



SUMMARY OF ACTUARIAL REPORTS

OKLAHOMA STATE PENSION COMMISSION

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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, 2017 Actuarial Valuation reports from plan actuaries¹**
 - 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 pension plans
 - Comment on trends in COLA provisions in US State plans



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

SYSTEM SUMMARY – FUNDED POSITION

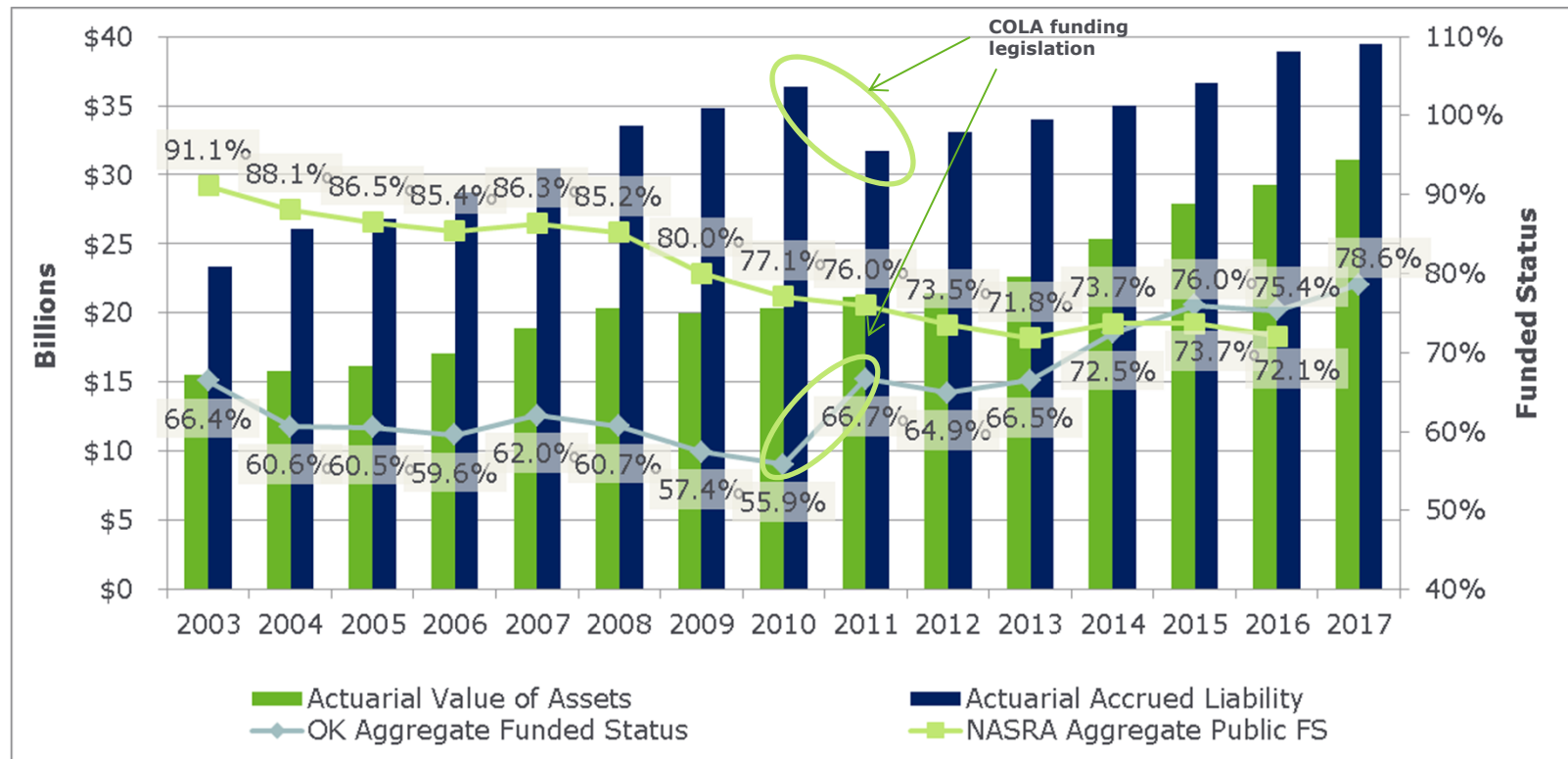
| Plan | Actuarial Value of Assets (in millions) | Actuarial Accrued Liability (in millions) | Funded Status as of 7/1/2017 | Funded Status as of 7/1/2016 |
|-------------------------|---|---|------------------------------|------------------------------|
| Teachers | \$15,516.3 | \$22,054.1 | 70.4% | 65.7% |
| Public Employees (PERS) | \$9,241.3 | \$9,781.6 | 94.5% | 93.2% |
| Firefighters | \$2,464.6 | \$3,767.2 | 65.4% | 65.9% |
| Police | \$2,447.4 | \$2,403.1 | 101.8% | 98.7% |
| Law Enforcement | \$957.3 | \$1,082.1 | 88.5% | 87.4% |
| Judges | \$321.4 | \$285.5 | 112.6% | 110.8% |
| Wildlife | \$109.5 | \$121.4 | 90.2% | 86.3% |
| Total | \$31,057.8 | \$39,495.1 | 78.6% | 75.4% |

