

NASRA Issue Brief: Public Pension Plan Investment Return Assumptions



Updated February 2018

As of September 30, 2017, state and local government retirement systems held assets of \$4.16 trillion.¹ These assets are held in trust and invested to pre-fund the cost of pension benefits. The investment return on these assets matters, as investment earnings account for a majority of public pension financing. A shortfall in long-term expected investment earnings must be made up by higher contributions or reduced benefits.

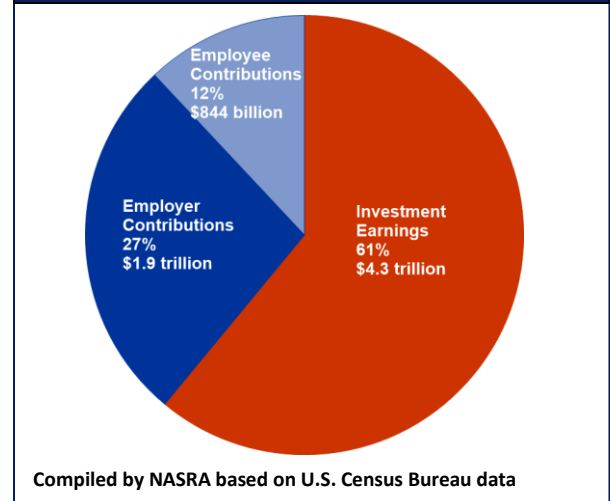
Funding a pension benefit requires the use of projections, known as actuarial assumptions, about future events. Actuarial assumptions fall into one of two broad categories: demographic and economic. Demographic assumptions are those pertaining to a pension plan's membership, such as changes in the number of working and retired plan participants; when participants will retire, and how long they'll live after they retire. Economic assumptions pertain to such factors as the rate of wage growth and the future expected investment return on the fund's assets.

As with other actuarial assumptions, projecting public pension fund investment returns requires a focus on the long-term. This brief discusses how investment return assumptions are established and evaluated, compares these assumptions with public funds' actual investment experience, and the challenging investment environment public retirement systems currently face.

Because investment earnings account for a majority of revenue for a typical public pension fund, the accuracy of the return assumption has a major effect on a plan's finances and actuarial funding level. An investment return assumption that is set too low will overstate liabilities and costs, causing current taxpayers to be overcharged and future taxpayers to be undercharged. A rate set too high will understate liabilities, undercharging current taxpayers, at the expense of future taxpayers. An assumption that is significantly wrong in either direction will cause a misallocation of resources and unfairly distribute costs among generations of taxpayers.

As shown in Figure 1, since 1987, public pension funds have accrued approximately \$7.0 trillion in revenue, of which \$4.3 trillion, or 61 percent, is from investment earnings. Employer contributions account for \$1.9 trillion, or 27 percent of the total, and employee contributions total \$844 billion, or 12 percent.²

Figure 1: Public Pension Sources of Revenue, 1987-2016



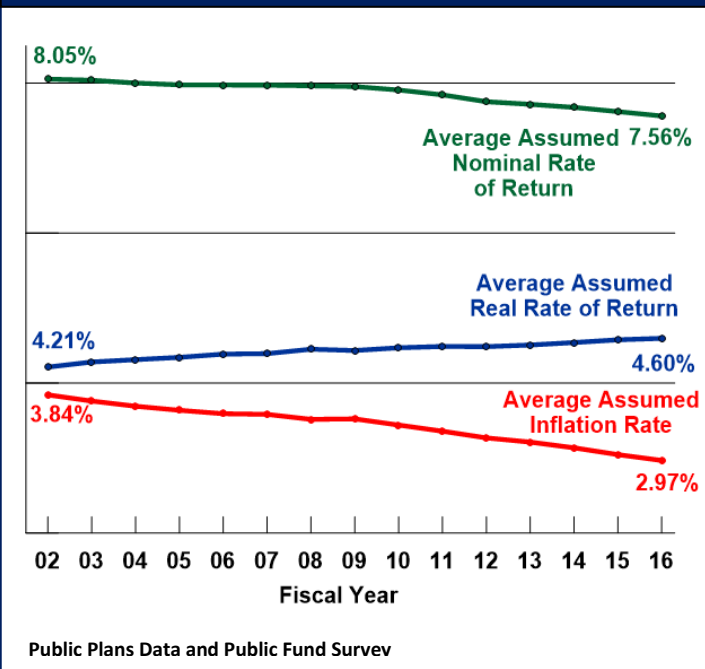
Most public retirement systems review their actuarial assumptions regularly, pursuant to state or local statute or system policy. The entity (or entities) responsible for setting the return assumption, as identified in Appendix B, typically works with one or more professional actuaries, who follow guidelines set forth by the Actuarial Standards Board in Actuarial Standards of Practice No. 27 (Selection of Economic Assumptions for Measuring Pension Obligations) (ASOP 27). ASOP 27 prescribes the factors actuaries should consider in setting economic actuarial assumptions, and recommends that actuaries consider the context of the measurement they are making, as defined by such factors as the purpose of the

