

WASHINGTON STATE 2020 ACTUARIAL VALUATION

AUGUST • 2021



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Letter of Introduction and Actuarial Certification Actuarial Valuation Report As of June 30, 2020

August 2021

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 purpose of this valuation is to provide an update on the funding progress of the systems listed above based on a June 30, 2020, valuation/measurement date. This report represents a “non-rate setting” valuation, meaning we use alternative methods to determine results and do not calculate current contribution rates for the systems. Instead, we update key plan funding measures and reflect material developments in the plan over the past year. This report should not be used for other purposes and is not intended to satisfy the accounting requirements under the Governmental Accounting Standards Board rules. Please replace this report with a more recent report when available.

To produce measures at June 30, 2020, unless otherwise noted we relied on the same data, assets, methods, and assumptions as the [June 30, 2019, Actuarial Valuation Report](#) (AVR). We projected the data forward one year reflecting assumed new hires and current members exiting the plan as expected. We estimated June 30, 2020, assets by relying on the Fiscal Year (FY)-end 2019 assets, reflecting actual investment performance over FY 2020, and reflecting assumed contribution amounts and benefit payments during FY 2020. We reviewed the actual June 30, 2020, participant and financial data to determine if any material changes to our projection assumptions were necessary. We also considered any material impacts to the plans from 2021 legislation. We believe these methods are reasonable and appropriate for the primary purpose stated above. Please see the **Actuarial Assumptions and Methods** section of this report for more information.

For all plans except for LEOFF 2, the assumptions used in this valuation for investment return, inflation, and salary growth were prescribed by the Pension Funding Council (PFC) and are subject to revision by the Legislature. For LEOFF 2, these assumptions are prescribed by the LEOFF 2



Retirement Board. Please see our [2019 Economic Experience Study](#) (EES) for further information on economic assumptions. We developed the demographic assumptions used in this valuation during the [2013-2018 Demographic Experience Study](#). The Legislature prescribed the actuarial cost and asset valuation methods. We also relied on assumptions and methods documented on our [Projection Disclosures](#) webpage to project the participant data file forward one year to the new measurement date (along with additional adjustments described later in this report). In our opinion, all data, methods, assumptions, and calculations are reasonable for the purposes of this measurement and are in conformity with generally accepted actuarial principles and standards of practice as of the date of this publication. The use of different data, methods, or assumptions could also be reasonable and could produce materially different results.

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. The [Risk Assessment](#) page of our website provides further information on the range and likelihood of potential outcomes that vary from expected results. The [Commentary on Risk](#) page of our website provides additional risk education.

This report is organized in the following sections:

- ❖ Summary of Key Results.
- ❖ Actuarial Exhibits.
- ❖ Participant Data.
- ❖ Actuarial Assumptions and Methods.

The **Summary of Key Results** provides a high-level summary of the valuation results for all systems combined including commentary on risk, funding policy, and key plan provisions. The **Actuarial Exhibits** provide detailed actuarial asset and liability information by retirement system. The **Participant Data** section provides key metrics of the participant data for each retirement system such as headcounts, average benefits, and average salary. **Actuarial Assumptions and Methods** contains principal actuarial assumptions and methods used in this valuation including details on the projection of 2019 data to 2020.

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. We encourage you to submit any questions you might have concerning this report to our mailing address or email address at state.actuary@leg.wa.gov.

Sincerely,

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

Michael T. Harbour, ASA, MAAA
Actuary

A photograph of a vineyard at sunrise or sunset. The sun is low on the horizon, creating a bright sunburst effect through the green leaves of the grapevines in the foreground. The vineyard rows stretch into the distance, leading to a valley with rolling hills under a sky with soft, white clouds. Overlaid on the image are several thick, curved, semi-transparent lines in shades of blue and teal, starting from the top left and curving towards the bottom right.

I. SUMMARY OF KEY RESULTS

I. SUMMARY OF KEY RESULTS

COMMENTS ON 2020 RESULTS

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

For this valuation, we considered actual plan and asset experience over FY 2020 and if this experience materially deviated from our estimation of the June 30, 2020, data file and assets. We also considered the impacts of the COVID-19 health crisis and any significant changes from the 2021 Legislative Session.

Based on our review, we adjusted our General Salary Growth and System Growth assumptions for FY 2020 to reflect actual changes over this period. Annual experience in salaries and the number of new hires tends to be volatile and may have a material impact on plan measures. Please see **Actuarial Assumptions and Methods** for details on the specific adjustments we made. Otherwise, we determined our other assumptions reasonably approximated actual plan experience for the purpose of this report, and we made no additional changes. We further observed no significant changes in the retirement system provisions from the 2021 Legislative Session, nor identified additional adjustments specific to the COVID-19 health crisis.

