FIREFIGHTERS' RETIREMENT SYSTEM

ACTUARIAL VALUATION AS OF
JUNE 30, 2018

G. S. CURRAN & COMPANY, LTD.

Actuarial Services

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November 5, 2018

Board of Trustees
Firefighters' Retirement System
3100 Brentwood Drive
Baton Rouge, LA 70809

Gentlemen:

We are pleased to present our report on the actuarial valuation of the Firefighters' Retirement System for the fiscal year ending June 30, 2018. Our report is based on the actuarial assumptions specified and relies on the data supplied by the system's administrators and accountants. This report was prepared at the request of the Board of Trustees of Firefighters' Retirement System of the State of Louisiana. The primary purpose of this report is to determine the actuarially required contribution for the retirement system for the fiscal year ending June 30, 2019 and to recommend the net direct employer contribution rate for Fiscal 2020. This report does not contain the information necessary for accounting disclosures as required by Governmental Accounting Standards Board (GASB) Statements 67 and 68; that information is included in a separate report. This report was prepared exclusively for Firefighters' Retirement System for a specific limited purpose. It is not for the use or benefit of any third party for any purpose.

In our opinion, all of the assumptions on which this valuation is based are reasonable individually and in the aggregate. Both economic and demographic assumptions are based on our expectations for future experience for the fund. This report has been prepared in accordance with generally accepted actuarial principles and practices, and to the best of our knowledge and belief, fairly reflects the actuarial present values and costs stated herein. The undersigned actuaries are members of the American Academy of Actuaries and have met the qualification standards for the American Academy of Actuaries to render the actuarial opinions incorporated in this report, and are available to provide further information or answer any questions with respect to this valuation.

Sincerely,

G. S. CURRAN & COMPANY, LTD.

By: Gary Curran, F.C.A., M.A.A.A., A.S.A. Gregory M. Curran

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SUMMARY OF VALUATION RESULTS
FIREFIGHTERS' RETIREMENT SYSTEM

Valuation Date:		June 30, 2018	June 30, 2017
Census Summary:	Active Members	4,424	4,429
	Retired Members and Survivors	2,327	2,289
	DROP Participants	192	173
	Terminated Due a Deferred Benefit	76	72
	Terminated Due a Refund	656	597
Payroll (excluding DROP participants):		$ 236,005,445	$ 232,500,397
Benefits in Payment (excluding DROP accruals):		$ 91,808,883	$ 88,444,685
Present Value of Future Benefits		$ 2,866,047,701	$ 2,733,929,875
Actuarial Accrued Liability (EAN):		$ 2,279,256,967	$ 2,166,881,556
Unfunded Actuarial Accrued Liability:		$ 537,805,006	$ 523,874,481
Actuarial Value of Assets (AVA):		$ 1,741,451,961	$ 1,643,007,075
Market Value of Assets (MVA):		$ 1,704,049,168	$ 1,593,696,648
Ratio of AVA to Actuarial Accrued Liability:		76.40%	75.82%

	Fiscal 2018	Fiscal 2017
Market Rate of Return:	6.5%	13.6%
Actuarial Rate of Return:	5.6%	5.7%

	Fiscal 2019		Fiscal 2018
Employers' Normal Cost (Mid-year):	$ 34,904,077		$ 33,146,680
Amortization Cost (Mid-year):	$ 58,710,108		$ 59,779,684
Estimated Administrative Cost:	$ 1,975,435		$ 1,609,870
Expected Insurance Premium Taxes Due:	$ 26,807,631		$ 25,953,989
Net Direct Employer Actuarially Required Contributions:	$ 68,781,989		$ 68,582,245
Projected Payroll:	$ 242,900,383		$ 239,205,188
Statutory Employee Contribution Rate: *	10.00%		10.00%
Board Approved Net Direct Employer Contribution Rate: *	26.50%	†	26.50%
Actuarially Required Net Direct Employer Contribution Rate: *	28.32%		28.67%

	Fiscal 2020	Fiscal 2019
Minimum Recommended Net Direct Employer Cont. Rate: *	27.75%	26.25%

* The above rates are for members with earnings greater than the Department of HHS poverty guidelines. For members with earnings below the poverty guidelines, employer rates will be 2.0% higher and employee rates will be 2.0% lower.

† The Board elected to set the Net Direct Employer Contribution Rate higher than the 26.25% minimum recommended rate

GENERAL COMMENTS

The values and calculations in this report were determined by applying statistical analysis and projections to system data and the assumptions listed. There is sometimes a tendency for readers to either dismiss results as mere “guesses” or alternatively to ascribe a greater degree of accuracy to the results than is warranted. In fact, neither of these assessments is valid. Actuarial calculations by their very nature involve estimations. As such, it is likely that eventual results will differ from those presented. The degree to which such differences evolve will depend on several factors including the completeness and accuracy of the data utilized, the degree to which assumptions approximate future experience, and the extent to which the mathematical model accurately describes the plan’s design and future outcomes.

Data quality varies from system to system and year to year. The data inputs involve both asset information and census information of plan participants. In both cases, the actuary must rely on third parties; nevertheless, steps are taken to reduce the probability and degree of errors. The development of assumptions is primarily the task of the actuary; however, information and advice from plan administrators, staff, and other professionals may be factored into the formation of assumptions. The process of setting assumptions is based primarily on analysis of past trends, but modification of historical experience is often required when the actuary has reason to believe that future circumstances may vary significantly from the past. Setting assumptions includes but is not limited to collecting past plan experience and studying general population demographics and economic factors from the past. The actuary will also consider current and future macro-economic and financial expectations as well as factors that are likely to impact the particular group under consideration. Hence, assumptions will also reflect the actuary’s judgment with regard to future changes in plan population and decrements in view of the particular factors which impact participants. Thus, the process of setting assumptions is not mere “guess work” but rather a process of mathematical analysis of past experience and of those factors likely to impact the future.

One area where the actuary is limited in his ability to develop accurate estimates is the projection of future investment earnings. The difficulties here are significant. First, the future is rarely like the past, and the data points available to develop stochastic trials are far fewer than the number required for statistical significance. In this area, some guess work is inevitable. However, there are tools available to lay a foundation for making estimates with an expectation of reliability. Although past data is limited, that which is available is likely to provide some insight into the future. This data consists of general economic and financial values such as past rates of inflation, rates of return variance, and correlations of returns among various asset classes along with the actual asset experience of the plan. In addition, the actuary can review the current asset market environment as well as economic forecasts from governmental and investment research groups to form a reasonable opinion with regard to probable future investment experience for the plan.

All of the above efforts would be in vain if the assumption process was static, and the plan would have to deal with the consequences of actual experience differing from assumptions after forty or fifty years of compounded errors. However, actuarial funding methods for pension plans all allow for periodic corrections of assumptions to conform with reality as it unfolds. This process of repeated correction of estimates produces results which although imperfect are nevertheless a reasonable approach to determine the contribution levels which will provide for the future benefits of plan participants.

COMMENTS ON DATA

For the valuation, the administrator of the system furnished a census in electronic format derived from the system's master data processing file indicating each active covered employee's sex, date of birth, service credit, annual salary, and accumulated contributions. Information on retirees detailing dates of birth of retirees and beneficiaries, as well as option categories and benefit amounts, was provided in like manner. In addition, data was supplied on former employees who are vested or who have contributions remaining on deposit. As illustrated in Exhibit VIII, there are 4,424 active contributing members in the system of whom 2,053 have vested retirement benefits; in addition, there are 192 participants in the Deferred Retirement Option Plan (DROP); 2,327 former members or their beneficiaries are receiving retirement benefits. An additional 732 terminated members have contributions remaining on deposit with the system; of this number 76 have vested rights for future retirement benefits. All individuals submitted were included in the valuation.

Census data submitted to our office is tested for errors. Several types of census data errors are possible; to ensure that the valuation results are as accurate as possible, a significant effort is made to identify and correct these errors. In order to minimize coverage errors (i.e., missing or duplicated individual records) the records are checked for duplicates, and a comparison of the current year's records to those submitted in prior years is made. Changes in status, new records, and previous records, which have no corresponding current record, are identified. This portion of the review indicates the annual flow of members from one status to another and is used to check some of the actuarial assumptions, such as retirement rates, rates of withdrawal, and mortality. In addition, the census is checked for reasonableness in several areas, such as age, service, salary, and current benefits. The records identified by this review as questionable are checked against data from prior valuations; those not recently verified are included in a detailed list of items sent to the system's administrative staff for verification and/or correction. Once the identified data has been researched and verified or corrected, it is returned to us for use in the valuation. Occasionally some requested information is either unavailable or impractical to obtain. In such cases, values may be assigned to missing data. The assigned values are based on information from similar records or based on information implied from other data in the record.

In addition to the statistical information provided on the system's participants, the system's administrator furnished general information related to other aspects of the system's expenses, benefits and funding. Valuation asset values as well as income and expenses for the fiscal year were based on information furnished by the by the Louisiana Legislative Auditor's office. As indicated in the system's financial statements, the net market value of the system's assets was $1,704,049,168 as of June 30, 2018. Net investment income for Fiscal 2018 measured on a market value basis was $104,507,945. Contributions to the system for the fiscal year totaled $114,419,192; benefits and expenses amounted to $108,574,617.

Notwithstanding our efforts to review both census and financial data for apparent errors, we must rely upon the system's administrative staff and accountants to provide accurate information. Our review of submitted information is limited to validation of reasonableness and consistency. Verification of submitted data to source information is beyond the scope of our efforts.

COMMENTS ON ACTUARIAL METHODS AND ASSUMPTIONS

This valuation is based on the Entry Age Normal actuarial cost method. Under the provisions of Louisiana R.S. 11:103 the funding excess for the plan which was determined to be $239,425 as of June 30, 1989 was amortized over thirty years. Subsequent experience gains and losses were amortized over fifteen years. Contribution gains or losses arising from contributions in excess of or less than the required contributions are amortized over the same period as experience gains and losses. Further changes in the unfunded accrued liability generated by mergers of groups of firefighters into the system are amortized over thirty years. All non-merger amortization bases in existence on June 30, 2002, were combined, offset, and re-amortized through June 30, 2029, in accordance with R.S. 11:103(D). The aggregate value of the bases as of that date was $175,578,584. Beginning with Fiscal 2010, actuarial gains and losses, as well as contribution gains and losses, were amortized over a 20 year period. Each year thereafter, the amortization period was set to decrease by one year until attaining a 15 year amortization period. All changes in assumptions or the method of valuing assets are amortized over 15 years. All amortization payments are on a level dollar basis.

The cost method used for this valuation generally produces normal costs which are level as a percentage of pay if assumptions are met and the composition of the active group with regard to age, sex, and service is stable. Overall costs may increase or decrease depending on payroll growth. Since payments on all of the funds amortization bases are level any payroll growth will reduce future amortization payments as a percentage of payroll. Should overall payroll contract, amortization payments will increase as a percentage of payroll.

In February of 2017, a recommendation was made to the Board of Trustees to reduce the long-term rate of return assumption. The recommendation was formed after an analysis of the system's portfolio along with expected long-term rates of return, standard deviations of return, and correlations between asset classes collected from a number of investment consulting firms in addition to the system's investment consultants, New England Pension Consultants. Based on this analysis and after discussions with the Board, a plan was approved to reduce the 7.5% valuation interest rate in effect for the Fiscal 2016 actuarial valuation to 7.0% over the subsequent five actuarial valuations with reductions of 0.10% each year, beginning with the June 30, 2017 valuation. Therefore, the assumed rate of return for the Fiscal 2018 valuation was set at 7.30%. These reductions in the valuation interest are in part based upon a reduction to the long-term inflation assumption. Therefore, the assumed long-term inflation rate will be reduced over the same period. For 2018, an assumed rate of inflation of 2.7% was implicit in the assumed rate of return. The remaining actuarial assumptions utilized for this report are based on the results of an actuarial experience study for the period July 1, 2009 – June 30, 2014, unless otherwise specified in this report. Additional details are given in the complete Experience Report for fiscal years 2010 through 2014.

Assuming that the expected returns on the portfolio as a whole are normally distributed, using a consultant average nominal rate of return of 7.09% and long-term portfolio standard deviation of 2.26%, we estimate that there is a 46% probability that the fund will have earnings at or above 7.30% in the long term and a 52% probability that the fund will have earnings at or above 7.0% in the long term.

Although the Board of Trustees has authority to grant ad hoc Cost of Living Increases (COLAs) under limited circumstances, these COLAs have not been shown to have a historical pattern, the amounts of the COLAs have not been relative to a defined cost-of-living or inflation index, and there is no evidence to conclude that COLAs will be granted on a predictable basis in the future. Therefore, for purposes of determining the present value of benefits, these COLAs were deemed not to be substantively automatic and the present value of benefits excludes COLAs not previously granted by the Board of Trustees.

The current year actuarial assumptions utilized for the report are outlined on pages forty-one through forty-five. All assumptions used are based on estimates of future long-term experience for the fund. All calculations, recommendations, and conclusions are based on the assumptions specified. To the extent that prospective experience differs from that assumed, adjustments to contribution levels will be required. Such differences will be revealed in future actuarial valuations. The net effect of the changes in assumptions increased the interest-adjusted amortization payments on the system's UAL by $2,586,320 which corresponds to payments of 1.06% of Fiscal 2019 projected payroll.

RISK FACTORS

Defined benefit pension plans are subject to a number of risks. These can be related either to plan assets or liabilities. In order to pay benefits, the plan must have sufficient assets. Several factors can lead to asset levels which are below those required to pay promised benefits. The first risk in this regard is the failure to contribute adequate funds to the plan. In some ways, this is the greatest risk, since other risks can usually be addressed by adequate actuarial funding.

All pension plans are subject to asset performance risk. Asset performance is comprised of the real rates of return earned on the portfolio of investments plus the underlying inflation rate. High levels of inflation or deflation can present the plan with problems by either reducing the purchasing power of plan benefits or impairing asset values in the trust. Asset performance over the long run depends not only on average returns but also on the volatility of returns. Two portfolios of identical size with identical average rates of return will accumulate different levels of assets if the volatility of returns differs since increased volatility reduces the accumulation of assets. Another element of asset risk is reinvestment risk. Recent interest rate declines have subjected pension plans to an increase in this risk. As fixed income securities have matured, investment managers have been forced to reinvest funds at decreasing rates of return. For pension plans which require significant net cash flow above contributions to fund benefit payments, the risk of insufficient liquidity is another risk component which can create problems if it becomes necessary to sell securities under unfavorable market conditions in order to raise cash necessary to pay retirement benefits. Even for individual securities, insolvency and performance risk can subject a plan to stress if these investments comprise a significant portion of plan assets. Security insolvency or severe underperformance can result in steep increases in sponsor contributions where individual investments comprise more than a de minimis amount of the investment portfolio.

In addition to asset risk, the plan is also subject to risks related to liabilities. These risks include longevity risk (the risk that retirees will live longer than expected), termination risk (the risk that fewer than the anticipated number of members will terminate service prior to retirement), and other factors that may have an impact on the liability structure of the plan. Final average compensation plans are vulnerable to unexpectedly large increases in salary for individual members near retirement. Conversely, in cases where plans have large unfunded liabilities, payroll contraction is a risk insofar as contributions which are typically reported as a percentage of payroll may increase as payrolls decline.