¹ Federal Reserve, *Flow of Funds Accounts of the United States: Flows and Outstandings, Third Quarter 2017*, Table L.120

² US Census Bureau, Annual Survey of Public Pensions, State & Local Data

measurement, the length of time the measurement period is intended to cover, and the projected pattern of the plan's cash flows.

Figure 2: Average nominal and real rate of return, and average assumed inflation rate, FY 02 – FY 16



ASOP 27 also advises that actuarial assumptions be reasonable, defined in subsection 3.6 as being consistent with five specified characteristics; and requires that actuaries consider relevant data, such as current and projected interest rates and rates of inflation; historic and projected returns for individual asset classes; and historic returns of the fund itself. For plans that remain open to new members, actuaries focus chiefly on a long investment horizon, i.e., 20 to 30 years, which is the length of a typical public pension plan's funding period. One key purpose for relying on a long timeframe is to promote the key policy objectives of cost stability and predictability, and intergenerational equity among taxpayers.

The investment return assumption used by public pension plans typically contains two components: inflation and the real rate of return. The sum of these components is the nominal return rate, which is the rate that is most often used and cited. The system's inflation assumption typically

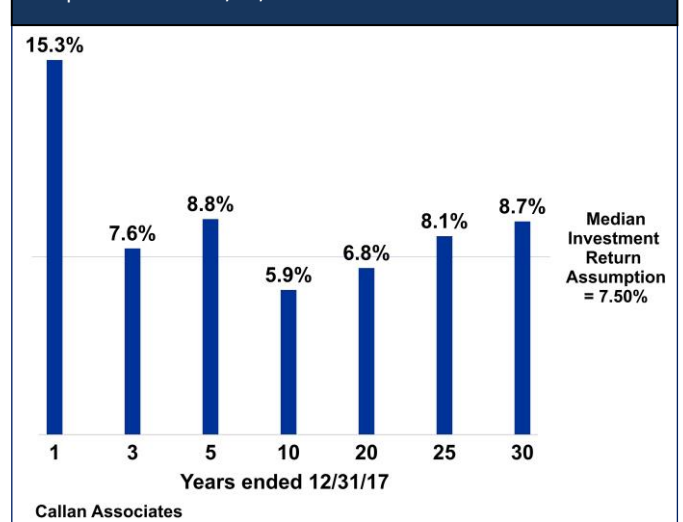
is applied also to other actuarial assumptions, such as the level of wage growth and, where relevant, assumed rates of cost-of-living adjustments (COLAs). Achieving an investment return approximately commensurate with the inflation rate normally is attainable by investing in securities, such as US Treasury bonds, that are often characterized as risk-free, i.e., that pay a guaranteed rate of return.

The second component of the investment return assumption is the real rate of return, which is the return on investment after adjusting for inflation. The real rate of return is intended to reflect the return produced as a result of the risk taken by investing the assets. Achieving a return higher than the risk-free rate requires taking some investment risk; for public pension funds, this risk takes the form of investments in assets such as public and private equities and real estate, which contain more risk than Treasury bonds.

