2018 ACTUARIAL VALUATION REPORT ON THE LOUISIANA STATE 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 STATE EMPLOYEES' RETIREMENT SYSTEM

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LOUISIANA LEGISLATIVE AUDITOR
DARYL G. PURPERA, CPA, CFE

December 14, 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 State 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

LASERS 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*	Definition*	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 TRSL.
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 a change in the mortality assumptions. Refer to Appendix B for more details.

- This valuation changes the inflation assumption to 2.30% from the 2.75% assumption in the last PRSAC-accepted valuation. Refer to Appendix D for more details.

- This valuation lowers the return assumption to 7.50% (from 8.25%) and sets the discount rate to be equal to the return assumption, at 7.50% (from 7.70%).

  This 7.50% return assumption is considerably higher than the assumption used in the valuation prepared by the actuary for the LLA last year (6.75%) due to (a) the recognition of cash flow in the determination of the most appropriate return assumptions (between the mid-term and long-term forecasts) and (b) the allowance of a range of reasonableness around the most appropriate return assumption, which is 7.00%. Yet, it is still significantly lower than the last PRSAC-accepted valuation.

  Refer to Appendices C and E through G for more details.

- This valuation changes the method of recognizing future gain-sharing cost-of-living (COLA) permanent benefit increases. Refer to Appendix H for more details.

- This valuation employs one return assumption (7.50%) and one discount rate (7.50%) for all purposes within the valuation, instead of one rate for some purposes and another rate for other purposes.

BRIEF SUMMARY COMPARING TO PRIOR YEARS

			----------Prior Years----------	
		June 30, 2018	**June 30, 2017**	**June 30, 2016**
A.	**Membership Data**			
	(1) Retirees	49,006	48,679	48,201
	(2) Actives	39,293	39,055	39,284
	(3) DROP	1,398	1,520	1,609
	(4) Terminated Vested	3,720	3,794	3,865
B.	**Annual Benefits**	$ 1,274,954,448	$ 1,248,400,896	$ 1,217,858,640
C.	**Total Payroll**	1,864,035,191	1,821,943,975	1,842,286,184
D.	**Valuation Assets**	12,360,520,632	11,976,792,982	11,630,816,397
E.	**Experience Account**	11,241,902	10,455,340	9,714,942
F.	**Investment Returns**			
	(1) Market (Total Assets)	8.78%	14.51%	-2.64%
	(2) Market (excl. OPR & self-directed)	9.01%	15.18%	-2.86%
	(3) Net Actuarial Value	7.52%	7.62%	5.43%
	(4) Rate for DROP Accounts	7.02%	7.12%	4.93%
G.	**Normal Costs**			
	(1) Total in Dollars	$ 238,799,075	$ 214,222,176	$ 219,475,742
	(2) Total Normal Cost Rate	12.81%	11.76%	11.91%
	(3) Employer Normal Cost Rate	4.79%	3.75%	3.93%
H.	**Accrued Liability**	$ 19,762,812,658	$ 18,792,105,561	$ 18,576,266,623
I.	**Unfunded Accrued Liability**	$ 7,402,292,026	$ 6,815,312,579	$ 6,945,450,226
J.	**Funded Percentage**	62.5%	63.7%	62.6%
K.	**Funding Requirements for the Fiscal Year Following the Valuation Date**			
	(1) Employees			
	a) Contributions	$ 150,134,207	$ 148,230,786	$ 149,440,502
	b) Rate	8.02%	8.01%	7.98%
	(2) Employers			
	a) Contributions	$ 761,620,361	$ 704,203,905	$ 700,058,533
	b) Rate	40.68%	38.05%	37.38%
L.	**Funding Requirements for the Subsequent Fiscal Year**			
	(1) Employees			
	a) Contributions	$ 150,472,783	$ 151,398,781	$ 152,741,091
	b) Rate	8.02%	8.01%	7.98%
	(2) Employers			
	a) Contributions	$ 820,803,768	$ 716,802,120	$ 724,363,377
	b) Rate	43.75%	37.90%	37.84%

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

	After Changes June 30, 2018	Before Changes June 30, 2018	June 30, 2017
A. Membership Data			
(1) Retirees	49,006	49,006	48,679
(2) Actives	39,293	39,293	39,055
(3) DROP	1,398	1,398	1,520
(4) Terminated Vested	3,720	3,720	3,794
B. Annual Benefits	$ 1,274,954,448	$ 1,274,954,448	$ 1,248,400,896
C. Total Payroll	1,864,035,191	1,864,035,191	1,821,943,975
D. Valuation Assets	12,360,520,632	12,360,520,632	11,976,792,982
E. Experience Account	11,241,902	11,241,902	10,455,340
F. Investment Returns			
(1) Market (Total Assets)	8.78%	8.78%	14.51%
(2) Market (excl. OPR & self-directed)	9.01%	9.01%	15.18%
(3) Net Actuarial Value	7.52%	7.52%	7.62%
(4) Rate for DROP Accounts	7.02%	7.02%	7.12%
G. Normal Costs			
(1) Total in Dollars	$ 238,799,075	$ 215,830,963	$ 214,222,176
(2) Total Normal Cost Rate	12.81%	11.58%	11.76%
(3) Employer Normal Cost Rate	4.79%	3.56%	3.75%
H. Accrued Liability	$ 19,762,812,658	$ 19,020,398,776	$ 18,792,105,561
I. Unfunded Accrued Liability	$ 7,402,292,026	$ 6,659,878,144	$ 6,815,312,579
J. Funded Percentage	62.5%	65.0%	63.7%
K. Funding Requirements for the Fiscal Year Following the Valuation Date			
(1) Employees			
a) Contributions	$ 150,134,207	$ 150,134,207	$ 148,230,786
b) Rate	8.02%	8.02%	8.01%
(2) Employers			
a) Contributions	$ 761,620,361	$ 687,469,571	$ 704,203,905
b) Rate	40.68%	36.70%	38.05%
L. Funding Requirements for the Subsequent Fiscal Year			
(1) Employees			
a) Contributions	$ 150,472,783	$ 150,472,783	$ 151,398,781
b) Rate	8.02%	8.02%	8.01%
(2) Employers			
a) Contributions	$ 820,803,768	$ 730,547,200	$ 716,802,120
b) Rate	43.75%	38.94%	37.90%

BRIEF SUMMARY COMPARING FINAL SELECTED ASSUMPTIONS TO MOST APPROPRIATE RETURN ASSUMPTION

	Final Selected 7.50%	Most Appropriate 7.00%
	June 30, 2018	**June 30, 2018**
A. Membership Data		
(1) Retirees	49,006	49,006
(2) Actives	39,293	39,293
(3) DROP	1,398	1,398
(4) Terminated Vested	3,720	3,720
B. Annual Benefits	$ 1,274,954,448	$ 1,274,954,448
C. Total Payroll	1,864,035,191	1,864,035,191
D. Valuation Assets	12,360,520,632	12,360,520,632
E. Experience Account	11,241,902	11,241,902
F. Investment Returns		
(1) Market (Total Assets)	8.78%	8.78%
(2) Market (excl. OPR & self-directed)	9.01%	9.01%
(3) Net Actuarial Value	7.52%	7.52%
(4) Rate for DROP Accounts	7.02%	7.02%
G. Normal Costs		
(1) Total in Dollars	$ 238,799,075	$ 260,905,993
(2) Total Normal Cost Rate	12.81%	14.00%
(3) Employer Normal Cost Rate	4.79%	5.98%
H. Accrued Liability	$ 19,762,812,658	$ 20,702,660,862
I. Unfunded Accrued Liability	$ 7,402,292,026	$ 8,342,140,230
J. Funded Percentage	62.5%	59.7%
K. Funding Requirements for the Fiscal Year Following the Valuation Date		
(1) Employees		
a) Contributions	$ 150,134,207	$ 150,134,207
b) Rate	8.02%	8.02%
(2) Employers		
a) Contributions	$ 761,620,361	$ 832,207,471
b) Rate	40.68%	44.46%
L. Funding Requirements for the Subsequent Fiscal Year		
(1) Employees		
a) Contributions	$ 150,472,783	$ 150,472,783
b) Rate	8.02%	8.02%
(2) Employers		
a) Contributions	$ 820,803,768	$ 908,451,331
b) Rate	43.75%	48.42%

BRIEF SUMMARY 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.

Mortality Tables

This valuation revised the rates of mortality used in this valuation as compared to the 2017 valuation adopted by PRSAC, in order to employ current actuarial methodologies along with current published mortality tables and mortality improvement scales, while directly reflecting LASERS' own mortality experience.

The most recent experience study on mortality rates covered the period July 1, 2007, through June 30, 2012, and was dated March 27, 2013. For this actuarial valuation, we chose to reflect the actual mortality experience exhibited by the LASERS' active and retiree population directly into the mortality tables, even though next year's valuation will reflect updated experience.

We recognize that experience studies for larger systems are generally performed every five years and the next one for LASERS is not scheduled until 2019. However, it is generally accepted among retirement system executives and actuaries that if events occur, or if better or new techniques emerge between experience studies that materially affect results, experience tables would be considered for change. Furthermore, Actuarial Standard of Practice (ASOP) No. 35 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. Refer to Appendix B for more information concerning this demographic change.

The table on page 8 presents the effect of the change in demographic assumptions (as well as other changes) on the unfunded accrued liability as of June 30, 2018 and on the projected employer contribution rate for FYE 2020.

Economic Assumptions (Inflation and Investment Return)

LASERS's actuarial calculations and disclosures as of June 30, 2017 were developed by its actuary using an investment return assumption of 8.25% (and 8.05% currently)[1]. However, 7.70% (7.65% currently) was commonly disclosed[2] and publicly understood as being LASERS's investment return assumption, which was the discount rate (not the return assumption).

- Confusion may result from the board and actuary's use of an *implicit* recognition of gain-sharing COLAs by reducing the net return assumption by 40 basis points (and by another 15 basis points to reflect administrative expenses last year) to obtain the final discount rate of 7.70% (or 7.65% currently). It could be construed as misleading to disclose the return assumption as being 7.70% (or 7.65% currently).

[1] Statement by the board actuary in the January 2018 PRSAC meeting, implied on pages 5 and 55 in the System actuary's 2017 valuation report valuation report, explicitly stated in pages 5-6 in the System actuary's response (6/23/17) to LLA inquiries concerning the board's 2017 valuation, and other documentation.

[2] By research and advocacy organizations (NASRA, Reason Foundation, Public Affairs Research Council), in the press (P&I and Greater Baton Rouge Business Report, Chief Investment Officer magazine), and on the System's own website (in 8/27/18 and 8/23/17 press releases, in the Frequently Asked Questions page as accessed on 12/20/17 and 12/1/18, and in the System's posted quarterly Responses to Senate Resolution No. 175, all found on www.laersonline.org).

- This confusion may also be exacerbated by the board's disclosure in its Comprehensive Annual Financial Statements (CAFR) and the State's disclosure in its CAFR, that the System's long-term expected investment rate of return assumption for 2017 was 7.70% (or 7.75%).

The changes employed in this actuarial valuation will remove the confusion by making the discount rate the same as the return assumption. This is achieved by using a more transparent method of recognizing future gain-sharing COLA benefits and administrative expenses, described below.

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 7.50% 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 7.00%.

A full, fair, and comparable disclosure (apples-to-apples) of the System's return assumption of 8.25% (2017) and 8.05% (2018) puts the System at the most aggressive return assumption in the Public Plan Database (NASRA). Refer to Appendix C for charts illustrating this point. This actuarial valuation report's 7.50% return assumption puts the System closer to the median.

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 C – Return Assumptions of Other Large Retirement Systems
- Appendix D – Basis for Inflation Assumption
- Appendix E – Basis for Net Investment Return Assumption
- Appendix F – Horizon for the Net Investment Return Assumption
- Appendix G – A Reasonable Range around the Most Appropriate Net Investment Return Assumption
- Appendix J – Press Clippings for Other Retirement Systems Lowering Their Return Assumptions (2015-2018).

The table on page 8 presents the effect of the change in economic assumptions (as well as other changes) on the unfunded accrued liability as of June 30, 2018, and on the projected employer contribution rate for FYE 2020

Method for Administrative Expenses

Act 94 of 2016 requires that the expected noninvestment-related administrative expenses for the contribution year be included in the actuarially required employer contribution beginning with the first fiscal year in which the projected aggregate employer contribution rate, calculated without regard to any changes in the board-approved actuarial valuation rate, will not increase. That threshold was satisfied for the contribution year ending June 30, 2019.

In this actuarial valuation, the LLA's actuary applied this direct explicit method to the determination of the contribution rate for the year ending June 30, 2019, just as LASERS' actuary did. Another component of the employer contribution requirement (besides the normal cost and the amortization payments) was included, equal to 0.95% of pay to fund for administrative expenses, just as LASERS' actuary did.

The table on page 8 presents the effect of the change in treatment of administrative expenses (as well as other changes) on the unfunded accrued liability as of June 30, 2018 and on the projected 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 gain-sharing COLA benefits of the plan. This is being accomplished by estimating, through stochastic modeling techniques, what the single equivalent annual COLA increase is, and measuring the single equivalent benefit in the actuarial valuation. The single fixed annual COLA rate that is equivalent to and approximates the current statutory gain-sharing template is 0.40% per year.

This is a different method than employed by the System and its actuary, which was to lower the return assumption by 40 basis points to derive a different and lower discount rate. That lower discount rate was then applied in a valuation without measuring any future COLA benefits. The 0.40% annual fixed COLA (COLA cost estimate by LLA's actuary) should not be confused with the 40 basis point reduction in the return assumption (COLA cost estimate by the System's actuary).

Using an explicit actuarial method to approximate the current statutory COLA template improves the valuation by making the return assumption equal the discount rate (thereby avoiding confusing and potentially misleading disclosures) and by making it more transparent and more useful to readers.

Users of this actuarial valuation report should read the Appendix H 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 8 presents the effect of the change in method for advance-recognizing gain-sharing COLA benefits (as well as other changes) on the unfunded accrued liability as of June 30, 2018 and on the projected employer contribution rate for FYE 2020.

Single Set of Actuarial Assumptions

In prior years, when return assumptions and discount rates were changed by the board and actuary, they were changed for the purpose of calculating the contribution rate(s) for the prospective year. Those new return assumptions and discount rates were not used to calculate and disclose the current accrued liability, current unfunded accrued liability, current funded ratio, or current normal costs as of the current valuation date. Consequently, within the same actuarial valuation report, different return assumptions and discount rates were used for disclosure of the liabilities from what was used for the prospective year's contribution requirements.

For clarity and for consistency with common actuarial practice, for this valuation's change in return assumption and other assumptions, all actuarial calculations and disclosures are made using the new assumptions. This change also improves simplicity and transparency in the annual actuarial valuation report.

It is recognized that this is not how things have always been done in prior year's official valuations. However, this is an opportunity to improve the valuation: for simplicity and transparency and for consistency with actuarial practice around the country and in Louisiana's other retirement systems.

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 employer contribution requirements for FYE 2020, for each of the first four 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 6/30/18 ($ Millions)	Projected Employer Contribution Rate For FYE 6/30/20 (as Pct of Projected Covered Pay)
(1) Without Any Changes in Assumptions or Methods *(benchmark values)*	6,659.9	38.9%
(2) Change in Actuarial System *(effect of change in Actuarial Valuation System against benchmark)*	6,652.0	38.9%
a. Effect of the Change: (2)-(1)	(7.9)	0.0%
(3) Change in Demographic Assumptions *(combined effect of all changes above and in Demographic Assumptions against benchmark)*	6,622.4	38.8%
a. Effect of this Additional Change: (3)-(2)	(29.6)	-0.1%
(4) Change in Economic Assumptions *(combined effect of all changes above and in Investment Return and Inflation Assumptions against benchmark)*	7,870.0	44.4%
a. Effect of this Additional Change: (4)-(3)	1,247.6	5.6%
(5) Change in Method for Administrative Expense *(combined effect of all changes above and in Method for Administrative Expenses against benchmark)*	7,591.3	44.2%
a. Effect of this Additional Change: (5)-(4)	(278.7)	-0.2%
(6) Change in Method for Gain-sharing COLA Benefits *(combined effect of all changes above and in Method for Gain-sharing COLA against benchmark)*	7,402.3	43.7%
a. Effect of this Additional Change: (6)-(5)	(189.0)	-0.5%
b. Effect of All four Changes: 2a+3a+4a+5a+6a = (6)-(1)	742.4	4.8%

Source: Developed by LLA's actuarial staff.

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

(2) Change in method for actuarial valuation system.

(3) Change in mortality tables from RP-2000 with *static* mortality improvement Scale AA to 2015 to applying LASERS-derived experience factors to RP-2014 with *generational* mortality improvement scale MP-2017.

(4) .Change in net investment return assumption from LASERS' 8.25% (not to be confused with LASERS' 7.70% discount rate) to LLA's 7.50% net investment return assumption

(5) Change in method for administrative expenses from LASERS' implicit reduction of net return assumption (down by 0.15%) to LLA's explicit normal cost load (of 0.95% of covered payroll), consistent with Act 94 of 2016 providing for direct funding of non-investment-related administrative expenses through the employer contribution.

(6) Change in method for gain-sharing COLA increases from LASERS' implicit reduction of net return assumption (down by 0.40%) to LLA's explicit single equivalent annual 0.40% COLA.

CONTRIBUTION RATES FOR FYE 2020

Contribution requirements for LASERS for FYE 2020 vary from sub-plan to sub-plan. The total contribution rate for each sub-plan has one or more of the following component parts:

1. Total Normal Cost
2. Employee Normal Cost
3. Employer Normal Cost
4. Administrative Expenses
5. UAL Costs that are shared by all sub-plans
6. UAL Costs specific to a particular sub-plan

Contribution rates are summarized below. More details are presented in Appendix A.

Projected Employer Contribution Rates for FYE 2020								
Sub Plan	Status 7/1/2018	Total NC (A)	Employee NC (B)	Employer NC (C) = (A) - (B)	Admin Expense % (D)	Shared UAL (E)	Plan Specific UAL (F)	Total Employer Contributions (F) = (C) + (D) + (E) + (F)
Rank & File and Appellate Law Clerks	O	11.48%	7.76%	3.72%	0.95%	38.92%	0.04%	43.63%
Pre 2011 Judges & Court Officers	C	17.04%	11.50%	5.54%	0.95%	38.92%	0.00%	45.41%
Post 2011 Judges	O	18.14%	13.00%	5.14%	0.95%	38.92%	0.00%	45.01%
Legislators	C	15.05%	11.50%	3.55%	0.95%	38.92%	0.00%	43.42%
Corrections Officers Primary	C	8.91%	9.00%	-0.09%	0.95%	38.92%	0.06%	39.84%
Corrections Offs Secondary	C	12.72%	9.00%	3.72%	0.95%	38.92%	0.10%	43.69%
Wildlife Officers	C	22.21%	9.50%	12.71%	0.95%	38.92%	0.04%	52.62%
Peace Officers	C	11.46%	9.00%	2.46%	0.95%	38.92%	0.05%	42.38%
ATC Officers	C	5.92%	9.00%	-3.08%	0.95%	38.92%	0.04%	36.83%
Bridge Police Officers	C	11.09%	8.40%	2.69%	0.95%	38.92%	0.04%	42.60%
Harbor Police	C	14.03%	9.00%	5.03%	0.95%	4.83%	0.07%	10.88%
Hazardous Duty Officers	O	14.12%	9.50%	4.62%	0.95%	38.92%	0.13%	44.62%
Total		11.86%	8.02%	3.84%	0.95%	38.91%	0.05%	43.75%

Status
O - Plan open to new members.
C - Plan closed to new members.

Rates presented above represent contribution rates applicable to employers and exclude amounts paid from sources discussed on the following pages.

In addition, LASERS receives direct payments from three special funds (dedicated sources of revenue). The amount of normal cost and amortization cost received from each fund is summarized below:

Payments From Special Funds for FYE 2020			
Special Fund	**Normal Cost**	**Amortization Cost**	**Total Payment**
Adult Probation and Parole Officers	40,408	-	40,408
Peace Officers	-	299,908	299,908
Harbor Police	-	154,894	154,894
Total	40,408	454,802	495,210

FUNDING REQUIREMENTS SPECIFIC TO INDIVIDUAL SUB-PLANS

All safety sub-plans that were affected by the recent Acts relating to added benefits for intentional acts of violence are charged with plan-specific UALs and UAL payments. Although most funding components are shared, some other components apply only to an individual sub-plan or to a group of employees within a sub-plan. These other situations (besides the intentional violence benefits) are summarized below.

Rank & File − The disability accrual rate for members hired on or after July 1, 2006, was increased by Act 262 of the 2008 regular session of the legislature. Retirement eligibility for members hired on or after July 1, 2006, was changed by Act 992 of the 2010 session. The unfunded accrued liability associated with the Rank & File sub-plan increased as a result of this legislation. The increase in UAL is being amortized with level payments over a 30-year period. UAL payments pertaining to these benefit changes are being charged only to employers of Rank & File employees.

Hazardous Duty Officers – The normal form of benefit for members of LASERS who elect to join the hazardous duty plan was changed by Act 992 of the 2010 session. The resultant UAL is being amortized with level payments over a period of 10 years. Employers of hazardous duty personnel are responsible for this amortization payment.

Alcohol Tobacco Control Officers – Eligibility requirements for enforcement officers of Alcohol Tobacco Control were modified by Act 740 of the 2008 session. The resultant UAL was amortized with level payments over a 10-year period. This amount was fully paid prior to this valuation from resources of the Department of Revenue Alcohol and Tobacco Control Officers Fund.

Peace Officers – The benefit accrual rate for certain Peace Officers was increased by Act 414 of the 2007 session. The UAL created by this change is funded with level annual payments over 30 years. The UAL contribution is paid from the Department of Public Safety Peace Officers Fund.

Adult Probation and Parole – The benefit accrual rate for certain adult probation and parole officers who were members of the Corrections Primary sub-plan prior to closure of that sub-plan was increased by Act 852 of the 2014 session. The increase in the UAL and the increase in the normal cost associated with the benefit increase are funded by appropriations from the Adult Probation and Parole Officer Retirement Fund (APPOR Fund). The first payment of $1,000,000 was made from the APPOR Fund on March 30, 2015 followed by a series of payments exceeding the minimum amounts resulting in accelerating pay-down of that liability. Accounting relative to LASERS and the APPOR Fund for the year ended June 30, 2018 is shown below.

A. Normal Cost		
1. Mid-Year Normal Cost Associated with Act 852	$	45,687
2. Interest Adjustment from January 1, 2018 to June 30, 2018		1,726
3. Normal Cost on June 30, 2018	$	47,413
B. UAL Amortization		
1. UAL Balance Associated with Act 852 on July 1, 2017	$	558,895
2. Interest Adjustment from July 1, 2016 to June 30, 2018		43,035
3. Preliminary UAL Balance Associated with Act 852 on June 30, 2018	$	601,930
C. Payments by the APPOR Fund to LASERS		
1. Payment on March 30, 2018	$	592,048
2. Interest Adjustment from March 30, 2018 to June 30, 2018		31,287
3. Accumulated Payments on June 30, 2018	$	623,335
D. Adjustment to the Act 852 UAL on June 30, 2018		
1. Normal Cost with Interest	$	47,413
2. Preliminary UAL Amortization Balance		601,930
3. Preliminary Total Balance	$	649,343
4. Accumulated Payments		623,335
5. UAL Balance on June 30, 2018 = D3 – D4	$	26,008
E. UAL Amortization Payment (Final Payment)	$	26,966

The mid-year normal cost payment and mid-year amortization payment due from the APPOR Fund for FYE 2019 are $41,346 and $26,966 respectively, and the amortization base will be paid off at that time. The projected mid-year normal cost payment due from the APPOR Fund for FYE 2020 is $40,408 with no amortization payments remaining.

Harbor Police – Act 648 of the 2014 session provided for the development of a Cooperative Endeavor Agreement (CEA) between LASERS and the Harbor Police Retirement System (HPRS), which would identify the terms of a merger between the two systems. The CEA provides the following:

1. LASERS will create a new sub-plan for members of HPRS on June 30, 2014.

2. Any person employed by the Port of New Orleans on or after July 1, 2014, who otherwise would have joined HPRS, will become a member of the LASERS Hazardous Duty sub-plan.

3. A member of the Harbor Police sub-plan may elect to transfer to the Hazardous Duty sub-plan of LASERS and relinquish his benefit rights under the old HPRS plan.

4. The total contribution rate applicable to the Hazardous Duty sub-plan will apply to police officers of the Port of New Orleans participating in the Hazardous Duty sub-plan.

5. The employer contribution rate for the Harbor Police sub-plan will be equal to the employer normal cost for the sub-plan plus amortization payment towards UAL changes arising after July 1, 2015. The Port of New Orleans will not pay (a) a shared amortization cost attributed to gains or losses established prior to July 1, 2015 or (b) a specific amortization cost for Hazardous Duty sub-plan on behalf of members of the Harbor Police sub-plan through FYE 2022.

6. The Port of New Orleans agrees to pay on or before June 30, 2022, the unfunded accrued liability of the HPRS as measured on July 1, 2015.

SOURCES AND AMOUNTS OF CHANGES IN THE UAL FOR FYE 2018

Gains and losses during FYE 2018 have been identified below, and the unfunded accrued liability at the end of the year has been reconciled with the unfunded accrued liability on June 30, 2017.

A.	**Unfunded Accrued Liability on June 30,2017**		**$**	**6,815,312,579**
B.	**Increases in the UAL Due to:**			
	1. Interest on the UAL	$ 524,779,069		
	2. Permanent Benefit Increase	0		
	3. Employer Contribution Shortfall	0		
	4. Assumption Change (Discount Rate/Salary Inflation)	1,247,650,366		
	5. Investment Loss	20,165,191		
	6. Experience Loss	0		
	7. Legislative Change (Acts 224 and 595)	657,700		
	8. Total Increases = Bl + B2 + B3 + B4 + B5 + B6 + B7		**$**	**1,793,252,326**
C.	**Decreases in the UAL Due to:**			
	1. Employer Amortization Payment	$ 662,441,955		
	2. Disbursement from the Experience Account	0		
	3. Employer Contribution Surplus	16,979,008		
	4. Assumption Change (Actuarial System Change)	7,904,881		
	5. Assumption Change (Demographic Changes)	29,611,861		
	6. Method for Admin Expense	278,720,139		
	7. Method for Gain Sharing COLA	188,999,603		
	8. Investment Gain	0		
	9. Experience Gain	17,938,599		
	10. Appropriations	3,676,833		
	11. Total Decreases = Cl + C2 +...+C9 + C10		**$**	**1,206,272,879**
D.	**Unfunded Accrued Liability on June 30, 2018** = A + B8 - C11		**$**	**7,402,292,026**

QUALIFICATIONS, DISCLOSURES, AND CERTIFICATION

This valuation has been prepared as of June 30, 2018, based on plan provisions for the Louisiana State Employees' Retirement System (LASERS) as documented in Title 11 of Louisiana Revised Statutes (R.S.), Sections 401 through 631.

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 employer contribution rates 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 11 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 sponsor is 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.

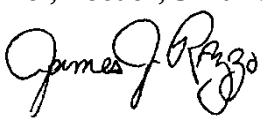
This actuarial valuation and contribution determination was prepared and completed by us or under our direct supervision, and we acknowledge responsibility for the results. To the best of our knowledge, the results are complete and accurate. In our opinion, the techniques and assumptions used are reasonable, 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 13, 2018

SECTION I:
DEVELOPMENT OF EMPLOYER CONTRIBUTIONS

1. Employer Contribution Requirements for FYE 2019 – Combined Plan

Employer contribution requirements for FYE 2019, as measured for all sub-plans combined using assumptions and methods applicable to that fiscal year, are calculated below. These values have been determined as if the entire system had been measured as a single financial entity. Although R.S. 11:102C requires separate calculations of normal cost for each sub-plan within LASERS, values in the aggregate are useful for comparisons with contribution requirements for prior years.

The amounts shown below for FYE 2019 are based on a 7.50% assumed rate of return on investments and a 7.50% discount rate. All calculations in this valuation as based on a single set of assumptions for the reasons set forth in the Summary and Conclusions section.

		Dollar Amount	Percent of Salary
A.	Employer Portion of Normal Cost Net of Act 852	$ 71,900,938	3.840867%
B.	Act 852 Normal Cost	41,346	n/a
C.	Administrative Expenses	17,783,977	0.950000%
D.	Shared Amortization Payments	640,277,184	34.202885%
E.	Amortization Payments for Sub Plans	1,431,109	0.076448%
F.	Contribution Variance Payments	30,708,921	1.640436%
G.	Total Contribution = A + B + C + D + E	$ 762,143,475	40.712845%
H.	Act 414 Appropriation (Peace Officers Fund)	299,908	0.016021%
I.	Act 740 Appropriation (ATC Officers Fund)	-	0.000000%
J.	Harbor Police Amortization Appropriation	154,894	0.008274%
K.	Act 852 AP&P Amortization Appropriation	26,966	0.001440%
L.	Act 852 AP&P Normal Cost Appropriation	41,346	n/a
M.	Net Required Contribution = F - G - H - I - J - K	$ 761,620,361	40.684901%
N.	Projected Payroll for FYE 2019	$ 1,871,997,592	
O.	Total Contribution Rate for FYE 2019		
	1. Employer Normal Cost Rate = A / M	3.84%	
	2. Administrative Expense Rate = C / M	0.95%	
	3. Employer Amortization Cost Rate = (D + E + F - H - J - K) / M	35.89%	
	4. Total Employer Contribution Rate = O1 + O2 + O 3	40.7%	
P.	Minimum Contribution Rate	15.5%	
Q.	Minimum Required Contribution for FYE 2019 = M x O	$ 290,159,627	15.500000%
R.	Required Employer Contribution for FYE 2019 = The Greater of L and P	$ 761,620,361	40.684901%

2. Employer Contribution Requirements for FYE 2020 – Combined Plan

Employer contribution requirements for FYE 2020, as measured for all sub-plans combined using assumptions and methods applicable to that fiscal year, are presented below. These values have been determined as if the entire system had been measured as a single financial entity. Although R.S. 11:102(C) requires separate calculations of normal cost for each sub-plan within LASERS, values in the aggregate are useful for comparisons with contribution requirements for prior years. Contribution requirements by sub-plan are presented in Appendix A.

