



FINANCIAL SECTION

Financial Statement

MOSERS has long been a leader in transparency, which is evident in our hallmark publication, the Annual Comprehensive Financial Report. MOSERS has received the Certificate of Achievement for Excellence in Financial Reporting from the Government Finance Officers Association (GFOA) for 33 consecutive years.

MOSERS



CPAs & BUSINESS ADVISORS

Independent Auditor's Report

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

Report on the Audit of the Financial Statements

Opinions

We have audited the financial statements of pension funds and custodial fund, collectively the aggregate fiduciary funds of the Missouri State Employees' Retirement System (MOSERS), a pension (and other employee benefit) trust fund of the State of Missouri, as of and for the year ended June 30, 2022, and the related notes to the financial statements, which collectively comprise MOSERS's basic financial statements as listed in the table of contents.

In our opinion, the accompanying financial statements referred to above present fairly, in all material respects, the respective fiduciary net position of the pension funds and custodial fund, collectively the aggregate fiduciary funds of MOSERS, as of June 30, 2022, and the respective changes in fiduciary net position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for Opinion

We conducted our audit in accordance with auditing standards generally accepted in the United States of America (GAAS) and the standards applicable to financial audits contained in *Government Auditing Standards (Government Auditing Standards)*, issued by the Comptroller General of the United States. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of MOSERS and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Responsibilities of Management for the Financial Statements

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

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Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinions. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS and *Government Auditing Standards* will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

In performing an audit in accordance with GAAS and *Government Auditing Standards*, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit 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 MOSERS' internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control-related matters that we identified during the audit.

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis and required supplementary information on pages 20-23 and 52-59 be presented to supplement the basic financial statements. Such information is the responsibility of management and, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Supplementary Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise the MOSERS' basic financial statements. The additional supplementary information accompanying financial information listed as additional supplemental schedules in the table of contents are presented for purposes of additional analysis and are not a required part of the basic financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. The information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the additional supplementary information accompanying financial information listed as additional supplemental schedules in the table of contents are fairly stated, in all material respects, in relation to the basic financial statements as a whole.

Other Information

Management is responsible for the other information included in the annual report. The other information comprises the introductory, investment, actuarial, and statistical sections but does not include the basic financial statements and our auditor's report thereon. Our opinion on the basic financial statements does not cover the other information, and we do not express an opinion or any form of assurance thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and consider whether a material inconsistency exists between the other information and the basic financial statements, or the other information otherwise appears to be materially misstated. If, based on the work performed, we conclude that an uncorrected material misstatement of the other information exists, we are required to describe it in our report.

Other Reporting Required by Government Auditing Standards

In accordance with Government Auditing Standards, we have also issued our report dated October 14, 2022 on our consideration of the MOSERS' internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of MOSERS' internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with Government Auditing Standards in considering MOSERS' internal control over financial reporting and compliance.



Boise, Idaho

October 14, 2022

Management's Discussion and Analysis

This discussion and analysis of the Missouri State Employees' Retirement System (MOSERS) provides an overview of the retirement system's financial activities for the fiscal year ended June 30, 2022. It is intended to be used in conjunction with the *Transmittal Letter* beginning on page 6 and *Basic Financial Statements and Notes to the Basic Financial Statements*, beginning on page 26 of this report.

Using This Financial Report

This *Annual Comprehensive Financial Report* (ACFR) reflects the activities of MOSERS as reported in the *Statements of Fiduciary Net Position* and the *Statements of Changes in Fiduciary Net Position*, which begin on page 24. These statements are prepared in conformity with generally accepted accounting principles. The *Notes to the Basic Financial Statements* are an integral part of the financial statements and include additional information not readily evident in the statements themselves. The *Required Supplementary Information* (RSI) and *Additional Financial Information* following the *Notes to the Basic Financial Statements* provide historical information and additional details considered useful in evaluating the condition of the plan.

See the *Actuarial Section* of this report for a detailed discussion of the actuarial value of assets and liabilities and the funded status of the plans.

The *Basic Financial Statements* contained in this section of the ACFR consist of:

- The *Statements of Fiduciary Net Position* report the fiduciary funds' assets, deferred outflows, liabilities, deferred inflows, and resulting net position, where total assets plus deferred outflows less current liabilities and deferred inflows equal net position held in trust for future pension benefits available at the end of the fiscal year. It is a snapshot of the financial position of the fiduciary funds at that specific point in time.
- The *Statements of Changes in Fiduciary Net Position* summarize the fiduciary funds' financial transactions that have occurred during the fiscal year where additions less deductions equal the change in net position. It supports the change that has occurred to the prior year's net position on the *Statements of Fiduciary Net Position*.
- The *Notes to the Basic Financial Statements* are an integral part of the above financial statements and include additional information not readily evident in the statements themselves.