Figure 2 illustrates the changes in the average nominal (non-inflation-adjusted) return, the inflation assumption, and the resulting real rate of return assumption. As the chart shows, although the average nominal public pension fund investment return has been declining, because the average rate of assumed inflation has been dropping more quickly, the average real rate of return has risen, from 4.21 percent in FY 02 to 4.60 percent in FY 16. One factor that may be contributing to the higher real rate of return is public pension funds' higher allocations to alternative assets, particularly to private equities, which usually have a higher expected return than other asset classes.

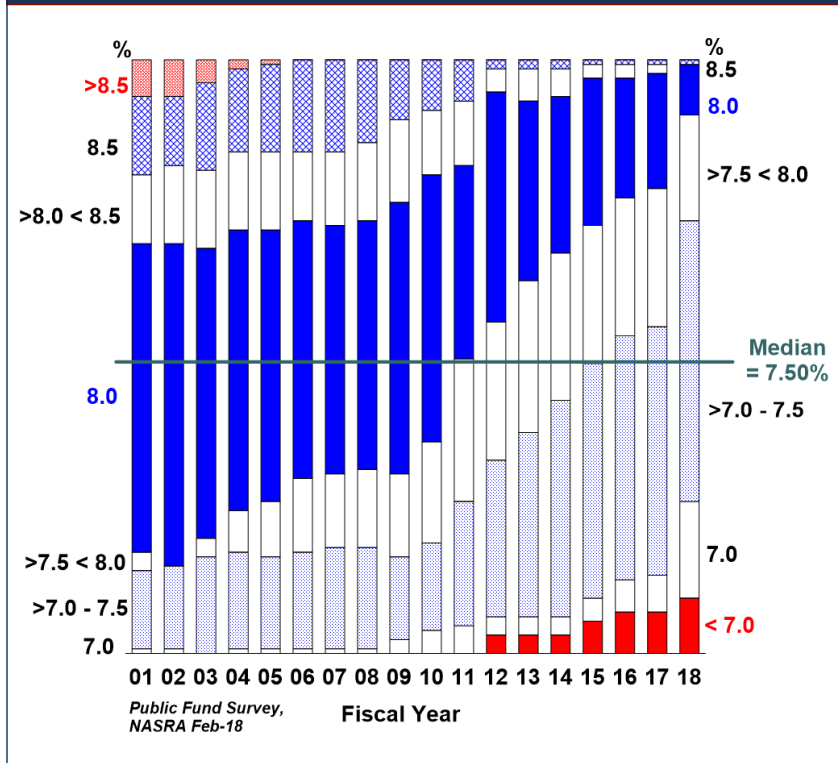
Figure 3 plots median public pension fund annualized investment returns for a range of periods ended December 31, 2017. As the figure shows, relatively strong returns in recent years are somewhat offset by the effects of market declines of 2000-02 and 2008-09, which are affecting returns for the 10- or 20-year periods ended 12/31/17, or both.

Figure 3: Median public pension annualized investment returns for period ended 12/31/2017



In the wake of the 2008-09 decline in capital markets and Great Recession, global interest rates and inflation have remained low by historic standards, due partly to so-called quantitative easing of central banks in many industrialized economies, including the U.S. Now in their ninth year, these low interest rates, with low rates of projected global economic growth, have led to reductions in projected returns for most asset classes, which, in turn, have resulted in an unprecedented number of reductions in the investment return assumption used by public pension plans. This trend is illustrated by Figure 4, which plots the distribution of investment return assumptions among a representative group of plans since 2001.

Figure 4: Change in Distribution of Public Pension Investment Return Assumptions, FY 01 to FY 18



Among the 129 plans measured, nearly three-fourths have reduced their investment return assumption since fiscal year 2010, resulting in a decline in the average return assumption from 7.91 percent to 7.36 percent. If projected returns continue to decline, investment return assumptions are likely to also continue their downward trend. Appendix A lists the assumptions in use or adopted for future use by the 129 plans in this dataset.

