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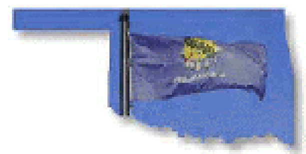

Oklahoma State Pension Commission

Summary of Actuarial Reports

February 22, 2017

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Introduction

- **NEPC is asked to review the Oklahoma State defined benefit pension plans from an actuarial standpoint on an annual basis**

- **Oklahoma Retirement System is comprised of seven plans:**
  - Teachers' Retirement System of Oklahoma ("Teachers')
  - Oklahoma Public Employees Retirement ("PERS")
  - Oklahoma Firefighters Pension and Retirement System ("Firefighters")
  - Oklahoma Police Pension and Retirement System ("Police")
  - Oklahoma Law Enforcement Retirement System ("Law Enforcement")
  - State of Oklahoma Uniform Retirement System for Justices and Judges ("Judges")
  - Retirement Plan for Full-Time Employees of the Department of Wildlife Conservation ("Wildlife")

- **Information contained in this report is based on July 1, 2016 Actuarial Valuation reports from plan actuaries[1]**
  - Funded status is based on each plan's funding policy

- **The goals of this presentation are:**
  - To present the funded position of the seven pension plans, funding basis and GASB 67
  - To review the comprehensive return performance of both asset and liabilities
  - To assess the actuarial assumptions and methods for reasonability
  - To note changes in legislation that affect the plans
  - Comment on trends in COLA provisions in US State plans

1. Buck Consultants, Cavanaugh Macdonald Consulting, and Gabriel, Roeder, Smith & Company

System Summary – Funded Position

Plan	Actuarial Value of Assets (in millions)	Actuarial Accrued Liability (in millions)	Funded Status as of 7/1/2016	Funded Status as of 7/1/2015
Teachers	$14,578	$22,193	**65.7%**	66.6%
Public Employees (PERS)	$8,791	$9,428	**93.2%**	93.6%
Firefighters	$2,293	$3,477	**65.9%**	65.0%
Police	$2,323	$2,355	**98.7%**	98.2%
Law Enforcement	$911	$1,043	**87.4%**	87.8%
Judges	$306	$276	**110.8%**	110.9%
Wildlife	$102	$119	**86.3%**	86.5%
Total	**$29,305**	**$38,891**	**75.4%**	76.0%

- **Overall funded status of the plans has decreased slightly since fiscal 2015, from 76.0% to 75.4%**
  - Volatile markets have led to poor asset returns over the past year for all of the plans
    - Average return of -1.12% on Market Value basis
  - However, return on an Actuarial Value basis was 7.45% due to delayed recognition of prior years' gains and recent years' losses
    - This actuarial (smoothed) value used in funded status calculation
  - Meanwhile, total plan liabilities grew by 6.0% over the last year

- **For comparison, the average public pension plan was 73.7% funded in FY 2015[1]**

1 Public Fund Survey Summary Findings for FY 2015, published December 2016 by the National Association of State Retirement Administrators (NASRA)

System Summary

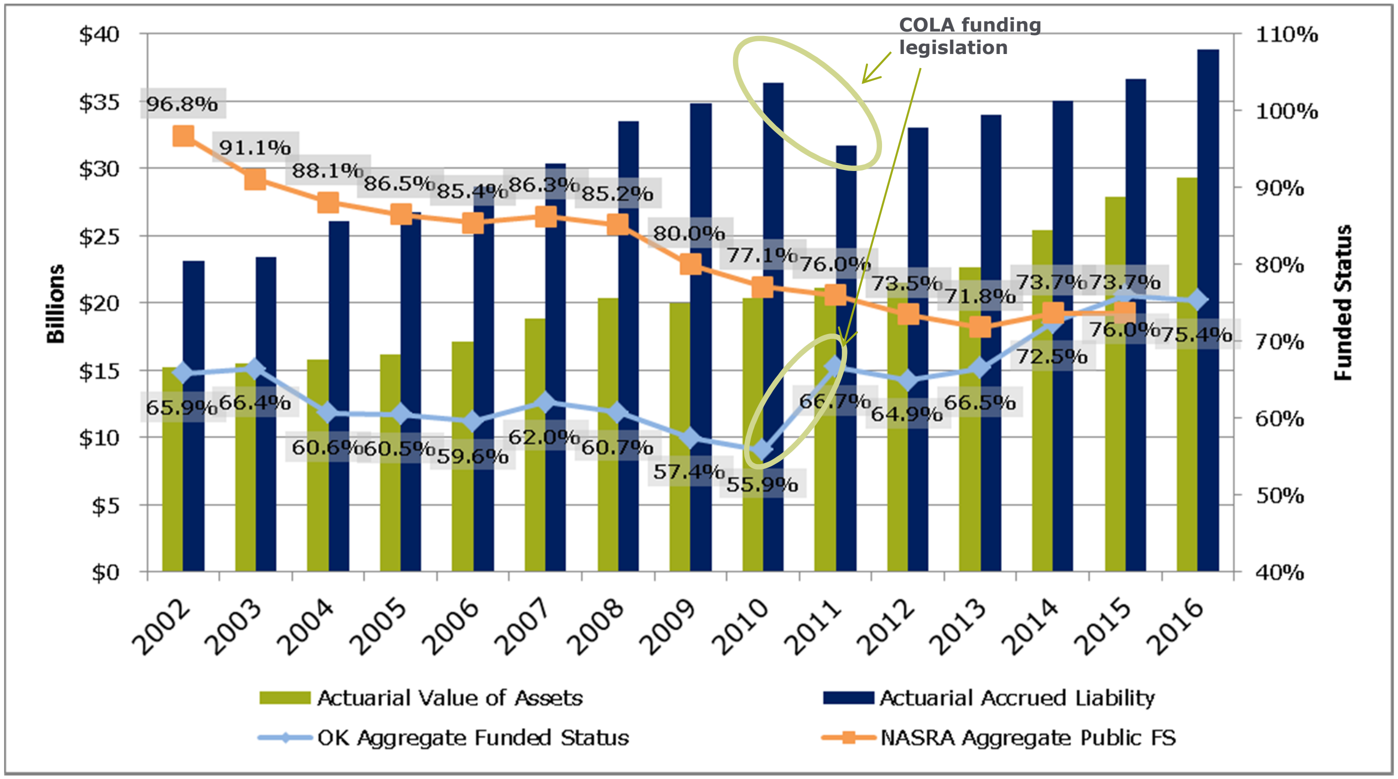
- **Even though the funded status of the plans decreased slightly since the July 2015 valuations, the plans have made great improvement in the last 7 years**
  - Legislative changes in 2011 regarding funding of cost of living adjustments (COLAs) and strong asset returns in fiscal years 2010-2014 have driven the improvement in funded status

