from investment gains being transferred from the regular pool of assets to the Experience Account were amortized together with all other unexpected decreases or increases in the unfunded accrued liability (also known as the total actuarial gain or loss) over a 30-year period. Beginning with the June 30, 2017 valuation, transfers to the Experience Account are to be amortized over 10-year period leaving the remainder of total actuarial gain or loss to be amortized over a 20-year period as before.

These rules comply with actuarial standards of practice. However, the rules are viewed as a not-recommended practice under the CCA PPC white paper because increases and decreases in UAL produced by the same cause are not always symmetrical.

The Louisiana Legislature has changed amortization periods several times since 1989. The LLA is currently monitoring this type of legislative action and will alert the appropriate legislators and retirement committees if changes are made that would cause the retirement system to fail in its constitutionally mandated requirement to be actuarially sound.

The funding policy described above is consistent with the plan accumulating adequate assets to make benefit payments when due and consistent with improving the funded status of the plan by fully amortizing the unfunded accrued liability. This retirement system is sustainable as long as actuarially determined contributions are paid when due and all actuarial assumptions are realized.

The Amortization Conversion Account was initially funded from the residual balance in the Experience Account as of June 30, 2013. Payments from the account are made as an offset to employer contributions based on the provisions of Act 478 of the 2014 Regular Legislative Session each year through Fiscal 2019. Any balances in the account as of June 30, 2019 will be amortized as an experience gain. Once the remaining balance in the Amortization Conversion Account is amortized, no further exclusion from the Actuarial Value of Assets will be necessary.

Asset Valuation Method

The actuarial value of assets is equal to the market value of assets for the current valuation date plus an adjustment to phase in investment gains and losses occurring over the past four years. For June 30, 2018, the preliminary actuarial value is equal to the market value of assets on June 30, 2014, plus 80% of investment gains/losses for FYE 2015, plus 60% of investment gains/losses for FYE 2016, plus 40% of investment gains/losses for FYE 2017, plus 20% of investment gains/losses for FYE 2018.

If the preliminary actuarial value of assets exceeds 115% of the market value on June 30, 2018, then the actuarial value is equal to the average of the preliminary value and 115% of the market value. If the preliminary value is less than 85% of the market value, then the actuarial value is equal to the average of the preliminary value and 85% of the market value. Otherwise, the actuarial value is equal to the preliminary value.

Asset valuation formulas are shown in Section I(3).

Methods for the Experience Account

A detailed analysis of the Experience Account is presented in Section II. The 2010 amendment to the Louisiana Constitution (Article (10)(29)(F)) and discussions with the LLA's General Counsel and with legislative staff have led us to reconsider the treatment of the Experience Account process. We have concluded the following:

1. Laws pertaining to transfers of gains to the Experience Account are still in force.

2. However, laws pertaining to COLAs require additional legislation to implement.

3. Therefore, LSERS still has an obligation under the law to fund the Experience Account as determined by Act 399 of 2014. However, disbursements from the Experience Account will occur only after a bill is introduced by the legislature, passed each house with a two-thirds vote, and signed by the governor.

We have prepared our employer contribution requirements for FYE 2019 and FYE 2020 in accordance with our understanding of the law as summarized above and as summarized in Section II.

Accelerated Reduction of the Oldest Outstanding Amortization Base

Investment gains falling between $0 and $15 million (adjusted pro-rata for increases in the Actuarial Value of Assets) are used to reduce the oldest outstanding amortization base. However, the amortization payment schedule is unaffected by the reduction in the outstanding balance.

Valuation Approval Process

The approval process for annual actuarial valuations for LSERS, as specified in Louisiana law, is summarized below:

1. The LSERS' retained actuary prepares an actuarial valuation which is presented to the LSERS Board of Trustees for review and approval.

2. The actuary for the LLA also prepares an actuarial valuation.

3. The actuaries present their valuations to PRSAC for its review and approval of one of the two valuations as the official valuation.

4. The official valuation is submitted to the House and Senate Committees on Retirements and to the Joint Legislative Committee on the Budget. The PRSAC-approved valuation receives automatic approval unless one of the legislative committees elects to overturn the PRSAC approval.

Benchmarking

Valuation results were tested by comparing actuarial calculations produced in this valuation with values produced by LSERS' retained actuary. Comparisons of values were made for each sub-plan, for each member status category, and for each type of decrement.

In aggregate, this valuation's present value of benefits, normal cost and accrued liability values (using old assumptions) as of June 30, 2018 was within acceptable margins of the value produced by the LSERS' retained actuary. Comparisons of values by status category and by decrement showed larger deviations, but on the whole produced values acceptable for valuation purposes.

6. Actuarial Assumptions

Demographic assumptions used in the valuation were adopted by the LSERS Board of Trustees following the most recent experience study, effective June 30, 2018. The study was based on an observation period July 1, 2012 through June 30, 2017. The retirement system is required to conduct an experience study every five years, but the scope of such a study is not necessarily limited to a five-year period. The experience study report, dated November 15, 2018, provides further information regarding the rationale for these assumptions. Unless otherwise indicated, all assumptions adopted by the LSERS Board for its June 30, 2018 valuation are implemented in this valuation. The prior assumptions and rate tables are illustrated at the end of this section.

Valuation Interest Rate

The assumed rate of return on the actuarial value of assets used for all purposes in this valuation is 6.80%. This rate is net of investment expenses. This 6.80% rate is based on research undertaken by the office of the LLA's actuary. Refer to Appendices B through E for further details.

Assumed Rate of Inflation

The assumed annual rate of inflation is 2.30%, and is a component of the assumed rate of return and of individual members' salary increase assumption.

Please refer to Appendix B for further details.

Mortality Assumption

Mortality assumptions used in this valuation are the same as adopted by the System and based on its most recent experience study.

The mortality assumption has been updated to the RP-2014 mortality tables, adjusted by System-derived mortality experience factors, with mortality generational improvement projected using the MP-2017 improvement scale from 2014. Base tables have been adjusted as follows:

- Active members mortality rates are taken from the RP-2014 Blue Collar Employee tables and adjusted by 1.3 for males and by 1.15 for females;
- Non-disabled retirees mortality rates are taken from the RP-2014 Blue Collar Healthy Annuitant tables and adjusted by 1.3 for males and by 1.15 for females;
- Disabled retirees mortality rates are taken from the RP-2014 Disabled Retiree tables;

Refer to pages that follow for a listing of mortality rates in the base table.

Please refer to Appendix A for comments on selection of demographic assumptions.

Cost of Living Adjustments/Increases (COLA)

Unfunded actuarial accrued liabilities as of June 30, 2018 and contribution rates for FYE 2019 and FYE 2020 were developed based on LSERS' gain-sharing COLA program using an explicit approach. The future benefits expected to be paid under the System's complex gain-sharing program are approximated with a single equivalent fixed annual COLA equal to 0.50%.

Please refer to Appendix F for further details.

Annual Salary Increase Rate

The rate of annual salary increase is 3.05%. This rate includes anticipated productivity growth, merit adjustments, and an inflation component of 2.30% for all purposes in this valuation, which is consistent with the inflation assumptions used to develop the return assumption.

Please refer to Appendix B further details concerning inflation assumptions.

Retirement Rates

The retirement rates were developed in the most recent experience study and are the same as adopted by LSERS. The table of these rates through age 75 is included later in the report. These rates apply only to those individuals eligible to retire.

Accumulated Leave Policies

Retirements are monitored to determine the amount of leave converted to service credit. Leave credit is accrued throughout the duration of the member's career. The average service credit converted is expressed as 1% percent of the accrued benefit. This rate is the same as adopted by the System based on the most recent experience study.

Retirement Limitations

Projected retirement benefits are not subject to IRC Section 415 limits.

DROP Entry Rates

DROP entry rates were developed in the most recent experience study and are the same as adopted by LSERS and based on the System's most recent experience study. The table of these rates is included later in the report. These rates apply only to those individuals eligible to enter the DROP plan and are applied only in the year of earliest DROP eligibility.

DROP Participation Period

All DROP participants are assumed to participate for 3 years and retire at the end of this participation period.

Retirement Rates for Active Former DROP Participants

Retirement rates for active former DROP participants were developed in the most recent experience study and are the same as adopted by LSERS. Active Former DROP Participants retire according to the rates listed for all actives in the table of rates through age 75 included later in the report.

Disability Rates

Disability incidence assumptions used in this valuation are the same as adopted by LSERS and based on the System's most recent experience study. The table of these rates through age 75 is included later in this report.

Withdrawal Rates

Voluntary termination or withdrawal rates were developed in the most recent experience study and are the same as adopted by LSERS.

The following rates of withdrawal are applied based upon completed years of service:

Service	Rate	Service	Rate
< 1	0.07	15	0.01
1	0.13	16	0.01
2	0.12	17	0.02
3	0.09	18	0.03
4	0.07	19	0.05
5	0.06	20	0.05
6	0.06	21	0.05
7	0.06	22	0.04
8	0.06	23	0.05
9	0.05	24	0.05
10	0.04	25	0.05
11	0.04	26	0.03
12	0.03	27	0.02
13	0.03	28	0.10
14	0.02	> 28	0.01

Marriage Statistics

70% of the members are assumed to be married (same assumption adopted by the System based on the most recent experience study); husbands are assumed to be three years older than wives.

Family Statistics

Assumptions utilized in determining the costs of various survivor benefits as listed below, and are the same as adopted by the System based on the most recent experience study:

Member's Age	% With Children	Number of Children	Average Age
25	70%	1.84	5
35	86%	2.13	9
45	75%	1.70	12
55	22%	1.42	14
65	4%	1.45	15

Vesting Electing Percentage

For members terminating with less than twenty years of service, it is assumed that 60% will withdraw their accumulated employee contributions. For members terminating with twenty or more years of service, it is assumed that only 2% will withdraw their accumulated employee contributions. The remaining are assumed to receive a deferred vested retirement benefit. These percentages are the same as adopted by the System based on the most recent experience study.

Administrative Expenses

Administrative expenses have been accounted for in this valuation by explicitly recognizing them as an addition to normal cost, as one of the three components of the employer contribution. For FYE 2019 and FYE 2020, administrative expenses are assumed to be $4,792,189 and $4,911,994, respectively.

CURRENT ACTUARIAL ASSUMPTIONS FOR ACTIVE EMPLOYEES (Effective June 30, 2018)
RP-2014 BLUE COLLAR MORTALITY TABLE (130% MALE/115% FEMALE)
PROJECTED GENERATIONALLY WITH SCALE MP-2017 (No Projection in Table)

	Mortality Rate			Mortality Rate	
Age	Male	Female	Age	Male	Female
18	0.000551	0.000176	50	0.002837	0.001236
19	0.000621	0.000182	51	0.003147	0.001353
20	0.000683	0.000182	52	0.003485	0.001475
21	0.000755	0.000182	53	0.003851	0.001603
22	0.000822	0.000182	54	0.004251	0.001736
23	0.000857	0.000186	55	0.004690	0.001876
24	0.000868	0.000190	56	0.005179	0.002024
25	0.000814	0.000194	57	0.005732	0.002182
26	0.000777	0.000201	58	0.006357	0.002352
27	0.000755	0.000210	59	0.007072	0.002536
28	0.000748	0.000220	60	0.007887	0.002739
29	0.000750	0.000231	61	0.008815	0.002963
30	0.000761	0.000244	62	0.009870	0.003212
31	0.000779	0.000259	63	0.011064	0.003491
32	0.000802	0.000274	64	0.012410	0.003801
33	0.000828	0.000289	65	0.013924	0.004145
34	0.000854	0.000305	66	0.015322	0.004600
35	0.000880	0.000321	67	0.016860	0.005105
36	0.000902	0.000336	68	0.018552	0.005665
37	0.000927	0.000357	69	0.020415	0.006286
38	0.000959	0.000380	70	0.022465	0.006976
39	0.001001	0.000409	71	0.024721	0.007741
40	0.001057	0.000444	72	0.027203	0.008590
41	0.001128	0.000486	73	0.029934	0.009532
42	0.001219	0.000535	74	0.032939	0.010578
43	0.001334	0.000593	75	0.036247	0.011738
44	0.001474	0.000661	76	0.039887	0.013026
45	0.001637	0.000737	77	0.043892	0.014455
46	0.001829	0.000822	78	0.048299	0.016041
47	0.002044	0.000915	79	0.053148	0.017801
48	0.002284	0.001016	80	0.058484	0.019754
49	0.002549	0.001123			

CURRENT ACTUARIAL ASSUMPTIONS FOR HEALTHY ANNUITANTS (Effective June 30, 2018)
RP-2014 BLUE COLLAR MORTALITY TABLE (130% MALE/115% FEMALE)
PROJECTED GENERATIONALLY WITH SCALE MP-2017 (No Projection in Table)

	Mortality Rate			Mortality Rate	
Age	Male	Female	Age	Male	Female
50	0.005283	0.003245	82	0.082737	0.054156
51	0.005699	0.003502	83	0.091729	0.060257
52	0.006153	0.003766	84	0.101739	0.067100
53	0.006696	0.004041	85	0.112880	0.074763
54	0.007245	0.004327	86	0.125275	0.083326
55	0.007799	0.004629	87	0.139055	0.092880
56	0.008366	0.004950	88	0.154375	0.103535
57	0.008953	0.005298	89	0.171405	0.115409
58	0.009573	0.005682	90	0.190333	0.128645
59	0.010247	0.006112	91	0.210347	0.142971
60	0.010993	0.006595	92	0.230987	0.158237
61	0.011831	0.007139	93	0.251986	0.174335
62	0.012778	0.007748	94	0.273231	0.191209
63	0.013849	0.008427	95	0.294719	0.208822
64	0.015054	0.009185	96	0.316498	0.227145
65	0.016400	0.010034	97	0.338633	0.246151
66	0.017895	0.010983	98	0.361153	0.266790
67	0.019546	0.012047	99	0.384019	0.288791
68	0.021366	0.013239	100	0.408184	0.311487
69	0.023374	0.014572	101	0.434675	0.334696
70	0.025593	0.016061	102	0.460979	0.358161
71	0.028050	0.017723	103	0.486881	0.381685
72	0.030776	0.019573	104	0.512177	0.405067
73	0.033810	0.021627	105	0.536680	0.428114
74	0.037190	0.023900	106	0.560230	0.450639
75	0.040959	0.026417	107	0.582695	0.472476
76	0.045162	0.029202	108	0.603970	0.493479
77	0.049850	0.032293	109	0.623983	0.513526
78	0.055080	0.035735	110	0.642689	0.532520
79	0.060913	0.039581	111	0.650000	0.550395
80	0.067417	0.043889	112	0.650000	0.567108
81	0.074664	0.048723	113	0.650000	0.575000

ACTUARIAL TABLES AND RATES

Age	Retirement Rates	Post-DROP Retirement Rates	DROP Rates	Disability Rates
18	0.00000	0.00000	0.00000	0.00083
19	0.00000	0.00000	0.00000	0.00083
20	0.00000	0.00000	0.00000	0.00083
21	0.00000	0.00000	0.00000	0.00083
22	0.00000	0.00000	0.00000	0.00083
23	0.00000	0.00000	0.00000	0.00083
24	0.00000	0.00000	0.00000	0.00083
25	0.00000	0.00000	0.00000	0.00083
26	0.00000	0.00000	0.00000	0.00083
27	0.00000	0.00000	0.00000	0.00083
28	0.00000	0.00000	0.00000	0.00083
29	0.00000	0.00000	0.00000	0.00083
30	0.00000	0.00000	0.00000	0.00083
31	0.00000	0.00000	0.00000	0.00083
32	0.00000	0.00000	0.00000	0.00083
33	0.00000	0.00000	0.00000	0.00083
34	0.00000	0.00000	0.00000	0.00083
35	0.00000	0.00000	0.00000	0.00094
36	0.00000	0.00000	0.00000	0.00105
37	0.00000	0.00000	0.00000	0.00116
38	0.00000	0.00000	0.00000	0.00132
39	0.00000	0.00000	0.00000	0.00149
40	0.00000	0.00000	0.00000	0.00171
41	0.00000	0.00000	0.00000	0.00193
42	0.00000	0.00000	0.00000	0.00215
43	0.00000	0.00000	0.00000	0.00242
44	0.00000	0.00000	0.00000	0.00275
45	0.00000	0.00000	0.00000	0.00314
46	0.17000	0.50000	0.83000	0.00358
47	0.17000	0.50000	0.83000	0.00402
48	0.17000	0.50000	0.83000	0.00457
49	0.17000	0.50000	0.83000	0.00517
50	0.17000	0.50000	0.83000	0.00589
51	0.25000	0.50000	0.75000	0.00671
52	0.28000	0.50000	0.72000	0.00759
53	0.33000	0.50000	0.67000	0.00864
54	0.17000	0.37000	0.83000	0.00979
55	0.19000	0.28000	0.81000	0.01111
56	0.36000	0.23000	0.64000	0.01265
57	0.18000	0.22000	0.82000	0.01436
58	0.40000	0.24000	0.60000	0.01628
59	0.33000	0.26000	0.67000	0.01854
60	0.23000	0.23000	0.61000	0.02684
61	0.18000	0.19000	0.49000	0.02684
62	0.16000	0.17000	0.44000	0.02684
63	0.17000	0.18000	0.42000	0.02684
64	0.22000	0.22000	0.38000	0.02684
65	0.27000	0.24000	0.32000	0.02684
66	0.31000	0.23000	0.24000	0.02684
67	0.31000	0.20000	0.20000	0.02684
68	0.28000	0.18000	0.20000	0.02684
69	0.24000	0.19000	0.21000	0.02684
70	0.22000	0.21000	0.22000	0.02684
71	0.22000	0.24000	0.21000	0.02684
72	0.23000	0.24000	0.21000	0.02684
73	0.22000	0.22000	0.25000	0.02684
74	0.22000	0.24000	0.33000	0.02684
75	0.23000	0.50000	0.39000	0.02684

PRIOR YEAR ASSUMPTIONS
(Revised Effective in this Valuation)

Valuation Interest Rate

The assumed rate of return on the actuarial value of assets used for all purposes in the prior valuation was 7.125% (net of investment expense).