The amounts shown below for FYE 2020 are based on a 7.50% assumed rate of return on investments and a 7.50% discount rate. All calculations in this valuation as based on a single set of assumptions for the reasons set forth in the Summary and Conclusions section.

		Dollar Amount	Percent of Salary
A.	Employer Portion of Normal Cost Net of Act 852	$ 72,063,086	3.840867%
B.	Act 852 Normal Cost	40,408	N/A
C.	Administrative Expenses	17,824,083	0.950000%
D.	Shared Amortization Payments	710,457,047	37.866419%
E.	Amortization Payments for Sub Plans	1,404,143	0.074839%
F.	Contribution Variance Payments	19,510,211	1.039868%
G.	Total Contribution = A + B + C + D + E	$ 821,298,978	43.774147%
H.	Act 414 Appropriation (Peace Officers Fund)	299,908	0.015985%
I.	Act 740 Appropriation (ATC Officers Fund)	-	0.000000%
J.	Harbor Police Amortization Appropriation	154,894	0.008256%
K.	Act 852 AP&P Amortization Appropriation	-	0.000000%
L.	Act 852 AP&P Normal Cost Appropriation	40,408	N/A
M.	Net Required Contribution = F - G - H - I - J - K	$ 820,803,768	43.747753%
N.	Projected Payroll for FYE 2020	$ 1,876,219,242	
O.	Total Contribution Rate for FYE 2020 = L / M		
	1. Employer Normal Cost Rate = A / M	3.84%	
	2. Administrative Expense Rate = C / M	0.95%	
	3. Employer Amortization Cost Rate = (D + E + F - H - J - K) / M	38.96%	
	4. Total Employer Contribution Rate = O1 + O2 + O 3	43.7%	
P.	Minimum Contribution Rate	15.5%	
Q.	Minimum Required Contribution for FYE 2020 = M x O	$ 290,813,983	15.500000%
R.	Required Employer Contribution for FYE 2020 = The Greater of L and P	$ 820,803,768	43.747753%

3. Normal Cost Values – Combined Plan

Employer and Employee Normal Costs

Funding rules under R.S. 11:22 require normal costs to be determined in accordance with the Entry Age Normal (EAN) funding method. Employee contributions and actuarially calculated employer normal cost values for FYE 2019 are based on the valuation of normal costs as of June 30, 2018. The total normal cost percentage is calculated as the total normal cost for FYE 2019 divided by the payroll as of June 30, 2018. The employee normal cost is calculated as employee contributions collected in FYE 2018 divided by the June 30, 2018 payroll. The employer normal cost percentage is equal to the difference between the total normal cost percentage and the employee normal cost percentage. These percentages are then multiplied by the projected payroll for FYE 2019 to determine dollar contribution amounts for FYE 2019.

Projected normal costs for FYE 2020 are calculated in a similar manner. The calculated normal cost percentages, however, are multiplied by projected payroll amounts for FYE 2020.

Normal costs for FYE 2019 and 2020 are based on 7.50% discount rate. The basis for these rates is described in Section III of this report. Please also refer to Appendices B and D - H for more information concerning the changes in assumptions and methods implemented for this valuation.

Development of Employer Contributions

		June 30, 2018 Valuation Actuarial FYE 2019 & Projected FYE 2020	June 30, 2017 Valuation Actuarial FYE 2018	June 30, 2017 Valuation Projected FYE 2019
A.	**Discount Rate**	7.50%	7.70%	7.65%
B.	**Total Normal Cost**			
	1. Retirement Benefits	$ 143,187,306	$ 140,772,747	Not Available
	2. Disability Benefits	5,267,948	4,837,059	Not Available
	3. Survivor Benefits	6,071,158	4,828,633	Not Available
	4. Voluntary Terminations	66,606,084	63,783,737	Not Available
	5. Total Normal Cost	$ 221,132,496	$ 214,222,176	$ 214,439,300
	6. Act 852 Normal Cost	41,755	46,096	45,687
	7. Total Normal Cost Net of Act 852 = B5 - B6	$ 221,090,741	$ 214,176,080	$ 214,393,613
C.	**Payroll**			
	1. On Valuation Date	$ 1,864,035,191	$ 1,821,943,975	$1,821,943,975
	2. Projected for FY after Valuation Date	1,871,997,592	1,850,571,613	n/a
	3. Projected for 2nd FY after Valuation Date	1,876,219,242	n/a	1,890,122,115
D.	**Normal Cost Rates**			
	1. Total Normal Cost Rate = B7 / C1	11.860867%	11.755360%	11.861660%
	2. Employee Normal Cost Rate	8.020000%	8.010000%	8.010000%
	3. Employer Normal Cost Rate = D1 – D2	3.840867%	3.745360%	3.851660%
E.	**Employer Normal Cost in Dollars Net of Act 852**			
	1. For 1st FY after Valuation Date = C2 x D3	$ 71,900,938	$ 69,310,569	n/a
	2. For 2nd FY after Valuation Date = C3 x D3	$ 89,887,169	n/a	$ 72,801,085
F.	**Employee Normal Cost**			
	1. For 1st FY after Valuation Date = C2 x D2	$ 150,134,207	$ 148,230,786	n/a
	2. For 2nd FY after Valuation Date = C3 x D2	$ 150,472,783	n/a	$ 151,398,781
G.	**Total Normal Cost**			
	1. For FYE 2019 = E1 + F1	$ 222,035,145	$ 217,541,355	n/a
	2. For FYE 2020 = E2 + F2	$ 240,359,952	n/a	$ 224,199,866

Increases in Normal Cost Attributable to Assumption Changes

The following assumptions changes have affected the determination of the normal cost rate as of June 30, 2018:

a. Changes in mortality assumptions,
a. Changes in future rates of return and inflation assumptions (and discount rate),
b. Changes in treatment of administrative expenses, and
b. Changes in treatment of gain-sharing COLA benefits.

Please refer to the Appendices for further details pertaining to the assumption changes. The change in normal cost due to change in actuarial systems is incorporated into both columns below. Increases associated with the various components of the normal cost are shown below.

		For the June 30, 2018 Valuation		
		Old Assumptions	New Assumptions	Increase/ (Decrease)
A.	**Discount Rate**	7.70%	7.50%	
B.	**Total Normal Cost**			
	1. Retirement Benefits	$ 141,326,055	$ 143,187,306	$ 1,861,251
	2. Disability Benefits	4,759,036	5,267,948	508,912
	3. Survivor benefits	4,829,129	6,071,158	1,242,029
	4. Voluntary Terminations	64,959,026	66,606,084	1,647,058
	5. Total Normal Cost	$ 215,873,246	$ 221,132,496	$ 5,259,250
	6. Act 852 Normal Cost	(42,283)	(41,755)	528
	7. Load for Administrative Expenses	N/A	17,708,334	N/A
	8. Total Normal Cost Net of Act 852	$ 215,830,963	$ 238,799,075	$ 22,968,112
C.	**Payrolls**			
	1. Payroll on June 30, 2018	$ 1,864,035,191	$ 1,864,035,191	$ -
	2. Projected Payroll for FYE 2019	1,871,997,592	1,871,997,592	-
	3. Projected Payroll for FYE 2020	1,876,219,242	1,876,219,242	-
D.	**Normal Cost Rates**			
	1. Total Normal Cost Rate Net of Act 852 = B8/C1	11.578696%	12.810867%	1.232171%
	2. Employee Normal Cost Rate	8.020000%	8.020000%	0.000000%
	3. Employer Normal Cost Rate Net of Act 852 = D1 - D2	3.558696%	4.790867%	1.232171%
E.	**Employer Normal Costs Net of Act 852**			
	1. Projected Cost for FYE 2019 = C2 x D3	66,618,703	89,684,915	23,066,211
	2. Projected Cost for FYE 2020 = C3 x D3	66,768,939	89,887,169	23,118,229
F.	**Employee Normal Costs**			
	1. Projected Cost for FYE 2019 = C2 x D2	150,134,207	150,134,207	-
	2. Projected Cost for FYE 2020 = C3 x D2	150,472,783	150,472,783	-

4. Unfunded Accrued Liability

Components of the Unfunded Accrued Liability as of June 30, 2018

Funding rules under R.S. 11:22 require a measurement of the unfunded accrued liability for the plan to be calculated in accordance with the Entry Age Normal funding method. This measurement is to be made for all sub-plans combined. Accrued liability values as of June 30, 2018, are based on a 7.50% return (and discount rate) net of investment expenses, and other assumptions and methods as described in Section III of this report. The unfunded accrued liability is based on the actuarial value of assets measured on June 30, 2018.

The components of the unfunded accrued liability on June 30, 2018 and June 30, 2017 are shown below.

		June 30, 2018	June 30, 2017
A.	**Discount Rate**	7.50%	7.70%
B.	**Accrued Liability**		
1	**Accrued Liability for Active Members**		
	(a) Retirement Benefits	4,862,490,196	4,685,254,899
	(b) Disability Benefits	77,129,522	65,485,353
	(c) Survivor Benefits	85,349,276	63,552,876
	(d) Voluntary Terminations	-	-
	(e) Total	$ 5,024,968,994	$ 4,814,293,128
	(f) Ratio of Active Liability to Total Accrued Liability	25.43%	25.62%
2	**Accrued Liability for Retired and Inactive Members**		
	(a) Regular Retirees	10,964,157,898	10,311,169,162
	(b) Disability Retirees	298,656,031	271,595,562
	(c) Survivors	806,956,010	766,314,480
	(d) Members with a Deferred Benefit	380,459,498	340,779,746
	(e) Contributions to be Refunded	84,891,360	84,543,183
	(f) Deferred Benefits for DROP Members	1,111,246,937	1,128,452,897
	(g) Account Balances for DROP Members	1,086,044,790	1,069,402,732
	(h) Account Balances for ORP Members	5,431,140	5,554,671
	(i) Total	$ 14,737,843,664	$ 13,977,812,433
	(j) Ratio of Inactive Liability to Total Accrued Liability	74.57%	74.38%
3	**Total Accrued Liability**	$ 19,762,812,658	$ 18,792,105,561
C.	**Valuation Assets**	$ 12,360,520,632	$ 11,976,792,982
D.	**Unfunded Accrued Liability**	7,402,292,026	6,815,312,579
E.	**Funded Ratio = C / B3**	62.54%	63.73%

Reconciliation of UAL between June 30, 2017 and June 30, 2018

The unfunded accrued liability on June 30, 2018, is reconciled below with the unfunded accrued liability on June 30, 2017.

A.	**Unfunded Accrued Liability on June 30, 2017**	**$**	**6,815,312,579**
B.	**Increases in the UAL Due to:**		
	1. Interest on the UAL	524,779,069	
	2. Permanent Benefit Increase	-	
	3. Employer Contribution Shortfall	-	
	4. Assumption Change (Discount Rate/Salary Inflation)	1,247,650,366	
	5. Investment Loss	20,165,191	
	6. Experience Loss	-	
	7. Legislative Changes (Acts 224 and 595)	657,700	
	8. Total Increases	**$**	**1,793,252,326**
C.	**Decreases in the UAL Due to:**		
	1. Employer Amortization Payment	662,441,955	
	2. Experience Account Disbursement	-	
	3. Employer Contribution Surplus	16,979,008	
	4. Assumption Change (Actuarial System Change)	7,904,881	
	5. Assumption Change (Demographic Changes)	29,611,861	
	6. Method for Admin Expense	278,720,139	
	7. Method for Gain Sharing COLA	188,999,603	
	8. Investment Gain	-	
	9. Experience Gain	17,938,599	
	10. Appropriations	3,676,833	
	11. Total Decreases	**$**	**1,206,272,879**
D.	**Unfunded Accrued Liability on June 30, 2018**		
	= A + B7 – C8	**$**	**7,402,292,026**

Projected Unfunded Accrued Liability as of June 30, 2019

The calculation of the projected unfunded accrued liability as of June 30, 2019, is shown below.

A.	**Unfunded Accrued Liability on June 30, 2018**		**$ 7,402,292,026**
B.	**Increases in the UAL Due to:**		
	1. Interest on the UAL	555,171,902	
	2. Expected Employer Contribution Shortfall	54,345,996	
	3. Recognition of Gain Sharing	-	
	4. Change in Assumptions	-	
	5. Total Increases = B1 + B2 + B3 + B4		**$ 609,517,898**
C.	**Decreases in the UAL Due to:**		
	1. Employer Amortization Payment	697,177,000	
	2. Employer Contribution Surplus	-	
	3. Total Decreases = C1 + C2		**$ 697,177,000**
D.	**Projected Unfunded Accrued Liability on June 30, 2019**		
	= A + B5 – C3		**$ 7,314,632,924**

5. Assets

Actuarial Value of Assets

The actuarial value of assets is the market value of assets adjusted to phase in realized and unrealized investment gains and losses that occurred over the four-year period immediately prior to the valuation date.

A. Investment Gain/(Losses) Based on Market	**June 30, 2018**	**June 30, 2017**	**June 30, 2016**	**June 30, 2015**
1. BOY Market Value	$11,753,275,850	$10,723,714,826	$11,415,150,926	$11,624,853,426
2. Contributions	893,191,312	839,563,997	886,025,786	888,347,447
3. Legislative Appropriations	3,676,833	250	10,790,721	4,540,773
4. Benefit Payments	1,352,826,833	1,312,067,062	1,274,505,193	1,237,388,009
5. Administrative Expenses	25,141,552	18,536,860	17,018,181	18,011,841
6. EOY Market Value	$12,283,713,118	$11,753,275,850	$10,723,714,826	$11,415,150,926
7. Actual Investment Income = A6 – A1 – A2 – A3 + A4 + A5	1,011,537,508	1,520,600,699	(296,729,233)	152,809,130
8. Expected Investment Income Based on the Discount Rate	886,267,945	812,060,122	869,797,447	886,702,860
9. Gain/(Loss) = A7 – A8	$ 125,269,563	$ 708,540,577	$(1,166,526,680)	$ (733,893,730)

B. Market Value Adjustment	**Gain/(Loss) (a)**	**Factor (b)**	**Market Value Adjustment (c) = (a) x (b)**
1. Adjustment for 2018	$ 125,269,563	80%	$ 100,215,650
1. Adjustment for 2017	708,540,587	60%	425,124,352
2. Adjustment for 2016	(1,166,526,680)	40%	(466,610,672)
3. Adjustment for 2015	(733,893,730)	20%	(146,778,746)
5. Total Market Value Adjustment			$ (88,049,416)

C. Preliminary Actuarial Value	
1. Market Value on June 30, 2018 = A6	12,283,713,118
2. Market Value Adjustment = B5	(88,049,416)
3. Preliminary Actuarial Value = C1 – C2	12,371,762,534
D. Corridor Values	
1. 80% x Market Value	9,826,970,494
2. 120% x Market Value	14,740,455,742
E. Actuarial Value of Assets = Preliminary Value if Preliminary Value is inside the Corridor. Otherwise the Actuarial Value = the average between the Preliminary Value and the Corridor	$12,371,762,534

Investment Gain/(Loss)

The Investment gain/(loss) is measured as the difference between actuarial and expected investment earnings during FYE 2018.

A.	**Components of the Gain/(Loss) Calculation**	
	1. Net Actuarial Value of Assets on June 30, 2017	$11,444,785,605
	2. Contributions for FYE 2018	819,848,903
	3. Legislative Appropriations	3,676,833
	4. Benefits Paid for FYE 2018	1,286,160,856
	5. Administrative Expenses Paid for FYE 2018	25,141,552
	6. Net Actuarial Value of Assets on June 30, 2018	$11,799,453,047
	7. Expected Rate of Return on Assets	7.70%
B.	Actual Investment Earnings = A6 – A1 – A2 – A3 + A4 + A5	$ 842,444,114
C.	Expected Investment Earnings	$ 862,609,305
D.	Investment Gain/(Loss) = B – C	$ (20,165,191)

Allocation of Investment Gains to the Experience Account

According to R.S. 11:542, 50% of the total actuarial investment gain, not associated with DROP accounts, in excess of $100 million will be transferred from the regular asset pool to the Experience Account. Beginning July 1, 2016, the $100 million hurdle will be indexed by the increase in the actuarial value of assets, if any. Moreover, the transfer to the Experience Account will be capped by the maximum COLA if the retirement system is less than 80% funded and two COLAs otherwise.

Funded Ratio	Maximum COLA
< 55%	0%
55% to < 65%	1.5%
65% to < 75%	2.0%
75% to < 80%	2.5%
80% +	3.0%

Development of Employer Contributions

The amount of assets to be transferred under R.S. 11:542 from the regular pool of assets to the Experience Account is calculated below.

A.	**Excess Investment Earnings = Investment Gain**	$	0
B.	**Excess Investment Earnings Paid to DROP Accounts**		
	1. DROP Accounts Eligible for System Investment Earnings		
	a. Total of all DROP and IBO accounts	$	1,056,349,473
	b. DROP accounts for Actives not entitled to system earnings		66,645,732
	c. Self-directed DROP accounts not entitled to system earnings		566,878,347
	d. DROP accounts entitled to system earnings = B1a – B1b – B1c	$	422,825,394
	2. Rate of Return Attributable to Excess Earnings on DROP Accounts		
	a. Adjusted Actual rate of return on investments for DROP accounts		7.019986%
	b. Adjusted Expected rate of return for DROP accounts		7.200000%
	c. Rate of return attributable to excess earnings = B2a – B2b		0.000000%
	3. Excess Investment Earnings Paid to DROP Accounts = B1d x B2c	$	0
C.	**Benefit Disbursements**	$	-
D.	**Actuarial Return Gain/(Loss) Paid to the Experience Account (EA)**		
	1. Experience Account Assets Entitled to System Earnings	$	10,455,340
	2. Actuarial Rate of Return on the Actuarial Value of Assets		7.519986%
	3. Actual Investment Earnings Payable to the EA = D1 x D2		786,240
	4. Expected Rate of Return on the Actuarial Value of Assets		
	5. Expected Investment Earnings on EA Assets = D1 x D4		
	6. Potential Investment Gains for the Experience Account = D3 - D5		
	7. Maximum Fund in the Experience Account = Present Value of a 1.5% PBI		132,790,266
	8. Maximum Investment Earnings Payable to the Experience Account = D7 - (D1 - C)		122,334,926
	9. Investment Earnings Payable to the EA = lesser of D8 and D3		786,240
	10. Investment Earnings to be Treated as an Investment Gain = D9 - D3		0
	11. Experience Account End of Period = lesser of D7 and (D1 - C + D3)		11,241,580
	12. Maximum Excess Investment Earnings that Can be Applied to EA = D7 - D11	$	121,548,686
E.	**Net Excess Investment Earnings = A – B3 + D7**	$	0
F.	**Allocation of Excess Investment Earnings to the Experience Account**		
	1. Net Excess Investment Earnings = E	$	0
	2. Administrative Expense		0
	3. Threshold Gain		108,125,754
	4. Gain Available for Gain Sharing = F1 – F2 – F3, but not less than 0		0
	5. Gain Sharing Percentage		50%
	6. Preliminary Allocation of Excess Gains to the Experience Account		0
	7. Maximum Excess Investment Earnings that Can be Applied to EA = D9		121,548,686
	8. Allocation of Excess Gains to the Experience Account = lesser F6 and F7	$	0

Employer Contribution Shortfall/(Surplus) for FYE 2018

Total contributions received from participating employers were higher in FYE 2018 than were expected. As a result, asset values are more than what they would have been otherwise. The unfunded accrued liability has decreased because of the contribution surplus. The surplus will be used to reduce the Original Amortization Base (OAB), without a recalculation of amortization payments. The calculation of the surplus as of June 30, 2018, is shown below.

A.	**Actual Employer Contributions**	
	1. Employer Contributions	$ 725,417,532
	2. ORP Contributions	385,339
	3. Payment to Harbor Police allocated to the next fiscal year	1,795,133
	4. APPOR underpayment	25,061
	5. Net Employer Contributions = A1 + A2 - A3 - A4	$ 724,032,799
B.	**Expected Employer Contributions**	
	1. Member Contributions	$ 152,189,709
	2. Employee Contribution Rate	8.02000000%
	3. Salaries on which Contributions were Received = B1 / B2	$ 1,897,627,294
	4. Employer Normal Cost Rate for FYE 2018	3.74536038%
	5. Members Affected by Act 852 of the 2014 Session	0.00246880%
	6. Total Employer Normal Cost Rate = B4 + B5	3.74782919%
	7. Expected Employer Normal Costs = B3 x B6	$ 71,119,830
	8. Contributions to the Employer Credit Account for FYE 2018	0
	9. Amortization Payments for FYE 2018	587,010,195
	10. Payments toward Contribution Variances for FYE 2018	49,541,977
	11. Expected Employer Contributions	$ 707,672,002
C.	**Mid-Year Employer Shortfall/(Surplus) for FYE 2018 = B11 – A5**	$ (16,360,798)
D.	**Interest at 7.70% for 1/2 Year and Adjustment for Rounding**	$ (618,211)
E.	**Employer Shortfall/(Surplus) on June 30, 2018 = C + D**	$ (16,979,009)

Projected Employer Contribution Shortfall/(Surplus) for FYE 2019

A shortfall in employer contributions is expected to occur for FYE 2019 because the currently developed actuarial employer contribution rate, 40.7% of pay for FYE 2019, is greater than the actual 37.9% rate of pay established by PRSAC a year ago. The expected shortfall of employer contributions is calculated below.

A.	CurrentlyDeveloped Employer Contributions Required in Mid-Year for FYE 2019	$	761,903,020
B.	Previously Projected Employer Contributions Expected in Mid-Year for FYE 2019		709,487,087
C.	Shortfall/(Surplus) of Employer Contributions Expected for Mid-Year for FYE 2019 = A - B	$	52,415,933
D.	Interest on Shortfall at 7.50% per Year from Mid-Year to End of Year		1,930,063
E.	Total Employer Contribution Shortfall/(Surplus) on June 30, 2019 = C + D	$	54,345,996

Asset Allocation (Market Values)

		June 30, 2018	June 30, 2017
A.	**Short-Term Assets**		
	1. Cash/Cash Equivalents	$ 176,067,072	$ 197,912,884
	2. Short-Term Investments	122,387,383	142,663,861
B.	**Bonds**		
	1. Domestic Issues	1,444,284,614	1,388,750,646
	2. International Issues	501,059,453	447,375,296
C.	**Equities**		
	1. Domestic Stock	2,909,424,470	2,666,613,896
	2. International Stock	3,903,379,731	3,798,051,961
D.	**Other Assets**		
	1. Fixed Assets	5,936,548	3,855,740
	2. Real Estate and Alternative Investments	3,132,410,258	3,048,043,546
E.	**Receivables Minus Payables**	89,598,187	59,897,298
F.	**Securities Lending (Assets minus Liabilities)**	54,554	110,722
G.	**Deferred Outflows and Inflows**	(889,152)	-
H.	**Total Assets**	$ 12,283,713,118	$ 11,753,275,850

Income Statement (Market Value)

		FYE June 30, 2018	FYE June 30, 2017
A.	**Income**		
	1. Contribution Income		
	a. Member Contributions	$ 152,189,709	$ 149,931,242
	b. Employer Contributions	725,417,532	675,166,965
	c. ORP Contributions	385,339	416,785
	d. Total = A1a + A1b + A1c	$ 877,992,580	$ 825,514,992
	2. Other Income		
	a. Legislative Appropriations	$ 3,676,833	$ 250
	b. Transfers/Purchases	11,370,988	9,989,730
	c. Miscellaneous	3,827,744	4,059,275
	d. Total = A2a + A2b + A2c	$ 18,875,565	$ 14,049,255
	3. Net Investment Income		
	a. Investments Income	$ 1,088,981,821	$ 1,596,128,574
	b. Investment Expense	77,444,313	75,527,875
	c. Net Investment Income = A3a – A3b	$ 1,011,537,508	$ 1,520,600,699
	Total Income = A1d + A2e + A3c	$ 1,908,405,653	$ 2,360,164,946
B.	**Expense**		
	1. Operating Expense		
	a. General Administration	$ 14,732,258	$ 17,074,984
	b. Post-Employment Benefits	9,525,495	904,975
	c. Other Expenses	883,799	556,901
	d. Total = B1a + B1b + B1c	$ 25,141,552	$ 18,536,860
	2. Benefit Payments		
	a. Pension Benefits	$ 1,317,635,325	$ 1,274,461,022
	b. Return of Employee Contributions	35,191,508	37,606,040
	c. Total = B2a + B2b	$ 1,352,826,833	$ 1,312,067,062
	3. Total Expense = B1d + B2c	$ 1,377,968,385	$ 1,330,603,922
C.	**Net Income = A4 – B3**	$ 530,437,268	$ 1,029,561,024

Allocation of Assets to Sub-accounts

		FYE June 30, 2018	FYE June 30, 2017
A.	**Employer Credit Account**		
	1. Beginning Balance for Current Year	$ -	$ -
	2. Allocation for Current Year	-	-
	3. Disbursements for Current Year	-	-
	4. Accumulated Interest for Current Year	-	-
	5. Ending Balance for Current Year = A1 + A2 – A3 + A4	$ -	$ -
B.	**Initial UAL Amortization Fund**		
	1. Beginning Balance for Current Year	$ -	$ -
	2. Allocation for Current Year	-	-
	3. Disbursements for Current Year	-	-
	4. Accumulated Interest	-	-
	5. Ending Balance for Current Year = B1 + B2 – B3 + B4	$ -	$ -
C.	**Experience Account Fund**		
	1. Beginning Balance for Current Year	$ 10,455,340	$ 9,714,942
	2. Allocation for Current Year	-	-
	3. Disbursements for Current Year	-	-
	4. Accumulated Interest	786,562	740,398
	5. Ending Balance for Current Year = C1 + C2 - C3 + C4	$ 11,241,902	$ 10,455,340
D.	**Valuation Assets**		
	1. Actuarial Value of Assets	$ 12,371,762,534	$ 11,987,248,322
	2. Employer Credit Account = A5	-	-
	3. Initial UAL Amortization Fund = B5	-	-
	4. Experience Account Fund = C5	11,241,902	10,455,340
	5. Valuation Assets = D1 – D2 – D3 – D4	$ 12,360,520,632	$ 11,976,792,982

6. Rates of Return on Investments

Rates of Return on Investments Based on Market Values

The market value of assets includes funds that have been invested outside the trust fund by members with money in ORP and self-directed accounts. Column (a) shows the rate of return on investments with these account funds included; column (b) shows the rate of return associated with ORP and self-directed account funds; and column (c) shows the rate of return with these funds excluded.

		Market Value (a)	Self-Directed & ORP Values (b)	Net Market Value (c) = (a) – (b)
A.	Asset Value on June 30, 2017	$ 11,753,275,850	$ 542,462,717	$ 11,210,813,133
B.	Contributions	896,868,145	73,342,409	823,525,736
C.	Benefit Payments	1,352,826,833	66,665,977	1,286,160,856
D.	Administrative Expenses	25,141,552	-	25,141,552
E.	Asset Value on June 30, 2018	$ 12,283,713,118	$ 572,309,487	$ 11,711,403,631
F.	Investment Income = E – A – B + C + D	$ 1,011,537,508	$ 23,170,338	$ 988,367,170
G.	Unrounded Rates of Return	8.784853%	4.245199%	9.010744%
H.	Rounded Rate of Return on Investments	8.78%	4.25%	9.01%

Rates of Return on Investments Based on Actuarial Values

The actuarial value of assets includes funds that have been invested outside the trust fund by members with money in ORP and self-directed accounts. Column (a) shows the rate of return on investments with these account funds included; column (b) shows the rate of return associated with ORP and self-directed account funds; and column (c) shows the rate of return with these funds excluded.