- **Average asset return on the plans' Market Value was -1.1% for the fiscal year ending June 30, 2016**
  - However, average asset return on the plans' Actuarial Value was **7.4%** for the fiscal year ending June 30, 2016
    - Gains and losses are recognized or "smoothed" over 5 years
    - 7.4% is in line with the assumed expected return of the plans of 7.0% to 7.5%

- **The Teachers' plan remains the largest and the least funded of the seven plans**
  - $22.2 billion in liabilities, $14.6 billion in assets, 65.7% funded
  - If current funding and benefit levels continue, the plan's Unfunded Accrued Liability would be funded after 23 years (was 14 years in 2015)
    - Prior to 2011, actuaries projected the period needed to fund Unfunded Accrued Liability as "infinite", meaning if the same contributions and assumptions continued as existed in 2011, the plan would never reach fully funded status
  - Teachers' plan discount rate was lowered from 8.0% to 7.5%, which increased liabilities

- **Oklahoma PERS created a defined contribution plan for new employees beginning after November 1, 2015 – this plan is not analyzed in this report**

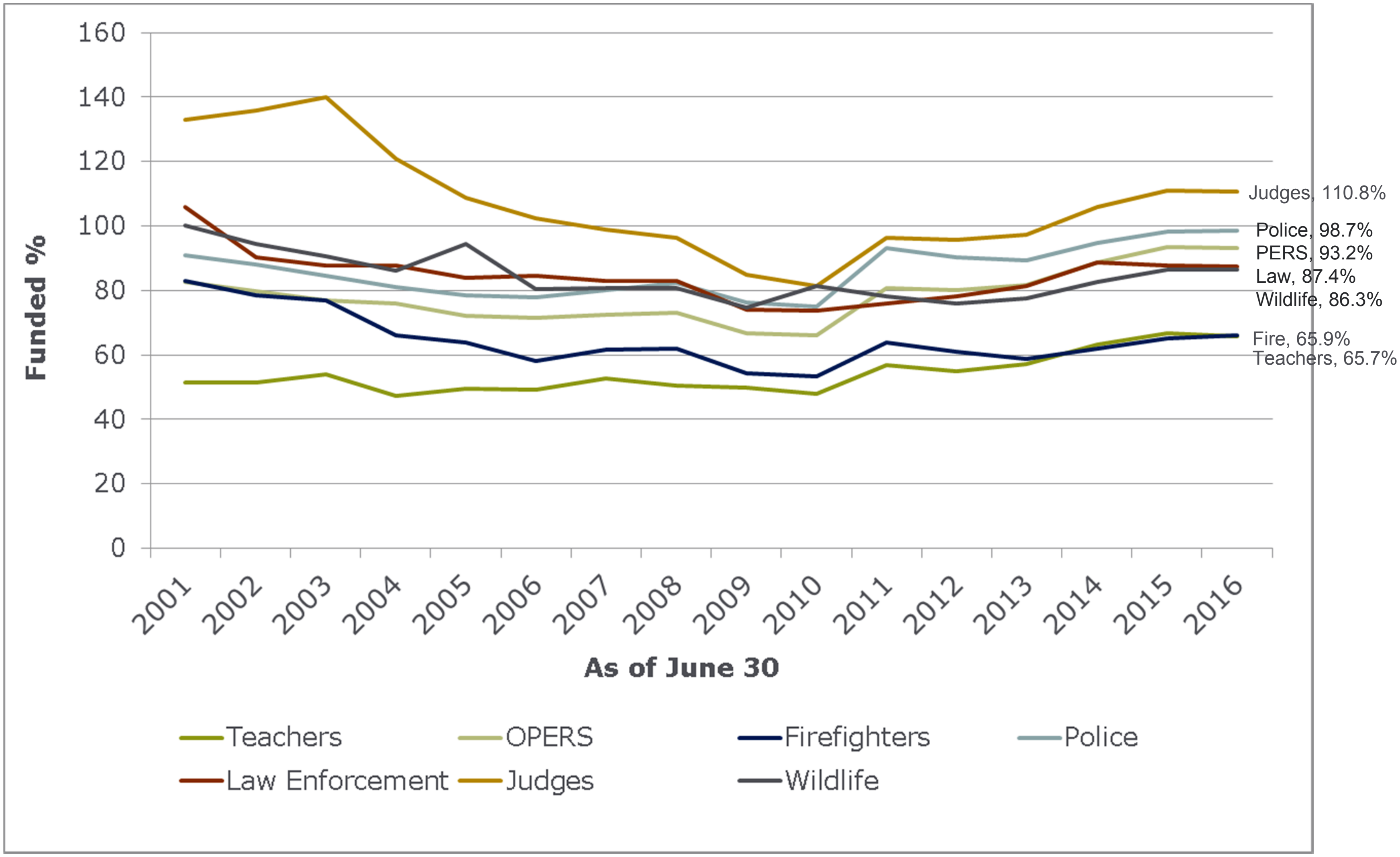
Funded Status History vs. Average Public Fund (Combined Plans)