- **Overall funded status of the plans increased more than 3% since fiscal 2016, from 75.4% to 78.6%**
 - Four plans are over 90% funded, and two plans are now over 100% funded
 - For comparison, the average public pension plan was 72.1% funded in FY 2016¹
- **Historically high markets in 2017 led to strong asset returns over the past fiscal year for all of the plans**
 - Average return on Market Value of Assets was 13.6%
 - However, return on an Actuarial Value basis was 8.6% due to delayed recognition of prior years' losses
 - This actuarial (smoothed) value used in funded status percentage calculation
 - Meanwhile, total plan liabilities grew by 1.6% over the last year



¹ Public Fund Survey Summary Findings for FY 2016, published November 2017 by the National Association of State Retirement Administrators (NASRA)

FUNDED STATUS HISTORY VS. AVERAGE PUBLIC FUND (COMBINED PLANS)

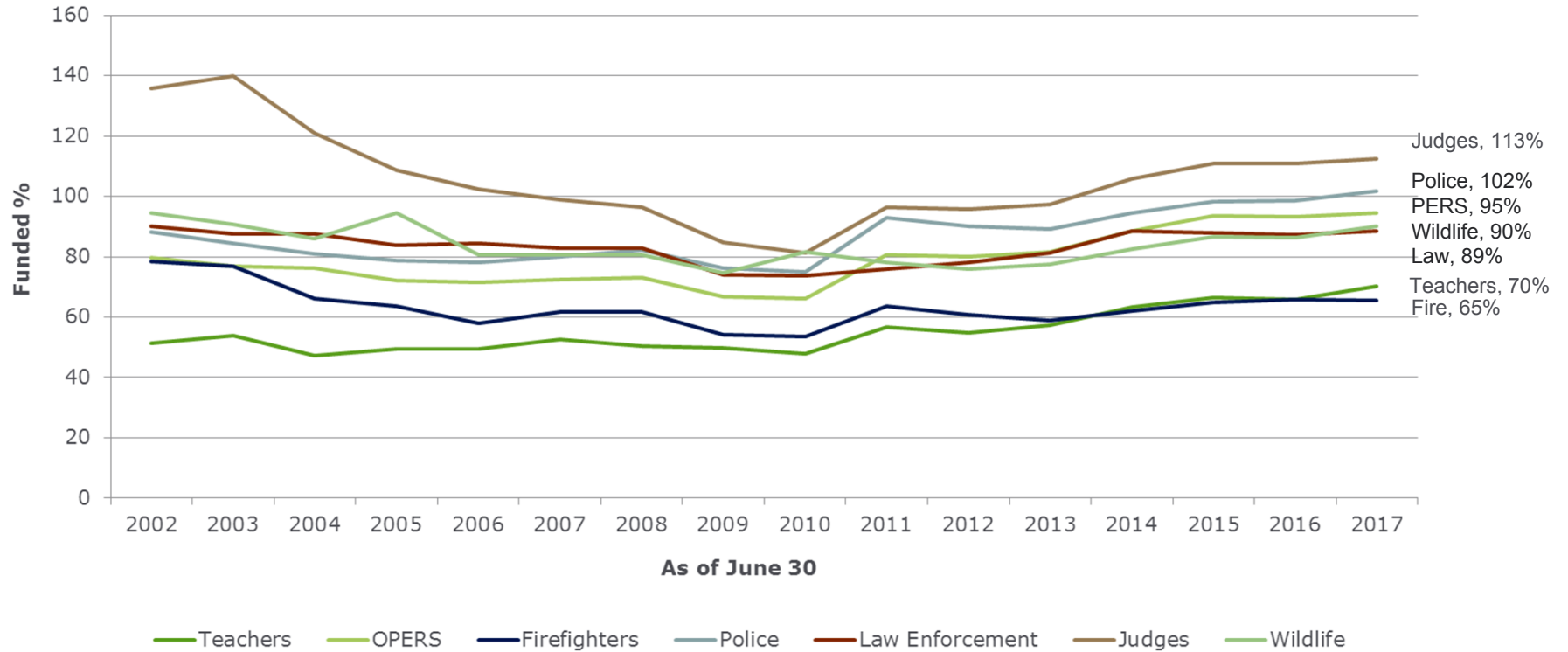


- **The Oklahoma plans' aggregate funded status has seen continued improvement and has surpassed the funded status of the average public plan¹**
 - Legislative changes made in 2011 regarding COLA funding had a significant effect
 - Equity markets have had consistently strong returns