Liability risk also includes items such as data errors. Significant errors in plan data can distort or disguise plan liabilities. When data corrections are made, the plan may experience unexpected increases or decreases in liabilities. Even natural disasters and dislocations in the economy or other unforeseen events can present risks to the plan. These events can affect member payroll and plan demographics, both of which impact costs.

Recommended actuarial contributions are based on expectations related to asset and liability performance; all of the above mentioned factors can produce unexpected changes in the future cost structures of the plan. For this reason, future costs may differ significantly from current levels. Ordinarily, variations in these factors will offset to some extent. However, even with the expectation that not all variations in costs will likely travel in the same direction, certain factors have the potential on their own accord to pose a significant risk to future cost levels and solvency.

Beyond identifying risk categories, it is possible to quantify some risk factors. One fairly well known risk metric is the funded ratio of the plan. The rate is given as plan assets divided by plan liabilities. However, the definition of each of these terms may vary. The two typical alternatives used for assets are the market and actuarial value of assets. There are a number of alternative measures of liability depending on the funding method employed. The Governmental Accounting Standards Board (GASB) specifies that for financial reporting purposes, the funded ratio is determined by using the market value of assets divided by the entry age normal accrued liability. This value is given in the system's financial report. Alternatively, we have calculated the ratio of the actuarial value of assets to the entry age normal accrued liability based on the funding methodology used to fund the plan. The ratio is 76.40% as of June 30, 2018. This value gives some indication of the financial strength of the plan; however, it does not guarantee the ability of the fund to pay benefits in the future or indicate that in the future, contributions are likely to be less than or greater than current contributions. In addition, the ratio cannot be used in isolation to compare the relative strength of different retirement systems. However, the trend of this ratio over time can give some insight into the financial health of the plan. Even in this regard, caution is warranted since market fluctuations in asset values and changes in plan assumptions can distort underlying trends in this value. One additional risk measure is the sensitivity of the plan's cost structure to asset gains and losses. For this plan, we have determined that based on current assets and demographics, for each percentage under (over) the assumed rate of return on the actuarial value of assets, there will be a corresponding increase (reduction) in the actuarially required contribution as a percentage of projected payroll of 0.77% for the fund.

The ability of a system to recover from adverse asset or liability performance is related to the maturity of the plan population. In general, plans with increasing active membership are less sensitive to asset and liability gains and losses than mature plans since changes in plan costs can be partially allocated to new members. If the plan has a large number of active members compared to retirees, asset or liability losses can be more easily addressed. As more members retire, contributions can only be collected from a smaller segment of the overall plan population. Often, population ratios of actives to annuitants are used to measure the plan's ability to adjust or recover from adverse events since contributions are made by or on behalf of active members but not for retirees. Thus, if the plan suffers a mortality loss through increased longevity, this will affect both actives and retirees, but the system can only fund this loss by contributions related to active members. A measure of risk related to plan maturity is the ratio of total benefit payments to active payroll. For Fiscal 2018, this ratio is 39%; ten years ago this ratio was 29%.

One other area of risk is the risk that plan assumptions will need to be revised to conform to changing actual or expected plan experience. Such assumption revisions could relate to demographic or economic factors. With regard to the economic assumptions, we have determined that a reduction in the valuation interest rate by 1% (without any change to other collateral factors) would increase the actuarially required employer contribution rate for Fiscal 2019 by 17.25% of payroll.

There is a risk that future actuarial measurements may differ significantly from current measurements presented in this report due to factors such as the following: plan experience differing from that anticipated by the economic or demographic assumptions, changes in economic or demographic assumption, completion of amortization payment and credit schedules, and changes in plan provisions or applicable law. Analysis of the effect of all these factors and additional risk metrics is beyond the scope of this report.

CHANGES IN PLAN PROVISIONS

The following changes to the system were enacted during the 2018 Regular Session of the Louisiana Legislature:

Act 45 of the 2018 Regular Session of the Louisiana Legislature provides that state and statewide retirement systems may invest in terror free investments outside of index fund vehicles to meet the requirements of R.S. 11:316.

Act 109 of the 2018 Regular Session of the Louisiana Legislature provides for definitions relative to rollovers of sums between the Firefighters' Retirement System and other qualified plans under the provisions of the Internal Revenue Code.

Act 114 of the 2018 Regular Session of the Louisiana Legislature allows members of the Firefighters' Retirement System to allocate Deferred Retirement Option Plan funds between two separate accounts: a liquid asset money market investment account and an account that earns a rate of return certified by the system’s actuary as the percentage rate of return on the system’s investment portfolio less the cost of merger notes with the understanding that such funds may experience a permanent reduction in value.

Act 115 of the 2018 Regular Session of the Louisiana Legislature provides relative to the fiduciary relationship between the Firefighters' Retirement System and its investment advisors.

Act 225 added language to comply with certain federal laws related to the Uniformed Services Employment and Reemployment Rights Act (USERRA) providing that each Board of Trustees shall promulgate rules to comply with USERRA.

Act 397 of the 2018 Regular Session of the Louisiana Legislature stipulates that state and statewide retirement systems may appoint an actuary or actuaries whose duties assigned by the Board shall relate only to the practice of actuarial science or ministerial duties that do not require the exercise of supervision or discretionary control over the administration or management of the system.

Act 399 of the 2018 Regular Session of the Louisiana Legislature stipulates that the Public Retirement Systems’ Actuarial Committee is established as the public retirement and pension system advisor of the Legislature of Louisiana. The act further states that the chair and vice chair shall rotate biennially between the speaker of the House of Representatives, or his designee, and the president of the Senate, or his designee, with terms beginning on the first of July. The committee shall elect any other officers as deemed advisable but no officer shall serve for more than four consecutive years.

ASSET EXPERIENCE

The actuarial and market rates of return for the past ten years are given below. These investment rates of return were determined by assuming a uniform distribution of income and expense throughout the fiscal year.

	Market Value	Actuarial Value
2009	-20.8%	-4.9% *
2010	12.2%	6.1%
2011	17.4%	4.5%
2012	-4.1% †	-0.2% †
2013	10.5%	2.5%
2014	11.4%	8.8%
2015	-0.2%	6.7%
2016	-2.3%	3.1%
2017	13.6%	5.7%
2018	6.5%	5.6%

* Includes the effect of a change in the method for calculating the actuarial value of assets. The actuarial value of assets is based on the market value of investment securities adjusted to phase in asset earnings above or below the assumed rate of return over a five-year period with limits set at 85% and 115% of the market value of assets. When the adjusted value falls outside of the limits, the actuarial value is set equal to the average of the limited and adjusted value.

† Based upon asset values which include an unaudited "best estimate" of the value of a receivable related to the FIA Leveraged Fund.

Geometric Average Market Rates of Return

5 year average	(Fiscal 2014 – 2018)	5.6%
10 year average	(Fiscal 2009 – 2018)	3.8%
15 year average	(Fiscal 2004 – 2018)	5.5%
20 year average	(Fiscal 1999 – 2018)	4.5%
25 year average	(Fiscal 1994 – 2018)	5.6%

The market rate of return gives a measure of investment return on a total return basis and includes realized and unrealized capital gains and losses as well as interest income. Asset and income values for merger notes were excluded from calculations in order to provide a measurement of the return on the portion of the portfolio under management. This rate of return gives an indication of performance for an actively managed portfolio where securities are bought and sold with the objective of producing the highest total rate of return. During 2018 the fund earned $23,007,629 of dividends, interest and other recurring income. During the same period, the Fund had net realized and unrealized capital gains on investments and non-recurring income of $91,342,798. This income was offset by investment expenses of $9,842,482.

The actuarial rate of return is presented for comparison to the assumed long-term rate of return of 7.4% used for the valuation (7.3% beginning with July 1, 2018). This rate is calculated based on the actuarial value of assets and the market value income adjusted for actuarial smoothing as given in Exhibit VI. Investment income used to calculate this yield is based upon a smoothing of investment income above or below the valuation interest rate over a five year period subject to constraints. The difference between rates of return on an actuarial and market value basis results from the smoothing utilized. Yields in excess of the applicable interest assumption will reduce future costs; yields below the applicable assumption will increase future costs. For Fiscal 2018, the system experienced net actuarial investment earnings of $29,194,603 below the actuarial assumed earnings rate in effect for Fiscal 2017 of 7.40% which produced an actuarial loss and increased the interest-adjusted amortization payments on the system's UAL by $3,153,344 or 1.30% of projected payroll.

DEMOGRAPHICS AND LIABILITY EXPERIENCE

A reconciliation of the census for the system is given in Exhibit X. The average active contributing member is 38 years old with 11.72 years of service credit and an annual salary of $53,347. The system's active contributing membership experienced a decrease of 5 members during Fiscal 2018. The number of DROP participants increased by 19 during Fiscal 2018. Over the last five years active membership has increased by 361 members. A review of the active census by age indicates that over the last ten years the population in the under thirty age group and the forty-one to fifty age group has decreased while the proportion of active members over fifty increased. Over the same ten-year period the system's active census by service remained relatively stable, although members with less than five years of service did decrease.

The average service retiree is 65 years old with a monthly benefit of $3,739. The number of retirees and beneficiaries receiving benefits from the system increased by 38 during the fiscal year. Over the last five years, the number has increased by 369; during the same period, the annual benefits in payment increased by $24,130,867.

The changes in the makeup of the population and changes in members' salaries increased the interest adjusted employer normal cost over the last year by $461,231; despite the increase, the employer normal cost percentage decreased by 0.02% of payroll. Plan liability experience for Fiscal 2018 was favorable. Salary increase rates at most durations were less than projected; retirements were below projected levels and withdrawals and retiree deaths were above projections. These factors tend to reduce costs. DROP entries above projected levels slightly offset the positive experience. Net plan liability experience gains totaled $22,251,659. These gains decreased the interest-adjusted amortization payments on the system's unfunded accrued liability by $2,403,428, which corresponds to payments of 0.99% of Fiscal 2019 payroll.

FUNDING ANALYSIS AND RECOMMENDATIONS

Actuarial funding of a retirement system is a process whereby funds are accumulated over the working lifetimes of employees in such a manner as to have sufficient assets available at retirement to pay for the lifetime benefits accrued by each member of the system. The required contributions are determined by an actuarial valuation based on rates of mortality, termination, disability, and retirement, as well as investment return and other statistical measures specific to the particular group. Each year a determination is made of two cost components, and the actuarially required contributions are based on the sum of these two components plus administrative expenses. These two components are the normal cost and the amortization payments on the unfunded actuarial accrued liability. The normal cost refers to the annual cost for active members allocated to each year by the particular cost method utilized. The term unfunded accrued liability (UAL) refers to the excess of the present value of plan benefits over the sum of current assets and future normal costs. Each year the UAL grows with interest and is reduced by payments. In addition it may be increased or diminished by plan experience, changes in assumptions, or changes in benefits including COLA's. Contributions in excess of or less than the actuarially required amount can also decrease or increase the UAL balance. New entrants to the system can also increase or lower costs as a percent of payroll depending upon their demographic distribution. Finally, payroll growth affects plan costs since payments on the system's unfunded liability are on a fixed, level schedule. If payroll increases, these costs are reduced as a percentage of payroll.

In order to establish the actuarially required contribution in any given year, it is necessary to define the assumptions, funding method, and method of amortizing the UAL. Thus, the determination of what contribution is actuarially required depends upon the funding method and amortization schedules employed. Regardless of the method selected, the ultimate cost of providing benefits is dependent upon the benefits, expenses, and investment earnings. Only to the extent that some methods accumulate assets more rapidly and thus produce greater investment earnings does the funding method affect the ultimate cost.

An explanation of the change in costs related to asset and liability gains and losses as well as changes in demographics and assumptions is given in prior sections of the report. In addition to these components, variances in contribution levels and payroll also affect costs. For Fiscal 2018 contributions totaled $6,228,012 less than required; the interest-adjusted amortization payment on the contribution shortfall for Fiscal 2019 is $672,695, or 0.28% of Fiscal 2019 projected payroll. In addition, for Fiscal 2019 the net effect of the change in payroll on amortization costs was to reduce such costs by 0.38% of projected payroll. Also, the elimination of gain and loss bases from 2003, after completion of all scheduled payments, results in a decrease in costs by 1.96%.

A reconciliation of the change in costs is given below. Values listed in dollars are interest adjusted for payment throughout the fiscal year. Percentages are based on the projected payroll for Fiscal 2019 except for those items labeled Fiscal 2018.

	Dollars	Percentage of Payroll
Employer Normal Cost for Fiscal 2018	$ 33,146,680	13.86%
Cost of Demographic and Salary Changes	$ 461,231	(0.02%)
Change due to Assumption Changes	$ 1,296,166	0.53%
Employer Normal Cost for Fiscal 2019	$ 34,904,077	14.37%
UAL Amortization Payments for Fiscal 2018	$ 59,779,684	24.99%
Change due to change in payroll	N/A	(0.38%)
Change due to elimination of Amortization	$ (4,780,035)	(1.96%)
Change due to Interest Rate Change	$ (298,472)	(0.12%)
Additional Amortization Expenses for Fiscal 2019:		
Benefit Change Loss (Gain)	$ 0	0.00%
Liability Assumption Loss (Gain)	$ 2,586,320	1.06%
Asset Experience Loss (Gain)	$ 3,153,344	1.30%
Liability Experience Loss (Gain)	$ (2,403,428)	(0.99%)
COLA Loss	$ 0	0.00%
Contribution Loss (Gain)	$ 672,695	0.28%
Total Amortization Expense (Credit) for Fiscal 2019	$ 58,710,108	24.18%
Insurance Premium Taxes	$ (26,807,631)	(11.04%)
Estimated Administrative Cost for Fiscal 2019	$ 1,975,435	0.81%
Total Employer Normal Cost & Amortization Payments	$ 68,781,989	28.32%

The derivation of the actuarially required contribution for the current fiscal year is given in Exhibit I. The employer normal cost for Fiscal 2019, interest adjusted for mid-year payment is $34,904,077. The interest adjusted amortization payments on the system's unfunded actuarial accrued liability totaled $58,710,108. The total actuarially required contribution is determined by summing these two values together with estimated administrative expenses. As given in line 12 of Exhibit I the total actuarially required contribution for Fiscal 2019 is $95,589,620. We estimate insurance premium taxes of $26,807,631, or 11.04% of payroll, will be paid to the system in Fiscal 2019. This level of Insurance Premium Taxes represents a 0.19% increase over the prior year as a percentage of payroll. Hence, the total actuarially required net direct employer contribution for Fiscal 2019 amounts to $68,781,989 or 28.32% of payroll.

The Fiscal 2017 actuarial valuation set a minimum recommended net direct employer contribution rate for Fiscal 2019 at 26.25%. Pursuant to R.S. 11:107, the Board of Trustees elected to maintain the Employer Contribution Rate at 26.50% (the net direct employer contribution rate for Fiscal 2018). Since the Net Direct Actuarially Required Employer Contribution Rate for Fiscal 2019 is 28.32% the system is projected to have a contribution loss despite the collection of extra contributions. Therefore, no funds were added to the system's Funding Deposit Account.