[Engrossed Substitute Senate Bill 5092](#), which passed during the 2021 Legislative Session, allocates \$800 million on June 30, 2023, to the TRS Plan 1 unfunded actuarial accrued liability. This transfer occurs after the measurement date of this valuation and is not reflected in this measurement. The expected Impact of the State's 2021-23 Budget on TRS 1 can be found on our [website](#).

Detailed gain and loss information by system can be found in the **Actuarial Exhibits** section of this report.

ACTUARIAL LIABILITIES

We show two measures for actuarial liabilities. 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 (PVFB) represents today's value of all future benefits when discounted at the valuation interest rate. 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.

Actuarial Liabilities		
(Dollars in Millions)	2020	2019
All Systems		
Future Value of Fully Projected Benefits*	\$808,336	\$767,739
Present Value of Fully Projected Benefits	\$132,347	\$126,001
Actuarial Accrued Liability	\$109,198	\$104,020
Valuation Interest Rate**	7.50%	7.50%

*Excludes additional TAP annuities purchased from Plan 3 defined contribution accounts over FY 2020.

**7.40% in LEOFF 2.

See the **Actuarial Exhibits** section of this report for a summary of actuarial liabilities by system and plan.

ASSETS

The following table shows the combined Market Value of Assets (MVA) and Actuarial Value of Assets (AVA) for all systems. The actual investment return on the MVA of the total Comingled Trust Fund was 4.53 percent over FY 2020, which is below the assumed return.

We develop an AVA to limit the volatility in the reported funded status due to annual investment earnings. We smooth (or defer recognition of) the difference between actual and expected annual investment returns over a specific period not to exceed eight years. The number of years of smoothing depends on the magnitude of the gain or loss. The AVA must remain within a 30 percent corridor around the MVA.

Assets—All Systems	
<i>(Dollars in Millions)</i>	
2019 Market Value	\$100,349
Estimated Contributions	\$4,414
Estimated Disbursements	(\$5,197)
Estimated Investment Returns	\$4,539
Adjustments to Market Value*	\$116
Estimated 2020 Market Value	\$104,221
FY 2020 Investment Return	4.53%
Deferred Gains/(Losses)	\$251
Estimated 2020 Actuarial Value	\$103,970
2019 Actuarial Value	\$95,987

*Adjustments for additional Plan 3 TAP annuity purchases over FY 2020.

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

FUNDED STATUS

The following table displays a summary of funded status combined across all retirement systems. Please see the **Actuarial Exhibits** section for information on individual systems.

Funded Status—All Systems		
<i>(Dollars in Millions)</i>	2020	2019
Actuarial Accrued Liability (A)	\$109,198	\$104,020
Actuarial Value of Assets (B)	\$103,970	\$95,987
Unfunded Accrued Liability (A) - (B)	\$5,229	\$8,033
Funded Ratio (B) / (A)	95%	92%

Funded status is one of several measures that helps to explain the health of a pension plan. The funded status represents the portion of the actuarial accrued liabilities covered by today's actuarial assets under our assumptions for the future. This means a plan with 100 percent funded status has one dollar in actuarial assets for each dollar of accrued liabilities at the valuation date. We generally consider a plan with funded status around 100 percent to be on target with funding. However, funded status above/below 100 percent is not automatically considered over-funded/at-risk. The funded status presented in this report are not sufficient to determine whether a plan has enough assets to terminate or settle the plan obligations. Furthermore, a plan with a funded status above 100 percent may still require ongoing contributions. See the 2019 AVR (the last "rate-setting valuation") for additional details.

SUMMARY OF PARTICIPANT DATA

The following table summarizes the estimated participant data used in the actuarial valuation for the plan year ending June 30, 2020, along with information from last year's valuation. The 2020 valuation data was determined by relying on the 2019 data and applying assumptions to estimate the number of members and changes in salaries. See the **Participant Data** section of the report for participant data summarized by system and plan. The **Actuarial Assumptions and Methods** section provides more details on how we calculated the 2020 data.

I. SUMMARY OF KEY RESULTS

Summary of All Plan Participants		
	2020 Projected	2019 Actual
Active Members		
Number	337,631	330,445
Total Salaries (in Millions)	\$25,634	\$23,148
Average Salary	\$75,924	\$70,052
Average Age	45.9	46.5
Average Service	10.7	11.1
Terminated Vested Members		
Number	69,346	64,157
Retirees and Beneficiaries		
Number	199,065	192,866
Average Monthly Benefit*	\$2,056	\$1,983

*Excludes additional TAP annuities purchased from Plan 3 defined contribution accounts.