- **The Oklahoma plans' aggregate funded status had consistently trailed the funded status of the average public plan[1]**
- **However, since 2011, after legislative changes were implemented in Oklahoma regarding COLA funding and since markets have had strong returns, there has been considerable improvement and convergence**

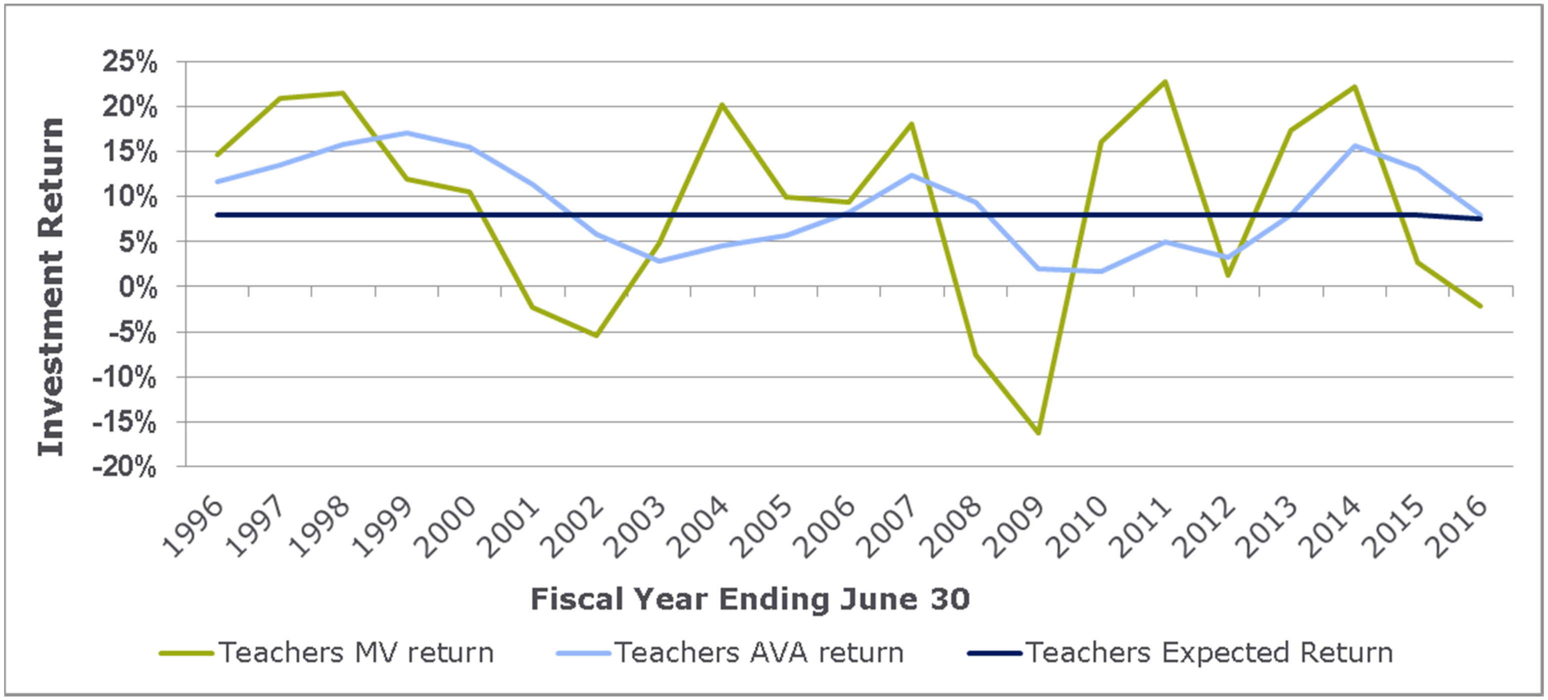
1. Average public plan results from the Public Fund Survey Summary Findings by the National Association of State Retirement Administrators, representing 85% of the state/local government pension community

