

Long Story Short

PENSIONS HAVE PURPOSE



Missouri State Employees' Retirement System
A Pension Trust Fund of the State of Missouri

Schedules of GASB 68 Pension Information
for Participating Employers
Fiscal Year Ended June 30, 2021

MOSERS



Independent Auditor's Report

To the Board of Trustees
Missouri State Employees' Retirement System
Jefferson City, Missouri

Report on Schedule of Allocations and Net Pension Amounts by Employer

We have audited the accompanying schedules of employer allocations of the Missouri State Employees' Plan and Missouri Judicial Plan, pension trust funds administered by the Missouri State Employees' Retirement System, collectively the System as of and for the year ended June 30, 2021, and related notes. We have also audited the totals for the columns titled net pension liability, total deferred outflows of resources, total deferred inflow of resources, discount rate sensitivity and plan pension expense (specified column totals) included in the accompanying schedule of pension amounts by employer (collectively the Schedules) of the System as of and for the year ended June 30, 2021, and related notes.

Management's Responsibility for the Schedules

Management is responsible for the preparation and fair presentation of the Schedules in accordance with accounting principles generally accepted in the United States of America; this includes design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of the Schedules that is free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express opinions on the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the System's preparation and fair presentation of the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the System's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used

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and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

Opinions

In our opinion, the Schedules referred to above present fairly, in all material respects, the employer allocations and net pension liability, total deferred outflows of resources, total deferred inflow of resources, discount rate sensitivity, and plan pension expense for the total of all participating entities for the System as of and for the year ended June 30, 2021, in accordance with accounting principles generally accepted in the United States of America.

Other Matters

We have audited, in accordance with auditing standards generally accepted in the United States of America, the financial statements of the System as of and for the year ended June 30, 2021, and our report thereon, dated October 29, 2021, expressed an unmodified opinion on those financial statements.

Other Information

Our audit was conducted for the purpose of forming opinions on the Schedules of the System. The Schedule of Net Deferred Outflows and Inflows of Resources by Employer to be Recognized in Pension Expense – MSEP and Judicial Plan and the Schedule of Employer Covered Payroll – MSEP and Judicial Plan are presented for purposes of additional analysis and are not a required part of the financial statements.

The Schedule of Net Deferred Outflows and Inflows of Resources by Employer to be Recognized as Pension Expense – MSEP and Judicial Plan are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the Schedules. Such information has been subjected to the auditing procedures applied in the audit of the Schedules and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the Schedules, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the Schedule of Net Deferred Outflows and Inflows of Resources by Employer to be Recognized in Pension Expense – MSEP and Judicial Plan are fairly stated, in all material respects, in relation to the Schedules as a whole.

The Schedules of Employer Covered Payroll – MSEP and Judicial Plan have not been subjected to the auditing procedures applied in the audit of the Schedules and, accordingly, we do not express an opinion or provide any assurance on them.

Restriction on Use

Our report is intended solely for the information and use of the System's management, the Board of Trustee, System's employers and their auditors and is not intended to be and should not be used by anyone other than these specified parties.



Boise, Idaho
January 7, 2022

Schedule of Employer Allocations

Schedule of Employer Allocations - MSEP

As of and for the year ended June 30, 2021

	Employer Contributions	Employer Allocated Proportion
State of Missouri	\$ 387,441,514	84.01169 %
Environmental Improvement and Energy Resource Authority	56,423	0.01224 %
Harris Stowe State University	2,414,222	0.52349 %
Lincoln University	3,352,645	0.72698 %
Missouri Agriculture and Small Business Development Authority	27,310	0.00592 %
Missouri Consolidated Health Care Plan	656,169	0.14228 %
Missouri Development Finance Board	125,139	0.02714 %
Missouri Housing Development Commission	1,332,508	0.28894 %
Missouri Public Entity Risk Management Fund	145,867	0.03163 %
Missouri Southern State University	4,028,953	0.87363 %
Missouri State University	21,790,636	4.72502 %
Missouri Technology Corporation	10,815	0.00235 %
Missouri Western State University	3,840,677	0.83280 %
Missouri Wine and Grape Board	62,144	0.01348 %
Northwest Missouri State University	7,290,142	1.58077 %
Southeast Missouri State University	9,261,441	2.00822 %
State Technical College of Missouri	2,333,823	0.50606 %
Truman State University	6,398,954	1.38753 %
University of Central Missouri	10,606,366	2.29985 %
Total	<u>\$ 461,175,748</u>	<u>100.00000 %</u>