Mortality Assumption

The mortality assumptions used in the prior valuation were the RP-2000 Combined Healthy Sex Distinct Tables for active members, annuitants and beneficiaries and the RP-2000 Disabled Lives Sex Distinct Mortality Tables for disabled members.

Annual Salary Increase Rate

The gross rates of annual salary increases (including inflation of 2.625% and merit increases) were as follows:

Years of Service	Salary Growth Rate
1-2	5.375%
3-18	4.075%
19-26	3.875%
27-30	3.375%
Above 30	3.075%

Accumulated Leave Policies

The retirements were monitored to determine the amount of leave converted to service credit. Leave credit is accrued throughout the duration of the member's career. The average service credit converted was expressed as a 3% increase in the accrued benefit.

Retiree Cost of Living Increases

The present values and accrued liabilities in the prior report did not include provisions for potential future COLA increases.

Marriage Statistics

80% of the members were assumed to be married in the prior valuation.

Vesting Electing Percentage

For members terminating with less than twenty years of service, it was assumed that 80% will withdraw their accumulated employee contributions. For members terminating with twenty or more years of service, it was assumed that only 30% will withdraw their accumulated employee contributions. The remaining members were assumed to receive a deferred vested retirement benefit.

Family Statistics

The assumptions used in determining the costs of various survivor benefits in the prior valuation are listed below.

Member's Age	% With Children	Number of Children	Average Age
25	62%	1.66	6
30	74%	1.94	8
35	82%	2.06	10
40	81%	1.98	12
45	66%	1.75	13
50	40%	1.48	14
55	19%	1.35	15
60	6%	1.35	15
65	2%	1.35	15

PRIOR YEAR ASSUMPTIONS
ACTUARIAL TABLES AND RATES

Age	Male Mortality Rates	Female Mortality Rates	Retirement Rates Pre 7/1/10	Retirement Rates Pre 7/1/15	Retirement Rates Post 7/1/15
18	0.000316	0.000188	0.000000	0.000000	0.000000
19	0.000331	0.000190	0.000000	0.000000	0.000000
20	0.000345	0.000191	0.000000	0.000000	0.000000
21	0.000357	0.000192	0.000000	0.000000	0.000000
22	0.000366	0.000194	0.000000	0.000000	0.000000
23	0.000373	0.000197	0.000000	0.000000	0.000000
24	0.000376	0.000201	0.000000	0.000000	0.000000
25	0.000376	0.000207	0.000000	0.000000	0.000000
26	0.000378	0.000214	0.000000	0.000000	0.000000
27	0.000382	0.000223	0.000000	0.000000	0.000000
28	0.000393	0.000235	0.000000	0.000000	0.000000
29	0.000412	0.000248	0.000000	0.000000	0.000000
30	0.000444	0.000264	0.000000	0.000000	0.000000
31	0.000499	0.000307	0.000000	0.000000	0.000000
32	0.000562	0.000350	0.000000	0.000000	0.000000
33	0.000631	0.000394	0.000000	0.000000	0.000000
34	0.000702	0.000435	0.000000	0.000000	0.000000
35	0.000773	0.000475	0.000000	0.000000	0.000000
36	0.000841	0.000514	0.000000	0.000000	0.000000
37	0.000904	0.000554	0.000000	0.000000	0.000000
38	0.000964	0.000598	0.000000	0.000000	0.000000
39	0.001021	0.000648	0.000000	0.000000	0.000000
40	0.001079	0.000706	0.000000	0.000000	0.000000
41	0.001142	0.000774	0.000000	0.000000	0.000000
42	0.001215	0.000852	0.000000	0.000000	0.000000
43	0.001299	0.000937	0.000000	0.000000	0.000000
44	0.001397	0.001029	0.000000	0.000000	0.000000
45	0.001508	0.001124	0.000000	0.000000	0.000000
46	0.001616	0.001223	0.000000	0.000000	0.000000
47	0.001734	0.001326	0.800000	0.000000	0.000000
48	0.001860	0.001434	0.700000	0.000000	0.000000
49	0.001995	0.001550	0.550000	0.000000	0.000000
50	0.002138	0.001676	0.550000	0.000000	0.000000
51	0.002449	0.001852	0.550000	0.000000	0.000000
52	0.002667	0.002018	0.550000	0.000000	0.000000
53	0.002916	0.002207	0.550000	0.000000	0.000000
54	0.003196	0.002424	0.370000	0.000000	0.000000
55	0.003624	0.002717	0.370000	0.000000	0.000000
56	0.004200	0.003090	0.370000	0.000000	0.000000
57	0.004693	0.003478	0.370000	0.000000	0.000000
58	0.005273	0.003923	0.450000	0.000000	0.000000
59	0.005945	0.004441	0.300000	0.000000	0.000000
60	0.006747	0.005055	0.300000	0.480000	0.000000
61	0.007676	0.005814	0.250000	0.250000	0.000000
62	0.008757	0.006657	0.250000	0.250000	0.480000
63	0.010012	0.007648	0.250000	0.250000	0.250000
64	0.011280	0.008619	0.250000	0.250000	0.250000
65	0.012737	0.009706	0.250000	0.250000	0.250000
66	0.014409	0.010954	0.250000	0.250000	0.250000
67	0.016075	0.012163	0.250000	0.250000	0.250000
68	0.017871	0.013445	0.250000	0.250000	0.250000
69	0.019802	0.014860	0.250000	0.250000	0.250000
70	0.022206	0.016742	0.250000	0.250000	0.250000
71	0.024570	0.018579	0.250000	0.250000	0.250000
72	0.027281	0.020665	0.250000	0.250000	0.250000
73	0.030387	0.022970	0.250000	0.250000	0.250000
74	0.033900	0.025458	0.990000	0.990000	0.990000
75	0.037834	0.028106	0.990000	0.990000	0.990000

PRIOR YEAR ASSUMPTIONS
ACTUARIAL TABLES AND RATES

Age	Disability Rates	Withdrawal Rates	DROP Rates Pre 7/1/10	DROP Rates Pre 7/1/15	DROP Rates Post 7/1/15
18	0.000000	0.150000	0.000000	0.000000	0.000000
19	0.000000	0.150000	0.000000	0.000000	0.000000
20	0.000000	0.150000	0.000000	0.000000	0.000000
21	0.000000	0.150000	0.000000	0.000000	0.000000
22	0.000000	0.150000	0.000000	0.000000	0.000000
23	0.000000	0.130000	0.000000	0.000000	0.000000
24	0.000000	0.130000	0.000000	0.000000	0.000000
25	0.000000	0.130000	0.000000	0.000000	0.000000
26	0.000000	0.100000	0.000000	0.000000	0.000000
27	0.000000	0.100000	0.000000	0.000000	0.000000
28	0.000000	0.100000	0.000000	0.000000	0.000000
29	0.000000	0.100000	0.000000	0.000000	0.000000
30	0.000000	0.100000	0.000000	0.000000	0.000000
31	0.000000	0.100000	0.000000	0.000000	0.000000
32	0.000000	0.100000	0.000000	0.000000	0.000000
33	0.000000	0.080000	0.000000	0.000000	0.000000
34	0.000000	0.080000	0.000000	0.000000	0.000000
35	0.001000	0.070000	0.000000	0.000000	0.000000
36	0.001000	0.070000	0.000000	0.000000	0.000000
37	0.001000	0.070000	0.000000	0.000000	0.000000
38	0.001000	0.065000	0.000000	0.000000	0.000000
39	0.001000	0.065000	0.000000	0.000000	0.000000
40	0.002000	0.065000	0.000000	0.000000	0.000000
41	0.002000	0.055000	0.000000	0.000000	0.000000
42	0.002000	0.055000	0.000000	0.000000	0.000000
43	0.003000	0.055000	0.000000	0.000000	0.000000
44	0.003000	0.055000	0.000000	0.000000	0.000000
45	0.003000	0.045000	0.000000	0.000000	0.000000
46	0.003000	0.045000	0.000000	0.000000	0.000000
47	0.004000	0.045000	0.000000	0.000000	0.000000
48	0.004000	0.045000	0.350000	0.000000	0.000000
49	0.005000	0.040000	0.350000	0.000000	0.000000
50	0.005000	0.040000	0.350000	0.000000	0.000000
51	0.006000	0.040000	0.300000	0.000000	0.000000
52	0.006000	0.040000	0.300000	0.000000	0.000000
53	0.006000	0.040000	0.200000	0.000000	0.000000
54	0.006000	0.040000	0.200000	0.000000	0.000000
55	0.007000	0.040000	0.500000	0.000000	0.000000
56	0.007000	0.040000	0.150000	0.000000	0.000000
57	0.006000	0.040000	0.150000	0.000000	0.000000
58	0.006000	0.040000	0.150000	0.000000	0.000000
59	0.003000	0.040000	0.150000	0.000000	0.000000
60	0.003000	0.040000	0.450000	0.450000	0.000000
61	0.003000	0.040000	0.100000	0.100000	0.000000
62	0.003000	0.040000	0.050000	0.050000	0.450000
63	0.003000	0.040000	0.050000	0.050000	0.100000
64	0.003000	0.040000	0.050000	0.050000	0.050000
65	0.003000	0.040000	0.050000	0.050000	0.050000
66	0.003000	0.040000	0.050000	0.050000	0.050000
67	0.003000	0.040000	0.050000	0.050000	0.050000
68	0.003000	0.040000	0.050000	0.050000	0.050000
69	0.003000	0.040000	0.050000	0.050000	0.050000
70	0.003000	0.040000	0.050000	0.050000	0.050000
71	0.003000	0.040000	0.000000	0.000000	0.000000
72	0.003000	0.040000	0.000000	0.000000	0.000000
73	0.003000	0.040000	0.000000	0.000000	0.000000
74	0.003000	0.040000	0.000000	0.000000	0.000000
75	0.003000	0.040000	0.000000	0.000000	0.000000

APPENDIX A
BASIS FOR MORTALITY ASSUMPTIONS

Appendix A: Basis for Mortality Assumptions

Introduction to Improvements in Assumptions and Methods

The actuary for the LLA is required by R.S. 11:127(C) to prepare an actuarial valuation for review by PRSAC. In fulfilling that responsibility, we accept almost all the actuarial assumptions developed by LSERS' actuary and adopted by its board of trustees, while we reject two or three other actuarial assumptions. Following is a brief summary of the principles we applied in adopting different assumptions used in this actuarial valuation as compared to the System's valuation.

1. The economic assumptions as to future inflation and future investment returns:
   a. Should be an unbiased expectation of the future,
   b. Should not be unduly influenced by perceptions of what the contributing entity(ies) can afford in current annual budget negotiations,
   c. Should explicitly reflect the System's own asset allocation,
   d. Should explicitly reflect the System's own projected benefit cash flow,
   e. Should lie within the mainstream of forward-looking forecasts from experts and
   f. Should be within a reasonable range above/below the most appropriate return assumption.

2. All benefits that are reasonably expected to be paid in the future should be measured actuarially, including expected future cost-of-living (COLA) benefits, using actuarial methods that are:
   a. *Explicit.* Separately identify the cost of COLA benefits, and should not be implicitly buried or conflated within the return assumption and
   b. *Transparent.* Clear and meaningful; should not be misleading or confuse to the public.

The improvements in these two actuarial assumptions/methods enhance the benefit security of plan members by ensuring the contribution requirements have a stronger actuarial basis. Furthermore, these improvements enhance the integrity of the financial disclosures issued by all participating governmental entities, by ensuring the balance sheet liabilities reflect all expected benefits and are a more transparent and fair representation of the pension obligation.

This Appendix A describes the approach, employed by the System's actuary, to develop mortality rates from the System's own experience. This is an acceptable method.

Experience Study

An actuarial experience study was prepared by the System's actuary for the period from July 1, 2012, through June 30, 2017, for the Louisiana School Employees' Retirement System. The experience study report, dated May 3, 2018, summarized the results. The experience study report includes the following demographic assumptions:

- Mortality Rates
- Retirement Rates
- Disability Rates
- Withdrawal/Termination Rates
- Salary Increases
- DROP Entry Rates
- Post-DROP Retirement Rates
- Family Statistics

We reviewed the experience study report and found all the sections relating to the demographic assumptions mentioned above to be described with reasonable detail and careful recognition of relevant experience. Therefore, we accept all the demographic assumptions proposed in the experience study report and find them fully appropriate for this 2018 actuarial valuation.

Mortality Assumption

The mortality assumption used in this 2018 actuarial valuation prepared by the LLA's actuary is based on the results of the experience study report. The methodology employed for developing the mortality assumption recommended by LSERS' actuary in the experience study report is a significant improvement from the methodology employed in prior years.

We commend this improvement by LSERS' actuary, since the mortality assumption is now based on the most recently developed broad-based mortality tables and on reasonable applications of actuarial credibility principles.

The following tables present the mortality experience for males and females through the exposure period:

Males

Age	Exposures (Number)	Actual Deaths (Number)	Exposures (Dollars)	Actual Deaths (Dollars)
1-5	0	0	0	0
6-10	0	0	0	0
11-15	1	0	550	0
16-20	2	0	1,304	0
21-25	6	3	6,014	2,649
26-30	1	0	100	0
31-35	2	0	1,074	0
36-40	5	2	1,794	1,091
41-45	9	0	5,246	0
46-50	30	4	42,670	5,436
51-55	190	13	314,618	18,540
56-60	357	34	570,559	46,102
61-65	780	95	1,007,356	116,194
66-70	904	132	930,659	131,499
71-75	899	184	678,626	138,428
76-80	743	233	543,913	174,488
81-85	524	241	419,674	191,429
86-90	256	172	223,258	148,104
91-95	72	59	67,028	54,419
96-100	13	10	10,768	8,216
100+	0	0	0	0
Total	4,794	1,182	4,825,211	1,036,595

Females

Age	Exposures (Number)	Actual Deaths (Number)	Exposures (Dollars)	Actual Deaths (Dollars)
1-5	0	0	0	0
6-10	0	0	0	0
11-15	1	0	626	0
16-20	4	3	3,240	2,912
21-25	8	5	5,462	4,520
26-30	1	0	1,074	0
31-35	1	0	390	0
36-40	4	0	1,845	0
41-45	15	3	12,023	2,824
46-50	45	5	39,252	3,924
51-55	119	7	123,928	6,463
56-60	442	21	530,957	18,022
61-65	1,154	85	1,187,138	78,685
66-70	1,450	157	1,225,987	128,217
71-75	1,407	162	950,707	110,284
76-80	1,154	242	730,292	155,296
81-85	740	259	479,715	172,094
86-90	345	189	237,041	130,540
91-95	95	67	67,441	47,826
96-100	11	8	8,584	5,116
100+	3	3	1,791	1791
Total	6,999	1,216	5,607,493	868,514

Credibility

Actuarial credibility pertains to the statistical confidence we can have in the results of an experience study for projecting future mortality rates.

Full credibility means that the data is fully reliable as a reasonable predictor of future experience and "adjustment factors" can be developed and applied to a standard reference table to obtain a new mortality table that make full use of the group's own experience. This retains the shape of the standard reference table, but adjusts the rates to partially or fully reflect the group's own actual experience.

If an experience study's data is partially credible, a weighted average adjustment factor should be applied to the standard reference table's individual mortality rates to obtain new mortality rates for each individual age that partially reflects the group's own experience and partially reflects the standard reference table.

For the purpose of the experience study, full credibility was assigned a confidence level of 90% of being within 5% margin from the correct value. The credibility was assessed for the overall population with male mortality measured separately from female mortality. In order to be fully credible, the experience study for each group for which factors are developed is required to have at least 1,082 deaths during the exposure period.

Based on the information in the above table, the LSERS experience study data is sufficient to be fully credible for males and for females since the number of deaths for each was more than 1,082. This means 100% of the experience study results can be taken into account in the determination of the mortality assumption, i.e., a 100% credibility factor should be used for both males and females.

Formula

This process is outlined in actuarial literature.[1] Following is the basic formula for determining new mortality rates for each age to be used in this valuation.

$$[\boldsymbol{f} \times (\mathbf{C}) \; + \; (\mathbf{1.0}) \times (\mathbf{1} - \mathbf{C})] \; \times \; \boldsymbol{q_x^{SR}} = \boldsymbol{q_x^{V}}$$

Where,

$\boldsymbol{q_x^{V}}$ is the probability (absolute rate) of a member age **x** dying before attaining age x+1, as used in this actuarial **V**aluation;

[1] A few examples in actuarial literature on reflecting fully credible and partially credible mortality experience in selecting mortality assumptions for pension valuations include: (a) A Public Policy Practice Note *Selecting and Documenting Mortality Assumptions for Pensions*, Revised June 2015, published by the American Academy of Actuaries (see especially Appendix 2), found at http://www.actuary.org/files/Mortality_PN_060515_0.pdf, (b) *Selecting Mortality Tables: A Credibility Approach*, by Gavin Benjamin published by the Society of Actuaries in October 2008, found at www.soa.org/files/research/projects/research-2008-benjamin.pdf and (c) *Credibility Theory for Pension Actuaries Webcast*, June 23, 2016 sponsored by the Society of Actuaries, found at https://www.soa.org/prof-dev/events/2016-credibility-theory-pension-actuaries/.

q_x^{SR} is the probability (absolute rate) of a member age **x** dying before attaining age x+1, as taken from the **S**tandard **R**eference table;

C is the **C**redibility factor assigned to the data in the experience study; C and (1-C) serve as weights in the weighted average adjustment factor;

f is the experience-derived adjustment factor to the standard mortality rate at every age (q_x^{SR}).

Base RP-2014 Mortality Tables

The RP-2014 Mortality Tables, the most recently developed broad-based mortality tables, were issued by the Retirement Plans Experience Committee (RPEC) of the Society of Actuaries. These were published in October 2014. These tables constitute the most recent and reliable standard reference tables available.