Funded Status History – Individual Plan Basis



Sources: 2000 to 2009: Buck Consultants, Milliman Consultants and Actuaries, and Gabriel, Roeder, Smith & Company
2010 and later: Buck Consultants, Cavanaugh Macdonald Consulting, and Gabriel, Roeder, Smith & Company

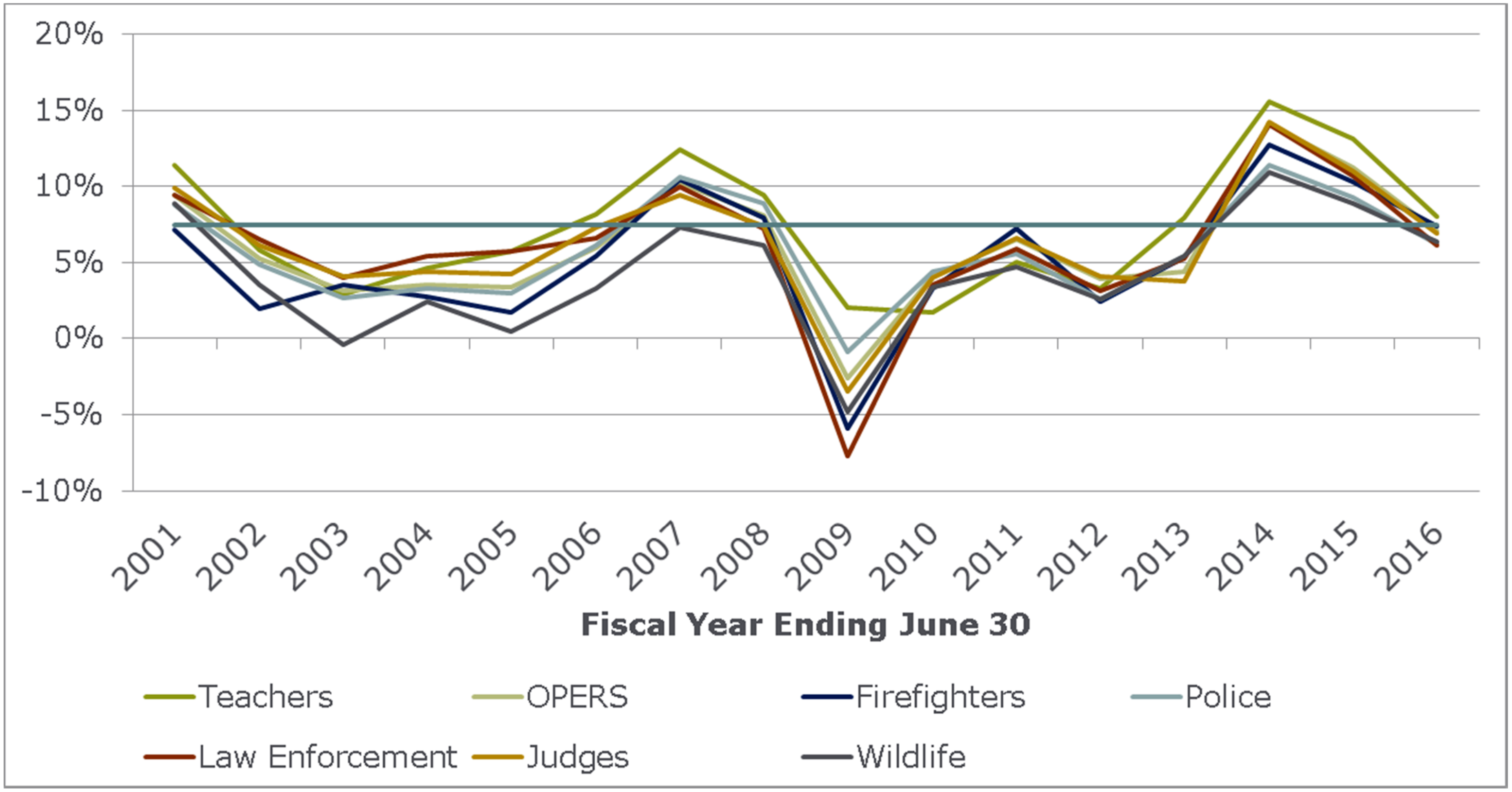
Investment Return (Teachers' Plan)



- **The Teachers' plan is shown as an example of the benefit of using actuarial value of assets vs. market value**
- **Actuarial Value return lags Market Value return as gains and losses are smoothed in over 5 years**
  - Helps smooth fluctuations in funded status and keep expected return close to assumed rate
- **Currently, actuarial value of assets is greater than market value as past gains are still being recognized, and losses from 2015 and 2016 were only partially recognized**

Sources: 1999 and earlier: R.V. Kuhns & Associates. 2000 and later: Gabriel, Roeder, Smith & Company