KEY ASSUMPTIONS

This table shows key economic assumptions used in this actuarial valuation. There were no changes in these assumptions from our prior year's valuation. Please see our 2019 EES for information on the development of these assumptions and the asset allocation policy.

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

*7.40% in LEOFF 2.

COMMENTARY ON RISK

Actuarial Standards of Practice (ASOP) guide actuaries when performing and communicating their work. [ASOP No. 51](#) – Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions is specific to communicating risk in defined benefit pension plans, particularly in how actual future measurements may differ significantly from expected future measurements. 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, we have developed a [Commentary on Risk](#) webpage which can be found on our website.

FUNDING POLICY AND CONTRIBUTION RATES

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 Revised Code of Washington \(RCW\)](#) – Actuarial Funding of State Retirement Systems. If all actuarial assumptions are realized and all future contributions required under the funding policy are made, we expect the funding policy to accumulate sufficient assets to provide for all future benefits for current members when due.

We did not calculate contribution rates as part of this non-rate setting and even-numbered year valuation. Under current Washington State law, the PFC reviews, and may adopt, contribution rates developed in odd-numbered year valuations. The PFC last considered contribution rates from the 2019 valuation and adopted rates for the 2021-23 Biennium. The following table shows key information for the contribution rate-setting process in the current and surrounding biennia.

Contribution Rate-Setting Process			
Contribution Rate Collection Period			
	2021-23 Biennium	2023-25 Biennium	2025-27 Biennium
Actuarial Valuation Date	June 30, 2019	June 30, 2021	June 30, 2023
Asset Returns Included	Returns through June 30, 2019	Returns through June 30, 2021	Returns through June 30, 2023
Rates Adopted During	Summer of 2020	Summer of 2022	Summer of 2024

In addition to calculating contribution rates in the 2019 AVR, we also estimate contribution rates for the 2023-25 and 2025-27 Biennia from projected assets and liabilities available on our [website](#). Please note these projections will change annually after the publication of this report based on modifications to plan provisions, assumptions, methods, and actual experience of the systems.

SUMMARY OF PLAN PROVISIONS

We provide a list of key plan provisions that change frequently in the plan provisions section of the [prior valuation](#). Our website contains the tables for provisions that change less frequently on the [Summary of General Plan Provisions](#) page. No significant plan provisions were excluded from this valuation. There were no changes to plan provisions during the 2021 Legislative Session that impacted results.

II. ACTUARIAL EXHIBITS



KEY RESULTS BY SYSTEM

The following tables show the liability, assets, and funded status calculations for each system and plan as of the June 30, 2020, measurement date. Please keep in mind a few important notes on funded status. A plan with a funded status above 100 percent will still require future contributions if the plan has not yet accumulated sufficient assets to cover the PVFB. As of this valuation, only LEOFF 1 is projected to have sufficient assets to cease ongoing contributions. The funded status will change with the use of assumptions and methods that vary from this report. Please visit our [Interactive Reports](#) webpage for funded status measures that vary by interest rate and asset valuation method under the latest rate setting valuation.

Actuarial Results by System*					
	PERS		TRS	SERS	
(Dollars in Millions)	Plan 1	Plan 2/3	Plan 1	Plan 2/3	Plan 2/3
Future Value of Fully Projected Benefits**					
Total	\$22,649	\$332,788	\$16,146	\$223,504	\$52,102
Present Value of Fully Projected Benefits					
Active Members	\$428	\$33,784	\$131	\$17,630	\$5,276
Inactive Members	\$10,763	\$21,201	\$7,981	\$7,272	\$3,433
Total	\$11,192	\$54,985	\$8,111	\$24,902	\$8,709
Entry Age Normal Actuarial Accrued Liability					
Active Members	\$397	\$24,359	\$124	\$10,995	\$3,558
Inactive Members	\$10,763	\$21,201	\$7,981	\$7,272	\$3,433
Total (A)	\$11,160	\$45,559	\$8,105	\$18,267	\$6,991
Assets					
Market Value of Assets	\$7,722	\$44,567	\$5,769	\$16,975	\$6,490
Actuarial Value of Assets (B)	\$7,686	\$44,497	\$5,721	\$16,967	\$6,485
Funded Ratio					
Unfunded Accrued Liability (A) - (B)	\$3,474	\$1,062	\$2,383	\$1,300	\$506
2020 Funded Ratio (B) / (A)	69%	98%	71%	93%	93%
Historical Funded Ratio					
2019	65%	96%	66%	91%	91%
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% (7.4% for LEOFF 2).