The RP-2014 mortality tables were used as the standard reference tables in determining the mortality assumption for this valuation. The RP-2014 mortality tables were not used as the base mortality table assumption in this actuarial valuation. The shape of RP-2014 was retained; but the mortality rates actually used as the base table in this actuarial valuation were the RP-2014 rates multiplied by a LSERS-derived adjustment factor.

The experience study report presents the mortality information for active, annuitant, and disabled members separately. For active members, the RP-2014 Blue Collar Employee Tables were used as the standard reference tables. For annuitant members, the RP-2014 Blue Collar Healthy Annuitants Tables were used as the standard reference tables. For disabled retiree members, the RP-2014 Disability Tables were used as the standard reference tables.

The following tables present the mortality rates based on the RP-2014 Blue Collar Employee Tables, the RP-2014 Blue Collar Healthy Annuitants Tables, and the RP-2014 Disability Tables:

RP-2014 Blue Collar Employee		
Sample Attained	Probability of Death Next Year	
Age	Male	Female
50	0.22%	0.12%
55	0.36%	0.19%
60	0.61%	0.27%
65	1.07%	0.41%
70	1.73%	0.70%
75	2.79%	1.17%
80	4.50%	1.98%

RP-2014 Blue Collar Healthy Annuitants		
Sample Attained	Probability of Death Next Year	
Age	Male	Female
50	0.41%	0.28%
55	0.60%	0.40%
60	0.85%	0.57%
65	1.26%	0.87%
70	1.97%	1.40%
75	3.15%	2.30%
80	5.19%	3.82%

RP-2014 Disability		
Sample Attained	Probability of Death Next Year	
Age	Male	Female
50	2.04%	1.19%
55	2.34%	1.45%
60	2.66%	1.70%
65	3.17%	2.09%
70	4.03%	2.82%
75	5.43%	4.10%
80	7.66%	6.10%

LSERS-derived adjustment factors

LSERS-derived adjustment factors to be applied to the RP-2014 Blue Collar mortality tables were calculated separately for the male and female annuitants (and the same factors were applied to the active members). Due to the manner of data collection and retention, separate adjustment factors were not developed for active employees. For the disabled retiree members, no adjustment factors were calculated due to the lack of available data.

The LSERS-derived adjustment factors were developed by comparing the total observed number of deaths for the group from the experience study to the total number of deaths expected from application of the RP-2014 reference mortality table for each subgroup projected to 2015, the central year of the experience study. Calculations were based on the following steps:

1. The dollar-weighted exposures at the beginning of the experience study period (July 1, 2012) were determined for each five-year age groups.

2. Using the median age (for each five-year age groups), the probability of dying in the next five years was calculated using the mortality rates from the standard reference tables with a preliminary adjustment factor.

3. For each of the five-year age groups, the resulting probability (from step 2) was multiplied by the dollar-weighted exposures (from step 1) to determine the expected number of deaths.

4. The total expected number of deaths of all the age groups was then compared to the actual number of deaths (reduced by a 5% margin) over the experience study period.

5. Steps 2 through 4 were repeated several times for each gender separately with adjustment factors varied at 5% increments until the number of expected deaths fell within acceptable margin of the actual number (reduced by a 5% margin).

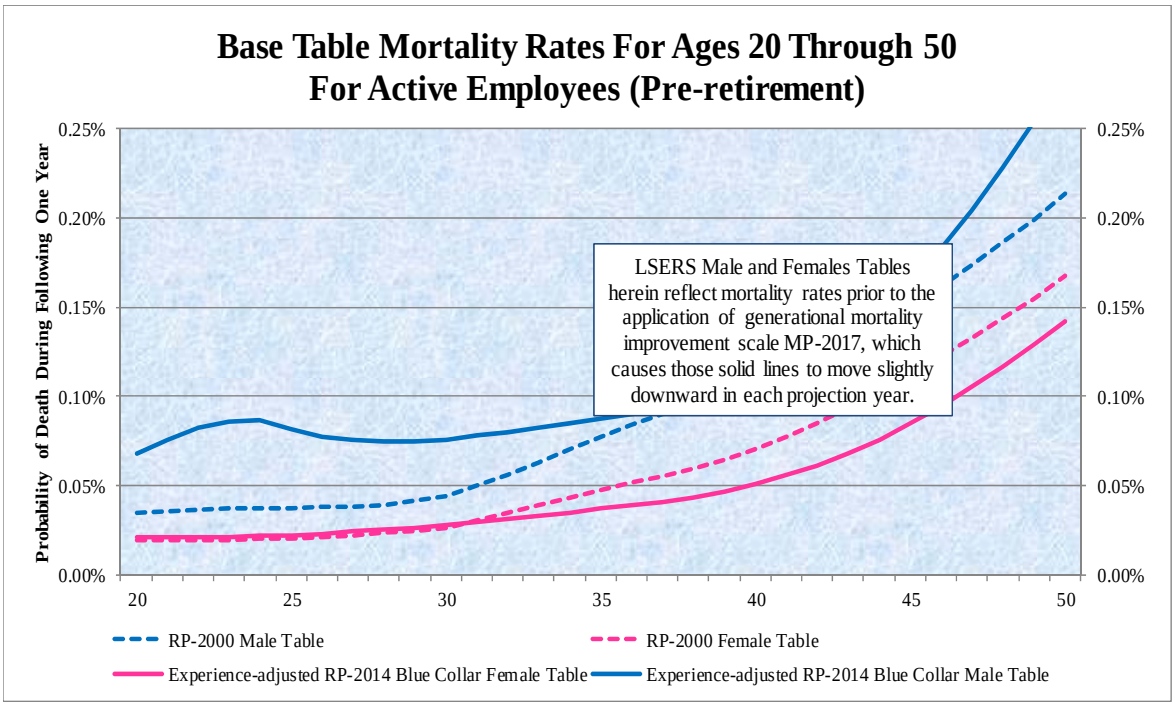
Using the process described above, the LSERS-derived adjustment factor for male annuitant members is 130% and the LSERS-derived adjustment factor for female annuitant members is 115%.

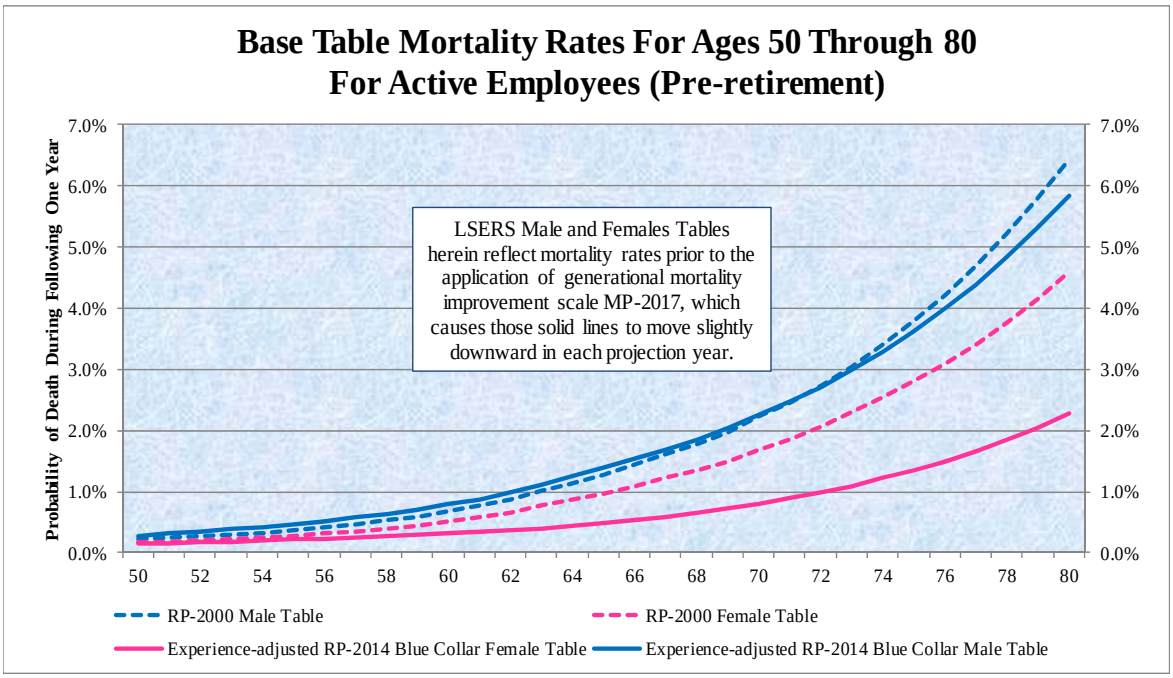
The same scaling factors were recommended to be used with the RP-2014 Blue Collar Employee mortality tables to model deaths of active employees. RP-2014 Disability Tables were used are used for disability retirees without system specific adjustments.

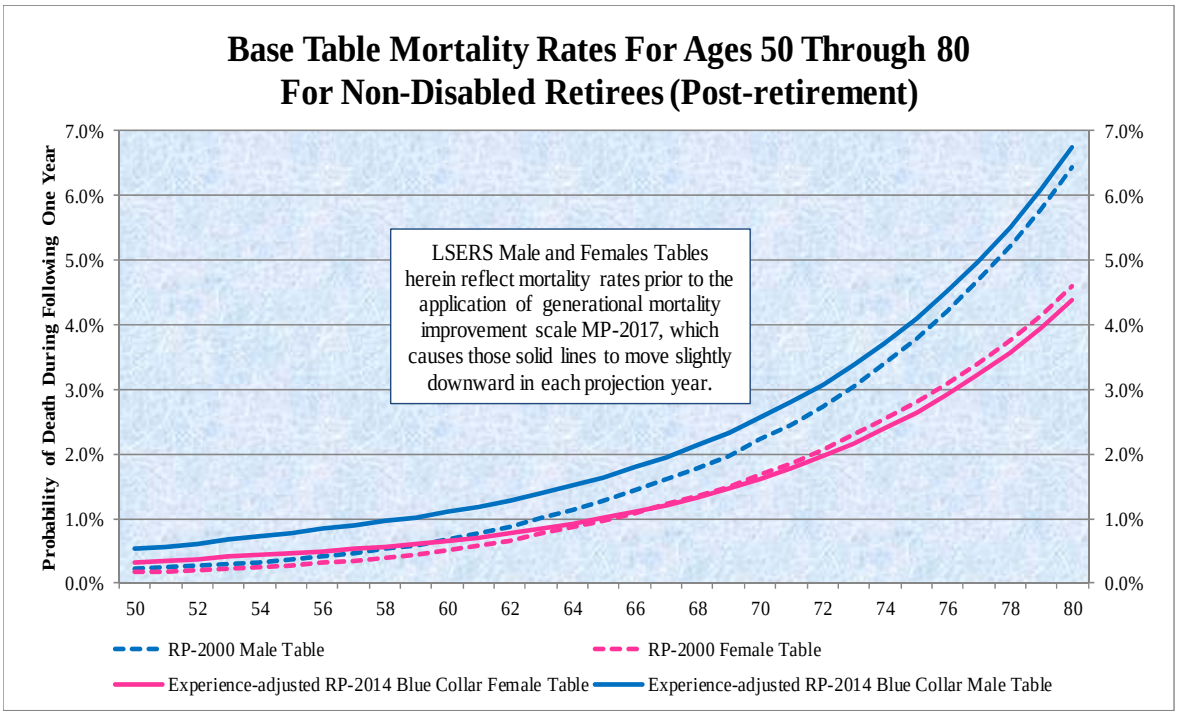
Four graphs on the following pages compare the base table mortality rates used in:

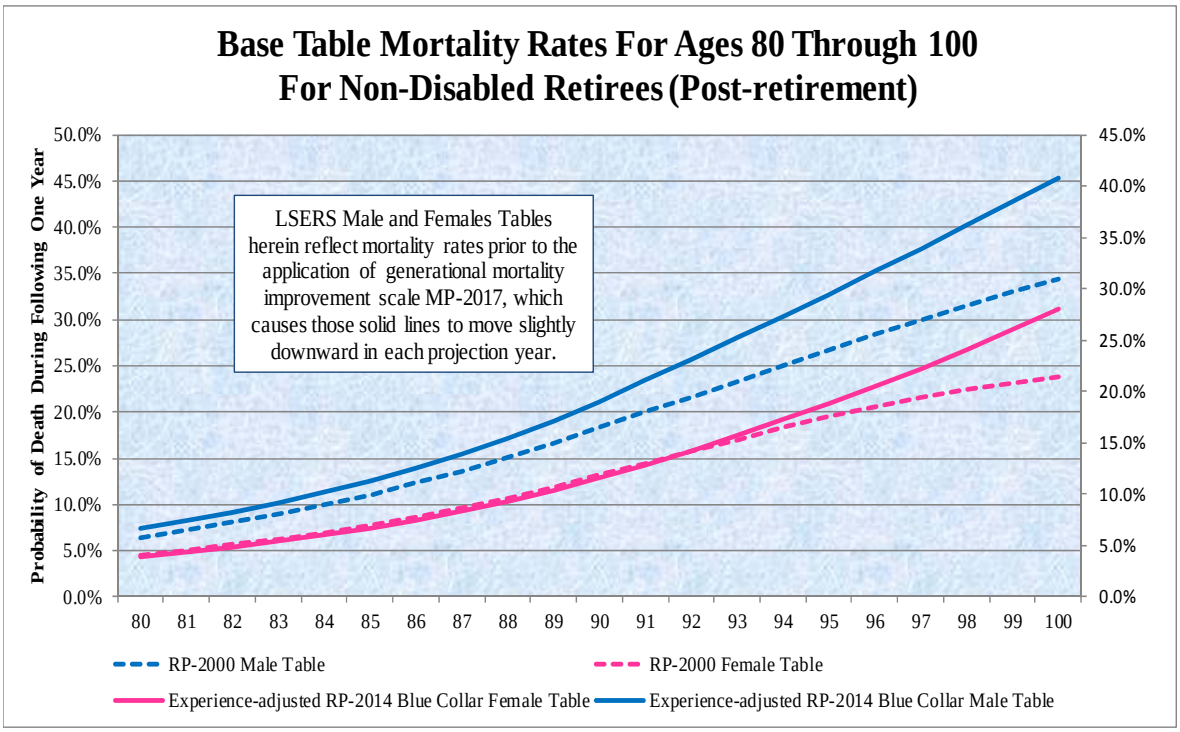
- The prior valuation (the published RP-2000 mortality tables) and
- This valuation (experience-adjusted RP-2014 Blue Collar mortality tables)

These represent base tables, prior to the respective methods of recognizing mortality improvement in the future.


Base Table Mortality Rates For Ages 20 Through 50
For Active Employees (Pre-retirement)
Probability of Death During Following One Year
0.25%
0.20%
0.15%
0.10%
0.05%
0.00%
20
25
30
35
40
45
50
LSERS Male and Females Tables herein reflect mortality rates prior to the application of generational mortality improvement scale MP-2017, which causes those solid lines to move slightly downward in each projection year.
RP-2000 Male Table
RP-2000 Female Table
Experience-adjusted RP-2014 Blue Collar Female Table
Experience-adjusted RP-2014 Blue Collar Male Table


Base Table Mortality Rates For Ages 50 Through 80
For Active Employees (Pre-retirement)
Probability of Death During Following One Year
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
50
52
54
56
58
60
62
64
66
68
70
72
74
76
78
80
LSERS Male and Females Tables herein reflect mortality rates prior to the application of generational mortality improvement scale MP-2017, which causes those solid lines to move slightly downward in each projection year.
RP-2000 Male Table
RP-2000 Female Table
Experience-adjusted RP-2014 Blue Collar Female Table
Experience-adjusted RP-2014 Blue Collar Male Table


Base Table Mortality Rates For Ages 50 Through 80
For Non-Disabled Retirees (Post-retirement)
Probability of Death During Following One Year
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80
LSERS Male and Females Tables herein reflect mortality rates prior to the application of generational mortality improvement scale MP-2017, which causes those solid lines to move slightly downward in each projection year.
RP-2000 Male Table
RP-2000 Female Table
Experience-adjusted RP-2014 Blue Collar Female Table
Experience-adjusted RP-2014 Blue Collar Male Table


Base Table Mortality Rates For Ages 80 Through 100
For Non-Disabled Retirees (Post-retirement)
Probability of Death During Following One Year
50.0%
45.0%
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
LSERS Male and Females Tables herein reflect mortality rates prior to the application of generational mortality improvement scale MP-2017, which causes those solid lines to move slightly downward in each projection year.
RP-2000 Male Table
RP-2000 Female Table
Experience-adjusted RP-2014 Blue Collar Female Table
Experience-adjusted RP-2014 Blue Collar Male Table

Mortality Improvement Scale

The prior valuation did not recognize any mortality improvements.

This valuation used the Society of Actuaries recommended approach – application of the generational mortality improvement scale MP-2017. The improvement scale projects the mortality rates from the base year (2014) of the mortality table to future years to account for future improvement in the mortality rates. The MP-2017 improvement scale, released in October 2017, is intended to be used along with the RP-2014 mortality tables and is the most recent improvement scale available as of the valuation date. Since the RP-2014 tables were constructed based on experience between years 2004 and 2008, the final published rates were developed by projecting rates from 2006 (central age for the experience period) to 2014 using improvement scale MP-2014. It is becoming more and more common to use the MP-2017 improvement scale with modified RP-2014 tables adjusted to remove the projection from 2006 to 2014. These adjusted tables are sometimes referred to as "RP-2014 adjusted to 2006" or simply RP-2006". This approach was recommended by the system actuary in the experience study report and is employed in the June 30, 2018 valuation. Specifically, experience based adjustment factors are applied to the base rates from RP-2006 Blue Collar tables and are then generationally project in the course of the valuation process using improvement scale MP-2017.

Actuarial Practice

We recognize that experience studies for larger systems are generally performed every five years, and such study for LSERS was prepared in 2018. It is also generally accepted among retirement system executives, board members and actuaries that if events occur or if better or new techniques emerge between experience studies that materially affect results, they would be considered for change.