Historical Investment Return on Actuarial Value of Assets



- **Average rate of return for fiscal year ending June 30 2016 was 7.45%**
  - Assumed rate of return was between 7.5% and 7.0% for all plans
  - However, the average market value rate of return was -1.12% for the same period

Oklahoma returns sources: 2000 to 2009: Buck Consultants, Milliman Consultants and Actuaries, and Gabriel, Roeder, Smith & Company
2010 and later: Buck Consultants, Cavanaugh Macdonald Consulting, and Gabriel, Roeder, Smith & Company

System Summary – State Costs and Contributions

- **The following table summarizes the State-only contribution requirements for the 2016 and 2017 fiscal years**

	FY 2017		FY 2016			
Pension Plan	**Required Contribution as % Pay**	**Required Contribution ($m)**	**Required Contribution as % Pay**	**Required Contribution ($m)**	**Actual Contribution ($m)**	**Est. Actual Contribution as % Pay**
Teachers*	7.8%	$332	7.7%	$306	$290	6.8%
OPERS	10.1%	$182	9.1%	$165	$296	16.5%
Firefighters	38.6%	$103	38.2%	$101	$92	34.5%
Police	3.3%	$11	2.2%	$6	$36	12.2%
Law Enforcement	27.7%	$25	26.4%	$22	$23	27.1%
Judges	10.5%	$4	10.0%	$3	$6	16.8%
Wildlife	22.3%	$3	23.4%	$3	$4	27.1%
Total as % of Payroll	**9.8%**		**9.0%**			**11.1%**
Total Dollars ($m)		**$659**		**$607**	**$747**	

* Teachers plan is estimated by subtracting expected Employer contributions of 9.3% of payroll from the calculated ADEC

- **For fiscal year ending 2016, the recommended contribution to the Oklahoma pension plans was $607 million, or 9.0% of total payroll**
  – $747 million was actually contributed, or 123% of required

- **For fiscal year ending 2017, the recommended contribution is 9.8% of payroll, or $659 million**

System Summary – Mandated Contribution Rates and Actual Contributions

- **The chart below shows the rates of contributions, by type, for each plan as mandated by statute**
- **The second table summarizes actual contributions dollars, by type, for each plan in fiscal 2016**

Mandated Employee and Employer Contribution Rates as of July 1, 2015

Pension Plan	Employee Contribution Rate (% of payroll)	Employer + Federal Contribution rate (% of payroll)	Municipality / Agency Contribution rate (% of payroll)	State Contribution rate
Teachers	7.0%	EESIP: 9.5% Non-EESIP: 8.55% Federal grants: 7.7%*		5% of tax and lottery revenue
OPERS	3.5%			16.5% of payroll
Firefighters	9.0%		14.00%	36% of insurance premium tax
Police	8.0%		13.0%	14% of insurance premium tax + a % of special tax credit fund
Law Enforcement	8.0%		11.0%	5.0% of insurance premium tax + 1.2% of drivers license tax
Judges	8.0%			19.0% of payroll
Wildlife	5.0%			

Actual Contributions by Type for Fiscal Year Ending June 30, 2016 (in $millions)

Pension Plan	Employee Contribution	Employer + Federal Contribution	Municipality / Agency Contribution	State Contribution	Total
Teachers	$294	$436		$290	**$1,020**
OPERS	$74			$296	**$370**
Firefighters	$25		$39	$92	**$156**
Police	$24		$39	$36	**$98**
Law Enforcement	$7		$10	$23	**$40**
Judges	$3			$6	**$8**
Wildlife	$1			$4	**$4**
Total	**$427**	**$436**	**$88**	**$747**	**$1,696**

Contribution History – State and Municipalities

Required **State and Employer Contribution - after reduction for estimated Employee contributions**

	7/1/06	7/1/07	7/1/08	7/1/09	7/1/10	7/1/11	7/1/12	7/1/13	7/1/14	7/1/15	7/1/16
Teachers*	$576	$591	$714	$742	$822	$588	$620	$603	$551	$762	$758
OPERS	$339	$364	$323	$389	$402	$240	$257	$259	$201	$165	$182
Firefighters**	$147	$147	$158	$187	$196	$142	$159	$162	$142	$139	$142
Police**	$95	$101	$103	$132	$147	$65	$79	$90	$64	$45	$51
Law Enforcement**	$33	$33	$37	$48	$50	$49	$45	$44	$32	$33	$34
Judges	$6	$8	$8	$11	$13	$7	$7	$7	$5	$3	$4
Wildlife	$3	$3	$3	$4	$3	$4	$4	$4	$4	$3	$3
Total	**$1,197**	**$1,246**	**$1,374**	**$1,514**	**$1,633**	**$1,094**	**$1,171**	**$1,169**	**$998**	**$1,150**	**$1,173**

