

WASHINGTON STATE

2018 Actuarial Valuation

September • 2019



Office of the
State Actuary

*“Supporting financial
security for generations.”*



Office of the State Actuary

“Supporting financial security for generations.”

Mailing Address

Office of the State Actuary
PO Box 40914
Olympia, Washington 98504-0914

Phone

Reception: 360.786.6140
TDD: 711

Physical Address

2100 Evergreen Park Dr. SW
Suite 150

Electronic Contact

state.actuary@leg.wa.gov
leg.wa.gov/osa

Report Preparation

Matthew M. Smith, FCA, EA, MAAA, State Actuary

Sarah Baker

Kelly Burkhardt

Mitch DeCamp

Kaitlyn Donahoe, MPA

Graham Dyer

Aaron Gutierrez, MPA, JD

Beth Halverson

Michael Harbour, ASA, MAAA

Luke Masselink, ASA, EA, MAAA

Corban Nemeth

Darren Painter

Frank Serra

Kyle Stineman, ASA

Keri Wallis

Lisa Won, ASA, FCA, MAAA

Additional Assistance

Department of Retirement Systems

Washington State Investment Board

Legislative Support Services

Legislative Evaluation and Accountability Program Committee

To obtain a copy of this report in alternative format call 360.786.6140 or for TDD 711.

Table of Contents

Letter of Introduction	1
I. Summary of Key Results	3
Intended Use	5
Commentary on Risk	5
Contribution Rates	5
Projected Contribution Rates	6
Contribution Rate-Setting Cycle	6
Funding Policy	6
Comments on 2018 Results	6
Actuarial Liabilities	7
Assets	7
Funded Status	8
Participant Data	8
Key Assumptions	8
II. Actuarial Exhibits	9
Actuarial Certification Letter	11
Contribution Rates	13
Actuarial Liabilities	19
Plan Assets	23
Funded Status	27
Actuarial Gain/Loss	28
III. Participant Data	33
Overview of System Membership	35
Summary of Plan Participants	38
IV. Appendices	41
Actuarial Methods and Assumptions	43
Summary of Plan Provisions	43
The Office of the State Actuary's Website	46



Office of the State Actuary

“Supporting financial security for generations.”

Letter of Introduction Actuarial Valuation Report As of June 30, 2018

September 2019

As required under [Chapter 41.45](#) of the Revised Code of Washington (RCW), this report documents the results of an actuarial valuation of the following Washington State retirement systems.

- ❖ Public Employees’ Retirement System (PERS).
- ❖ Teachers’ Retirement System (TRS).
- ❖ School Employees’ Retirement System (SERS).
- ❖ Public Safety Employees’ Retirement System (PSERS).
- ❖ Law Enforcement Officers’ and Fire Fighters’ Retirement System (LEOFF).
- ❖ Washington State Patrol Retirement System (WSPRS).

The primary purpose of this valuation is to determine contribution requirements for the systems listed above based on a June 30, 2018, measurement date and under the funding policy established by the Legislature. These contribution requirements are purely informational since, according to state law, this “off-cycle” valuation is not used to determine contribution rates. This valuation also provides information on the funding progress and developments in the plans over the past year.

This report is organized in the following four sections.

- ❖ Summary of Key Results.
- ❖ Actuarial Exhibits.
- ❖ Participant Data.
- ❖ Appendices.

The **Summary of Key Results** section provides a high-level summary of the valuation results for all systems combined. The **Actuarial Exhibits** and **Participant Data** sections of the report provide detailed actuarial asset and liability information and participant data for each system and



plan separately. The **Appendices** provide access to a summary of the principal actuarial assumptions and methods, major plan provisions, and additional information used to prepare this valuation.

We encourage you to submit any questions you might have concerning this report to our mailing address or our e-mail address at state.actuary@leg.wa.gov. We also invite you to visit our website (leg.wa.gov/osa), for further information regarding the actuarial funding of the Washington State retirement systems.

Sincerely,

Luke Masselink, ASA, EA, MAAA
Senior Actuary

Matthew M. Smith, FCA, EA, MAAA
State Actuary



2018
Actuarial
Valuation
Report



I. SUMMARY OF KEY RESULTS

Intended Use

The purpose of this report is to develop contribution rates required to fund the Washington State retirement systems based on a June 30, 2018, measurement date, and the funding policy described in this section. This report provides information on the contribution rates, funding progress, and developments in the plans over the past year. This report also discloses the data, assumptions, and methods we, the Office of the State Actuary (OSA), used to develop the contribution rates. This report is not intended to satisfy the accounting requirements under the Governmental Accounting Standards Board (GASB) rules.

Similarly, this actuarial valuation is not intended to report on the overall health or financial condition of the pension system. Such information can be found in the [2019 Report on Financial Condition](#) (RFC), which we issue every two years. The key measures we use in the RFC to assess the health of a pension plan include funding level, adequacy and affordability of contributions, and risk.

Commentary on Risk

In the course of developing our actuarial valuation we make hundreds of assumptions, such as the level of returns on future investments, the rate of mortality for retirees, and the number of members contributing to the pension system annually. In some cases, small changes in these assumptions or unexpected plan experience can lead to significant changes in measurements, like the calculation of a plan's contribution rates or the projection of a plan's funded status. This can affect plan risk, and these sensitivities can evolve as the plans grow and mature over time. The Legislature's response to these changes and their action governing the state's pension system also affects plan risk. To help readers better understand some of these risks and their potential impacts at a system-wide level, we have developed a "[Commentary on Risk](#)" webpage which can be found on our website.

Contribution Rates

We determine the member and employer contribution rates as a percentage of salary. The summary table to the right shows contribution rates based on the 2018 valuation, along with rates from the previous valuation. Throughout this report, we reconcile how plan experience compared to our assumptions over the valuation year. In doing so, we compare the contribution rates calculated under this valuation against those rates calculated under the 2017 valuation. Please note, however, that the 2018 contribution rates calculated in this valuation will not be collected, as 2018 is not a rate-setting year under the current contribution rate-setting cycle. The **Actuarial Exhibits** section of this report shows how we developed the contribution rates for 2018.

No member or employer/state contributions are required for the LEOFF Plan 1 as the plan remains fully funded. See [RCW 41.26.080\(2\)](#).

Minimum employer contribution rates adopted by the Legislature for the PERS Plan 1 and the TRS Plan 1 became effective at the beginning of the 2015-17 Biennium. The employer contribution rate for PERS 1 remains above the minimum. Ignoring recent benefit improvements, the TRS 1 employer contribution rate is below the minimum. However, the final calculated TRS 1 employer contribution rate is above the minimum due to the supplemental contribution rate increases for recent benefit enhancements. For more information, please refer to the contribution rate development in the **Actuarial Exhibits** section.

Calculated Contribution Rates				
	Plan 1		Plans 2/3	
	2018	2017	2018	2017
PERS				
Member*	6.00%	6.00%	7.46%	7.90%
Total Employer	11.56%	12.68%	11.56%	12.68%
TRS				
Member*	6.00%	6.00%	8.02%	7.77%
Total Employer	14.51%	15.33%	14.51%	15.33%
SERS				
Member*	N/A	N/A	8.02%	8.25%
Total Employer	N/A	N/A	12.10%	13.01%
PSERS				
Member	N/A	N/A	7.09%	7.20%
Total Employer	N/A	N/A	11.17%	11.96%
LEOFF				
Member	0.00%	0.00%	8.67%	8.59%
Employer	0.00%	0.00%	5.20%	5.15%
State	0.00%	0.00%	3.47%	3.44%
WSPRS				
Member	8.45%	8.45%	8.45%	8.45%
Employer (State)	20.41%	22.13%	20.41%	22.13%

Note: Employer rates exclude administrative expense rate.

**Plan 3 members do not contribute to the defined benefit plan.*

Projected Contribution Rates

In addition to calculating contribution rates in this report, we also estimate contribution rates for future biennia based upon projected assets and liabilities. These projected rates can be found on our [website](#). Please note that these projected rates are subject to change based on modifications to plan provisions, assumptions, and the actual experience of the systems.

Contribution Rate-Setting Cycle

Under current Washington State law, in July of even-numbered years, the Pension Funding Council (PFC) reviews the basic contribution rates that we calculate. These rates are based on an actuarial valuation performed on asset, participant, and plan information compiled in odd-numbered years. In calculating basic contribution rates, we apply the statutory funding policies described in this section.

The PFC may adopt changes to contribution rates by an affirmative vote of at least four members. The basic rates adopted by the PFC will remain in place for the ensuing biennium, subject to revision by the Legislature. The LEOFF 2 Board performs these duties for LEOFF 2 under the same cycle.

[RCW 41.45.070](#) requires that a temporary and supplemental contribution rate increase be charged to fund the cost of benefit enhancements enacted following the adoption of the basic rates. Supplemental contribution rates are included in the basic rates at the beginning of the next contribution rate-setting cycle.

Funding Policy

Washington State relies on systematic actuarial funding to finance the on-going cost of the state retirement systems. Under this financing approach, we reduce the cost of future pension payments by the expected long-term return on invested contributions.

The state's funding policy is found in [Chapter 41.45 RCW](#) — Actuarial Funding of State Retirement Systems. It includes the following goals:

- Provide a dependable and systematic process for funding the benefits to members and retirees of the Washington State retirement systems.
- Fully fund the retirement system Plans 2 and 3, and WSPRS, as provided by law.
- Fully amortize the total cost of LEOFF Plan 1 not later than June 30, 2024.
- Fully amortize the Unfunded Actuarial Accrued Liability (UAAL) in PERS Plan 1 and TRS Plan 1 within a rolling ten-year period using methods and assumptions that balance needs for increased benefit security, decreased contribution rate volatility, and affordability of pension contribution rates.
- Establish long-term employer contribution rates that will remain a relatively predictable proportion of future state budgets.
- Fund, to the extent feasible, all benefits for Plans 2 and 3 members over the working lives of those members so that the taxpayers who receive the benefit of those members' service pay the cost of those benefits.

Based on the funding policy, the same contribution rate is charged to employers within each system regardless of the plan in which employees hold membership (except for LEOFF). In addition, all benefit increases that become effective after June 30, 2009, for PERS Plan 1 and TRS Plan 1 members, are funded over a fixed ten-year period.

If all actuarial assumptions are realized and all future contributions required under this funding policy are made, we expect the funding policy to accumulate sufficient assets to provide for all future benefits for current members when due.

The Washington State Investment Board (WSIB) directs the investment of retirement system contributions. [RCW 43.33A.110](#) requires WSIB to maximize investment returns at a prudent level of risk.

Comments on 2018 Results

Many factors can influence how actuarial valuation results change from one measurement date to the next. Those factors include changes in the covered population, changes in plan provisions, assumptions and methods, and experience that varies from our expectations.

For this valuation, we observed no significant changes in the retirement system population. We also made no significant changes to our actuarial methods. We did modify our TRS general salary increase assumption from 3.50 percent to 8.00 percent for one year to reflect the impact of higher than expected salary increases provided under collective bargaining agreements adopted in the summer of 2018.

There were also a few plan provision changes, such as the expansion of the statutory list of presumptive occupational diseases for certain members of LEOFF and PERS. See the **Summary of Plan Provisions** section of this report for more details.

During the 2019 Legislative Session, [House Bill 2144](#) (C 366 L19) was passed which transferred \$300 million from the LEOFF Plan 2 trust fund to the plan's Benefit Improvement Account (BIA), effective July 1, 2019. We reflected the anticipated impact of this law on LEOFF Plan 2's assets in this valuation.

In terms of annual plan experience, the actual rate of investment return on the Market Value of Assets (MVA) was 10.20 percent, which was above the assumed rate. The rate of investment return on the Actuarial Value of Assets (AVA) was 9.43 percent, which was also higher than expected for the valuation year. Salaries grew more than expected for all plans except LEOFF Plan 1, which has a very small remaining active population. With regard to the covered population, the most significant change we observed occurred in WSPRS Plan 2, whose active population increased by approximately 9 percent over the valuation year.

Detailed gain and loss information by system can be found in the **Actuarial Exhibits** section of this report. Please see the **Actuarial Certification Letter** for additional comments on the valuation results.

Actuarial Liabilities

The next table summarizes key measures of actuarial liability along with the liabilities from last year's valuation. The Future Value of Fully Projected Benefits represents the total expected value of all future benefit payments for all members of all systems as of the valuation date. The Present Value of Fully Projected Benefits represents today's value of the Future Value of Fully Projected Benefits when we discount future benefit payments with the valuation interest rate. In other words, if we invest the Present Value of Fully Projected Benefits as a lump sum amount at the valuation date and earn the currently assumed valuation interest rate each year, we anticipate there would be enough money to pay all expected future benefit payments for current members.