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



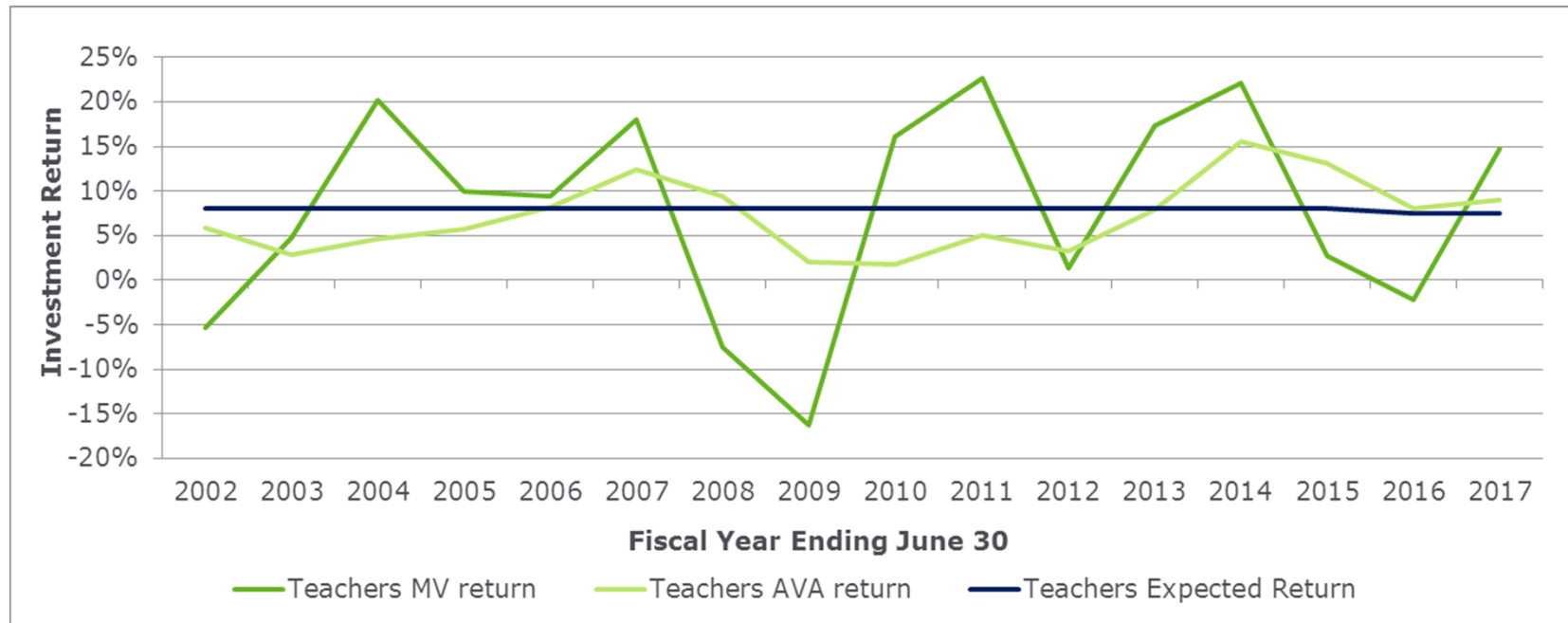
FUNDED STATUS HISTORY – INDIVIDUAL PLAN BASIS



Sources: 2000 to 2009: Buck Consultants, Milliman Consultants and Actuaries, and Gabriel, Roeder, Smith & Company
 2010 to 2016: Buck Consultants, Cavanaugh Macdonald Consulting, and Gabriel, Roeder, Smith & Company
 2017: Conduent Consultants, Cavanaugh Macdonald Consulting, and Gabriel, Roeder, Smith & Company