Furthermore, Actuarial Standard of Practice (ASOP) No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*, states that at each measurement date the actuary should determine whether the assumptions continue to be reasonable, which includes the requirement to take into account historical and current demographic data that is relevant as of the measurement date.

We believe the mortality table used in this 2018 actuarial valuation (developed as described above) satisfies that ASOP and is consistent with current actuarial literature.

For all other demographic assumptions

In our opinion, all other demographic assumptions set forth in the Experience Study report prepared by the System's actuary (dated May 3, 2018) for the period from July 1, 2012, through June 30, 2017, and approved by the retirement board are suitable for use in LSERS' 2018 Actuarial Valuation.

APPENDIX B
BASIS FOR INFLATION ASSUMPTION

Appendix B: Basis for Inflation Assumption

Introduction to Improvements in Assumptions and Methods (repeated from Appendix A)

The actuary for the LLA is required by R.S. 11:127(C) to prepare an actuarial valuation for review by PRSAC. In fulfilling that responsibility, we accept almost all the actuarial assumptions developed by LSERS' actuary and adopted by its board of trustees, while we reject two or three other actuarial assumptions. Following is a brief summary of the principles we applied in adopting different assumptions used in this actuarial valuation as compared to the System's valuation.

1. The economic assumptions as to future inflation and future investment returns:
   a. Should be an unbiased expectation of the future,
   b. Should not be unduly influenced by perceptions of what the contributing entity(ies) can afford in current annual budget negotiations,
   c. Should explicitly reflect the System's own asset allocation,
   d. Should explicitly reflect the System's own projected benefit cash flow,
   e. Should lie within the mainstream of forward-looking forecasts from experts and
   f. Should be within a reasonable range above/below the most appropriate return assumption.

2. All benefits that are reasonably expected to be paid in the future should be measured actuarially, including expected future cost-of-living (COLA) benefits, using actuarial methods that are:
   a. *Explicit.* Separately identify the cost of COLA benefits, and should not be implicitly buried or conflated within the return assumption and
   b. *Transparent. C*lear and meaningful; should not be misleading or confuse to the public.

The improvements in these two actuarial assumptions/methods enhance the benefit security of plan members by ensuring the contribution requirements have a stronger actuarial basis. Furthermore, these improvements enhance the integrity of the financial disclosures issued by all participating governmental entities, by ensuring the balance sheet liabilities reflect all expected benefits and are a more transparent and fair representation of the pension obligation.

This Appendix B describes our approach to developing the economic assumption as to future price inflation.

Perspectives: Where Should Actuaries Look for Input on Inflation Assumptions?

There are two types of perspectives to consider when defending or determining an assumed rate of future inflation. One is temporal – Do we look more to historical rates to inform decision-makers; or more to forward-looking forecasts of the future? The other is social – Do we look more to what other retirement systems are doing; or look more to what expert inflation forecasters are expecting?

Past returns? Looking backwards at historical inflation rates is not considered to be reliable supporting documentation for current pension actuarial assumptions of future inflation. Historical inflation rates are viewed more as information, than used to defend or determine a current inflation assumption. The past is indeed useful for understanding historical relationships among various economic forces.

The current economic environment is not like the past 10, 30, or 50 years; and the future economic environment is certain to be different from the past. The role of the Federal Reserve Board and other factors are different than they used to be years ago.

A forward-looking perspective should drive the defense or determination of an inflation assumption for pension actuarial valuations. Strategically selecting historical rates (an X-year period ending on Y-date) to justify a return assumption being applied to the next 10, 20, or 30 year period is not valid.

Therefore, historical CPI rates of increase have minimal relevance to us. We chose instead to develop our inflation assumptions based on *forward-looking* forecasts from subject matter experts.

Other retirement systems? Looking to what other peer retirement systems are assuming for future inflation rates is generally not a well-placed focus for defending or determining a future inflation rate.

While it may be interesting, even important, to know what inflation assumptions are used by other large public sector retirement systems, that information is not useful for discharging our duties for adopting an inflation assumption for the System's actuarial valuation. It is not useful for actually informing us concerning the economic forecasts applicable to this valuation.

a. *Different environments*. Public retirement systems across the United States each have their own politics, environments and sets of agency risk. Their assumption-setters may not have adhered to mainstream and objective forecasts of experts, but may have been influenced by budgets, protectionism, and politics. These are not best practices to be emulated when setting assumptions. Since it is impossible to determine which retirement systems applied a robust, analytical process and which were more influenced by budgets, it is best not to select the inflation assumption based on what other retirement systems assume.

b. *Different horizon*. Other retirement systems may have been influenced by their consultants advocating a long-term horizon for the net investment return assumption.

This is fairly common, but as discussed below, a mid-term horizon is more appropriate for the reasons stated. A single equivalent rate between the mid-term consensus and the longer term consensus, derived from a system's own respective cash flow demands, may be the most appropriate return assumption.

Looking at other retirement systems is important and useful for knowing what others are doing; but it is not appropriate as a driving factor in defending or determining an inflation assumption for this retirement System.

Expert sources of inflation forecasts (from large, independent, unbiased and, reputable inflation forecasting organizations) are the best places to look for input when setting an inflation assumption for pension valuations. These are much more objective and unfiltered sources, directly from the experts themselves, to guide decision-makers.

Adopting a *process* that looks to a consensus of external and independent subject matter experts' forward-looking forecasts is the best way to avoid the political and budget pressures that sometimes distract or influence assumption-setters away from our primary duty to set an inflation assumption as an unbiased best estimate (or most appropriate) of the future inflation.

Inflation Forecasts from Independent Experts

Expected rates of inflation are critical components of expected rates of return. In a building block approach it forms the starting point for building up the final choice for the return assumption, salary scale increases for individuals, cost-of-living adjustment benefits, general wage inflation and a payroll growth rate assumption when applicable.

We applied considerable care to obtain relevant research and opinions from independent inflation forecasting experts for this fundamental component.

There are many professional sources available to actuaries and investment consultants that forecast inflation on a forward-looking basis.

Inflation forecasting is mostly the domain of *economists*, particularly those specializing in that area. In our opinion, as mentioned earlier, forward-looking forecasts from subject matter experts are much more appropriate than historical rates or peer groups.

Consider the forward-looking forecasts from the following eight (8) subject matter expert organizations, comprising hundreds of economists' opinions.

Major Inflation Forecasters	
Congressional Budget Office	Federal Reserve Bank of Cleveland
Federal Reserve Bank of Philadelphia	Federal Reserve Bank of New York
Federal Reserve Board	Social Security Trustees Report
U.S. Department of the Treasury	Investment Forecaster Survey (GRS)

Some of these organizations provide multiple forecasts of inflation for different time horizons, making a total of 18 forecasts from eight (8) reputable sources.

2018 Forward-looking Forecasts of CPI Inflation		
Horizon	**Average**	**Sources**
27 - 30^{+} yrs	2.41%	6
20 yrs	2.25%	3
10 yrs	2.24%	9

Our preferred inflation assumption for a 10 year horizon would be 2.24%, the consensus average directly from nine (9) expert sources of mid-term inflation forecasts.

Our preferred inflation assumption for a 30 year horizon would be 2.41%, the consensus average directly from six (6) expert sources of long-term inflation forecasts

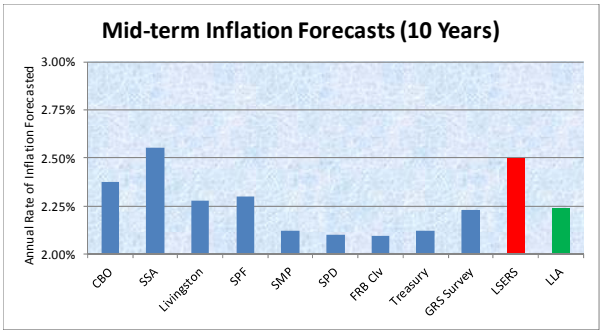
Both mid-term and long-term horizons of inflation forecasts are used in developing our final net return assumption. It would be a false choice to be forced to pick between mid-term and long-term for the net return assumption. The composite single equivalent benefit horizon turns out to be much closer to the mid-term horizon than the long-term horizon, due to the expected future benefits stream, and the long-term forecasts are less reliable for reasons discussed in Appendix D. Nevertheless, our final development of the net return assumption is a blend or the single equivalent net return assumption (between the mid-term and long-term census averages).

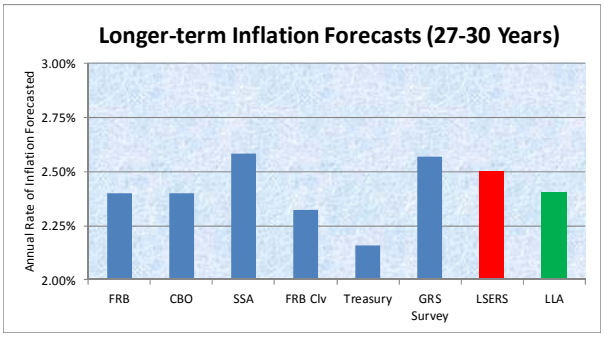
On the other hand, the inflation component of the individual salary scale assumptions more clearly should be the mid-term horizon, given the average remaining working life of active members.

Consider the exhibit below, which shows the detailed inflation forecasts of these eight large reputable expert organizations in the field of inflation forecasting.

Appendix B: Basis for Inflation Assumption

2018 Forward-looking Annual Inflation Forecasts (From Professional Experts in the Field of Forecasting Inflation)	
Federal Reserve Board's Federal Open Market Committee	
Current Long-run Price Inflation Objective:	
Objective since Jan 2012; Personal Consumer Expenditures (PCE)	2.00%
Consumer Price Index Inflation Objective (CPI = PCE + approx 40 bps)	2.40%
Congressional Budget Office: The Budget and Economic Outlook	
Overall Consumer Price Index (April 2018; Ultimate)	2.40%
Overall Consumer Price Index (April 2018; 10 Years)	2.38%
2018 Social Security Trustees Report	
CPI-W 10-Year Intermediate Assumption	2.55%
CPI-W 30-Year Intermediate Assumption	2.58%
Federal Reserve Bank of Philadelphia	
Livingston Survey: 10-Year Median Forecast (June 2018)	2.28%
Survey of Professional Forecasters: 10-Year Median Forecast (2Q2018)	2.30%
Federal Reserve Bank of New York's Trading Desk (June 2018)	
Survey of Market Participants: 10-Year Median Expectation	2.12%
Survey of Primary Dealers: 10-Year Median Expectation	2.10%
Federal Reserve Bank of Cleveland (July 1, 2018)	
10-Year Expectation	2.09%
20-Year Expectation	2.23%
30-Year Expectation	2.32%
U.S. Department of the Treasury (Ave in June 2018)	
10-Year Breakeven Inflation	2.12%
20-Year Breakeven Inflation	2.12%
30-Year Breakeven Inflation	2.16%
2018 GRS Survey of Investment Consultants and Forecasters	
Median expectation among 12 firms (averaging a 10-year horizon)	2.23%
Median expectation among 4 firms (averaging 27-year horizon)	2.57%





Note the System's inflation assumption makes no distinction between mid-term or longer-term; but is just a single 2.50% rate for its 2018 valuation.

Clearly, it is difficult to defend an inflation assumption of 2.50% for a mid-term horizon of 10 years. An inflation assumption of 2.50% for a long-term assumption of 30 years might be defensible. We opt for unbiased and independent opinions of leading inflation forecasters. To repeat the summary table for convenience:

2018 Forward-looking Forecasts of CPI Inflation		
Horizon	**Average**	**Sources**
27 - 30^{+} yrs	2.41%	6
20 yrs	2.25%	3
10 yrs	2.24%	9

APPENDIX C
BASIS FOR NET INVESTMENT RETURN ASSUMPTION

Introduction to Improvements in Assumptions and Methods (repeated from Appendix A)

The actuary for the LLA is required by R.S. 11:127(C) to prepare an actuarial valuation for review by PRSAC. In fulfilling that responsibility, we accept almost all the actuarial assumptions developed by LSERS' actuary and adopted by its board of trustees, while we reject two or three other actuarial assumptions. Following is a brief summary of the principles we applied in adopting different assumptions used in this actuarial valuation as compared to the System's valuation.

1. The economic assumptions as to future inflation and future investment returns:
   a. Should be an unbiased expectation of the future,
   b. Should not be unduly influenced by perceptions of what the contributing entity(ies) can afford in current annual budget negotiations,
   c. Should explicitly reflect the System's own asset allocation,
   d. Should explicitly reflect the System's own projected benefit cash flow,
   e. Should lie within the mainstream of forward-looking forecasts from experts and
   f. Should be within a reasonable range above/below the most appropriate return assumption.

2. All benefits that are reasonably expected to be paid in the future should be measured actuarially, including expected future cost-of-living (COLA) benefits, using actuarial methods that are:
   a. *Explicit.* Separately identify the cost of COLA benefits, and should not be implicitly buried or conflated within the return assumption and
   b. *Transparent. C*lear and meaningful; should not be misleading or confuse to the public.

The improvements in these two actuarial assumptions/methods enhance the benefit security of plan members by ensuring the contribution requirements have a stronger actuarial basis. Furthermore, these improvements enhance the integrity of the financial disclosures issued by all participating governmental entities, by ensuring the balance sheet liabilities are a more transparent and fair representation of the pension obligation.

This Appendix C describes our approach to developing the economic assumption as to the future net investment returns of the retirement fund's portfolio.

Principles for Setting Pension Return Assumptions

The purpose of the return assumption is to forecast what the pension portfolio is expected to earn in the future. While we are cognizant of the financial burden that pension contributions place on participating employers, our responsibility is to measure costs and liabilities without being unduly influenced by the resulting contribution requirement for a given return assumption. The role of the actuary for the LLA is to make an unbiased measurement of the retirement program's expected future cost to taxpayers, without regard whether the contributions are affordable.

The pension return assumption should be a reasonable and defensible best estimate of the future net investment return of the pension portfolio over the given horizon. It should be based on the professional forecasts of *independent* subject matter experts and should be appropriate for use in an actuarial valuation of a retirement system. While we understand that different professionals may have differing opinions about the future, we do not consider the pension return assumption to be a lever to adjust up or down depending on what is affordable at the time.

Our primary focus is on following a robust and analytical process for objectively adopting an appropriate forecast of the pension portfolio's future earnings. We recognize the initial contribution shock caused by a large change in return assumption. But we choose to separate the setting of the most appropriate return assumption from budget implications; not to ignore the budget implications, but to address them separately, after the most appropriate return assumptions is derived.

Nevertheless, a reasonable and defensible "most appropriate" assumption for future net investment returns:

a. Provides the most unbiased measure of the unfunded actuarial liability that is reported to the public,

b. Provides the most responsible funding levels for the benefit security of plan members, and

c. Achieves an appropriate balance of intergenerational equity (does not unduly "kick the can down the road").

This *purpose* of the return assumption is what drives our *process* for setting the assumption used in this actuarial valuation.

Process for Setting the Pension Return Assumption

We follow a robust and disciplined process for setting the return assumption (including the inflation assumption). The process includes these elements:

1. Perspectives: Where Should Actuaries Look for Input?
2. Inflation Forecasts from *Independent* Experts.
3. Asset Allocation.
4. Investment Return Forecasts from *Independent* Experts.
5. Consensus of Multiple Independent Experts.
6. Appropriate Horizon.
7. Most Appropriate Return Assumption
8. Reasonable Range Around the Most Appropriate Return Assumption

Perspectives: Where Should Actuaries Look for Input on Return Assumptions?

There are two types of perspectives to consider when defending or determining an assumed rate of future net investment returns of a pension fund. One is temporal – Do we look more to historical rates to inform decision-makers; or more to forward-looking forecasts of the future? The other is social – Do we look more to what other retirement systems are doing; or look more to what expert forecasters would expect for the System's own portfolio in the future?

Past returns? Looking backwards at historical rates of return is not considered to be reliable supporting documentation for current pension actuarial assumptions of future net returns. Historical rates of return are viewed more as information, than used to defend or determine a current net return assumption. The past is indeed useful for understanding historical relationships among various economic forces and various statistical metrics such as standard deviations, correlation coefficients and P/E ratios; but even those have been known to change over time and may be different from their historical averages.

The current economic environment is not like the past 10, 30, or 50 years; and the future economic environment is certain to be different from the past. The role of the Federal Reserve Board and other factors are different than they used to be years ago. The System's portfolio and its managers are not even the same now as they were in the past; nor will they be the same in the future as they are now.

A forward-looking perspective should drive the defense or determination of a net return assumption for pension actuarial valuations. Strategically selecting historical returns (an X-year period ending on Y-date) to justify a return assumption being applied to the next 10, 20, or 30 year period is not valid.

Therefore, historical returns for this System or investments in general have minimal relevance to us. We chose instead to develop our net return assumptions based on *forward-looking* forecasts from subject matter experts, then apply this System's own characteristics to arrive at a final assumption.

Other retirement systems? Looking to what other peer retirement systems are assuming for future investment returns is generally not a well-placed focus.

While it may be interesting, even important, to know what investment return assumptions are used by other large public sector retirement systems, that information is not useful for discharging our duties for adopting a net investment return assumption for the System's actuarial valuation. It is not useful for actually informing us concerning the economic forecasts applicable to this valuation.

a. *Different environments*. Public retirement systems across the United States each have their own politics, environments and sets of agency risk. Their assumption-setters may not have adhered to mainstream and objective forecasts of experts, but may have been influenced by budgets, protectionism, and politics. These are not best practices to be emulated when setting assumptions. Since it is impossible to determine which retirement systems applied a robust, analytical process and which were more influenced by budgets, we felt it best not to select the return assumptions based on what other retirement systems assume.

b. *Different asset allocations*. Other retirement systems are certain to have different asset allocations than this System, either more aggressive or less aggressive. That would make it a false comparison. A system's own table of asset allocation targets is a major input factor into the selection process.

c. *Different horizon*. Other retirement systems may have been influenced by their consultants advocating a long-term horizon for the net investment return assumption. This is fairly common, but as discussed below, a mid-term horizon in more appropriate for the reasons stated. A single equivalent rate between the mid-term consensus and the longer term consensus, derived from a system's own respective cash flow demands, may be the most appropriate return assumption.