Actuarial Liabilities		
(Dollars in Millions)	2018	2017
All Systems		
Future Value of Fully Projected Benefits	\$705,427	\$655,649
Present Value of Fully Projected Benefits	117,706	110,871
Actuarial Accrued Liability*	\$98,061	\$92,791
Valuation Interest Rate**	7.50%	7.50%

*Calculated using Entry Age Normal (EAN) cost method.

**7.40% in LEOFF 2.

The Actuarial Accrued Liability identifies the portion of the present value of future benefits that has been accrued as of the valuation date based on the Entry Age Normal (EAN) actuarial cost method.

See the **Actuarial Exhibits** section of this report for a summary of actuarial liabilities by system and plan. For projected benefit payments by year for each system and plan, please visit the [Interactive Reports](#) page on our website. Also, see the [Glossary](#) on our website for brief explanations of the actuarial terms.

Assets

The table to the right shows the combined MVA and AVA along with approximate rates of investment return for all the systems combined.

To limit the volatility in contribution rates and funded status due to short-term market fluctuations, we smooth (or defer recognition of) the difference between actual and expected annual investment returns over a period not to exceed eight years. The number of years over which we smooth is dependent on the magnitude of the gain or loss. The AVA equals the MVA less the Total Deferred Investment Gains and (Losses) at the valuation date. The AVA can never be less than 70 percent or greater than 130 percent of the MVA.

See the **Actuarial Exhibits** section of this report for a summary of assets by system and plan, and for the development of the AVA.

Assets		
(Dollars in Millions)	2018	2017
All Systems		
Market Value of Assets (MVA)	\$92,057	\$84,853
Actuarial Value of Assets (AVA)	86,855	80,168
Contributions ¹	3,700	3,084
Disbursements	4,620	4,093
Investment Return	8,048	10,505
Other ²	\$77	\$83
MVA Return ³	10.20%	13.44%
AVA Return ⁴	9.43%	9.17%

¹ Employee and Employer.

² Includes transfers, restorations, payables, etc.

³ Time-weighted rate of return on the MVA, net of expenses.

⁴ The AVA is used in determining contribution rates.

Funded Status

Funded status is one of many measures that helps explain the health of a pension plan. A history of funded status measured consistently over a defined period helps readers evaluate a plan's funding progress over time. The funded status represents the portion of the actuarial accrued liability covered by today's actuarial assets. A plan with a 100 percent funded status has one dollar in actuarial assets for each dollar of accrued liability at the valuation date. A plan with a funded status of at least 100 percent is generally considered to be on target with its financing plan. However, a plan more/less than 100 percent funded is not automatically considered over-funded/at-risk.

The table to the right displays the funded status for all the systems combined. We provide this table for summarization purposes only. Absent a qualified merger or plan termination, assets from an individual qualified retirement plan may not be used to fund benefits from another plan. See the **Actuarial Exhibits** section of this report for the funded status by system and plan.

Funded Status		
(Dollars in Millions)	2018	2017
All Systems		
a. Accrued Liability*	\$98,061	\$92,791
b. Market Value of Assets	92,057	84,853
c. Deferred Gains/(Losses)	5,202	4,685
d. Actuarial Value of Assets (b - c)	86,855	80,168
Unfunded Liability (a - d)	\$11,206	\$12,623
Funded Ratio (d / a)	89%	86%

Note: Totals may not agree due to rounding.

*Liabilities valued using Entry Age Normal cost method.

Participant Data

The table to the right summarizes participant data used in the actuarial valuation for the plan year ending June 30, 2018, along with information from last year's valuation. See the **Participant Data** section of this report for participant data summarized by system and plan.

Participant Data		
All Systems	2018	2017
Active Members		
Number	323,491	317,677
Total Salaries (in Millions)	\$21,255	\$20,031
Average Annual Salary	\$65,704	\$63,054
Average Attained Age	46.6	46.8
Average Service	11.3	11.5
Retirees and Beneficiaries		
Number	185,139	177,685
Average Annual Benefit	\$23,144	\$22,768
Terminated Members		
Number Vested	63,040	61,519
Number Non-Vested*	140,254	135,108

*Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

Key Assumptions

This table displays key economic assumptions used in the actuarial valuation. There were no changes in these assumptions from our prior year's valuation. As noted in the **Comments on 2018 Results** section, we did modify the general salary increase assumption for TRS members for one year. For all future years for TRS, we relied on the long-term assumption of 3.50 percent.

Key Assumptions	
All Systems	
Valuation Interest Rate*	7.50%
General Salary Increase	3.50%
Inflation	2.75%
Growth in Membership**	0.95%

*7.40% in LEOFF 2.

**1.25% in TRS. Used for the amortization of PERS 1 and TRS 1 UAAL only.



2018
Actuarial
Valuation
Report



II. ACTUARIAL EXHIBITS





Office of the State Actuary

“Supporting financial security for generations.”

Actuarial Certification Letter Actuarial Valuation Report As of June 30, 2018

September 2019

This report documents the results of an actuarial valuation of the retirement plans defined under Chapters 41.26, 41.32, 41.35, 41.37, 41.40, and 43.43 of the [Revised Code of Washington](#). The primary purpose of this valuation is to determine contribution requirements for the retirement plans based on a June 30, 2018, measurement date, consistent with the prescribed funding policies. These contribution requirements are purely informational since, according to state law, this “off-cycle” valuation is not used to determine contribution rates. This valuation also provides information on the funding progress and developments in the plans over the past year. This valuation report should not be used for other purposes. Please replace this report with a more recent report when available.

Future actuarial measurements may differ significantly from the current measurements presented in this report if plan experience differs from that anticipated by the assumptions, or if changes occur in the methods, assumptions, plan provisions, or applicable law. We have not performed analysis of the potential range of such future measurements for the purposes of this valuation. However, we do provide stochastic analysis of possible future outcomes on the [Risk Assessment](#) page of our website. We also provide additional risk education on the [Commentary on Risk](#) page of our website.

The valuation results summarized in this report involve calculations that require assumptions about future economic and demographic events. We believe that the assumptions and methods used in the underlying valuation are reasonable and appropriate for the primary purpose stated above. However, the use of another set of assumptions and methods could also be reasonable and could produce materially different results. Actual results may vary from our expectations.

For all plans with the exception of the Law Enforcement Officers’ and Fire Fighters’ Retirement System (LEOFF) Plan 2, the assumptions used in this valuation for investment return, inflation, salary growth¹, and membership growth were prescribed by the Pension Funding Council (PFC) and are subject to revision by the Legislature. For LEOFF Plan 2, these assumptions are prescribed by the LEOFF Plan 2 Retirement Board. Please see our [2017 Economic Experience Study](#) report for further information on economic assumptions. We developed the demographic assumptions used in this valuation during the [2007-2012 Demographic Experience Study](#). The Legislature prescribed the actuarial cost and asset valuation methods. In our opinion, all methods, assumptions, and calculations are reasonable and are in conformity with generally accepted actuarial principles and standards of practice as of the date of this publication.

¹The PFC did not prescribe the one-year TRS salary growth increase that resulted from higher than expected salary increases provided under collective bargaining agreements adopted in the summer of 2018. OSA selected that assumption based on reviewing salary data collected from DRS and our professional judgment. The actual growth may be more or less than assumed and will be reflected in next year’s valuation.



The Department of Retirement Systems (DRS) provided us with audited member and beneficiary data. We checked the data for reasonableness as appropriate based on the purpose of the valuation. The Washington State Investment Board (WSIB) and DRS provided audited financial and asset information. We relied on all the information provided as complete and accurate, however we did adjust the LEOFF Plan 2 assets to reflect an expected future transfer to the LEOFF 2 Benefit Improvement Account. In our opinion, this information is adequate and substantially complete for purposes of this valuation.

The asset smoothing method adopted during the 2003 Legislative Session (Chapter 11, Laws of 2003, E1) was intended to address the volatility of contribution rates under the aggregate funding method when used in combination with the existing asset allocation policy of WSIB. The combination of the current asset smoothing method with any other funding method or asset allocation policy may not be appropriate. The Legislature may need to revisit the application of the current asset smoothing method with the Plan 1 funding method as the duration of liabilities in those plans becomes shorter.

Under legislation enacted in 2009 (Chapter 561, Laws of 2009), the Unfunded Actuarial Accrued Liability (UAAL) in the Public Employees' Retirement System (PERS) and the Teachers' Retirement System (TRS) Plans 1 must be amortized over a rolling ten-year period, as a level percentage of projected system payroll. The projected payroll includes pay from current members of PERS and TRS Plans 2/3, as well as projected payroll from future new members. For PERS, the projected payroll also includes current and projected payroll from retirement systems previously covered under PERS. As a result of this method, all employers of PERS, School Employees' Retirement System (SERS), and Public Safety Employees' Retirement System (PSERS) contribute to the PERS 1 UAAL. All employers of TRS contribute to the TRS 1 UAAL. This is a non-standard amortization method since it includes payroll outside the plan. Additionally, the funding method includes minimum contribution rates effective at the beginning of the 2015-17 Biennium. All contributions required under this method are necessary to fully amortize the UAAL in these plans. Failure to make all future required contributions may result in premature plan insolvency.

The Plan 1 funding method for PERS 1 and TRS 1 is also non-standard in its use of the employer normal cost rate from the Plans 2/3 instead of the underlying Plan 1 employer normal cost rate. However, we find this method reasonable and appropriate given the limited remaining future salary in Plan 1 and the relatively short period for amortizing the UAAL. Furthermore, Plan 1 member normal cost rates are fixed in statute at 6 percent and the use of the Plan 2/3 employer normal cost for Plan 1 allows the Legislature to charge all employers the same contribution rate regardless of the plan in which employees hold membership (except for LEOFF).

The undersigned, with actuarial credentials, meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. While this report is intended to be complete, we are available to offer extra advice and explanations as needed.

Sincerely,

Luke Masselink, ASA, EA, MAAA
Senior Actuary

Matthew M. Smith, FCA, EA, MAAA
State Actuary

Contribution Rates

Member and Employer Rate Summary				
	Plan 1		Plans 2/3	
	2018	2017	2018	2017
PERS				
Member*	6.00%	6.00%	7.46%	7.90%
Employer (Normal Cost)	7.48%	7.92%	7.48%	7.92%
Employer (Plan 1 UAAL)	4.08%	4.76%	4.08%	4.76%
Total Employer	11.56%	12.68%	11.56%	12.68%
TRS				
Member*	6.00%	6.00%	8.02%	7.77%
Employer (Normal Cost)	8.40%	8.15%	8.40%	8.15%
Employer (Plan 1 UAAL)	6.11%	7.18%	6.11%	7.18%
Total Employer	14.51%	15.33%	14.51%	15.33%
SERS				
Member*	N/A	N/A	8.02%	8.25%
Employer (Normal Cost)	N/A	N/A	8.02%	8.25%
Employer (PERS Plan 1 UAAL)	N/A	N/A	4.08%	4.76%
Total Employer	N/A	N/A	12.10%	13.01%
PSERS				
Member	N/A	N/A	7.09%	7.20%
Employer (Normal Cost)	N/A	N/A	7.09%	7.20%
Employer (PERS Plan 1 UAAL)	N/A	N/A	4.08%	4.76%
Total Employer	N/A	N/A	11.17%	11.96%
LEOFF				
Member	0.00%	0.00%	8.67%	8.59%
Employer	0.00%	0.00%	5.20%	5.15%
State (Normal Cost)	0.00%	0.00%	3.47%	3.44%
State (Plan 1 UAAL)	0.00%	0.00%	0.00%	0.00%
Total State	0.00%	0.00%	3.47%	3.44%
WSPRS				
Member	8.45%	8.45%	8.45%	8.45%
Employer (State)	20.41%	22.13%	20.41%	22.13%

Note: Employer rates exclude administrative expense rate.

*Plan 3 members do not contribute to the defined benefit plan.

Development of 2018 Employer/State Rates					
	PERS		TRS		SERS
	Plan 1	Plans 2/3	Plan 1	Plans 2/3	Plans 2/3
a. Total Normal Cost	13.48%	14.94%	14.40%	16.42%	16.04%
b. Member Normal Cost*	6.00%	7.46%	6.00%	8.02%	8.02%
c. Employer Contribution (a - b)	7.48%	7.48%	8.40%	8.40%	8.02%
d. Cost to Amortize UAAL	4.08%	4.08%	6.11%	6.11%	4.08%
e. Total Employer Rate (c + d)	11.56%	11.56%	14.51%	14.51%	12.10%

Note: Employer rates exclude administrative expense rate.

*Plan 3 members do not contribute to the defined benefit plan. TRS 2 member rate may be subject to a member maximum rate.

Development of 2018 Employer/State Rates (Continued)				
	PSERS	LEOFF		WSPRS
	Plan 2	Plan 1	Plan 2	Plans 1/2
a. Total Normal Cost	14.18%	0.00%	17.34%	28.86%
b. Member Normal Cost*	7.09%	0.00%	8.67%	8.45%
c. Employer Contribution (a - b)	7.09%	0.00%	8.67%	20.41%
d. Cost to Amortize UAAL	4.08%	0.00%	0.00%	N/A
e. Total Employer Rate (c + d)**	11.17%	0.00%	5.20%	20.41%

Note: Employer rates exclude administrative expense rate.