Funding Analysis

Funded status is presented using two different valuation methods within this document for two different purposes. One valuation method is for the purpose of determining contribution rates, and the other method is required by Governmental Accounting Standards Board (GASB) Statement 67 to provide information about the net pension liability as of a specific point in time using the market value of investment assets. The valuation method used for determining contribution rates smooths investment activity over a period of five years to minimize the impact investment market volatility can have on contribution rates.

Funding Methodology for Determining Contribution Rates

The unfunded actuarial accrued liability (UAAL) for the Missouri State Employees' Plan (MSEP) increased by \$0.3 billion from \$6.2 billion at June 30, 2021, to \$6.5 billion at June 30, 2022, with a corresponding decrease in funded percentage from 59.0% to 57.7%.

The UAAL for the Judicial Plan decreased by \$5.3 million from \$431.3 million at June 30, 2021, to \$426.0 million at June 30, 2022, with an increase in funded percentage from 31.1% to 32.4%.

The assumed rate of investment return was 6.95% for both the MSEP and the Judicial Plan.

Financial Reporting Methodology required by GASB Statement 67

The fund net position as a percentage of total pension liability decreased from 63.0% at June 30, 2021, to 53.5% at June 30, 2022, for the MSEP Fund, and decreased from 33.7% to 30.2% for the Judicial Plan Fund. See the *Required Supplementary Information* section of this report for more information about net pension liability and related information.

Financial Reporting Highlights

MOSERS adopted Statement 87 *Leases*, and Statement 96 *Subscription-Based Information Technology Arrangements* issued by GASB.

As part of adopting these GASB statements, MOSERS has capitalized leases and subscription-based information technology arrangements that have aggregate payments over the life of the contract in excess of \$50,000, and included them in capital assets as right-to-use assets. MOSERS also recorded a lease liability for the present value of the future lease or subscription payments. The lease liability is reported with other administrative liabilities on the *Statements of Fiduciary Net Position*.

Prior year comparative amounts have not been adjusted because the terms of the agreements covered by GASB Statements 87 and 96 did not affect previous periods.

The *Summary Comparative Statements of Fiduciary Net Position*, and the *Summary Comparative Statements of Changes in Fiduciary Net Position* presented below are designed to provide the reader of this report with a high level overview of MOSERS' financial activity and net position.

Summary Comparative Statements of Fiduciary Net Position

	As of June 30, 2022	As of June 30, 2021	Amount of Change	Percentage Change
Assets				
Administrative operating cash and equivalents	\$ 14,957,215	\$ 7,386,658	\$ 7,570,557	102.49%
Receivables	977,028,152	750,600,068	226,428,084	30.17
Investments	12,239,716,310	12,850,390,046	(610,673,736)	(4.75)
Capital assets, net of accumulated depreciation	14,237,807	11,070,763	3,167,044	28.61
Total assets	13,245,939,484	13,619,447,535	(373,508,051)	(2.74)
Deferred outflow of resources	770,232	917,071	(146,839)	(16.01)
Liabilities				
Administrative and other payables	15,864,368	6,903,186	8,961,182	129.81
Investment related payables and obligations	4,780,687,176	3,869,974,406	910,712,770	23.53
MOSERS investment portfolio liability (MIP)	3,539,587	3,953,169	(413,582)	(10.46)
Net OPEB liability	6,413,236	7,682,560	(1,269,324)	(16.52)
Total liabilities	4,806,504,367	3,888,513,321	917,991,046	23.61
Deferred inflow of resources	1,216,203	718,655	497,548	69.23
Net position restricted for fiduciary activities	\$ 8,438,989,146	\$ 9,731,132,630	\$ (1,292,143,484)	(13.28)

The largest components of the net position of the pension trust funds are investments, and investment related receivables and liabilities. The majority of MOSERS' receivable balances are comprised of investment related transactions, such as pending trade settlements, and interest and dividends receivable. Investment related liabilities include payables for investments purchased, manager fees payable, and obligations under repurchase agreements. MOSERS investment portfolio liability (MIP) represents the amount Missouri Deferred Compensation Plan participants have invested in MOSERS' portfolio. The value of the portfolio, which includes investments, and investment related receivable and liability balances, decreased this year because MOSERS experienced a (9.02)% return on plan assets.