		Actuarial Value (a)	Self-Directed & ORP Values (b)	Net Actuarial Value (c) = (a) – (b)
A.	Asset Value on June 30, 2017	$ 11,987,248,322	$ 542,462,717	$ 11,444,785,605
B.	Contributions	896,868,145	73,342,409	823,525,736
C.	Benefit Payments	1,352,826,833	66,665,977	1,286,160,856
D.	Administrative Expenses	25,141,552	-	25,141,552
E.	Asset Value on June 30, 2018	$ 12,371,762,534	$ 572,309,487	$ 11,799,453,047
F.	Investment Income = E – A – B + C + D	$ 865,614,452	$ 23,170,338	$ 842,444,114
G.	Unrounded Rates of Return	7.367849%	4.245199%	7.519986%
H.	Rounded Rate of Return on Investments	7.37%	4.25%	7.52%

Rate of Return to Be Granted on Drop Accounts

A.	Rounded Rate of Return on the Net Actuarial Value of	7.52%
B.	Reduction for Administrative Expenses	0.50%
C.	Rate of Return to Be Granted on DROP Accounts	7.02%

Summary of Rates of Return on Investments

		Rates Measured on June 30				
		2018	**2017**	**2016**	**2015**	**2014**
A.	Total Market Value	8.78%	14.51%	-2.64%	1.34%	17.55%
B.	Market Value Net of Self-Directed and ORP Accounts	9.01%	15.18%	-2.86%	1.30%	18.19%
C.	Actuarial Value Net of Self-Directed and ORP Accounts	7.52%	7.62%	5.43%	10.64%	13.45%
D.	Five-Year Geometric Average of the Actuarial Value Net of Self-Directed and ORP Accounts	8.90%	10.19%	9.69%	9.69%	7.97%
E.	Interest Credited to Self-Directed and ORP Accounts	7.02%	7.12%	4.93%	10.14%	12.95%

7. Amortization Payments for FYE June 30, 2019

Year	Description	Amortization Method	Amortization Period	Initial Liability	Years Remaining	Balance on June 30, 2017	Mid-Year Payment	Balance on June 30, 2018
Shared Bases								
2010	OAB	I	19	$ 1,936,750,759	11	$ 1,498,286,364	$ 200,704,330	$ 1,402,563,163
2010	EAAB	I	30	2,493,227,298	22	2,319,343,296	221,032,484	2,264,122,686
2009	Assumption Change	L	30	(221,451,744)	21	(196,833,448)	(18,230,508)	(192,694,164)
2009	Change in Liability	L	30	1,381,087,874	21	1,227,555,416	113,694,897	1,201,740,694
2010	Change in Liability	L	30	630,583,407	22	570,577,090	51,832,298	559,629,501
2011	Change in Liability	L	30	86,983,753	23	79,994,066	7,139,386	78,591,348
2012	Assumption Change	L	30	357,645,630	24	333,802,950	29,313,405	328,445,386
2012	Change in Liability	L	30	272,743,878	24	254,561,229	22,354,675	250,475,501
2013	Asset Method Change	L	30	(85,105,147)	25	(80,539,875)	(6,968,685)	(79,355,079)
2013	Change in Liability	L	30	(539,829,321)	25	(510,871,404)	(44,202,972)	(503,356,142)
2014	Liability Gain	L	30	(61,187,556)	26	(58,643,446)	(5,005,605)	(57,851,783)
2014	Assumption Change	L	30	725,253,130	26	695,097,934	59,331,200	685,714,382
2014	Funding Method Change	L	30	622,016,608	26	596,153,870	50,885,671	588,106,024
2014	Reduction in EA Deposit	L	5	(181,814,713)	1	(41,973,938)	(43,519,505)	-
2014	Gain from $50 to $100 M	L	5	(50,000,000)	1	(11,543,053)	(11,968,092)	-
2014	Remaining Investment Gain	L	5	(186,404,837)	1	(43,033,619)	(44,618,206)	-
2015	Remaining Gains	L	30	(181,167,204)	27	(175,729,245)	(14,813,626)	(173,549,844)
2015	Experience Loss	L	30	27,584,310	27	26,756,333	2,255,506	26,424,500
2016	Other Experience Gain	L	30	(80,839,360)	28	(79,259,424)	(6,605,209)	(78,355,454)
2016	Investment Experience Loss	L	30	249,797,074	28	244,958,790	20,414,026	242,164,987
2017	Change in Assumptions	L	30	41,711,761	29	41,322,783	3,407,547	40,888,972
2017	Experience Gain	L	30	(85,274,362)	29	(84,479,144)	(6,966,294)	(83,592,272)
2018	Actuarial System Method Change	L	30	(7,904,881)	30	(7,904,881)	(645,546)	(7,828,431)
2018	Experience Loss	L	30	2,226,592	30	2,226,592	181,833	2,205,058
2018	Mortality Assump. Changes	L	30	(29,611,861)	30	(29,611,861)	(2,418,229)	(29,325,477)
2018	Economic Assump. Changes	L	30	1,247,650,366	30	1,247,650,366	101,888,358	1,235,584,045
2018	Admin Expense Method Change	L	30	(278,720,139)	30	(278,720,139)	(22,761,455)	(276,024,571)
2018	COLA Method Change	L	30	(188,999,603)	30	(188,999,603)	(15,434,500)	(187,171,743)
Total				$ 7,896,951,712		$ 7,350,143,999	$ 640,277,184	$ 7,237,551,287
Plan Specific Bases								
2007	Act 414 Liab Change	L	30	3,631,308	19	3,096,792	299,908	3,018,100
2010	Act 992 2010 Change	L	10	5,036,841	2	1,335,101	717,148	691,679
2011	Act 992 2011 Change	L	10	452,190	3	173,082	64,193	119,506
2012	Act 992 2012 Change	L	10	533,971	4	262,480	75,585	203,798
2014	Act 852 2014 Change	L	10	5,278,524	1	26,008	26,966	-
2016	Harbor Police	L	6	3,358,474	4	537,895	154,894	417,640
2018	Act 244 and 595	L	10	657,700	10	657,700	92,415	611,210
Total				$ 18,949,008		$ 6,089,058	$ 1,431,109	$ 5,061,933
Total Outstanding Balances						$ 7,356,233,057	$ 641,708,293	$ 7,242,613,220
Employers Credit Balance								
2014	Contribution Variance	L	5	100,910,314	1	23,296,262	24,154,079	-
2015	Contribution Variance	L	5	-	2	-	-	-
2016	Contribution Variance	L	5	-	3	-	-	-
2017	Contribution Variance	L	5	27,473,914	4	22,762,707	6,554,842	17,673,705
2018	Contribution Variance	L	5	-	5	-	-	-
Total				$ 128,384,228		$ 46,058,969	$ 30,708,921	$ 17,673,705
Grand Total						**$7,402,292,026**	**$ 672,417,214**	**$7,260,286,925**

8. Amortization Payments for FYE June 30, 2020

Year	Description	Amortization Method	Amortization Period	Initial Liability	Years Remaining	Balance on June 30, 2018	Mid-Year Payment	Balance on June 30, 2019
Shared Bases								
2010	OAB	I	19	$ 1,936,750,759	10	$ 1,402,563,163	$ 182,110,203	$ 1,318,939,523
2010	EAAB	I	30	2,493,227,298	21	2,264,122,686	209,700,672	2,216,509,603
2009	Assumption Change	L	30	(221,451,744)	20	(192,694,164)	(18,230,508)	(188,244,433)
2009	Change in Liability	L	30	1,381,087,874	20	1,201,740,695	113,694,897	1,173,989,869
2010	Change in Liability	L	30	630,583,407	21	559,629,501	51,832,298	547,860,843
2011	Change in Liability	L	30	86,983,753	22	78,591,349	7,139,386	77,083,427
2012	Assumption Change	L	30	357,645,630	23	328,445,385	29,313,405	322,686,004
2012	Change in Liability	L	30	272,743,878	23	250,475,502	22,354,675	246,083,344
2013	Asset Method Change	L	30	(85,105,147)	24	(79,355,078)	(6,968,685)	(78,081,422)
2013	Change in Liability	L	30	(539,829,321)	24	(503,356,142)	(44,202,972)	(495,277,236)
2014	Liability Gain	L	30	(61,187,556)	25	(57,851,782)	(5,005,605)	(57,000,744)
2014	Assumption Change	L	30	725,253,130	25	685,714,381	59,331,200	675,627,062
2014	Funding Method Change	L	30	622,016,608	25	588,106,023	50,885,670	579,454,589
2015	Remaining Gains	L	30	(181,167,204)	26	(173,549,844)	(14,813,626)	(171,206,988)
2015	Experience Loss	L	30	27,584,310	26	26,424,501	2,255,506	26,067,780
2016	Other Experience Gain	L	30	(80,839,360)	27	(78,355,454)	(6,605,209)	(77,383,687)
2016	Investment Experience Loss	L	30	249,797,074	27	242,164,987	20,414,026	239,161,648
2017	Change in Assumptions	L	30	41,711,761	28	40,888,972	3,407,547	40,422,625
2017	Experience Gain	L	30	(85,274,362)	28	(83,592,272)	(6,966,294)	(82,638,885)
2018	Actuarial System Method Change	L	30	(7,904,881)	29	(7,828,431)	(645,546)	(7,746,247)
2018	Experience Loss	L	30	2,226,592	29	2,205,058	181,833	2,181,909
2018	Mortality Assump. Changes	L	30	(29,611,861)	29	(29,325,477)	(2,418,229)	(29,017,615)
2018	Economic Assump. Changes	L	30	1,247,650,366	29	1,235,584,045	101,888,358	1,222,612,750
2018	Admin Expense Method Change	L	30	(278,720,139)	29	(276,024,571)	(22,761,455)	(273,126,835)
2018	COLA Method Change	L	30	(188,999,603)	29	(187,171,743)	(15,434,500)	(185,206,794)
Total				$ 8,315,171,262		$ 7,237,551,290	$ 710,457,047	$ 7,043,750,090
Plan Specific Bases								
2007	Act 414 Liab Change	L	30	3,631,308	18	3,018,100	299,908	2,933,506
2010	Act 992 2010 Change	L	10	5,036,841	1	691,679	717,148	-
2011	Act 992 2011 Change	L	10	452,190	2	119,506	64,193	61,912
2012	Act 992 2012 Change	L	10	533,971	3	203,798	75,585	140,715
2016	Harbor Police	L	6	3,358,474	3	417,640	154,894	288,365
2018	Act 244 and 595	L	10	657,700	9	611,210	92,415	561,233
Total				$ 13,670,484		$ 5,061,933	$ 1,404,143	$ 3,985,731
Total Outstanding Balances						$ 7,242,613,223	$ 711,861,190	$ 7,047,735,821
Employers Credit Balance								
2015	Contribution Variance	L	5	-	1	-	-	-
2016	Contribution Variance	L	5	-	2	-	-	-
2017	Contribution Variance	L	5	27,473,914	3	17,673,705	6,554,842	12,203,028
2018	Contribution Variance	L	5	-	4	-	-	-
2019	Contribution Variance	L	5	54,345,996	5	54,345,996	12,955,369	44,989,533
Total				$ 81,819,910		$ 72,019,701	$ 19,510,211	$ 57,192,561
Grand Total						**$ 7,314,632,924**	**$ 731,371,401**	**$ 7,104,928,382**

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 1991 legislative session. The program contained two components:

1. **Gain-sharing** – A portion of investment gains (and until 2004, investment losses) was to be transferred from the pool of assets 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 several times since its inception, 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. Monte Carlo simulations then produce estimates of the average annual transfer to the Experience Account.

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.

Stochastic modeling techniques can then determine the single fixed annual COLA that would approximate or be equivalent to the current statutory mechanism. This single equivalent fixed annual COLA rate can then be modeled within the regular annual actuarial valuation. We have determined the single equivalent fixed COLA assumption should be a 0.40% annual COLA for the gain-sharing COLA program. This is the current best estimate. While this single equivalent rate has held consistent with prior year's estimates, 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 0.40% 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 0.40% 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 0.40% of the present value of currently eligible payees.

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

No investment gains were transferred to the Experience Account on June 30, 2018, as there were no investment experience gains eligible. The rate of return on the Actuarial Value of Assets was 7.52%, which is below the discount rate of 7.70%. Calculations associated with this analysis are shown in Section I(5).

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

Benefit and funding provisions associated with the LASERS gain-sharing COLA program are contained in R.S. 11:102.1 and 11:542. According to R.S. 11:542, 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 in 1991. For example, Act 497 of the 2009 session required all funds in the Experience Account to be transferred back to the regular pool of assets. The balance in the Experience Account was set to $0. 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 LASERS' interpretation of the law. On each valuation date, LASERS 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 LASERS, increases the investment gain that otherwise would be calculated. Under LASERS' 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 LASERS that exceeds a specified threshold (currently set at $100 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 $100 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.

   c. The transfer amount may not exceed the amounts shown in Table 1.

Table 1

Funded Ration 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 a cost-of-living adjustment (COLA). 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 LASERS 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, or:

      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 8.25% (8.25% 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, or:

      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. No COLA may be granted on July 1 if the actuarial return on system assets for the FYE on the June 30 prior to the valuation date is less than the discount rate on that date (currently 7.70%) and the funded ratio of the system is less than 80%.

   d. 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.

   e. 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 (refer to table on the next page).

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

Prior to the June 30, 2011, Valuation

A COLA potentially becomes payable whenever there is an increase in the cost of living based on the Consumer Price Index for all urban consumers (CPI-U) and other specified numerical measures are satisfied. Prior to June 30, 2011, a COLA could be granted only in accordance with the following approval process:

1. The actuary for LASERS must determine that the necessary conditions exist for a COLA to be granted and then determines the actuarial cost that will be incurred by the Experience Account should such an increase be approved.

2. The LASERS' actuary must also declare that there are sufficient dollars in the Experience Account to cover the actuarial cost of the COLA.

3. The actuary for the Louisiana Legislative Auditor must review the actuarial cost analysis and must not disagree with the assessment prepared by the LASERS' actuary.

4. The LASERS' board of trustees must approve the COLA.

5. The LASERS board of trustees must ask the Speaker of the House and the President of the Senate for a concurrent resolution to authorize the COLA. A COLA is granted with a 50% majority vote by the legislature on the concurrent resolution.

6. The COLA becomes effective on the first day of the fiscal year following the legislative session.

Effective with the June 30, 2011, Valuation

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 plant 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, italics 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, employer contribution requirements that would have been required for FYE 2019, and projected employer contribution rates required for FYE 2020. Census data, actuarial methods, and actuarial assumptions used in the preparation of June 30, 2018 assets, liabilities, and employer contribution rates required for FYE 2019 and FYE 2020 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 LASERS and its actuary. A comparison with census summaries prepared by the LASERS' actuary confirmed the reasonability of the census data used in preparing this report.

	June 30 Valuation Date		
Membership Status	**2018**	**2017**	**2016**
Rank and File Including Appellate Law Clerks	32,587	32,352	32,481
Legislators	7	7	8
Special Legislators	0	0	0
Judges Prior 2011	197	214	219
Judges Post 2011	107	95	88
Wildlife	147	157	160
Corrections Primary	160	192	237
Corrections Secondary	1,528	1,701	1,895
Peace Officers	49	51	57
Alcohol Tobacco Control	11	12	12
Bridge Police	5	5	5
Harbor Police	23	27	32
Hazardous Duty Plan	2,823	2,624	2,440
Post DROP	1,649	1,618	1,650
Total Active Members	**39,293**	**39,055**	**39,284**
DROP Participants	1,398	1,520	1,609
Regular Retirees	40,832	40,482	39,998
Disability Retirees	2,234	2,325	2,401
Survivors	5,940	5,872	5,802
Terminated Vested & Reciprocal	3,720	3,794	3,865
Total Inactive Members	**54,124**	**53,993**	**53,675**
Total Active and Inactive Members	**93,417**	**93,048**	**92,959**
Terminated Due Refund	54,370	53,573	52,837
Total Members	**147,787**	**146,621**	**145,796**

Membership Reconciliation

	Active (Pre DROP)	Active (After DROP)	Terminated Vested	In DROP	Retired, Disabled, Survivor	Total
Members on June 30, 2017	**37,437**	**1,618**	**3,794**	**1,520**	**48,679**	**93,048**
Additions to Census						
Initial Membership	4,462	0	0	0	0	4,462
Rehired Members	537	0	0	0	0	537
Data Revisions	1	0	8	2	25	36
Total Additions	**5,000**	**0**	**8**	**2**	**25**	**5,035**
Change in Status						
Active to Term Vested	(504)	0	504	0	0	0
Active to In DROP	(501)	0	0	501	0	0
Active to Retired	(821)	0	0	0	821	0
Disabled to Active	0	0	0	0	0	0
Terminated Vested to Active	131	0	(131)	0	0	0
Terminated Vested to Retiree	0	0	(206)	0	206	0
Terminated Vested to DROP	0	0	(5)	5	0	0
In DROP to Active After	0	333	0	(333)	0	0
In DROP to Retiree	0	0	0	(296)	296	0
Active After DROP to Retiree	0	(314)	0	0	314	0
Data Revisions	0	15	0	0	(15)	0
Total Changes	**(1,695)**	**34**	**162**	**(123)**	**1,622**	**0**
Eliminated from Census						
Refunded	(1,381)	0	(185)	0	0	(1,566)
Terminated, Due Refund	(1,651)	0	(26)	0	0	(1,677)
Deceased	(28)	(2)	(20)	0	(1,269)	(1,319)
Data Revisions	(38)	(1)	(13)	(1)	(51)	(104)
Total Eliminated	**(3,098)**	**(3)**	**(244)**	**(1)**	**(1,320)**	**(4,666)**
Members on June 30, 2018	**37,644**	**1,649**	**3,720**	**1,398**	**49,006**	**93,417**

LASERS MEMBERSHIP PROFILE
Regular Members Before July 2006

CELLS DEPICT **Member Count** **Valuation Date** **6/30/2018**
Total Salary

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[25-29)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[30-34)	1	3	7	100	11	-	-	-	-	122
	5,170	69,654	242,135	3,905,149	453,800	-	-	-	-	4,675,908
[35-39)	5	10	31	639	397	35	1	-	-	1118
	122,413	279,125	1,407,453	33,225,406	20,152,313	1,867,218	74,039	-	-	57,127,967
[40-44)	-	22	34	500	954	363	24	-	-	1897
	-	796,738	1,707,882	25,381,880	53,566,133	20,248,966	1,682,834	-	-	103,384,433
[45-49)	2	17	18	429	885	890	369	17	-	2627
	73,023	697,223	865,799	21,622,096	48,865,357	53,561,549	23,437,804	1,549,241	-	150,672,092
[50-54)	5	11	19	412	760	846	1016	90	6	3165
	117,563	379,790	824,178	19,547,072	38,783,378	47,055,647	65,230,349	6,875,024	427,141	179,240,142
[55-59)	3	11	19	418	778	729	291	117	56	2422
	42,604	397,906	787,714	19,634,085	37,877,050	38,010,072	19,918,224	8,944,329	3,631,189	129,243,173
[60-64)	-	6	17	225	351	227	163	69	61	1119
	-	232,677	724,968	11,657,606	17,327,196	12,666,163	10,782,340	4,845,092	4,412,860	62,648,902
[65-69)	-	1	5	82	152	129	75	35	39	518
	-	13,464	234,673	4,087,749	7,769,227	7,847,921	4,692,332	2,600,352	3,271,504	30,517,222
[70+	-	1	3	23	59	45	43	20	22	216
	-	26,251	181,075	1,010,381	3,121,543	2,569,375	2,380,249	1,197,343	1,225,842	11,712,059
TOTAL	16	82	153	2828	4347	3264	1982	348	184	13,204
	$360,774	2,892,828	6,975,877	140,071,424	227,915,997	183,826,911	128,198,171	26,011,381	12968536	$729,221,899

AVERAGES	Attained Age	51.40
	Service Years	19.67
	Annual Salary	$55,227

LASERS MEMBERSHIP PROFILE
Regular Members After July 2006

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	Total
[0-24)	720	559	7	-	-	-	-	-	-	1286
	$17,340,519	15,018,611	192,101	-	-	-	-	-	-	$32,551,231
[25-29)	780	1595	287	17	-	-	-	-	-	2679
	21,339,921	53,578,918	11,122,818	556,077	-	-	-	-	-	86,597,734
[30-34)	570	1527	982	289	2	-	-	-	-	3370
	17,624,780	57,468,454	45,025,475	13,685,038	83,199	-	-	-	-	133,886,946
[35-39)	460	1140	776	586	13	-	-	-	-	2975
	14,595,427	44,183,308	37,263,844	29,674,393	788,728	-	-	-	-	126,505,700
[40-44)	342	872	594	439	22	2	1	-	-	2272
	10,826,151	33,971,854	28,914,809	22,161,074	1,483,239	84,376	45,403	-	-	97,486,906
[45-49)	315	834	564	383	14	5	-	-	-	2115
	10,607,677	33,981,299	26,724,137	19,301,641	1,042,735	266,976	-	-	-	91,924,465
[50-54)	248	701	526	379	10	5	4	-	-	1873
	8,453,420	27,719,779	25,044,706	18,116,837	618,074	308,693	196,279	-	-	80,457,788
[55-59)	147	510	513	340	21	7	2	-	-	1540
	4,802,196	20,033,508	23,175,695	15,899,695	1,249,396	475,487	158,157	-	-	65,794,134
[60-64)	54	232	324	240	10	1	1	-	-	862
	1,970,606	10,173,149	14,660,957	11,027,262	875,467	77,462	57,136	-	-	38,842,039
[65-69)	23	48	83	74	2	-	-	-	-	230
	773,647	2,320,454	4,280,732	3,543,876	204,725	-	-	-	-	11,123,434
[70+	2	22	20	19	-	-	-	-	-	63
	127,105	851,852	1,200,982	1,130,681	-	-	-	-	-	3,310,620
TOTAL	3661	8040	4676	2766	94	20	8	-	-	19,265
	$108,461,449	299,301,186	217,606,256	135,096,574	6,345,563	1,212,994	456,975	-	-	$768,480,997

AVERAGES	Attained Age	40.59
	Service Years	4.70
	Annual Salary	$39,890

LASERS MEMBERSHIP PROFILE
Appellate Law Clerks

CELLS DEPICT **Member Count** **Valuation Date** **6/30/2018**
Total Salary

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[25-29)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[30-34)	-	-	4	-	-	-	-	-	-	4
	-	-	267,115	-	-	-	-	-	-	267,115
[35-39)	-	-	5	3	-	-	-	-	-	8
	-	-	316,847	217,728	-	-	-	-	-	534,575
[40-44)	-	-	1	14	2	1	-	-	-	18
	-	-	66,218	1,024,744	140,388	68,009	-	-	-	1,299,359
[45-49)	-	-	3	7	8	5	1	-	-	24
	-	-	253,656	486,633	633,101	399,198	79,429	-	-	1,852,017
[50-54)	-	-	-	1	6	6	6	1	-	20
	-	-	-	112,710	513,548	518,505	559,994	85,482	-	1,790,239
[55-59)	-	-	1	2	7	4	3	7	-	24
	-	-	69,984	170,079	623,760	351,751	283,534	737,091	-	2,236,199
[60-64)	-	-	2	1	4	2	1	3	1	14
	-	-	136,923	68,844	363,582	160,114	79,422	311,822	97,491	1,218,198
[65-69)	-	-	-	3	-	1	-	1	-	5
	-	-	-	222,243	-	83,295	-	98,266	-	403,804
[70+	-	-	-	-	1	-	-	-	-	1
	-	-	-	-	70,445	-	-	-	-	70,445
TOTAL	-	-	16	31	28	19	11	12	1	118
	$ -	-	1,110,743	2,302,981	2,344,824	1,580,872	1,002,379	1,232,661	97491	$9,671,951

AVERAGES	Attained Age	51.25
	Service Years	18.21
	Annual Salary	$81,966

LASERS MEMBERSHIP PROFILE
Participating Legislators

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[25-29)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[30-34)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[35-39)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[40-44)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[45-49)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[50-54)	-	-	-	-	1	-	-	-	-	1
	-	-	-	-	43,360	-	-	-	-	43,360
[55-59)	-	-	1	-	-	-	-	-	-	1
	-	-	124,303	-	-	-	-	-	-	124,303
[60-64)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[65-69)	-	-	-	1	-	1	-	1	1	4
	-	-	-	41,168	-	41,284	-	43,252	43,440	169,144
[70+	-	-	-	1	-	-	-	-	-	1
	-	-	-	92,795	-	-	-	-	-	92,795
TOTAL	-	-	1	2	1	1	-	1	1	7
	-	-	124,303	133,963	43,360	41,284	-	43,252	43,440	$429,602

AVERAGES	Attained Age	65.19
	Service Years	21.74
	Annual Salary	$61,372

LASERS MEMBERSHIP PROFILE
Active Judges Pre-2011

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[25-29)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[30-34)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[35-39)	-	-	1	-	-	-	-	-	-	1
	-	-	115,530	-	-	-	-	-	-	115,530
[40-44)	-	-	1	1	-	-	-	-	-	2
	-	-	138,989	56,071	-	-	-	-	-	195,060
[45-49)	-	1	16	2	4	1	-	-	-	24
	-	158,147	2,254,787	196,317	470,389	151,943	-	-	-	3,231,583
[50-54)	-	-	5	9	8	4	2	1	-	29
	-	-	727,785	1,269,443	1,087,827	605,156	307,444	151,943	-	4,149,598
[55-59)	-	-	14	8	7	12	5	-	-	46
	-	-	2,080,906	1,169,679	1,047,345	1,863,653	777,984	-	-	6,939,567
[60-64)	-	2	7	6	6	16	12	-	-	49
	-	304,130	1,033,045	891,875	913,006	2,488,220	1,825,673	-	-	7,455,949
[65-69)	-	-	-	2	8	6	9	1	-	26
	-	-	-	303,886	1,131,328	916,925	1,361,585	151,943	-	3,865,667
[70+	-	-	-	2	5	5	6	2	-	20
	-	-	-	309,050	742,274	764,891	911,952	303,886	-	3,032,053
TOTAL	-	3	44	30	38	44	34	4	-	197
	-	462,277	6,351,042	4,196,321	5,392,169	6,790,788	5,184,638	607,772	-	$28,985,007

AVERAGES		
	Attained Age	59.38
	Service Years	17.75
	Annual Salary	$147,132

LASERS MEMBERSHIP PROFILE
Active Judges Post 2011

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[25-29)	1	-	-	-	-	-	-	-	-	1
	149,360	-	-	-	-	-	-	-	-	149,360
[30-34)	-	1	-	-	-	-	-	-	-	1
	-	48,139	-	-	-	-	-	-	-	48,139
[35-39)	1	7	-	-	-	-	-	-	-	8
	151,944	992,748	-	-	-	-	-	-	-	1,144,692
[40-44)	3	13	1	1	-	-	-	-	-	18
	369,784	1,875,255	151,943	151,943	-	-	-	-	-	2,548,925
[45-49)	1	13	4	-	-	-	-	-	-	18
	144,442	1,826,891	613,632	-	-	-	-	-	-	2,584,965
[50-54)	3	17	6	1	2	-	-	-	-	29
	414,327	2,553,262	911,314	151,943	300,876	-	-	-	-	4,331,722
[55-59)	1	5	4	-	1	1	-	-	-	12
	151,944	759,155	613,976	-	151,943	151,943	-	-	-	1,828,961
[60-64)	2	5	6	-	-	-	-	-	-	13
	275,547	765,919	917,862	-	-	-	-	-	-	1,959,328
[65-69)	-	4	2	-	-	-	-	-	-	6
	-	602,785	285,915	-	-	-	-	-	-	888,700
[70+	-	1	-	-	-	-	-	-	-	1
	-	110,516	-	-	-	-	-	-	-	110,516
TOTAL	12	66	23	2	3	1	-	-	-	107
	$1,657,347	9,534,670	3,494,642	303,886	452,819	151,943	-	-	-	$15,595,307

AVERAGES		
	Attained Age	51.26
	Service Years	4.38
	Annual Salary	$145,751

LASERS MEMBERSHIP PROFILE
Hazardous Duty

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	310	166	5	-	-	-	-	-	-	481
	$7,608,021	4,938,244	152,228	-	-	-	-	-	-	$12,698,493
[25-29)	195	326	49	-	-	-	-	-	-	570
	5,068,599	10,944,688	1,832,250	-	-	-	-	-	-	17,845,537
[30-34)	104	200	84	14	-	-	-	-	-	402
	3,012,990	7,096,218	3,221,922	632,349	-	-	-	-	-	13,963,479
[35-39)	96	149	58	36	15	1	-	-	-	355
	2,826,342	5,209,626	2,402,568	1,812,834	824,424	71,460	-	-	-	13,147,254
[40-44)	60	97	41	20	20	11	-	-	-	249
	2,002,810	3,363,092	1,664,633	1,044,375	1,120,913	676,166	-	-	-	9,871,989
[45-49)	55	114	64	19	24	19	5	-	-	300
	1,751,988	4,275,487	2,790,397	940,902	1,384,008	1,046,705	382,575	-	-	12,572,062
[50-54)	45	96	50	16	13	15	1	-	-	236
	1,314,916	3,668,006	2,088,987	786,956	634,443	773,185	50,492	-	-	9,316,985
[55-59)	29	71	32	9	7	7	3	1	-	159
	1,050,980	2,918,148	1,424,076	438,459	384,307	353,489	166,134	62,154	-	6,797,747
[60-64)	12	21	11	1	3	1	-	-	-	49
	485,518	758,266	517,228	66,025	193,683	55,932	-	-	-	2,076,652
[65-69)	2	9	4	2	1	-	-	-	-	18
	65,450	363,978	153,187	116,167	41,799	-	-	-	-	740,581
[70+	-	2	1	1	-	-	-	-	-	4
	-	75,310	67,627	33,210	-	-	-	-	-	176,147
TOTAL	908	1251	399	118	83	54	9	1	-	2,823
	$25,187,614	43,611,063	16,315,103	5,871,277	4,583,577	2,976,937	599,201	62,154	-	$99,206,926

AVERAGES		
	Attained Age	36.63
	Service Years	3.73
	Annual Salary	$35,142

LASERS MEMBERSHIP PROFILE
Corrections Primary

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35 +	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[25-29)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[30-34)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[35-39)	-	1	-	-	1	-	-	-	-	2
	-	21,172	-	-	67,289	-	-	-	-	88,461
[40-44)	-	1	-	1	9	9	-	-	-	20
	-	29,816	-	50,973	441,401	445,246	-	-	-	967,436
[45-49)	-	-	-	-	14	12	1	-	-	27
	-	-	-	-	731,488	629,566	61,251	-	-	1,422,305
[50-54)	-	-	-	-	10	9	5	1	-	25
	-	-	-	-	497,959	508,889	304,362	133,486	-	1,444,696
[55-59)	-	-	-	-	27	16	6	-	-	49
	-	-	-	-	1,358,244	886,140	402,204	-	-	2,646,588
[60-64)	-	-	-	-	13	7	4	3	-	27
	-	-	-	-	626,538	370,917	226,123	195,440	-	1,419,018
[65-69)	-	-	-	1	3	3	1	1	-	9
	-	-	-	45,587	137,512	144,320	76,112	70,162	-	473,693
[70+	-	-	-	-	-	-	1	-	-	1
	-	-	-	-	-	-	54,576	-	-	54,576
TOTAL	-	2	-	2	77	56	18	5	-	160
	$ -	50,988	-	96,560	3,860,431	2,985,078	1,124,628	399,088	-	$8,516,773

AVERAGES		
	Attained Age	54.44
	Service Years	20.82
	Annual Salary	$53,230

LASERS MEMBERSHIP PROFILE
Corrections Secondary

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	-
[25-29)	-	1	15	7	-	-	-	-	-	23
	-	26,596	548,569	269,538	-	-	-	-	-	844,703
[30-34)	-	2	53	65	3	-	-	-	-	123
	-	64,025	2,111,144	2,660,082	136,286	-	-	-	-	4,971,537
[35-39)	-	-	30	119	89	6	-	-	-	244
	-	-	1,203,763	5,417,283	4,427,699	298,568	-	-	-	11,347,313
[40-44)	-	-	28	60	118	72	4	-	-	282
	-	-	1,113,264	2,583,462	6,342,235	4,235,622	279,391	-	-	14,553,974
[45-49)	-	-	23	66	93	120	24	-	-	326
	-	-	1,005,883	2,967,789	4,864,336	7,388,000	1,730,554	-	-	17,956,562
[50-54)	-	2	22	59	82	60	40	8	1	274
	-	59,048	835,045	2,398,671	4,060,917	3,474,881	2,908,061	631,620	110,541	14,478,784
[55-59)	-	1	19	48	55	27	10	2	-	162
	-	32,946	773,274	2,045,098	2,638,936	1,519,940	637,509	180,048	-	7,827,751
[60-64)	-	-	13	20	21	5	2	3	1	65
	-	-	516,064	833,898	998,365	276,856	128,040	200,467	50,586	3,004,276
[65-69)	-	-	5	8	3	3	1	1	-	21
	-	-	203,911	339,069	151,471	246,893	41,786	73,868	-	1,056,998
[70+	-	-	1	2	3	2	-	-	-	8
	-	-	32,995	73,294	187,135	115,922	-	-	-	409,346
TOTAL	-	6	209	454	467	295	81	14	2	1,528
	-	182,615	8,343,912	19,588,184	23,807,380	17,556,682	5,725,341	1,086,003	161127	$76,451,244

