

**ARKANSAS TEACHER RETIREMENT SYSTEM**  
**ANNUAL ACTUARIAL VALUATION OF ANNUITIES**  
**BEING PAID TO RETIREES AND BENEFICIARIES**  
**JUNE 30, 2015**

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## REPORT OF ACTUARIAL VALUATION OF ATRS RETIRED LIVES

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December 17, 2015

Board of Trustees  
Arkansas Teacher Retirement System  
Little Rock, Arkansas

Dear Board Members:

Presented in this report are the results of the *Annual Actuarial Valuation of annuities being paid to retirees and beneficiaries* of the Arkansas Teacher Retirement System.

*The date of the valuation* was June 30, 2015 (using amounts payable as of July 1, 2015).

The valuation was based upon census data and financial information provided by the System's administrative staff. Preparation of this data requires considerable staff time. The helpful cooperation of the Arkansas Teacher Retirement System staff in furnishing the data is acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the data provided by ATRS.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the Retirement System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

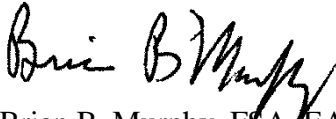
The findings in this report are based on data and other information through June 30, 2015. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law. The scope of an actuarial valuation does not contain an analysis of the potential range of such future measurements.

This report was prepared using certain assumptions approved by the Board under Section 24-7-305 of the Arkansas Code. The actuarial assumptions used for valuation purposes are summarized in the Appendix. These assumptions reflect experience during the period July 1, 2005 to June 30, 2010.

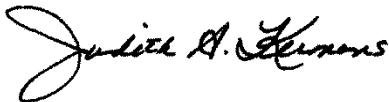
To the best of our knowledge, this report is complete and accurate and was made in accordance with standards of practice promulgated by the Actuarial Standards Board of the American Academy of Actuaries. The actuarial assumptions used for the valuation produce results which, individually and in the aggregate, are reasonable.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. Brian B. Murphy, Judith A. Kermans and Heidi G. Barry are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The actuaries submitting this report are independent of the plan sponsor.


Respectfully submitted,



Brian B. Murphy, FSA, EA, MAAA, FCA



Judith A. Kermans, EA, MAAA, FCA



Heidi G. Barry, ASA, MAAA

BBM/JAK/HGB:bd

## COMMENTS

As expected, during the year ended June 30, 2015 the number of retired lives increased, as did the total amount being paid monthly to retired lives.

*The financing diagram* on page 7 shows the general pattern in which cash benefits increase (the gold line). The schedule below shows how ATRS history illustrates the general pattern.

June 30	Retired Lives Receiving Benefits		
	No.	Annual Rates	% of Active Payroll
		(millions)	
1967	3,846	\$ 6.27	
1972	5,453	11.08	
1977	7,524	23.96	
1982	8,828	36.64	
1987	10,526	66.45	10.0%
1992	12,033	115.50	10.7%
1997	14,233	194.90	15.0%
1998	14,802	220.38	16.1%
1999	15,887	248.75	17.4%
2000	16,657	280.14	18.9%
2001	17,778	309.03	19.8%
2002	19,199	334.15	20.5%
2003	20,271	359.98	21.4%
2004	21,428	386.23	22.1%
2005	22,680	415.04	21.2%
2006	24,153	449.77	21.6%
2007	25,611	484.55	21.1%
2008	26,801	515.56	21.5%
2009	28,818	564.59	22.8%
2010	30,587	612.77	23.1%
2011	32,099	657.08	24.1%
2012	34,160	709.17	26.1%
2013	36,254	763.76	28.0%
2014	38,478	822.19	29.8%
2015	40,748	916.62	33.0%

*A significant financial goal* for the Teacher Retirement System was to reach a point in time where System assets fully covered the liabilities for future benefit payments to retirees and beneficiaries then on rolls. This goal was achieved in 1980 and retired life liabilities continue to be 100% funded.

## **OTHER OBSERVATIONS**

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### **General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status**

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 8.0% on the actuarial value of assets), it is expected that:

- 1) The unfunded actuarial accrued liabilities will be fully amortized after 33 years, and
- 2) The funded status of the plan will increase gradually towards a 100% funded ratio.
- 3) The unfunded accrued liability will increase for an extended period before beginning to decline.

### **Limitations of Funded Status Measurements**

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

- 1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to a unrelated third party in an arm's length market value type transaction.
- 2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- 3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

### **Limitations of Project Scope**

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

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## **FINANCIAL PRINCIPLES**

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## ANNUAL RESERVE TRANSFERS

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The annual accounting transfers listed below are recommended so that retired life accounts will be fully funded as of the valuation date.

<b>Reserve Account</b>	<b>June 30, 2015 Balance Reported</b>	<b>Transfer Amount</b>	<b>June 30, 2015 Balance After Transfer</b>
RRA	\$9,043,552,180	\$ 472,187,217	\$9,515,739,397
808 RRA	16,730,157	594,984	17,325,141
SBA	90,353,488	4,919,307	95,272,795
EAA	(3,694,081,484)	(477,701,508)	(4,171,782,992)
<b>Total</b>	<b>\$5,456,554,341</b>	<b>\$ 0</b>	<b>\$5,456,554,341</b>

Lump sum death benefits for retirees are paid from the Employer Accumulation Account and are not included in the figures shown in this report. The liabilities for lump sum death benefits for retirees are currently \$97.9 million.



## FINANCIAL PRINCIPLES AND OPERATIONAL TECHNIQUES

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***Promises Made and To Be Paid For.*** As each year is completed, the System in effect hands an “IOU” to each member then acquiring a year of service credit. The “IOU” says: “The Arkansas Teacher Retirement System owes you one year’s worth of retirement benefits, payments in cash commencing when you qualify for retirement.”

The related ***key financial questions*** are:

***Which generation of taxpayers contributes the money to cover the IOU?***

***The present taxpayers***, who receive the benefit of the member’s present year of service?

***Or the future taxpayers***, who happen to be in Arkansas at the time the IOU becomes a cash demand?

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The financial objective of the ATRS is that this year’s taxpayers contribute the money to cover the IOUs being handed out this year so that ***the employer contribution rate will remain approximately level from generation to generation*** -- our children and our grandchildren will not have to contribute greater percents of pay than we contribute now. This objective was set forth in Act 793 of 1977.

(There are systems which have ***a design for deferring contributions to future taxpayers***, lured by a lower contribution rate now and putting aside the fact that the contribution rate must then relentlessly grow much greater over decades of time -- consume now, and let your children face higher contribution rates after you retire.)

