NASRA Issue Brief:
Public Pension Plan Investment Return Assumptions

Updated March 2023

As of December 31, 2022, state and local government retirement systems held assets of approximately $5.19 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, over time, be made up by higher contributions or reduced benefits.

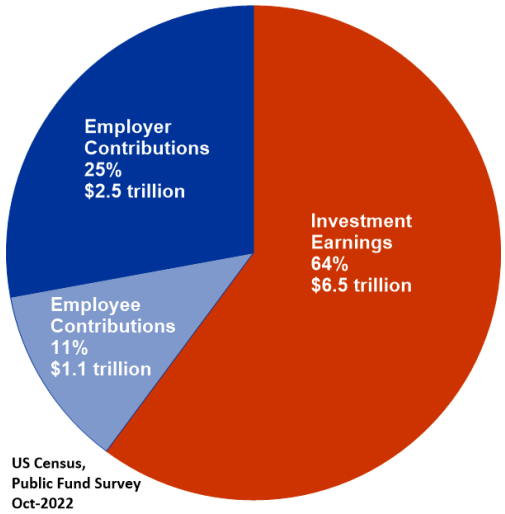
Funding a pension benefit requires the use of projections, known as actuarial assumptions, about future events. Actuarial assumptions fall into one of two broad categories: demographic and economic. Demographic assumptions are those pertaining to a pension plan's membership, such as changes in the number 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, and the challenging investment environment public retirement systems currently face.

Because investment earnings account for most of the 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, for the 30-year period ended in 2021, public pension funds accrued approximately $10.1 trillion in revenue, of which $6.5 trillion, or 64 percent, is from investment earnings. Employer contributions account for $2.5 trillion, or 25 percent of the total, and employee contributions total $1.06 trillion, or 11 percent.[2] The large portion of revenues from investment earnings reflect the important role they play in funding public pension benefits.

Figure 1: Public Pension Sources of Revenue, 1992-2021



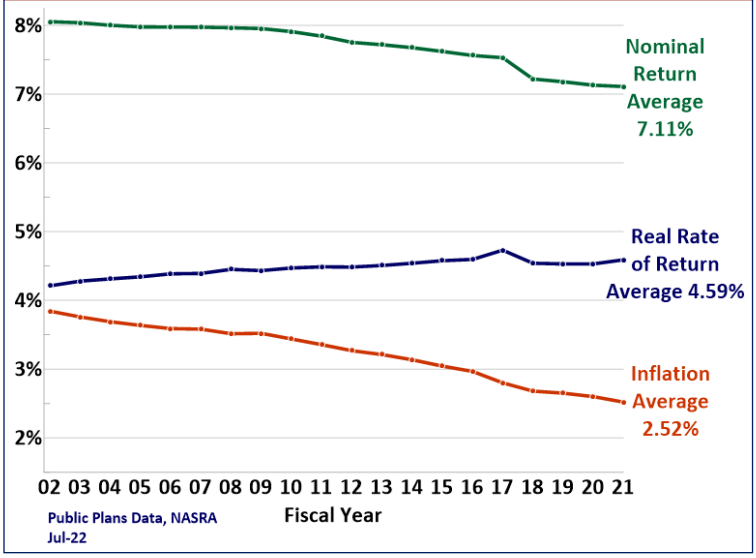
Compiled by NASRA based on U.S. Census Bureau data

Public retirement systems typically 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

[1] Federal Reserve, *Flow of Funds Accounts of the United States: Flows and Outstandings, Fourth Quarter 2022*, Table L.120

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

Figure 2: Average nominal and real rate of return, and average assumed inflation rate, FY 02 – FY 21



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

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 incremental return above the assumed rate of inflation, or the real rate of return. The sum of these components is the nominal rate of return, which is the rate that is most often used and cited. The system's inflation assumption typically is also used to develop 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 high-quality fixed income securities, such as US Treasuries.