*Plan 3 members do not contribute to the defined benefit plan. WSPRS member rate may be subject to a member maximum rate.

**The state pays 20% of the total normal cost for LEOFF 2. This reduces the total employer employer contribution rate from 8.67% to 5.20%.

TRS Plan 2 Maximum Member Contribution Rates					
Valuation Year	Prior Max	Supplemental	New Max	Description	Source
2010 - 2018	8.63%	0.01%	8.64%	AFC protection against reduced salaries.	C 5 L 11
2007 - 2009	8.55%	0.08%	8.63%	Out-of-state service credit purchases.	C 101 L 08
2006	7.76%	0.79%	8.55%	Improved Subsidized ERFs for certain Plan 2/3 members.	C 491 L 07
2005	7.75%	0.01%	7.76%	Lowered vesting requirements for certain Plan 3 members.	C 33 L 06
1999 - 2004	6.59%	1.16%	7.75%	Subsidized ERFs for Plan 2/3 members.	C 247 L 00
1997 - 1998	N/A	N/A	6.59%		

Note: Maximum member contribution rates change each year by 50% of benefit improvements, except as stated in RCW 41.45.070.

WSPRS Plan 1/2 Maximum Member Contribution Rates					
Valuation Year	Prior Max	Supplemental	New Max	Description	Source
2017 - 2018	8.44%	0.01%	8.45%	Modified the definition of "Veteran".	C 61 L 18
2016*	7.68%	0.76%	8.44%	Expanded the definition of pensionable overtime.	C 181 L 17
	7.34%	0.34%	7.68%		
2014 - 2015	7.19%	0.15%	7.34%	L&I duty-related death benefits paid from pension trust fund on remarriage.	C 78 L 15
2009 - 2013	7.18%	0.01%	7.19%	Increased duty-related death benefits.	C 261 L 10
2008	6.95%	0.23%	7.18%	Survivor benefits for registered domestic partners.	C 522 L 09
2006** - 2007	N/A	N/A	6.95%		

Note: Maximum member contribution rates change each year by 50% of benefit improvements, except as stated in RCW 41.45.070.

*This law stipulated a phased increase to the member maximum rate by applying 0.34% in Fiscal Year 2018 and 0.76% in Fiscal Year 2019.

**The original maximum contribution rate of 7% was decreased by 0.05% for C 87 L 07 (Raised maximum retirement age, 0.14% decrease) and C 488 L 07 (Provided medical premium reimbursements for certain survivors, 0.09% increase).

The tables on the following pages show the development of the normal cost rates and the Plan 1 UAAL rates. Consistent with current funding policy, the normal cost rates include minimum contribution rates to provide stable and adequate contribution rates over time. These minimum rates are a percent of the normal cost calculated under the EAN funding method. The percent is 70 percent for WSPRS Plans 1 and 2, 100 percent for LEOFF Plan 2, and 80 percent for all other plans.

The PERS 1 and TRS 1 UAAL, under current funding policy, must be amortized over a rolling ten-year period, as a level percentage of projected system payroll. All employers of PERS, SERS, and PSERS members contribute toward the PERS 1 UAAL, while all employers of TRS members contribute toward the TRS 1 UAAL. UAAL rates also include minimum contribution rates to ensure complete amortization of the UAAL. The minimum UAAL rate is 3.50 percent in PERS 1 and 5.75 percent in TRS 1. Please see the [Glossary](#) for a more detailed explanation of EAN and UAAL.

We provide additional contribution rate calculations on the [Interactive Reports](#) page of our website. This interactive report calculates member and employer contribution rates that vary based on the asset valuation method and discount rate that the user selects. The state's funding policy, defined under [Chapter 41.45 RCW](#), does not vary based on these selections.

Development of Normal Cost Rates				
<i>(Dollars in Millions)</i>				
	PERS 2/3	TRS 2/3	SERS 2/3	
1. Calculated Member Normal Cost Rate				
a.	Future Value of Fully Projected Benefits	\$302,465	\$171,909	\$42,154
b.	Present Value of Fully Projected Benefits	48,506	19,837	7,109
c.	Valuation Assets	36,601	13,232	5,131
d.	Unfunded Fully Projected Benefits (b - c)	11,905	6,605	1,978
e.	Past Liability Balance	14	69	0
f.	Adjusted Unfunded (d - e)	\$11,891	\$6,536	\$1,978
Present Value of Projected Salaries to Current Members (PVS)				
g.	Plan 1 PVS	N/A	N/A	N/A
h.	Plan 2 PVS	69,331	17,756	7,583
i.	Plan 3 PVS	21,407	45,993	9,491
j.	Weighted PVS (2g + 2h + i)	\$160,069	\$81,505	\$24,656
k.	Member Normal Cost (f / j)	7.43%	8.02%	8.02%
l.	Member Minimum Contribution Rate	4.37%	5.19%	4.60%
m.	Prior Year Member Maximum Contribution Rate	N/A	8.64%	N/A
n.	Member Contribution Rate with Max/Min	7.43%	8.02%	8.02%
o.	Change In Plan Provisions (Laws of 2019) ¹	0.03%	0.00%	0.00%
p.	Calculated Member Contribution Rate (n + o)²	7.46%	8.02%	8.02%
2. Calculated Employer Normal Cost Rate				
a.	Present Value of Fully Projected Benefits	\$48,506	\$19,837	\$7,109
b.	Valuation Assets	36,601	13,232	5,131
c.	Unfunded Benefits (a - b)	11,905	6,605	1,978
d.	Present Value of Member Contributions	5,150	1,424	608
e.	Past Liability Balance	14	69	0
f.	Employer Responsibility (c - d - e)	\$6,741	\$5,112	\$1,370
Present Value of Projected Salaries to Current Members (PVS)				
g.	Plan 1 PVS	N/A	N/A	N/A
h.	Plan 2 PVS	69,331	17,756	7,583
i.	Plan 3 PVS	21,407	45,993	9,491
j.	Total PVS (g + h + i)	\$90,738	\$63,749	\$17,073
k.	Employer Normal Cost (f / j)	7.43%	8.02%	8.02%
l.	Employer Minimum Contribution Rate	4.37%	5.19%	4.60%
m.	Employer Contribution Rate with Minimum	7.43%	8.02%	8.02%
n.	Excess Employer Rate	N/A	0.00%	N/A
o.	Rate to Amortize Past Liability Balance ³	0.02%	0.38%	0.00%
p.	Change In Plan Provisions (Laws of 2019) ¹	0.03%	0.00%	0.00%
q.	Calculated Employer Contribution Rate (m + n + o + p)	7.48%	8.40%	8.02%
3. Adopted Normal Cost Rates for 2019-21⁴				
a.	Member Contribution Rate	7.90%	7.77%	8.25%
b.	Employer Contribution Rate	7.92%	8.15%	8.25%
c.	State Contribution Rate	N/A	N/A	N/A
d.	Total Contribution Rate (a + b + c)	15.82%	15.92%	16.50%

Note: Totals may not agree due to rounding.

¹ This also includes the impacts from the following Laws of 2018 - SERS Membership for Nursing/Custody/Safety (C 241 L 18). The liability and rate impact from this law was applied as an add-on this year, and will be programmed into our base valuation next year.

² Plan 3 members do not contribute to the defined benefit plan.

³ PERS, TRS, and SERS liability is attributable to past Plan 3 gain-sharing. For PERS and TRS, this rate has been reduced since the gain-sharing liability is expected to be paid off in the 2019-21 Biennium. For SERS, no rate is expected to be needed in the 2019-21 Biennium.

⁴ LEOFF 2 rates adopted by LEOFF 2 Board; all others adopted by the PFC.

Development of Normal Cost Rates (Continued)				
(Dollars in Millions)		PSERS 2	LEOFF 2	WSPRS 1/2
1. Calculated Member Normal Cost Rate				
a.	Future Value of Fully Projected Benefits	\$17,317	\$108,950	\$8,971
b.	Present Value of Fully Projected Benefits	1,132	14,812	1,517
c.	Valuation Assets ¹	572	11,972	1,215
d.	Unfunded Fully Projected Benefits (b - c)	560	2,841	302
e.	Past Liability Balance	0	0	7
f.	Adjusted Unfunded (d - e)	\$560	\$2,841	\$295
Present Value of Projected Salaries to Current Members (PVS)				
g.	Plan 1 PVS	N/A	N/A	\$ 284.65
h.	Plan 2 PVS	4,139	21,915	785
i.	Plan 3 PVS	N/A	N/A	N/A
j.	Weighted PVS (2g + 2h + i)	\$8,279	\$43,829	\$2,139
k.	Member Normal Cost (f / j)	6.76%	6.48%	13.77%
l.	Member Minimum Contribution Rate	5.48%	8.57%	7.31%
m.	Prior Year Member Maximum Contribution Rate	N/A	N/A	8.45%
n.	Member Contribution Rate with Max/Min	6.76%	8.57%	8.45%
o.	Change In Plan Provisions (Laws of 2019) ²	0.33%	0.10%	0.00%
p.	Calculated Member Contribution Rate (n + o)	7.09%	8.67%	8.45%
2. Calculated Employer Normal Cost Rate				
a.	Present Value of Fully Projected Benefits	\$1,132	\$14,812	\$1,517
b.	Valuation Assets ¹	572	11,972	1,215
c.	Unfunded Benefits (a - b)	560	2,841	302
d.	Present Value of Member Contributions	280	1,420	147
e.	Past Liability Balance	0	0	7
f.	Employer Responsibility (c - d - e)	\$280	\$1,420	\$147
Present Value of Projected Salaries to Current Members (PVS)				
g.	Plan 1 PVS	N/A	N/A	\$285
h.	Plan 2 PVS	4,139	21,915	785
i.	Plan 3 PVS	N/A	N/A	N/A
j.	Total PVS (g + h + i)	\$4,139	\$21,915	\$1,069
k.	Employer Normal Cost (f / j)	6.76%	6.48%	13.77%
l.	Employer Minimum Contribution Rate	5.48%	8.57%	7.31%
m.	Employer Contribution Rate with Minimum	6.76%	8.57%	13.77%
n.	Excess Employer Rate	N/A	N/A	5.32%
o.	Rate to Amortize Past Liability Balance ³	N/A	N/A	1.32%
p.	Change In Plan Provisions (Laws of 2019) ²	0.33%	0.10%	0.00%
q.	Calculated Employer Contribution Rate (m + n + o + p)	7.09%	8.67%	20.41%
3. Adopted Normal Cost Rates for 2019-21⁴				
a.	Member Contribution Rate	7.20%	8.59%	8.45%
b.	Employer Contribution Rate	7.20%	5.15%	17.50% ⁵
c.	State Contribution Rate	N/A	3.44%	N/A
d.	Total Contribution Rate (a + b + c)	14.40%	17.18%	25.95%

Note: Totals may not agree due to rounding.

¹ LEOFF 2's assets for 2018 exclude the \$20.2 million held in the LEOFF 2 BIA and have been further reduced by \$300 million payable to the BIA effective 7/1/2019 (C 366 L 19). This reduction is \$279.3 million as of 6/30/2018 valuation date, after discounting by plan's interest rate of 7.4%.

² This also includes the impacts from the following Laws of 2018 - PSERS Membership for Nursing/Custody/Safety (C 241 L 18) and LEOFF 2 PTSD Occupational Disease (C 264 L 18). The liability and rate impact from these laws were applied as an add-on this year, and will be programmed into our base valuation next year.

³ WSPRS liability is attributable to past costs for improved survivor benefits.

⁴ LEOFF 2 rates adopted by LEOFF 2 Board; all others adopted by the PFC. LEOFF 2 rate: 50% Member, 30% Employer, 20% State.

⁵ Legislature revised PFC adopted employer contribution rate during the 2019 Legislative Session (C 416 L 19).

II. ACTUARIAL EXHIBITS

It should be noted in the previous table that during the 2019 Legislative Session, a law was passed (C 416 L 19) which smoothed the WSPRS employer contribution rate increase that would occur between the 2017-19 Biennium and the 2019-21 Biennium. This rate increase will be smoothed over three Biennia from 2019 to 2025. The adopted employer contribution rate displayed above does not yet reflect this legislation. This will be addressed in next year's rate-setting valuation.