An inevitable byproduct of the level-cost design is the accumulation of reserve assets for decades and the income produced when the assets are invested. ***Investment income*** becomes the ***third and largest contributor*** for benefits to employees, and is interlocked with the contribution amounts required from employees and employers.

Translated to actuarial terminology, this level-cost objective means that the contribution rates must total at least the following:

Normal Cost (the cost of members' service being rendered this year)

... plus ...

Interest on Unfunded Actuarial Accrued Liabilities (unfunded accrued liabilities are the difference between (i) liabilities for service already rendered and (ii) the accrued assets of the plan).

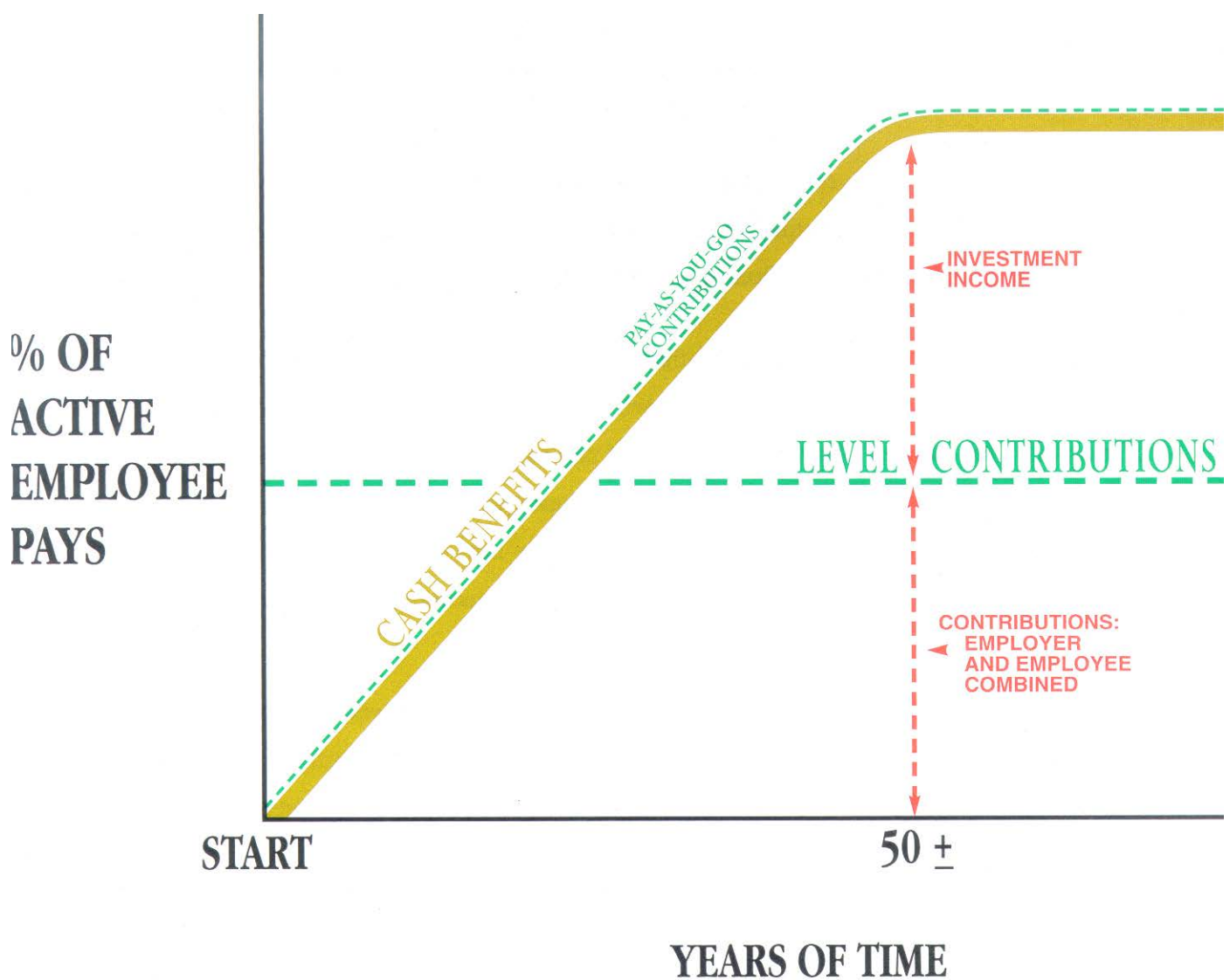
***Computing Contributions to Support System Benefits.*** From a given schedule of benefits and from the employee data and asset data furnished, the actuary determines the contribution rates to support the benefits, by means of *an actuarial valuation*.

An actuarial valuation has a number of ingredients such as: the rate of investment income which plan assets will earn; the rates of withdrawal of active members who leave covered employment before qualifying for any monthly benefit; the rates of mortality; the rates of disability; the rates of pay increases; and the assumed age or ages at actual retirement.

In an actuarial valuation, assumptions must be made as to what the above rates will be, for the next year and for decades in the future. Only the subsequent actual experience of the System can indicate the degree of accuracy of the assumptions.

***Reconciling Differences Between Assumed Experience and Actual Experience.*** Once actual experience has occurred and been observed, it will not coincide exactly with assumed experience, regardless of the accuracy of the assumptions or the skill of the actuary and the precision of the calculations made. The future can be predicted with considerable but not complete precision.

ATRS copes with these continually changing differences by having annual actuarial valuations. Each actuarial valuation is a complete recalculation of assumed future experience, taking into account all past differences between assumed and actual experience. The result is continual adjustments in financial position.



**CASH BENEFITS LINE.** This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

**LEVEL CONTRIBUTION LINE.** Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

**Economic Risk Areas**

- Rates of investment return
- Rates of pay increase
- Changes in active member group size

**Non-Economic Risk Areas**

- Ages at actual retirement
- Rates of mortality
- Rates of withdrawal of active members (turnover)
- Rates of disability

## THE ACTUARIAL VALUATION PROCESS

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*The financing diagram* on the opposite page shows the relationship between the two fundamentally different philosophies of paying for retirement benefits: the method where contributions match cash benefit payments (or barely exceed cash benefit payments, as in the Federal Social Security program), and is thus an *increasing contribution method*; and the *level contribution method* which equalizes contributions between the generations.