**Excludes additional TAP annuities purchased from Plan 3 defined contribution accounts over FY 2020.

II. ACTUARIAL EXHIBITS

Actuarial Results by System* (Continued)					
	PSERS	LEOFF	WSPRS	Total	
<i>(Dollars in Millions)</i>	Plan 2	Plan 1	Plan 2	Plan 1/2	All Systems
Future Value of Fully Projected Benefits**					
Total	\$19,344	\$8,561	\$123,878	\$9,365	\$808,336
Present Value of Fully Projected Benefits					
Active Members	\$1,507	\$25	\$11,639	\$669	\$71,089
Inactive Members	\$122	\$3,948	\$5,561	\$977	\$61,258
Total	\$1,629	\$3,974	\$17,200	\$1,645	\$132,347
Entry Age Normal Actuarial Accrued Liability					
Active Members	\$692	\$25	\$7,343	\$447	\$47,940
Inactive Members	\$122	\$3,948	\$5,561	\$977	\$61,258
Total (A)	\$814	\$3,973	\$12,905	\$1,424	\$109,198
Assets					
Market Value of Assets	\$821	\$5,919	\$14,573	\$1,384	\$104,221
Actuarial Value of Assets (B)	\$821	\$5,893	\$14,520	\$1,379	\$103,970
Funded Ratio					
Unfunded Accrued Liability (A) - (B)	(\$7)	(\$1,920)	(\$1,616)	\$45	\$5,229
2020 Funded Ratio (B) / (A)	101%	148%	113%	97%	95%
Historical Funded Ratio					
2019	101%	141%	111%	95%	92%
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).

**Excludes additional TAP annuities purchased from Plan 3 defined contribution accounts over FY 2020.

PLAN ASSETS

The following tables show the estimated change in the MVA and AVA over the prior year. We calculated the AVA by smoothing or deferring investment gains or losses and recognizing past deferred assets consistent with funding policy in [RCW 41.45.035](#). Please see **Actuarial Assumptions and Methods** for investment returns by plan used in these calculations for FY 2020.

Change in Assets					
(Dollars in Millions)	PERS		TRS		SERS
	Plan 1	Plan 2/3	Plan 1	Plan 2/3	Plan 2/3
Reconciliation of Market Value of Assets					
2019 Market Value	\$7,851	\$42,532	\$5,880	\$15,943	\$6,118
Estimated Contributions	\$725	\$1,637	\$522	\$723	\$311
Estimated Disbursements	(\$1,196)	(\$1,574)	(\$887)	(\$487)	(\$237)
Estimated Investment Returns	\$342	\$1,937	\$255	\$734	\$281
Adjustments to Market Value*	N/A	\$36	N/A	\$62	\$17
Estimated 2020 Market Value (A)	\$7,722	\$44,567	\$5,769	\$16,975	\$6,490
Development of Actuarial Value of Assets					
Prior Deferred Investment Gain/(Loss)					
Plan Year Ending 6/30/2019	\$0	\$0	\$0	\$0	\$0
Plan Year Ending 6/30/2018	\$0	\$0	\$0	\$0	\$0
Plan Year Ending 6/30/2017	\$179	\$839	\$152	\$299	\$117
Plan Year Ending 6/30/2016	(\$67)	(\$259)	(\$54)	(\$91)	(\$36)
Plan Year Ending 6/30/2015	\$0	\$0	\$0	\$0	\$0
Plan Year Ending 6/30/2014	\$96	\$326	\$79	\$113	\$45
Total Prior Deferred Investment Gain/(Loss) (B)	\$208	\$907	\$177	\$321	\$126
2020 Deferred Investment Gain/(Loss) (C)	(\$172)	(\$837)	(\$129)	(\$314)	(\$121)
Estimated 2020 Actuarial Value (A) - (B) - (C)	\$7,686	\$44,497	\$5,721	\$16,967	\$6,485

*Adjustments for additional Plan 3 TAP annuity purchases over FY 2020.