Amortization of the Plan 1 Unfunded Actuarial Accrued Liability (UAAL)			
<i>(Dollars in Millions)</i>	PERS 1	TRS 1	LEOFF 1
a. Future Value of Fully Projected Benefits	\$26,023	\$18,457	\$9,180
b. Present Value of Fully Projected Benefits (PVFB)	11,999	8,598	4,096
c. Valuation Assets	7,193	5,399	5,538
d. Actuarial Present Value of Future Normal Costs	54	17	0
e. Balance of Plan 1 Benefit Improvements ¹	188	132	N/A
f. UAAL (b - c - d - e)	\$4,563	\$3,050	(\$1,442)
g. Amortization Date	N/A	N/A	6/30/2024
h. Present Value of Projected Salaries ²	\$118,925	\$56,191	\$5,487
i. Contribution Rate Before Adjustments (f / h)	3.84%	5.43%	(26.29%)
j. Minimum Contribution Rate	3.50%	5.75%	N/A
k. Preliminary Contribution Rate	3.84%	5.75%	(26.29%)
l. Plan 1 Benefit Improvements	0.24%	0.36%	N/A
m. Change In Plan Provisions (Laws of 2019)	0.00%	0.00%	0.00%
n. Calculated Plan 1 UAAL Contribution Rates (k + l + m)	4.08%	6.11%	(26.29%)³
Adopted Plan 1 UAAL Contribution Rates for 2019-21	4.76%	7.18%	0.00%

Note: Totals may not agree due to rounding.

¹As stated in RCW 41.45.060, the cost of funding Plan 1 benefit improvements shall be amortized over a fixed 10-year period.

²Measured under the plan's amortization method.

³No LEOFF 1 UAAL contributions are required when the plan is fully funded under current methods and assumptions.

Actuarial Liabilities

Present Value of Fully Projected Benefits						
(Dollars in Millions)	PERS			TRS		
	Plan 1	Plans 2/3	Total	Plan 1	Plans 2/3	Total
Active Members						
Retirement	\$663	\$29,497	\$30,159	\$239	\$13,859	\$14,098
Termination	0	1,027	1,027	0	524	524
Death	9	282	291	2	112	114
Disability	0	164	164	0	17	17
ROC ¹ on Termination	0	397	397	0	53	53
ROC ¹ on Death	15	278	292	4	38	42
Total Active	\$687	\$31,644	\$32,331	\$246	\$14,604	\$14,849
Inactive Members						
Terminated Vested	\$84	\$3,086	\$3,170	\$27	\$1,193	\$1,220
Terminated Non-Vested ²	7	284	292	3	54	57
Service Retired ³	10,389	12,903	23,292	7,845	3,890	11,735
Disability Retired	103	148	251	75	12	88
Survivors	729	440	1,170	402	84	486
Total Inactive	\$11,312	\$16,862	\$28,174	\$8,353	\$5,234	\$13,587
Laws of 2019 ⁴	0	(153)	(153)	0	0	0
2018 Total	\$11,999	\$48,354	\$60,353	\$8,598	\$19,837	\$28,436
2017 Total	\$12,412	\$45,048	\$57,459	\$8,938	\$17,514	\$26,452

Note: Totals may not agree due to rounding.

¹ Return of Contributions.

² Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

³ Includes liability from individuals who are entitled to a portion of the primary member's benefit (legal order payees).

⁴ This also includes the impacts from the following Laws of 2018 - PSERS Membership for Nursing/Custody/Safety (C 241 L 18). The liability and rate impact from this law was applied as an add-on this year, and will be programmed into our base valuation next year.

Present Value of Fully Projected Benefits (Continued)						
(Dollars in Millions)	SERS	PSERS	LEOFF		WSPRS	
	Plans 2/3	Plan 2	Plan 1	Plan 2	Total	Plans 1/2
Active Members						
Retirement	\$4,113	\$932	\$33	\$9,380	\$9,413	\$626
Termination	258	61	0	168	168	4
Death	42	7	0	134	135	6
Disability	18	6	0	434	434	2
ROC ¹ on Termination	50	30	0	114	114	3
ROC ¹ on Death	27	12	0	161	161	3
Total Active	\$4,509	\$1,048	\$34	\$10,390	\$10,424	\$644
Inactive Members						
Terminated Vested	\$691	\$36	\$1	\$238	\$240	\$18
Terminated Non-Vested ²	32	15	0	14	14	1
Service Retired ³	1,810	32	1,854	3,796	5,649	779
Disability Retired	17	1	1,557	229	1,786	6
Survivors	51	0	650	145	795	69
Total Inactive	\$2,601	\$84	\$4,062	\$4,422	\$8,485	\$873
Laws of 2019 ⁴	0	218	0	34	34	0
2018 Total	\$7,109	\$1,349	\$4,096	\$14,846	\$18,942	\$1,517
2017 Total	\$6,486	\$1,213	\$4,124	\$13,689	\$17,813	\$1,448

Note: Totals may not agree due to rounding.

¹ Return of Contributions.

² Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

³ Includes liability from individuals who are entitled to a portion of the primary member's benefit (legal order payees).

⁴ This also includes the impacts from the following Laws of 2018 - PSERS Membership for Nursing/Custody/Safety (C 241 L 18) and LEOFF 2 PTSD Occupational Disease (C 264 L18). The liability and rate impact from these laws were applied as an add-on this year, and will be programmed into our base valuation next year.

Entry Age Normal Accrued Liability ¹						
(Dollars in Millions)	PERS			TRS		
	Plan 1	Plans 2/3	Total	Plan 1	Plans 2/3	Total
Active Members						
Retirement	\$619	\$22,614	\$23,233	\$226	\$9,252	\$9,478
Termination	(6)	315	309	(2)	145	144
Death	8	213	221	2	74	76
Disability	(1)	80	79	(0)	6	6
ROC ² on Termination	(4)	(217)	(222)	(1)	(21)	(22)
ROC ² on Death	14	185	199	4	15	20
Total Active	\$630	\$23,189	\$23,819	\$230	\$9,471	\$9,701
Inactive Members						
Terminated Vested	\$84	\$3,086	\$3,170	\$27	\$1,193	\$1,220
Terminated Non-Vested ³	7	284	292	3	54	57
Service Retired ⁴	10,389	12,903	23,292	7,845	3,890	11,735
Disability Retired	103	148	251	75	12	88
Survivors	729	440	1,170	402	84	486
Total Inactive	\$11,312	\$16,862	\$28,174	\$8,353	\$5,234	\$13,587
Laws of 2019 ⁵	0	(27)	(26)	0	0	0
2018 Total	\$11,942	\$40,024	\$51,967	\$8,583	\$14,705	\$23,288
2017 Total	\$12,341	\$37,166	\$49,507	\$8,918	\$13,095	\$22,013

Note: Totals may not agree due to rounding.

¹ Calculated using the EAN cost method. This method was not used to determine contribution requirements.

² Return of Contributions.

³ Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

⁴ Includes liability from individuals who are entitled to a portion of the primary member's benefit (legal order payees).

⁵ This also includes the impacts from the following Laws of 2018 - PSERS Membership for Nursing/Custody/Safety (C 241 L 18). The liability and rate impact from this law was applied as an add-on this year, and will be programmed into our base valuation next year.

Entry Age Normal Accrued Liability ¹ (Continued)						
(Dollars in Millions)	SERS	PSERS	LEOFF			WSPRS
	Plans 2/3	Plan 2	Plan 1	Plan 2	Total	Plans 1/2
Active Members						
Retirement	\$3,039	\$487	\$33	\$6,264	\$6,297	\$424
Termination	70	21	(0)	31	31	1
Death	30	3	0	46	47	2
Disability	7	2	(1)	235	234	1
ROC ² on Termination	(15)	(7)	0	(31)	(31)	(1)
ROC ² on Death	16	5	0	97	97	2
Total Active	\$3,148	\$512	\$32	\$6,642	\$6,674	\$429
Inactive Members						
Terminated Vested	\$691	\$36	\$1	\$238	\$240	\$18
Terminated Non-Vested ³	32	15	0	14	14	1
Service Retired ⁴	1,810	32	1,854	3,796	5,649	779
Disability Retired	17	1	1,557	229	1,786	6
Survivors	51	0	650	145	795	69
Total Inactive	\$2,601	\$84	\$4,062	\$4,422	\$8,485	\$873
Laws of 2019 ⁵	0	0	0	2	2	0
2018 Total	\$5,748	\$596	\$4,095	\$11,066	\$15,161	\$1,302
2017 Total	\$5,242	\$506	\$4,121	\$10,160	\$14,281	\$1,244

Note: Totals may not agree due to rounding.

¹ Calculated using the EAN cost method. This method was not used to determine contribution requirements.

² Return of Contributions.

³ Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

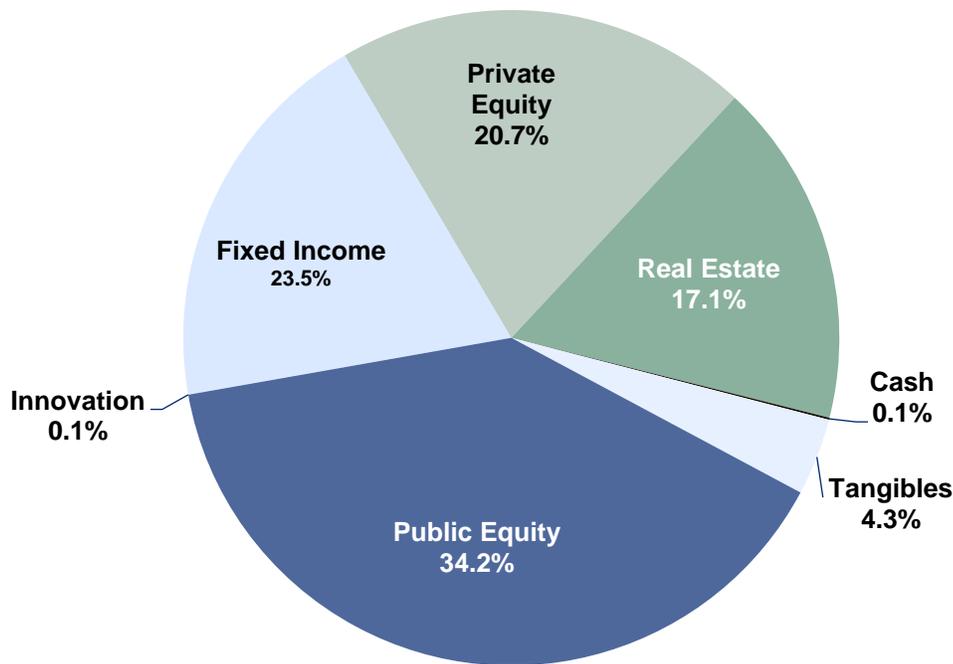
⁴ Includes liability from individuals who are entitled to a portion of the primary member's benefit (legal order payees).

⁵ This also includes the impacts from the following Laws of 2018 - PSERS Membership for Nursing/Custody/Safety (C 241 L 18) and LEOFF 2 PTSD Occupational Disease (C 264 L 18). The liability and rate impact from these laws were applied as an add-on this year, and will be programmed into our base valuation next year.

We report the present and future value of benefit payments by year and by plan on our website. We also show how the present value of these benefit payments varies by interest rate assumptions. For more information or to view projected benefit payments, please visit the [Interactive Reports](#) page on our website.

Plan Assets

Retirement Commingled Trust Fund (CTF) Asset Allocation



Source: Washington State Investment Board.

Cash: Highly liquid, very safe investments that can be easily converted into cash, such as Treasury Bills and money-market funds.

Fixed Income: Securities representing debt obligations and usually having fixed payments and maturities. Different types of fixed income securities include government and corporate bonds, mortgage-backed securities, asset-backed securities, convertible issues, and may also include money-market instruments.

Innovation: Fund that provides the ability to invest in a broad range of assets that fall outside the traditional asset classes or management style of existing asset classes.

Public Equity: Shares of U.S. and non-U.S. corporations that trade on public exchanges or "over-the-counter." The ownership of a corporation is represented by shares that are claimed on the corporation's earnings and assets.

Private Equity: The infusion of equity capital into a private company (one that is not available on the public markets). Private equity investments include securities that are not listed on a public exchange and are not easily accessible to most individuals. These investments range from initial capital in start-up enterprises to leveraged buyouts of mature corporations.

Real Estate: An externally-managed selection of partnership investments with the majority of the partnerships invested in high-quality real estate leased to third parties.

Tangibles: The tangible asset portfolio invests in sectors such as infrastructure, timber, agriculture, natural resources, commodities, or other sectors consistent with the goals of the asset class.

II. ACTUARIAL EXHIBITS

In the asset tables that follow, LEOFF 2's MVA and AVA exclude \$20.2 million held in the LEOFF 2 BIA, and have been further reduced by \$300 million payable to the BIA effective July 1 2019 (C 366 L19). This reduction is \$279.3 million as of the June 30, 2018, valuation date, after discounting by the plan's interest rate of 7.40 percent.