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*The actuarial valuation* is the mathematical process by which the level contribution rate is determined, and the flow of activity constituting the valuation may be summarized as follows:

A. *Census data*, furnished by plan administrator

Retired lives now receiving benefits

Former employees with vested benefits not yet payable

Active employees

B. + *Asset data* (cash & investments), furnished by plan administrator

C. + *Benefit provisions* that establish eligibility and amounts of payments to members

D. + *Assumptions concerning future financial experience in various risk areas*, which assumptions are established by the Board of Trustees after consulting with the actuary

E. + *The funding method* for employer contributions (the long-term planned pattern for employer contributions)

F. + *Mathematically combining the assumptions, the funding method, and the data*

G. = Determination of:

*Plan financial position*, and/or

*New Employer Contribution Rate*

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## **BENEFIT PROVISIONS**

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## SUMMARY OF PROVISIONS

### JUNE 30, 2015

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**1. Post-Retirement Increases – A.C.A. §§ 24-7-713, 24-7-727 (compound COLA).**

Each July 1, annuities are adjusted to be equal to the base annuity times 100% plus 3% for each full year in the period from the effective date of the base annuity to the current July 1. The base annuity is the amount of the member's annuity on the later of July 1, 2001 or the effective date of retirement, as re-determined by Acts 396 of 1999 and 992 of 1997. The July 1, 2009 cost of living adjustment for retirees was compounded. The annuity was adjusted by multiplying 3% times the June 30, 2009 retirement benefit amount. After it was calculated on July 1, 2009, the base amount was reset to be the July 1, 2009 benefit amount. Future cost of living raises will be established by the new updated base amount. Future cost of living adjustments will be evaluated on an annual basis to determine if a simple or compound cost of living increase will be given, depending on the financial condition of the System. Act 967 of 2013 would allow the ATRS Board to reverse the compounding of a benefit and reset the base amount to the pre-compounding amount. If this were to occur, it would include participants in the T-DROP plan. The future benefits of a member would not be reduced to recover any benefits paid to a member as a result of the compounding. In addition, the member's benefit on the date of the reversal would not be impacted, but future COLA's would be based upon the reset base amount. This act is dependent upon the actuary's certification that the amortization period is in excess of 30 years to pay unfunded liabilities prior to any reversal of the compounding of the COLA.

**2. Lump Sum Death Benefit – A.C.A. § 24-7-720.** Beneficiaries of deceased active members or retirees with 10 or more years of ATRS credited service are eligible to receive a lump sum death benefit of up to \$10,000 (\$6,667 for non-contributory service-benefit). The amount will be prorated for members who have both contributory service and non-contributory service. Members with 15 or more years of contributory service will receive the full \$10,000 (Act 977 of 2011).

**3. Act 808 Retirement – A.C.A. § 24-4-732.** Any employee of a state agency who was an active member of the Arkansas Teacher Retirement System on April 8, 1987, and who qualified for retirement before January 1, 1988, could become a member of the Arkansas Public Employees Retirement System and retire from that system. All credited service was transferred to that system but the member's contributions were retained by the Arkansas Teacher Retirement System and the benefit amount is transferred monthly to the Arkansas Public Employees Retirement System. Each July 1, annuities are adjusted by 3% (compound escalator).

## SUMMARY OF PROVISIONS

### JUNE 30, 2015

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4. **Act 793 Retirement – A.C.A. § 24-4-522.** Any employee who was a member of the rehabilitation services in 1977 was permitted to become a member of the Arkansas Public Employees Retirement System. Liabilities associated with prior service earned through June 30, 1978 remain in the Arkansas Teacher Retirement System. Future service is allocated to the Arkansas Public Employees Retirement System. Each July 1, annuities are adjusted by 3% (compound escalator).
5. **Retiree Health Stipend – A.C.A. § 24-7-713.** Each retired member as of June 30, 2008, with 5 or more years of ATRS credited service receives \$75 per month toward retiree health care premiums. Members in T-DROP do not receive the \$75 per month until actual retirement. For all members retiring on or after July 1, 2008, a minimum of 10 years of ATRS credited service is required to receive the \$75 per month stipend. Act 603 of 2013 allows the ATRS Board to increase or decrease the stipend to a minimum of \$1 per month and a maximum of \$75 per month. This act is dependent upon the actuary's certification that the amortization period is in excess of 30 years to pay unfunded liabilities prior to any reduction in the current stipend. The stipend for fiscal year 2015 remains at \$75 per month.
6. **T-DROP Cash Balance Account.** Effective July 1, 2012, a T-DROP cash balance account was established that allows members exiting (retiring) from T-DROP to place all or a portion of their T-DROP proceeds into a Cash Balance Account (CBA) at ATRS. The interest rate credited will be between 2.0% and 4.0%, increasing 25 basis points for each year on deposit.

7. **Optional Forms of Benefits – A.C.A. § 24-7-706:**

**Option 1 (*Straight Life Annuity*)**

A member will receive the maximum monthly benefit for which he/she qualifies, throughout his/her lifetime. No monthly benefits will be paid to his/her beneficiary after the member's death. Should a member die before he/she has drawn in benefits an amount equal to his/her contributions plus earned interest, the balance will be paid to a designated beneficiary. The designated beneficiary may be anyone chosen by the member.

**Option A (*100% Survivor Annuity*)**

Under this option a member will receive a reduced annuity throughout his/her lifetime. Upon the member's death, the designated beneficiary will receive the same annuity for the balance of his/her lifetime.

## SUMMARY OF PROVISIONS

### JUNE 30, 2015

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#### **Option B (*50% Survivor Annuity*)**

Under this option a member will receive a reduced annuity throughout his/her lifetime. Upon the member's death, the designated beneficiary will receive one-half (1/2) of this annuity for the balance of his/her lifetime.

#### **Option C (*Annuity for Ten Years Certain and Life Thereafter*)**

A reduced monthly benefit payable for 120 months. After that time, a member's monthly allowance will revert to the amount he/she would have received under the regular plan and continue for life. If the member dies before receiving 120 payments, the designated beneficiary will receive a monthly benefit in the same amount until monthly benefits to both the member and the beneficiary equal 120 monthly payments. No further benefits are then payable to the beneficiary.

Option Factors are based upon an 8.0% interest rate and the 1971 Group Annuity Mortality Table projected to 1984, with a 75% unisex mix.



**SAMPLE BENEFIT COMPUTATIONS FOR A MEMBER  
RETIRING JULY 1, 2015 WITH A  
SIMPLE 3% COLA**

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Data for an Example member is shown below.

Annual retirement benefit as of July 1, 2015:        \$30,000

Projected Benefits, taking into account increases after retirement would be:

<b>Year Ended June 30</b>	<b>Annual Amount</b>		<b>\$ Increase</b>
	<b>Base</b>	<b>Current</b>	
2016	\$30,000	\$30,000	\$ 0
2017	30,000	30,900	900
2018	30,000	31,800	900
2019	30,000	32,700	900
2020	30,000	33,600	900

Thereafter, the amount would increase by \$900 annually for life. Act 793 members and Act 808 members receive compound COLAs.