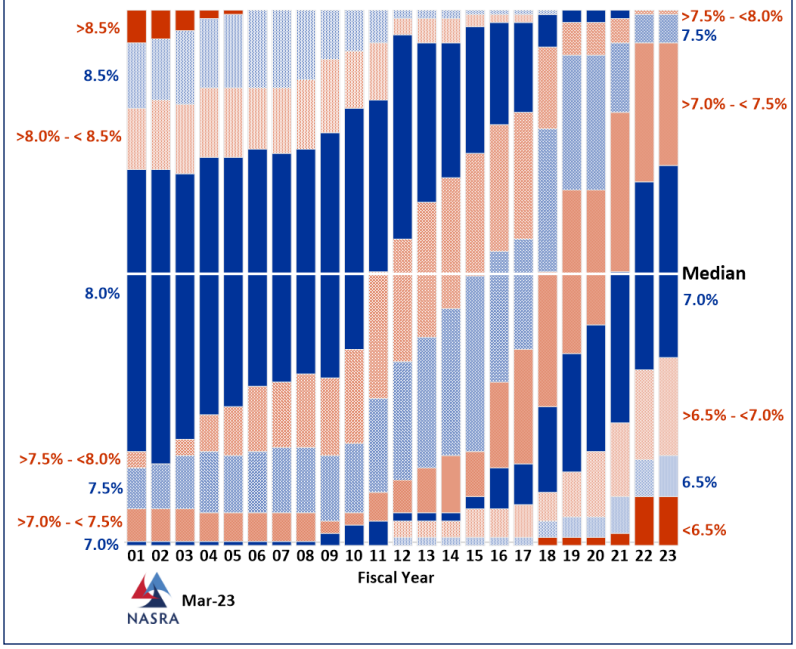
The second component of the investment return assumption is the real rate of return, which is the return on investment after adjusting for inflation. The real rate of return is intended to reflect the return produced by investing the assets in a broadly diversified portfolio. Achieving a return higher than the rate of inflation requires taking on more investment risk than Treasury bonds only.

Figure 2 illustrates the changes in the average nominal (non-inflation-adjusted) return, the inflation assumption, and the resulting real rate of return assumption. Two key takeaways from this data are that a) a lower assumed rate of inflation has been the primary driver of reductions in the nominal investment return assumption in recent years; and b) 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 4.59 percent in FY 21. One factor that has contributed to the higher real rate of return is public pension funds' higher allocations to alternative assets, particularly private equities, which usually have a higher expected return than most other asset classes.

Following a period of more than a decade of relatively low rates of inflation, the Consumer Price Index (CPI) began increasing sharply in early 2021. Since January 2021, the CPI has increased at an annual rate of approximately 7.0 percent. Because of the key role inflation plays in determining a pension plan's investment return assumption, this higher inflation experience may cause pension plans to re-examine their investment return assumption. The pace of plans reducing their return assumption appears to have slowed noticeably in recent months.

A key question regarding the future of inflation is whether the recent higher rate will be "transitory," i.e., short-lived, or if inflation will remain elevated for a sustained period. Despite the experience of the past two years, one key technical market measure of inflation—the 30-Year Breakeven Rate—suggests that the projected long-term inflation rate remains below 2.5 percent. Professional actuaries typically consider a very long timeframe when setting economic actuarial assumptions, such as rates of inflation and investment return. Unless long-term projections of inflation, such as the 30-

Figure 3: Change in Distribution of Nominal Public Pension Investment Return Assumptions, FY 01 to FY 23