Since the actual employer contribution rate for Fiscal 2019 is 26.50% of payroll, there will be a contribution shortfall of 1.82% of payroll. This shortfall will increase the actuarially required contribution recommended for Fiscal 2020. In order to determine a minimum recommended net direct employer contribution rate for Fiscal 2020, the Employer Normal Cost and Amortization Payments were estimated for Fiscal 2020, adjusted for the impact of the estimated contribution shortfall for Fiscal 2019, the change in the valuation interest rate, and the estimated Insurance Premium Taxes for Fiscal 2020. Therefore, as given in line 25 of Exhibit I, the estimated actuarially required net direct employer contribution for Fiscal 2020 is $69,222,705, or 27.75% of projected payroll (rounded to the nearest 0.25%) for members with earnings greater than the Department of HHS poverty guidelines. For members with earnings less than or equal to the Department of HHS poverty guidelines, employee contributions will be set equal to 8.00% of payroll. The employer contribution rate to be applied to the earnings of such members should be set equal to 29.75% of payroll.

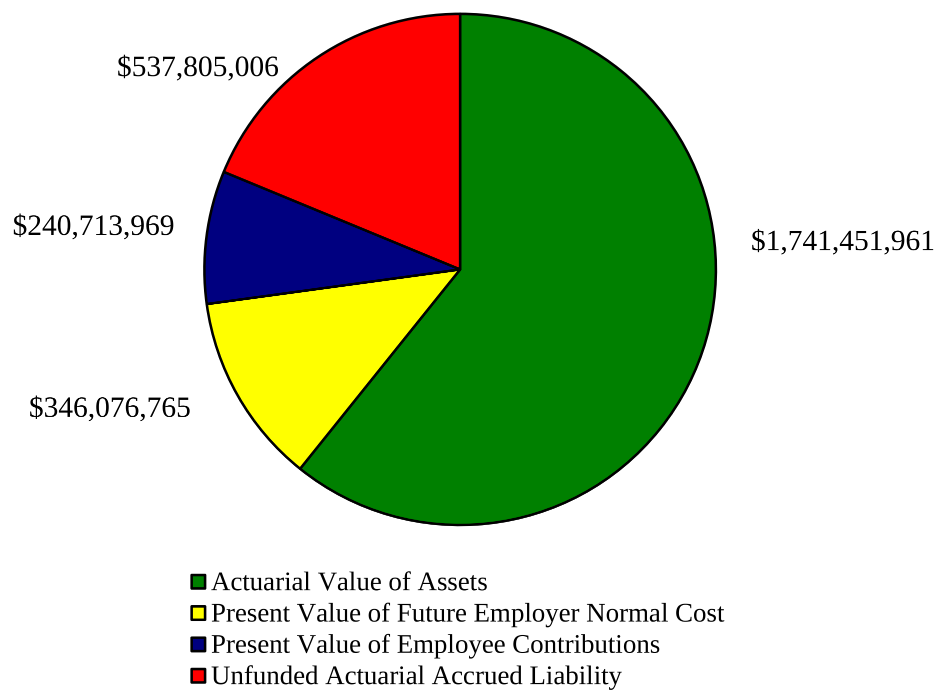
COST OF LIVING INCREASES

During Fiscal 2018, the actual cost of living (as measured by the US Department of Labor CPI-U) increased by 2.9%. Cost of living provisions for the system are detailed in R.S. 11:2260A(7) and R.S. 11:246. The former statute allows the Board to use interest earnings in excess of the normal requirements to grant annual cost of living increases of up to 3% of each retiree's current benefit. R.S. 11:246 provides cost of living increases to retirees and beneficiaries over the age of 65 equal to 2% of the benefit in payment on October 1, 1977, or the date the benefit was originally received if retirement commenced after that date. In addition, R.S. 11:241 provides that cost of living benefits shall be in the form (unless the Board otherwise specifies) of $X×(A+B) where X is at most $1 and "A" represents the number of years of credited service accrued at retirement or at death of the member or retiree and "B" is equal to the number of years since retirement or since death of the member or retiree to June 30th of the initial year of such increase. The provisions of this subpart do not repeal provisions relative to cost of living adjustments contained within the individual laws governing systems; however, they are to be controlling in cases of conflict.

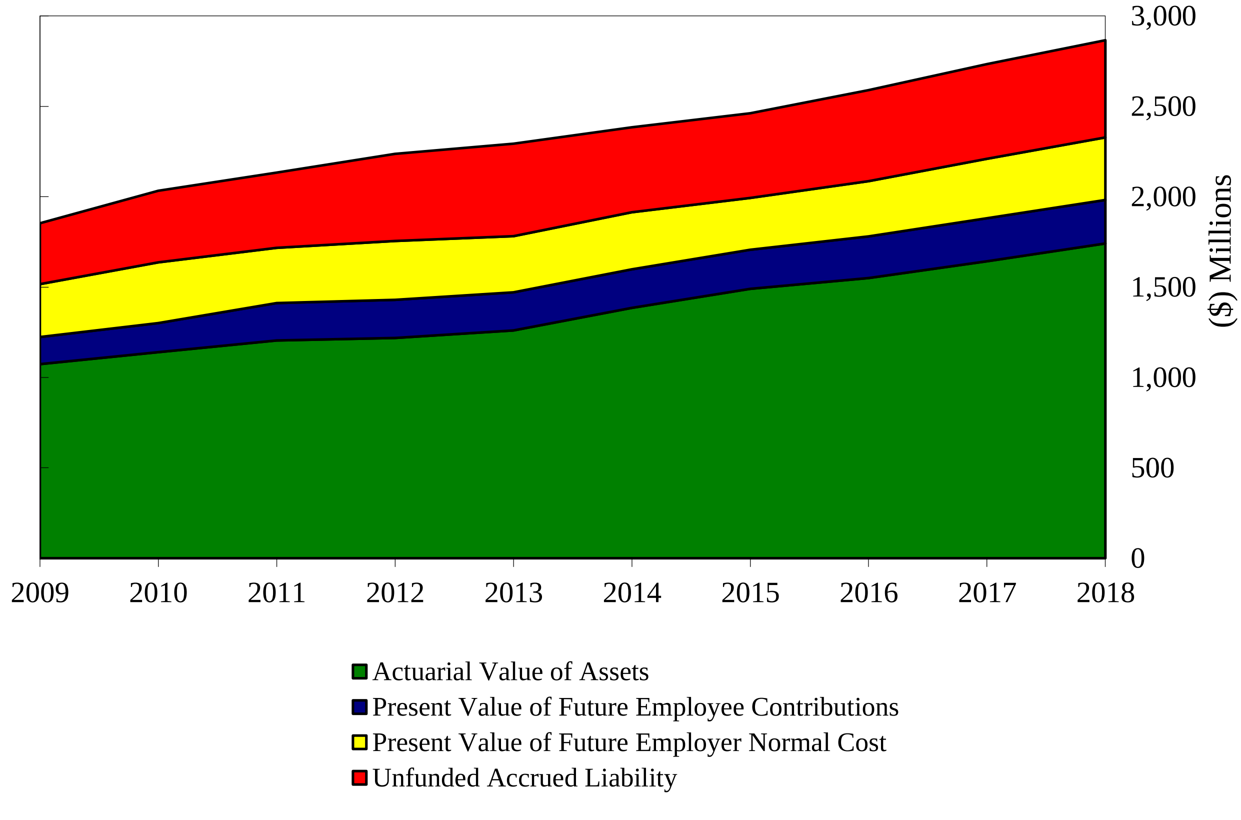
R.S. 11:243 sets forth the funding criteria necessary in order to grant cost of living adjustments to regular retirees and beneficiaries (who are neither the surviving spouse nor children of the retiree.) The criteria for the fund to qualify as eligible to grant any such increase is as follows: a funded ratio of at least 70% if the system has not granted a benefit increase to retirees, survivors, or beneficiaries in any of the three most recent fiscal years; a funded ratio of at least 80% if the system has not granted such an increase in any of the two most recent fiscal years; or a funded ratio of at least 90% if the system has not granted such an increase in the most recent fiscal year. The funded ratio at any fiscal year end is the ratio of the actuarial value of assets to the actuarial accrued liability under the funding method prescribed by the legislative auditor (currently the Projected Unit Credit Method for this system).

With a funded ratio (as measured by the Actuarial Value of Assets divided by the Pension Benefit Obligation) of 78.63% and since the system granted a cost of living increase on January 1, 2015 which is not within the three most recent fiscal years, we have determined that for Fiscal 2018 the plan does meet the criteria set forth in R. S. 11:243 for granting a cost of living increase. However, the system failed to earn the 7.40% assumed rate of return on an actuarial basis and therefore has no “excess interest” for the fiscal year. Therefore, the system does not qualify for payment of a cost of living increase.

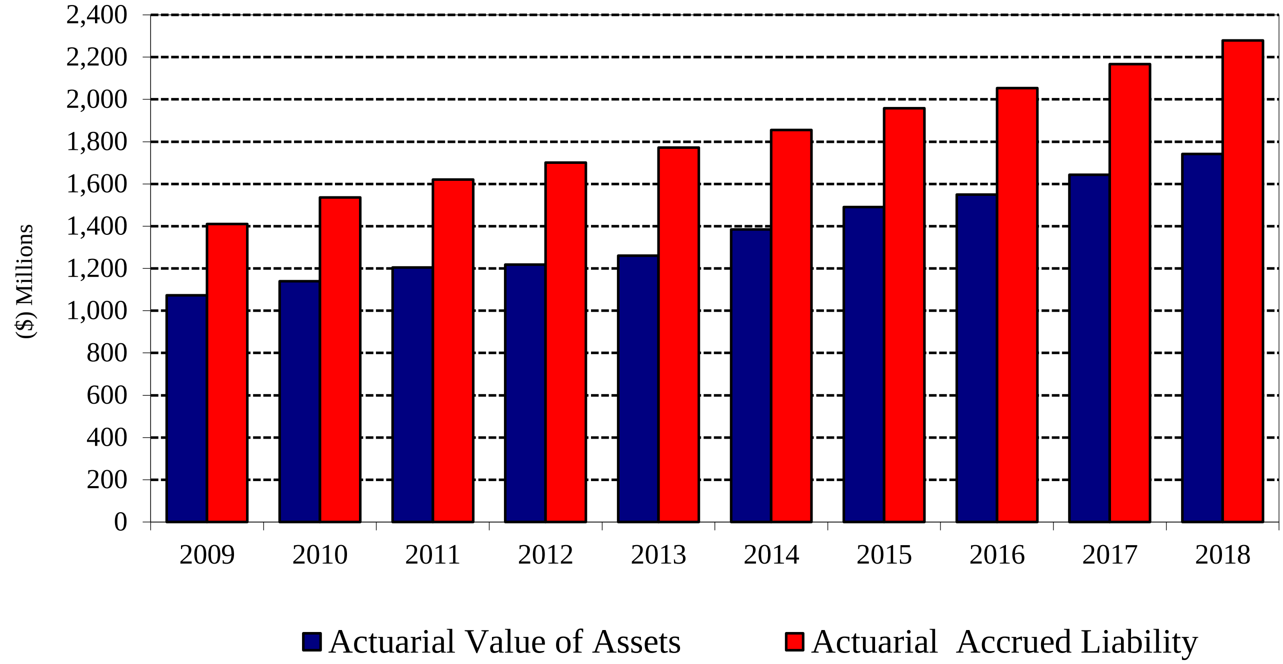
Components of Present Value of Future Benefits
June 30, 2018



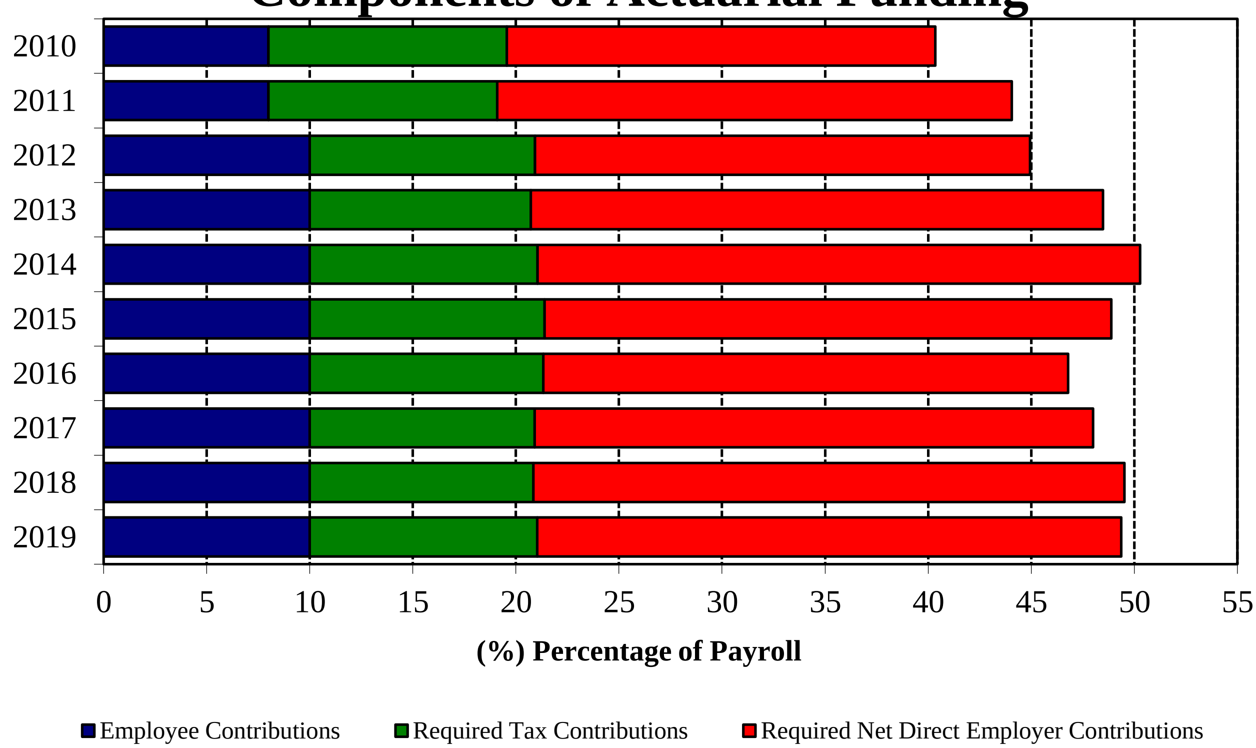
Components of Present Value of Future Benefits
Historical