Looking at other retirement systems is important and useful for knowing what others are doing; but is not appropriate as a driving factor in defending or determining a return assumption for this retirement System.

Expert sources of investment return forecasts (from large, independent, unbiased and, reputable forecasting firms) are the best places to look for input when setting a return assumption for pension valuations. These are much more objective and unfiltered sources, directly from the experts themselves, to guide decision-makers.

Adopting a *process* that looks to a consensus of external and independent subject matter experts' forward-looking forecasts is the best way to avoid the political and budget pressures that sometimes distract or influence assumption-setters away from our primary duty to set a return assumption as an unbiased best estimate (or most appropriate) of the future earnings of the portfolio.

Asset Allocation

It has been generally accepted for many years that a fund's asset allocation is responsible for the vast majority of a fund's investment performance. Therefore, the asset allocation of the System is a core element in setting and evaluating assumed future returns.

We relied on the 16 target asset allocation percentages set forth in the System's formal Investment Policy Statement last updated October 2, 2017.

2018 LSERS Target Asset Allocation			
Risk Assets		**Fixed Income Assets**	
US Equity Composite	20%	US Core/Core Plus Fixed Income Composite	5%
International Large Cap Composite	15%	High Yield Fixed Income	5%
International Small Cap Composite	3%	Opportunistic Fixed Income	3%
Emerging Markets Equity Composite	10%	Global Fixed Income Composite	10%
Total Real Estate Composite	5%	Emerging Market Debt Composite	7%
REIT Composite	3%		
Timber	2%	*Total Fixed Income Assets*	*30%*
Oil&Gas	2%		
Infrastructure	2%		
Hedge Fund of Funds	3%		
Private Equity Composite	5%		
Total Risk Assets	*70%*		
		Total Asset Allocation	*100%*

***Source**: Current (2018) Investment Policy Statement (dated 10/2/2017) and the 6/30/2018 Investment Performance Report Targets*

Refer to Appendix G for additional information concerning pension risk in accordance with ASOP No. 51.

Input from Independent Experts

We applied the target asset allocations to the expectations in the GRS Survey of 13 major national investment consultants and forecasters.

External forecasters

These 13 firms are independent of the LLA's office and independent of GRS. This way, all parties can be assured there is no real or perceived agency risk or bias in the selection of the most appropriate return assumption by the actuary for the LLA.

Twelve of these 13 investment consultants/forecasters provided GRS with their mid-term (10 years) horizon forecasts, and four of them provided GRS with their longer-term (20 to 30 years) horizon forecasts. Given the brevity of the descriptions of the asset classes identified, our mapping of the fund's asset classes to the investment consultant's asset classes may not be exact.

Listed below are the national firms in our 2018 GRS Survey. These are very large and reputable investment consultants and forecasters.

Participating Investment Forecasters			
Aon/Hewitt[IC]	BNY/Mellon[IM]	Callan[IC]	Cambridge Associates[IC]
J.P. Morgan[IM]	Marquette[IC]	Mercer[IC]	NEPC[IC]
PCA[IC]	RVK[IC]	Summit[IC]	VOYA[IM]
Wilshire Associates[IC]			

[IC] *In the top 25 largest investment consultants, according to the most recent survey from P&I.*

[IM] *In the top 75 largest investment managers, according to the most recent survey from P&I/WTW.*

Number of experts

A caution is in order against including too many in the consensus survey. GRS includes 13 large forecasting firms, with large research staffs, robust methodologies and peer accountability.

If the number of firms in the survey were too high, it would include firms with smaller research staffs, much less robust methodologies and less peer accountability. Furthermore, smaller firms often rely on some of the same research information and forecasts developed by the larger firms and, therefore, create overlap in the survey.

Methodology

The actuary for the Legislative Auditor adopts a methodology that minimizes "mapping error" and selects experts for inflation forecasting separate from investment return forecasting:

1. Mapping error refers to the slippage that sometimes occurs when mapping asset

allocations from one list of asset classes to another. Not all asset class lists are identical. For example, one list might include international debt while another might fold its holdings in international debt into an asset class called merely core fixed income. A reasonable proxy must be substituted. This creates some amount of uncertainty in the process.

The actuary for the Legislative Auditor minimized this mapping error by using only a single mapping.

Another methodology creates a standardized set of asset classes and maps all forecasters' asset classes into this single standardized list of asset classes. The *first source of mapping error* occurs when each such standardized asset class is assigned a composite expected return and a composite standard deviation from those forecasters who all have different lists of asset classes. A *second source of mapping error* arises from trying to create a single standardized composite set of correlation coefficients across mismatched sets of asset classes. These two sources of mapping error distort each forecaster's original capital market assumptions and their own considered relationships among asset classes. Then a *third source of mapping error* occurs when a system's own asset class list is mapped to the standardized set of asset classes with their composite expected returns, standard deviations and correlation coefficients.

The methodology employed in this valuation's research maps the System's asset allocation to each of the 13 forecasters' asset classes separately, thereby preserving the integrity of each such forecaster's capital market assumptions. This methodology also generates useful information about what each forecaster would say is their own expectation of the System's portfolio returns in the future.

2. As described in detail in Appendix B, the actuary for the Legislative Auditor turned to professional inflation forecasters for estimates of future inflation rates for this actuarial valuation report. Investment consultants and managers all have some expectations of future inflation, and usually include those expectations in their capital market assumptions for their investment forecasts. While investment forecasters are one source for inflation forecasting, they are not considered the best source.

   Economists are the best source of inflation forecasting. Economists often specialize in a wide range of subtopics (labor markets, tax revenue, etc.). Economists who publish inflation forecasts (specialists) are the best sources, not investment consultants.

Independent Experts' Forecasts for LSERS

We mapped the System's most recent target asset allocation to each of these 13 investment forecasters' expected returns by asset class.

We replaced the mid-term investment forecasters' respective mid-term inflation assumptions with 2.24%, our preferred mid-term assumption based on the consensus of expert inflation forecasters' expectations presented above in order to normalize for a consistent inflation assumption across all forecasters.

Likewise, we replaced the long-term investment forecasters' respective long-term inflation assumptions with 2.41%, our preferred long-term assumption based on the consensus of expert inflation forecasters' expectations presented above in order to normalize for a consistent inflation assumption across all forecasters.

This process results in normalized expected returns for any one given year in each of the two forecast horizons (mid-term and long-term). These are called the expected arithmetic returns. Finally, we reduced the resultant one-year arithmetic returns for volatility drag in the compound return expected over time, because pensions are all about compounding in a volatile environment over the horizon. These are called the expected geometric returns or 50th percentiles.

Below are the results of this process for the mid-term horizon.

Investment Forecaster	Distribution of 10-Year Compound Average Percentile Expectations			Probability of exceeding 7.0625%
	40th	50th	60th	
1	3.87%	4.89%	5.91%	29.55%
2	4.46%	5.51%	6.57%	35.59%
3	4.72%	5.75%	6.78%	37.35%
4	4.83%	5.75%	6.67%	35.98%
5	4.81%	5.82%	6.84%	37.86%
6	4.98%	5.82%	6.66%	35.48%
7	4.83%	5.92%	7.03%	39.71%
8	5.03%	6.01%	7.00%	39.43%
9	5.14%	6.05%	6.96%	38.94%
10	5.04%	6.08%	7.14%	40.76%
11	5.19%	6.15%	7.12%	40.56%
12	6.53%	7.42%	8.31%	54.01%
Average	**4.95%**	**5.93%**	**6.92%**	**38.77%**
Average of Middle* 10	**4.90%**	**5.89%**	**6.88%**	**38.17%**

* Discarding the lowest and highest outliers.

There are three important takeaways from this exhibit:

a. Over the mid-term horizon, the range of expert expectations of the 50th percentile of compound average return runs from 4.89% to 7.42%.

b. The 50th percentile consensus expert mid-term forecast is 5.93%.

c. The consensus of these experts is that there is only a 38.77% chance of achieving at least the current 7.0625% over the mid-term horizon. This does not mean a 38.77% chance of achieving the 7.0625% assumption in any year during the horizon; it means that the compound return over the next 10 years has a 38.77% of achieving at least the 7.0625% assumption.

This is why, actuarially speaking, the 5.93% rate of return is the preferred assumption for a mid-term horizon because it is the 50th percentile expectation of compound returns over a mid-term horizon. The consensus is that there is a 50-50 chance of returning at least 5.93% when compounded over the next 10 years.

Below are the results of this process for the long-term horizon.

Investment Forecaster	Distribution of 27-Year Compound Average Percentile Expectations 40th	50th	60th	Probability of exceeding 7.0625%
A	5.96%	6.57%	7.19%	42.03%
B	6.15%	6.78%	7.41%	45.43%
C	6.32%	6.92%	7.53%	47.69%
D	6.44%	7.05%	7.67%	49.80%
Average	6.22%	6.83%	7.45%	46.24%

***Note** : These investment forecasters providing longer term expectations are among the top 12 largest investment consultants with substantial research departments. Nevertheless, in our opinion, mid-term forecasts (or somewhere between mid-term and longer-term) are more appropriate for most retirement systems for reasons discussed in Appendix F.*

There are three important takeaways from this exhibit:

1. Over the long-term horizon, the range of expert expectations of the 50th percentile of compound average return runs from 6.57% to 7.05%.

2. The 50th percentile expectation of the consensus average for the long-term horizon is 6.83%.

3. The consensus of these experts is that there is only a 46.24% chance of achieving at least the current 7.0625% over the long-term horizon. This does not mean a 46.24% chance of achieving the 7.0625% assumption in any year during the horizon; it means the compound return over the next 27 years has a 46.24% of achieving at least the 7.0625% assumption.

This is why, actuarially speaking, the 6.83% rate of return is the preferred assumption for a long-term horizon because it is the 50th percentile expectation of compound returns over a long-term horizon. The consensus is that there is a 50-50 chance of returning at least 6.83% when

compounded over the next 27 years.

However, as discussed in a later section, we do not have to choose between the mid-term and long-term horizons. That most appropriate return is somewhere in between the two horizons, derived by recognizing the plan's own expected benefit stream.

A new pension plan with very little in benefits paid until the third decade can comfortably use a long-term horizon. But a mature pension plan with a large proportion of its future benefits expected to be paid in the first decade or two should adopt a return assumption that is closer to the mid-term than to the long-term. This derives from basic actuarial principles.

Refer to the Appendix D below on the appropriate horizon for more actuarial details.

Consensus of Multiple Independent Experts

Rather than rely on just one or two experts, we follow conventional wisdom and track the consensus (average) of several expert forecasts.

It matters not whether the field of forecasting is for hurricanes, earthquakes, elections, or inflation and investment returns, a *consensus average* of many reputable experts is proven to be more accurate than any one of those experts.

This ensures the final selection of the return assumption is in the mainstream consensus of reputable national experts.

As described in the section above on "*Perspectives: Where Should Actuaries Look for Input on Return Assumptions"*, it is more important to be in (a) the mainstream of what forecasting experts say about this System's portfolio than to be in (b) the mainstream of what other retirement systems say about their own systems.

APPENDIX D
HORIZON FOR THE
NET INVESTMENT RETURN ASSUMPTION

Appendix D: Horizon for the Net Investment Return Assumption

It is often said that projecting pension costs is a long-term proposition. Forecasts of future inflation and future returns come in short-term horizons (1-5 years), mid-term horizons (5-10 years), and longer-term horizons (20-30 years). Long-term forecasts are appealing and tempting, usually producing higher returns than mid-term horizon forecasts.

While it may be argued that reliance should be placed on the longest-term horizons, there are at least four compelling reasons not to do so:

Compelling reason #1: Underperformance in the mid-term is not sustainable.

If the forecasting experts are right, there may be a decade or two of lower pension plan returns, with a need for very high returns thereafter if their longer-term forecasts are to hold up.

For example, in correspondence dated May 6, 2016, the U.S. Treasury Department denied the application of the Board of Trustees of the Central States, Southeast and Southwest Areas Pension Plan for rolling back benefits under the Multiemployer Pension Reform Plan Act of 2014 in order to avoid insolvency. One of the reasons given in the ruling[2] was that the 7.5% and other embedded return assumptions were "significantly optimistic" and were "not reasonable." More specifically, the ruling stated that the return assumptions used to support the application were not reasonable or appropriate for the purpose of the measurement, did not take into account relevant current economic and investment forecast data, and had significant bias by being significantly optimistic. This three-fold denouncement was made primarily on the basis of the assumption's failure to recognize the lower expected returns in the first 10 to 20 years of the longer term horizon.

Even though pensions are long-term propositions, we live in a short-term and mid-term world. We should not need to wait 20 or 30 years to be vindicated for an assumption for which we have so little confidence in anyway. In *The Tract on Monetary Reform (*1923), John Maynard Keynes said, "*But this long run is a misleading guide to current affairs. In the long run we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is past the ocean is flat again.*" Many financial economists, many in the press and many academics are calling for much lower investment return assumptions. The optics are not good for continuing to hold to a long-term horizon of 20-30^{+} years, when so many mid-term years are forecasted by the experts to be underperforming against the long-term.

Repeated underperformance (for the next decade or so) of actual returns compared to the assumed return undermines the confidence in defined benefit plans. If the experts are right about the next 10 years but the return assumption is significantly higher, legislators and taxpayers might insist on a retirement plan that transfers the investment risk onto the members. Repeated increases in contribution rates and repeated additions to the unfunded actuarial liability may not be tolerable.

It is better to be more conservative in the return assumption over the mid-term time horizon while experts are forecasting lower compound annual returns.

[2] https://www.treasury.gov/services/Responses2/Central%20States%20Notification%20Letter.pdf

Compelling reason #2: Over-reliance on reversion to mean returns.

Long-term investment return forecasts (20-30 year horizons) often use a different methodology than mid-term forecasts. They often rely on the concept of "reversion to mean returns". While almost everything about the future is not known for certain, at least two things are known for sure – (1) The long-term picture will not be like the past and (2) Neither will the steps leading through it. Reversion to mean returns depends on the future environment being like the past.

The number of heads we see in an unbiased coin-flip experiment exhibits reversion to the mean. Given a large enough number of coin-flips, we can reasonably expect the future number of heads to be approximately the same as in the past (half the number of coin-flips), because the coin is unbiased and the future is very much like the past. This cannot be said of investment markets.

This weakness of long-term forecasts is not, by itself, sufficient to disregard experts' long-term forecasts of the future entirely. But it should inform us not to rely on it to the exclusion of mid-term forecasts.

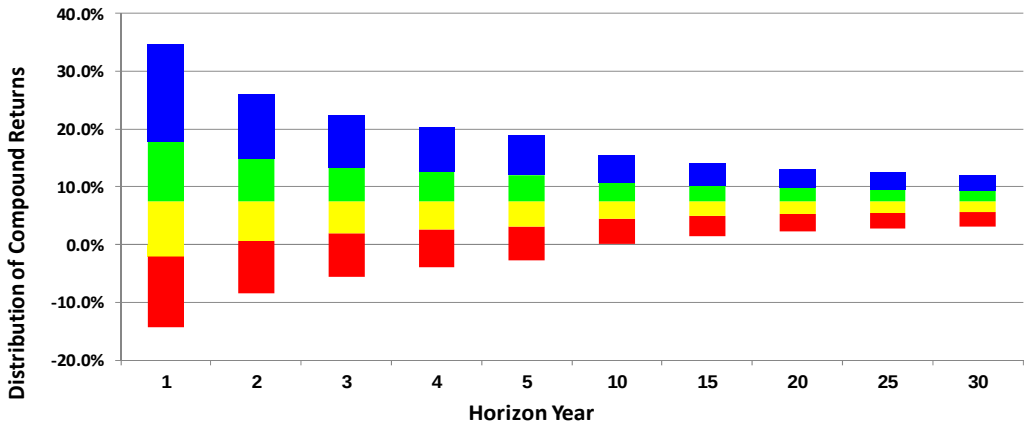
Compelling reason #3: Return forecasts over a longer-term horizon are the less reliable.

There is less certainty in the longer-term forecasts. Conventional risk management says that in the face of uncertainty, investors become more conservative. Thus, decision-makers should consider being more conservative than the longer-term forecasts because the longer-term forecasts are more uncertain. This is a principle in any forecasting profession, whether investment forecasting, election forecasting or hurricane forecasting. Longer-term forecasts are less reliable than mid-term forecasts.

There are two types of statistical error in forecasting –

1. Error around the mean (some have called this "risk") and
2. Error in the mean (and some call this "uncertainty").

Consider the following graph of the expected dispersion of forecasted compound returns around the forecasted compound mean. This shows that the compounded error around the compounded mean decreases over time. This is a common graph. But that type of error is not the one that brings the most uncertainty.



This dispersion graph *presumes* we know for certain what the statistical mean is for the ever-varying future investment returns, and illustrates merely what we think about how the varying returns will behave around that anchor-mean. The biggest uncertainty, here, is that no one knows for certain what the anchor-mean will be.

Many unexpected events will happen in the future that will throw off the anchor from our *presumption*. Even though the experts are reasonably accurate about the dispersion around the mean, they are likely to be off for their expectation of the future mean.

Many more things can insert themselves into our future over the next 30 years than over the next 10 years. So when we say, "*Return forecasts over a longer-term horizon are the less reliable*", we do not refer to the dispersion illustrated in this graph (which might be misunderstood as proving the opposite). We are referring to how confident (or not) we are in the mean itself.

We can mitigate some of the uncertainty by aggregating the opinions or several experts as to what the long-term compound annual return will be, i.e., calculate the average (or consensus) of their forecasts. However, the consensus of long-term forecasts is still more unreliable than the consensus of mid-term forecasts. There will be many events in years 1-10 that will undermine the mid-term outcome, making the final result either higher or lower than the mid-term consensus forecast. But add other 20 years on top of that (years 11-30) and many more events can insert themselves in years 11-30 to undermine any such long-term forecast.