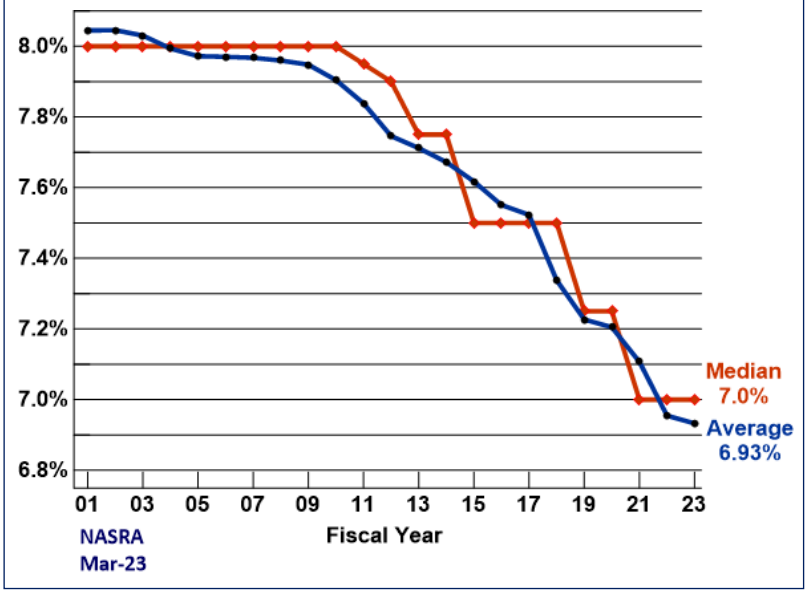
year breakeven rate, rise materially, the recent inflationary experience may have little effect on public pension investment return assumptions in the near future.

In the wake of the 2008-09 capital market decline and Great Recession, global interest rates and inflation declined and remained low by historic standards for over a decade. These low interest rates led to reductions in projected returns for most asset classes, which, in turn, has resulted in an unprecedented number of reductions in the assumed rate of return used by public pension plans. This trend is illustrated by Figure 3, which plots the distribution of investment return assumptions among a representative group of plans since 2001. Among the 131 plans measured, 106, or 81 percent, have reduced their assumed rate of return since fiscal year 2018, and all have done so since fiscal year 2010. These reductions have resulted in a decline in the average return assumption from 7.33 percent in FY 18 to 6.93 percent in FY 23. Appendix A lists the assumptions in use or adopted for future use by the 131 plans in this dataset, as of March 2023.

Figure 4 presents the median and average nominal investment return assumptions for the 131 plans in the NASRA dataset. This data is a summation of the information presented in Figure 4. As Figure 4 shows, the nominal investment return assumption has declined from 7.95 percent in FY 07 to 6.93 percent currently. Similarly, the median return assumption has dropped from 8.0 percent in FY 10 to 7.0 percent in the current year.

Although each pension plan is unique, the effect of a 25-basis point reduction in the investment return actuarial assumption, such as from 7.5 percent to 7.25 percent, has been estimated to increase the cost of a plan that has an automatic COLA, by three percent of pay (such as from 10 percent to 13 percent), and for a plan that does not have a COLA, by two percent of pay.

Figure 4: Change to average and median investment return assumption, FY 01 to FY 23



Conclusion

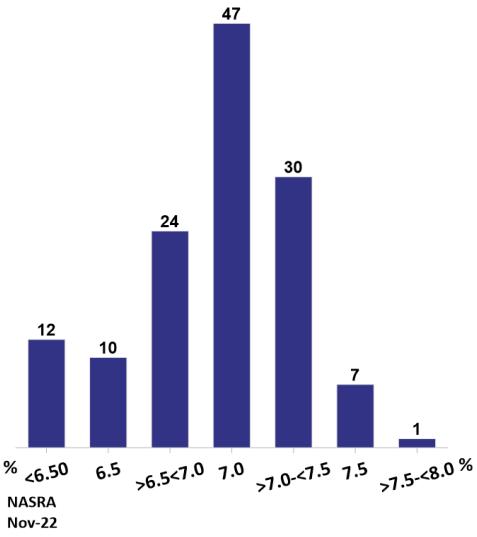
The investment return assumption is the single most consequential of all actuarial assumptions in terms of its effect on a pension plan's finances. The sustained period of low interest rates, which lasted for over a decade since 2009, combined with lower projected returns for most asset classes, has caused many public pension plans to reduce their long-term expected investment returns.