Actuarial Value of Assets vs. Actuarial Accrued Liability

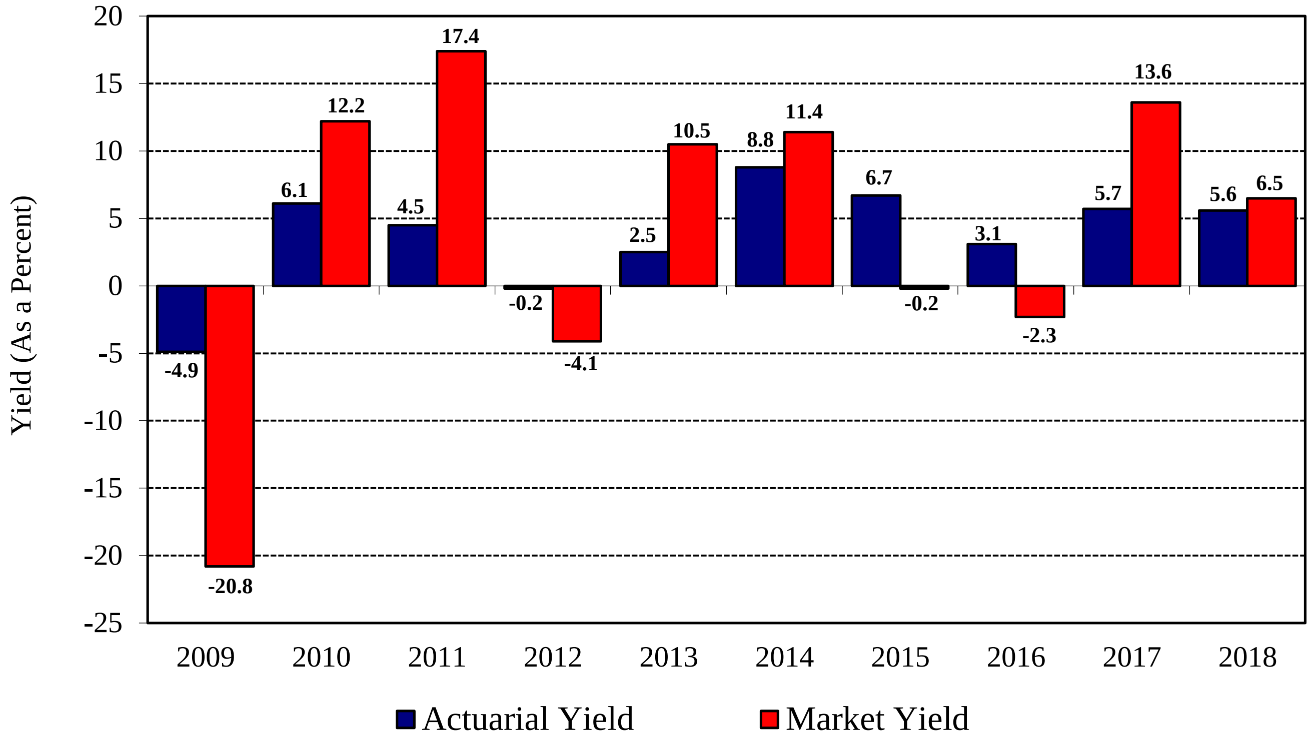


Components of Actuarial Funding

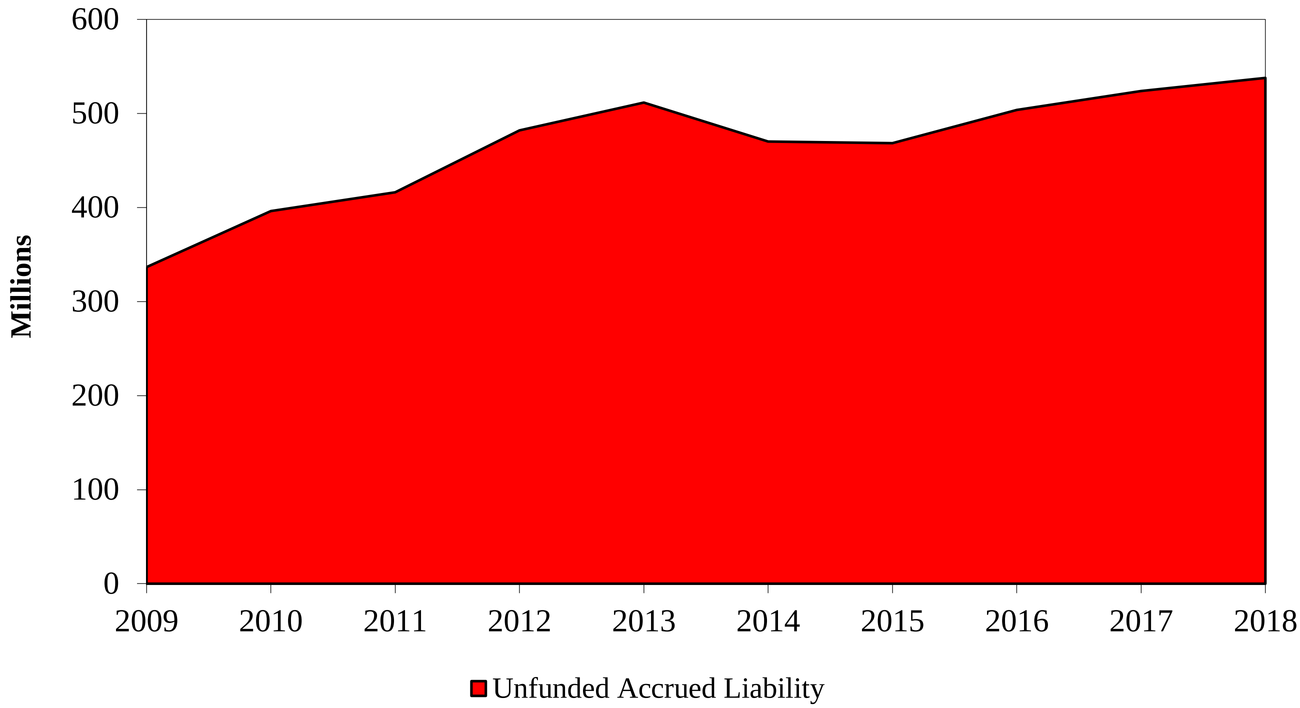


(2012 and later employee contribution level is based on members with earnings above the poverty level)

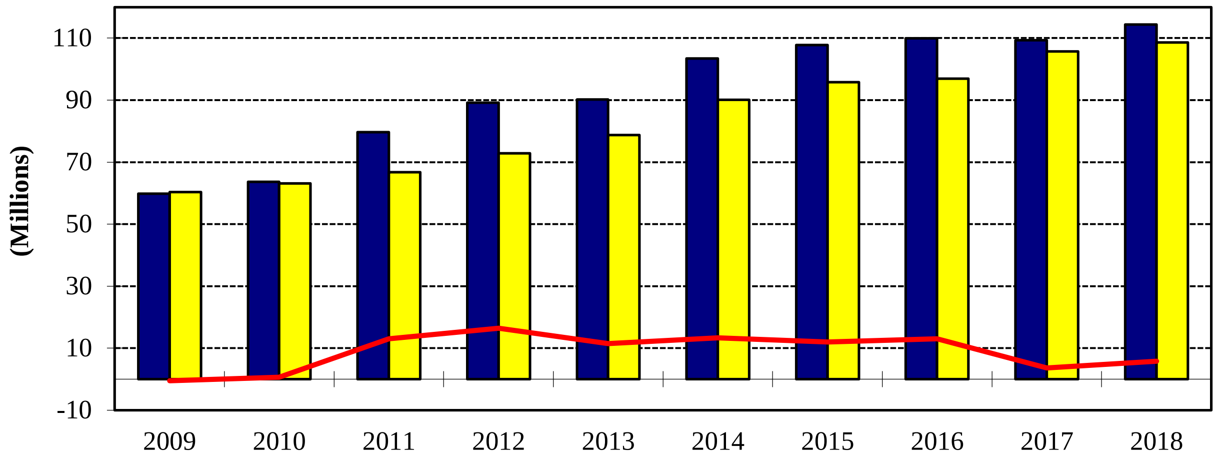
Historical Asset Yields



Unfunded Accrued Liability



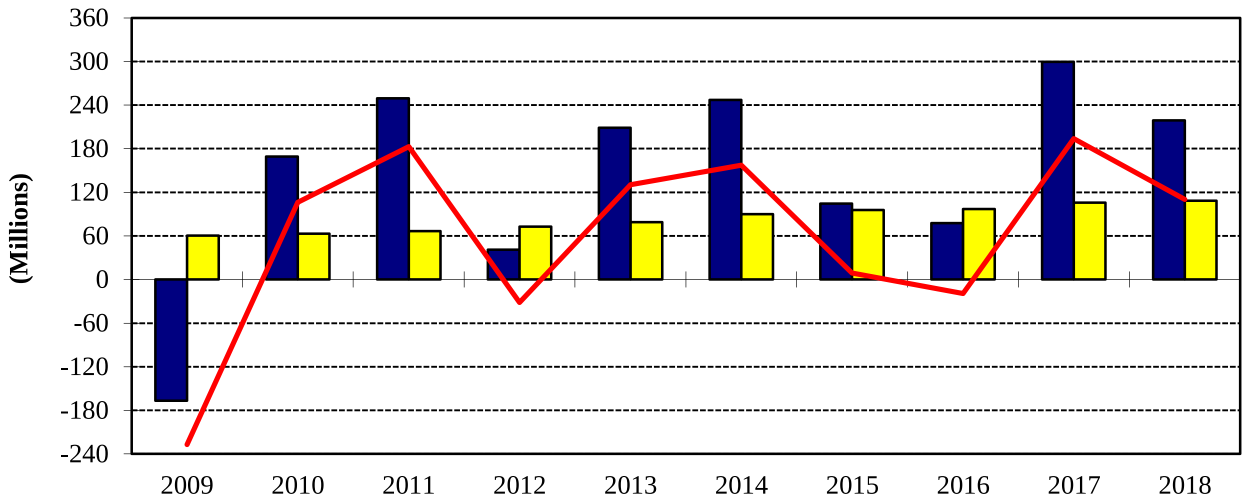
Net Non-Investment Income



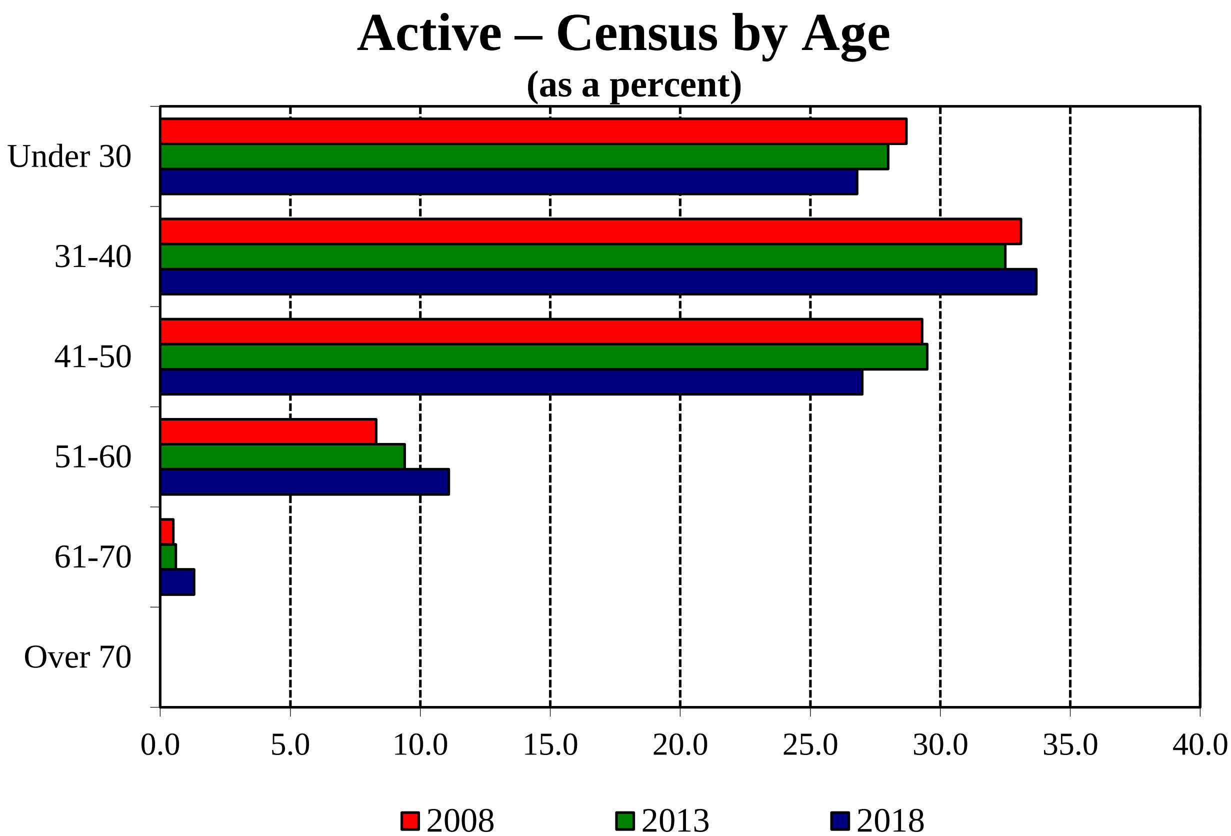
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Non-Investment Income ($Mil)	59.8	63.7	79.7	89.2	90.2	103.4	107.8	109.9	109.3	114.4
Benefits and Expenses ($Mil)	60.3	63.1	66.7	72.8	78.7	90.1	95.8	96.9	105.7	108.6
Net Non-Investment Income ($Mil)	-0.5	0.6	13.0	16.4	11.5	13.3	12.0	13.0	3.6	5.8