Schedule of Employer Allocations

Schedule of Employer Allocations - Judicial Plan

As of and for the year ended June 30, 2021

	Employer Contributions	Employer Allocated Proportion
State of Missouri	\$ 39,990,330	100.00000 %
Total	<u>\$ 39,990,330</u>	<u>100.00000 %</u>

Schedule of Pension Amounts by Employer

Schedule of Pension Amounts by Employer - MSEP

As of and for the year ended June 30, 2021

	June 30, 2021 Net Pension Liability (NPL)	Discount Rate Sensitivity			Pension Expense		
		1% Decrease (5.95%)	Current Discount Rate (6.95%)	1% Increase (7.95%)	Proportionate Share of Pension Plan Expense	Net Amortization of Deferred Amounts from Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions	Total Employer Pension Expense
State of Missouri	\$ 4,696,855,099	\$6,190,684,247	\$4,696,855,099	\$3,449,695,530	\$586,861,277	\$27,420,139	\$614,281,416
Environmental Improvement and Energy Resource Authority	684,024	901,577	684,024	502,395	85,467	-47,338	38,129
Harris Stowe State University	29,267,009	38,575,347	29,267,009	21,495,718	3,656,846	1,840,297	5,497,143
Lincoln University	40,643,279	53,569,825	40,643,279	29,851,237	5,078,284	-811,893	4,266,391
Missouri Agriculture and Small Business Development Authority	331,082	436,383	331,082	243,170	41,368	-62,719	-21,351
Missouri Consolidated Health Care Plan	7,954,583	10,484,529	7,954,583	5,842,397	993,907	-148,578	845,329
Missouri Development Finance Board	1,517,041	1,999,534	1,517,041	1,114,220	189,551	25,299	214,850
Missouri Housing Development Commission	16,153,648	21,291,297	16,153,648	11,864,358	2,018,361	-204,598	1,813,763
Missouri Public Entity Risk Management Fund	1,768,288	2,330,689	1,768,288	1,298,753	220,943	-3,941	217,002
Missouri Southern State University	48,841,953	64,376,077	48,841,953	35,872,911	6,102,690	-2,685,508	3,417,182
Missouri State University	264,162,359	348,178,881	264,162,359	194,019,123	33,006,481	-5,139,952	27,866,529
Missouri Technology Corporation	131,102	172,799	131,102	96,291	16,381	-133,573	-117,192
Missouri Western State University	46,559,543	61,367,749	46,559,543	34,196,551	5,817,508	-4,357,776	1,459,732
Missouri Wine and Grape Board	753,349	992,951	753,349	553,312	94,129	-2,309	91,820
Northwest Missouri State University	88,376,536	116,484,588	88,376,536	64,909,846	11,042,446	704,604	11,747,050
Southeast Missouri State University	112,274,110	147,982,756	112,274,110	82,461,878	14,028,393	-5,716,559	8,311,834
State Technical College of Missouri	28,292,324	37,290,664	28,292,324	20,779,841	3,535,061	1,081,235	4,616,296
Truman State University	77,572,868	102,244,826	77,572,868	56,974,884	9,692,552	-4,412,947	5,279,605
University of Central Missouri	128,578,260	169,472,422	128,578,260	94,436,775	16,065,559	-7,343,883	8,721,676
Total MSEP	\$ 5,590,716,457	\$ 7,368,837,141	\$ 5,590,716,457	\$ 4,106,209,190	\$ 698,547,204	\$ 0	\$ 698,547,204

Schedule of Pension Amounts by Employer

Schedule of Pension Amounts by Employer - MSEP (Continued)