The recent uptick in the rate of inflation may cause some public pension plans to reconsider their investment return assumption, although projections about changes in the long-term rate of inflation have not changed. By itself, 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 (and typically does) include abundant input and feedback from investment experts and actuarial professionals, and should reflect consideration of the factors prescribed in actuarial standards of practice.

See Also:

- Financial Reporting for Pension Plans, Statement No. 67, Governmental Accounting Standards Board
- The Liability Side of the Equation Revisited, Missouri SERS, September 2006

Figure 4: Distribution of investment return assumptions



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National Association of State Retirement Administrators

Appendix A: Investment Return Assumption by Plan

Figures reflect the nominal assumption in use, or announced for use, as of March 2023.
This list of nominal investment return assumptions is updated at www.nasra.org/latestreturnassumptions

Plan	Rate (%)
Alabama ERS	7.45
Alabama Teachers	7.45
Alaska PERS	7.25
Alaska Teachers	7.25
Arizona Public Safety Personnel	7.20[1]
Arizona SRS	7.0
Arkansas PERS	7.15
Arkansas State Highway ERS	7.50
Arkansas Teachers	7.25
California PERF[2]	6.80
California Teachers	7.0
Chicago Teachers	6.75
City of Austin ERS	6.75
Colorado Affiliated Local	7.0
Colorado Fire & Police Statewide	7.0
Colorado Municipal	7.25
Colorado School	7.25
Colorado State	7.25
Connecticut SERS	6.90
Connecticut Teachers	6.90
Contra Costa County	7.0
DC Police & Fire	6.50
DC Teachers	6.50
Delaware State Employees	7.0
Denver Employees	7.25
Denver Public Schools	7.25
Fairfax County Schools	7.25
Florida RS	6.70
Georgia ERS[3]	7.20
Georgia Teachers	6.90
Hawaii ERS	7.0
Houston Firefighters	7.0
Idaho PERS	6.30
Illinois Municipal	7.25
Illinois SERS	6.75
Illinois Teachers	7.0
Illinois Universities	6.50
Indiana PERF	6.25
Indiana Teachers	6.25
Iowa PERS	7.0
Kansas PERS	7.0
Los Angeles County ERA	7.0
Louisiana Parochial Employees	6.40
Louisiana SERS[4]	7.25
Louisiana Teachers[5]	7.25
Maine Local	6.50
Maine State and Teacher	6.50
Maryland PERS	6.80
Maryland Teachers	6.80
Massachusetts SERS	7.0
Massachusetts Teachers	7.0
Michigan Municipal[6]	7.0
Michigan Public Schools	6.0
Michigan SERS	6. 0
Minnesota PERF	7.50
Minnesota State Employees	7.50
Minnesota Teachers	7.50
Mississippi PERS[8]	7.55
Missouri DOT and Highway Patrol	6.50
Missouri Local	7.0
Missouri PEERS	7.30
Missouri State Employees	6.95
Missouri Teachers	7.30
Montana PERS	7.30
Montana Teachers	7.30
Nebraska Schools[9]	7.10
Nevada Police Officer and Firefighter	7.25
Nevada Regular Employees	7.25
New Hampshire Retirement System	6.75
New Jersey PERS	7.0
New Jersey Police & Fire	7.0
New Jersey Teachers	7.0
New Mexico PERA	7.25
New Mexico Teachers	7.0
New York City ERS	7.0
New York City Teachers	7.0
New York State Teachers	6.95
North Carolina Local Government	6.50
North Carolina Teachers and State Employees	6.50
North Dakota PERS	6.50
North Dakota Teachers	7.25
NY State & Local ERS	5.90
NY State & Local Police & Fire	5.90