Actual **State and Employer Contributions**

	7/1/06	7/1/07	7/1/08	7/1/09	7/1/10	7/1/11	7/1/12	7/1/13	7/1/14	7/1/15	7/1/16
Teachers*	$536	$597	$619	$621	$638	$682	$701	$707	$728	$725	TBD
OPERS	$198	$220	$243	$260	$253	$263	$270	$280	$292	$296	TBD
Firefighters**	$118	$83	$83	$82	$92	$101	$111	$116	$130	$132	TBD
Police**	$56	$56	$59	$55	$56	$61	$66	$67	$73	$74	TBD
Law Enforcement**	$24	$25	$25	$23	$25	$26	$28	$30	$32	$33	TBD
Judges	$1	$2	$2	$9	$3	$4	$4	$5	$5	$6	TBD
Wildlife	$3	$3	$3	$4	$3	$4	$4	$4	$4	$4	TBD
Total	**$936**	**$986**	**$1,034**	**$1,054**	**$1,070**	**$1,141**	**$1,184**	**$1,208**	**$1,265**	**$1,269**	**TBD**

Percent of Required State and Employer Contribution Actually Contributed

	7/1/06	7/1/07	7/1/08	7/1/09	7/1/10	7/1/11	7/1/12	7/1/13	7/1/14	7/1/15	7/1/16
Teachers*	93%	101%	87%	84%	78%	116%	113%	117%	132%	95%	TBD
OPERS	58%	61%	75%	67%	63%	110%	105%	108%	146%	180%	TBD
Firefighters**	80%	56%	53%	44%	47%	71%	70%	71%	91%	94%	TBD
Police**	59%	56%	57%	41%	38%	94%	84%	74%	114%	166%	TBD
Law Enforcement**	75%	77%	68%	48%	50%	53%	63%	68%	101%	100%	TBD
Judges	20%	22%	27%	81%	24%	57%	57%	66%	108%	169%	TBD
Wildlife	104%	97%	100%	100%	100%	108%	96%	100%	117%	116%	TBD
Total	**78%**	**79%**	**75%**	**70%**	**66%**	**104%**	**101%**	**103%**	**127%**	**110%**	**TBD**

* Teachers plan contributions include State, Employer, and Federal funds

** Contributions include State and Agency or Municipality funds

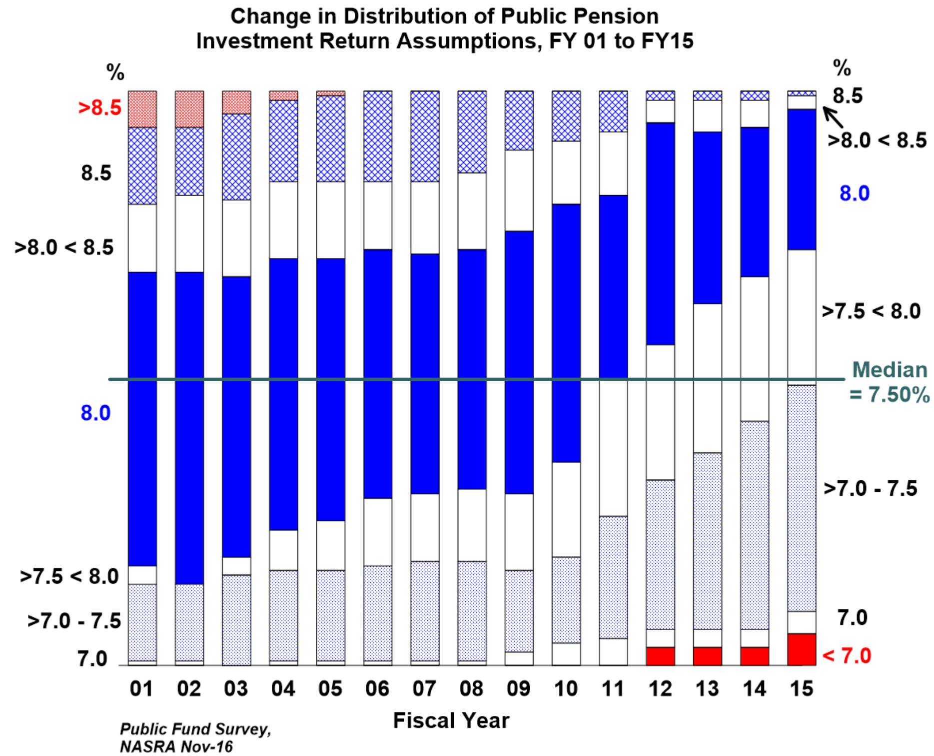
System Summary – GASB 67 Funded Position for Fiscal 2016

Plan	Market Value of Assets (in millions)	Actuarial Accrued Liability (in millions)	Funded Status as of 7/1/2016	Discount Rate
Teachers	$13,814	$22,193	**62.2%**	7.50%
Public Employees (PERS)	$8,436	$9,428	**89.5%**	7.25%
Firefighters	$2,256	$3,477	**64.9%**	7.50%
Police	$2,202	$2,355	**93.5%**	7.50%
Law Enforcement	$854	$1,043	**81.9%**	7.50%
Judges	$294	$276	**106.3%**	7.25%
Wildlife	$99	$119	**83.5%**	7.00%
Total	**$27,954**	**$38,891**	**71.9%**	7.44%