Another noteworthy change in MOSERS' *Statement of Fiduciary Net Position* is the increase in capital assets related to the continued development of our new pension administration system. MOSERS capitalized a total of \$2.3 million in project costs incurred during the year, which includes staff payroll costs of \$0.7 million. When the new pension administration system is implemented, these capitalized software development project costs will be amortized over the estimated useful life the system. The project is expected to be completed in 2023.

Summary Comparative Statements of Changes in Fiduciary Net Position

	Year Ended June 30, 2022	Year Ended June 30, 2021	Amount of Change	Percentage Change
Additions				
Contributions	\$ 587,430,121	\$ 577,738,031	\$ 9,692,090	1.68%
Net investment income	(835,205,231)	2,077,042,662	(2,912,247,893)	(140.21)
Miscellaneous income	485,972	560,195	(74,223)	(13.25)
Total additions	(247,289,138)	2,655,340,888	(2,902,630,026)	(109.31)
Deductions				
Benefit payments	992,014,868	953,049,815	38,965,053	4.09
Premium disbursements	29,896,004	31,597,820	(1,701,816)	(5.39)
Service transfers and refunds	13,134,944	8,425,724	4,709,220	55.89
Administrative expenses	9,808,530	9,372,885	435,645	4.65
Total deductions	1,044,854,346	1,002,446,244	42,408,102	4.23
Net increase	(1,292,143,484)	1,652,894,644	(2,945,038,128)	(178.17)
Net position beginning of year	9,731,132,630	8,078,237,986	1,652,894,644	20.46
Net positions restricted for fiduciary activities	\$ 8,438,989,146	\$ 9,731,132,630	\$ (1,292,143,484)	(13.28)

Investment Results

MOSERS' total fund net position decreased by \$1.3 billion, to end at \$8.4 billion in fiscal year 2022. Net position decreased significantly from last year, driven primarily by negative investment returns, but is still slightly higher than the fiscal year 2020 net position of \$8.0 billion. The fund returned a time-weighted return of (9.02)% in fiscal year 2022 compared to 26.40% in fiscal year 2021.

The risk-on investment environment experienced last fiscal year, following the reopening of establishments and government stimulus, transitioned to an environment with undesirable inflation. In an effort to bring inflation under control, the Federal Reserve has steadily increased interest rates, and has set an expectation of further rate increases to come. These changes in the investment environment and future economic outlook have decreased investor risk appetite and have generally resulted in negative returns in many asset classes this year. As further discussed in the *Investment Section* of this report, we continue to recognize the importance of diversifying our investment assets to contribute to our long-term success.

It is also important to note that investment gains and losses are actuarially smoothed over a 5-year period to prevent market volatility from causing significant year-to-year changes in the contribution rate.

The *Investment Section* of this report contains additional information regarding investments activity.

Contribution Revenue

Contribution revenue increased by 1.68% from the prior year. Contribution revenue is determined by two significant factors: the contribution rate and the covered payroll of active benefit-eligible employees. The contribution rate is set in advance, however unexpected changes in covered payroll can cause contribution revenue to come in above or below expectation.

The employer retirement contribution rates for the MSEP members is the primary driver for total fund contributions revenue. This rate increased from 22.88% in fiscal year 2021 to 23.51% in fiscal year 2022. The employee contribution rates for 2011 tier members remains at 4% of gross pay. The percent of MSEP 2011 tier members who contribute 4% continues to grow every year to make up a larger percentage of our overall membership base.

Covered payroll is the other primary factor that ultimately determines our contribution revenue. There was a small increase in covered payroll during the fiscal year. It has been a difficult year for employee retention and recruitment. The active membership base decreased by 2.9%, however salary increases were greater than our actuarial assumptions. These opposing factors resulted in a small increase in the overall covered payroll, but the overall increase was less than our actuarial assumptions. Although the active membership counts decreased overall during the year, the rate at which active member counts decreased started to level off during the year.

All things considered, MSEP retirement contributions revenue increased, but not as much as was expected because covered payroll for the year was below expectations.