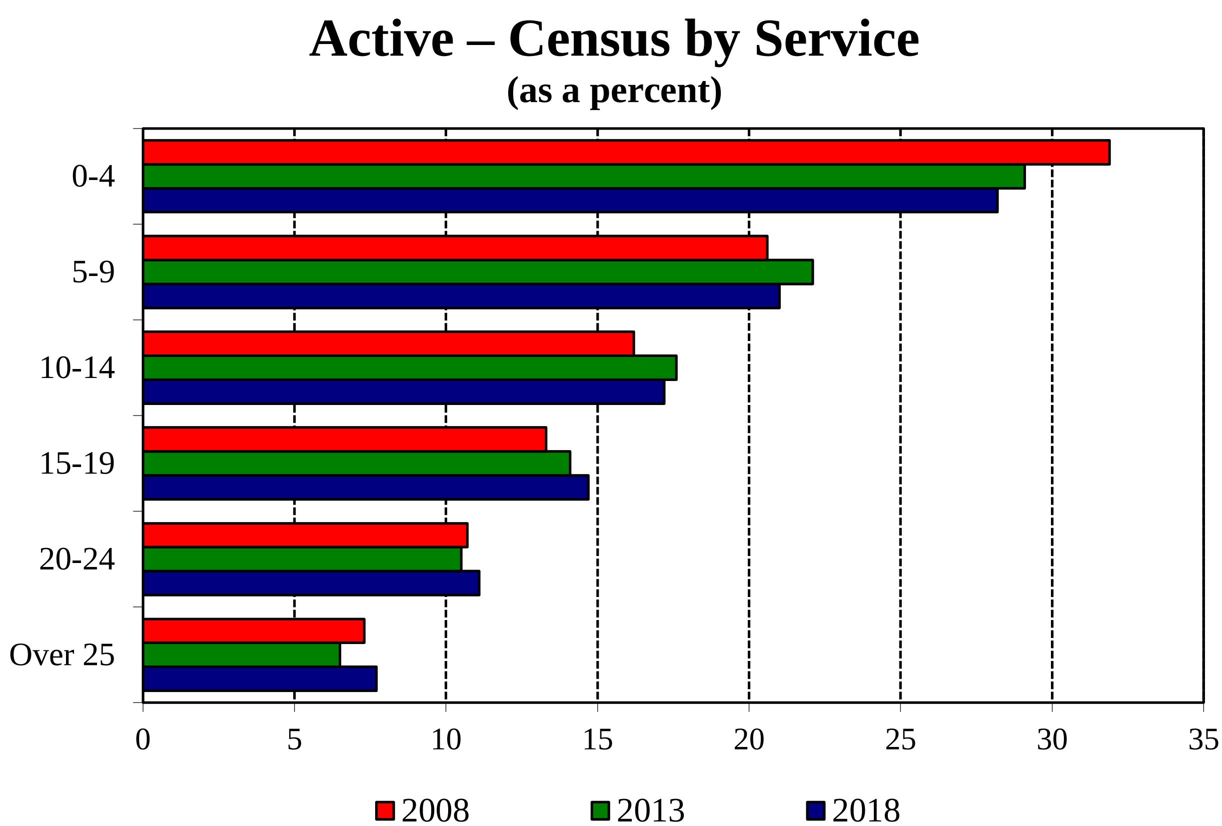
Total Income vs. Expenses

(Based on Market Value of Assets)



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Income ($Mil)	-166.6	169.3	249.4	41.2	209.0	247.2	104.6	77.7	299.5	218.9
Benefits and Expenses ($Mil)	60.3	63.1	66.7	72.8	78.7	90.1	95.8	96.9	105.7	108.6
Net Change in MVA ($Mil)	-226.9	106.2	182.7	-31.6	130.3	157.1	8.8	-19.2	193.8	110.3


Active – Census by Age
(as a percent)
Under 30
31-40
41-50
51-60
61-70
Over 70
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
2008
2013
2018


Active – Census by Service
(as a percent)
0-4
5-9
10-14
15-19
20-24
Over 25
0
5
10
15
20
25
30
35
2008
2013
2018

EXHIBITS

EXHIBIT I
ANALYSIS OF ACTUARIALLY REQUIRED CONTRIBUTIONS

1.	Normal Cost of Retirement Benefits	$	50,118,411	
2.	Normal Cost of Death Benefits	$	1,597,788	
3.	Normal Cost of Disability Benefits	$	1,398,060	
4.	Normal Cost of Deferred Retirement Benefits	$	1,751,476	
5.	Normal Cost of Contribution Refunds	$	2,279,322	
6.	TOTAL Normal Cost as of July 1, 2018 (1+2+3+4+5)	$	57,145,057	
7.	TOTAL Normal Cost Interest Adjusted for Mid-year Payment	$	59,194,115	
8.	Adjustment to Total Normal Cost for Employee Portion	$	24,290,038	
9.	Employer Normal Cost, Adjusted for Midyear Payment (6 – 7)	$	34,904,077	
10.	Amortization Payments on Unfunded Accrued Liability at Midyear	$	58,710,108	
11.	Projected Administrative Expenses for Fiscal 2019	$	1,975,435	
12.	TOTAL Employer Cost (9 + 10 + 11)	$	95,589,620	
13.	Expected Insurance Premium Taxes due in Fiscal 2019	$	26,807,631	
14.	Net Direct Actuarially Required Employer Contribution for Fiscal 2019 (12 – 13)	$	68,781,989	
15.	Projected Payroll for Contributing Members (Fiscal 2019)	$	242,900,383	
16.	Net Direct Actuarially Required Employer Contribution as a Percentage of Projected Payroll for Fiscal 2019 (14 ÷ 15)		28.32%	*
17.	Actual Net Direct Employer Contribution Rate for Fiscal 2019		26.50%	* †
18.	Projected Fiscal 2019 Contribution Loss (Gain) as a % of Payroll (16 – 17)		1.82%	
19.	Projected Fiscal 2019 Employer Contribution Shortfall (Surplus) (15 × 18)	$	4,420,787	
20.	Amortization of Interest Adjusted Fiscal 2019 Employer Contribution Shortfall (Surplus) Based on Midyear Payment in Fiscal 2020	$	494,616	
21.	Estimated Fiscal 2020 Employer Normal Cost Adjusted for Midyear Payment	$	35,923,805	
22.	Estimated Fiscal 2020 Amortization Payments	$	58,306,949	
23.	Estimated Fiscal 2020 Administrative Expenses	$	2,028,772	
24.	Estimated Insurance Premium Taxes due in Fiscal 2020	$	27,531,437	
25.	Estimated Actuarially Required Net Direct Employer Contributions for Fiscal 2020 (20 + 21 + 22 + 23 – 24)	$	69,222,705	
26.	Projected Payroll for Contributing Members (Fiscal 2020)	$	249,996,758	
27.	Minimum Recommended Net Direct Employer Contribution Rate for Fiscal 2020 (25 ÷ 26, Rounded to nearest 0.25%)		27.75%	*

* The above rates are for members with earnings greater than the Department of HHS poverty guidelines. For members with earnings below the poverty guidelines, employer rates will be 2.0% higher and employee rates will be 2.0% lower.

† The Board elected to hold the Net Direct Employer Contribution Rate for 2019 at 26.50% for 2018 in accordance with R.S. 11:107.

EXHIBIT II
PRESENT VALUE OF FUTURE BENEFITS

PRESENT VALUE OF FUTURE BENEFITS FOR ACTIVE MEMBERS:

Retirement Benefits	$ 1,682,268,788	
Survivor Benefits	27,292,953	
Disability Benefits	19,821,972	
Vested Termination Benefits	32,106,959	
Refunds of Contributions	14,247,192	
TOTAL Present Value of Future Benefits for Active Members		$ 1,775,737,864

PRESENT VALUE OF FUTURE BENEFITS FOR TERMINATED MEMBERS:

Terminated Vested Members Due Benefits at Retirement	$ 14,864,962	
Terminated Members with Reciprocals Due Benefits at Retirement	0	
Terminated Members Due a Refund	3,790,505	
TOTAL Present Value of Future Benefits for Terminated Members		$ 18,655,467

PRESENT VALUE OF FUTURE BENEFITS FOR RETIREES:

Regular Retirees			
Maximum	$ 236,564,777		
Option 1	82,802,448		
Option 2	393,355,601		
Option 3	152,225,949		
Option 4	8,233,498		
Option 5	0		
TOTAL Regular Retirees		$ 873,182,273	
Disability Retirees		28,472,638	
Survivors & Widows		67,977,823	
DROP Account Balances Payable to Retirees		98,641,223	
IBO Retirees' Account Balance		3,380,413	
TOTAL Present Value of Future Benefits for Retirees & Survivors			$ 1,071,654,370

TOTAL PRESENT VALUE OF FUTURE BENEFITS	$ 2,866,047,701

EXHIBIT III – SCHEDULE A
MARKET VALUE OF ASSETS

CURRENT ASSETS:				
Cash in Banks	$	9,195,745		
Contributions and Taxes Receivable		7,599,634		
Accrued Interest and Dividends		4,255,864		
Investments Receivable		1,355,670		
Prepaid Expenses		22,625		
TOTAL CURRENT ASSETS			$	22,429,538
Property Plant & Equipment			$	647,997
INVESTMENTS:				
Cash Equivalents	$	66,015,292		
Equities		934,799,007		
Fixed Income		346,813,846		
Real Estate		119,239,051		
Alternative Investments		56,647,480		
Tactical Allocation		159,322,814		
Other Investments		399,441		
TOTAL INVESTMENTS			$	1,683,236,931
MERGER NOTES			$	2,607,085
DEFERRED OUTFLOWS OF RESOURCES			$	0
TOTAL ASSETS			$	1,708,921,551
CURRENT LIABILITIES:				
Accounts Payable	$	1,797,974		
Investments Payable		2,455,906		
Other Post-Employment Benefits		577,423		
TOTAL CURRENT LIABILITIES			$	4,831,303
DEFERRED INFLOWS OF RESOURCES			$	41,080
MARKET VALUE OF ASSETS			$	1,704,049,168

EXHIBIT III – SCHEDULE B
ACTUARIAL VALUE OF ASSETS

Excess (Shortfall) of invested income
for current and previous 4 years:

Fiscal year 2018	$	(13,637,997)
Fiscal year 2017		85,071,538
Fiscal year 2016		(139,144,339)
Fiscal year 2015		(109,387,912)
Fiscal year 2014		49,370,553
Total for five years	$	(127,728,157)

Deferral of excess (shortfall) of invested income:

Fiscal year 2018 (80%)	$	(10,910,398)
Fiscal year 2017 (60%)		51,042,923
Fiscal year 2016 (40%)		(55,657,736)
Fiscal year 2015 (20%)		(21,877,582)
Fiscal year 2014 (0%)		0
Total deferred for year	$	(37,402,793)

Market value of plan net assets, end of year	$	1,704,049,168
Preliminary actuarial value of plan assets, end of year	$	1,741,451,961

Actuarial value of assets corridor

85% of market value, end of year	$	1,448,441,793
115% of market value, end of year	$	1,959,656,543

Final actuarial value of plan net assets, end of year	$	1,741,451,961

EXHIBIT IV
PRESENT VALUE OF FUTURE CONTRIBUTIONS

Employee Contributions to the Annuity Savings Fund	$	240,713,969
Employer Normal Contributions to the Pension Accumulation Fund		346,076,765
Employer Amortization Payments to the Pension Accumulation Fund		537,805,006
TOTAL PRESENT VALUE OF FUTURE CONTRIBUTIONS	$	1,124,595,740

EXHIBIT V - SCHEDULE A
ACTUARIAL ACCRUED LIABILITIES

LIABILITY FOR ACTIVE MEMBERS				
Accrued Liability for Retirement Benefits	$	1,167,218,392		
Accrued Liability for Survivor Benefits		10,959,982		
Accrued Liability for Disability Benefits		5,544,077		
Accrued Liability for Vested Termination Benefits		14,195,729		
Accrued Liability for Refunds of Contributions		(8,971,050)		
TOTAL Actuarial Accrued Liability for Active Members			$	1,188,947,130
LIABILITY FOR TERMINATED MEMBERS			$	18,655,467
LIABILITY FOR RETIREES AND SURVIVORS			$	1,071,654,370
TOTAL ACTUARIAL ACCRUED LIABILITY			$	2,279,256,967
ACTUARIAL VALUE OF ASSETS			$	1,741,451,961
UNFUNDED ACTUARIAL ACCRUED LIABILITY			$	537,805,006

EXHIBIT V - SCHEDULE B
CHANGE IN UNFUNDED ACTUARIAL ACCRUED LIABILITY

PRIOR YEAR UNFUNDED ACCRUED LIABILITY			$	523,874,481
Interest on Unfunded Accrued Liability	$	38,766,712		
Investment Experience Loss		29,194,603		
Liability Assumption Loss		23,944,920		
Contribution Shortfall with Accrued Interest		6,228,012		
TOTAL Additions to UAL			$	98,134,247
Liability Experience Gain		22,251,659		
Interest Adjusted Amortization Payments		61,952,063		
TOTAL Reductions to UAL			$	84,203,722
NET Change in Unfunded Accrued Liability			$	13,930,525
CURRENT YEAR UNFUNDED ACCRUED LIABILITY			$	537,805,006

EXHIBIT V - SCHEDULE C
AMORTIZATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY - June 30, 2018

FISCAL YEAR	DESCRIPTION	AMORT. PERIOD	INITIAL BALANCE	YEARS REMAINING	REMAINING BALANCE	AMORT. PAYMENTS
1993	Merger Loss	30	$13,485,002	5	$4,554,792	$1,043,625
1995	Merger Loss	30	41,779,611	7	18,524,748	3,237,057
1996	Merger Loss	30	1,772,399	8	870,190	137,397
1997	Merger Loss	30	890,324	9	476,642	69,054
1998	Merger Loss	30	1,602,435	10	924,247	124,346
1999	Merger Loss	30	14,104,876	11	8,680,433	1,095,018
2001	Merger Loss	30	3,117,590	13	2,135,903	242,242
2002	Cumulative Non-Merger Bases	27	175,578,584	11	111,861,839	14,111,128
2004	Contribution Loss	15	2,129,874	1	224,001	224,001
2004	Experience Loss	15	1,570,785	1	165,202	165,202
2005	Experience Gain	15	(24,922,321)	2	(5,067,346)	(2,622,895)
2005	Assumption Gain	15	(57,207,831)	2	(11,631,819)	(6,020,715)
2005	Contribution Gain	15	(2,457,193)	2	(499,610)	(258,602)
2006	Experience Gain	15	(30,043,731)	3	(8,847,301)	(3,159,155)
2006	Benefits/COLA Loss	15	12,495,729	3	3,679,752	1,313,949
2006	Assumption Loss	15	7,880,410	3	2,320,629	828,640
2006	Contribution Gain	15	(3,044,474)	3	(896,540)	(320,132)
2007	Contribution Gain	15	(3,684,696)	4	(1,397,525)	(387,126)
2007	Merger Loss	30	1,065,812	19	898,508	82,851
2007	Experience Gain	15	(19,348,466)	4	(7,338,455)	(2,032,814)
2007	Benefits/COLA Loss	15	13,421,495	4	5,090,482	1,410,107
2008	Assumption Gain	15	(138,425)	5	(63,421)	(14,531)
2008	Contribution Gain	15	(4,399,499)	5	(2,015,682)	(461,847)
2008	Merger Loss	30	1,556,324	20	1,343,049	120,918
2008	Experience Loss	15	11,244,458	5	5,151,781	1,180,411
2008	Benefits/COLA Loss	15	15,006,752	5	6,875,521	1,575,366
2009	Asset Assumption Gain	15	(121,695,690)	6	(64,686,581)	(12,765,060)
2009	Asset Experience Loss	20	261,874,151	11	187,853,338	23,697,290
2009	COLA Loss	20	15,784,880	11	11,323,158	1,428,392
2009	Experience Gain	20	(3,921,422)	11	(2,813,000)	(354,854)
2009	Contribution Loss	20	993,536	11	712,705	89,906
2010	Liability Assumption Loss	15	37,843,942	7	22,699,092	3,966,491
2010	Asset Experience Loss	19	14,930,089	11	10,963,143	1,382,977
2010	Experience Loss	19	985,441	11	723,608	91,282
2010	Contribution Loss	19	11,264,571	11	8,271,559	1,043,439
2011	Merger Loss	30	329,132	23	301,093	25,535
2011	Asset Experience Loss	18	34,204,316	11	25,771,047	3,250,962
2011	Experience Gain	18	(13,197,519)	11	(9,943,596)	(1,254,363)
2011	Contribution Loss	18	6,777,563	11	5,106,516	644,176
2012	Asset Experience Loss	17	93,583,915	11	72,543,588	9,151,216
2012	Experience Gain	17	(21,072,289)	11	(16,334,639)	(2,060,579)
2012	Contribution Loss	17	2,867,982	11	2,223,178	280,449
2013	Asset Experience Loss	16	61,647,815	11	49,316,444	6,221,162