As of and for the year ended June 30, 2021

	Deferred Outflows					Deferred Inflows				
	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Earnings on Pension Plan Investments	Changes of Assumptions	Changes in Proportion	Total Deferred Outflows of Resources	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Earnings on Pension Plan Investments	Changes of Assumptions	Changes in Proportion	Total Deferred Inflows of Resources
State of Missouri	\$74,892,771	\$ 0	\$ 328,499,163	\$32,797,402	\$436,189,336	\$20,780,363	\$ 846,792,861	\$ 0	\$ 0	\$ 867,573,224
Environmental Improvement and Energy Resource Authority	10,907	0	47,841	106,841	165,589	3,026	123,322	0	31,280	157,628
Harris Stowe State University	466,671	0	2,046,942	2,579,870	5,093,483	129,486	5,276,529	0	0	5,406,015
Lincoln University	648,069	0	2,842,601	16,060	3,506,730	179,819	7,327,549	0	752,662	8,260,030
Missouri Agriculture and Small Business Development Authority	5,279	0	23,156	8,447	36,882	1,465	59,691	0	149,440	210,596
Missouri Consolidated Health Care Plan	126,838	0	556,345	0	683,183	35,194	1,434,126	0	128,921	1,598,241
Missouri Development Finance Board	24,190	0	106,102	24,353	154,645	6,712	273,506	0	0	280,218
Missouri Housing Development Commission	257,575	0	1,129,790	369,811	1,757,176	71,469	2,912,330	0	184,585	3,168,384
Missouri Public Entity Risk Management Fund	28,196	0	123,674	29,419	181,289	7,823	318,804	0	74,798	401,425
Missouri Southern State University	778,800	0	3,416,018	41,132	4,235,950	216,092	8,805,683	0	4,747,645	13,769,420
Missouri State University	4,212,149	0	18,475,578	0	22,687,727	1,168,737	47,625,654	0	8,741,334	57,535,725
Missouri Technology Corporation	2,090	0	9,169	0	11,259	580	23,636	0	149,365	173,581
Missouri Western State University	742,406	0	3,256,385	0	3,998,791	205,994	8,394,188	0	6,663,514	15,263,696
Missouri Wine and Grape Board	12,012	0	52,689	0	64,701	3,333	135,821	0	12,840	151,994
Northwest Missouri State University	1,409,191	0	6,181,076	963,922	8,554,189	391,006	15,933,346	0	55,854	16,380,206
Southeast Missouri State University	1,790,245	0	7,852,478	0	9,642,723	496,736	20,241,824	0	4,325,641	25,064,201
State Technical College of Missouri	451,130	0	1,978,772	1,557,141	3,987,043	125,174	5,100,804	0	48,440	5,274,418
Truman State University	1,236,923	0	5,425,465	0	6,662,388	343,207	13,985,561	0	6,073,298	20,402,066
University of Central Missouri	2,050,219	0	8,992,794	947,647	11,990,660	568,871	23,181,288	0	7,302,428	31,052,587
Total MSEP	\$89,145,661	\$ 0	\$ 391,016,038	\$39,442,045	\$519,603,744	\$24,735,087	\$1,007,946,523	\$ 0	\$39,442,045	\$1,072,123,655

Schedule of Pension Amounts by Employer

Schedule of Pension Amounts by Employer - Judicial Plan

As of and for the year ended June 30, 2021

	Discount Rate Sensitivity				Pension Expense
	June 30, 2021 Net Pension Liability (NPL)	1% Decrease (5.95%)	Current Discount Rate (6.95%)	1% Increase (7.95%)	Total Employer Pension Expense
State of Missouri	\$ 415,202,877	\$ 477,775,000	\$ 415,202,877	\$ 361,630,687	\$ 37,147,698
Total Judicial Plan	\$ 415,202,877	\$ 477,775,000	\$ 415,202,877	\$ 361,630,687	\$ 37,147,698

Schedule of Pension Amounts by Employer

Schedule of Pension Amounts by Employer - Judicial Plan (Continued)

As of and for the year ended June 30, 2021

	Deferred Outflows				Deferred Inflows			
	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Earnings on Pension Plan Investments	Changes of Assumptions	Total Deferred Outflows of Resources	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Earnings on Pension Plan Investments	Changes of Assumptions	Total Deferred Inflows of Resources
State of Missouri	\$ 237,680	\$ 0	\$ 4,518,569	\$ 4,756,249	\$ 12,990,585	\$ 22,175,671	\$ 3,738,008	\$ 38,904,264
Total Judicial Plan	\$ 237,680	\$ 0	\$ 4,518,569	\$ 4,756,249	\$ 12,990,585	\$ 22,175,671	\$ 3,738,008	\$ 38,904,264

Note 1 - Plan Descriptions

The Missouri State Employees' Retirement System (MOSERS or the System) consists of two plans: the Missouri State Employees' Plan (MSEP) and the Judicial Plan.