This is the third reason why we are hesitant to place too much reliance on long-term investment return forecasts.

Compelling reason #4: The system's own cash flow demands.

Possibly the most compelling reason *not* to accept the long-term forecasts, without regard to the mid-term forecasts is a purely actuarial reason. It is fundamental in setting actuarial assumptions to incorporate (explicitly so) a retirement system's own characteristics into the process.

- The most obvious factor is to incorporate a system's own investment policy's asset allocation, as required by ASOP 27 Section 3.8.3(a). It is an actuarial weakness to either select or defend a system's return assumption without explicitly incorporating the fund's own asset allocation into the math.

- Secondly, a system's own cash demands upon the fund should explicitly be incorporated into the assumption-setting math, as required by ASOP 27 Section 3.8.3(f). The timing of when benefit and expense payments place a drain on the fund affects how much the fund should be expected to earn while those assets are still in the fund.

Experts currently forecast investment returns to be lower over the mid-term horizon (say, years 1-10) than over the long-term (years 11-30). They generally expect the later years to boost the compound average over 30 years compared to the compound average over the first 10 years.

Consider a newly formed retirement system (system A) which is expected to pay very little in benefits over the mid-term horizon and most of its benefits beginning in year 25. Consider

another retirement system (system B) that is a "mature" retirement system. This is not so extreme, but actually quite common. A mature retirement system is expected to pay a significant amount of its current accrued benefits over years 1-10. Mature retirement systems often pay out more in benefits than they take in from contributions (from employees, employers or other sources). This is the natural order of things.

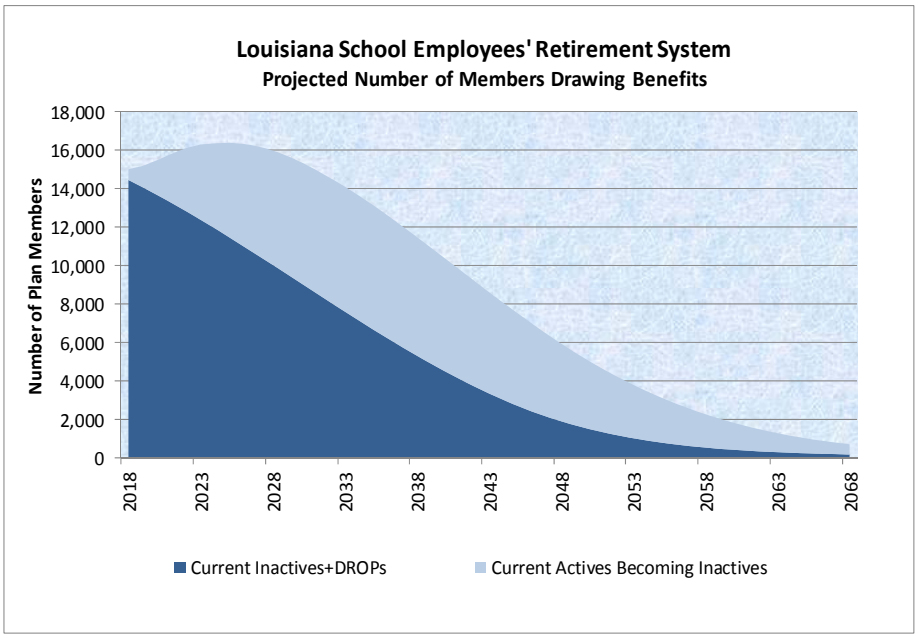
Retirement system A can comfortably adopt a longer-term horizon for its expected investment return assumption because it has a long time to make up for the lower earnings that are expected in the mid-term (e.g., years 1-10) before it has to actually pay benefits out of the fund.

A large portion of retirement system B's current assets will not be around in years 11-30. They will be paid out of the fund over the next 1-10 years. Those assets will be earning only what is available in the marketplace over the next 1-10 years. They will not be around to make up for the lower earnings that are expected in the mid-term (e.g., years 1-10).

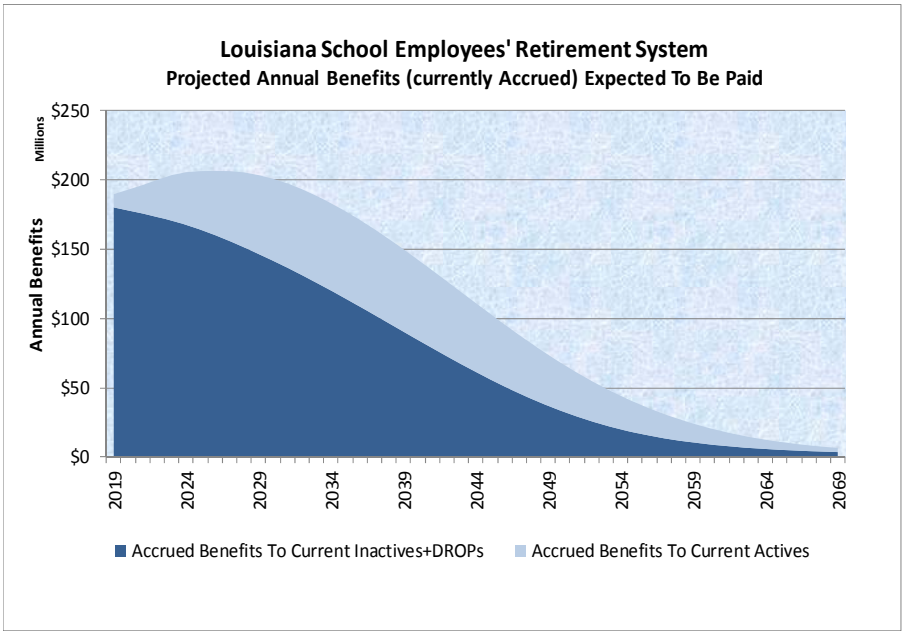
Even if one were to a accept long-term horizon for setting return assumptions, in disregard of the first three arguments outlined in the immediately preceding pages, he or she would need to take into account the systems own benefit demands and adopt a return assumption somewhere between the mid-term and long-term expectations, so as to recognize the investment horizon or timetable for the benefit payments to be made over the next 10 years.

Furthermore, even the benefits expected to be paid out in years 11-20 will not be around for those last 10 years (years 20-30) and the first 10 years of earnings will drag down their average compounded return for the time remaining in the fund (years 1-20).

There is a not-so-complicated actuarial projection of a retirement system's future benefit demands. Consider the following graphs illustrating these points.

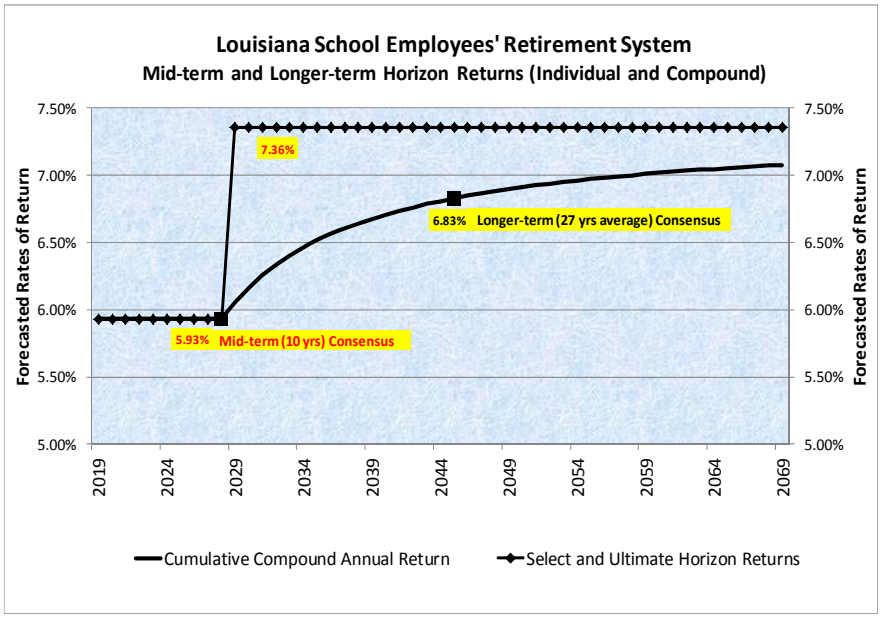


Over 14,000 current retirees are drawing benefits and will continue to do so until death. More retirees will be added to the roll from current active employees retiring in the years ahead, and then they will continue to receive benefits until death.



Currently, over $175 million per year in benefits are being paid to current retirees. Their benefits will continue until death. More benefits will be paid to current active who will retire in the years ahead. This, of course, is the purpose of retirement systems – to pay benefits to retiring public servants.

For many years, benefits and expenses paid exceed the contributions made from employees, employers and the state (i.e., negative cash flow). This System is very mature. The cash demands upon the fund need to be recognized in setting or defending the return assumptions.

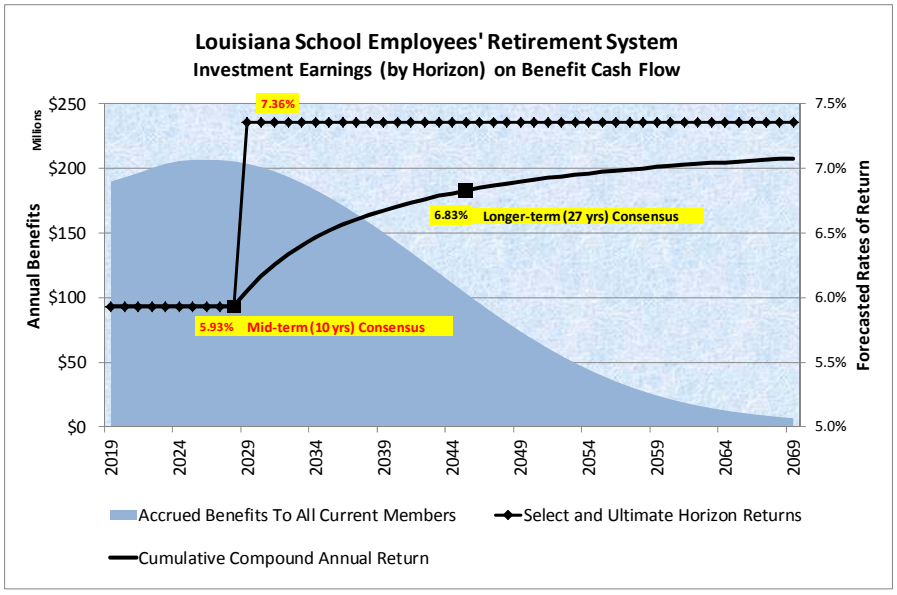


As presented in the previous Appendix C, the consensus 50th percentile expectation for the compound annual returns over the next 10 years (years 1-10) is 5.93%, and over the full 30 years (years 1-30) it is 6.83%. In order for the 30-year average to be 6.83%, the returns during each of the years 11-30 need to be 7.36% (in order to make up for drag in returns for years 1-10).

The curved line from 2028 through 2069 represents the cumulative compound average returns at each point, comprised of returns of 5.93% per year for years 1-10 compounded with returns of 7.36% each year thereafter. Notice at 27 years, the compound average return is the forecasted 6.83%.

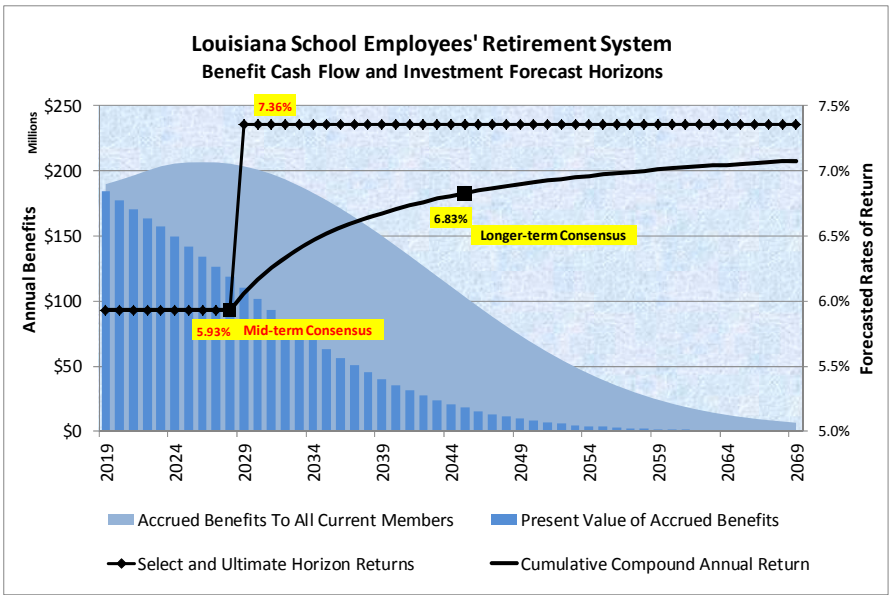
This separate forecast of returns for years 1-10 and years 11-30 is necessary to measure the earnings generated by the fund's current assets from the valuation date through the year when the benefits are expected to be paid.

In the graph below, overlay the total annual benefits (accrued to current retirees and current actives becoming retired) to illustrate the time when the benefit assets are still in the fund.

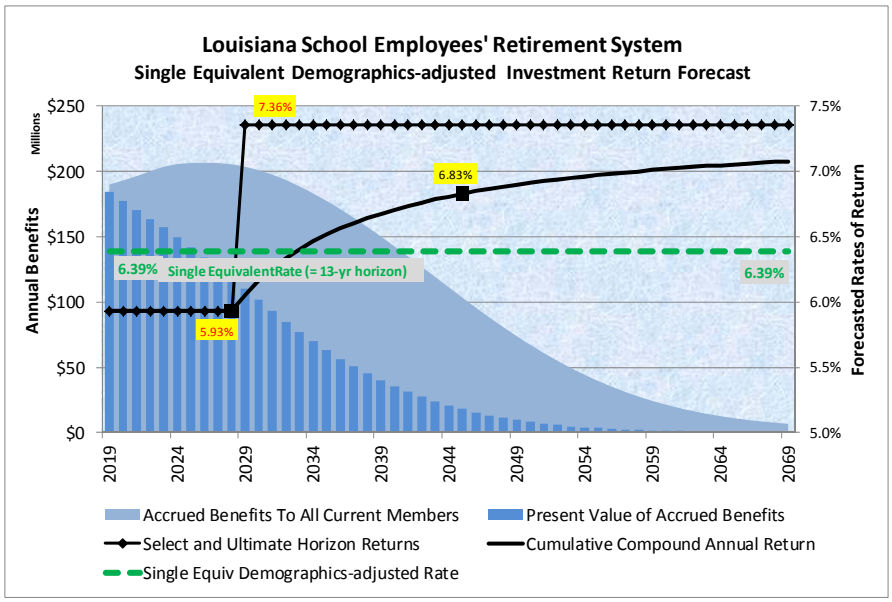


Appendix D: Horizon for the Net Investment Return Assumption

The graph below overlays the present value (darker blue bars) of those annual benefit payments to illustrate the effect in terms of current dollars, i.e., current assets that will ultimately pay those benefits (lighter blue region). Again, the current assets that will pay these expected benefits for years 1-10 will only be earning 5.93% per year, while assets that will pay the benefits for years 11-20 will be earning only 5.93% for years 1-10 and 7.36% for the balance of years until payment.



Recognizing the System's own benefit demand timing and the different earnings expectations over years 1-10 versus years 11-27, the single equivalent net investment return on all assets used to pay these benefits is 6.39%.



All of these last several pages demonstrate how inappropriate it is to simply adopt a 30-year horizon for setting the net investment return assumption for an actuarial funding valuation.

To summarize, adopting a return assumption should incorporate in an explicit manner:

1. A retirement system's own investment policy (target asset allocation) and
2. A retirement system's own expected benefit stream.

Notice the horizon associated with the single equivalent expected return is 13 years. Therefore, the mid-term forecast consensus should have a strong influence over the final assumption that incorporates the system's own cash benefit demands.

Some might argue, based on the first three compelling reasons not to consider long-term horizon forecasts at all, i.e., that the 5.93% consensus of 10-year expectations is even more appropriate than the 6.39% single equivalent return assumption. There is merit in that position for those three compelling reasons.

We chose to use a rounded-down assumption of 6.30% as the "most appropriate" return assumption. However, as set forth in the following Appendix E, we consider a range of reasonableness around (above and below) this most appropriate return assumption.

Appendix E
A Reasonable Range Around The Most Appropriate Assumed Net Investment Rate of Return

Most Appropriate Return Assumption

The single equivalent return assumption developed in the previous Appendix D is 6.30%, rounding down from 6.39% to reflect less confidence in the long-term return forecasts.

The actuary for the Louisiana Legislative Auditor, therefore, adopts 6.30% as the "most appropriate" return assumption, with a range of reasonableness around it. This valuation was prepared using a net return assumption at the very top of the range of reasonableness around the most appropriate return assumption of 6.30%.

Reasonable Range around the Most Appropriate Return Assumption

After all the robust analytics are applied to develop the most appropriate single equivalent return assumption, the next and final step in the process is to identify a reasonable range around that "most appropriate" return assumption.

Even though this process is robust, objective and analytical, it does not assure that the most appropriate return assumption is what the future will actually bring.

There is some slippage or uncertainty at key steps in the process. The final step is to overlay a certain amount of subjectivity to the final range. This range is intended to recognize the uncertainties inherent in this process. The uncertainties can go both ways: the actual emerging results over time can turn out either higher or lower than this "most appropriate" return assumption.

Therefore, the range is expressed as X basis points above and below the most appropriate return assumption.

- Mapping error might be responsible for 10-20 basis points.
- Considering the four long-term horizon forecasters, the range between top and bottom 50th percentiles is 48 basis points.
- Considering the 12 mid-term horizon forecasters, after discarding the two outlier 50th percentiles (lowest and highest), the range between the 2nd lowest and the 2nd highest is 64 basis points.