Judicial Plan contributions and Insurance fund premium contributions each account for less than 10% of total fund contributions revenues. Covered payroll for judges increased 0.5% over last year based on the actuarial valuation report. Judicial Plan membership did not appear to experience the same challenges as the MSEP membership base. Contributions were slightly lower than last year because the fiscal year 2022 contribution rate was lower than the fiscal year 2021 rate. Insurance fund premium contributions were also lower than the prior year.

The *Actuarial Section* of this report contains more information about actuarial experience.

Benefits Expenses

Increases in benefit payment expenses were larger than the increases in contributions revenue for the year due to shifting member demographics. The population of retirees receiving benefits continued to grow during the fiscal year, while the population of active benefit-eligible state employees has continued to decline. A growing retiree population and shrinking active employee population puts upward pressure on the contribution rate. Schedules of retirees added and removed from the benefit rolls can be viewed on pages 102-103 of the *Actuarial Section* of this report.

Cost-of-living adjustments (COLAs) provided to existing benefit recipients also cause benefit expenses to increase each year. Members employed before August 28, 1997, who retired under the MSEP, receive a COLA of at least 4% each year (maximum 5%) until they reach their COLA cap. For general state employees, COLAs are based on 80% of the percentage increase in the average Consumer Price Index (CPI) from one year to the next. The maximum increase is 5% (minimum 0%). The cost-of-living adjustment for fiscal year 2022 was 3.758%.

Administrative Expenses

Administrative expenses totaled \$9.8 million in fiscal year 2022, compared to \$9.4 million in fiscal year 2021. MOSERS experienced an increase in administrative expense due mainly to increases in professional services costs and software licensing costs.

Requests for Information

This financial report is designed to provide a general overview of the System's finances for all those who are interested. Questions concerning any of the information provided in this report or requests for additional information should be addressed to MOSERS at P.O. Box 209, Jefferson City, MO 65102 or by email at FOIArequest@mosers.org.

Statements of Fiduciary Net Position

As of June 30, 2022

	MSEP Pension Fund	Judicial Pension Fund	Insurance Custodial Fund	Total
Assets				
Administrative operating cash and cash equivalents	\$ 11,922,515	\$ 0	\$ 3,034,700	\$ 14,957,215
Receivables				
Contributions and premiums	21,184,188	1,687,529	874,021	23,745,738
Investment income	694,882,330	15,705,016	0	710,587,346
Investment sales	237,081,295	5,542,404	0	242,623,699
Other receivables	71,369	0	0	71,369
Total receivables	953,219,182	22,934,949	874,021	977,028,152
Investments and derivatives				
Investments - cash and cash equivalents	1,468,245,746	33,982,606	0	1,502,228,352
Investments - treasuries	4,244,677,040	97,822,248	0	4,342,499,288
Investments - fixed income	235,024,340	5,540,608	0	240,564,948
Investments - equities	304,178,738	6,850,946	0	311,029,684
Investments - real estate investment trusts	399,161,878	9,293,797	0	408,455,675
Investments - equity and fixed income commingled funds	1,497,903,405	34,378,707	0	1,532,282,112
Investments - alternatives and limited partnerships	3,820,583,460	87,687,043	0	3,908,270,503
Investments - derivative instruments	(5,496,854)	(117,398)	0	(5,614,252)
Total investments and derivatives	11,964,277,753	275,438,557	0	12,239,716,310
Capital assets, net of accumulated depreciation	14,237,807	0	0	14,237,807
Total assets	12,943,657,257	298,373,506	3,908,721	13,245,939,484
Deferred outflow of resources	752,849	17,383	0	770,232
Liabilities				
Administrative and benefit expense payables	10,754,510	645,567	3,783,258	15,183,335
Employee vacation and overtime liability	665,663	15,370	0	681,033
Payable for investments purchased	127,786,296	2,932,216	0	130,718,512
Management fees payable	1,286,007	30,360	0	1,316,367
Investment activities payable	942,176,190	21,220,700	0	963,396,890
Obligations under repurchase agreements	3,602,409,740	82,845,667	0	3,685,255,407
MOSERS investment portfolio liability (MIP)	3,459,846	79,741	0	3,539,587
Net OPEB liability	6,268,501	144,735	0	6,413,236
Total liabilities	4,694,806,753	107,914,356	3,783,258	4,806,504,367
Deferred inflow of resources	1,188,756	27,447	0	1,216,203
Net position restricted for pension activities	8,248,414,597	190,449,086	0	8,438,863,683
Net position restricted for custodial activities	0	0	125,463	125,463
Net position restricted for fiduciary activities	\$ 8,248,414,597	\$ 190,449,086	\$ 125,463	\$ 8,438,989,146

See accompanying *Notes to the Basic Financial Statements*.