The MSEP is a cost-sharing multiple-employer, defined benefit public employee retirement plan with two benefit structures known as the MSEP (closed plan) and MSEP 2000 (which includes the MSEP 2011 tier), which are administered by MOSERS in accordance with Sections 104.010 and 104.312 to 104.1215 of the Revised Statutes of Missouri (RSMo). As established under Section 104.320, RSMo, MOSERS is a body corporate and an instrumentality of the state. The System is vested with the powers and duties specified in Sections 104.010 and 104.312 to 104.1215, RSMo, and such other powers as may be necessary or proper to enable it, its officers, employees, and agents to carry out fully and effectively all the purposes of Sections 104.010 and 104.312 to 104.1215, RSMo.

Responsibility for the operation and administration of the System is vested in the 11-member MOSERS Board of Trustees (the Board) as defined by state law. Due to the nature of MOSERS' reliance on funding from the state of Missouri and other state government agencies and the overall control of the plan document by the legislative and executive branches of state government, the MSEP is considered a pension trust fund of the state of Missouri, and is included in the state's financial reports as a pension trust fund.

Generally, all full-time state employees hired before July 2000, who were not covered under another state sponsored retirement plan, are eligible for membership in the MSEP (closed plan). Full-time state employees hired after July 2000, and before January 2011, are eligible for membership in the MSEP 2000. Employees hired for the first time on or after January 2011 are eligible for membership in the MSEP 2011 tier of the MSEP 2000. MOSERS participates as an employer in the MSEP and MSEP 2000. The MSEP provides retirement, survivor, and disability benefits.

The Judicial Plan is a single-employer, public employee retirement plan administered in accordance with Sections 476.445 to 476.690, RSMo. Responsibility for the operation and administration of the Judicial Plan is vested in the MOSERS Board. Due to the nature of MOSERS' reliance on funding from the state of Missouri and the overall control of the plan document by the legislative and executive branches of state government, the Judicial Plan is considered a component unit of the state of Missouri financial reporting entity and is included in the state's financial reports as a pension trust fund. Judges and commissioners of the supreme court or the court of appeals, judges of the circuit court, probate court, magistrate court, court of common pleas, court of criminal corrections, justices of the peace, or commissioners or deputy commissioners of the circuit court appointed after February 29, 1972, commissioners of the juvenile division of the circuit court

Notes to Schedules

appointed pursuant to Section 11.023, RSMo, commissioners of the drug court pursuant to Section 478.466, RSMo, or commissioners of the family court are eligible for membership in the Judicial Plan. The Judicial Plan provides retirement, survivor, and disability benefits. Members are immediately vested.

Further information related to required contributions, pension benefits, other plan terms, and investments and related return and financial information related to MOSERS is available as described in Note 5.

Participating employers in the MSEP, for which amounts are allocated in the schedules include the state of Missouri, component units of the state of Missouri, and related organizations excluded from the state of Missouri's reporting entity. The state of Missouri is the only participating employer in the Judicial Plan.

The employer contribution rate for pension plans for the year ended June 30, 2021 were as follows:

Exhibit 1: Employer Contribution Rate for Pension Plans

	MSEP	Judicial Plan
Rate as percentage of payroll	22.88 %	63.38 %

Note 2 – Condensed Summary of Significant Accounting Policies

MOSERS employers are required to report pension information in their financial statements in accordance with Governmental Accounting Standards. The Schedules of Employer Allocations and Schedules of Pension Amounts by Employer provide employers with the required information for financial reporting under that standard.

The underlying financial information used to prepare the pension allocation schedules is based on MOSERS' financial statements and its accounting and payroll reporting systems. The financial statements of both MSEP and the Judicial Plan were prepared using the accrual basis of accounting and in accordance with U.S. generally accepted accounting principles.

Member and employer contributions are recognized when due, pursuant to formal commitments and statutory requirements. Benefits and refunds of employee contributions are recognized when due and payable in accordance with the statutes governing MOSERS. Expenses are recognized when the liability is incurred, regardless of when payment is made. Investments are reported at fair value on a trade date basis.

Total employer contributions due for the fiscal year are generally used as the basis for determining each employer's proportionate share of the collective pension amounts reported on the schedules. However, the

System is excluded from all allocations. As a result, contributions totaling \$1,739,201 related to the System's members were excluded from the Schedules of Employer Allocations.

The net pension liability is based on each plan's fiduciary net position as reported in its financial statements and the estimated total pension liability estimated by MOSERS' actuary as of each fiscal year-end. It is allocated based on each employer's proportionate share of contributions.