EXPECTED RETURN – TEACHERS PLAN

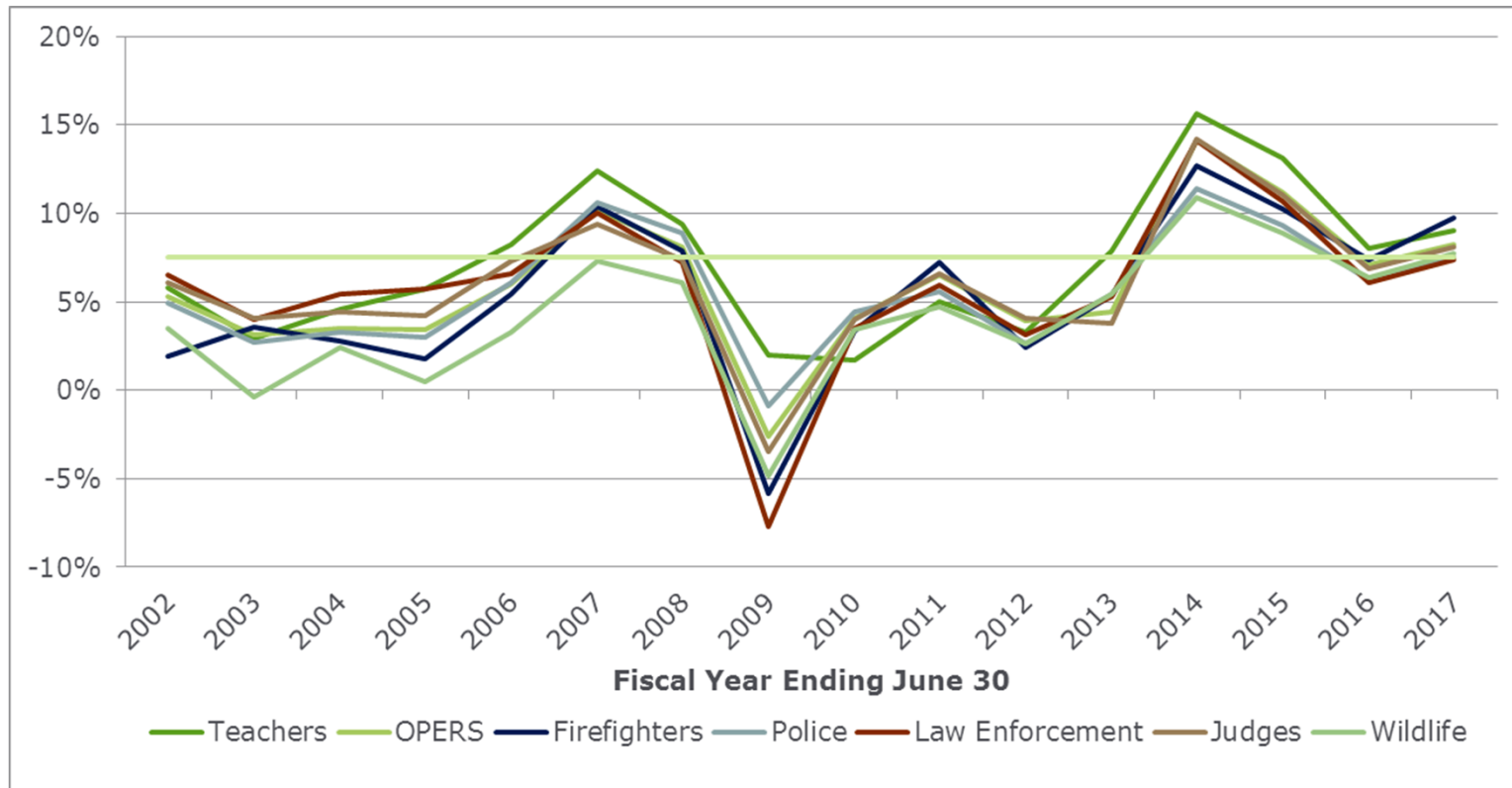


- **The Teachers' plan is shown as an example of the benefit of using actuarial value of assets vs. market value**
- **Actuarial Value return lags Market Value return as gains and losses are smoothed in over 5 years**
 - Helps smooth fluctuations in funded status and keep expected return close to assumed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



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

HISTORICAL RATE OF RETURN



- **Average actuarial rate of return for fiscal year ending June 30, 2017 was 8.6%**
 - Assumed rate of return was between 7.5% and 7.0% for all plans

Sources: 2000 to 2009: Buck Consultants, Milliman Consultants and Actuaries, and Gabriel, Roeder, Smith & Company
 2010 to 2016: Buck Consultants, Cavanaugh Macdonald Consulting, and Gabriel, Roeder, Smith & Company
 2017: Conduent 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 2018 and 2017 fiscal years

| Pension Plan | FY 2018 | | FY 2017 | | | |
|------------------------------|--------------------------------|-----------------------------|--------------------------------|-----------------------------|---------------------------|-----------------------------------|
| | Required Contribution as % Pay | Required Contribution (\$m) | Required Contribution as % Pay | Required Contribution (\$m) | Actual Contribution (\$m) | Est. Actual Contribution as % Pay |
| Teachers* | 7.7% | \$316.91 | 7.8% | \$331.87 | \$278.92 | 6.5% |
| OPERS | 10.1% | \$174.28 | 10.1% | \$182.00 | \$288.34 | 17.1% |
| Firefighters | 41.2% | \$115.48 | 38.6% | \$103.14 | \$88.13 | 31.4% |
| Police | 0.0% | \$0.00 | 3.3% | \$10.64 | \$34.28 | 10.9% |
| Law Enforcement | 27.0% | \$23.35 | 27.7% | \$24.53 | \$21.84 | 25.3% |
| Judges | 5.0% | \$1.65 | 10.5% | \$3.66 | \$6.19 | 18.6% |
| Wildlife | 19.5% | \$2.49 | 22.3% | \$2.99 | \$4.78 | 37.3% |
| Total as % of Payroll | 9.5% | | 9.8% | | | 10.8% |
| Total Dollars (\$m) | | \$634.16 | | \$658.83 | \$722.49 | |