Kentucky County	6.25
Kentucky ERS[3]	5.25
Kentucky Teachers	7.10
Ohio Teachers	7.0
Oklahoma PERS	6.50
Oklahoma Teachers	7.0
Orange County ERS	7.0
Oregon PERS	6.90
Pennsylvania School Employees	7.0
Pennsylvania State ERS	6.875
Phoenix ERS	7.0
Rhode Island ERS	7.0
Rhode Island Municipal	7.0
Richmond Retirement System	7.0
San Diego City	6.50
San Diego County	7.0
San Francisco City & County	7.20
South Carolina Police	7.0
South Carolina RS	7.0
South Dakota RS	6.50
St. Louis School Employees	7.0
St. Paul Teachers	7.50
Texas County & District	7.50
Texas ERS	7.0
Texas LECOS	7.0

Ohio PERS	6.90
Ohio Police & Fire	7.50
Ohio School Employees	7.0
Texas Municipal	6.75
Texas Teachers	7.0
Tennessee Political Subdivisions	6.75
Tennessee State and Teachers	6.75
University of California	6.75
Utah Noncontributory	6.85
Vermont State Employees	7.0
Vermont Teachers	7.0
Virginia Retirement System	6.75
Washington LEOFF Plan 1	7.0
Washington LEOFF Plan 2	7.0
Washington PERS 1	7.0
Washington PERS 2/3	7.0
Washington School Employees Plan 2/3	7.0
Washington Teachers Plan 1	7.0
Washington Teachers Plan 2/3	7.0
West Virginia PERS	7.25
West Virginia Teachers	7.25
Wisconsin Retirement System	6.80
Wyoming Public Employees	6.80

The following footnotes reflect additional explanations, qualifications, and scheduled future developments for certain plans, and are a critical component of this data set.

1. The Arizona Public Safety Personnel Retirement System administers a plan for public safety personnel comprised of three tiers depending on participants' date of hire. The rate shown applies to Tiers 1 & 2. The investment return assumption used for Tier 3 is 7.0%.
2. 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. Effective with the June 30, 2022 valuation, the assumed rate of return will be reduced by 10 basis points from the immediate prior actuarial valuation, to a minimum of 7.0%, as long as the actual rate of return for the fiscal year ending with the current valuation date exceeds the assumed rate of return from the immediate prior actuarial valuation.
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 discount rate used to determine the FY 2022/2023 funding requirement is 7.25%, 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 currently 7.60%.
6. 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 currently 7.60%.

7. In February 2022 the MERS Board adopted a dedicated gains policy for systematically reducing the investment return assumption when actual investment returns exceed the plan's current assumed rate of return. Whether the assumed rate of return is lowered, and the magnitude of any reduction, depends on the excess gains available and the most recent range of reasonable economic assumptions as provided by MERS' consulting actuary. Under this policy a portion of the excess returns will continue to be smoothed over a five-year period, and some of the excess return will be immediately recognized to offset the increase in contributions.
    a. If the current assumed rate of return is at or above the mid-point in the range, the full amount of excess gains will be used to lower the assumption. If the current assumed rate of return is below the mid-point in the range, half of the excess gains will be used to lower the assumption.
    b. The assumed rate of return will not be reduced below the bottom of the range.
    c. If the ratio of Actuarial Value of Assets to Market Value of Assets is below 80% or above 120%, excess market gains will not be used to lower or buy down the rate of return, and the normal smoothing method will be applied.
8. A 2019 amendment to the Mississippi PERS funding policy stipulates that the investment return assumption will be reduced until it reaches the rate recommended by the actuary in the most recent experience study using investment gains based on the following parameters:
    a. 2% excess return over assumed rate, lower assumption by 5 basis points
    b. 5% excess return over assumed rate, lower assumption by 10 basis points
    c. 8% excess return over assumed rate, lower assumption by 15 basis points
    d. 12% excess return over assumed rate, lower assumption by 20 basis points
9. The assumed rate of return for the Nebraska School Retirement System will decline by 10 basis points each year until reaching 7.0 percent effective FY 24.

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	Vermont Pension Investment Commission
VT	Vermont Teachers Retirement System	Vermont Pension Investment Commission
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.