Deferred inflows and outflows, except for the change in proportion, are allocated based on each employer's proportionate share of contributions for the fiscal year. The difference between expected and actual investment earnings on pension plan investments is amortized as a component of pension expense over five years on a straight-line basis while the differences between expected and actual experience and changes in assumptions are amortized as a component of pension expense over the expected average remaining service lifetime (EARSL) of all participants. Deferred inflows and outflows related to the change in proportion used for allocation purposes from one fiscal year to the next are estimated by reallocating beginning balances using the ending allocation percentage and amortizing the difference over the EARSL as a component of pension expense. The remaining unamortized deferred inflows and outflows are reported in the Schedule of Pension Amounts by Employer. Each year's layer of deferred inflows and outflows retains its original calculated EARSL.

Pension expense is based on the service cost earned by participants during the fiscal year, interest on the total pension liability, certain changes in plan fiduciary net position, and the current year amortization of deferred inflows and outflows. It is allocated based on each employer's proportionate share of collective plan amounts and its specific amortization of change in proportion deferred item.

The preparation of these schedules in conformity with U.S. generally accepted accounting principles requires management to make significant estimates and assumptions that affect the reported amounts during the reporting period. Actual results could differ from those estimates.

Note 3 – Actuarial Assumptions, Methods and Net Pension Liability

Net Pension Liability of Employers

The components of the net pension liability as of June 30, 2021 were as follows:

Exhibit 2: Net Pension Liability of Employers

	MSEP	Judicial Plan
Total pension liability	\$ 15,110,646,537	\$ 626,284,219
MOSERS' fiduciary net position	9,519,930,080	211,081,342
Employers' net pension liability	<u>\$ 5,590,716,457</u>	<u>\$ 415,202,877</u>
Plan net position as a percentage of the total pension liability	63.00 %	33.70 %
Employers' covered payroll *	\$ 2,015,622,897	\$ 63,096,106
Employers' net pension liability as a percentage of covered payroll *	277.37 %	658.05 %

*Amounts reported as *Covered payroll*, and *Net pension liability as a percentage of covered payroll* in these GASB 68 Employer Schedules differ from amounts reported in MOSERS' annual actuarial valuation and *Annual Comprehensive Financial Report (ACFR)*. MOSERS internal payroll costs are included in the covered payroll figures reported in the annual actuarial valuation and ACFR, but are excluded from amounts reported in these GASB 68 schedules because net pension liability must be allocated among the participating employers, and not the System for the purposes of GASB Statement 68. In addition, the covered payroll figures reported in annual actuarial valuation and the ACFR include estimates for June payroll amounts to facilitate a timely completion of those reports, but amounts reported in these GASB 68 Employer Schedules are based on actual amounts.

An actuarial valuation of an ongoing plan involves estimates of the reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality, and future salary increases. Amounts determined regarding the net pension liability are subject to continual revision as actual results are compared with past expectations and new estimates are made about the future. The Schedule of Changes in Employers' Net Pension Liability, which can be found in MOSERS ACFR, presents multi-year trend information about whether the plan fiduciary net positions are increasing or decreasing over time relative to the total pension liability. The total pension liability, as of June 30, 2021, is \$15,110,646,537 for MSEP and \$626,284,219 for the Judicial Plan based on an actuarial valuation performed as of June 30, 2021, and a measurement date of June 30, 2021, using generally accepted actuarial procedures.

Actuarial Assumptions Used to Determine Net Pension Liability

An actuarial experience study covering the five-year period ended June 30, 2020, was performed in 2021. Certain actuarial assumptions and methods were changed as a result of the experience study, including:

- Subsequent changes in the unfunded actuarial accrued liability due to actuarial gains/losses or assumption changes are now amortized over a closed 25 year period, instead of 30 years.
- Mortality assumptions are now based on generational tables.

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- The merit component of the salary increase assumption was adjusted to partially reflect observed experience.

Exhibit 3: Summary of Actuarial Assumptions for the MSEP & the Judicial Plan Used to Determine Net Pension Liability

	Assumption
Valuation date	June 30, 2021
Actuarial cost method	Entry age normal
Asset valuation method	Market value
Investment rate of return	6.95 %
Projected salary increases	2.75 - 10.00% (MSEP) 3.00% (Judicial Plan)
Rate of payroll growth	2.25 %
COLAs	4.00%/1.80%*
Price inflation	2.25 %

* 4.00% compounded annually, when a minimum COLA of 4.00% is in effect. 1.80% compounded annually, when no minimum COLA is in effect (80% of price inflation).