Change in Assets (Continued)					
(Dollars in Millions)	PSERS	LEOFF		WSPRS	Total
	Plan 2	Plan 1	Plan 2*	Plan 1/2	All Systems
Reconciliation of Market Value of Assets					
2019 Market Value	\$717	\$6,029	\$13,916	\$1,362	\$100,349
Estimated Contributions	\$81	\$0	\$385	\$30	\$4,414
Estimated Disbursements	(\$12)	(\$372)	(\$363)	(\$68)	(\$5,197)
Estimated Investment Returns	\$35	\$262	\$634	\$61	\$4,539
Adjustments to Market Value**	N/A	N/A	N/A	N/A	N/A
Estimated 2020 Market Value (A)	\$821	\$5,919	\$14,573	\$1,384	\$104,221
Development of Actuarial Value of Assets					
Prior Deferred Investment Gain/(Loss)					
Plan Year Ending 6/30/2019	\$0	\$0	\$0	\$0	\$0
Plan Year Ending 6/30/2018	\$0	\$0	\$0	\$0	\$0
Plan Year Ending 6/30/2017	\$12	\$139	\$291	\$29	\$2,057
Plan Year Ending 6/30/2016	\$0	(\$50)	(\$83)	(\$10)	(\$648)
Plan Year Ending 6/30/2015	\$0	\$0	\$0	\$0	\$0
Plan Year Ending 6/30/2014	\$3	\$68	\$110	\$13	\$853
Total Prior Deferred Investment Gain/(Loss) (B)	\$15	\$158	\$317	\$32	\$2,262
2020 Deferred Investment Gain/(Loss) (C)	(\$14)	(\$132)	(\$265)	(\$27)	(\$2,011)
Estimated 2020 Actuarial Value (A) - (B) - (C)	\$821	\$5,893	\$14,520	\$1,379	\$103,970

*In accordance with RCW 41.26.805 LEOFF 2 BIA assets have been excluded from this measurement. The LEOFF 2 BIA assets were \$22 million and \$342 million in 2019 and 2020, respectively. The LEOFF 2 assets for 2019 also exclude the \$300 million payable to the BIA effective 7/1/2019 (C 366 L 19).

**Adjustments for additional Plan 3 TAP annuity purchases over FY 2020.

ACTUARIAL GAIN/LOSS

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/increase funded status; actuarial losses will increase contribution rates/decrease funded status. Under a reasonable set of actuarial assumptions, actuarial gains and losses will offset over long-term experience periods. The following tables display actuarial gains and losses expressed as the change in unfunded PVFB. Unfunded PVFB is the difference between PVFB (today's value of all future benefits when discounted at the valuation interest rate) and the AVA. It is used in the development of normal cost contribution rates in rate-setting valuations. This is a useful metric for actuarial gain/loss because it reflects changes in liabilities for both current members and those projected to be hired in FY 2020 along with any changes in plan assets.

(Gain)/Loss Analysis					
Change in Unfunded PVFB by Source					
	PERS		TRS		SERS
<i>(Dollars in Millions)</i>	Plan 1	Plan 2/3	Plan 1	Plan 2/3	Plan 2/3
(1) 2019 Unfunded PVFB	\$4,114	\$10,827	\$2,857	\$7,857	\$2,224
(2) Expected Change	(\$670)	(\$1,859)	(\$510)	(\$509)	(\$291)
Expected 2020 Unfunded PVFB	\$3,444	\$8,968	\$2,347	\$7,348	\$1,933
Differences Between Actual and Expected Experience					
Salaries	4	406	(0)	(119)	73
System Growth	0	696	0	548	158
Investment Returns	57	419	43	157	60
Software Update	0	0	0	0	0
Adjustment for TAP Annuity Purchases	N/A	0	N/A	0	0
Incremental Changes					
Plan Change	0	0	0	0	0
Method Change	0	0	0	0	0
Assumption Change	0	0	0	0	0
Correction Change	0	0	0	0	0
(3) Total Change from Experience	\$62	\$1,520	\$43	\$586	\$291
(4) Laws of 2021	\$0	\$0	\$0	\$0	\$0
2020 Unfunded PVFB (1 + 2 + 3 + 4)	\$3,505	\$10,488	\$2,390	\$7,934	\$2,224

(Gain)/Loss Analysis (Continued)				
Change in Unfunded PVFB by Source				
	PSERS	LEOFF	WSPRS	
<i>(Dollars in Millions)</i>	Plan 2	Plan 1	Plan 2	Plan 1/2
(1) 2019 Unfunded PVFB	\$701	(\$1,657)	\$2,802	\$288
(2) Expected Change	(\$45)	(\$283)	(\$540)	(\$43)
Expected 2020 Unfunded PVFB	\$656	(\$1,940)	\$2,263	\$246
Differences Between Actual and Expected Experience				
Salaries/LEOFF 1 Inflation	40	(24)	20	(6)
System Growth	105	0	265	14
Investment Returns	7	44	132	13
Software Update	0	0	1	0
Adjustment for TAP Annuity Purchases	N/A	N/A	N/A	N/A
Incremental Changes				
Plan Change	0	0	0	0
Method Change	0	0	0	0
Assumption Change	0	0	0	0
Correction Change	0	0	0	0
(3) Total Change from Experience	\$153	\$20	\$417	\$21
(4) Laws of 2021	\$0	\$0	\$0	\$0
2020 Unfunded PVFB (1 + 2 + 3 + 4)	\$808	(\$1,919)	\$2,680	\$266

III. PARTICIPANT DATA

PROJECTION OF DATA TO 2020

The following tables illustrate the projection of actual 2019 participant data to 2020. The **Actuarial Assumptions and Method** section includes details on this calculation.