Therefore, we consider 100 basis points *around* the most appropriate return assumption to be a reasonable range, i.e., 50 basis points above and 50 basis points below the 6.30% most appropriate return assumption. *This results in a reasonable range of 5.80% to 6.80%.*

A choice of 6.80%, even though lying within the reasonable range, lies at the upper extremities of reasonableness and, should be considered aggressive.

A valuation assumption of 6.80% is not conservative. The 6.30% most appropriate return assumption should also not be considered "conservative". It is at the middle of the range, i.e., the most appropriate. The bottom end of the range, 5.80%, should be considered conservative.

APPENDIX F
MEASURING FUTURE GAIN-SHARING COST-OF-LIVING BENEFITS

Modeling Gain-sharing COLA Benefits

COLA benefits derived from investment earnings above certain thresholds are commonly called "gain-sharing" COLAs. More commonly, retirement benefit COLAs are fixed or tied to the Consumer Price Index.

This term "gain-sharing" derives from plan provisions that "share" higher-than-usual investment gains with members rather than using them, as is typically done, to help pay (indirectly) for the employer's required contribution. But there is a cost to that "sharing". Measuring that cost is the subject of this Appendix F.

The System's retirees are likely to receive future cost-of-living (COLA) benefit increases with some regularity. This likelihood comes from the workings of the relevant state statutes coupled with the tendency and history of board members and legislators voting to grant COLAs whenever allowed in accordance with the statutory template.

A notional Experience Account is maintained by the System to hold funds which ultimately are used to provide COLA benefits. The Experience Account is replenished with investment gains that exceed certain thresholds, subject to a series of complex formulas and rules set forth in the statutes.

LSERS does not currently include the value of future COLA-grants in it measurement of costs and liabilities. LSERS does recognize one fill-up of the Experience Account as an automatic benefit that would someday need to be translated into a COLA. But LSERS does not recognize any depletion of the account by the granted of any future COLA, so as to automatically fill up the account again with "excess" earnings. So, beyond that one fill-up, no future COLA benefits are recognized.

The System's retirees are likely to receive future cost-of-living (COLA) benefit increases with some regularity. This likelihood comes from the workings of the relevant state statutes coupled with the tendency and history of board members and legislators voting to grant COLAs whenever allowed in accordance with the statutory template. Consider the following internal and external forces at play, which tend to press board members, the Legislature, and the Governor to recommend and approve COLAs when allowed:

a. While we have no personal knowledge of, or experience with, the LSERS board, generally speaking, retirement board members often have a sense of duty to serve the plan members. The LSERS retirement board of trustees is composed of individuals who have a natural constituency in plan members. There is a natural tendency to recommend COLAs when allowed.

b. Social Security gives a COLA almost every year. In any given future year, if LSERS retirees have not had a COLA in a couple years, and since they are not generally covered by Social Security, there is a natural tendency to want to recommend a COLA if allowed.

c. Furthermore, if other retirement systems, such as LASERS, TRSL and LSPRS, or other statewide systems give COLAs in a given year, LSERS' board members, legislators, and the Governor will feel pressure to recommend a COLA if allowed.

d. Finally, if the funded ratio of the System continues to improve as it is expected to do, board members might feel like sharing that success with the plan members by recommending a COLA.

Following is a table that illustrates the recent history of when LSERS' COLAs were allowed to be granted and how much was granted. This information has been extracted from Title 11 of Revised Statutes and from information reported in LSERS' annual actuarial valuation reports.

The automatic Mechanism for Allowing COLAs is Actuarially Measurable The Pattern of Experience, Legislative History, and Politics Expect COLA Approvals Whenever Allowed					
Actuarial Valuation Date	**Legislative Session**	**Amount Allowed By Statutory Template**	**Amount Granted by Legislature and Approved by Governor**	**Date COLA Paid**	**Comments**
6/30/2018	2019	None[3]	None	NA	Insufficient balance
6/30/2017	2018	None[4]	None	NA	Insufficient balance
6/30/2016	2017	None[5]	None	NA	Granted in prior year and insufficient funds
6/30/2015	2016	0.1%	1.9%[6]	7/1/16 (Act No. 512)	Legislature granted additional COLA outside the template; Governor signed it
6/30/2014	2015	None	None	NA	Legislature voted to grant a COLA outside the template; but Governor vetoed it
6/30/2013	2014	1.5%	1.5%[7]	6/30/14 (Act No. 103)	Legislature granted a full COLA as permitted
6/30/2012	2013	3.15%	3.15%[8]	7/1/13 (Act No. 297)	Legislature granted a COLA for a select group of retirees
6/30/2011	2012	None	None	NA	Empty Experience Account due to Great Recession investment losses phased in over time
6/30/2010	2011	None	None	NA	
6/30/2009	2010	None	None	NA	

During the last nine years, the Legislature and Governor approved COLAs the three times they were permitted by the statutory template to do so. Similarly, there were no cases when a template COLA was allowed but the Legislature or Governor failed to grant it. The evidence leads us to conclude, based on the historical pattern inherent in the data, a COLA was granted every year that the statutory mechanism allowed the Legislature to grant one, and that a COLA was not granted for years when the statutory mechanism did not otherwise permit the Legislature to grant one.

[3] The funds in the Experience Account were not sufficient to grant a full COLA. According to the statutory mechanism, partial COLA's are not permitted except for very narrow set of circumstances.
[4] The funds in the Experience Account were not sufficient to grant a full COLA. According to the statutory mechanism, partial COLA's are not permitted except for very narrow set of circumstances.
[5] The funds in the experience account were not sufficient to grant a full COLA. According to the statutory mechanism, even if there are funds in the Experience Account, the Board of Trusties is not permitted to recommend to the Legislature that a partial COLA be granted to be effective July 1, 2017 (based on the 2016 Experience Account balance).
[6] The application of the statutory mechanism available to the 2016 Legislature would have allowed only a 0.1% COLA due to the limitation of the Consumer Price Index. However, the 2016 Legislature overrode the template (Act 93) and allowed for a 2% COLA but not to exceed the percentage that could be purchased by the balance in the Experience Account at June 30, 2016. The balance could purchase a 1.9% increase.
[7] In Act 399 the 2014 Legislature adopted a template limiting the frequency and level of COLAs to be recommended while the Plan us less than 80% funded or when the actual actuarial rate of return is below 7.25%. Act 103 of 2014 granted a 1.5% COLA in accordance with that newly adopted template.
[8] Act 297 of 2013 authorized a COLA of up to 3.75% but not to exceed the level that could be purchased by the funds in the Experience Account.

The 2016 Legislature decided that the statutory mechanism did not allow *enough* of an increase; so it granted *more* through an amendment outside the established statutory template for COLAs. The main point is that the pattern that emerges from the application of the statutory template has been "to grant a template COLA whenever the template allows it, and possibly to grant a non-template COLA even when the template disallows it." We do not find a sufficient pattern of non-template COLAs being granted, but do find a sufficient pattern for template-driven COLAs.

Act 399 passed in the 2014 Legislature included a limit on the frequency so that a permanent benefit increase may not be granted more often the every other year until the System is at least 85% funded. The statutory mechanism and this feature are additional evidence of an intention by the Legislature to approve COLAs with some regularity.

In addition, Legislators are inclined to approve COLAs whenever permitted by the statutory template since they have often been told they have already been funded with the balance in the Experience Account.

It is clear that recognizing only one year's transfer to the Experience Account (and that no future COLA benefits would be granted) does not reflect the likelihood that COLAs will be granted in the future. Thus, in this valuation, all actuarially expected future COLA benefits are assumed to be granted in accordance with the statutory template. This is a change in the actuarial assumptions from the previous PRSAC-adopted valuations. Refer to Appendix F for more details in support of this change in assumption.

The mathematical and logical rules set forth in the statutory template lend themselves to actuarial modeling. The frequency and magnitude of the future transfers to the Experience Account can be modelled actuarially using well-accepted techniques. Given the presumption that Legislators will grant template-driven COLAs whenever allowed by the statutes, it is actuarially appropriate to recognize the frequency and magnitude of future COLAs when performing an annual actuarial valuation of the System's costs and liabilities.

Modeling Gain-sharing COLA Benefits

We have seen three actuarial methods employed to measure the costs and liabilities of future COLAs, all of which require stochastic modeling techniques to simulate the operation of the statutory mechanism. The statutory COLA provisions applicable to the System are complex, but can be modeled actuarially. Each actuarial method involves an estimate of one statistic or another, which should be re-calculated every few years unless something changes significantly or the actuarial programming is improved. Nevertheless, as with all assumptions, it should be reviewed every year for reasonableness.

The three actuarial methods are described below, along with our rationale for why we employed the first one in this actuarial valuation rather than either of the other two.

1. The first actuarial method (preferred) is also the most explicit and transparent of the three actuarial methods. It determines a *single equivalent annual COLA* benefit which is calculated as equivalent to the stochastically modelled statutory template (after transfers

to the Experience Account and after approvals of permanent benefit increases).

It substitutes an assumed annual COLA to measure the plan's future costs and liabilities. It is only hypothetically applied annually, in the actuarial valuation as an approximation of the actual COLA provisions.

a. This is preferable to the third method because this first method leaves the return assumption equal to the discount rate. This method will eliminate substantial confusion and misunderstanding, caused by the current method.

b. It is preferable to the next two methods because it gives management of the System and Legislators an idea of how much of an annual COLA is equivalent to the current complex statutory template.

c. It is preferable to the next two methods because the statistic being estimated is not a number of investment basis point earnings, nor a load factor, but an equivalent annual COLA – the very thing that is being promised in the statutes.

d. It is useful information for members who want a rough equivalent annual COLA value. We do not believe use of this actuarial method in the annual actuarial valuation will automatically give members an expectation of an annual COLA, as some have purported. The statutes prevail; and knowledgeable parties should understand that COLAs are not allowed to be granted annually until the funded status reaches a higher level. This is just an estimated equivalency.

2. The second actuarial method *adds a load factor* to the non-COLA benefit stream to approximate the effect of granting future COLAs. This load factor is applied to increase the non-COLA normal cost and actuarial accrued liability as an estimate of the additional benefits generated by the workings of the COLA provisions (after transfers to the Experience Account and after approvals of permanent benefit increases).

   While not as preferable as the first method, this second method is preferable to the third method because it leaves the return assumption equal to the discount rate. This method would eliminate a lot of the confusion and misunderstanding, caused by the current method. However, this second method lacks additional management-useful information available under the first actuarial method.

3. The third actuarial method employs an implicit recognition of future COLAs by *reducing the return assumption* by an annual amount expected (on average) to be syphoned off from the core pension fund and transferred to the Experience Account. This is the least preferable of the three methods because:

   a. It creates confusion between the return assumption and discount rate. This can lead to significant confusion and misunderstanding of the actual assumptions.

   b. This third method is not permitted for GASB financial reporting.

c. It is not fully transparent in isolating and identifying the stream of expected COLA benefits.

d. The "implicit" approach is out of favor among actuaries, who generally prefer "explicit" assumptions being reasonable individually; the actuarial profession moved toward explicit assumptions during the 1970s and 1980s.

e. It causes some confusion and interpretive questions when applying the statutory rules and determining the actuarial gains and losses in connection with the use of a return assumption, the board-approved valuation rate, and/or the discount rate.

Modeling results for the first actuarial method

The first actuarial method (preferred) projects the expected streams of future gain-sharing transfers into the Experience Account using the investment-related assumptions adopted by the LLA's actuary.

The application of this explicit model stochastically generated net investment returns for the next 30 years, and did so 500 times (i.e., 500 trials). A total of 15,000 annual rates of return (single-year market rates) were randomly selected from a lognormal distribution with these parameters:

- A mean of 6.65% during years 1-10,
- A mean of 7.58% during years 11-30, and
- A standard deviation of 12.38% for years 1-30.

These lognormal parameters (arithmetic means - one year) are not to be confused with the 50th percentile expectations (geometric means - compounded) over similar time periods addressed in Appendices B through E.

The computer-generated market returns were used as the base input to the model which simulated the operation of the System's complex gain-sharing COLA program over time. The means were not the expected compound returns over time (as discussed in Appendices B and C), which is much lower and more appropriate for actuarial valuations. These means are the forecaster's consensus expectations for each one year standing on its own.

The model applied the various internal statutory rules and limitations on the amounts that might be transferred to the Experience Account. It assumes that every year for which the statutes permit a permanent benefit increase to be granted, it will be granted and will be the maximum allowed. There is substantial evidence for this assumption from both historical statistics and behavioral expectations.

The model built for this purpose includes the following primary steps, as well as numerous other intermediary tests and calculations:

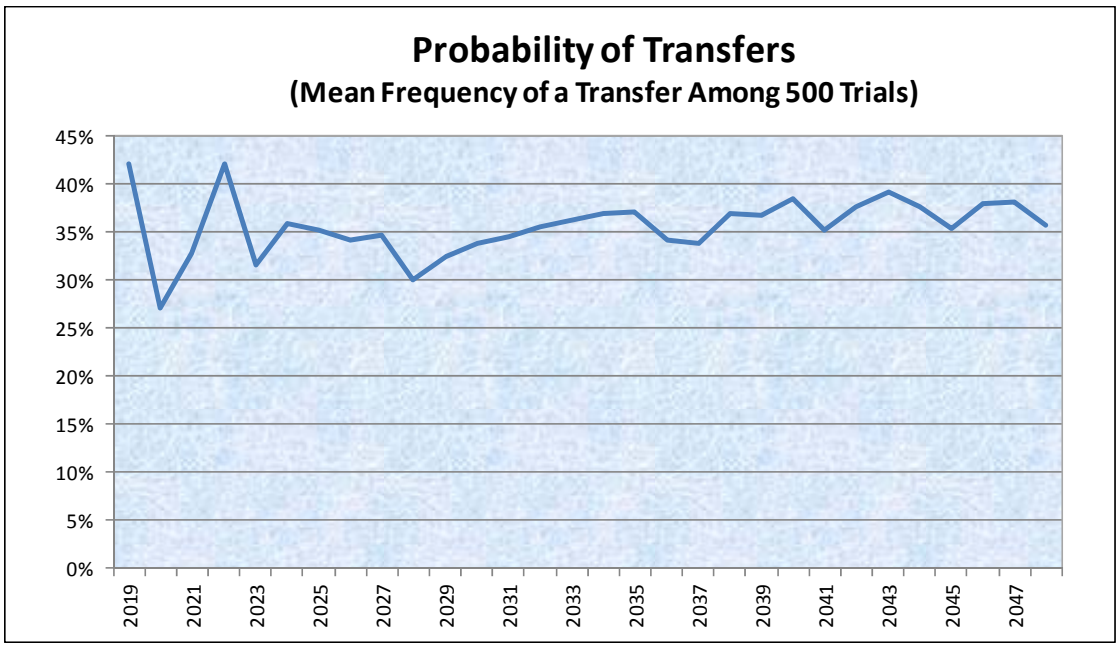
a. Modeling future new hires and future actuarial valuations,
b. Modeling the markets and future rates of return using generally acceptable techniques,
c. Modeling the smoothed actuarial rate of return,

d. Modeling the dollar hurdle,
e. Modeling the limitations on the balance in the Experience Account,
f. Modeling the maximum allowed on the COLA rate,
g. Modeling the frequency rules for granting a COLA and
h. Modeling the amount of the COLA rate.

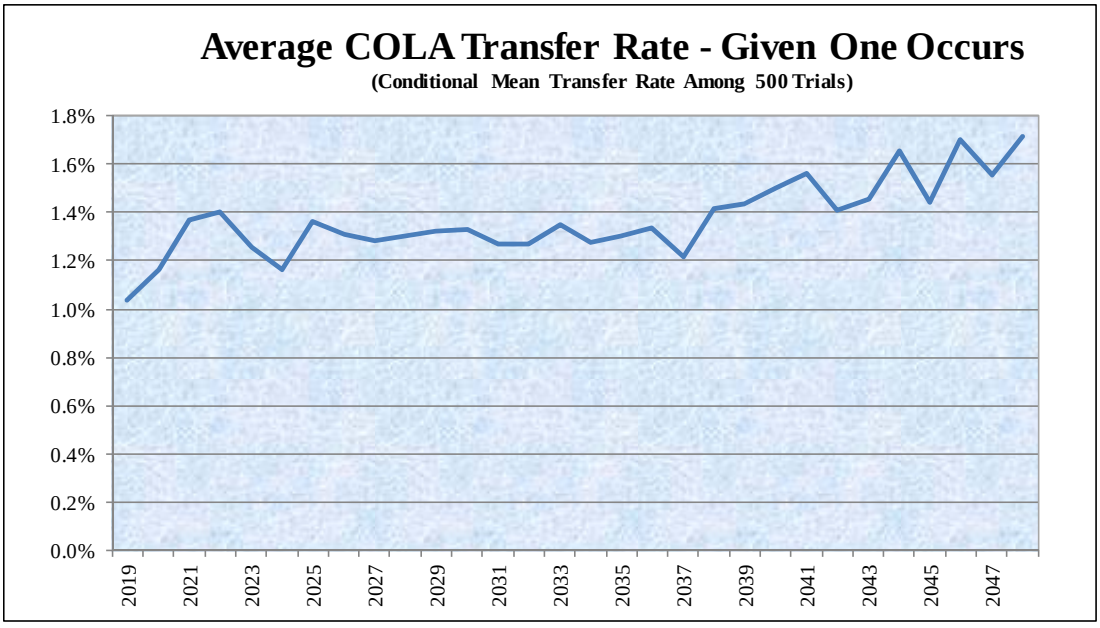
In some years, the model expects a transfer to the Experience Account and in some years expects none. For each year in which the model expects a transfer, the amount can vary widely.