FISCAL YEAR	DESCRIPTION	AMORT. PERIOD	INITIAL BALANCE	YEARS REMAINING	REMAINING BALANCE	AMORT. PAYMENTS
2013	Experience Gain	16	(30,226,604)	11	(24,180,397)	(3,050,305)
2013	Contribution Loss	16	9,431,584	11	7,544,991	951,784
2013	Assumption Loss	15	1,290,257	10	1,002,969	134,937
2014	Asset Experience Gain	15	(16,528,266)	11	(13,693,048)	(1,727,348)
2014	Experience Gain	15	(12,708,035)	11	(10,528,129)	(1,328,101)
2014	Contribution Loss	15	3,117,549	11	2,582,773	325,811
2014	Liability Assumption Gain	15	(318,965)	11	(264,250)	(33,335)
2015	Asset Experience Loss	15	11,058,278	12	9,687,266	1,154,911
2015	Experience Gain	15	(18,187,590)	12	(15,932,684)	(1,899,486)
2015	Contribution Gain	15	(5,158,272)	12	(4,518,745)	(538,722)
2015	Liability Assumption Loss	15	7,891,805	12	6,913,375	824,209
2015	COLA Loss	15	17,767,886	12	15,565,013	1,855,653
2016	Asset Experience Loss	15	65,389,778	13	60,175,595	6,824,771
2016	Experience Gain	15	(6,578,348)	13	(6,053,790)	(686,586)
2016	Contribution Gain	15	(6,794,080)	13	(6,252,319)	(709,102)
2017	Liability Assumption Loss	15	22,708,091	14	21,831,906	2,368,562
2017	Asset Experience Loss	15	27,265,283	14	26,213,260	2,843,899
2017	Experience Gain	15	(13,331,207)	14	(12,816,826)	(1,390,509)
2017	Contribution Loss	15	3,496,362	14	3,361,456	364,687
2018	Asset Experience Loss	15	29,194,603	15	29,194,603	3,044,188
2018	Experience Gain	15	(22,251,659)	15	(22,251,659)	(2,320,231)
2018	Contribution Loss	15	6,228,012	15	6,228,012	649,409
2018	Liability Assumption Loss	15	23,944,920	15	23,944,920	2,496,792

TOTAL Unfunded Actuarial Accrued Liability $ 537,805,006 *

TOTAL Fiscal 2019 Amortization Payments at Beginning of Year $ 56,677,804

TOTAL Fiscal 2019 Amortization Payments Adjusted to Mid-Year $ 58,710,108

* Does not equal sum of remaining balances due to rounding.

EXHIBIT VI
ANALYSIS OF CHANGE IN ASSETS

Actuarial Value of Assets (June 30, 2017)			$	1,643,007,075
INCOME:				
Member Contributions	$	23,860,402		
Employer Contributions		63,243,874		
Irregular Contributions		704,685		
Insurance Premium Taxes		25,953,989		
Transfers From Other Systems		604,325		
Other Income		51,917		
Total Contributions			$	114,419,192
Net Appreciation of Investments	$	81,122,151		
Interest & Dividends		23,007,629		
Legal Settlement		10,220,647		
Investment Expense		(9,842,482)		
Net Investment Income			$	104,507,945
TOTAL Income			$	218,927,137
EXPENSES:				
Retirement Benefits	$	104,277,290		
Refunds of Contributions		1,781,606		
Transfers to Other Systems		294,715		
Administrative Expenses		2,221,006		
TOTAL Expenses			$	108,574,617
Net Market Value Income for Fiscal 2018 (Income - Expenses)			$	110,352,520
Unadjusted Assets as of June 30, 2018 (Assets Previous Year + Net Income)			$	1,753,359,595
Adjustment for Actuarial Smoothing			$	(11,907,634)
Actuarial Value of Assets: (June 30, 2018)			$	1,741,451,961

EXHIBIT VII
PENSION BENEFIT OBLIGATION

Present Value of Credited Projected Benefits Payable to Current Employees............	$ 1,124,410,780
Present Value of Benefits Payable to Terminated Employees	18,655,467
Present Value of Benefits Payable to Current Retirees and Beneficiaries	1,071,654,370
TOTAL PENSION BENEFIT OBLIGATION	$ 2,214,720,617
NET ACTUARIAL VALUE OF ASSETS	$ 1,741,451,961
Ratio of Net Actuarial Value of Assets to Pension Benefit Obligation.......................	78.63%

EXHIBIT VIII
CENSUS DATA

	Active	Terminated with Funds on Deposit	DROP	Retired	Total
Number of members as of June 30, 2017	4,429	669	173	2,289	7,560
Additions to Census					
Initial membership	249	21			270
Omitted in error last year					
Death of another member				21	21
Adjustment for multiple records				4	4
Change in Status during Year					
Actives terminating service	(117)	117			
Actives who retired	(33)			33	
Actives entering DROP	(72)		72		
Term. members rehired	26	(26)			
Term. members who retire		(1)		1	
Retirees who are rehired					
Refunded who are rehired	2	2			4
DROP participants retiring			(42)	42	
DROP returned to work	11		(11)		
Omitted in error last year					
Eliminated from Census					
Refund of contributions	(65)	(50)			(115)
Deaths	(6)			(63)	(69)
Included in error last year					
Adjustment for multiple records					
Number of members as of June 30, 2018	4,424	732	192	2,327	7,675

ACTIVES CENSUS BY AGE:

Age	Number Male	Number Female	Total Number	Average Salary	Total Salary
16 - 20	21	0	21	31,996	671,914
21 - 25	414	20	434	36,605	15,886,397
26 - 30	704	27	731	41,280	30,175,350
31 - 35	774	35	809	46,835	37,889,395
36 - 40	632	51	683	53,070	36,246,935
41 - 45	579	32	611	60,455	36,937,716
46 - 50	546	39	585	66,635	38,981,743
51 - 55	318	33	351	69,294	24,322,054
56 - 60	116	25	141	72,443	10,214,398
61 - 65	40	9	49	75,346	3,691,939
66 - 70	6	1	7	108,132	756,921
71 - 75	2	0	2	115,342	230,683
TOTAL	4,152	272	4,424	53,347	236,005,445

THE ACTIVE CENSUS INCLUDES 2,053 ACTIVES WITH VESTED BENEFITS, INCLUDING 64 ACTIVE FORMER DROP PARTICIPANTS. THE 192 CURRENT DROP PARTICIPANTS ARE EXCLUDED.

DROP PARTICIPANTS:

Age	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
46 - 50	21	1	22	58,870	1,295,150
51 - 55	95	5	100	62,697	6,269,710
56 - 60	54	3	57	62,665	3,571,920
61 - 65	12	0	12	75,767	909,201
66 - 70	1	0	1	44,770	44,770
TOTAL	183	9	192	62,973	12,090,751

TERMINATED MEMBERS DUE A DEFERRED RETIREMENT BENEFIT:

Age	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
31 - 35	2	0	2	22,885	45,770
36 - 40	8	2	10	26,507	265,073
41 - 45	17	0	17	25,265	429,501
46 - 50	25	1	26	24,884	646,989
51 - 55	20	1	21	29,824	626,310
TOTAL	72	4	76	26,495	2,013,643

TERMINATED MEMBERS DUE A REFUND OF CONTRIBUTIONS:

Contributions Ranging From		To	Number	Total Contributions
0	-	99	60	3,035
100	-	499	162	41,818
500	-	999	68	47,891
1000	-	1999	67	95,027
2000	-	4999	101	329,640
5000	-	9999	81	587,586
10000	-	19999	60	858,948
20000	and above		57	1,826,560
	TOTAL		656	3,790,505

REGULAR RETIREES:

Age	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
46 - 50	27	2	29	47,982	1,391,488
51 - 55	173	8	181	50,730	9,182,196
56 - 60	379	18	397	50,487	20,043,409
61 - 65	361	13	374	48,703	18,214,819
66 - 70	348	7	355	43,279	15,364,035
71 - 75	223	7	230	37,665	8,663,026
76 - 80	136	1	137	38,621	5,291,040
81 - 85	56	0	56	30,901	1,730,432
86 - 90	32	0	32	23,922	765,492
91 - 99	18	0	18	28,773	517,908
TOTAL	1,753	56	1,809	44,867	81,163,845

DISABILITY RETIREES:

Age	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
36 - 40	3	1	4	25,740	102,961
41 - 45	4	2	6	27,812	166,874
46 - 50	20	0	20	27,483	549,664
51 - 55	18	3	21	22,207	466,353
56 - 60	20	3	23	23,712	545,378
61 - 65	19	0	19	20,385	387,319
66 - 70	19	2	21	20,630	433,240
71 - 75	8	0	8	18,852	150,816
76 - 80	4	0	4	12,088	48,350
81 - 85	6	0	6	14,089	84,532
86 - 90	3	0	3	19,955	59,864
91 - 99	1	0	1	13,830	13,830
TOTAL	125	11	136	22,126	3,009,181

SURVIVORS:

Age	Number Male	Number Female	Total Number	Average Benefit	Total Benefit
0 - 25	16	27	43	5,519	237,318
26 - 30	0	2	2	20,618	41,236
31 - 35	1	2	3	20,556	61,667
36 - 40	0	7	7	26,861	188,026
41 - 45	1	6	7	23,478	164,348
46 - 50	1	11	12	24,619	295,433
51 - 55	0	18	18	28,205	507,690
56 - 60	1	24	25	26,329	658,218
61 - 65	3	31	34	27,860	947,255
66 - 70	0	48	48	21,936	1,052,942
71 - 75	1	38	39	22,066	860,555
76 - 80	0	49	49	20,296	994,523
81 - 85	0	48	48	17,803	854,559
86 - 90	0	41	41	16,411	672,862
91 - 99	0	6	6	16,538	99,225
TOTAL	24	358	382	19,989	7,635,857

ACTIVE MEMBERS:

Attained Ages	Completed Years of Service: 0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Total
0 - 20	17	4										21
21 - 25	107	105	110	61	33	18						434
26 - 30	69	91	103	64	76	303	25					731
31 - 35	33	49	48	59	43	302	266	9				809
36 - 40	10	19	26	24	20	146	243	187	8			683
41 - 45	6	8	7	9	10	88	111	204	165	3		611
46 - 50	5	5	8	5	4	41	64	137	211	105		585
51 - 55			3	3	5	23	31	71	81	100	34	351
56 - 60						10	17	25	21	28	40	141
61 - 65							5	18	6	7	13	49
66 - 70										1	6	7
71 & Over											2	2
Totals	247	281	305	225	191	931	762	651	492	244	95	4,424

AVERAGE ANNUAL SALARY OF ACTIVE MEMBERS:

Attained Ages	Completed Years of Service: 0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Average Salary
0 - 20	31,848	32,624										31,996
21 - 25	32,065	34,317	39,140	39,621	42,047	41,242						36,605
26 - 30	32,113	35,200	39,385	41,113	40,983	45,414	47,732					41,280
31 - 35	33,209	37,729	39,789	43,054	41,922	47,318	52,270	55,337				46,835
36 - 40	38,782	37,201	39,447	44,053	43,031	48,511	55,515	59,396	66,126			53,070
41 - 45	34,379	33,976	51,031	39,282	43,372	50,358	55,826	62,869	70,484	77,318		60,455
46 - 50	43,116	41,983	37,721	43,117	40,522	51,545	57,055	65,033	72,090	76,109		66,635
51 - 55			45,579	39,105	47,120	49,480	56,846	65,927	74,743	74,522	80,735	69,294
56 - 60						54,158	48,844	62,154	86,098	76,704	83,322	72,443
61 - 65							55,109	76,039	68,847	83,089	80,999	75,346
66 - 70										79,425	112,916	108,132
71 & Over											115,342	115,342
Average	32,768	35,496	39,650	41,476	41,869	47,368	54,204	62,893	72,449	75,755	84,621	53,347

TERMINATED MEMBERS DUE A DEFERRED RETIREMENT BENEFIT:

Attained Ages	Years Until Retirement Eligibility: 0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Total
0 - 30												0
31 - 35									2			2
36 - 40								10				10
41 - 45						1	16					17
46 - 50			2			24						26
51 - 55	2	3	9	5	2							21
56 & Over												0
Totals	2	3	11	5	2	25	16	10	2	0	0	76

AVERAGE ANNUAL BENEFITS OF TERMINATED MEMBERS DUE A DEFERRED RETIREMENT BENEFIT:

Attained Ages	Years Until Retirement Eligibility: 0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Average Benefit
0 - 30												0
31 - 35									22,885			22,885
36 - 40								26,507				26,507
41 - 45						54,830	23,417					25,265
46 - 50			42,567			23,411						24,884
51 - 55	60,278	28,138	24,509	31,510	21,604							29,824
56 & Over												0
Average	60,278	28,138	27,792	31,510	21,604	24,667	23,417	26,507	22,885	0	0	26,495

SERVICE RETIREES:

Attained Ages	Completed Years Since Retirement											
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Total
0 - 50	7	10	6	3	3							29
51 - 55	31	34	31	21	16	37	11					181
56 - 60	18	40	28	47	51	155	57	1				397
61 - 65	13	11	18	27	32	132	113	24	4			374
66 - 70	3	2	5	3	8	59	107	130	26	11	1	355
71 - 75	1	1				14	37	84	63	12	18	230
76 - 80						4	9	19	54	26	25	137
81 - 85							2	3	6	14	31	56
86 - 90								1	2	4	25	32
91 & Over										2	16	18
Totals	73	98	88	101	110	401	336	262	155	69	116	1,809

AVERAGE ANNUAL BENEFITS PAYABLE TO SERVICE RETIREES:

Attained Ages	Completed Years Since Retirement											
	0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Average Benefit
0 - 50	56,229	48,087	43,598	47,495	37,648							47,982
51 - 55	60,459	51,717	49,625	54,449	47,568	45,827	37,372					50,730
56 - 60	54,953	57,115	52,519	51,462	55,975	49,901	39,886	17,529				50,487
61 - 65	62,971	61,476	54,112	52,851	61,122	48,640	42,937	41,022	26,548			48,703
66 - 70	40,065	84,056	65,724	28,888	50,092	49,800	45,395	40,585	33,495	26,633	24,335	43,279
71 - 75	32,508	19,580				38,722	36,854	42,567	37,389	28,209	24,197	37,665
76 - 80						47,569	51,545	37,735	44,783	34,706	23,971	38,621
81 - 85							25,069	47,362	44,309	33,730	25,811	30,901
86 - 90								6,128	40,267	36,195	21,362	23,922
91 & Over										49,243	26,214	28,773
Average	57,922	54,977	51,967	51,666	55,322	48,682	42,474	40,912	39,337	32,599	24,248	44,867