One challenging facet of setting the investment return assumption that has emerged more recently is a divergence between expected returns over the near term, i.e., the next five to 10 years, and over the longer term, i.e., 20 to 30 years³. A growing number of investment return projections are concluding that near-term returns will be materially lower than both historic norms as well as projected returns over longer timeframes. Because many near-term projections calculated recently are well below the long-term assumption most plans are using,

some plans face the difficult choice of either maintaining a return assumption that is higher than near-term expectations, or lowering their return assumption to reflect near-term expectations.

If actual investment returns in the near-term prove to be lower than historic norms, plans that maintain their long-term return assumption risk experiencing a steady increase in unfunded pension liabilities and corresponding costs. Alternatively, plans that reduce their assumption in the face of diminished near-term projections will experience an immediate increase unfunded liabilities and required costs. As a rule of thumb, a 25 basis point reduction in the return assumption, such as from 8.0 percent to 7.75 percent, will increase the cost of a plan that has a COLA, by three percent of pay (such as from 10 percent to 13 percent), and a plan that does not have a COLA, by two percent of pay.

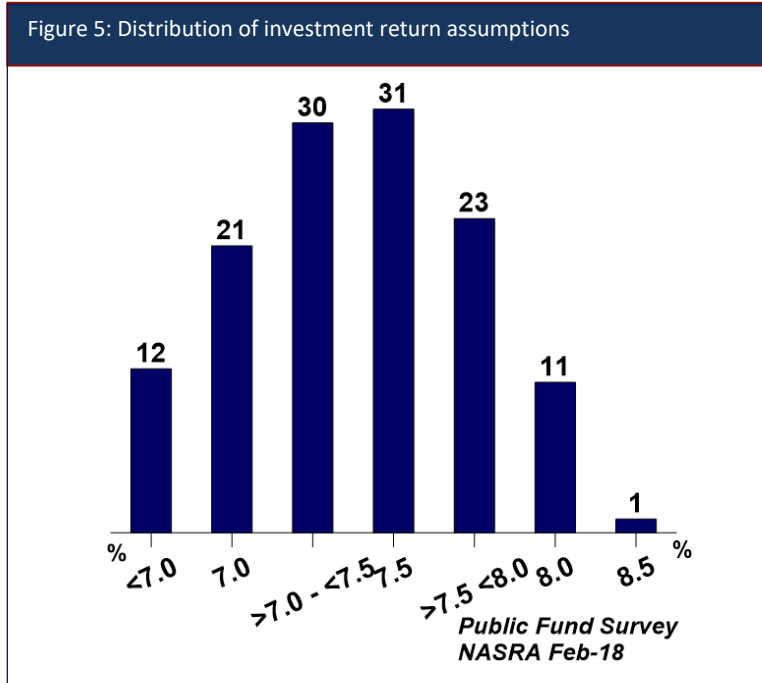
Conclusion

The investment return assumption is the single most consequential of all actuarial assumptions in terms of its effect on a pension plan's finances. The sustained period of low interest rates since 2009 has caused many public pension plans to re-evaluate their long-term expected investment returns, leading to an unprecedented number of reductions in plan investment return assumptions. Absent other changes, a lower investment return assumption increases both the plan's unfunded liabilities and cost. The process for evaluating a pension plan's investment return assumption should include abundant input and feedback from professional experts and actuaries, and should reflect consideration of the factors prescribed in actuarial standards of practice.

³ Horizon Actuarial Services, "Survey of Capital Market Assumptions, 2017 Edition (August 2017) p4

See Also:

- [Actuarial Standards of Practice No. 27](#), Actuarial Standards Board
- [The Liability Side of the Equation Revisited](#), Missouri SERS, September 2006



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Appendix A: Investment Return Assumption by Plan

(Figures reflect the nominal assumption in use, or announced for use, as of February 2018¹)