* Teachers plan contribution is estimated by subtracting expected Employer contributions of 9.3% of payroll from the calculated ADEC of 17.0%

- For fiscal year ending 2018, the recommended contribution is 9.5% of payroll, or \$634 million – lower than 2017
- For fiscal year ending 2017, the recommended contribution to the Oklahoma pension plans was \$659 million, or 9.8% of total payroll
 - However, the actual contribution amount was \$722 million, or 110% of required
- The contribution amounts for each plan are not tied to the calculation of the actuarially determined contributions amounts (see the following page)
 - In 2017, four plans received more than what was required
 - In 2018, the Police plan has no required contribution for 2018, but will receive the statutory contribution of 14% of insurance premiums taxes
 - In 2018, Judges and Justices plan requires 5% of payroll for next year, but will receive 20.5% of payroll, per current statute

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 2017

Mandated Employee and Employer Contribution Rates as of July 1, 2017

| 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% Reg. Universities: 8.55% Federal grants: 7.7%* | | 5% of tax and lottery revenue |
| OPERS | 3.5% | | | 16.5% of payroll |
| Firefighters | 9.0% | | 14.0% | 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% | | | 20.5% of payroll** |
| Wildlife | 5.0% | | | |

* Scheduled to increase to 7.8% in fiscal 2018

** Increased from 19.0% in fiscal 2016 to 20.5% in fiscal 2017. Scheduled to increase to 22.0% by fiscal 2019.

Actual Contributions by Type for Fiscal Year Ending June 30, 2017 (in \$millions)

| Pension Plan | Employee Contribution | Employer + Federal Contribution | Municipality / Agency Contribution | State Contribution | Total |
|-----------------|-----------------------|---------------------------------|------------------------------------|--------------------|-------------------|
| Teachers | \$292.95 | \$426.28 | | \$278.92 | \$998.16 |
| OPERS | \$70.28 | | | \$288.34 | \$358.62 |
| Firefighters | \$25.24 | | \$40.33 | \$88.13 | \$153.70 |
| Police | \$23.92 | | \$38.89 | \$34.28 | \$98.00 |
| Law Enforcement | \$6.83 | | \$10.11 | \$21.84 | \$38.79 |
| Judges | \$2.66 | | | \$6.19 | \$8.00 |
| Wildlife | \$0.63 | | | \$4.78 | \$5.41 |
| Total | \$422.51 | \$426.28 | \$89.32 | \$722.49 | \$1,660.67 |



CONTRIBUTION HISTORY – STATE AND MUNICIPALITIES

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

| | 07/01/07 | 07/01/08 | 07/01/09 | 07/01/10 | 07/01/11 | 07/01/12 | 07/01/13 | 07/01/14 | 07/01/15 | 07/01/16 | 07/01/17 |
|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------|------------------|------------------|------------------|
| Teachers* | \$590.5 | \$714.4 | \$742.3 | \$822.4 | \$588.0 | \$620.0 | \$603.0 | \$550.7 | \$762.0 | \$758.0 | \$729.0 |
| OPERS | \$363.9 | \$323.1 | \$389.2 | \$402.0 | \$240.0 | \$257.0 | \$259.0 | \$200.8 | \$164.6 | \$182.0 | \$174.3 |
| Firefighters** | \$147.3 | \$157.8 | \$187.2 | \$195.7 | \$142.0 | \$159.0 | \$162.0 | \$142.4 | \$139.2 | \$141.5 | \$155.5 |
| Police** | \$100.5 | \$102.6 | \$132.5 | \$146.8 | \$65.0 | \$79.0 | \$90.0 | \$63.9 | \$44.7 | \$51.0 | \$40.8 |
| Law Enforcement** | \$32.7 | \$36.6 | \$48.1 | \$50.1 | \$48.6 | \$44.7 | \$43.8 | \$31.8 | \$33.3 | \$34.0 | \$33.0 |
| Judges | \$7.6 | \$8.2 | \$10.8 | \$12.5 | \$7.0 | \$7.0 | \$7.0 | \$4.9 | \$3.5 | \$3.7 | \$1.7 |
| Wildlife | \$3.1 | \$3.4 | \$4.4 | \$3.2 | \$3.8 | \$4.3 | \$4.3 | \$3.7 | \$3.2 | \$3.0 | \$2.5 |
| Total | \$1,245.6 | \$1,374.0 | \$1,514.4 | \$1,632.7 | \$1,094.4 | \$1,171.0 | \$1,169.1 | \$998.2 | \$1,150.4 | \$1,173.2 | \$1,136.7 |