AVERAGES	Attained Age	46.55
	Service Years	16.17
	Annual Salary	$50,034

LASERS MEMBERSHIP PROFILE
Wildlife

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[25-29)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[30-34)	-	-	8	11	-	-	-	-	-	19
	-	-	459,900	668,880	-	-	-	-	-	1,128,780
[35-39)	-	-	4	33	5	-	-	-	-	42
	-	-	231,249	2,125,702	351,164	-	-	-	-	2,708,115
[40-44)	-	-	3	5	23	3	-	-	-	34
	-	-	179,181	330,945	1,791,733	229,555	-	-	-	2,531,414
[45-49)	-	-	-	7	14	11	2	-	-	34
	-	-	-	451,534	1,090,991	913,016	180,477	-	-	2,636,018
[50-54)	-	-	-	2	4	5	2	-	-	13
	-	-	-	143,476	290,427	413,122	179,879	-	-	1,026,904
[55-59)	-	-	-	-	2	-	2	1	-	5
	-	-	-	-	165667	-	207,662	138,320	-	511,649
[60-64)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[65-69)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[70+	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
TOTAL	-	-	15	58	48	19	6	1	-	147
	$ -	-	870,330	3,720,537	3,689,982	1,555,693	568,018	138,320	-	$10,542,880

AVERAGES	Attained Age	42.45
	Service Years	15.78
	Annual Salary	$71,720

LASERS MEMBERSHIP PROFILE
Peace Officers

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[25-29)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[30-34)	-	-	-	1	-	-	-	-	-	1
	-	-	-	45,298	-	-	-	-	-	45,298
[35-39)	-	-	-	6	2	1	-	-	-	9
	-	-	-	300,452	113,443	44,397	-	-	-	458,292
[40-44)	-	-	-	3	-	5	-	-	-	8
	-	-	-	163,914	-	267,378	-	-	-	431,292
[45-49)	-	-	1	3	4	1	2	-	-	11
	-	-	35,310	147,347	206,756	46,698	138,316	-	-	574,427
[50-54)	-	-	-	-	-	2	10	1	-	13
	-	-	-	-	-	119,553	668,573	71,035	-	859,161
[55-59)	-	-	-	-	-	2	-	-	-	2
	-	-	-	-	-	122,044	-	-	-	122,044
[60-64)	-	-	-	1	-	-	-	-	-	1
	-	-	-	74,584	-	-	-	-	-	74,584
[65-69)	-	-	-	2	1	-	-	-	-	3
	-	-	-	124,063	76,311	-	-	-	-	200,374
[70+	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
TOTAL	-	-	2	16	7	11	12	1	-	49
	$ -	-	101,664	855,658	396,510	600,070	806,889	71,035	-	$2,831,826

AVERAGES		
	Attained Age	48.60
	Service Years	19.43
	Annual Salary	$57,792

LASERS MEMBERSHIP PROFILE
Alcohol Tobacco Control

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[25-29)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[30-34)	-	-	-	1	-	-	-	-	-	1
	-	-	-	43,843	-	-	-	-	-	43,843
[35-39)	-	-	-	2	-	-	-	-	-	2
	-	-	-	112,098	-	-	-	-	-	112,098
[40-44)	-	-	-	2	2	-	-	-	-	4
	-	-	-	106,713	106,161	-	-	-	-	212,874
[45-49)	-	-	-	-	-	-	1	-	-	1
	-	-	-	-	-	-	53,805	-	-	53,805
[50-54)	-	-	-	-	-	-	1	-	-	1
	-	-	-	-	-	-	127,613	-	-	127,613
[55-59)	-	-	-	-	-	1	1	-	-	2
	-	-	-	-	-	70,261	77,271	-	-	147,532
[60-64)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[65-69)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[70+	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
TOTAL	-	-	-	5	2	1	3	-	-	11
	$ -	-	-	262,654	106,161	70,261	258,689	-	-	$697,765

AVERAGES	Attained Age	45.31
	Service Years	18.48
	Annual Salary	$63,433

LASERS MEMBERSHIP PROFILE
Bridge Police

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[25-29)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[30-34)	-	-	1	-	-	-	-	-	-	1
	-	-	45,736	-	-	-	-	-	-	45,736
[35-39)	-	-	-	1	-	-	-	-	-	1
	-	-	-	42,782	-	-	-	-	-	42,782
[40-44)	-	-	-	-	2	-	-	-	-	2
	-	-	-	-	107,434	-	-	-	-	107,434
[45-49)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[50-54)	-	-	-	-	-	-	-	1	-	1
	-	-	-	-	-	-	-	64,430	-	64,430
[55-59)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[60-64)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[65-69)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[70+	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
TOTAL	-	-	1	1	-	-	1	-	-	5
	$ -	-	45,736	42,782	-	-	64,430	-	-	$260,382

AVERAGES	Attained Age	41.72
	Service Years	16.82
	Annual Salary	$52,076

LASERS MEMBERSHIP PROFILE
Harbor Police

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	-
[25-29)	-	1	1	-	-	-	-	-	-	2
	-	39,146	45,633	-	-	-	-	-	-	84,779
[30-34)	-	-	1	2	-	-	-	-	-	3
	-	-	46,671	92,687	-	-	-	-	-	139,358
[35-39)	-	-	1	-	1	-	-	-	-	2
	-	-	42,650	-	51,919	-	-	-	-	94,569
[40-44)	-	-	1	1	2	-	-	-	-	4
	-	-	43,295	46,364	125,567	-	-	-	-	215,226
[45-49)	-	1	-	2	2	2	-	-	-	7
	-	42890	-	106,261	113,189	123,476	-	-	-	385,816
[50-54)	-	-	-	-	-	-	2	-	-	2
	-	-	-	-	-	-	137,920	-	-	137,920
[55-59)	-	-	-	-	-	1	1	-	-	2
	-	-	-	-	-	53,220	58,770	-	-	111,990
[60-64)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[65-69)	-	-	-	-	-	1	-	-	-	-
	-	-	-	-	-	53,562	-	-	-	-
[70+	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
TOTAL	-	2	4	5	5	4	3	-	-	23
	$ -	82036	178,249	245,312	290,675	230,258	196,690	-	-	$1,223,220

AVERAGES	Attained Age	44.66
	Service Years	15.39
	Annual Salary	$53,183

LASERS MEMBERSHIP PROFILE
DROP Participants

CELLS DEPICT **Member Count**
Total Benefit

Valuation Date **6/30/2018**

Age/Years Retired	(0-1)	[1-2)	[2-3)	[3-4)	[4-5)	[5-10)	[10-14)	[15-20)	[20+	TOTAL
[0-40)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[40-44)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[45-49)	12	14	2	-	1	-	-	-	-	29
	$550,020	$661,476	$103,920	-	$39,360	-	-	-	-	$1,354,776
[50-54)	67	61	40	-	-	-	-	-	-	168
	$3,175,140	$2,584,308	$1,690,596	-	-	-	-	-	-	$7,450,044
[55-59)	208	210	170	1	-	-	-	-	-	589
	$8,381,940	$8,037,132	$6,877,656	$67,644	-	-	-	-	-	$23,364,372
[60-64)	209	196	193	1	-	-	-	-	-	599
	$4,931,880	$4,226,544	$4,916,256	$37,536	-	-	-	-	-	$14,112,216
[65-69)	1	2	8	-	-	-	-	-	-	11
	$13,164	$13,464	$62,004	-	-	-	-	-	-	$88,632
[70-74)	1	-	1	-	-	-	-	-	-	2
	$122,352	-	$15,552	-	-	-	-	-	-	$137,904
[75-79)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[80-84)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[85-89)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[90+	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
TOTAL	498	483	414	2	1	-	-	-	-	1398
	$17,174,496	$15,522,924	$13,665,984	$105,180	$39,360	-	-	-	-	$46,507,944

AVERAGES	Attained Age	58.37
	Years Retired	1.45
	Yearly Benefit	$33,267

LASERS MEMBERSHIP PROFILE
After DROP

CELLS DEPICT **Member Count**
Total Salary
Total Benefit

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-2)	[2-3)	[3-4)	[4-5)	[5-10)	[10-14)	[15+	TOTAL
[0-45)	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	$ -
	$ -	-	-	-	-	-	-	-	$ -
[45-49)	2	1	-	-	-	-	-	-	3
	101,674	50,586	-	-	-	-	-	-	152,260
	76,692	37,332	-	-	-	-	-	-	114,024
[50-54)	44	15	18	7	2	1	2	-	89
	2,220,595	1,052,308	1,161,727	498,073	135,957	66,611	208,719	-	5,343,990
	1,831,596	680,688	712,332	318,828	85,176	19,140	48,504	-	3,696,264
[55-59)	113	107	51	64	37	56	8	1	437
	6,730,964	6,859,656	3,328,363	4,232,633	2,535,613	3,431,386	649,084	151,943	27,919,642
	4,909,476	4,385,364	2,034,624	2,682,144	1,506,744	1,862,904	149,700	86,664	17,617,620
[60-64)	160	115	55	68	56	130	17	4	605
	7,744,709	6,494,549	3,269,815	4,636,833	3,686,436	8,345,965	1,148,924	343,500	35,670,731
	4,179,660	2,858,652	1,859,232	2,724,084	2,170,668	4,494,252	410,112	64,380	18,761,040
[65-69)	12	17	68	59	27	109	33	8	333
	666,518	842,707	3,673,378	3,462,031	1,650,476	6,448,477	2,821,448	518,777	20,083,812
	264,228	307,116	1,271,820	1,393,812	533,652	2,781,924	1,124,208	153,912	7,830,672
[70+	5	5	4	6	2	65	65	30	182
	308,559	253,015	186,937	342,329	56,896	3,611,740	4,358,409	1,973,967	11,091,852
	149,148	41,076	37,680	123,780	12,780	1,023,156	1,375,152	635,148	3,397,920
TOTAL	336	260	196	204	124	361	125	43	1,649
	$17,773,019	15,552,821	11,620,220	13,171,899	8,065,378	21,904,179	9,186,584	2,988,187	$100,262,287
	$11,410,800	8,310,228	5,915,688	7,242,648	4,309,020	10,181,376	3,107,676	940,104	$51,417,540

AVERAGES	Attained Age	63.09
	Service Years	4.28
	Annual Salary	$60,802
	Yearly Benefit	$31,181

LASERS MEMBERSHIP PROFILE
Post Retirement Service

CELLS DEPICT **Member Count**
Total Salary

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$ -	-	-	-	-	-	-	-	-	$ -
[25-29)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[30-34)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[35-39)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[40-44)	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-
[45-49)	-	2	-	-	-	-	-	-	-	2
	-	155,621	-	-	-	-	-	-	-	155,621
[50-54)	4	8	3	-	-	-	-	-	-	15
	178,598	527,639	162,456	-	-	-	-	-	-	868,693
[55-59)	10	17	7	3	1	-	-	-	-	38
	500,961	992,382	448,411	166,488	60,544	-	-	-	-	2,168,786
[60-64)	21	18	9	4	3	-	-	-	-	55
	905,756	985,973	744,053	196,637	215,640	-	-	-	-	3,048,059
[65-69)	16	24	9	1	1	-	-	-	-	51
	711,430	1,297,711	573,112	65,179	54,576	-	-	-	-	2,702,008
[70+	21	22	9	5	3	-	-	-	-	60
	812,991	1,093,242	312,748	238,401	256,576	-	-	-	-	2,713,958
TOTAL	72	91	37	13	8	-	-	-	-	221
	$3,109,735	5,052,568	2,240,780	666,705	587,336	-	-	-	-	$11,657,124

AVERAGES	Attained Age	66.06
	Service Years	3.6
	Annual Salary	$52,747

LASERS MEMBERSHIP PROFILE
Regular Retirees

CELLS DEPICT **Member Count**
Total Benefits

Valuation Date **6/30/2018**

Age/Years Retired	(0-1)	[1-2)	[2-3)	[3-4)	[4-5)	[5-10)	[10-14)	[15-20)	[20+	TOTAL
[0-40)	-	-	-	1	1	-	-	-	-	2
	-	-	-	16,284	8,232	-	-	-	-	$24,516
[40-44)	8	13	3	5	3	5	-	-	-	37
	247,740	245,100	63,828	145,656	42,000	66,072	-	-	-	810,396
[45-49)	41	43	30	32	66	103	-	-	-	315
	1,677,708	1,410,648	1,004,388	825,948	1,097,484	1,783,404	-	-	-	7,799,580
[50-54)	80	76	84	133	220	412	54	8	-	1,067
	3,359,124	3,098,736	3,065,400	4,968,816	6,114,408	10,775,100	1,037,388	140,976	-	32,559,948
[55-59)	158	188	191	308	526	1970	355	170	20	3,886
	6,560,820	7,528,548	7,534,236	10,810,656	17,697,012	70,486,164	8,932,824	3,102,228	335,628	132,988,116
[60-64)	435	473	478	559	636	3140	1702	405	139	7,967
	9,593,232	10,581,792	11,694,108	13,989,564	16,964,388	119,615,268	53,120,964	7,620,840	2,439,576	245,619,732
[65-69)	172	155	205	227	361	3478	3188	1429	316	9,531
	4,739,100	4,484,760	5,299,308	5,773,416	8,175,828	88,515,516	102,766,284	42,467,772	6,792,504	269,014,488
[70-74)	48	77	74	105	84	1112	2545	2316	1000	7,361
	1,252,032	2,208,024	1,841,556	3,520,488	1,757,616	25,977,312	53,262,516	68,905,668	27,749,364	186,474,576
[75-79)	7	11	18	23	25	277	570	1929	1779	4,639
	129,348	252,036	535,956	995,376	599,844	6,753,120	10,235,868	36,621,648	47,733,972	103,857,168
[80-84)	4	4	6	7	6	67	141	451	2477	3,163
	104,928	131,016	92,208	243,540	116,616	2,133,756	2,549,052	7,859,724	52,542,276	65,773,116
[85-89)	-	1	-	-	1	15	23	107	1703	1,850
	-	2,940	-	-	30,792	473,628	484,524	2,056,260	31,429,140	34,477,284
[90+	-	-	-	-	-	3	1	17	993	1014
	-	-	-	-	-	50,580	43,380	240,696	15,857,604	16,192,260
TOTAL	953	1,041	1,089	1,400	1,929	10,582	8,579	6,832	8,427	40,832
	$27,664,032	29,943,600	31,130,988	41,289,744	52,604,220	326,629,920	232,432,800	169,015,812	184,880,064	$1,095,591,180

AVERAGES		
	Attained Age	69.76
	Years Retired	13.13
	Yearly Benefit	$26,832

LASERS MEMBERSHIP PROFILE
Disability Benefits

CELLS DEPICT **Member Count**
Total Benefits

Valuation Date **6/30/2018**

Age/Years Retired	(0-1)	[1-2)	[2-3)	[3-4)	[4-5)	[5-10)	[10-14)	[15-20)	[20+	TOTAL
[0-40)	4	2	1	2	1	1	-	-	-	11
	$90,636	20,412	7,992	27,048	11,544	12192	-	-	-	$169,824
[40-44)	2	2	4	3	5	7	-	-	-	23
	19,488	39,600	82,800	65,532	68,268	112,380	-	-	-	388,068
[45-49)	4	4	6	3	2	28	5	-	-	52
	114,276	106,848	65,940	64,080	21,972	468,456	103,788	-	-	945,360
[50-54)	6	7	14	13	12	70	33	10	-	165
	110,652	172,704	276,708	304,608	220,884	1,234,140	462,504	100,596	-	2,882,796
[55-59)	12	8	15	19	14	116	53	55	18	310
	165,756	102,228	240,888	282,012	242,544	2,397,360	813,792	683,748	146,856	5,075,184
[60-64)	2	2	4	8	16	141	140	95	74	482
	32,988	22,716	50,676	105,408	307,116	2,663,124	2,478,252	1,371,312	722,592	7,754,184
[65-69)	-	-	-	-	-	45	119	137	117	418
	-	-	-	-	-	730,920	1,886,508	2,236,128	1,330,236	6,183,792
[70-74)	-	-	-	-	-	1	42	110	180	333
	-	-	-	-	-	66,960	521,604	1,471,260	2,144,604	4,204,428
[75-79)	-	-	-	-	-	-	1	29	193	223
	-	-	-	-	-	-	4,536	337,104	2,035,500	2,377,140
[80-84)	-	-	-	-	-	-	1	-	129	130
	-	-	-	-	-	-	58,092	-	1,232,544	1,290,636
[85-89)	-	-	-	-	-	-	-	1	59	60
	-	-	-	-	-	-	-	52,608	619,860	672,468
[90+	-	-	-	-	-	-	-	-	27	27
	-	-	-	-	-	-	-	-	244,128	244,128
TOTAL	30	25	44	48	50	409	394	437	797	2,234
	$533,796	464,508	725,004	848,688	872,328	7,685,532	6,329,076	6,252,756	8,476,320	$32,188,008

AVERAGES	Attained Age	66.58
	Years Retired	16.99
	Yearly Benefit	$14,408

LASERS MEMBERSHIP PROFILE
Survivor Benefits

CELLS DEPICT **Member Count**
Total Benefits

Valuation Date **6/30/2018**

Age/Years Retired	(0-1)	[1-2)	[2-3)	[3-4)	[4-5)	[5-10)	[10-14)	[15-20)	[20+	TOTAL
[0-40)	7	17	15	15	10	88	98	94	132	476
	$208,512	593,580	444,876	457,032	197,400	2,319,924	2,160,180	1,659,840	1,830,132	$9,871,476
[40-44)	1	1	-	2	4	7	18	20	50	103
	25,104	31,944	-	63,492	25,272	89,688	356,724	347,508	713,892	1,653,624
[45-49)	2	-	1	3	2	14	15	15	40	92
	44,532	-	9,516	54,180	12,204	294,480	204,528	223,824	571,908	1,415,172
[50-54)	3	5	2	1	9	25	17	24	26	112
	50,700	132,252	94,800	23,268	208,056	606,684	230,472	375,324	315,144	2,036,700
[55-59)	1	4	5	5	14	49	61	48	59	246
	7,512	98,076	140,340	132,084	406,980	1,053,876	1,242,540	628,500	779,052	4,488,960
[60-64)	1	8	6	15	14	90	96	76	97	403
	16,404	213,300	118,452	265,956	301,356	2,214,480	1,979,340	1,257,588	1,501,344	7,868,220
[65-69)	2	2	4	5	14	91	167	156	190	631
	34,488	36,360	135,144	125,352	240,408	2,135,604	3,432,456	3,425,292	3,208,560	12,773,664
[70-74)	-	3	6	3	6	42	150	189	427	826
	-	200,256	153,816	90,624	160,512	777,180	2,931,708	4,260,012	7,107,192	15,681,300
[75-79)	1	3	1	-	1	20	76	153	667	922
	2,544	38,436	58,164	-	23,172	662,964	1,288,440	2,424,756	10,636,128	15,134,604
[80-84)	1	-	-	1	1	8	22	79	806	918
	63,276	-	-	2,868	19,908	160,452	361,308	1,300,416	11,908,860	13,817,088
[85-89)	-	-	-	-	1	1	7	23	650	682
	-	-	-	-	17,292	19,680	146,892	321,936	8,686,164	9,191,964
90+	-	-	-	-	-	-	-	3	526	529
	-	-	-	-	-	-	-	57,000	6,677,544	6,734,544
TOTAL	19	43	40	50	76	435	727	880	3,670	5,940
	$453,072	1,344,204	1,155,108	1,214,856	1,612,560	10,335,012	14,334,588	16,281,996	53,935,920	$100,667,316

AVERAGES		
	Attained Age	71.73
	Years Retired	23.00
	Yearly Benefit	$16,947

LASERS MEMBERSHIP PROFILE
Terminated Vested

CELLS DEPICT **Member Count**
Total Benefits

Valuation Date **6/30/2018**

Age/Service	(0-1)	[1-5)	[5-10)	[10-15)	[15-20)	[20-25)	[25-30)	[30-35)	[35+	TOTAL
[0-24)	-	-	-	-	-	-	-	-	-	-
	$-	-	-	-	-	-	-	-	-	$-
[25-29)	-	-	25	2	-	-	-	-	-	27
	-	-	263,244	38,184	-	-	-	-	-	301,428
[30-34)	-	2	198	24	1	-	-	-	-	225
	-	11,892	1,809,844	364,188	34524	-	-	-	-	2,220,448
[35-39)	1	2	227	158	18	-	-	-	-	406
	216	4,764	2,167,440	2,570,004	370,656	-	-	-	-	5,113,080
[40-44)	-	1	147	264	59	4	-	-	-	475
	-	6,276	1,473,300	4,630,354	1,484,148	104,844	-	-	-	7,698,922
[45-49)	1	3	134	333	158	25	3	-	-	657
	360	9,960	1,376,940	5,923,819	4,095,756	973,752	146,820	-	-	12,527,407
[50-54)	-	3	95	348	185	63	20	1	-	715
	-	8,736	958,860	5,932,260	4,611,504	2,028,076	745,008	43,896	-	14,328,339
[55-59)	1	1	127	445	237	51	8	-	-	870
	1,080	6,144	1,221,457	6,804,660	5,194,979	1,341,108	475,800	-	-	15,045,228
[60-64)	1	4	33	121	59	12	1	-	1	232
	516	30276	295,368	1,676,352	1,208,172	318,660	37,812	-	51348	3,618,504
[65-69)	-	3	7	40	9	9	3	-	-	71
	-	92,004	248,820	383,184	104,556	166,380	81,864	-	-	1,076,808
[70+	1	-	2	24	8	2	3	2	-	42
	348	-	1,596	101,400	80,124	19,680	10,404	50,076	-	263,628
TOTAL	5	19	995	1,759	734	166	38	3	1	3,720
	$2,520	170,052	9,816,869	28,424,404	17,184,419	4,952,500	1,497,708	93,972	51348	$62,193,792

AVERAGES		
	Attained Age	49.85
	Service Years	12.19
	Yearly Benefit	$16,719

1. Plan Provisions

EFFECTIVE DATE:

July 1, 1947

EMPLOYEE:

Any person who legally occupies a position in state service.

EMPLOYER:

The State of Louisiana or any of its boards, commissions, departments, agencies, and courts which are contributing members and those approved for membership by the legislature from which any employee receives his compensation.

ELIGIBILITY FOR PARTICIPATION:

Condition of employment in state service except the following: elected or appointed officials or employees who are contributing members of any other state system; public officials and state employees who receive a per diem in lieu of compensation; persons employed prior to January 1, 1973, who work on a part-time basis and elect not to participate; patient or inmate help in state charitable, penal, or correctional institutions; part-time students, interns, and resident physicians; independent contractors; employees who are age 60 or older at time of employment; retirees of the retirement system who return to work under certain conditions; judges who failed to elect membership prior to October 2, 1976; civilian employees who on November 1, 1981, were within five years of retirement eligibility in the Federal Civil Service Retirement and Disability Fund; teachers employed after September 10, 1982; nurses employed from employment pools at state charity hospitals; temporary, seasonal, part-time employees of DOTC, or as defined in Federal law.

SERVICE:

Service as an "Employee," defined above.

CREDITABLE SERVICE:

For service prior to January 1, 1973: 1/4 year granted for each 89 day interval of service, not to exceed one credit per fiscal year. Minimum 15 days required for 1st Quarter credit.

For service on or after January 1, 1973, a member shall receive credit based on the ratio of actual pay to the annual base per calendar year. Fractional service shall be rounded to the next highest 1/10th, not to exceed 100 percent per year.

ADDITIONAL CREDITABLE SERVICE:

1. Credit for service canceled by withdrawal of accumulated contributions may be restored by member by paying into system the amount withdrawn plus interest at the Actuarial Valuation rate.

2. Maximum of four years of credit for military service may be obtained for each member with at least two years of service, contingent on payment of Actuarial Cost.

3. Credit for service which was classified as a job appointment or emergency appointment where the intended duration of employment exceeds two years of service.

4. At retirement, all accumulated unused sick and annual leave shall be credited based on the following schedule:

1 - 26 Days	10% of a Year
27 - 52 Days	20% of a Year
53 - 78 Days	30% of a Year
79 - 104 Days	40% of a Year
105 - 130 Days	50% of a Year
131 - 156 Days	60% of a Year
157 - 182 Days	70% of a Year
183 - 208 Days	80% of a Year
209 - 234 Days	90% of a Year
235 - 260 Days	100% of a Year

Service credit for unused leave can be used for computation purpose only, not for eligibility. An actuarial equivalent lump sum is available after August 15, 1993.

EARNABLE COMPENSATION:

The base pay earned by an employee for a given pay period as reported by the employing agency. This includes the full amount earned by an employee, overtime, and per diem earned by an employee of the House of Representatives, the Senate, or an agency of the Legislature, and expense allowances and per diem paid to members of the Legislature, the Clerk, or Sergeant at Arms of the House of Representatives and President and Secretary or Sergeant at Arms of the Senate.

AVERAGE FINAL COMPENSATION FOR BENEFIT PURPOSES:

The average annual earned compensation for the 36 highest months of successive employment, or the highest 36 successive joined months where interruption of service occurred; part-time employees use the base pay the part-time employee would have received had employment been full-time. Per Act 75 of 2005, average final

compensation for Regular members, Bridge Police, and Appellate Law Clerks hired on or after July, 1, 2006, is determined as the 60 highest months of successive employment. Per Act 992 of 2010, average final compensation for Judges hired on or after January 1, 2011, and all members of the Hazardous Duty Plan is based on the highest 60 months. Compensation is limited by the 401(a)(17) compensation limit of the Internal Revenue Code for certain members.

ACCUMULATED CONTRIBUTIONS:

The sum of all amounts deducted from the earned compensation of a member and credited to the individual account in the employee's savings account, together with regular interest credited prior to July 1971.

EMPLOYEE CONTRIBUTIONS:

Sub Plan	Contribution Rate
Rank & File Employees and Appellate Law Clerks	7.5%
Pre Act 75 (Hired before 7/1/2006)	8.0%
Post Act 75 (Hired after 6/30/2006)	11.5%
Pre 2011 Judges and Court Officers	13.0%
Post 2011 Judges	11.5%
Legislators	9.5%
Special Legislative	

Sub Plan	Contribution Rate
Correction-Primary	9.0%
Corrections-Secondary	9.0%
Wildlife Officers	9.5%
Peace Officers	9.0%
ATC Officers	9.0%
Bridge Police	8.5%
Hazardous Duty	9.5%

EMPLOYER CONTRIBUTIONS:

Act 81 of 1988 requires the employer's rate to be actuarially determined and set annually, based on the Public Retirement Systems' Actuarial Committee's recommendation to the Legislature. Act 1026 of the 2010 Legislative Session further requires that the employer contribution rate be determined separately by sub-plan. The normal cost portion of each plan's employer contribution rate varies based upon that plan's benefits, member demographics, and the rate contributed by employees. The shared UAL contribution rate is determined in aggregate for all plans. The UAL established due to a specific plan or group of plans due to legislation will be allocated entirely to the applicable plan(s).

RETIREMENT BENEFIT:

NORMAL RETIREMENT:

Eligibility and Benefit:

Members whose first employment which makes them eligible for membership in a Louisiana state retirement system occurs on or after July 1, 2015:

1. Regular Plan: Eligible with 5 years at age 62. Benefit accrual rate is 2.5%.

2. Judges: Eligible with 5 years at age 62. Benefit accrual is 3.5%, plus regular plan benefits for prior service.

3. Hazardous Duty Plan: Eligible with 12 years at age 55, or 25 years at any age. Benefit accrual rate is 3.33% for service earned in the Hazardous Duty Plan if the last 10 years of service was earned in a hazardous duty position; otherwise, the accrual rate is 2.5%.

Members whose first employment which makes them eligible for membership in a Louisiana state retirement system occurs between January 1, 2011, and June 30, 2015:

1. Regular Plan: Eligible with 5 years at age 60. Benefit accrual rate is 2.5%.

2. Judges: Eligible with 5 years at age 60. Benefit accrual is 3.5%, plus regular plan benefits for prior service.

3. Hazardous Duty Plan: Eligible with 12 years at age 55 or 25 years at any age. Benefit accrual rate is 3.33% for service earned in the Hazardous Duty Plan if the last 10 years of service was earned in a hazardous duty position; otherwise, the accrual rate is 2.5%.

Members whose first employment which makes them eligible for membership in a Louisiana state retirement system occurs prior to January 1, 2011:

1. Regular members hired prior to July 1, 2006: Eligible with 10 years at age 60, 25 years at age 55, or 30 years at any age. Regular members hired on or after July 1, 2006, are eligible with 5 years at age 60. Benefit accrual rate is 2.5% for all years of service.

2. Judges, Court Officers, and Appellate Law Clerks: Eligible with 18 years at any age, 10 years at age 65, 20 total years with at least 12 years as a judge or court officer at age 50, 12 years at age 55, or age 70 regardless of service. Judges and Court Officers earn 3.5% per year of service, plus regular plan benefits for prior service. Appellate Law Clerks earn 2.5% for all years of service.

3. Members of the Legislature, Governor, Lieutenant Governor and State Treasurer: Eligible with 16 years of service at any age, 20 total years with at least 12 years as a member of this class at age 50, or 12 years at age 55. Members earn 3.5% per year of service, plus regular plan benefits for prior service.

4. Plans for certain employees of the Department of Public Safety and Corrections:
   a. Corrections Primary hired before 8/15/1986: Eligible with 10 years at age 60, or 20 years at any age. Benefit accrual rate is 2.5%.
   b. Corrections Primary hired between 8/15/1986 and 12/31/2001: Eligible with 10 years at age 60, or 20 years at age 50. Benefit accrual rate is 2.5%.
   c. Corrections Primary hired prior to 12/31/2001 and employed as a probation and parole officers in the office of adult services of the Department of Corrections: Eligibility is as stated above. Benefit accrual rate is 3.0% for service earned prior to 7/1/2014 and 3.33% for service earned after 6/30/2014.
   d. Corrections Secondary Plan hired after 1/1/2002 or transferred from Corrections Primary Plan: Eligible with 10 years at age 60, or 25 years at any age. Benefit accrual rate is 3.33%.