Change in Market Value of Assets						
(Dollars in Millions)	PERS			TRS		
	Plan 1 Fund 631	Plans 2/3* Fund 641	Total	Plan 1 Fund 632	Plans 2/3* Fund 642	Total
2017 Market Value	\$7,497	\$35,001	\$42,498	\$5,759	\$12,524	\$18,283
Revenue						
Member Contributions	\$8	\$601	\$610	\$3	\$98	\$101
Employer/State Contributions	675	779	1,453	421	446	867
Total Contributions	683	1,380	2,063	423	544	967
Investment Return	687	3,350	4,037	522	1,204	1,726
Restorations**	4	35	40	1	5	7
Transfers In	0	1	1	0	1	1
Miscellaneous	0	0	0	0	0	0
Total Revenue	\$1,374	\$4,766	\$6,140	\$947	\$1,754	\$2,701
Disbursements						
Monthly Benefits***	\$1,190	\$1,034	\$2,223	\$903	\$299	\$1,203
Refunds	4	42	46	2	4	5
Total Benefits	1,193	1,076	2,269	905	303	1,208
Transfers Out	0	5	5	0	2	2
Expenses	0	1	1	0	0	0
Payables	0	0	0	0	0	0
Total Disbursements	\$1,194	\$1,081	\$2,275	\$905	\$305	\$1,210
2018 Market Value	\$7,677	\$38,685	\$46,363	\$5,802	\$13,973	\$19,774
2018 Actuarial Value	\$7,193	\$36,601	\$43,794	\$5,399	\$13,232	\$18,632
Ratio (AV / MV)	94%	95%	94%	93%	95%	94%

Note: Totals may not agree due to rounding.

*Defined Benefit portion only.

**Includes additional annuity purchases and service credit purchases.

***TRS Plan 1 value includes annuity cashouts.

Change in Market Value of Assets (Continued)							
(Dollars in Millions)	SERS	PSERS	LEOFF			WSPRS	Total
	Plans 2/3* Fund 633	Plan 2 Fund 635	Plan 1 Fund 819	Plan 2 Fund 829	Total	Plans 1/2 Fund 615	
2017 Market Value	\$4,864	\$504	\$5,736	\$11,758	\$17,494	\$1,211	\$84,853
Revenue							
Contributions							
Member	70	26	0	174	174	8	\$989
Employer/State	177	26	0	175	175	14	2,711
Total Contributions	246	52	0	349	349	23	3,700
Investment Return	466	50	530	1,125	1,655	114	8,048
Restorations**	1	0	0	23	24	2	73
Transfers In	0	0	0	1	1	1	4
Miscellaneous	0	0	0	0	0	0	0
Total Revenue	\$714	\$103	\$530	\$1,498	\$2,028	\$139	\$11,824
Disbursements							
Monthly Benefits	\$151	\$2	\$364	\$260	\$624	\$60	\$4,262
Refunds	4	3	0	9	9	0	67
Total Benefits	155	5	364	268	632	60	4,329
Transfers Out	2	0	0	279	279	0	288
Expenses	0	0	0	2	2	0	3
Payables	0	0	0	0	0	0	0
Total Disbursements	\$157	\$5	\$364	\$549	\$913	\$60	\$4,620
2018 Market Value (MV)	\$5,421	\$601	\$5,903	\$12,706	\$18,609	\$1,289	\$92,057
2018 Actuarial Value (AV)	\$5,131	\$572	\$5,538	\$11,972	\$17,510	\$1,215	\$86,855
Ratio (AV / MV)	95%	95%	94%	94%	94%	94%	94%

Note: Totals may not agree due to rounding.

*Defined Benefit portion only.

**Includes additional annuity purchases and service credit purchases.

Calculation of Actuarial Value of Assets						
(Dollars in Millions)	PERS 1	PERS 2/3*	TRS 1	TRS 2/3*	SERS 2/3*	
a. Market Value at 6/30/2018	\$7,677	\$38,685	\$5,802	\$13,973	\$5,421	
Deferred Gains and (Losses)						
Plan Year Ending	Smoothing Period	Years Remaining				
6/30/2018	3	2	\$99	\$482	\$75	\$174
6/30/2017	7	5	299	1,399	253	498
6/30/2016	6	3	(200)	(776)	(161)	(272)
6/30/2014	8	3	287	979	236	340
b. Total Deferral			\$484	\$2,084	\$403	\$740
c. Market Value less Deferral (a - b)			\$7,193	\$36,601	\$5,399	\$13,232
d. 70% of Market Value of Assets			\$5,374	\$27,080	\$4,061	\$9,781
e. 130% of Market Value of Assets			\$9,981	\$50,291	\$7,542	\$18,164
f. Actuarial Value of Assets**			\$7,193	\$36,601	\$5,399	\$13,232

Note: Totals may not agree due to rounding. The gain/(loss) for 6/30/2015 has been fully realized for all plans.

*Defined Benefit portion only.

**Actuarial value of assets can never be less than 70% or greater than 130% of the market value of assets.

Calculation of Actuarial Value of Assets (Continued)							
(Dollars in Millions)	PSERS 2	LEOFF 1	LEOFF 2	WSPRS 1/2	Total		
a. Market Value at 6/30/2018	\$601	\$5,903	\$12,706	\$1,289	\$92,057		
Deferred Gains and (Losses)							
Plan Year Ending	Smoothing Period	Years Remaining					
6/30/2018	3	2	\$7	\$76	\$170	\$16	\$1,166
6/30/2017	7	5	19	232	484	49	3,428
6/30/2016	6,5*	3,2*	(7)	(149)	(249)	(29)	(1,950)
6/30/2014	8	3	10	205	329	39	2,559
b. Total Deferral			\$29	\$364	\$734	\$75	\$5,202
c. Market Value less Deferral (a - b)			\$572	\$5,538	\$11,972	\$1,215	\$86,855
d. 70% of Market Value of Assets			\$421	\$4,132	\$8,894	\$903	\$64,440
e. 130% of Market Value of Assets			\$782	\$7,674	\$16,518	\$1,676	\$119,674
f. Actuarial Value of Assets**			\$572	\$5,538	\$11,972	\$1,215	\$86,855

Note: Totals may not agree due to rounding. The gain/(loss) for 6/30/2015 has been fully realized for all plans.

*2016: PSERS 2 = 5 year smoothing period, 2 years remaining; all other plans = 6 year smoothing period, 3 years remaining.

**AVA can never be less than 70% or greater than 130% of the MVA.

Investment Gains and (Losses) for Prior Year					
(Dollars in Millions)	PERS 1	PERS 2/3*	TRS 1	TRS 2/3*	SERS 2/3*
a. 2017 Market Value**	\$7,460	\$34,957	\$5,743	\$12,501	\$4,852
b. Total Cash Flow	(515)	325	(492)	249	89
c. 2018 Market Value**	7,633	38,640	5,775	13,958	5,408
d. Actual Return (c - b - a)	\$688	\$3,357	\$523	\$1,208	\$468
e. Weighted Asset Amount	\$7,201	\$35,118	\$5,489	\$12,616	\$4,889
f. Expected Return (7.5% x e)	540	2,634	412	946	367
g. Investment Gain/(Loss) for Prior Year (d - f)	148	724	112	262	101
h. Dollar-Weighted Rate of Return**	9.55%	9.56%	9.53%	9.57%	9.57%

Note: Totals may not agree due to rounding.

*Defined Benefit portion only.

**Source: Washington State Investment Board.

Investment Gains and (Losses) for Prior Year (Continued)					
(Dollars in Millions)	PSERS 2	LEOFF 1	LEOFF 2	WSPRS	Total
a. 2017 Market Value*	\$502	\$5,736	\$11,720	\$1,210	\$84,680
b. Total Cash Flow	48	(365)	(183)	(36)	(879)
c. 2018 Market Value	600	5,902	12,662	1,288	91,866
d. Actual Return (c - b - a)	\$50	\$531	\$1,125	\$114	\$8,064
e. Weighted Asset Amount	\$525	\$5,557	\$11,769	\$1,192	\$84,356
f. Expected Return (7.5% x e)**	39	417	871	89	6,315
g. Investment Gain/(Loss) for Prior Year (d - f)	11	114	254	24	1,749
h. Dollar-Weighted Rate of Return*	9.51%	9.55%	9.56%	9.55%	9.56%

Note: Totals may not agree due to rounding.

*Source: Washington State Investment Board.

**The expected return for LEOFF 2 is (7.4% x e).

Funded Status

In our actuarial valuation report, we calculate a plan's funded status by comparing the plan's current assets, determined under an asset valuation method, to the actuarial accrued liability of its members calculated under an actuarial cost method. Funded status can vary significantly from plan to plan, depending on the purpose of the measurement and the assumptions and methods used to determine the funded status.

Based on the purpose of the measurement, actuaries can select from several acceptable actuarial cost methods when measuring a plan's funded status. The cost methods vary in the manner they allocate benefits to past and future time periods. Generally speaking, benefits allocated to past service are considered accrued (or earned). Please see the [Glossary](#) on our website for an explanation of the actuarial cost methods we use in this actuarial valuation.

Consistent with financial reporting under GASB requirements, we report funded status using the EAN actuarial cost method. However, the funded status measures we share in this report may still vary from those presented in the *DRS Comprehensive Annual Financial Report*. These differences occur because the assumptions and methods applied to determine contribution requirements (under a funding valuation) may not apply for financial reporting under GASB accounting standards (an accounting valuation). Put another way, these measurements still represent distinct measurements for specific purposes and the results may vary between the two reports.

To determine the present value (today's value) of accrued benefits, we discount future benefits to the valuation date using the valuation interest rate. This rate is intended to be consistent with the long-term expected return under the plan's funding policy. For all plans, with the exception of the LEOFF Plan 2, the valuation interest rate is prescribed by the PFC and is subject to revision by the Legislature. For LEOFF Plan 2, the valuation interest rate is prescribed by the LEOFF Plan 2 Retirement Board. (Note: This discount rate may vary from the rate used for financial reporting under GASB accounting standards).

In addition to the valuation interest rate, we use the same long-term assumptions to develop the funded status measure in this report that we use to determine the contribution requirements of the plan. We don't expect the assumptions to match actual experience over short-term periods. However, we do expect these assumptions to reasonably approximate average annual experience over long-term periods. This measure of funded status is consistent with the state's current funding policy and financing plan for future retirement benefits.

For reporting funded status and calculating contribution requirements, we also use an asset valuation method to determine the AVA. This asset valuation method smooths the inherent volatility in the MVA by deferring a portion of annual investment gains or losses for a certain number of years. Investment gains and losses occur when the annual return on investments varies from the long-term assumed rate. To determine the 2018 investment gains or losses, we used an investment return assumption of 7.50 percent (7.40 percent for the LEOFF Plan 2). The AVA provides a more stable measure of the plan's assets on an ongoing basis.

With this background in mind, we display the funded status on an "actuarial value" basis for each plan in the following table. For the actuarial value basis, we use the assumed long-term rate of return and AVA consistent with the plan's funding policy.

It's also reasonable and acceptable to report funded status using other assumptions and methods. The resulting funded status will change with the use of assumptions and methods that vary from what we present in this report. Please visit the [Interactive Reports](#) page on our website for funded status measures that vary by interest rate assumptions and asset valuation methods.

Funded Status on an Actuarial Value Basis*					
<i>(Dollars in Millions)</i>	PERS		TRS		SERS
	Plan 1	Plans 2/3	Plan 1	Plans 2/3	Plan 2/3
Accrued Liability	\$11,942	\$40,024	\$8,583	\$14,705	\$5,748
Valuation Assets	\$7,193	\$36,601	\$5,399	\$13,232	\$5,131
Unfunded Liability	\$4,749	\$3,423	\$3,183	\$1,473	\$617
Funded Ratio					
2018	60%	91%	63%	90%	89%
2017	57%	89%	60%	91%	88%
2016	56%	87%	61%	89%	87%
2015	58%	88%	64%	92%	89%
2014	61%	90%	69%	94%	91%

Note: Totals may not agree due to rounding.

**Liabilities valued using the EAN cost method at an interest rate of 7.5%. All assets have been valued under the actuarial asset method.*

II. ACTUARIAL EXHIBITS

Generally speaking, under current funding policy, when a plan is less/more than 100 percent funded, we expect higher/lower contribution requirements in the near term to return the plan to a 100 percent funded status over time. A plan with a funded status above 100 percent will require future contributions if the plan has not yet accumulated sufficient assets to pay both the expected cost of benefits that have been earned today and the expected cost of benefits that will be earned by current members in the future. As of this valuation date, and under the data, assumptions and methods used for this actuarial valuation, only LEOFF Plan 1 has sufficient assets to cease ongoing contributions.

Funded Status on an Actuarial Value Basis*					
(Continued)					
<i>(Dollars in Millions)</i>	PSERS	LEOFF		WSPRS	Total
	Plan 2	Plan 1	Plan 2	Plans 1/2	
Accrued Liability	\$596	\$4,095	\$11,066	\$1,302	\$98,061
Valuation Assets	\$572	\$5,538	\$11,972	\$1,215	\$86,855
Unfunded Liability	\$24	(\$1,444)	(\$906)	\$87	\$11,206
Funded Ratio					
2018	96%	135%	108%	93%	89%
2017	95%	131%	109%	92%	86%
2016	94%	126%	105%	91%	84%
2015	95%	125%	105%	98%	86%
2014	96%	127%	107%	100%	87%

Note: Totals may not agree due to rounding.