Mortality Rates - MSEP

Pre-retirement mortality rates were based on the Pub-2010 General Members Below Median Employee mortality table, set back two years for males and set forward one year for females. Mortality was projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Post-retirement mortality rates for retirees were based on the Pub-2010 General Members Below Median Healthy Retiree mortality table, scaled by 104%, set back two years for males and set forward one year for females. Mortality projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Post-retirement mortality rates for beneficiaries were based on the Pub-2010 General Members Below Median Contingent Survivor mortality table, set back two years for males and set forward one year for females. Mortality was projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Mortality Rates - Judicial Plan

Pre-retirement mortality rates were based on the Pub-2010 General Members Median Employee mortality table. Mortality was projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Post-retirement mortality rates for retirees were based on the Pub-2010 General Members Median Healthy Retiree mortality table. Mortality was projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Post-retirement mortality rates for beneficiaries were based on the Pub-2010 General Members Median Contingent Survivor mortality table. Mortality was projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Discount Rate

The discount rate used to measure the total pension liability was 6.95%. The projection of cash flows used to determine the discount rate assumed that contributions from participating employers will be made using the actuarially determined rates. Based on those assumptions, MOSERS' fiduciary net position was projected to be available to make all the projected future benefit payments of the current plan members. As a result, the long-term expected rate of return on pension plan investments of 6.95% was applied to all periods of projected benefit payments to determine the total pension liability.

The table below presents the net pension liability of the plans, as of June 30, 2021, calculated using the discount rate of 6.95%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1% lower (5.95%) or 1% higher (7.95%) than the current rate.

Exhibit 4: Discount Rate Sensitivity

Employers' Net Pension Liability		1% Decrease (5.95)%	Current Discount Rate (6.95)%	1% Increase (7.95)%
MSEP	\$	7,368,837,141	\$ 5,590,716,457	\$ 4,106,209,190
Judicial Plan	\$	477,775,000	\$ 415,202,877	\$ 361,630,687

The current funding policy, if actuarial assumptions are met, results in the projected plan fiduciary net position being sufficient to pay benefits for all future years. Therefore, the current 6.95% discount rate is considered adequate, and the use of the municipal bond rate calculation is not necessary.

Long-Term Expected Rate of Return

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate rates of expected future rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future rates of return by the target

Notes to Schedules

asset allocation percentage and by adjusting for expected inflation, volatility and correlations. Best estimates of the real rates of return expected are summarized by asset class in the following tables.

Exhibit 5: Long-Term Expected Rate of Return

Asset Class	Policy Allocation	Long-Term Expected Nominal Return*	Long-Term Expected Real Return	Weighted Average Long-Term Expected Nominal Return
Global public equities	30.0 %	7.7 %	5.8 %	2.3 %
Global private equities	15.0	9.3	7.4	1.4
Long treasuries	25.0	3.5	1.6	0.9
Core bonds	10.0	3.1	1.2	0.3
Commodities	5.0	5.5	3.6	0.3
TIPS	25.0	2.7	0.8	0.7
Private real assets	5.0	7.1	5.2	0.3
Public real assets	5.0	7.7	5.8	0.4
Hedge funds	5.0	4.8	2.9	0.2
Alternative beta	10.0	5.3	3.4	0.5
Private credit	5.0	9.5	7.6	0.5
Cash and cash equivalents**	(40.0)	—	—	—
	100.0 %			
Correlation/Volatility Adjustment				(0.6)
Long-Term Expected Net Nominal Return				7.2
Less : Investment Inflation Assumption				(1.9)
Long-Term Expected Geometric Net Real Return				5.3 %

* Long-term expected arithmetic returns of the asset classes at the time of the asset allocation study for each portfolio.

** Cash and cash equivalents policy allocation amounts are negative due to use of leverage.

Note 4 – Basis for Allocation

The employers' proportionate share, reported in the Schedules of Employer Allocations, is calculated using accrued retirement contributions as of June 30, 2021. Adjustments have been made for employer contributions received that do not reflect an employer's projected long-term contribution effort. As a result, the total employer contribution amounts reported in the Schedule of Employer Allocations do not agree with the total employer contribution amounts reported on the Combined Statements of Changes in Fiduciary Net Position in MOSERS' June 30, 2021 ACFR.