5. Wildlife and Fisheries:
   a. Members hired before July 1, 2003: 10 years at age 55, or 20 years at any age. Benefit accrual is 3.0% for service earned prior to July 1, 2003 and 3.33% for service earned after July 1, 2003.
   b. Members hired on or after July 1, 2003: 10 years at age 60, or 25 years at any age. Benefit accrual is 3.33%.

6. Peace Officers: Eligible with 10 years of service at age 60, 25 years at age 55, or 30 years at any age. Benefit accrual is 3.33%.

7. Alcohol Tobacco Control: Eligible with 10 years of service at age 60, or 25 years of service at any age. Benefit accrual is 3.33%.

8. Bridge Police: Eligible with 10 years at age 60, or 25 years at any age. Benefit accrual is 2.5%

NOTES:

A. Benefit is limited to 100% of average compensation.

B. Retirees who return to work will continue to receive unreduced benefits if compensation does not exceed 50% of the annual benefit during the fiscal year. Earnings above this limit will result in a corresponding reduction to benefits. Retirees who return to work may choose to suspend their retirement benefits and resume making contributions in the system. Upon subsequent retirement, benefits will resume. If post-retirement employment is at least 36 months, a supplemental benefit will be calculated based on current final average salary. Otherwise, a supplemental benefit will be calculated based on the frozen final average salary at the original retirement date.

C. A $300 annual supplemental benefit is provided to persons who become members of the retirement system prior to July 1, 1986 (Act 608 of 1986).

D. For members employed after January 1, 1990, the annual pension paid from the trust cannot exceed the maximum benefit provided under Section 415(b) of the Internal Revenue Service Code, and related Section 415 regulations, as adjusted for inflation and form of benefit other than life annuity or qualified joint and survivor annuity for retirement ages as follows:

Age	Maximum	Age	Maximum	Age	Maximum
48	$62,674	56	$122,937	64	$215,000
49	68,035	57	134,139	65	215,000
50	73,895	58	146,473	66	215,000
51	80,309	59	160,071	67	215,000
52	87,329	60	175,083	68	215,000
53	95,025	61	191,670	69	215,000
54	103,469	62	210,000	70	215,000
55	112,745	63	210,000		

ACTUARIALLY REDUCED RETIREMENT:

Members with 20 years of service credit at any age are eligible for an actuarially reduced benefit from the earliest date the member would have been eligible if employment had continued to the earliest normal retirement date, based on service earned to date. This does not apply to the correctional secondary plan members or wildlife agents hired on or after July 1, 2003.

POST RETIREMENT INCREASES:

Provisions pertaining to cost-of-living adjustments are summarized in Section II(2).

MINIMUM BENEFITS:

Effective September 1, 2001, retirees and beneficiaries receiving retirement benefits shall be entitled to a minimum benefit which is not less than $30.00 per month for each year of creditable service. The minimum benefit is adjusted for the option elected at retirement.

DISABILITY RETIREMENT:

Eligibility:

Ten years of creditable service and certification of disability by medical board. (Medical examination may be required once per year for the first five years of disability retirement, and once every three years thereafter, until age 60.)

Benefit*:

(1) The disability retirement annuity shall be equivalent to the regular retirement formula without reduction by reason of age for all classes of membership.

(2) For judges and court officers, the benefit in (1) above, but not less than 50% of current salary.

(3) Members of the Corrections Primary Plan with disabilities incurred in the line of duty may retire with 60% of their final average compensation, regardless of years of service. When incurred in the line of duty and caused by an intentional act of violence, the retirement annuity is 100% of final average compensation. Disabilities not incurred in the line of duty shall receive benefits according to (1) above.

(4) Members of the Corrections Secondary Plan with disabilities incurred in the line of duty may retire with 40% of their final average compensation regardless of service. If the member has 10 or more years of service, the benefit will be the greater of 40% of final average compensation or the benefit determined by (1) above. When incurred in the line of duty and caused by an intentional act of violence, the retirement annuity is 100% of final average compensation. Disabilities not incurred in the line of duty shall receive benefits according to (1) above.

(5) For certain Wildlife agents, partial disabilities not eligible for (1) above receive 75% of the benefit in (1); members totally disabled while in the line of duty receive 60% of average compensation. When incurred in the line of duty and caused by an intentional act of violence, the retirement annuity is 100% of final average compensation.

(6) Members of the Hazardous Duty Plan with disabilities incurred in the line of duty may retire with 75% of their final average compensation, regardless of years of service. When incurred in the line of duty and caused by an intentional act of violence, the retirement annuity is 100% of final average compensation. Disabilities not incurred in the line of duty shall receive benefits according to (1) above.

* Because of a lack of enough data to differentiate disability for in-line of duty versus not-in-line of duty, disability benefits for certain sub-plans are valued as a retirement benefit in (1). This assumption has no material impact on liabilities.

SURVIVOR'S BENEFITS:

Members whose first employment, making them eligible for membership in a Louisiana state retirement system, occurs on or after January 1, 2011, or members of the Hazardous Duty Plan regardless of when hired:

Eligibility and Benefit:

1. Regular Members and Judges
   a. Surviving spouse with minor children of a deceased member with five years of service credit, two of which were earned immediately prior to death, or 20 years of

service will receive 50% of the retirement benefit that would have been due the member, or $600 per month if greater. Each qualifying child will receive 50% of the spouses benefit, up to two children. The total paid to the spouse and children subject to minimum based on the Option 2A equivalent for the surviving spouse.

b. Surviving spouse, legally married one year prior to death, of a deceased member with 10 years of service credit, two of which were earned immediately prior to death, or 20 years of service regardless of date earned will receive the Option 2A equivalent of the retirement benefit that would have been due the member, or $600 per month if greater.
c. Surviving minor children will each (up to two) receive 50% of the benefit paid to a surviving spouse with children. This amount will be divided equally among all eligible children.
d. Surviving handicapped or mentally retarded children continue to receive a minor child's benefit described above in (1) or (3) whichever is applicable.

2. Hazardous duty members:
   a. Surviving spouse and children of members who did not die in the line of duty receive benefits described for non-Hazardous Duty members.
   b. Surviving spouse and children of members who died in the line of duty receive 80% of the member's final average compensation, or 100% if the death was caused by an intentional act of violence The benefit is shared equally.
   c. Surviving spouse of a retired member will receive 75% of members' monthly benefit. If no spouse, then surviving children receive 1.c. above.

3. If no one is eligible to receive a survivor benefit, then the named beneficiary will receive the member's accumulated contributions.

Members whose first employment which makes them eligible for membership in a Louisiana state retirement system occurs prior to January 1, 2011:

Eligibility and Benefit:

1. Regular members:
   a. Surviving spouse, legally married one year prior to death, of a deceased member with 10 years of service credit, two of which were earned immediately prior to death, or 20 years of service regardless of date earned, receive the greater of 50% of member's average compensation or $200 per month.
   b. If member with no spouse has surviving minor children and 5 years of service credit, two of which were earned immediately prior to death, or 20 years of service regardless of date earned, minor children shall receive the greater of 75% of member's average compensation or $300 per month.
   c. For surviving spouse with minor children, the spouse must be eligible per (a) above and the children per (b) above to receive these benefits. If either one is ineligible, then the criteria in (a) or (b) would apply accordingly.
   d. Surviving handicapped or mentally retarded children continue to receive a minor child's benefit described above in (1a) or (1c) whichever is applicable.

2. Surviving spouse of a judge or court officer receive survivor's benefit described in (1a) or (1b), but not less than the greater of 1/3 the member's current compensation, 50% of the retirement pay which such member was entitled or receiving prior to death, or 50%

of the member's final average compensation (if the provisions of R.S. 11:471 are met). Benefit limited to 75% of average compensation.

3. Corrections
   a. In the line of duty:
      i. Surviving spouse with no minor children: 60% of average compensation if member had less than 25 years of service, or 75% of average compensation if member had 25 or more years of service.
      ii. Minor children or disabled children and no spouse: 60% of average compensation if member had less than 5 years of service (25 years for Secondary Plan), or 75% of average compensation if member had 5 or more years of service (25 years for Secondary Plan).
      iii. Surviving spouse with minor children: 60% of average compensation if member had less than 5 years of service (25 years for secondary plan) and benefit divided 1/3 to spouse and 2/3 to minor children equally. 75% of average compensation if member had 5 or more years of service (25 years for Secondary Plan) and benefit divided 1/3 to spouse and 2/3 to minor children equally.
   b. Not in the line of duty surviving spouse receives benefits in accordance with the provisions for regular members.

4. Wildlife agents
   a. In line of duty:
      i. Surviving spouse receives 75% of average compensation if member has 25 or more years of service, otherwise, spouse receives 60% of compensation. Benefits cease upon remarriage.
         i. Children under age 18: one child - 30% of average compensation, 2 children - 40%, 3 children - 50%, 4 or more children - 60%, divided equally among children.
   b. Not in the line of duty benefit to surviving spouse and children: Surviving spouse receives a benefit as if the member retired on the date of death, until remarried. If a member dies prior to age 55 with at least 15 years of service, benefit computed based on years of service without regard to age.
   c. Survivors of retired wildlife agents will receive 75% of the retiree benefit in priority order: surviving spouse (until remarriage), children under age 18, parents who derive main support from retired agent.

5. If no one is eligible to receive a survivor benefit, then the named beneficiary will receive the member's accumulated contributions.

OPTIONAL FORMS OF BENEFIT:

In lieu of receiving a normal retirement benefit, members may elect to receive an actuarial equivalent retirement allowance in a reduced form as follows:

Option 1 If a member dies before receiving present value of annuity in monthly payments, balance paid to designated beneficiary.

Option 2 100% of reduced retirement allowance, if member dies, to be continued to designated beneficiary for his lifetime.

Option 3 50% of reduced retirement allowance, if member dies, to be continued to designated beneficiary for his lifetime.

Option 4 Other benefits of equal actuarial value may be elected with approval of board.

A. 90% of the maximum retirement allowance to member; when member dies, 55% of the maximum retirement allowance continued to beneficiary.

B. Reduced retirement allowance to member; if member dies, 55% of the maximum retirement allowance continues to beneficiary, adjusted based on the age and relationship of the beneficiary to the member.

C. Special reversionary annuities to Options 2, 3, and 4. Member's reduced benefit reverts to the maximum if the beneficiary predeceases the annuitant.

If divorced after retirement, optional benefit can revert to maximum benefit with actuarial adjustment.

Automatic COLA Option – An increasing annuity option permits the member to make an irrevocable election at retirement to receive an actuarially reduced benefit, which increases 2.5% annually. The increases begin on the first retirement anniversary date, but not before the retiree attains age 55 or would have attained age 55 in the case of a surviving spouse. This option can be chosen in combination with the above options.

Initial Benefit Option – Maximum benefit actuarially reduced for partial lump sum equal to not more than 36 months of maximum monthly pension.

REFUND OF CONTRIBUTIONS:

If a member ceases to be a member, except by death or retirement, he shall be paid such part of the amount of the accumulated contributions credited to his individual account in annuity savings fund as he shall demand, plus any accumulated interest thereon as of June 30, 1971; if member of legislature, no interest. No interest credited after June 30, 1971. Death prior to retirement - accumulated contributions credited to individual account in annuity savings fund are returnable to designated beneficiary, if any; otherwise, to his estate.

DEFERRED RETIREMENT OPTION PLAN:

Instead of terminating employment and accepting a service retirement allowance, any member who has met the normal eligibility requirements may participate in the Deferred Retirement Option Plan (DROP).

Normal Eligibility:

Any member who is eligible for unreduced service retirement allowance may begin participation on the first retirement eligibility date for a period not to exceed the third anniversary of retirement eligibility.

Benefit:

Upon termination of employment, a participant will receive, at his option:

(1) Lump sum payment (equal to the payments to the account);
(2) A true annuity based upon his account; or
(3) Other methods of payment approved by the Board of Trustees.

If a participant dies during the period of participation in the program, his account balance shall be paid to the beneficiary, or if none, to his estate in any form approved by the Board of Trustees.

If employment is not terminated at the end of DROP participation, then:

(1) Payment into account shall cease;
(2) Payment from account only upon termination of employment; and
(3) The participant shall resume active contributing membership.

Then, upon termination of employment, the benefit payments indicated above shall be paid. The participant shall receive an additional retirement benefit based on additional service rendered since termination of participation in the fund, usually the normal method of computation of benefit subject to the following:

(1) If additional service was less than the period used to determine the average compensation, then the average compensation figure used to calculate the additional benefit shall be based on compensation used to determine the initial benefit.
(2) If additional service was greater than the period used to determine the average compensation, the average compensation figure used to calculate the additional benefit shall be based on compensation earned during the period of additional service.

DROP accounts for members who become eligible for retirement prior to January 1, 2004, and participate in DROP shall earn interest, following termination of DROP, at a rate of 0.5% below the actuarial rate of the System's investment portfolio.

Members eligible for retirement on or after January 1, 2004, must invest their DROP accounts in self-directed accounts approved by the Board of Trustees.

4. Funding Policies

LASERS' funding policy is generally described in Sections 102 and 102.1 of Title 11 of Louisiana Revised Statutes. LASERS 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 variance. The contribution process is defined below:

a. **Projected Employer Dollar Contribution for FYE 2018** −018 ted Employer2016, valuation established the projected employer contribution rate for FYE 2018. The projected dollar contribution for FYE 2018 is equal to the projected 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's financial statements.

c. **Contribution Variance** – The difference between the Actual Dollar Contribution for FYE 2018 and the Projected Dollar Contribution for FYE 2018, adjusted for investment earnings, is equal to the Contribution Variance. A positive variance means that a contribution surplus occurred for FYE 2018. A negative variance indicates a contribution shortfall or deficit.

d. **Actuarially Determined Employer Contribution Rate for FYE 2019 -** The actuarially determined 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 administrative expense cost rate is equal to the historical annual dollar amount divided by the payroll for that year. 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, the administrative expense cost rate and the amortization cost rate.

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

f. **Projected Employer Contribution Rate for FYE 2020** –The June 30, 2018 valuation establishes the projected employer contribution rate for FYE 2020. The rate is equal to the projected employer dollar contributions for FYE 2020 divided by the projected active member payroll for FYE 2020.

g. **Projected Employer Dollar Contribution for FYE 2020** –The June 30, 2018 valuation establishes the projected employer contribution rate for FYE 2020. It is equal to the projected employer contribution rate multiplied by the projected active member payroll.

From time to time, additional funding is provided directly by the state out of non-recurring revenue in accordance with Article VII, Section 10(D)(2)(b)(ii). This provision of the Constitution requires such funds to be used to reduce the Original Amortization Base (OAB), which includes the Initial Unfunded Accrued Liability (IUAL). These amounts have been about 1% of the total contribution paid to the retirement system annually since the inception of this constitutional provision in 2014.

According to Article X(29)(E)(2)(a) of the Louisiana Constitution, the minimum employer contribution that may be made to LASERS is equal to 10.9% and 11.7%, depending on whether the employee was hired on or before June 30, 2006, or on or after July 1, 2006, respectively. The legislature established a larger minimum employer contribution rate in the 2004 session. This legislative minimum is 15.5% of pay. Any amount made in excess of the legislative minimum will be deposited and accumulated in the Employer Credit Account. Amounts in the Employer Credit Account may be used only to reduce any UAL established before July 1, 2004.

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. The 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, 2015, to amortize new credits or debits to the unfunded accrued liability. Unfunded accrued liability charges or credits established on June 30, 2015, or in 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. Increases or decreases resulting from decrement gains and losses are amortized with level payments over 30 years.

c. Increases or decreases resulting from changes in actuarial assumptions and methods are amortized with level payments over a 30-year period.

d. Contributions actually made for a given fiscal year will be more or less than the amount actually required. Contribution deficits will be amortized with level payments over a 5-year period. Contribution surpluses will be used to reduce the OAB through FYE 2040 (i.e., immediate amortization). Thereafter, surpluses will be amortized with level payments over 5 years.

e. Increases resulting from actual contributions being less than the actual dollar required contribution are amortized with level payments over 5 years. Decreases resulting from actual contributions being greater than the dollar contribution requirement are used to reduce the OAB through FYE 2040 (i.e., immediate amortization). Decreases thereafter will be amortized with level payments over a 5-year period.

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

    1. Investment losses are amortized with level payments over a 30-year period. Once the system becomes 85% funded, investment gains will be amortized over a 20-year period.

    2. Investment gains up to the first investment hurdle ($50 million) are used to reduce the outstanding balance of the OAB. However, the OAB payment schedule will remain the same and the OAB will be paid off sooner than it would otherwise.

    3. Investment gains between the first hurdle ($50 million) and the second hurdle ($100 million), as indexed, are used to reduce the outstanding balance of the Experience Account Amortization Base (EAAB). However, the EAAB payment schedule will

remain the same and the EAAB will be paid off sooner than it would otherwise.

4. Both hurdles are being indexed to increases (but not decreases) in the Actuarial Value of Assets since June 30, 2015. For the June 30, 2018 valuation, the first hurdle increased to $54,062,873 and the second hurdle is $108,125,746.

5. Investment gains exceeding the second hurdle, net of transfer to the Experience Account, will not be transferred to the Experience Account, but rather will be amortized over 30 years. Once the system becomes 70% funded, investment gains exceeding the second hurdle will be amortized over a 20-year period.

g. 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, 2016 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 30-year period as before.

   Ever since LASERS began using an assumed actuarial valuation rate (also known as the discount rate) which is lower than the assumed actuarial rate of return on assets to recognize the expectation of experience account transfers, ambiguities arose in the application of the rules for determining whether a transfer is to occur and how much it would be. Although this issue did not affect the June 30, 2018 valuation because no funds were transferred to the Experience Account on June 30, 2018, these ambiguities should be addressed and resolved in the near future.

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:

a. Some UAL bases have amortization periods that are longer than 25 years.
b. 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. 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.

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 120% of the market value on June 30, 2018, then the actuarial value is equal to the average of the preliminary value and 120% of the market value. If the preliminary value is less than 80% of the market value, then the actuarial value is equal to the average of the preliminary value and 80% of the market value. Otherwise, the actuarial value is equal to the preliminary value.

Asset valuation formulas are shown in Section I(5).

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:

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

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

c. Therefore, LASERS 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 2020 in accordance with our understanding of the law as summarized above and as summarized in Section II.

Accelerated Reduction of the OAB and EAAB

Specified actuarial gains are used to reduce the outstanding balances of the OAB and the EAAB. These gains include the following special allocations:

1. Specified legislative appropriations reduce the outstanding balance of the OAB.

2. Positive Contribution Variances (or surpluses) reduce the outstanding balance of the OAB.

3. Investment gains falling between $0 and $50 (as indexed) million reduce the outstanding balance of the OAB.

4. Investment gains falling between $50 million and $100 million (as indexed) reduce the outstanding balance of the EAAB.

However, the amortization payment schedule is unaffected by the reduction in the outstanding balance. Although not identified as such in the law, the end result is that the OAB and the EAAB will each consist of two separate accounts – an Amortization Account and an Offset Account. These accounts operate in the following manner:

a. Amortization payments and outstanding balances in the Amortization Account will be unaffected by the special allocation to the OAB and EAAB cited above. This Amortization Account will operate as if the special allocations did not exist.

b. The special allocations will be accumulated in the Offset Account. The outstanding balance in the Offset Account will grow annually with new special allocations and interest based on the discount rate.

c. The outstanding balance of the OAB on any June 30 will be equal to the outstanding balance of the Amortization Account minus the outstanding balance on the Offset Account.

d. Every fifth year beginning with the valuation developing the contribution for the fiscal year ending June 30, 2020 balances in the Offset Accounts will be transferred to the respective Amortization Accounts and amortization payments will be recomputed to reflect such transfers.

Eventually, the Offset Account will equal or exceed the Amortization Account and the OAB or EAAB will be fully paid.

Valuation Approval Process

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

a. The LASERS actuary prepares an actuarial valuation which is presented to the LASERS board of trustees for review and approval.

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

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

d. The official valuation is submitted to the House and Senate Committees on Retirement 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 LASERS' 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 LASERS' retained actuary. Comparisons of values by sub-plan, by status category, and by decrement showed larger deviations, but on the whole produced values acceptable for valuation purposes.

Because of the set of new actuarial assumptions selected by the actuary for the LLA effective in this valuation and because one set of actuarial assumptions is used for this valuation, the (unfunded) accrued liability as of June 30, 2018 was based on these new assumptions and methods, as are the contributions that would have been required for FYE 2019 and the contribution rates required for FYE 2020.

6. Actuarial Assumptions

LASERS typically conducts an experience study every five years, but the scope of such a study is not necessarily limited to a 5-year period. An actuarial experience study (dated January 16, 2014) was prepared by the System's actuary for the period from July 1, 2008, through June 30, 2013. With the exception of mortality rates (see below), the demographic assumptions used in this valuation are the same as approved by the System from the recommendation in the most recent experience study.

Actuarial assumptions used in the June 30, 2018, valuation are summarized in this section of the report.

Economic Assumptions

Assumed Rate of Return on the Actuarial Value of Assets

The assumed rate of return on the actuarial value of assets used for all purposes in this valuation is 7.50%. This applies to calculations of the unfunded actuarial accrued liabilities as of June 30 2018, and contribution rates that would have applied to FYE 2019 and the contribution rates that will apply to FYE 2020. This rate is net of investment expenses. This 7.50% rate is based on research undertaken by the office of the LLA's actuary. Refer to Appendices C through G for further details.

The Cost of the Gain-Sharing COLA Program

The unfunded actuarial accrued liabilities as of June 30, 2018, and contribution rates that would have applied to FYE 2019 and the contribution rates that will apply to FYE 2020 were developed based on LASERS's 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 0.40%.

Please refer to Appendix H for further details.

Discount Rate

The discount rate is set equal to the investment return assumption (7.50%) without adjustment. Please refer to Appendix C through G for further details regarding the selection of 7.50% as the return assumption.

Assumed Rate of Inflation

The assumed rate of inflation is 2.30%, and is a component of the assumed rate of return and of individual members' salary increase assumption and the return assumption. The 2.30% expected inflation rate is a composite of the mid-term and long-term inflation expectations.

Please refer to Appendix C for further details.

Administrative Expense

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. It is estimated as 0.95% of covered payroll.

Mortality Assumption

The mortality tables used for all purposes in this valuation update the mortality tables used in the previous PRSAC-accepted valuation. The new mortality tables were based on 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. The adjustments to the standard RP-2014 tables were developed based on the data presented in the most recent experience study, but was based on current actuarial methodologies published in current actuarial literature.

The base tables have been adjusted as follows:

- Mortality rates for active members and non-disabled annuitants are taken from the RP-2014 Healthy Combined tables and adjusted by 1.58 for males and by 1.36 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 B for more details on the development of the new mortality tables and on the acceptance of the other demographic assumptions form the previous valuation (as recommended and adopted form the most recent experience study).

Disability Incidence Assumption

Disability incidence assumptions used in this valuation are the same as adopted by the System and based on the System's most recent experience study.

Retirement/DROP Assumption

Eligibility for normal retirement benefits and participation in DROP is based on age and service requirements that vary by sub-plan. Retirement/DROP decrements differ from one sub-plan to another. These decrements were developed in the most recent experience study and are the same as adopted by the System and based on the System's most recent experience study. Refer to pages that follow for a listing of retirement/DROP rates.

Termination Assumption

Voluntary termination or withdrawal rates were developed in the most recent experience study. Rates for Regular members and Corrections/Hazardous Duty members are based on a combination of age and service. Rates for Judges and Wildlife are based on service. For members hired before July 1, 2015, and terminating with vested benefits, it is assumed that 20% will elect to withdraw their accumulated employee contribution, and 80% will receive a benefit beginning at age 60. For

members hired on or after July 1, 2015, and terminating with vested benefits, it is assumed that 20% will elect to withdraw their accumulated employee contribution, and 80% will receive a benefit beginning at age 62. Refer to pages that follow for a listing of termination rates.

Salary Growth

The rates of annual salary growth are based upon the member's years of service and are based on the most recent experience study. The rates include 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 assumptions. The 2.30% expected inflation rate is a composite of the mid-term and long-term inflation expectations. Please refer to Appendix C further details concerning inflation assumptions.

Family Statistics

The composition of the family is based upon Current Population Reports published by the United States Census Bureau. Seventy-five percent of the membership is assumed to be married. The wife is assumed to be three years younger than the husband. Sample rates for the assumed number of minor children are as follows:

Age of Member	Number of Minor Children	Years for Youngest Child to Attain Majority
25	1.2	17
30	1.4	15
35	1.7	13
40	1.7	10
45	1.4	8
50	1.1	4

Assumption for Incomplete Data

No records were identified as containing suspicious data or errors. All data were assumed to be reliable and accurate without adjustments.

Converted Leave

Leave credit is accrued throughout a member's career and converted to service credit or paid as a lump sum. Converted leave rates below represent the percentage increase in a retiree's accrued benefit upon conversion of the leave to benefits. The rates, shown below, are based on the most recent experience study.

	Regular Retirement	Disability
Regular Members	3.50%	1.50%
Judicial Members	1.00%	1.00%
Corrections	5.00%	3.00%
Wildlife	6.00%	3.00%

PRIOR ACTUARIAL ASSUMPTIONS (Effective June 30, 2014)
RP-2000 MORTALITY TABLE WITH PROJECTION TO 2015
WITH SCALE AA FOR ALL SUB PLANS

	Mortality Rate			Mortality Rate			Mortality Rate	
Age	Male	Female	Age	Male	Female	Age	Male	Female
18	0.000237	0.000152	53	0.002154	0.001841	88	0.139683	0.101042
19	0.000248	0.000151	54	0.002360	0.002085	89	0.154366	0.113903
20	0.000259	0.000150	55	0.002718	0.002409	90	0.172706	0.125879
21	0.000272	0.000148	56	0.003198	0.002823	91	0.188113	0.138232
22	0.000283	0.000150	57	0.003629	0.003226	92	0.207060	0.150672
23	0.000297	0.000155	58	0.004140	0.003639	93	0.223365	0.165391
24	0.000309	0.000160	59	0.004667	0.004119	94	0.239646	0.177391
25	0.000323	0.000168	60	0.005297	0.004689	95	0.259578	0.188755
26	0.000345	0.000179	61	0.006119	0.005393	96	0.275506	0.199303
27	0.000354	0.000186	62	0.006981	0.006175	97	0.290981	0.212034
28	0.000365	0.000196	63	0.008104	0.007094	98	0.310600	0.220611
29	0.000382	0.000207	64	0.009130	0.007995	99	0.325288	0.227940
30	0.000412	0.000227	65	0.010309	0.009003	100	0.339424	0.233930
31	0.000463	0.000272	66	0.011841	0.010161	101	0.358628	0.244834
32	0.000521	0.000310	67	0.013210	0.011282	102	0.371685	0.254498
33	0.000585	0.000344	68	0.014464	0.012471	103	0.383040	0.266044
34	0.000651	0.000374	69	0.016027	0.013784	104	0.392003	0.279055
35	0.000717	0.000402	70	0.017702	0.015529	105	0.397886	0.293116
36	0.000780	0.000429	71	0.019586	0.016975	106	0.400000	0.307811
37	0.000839	0.000455	72	0.021747	0.018881	107	0.400000	0.322725
38	0.000881	0.000484	73	0.024223	0.020673	108	0.400000	0.337441
39	0.000919	0.000517	74	0.027024	0.022912	109	0.400000	0.351544
40	0.000957	0.000563	75	0.030622	0.024916	110	0.400000	0.364617
41	0.000997	0.000617	76	0.034131	0.027451	111	0.400000	0.376246
42	0.001045	0.000679	77	0.038547	0.030694	112	0.400000	0.386015
43	0.001100	0.000747	78	0.043489	0.033835	113	0.400000	0.393507
44	0.001166	0.000820	79	0.049071	0.037355	114	0.400000	0.398308
45	0.001239	0.000882	80	0.055360	0.041291	115	0.400000	0.400000
46	0.001308	0.000946	81	0.062905	0.045702	116	0.400000	0.400000
47	0.001382	0.001010	82	0.071350	0.050664	117	0.400000	0.400000
48	0.001460	0.001092	83	0.079534	0.056255	118	0.400000	0.400000
49	0.001543	0.001180	84	0.089800	0.062565	119	0.400000	0.400000
50	0.001628	0.001296	85	0.099680	0.070761	120	1.000000	1.000000
51	0.001837	0.001454	86	0.110516	0.080120			
52	0.001970	0.001633	87	0.124300	0.090716			

CURRENT ACTUARIAL ASSUMPTIONS (Effective June 30, 2018)
RP-2014 MORTALITY TABLE (158% MALE/136% FEMALE)
PROJECTED GENERATIONALLY WITH SCALE MP-2016 (No Projection in Table)

	Mortality Rate			Mortality Rate			Mortality Rate	
Age	Male	Female	Age	Male	Female	Age	Male	Female
18	0.000518	0.000214	53	0.004160	0.002249	88	0.171574	0.115913
19	0.000583	0.000220	54	0.004698	0.002501	89	0.191968	0.129966
20	0.000641	0.000220	55	0.005278	0.002772	90	0.214735	0.145691
21	0.000709	0.000220	56	0.005909	0.003066	91	0.239089	0.162852
22	0.000771	0.000220	57	0.006596	0.003388	92	0.264527	0.181287
23	0.000804	0.000226	58	0.007347	0.003747	93	0.290767	0.200899
24	0.000815	0.000230	59	0.008173	0.004149	94	0.317697	0.221641
25	0.000765	0.000235	60	0.009081	0.004606	95	0.345323	0.243486
26	0.000730	0.000243	61	0.010083	0.005125	96	0.373725	0.266428
27	0.000709	0.000254	62	0.011187	0.005714	97	0.402993	0.290448
28	0.000702	0.000267	63	0.012407	0.006382	98	0.433189	0.315508
29	0.000705	0.000280	64	0.013753	0.007135	99	0.464280	0.341527
30	0.000714	0.000296	65	0.015239	0.007986	100	0.496101	0.368367
31	0.000732	0.000314	66	0.016797	0.008995	101	0.528297	0.395814
32	0.000754	0.000332	67	0.018522	0.010128	102	0.560266	0.423564
33	0.000777	0.000351	68	0.020434	0.011401	103	0.591748	0.451384
34	0.000803	0.000370	69	0.022555	0.012829	104	0.622492	0.479036
35	0.000826	0.000389	70	0.024912	0.014434	105	0.652273	0.506291
36	0.000847	0.000408	71	0.027529	0.016234	106	0.680895	0.532930
37	0.000871	0.000432	72	0.030437	0.018251	107	0.708199	0.558755
38	0.000901	0.000461	73	0.033674	0.020511	108	0.734055	0.583592
39	0.000940	0.000496	74	0.037281	0.023042	109	0.758379	0.607300
40	0.000992	0.000539	75	0.041307	0.025882	110	0.781114	0.629763
41	0.001060	0.000589	76	0.045817	0.029074	111	0.790000	0.650901
42	0.001146	0.000649	77	0.050884	0.032676	112	0.790000	0.670666
43	0.001253	0.000719	78	0.056595	0.036757	113	0.790000	0.680000
44	0.001384	0.000801	79	0.063051	0.041396	114	0.790000	0.680000
45	0.001537	0.000894	80	0.070369	0.046688	115	0.790000	0.680000
46	0.001717	0.000997	81	0.078676	0.052745	116	0.790000	0.680000
47	0.001920	0.001110	82	0.087731	0.058815	117	0.790000	0.680000
48	0.002146	0.001232	83	0.097954	0.065695	118	0.790000	0.680000
49	0.002394	0.001361	84	0.109478	0.073484	119	0.790000	0.680000
50	0.002781	0.001570	85	0.122445	0.082285	120	1.000000	1.000000
51	0.003204	0.001785	86	0.137005	0.092209			
52	0.003664	0.002011	87	0.153320	0.103376			