**Liabilities valued using the EAN cost method at an interest rate of 7.5% (7.4% for LEOFF 2). All assets have been valued under the actuarial asset method.*

The funded status measures presented in this report are not sufficient to determine whether a plan has enough assets to terminate or settle the plan obligations.

Actuarial Gain/Loss

The following tables display actuarial gains and losses, expressed as contribution rate changes. Actuaries use gain/loss analysis to compare actual changes to assumed changes from various sources with respect to assets, liabilities, and salaries. We also use this analysis to determine:

- The accuracy of our valuation model and annual processing.
- Why contribution rates changed.
- The reasonableness of the actuarial assumptions.

Actuarial gains will reduce contribution rates; actuarial losses will increase contribution rates. Under a reasonable set of actuarial assumptions, actuarial gains and losses will offset over long-term experience periods. The tables that follow provide more details on the individual contribution rate gains and losses for both the Normal Cost rate and the UAAL rate that employers pay.

Change in Employer and State Plan 2/3 Normal Cost Rate by Source			
Change in Normal Costs	PERS	TRS	SERS
2017 Normal Cost Before Laws of 2018	7.89%	8.15%	8.25%
Remove Rate Floor	0.00%	0.00%	0.00%
Remove Prior Employer Liability	(0.02%)	(0.38%)	0.00%
2017 Adjusted Normal Cost Rate	7.87%	7.77%	8.25%
Liabilities			
Salaries	0.08%	0.24%	0.51%
Termination	(0.12%)	(0.31%)	(0.22%)
Retirement	0.02%	0.03%	0.04%
Disability	0.00%	0.00%	0.01%
Mortality	0.02%	0.03%	0.04%
Growth / Return to Work	0.62%	1.13%	0.89%
Other Liabilities	0.18%	0.08%	0.16%
Total Liability Gains/Losses	0.80%	1.20%	1.43%
Assets*			
Contributions	0.05%	0.01%	0.03%
Disbursements	(0.08%)	(0.04%)	(0.03%)
Investment Returns	(0.39%)	(0.29%)	(0.37%)
Total Asset Gains/Losses	(0.42%)	(0.32%)	(0.37%)
Incremental Changes			
Plan Change	0.00%	0.00%	0.00%
Method Change	0.00%	0.00%	0.00%
Assumption Change	0.00%	0.35%	0.00%
Correction Change	0.02%	0.00%	0.04%
Experience Study Change	0.00%	0.00%	0.00%
Total Incremental Changes Gains/Losses	0.02%	0.35%	0.04%
Present Value of Future Salaries Gains/Losses	(0.73%)	(0.96%)	(1.22%)
Other Gains/Losses	(0.11%)	(0.02%)	(0.11%)
Total Change	(0.44%)	0.25%	(0.23%)
2018 Preliminary Normal Cost	7.43%	8.02%	8.02%
Increase from Applied Rate Floor	0.00%	0.00%	0.00%
Rate to Amortize Prior Employer Liability**	0.02%	0.38%	0.00%
Excess Member Rate	N/A	0.00%	N/A
Laws of 2019***	0.03%	0.00%	0.00%
2018 Adjusted Normal Cost	7.48%	8.40%	8.02%

*Asset Gain/Loss performed on AVA not MVA.

**For PERS and TRS, rates reflect an expected liability payoff date within the 2019-21 Biennium.
For SERS, the rate reflects an expected payoff date within the 2017-19 Biennium.

***This also includes the impacts from the following Laws of 2018 -- PSERS Membership for Nursing/Custody/Safety (C 241 L 18). The liability and rate impact from this law was applied as an add-on this year and will be programmed into our base valuation next year.

Change in Employer and State Plan 2/3 Normal Cost Rate by Source (Continued)			
Change in Normal Costs	PSERS	LEOFF¹	WSPRS²
2017 Normal Cost Before Laws of 2018	6.87%	3.42%	22.12%
Remove Rate Floor	0.00%	(0.86%)	0.00%
Remove Prior Employer Liability ³	0.00%	0.00%	(7.50%)
2017 Adjusted Normal Cost Rate	6.87%	2.56%	14.62%
Liabilities			
Salaries	0.10%	0.01%	(0.08%)
Termination	(0.16%)	(0.01%)	(0.04%)
Retirement	0.01%	0.01%	(0.02%)
Disability	0.01%	0.00%	0.03%
Mortality	0.02%	0.01%	0.08%
Growth / Return to Work	0.96%	0.34%	0.98%
Other Liabilities	0.01%	0.05%	0.20%
Total Liability Gains/Losses	0.95%	0.41%	1.15%
Assets⁴			
Contributions	(0.00%)	(0.12%)	0.37%
Disbursements	(0.04%)	0.27%	(0.02%)
Investment Returns	(0.09%)	(0.29%)	(1.06%)
Total Asset Gains/Losses	(0.13%)	(0.14%)	(0.71%)
Incremental Changes			
Plan Change	0.00%	0.00%	0.00%
Method Change	0.00%	0.00%	0.00%
Assumption Change	0.00%	0.00%	0.00%
Correction Change	0.00%	0.00%	0.00%
Experience Study Change	0.00%	0.00%	0.00%
Total Incremental Changes Gains/Losses	0.00%	0.00%	0.00%
Present Value of Future Salaries Gains/Losses	(0.88%)	(0.22%)	(1.24%)
Other Gains/Losses	(0.05%)	(0.02%)	(0.05%)
Total Change	(0.11%)	0.03%	(0.85%)
2018 Preliminary Normal Cost	6.76%	2.59%	13.77%
Increase from Applied Rate Floor	0.00%	0.84%	0.00%
Rate to Amortize Prior Employer Liability	0.00%	0.00%	1.32%
Excess Member Rate	N/A	N/A	5.32%
Laws of 2019 ⁵	0.33%	0.04%	0.00%
2018 Adjusted Normal Cost	7.09%	3.47%	20.41%

¹ The LEOFF contribution rate is the state's portion only (20% of the Plan 2 Normal Cost).

² The WSPRS normal cost contribution rate applies to Plans 1 and 2.

³ For WSPRS, (6.18%) of this rate is attributable to the excess member rate, and the remaining (1.32%) is attributable to prior employer liability.

⁴ Asset Gain/Loss performed on AVA not MVA.

⁵ This also includes the impacts from the following Laws of 2018 - PSERS Membership for Nursing/Custody/Safety (C 241 L 18) and LEOFF 2 PTSD Occupational Disease (C 264 L 18). The liability and rate impact from these laws were applied as an add-on this year, and will be programmed into our valuation next year.

Change in Employer and State Plan 1 UAAL Rate by Source¹			
Change in UAAL Rate	PERS, SERS, & PSERS²	TRS	LEOFF³
2017 UAAL Rate Before Laws of 2018	4.66%	6.97%	(14.76%)
Remove Rate Floor	0.00%	0.00%	0.00%
Remove Plan 1 Benefit Improvements	(0.14%)	(0.15%)	N/A
Fixed Amortization Date Adjustment ⁴	N/A	N/A	(9.86%)
2017 Adjusted UAAL Rate	4.52%	6.82%	(24.62%)
Liabilities			
Salaries	0.00%	0.01%	(0.05%)
Termination	0.00%	0.00%	0.00%
Retirement	0.00%	0.00%	0.00%
Disability	0.00%	0.00%	0.00%
Mortality	(0.03%)	0.01%	(0.06%)
Return to Work	0.00%	0.00%	0.00%
Inflation (CPI)	0.00%	0.00%	0.23%
Other Liabilities	0.04%	0.01%	0.60%
Total Liability Gains/Losses	0.01%	0.03%	0.72%
Assets ⁵			
Contributions	(0.05%)	(0.03%)	(0.01%)
Disbursements	(0.01%)	0.02%	0.03%
Investment Returns	(0.14%)	(0.26%)	(1.96%)
Total Asset Gains/Losses	(0.20%)	(0.27%)	(1.94%)
Incremental Changes			
Plan Change	0.00%	0.00%	0.00%
Method Change	0.00%	0.00%	0.00%
Assumption Change	0.00%	(0.30%)	0.00%
Correction Change	0.01%	0.01%	0.00%
Experience Study Change	0.00%	0.00%	0.00%
Total Incremental Changes Gains/Losses	0.01%	(0.29%)	0.00%
Present Value of Future Salaries Gains/Losses	(0.43%)	(0.76%)	0.19%
Other Gains/Losses	(0.07%)	(0.10%)	(0.64%)
Total Change	(0.68%)	(1.39%)	(1.67%)
2018 Preliminary UAAL Rate	3.84%	5.43%	(26.29%)
Increase from Applied Rate Floor	0.00%	0.32%	N/A
Increase from Plan 1 Benefit Improvements	0.24%	0.36%	N/A
Laws of 2019	0.00%	0.00%	0.00%
2018 Adjusted UAAL Rate	4.08%	6.11%	(26.29%)

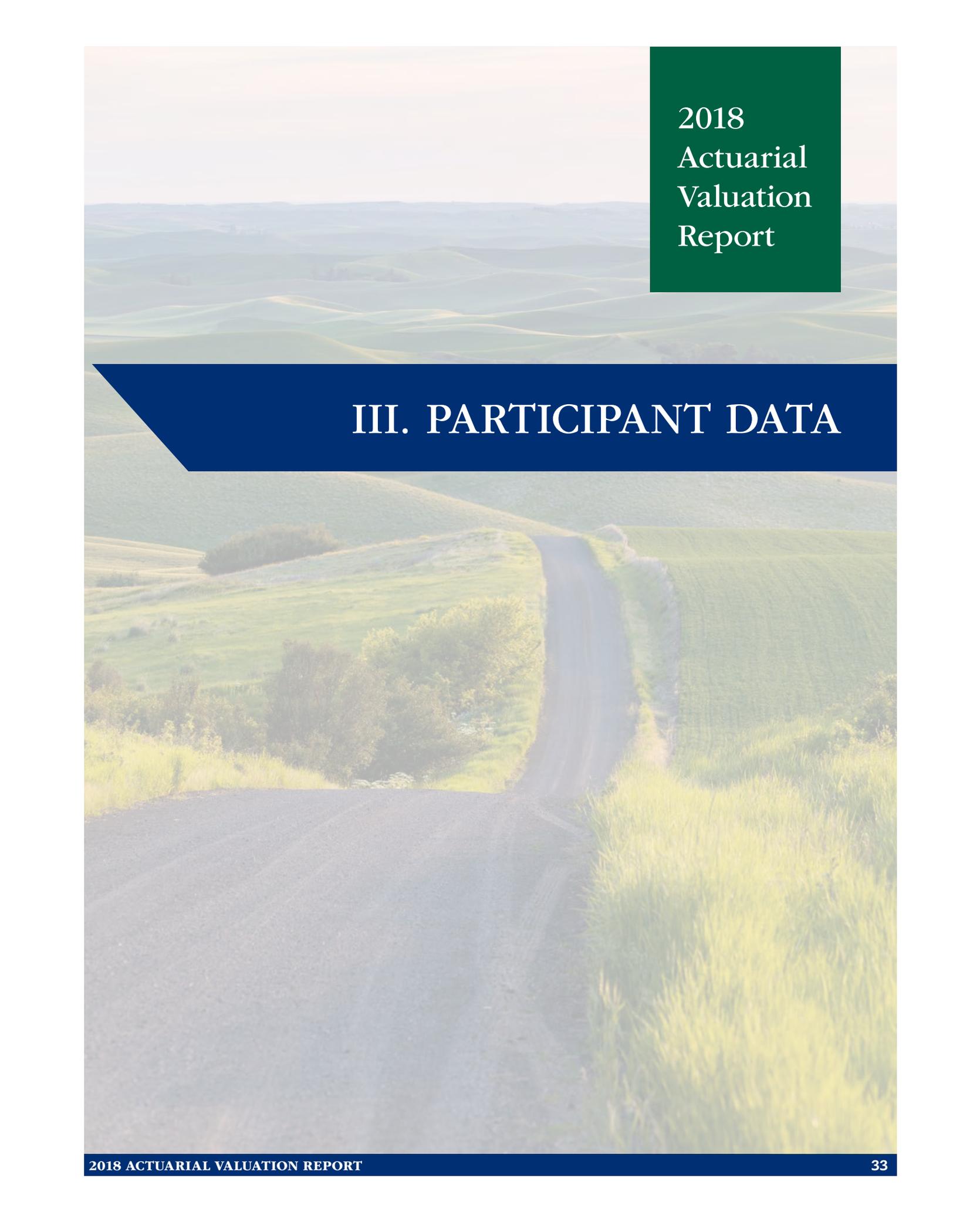
¹ WSPRS does not have a UAAL rate.