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## **CHANGES IN PURCHASING POWER**

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## BENEFIT CHANGES DURING RECENT YEARS OF RETIREMENT & RELATED CHANGES IN PURCHASING POWER (1980 \$)

Year Ended June 30	Increase Beginning of Year	Benefit Dollars in Year*	Inflation (Loss) in Year#	Purchasing Power at Year End	
				1980 \$	% of 1980
1980	\$ - - - -	\$ 5,000	- - - -	\$5,000	100%
1981	75	5,075	(9.6)%	4,632	93%
1982	152	5,227	(7.1)%	4,456	89%
1983	152	5,379	(2.6)%	4,471	89%
1984	431	5,810	(4.2)%	4,633	93%
1985	438	6,248	(3.7)%	4,802	96%
1986	509	6,757	(1.7)%	5,103	102%
1987	197	6,954	(3.7)%	5,067	101%
1988	400	7,354	(3.9)%	5,154	103%
1989	503	7,857	(5.1)%	5,236	105%
1990	497	8,354	(4.7)%	5,319	106%
1991	230	8,584	(4.7)%	5,220	104%
1992	762	9,346	(3.1)%	5,513	110%
1993	792	10,138	(3.0)%	5,806	116%
1994	820	10,958	(2.5)%	6,123	122%
1995	303	11,261	(3.0)%	6,107	122%
1996	303	11,564	(2.8)%	6,103	122%
1997	1,657	13,221	(2.3)%	6,821	136%
1998	1,214	14,435	(1.7)%	7,324	146%
1999	323	14,758	(2.0)%	7,344	147%
2000	1,039	15,797	(3.7)%	7,583	152%
2001	1,220	17,017	(3.2)%	7,907	158%
2002	672	17,689	(1.1)%	8,132	163%
2003	468	18,157	(2.1)%	8,174	163%
2004	468	18,625	(3.3)%	8,120	162%
2005	468	19,093	(2.5)%	8,118	162%
2006	468	19,561	(4.3)%	7,973	159%
2007	468	20,029	(2.7)%	7,950	159%
2008	468	20,497	(5.0)%	7,747	155%
2009	468	20,965	1.4 %	8,038	161%
2010	629	21,594	(1.1)%	8,193	164%
2011	648	22,242	(3.6)%	8,149	163%
2012	648	22,890	(1.7)%	8,249	165%
2013	648	23,538	(1.8)%	8,336	167%
2014	648	24,186	(2.1)%	8,392	168%
2015	648	24,834	(0.1)%	8,606	172%
2016	648	25,482			

\* The \$5,000 benefit used to begin this schedule is an arbitrary amount. A different beginning amount would show a different purchasing power amount, but the same in percent loss.

# Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

## BENEFIT CHANGES DURING RECENT YEARS OF RETIREMENT & RELATED CHANGES IN PURCHASING POWER (1990 \$)

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Year Ended June 30	Increase Beginning of Year	Benefit Dollars in Year*	Inflation (Loss) in Year#	Purchasing Power At Year End	
				1990 \$	% of 1990
1990	\$ - - - -	\$ 5,000	- - - -	\$5,000	100%
1991	150	5,150	(4.7)%	4,919	98%
1992	457	5,607	(3.1)%	5,195	104%
1993	475	6,082	(3.0)%	5,471	109%
1994	492	6,574	(2.5)%	5,770	115%
1995	182	6,756	(3.0)%	5,755	115%
1996	182	6,938	(2.8)%	5,751	115%
1997	330	7,268	(2.3)%	5,889	118%
1998	667	7,935	(1.7)%	6,324	126%
1999	177	8,112	(2.0)%	6,340	127%
2000	849	8,961	(3.7)%	6,756	135%
2001	826	9,787	(3.2)%	7,143	143%
2002	387	10,174	(1.1)%	7,346	147%
2003	270	10,444	(2.1)%	7,385	148%
2004	270	10,714	(3.3)%	7,337	147%
2005	270	10,984	(2.5)%	7,336	147%
2006	270	11,254	(4.3)%	7,205	144%
2007	270	11,524	(2.7)%	7,185	144%
2008	270	11,794	(5.0)%	7,002	140%
2009	270	12,064	1.4 %	7,265	145%
2010	362	12,426	(1.1)%	7,405	148%
2011	373	12,799	(3.6)%	7,366	147%
2012	373	13,171	(1.7)%	7,456	149%
2013	373	13,544	(1.8)%	7,535	151%
2014	373	13,917	(2.1)%	7,585	152%
2015	373	14,290	(0.1)%	7,779	156%
2016	373	14,663			

\* The \$5,000 benefit used to begin this schedule is an arbitrary amount. A different beginning amount would show a different purchasing power amount, but the same in percent loss.

# Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

## BENEFIT CHANGES DURING RECENT YEARS OF RETIREMENT & RELATED CHANGES IN PURCHASING POWER (2000 \$)

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Year Ended June 30	Increase Beginning of Year	Benefit Dollars in Year*	Inflation (Loss) in Year#	Purchasing Power At Year End	
				2000 \$	% of 2000
2000	\$ - - - -	\$ 5,900	- - - -	\$5,900	100%
2001	177	6,077	(3.2)%	5,886	100%
2002	252	6,329	(1.1)%	6,065	103%
2003	179	6,508	(2.1)%	6,108	104%
2004	179	6,687	(3.3)%	6,078	103%
2005	179	6,867	(2.5)%	6,086	103%
2006	179	7,046	(4.3)%	5,987	101%
2007	179	7,225	(2.7)%	5,978	101%
2008	179	7,404	(5.0)%	5,834	99%
2009	179	7,583	1.4 %	6,061	103%
2010	228	7,811	(1.1)%	6,178	105%
2011	234	8,045	(3.6)%	6,145	104%
2012	234	8,280	(1.7)%	6,221	105%
2013	234	8,515	(1.8)%	6,287	107%
2014	234	8,749	(2.1)%	6,328	107%
2015	234	8,983	(0.1)%	6,490	110%
2016	234	9,217			

\* The \$5,900 benefit used to begin this schedule is an arbitrary amount. A different beginning amount would show a different purchasing power amount, but the same in percent loss.

# Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

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## VALUATION DATA

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**SUMMARY OF  
ANNUITIES BEING PAID RETIREES AND BENEFICIARIES JULY 1, 2015  
BY DISBURSING ACCOUNT AND GENDER**

Disbursing Account	Men		Women		Totals	
	No.	Annual Annuities	No.	Annual Annuities	No.	Annual Annuities
<b>Retirement Reserve Account</b>						
Age & Service Annuities						
Retirees	8,559	\$ 222,185,271	27,388	\$618,487,839	35,947	\$ 840,673,110
Beneficiaries	263	4,876,237	674	14,667,330	937	19,543,566
Totals	8,822	227,061,507	28,062	633,155,169	36,884	860,216,676
Disability						
Retirees	542	7,663,975	2,094	29,608,914	2,636	37,272,889
Beneficiaries	143	2,024,463	143	2,423,329	286	4,447,792
Totals	685	9,688,438	2,237	32,032,243	2,922	41,720,681
Act 793	103	1,323,656	96	708,238	199	2,031,894
Total retirees and beneficiaries being paid from Retirement Reserve Account	9,610	238,073,601	30,395	665,895,650	40,005	903,969,251
<b>Survivor's Benefit Account</b>	326	4,246,716	352	5,284,173	678	9,530,889
<b>Act 808</b>	36	2,182,078	29	937,836	65	3,119,914
<b>Totals</b>	<b>9,972</b>	<b>244,502,395</b>	<b>30,776</b>	<b>672,117,659</b>	<b>40,748</b>	<b>916,620,054</b>
Prior Year Totals	9,519	\$ 224,680,765	28,959	\$597,513,393	38,478	\$ 822,194,158

**SUMMARY OF  
ANNUITIES BEING PAID RETIREES AND BENEFICIARIES JULY 1, 2015  
BY DISBURSING ACCOUNT AND SOURCE OF FINANCING**

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Disbursing Account	Annual Annuities		Total	
	Employee Financed	Employer Financed	No.	Annual Annuities
<b>Retirement Reserve Account</b>				
Age & Service Annuities				
Retirees	\$ 80,134,797	\$ 760,538,313	35,947	\$ 840,673,110
Beneficiaries	624,423	18,919,143	937	19,543,566
Totals	80,759,220	779,457,456	36,884	860,216,676
Disability				
Retirees	2,511,565	34,761,324	2,636	37,272,889
Beneficiaries	225,913	4,221,879	286	4,447,792
Totals	2,737,478	38,983,203	2,922	41,720,681
Act 793	163,479	1,868,415	199	2,031,894
Total retirees and beneficiaries being paid from Retirement Reserve Account	83,660,177	820,309,074	40,005	903,969,251
<b>Survivor's Benefit Account</b>	518,063	9,012,826	678	9,530,889
<b>Act 808</b>	150,368	2,969,546	65	3,119,914
<b>Totals</b>	<b>84,328,608</b>	<b>832,291,446</b>	<b>40,748</b>	<b>916,620,054</b>
Prior Year Totals	\$ 85,975,532	\$ 736,218,626	38,478	\$ 822,194,158



**ANNUITIES BEING PAID RETIREES AND BENEFICIARIES JULY 1, 2015**  
**BY TYPE OF ANNUITY BEING PAID**

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Type of Annuity	No.	Annual Amounts		
		Original Annuities	Base Annuities	Current Annuities
RETIREMENT RESERVE ACCOUNT				
Age & Service				
Option 1 (Basic single life)	28,440	\$ 417,556,718	\$ 552,196,574	\$ 641,627,493
Option A (Joint & 100% Survivor)	4,471	74,679,813	93,822,052	108,760,792
Option B (Joint & 50% Survivor)	2,287	49,521,331	64,880,219	75,646,965
Option C (10 year certain)	749	11,276,465	12,715,622	14,637,860
Beneficiaries	937	15,117,813	16,647,475	19,543,566
Totals	36,884	568,152,140	740,261,942	860,216,676
Disability				
Option 1	2,149	20,828,098	26,437,328	30,448,912
Option A	361	3,721,976	4,251,488	4,852,532
Option B	78	1,056,938	1,287,945	1,482,463
Option C	48	413,803	421,485	488,982
Beneficiaries	286	3,003,992	3,788,640	4,447,792
Totals	2,922	29,024,807	36,186,886	41,720,681
Totals	39,806	597,176,947	776,448,828	901,937,357
SURVIVOR'S BENEFIT ACCOUNT				
Beneficiaries of Deceased Members	678	\$ 6,458,581	\$ 8,269,068	\$ 9,530,889
OTHER ANNUITIES				
Act 793	199	\$ 1,132,001	\$ 2,031,894	2,031,894
Act 808	65	1,205,456	3,119,914	3,119,914
RETIREMENT SYSTEM TOTALS				
Total Annuities Being Paid	40,748	\$ 605,972,985	\$ 789,869,704	\$ 916,620,054

**The Original Annuity** is the annuity at the date of retirement.

**The Base Annuity** is the amount from which the 3.0% COLA is calculated.

**The Current Annuity** is the annuity payable at July 1, 2015.

**ANNUITIES BEING PAID JULY 1, 2015**  
**FROM THE RETIREMENT RESERVE ACCOUNT TO**  
**AGE AND SERVICE RETIREES AND BENEFICIARIES**  
**BY ATTAINED AGES**

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Attained Age	Annual Amounts			
	No.	Original Annuities	Base Annuities	Current Annuities
Under 40	12	\$ 208,674	\$ 205,552	\$ 237,445
40-44	4	51,535	59,376	69,536
45-49	29	469,476	469,228	486,382
50-54	375	9,538,193	9,685,624	10,409,512
55-59	1,449	38,574,297	41,682,783	47,547,731
60-64	6,799	122,803,619	140,956,137	160,166,305
65-69	11,015	182,857,469	221,533,456	256,674,045
70-74	7,502	107,373,584	143,060,432	168,875,389
75-79	4,641	57,587,118	86,642,656	102,476,354
80-84	2,798	29,940,828	52,033,645	61,429,091
85-89	1,516	13,760,560	29,584,359	34,913,474
90-94	545	4,036,680	10,765,489	12,703,507
95 & Up	199	950,107	3,583,205	4,227,905
<b>Totals</b>	<b>36,884</b>	<b>\$568,152,140</b>	<b>\$740,261,942</b>	<b>\$860,216,676</b>

**ANNUITIES BEING PAID JULY 1, 2015**  
**FROM THE RETIREMENT RESERVE ACCOUNT TO**  
**DISABILITY RETIREES AND BENEFICIARIES BY ATTAINED AGES**