Plan	Rate (%)
Alabama ERS	7.75
Alabama Teachers	7.75
Alaska PERS	8.0
Alaska Teachers	8.0
Arizona Public Safety Personnel	7.40
Arizona SRS	7.50
Arkansas PERS	7.15
Arkansas State Highway ERS	8.0
Arkansas Teachers	7.50
California PERF ²	7.375
California Teachers ³	7.25
Chicago Teachers	7.75
City of Austin ERS	7.50
Colorado Affiliated Local	7.50
Colorado Fire & Police Statewide	7.50
Colorado Municipal	7.25
Colorado School	7.25
Colorado State	7.25
Connecticut SERS	6.90
Connecticut Teachers	8.0
Contra Costa County	7.25
DC Police & Fire	6.50
DC Teachers	6.50
Delaware State Employees	7.0
Denver Employees	7.75
Denver Public Schools	7.25
Duluth Teachers	8.0
Fairfax County Schools	7.50
Florida RS	7.50
Georgia ERS	7.50
Georgia Teachers	7.50
Hawaii ERS	7.0
Houston Firefighters	7.0
Idaho PERS	7.0
Illinois Municipal	7.50
Illinois SERS	7.25
Illinois Teachers	7.0
Illinois Universities	7.25
Indiana PERF	6.75
Indiana Teachers	6.75
Iowa PERS	7.0
Kansas PERS	7.75
Kentucky County	6.25
Kentucky ERS ⁴	5.25
Kentucky Teachers	7.50

Los Angeles County ERS	7.50
Louisiana Parochial Employees	7.0
Louisiana SERS ⁵	7.70
Louisiana Teachers ⁵	7.70
Maine Local	6.875
Maine State and Teacher	6.875
Maryland PERS ⁶	7.50
Maryland Teachers ⁶	7.50
Massachusetts SERS	7.50
Massachusetts Teachers	7.50
Michigan Municipal	7.75
Michigan Public Schools ⁷	7.05
Michigan SERS	7.0
Minnesota PERF	8.0
Minnesota State Employees	8.0
Minnesota Teachers ⁸	8.50
Mississippi PERS	7.75
Missouri DOT and Highway Patrol	7.75
Missouri Local	7.25
Missouri PEERS	7.60
Missouri State Employees	7.65
Missouri Teachers	7.60
Montana PERS	7.65
Montana Teachers	7.75
Nebraska Schools	7.50
Nevada Police Officer and Firefighter	7.50
Nevada Regular Employees	7.50
New Hampshire Retirement System	7.25
New Jersey PERS	7.0
New Jersey Police & Fire	7.0
New Jersey Teachers	7.0
New Mexico PERA ⁹	7.51
New Mexico Teachers	7.25
New York City ERS	7.0
New York City Teachers	7.0
New York State Teachers	7.25
North Carolina Local Government	7.20
North Carolina Teachers and State Employees	7.20
North Dakota PERS	7.75
North Dakota Teachers	7.75
NY State & Local ERS	7.0
NY State & Local Police & Fire	7.0
Ohio PERS	7.50
Ohio Police & Fire	8.0
Ohio School Employees	7.50

Ohio Teachers	7.45
Oklahoma PERS	7.0
Oklahoma Teachers	7.50
Orange County ERS	7.0
Oregon PERS	7.20
Pennsylvania School Employees	7.25
Pennsylvania State ERS	7.25
Phoenix ERS	7.50
Rhode Island ERS	7.0
Rhode Island Municipal	7.0
San Diego County	7.25
San Francisco City & County	7.46
South Carolina Police	7.25
South Carolina RS	7.25
South Dakota RS	6.50
St. Louis School Employees	7.50
St. Paul Teachers	8.0
Texas County & District	8.0
Texas ERS	7.50
Texas LECOS	7.50
Texas Municipal	6.75

Texas Teachers	8.0
Tennessee Political Subdivisions	7.25
Tennessee State and Teachers	7.25
Utah Noncontributory	6.95
Vermont State Employees	7.50
Vermont Teachers	7.50
Virginia Retirement System	7.0
Washington LEOFF Plan 1 ¹⁰	7.70
Washington LEOFF Plan 2 ¹¹	7.50
Washington PERS 1 ¹⁰	7.70
Washington PERS 2/3 ¹⁰	7.70
Washington School Employees Plan 2/3 ¹⁰	7.70
Washington Teachers Plan 1 ¹⁰	7.70
Washington Teachers Plan 2/3 ¹⁰	7.70
West Virginia PERS	7.50
West Virginia Teachers	7.50
Wisconsin Retirement System	7.20
Wyoming Public Employees	7.0