² Rate determined to fund the PERS Plan 1 UAAL. SERS and PSERS employers also pay the PERS 1 UAAL rate.

³ The LEOFF contribution rate is the UAAL rate for Plan 1. The plan has a surplus of assets over liabilities, so no rate is currently payable.

⁴ LEOFF 2 fixed amortization date is 6/30/2024.

⁵ Asset Gain/Loss performed on AVA not MVA.



2018
Actuarial
Valuation
Report



III. PARTICIPANT DATA

Overview of System Membership

The state administers nine retirement systems for state and local public employees. Retirement system membership is determined according to the participant's occupation and employer. Employees covered by each system are defined in separate chapters of the RCW.

PERS - Public Employees' Retirement System <i>Chapter 41.40 RCW</i>	State employees; employees of all counties and most cities (some exceptions are Tacoma, Seattle, and Spokane); non-teaching employees of institutions of higher learning and community colleges; employees of ports, service districts, Energy Northwest, public utility districts, and judges first elected or appointed after June 30, 1988.
TRS - Teachers' Retirement System <i>Chapter 41.32 RCW</i>	Certificated teachers; administrators; and educational staff associates.
SERS - School Employees' Retirement System <i>Chapter 41.35 RCW</i>	Classified school district employees and educational service district employees.
PSERS - Public Safety Employees' Retirement System <i>Chapter 41.37 RCW</i>	Correction officers (state, state community, county, city, and local community); state park rangers; enforcement officers with the Liquor and Cannabis Board, Washington State Patrol (commercial vehicle), Gambling Commission, and the Department of Natural Resources; security staff and nurses working at certain state institutions and local correctional departments.
LEOFF - Law Enforcement Officers' and Fire Fighters' Retirement System <i>Chapter 41.26 RCW</i>	Fire fighters; emergency medical technicians; law enforcement officers including sheriffs; university, port, city police officers, and enforcement officers with the Department of Fish and Wildlife.
WSPRS - Washington State Patrol Retirement System <i>Chapter 43.43 RCW</i>	Commissioned officers of the Washington State Patrol.

In addition to the six systems described above, the state also administers benefits for three other retirement systems not included in this valuation. Those systems are the volunteer fire fighters, which has a separate actuarial valuation, and two small judicial systems, which are closed to new members. Any judge hired after June 30, 1988, becomes a member of the PERS Plans 2/3.

Beginning with the 2015 valuation period, OSA prepares valuations for certain retirement provisions under the Higher Education Retirement Plans. These plans are offered to certain employees of colleges and universities in Washington and are not administered by DRS. The results of these valuations are provided in separate reports.

Active Membership By Employer and Plan as of June 30, 2018							
Employer	All Systems	PERS			TRS		
		Plan 1	Plan 2	Plan 3	Plan 1	Plan 2	Plan 3
State Agencies	63,873	604	44,724	13,804	5	30	52
Higher Education	23,020	214	14,425	7,923	5	5	334
Community Colleges	6,566	73	4,252	1,771	16	41	413
K-12	134,338	534	0	0	461	19,874	53,282
Counties	34,867	291	24,283	5,192	0	0	0
County Sub Divisions	14,795	91	11,095	3,052	0	0	0
First Class Cities	8,656	35	2,591	705	0	0	0
Other Cities	19,095	93	11,249	2,432	0	0	0
Ports	2,685	21	2,000	450	0	0	0
Education Service District	2,237	9	0	0	4	81	234
Fire Districts	4,937	4	717	125	0	0	0
Public Utility District	4,850	25	4,162	663	0	0	0
Water Districts	2,182	16	1,889	277	0	0	0
Energy Northwest	1,092	1	778	313	0	0	0
Charter Schools	264	0	0	0	0	58	113
Tribal Compact Schools	34	0	0	0	0	7	4
Total	323,491	2,011	122,165	36,707	491	20,096	54,432

Active Membership By Employer and Plan as of June 30, 2018 (Continued)							
Employer	SERS		PSERS	LEOFF		WSPRS	
	Plan 2	Plan 3	Plan 2	Plan 1	Plan 2	Plan 1	Plan 2
State Agencies	0	0	3,481	0	132	444	597
Higher Education	0	0	0	0	114	0	0
Community Colleges	0	0	0	0	0	0	0
K-12	26,437	33,750	0	0	0	0	0
Counties	0	0	2,246	5	2,850	0	0
County Sub Divisions	0	0	125	0	432	0	0
First Class Cities	0	0	33	16	5,276	0	0
Other Cities	0	0	295	3	5,023	0	0
Ports	0	0	0	0	214	0	0
Education Service District	945	964	0	0	0	0	0
Fire Districts	0	0	0	2	4,089	0	0
Public Utility District	0	0	0	0	0	0	0
Water Districts	0	0	0	0	0	0	0
Energy Northwest	0	0	0	0	0	0	0
Charter Schools	35	58	0	0	0	0	0
Tribal Compact Schools	14	9	0	0	0	0	0
Total	27,431	34,781	6,180	26	18,130	444	597

The following tables show participant data changes from last year's valuation to this year's valuation. We divide the participant data into two main categories:

Actives — members accruing benefits in the plan.

Annuitants — members and beneficiaries receiving benefits from the plan.

Reconciliation of Active and Annuitant Data								
	PERS				TRS			
	Plan 1	Plan 2	Plan 3	Total	Plan 1	Plan 2	Plan 3	Total
2017 Actives	2,597	121,934	34,943	159,474	698	18,747	53,780	73,225
Transfers	0	(260)	5,696	5,436	0	(40)	2,960	2,920
Hires/Rehires	33	12,576	855	13,464	7	3,087	1,847	4,941
New Retirees	(549)	(3,179)	(453)	(4,181)	(199)	(218)	(923)	(1,340)
Deaths	(12)	(201)	(33)	(246)	(2)	(16)	(44)	(62)
Terminations	(58)	(8,705)	(4,301)	(13,064)	(13)	(1,464)	(3,188)	(4,665)
2018 Actives	2,011	122,165	36,707	160,883	491	20,096	54,432	75,019
2017 Annuitants	48,111	46,537	4,262	98,910	34,151	5,060	10,264	49,475
New Retirees	732	4,897	731	6,360	248	423	1,674	2,345
Annuitant Deaths	(2,290)	(1,104)	(54)	(3,448)	(1,178)	(71)	(74)	(1,323)
New Survivors	332	339	29	700	167	26	62	255
Other	(5)	(5)	(3)	(13)	(3)	(2)	(1)	(6)
2018 Annuitants	46,880	50,664	4,965	102,509	33,385	5,436	11,925	50,746
Ratio Actives to Annuitants	0.04	2.41	7.39	1.57	0.01	3.70	4.56	1.48

Reconciliation of Active and Annuitant Data (Continued)				
	SERS			PSERS
	Plan 2	Plan 3	Total	Plan 2
2017 Actives	26,697	33,715	60,412	5,822
Transfers	(110)	4,495	4,385	0
Hires/Rehires	3,991	722	4,713	921
New Retirees	(632)	(697)	(1,329)	(40)
Deaths	(29)	(46)	(75)	(5)
Terminations	(2,486)	(3,408)	(5,894)	(518)
2018 Actives	27,431	34,781	62,212	6,180
2017 Annuitants	8,216	7,725	15,941	167
New Retirees	1,036	1,160	2,196	63
Annuitant Deaths	(138)	(102)	(240)	(1)
New Survivors	43	67	110	2
Other	0	0	0	0
2018 Annuitants	9,157	8,850	18,007	231
Ratio Actives to Annuitants	3.00	3.93	3.45	26.75

Reconciliation of Active and Annuitant Data (Continued)							
	LEOFF			WSPRS			All
	Plan 1	Plan 2	Total	Plan 1	Plan 2	Total	Systems
2017 Actives	40	17,694	17,734	464	546	1,010	317,677
Transfers	0	0	0	0	0	0	12,741
Hires/Rehires	0	1,345	1,345	11	75	86	25,470
New Retirees	(13)	(519)	(532)	(29)	0	(29)	(7,451)
Deaths	0	(13)	(13)	0	0	0	(401)
Terminations	(1)	(377)	(378)	(2)	(24)	(26)	(24,545)
2018 Actives	26	18,130	18,156	444	597	1,041	323,491
2017 Annuitants	7,228	4,851	12,079	1,113	0	1,113	177,685
New Retirees	13	610	623	34	0	34	11,621
Annuitant Deaths	(280)	(34)	(314)	(17)	0	(17)	(5,343)
New Survivors	115	17	132	7	0	7	1,206
Other	(2)	(8)	(10)	(1)	0	(1)	(30)
2018 Annuitants	7,074	5,436	12,510	1,136	0	1,136	185,139
Ratio Actives to Annuitants	0.00	3.34	1.45	0.39	N/A	0.92	1.75

Summary of Plan Participants

Summary of Plan Participants								
PERS	2018				2017			
	Plan 1	Plan 2	Plan 3	Total	Plan 1	Plan 2	Plan 3	Total
Active Members								
Number	2,011	122,165	36,707	160,883	2,597	121,934	34,943	159,474
Total Salaries (<i>Dollars in Millions</i>)	\$131	\$8,252	\$2,278	\$10,661	\$163	\$7,926	\$2,090	\$10,179
Average Age	65.9	47.8	43.3	47.0	65.1	47.9	43.3	47.2
Average Service	26.0	12.1	8.2	11.4	25.7	12.1	8.4	11.5
Average Salary	\$65,269	\$67,547	\$62,058	\$66,266	\$62,610	\$65,002	\$59,809	\$63,825
Terminated Members								
Vested	515	28,232	5,914	34,661	660	27,796	5,598	34,054
Non-Vested*	2,782	110,579	0	113,361	3,018	107,483	0	110,501
Total Terminated	3,297	138,811	5,914	148,022	3,678	135,279	5,598	144,555
Annuitants								
Service Retired**	40,601	45,520	4,597	90,718	41,709	41,629	3,919	87,257
Disability Retired	812	1,900	89	2,801	867	1,917	89	2,873
Survivors	5,467	3,244	279	8,990	5,535	2,991	254	8,780
Total Annuitants	46,880	50,664	4,965	102,509	48,111	46,537	4,262	98,910
Avg. Monthly Benefit, All Annuitants***	\$2,091	\$1,676	\$942	\$1,830	\$2,048	\$1,592	\$890	\$1,783
Number of New Service Retirees	726	4,804	724	6,254	819	4,481	591	5,891
Avg. Benefit, New Service Retirees***	\$2,390	\$2,112	\$1,146	\$2,032	\$2,390	\$2,113	\$1,001	\$2,040

*Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

**Includes retirements from active and terminated with vested status.

***Plan 3 benefit amounts represent Defined Benefit portion only.

Summary of Plan Participants (Continued)								
TRS	2018				2017			
	Plan 1	Plan 2	Plan 3	Total	Plan 1	Plan 2	Plan 3	Total
Active Members								
Number	491	20,096	54,432	75,019	698	18,747	53,780	73,225
Total Salaries (<i>Dollars in Millions</i>)	\$45	\$1,407	\$4,473	\$5,924	\$61	\$1,244	\$4,196	\$5,501
Average Age	67.1	41.6	46.2	45.1	66.1	41.7	46.2	45.2
Average Service	32.9	7.6	14.1	12.5	32.3	7.7	14.1	12.6
Average Salary	\$91,688	\$69,990	\$82,168	\$78,968	\$87,446	\$66,374	\$78,023	\$75,130
Terminated Members								
Vested	152	2,729	9,080	11,961	187	2,612	8,914	11,713
Non-Vested*	277	6,729	0	7,006	311	6,300	0	6,611
Total Terminated	429	9,458	9,080	18,967	498	8,912	8,914	18,324
Annuitants								
Service Retired**	30,063	5,130	11,342	46,535	30,776	4,778	9,748	45,302
Disability Retired	484	82	94	660	509	82	86	677
Survivors	2,838	224	489	3,551	2,866	200	430	3,496
Total Annuitants	33,385	5,436	11,925	50,746	34,151	5,060	10,264	49,475
Avg. Monthly Benefit, All Annuitants***	\$2,203	\$2,002	\$1,200	\$1,946	\$2,178	\$1,924	\$1,139	\$1,936
Number of New Service Retirees	247	420	1,653	2,320	302	418	1,406	2,126
Avg. Benefit, New Service Retirees***	\$3,109	\$2,395	\$1,455	\$1,801	\$3,223	\$2,365	\$1,380	\$1,835

*Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

**Includes retirements from active and terminated with vested status.

***Plan 3 benefit amounts represent Defined Benefit portion only.

Summary of Plan Participants (Continued)						
SERS	2018			2017		
	Plan 2	Plan 3	Total	Plan 2	Plan 3	Total
Active Members						
Number	27,431	34,781	62,212	26,697	33,715	60,412
Total Salaries (<i>Dollars in Millions</i>)	\$960	\$1,219	\$2,179	\$885	\$1,127	\$2,012
Average Age	49.6	49.2	49.4	49.8	49.5	49.6
Average Service	8.9	9.6	9.3	9.1	9.9	9.5
Average Salary	\$34,994	\$35,037	\$35,018	\$33,153	\$33,436	\$33,311
Terminated Members						
Vested	6,080	8,753	14,833	5,914	8,403	14,317
Non-Vested*	15,260	0	15,260	13,740	0	13,740
Total Terminated	21,340	8,753	30,093	19,654	8,403	28,057
Annuitants						
Service Retired**	8,471	8,423	16,894	7,566	7,356	14,922
Disability Retired	265	92	357	262	92	354
Survivors	421	335	756	388	277	665
Total Annuitants	9,157	8,850	18,007	8,216	7,725	15,941
Avg. Monthly Benefit, All Annuitants***	\$905	\$501	\$707	\$879	\$480	\$686
Number of New Service Retirees	1,020	1,139	2,159	911	1,033	1,944
Avg. Benefit, New Service Retirees***	\$973	\$581	\$766	\$978	\$537	\$744

*Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

**Includes retirements from active and terminated with vested status.

***Plan 3 benefit amounts represent Defined Benefit portion only.

Summary of Plan Participants (Continued)		
PSERS	2018	2017
Active Members		
Number	6,180	5,822
Total Salaries (<i>Dollars in Millions</i>)	\$399	\$362
Average Age	40.0	40.1
Average Service	6.2	6.0
Average Salary	\$64,619	\$62,247
Terminated Members		
Vested	545	468
Non-Vested*	2,472	2,240
Total Terminated	3,017	2,708
Annuitants		
Service Retired**	207	148
Disability Retired	16	13
Survivors	8	6
Total Annuitants	231	167
Avg. Monthly Benefit, All Annuitants	\$820	\$745
Number of New Service Retirees	59	54
Avg. Benefit, New Service Retirees	\$1,012	\$1,063

*Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

**Includes retirements from active and terminated with vested status.

III. PARTICIPANT DATA

Summary of Plan Participants (Continued)						
LEOFF	2018			2017		
	Plan 1	Plan 2	Total	Plan 1	Plan 2	Total
Active Members						
Number	26	18,130	18,156	40	17,694	17,734
Total Salaries (<i>Dollars in Millions</i>)	\$3	\$1,982	\$1,985	\$5	\$1,879	\$1,883
Average Age	66.9	43.1	43.1	65.8	43.2	43.3
Average Service	42.3	13.9	13.9	41.1	14.2	14.3
Average Salary	\$108,832	\$109,319	\$109,318	\$114,135	\$106,169	\$106,187
Terminated Members						
Vested	1	934	935	0	863	863
Non-Vested*	29	2,055	2,084	29	1,917	1,946
Total Terminated	30	2,989	3,019	29	2,780	2,809
Annuitants						
Service Retired**	2,400	4,733	7,133	2,462	4,200	6,662
Disability Retired	3,023	446	3,469	3,128	409	3,537
Survivors	1,651	257	1,908	1,638	242	1,880
Total Annuitants	7,074	5,436	12,510	7,228	4,851	12,079
Avg. Monthly Benefit, All Annuitants	\$4,342	\$4,070	\$4,224	\$4,181	\$3,894	\$4,066
Number of New Service Retirees***	13	575	588	24	572	596
Avg. Benefit, New Service Retirees***	\$9,177	\$4,896	\$4,991	\$8,455	\$4,798	\$4,945

*Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

**Includes retirements from active and terminated with vested status.

***Includes retirees with disabilities for Plan 1 only.

Summary of Plan Participants (Continued)						
WSPRS	2018			2017		
	Plan 1	Plan 2	Total	Plan 1	Plan 2	Total
Active Members						
Number	444	597	1,041	464	546	1,010
Total Salaries (<i>Dollars in Millions</i>)	\$52	\$55	\$107	\$48	\$45	\$93
Average Age	48.8	33.6	40.1	48.2	33.7	40.4
Average Service	22.0	7.4	13.6	21.4	7.3	13.8
Average Salary	\$116,625	\$92,066	\$102,541	\$102,624	\$82,863	\$91,941
Terminated Members						
Vested	71	34	105	73	31	104
Non-Vested*	17	54	71	17	53	70
Disability Retired**	40	0	40	42	0	42
Total Terminated	128	88	216	132	84	216
Annuitants						
Service Retired***	961	0	961	918	0	918
Survivors	175	0	175	160	0	160
Total Annuitants	1,136	0	1,136	1,113	0	1,113
Avg. Monthly Benefit, All Annuitants	\$4,414	\$0	\$4,414	\$4,287	\$0	\$4,287
Number of New Service Retirees	34	0	34	37	0	37
Avg. Benefit, New Service Retirees	\$4,987	\$0	\$4,987	\$4,389	\$0	\$4,389

*Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

**Benefits provided outside of pension funds.

***Includes retirements from active and terminated with vested status.

2018
Actuarial
Valuation
Report

IV. APPENDICES



Actuarial Methods and Assumptions

To calculate the contribution rates necessary to pre-fund a plan's benefits, an actuary uses an actuarial cost method, an asset valuation method, a funding policy, economic assumptions, and demographic assumptions. The sections below list the methods and assumptions that change regularly or are new since the last actuarial valuation report. Please see the [Actuarial Methods](#) web page for descriptions of the actuarial cost methods and asset valuation method we use for this valuation, and please see the [Actuarial Assumptions](#) web page for descriptions of all remaining assumptions.

Frequently Changing Assumptions

We make an assumption to help us project the value of accumulated employee contributions with interest if a member elects a refund of contributions instead of a deferred retirement allowance upon termination.

PERS 1 and TRS 1 member rates are set in statute at 6 percent. No LEOFF 1 rates are required as long as the plan remains fully funded. Plan 3 members do not contribute to the defined benefit plan.

Member Contribution Rates for Savings Fund Accrual	
System/Plans	Contribution Rate
PERS 2	5.44%
TRS 2	6.39%
SERS 2	5.71%
PSERS 2	6.92%
LEOFF 2	8.54%
WSPRS 1/2	8.45%

Changes in Methods and Assumptions since the Last Valuation

- We increased our TRS general salary growth assumption from 3.50 percent to 8.00 percent for one year. We did this to reflect the impact of higher than expected salary increases provided under collective bargaining agreements adopted in the summer of 2018. We based this decision on salary data for the upcoming year provided by DRS and our professional judgment. We did not see it necessary to make a change to our SERS salary growth assumption. The actual growth may be more or less than assumed and will be reflected in next year's valuation.
- We updated our Cost-of-Living Adjustment (COLA) programming to reflect legislation passed during the 2018 Legislative Session (C151 L18). This law provides PERS and TRS Plan 1 annuitants who are not receiving a basic minimum, alternate minimum, or temporary disability benefit with a one-time permanent 1.5 percent increase to their monthly retirement benefit, not to exceed a maximum of \$62.50 per month.
- We updated our modeling to reflect DRS' policy of providing benefit payments retroactively to the date of initial retirement eligibility for terminated vested members who delay retirement.

Summary of Plan Provisions

The summary of key plan provisions used in the actuarial valuation are provided in two sets of tables. The tables below contain plan provisions that can change frequently while the provisions that change less frequently can be found on the [Summary of General Plan Provisions](#) page of our website.

Please note that at the time of this valuation, sufficient data on the [Total Allocation Portfolio \(TAP\) Annuities](#) available to Plan 3 members was not available. We are in the process of working with DRS to determine the liabilities and assets for this program. We expect to provide further details on these benefits in future valuations.

Summary of Frequently Changing Plan Provisions - PERS			
	Plan 1	Plan 2	Plan 3
COLA	\$2.46 per Month per Year of Service (YOS) on 7/1/19*	Lesser of CPI** or 3%	Lesser of CPI** or 3%
Minimum Benefit per Month	\$62.35* per YOS on 7/1/19, \$1,957.15* for Select Annuitants	N/A	N/A
Material Plan Provision Changes Since Last Valuation	None	None	None
Significant Plan Provisions not Included in this Valuation	None	Portability with First Class Cities***	Total Allocation Portfolio (TAP) Annuities

*Minimum COLA payable to qualified members only; increases by 3% annually. The Uniform COLA was removed under C 362 L 11.

**CPI: Urban Wage Earners & Clerical Workers, Seattle-Tacoma-Bellevue, WA - All Items.

***Data was not available to assess the liability of these portability benefits at the time of this valuation. We expect to provide further details in our next valuation.

Summary of Frequently Changing Plan Provisions - TRS			
	Plan 1	Plan 2	Plan 3
COLA	\$2.46 per Month per Year of Service (YOS) on 7/1/19*	Lesser of CPI** or 3%	Lesser of CPI** or 3%
Minimum Benefit per Month	\$62.35* per YOS on 7/1/19, \$1,957.15* for Select Annuitants	N/A	N/A
Changes in Plan Provisions Since Last Valuation	None	None	None
Significant Plan Provisions not Included in this Valuation	None	None	Total Allocation Portfolio (TAP) Annuities

*Minimum COLA payable to qualified members only; increases by 3% annually. The Uniform COLA was removed under C 362 L 11.

**CPI: Urban Wage Earners & Clerical Workers, Seattle-Tacoma-Bellevue, WA - All Items.

Summary of Frequently Changing Plan Provisions - SERS		
	Plan 2	Plan 3
COLA	Lesser of CPI* or 3%	Lesser of CPI* or 3%
Minimum Benefit per Month	N/A	N/A
Material Plan Provision Changes Since Last Valuation	None	None
Significant Plan Provisions not Included in this Valuation	None	Total Allocation Portfolio (TAP) Annuities

*CPI: Urban Wage Earners & Clerical Workers, Seattle-Tacoma-Bellevue, WA - All Items.

Summary of Frequently Changing Plan Provision - PSERS	
	Plan 2
COLA	Lesser of CPI* or 3%
Minimum Benefit per Month	N/A
Material Plan Provision Changes Since Last Valuation	None
Significant Plan Provisions not Included in this Valuation	None

*CPI: Urban Wage Earners & Clerical Workers, Seattle-Tacoma-Bellevue, WA - All Items.

Summary of Frequently Changing Plan Provisions - LEOFF		
	Plan 1	Plan 2
COLA	Full CPI*	Lesser of CPI* or 3%
Minimum Benefit per Month	N/A	N/A
Material Plan Provision Changes Since Last Valuation	None	Occupational Disease Presumption (C 133 L 19), BIA Transfer (C 366 L 19)
Significant Plan Provisions not Included in this Valuation	None	None

*CPI: Urban Wage Earners & Clerical Workers, Seattle-Tacoma-Bellevue, WA - All Items.

Summary of Frequently Changing Plan Provision - WSPRS		
	Plan 1	Plan 2
COLA	Lesser of CPI* or 3%	Lesser of CPI* or 3%
Minimum Benefit per Month**	\$37.01 per Year of Service (YOS) on 1/1/19	\$37.01 per YOS on 1/1/19
Material Plan Provision Changes Since Last Valuation	None	None
Significant Plan Provisions not Included in this Valuation	None	None

*CPI: Urban Wage Earners & Clerical Workers, Seattle-Tacoma-Bellevue, WA - All Items.

**Amount increases by 3% annually.

These tables present high-level summaries and are not meant to be exhaustive lists. For complete details of plan provisions, please refer to the statutes governing the systems or contact the plan administrator (DRS). In the unlikely event that information contained in these summary tables conflicts with state law, the law takes precedence.

The Office of the State Actuary’s Website

Our website (leg.wa.gov/osa) contains additional information and educational material not included in this report. The site also contains an archive of prior Actuarial Valuation Reports and other recent studies that OSA has produced. The following is a list of materials found on our website that could be useful to the reader.

Glossary

Definitions for frequently used actuarial and pension terms.

Age Distributions

Tables summarizing valuation statistics by system, plan, and member/annuitant age.

Historical Data

Tables summarizing valuation statistics by retirement system and valuation period.

Prior Actuarial Valuation Reports

Archive of valuations over the past several years.

2017 Report on Financial Condition and Economic Experience Study

Report examining the financial health of the retirement systems and long-term economic assumptions.

2019 Report on Financial Condition and Economic Experience Study

Report examining the financial health of the retirement systems and long-term economic assumptions.

2007-2012 Demographic Experience Study

Most recent report examining demographic behavior within each of the retirement systems.

2016 Risk Assessment

Information examining the effect of unexpected experience on the retirement systems.

Commentary on Risk

Educational information on the risks inherent in our actuarial measurements and how these measurements could vary under different circumstances.

Contribution Rate Projections

Forecasts for future contribution rates based on projected assets and liabilities.

Interactive Reports

Set of reports displaying funded status, projected benefit payments, and contribution rates that vary by key inputs the user selects.

WASHINGTON STATE

2018 Actuarial Valuation

September • 2019



Office of the
State Actuary

*“Supporting financial
security for generations.”*

leg.wa.gov/osa