DISABILITY RETIREES:

Attained Ages	Completed Years Since Retirement 0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Total
0 - 35												0
36 - 40			2		1			1				4
41 - 45		2	1	1		2						6
46 - 50	1	2	2		3	7	3	2				20
51 - 55					1	6	6	5	3			21
56 - 60			2		1	1	6	6	3	4		23
61 - 65			1			2	2	4	4	3	3	19
66 - 70							2	1	3	11	4	21
71 - 75								1	1	2	4	8
76 - 80								1		1	2	4
81 - 85								2		1	3	6
86 - 90									1		2	3
91 & Over											1	1
Totals	1	4	8	1	6	18	19	23	15	22	19	136

AVERAGE ANNUAL BENEFITS PAYABLE TO DISABILITY RETIREES:

Attained Ages	Completed Years Since Retirement 0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Average Benefit
0 - 35												0
36 - 40			30,233		27,451			15,044				25,740
41 - 45		32,442	33,755	32,640		17,797						27,812
46 - 50	39,919	20,708	22,286		48,810	28,533	18,365	11,250				27,483
51 - 55					26,880	26,448	23,496	17,321	17,736			22,207
56 - 60			46,440		26,387	9,416	31,286	21,865	11,994	15,452		23,712
61 - 65			25,265			31,114	25,497	14,834	21,413	15,270	19,345	20,385
66 - 70							30,361	28,054	21,231	18,816	18,449	20,630
71 - 75								13,384	24,781	22,353	16,987	18,852
76 - 80								9,952		17,762	10,318	12,087
81 - 85								9,396		14,178	17,188	14,089
86 - 90									36,337		11,763	19,955
91 & Over											13,830	13,830
Average	39,919	26,575	32,117	32,640	37,858	25,870	26,079	16,733	19,977	17,784	16,281	22,126

SURVIVING BENEFICIARIES OF FORMER MEMBERS:

Attained Ages	Completed Years Since Retirement: 0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Total
0 - 20	10	2		3	3	11	6	1	2			38
21 - 25				1		1	3					5
26 - 30	1			1								2
31 - 35		1			1		1					3
36 - 40	1	1				3	1		1			7
41 - 45	1				2	1	1		1	1		7
46 - 50	1				1	2	4	2	2			12
51 - 55				1	1	5	5	3	2	1		18
56 - 60			1	1	2	7	5	4	5			25
61 - 65		1			1	2	13	3	4	4	6	34
66 - 70		1		1	2	2	5	15	11	6	5	48
71 - 75						1	3	8	12	3	12	39
76 - 80							2	8	4	10	25	49
81 - 85								4	4	8	32	48
86 - 90										2	39	41
91 & Over											6	6
Totals	14	6	1	8	13	35	49	48	48	35	125	382

AVERAGE ANNUAL BENEFITS PAYABLE TO SURVIVORS OF FORMER MEMBERS:

Attained Ages	Completed Years Since Retirement: 0	1	2	3	4	5- 9	10-14	15-19	20-24	25-29	30&Over	Average Benefit
0 - 20	7,155	6,175		5,556	5,874	5,375	3,955	3,756	5,836			5,696
21 - 25				5,170		5,569	3,372					4,171
26 - 30	19,013			22,222								20,618
31 - 35		15,701			32,146		13,820					20,556
36 - 40	39,898	41,164				15,077	26,719		35,014			26,861
41 - 45	35,970				32,864	27,967	23,716		9,175	1,791		23,478
46 - 50	38,590				31,539	40,851	21,490	16,968	11,852			24,619
51 - 55				34,468	48,685	41,870	29,529	17,112	3,256	9,691		28,205
56 - 60			60,900	58,647	23,215	31,309	23,356	14,673	19,521			26,329
61 - 65		86,771			27,230	40,097	31,530	23,921	25,139	19,842	15,248	27,860
66 - 70		15,421		64,092	19,679	24,063	27,251	20,645	21,542	24,131	11,653	21,936
71 - 75						34,036	44,493	18,877	26,140	25,472	12,661	22,066
76 - 80							37,181	25,782	29,945	28,049	12,545	20,296
81 - 85								4,774	38,570	27,772	14,344	17,803
86 - 90										21,307	16,160	16,411
91 & Over											16,537	16,537
Average	14,644	28,568	60,900	25,158	23,749	23,156	24,540	18,865	23,103	24,495	14,430	19,989

EXHIBIT IX
YEAR-TO-YEAR COMPARISON

	Fiscal 2018	Fiscal 2017	Fiscal 2016	Fiscal 2015
Number of Active Members	4,424	4,429	4,362	4,192
Number of Retirees & Survivors	2,327	2,289	2,213	2,139
DROP Participants	192	173	173	166
Number of Terminated Due Deferred Benefits	76	72	72	81
Number Terminated Due Refunds	656	597	558	523
Active Lives Payroll (excludes DROP participants)	$ 236,005,445	$ 232,500,397	$ 225,301,112	$ 211,963,892
Retiree Benefits in Payment	$ 91,808,883	$ 88,444,685	$ 83,899,034	$ 79,924,818
Market Value of Assets	$ 1,704,049,168	$ 1,593,696,648	$ 1,399,892,212	$ 1,419,138,769
Ratio of Actuarial Value of Assets to Actuarial Accrued Liability	76.40%	75.82%	75.48%	76.09%
Actuarial Accrued Liability (EAN)	$ 2,279,256,967	$ 2,166,881,556	$ 2,053,982,618	$ 1,958,850,006
Actuarial Value of Assets	$ 1,741,451,961	$ 1,643,007,075	$ 1,550,261,745	$ 1,490,408,510
UAL (Funding Excess)	$ 537,805,006	$ 523,874,481	$ 503,720,873	$ 468,441,496
P.V. of Future Employer Normal Contributions	$ 346,076,765	$ 328,942,059	$ 305,570,473	$ 286,640,979
Present Value of Future Employee Contrib.	$ 240,713,969	$ 238,106,260	$ 230,423,085	$ 216,351,986
Present Value of Future Benefits	$ 2,866,047,701	$ 2,733,929,875	$ 2,589,976,176	$ 2,461,842,971

	Fiscal 2019	Fiscal 2018	Fiscal 2017	Fiscal 2016
Statutory Employee Contribution Rate for Members With Earnings Above Poverty Level *	10.00%	10.00%	10.00%	10.00%
Required Tax Contributions as a Percentage of Projected Payroll	11.04%	10.85%	10.91%	11.33%
Actuarially Required Employer Contribution as a Percentage of Projected Payroll	28.32%	28.67%	27.09%	25.44%
Board Approved Employer Contribution as a Percentage of Projected Payroll	26.50%	26.50%	25.25%	27.25%

* The above rates are for members with earnings greater than the Department of HHS poverty guidelines. For members with earnings below the poverty guidelines, employer rates will be 2.0% higher and employee rates will be 2.0% lower.

Fiscal 2014	Fiscal 2013	Fiscal 2012	Fiscal 2011	Fiscal 2010	Fiscal 2009
4,098	4,063	4,056	4,020	3,989	3,882
2,057	1,958	1,875	1,802	1,749	1,688
185	221	217	225	162	147
9	71	70	68	59	55
472	450	398	418	442	407
$ 203,333,976	$ 199,129,982	$ 198,112,999	$ 193,136,985	$ 189,542,210	$ 178,913,097
$ 73,404,453	$ 67,678,016	$ 62,975,274	$ 58,699,965	$ 56,056,554	$ 53,031,851
$ 1,410,307,198	$ 1,253,213,084	$ 1,122,864,548	$ 1,154,482,040	$ 971,775,080	$ 865,547,030
74.66%	71.13%	71.66%	74.33%	74.21%	76.13%
$ 1,855,298,538	$ 1,771,931,777	$ 1,700,643,083	$ 1,621,007,988	$ 1,536,258,543	$ 1,410,559,615
$ 1,385,135,204	$ 1,260,348,240	$ 1,218,618,308	$ 1,204,830,245	$ 1,140,054,175	$ 1,073,797,423
$ 470,163,334	$ 511,583,537	$ 482,024,775	$ 416,177,743	$ 396,204,368	$ 336,762,192
$ 315,734,786	$ 310,702,226	$ 325,616,184	$ 305,540,215	$ 335,984,027	$ 292,585,945
$ 213,279,261	$ 210,842,508	$ 211,015,125	$ 206,989,105	$ 160,939,180	$ 150,094,699
$ 2,384,312,585	$ 2,294,778,794	$ 2,223,486,329	$ 2,133,537,308	$ 2,033,181,750	$ 1,853,240,259

Fiscal 2015	Fiscal 2014	Fiscal 2013	Fiscal 2012	Fiscal 2011	Fiscal 2010
10.00%	10.00%	10.00%	10.00%	8.00%	8.00%
11.39%	11.05%	10.72%	10.93%	11.09%	11.56%
27.50%	29.23%	27.77%	24.02%	24.97%	20.79%
29.25%	28.25%	24.00%	23.25%	21.50%	14.00%

SUMMARY OF PRINCIPAL PLAN PROVISIONS

The Firefighters' Retirement System was established as of January 1, 1980, for the purpose of providing retirement allowances and other benefits as described under R.S. 11:2256 - 11:2259. The following summary of plan provisions is for general informational purposes only and does not constitute a guarantee of benefits.

MEMBERSHIP - All full time firefighters or any person in a position as defined in the municipal fire and police civil service system who is employed by a fire department of any municipality, parish, or fire protection district of the State of Louisiana, except Orleans, and East Baton Rouge Parishes, who earns at least three hundred seventy-five dollars per month excluding state supplemental pay are required to be members of this retirement system. Employees of the system are eligible, at their option to become members of the system. Persons must be under the age of fifty to be eligible for system membership unless they become members through merger.

CONTRIBUTION RATES - Under the provisions of R.S. 11:62, 11:103, and 22:1476A(3), the fund is financed by a combination of employee contributions, employer contributions, and insurance premium taxes. The employee contribution rate is set by R.S. 11:62 but cannot be less than 8% or more than 10% of earnable compensation. The employee contribution rate is fixed at 8% for members whose earnable compensation is less than or equal to the poverty guidelines issued by the U. S. Department of Health and Human Services. Gross employer contributions are determined by actuarial valuation and are subject to change each year in accordance with R. S. 11:103, 11:105, 11:107 and 11:107.1. The employee contribution rate is set at 8% when gross employer contributions total 25% or less of earnable compensation. The employee rate then increases 0.25% for each 0.75% increase in the total rate, subject to a maximum rate of 10%. Insurance premium taxes are allocated to the system based on available funds and the statutory provisions as described in R.S. 22:1476A(3).

CONTRIBUTION REFUNDS - Upon withdrawal from service, members not entitled to a retirement allowance may receive a refund of accumulated contributions. Refunds are payable ninety days after the effective date of withdrawal from service.

RETIREMENT BENEFITS - Members with twelve years of creditable service may retire at age fifty-five; members with twenty years of service may retire at age fifty; members with twenty-five years of service may retire regardless of age, provided that they have been a member of this system for at least one year. The retirement allowance is equal to three and one-third percent of the member's average final compensation multiplied by his years of creditable service, not to exceed one hundred percent of his average final compensation.

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

> **Option 1** - If the member dies before he has received in annuity payments the present value of his member's annuity as it was at the time of retirement the balance is paid to his beneficiary.
>
> **Option 2** - Upon retirement, the member receives a reduced benefit. Upon the member's death, the designated beneficiary will continue to receive the same reduced benefit.

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

Option 4 - Upon retirement, the member elects to receive a board approved benefit payable to the member, the member's spouse, or the member's dependent child, which is actuarially equivalent to the maximum benefit.

A member may also elect to receive an actuarially reduced benefit which provides for an automatic 2 ½% annual compound increase in monthly retirement benefits based on the reduced benefit and commencing on the later of age fifty-five or retirement anniversary; this COLA is in addition to any ad hoc COLAs which are payable.

Initial Benefit Option – This option is available only to regular retirees who have not participated in the Deferred Retirement Option Plan. Under this option members may receive an initial benefit plus a reduced monthly retirement allowance which, when combined, equal the actuarially equivalent amount of the maximum retirement allowance. The initial benefit may not exceed an amount equal to thirty-six payments of the member's maximum retirement allowance. The initial benefit can be paid either as a lump-sum payment or placed in an account called an "initial benefit account" with interest credited thereto and monthly payments made from the account.

DISABILITY BENEFITS - Any member who has been officially certified as totally disabled solely as the result of injuries sustained in the performance of his official duties, or for any cause, provided the member has a least five years of creditable service and provided that the disability was incurred while the member was an active contributing member, is entitled to disability benefits. Any member under the age of fifty who becomes totally disabled will receive a disability benefit equal to 60% of final compensation for an injury received in the line of duty; or 75% of his accrued retirement benefit with a minimum of 25% of average salary for any injury received, even though not in the line of duty. Any member age fifty or older who becomes totally disabled from an injury sustained in the line of duty is entitled to a disability benefit equal to the greater of 60% of final compensation or his accrued retirement benefit. Any member age fifty or older who becomes totally disabled as a result of any injury, even though not in the line of duty, is entitled to a disability benefit equal to his accrued retirement benefit with a minimum of 25% of average salary. The surviving spouse of a member who was on disability retirement at the time of death receives a benefit of $200 per month. When the member takes disability retirement, he may in addition take an actuarially reduced benefit in which case the member's surviving spouse receives 50% of the disability benefit being paid immediately prior to the death of the disability retiree. The retirement system may reduce benefits paid to a disability retiree who is also receiving workers compensation payments.

SURVIVOR BENEFITS - Benefits are payable to survivors of a deceased member who dies and is not eligible for retirement as follows. If any member is killed in the line of duty and leaves a surviving eligible spouse, the spouse is entitled to an annual benefit equal to two-thirds of the deceased member's final compensation. If any member dies from a cause not in the line of duty, the surviving spouse is entitled to an annual benefit equal to 3% of the deceased member's average final compensation multiplied by his total years of creditable service; however, in no event is the annual benefit less than 40% nor more than 60% of the deceased member's average final compensation. Children of the deceased member who are under the age of eighteen years are entitled to the greater of $200 per month or 10% of average final compensation (not to exceed 100% of average final compensation) until reaching the age of eighteen or until the age of twenty-two if enrolled full-time in an institution of higher learning, unless the surviving child is physically handicapped or mentally retarded in which case the benefit is payable regardless of age. If a deceased member dies leaving no surviving spouse, but at least one minor child, each child is entitled to receive forty percent of the deceased's average final compensation, not to exceed an aggregate of sixty percent of average final compensation.