RANK AND FILE SUB PLAN (INCLUDING APPELLATE LAW CLERKS)
ACTUARIAL TABLES AND RATES

	Disability	Termination Rates										Salary
Age	Rates	< 1 Year	1 Year	2-3 Years	4-5 Years	6 Years	7 Years	8 Years	9 Years	>=10 Years	Duration	Merit Scale*
18	0.0000	0.450	0.300	0.220	0.140	0.100	0.080	0.070	0.060	0.050	0	0.0971
19	0.0000	0.450	0.300	0.220	0.140	0.100	0.080	0.070	0.060	0.050	1	0.0485
20	0.0000	0.450	0.300	0.220	0.140	0.100	0.080	0.070	0.060	0.050	2	0.0388
21	0.0000	0.400	0.300	0.220	0.140	0.100	0.080	0.070	0.060	0.050	3	0.0340
22	0.0000	0.350	0.250	0.220	0.140	0.100	0.080	0.070	0.060	0.050	4	0.0291
23	0.0000	0.290	0.250	0.220	0.130	0.100	0.080	0.070	0.060	0.050	5	0.0267
24	0.0000	0.290	0.210	0.210	0.120	0.100	0.080	0.070	0.060	0.050	6	0.0248
25	0.0000	0.290	0.207	0.200	0.118	0.100	0.080	0.070	0.060	0.050	7	0.0233
26	0.0000	0.290	0.204	0.200	0.116	0.100	0.080	0.070	0.060	0.050	8	0.0223
27	0.0000	0.290	0.201	0.190	0.114	0.100	0.080	0.070	0.060	0.050	9	0.0214
28	0.0000	0.290	0.198	0.180	0.112	0.100	0.080	0.070	0.060	0.050	10	0.0204
29	0.0001	0.290	0.195	0.170	0.110	0.100	0.080	0.070	0.060	0.050	11	0.0194
30	0.0001	0.290	0.192	0.170	0.108	0.100	0.080	0.070	0.060	0.050	12	0.0184
31	0.0001	0.290	0.189	0.160	0.106	0.100	0.080	0.070	0.060	0.050	13	0.0175
32	0.0001	0.290	0.186	0.150	0.104	0.100	0.080	0.070	0.060	0.050	14	0.0165
33	0.0001	0.290	0.183	0.130	0.102	0.100	0.080	0.070	0.060	0.050	15	0.0155
34	0.0001	0.290	0.180	0.130	0.100	0.100	0.080	0.070	0.060	0.050	16	0.0146
35	0.0004	0.290	0.177	0.130	0.098	0.100	0.080	0.070	0.060	0.050	17	0.0136
36	0.0004	0.285	0.174	0.130	0.096	0.100	0.080	0.070	0.060	0.050	18	0.0126
37	0.0004	0.280	0.171	0.120	0.094	0.100	0.080	0.070	0.060	0.050	19	0.0117
38	0.0004	0.275	0.168	0.120	0.092	0.100	0.080	0.070	0.060	0.050	20	0.0107
39	0.0004	0.270	0.165	0.120	0.090	0.100	0.080	0.070	0.060	0.050	21	0.0097
40	0.0004	0.265	0.162	0.110	0.088	0.100	0.080	0.070	0.060	0.050	22	0.0097
41	0.0014	0.260	0.159	0.110	0.086	0.100	0.080	0.070	0.060	0.050	23	0.0097
42	0.0014	0.255	0.156	0.110	0.084	0.100	0.080	0.070	0.060	0.050	24	0.0097
43	0.0014	0.250	0.153	0.080	0.082	0.080	0.070	0.060	0.050	0.040	25	0.0097
44	0.0014	0.245	0.150	0.080	0.080	0.080	0.070	0.060	0.050	0.040	26	0.0097
45	0.0022	0.240	0.147	0.080	0.078	0.080	0.070	0.060	0.050	0.040	27	0.0097
46	0.0022	0.235	0.144	0.080	0.076	0.080	0.070	0.060	0.050	0.040	28	0.0097
47	0.0022	0.230	0.141	0.080	0.074	0.080	0.070	0.060	0.050	0.040	29	0.0097
48	0.0028	0.225	0.138	0.080	0.072	0.080	0.070	0.060	0.050	0.040	30	0.0097
49	0.0028	0.220	0.135	0.080	0.070	0.080	0.070	0.060	0.050	0.040	31	0.0097
50	0.0028	0.215	0.132	0.080	0.068	0.080	0.070	0.060	0.050	0.040	32	0.0097
51	0.0028	0.210	0.129	0.080	0.066	0.080	0.070	0.060	0.050	0.040	33	0.0097
52	0.0036	0.205	0.126	0.080	0.064	0.080	0.070	0.060	0.050	0.040	34	0.0097
53	0.0036	0.200	0.123	0.080	0.062	0.080	0.070	0.060	0.050	0.040	35	0.0097
54	0.0036	0.195	0.120	0.080	0.060	0.080	0.070	0.060	0.050	0.040	36	0.0097
55	0.0036	0.190	0.117	0.080	0.058	0.080	0.070	0.060	0.050	0.040	37	0.0097
56	0.0036	0.185	0.114	0.080	0.056	0.080	0.070	0.060	0.050	0.040	38	0.0097
57	0.0048	0.180	0.111	0.080	0.054	0.080	0.070	0.060	0.050	0.040	39	0.0097
58	0.0048	0.175	0.108	0.080	0.052	0.080	0.070	0.060	0.050	0.040	>=40	0.0097
59	0.0040	0.170	0.105	0.080	0.050	0.080	0.070	0.060	0.050	0.040		
>=60	0.0000	0.165	0.102	0.080	0.048	0.080	0.070	0.060	0.050	0.040		

*Salary Scale is (1+ Inflation) x (1+ Salary Merit)
The inflation rate for all purposes for this valuation is 2.30%.

RANK AND FILE SUB PLAN (EXCLUDING APPELLATE LAW CLERKS)
ACTUARIAL TABLES AND RATES

*Retirement Rates for Appellate Law Clerks are the same as Judges on the next page

Age	Retirement/DROP Rates*				
	0-9 Years	10-19 Years	20-24 Years	25-29 Years	>=30 Years
<=34	0.000	0.000	0.000	0.000	0.000
35	0.000	0.000	0.020	0.030	0.000
36	0.000	0.000	0.020	0.030	0.000
37	0.000	0.000	0.020	0.030	0.000
38	0.000	0.000	0.020	0.030	0.000
39	0.000	0.000	0.020	0.030	0.000
40	0.000	0.000	0.020	0.030	0.000
41	0.000	0.000	0.020	0.030	0.000
42	0.000	0.000	0.020	0.030	0.000
43	0.000	0.000	0.020	0.030	0.000
44	0.000	0.000	0.020	0.030	0.000
45	0.000	0.000	0.020	0.030	0.030
46	0.000	0.000	0.020	0.030	0.030
47	0.000	0.000	0.020	0.030	0.500
48	0.000	0.000	0.020	0.060	0.500
49	0.000	0.000	0.020	0.070	0.500
50	0.000	0.000	0.030	0.070	0.430
51	0.000	0.000	0.030	0.070	0.400
52	0.000	0.000	0.030	0.080	0.470
53	0.000	0.000	0.030	0.120	0.440
54	0.000	0.000	0.060	0.280	0.470
55	0.000	0.000	0.080	0.550	0.300
56	0.000	0.000	0.080	0.320	0.250
57	0.000	0.000	0.080	0.300	0.220
58	0.000	0.000	0.080	0.280	0.200
59	0.000	0.000	0.250	0.350	0.180
60	0.100	0.330	0.550	0.300	0.240
61	0.250	0.180	0.210	0.180	0.220
62	0.250	0.160	0.200	0.180	0.250
63	0.250	0.160	0.150	0.250	0.250
64	0.250	0.170	0.150	0.180	0.250
65	0.250	0.240	0.250	0.250	0.250
66	0.250	0.160	0.250	0.200	0.300
67	0.250	0.230	0.300	0.180	0.350
68	0.250	0.230	0.100	0.180	0.200
69	0.250	0.230	0.250	0.400	0.200
70	0.750	0.230	0.250	0.350	0.250
71	0.750	0.230	0.250	0.350	0.250
72	0.750	0.230	0.250	0.350	0.250
73	0.750	0.230	0.250	0.350	0.250
74	0.750	0.230	0.250	0.350	0.250
>=75	1.000	1.000	1.000	1.000	1.000

PRE 2011 JUDGES SUB PLAN AND POST 2011 JUDGES SUB PLAN
ACTUARIAL TABLES AND RATES

		Retirement Rates					
	Disability	(Also Applies to Appellate Law Clerks)				Termination	Salary Merit
Age	Rates	0-14 Years	15-19 Years	>=20 Years	Duration	Rates	Scale*
<=45	0.000	0.000	0.000	0.000	0	0.000	0.0243
46	0.000	0.000	0.200	0.000	1	0.030	0.0000
47	0.000	0.000	0.200	0.000	2	0.040	0.0000
48	0.000	0.000	0.200	0.000	3	0.030	0.0000
49	0.000	0.000	0.200	0.050	4	0.020	0.0000
50	0.000	0.000	0.200	0.050	5	0.010	0.0000
51	0.000	0.000	0.100	0.050	6	0.010	0.0000
52	0.000	0.000	0.100	0.050	7	0.010	0.0000
53	0.000	0.000	0.100	0.050	8	0.010	0.0000
54	0.000	0.000	0.200	0.050	9	0.010	0.0000
55	0.000	0.050	0.200	0.100	10	0.010	0.0000
56	0.000	0.050	0.100	0.060	11	0.010	0.0000
57	0.000	0.100	0.020	0.060	12+	0.010	0.0000
58	0.000	0.050	0.020	0.060			
59	0.000	0.050	0.020	0.080			
60	0.000	0.100	0.020	0.080			
61	0.000	0.100	0.020	0.120			
62	0.000	0.200	0.020	0.120			
63	0.000	0.200	0.020	0.060			
64	0.000	0.150	0.100	0.060			
65	0.000	0.500	0.100	0.060			
66	0.000	0.100	0.100	0.110			
67	0.000	0.100	0.100	0.100			
68	0.000	0.100	0.100	0.100			
69	0.000	0.100	0.100	0.100			
70	0.000	0.100	0.100	0.100			
71	0.000	0.050	0.400	0.400			
72	0.000	0.050	0.400	0.400			
73	0.000	0.050	0.400	0.400			
74	0.000	0.050	0.400	0.400			
>=75	0.000	1	1	1			

*Salary Scale is (1+ Inflation) x (1+ Salary Merit)

The inflation rate for all purposes for this valuation is 2.30%.

HAZARDOUS DUTY, CORRECTIONS AND WILDLLIFE
ACTUARIAL TABLES AND RATES

Age	Disability Rates	Retirement/DROP Rates		Termination Rates (Hazardous Duty and Corrections Only)		Duration	Termination Rates (Wildlife Only)	Salary Merit Scale
		0-24 Years	>=25 Years	0-9 Years	>=10 Years			
<=17	0.000	0.000	0.000	0.000	0.000	0	0.080	0.1117
18	0.000	0.200	0.250	0.500	0.000	1	0.080	0.0519
19	0.000	0.200	0.250	0.500	0.000	2	0.080	0.0388
20	0.000	0.200	0.250	0.460	0.000	3	0.080	0.0379
21	0.000	0.200	0.250	0.420	0.000	4	0.050	0.0330
22	0.000	0.200	0.250	0.380	0.000	5	0.050	0.0320
23	0.000	0.200	0.250	0.350	0.100	6	0.030	0.0316
24	0.000	0.200	0.250	0.320	0.100	7	0.030	0.0311
25	0.000	0.200	0.250	0.290	0.100	8	0.030	0.0306
26	0.000	0.200	0.250	0.270	0.100	9	0.030	0.0301
27	0.000	0.200	0.250	0.250	0.100	10	0.030	0.0296
28	0.000	0.200	0.250	0.230	0.100	11	0.030	0.0291
29	0.000	0.200	0.250	0.210	0.100	12	0.030	0.0286
30	0.000	0.200	0.250	0.200	0.100	13	0.030	0.0282
31	0.000	0.200	0.250	0.200	0.100	14	0.030	0.0277
32	0.000	0.200	0.250	0.200	0.100	15	0.030	0.0272
33	0.000	0.200	0.250	0.200	0.080	16	0.030	0.0267
34	0.000	0.200	0.250	0.200	0.080	17	0.030	0.0262
35	0.002	0.200	0.250	0.200	0.080	18	0.030	0.0257
36	0.002	0.200	0.250	0.180	0.060	19	0.030	0.0252
37	0.002	0.200	0.250	0.180	0.060	20	0.030	0.0248
38	0.002	0.200	0.250	0.180	0.060	21	0.030	0.0243
39	0.002	0.200	0.250	0.180	0.060	22	0.030	0.0243
40	0.003	0.200	0.250	0.180	0.050	23	0.030	0.0238
41	0.003	0.200	0.250	0.180	0.050	24	0.030	0.0238
42	0.003	0.200	0.250	0.180	0.050	25	0.030	0.0243
43	0.003	0.200	0.250	0.180	0.050	26	0.030	0.0243
44	0.003	0.200	0.250	0.180	0.060	27	0.030	0.0155
45	0.003	0.200	0.250	0.170	0.060	28	0.030	0.0155
46	0.003	0.200	0.250	0.170	0.060	29	0.030	0.0150
47	0.003	0.200	0.250	0.170	0.060	30	0.030	0.0058
48	0.003	0.200	0.250	0.170	0.060	31	0.030	0.0058
49	0.003	0.200	0.250	0.170	0.070	32	0.030	0.0058
50	0.003	0.350	0.200	0.130	0.070	33	0.030	0.0058

*Salary Scale is (1+ Inflation) x (1+ Salary Merit)
The inflation rate for all purposes for this valuation is 2.30%.

HAZARDOUS DUTY, CORRECTIONS AND WILDLLIFE
ACI'UARIAL TABLES AND RATES

Age	Disability Rates	Retirement/DROP Rates		Termination Rates (Hazardous Duty and Corrections Only)		Duration	Termination Rates (Wildlife Only)	Salary Merit Scale
		0-24 Years	>=25 Years	0-9 Years	>=10 Years			
51	0.003	0.100	0.250	0.130	0.070	34	0.030	0.0058
52	0.005	0.250	0.350	0.130	0.070	35	0.030	0.0058
53	0.005	0.250	0.350	0.130	0.070	36	0.030	0.0058
54	0.005	0.300	0.350	0.130	0.100	37	0.030	0.0058
55	0.008	0.300	0.350	0.130	0.100	38	0.030	0.0058
56	0.008	0.300	0.350	0.130	0.100	39	0.030	0.0058
57	0.008		0.350	0.130	0.100	>=40	0.030	0.0058
58	0.008	0.300	0.350	0.130	0.100			
59	0.008	0.300	0.350	0.130	0.100			
60	0.000	0.450	0.500	0.130	0.100			
61	0.000	0.400	0.500	0.130	0.100			
62	0.000	0.400	0.500	0.130	0.100			
63	0.000	0.400	0.500	0.130	0.100			
64	0.000	0.400	0.500	0.130	0.100			
65	0.000	0.350	0.500	0.130	0.100			
66	0.000	0.350	0.500	0.130	0.100			
67	0.000	0.350	0.500	0.130	0.100			
68	0.000	0.350	0.500	0.130	0.100			
69	0.000	0.350	0.500	0.130	0.100			
70	0.000	0.500	0.500	0.130	0.100			
71	0.000	0.500	0.500	0.130	0.100			
72	0.000	0.500	0.500	0.130	0.100			
73	0.000	0.500	0.500	0.130	0.100			
74	0.000	0.500	0.500	0.130	0.100			
>=75	0.000	1.000	1.000	0.130	0.100			

*Salary Scale is (1+ Inflation) x (1+ Salary Merit)
The inflation rate for all purposes for this valuation is 2.30%.

APPENDIX A
CONTRIBUTION RATES FOR SUB-PLANS

The calculations of employer contribution rates for FYE 2020 for employers participating in each sub-plan of LASERS are shown below. These contribution requirements are based on revised assumptions and methods.

A. Rank and File Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 75,001,218	$ 1,611,308,326	4.654678%
Shared Amortization Costs	627,185,694		38.924003%
Plan Specific Costs	717,148		0.044507%
Total	$ 702,904,060		43.623188%

B. Appellate Law Clerks Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 613,329	$ 9,319,310	6.581275%
Shared Amortization Costs	3,627,449		38.924007%
Plan Specific Costs	-		0.000000%
Total	$ 4,240,778		45.505282%

C. Pre-2011 Judges and Court Officers Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 1,964,945	$ 30,285,483	6.488076%
Shared Amortization Costs	11,788,322		38.924002%
Plan Specific Costs	-		0.000000%
Total	$ 13,753,267		45.412078%

D. Post-2011 Judges Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 1,174,313	$ 19,267,705	6.094723%
Shared Amortization Costs	7,499,762		38.924003%
Plan Specific Costs	-		0.000000%
Total	$ 8,674,075		45.018726%

E. Legislators Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 19,319	$ 429,217	4.500887%
Shared Amortization Costs	167,068		38.923933%
Plan Specific Costs	-		0.000000%
Total	$ 186,387		43.424820%

G. Corrections Officers Primary Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 77,125	$ 9,018,891	0.855155%
Shared Amortization Costs	3,510,514		38.924008%
Plan Specific Costs	5,361		0.000000%
Total	$ 3,593,000		39.838604%

H. Adult Probation and Parole Officers Fund

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 40,408	Not Applicable	Not Applicable
Amortization Cost	-		
Total	$ 40,408		

I. Corrections Officers Secondary Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 3,229,691	$ 69,166,950	4.669414%
Shared Amortization Costs	26,922,546		38.924003%
Plan Specific Costs	67,885		0.098146%
Total	$ 30,220,122		43.691563%

J. Wildlife Officers Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 1,362,927	$ 9,979,964	13.656629%
Shared Amortization Costs	3,884,601		38.923998%
Plan Specific Costs	4,415		0.044235%
Total	$ 5,251,942		52.624862%

K. Peace Officers Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 90,747	$ 2,662,692	3.408076%
Shared Amortization Costs	1,036,426		38.923993%
Plan Specific Costs	1,215		0.045617%
Total	$ 1,128,387		42.377687%

L. Peace Officers Fund

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 0	Not Applicable	Not Applicable
Amortization Cost	299,908		
Total	$ 299,908		

M. Alcohol Tobacco Control Officers Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ (11,982)	$ 561,449	-2.134163%
Shared Amortization Costs	218,538		38.923934%
Plan Specific Costs	210		0.037323%
Total	$ 206,765		36.827094%

N. Bridge Police Officers Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 8,736	$ 239,789	3.643198%
Shared Amortization Costs	93,336		38.924177%
Plan Specific Costs	106		0.044235%
Total	$ 102,178		42.611610%

O. Harbor Police Fund

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 0	Not Applicable	Not Applicable
Amortization Cost	154,894		
Total	$ 154,894		

P. Harbor Police Officers Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 58,255	$ 974,786	5.976233%
Shared Amortization Costs	47,784		4.901964%
Plan Specific Costs	728		
Total	$ 106,039		10.878197%

Q. Hazardous Duty Officers Sub Plan

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 6,298,546	$ 113,004,680	5.573704%
Shared Amortization Costs	43,985,945		38.924003%
Plan Specific Costs	152,275		0.134751%
Total	$ 50,436,766		44.632458%

R. Total for All Sub Plans

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 89,887,170	$ 1,876,219,242	4.790867%
Shared Amortization Costs	729,967,257		38.906288%
Plan Specific Costs	949,341		0.050599%
Total	$ 820,803,768		43.747753%

S. Total for All Funds

	Dollar Contribution	Projected Payroll	Contribution Rate
Normal Cost + Admin Expense	$ 40,408	Not Applicable	Not Applicable
Amortization Cost	454,802		
Total	$ 495,210		

APPENDIX B
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 some of the actuarial assumptions developed by LASERS' actuary and adopted by its board, while we reject 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 last PRSAC-accepted valuation.

1. When mortality rates are developed based on a retirement system's own experience, they should be developed using current accepted actuarial models.

2. 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.

3. The expected future cost-of-living (COLA) benefits should be measured using an actuarial method that is:
   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.

4. One set of assumptions is used for the calculation of the unfunded actuarial liability as of June 30, 2018, and the contribution rate for the year ending June 30, 2020.
   a. *A change*. LASERS' board and actuary use two set of assumptions in a given actuarial valuation report, one for the UAL and one for the projected contribution rate.
   b. *Simple.* One set of assumptions is less complicated for a given actuarial valuation report.
   c. *Transparent.* Clear as to what the assumptions are; no confusion with multiple assumptions used for different purposes in the same report.
   d. *Consistent with actuarial practice.* Consistent with the method used by other actuaries around the country and in Louisiana when assumptions are changed.
   e. *Consistent with the need for new assumptions.* If a new set of assumptions is more appropriate, and is adopted for use in an actuarial valuation, that new set of assumptions should consistently be used for all purposes throughout the actuarial valuation report.

The improvements in these four 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 State's financial disclosures by ensuring the balance sheet liabilities are a more transparent and fair representation of the pension obligation.

This Appendix B describes our approach to developing mortality rates from the System's own experience.

Plan Experience

The mortality tables employed in the actuarial valuation were developed directly from the mortality experience of the group.

Experience Study

An Actuarial Experience Study was prepared by the System's actuary for the period from July 1, 2008 through June 30, 2013, for the Louisiana State Employees' Retirement System. Their experience study report, dated January 16, 2014, summarized the results.

The following table presents the mortality experience during the exposure period:

	Males		Females	
Age	Exposures	Actual Deaths	Exposures	Actual Deaths
<20	386	9	270	5
20-24	3,364	34	3,713	28
25-29	7,290	11	12,708	19
30-34	8,167	38	16,001	58
35-39	8,964	42	16,963	75
40-44	10,872	81	19,417	95
45-49	13,296	88	25,197	121
50-54	16,494	118	31,946	141
55-59	18,038	137	33,429	189
60-64	17,389	185	28,225	204
65-69	12,263	219	19,028	203
70-74	9,801	338	14,921	287
75-79	7,241	377	11,990	424
80-84	5,093	411	10,427	625
85-89	2,688	369	7,208	671
90-94	902	173	3,081	536
95-99	167	49	673	171
100+	24	6	86	27
Total	142,439	2,685	255,283	3,879

The experience study report failed to describe a robust and up-to-date actuarial process for developing (a) a base mortality table and (b) mortality improvement projections, using current actuarial methods published in actuarial literature. Therefore, the mortality table adopted by the System and used in previous actuarial valuations, prepared by the System' actuary, was rejected for use in this actuarial valuation report. The previous mortality tables would not be appropriate for this valuation when all the raw data to create fully appropriate mortality tables is readily available in that experience study report.

The balance of this Appendix B presents the development of more appropriate mortality assumptions for this valuation, consistent with actuarial literature.

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 this analysis, full credibility was assigned a confidence level of 90% of being within 5% margin from the correct value. The credibility was assessed separately for males and females (combining actives and retirees because the experience study report did not separate actives' experience from retirees' experience). In order to be fully credible, the experience study is required to have at least 1,082 deaths during the exposure period for each subgroup.

Based on the information in the above table, the LASERS experience study data is fully credible for each group (males and females) since their respective numbers of deaths are more than 1,082 each. The credibility factors are therefore 100% for the male members and the female members. This means 100% of the experience study results can be taken into account in the determination of the mortality assumption for male members and female members.

Formula

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

$$\left[\left(\frac{q_A^{ES}}{q_A^{SR}}\right) \times (\mathbf{C}) \; + \; (\mathbf{1.0}) \times (\mathbf{1} - \mathbf{C})\right] \times \; q_x^{SR} = q_x^{V}$$

Where,

[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, 2017 sponsored by the Society of Actuaries, found at https://www.soa.org/prof-dev/events/2016-credibility-theory-pension-actuaries/.

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;

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 (for LASERS, the Credibility factors for males and females are both 100%);

q_A^{ES} is the **A**verage probability (absolute rate), derived as an average or composite rate for the whole group from the **E**xperience **S**tudy, i.e., total deaths divided by total exposures; and

q_A^{SR} is the **A**verage probability (absolute rate), derived as an average or composite rate for the whole group expected by the **S**tandard **R**eference table.

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 are therefore 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 LASERS-derived adjustment factor.

The experience study report did not present the mortality information for active and retiree members separately. Since the RP-2014 did not publish a combined mortality table, the active table and retiree table from RP-2014 were combined into a single table (the two tables overlap for ages 50 through 80) for males and another table for females by age. The two gender-specific combined RP-2014 mortality tables are therefore used as the standard reference tables in determining the mortality assumption.

The following table presents the mortality rates based on the combined RP-2014 healthy life mortality tables for different ages:

Sample Attained Age	Probability of Death Next Year	
	Male	Female
50	0.29%	0.19%
55	0.43%	0.26%
60	0.62%	0.38%
65	0.96%	0.59%
70	1.53%	0.96%
75	2.50%	1.59%
80	4.18%	2.66%
85	7.75%	6.05%

LASERS-derived adjustment factors

LASERS-derived adjustment factors to be applied to the combined (active and retiree) RP-2014 mortality tables were calculated separately for males and females. To do so, the combined RP-2014 mortality tables were projected backward to 2011 (using projection scale MP-2014) to match the central year of the experience study. These tables became the new standard reference table so as to line up with the central year of the experience study.

The ratio of the average/composite mortality rate from the experience study (q_A^{ES}) to the average/composite mortality rate of the combined RP-2014 mortality table projected backward to 2011 (q_A^{SR}) was calculated for each group (male and female).

a. For male members, the LASERS-derived adjustment factor is 158%. That ratio was calculated by dividing the average/composite mortality rate (1.89%) from the LASERS-derived experience by the average mortality/composite rate of the RP-2014 mortality table projected backward to 2011 (1.19%).

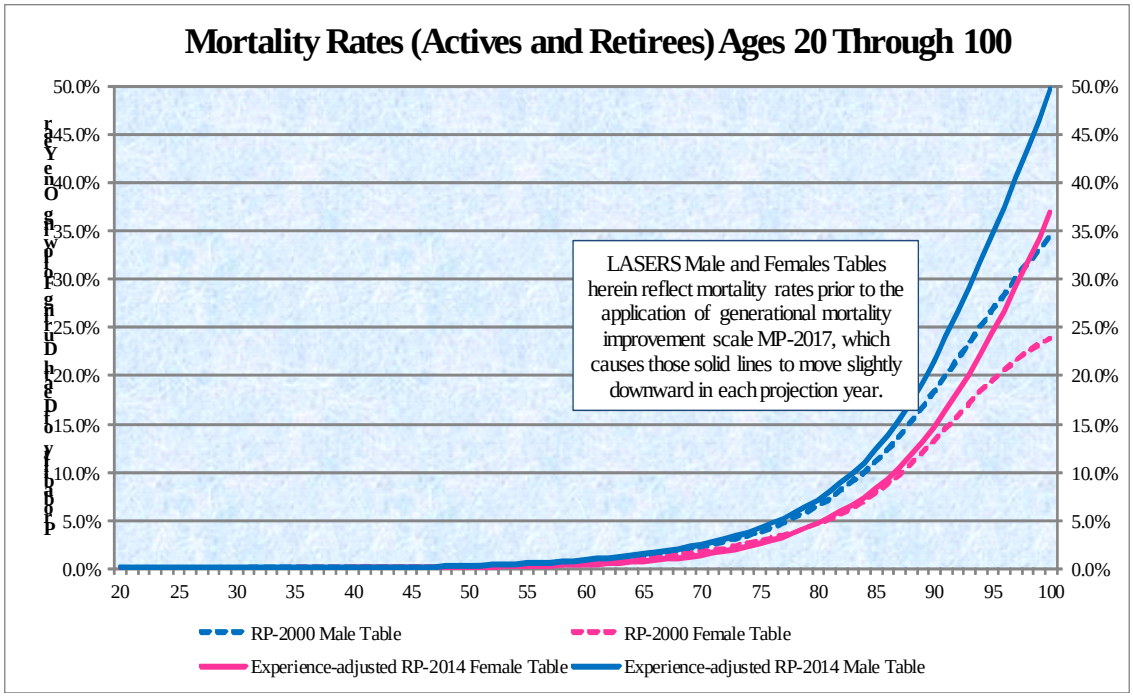
b. For female members, the LASERS-derived adjustment factor is 136%. That ratio was calculated by dividing the average/composite mortality rate (1.52%) from the LASERS-derived experience by the average/composite mortality rate of the RP-2014 mortality table projected backward to 2011 (1.12%).