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Attained Age	Annual Amounts			
	No.	Original Annuities	Base Annuities	Current Annuities
Under 40	43	\$ 365,717	\$ 357,384	\$ 398,512
40-44	49	392,370	398,530	431,715
45-49	116	1,310,789	1,324,568	1,445,285
50-54	300	3,116,432	3,231,455	3,559,839
55-59	534	5,697,110	6,007,646	6,743,227
60-64	644	6,439,544	7,162,030	8,270,010
65-69	590	6,046,123	7,606,225	8,956,397
70-74	319	3,073,879	4,548,342	5,365,869
75-79	150	1,475,504	2,564,711	3,026,349
80-84	86	640,777	1,538,921	1,815,925
85-89	62	321,413	999,408	1,179,307
90-94	23	127,888	368,047	434,295
95 & Up	6	17,261	79,619	93,951
<b>Totals</b>	<b>2,922</b>	<b>\$29,024,807</b>	<b>\$36,186,886</b>	<b>\$41,720,681</b>

**ANNUITIES BEING PAID JULY 1, 2015**  
**FROM THE RETIREMENT RESERVE ACCOUNT TO**  
**ACT 793 RETIREES AND BENEFICIARIES BY ATTAINED AGES**

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Attained Age	Annual Amounts		
	No.	Original Annuities	Current Annuities
Under 40	-	\$ -	\$ -
40-44	-	-	-
45-49	-	-	-
50-54	-	-	-
55-59	1	290	382
60-64	20	57,357	80,339
65-69	47	222,640	352,087
70-74	44	291,880	479,058
75-79	30	190,557	322,729
80-84	34	266,447	526,575
85-89	17	66,148	170,166
90-94	6	36,682	100,558
95 & Up	-	-	-
<b>Totals</b>	<b>199</b>	<b>\$1,132,001</b>	<b>\$2,031,894</b>

Base annuities are equal to current annuities since the COLA is compound.

**ANNUITIES BEING PAID JULY 1, 2015**  
**FROM THE RETIREMENT RESERVE ACCOUNT TO**  
**SURVIVOR BENEFICIARIES BY ATTAINED AGES**

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Attained Age	Annual Amounts			
	No.	Original Annuities	Base Annuities	Current Annuities
Under 40	145	\$ 912,392	\$ 944,143	\$ 1,049,925
40-44	7	20,932	28,842	34,035
45-49	17	102,023	115,259	133,342
50-54	24	309,170	321,733	350,284
55-59	58	817,623	908,562	1,027,803
60-64	97	1,169,724	1,320,943	1,507,742
65-69	119	1,514,739	1,792,524	2,088,899
70-74	87	849,493	1,186,557	1,393,056
75-79	58	431,186	765,052	901,641
80-84	43	263,373	641,303	756,062
85-89	17	55,628	174,917	206,404
90-94	5	11,098	62,344	73,567
95 & Up	1	1,200	6,889	8,129
<b>Totals</b>	<b>678</b>	<b>\$6,458,581</b>	<b>\$8,269,068</b>	<b>\$9,530,889</b>

**ANNUITIES BEING PAID JULY 1, 2015**  
**FROM THE ACT 808 RETIREMENT RESERVE ACCOUNT TO**  
**ACT 808 RETIREES AND BENEFICIARIES BY ATTAINED AGES**

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Attained Age	Annual Amounts		
	No.	Original Annuities	Current Annuities
Under 40	-	\$ -	\$ -
40-44	-	-	-
45-49	-	-	-
50-54	-	-	-
55-59	-	-	-
60-64	-	-	-
65-69	-	-	-
70-74	-	-	-
75-79	7	108,499	297,582
80-84	26	500,143	1,280,243
85-89	18	341,330	908,859
90-94	13	250,911	619,957
95 & Up	1	4,573	13,273
<b>Totals</b>	<b>65</b>	<b>\$1,205,456</b>	<b>\$3,119,914</b>

Base annuities are the same as current annuities since the COLA is compound.

**RETIREE AND BENEFICIARY DATA**  
**AS OF JUNE 30**

Year	Estimated Number		Total Retirees	Annual Allowances (Millions)	% Increase in Annual Allowances	Average Annual Allowances
	Added	Removed				
1990	588	337	11,654	\$ 92.69	7.0%	\$ 7,954
1991	489	253	11,890	104.60	12.8%	8,797
1992	455	312	12,033	115.50	10.4%	9,599
1993	589	316	12,306	129.71	12.3%	10,540
1994	846	512	12,640	141.87	9.4%	11,224
1995	908	342	13,206	156.59	10.4%	11,857
1996	1,107	654	13,659	170.59	8.9%	12,489
1997	1,049	475	14,233	194.90	14.3%	13,694
1998	809	240	14,802	220.38	13.1%	14,888
1999	1,582	497	15,887	248.75	12.9%	15,658
2000	1,249	479	16,657	280.14	12.6%	16,818
2001	1,571	450	17,778	309.03	10.3%	17,383
2002	1,989	568	19,199	334.15	8.1%	17,404
2003	1,621	549	20,271	359.98	7.7%	17,758
2004	1,685	528	21,428	386.23	7.3%	18,025
2005	1,822	570	22,680	415.04	7.5%	18,300
2006	1,958	485	24,153	449.77	8.4%	18,622
2007	2,017	559	25,611	484.55	7.7%	18,920
2008	1,703	513	26,801	515.56	6.4%	19,237
2009	2,721	704	28,818	564.59	9.5%	19,591
2010	2,588	819	30,587	612.77	8.5%	20,034
2011	2,394	882	32,099	657.08	7.2%	20,470
2012	2,932	871	34,160	709.17	7.9%	20,760
2013	3,039	945	36,254	763.76	7.7%	21,067
2014	3,156	932	38,478	822.19	7.7%	21,368
2015	3,326	1,056	40,748	916.62	11.5% <sup>@</sup>	22,495

T-DROP participants are classified as active members for purposes of the valuation and are not included in this schedule.

<sup>@</sup> Increased percent due to T-DROP annuities included in 2015.

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## **REPORTED ASSETS**

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*The assets* of the Retirement System, as of June 30, 2015, were reported to your actuary to be \$15,035,701,313. This amount, together with a funding value adjustment of \$(601,877,324), is used to finance the Retirement System liability.