Projection of Active and Annuitant Data to 2020					
	PERS		TRS		SERS
	Plan 1	Plan 2/3	Plan 1	Plan 2/3	Plan 2/3
2019 Actives	1,538	160,501	350	76,912	63,766
Hires/Rehires	0	18,616	0	6,775	8,506
New Retirees	(341)	(5,002)	(119)	(1,694)	(2,211)
Deaths	(7)	(240)	(2)	(69)	(101)
Terminations	(12)	(11,038)	0	(2,761)	(4,535)
2020 Actives	1,178	162,837	229	79,163	65,425
2019 Annuitants	45,633	60,632	32,570	19,556	20,043
New Annuitants	814	5,662	410	1,822	2,389
Annuitant Deaths	(2,162)	(1,442)	(1,255)	(241)	(368)
2020 Annuitants	44,285	64,852	31,725	21,137	22,064
Ratio Actives to Annuitants	0.03	2.51	0.01	3.75	2.97

Projection of Active and Annuitant Data to 2020 (Continued)				
	PSERS	LEOFF		WSPRS
	Plan 2	Plan 1	Plan 2	Plan 1/2
2019 Actives	7,758	20	18,557	1,043
Hires/Rehires	1,802	0	1,079	56
New Retirees	(103)	(10)	(508)	(33)
Deaths	(7)	0	(17)	(1)
Terminations	(554)	0	(272)	(11)
2020 Actives	8,896	10	18,839	1,054
2019 Annuitants	296	6,891	6,064	1,181
New Annuitants	109	213	542	54
Annuitant Deaths	(3)	(296)	(56)	(29)
2020 Annuitants	402	6,808	6,550	1,206
Ratio Actives to Annuitants	22.13	0.00	2.88	0.87

SUMMARY OF PLAN PARTICIPANTS

The following tables detail the participant data we relied on for each system for the June 30, 2020, measurement date and a comparison to actual 2019 participant data.

Summary of Plan Participants—PERS				
	2020 Projected		2019 Actual	
	Plan 1	Plan 2/3	Plan 1	Plan 2/3
Active Members				
Number	1,178	162,837	1,538	160,501
Total Salaries (Dollars in Millions)	\$88	\$12,148	\$105	\$11,031
Average Age	67.5	46.1	66.6	46.7
Average Service	26.9	10.8	26.2	11.0
Average Salary	\$74,541	\$73,206	\$68,120	\$68,725
Terminated Members				
Vested	394	37,705	396	35,012
Annuitants				
Service Retired*	38,545	58,923	39,521	54,829
Disability Retired	718	2,034	754	1,961
Survivors	5,022	3,895	5,358	3,842
Total Annuitants	44,285	64,852	45,633	60,632
Avg. Monthly Benefit, All Annuitants**	\$2,186	\$1,874	\$2,159	\$1,703

Note: Totals may not agree due to rounding.

*Includes retirements from active and terminated with vested status.

**Excludes additional TAP annuities purchased from Plan 3 defined contribution accounts.

Summary of Plan Participants—TRS				
	2020 Projected		2019 Actual	
	Plan 1	Plan 2/3	Plan 1	Plan 2/3
Active Members				
Number	229	79,163	350	76,912
Total Salaries (Dollars in Millions)	\$25	\$7,514	\$36	\$6,767
Average Age	68.9	44.5	68.0	45.0
Average Service	34.2	12.2	33.4	12.3
Average Salary	\$110,064	\$92,563	\$102,091	\$87,982
Terminated Members				
Vested	118	12,793	119	11,654
Annuitants				
Service Retired*	28,641	20,113	29,275	18,590
Disability Retired	427	198	453	179
Survivors	2,657	826	2,842	787
Total Annuitants	31,725	21,137	32,570	19,556
Avg. Monthly Benefit, All Annuitants**	\$2,264	\$1,657	\$2,262	\$1,519

Note: Totals may not agree due to rounding.

*Includes retirements from active and terminated with vested status.

**Excludes additional TAP annuities purchased from Plan 3 defined contribution accounts.

Summary of Plan Participants—SERS		
	2020 Projected	2019 Actual
	Plan 2/3	Plan 2/3
Active Members		
Number	65,425	63,766
Total Salaries (Dollars in Millions)	\$2,735	\$2,453
Average Age	48.5	49.2
Average Service	8.8	9.1
Average Salary	\$41,838	\$38,462
Terminated Members		
Vested	16,480	15,271
Annuitants		
Service Retired*	20,776	18,835
Disability Retired	403	367
Survivors	885	841
Total Annuitants	22,064	20,043
Avg. Monthly Benefit, All Annuitants**	\$805	\$733

Note: Totals may not agree due to rounding.