1. This list of nominal investment return assumptions is updated at www.nasra.org/latestreturnassumptions
2. CalPERS is reducing its investment return assumption from 7.50 percent to 7.0 percent over three years. In February 2017 the CalPERS Board adopted a risk mitigation policy, effective beginning FY 2021, that calls for a reduction in the system's investment return assumption commensurate with the pension fund achieving a specified level of investment return. Details are available online: <https://www.calpers.ca.gov/docs/board-agendas/201702/financeadmin/item-9a-02.pdf>.
3. CalSTRS is reducing its investment return assumption from 7.50 percent to 7.0 percent over two years.
4. The Kentucky ERS is composed of two plans: Hazardous and Non-Hazardous. The rate shown applies to the plan's Non-Hazardous plan, which accounts for more than 90 percent of the Kentucky ERS plan liabilities. The investment return assumption used for the Hazardous plan is 6.25 percent.
5. The Louisiana State Employees' Retirement System and Teachers' Retirement System are reducing their discount rate from 7.75 percent to 7.50 percent by 2021 in annual increments of 0.05 percent. The discount rate used to determine the FY 2018/2019 funding requirement is 7.65%, which is net of gain-sharing. The investment return assumption differs from the discount rate because of the effective cost of providing potential future ad hoc postretirement benefit increases, or gain-sharing. The investment return assumption, which includes gain-sharing, is reducing incrementally to 7.50% by 2021.
6. The assumed rate of return for the Maryland Public Employees' Retirement System and Teachers Retirement Systems is scheduled to decrease to 7.45 percent beginning July 1, 2018.
7. The Michigan Public School Employees' Retirement System administers three plans: a defined benefit plan and two hybrid plans (Pension Plus and Pension Plus 2). The rate shown applies to the defined benefit plan. The investment return assumption used for the Pension Plus plan is 7.0 percent, and 6.0 percent for Pension Plus 2.
8. Legislation approved by the Minnesota Legislature in 2016 would have reduced the return assumption of the Teachers' Retirement Association to 8.0 percent, but was vetoed by the governor for reasons extraneous to the assumption.
9. Reflects a weighted average rate based on 7.25 percent for FY17-26 and 7.75 percent thereafter.
10. For all Washington State plans except LEOFF Plan 2, the assumed rate of return is scheduled to decrease to 7.5 percent for the 2019-21 biennium.
11. The assumed rate of return for the Washington LEOFF Plan 2 is scheduled to decrease to 7.4 percent for the 2019-2021 biennium.

Appendix B: Entity Responsible for Setting Investment Return Assumption for Selected State Plans

State	System	Investment Return Assumption Set By
AK	Alaska Public Employees Retirement System	Alaska Retirement Management Board
AK	Alaska Teachers Retirement System	Alaska Retirement Management Board
AL	Retirement Systems of Alabama	Retirement board
AR	Arkansas Public Employees Retirement System	Retirement board
AR	Arkansas State Highway Employees' Retirement System	Retirement board
AR	Arkansas Teachers Retirement System	Retirement board
AZ	Arizona Public Safety Personnel Retirement System	Retirement board
AZ	Arizona State Retirement System	Retirement board
CA	California Public Employees Retirement System	Retirement board
CA	California State Teachers Retirement System	Retirement board
CO	Colorado Public Employees Retirement Association	Retirement board
CO	Fire & Police Pension Association of Colorado	Retirement board
CT	Connecticut State Employees Retirement System	State Employees Retirement Commission
CT	Connecticut Teachers Retirement Board	Retirement board
DC	District of Columbia Retirement Board	Retirement board
DE	Delaware Public Employees Retirement System	Retirement board
FL	Florida Retirement System	FRS Actuarial Assumption Estimating Conference ¹
GA	Georgia Employees Retirement System	Retirement board
GA	Georgia Teachers Retirement System	Retirement board
HI	Hawaii Employees Retirement System	Retirement board
IA	Iowa Public Employees Retirement System	IPERS Investment Board
ID	Idaho Public Employees Retirement System	Retirement board
IL	Illinois State Universities Retirement System	Retirement board
IL	Illinois State Employees Retirement System	Retirement board
IL	Illinois Municipal Retirement Fund	Retirement board
IL	Illinois Teachers Retirement System	Retirement board
IN	Indiana Public Retirement System	Retirement board
KS	Kansas Public Employees Retirement System	Retirement board
KY	Kentucky Retirement Systems	Retirement board
KY	Kentucky Teachers Retirement System	Retirement board
LA	Louisiana State Employees Retirement System	Retirement board
LA	Louisiana Parochial Employees' Retirement System	Retirement board
LA	Louisiana Teachers Retirement System	Retirement board
MA	Massachusetts State Employees Retirement System	Collaborative between the legislature, state treasurer, governor, and the Massachusetts Public Employee Retirement Administration Commission
MA	Massachusetts Teachers Retirement Board	Collaborative between the legislature, state treasurer, governor, and the Massachusetts Public Employee Retirement Administration Commission
MD	Maryland State Retirement and Pension System	Retirement board
ME	Maine Public Employees Retirement System	Retirement board
MI	Michigan Public School Employees Retirement System	Retirement board
MI	Michigan State Employees Retirement System	Retirement board
MI	Municipal Employees' Retirement System of Michigan	Retirement board
MN	Minnesota Public Employees Retirement Association	Legislature
MN	Minnesota State Retirement System	Legislature
MN	Minnesota Teachers Retirement Association	Legislature