Actual State and Employer Contributions

| | 07/01/07 | 07/01/08 | 07/01/09 | 07/01/10 | 07/01/11 | 07/01/12 | 07/01/13 | 07/01/14 | 07/01/15 | 07/01/16 | 07/01/17 |
|-------------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|----------|
| Teachers* | \$597.0 | \$618.6 | \$620.6 | \$638.0 | \$682.0 | \$701.0 | \$707.0 | \$728.0 | \$725.0 | \$705.2 | TBD |
| OPERS | \$220.2 | \$243.0 | \$260.0 | \$253.0 | \$263.0 | \$270.0 | \$280.0 | \$292.2 | \$296.0 | \$288.3 | TBD |
| Firefighters** | \$83.1 | \$83.2 | \$82.2 | \$92.0 | \$101.0 | \$111.0 | \$115.6 | \$130.1 | \$131.5 | \$128.5 | TBD |
| Police** | \$56.1 | \$58.6 | \$54.6 | \$56.0 | \$61.0 | \$66.0 | \$66.9 | \$72.8 | \$74.0 | \$73.2 | TBD |
| Law Enforcement** | \$25.0 | \$24.9 | \$23.1 | \$25.0 | \$26.0 | \$28.0 | \$29.7 | \$32.3 | \$33.0 | \$32.0 | TBD |
| Judges | \$1.7 | \$2.2 | \$8.7 | \$3.0 | \$4.0 | \$4.0 | \$4.6 | \$5.3 | \$5.8 | \$6.2 | TBD |
| Wildlife | \$3.0 | \$3.4 | \$4.4 | \$3.2 | \$4.1 | \$4.1 | \$4.3 | \$4.3 | \$3.7 | \$4.8 | TBD |
| Total | \$986.1 | \$1,033.9 | \$1,053.5 | \$1,070.2 | \$1,141.1 | \$1,184.1 | \$1,208.1 | \$1,264.9 | \$1,269.0 | \$1,238.1 | TBD |

Percent of Required State and Employer Contribution Actually Contributed

| | 07/01/07 | 07/01/08 | 07/01/09 | 07/01/10 | 07/01/11 | 07/01/12 | 07/01/13 | 07/01/14 | 07/01/15 | 07/01/16 | 07/01/17 |
|-------------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|----------|
| Teachers* | 101.1% | 86.6% | 83.6% | 77.6% | 116.0% | 113.1% | 117.2% | 132.2% | 95.1% | 93.0% | TBD |
| OPERS | 60.5% | 75.2% | 66.8% | 62.9% | 109.6% | 105.1% | 108.1% | 145.5% | 179.8% | 158.4% | TBD |
| Firefighters** | 56.4% | 52.7% | 43.9% | 47.0% | 71.1% | 69.8% | 71.4% | 91.4% | 94.5% | 90.8% | TBD |
| Police** | 55.8% | 57.1% | 41.2% | 38.1% | 93.8% | 83.5% | 74.3% | 113.9% | 165.7% | 143.5% | TBD |
| Law Enforcement** | 76.5% | 68.0% | 48.1% | 49.9% | 53.5% | 62.6% | 67.8% | 101.4% | 99.7% | 94.0% | TBD |
| Judges | 22.2% | 27.4% | 80.8% | 24.0% | 57.1% | 57.1% | 65.9% | 108.1% | 168.8% | 169.1% | TBD |
| Wildlife | 97.1% | 100.3% | 100.0% | 100.0% | 107.9% | 96.1% | 99.8% | 116.7% | 115.7% | 159.3% | TBD |
| Total | 79.2% | 75.2% | 69.6% | 65.5% | 104.3% | 101.1% | 103.3% | 126.7% | 110.3% | 105.5% | TBD |