*Includes retirements from active and terminated with vested status.

**Excludes additional TAP annuities purchased from Plan 3 defined contribution accounts.

Summary of Plan Participants—PSERS		
	2020 Projected	2019 Actual
	Plan 2	Plan 2
Active Members		
Number	8,896	7,758
Total Salaries (Dollars in Millions)	\$656	\$529
Average Age	39.6	40.4
Average Service	5.3	5.4
Average Salary	\$73,707	\$68,236
Terminated Members		
Vested	774	629
Annuitants		
Service Retired*	363	266
Disability Retired	23	18
Survivors	16	12
Total Annuitants	402	296
Avg. Monthly Benefit, All Annuitants	\$1,055	\$900

Note: Totals may not agree due to rounding.

*Includes retirements from active and terminated with vested status.

III. PARTICIPANT DATA

Summary of Plan Participants—LEOFF				
	2020 Projected		2019 Actual	
	Plan 1	Plan 2	Plan 1	Plan 2
Active Members				
Number	10	18,839	20	18,557
Total Salaries (Dollars in Millions)	\$1	\$2,349	\$2	\$2,117
Average Age	66.2	42.8	67.8	42.8
Average Service	43.0	13.6	43.3	13.6
Average Salary	\$114,273	\$124,681	\$106,597	\$114,085
Terminated Members				
Vested	1	968	1	969
Annuitants				
Service Retired*	2,328	5,764	2,322	5,312
Disability Retired	2,898	508	2,904	473
Survivors	1,582	278	1,665	279
Total Annuitants	6,808	6,550	6,891	6,064
Avg. Monthly Benefit, All Annuitants	\$4,548	\$4,562	\$4,507	\$4,260

Note: Totals may not agree due to rounding.

*Includes retirements from active and terminated with vested status.

Summary of Plan Participants—WSPRS		
	2020 Projected	2019 Actual
	Plan 1/2	Plan 1/2
Active Members		
Number	1,054	1,043
Total Salaries (Dollars in Millions)	\$118	\$109
Average Age	39.6	39.7
Average Service	13.2	13.3
Average Salary	\$112,364	\$104,592
Terminated Members		
Vested	113	106
Disability Retired*	36	37
Annuitants		
Service Retired**	1,027	996
Survivors	179	185
Total Annuitants	1,206	1,181
Avg. Monthly Benefit, All Annuitants	\$4,845	\$4,611

Note: Totals may not agree due to rounding.

*Benefits provided outside of pension fund.

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

The background of the page is a scenic photograph of a river flowing through a forest. The river is in the foreground, with large, smooth, reddish-brown rocks scattered throughout. The water is clear and appears to be moving quickly, creating a white, frothy texture. The forest is dense with green trees, and the sky is a pale, overcast blue. A blue banner is positioned at the top of the page, containing the section header. Three diagonal, semi-transparent ribbons in shades of blue and green cross the page from the top left towards the bottom right.

IV. ACTUARIAL ASSUMPTIONS AND METHODS

IV. ACTUARIAL ASSUMPTIONS AND METHODS

To calculate the plan funding metrics in this valuation, we relied on an asset valuation method, funding policy, economic assumptions, and demographics assumptions. This section details methods and assumptions we made to produce data as of June 30, 2020, from the prior data file. Unless otherwise noted, all other methods and assumptions are consistent with the 2019 AVR. Please see the [Actuarial Methods](#) webpage for descriptions of the actuarial cost methods and asset valuation method we use for this valuation, and the [Actuarial Assumptions](#) webpage for descriptions for all remaining assumptions.

To determine appropriate assumptions and methods for purposes of projecting the data one year forward, we consulted [ASOP No. 4 – Measuring Pension Obligations and Determining Pension Plan Costs or Contributions](#). This standard provides guidance to actuaries when measuring obligations under a pension plan and includes a section on adjustments of results from a prior measurement. The adjustments we made are noted in the following sub-sections.

2020 PARTICIPANT DATA FILE

To estimate participant data on the measurement date of June 30, 2020, we relied on the June 30, 2019, participant data file. To project the participant data forward one year, we relied on the following sources for our assumptions.

- ❖ The *2013-2018 Demographic Experience Study* to project the number of members exiting the system due to termination, disability, death, and retirement.
- ❖ The 2019 EES to project general salary increases.
- ❖ The *2016 Risk Assessment Assumptions Study* (RAAS) to project the demographics of new members joining the retirement systems. Summary information is available on our [Projections Disclosures](#) webpage.