DEFERRED RETIREMENT OPTION PLAN - In lieu of terminating employment and accepting a service retirement allowance, any member of the system who has at least twenty years of creditable service and who is eligible to receive a service retirement allowance may elect to participate in the deferred retirement option plan for up to thirty-six months and defer the receipt of benefits. Upon commencement of participation in the plan, membership in the system terminates and neither the employee nor employer contributions are payable. Compensation and creditable service will remain as they existed on the effective date of commencement of participation in the plan. The monthly retirement benefits that would have been payable, had the member elected to cease employment and receive a service retirement allowance, are paid into the deferred retirement option plan account. Upon termination of employment at the end of the specified period of participation, a participant in the program may receive, at his option, a lump sum payment from the account equal to the payments to the account, or a true annuity based upon his account, or he may elect any other method of payment if approved by the Board of Trustees. The monthly benefits that were being paid into the fund during the period of participation will begin to be paid to the retiree. If employment is not terminated at the end of the thirty-six months, payments into the account cease and the member resumes active contributing membership in the system. If the participant dies during the period of participation in the program, a lump sum payment equal to his account balance is paid to his named beneficiary or, if none, to his estate; in addition, normal survivor benefits are payable to survivors of retirees.

COST OF LIVING INCREASES - The Board of Trustees is authorized to grant retired members and widows of members who have retired an annual cost of living increase of up to 3% of their current benefit, and all retired members and widows who are sixty-five years of age and older a 2% increase in their original benefit. In order for the Board to grant either of these increases the system must meet certain criteria detailed in the statute related to funding status and interest earnings. In lieu of these cost of living adjustments the Board may also grant an increase in the form of "$X \times (A+B)$" where "X" is any amount up to $1 per month, and "A" is equal to the number of years of credited service accrued at retirement or at death of the member of retiree, and "B" is equal to the number of years since retirement or since death of the member or retiree to June thirtieth of the initial year of such increase.

ACTUARIAL ASSUMPTIONS

In determining actuarial costs, certain assumptions must be made regarding future experience under the plan. These assumptions include the rate of investment return, mortality of plan members, rates of salary increase, rates of retirement, rates of termination, rates of disability, and various other factors that have an impact on the cost of the plan. To the extent that future experience varies from the assumptions selected for valuation, future costs will be either higher or lower than anticipated. The following chart illustrates the effect of emerging experience on the plan.

Factor	Increase in Factor Results in
Investment Earnings Rate	Decrease in Cost
Annual Rate of Salary Increase	Increase in Cost
Rates of Retirement	Increase in Cost
Rates of Termination	Decrease in Cost
Rates of Disability	Increase in Cost
Rates of Mortality	Decrease in Cost

ACTUARIAL COST METHOD: Individual Entry Age Normal With Allocation of Cost Based on Earnings. Entry and Attained Ages Calculated on an Age Near Birthday Basis.

VALUATION INTEREST RATE: 7.30% (Net of investment expense)

ACTUARIAL ASSET VALUES: All assets are valued at market value adjusted to defer four-fifths of all earnings above or below the valuation interest rate in the valuation year, three-fifths of all earnings above or below the valuation interest rate in the prior year, two-fifths of all earnings above or below the valuation interest rate from two years prior, and one-fifth of all earnings above or below the valuation interest rate from three years prior. The resulting smoothed values are subject to a corridor of 85% to 115% of the market value of assets. If the smoothed value falls outside the corridor, the actuarial value is set equal to the average of the corridor limit and the smoothed value.

ACTIVE, ANNUITANT AND BENEFICIARY MORTALITY: RP-2000 Combined Healthy with Blue Collar Adjustment Sex Distinct Mortality Tables Projected to 2031 using Scale AA

RETIREE COST OF LIVING INCREASES: The present value of future retirement benefits is based on benefits currently being paid by the system and includes previously granted cost of living increases. The present values do not include provisions for potential future increases not yet authorized by the Board of Trustees.

ANNUAL SALARY INCREASE RATE: Salary increases include 2.7% inflation and merit increases. The gross rates including inflation and merit increases are as follows:

Years of Service	Salary Growth Rate
1 – 2	15.000%
3 – 14	5.750%
15 – 24	5.250%
25 & over	4.750%

RETIREMENT RATES: The table of these rates is included later in the report. These rates apply only to those individuals eligible to retire.

RETIREMENT LIMITATIONS: Projected retirement benefits are not subject to IRS Section 415 limits.

DROP ENTRY RATES: The table of these rates is included later in the report. These rates apply only to those individuals eligible to participate.

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

RETIREMENT RATES FOR ACTIVE FORMER DROP PARTICIPANTS: Retirement rates for active former DROP participants are as follows:

Ages	Retirement Rates
Under 75	0.25
75 & Over	1.00

DISABILITY RATES: 55% of the disability rates used for the 21st valuation of the Railroad Retirement System for individuals with 10-19 years of service. The table of these rates is included later in the report. 20% of total disabilities are assumed to be in the line of duty.

WITHDRAWAL RATES: The rates of withdrawal are applied based upon completed years of service according to the following table:

Service	Factor	Service	Factor
<1	0.075	6	0.050
1	0.065	7	0.040
2	0.065	8	0.030
3	0.065	9	0.020
4	0.050	>9	0.010
5	0.050		

Note: The withdrawal rate for individuals eligible to retire is assumed to be zero.

MARRIAGE STATISTICS: 70% of the members are assumed to be married; husbands are assumed to be three years older than wives.

SERVICE RELATED DEATH: 20% of Total Deaths

FAMILY STATISTICS: Assumptions utilized in determining the costs of various survivor benefits as listed below, are derived from the information provided in the 2010 U. S. Census:

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

DISABLED LIVES MORTALITY: RP-2000 Disabled Lives Mortality Tables set back 5 years for males and set back 3 years for females

IN THE LINE OF DUTY DISABILITY: 20% of Total Disabilities

VESTING ELECTING PERCENTAGE: 70% of those vested elect deferred benefits in lieu of contribution refunds.

ACTUARIAL TABLES AND RATES

Age	Male Mortality Rates	Female Mortality Rates	Male Disabled Mortality Rates	Female Disabled Mortality Rates	Retirement Rates	DROP Entry Rates	Disability Rates
18	0.00017	0.00012	0.02257	0.00745	0.000000	0.000000	0.000830
19	0.00018	0.00012	0.02257	0.00745	0.000000	0.000000	0.000830
20	0.00019	0.00012	0.02257	0.00745	0.000000	0.000000	0.000830
21	0.00020	0.00011	0.02257	0.00745	0.000000	0.000000	0.000830
22	0.00022	0.00011	0.02257	0.00745	0.000000	0.000000	0.000830
23	0.00023	0.00012	0.02257	0.00745	0.000000	0.000000	0.000830
24	0.00025	0.00013	0.02257	0.00745	0.000000	0.000000	0.000830
25	0.00028	0.00013	0.02257	0.00745	0.000000	0.000000	0.000830
26	0.00031	0.00015	0.02257	0.00745	0.000000	0.000000	0.000830
27	0.00033	0.00015	0.02257	0.00745	0.000000	0.000000	0.000830
28	0.00034	0.00016	0.02257	0.00745	0.000000	0.000000	0.000830
29	0.00035	0.00017	0.02257	0.00745	0.000000	0.000000	0.000830
30	0.00062	0.00021	0.02257	0.00745	0.000000	0.000000	0.000830
31	0.00068	0.00026	0.02257	0.00745	0.000000	0.000000	0.000830
32	0.00075	0.00029	0.02257	0.00745	0.000000	0.000000	0.000830
33	0.00081	0.00031	0.02257	0.00745	0.000000	0.000000	0.000830
34	0.00087	0.00034	0.02257	0.00745	0.000000	0.000000	0.000830
35	0.00093	0.00037	0.02257	0.00745	0.000000	0.000000	0.000940
36	0.00098	0.00040	0.02257	0.00745	0.000000	0.000000	0.001050
37	0.00103	0.00043	0.02257	0.00745	0.000000	0.000000	0.001160
38	0.00105	0.00046	0.02257	0.00745	0.000000	0.000000	0.001320
39	0.00106	0.00050	0.02257	0.00745	0.000000	0.000000	0.001490
40	0.00107	0.00055	0.02257	0.00745	0.000000	0.000000	0.001710
41	0.00108	0.00061	0.02257	0.00745	0.060000	0.150000	0.001930
42	0.00110	0.00067	0.02257	0.00745	0.060000	0.150000	0.002150
43	0.00113	0.00074	0.02257	0.00745	0.060000	0.150000	0.002420
44	0.00116	0.00080	0.02257	0.00745	0.060000	0.150000	0.002750
45	0.00120	0.00084	0.02257	0.00745	0.060000	0.150000	0.003140
46	0.00122	0.00088	0.02257	0.00745	0.060000	0.150000	0.003580
47	0.00126	0.00091	0.02257	0.00745	0.060000	0.150000	0.004020
48	0.00129	0.00097	0.02257	0.00745	0.060000	0.150000	0.004570
49	0.00133	0.00104	0.02257	0.00818	0.060000	0.150000	0.005170
50	0.00137	0.00115	0.02257	0.00896	0.060000	0.170000	0.005890
51	0.00151	0.00127	0.02385	0.00978	0.060000	0.170000	0.006710
52	0.00160	0.00145	0.02512	0.01063	0.060000	0.170000	0.007590
53	0.00176	0.00166	0.02640	0.01154	0.060000	0.170000	0.008640
54	0.00195	0.00190	0.02769	0.01248	0.060000	0.170000	0.009790
55	0.00232	0.00218	0.02897	0.01346	0.060000	0.170000	0.011110
56	0.00283	0.00254	0.03027	0.01446	0.060000	0.170000	0.012650
57	0.00331	0.00290	0.03156	0.01550	0.060000	0.170000	0.014360
58	0.00388	0.00325	0.03286	0.01654	0.060000	0.170000	0.016280
59	0.00440	0.00369	0.03415	0.01760	0.060000	0.170000	0.018540
60	0.00502	0.00424	0.03544	0.01865	0.060000	0.170000	0.026840
61	0.00590	0.00496	0.03673	0.01971	0.060000	0.170000	0.026840
62	0.00674	0.00581	0.03803	0.02077	0.060000	0.170000	0.026840
63	0.00795	0.00683	0.03933	0.02184	0.060000	0.170000	0.026840
64	0.00892	0.00782	0.04067	0.02294	0.060000	0.170000	0.026840
65	0.01004	0.00890	0.04204	0.02408	0.500000	0.170000	0.026840
66	0.01170	0.01013	0.04347	0.02529	0.500000	0.170000	0.026840
67	0.01303	0.01131	0.04498	0.02660	0.500000	0.170000	0.026840
68	0.01400	0.01260	0.04658	0.02803	0.500000	0.170000	0.026840
69	0.01547	0.01403	0.04831	0.02959	0.500000	0.170000	0.026840
70	0.01675	0.01595	0.05017	0.03132	0.500000	0.000000	0.026840
71	0.01836	0.01721	0.05221	0.03323	0.500000	0.000000	0.026840
72	0.02015	0.01914	0.05445	0.03533	0.500000	0.000000	0.026840
73	0.02216	0.02056	0.05691	0.03764	0.500000	0.000000	0.026840
74	0.02444	0.02267	0.05961	0.04014	0.500000	0.000000	0.026840
75	0.02786	0.02408	0.06258	0.04285	0.500000	0.000000	0.026840

PRIOR YEAR ASSUMPTIONS

VALUATION INTEREST RATE:	7.4% (Net of investment expense)
INFLATION RATE:	2.775%

GLOSSARY

Accrued Benefit – The pension benefit that an individual has earned as of a specific date based on the provisions of the plan and the individual's age, service, and salary as of that date.

Actuarial Accrued Liability – The actuarial present value of benefits payable to members of the fund less the present value of future normal costs attributable to the members.

Actuarial Assumptions - Assumptions as to the occurrence of future events affecting pension costs. These assumptions include rates of mortality, withdrawal, disablement, and retirement. Also included are rates of investment earnings, changes in compensation, as well as statistics related to marriage and family composition.

Actuarial Cost Method – A procedure for determining the portion of the cost of a pension plan to be allocated to each year. Each cost method allocates a certain portion of the actuarial present value of benefits between the actuarial accrued liability and future normal costs. Once this allocation is made, a determination of the normal cost attributable to a specific year can be made along with the payment to amortize any unfunded actuarial accrued liability. To the extent that a particular funding method allocates a greater (lesser) portion of the actual present value of benefits to the actuarial accrued liability it will allocate less (more) to future normal costs.

Actuarial Equivalence – Payments or receipts with equal actuarial value on a given date when valued using the same set of actuarial assumptions.

Actuarial Gain (Loss) – The financial effect on the fund of the difference between the expected and actual experience of the fund. The experience may be related to investment earnings above (or below) those expected or changes in the liability structure due to fewer (or greater) than the expected numbers of retirements, deaths, disabilities, or withdrawals. In addition, other factors such as pay increases above (or below) those forecast can result in actuarial gains or losses. The effect of such gains (or losses) is to decrease (or increase) future costs.

Actuarial Present Value - The value, as of a specified date, of an amount or series of amounts payable or receivable thereafter, with each amount adjusted to reflect the time value of money (through accrual of interest) and the probability of payments. For example: if $600 invested today will be worth $1,000 in 10 years and there is a 50% probability that a person will live 10 years, then the actuarial present value of $1,000 payable to that person if he should survive 10 years is $300.

Actuarial Value of Assets - The value of cash, investments, and other property belonging to the pension plan as used by the actuary for the purpose of the actuarial valuation. This may correspond to the book value, market value, or some modification involving either or both book and market value. Adjustments to market values are often made to reduce the volatility of asset values.

Asset Gain (Loss) - That portion of the actuarial gain attributable to investment performance above (below) the expected rate of return in the actuarial assumptions.

Amortization Payment - That portion of the pension plan contribution designated to pay interest and reduce the outstanding principal balance of unfunded actuarial accrued liability. If the amortization payment is less than the accrued interest on the unfunded actuarial accrued liability the outstanding principal balance will increase.

Contribution Shortfall (Excess) - The difference between contributions recommended in the prior valuation and the actual amount received.

Decrements – Events which result in the termination of membership in the system such as retirement, disability, withdrawal, or death.

Employer Normal Cost - That portion of the normal cost not attributable to employee contributions. It includes both direct contributions made by the employer and contributions from other non-employee sources such as revenue sharing and revenues related to taxes.

Funded Ratio – A measure of the ratio of assets to liabilities of the system according to a specific definition of those two values. Typically the assets used in the measure are the actuarial value of assets; the liabilities are defined by reference to some recognized actuarial funding method. Thus the funded ratio of a plan depends not only on the financial strength of the plan but also on the funding method used to determine the liabilities and the asset valuation method used to determine the assets in the ratio.

Normal Cost - That portion of the actuarial present value of pension plan benefits and expenses allocated to a valuation year by the actuarial cost method. This is analogous to one year's insurance premium.

Pension Benefit Obligation - The actuarial present value of benefits earned or credited to date based on the members expected final average compensation at retirement. For current retirees or terminated members this is equivalent to the actuarial present value of their accrued benefit.

Projected Benefits – The benefits expected to be paid in the future based on the provisions of the plan and the actuarial assumptions. The projected values are based on anticipated future advancement in age and accrual of service as well as increases in salary paid to the participant.

Unfunded Actuarial Accrued Liability - The excess of the actuarial accrued liability over the actuarial value of assets.

Vested Benefits - Benefits that the members are entitled to even if they withdraw from service.