- **GASB 67 was first implemented for the fiscal year ending June 30, 2014**
  - Uses **Market Value of Assets** instead of Actuarial (smoothed) Value of Assets
  - May use a different discount rate than expected return if projected assets are deemed not sufficient to pay projected benefits
- **As of July 1, 2016, overall funded status of the plans were 71.9% under GASB 67, vs. 75.4% using Actuarial value of assets**
  - As mentioned previously, the actuarial value of assets is currently greater than market value of assets since losses from the past two years have not been fully recognized
- **For fiscal 2016, each plan’s actuary has determined that all the plans’ projected benefits would be covered by projected assets, therefore discount rates remained unchanged from the funding valuations**

System Summary – Characteristics and Assumptions

- **Investment return assumptions (7.5% for Teachers, Fire, Police, and Law Enforcement; 7.25% for PERS and Judges; 7.0% for Wildlife) are in line with other public funds**
  - In 2016, the Teachers plan lowered their expected return assumption from 8.0% to 7.5%, while PERS and Judges plans lowered their assumptions from 7.5% to 7.25%
- **Median discount rate for public plans was 7.5% in 2015, according to NASRA[1]**



1 Public Fund Survey Summary Findings for FY 2015, published December 2016 by the National Association of State Retirement Administrators (NASRA)

System Summary - Characteristics and Assumptions

- **All plans have in place long term amortization schedules to fund the Unfunded Accrued Liability**
  - However some schedules are "open" (re-determined each year) and some "closed" (declining by one year each year)
  - Some plans which had closed amortization schedules are currently amortizing their unfunded liability over shorter timeframes, which result in higher recommended contributions
  - The amortization periods for the Oklahoma pension plans are as follows:
    - 5 years – open (Police)
    - 11 years – closed (Judges and OPERS)
    - 12 years – open (Wildlife) - based on the average future working lifetime for active members
    - 13 years – closed (Law Enforcement)
    - 28 years – closed (Firefighters) – reset in 2014
    - 20 years - open (Teachers) for fiscal 2017
      - In September 2015, the Board adopted an approach to determine the amortization period as the funding period for the current actuarial valuation (i.e., 23 years as of June 30, 2016), not in excess of 20 years

- **All plans employ similar actuarial asset valuation methods, where gains and losses are smoothed over 5 years**

- **Actuaries and accountants will recommend if newer mortality assumptions are suitable for the plans' demographics**
  - RP-2014 mortality tables were published in 2014 by the Society of Actuaries, reflecting improved longevity of plan participants
  - These tables were developed for corporate plans and will be mandated by the IRS for funding valuations beginning in 2018, however many corporate plan accountants have pushed for earlier adoption
  - Adopting these tables could increase plan liabilities by 2-10%, depending on plan demographics

- **Most of the plans' continue to use the RP-2000 mortality tables**
  - Wildlife plan has already adopted the RP-2014 mortality tables

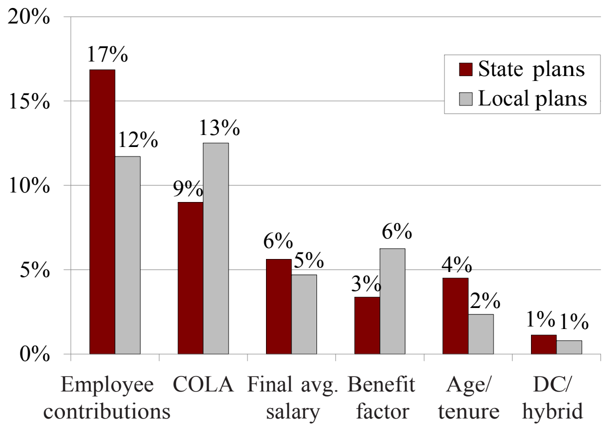
System Summary – 2016 Legislative Changes

- **There were no new legislative changes affecting the pension plans enacted in fiscal year ending June 30, 2016**

- **Oklahoma PERS created a defined contribution plan for most new employees beginning November 1, 2015**
  - The effect on the defined benefit plan liabilities will not be seen immediately as all prior benefits remain in the plan
  - Eventually, plan population will begin to decline, lowering plan costs but also lowering active payroll used for percentage purposes
  - This defined contribution plan is not covered in the analysis in this report

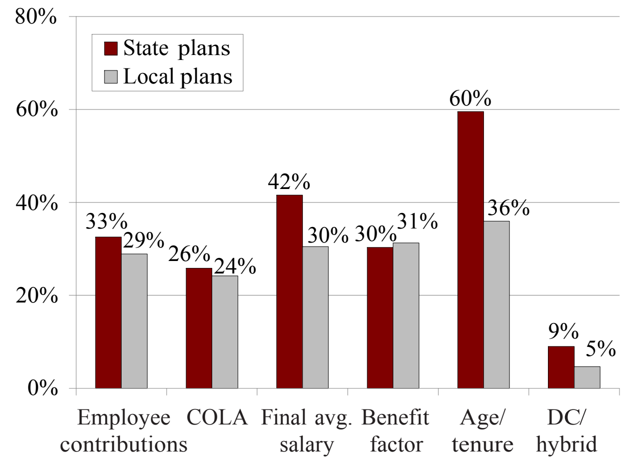
Legislative Update – Nationwide COLA Changes

Figure 2. Percentage of Plans Making Benefit Changes to Current Employees, by Type of Reform, 2009-2014



Source: Plan AVs and CAFRs (2009-2014).