Accounts	Assets at June 30	
	2015	2014
Regular Accounts		
Members' Deposit Accounts		
Contributions	\$ 1,104,106,342	\$ 1,050,880,172
Interest	7,869,410,906	7,959,009,433
Total	8,973,517,248	9,009,889,605
T-Drop Member Deposit Accounts		
Contributions	24,219,104	25,948,037
Interest	43,020,907	51,429,946
Total	67,240,011	77,377,983
Cash Balance Account	52,200,512	32,505,783
Employer's Accumulation Account	(3,694,081,484)	(3,346,284,727)
Retirement Reserve Account	9,043,552,180	8,475,209,978
Act 808 Retirement Reserve Account	16,730,157	19,335,225
T-Lump Payable	476,250,673	488,217,048
Survivors Benefit Account	90,353,488	89,774,642
Total Regular Accounts	15,025,762,786	14,846,025,538
Other Accounts		
Income Expense Account	9,938,528	10,251,130
Other Special Reserves	-	-
Miscellaneous	-	-
Total Other Accounts	9,938,528	10,251,130
Total Accounting Value of Assets	15,035,701,313	14,856,276,668
Market Value Adjustment	(601,877,324)	(1,481,511,168)
<b>Funding Value of Assets</b>	<b>\$14,433,823,989</b>	<b>\$13,374,765,500</b>

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## VALUATION RESULTS

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**LIABILITIES FOR ANNUITIES BEING PAID JULY 1, 2015**  
**TABULATED BY TYPE OF ANNUITY BEING PAID**

Type of Annuity	Liabilities July 1, 2015		
	Men	Women	Totals
<b>RETIREMENT RESERVE ACCOUNT</b>			
Age & Service Annuities			
Option 1 (Straight Life)	\$ 1,211,423,636	\$ 5,292,433,601	\$ 6,503,857,237
Option A (100% Joint & Survivor)	703,689,873	667,559,753	1,371,249,626
Option B ( 50% Joint & Survivor)	348,681,099	505,709,802	854,390,901
Option C (10 Years Certain & Life)	36,768,262	137,936,427	174,704,689
Beneficiaries	38,996,170	128,947,401	167,943,571
Total Age & Service	2,339,559,040	6,732,586,984	9,072,146,024
Disability Annuities			
Option 1	252,892,224	107,119	252,999,343
Option A	39,102,525	1,462,646	40,565,171
Option B	10,672,797	16,476,310	27,149,107
Option C	1,856,023	5,364,038	7,220,061
Beneficiaries	23,226,684	75,034,898	98,261,582
Total Disability	327,750,253	98,445,011	426,195,264
Total Retirement Reserve Account	2,667,309,293	6,831,031,995	9,498,341,288
<b>SURVIVORS' BENEFIT ACCOUNT</b>			
Beneficiaries of Deceased Members	\$ 42,149,166	\$ 53,123,629	\$ 95,272,795
<b>OTHER LIABILITIES</b>			
Act 793	\$ 11,125,956	\$ 6,272,153	\$ 17,398,109
Act 808	12,027,179	5,297,962	17,325,141
<b>RETIREMENT SYSTEM TOTALS</b>			
Total Annuity Liabilities	2,732,611,594	6,895,725,739	9,628,337,333
Cash Benefit Account Liabilities			52,200,512
Liabilities for Lump Sum Death Benefits			97,924,436
Total	\$ 2,732,611,594	\$ 6,895,725,739	\$ 9,778,462,281

**RETIREMENT RESERVE ACCOUNT**  
**COMPARATIVE STATEMENT OF ANNUITIES, ACCRUED LIABILITIES AND ASSETS**  
**(\$ MILLIONS)**

Valuation Date June 30	Annual Annuities Being Paid			Average	Computed Liabilities	Applicable Assets	Unfunded Retired Life Liabilities	Ratio of Assets to Liabilities
	No.	Amount	% Incr.					
1975*	6,381	\$ 19.80	21.4%	\$ 3,102	\$ 188.00	\$ 142.9	\$ 45.1	76.0%
1980*#	8,001	30.10	3.5%	3,761	280.7	280.7	none	100.0%
1985*+	9,331	51.49	13.6%	5,518	479.9	479.9	none	100.0%
1990	11,054	87.84	7.2%	7,946	847.7	847.7	none	100.0%
1995	12,622	150.45	10.8%	11,920	1,428.6	1,428.6	none	100.0%
2000* ##	16,172	275.65	14.6%	17,045	2,828.8	2,828.8	none	100.0%
2005	22,147	409.42	7.5%	18,486	4,148.1	4,148.1	none	100.0%
2006	23,606	443.98	8.4%	18,808	4,483.4	4,483.4	none	100.0%
2007	25,038	478.30	7.7%	19,103	4,816.4	4,816.4	none	100.0%
2008	26,258	509.29	6.5%	19,396	5,391.3	5,391.3	none	100.0%
2009	28,228	557.83	9.5%	19,762	5,891.9	5,891.9	none	100.0%
2010	29,969	605.55	8.6%	20,206	6,358.0	6,358.0	none	100.0%
2011**	31,498	649.47	7.3%	20,619	6,972.6	6,972.6	none	100.0%
2012	33,533	701.09	7.9%	20,907	7,481.0	7,481.0	none	100.0%
2013	35,622	755.26	7.7%	21,202	8,004.8	8,004.8	none	100.0%
2014	37,824	813.33	7.7%	21,503	8,561.9	8,494.5	none	99.2%
2015	40,070	907.09	11.5% @	22,638	9,515.7	9,515.7	none	100.0%

\* Includes amendments which increased benefits to retirees.

# After change in interest assumption from 6.0% to 7.0%, change in post-retirement adjustments from 1.5% to 3.0% and recommended reserve transfer.

+ After redetermination of base, retroactive application of new minimum benefit formula and reserve transfers.

## Includes Act 808 and Act 793 retirees beginning in 2000.

\*\* After changes in assumptions.

@ Increased percent due to TDROP annuities included in 2015.

**SURVIVORS' BENEFIT ACCOUNT  
ACCRUED LIABILITIES AND ASSETS  
COMPARATIVE STATEMENT**

Valuation Date June 30	Annual Annuities Being Paid		Computed Liabilities	Applicable Assets	Unfunded Accrued Liabilities	Ratio of Assets to Liabilities
	No.	Amount				
1975*	274	\$ 462,116	\$ 4,321,044	\$ 4,098,953	\$ 222,091	94.9%
1980*#	393	772,631	7,042,644	7,042,644	none	100.0%
1985*+	421	1,240,399	12,411,800	12,411,800	none	100.0%
1990	424	1,830,743	18,117,244	18,117,244	none	100.0%
1995	416	2,723,940	26,220,218	26,220,218	none	100.0%
2000*	485	4,487,519	43,701,138	43,701,138	none	100.0%
2005	533	5,619,675	56,257,745	56,257,745	none	100.0%
2006	547	5,791,974	57,605,939	57,605,939	none	100.0%
2007	573	6,250,603	63,481,565	63,481,565	none	100.0%
2008	543	6,269,551	66,496,539	66,496,539	none	100.0%
2009	590	6,761,034	70,857,161	70,857,161	none	100.0%
2010	618	7,224,585	75,108,334	75,108,334	none	100.0%
2011**	601	7,605,212	81,150,385	81,150,385	none	100.0%
2012	627	8,081,913	84,930,745	84,930,745	none	100.0%
2013	632	8,491,667	88,139,802	88,139,802	none	100.0%
2014	654	8,861,734	89,793,996	89,793,996	none	100.0%
2015	678	9,530,889	95,272,795	95,272,795	none	100.0%

\* Includes amendments.