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

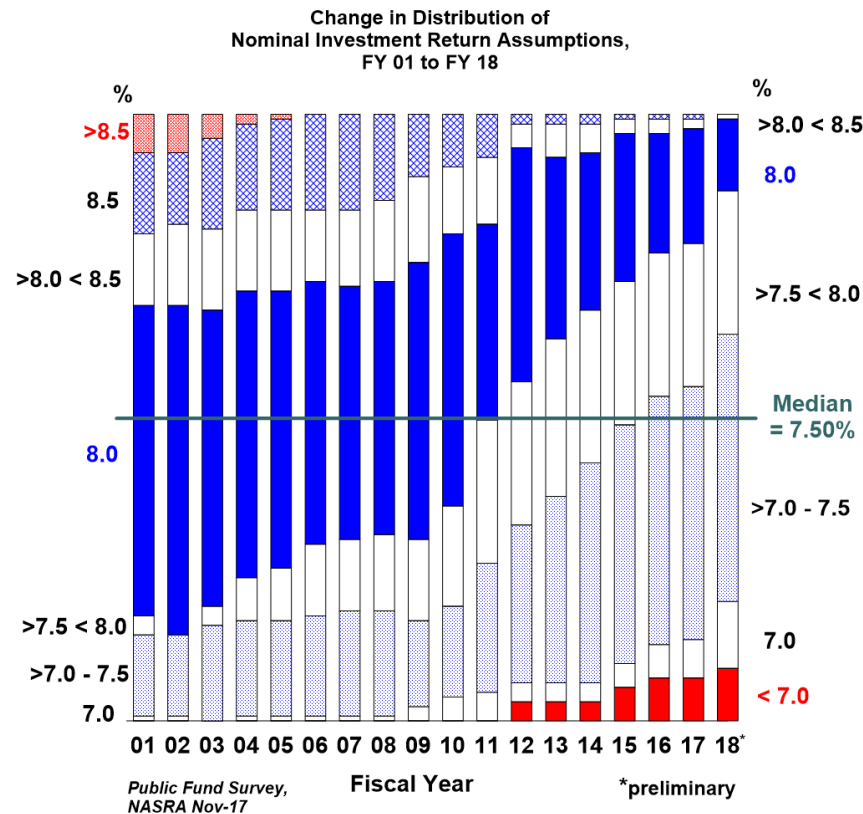
** Contributions include State and Agency or Municipality funds

- **Actual contributions exceeded recommended amounts by \$65m in fiscal 2017**
- **Four plans received more than the required contribution amount**



SYSTEM SUMMARY – CHARACTERISTICS AND ASSUMPTIONS

- **Investment return assumptions (7.5% for Teachers, Fire, Police, and Law Enforcement; 7.0% for PERS, Judges, and Wildlife) are in line with other public funds**
 - In 2017, the PERS and Judges plans lowered their expected return assumptions from 7.25% to 7.0%
 - Median discount rate for public plans was estimated to be 7.5% in fiscal 2018



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)
 - 10 years – closed (Judges and OPERS)
 - 11 years – open (Wildlife) - based on the average future working lifetime for active members
 - 12 years – closed (Law Enforcement)
 - 27 years – closed (Firefighters) – reset in 2014
 - 17 years - open (Teachers)
 - The amortization period is set as the funding period for the current actuarial valuation, not in excess of 20 years
- **All plans employ similar actuarial asset valuation methods, where gains and losses are smoothed over 5 years**
- **Four of the plans have adopted the RP-2014 mortality tables, which have increased longevity assumptions over previous tables and therefore increased plan liabilities**
 - PERS, Law Enforcement, Judges and Justices, and Wildlife plans

SYSTEM SUMMARY – FUNDED POSITION – GASB 67

| Plan | Market Value of Assets (in millions) | Actuarial Accrued Liability (in millions) | Funded Status as of 7/1/2017 | Discount Rate |
|-------------------------|--------------------------------------|---|------------------------------|---------------|
| Teachers | \$14,990.0 | \$21,625.4 | 69.3% | 7.5% |
| Public Employees (PERS) | \$8,914.0 | \$9,454.6 | 94.3% | 7.0% |
| Firefighters | \$2,509.5 | \$3,767.2 | 66.6% | 7.5% |
| Police | \$2,395.4 | \$2,403.1 | 99.7% | 7.5% |
| Law Enforcement | \$939.3 | \$1,069.3 | 87.8% | 7.5% |
| Judges | \$318.3 | \$282.8 | 112.5% | 7.0% |
| Wildlife | \$109.0 | \$121.4 | 89.8% | 7.0% |
| Total | \$30,175.4 | \$38,723.8 | 77.9% | 7.4% |

- **As of July 1, 2017, overall funded status of the plans were 77.9% under GASB 67, vs. 78.6% for funding purposes**
- **GASB 67 uses Market Value of Assets instead of Actuarial Value, and may use a different discount rate than for funding purposes**
 - For fiscal 2017, 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
- **Values exclude GASB 74 OPEB liabilities and assets**