Exhibit 6: Reconciliation of Employer Contributions

	MSEP		Judicial Plan	
Employer Contributions reported in MOSERS' Statement of Changes of Fiduciary Net Position for the Year ended June 30, 2021	\$	463,293,368	\$	39,996,509
Adjustments for contributions related to past and future periods		(378,419)		(6,179)
Deduct MOSERS contributions not included in the allocation		(1,739,201)		—
Total employer contributions used as the basis for allocating employer's proportionate share of collective pension amounts.	\$	461,175,748	\$	39,990,330

The difference in contributions, as reported on the June 30, 2021 Schedule of Employer Allocations, and the total employer contributions as reported on the Combined Statements of Changes in Fiduciary Net Position in MOSERS' June 30, 2021 ACFR, is a difference between employer contributions and proportionate share of contributions, which is allocated proportionately to employers on the Schedules of Pension Amounts by Employer, based on the calculated allocation percentage. That amount is deferred and recognized over the average of the expected remaining service lives of active and inactive members.

Note 5 – Changes in Benefit Terms and Assumptions

There were no changes in benefit terms during the fiscal year ended June 30, 2021.

Below is a summary of the changes in MSEP assumptions since the prior year:

- Subsequent changes in the UAAL due to actuarial gains/losses or assumption changes are amortized as a level percentage of payroll, over closed 25-year periods.
- The merit component of the salary increase assumption was adjusted to partially reflect observed experience.
- The mortality assumption was changed to reflect the Pub-2010 General Members Below Median Mortality Table. Specifically, the retiree mortality has been changed to be 104% of the Pub-2010 General Members Below Median Table set back two years for males and 104% of the Pub-2010 General Members Below Median Table set forward one year for females. Future generational mortality improvement is reflected by using 100% of Scale MP-2020 through 2020 and 75% of Scale MP-2020 for years after 2020.
- The retirement assumption was changed to have separate tables for MSEP, MSEP 2000 and MSEP 2011. The tables were simplified to reduce the complexity of the select and ultimate retirement assumption by only using rates for first eligibility for unreduced retirement and rates for the years thereafter.

- The termination assumption was changed from select and ultimate tables to a single table based on service only. In addition, the rates are now unisex.
- The disability assumption was adjusted to partially reflect observed experience.
- The percentage of members who are assumed to be married was decreased from 60% to 50% for pre-retirement death benefits and from 70% to 65% upon retirement.
- The military service purchase assumption was reduced from 4 months to 3 months for MSEP and MSEP 2000 members.
- Minor adjustments were made to the loads used to estimate the cost of the immediate unreduced survivor annuity payable to a deferred member's beneficiary upon death.

Below is a summary of the changes in Judicial assumptions since the prior year:

- Subsequent changes in the UAAL due to actuarial gains/losses or assumption changes are amortized as a level percentage of payroll, over closed 25-year periods.
- The salary increase assumption was changed from an age-based table to a flat 3.0% assumption.
- The mortality assumption was changed to reflect the Pub-2010 General Members Median Mortality Table. Future generational mortality improvement is reflected by using 100% of Scale MP-2020 through 2020 and 75% of Scale MP-2020 for years after 2020.
- The retirement assumption was adjusted to partially reflect observed experience. Rates are now unisex.
- The termination assumption was changed from a sex distinct, service-based table to a flat 2.0% for all years.
- The disability assumption was eliminated.
- The percentage of members who are assumed to be married was increased from 80% to 90%.

Note 6 – Additional Financial and Actuarial Information

Additional financial and actuarial information supporting the preparation of the Schedules of Employer Allocations and Schedules of Pension Amounts by Employer is included in the Systems' ACFR for the year ended June 30, 2021. The ACFR can be obtained at www.mosers.org.

Supplementary Information

Schedule of Net Deferred Outflows and Inflows of Resources by Employer to be Recognized in Pension Expense - MSEP