MO	Missouri Local Government Employees Retirement System	Retirement board
MO	Missouri Public Schools Retirement System	Retirement board
MO	Missouri State Employees Retirement System	Retirement board
MO	MoDOT & Patrol Employees' Retirement System	Retirement board
MS	Mississippi Public Employees Retirement System	Retirement board
MT	Montana Public Employees Retirement Board	Retirement board
MT	Montana Teachers Retirement System	Retirement board
NC	North Carolina Retirement Systems	Retirement board
ND	North Dakota Public Employees Retirement System	Retirement board
ND	North Dakota Teachers Fund for Retirement	Retirement board
NE	Nebraska Public Employees Retirement System	Retirement board
NH	New Hampshire Retirement System	Retirement board
NJ	New Jersey Division of Pension and Benefits	Retirement board and state treasurer
NM	New Mexico Educational Retirement Board	Retirement board
NM	New Mexico Public Employees Retirement Association	Retirement board
NV	Nevada Public Employees Retirement System	Retirement board
NY	New York State & Local Retirement Systems	State comptroller
NY	New York State Teachers Retirement System	Retirement board
OH	Ohio Police and Fire Pension Fund	Retirement board
OH	Ohio Public Employees Retirement System	Retirement board
OH	Ohio School Employees Retirement System	Retirement board
OH	Ohio State Teachers Retirement System	Retirement board
OK	Oklahoma Public Employees Retirement System	Retirement board
OK	Oklahoma Teachers Retirement System	Retirement board
OR	Oregon Public Employees Retirement System	Retirement board
PA	Pennsylvania Public School Employees Retirement System	Retirement board
PA	Pennsylvania State Employees Retirement System	Retirement board
RI	Rhode Island Employees Retirement System	Retirement board
SC	South Carolina Retirement Systems	Legislature
SD	South Dakota Retirement System	Retirement board
TN	Tennessee Consolidated Retirement System	Retirement board
TX	Teacher Retirement System of Texas	Retirement board
TX	Texas County & District Retirement System	Retirement board
TX	Texas Employees Retirement System	Retirement board
TX	Texas Municipal Retirement System	Retirement board
UT	Utah Retirement Systems	Retirement board
VA	Virginia Retirement System	Retirement board
VT	Vermont State Employees Retirement System	Retirement board
VT	Vermont Teachers Retirement System	Retirement board
WA	Washington Department of Retirement Systems	Legislature
WI	Wisconsin Retirement System	Retirement board
WV	West Virginia Consolidated Public Retirement Board	Retirement board
WY	Wyoming Retirement System	Retirement board

1. The Conference consists of staff from the Florida House, Senate, and Governor's office