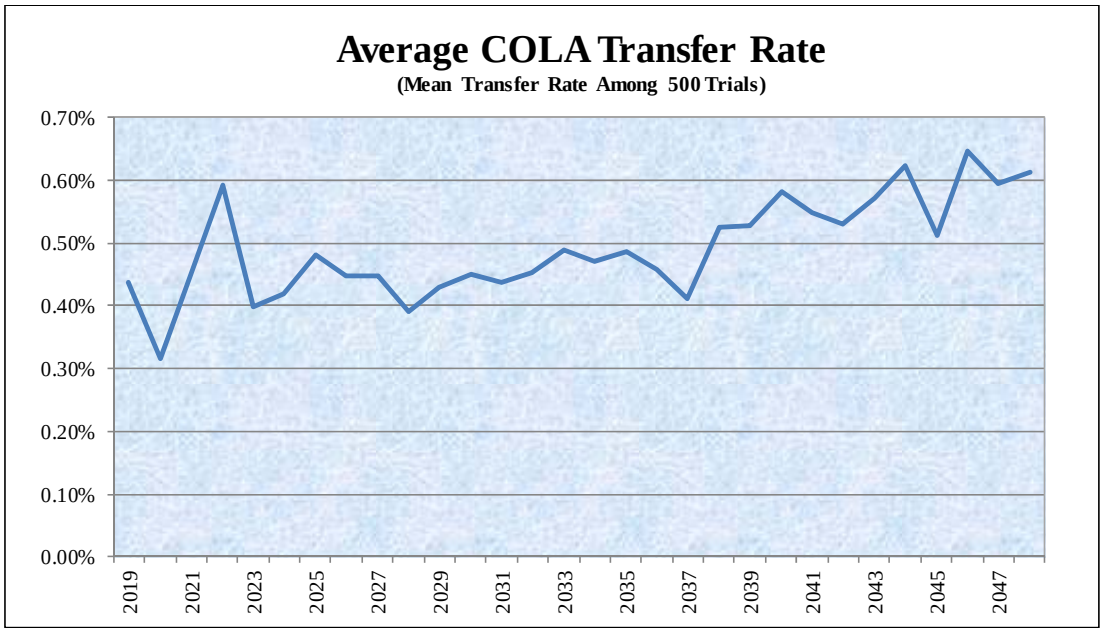
The mean (average) amount expected to be transferred to the Experience Account each year was captured and their present value calculated. *It was determined that a 0.50% annual cost-of-living increase (COLA) would produce the same additional present value.* This is the fixed annual COLA rate that approximates the statutory COLA template. It is, therefore, considered the single equivalent COLA this year representing the future working of the statutory gain-sharing mechanism.

Consider the following graphs illustrating the results (Experience Account transfers) of the simulations in the stochastic model of LSERS' gain-sharing COLA program.



Based on the graph above, during each of the next 30 years there is a 25% to 45% chance of a transfer to the Experience Account. In other words, transfers to the Experience Account are expected to occur approximately two out of every five years. Once a transfer occurs, it may not be used for anything other than COLAs (unless the Legislature changes the template); although there may be a slight shift in timing. Therefore, measuring the transfer frequency and amounts is the same as measuring the future COLAs.





Based on present values of future expected COLA transfers to the Experience Account, therefore, the final assumption used in this first actuarial method is to include a fixed annual COLA of 0.50% as a reasonable approximation of the future workings of the actual statutory gain-sharing COLA template.

APPENDIX G
RISKS ASSOCIATED WITH MEASURING THE ACCRUED LIABILITY AND ACTUARIALLY DETERMINED CONTRIBUTIONS

Appendix G: Risks Associated with Actuarial Measurements

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

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

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;
2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. Salary and Payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;
6. Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The computed contribution rates presented in this actuarial valuation report may be considered as a minimum contribution rate that complies with state statute. The timely receipt of actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. This System is considered to be very mature, requiring extra attention to various actuarial risks.

Generally accepted plan maturity measures include the following:

Risk Measures	2018	2017	2016	2015	2014
Ratio of the market value of assets to total payroll	6.7	6.7	6.2	6.6	6.7
Ratio of actuarial accrued liability to payroll	9.0	8.9	8.8	8.9	8.8
Funded ratio	74%	75%	70%	74%	76%
Ratio of actives to inactives and beneficiaries	0.4	0.4	0.4	0.4	0.4
Net cash in (out) flow: in millions	$ (91)	$ (85)	$ (73)	$ (60)	$ (53)
Ratio of net cash flow to market value of assets	-4.7%	-4.4%	-4.1%	-3.2%	-2.9%
Duration of the actuarial accrued liability	10.2	NA	NA	NA	NA

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher or increasing level of this maturity measure generally indicates a higher or increasing volatility in plan sponsor contributions as a percentage of payroll, and vice versa.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% different than assumed would equal 5% of payroll. A higher or increasing level of this maturity measure generally indicates a higher or increasing volatility in liability (and plan sponsor contributions) as a percentage of payroll, and vice versa.

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when a plan is mature. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions. As a plan matures, it takes on more actuarial risk.

Duration of Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

Useful risk metrics include unfunded actuarial liability (and net pension liability), funded ratio (on actuarial value or market value basis) and actuarially determined employer contribution rates required.

APPENDIX H
PRESS CLIPPINGS FOR OTHER RETIREMENT SYSTEMS LOWERING THEIR RETURN ASSUMPTIONS (2015-2018)

Other retirement systems and state officials have characterized their decisions to lower pension return assumptions as being positive actions for plan members and taxpayers.

Appendix H: Press Clippings for Retirement Systems Lowering Return Assumptions

New Jersey

The New Jersey Pension Fund's assumed rate of return has been reduced to 7% from 7.65% by state Treasurer Ford M. Scudder, the second rate cut he has enacted this year. Mr. Scudder had cut the rate to 7.65% from 7.9% in February 2017.
"Given the current elevated level of asset values across the board, long-run expected returns have diminished, so it is appropriate to lower the assumed rate of return," Mr. Rijksen wrote [Willem Rijksen, a Treasury Department spokesman]. "Our actuaries have suggested doing so, and it is the unmistakable trend in public pension plans across the country."
Pensions and Investments Online (pionline.com), 12/22/17

The move increases the pension tab for state and local governments by more than $800 million for the fiscal year that begins in July, according to an NJ Advance Media analysis of state actuary reports released Tuesday.
The change was praised by the pension fund actuaries, who say a 7 percent assumed rate of return is in line with other large funds and is a more conservative estimate of what pension investments can achieve over the long term. In contrast, assuming the investments will earn a high rate makes the pension fund look healthier than it really is and doesn't reflect the reality of the state's investment outcomes, actuaries say.
The state contributes less than what's recommended by actuaries. This year, it's expected to kick in about $2.5 billion, or half of what's recommended, and it is on track to contribute 60 percent next year.
NJ.com, New Jersey Online, 12/22/17

Notice a couple observations: (1) Down from 7.9% to 7.65% to 7.0% in 10 months, (2) The change will increase the contribution requirement by more than $800 million and (3) NJ is roughly tied (with Kentucky) for the worst-funded pension system in the country (30.9% in 2016) and has been contributing only about half the actuarially required contribution under their previously high return assumption, yet they did the "appropriate" thing and lowered the return assumption from 7.9% to 7.0%.
*Notice the **positive statements** about this decision: (1) "a 7 percent assumed rate of return is a more conservative estimate of what pension investments can achieve" (2) "Given the current elevated level of asset values across the board, long-run expected returns have diminished, so it is appropriate to lower the assumed rate of return."*

Kentucky

Since the last actuarial valuation the Board adopted changes to certain economic assumptions for KERS, CERS and SPRS. Specifically, the Board decreased the price inflation assumption to 2.30% for all funds. The assumed rate of return was decreased to 5.25% for two of its pension funds, and to 6.25% for the three other pension funds and all the insurance funds associated with the systems.
2017 Actuarial Valuation Report

He admonished, "We need to use real numbers . . . We need to use actual data. We need to use true rates of return, and not hypothetical ones."
Huffingtonpost.com, 4/4/17, quote from Gov. Matt Bevin

"The most important function of our board is to give correct numbers to the legislature," Farris said. "If we don't do that, if we continue to rely on aggressively optimistic assumptions, then we will continue to fall behind.",
Kentucky.com, 5/20/17, quote from board chairman John Farris

"We're trying to make the assumptions more realistic and from an investment standpoint, more in line with structure and expectations of the portfolios," Mr. Eager said.
pionline.com, 7/14/17, quote from Interim Executive Director David Eager

[State Budget Director John] Chilton said that Gov. Matt Bevin and state lawmakers believe it is important to embrace the revised financial assumptions. "No more pretending that everything is just fine," he wrote. "Everyone needs to understand the severity of the situation. To do otherwise will lead to solutions that fall short of solving the problem." Kentucky.com, 9/9/17

Note a couple observations: (1) Down from 7.5% to 6.35% for some plans and 5.25% for others and (2) KY is roughly tied (with New Jersey) for the worst-funded pension system in the country (31.4% in 2016), yet they did the "more realistic" thing and lowered the return assumption from 7.5% to 6.25% and 5.25%.
*Notice the **positive statements** said: (1) "The most important function of our board is to give correct numbers to the legislature", (2) "We're trying to make the assumptions more realistic and from an investment standpoint, more in line with structure and expectations of the portfolios,"*

Appendix H: Press Clippings for Retirement Systems Lowering Return Assumptions

Arkansas

The trustees last week voted to reduce the system's projected annual investment returns from 7.25 percent to 6.25 percent at the recommendation of actuary Gabriel, Roeder, Smith & Co. of Southfield, Mich., . . . [Gail Stone, executive director for the judicial retirement system,] explained that "10-year capital market predictions from a basket of 8 different public fund investment consultants did not support a 7.25 [percent investment] return, given the AJRS fund's very conservative asset allocation."
Arkansasonline.com, 8/14/15

*Notice the **positive statement**: The executive director wanted the return assumption to be consistent with the "10-year capital market assumptions of a basket of 8 different public fund investment consultants."*

New York

New York State Common Retirement Fund, Albany, is lowering its assumed rate of return to 7% from 7.5%. "Lowering the assumed rate of return is fiscally prudent and will better position the state pension fund for the future. This strategic decision is consistent with the tougher investment climate ahead."
pionline.com, 9/9/15, quote from Thomas DiNapoli (State Comptroller and sole trustee)

*Notice the **positive statements**: (1) Lowering it is fiscally prudent, (2) Lowering the return assumption will put the state pension fund in a better position for the future."*

California Teachers

CalSTRS on Wednesday approved lowering the pension fund's assumed rate of return to 7% from 7.5% over the next two years because of diminished capital market and inflation forecasts. Milliman, the board's actuarial consultant, last month had recommended a reduction to 7.25%, but also offered the board the option of a 7% rate of return.
The plan approved by the board of the $196.4 billion California State Teachers' Retirement System would lower the rate of return to 7.25% as of July 1, and 7% as of July 1, 2018.
The vote for the more aggressive reduction came at a meeting in San Diego after a report from one of CalSTRS' investment consultants, Pension Consulting Alliance, that the pension fund had a less than 50% chance of meeting the 7.25% rate of return long term. "It's responsible," said board member Harry M. Keiley of the move to 7%. Mr. Keiley said it was necessary to ensure the long-term financial stability of the retirement system.
pionline.com, 2/4/17

"Going to 7.00% would be an acceptable alternative if the board wanted to add another level of conservatism in the actuarial assumptions by increasing the likelihood the investment assumption will be met long term," the report said.
calpensions.com, 1/28/17, quote from the Milliman actuarial experience study

Note a couple observations: (1) CalSTRS investment consultant said there was less than a 50% chance of meeting a 7.25% assumption and (2) The board's investment consultant directed attention to the probability of the compound average return over time reaching the assumption.
*Notice the **positive statements** the Board member made about this move: (1) "It's responsible." and (2) "It was necessary to ensure the long-term financial stability of the retirement system."*

Oregon

The Oregon Public Employees Retirement Fund's board lowered the assumed rate of return for the $73 billion pension fund to 7.2% from 7.5%, said James Sinks, spokesman for the Oregon State Treasury, in an email. Return projections for the next 10 years are lower than in the prior decade, according to a report presented at the pension fund's July 28 meeting.
pionline.com, 8/1/17

Appendix H: Press Clippings for Retirement Systems Lowering Return Assumptions

Article about Alaska that mentions California

The nation's largest public employee retirement system has just cut its long-term predictions of how much it expects to earn on its investments to 6.5 percent, raising a caution flag for Alaska, which still has expectations of 8 percent returns.

The assumed long-range investment returns are a key indicator of the financial health of the state retirement programs. Pick a number that is too high and the systems give a false image of financial strength. In addition, it could force a pattern of more aggressive and risky investments.

It is generally easier to get agreement on optimistic numbers, especially when budgets are tight. The difficulty is that you never really know what returns will be until the future becomes the past.

While other states have trimmed back their long-term earnings estimates since 2008, Alaska is still using 8 percent as its target, which is on the high end of pension systems in the United States.

"Some critics of current public pension investment return assumption levels say that current low interest rates and volatile investment markets require public pension funds to take on excessive investment risk to achieve their assumption," the National Association of State Retirement Administrators said in May.

But California Gov. Jerry Brown says the new plan is irresponsible because of the slow pace in lowering expectations, a claim that the California Public Employees Retirement System denies. A more rapid reduction in investment return projections would have increased the strain on local governments, it said. But Brown, expressing more caution than his state's retirement board, said the CalPERS plan is based on "unrealistic investment returns" and assumes an "unacceptable level of risk in the coming years."

Alaska Dispatch News, 12/9/15

Iowa

Iowa Public Employees' Retirement System, Des Moines, lowered its assumed rate of return to 7% from 7.5%, said a news release from the $28.5 billion pension fund.

Under the changes, the pension fund's funding ratio is expected to fall by roughly four basis points to 80% and liabilities are expected to increase by $1.4 billion.

The changes follow a review of economic assumptions from actuarial firm Cavanaugh Macdonald Consulting.

"Even though these changes will have a negative impact on IPERS' funded ratio, the investment board believes that these modifications will provide a more accurate valuation of future liabilities," IPERS said in the news release.

pionline.com, 3/28/17

*Notice the **positive statement** about the decision "Even though these changes will have a negative impact on IPERS' funded ratio, the investment board believes that these modifications will provide a more accurate valuation of future liabilities,"*

Maryland

"The action taken by the Board is part of its overall strategy to increase the probability of achieving investment returns required to improve the health of the retirement System and meet its obligations to its members," says State Treasurer Nancy K. Kopp, chair of the MSRPS Board of Trustees. "Recognizing that both the inflation experience and expectations for future inflation remain lower than the rate currently assumed, the Board felt it reasonable to reduce the expected return accordingly."

plansponsor.com, 8/2/17

*Notice those two **positive statements** about their changes.*

San Mateo County

San Mateo County Employees' Retirement Association, Redwood City, Calif., lowered its assumed rate of return to 7% from 7.25%.

"In the coming years, lowering the rate will add to the financial strength and stability of the retirement fund by mitigating the effects of future returns that are lower than current expectations."

SamCERA.org News, 7/6/16

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North Carolina
"We need to make realistic assumptions regarding our ability to achieve expected returns in the future. We owe it to the General Assembly, taxpayers, public employees and future generations to be transparent and realistic about the true valuation of the pension plans," pionline.com, 5/1/18, State Treasurer Dale Folwell

Texas Teachers
Brian Guthrie, TRS executive director, told trustees the consensus among outside parties was that market returns will be significantly lower, and he stressed that "not taking action" to lower the assumed rate of return would not be prudent. Cypen & Cypen E-Newsletter, 8/16/18

Ohio Public Employees
"We are long-term investors, but investment returns over the next 10 to 15 years are very important to our plan," said Karen Carraher, executive director, in the news release. pionline.com, 10/22/18

Colorado
In the race for Colorado treasurer, Republican Brian Watson is in favor or raising the retirement age to at least to 67 — to match Social Security — as well as reducing or freezing cost-of-living adjustments and dropping Colorado PERA's assumed rate of return from 7.25% to something more "realistic," according to his campaign website. pionline.com, 10/30/18

Other Positive Statements about Lowering the Return Assumption
Harrisburg cannot take advantage of the Act 44 MMO reduction and does not set unrealistically high investment return assumptions which, Mr. McAneny said, has been a key factor in its success in managing its pension funds. Scranton Times-Tribune, 7/9/15
“If we do lower that assumed rate, that would certainly be a conservative approach. And one that I think would be reasonable,” he continued. “The stock market can’t stay up as high as it has forever. I think being a little more conservative would be prudent.” pension360.org, 7/24/15, quotes from Thomas DiNapoli
“But with the volatile market environment we have seen this year, and will likely see for the next several years, changing the assumed rate of return was a prudent decision," stated Chief Investment Officer Craig Husting [of Missouri’s school and teacher retirement systems]. psrs.peers.org 6/17/16
The $7.8 billion pension fund’s board approved the change at its June 16 meeting, Ms. Smith said, to “put the system on a path that reflects the current and expected low-return capital markets and to ensure adequate funding to pay future benefits.” pionline.com, 7/13/16, quote from Candy Smith, Spokeswoman for the Missouri State Employees’ RS
“This more conservative assumption will require additional state investments into the retirement systems, helping to ensure that available funds will be sufficient to pay the benefits that have been earned,” said a summary of the governor's proposed budget changes. pionline.com, 2/10/17, Michigan Gov. Rick Snyder

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General
"The use of such high assumptions is deceptive because it keeps the funded level looking higher than it should be," said David Crane, public policy lecturer at Stanford University who worked as an adviser to former California Gov. Arnold Schwarzenegger. "Too high a return is dishonest." news.bna.com, 8/19/15
A lower rate of return can force issuers to face up to their funding commitments," said Tom Aaron, vice president with Moody's Investors Service. news.bna.com, 8/19/15
Lockhart also discussed the correlation between macroeconomic growth and pension funding. He recommended that public pension funds align their overall investment return assumptions with realistic assumptions related to macroeconomic momentum and trends. frbatlanta.org, 8/28/15, quote from Dennis Lockhart, President and CEO of Atlanta Federal Reserve Bank