Figure 3. Percentage of Plans Making Benefit Changes to New Employees, by Type of Reform, 2009-2014



Source: Plan AVs and CAFRs (2009-2014).

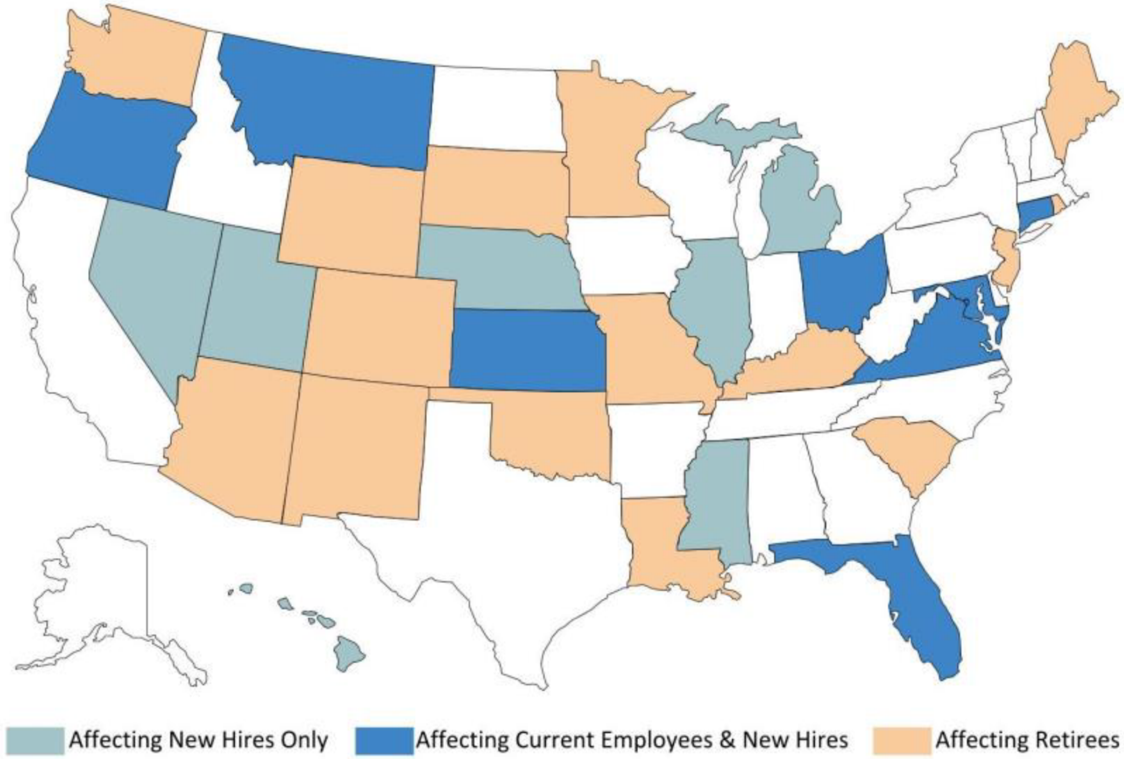
- **During the period 2009 to 2014, changes to COLA benefits have been made by 9% of States for current employees and by 26% of states for new employees**

- **Oklahoma's pension plans have an ad hoc COLA provision, which must be fully funded prior to payment per a 2011 regulation**

Source: "STATE AND LOCAL PENSION REFORM SINCE THE FINANCIAL CRISIS" By Jean-Pierre Aubry and Caroline V. Crawford*, Center for Retirement Research at Boston College, *State and Local Pension Plans, Number 54*, January 2017

Legislative updates – Nationwide COLA Changes

State Retirement Systems Undergoing COLA Legislative Changes, 2009-2016



- **Since 2009, fifteen states have changed COLAs affecting current retirees, eight states have addressed current employees' benefits, and seven states have changed the COLA structure only for future employees**

- **The legality of these modifications in several states has been, or is, being challenged in court**

Source: **NASRA, "Issue Brief: Cost-of-Living Adjustments", October 2016**

Summary and Conclusions

- **In aggregate, the State's plans are 75.4% funded as of June 30, 2016**
  - The plans have shown great improvement over the past 14 years
  - Funded status increased slightly for the Police and Firefighters plans, otherwise most plans saw a slight decline in funded status
  - Five out of the seven plans are over 86% funded
    - Recall that corporate plans have a funding threshold of staying above 80% funded

- **Actual contributions exceeded recommended amounts by $119m in fiscal 2015**

- **Prior years' strong asset performance continues to flow through the actuarial value of assets and helped boost funded status**
  - Actuarial value is currently higher than the market value of assets

- **The plans' assumptions are within a reasonable range**
  - Three plans lowered their expected return assumption this year, no plans use above 7.5% now

- **GASB 67 reporting found the Oklahoma plans at 71.9% funded, using market value of assets**
  - For fiscal 2016, each plan's actuary had determined that each plans' projected benefits would be covered by projected assets, therefore discount rates remained unchanged from funding valuations