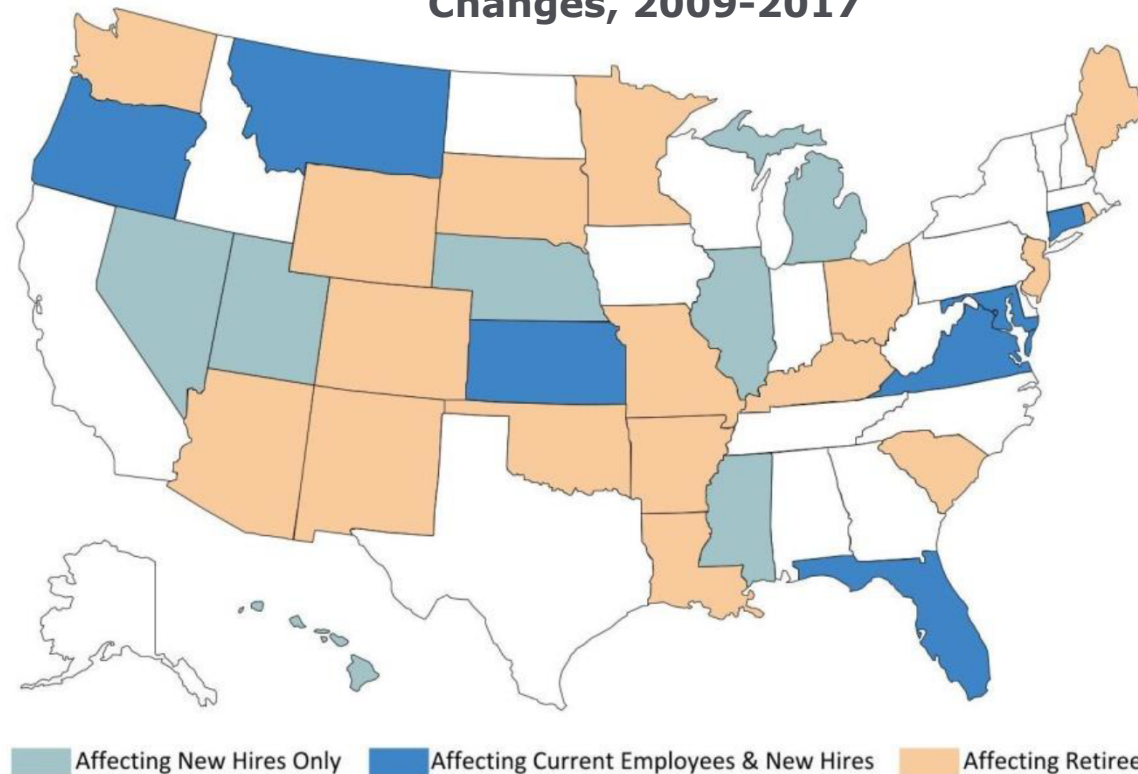


SYSTEM SUMMARY – 2017 LEGISLATIVE CHANGES

- **Teachers plan saw changes from HB 1162, which changed the “vesting” period to be eligible for benefits from five to seven years for members who join after October 31, 2017**
- **Oklahoma PERS created a defined contribution plan for most new employees hired after November 1, 2015**
 - The effect on the defined benefit plan liabilities will be small in the near term as all benefits earned prior to November 1, 2015 remain in the plan
 - Eventually, the defined benefit plan population will begin to decline, lowering plan liabilities, but also lowering active payroll used for percentage of payroll purposes
 - This defined contribution plan is not covered in the analysis in this report

LEGISLATIVE UPDATES – NATIONWIDE COLA CHANGES

State Retirement Systems Undergoing COLA Legislative Changes, 2009-2017



- **Since 2009, seventeen states changed COLAs affecting current retirees, seven states addressed current employees' benefits, and seven states changed the COLA structure only for future employees.**
- **The legality of these modifications in several states is being challenged in court**

SUMMARY AND CONCLUSIONS

- **In aggregate, the State's plans are 78.6% funded as of June 30, 2017**
 - All plans saw an increase in funded status, except for a slight decrease in the Firefighters plan
 - Four of the seven plans are now over 90% funded
 - Recall that corporate plans have a typical minimum funding threshold of staying above 80% funded
- **Actual State contributions exceeded recommended amounts by \$65m in fiscal 2017**
 - In 2017, four plans received more than the Actuarially Determined Contribution amount, as the statutory contributions are not tied to actuarial calculations
- **Prior two years of asset losses continue to be recognized in the actuarial value of assets, slightly boosting funded status**
 - Actuarial value is currently higher than the market value of assets
- **The plans' assumptions are within a reasonable range**
 - Two plans lowered their expected return assumption this year, all plans use 7.5% or 7.0% to discount liabilities
 - Four plans have updated their mortality assumptions to the RP-2014 mortality tables
- **GASB 67 reporting found the Oklahoma plans at 77.9% funded, using market value of assets**
 - For fiscal 2017, 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