We reviewed actual plan experience over FY 2020 to evaluate material differences with our assumptions and methods. Based on this review, we made the following adjustments to our General Salary Growth and System Growth assumptions for FY 2020 to more closely model actual experience.

General Salary Growth Assumption					
	PERS		TRS		SERS
	Plan 1	Plan 2/3	Plan 1	Plan 2/3	Plan 2/3
Prior Assumption	3.50%	3.50%	3.50%	3.50%	3.50%
Adjusted Assumption for FY 2020	5.30%	5.00%	3.40%	2.80%	5.20%

General Salary Growth Assumption (Continued)				
	PSERS	LEOFF		WSPRS
	Plan 2	Plan 1	Plan 2	Plan 1/2
Prior Assumption	3.50%	3.50%	3.50%	3.50%
Adjusted Assumption for FY 2020	6.60%	N/A	3.70%	2.50%

System Growth Assumption						
	PERS	TRS	SERS	PSERS	LEOFF	WSPRS
Prior RAAS Assumption	0.95%	0.95%	0.95%	0.95%	0.80%	0.85%
Adjusted Assumption for FY 2020	1.28%	2.76%	2.43%	14.67%	1.46%	1.05%

The Department of Retirement System provided, and we included additional assets from Plan 3 members purchasing TAP annuities over FY 2020. These annuities are purchased using factors that create no expected unfunded cost to the retirement systems, also known as “actuarial equivalence”. We, therefore, for this measurement, included corresponding liabilities equal to the additional assets.

We also adjusted our Inflation assumption for LEOFF 1 from 2.75 percent to 2.14 percent for FY 2020 to match actual experience. LEOFF 1 liabilities are sensitive to changes in inflation because the majority of the LEOFF 1 population is retired and it has a different cost-of-living adjustment structure than other plans. Otherwise, we made no changes to our prior assumptions to calculate the 2020 participant data.

The tables in the **Summary of Plan Participants** section of this report show the projected population from 2019 to 2020 using the assumptions outlined in this section.

2020 ASSETS

We developed a June 30, 2020, MVA estimate by relying on the actual investment performance of each plan over FY 2020 and including mid-year contributions and benefit payments based on our assumptions. The resulting estimate for investment returns, benefit payments, and contributions were compared with the actual MVA to determine if changes to our methods were necessary. We calculated the AVA by smoothing the total earnings and recognizing past smoothed assets consistent with funding policy in RCW 41.45.035. Please see the Plan Assets section of the **Actuarial Exhibits** for the calculation of the AVA.

The following tables outline the investment returns by plan over FY 2020 and the smoothing period. The length of the smoothing period is dependent on the investment return of the plan. For a complete list of the potential smoothing periods under current funding policy, please see the [Actuarial Methods](#) page of our website.

FY 2020 Investment Returns					
	PERS		TRS		SERS
	Plan 1	Plan 2/3	Plan 1	Plan 2/3	Plan 2/3
Asset Returns	4.49%	4.55%	4.48%	4.57%	4.56%
Smoothing Period (Years)	4	3	4	3	3

FY 2020 Investment Returns (Continued)				
	PSERS	LEOFF		WSPRS
	Plan 2	Plan 1	Plan 2	Plan 1/2
Asset Returns	4.63%	4.48%	4.55%	4.51%
Smoothing Years	3	4	3	3

COMMENTS ON VALUATION MODEL

As required under [ASOP No. 56 – Modeling](#), we share the following comments related to our reliance on the ProVal® software developed by [Winklevoss Technologies](#).

- ❖ We understand this software model was primarily created for use by actuaries when performing valuations and projections of pension and retiree medical plans. The use of the model for this analysis is appropriate given its intended purpose.
- ❖ For this valuation, we utilize the core projection feature within the model as part of developing actuarial measurements as of a future point in time. Our independent estimates indicate that the resulting outputs are reasonable for purposes of this valuation.
- ❖ To assess the general operation of the model, we reviewed the output for reasonableness. This includes comparing the results to our simplified estimates done in Microsoft Excel and examining sample lives to confirm the programming is working as intended. We are not aware of any known weaknesses or limitations of the model that have a material impact on the results.

Additionally, we considered how the use of different inputs to the model (e.g., data/assumptions/provisions) produce different results and evaluated the relative impacts to our expectations. This allows us to gain a deeper knowledge of the model's important dependencies and major sensitivities.



V. APPENDICES

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.

2019 Report on Financial Condition and Economic Experience Study

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

2013-2018 Demographic Experience Study

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

2016 Risk Assessment Assumptions Study

This study reviews and updates the assumptions we use in our ongoing risk assessments.

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 2020 ACTUARIAL VALUATION

AUGUST • 2021



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