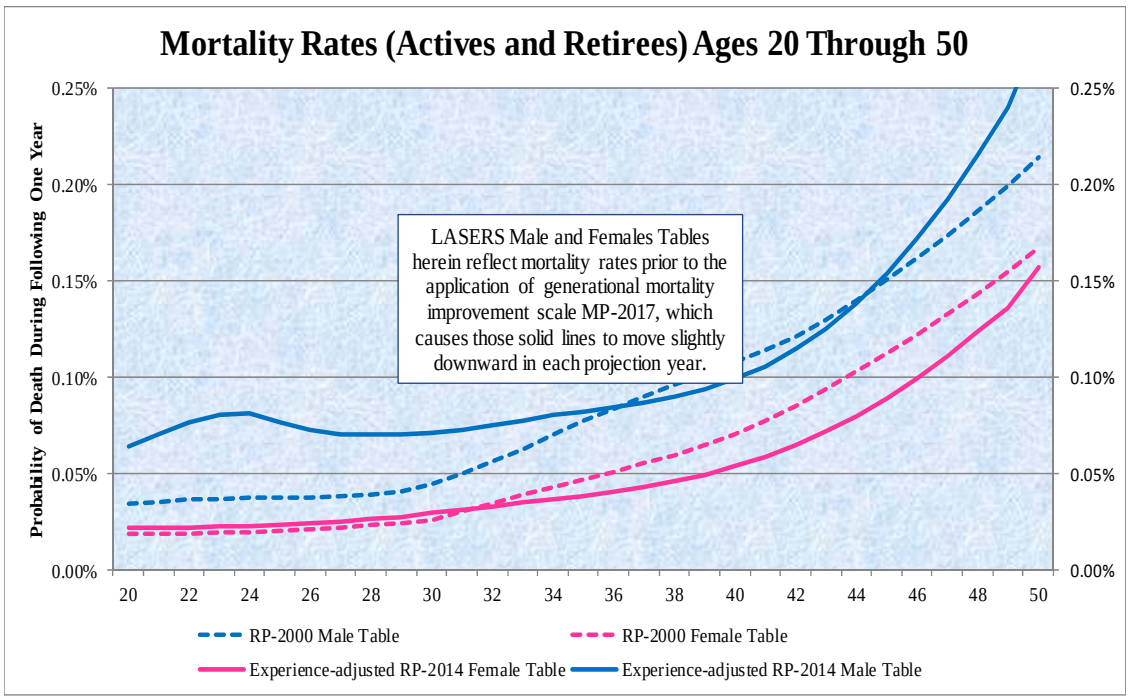
Again, in the formula, above, the credibility factor is 100% and the adjustment factor is the part in brackets. The fact that both of these LASERS-derived adjustment factors are above 100% indicate that LASERS' mortality experience (at the 2011 central year of the study) was worse than the national standard reference table (projected back to 2011).

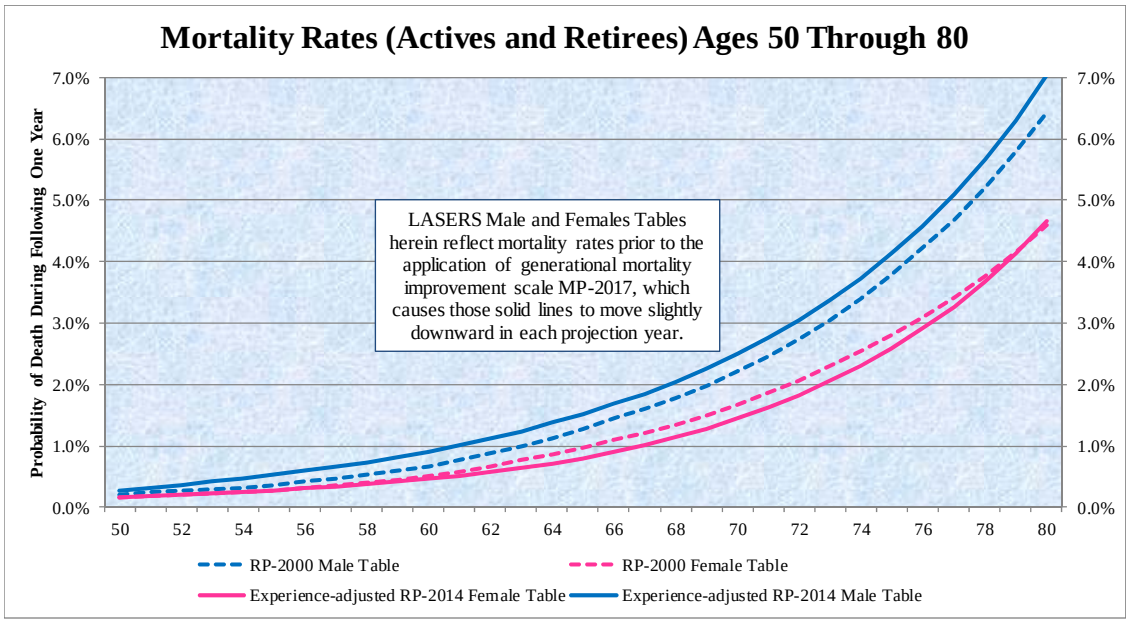
Four graphs on the following pages compare the base table mortality rates used in:

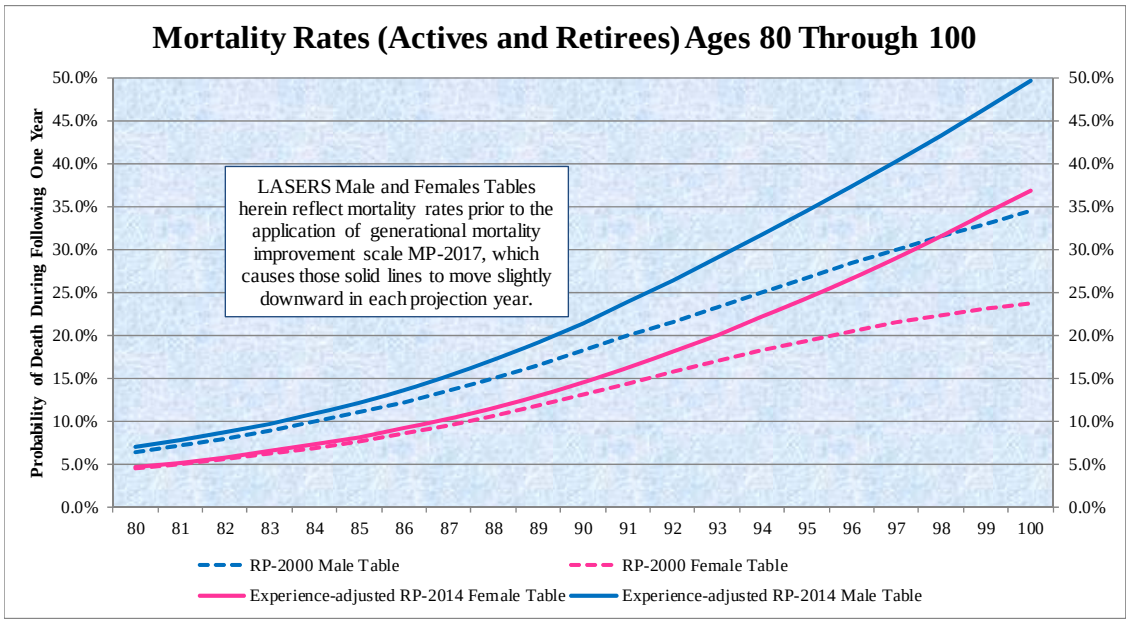
- The prior valuation (the published RP-2000 mortality tables) and
- This valuation (experience-adjusted RP-2014 mortality tables)

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


Mortality Rates (Actives and Retirees) Ages 20 Through 100
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%
20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
LASERS 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 Female Table
Experience-adjusted RP-2014 Male Table


Mortality Rates (Actives and Retirees) Ages 20 Through 50
Probability of Death During Following One Year
0.25%
0.20%
0.15%
0.10%
0.05%
0.00%
20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
LASERS 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 Female Table
Experience-adjusted RP-2014 Male Table


Mortality Rates (Actives and Retirees) Ages 50 Through 80
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
LASERS 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 Female Table
Experience-adjusted RP-2014 Male Table


Mortality Rates (Actives and Retirees) Ages 80 Through 100
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
LASERS 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 Female Table
Experience-adjusted RP-2014 Male Table

MP-2017 Improvement Scale

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. The MP-2017 improvement scale is therefore used. The MP-2017 generational improvement scale was applied to the LASERS-adjusted version of RP-2014 base table.

The actuarial profession (as represented by the RPEC of the Society of Actuaries) prefers this generational approach for recognizing future mortality improvement, rather than simply projecting improvements to a static future date.

Actuarial Practice

We recognize that experience studies for larger systems are generally performed every five years, and the next such study for LASERS is scheduled to be prepared in 2019. However, 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.

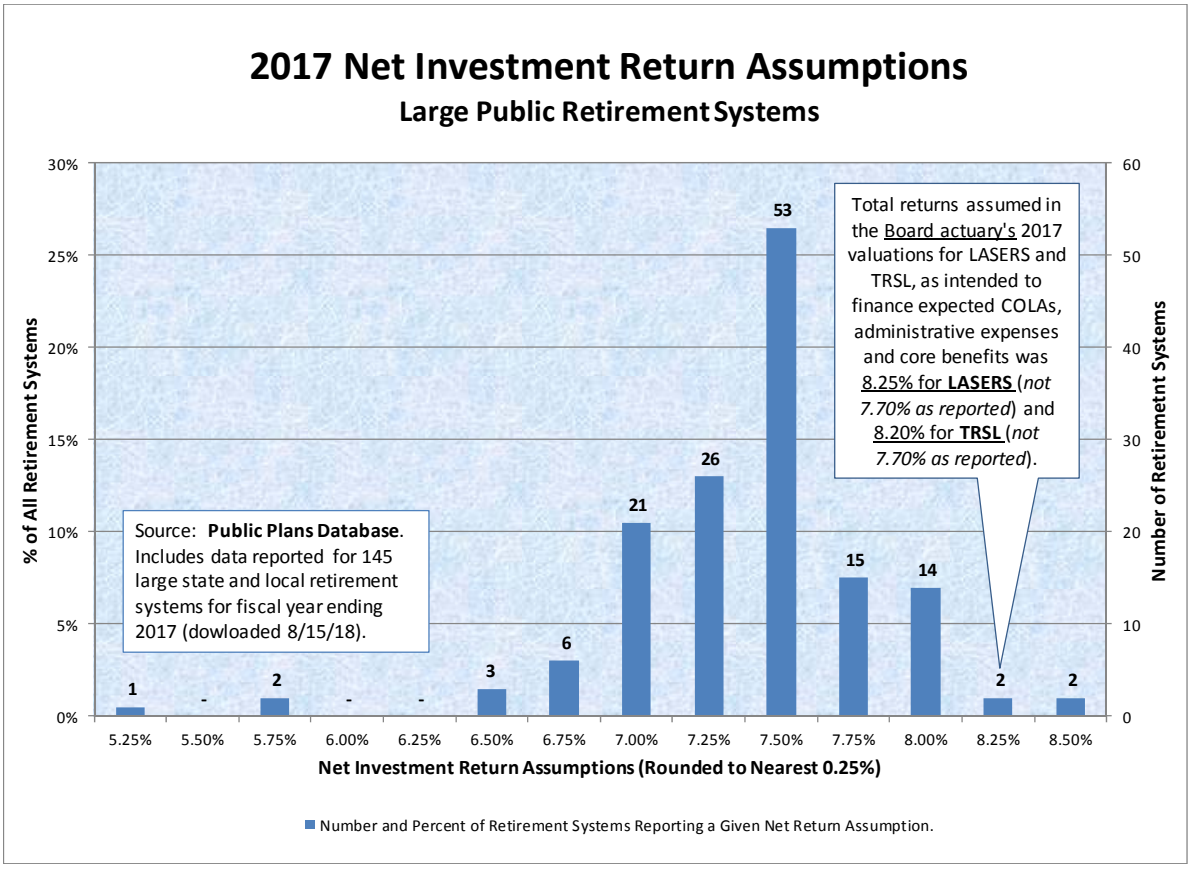
We believe the mortality table used in this 2018 actuarial valuation (developed as described above) satisfies that ASOP and is consistent with current actuarial literature.

APPENDIX C
RETURN ASSUMPTIONS FOR OTHER LARGE RETIREMENT SYSTEMS

COMPARISON OF 2017 RETURN ASSUMPTIONS

For the 2017 actuarial valuation, LASERS' retirement board and actuary used a net investment return assumption of (a) 8.25% for the calculation of the System's unfunded actuarial liability as of June 30, 2017 and (b) 8.05% for the calculation of the prospective contribution rate for the year ending June 30, 2019. PRSAC accepted that valuation report.

For perspective, the following chart presents the distribution of 2017 return assumption for large retirement systems, using the same database as NASRA uses for their research and publications.

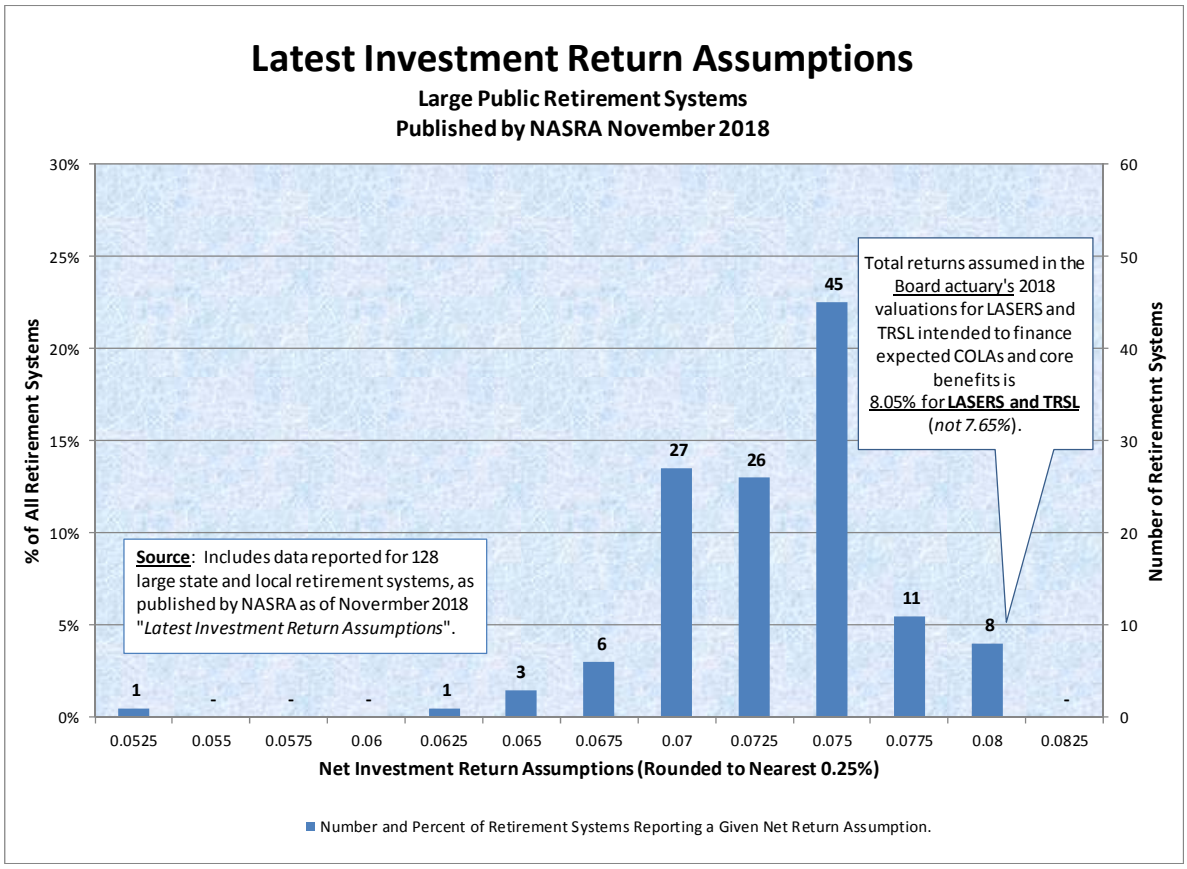


The System's 2017 return assumption has been said to be 7.70%; but it was actually 8.25%, not 7.70%. Refer to the Summary and Conclusions section of this report for support of this observation. In order to finance the core/regular benefits, expected COLA benefits and administrative expenses, LASERS' actuarial valuation was prepared assuming 8.25% was needed in total.

COMPARISON OF 2018 RETURN ASSUMPTIONS

For the System's 2018 valuation report, the return assumption needed to finance all expected plan benefits (core benefits and gain-sharing COLAs) is actually 8.05%, not 7.65%. Consider how this compares to other large retirement systems, as published by NASRA.

Comparing the previous chart and this chart, the reader can see the continued and significant movement downward in return assumptions by large public sector retirement systems.

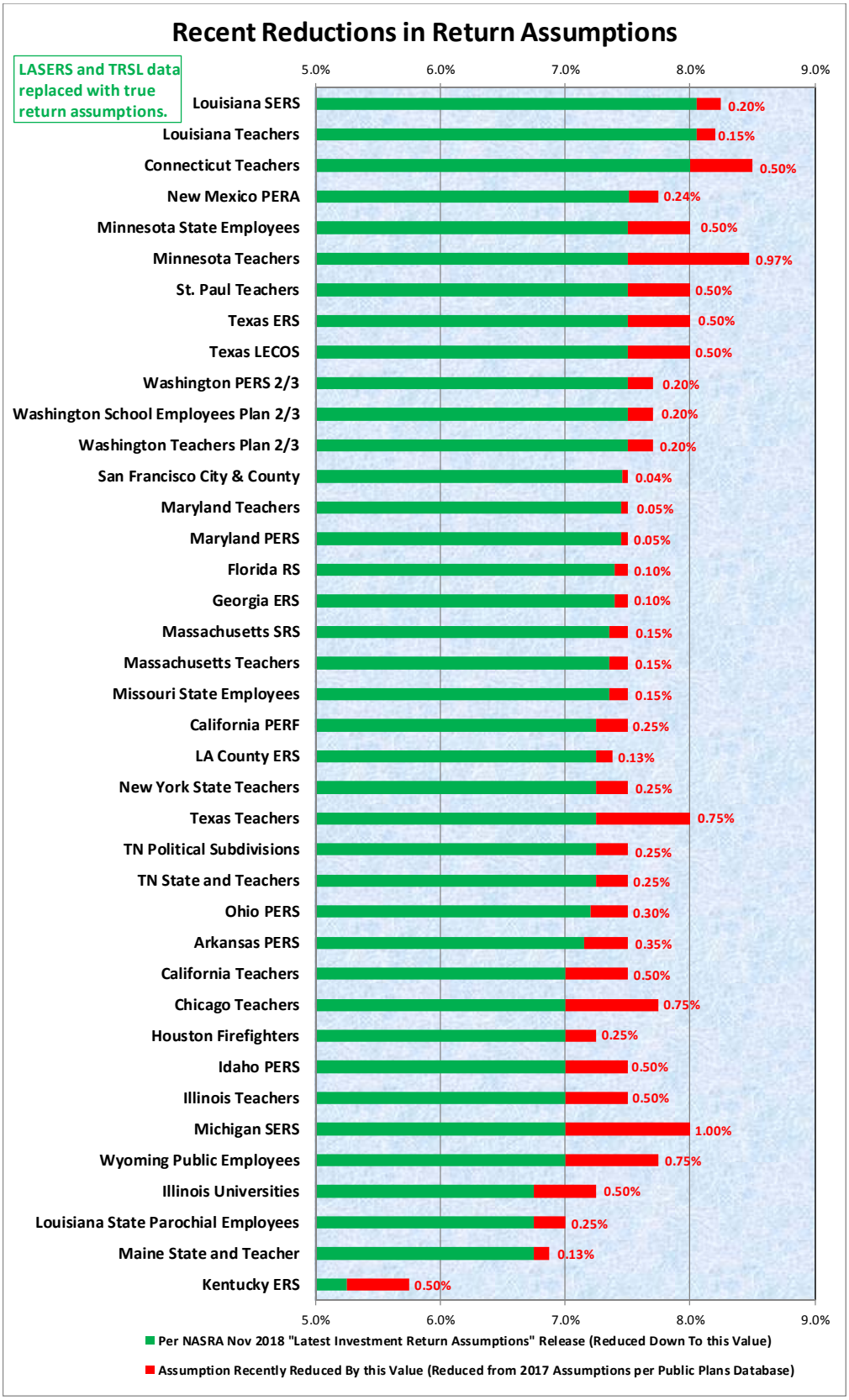


For this actuarial valuation report, as derived in Appendices D through G, the actuary for the LLA uses a net investment return assumption (same as discount rate) of 7.50% for all purposes. This valuation's assumption of 7.50% is at the upper end a range of reasonableness for this year (6.50% to 7.50%). As derived in Appendices D through G, the "most appropriate" net return assumption for this valuation would be 7.00%.

SYSTEM-BY-SYSTEM REDUCTIONS

Consider the prevalence and magnitude of recent reductions in return assumptions among large public sector retirement systems in the past year, as shown in the chart below.

Also, please refer to Appendix J for press clippings for positive statements by the systems, state treasurers, and others about their reductions in return assumptions.


Recent Reductions in Return Assumptions
LASERS and TRSL data replaced with true return assumptions.
5.0%
6.0%
7.0%
8.0%
9.0%
Louisiana SERS 0.20%
Louisiana Teachers 0.15%
Connecticut Teachers 0.50%
New Mexico PERA 0.24%
Minnesota State Employees 0.50%
Minnesota Teachers 0.97%
St. Paul Teachers 0.50%
Texas ERS 0.50%
Texas LECOS 0.50%
Washington PERS 2/3 0.20%
Washington School Employees Plan 2/3 0.20%
Washington Teachers Plan 2/3 0.20%
San Francisco City & County 0.04%
Maryland Teachers 0.05%
Maryland PERS 0.05%
Florida RS 0.10%
Georgia ERS 0.10%
Massachusetts SRS 0.15%
Massachusetts Teachers 0.15%
Missouri State Employees 0.15%
California PERF 0.25%
LA County ERS 0.13%
New York State Teachers 0.25%
Texas Teachers 0.75%
TN Political Subdivisions 0.25%
TN State and Teachers 0.25%
Ohio PERS 0.30%
Arkansas PERS 0.35%
California Teachers 0.50%
Chicago Teachers 0.75%
Houston Firefighters 0.25%
Idaho PERS 0.50%
Illinois Teachers 0.50%
Michigan SERS 1.00%
Wyoming Public Employees 0.75%
Illinois Universities 0.50%
Louisiana State Parochial Employees 0.25%
Maine State and Teacher 0.13%
Kentucky ERS 0.50%
5.0%
6.0%
7.0%
8.0%
9.0%
Per NASRA Nov 2018 "Latest Investment Return Assumptions" Release (Reduced Down To this Value)
Assumption Recently Reduced By this Value (Reduced from 2017 Assumptions per Public Plans Database)

APPENDIX D
BASIS FOR INFLATION ASSUMPTION

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

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 some of the actuarial assumptions developed by LASERS' actuary and adopted by its board, while we reject 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 last PRSAC-accepted valuation.

1. When mortality rates are developed based on a retirement system's own experience, they should be developed in accordance with current actuarial literature.

2. 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.

3. The expected future cost-of-living (COLA) benefits should be measured using an actuarial method that is:
   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.

4. One set of assumptions is used for the calculation of the unfunded actuarial liability as of June 30, 2018, and the contribution rate for the year ending June 30, 2020.
   a. *A change*. LASERS' board and actuary use two set of assumptions in a given actuarial valuation report, one for the UAL and one for the projected contribution rate.
   b. *Simple*. Less complicated for a given actuarial valuation report.
   c. *Transparent.* Clear as to what the assumptions are; no confusion with multiple assumptions used for different purposes in the same report.
   d. *Consistent with actuarial practice.* Consistent with the method used by other actuaries around the country and in Louisiana when assumptions are changed.
   e. *Consistent with the need for new assumptions.* If a new set of assumptions is more appropriate, and adopted for use in an actuarial valuation, that new set of assumptions should consistently be used for all purposes throughout the actuarial valuation report.

The improvements in these four 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 State's financial disclosures by ensuring the balance sheet liabilities are a more transparent and fair representation of the pension obligation.

This Appendix D 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 look 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.

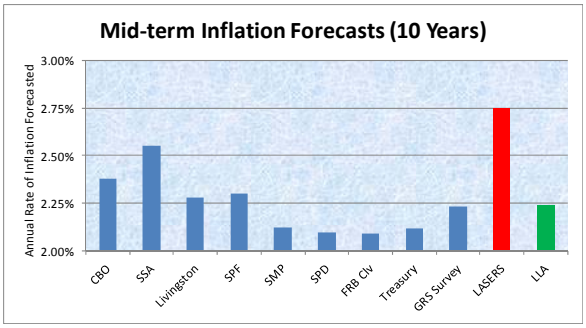
Our preferred inflation assumption for a 30-year horizon would be 2.41%, the consensus average directly from six (6) expert sources of long-term inflation forecasts

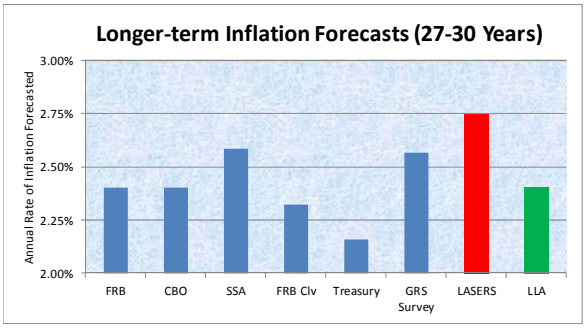
Both mid-term and long-term horizons of inflation forecasts are used in developing our final net return assumption. It would be a false choice to be forced to pick between mid-term and long-term for the net return assumption. The composite single equivalent benefit horizon turns out to be much closer 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 F. 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.

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 2.75% rate for its 2018 valuation.

Clearly, an inflation assumption of 2.75% for a mid-term horizon of 10 years is an outlier and cannot be defended. It is also very difficult to defend an inflation assumption of 2.75% even for a long-term assumption of 30 years. Refer to the table above for specific forecasts among professional specialists in forecasting inflation for any forecast that is 2.7%%.

A consensus of unbiased and independent opinions of leading inflation forecasters is most appropriate for this valuation. 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 E
BASIS FOR NET INVESTMENT RETURN ASSUMPTION

Appendix E: Basis for Net Investment Return Assumption

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

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 some of the actuarial assumptions developed by LASERS' actuary and adopted by its board, while we reject 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 last PRSAC-accepted valuation.

1. When mortality rates are developed based on a retirement system's own experience, they should be developed in accordance with current actuarial literature.

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   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.

3. The expected future cost-of-living (COLA) benefits should be measured using an actuarial method that is:
   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.

4. One set of assumptions is used for the calculation of the unfunded actuarial liability as of June 30, 2018, and the contribution rate for the year ending June 30, 2020.
   a. *A change*. LASERS' board and actuary use two set of assumptions in a given actuarial valuation report, one for the UAL and one for the projected contribution rate.
   b. *Simple*. Less complicated for a given actuarial valuation report.
   c. *Transparent.* Clear as to what the assumptions are; no confusion with multiple assumptions used for different purposes in the same report.
   d. *Consistent with actuarial practice.* Consistent with the method used by other actuaries around the country and in Louisiana when assumptions are changed.
   e. *Consistent with the need for new assumptions.* If a new set of assumptions is more appropriate, and is adopted for use in an actuarial valuation, the new set of assumptions should consistently be used for all purposes throughout the actuarial valuation report.

The improvements in these four 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 State's financial disclosures by ensuring the balance sheet liabilities are a more transparent and fair representation of the pension obligation.

This Appendix E 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. Our role is not to set or recommend assumptions to assist the employers in balancing their current budgets.

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 13 target asset allocation percentages set forth in the System's formal Investment Policy Statement last updated August 1, 2018.

2018 LASERS Target Asset Allocation			
Risk Assets		**Fixed Income Assets**	
Domestic Large Cap	13%	Core Fixed Income	3%
Domestic Mid Cap	4%	Domestic High Yield	3%
Domestic Small Cap	6%	Global Multi-Sector	7%
Established International (Lg Cap)	15%	Emerging Market Debt	3%
Established International (Sm Cap)	5%		
Emerging International Equity	12%		
Private Markets	15%	*Total Fixed Income Assets*	*16%*
Absolute Return	7%		
Risk Parity	7%		
Total Risk Assets	*84%*	*Total Asset Allocation*	*100%*

Source: Current LASERS Investment Policy Statement (dated August 1, 2018)

This asset allocation is riskier than other pension funds. Even the fund's allocations to fixed income assets are risk-oriented. It is, therefore, expected to earn somewhat more than others with more conservative portfolios. As a result, this System's expected rate of return *should* be greater than other retirement systems with lower allocations to risk assets.

Refer to Appendix I 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
		Wilshire[IC]	

[IC] *In the top 25 largest investment consultants, according to the most recent survey from P&I.*
[IM] *In the top 10 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 D, 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 LASERS

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
	40th	50th	60th	8.05%
1	4.51%	5.55%	6.60%	27.49%
2	4.83%	6.09%	7.36%	34.90%
3	5.20%	6.25%	7.30%	33.33%
4	5.43%	6.47%	7.52%	35.15%
5	5.16%	6.52%	7.91%	39.00%
6	5.46%	6.55%	7.64%	36.40%
7	5.36%	6.55%	7.75%	37.62%
8	5.43%	6.59%	7.76%	37.65%
9	5.27%	6.68%	8.12%	40.46%
10	5.66%	6.82%	7.99%	39.47%
11	5.97%	7.08%	8.19%	41.27%
12	7.22%	8.25%	9.30%	51.96%
Average	**5.46%**	**6.62%**	**7.79%**	**37.89%**
Average of Middle* 10	**5.38%**	**6.56%**	**7.75%**	**37.53%**

* 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 5.55% to 8.25%.

b. The 50th percentile consensus expert mid-term forecast is 6.62%.

c. The consensus of these experts is that there is only a 37.89% chance of achieving at least the current 8.05% over the mid-term horizon. *The System's current return assumption is 8.05% (not 7.65% or 7.60%).* This does not mean a 37.89% chance of achieving the 8.05% assumption in any year during the horizon; it means that the compound return over the next 10 years has a 37.89% of achieving at least the 8.05% assumption.

This is why, actuarially speaking, the 6.62% 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 6.62% 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			Probability of exceeding
	40th	50th	60th	8.05%
A	6.58%	7.27%	7.97%	38.81%
B	6.55%	7.27%	8.00%	39.36%
C	6.88%	7.59%	8.31%	43.54%
D	7.11%	7.86%	8.61%	47.45%
Average	6.78%	7.50%	8.22%	40.57%

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 7.27% to 7.86%.