As of June 30, 2021

	2022	2023	2024	2025	2026	Total
State of Missouri	\$ 40,112,299	\$ 7,022,908	\$ (226,875,332)	\$ (251,643,759)	\$ 0	\$ (431,383,884)
Environmental Improvement and Energy Resource Authority	56,792	20,857	(33,041)	(36,648)	0	7,960
Harris Stowe State University	1,653,248	1,015,963	(1,413,704)	(1,568,041)	0	(312,534)
Lincoln University	(214,695)	(397,837)	(1,963,219)	(2,177,548)	0	(4,753,299)
Missouri Agriculture and Small Business Development Authority	(66,995)	(72,988)	(15,992)	(17,738)	0	(173,713)
Missouri Consolidated Health Care Plan	(70,997)	(33,642)	(384,235)	(426,183)	0	(915,057)
Missouri Development Finance Board	24,599	4,385	(73,279)	(81,279)	0	(125,574)
Missouri Housing Development Commission	88,459	146,078	(780,280)	(865,465)	0	(1,411,208)
Missouri Public Entity Risk Management Fund	(2,485)	(37,496)	(85,415)	(94,740)	0	(220,136)
Missouri Southern State University	(2,255,346)	(2,302,070)	(2,359,245)	(2,616,809)	0	(9,533,470)
Missouri State University	(3,553,783)	(4,381,159)	(12,760,011)	(14,153,047)	0	(34,848,000)
Missouri Technology Corporation	(106,015)	(42,950)	(6,333)	(7,024)	0	(162,322)
Missouri Western State University	(4,049,546)	(2,471,839)	(2,248,997)	(2,494,524)	0	(11,264,906)
Missouri Wine and Grape Board	(4,242)	(6,299)	(36,389)	(40,362)	0	(87,292)
Northwest Missouri State University	1,266,292	(88,443)	(4,268,911)	(4,734,956)	0	(7,826,018)
Southeast Missouri State University	(2,359,271)	(1,623,638)	(5,423,251)	(6,015,318)	0	(15,421,478)
State Technical College of Missouri	916,342	678,725	(1,366,623)	(1,515,820)	0	(1,287,376)
Truman State University	(3,438,860)	(2,397,637)	(3,747,054)	(4,156,127)	0	(13,739,678)
University of Central Missouri	(2,740,598)	(3,221,680)	(6,210,801)	(6,888,847)	0	(19,061,926)
Total	\$ 25,255,198	\$ (8,188,762)	\$ (270,052,112)	\$ (299,534,235)	\$ 0	\$ (552,519,911)

Supplementary Information

Schedule of Net Deferred Outflows and Inflows of Resources by Employer to be Recognized in Pension Expense - Judicial Plan

As of June 30, 2021

	2022	2023	2024	2025	2026	Total
State of Missouri	\$ (8,398,253)	\$ (9,798,698)	\$ (9,065,144)	\$ (6,885,920)	\$ 0	\$ (34,148,015)
Total	<u>\$ (8,398,253)</u>	<u>\$ (9,798,698)</u>	<u>\$ (9,065,144)</u>	<u>\$ (6,885,920)</u>	<u>\$ 0</u>	<u>\$ (34,148,015)</u>

Supplementary Information

Schedule of Employer Covered Payroll - MSEP

As of and for the year ended June 30, 2021 (Unaudited)

	Employer Covered Payroll
State of Missouri	\$ 1,693,351,580
Environmental Improvement and Energy Resource Authority	246,604
Harris Stowe State University	10,551,869
Lincoln University	14,653,166
Missouri Agriculture and Small Business Development Authority	119,359
Missouri Consolidated Health Care Plan	2,867,872
Missouri Development Finance Board	546,939
Missouri Housing Development Commission	5,823,897
Missouri Public Entity Risk Management Fund	637,530
Missouri Southern State University	17,609,065
Missouri State University	95,243,423
Missouri Technology Corporation	47,269
Missouri Western State University	16,787,199
Missouri Wine and Grape Board	271,608
Northwest Missouri State University	31,862,742
Southeast Missouri State University	40,478,328
State Technical College of Missouri	10,200,276
Truman State University	27,967,688
University of Central Missouri	46,356,483
Total	<u>\$ 2,015,622,897</u>

Schedule of Employer Covered Payroll - Judicial Plan

As of and for the year ended June 30, 2021 (Unaudited)

	Employer Covered Payroll
State of Missouri	\$ 63,096,106
Total	<u>\$ 63,096,106</u>

Note 1. Recognition Period

The recognition period of the changes in proportion and differences between employer contributions and proportionate share of contributions, as well as the difference between expected and actual experience, and changes in assumptions are recognized over the average expected remaining service lives of active and inactive members. The difference between projected and actual investment earnings is recognized over 5 years. Plan amendments are recognized immediately.

The average expected remaining services lives of active and inactive members were as follows:

Exhibit 7: Average Expected Remaining Service Lives

Average Expected Remaining Service Lives as of Fiscal Year end June 30,	MSEP	Judicial Plan
2021	2.9530	4.1400
2020	3.0840	4.1680
2019	3.2630	3.9620
2018	3.5520	3.9040
2017	3.6500	3.8210