# After change in interest assumption from 6.0% to 7.0%, change in post-retirement adjustments from 1.5% to 3.0% and recommended reserve transfer.

+ After redetermination of base annuity, retroactive application of new minimum benefit formula and recommended reserve transfer.

\*\* After changes in assumptions.

**ANNUAL ALLOWANCES OF RETIRED LIVES  
BY YEAR OF RETIREMENT  
AS OF JUNE 30, 2015**

Calendar Year of Retirement	No.	Annual Amount Being Paid			Average
		Original	Total Increase	Current	
2015*	632	\$ 6,449,906	\$ 332,821	\$ 6,782,727	\$ 10,732
2014	3,137	51,665,099	9,268,773	60,933,872	19,424
2013	2,866	47,416,307	10,597,490	58,013,797	20,242
2012	2,857	45,028,184	11,670,446	56,698,630	19,846
2011	2,557	41,031,268	11,827,249	52,858,517	20,672
2010	2,210	35,054,655	12,163,636	47,218,291	21,366
2009	2,315	37,106,081	14,262,344	51,368,425	22,189
2008	2,208	34,214,696	13,280,010	47,494,706	21,510
2007	2,087	31,529,477	12,470,116	43,999,593	21,083
2006	1,880	28,764,182	12,868,855	41,633,037	22,145
2005	1,822	28,456,417	14,633,803	43,090,220	23,650
2004	1,642	24,056,518	12,427,041	36,483,559	22,219
2003	1,475	21,393,913	11,569,161	32,963,074	22,348
2002	1,417	21,266,728	11,779,334	33,046,062	23,321
2001	1,525	20,140,165	11,480,939	31,621,104	20,735
2000	1,267	19,289,838	12,173,254	31,463,092	24,833
1999	1,092	15,462,258	11,187,378	26,649,636	24,404
1998	1,092	14,040,579	11,077,860	25,118,439	23,002
1997	813	12,228,726	10,669,492	22,898,218	28,165
1996	681	10,520,827	9,398,542	19,919,369	29,250
1995	715	11,081,917	10,416,479	21,498,396	30,068
1994	742	11,512,388	11,777,039	23,289,427	31,387
1993	551	8,590,477	9,202,517	17,792,994	32,292
1992	411	5,073,373	6,366,233	11,439,606	27,834
1991	295	3,239,079	4,548,787	7,787,866	26,400
1990	338	3,502,159	5,645,767	9,147,926	27,065
1989	319	3,391,661	5,587,824	8,979,485	28,149
1988	332	3,490,599	6,127,707	9,618,306	28,971
1987	336	3,289,912	6,472,737	9,762,649	29,056
1986	227	2,081,985	4,494,222	6,576,207	28,970
1985	212	1,759,712	3,868,934	5,628,646	26,550
1984	138	1,006,148	2,527,240	3,533,388	25,604
1983	130	841,776	2,128,590	2,970,366	22,849
1982	74	469,827	1,335,732	1,805,559	24,399
1981	83	489,626	1,278,342	1,767,968	21,301
Before 1980	270	1,036,522	3,730,375	4,766,897	17,655
<b>TOTAL</b>	<b>40,748</b>	<b>\$605,972,985</b>	<b>\$310,647,069</b>	<b>\$916,620,054</b>	<b>\$22,495</b>

\* Reporting for calendar year 2015 is not yet complete. The July 1<sup>st</sup> retirees are not included in the schedule.

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## APPENDIX

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## APPENDIX

*Single Life Retirement Values  
Based on RP-2000 Mortality Tables Projected  
25 Years with Scale AA (95% for Men & 87% for Women) & 8.0% Interest*

Sample Attained Ages	Present Value of \$1.00 Monthly for Life		Present Value of \$1 Monthly for Life Increasing 3.0% Annually		Future Life Expectancy (years)		Percent Dying within Next Year	
	Men	Women	Men	Women	Men	Women	Men	Women
40	\$147.45	\$148.74	\$192.83	\$195.36	43.26	45.92	0.08 %	0.04 %
45	144.24	145.78	186.54	189.56	38.45	41.03	0.10 %	0.07 %
50	139.69	141.63	178.19	181.91	33.65	36.18	0.13 %	0.10 %
55	133.32	135.93	167.29	172.06	28.89	31.39	0.21 %	0.19 %
60	124.93	128.62	153.79	160.06	24.28	26.77	0.43 %	0.39 %
65	114.53	119.62	137.94	146.03	19.92	22.41	0.85 %	0.74 %
70	102.19	109.01	120.09	130.24	15.89	18.36	1.45 %	1.28 %
75	87.25	96.62	99.84	112.72	12.15	14.64	2.53 %	2.00 %
80	70.65	82.27	78.66	93.60	8.86	11.25	4.76 %	3.35 %
85	54.64	66.59	59.29	73.90	6.25	8.29	8.83 %	5.80 %
Ref:	472 x 0.95	473 x 0.87	472 x 0.95	473 x 0.87				

Sample Attained Ages	Benefit Increasing 3.0% Yearly	Portion of Age 60 Lives Still Alive	
		Men	Women
60	\$100.00	100%	100%
65	115.00	97%	97%
70	130.00	92%	93%
75	145.00	84%	86%
80	160.00	71%	76%
Ref		472 x 0.95	473 x 0.87

For disabled retirees the mortality table used was the 1983 Group Annuity Mortality Table set forward 5 years.



December 17, 2015


Mr. George Hopkins  
Executive Director  
Arkansas Teacher Retirement System  
1400 West Third  
Little Rock, Arkansas 72201

**Re: Report of June 30, 2015 Actuarial Valuation of Retirees & Beneficiaries**

Dear Mr. Hopkins:

Enclosed are 15 copies of this report. Please let us know if anything else is needed.

Sincerely,

A handwritten signature in black ink, reading "Judith A. Kermans". The signature is fluid and cursive, with the first name "Judith" being the most prominent part.

Judith A. Kermans, EA, MAAA, FCA

JAK:bd

Enclosures