2. The 50th percentile expectation of the consensus average for the long-term horizon is 7.50%.

3. The consensus of these experts is that there is only a 40.57% chance of achieving at least the current 8.05% over the long-term horizon. *The System's current return assumption is 8.05% (not 7.65% or 7.60%).* This does not mean a 40.57% chance of achieving the 8.05% assumption in any year during the horizon; it means the compound return over the next 27 years has a 40.57% of achieving at least the 8.05% assumption.

This is why, actuarially speaking, the 7.50% 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 7.50% 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 F 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 F
HORIZON FOR THE
NET INVESTMENT RETURN ASSUMPTION

Appendix F: 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.

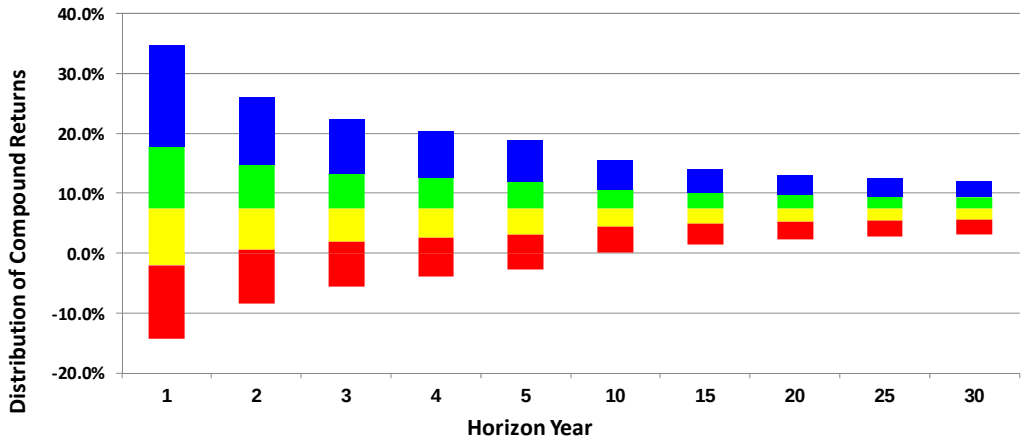
Compelling reason #3: Return forecasts over a longer-term horizon are the less reliable.

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.

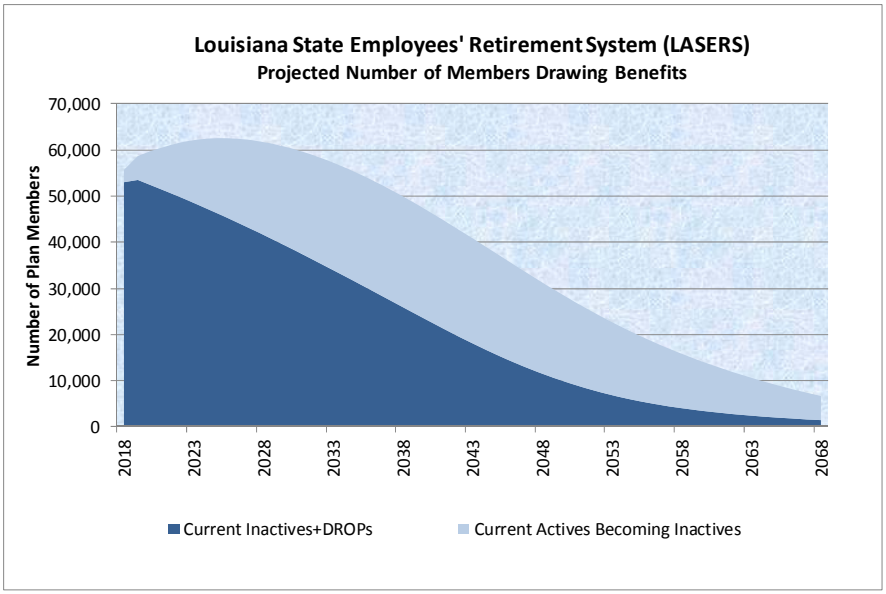
Retirement system A can comfortably adopt a longer-term horizon for its expected investment return assumption because it has a long time to make up for the lower earnings that are expected in the mid-term (e.g., years 1-10) before it has to actually pay benefits out of the fund.

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).

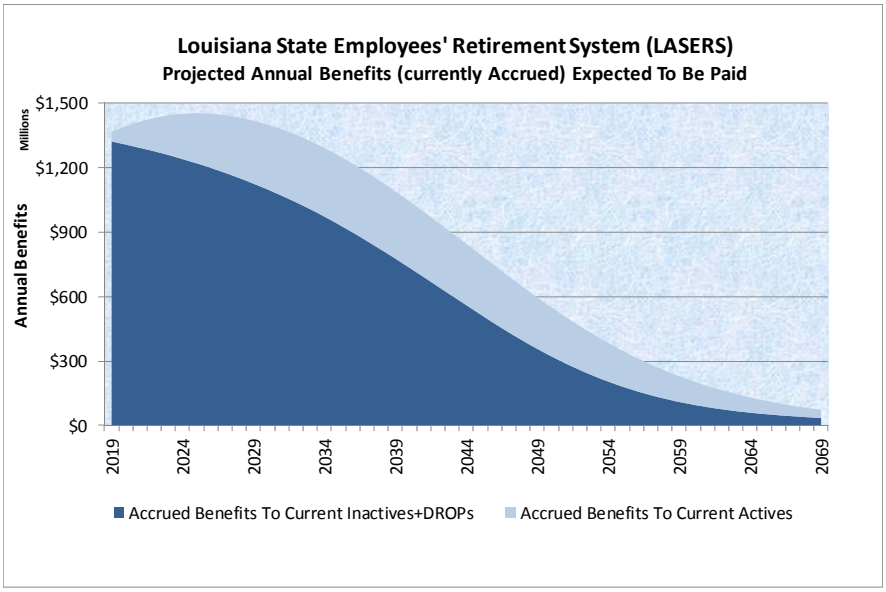
Even if one were to a accept long-term horizon for setting return assumptions, in disregard of the first three arguments outlined in the immediately preceding pages, he or she would need to take into account the systems own benefit demands and adopt a return assumption somewhere between the mid-term 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.

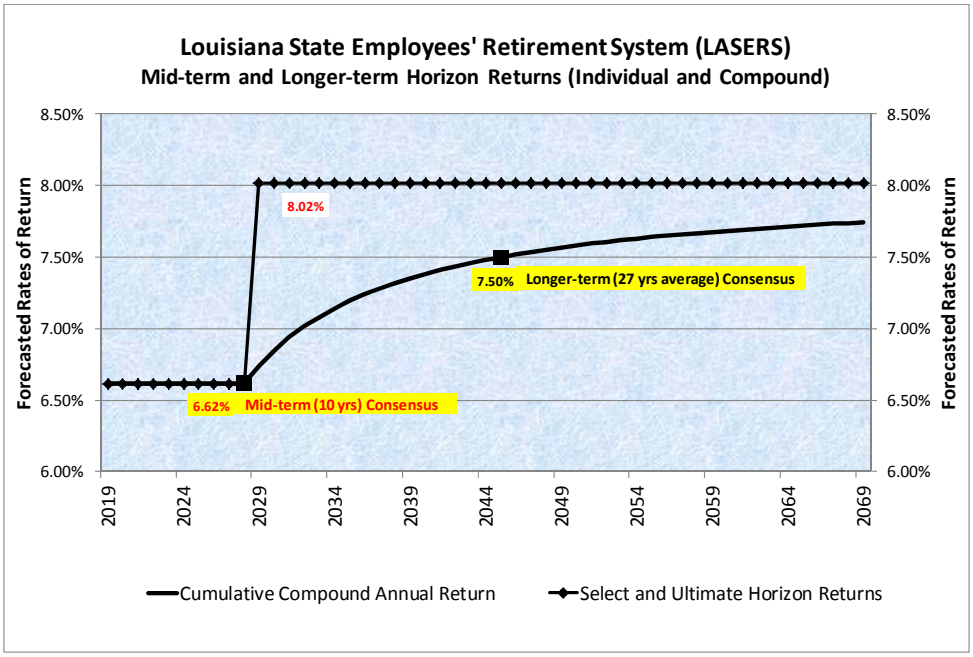


Over 50,000 current retirees are drawing benefits and will continue to do so until death. More retirees will be added to the roll from current active employees retiring in the years ahead, and then they will continue to receive benefits until death.



Currently, over more than $1 billion 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.

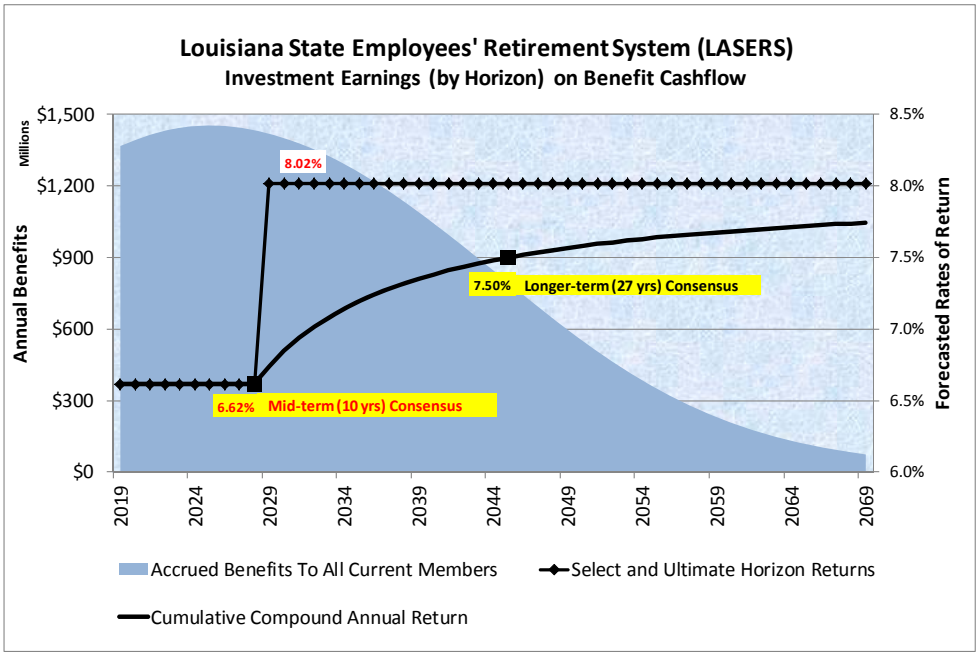


As presented in the previous Appendix E, the consensus 50th percentile expectation for the compound annual returns over the next 10 years (years 1-10) is 6.62%, and over the full 30 years (years 1-30) it is 7.50%. In order for the 30-year average to be 7.50%, the returns during each of the years 11-30 need to be 8.02% (in order to make up for drag in returns for years 1-10).

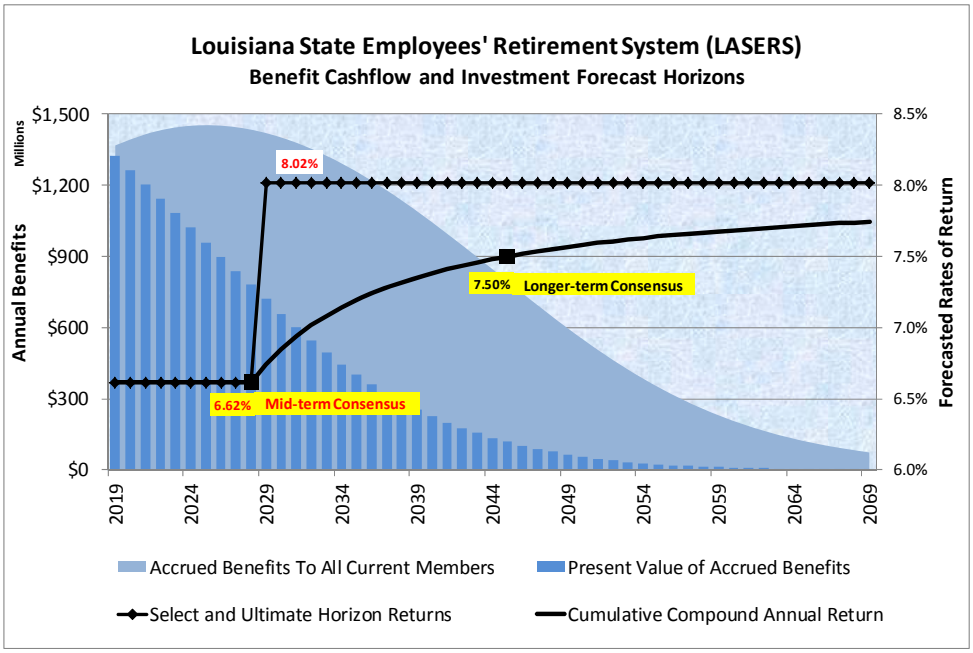
The curved line from 2028 through 2069 represents the cumulative compound average returns at each point, comprised of returns of 6.62% per year for years 1-10 compounded with returns of 8.02% each year thereafter. Notice at 27 years, the compound average return is the forecasted 7.50%.

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.

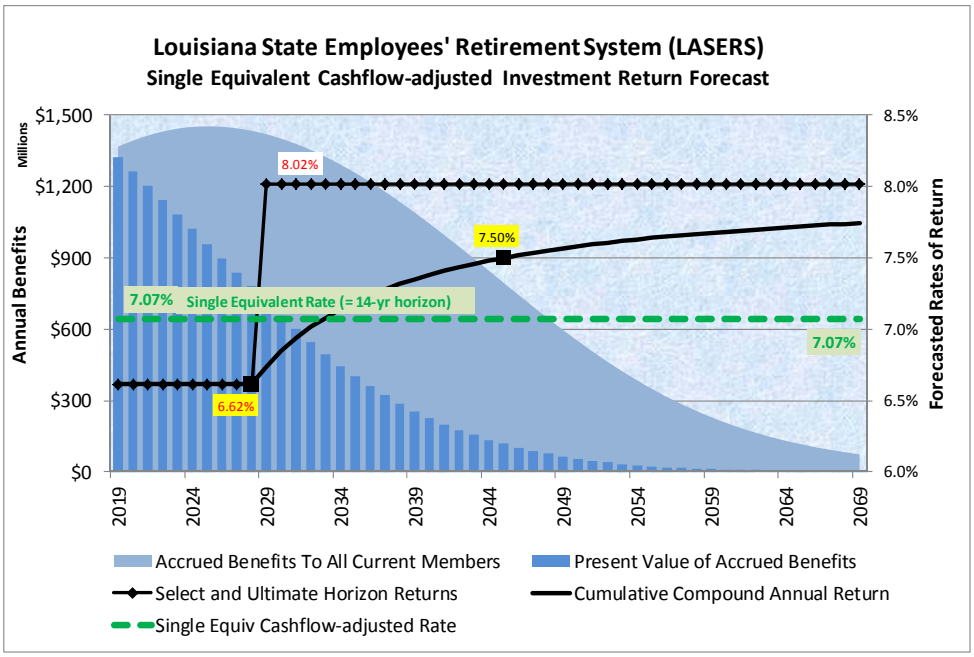
In the graph below, overlay the total annual benefits (accrued to current retirees and current actives becoming retired) to illustrate the time when the benefit assets are still in the fund.



In the graph below, overlay 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 6.62% per year, while assets that will pay the benefits for years 11-20 will be earning only 6.62% for years 1-10 and 8.02% 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 7.07%.



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 14 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 6.62% consensus of 10-year expectations is even more appropriate than the 7.07% single equivalent return assumption. There is merit in that position for those three compelling reasons.

We chose to use a rounded-down assumption of 7.0% as the "most appropriate" return assumption. However, as set forth in the following Appendix G, we consider a range of reasonableness around (above and below) this most appropriate return assumption.

APPENDIX G
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 F is 7.00%, rounding down from 7.07% to reflect less confidence in the long-term return forecasts.

The actuary for the Louisiana Legislative Auditor, therefore, adopts 7.00% 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 7.00%.

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 59 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 99 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 7.00% most appropriate return assumption. *This results in a reasonable range of 6.50% to 7.50%.*

A choice of 7.50%, even though lying within the reasonable range, lies at the upper extremities of reasonableness and, should be considered aggressive.

A valuation assumption of 7.50% is not conservative. The 7.00% 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, 6.50%, should be considered conservative.

APPENDIX H
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 H.

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.

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.

The System's board and actuary have included the value of future COLAs, as described above, in each of the last several annual funding valuations. We concur that it is essential to recognize the costs and liabilities of future COLAs in all actuarial valuations, and have done so in this valuation.

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 (which is currently employed by the System and its actuary) 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 (which is currently employed by the System and its actuary) 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 is the current method employed by the System and its actuary. It 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 a confusion between the return assumption and discount rate. For 2017, as described in Appendix C, page C-1, the System assumed 8.25% as the total rate of return (net of investment-related expenses) to finance the core/regular benefits, the gain-sharing COLA benefits and administrative expenses. They *reduced the return assumption* by 0.40% as an estimate of the cost of gain-sharing COLAs and by 0.15% for the administrative expenses, which resulted in a final discount rate of 7.70%. These are called implicit adjustments to the return assumption.

    The System has disclosed 8.25% as its return assumption to some audiences but 7.70% to broader audiences, while they really mean their discount rate was 7.70%. This has led 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 7.62% during years 1-10,
- A mean of 8.52% during years 11-30, and
- A standard deviation of 14.75% 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 D through G.

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 D and E), 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.

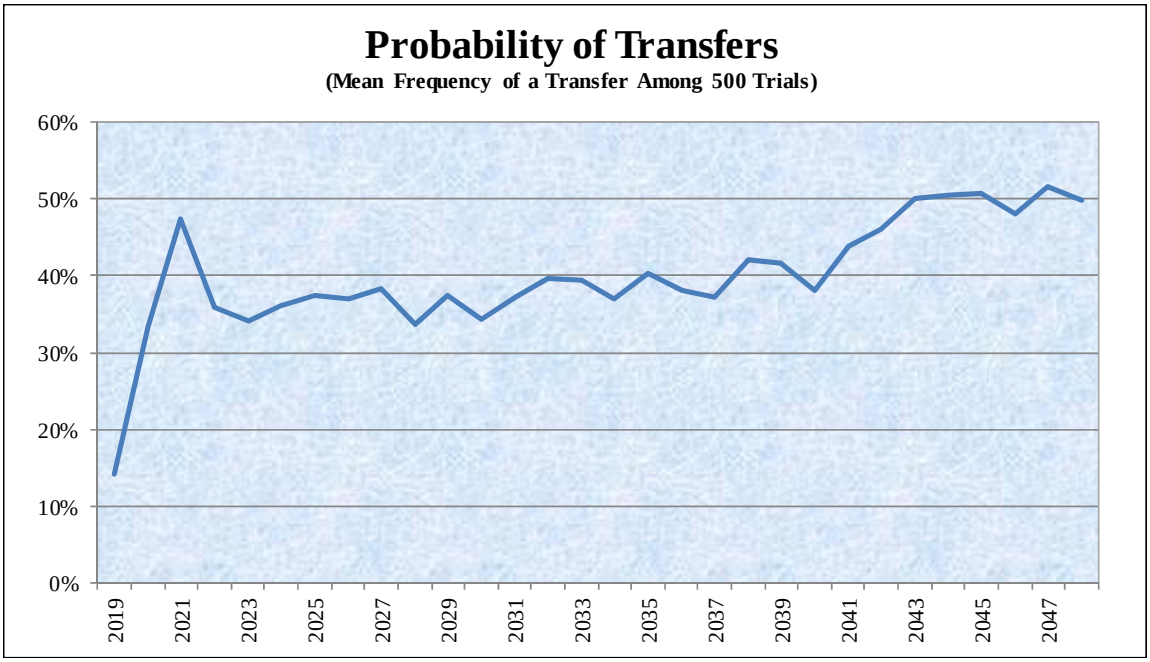
The model built for this purpose includes the following primary steps, as well as numerous other intermediary tests and calculations:

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.

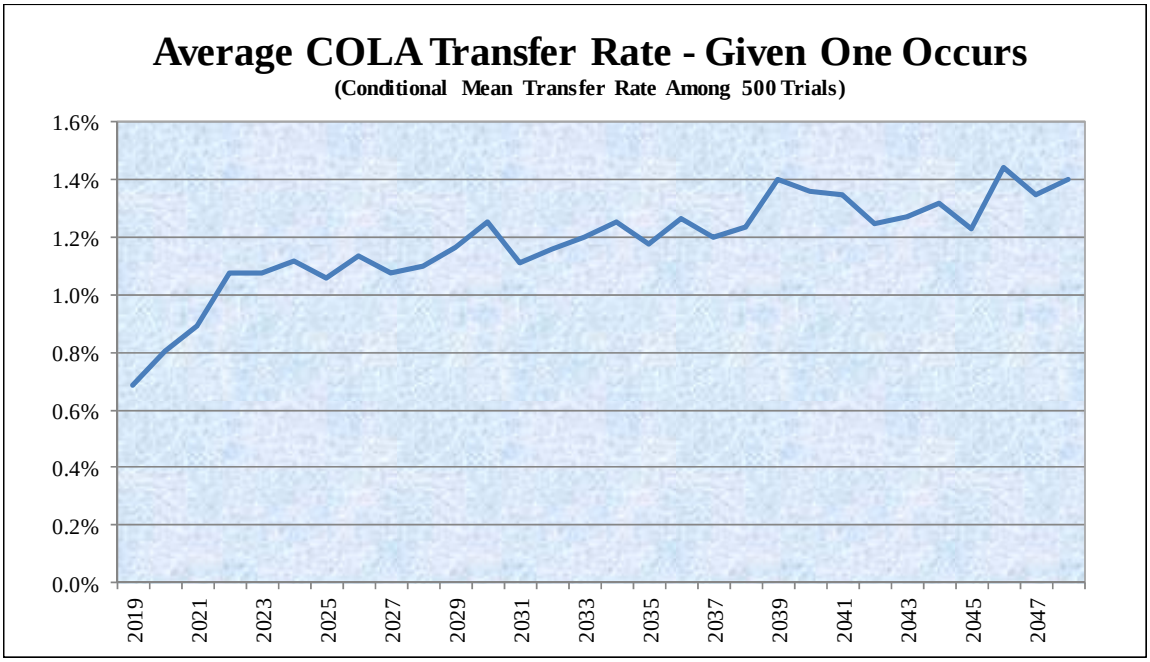
In some years, the model expects a transfer to the Experience Account and in some years expects none. For each year in which the model expects a transfer, the amount can vary widely.

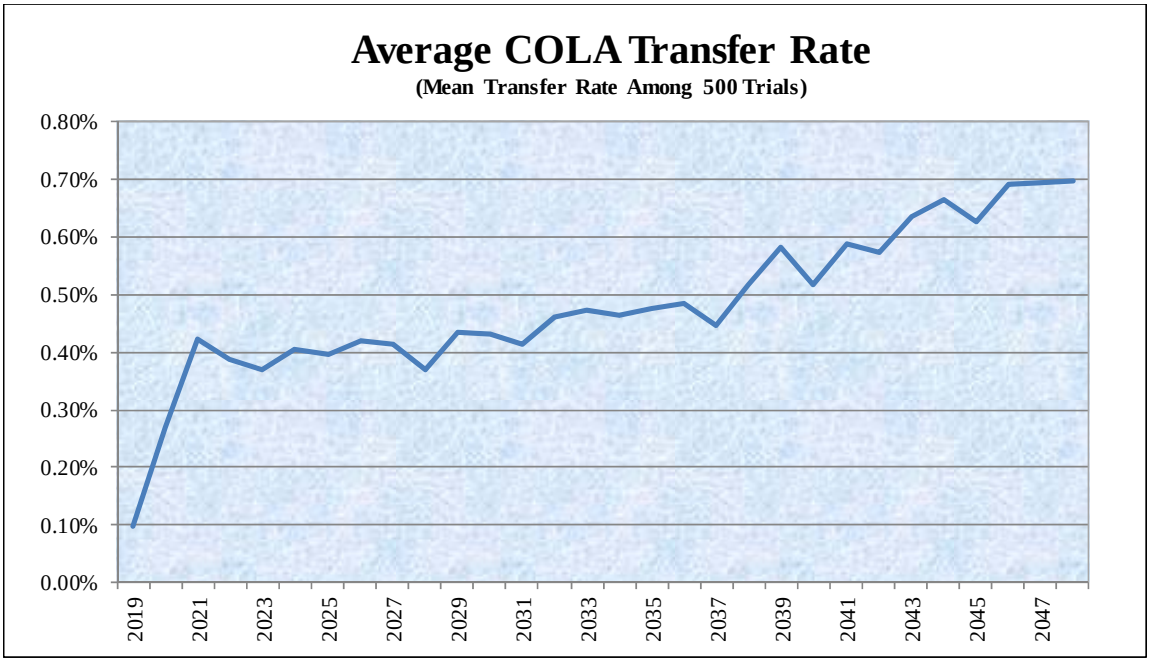
The mean (average) amount expected to be transferred to the Experience Account each year was captured and their present value calculated. *It was determined that a 0.40% annual cost-of-living increase (COLA) would produce the same additional present value.* This is not to be confused with the 0.40% which the board actuary reduces the total return assumption to obtain the discount rate. That is a different 0.40%. This is the fixed annual COLA rate that approximates the statutory COLA template. This 0.40% annual COLA rate is approximately same result obtained in the last two years. 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 LASERS' gain-sharing COLA program.



Based on the graph above, during each of the next 20 years there is a 35% to 40% chance of a transfer to the Experience Account and during the years 20-30 there is a 40% to 50% chance of such a transfer. 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 0.40% as a reasonable approximation of the future workings of the actual statutory gain-sharing COLA template.

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

Appendix I: 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	6.6	6.5	5.8	6.1	6.4
Ratio of actuarial accrued liability to payroll	10.2	10.3	10.1	9.8	9.9
Funded ratio	64%	63%	58%	63%	65%
Ratio of actives to inactives and beneficiaries	0.3	0.3	0.3	0.3	0.3
Net cash in (out) flow: in millions	$ (496)	$ (505)	$ (410)	$ (375)	$ (476)
Ratio of net cash flow to market value of assets	-4.0%	-4.3%	-3.8%	-3.3%	-4.1%
Duration of the actuarial accrued liability	10.0	NA	NA	NA	NA

Source: System's Comprehensive Annual Financial Reports

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.

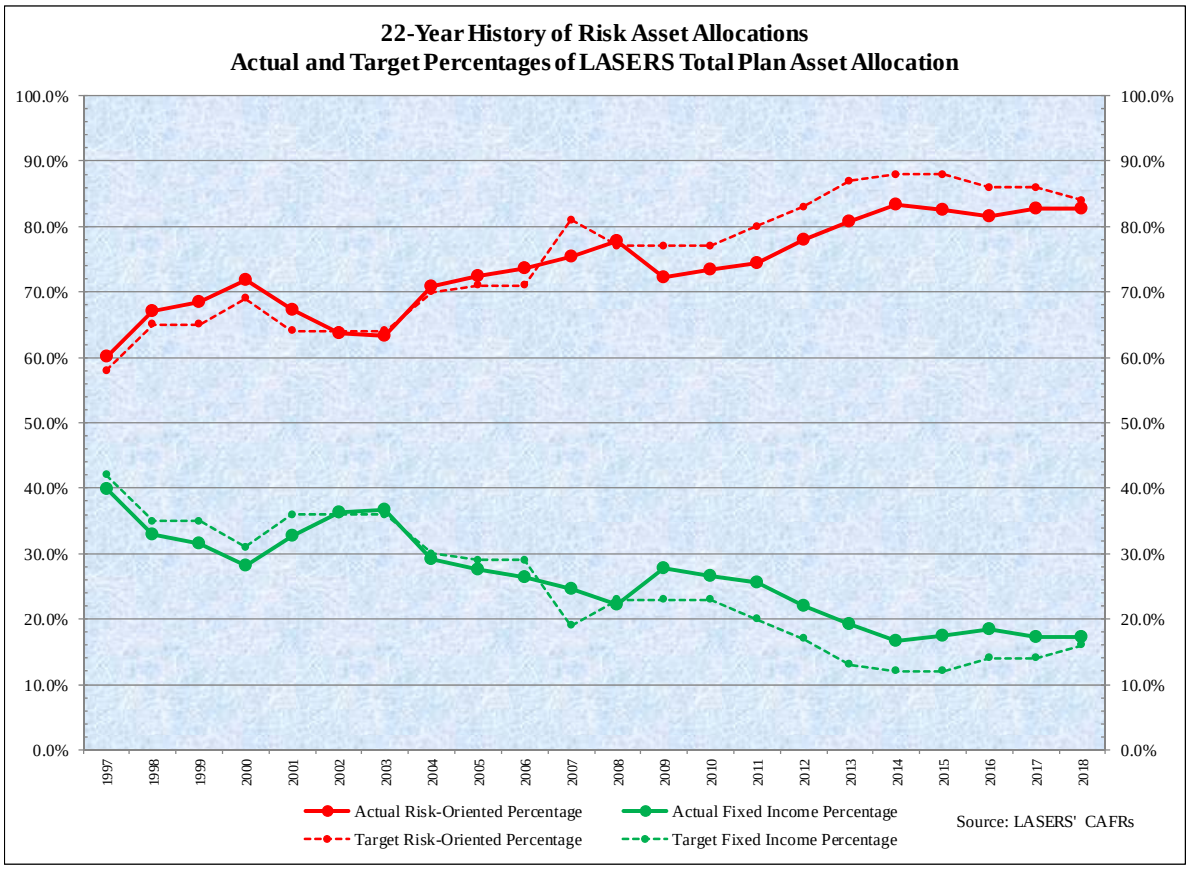
Duration of Actuarial Accrued Liability

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%.

Asset Allocation

Focusing on investment risk, the primary source of volatility risk in a retirement plan's unfunded actuarial liability, funded ratio and employer contributions is mostly ascribed to the fund's asset allocation.

A larger portion of a fund's assets allocated to risk-oriented asset classes means a larger expected return coupled with a larger expected volatility in returns. The following chart illustrates the progression of the System's investments toward more risk-oriented asset classes.



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 J
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 J: 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 J: 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 J: 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

Appendix J: Press Clippings for Retirement Systems Lowering Return Assumptions

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

Appendix J: Press Clippings for Retirement Systems Lowering Return Assumptions

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