Statements of Changes in Fiduciary Net Position

For the Year Ended June 30, 2022

	MSEP Pension Fund	Judicial Pension Fund	Insurance Custodial Fund	Total
Additions				
<i>Contributions and premiums</i>				
Employer contributions and premiums	\$ 471,302,256	\$ 39,228,848	\$ 13,022,209	\$ 523,553,313
Employee contributions and premiums	39,809,873	1,550,712	16,902,402	58,262,987
Member purchases of service credit	2,119,195	0	0	2,119,195
Service transfer contributions	3,494,626	0	0	3,494,626
Total contributions and premiums	516,725,950	40,779,560	29,924,611	587,430,121
<i>Investment activity</i>				
Investing activity income:				
Net appreciation in fair value of investments	(314,006,477)	(7,404,929)	0	(321,411,406)
Interest	16,011,154	404,802	4,258	16,420,214
Dividends	28,927,043	653,297	0	29,580,340
Other	180,295	4,056	0	184,351
Total investing activity income (loss)	(268,887,985)	(6,342,774)	4,258	(275,226,501)
Investing activity expenses:				
Management and incentives fees	120,049,461	2,726,369	0	122,775,830
Custody and other fees	849,117	19,188	0	868,305
Consultant fees	584,730	13,262	0	597,992
Internal investment activity expenses	6,933,575	62,238	0	6,995,813
Total investing activity expenses	128,416,883	2,821,057	0	131,237,940
Reverse repurchase agreement activity:				
Loss on assets in reverse repurchase agreements	(407,613,464)	(9,376,170)	0	(416,989,634)
Interest expense from reverse repurchase agreements	(11,489,211)	(261,945)	0	(11,751,156)
Total net loss from reverse repurchase agreement activity	(419,102,675)	(9,638,115)	0	(428,740,790)
Total net investment income (loss)	(816,407,543)	(18,801,946)	4,258	(835,205,231)
Miscellaneous income	5,852	0	480,120	485,972
Total additions	(299,675,741)	21,977,614	30,408,989	(247,289,138)
Deductions				
Benefit payments	868,805,239	42,513,238	0	911,318,477
Premium disbursements	0	0	29,896,004	29,896,004
BackDROP payments	80,000,613	0	0	80,000,613
Buyout and lump-sum payments	695,778	0	0	695,778
Service transfer payments	4,672,072	0	0	4,672,072
Contribution and premium refunds	8,417,124	17,140	28,608	8,462,872
Administrative expenses	9,248,916	79,492	480,122	9,808,530
Total deductions	971,839,742	42,609,870	30,404,734	1,044,854,346
Net increase (decrease) in net position	(1,271,515,483)	(20,632,256)	4,255	(1,292,143,484)
Net position restricted for fiduciary activities:				
Beginning of year	9,519,930,080	211,081,342	121,208	9,731,132,630
End of year	\$ 8,248,414,597	\$ 190,449,086	\$ 125,463	\$ 8,438,989,146

See accompanying *Notes to the Basic Financial Statements*.

Notes to the Basic Financial Statements

Note 1 – Plan Descriptions and Contribution Information

The MSEP and the Judicial Plan are pension plans covering substantially all state of Missouri employees and judges.

Missouri State Employees' Plan (MSEP)

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 the Missouri State Employees' Retirement System (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 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.

The Board intends to follow a financing pattern which computes and requires contribution amounts which, expressed as a percent of active member payroll, will remain approximately level from year to year and from one generation of citizens to the next. For the year ended June 30, 2022, the employer contribution rate was 23.51% of covered payroll.

Complete recognition of the year-to-year swings in the fair value of System assets would produce contribution rate changes that would run counter to the "approximately level" goal. A common actuarial practice, referred to as asset smoothing, is used to address that issue. Recognizing the difference between the actual and assumed investment returns over a closed, five-year period helps ensure a more stable contribution rate.

At any point in time, the actuarial value of assets will be more or less than the fair value but, if the smoothing method is prudent and properly constructed, those values will converge over time. As of June 30, 2022 the ratio of actuarial value of assets to fair value of assets was 107.83%, for the MSEP.

Per the June 30, 2022 actuarial valuation, membership in the MSEP consisted of the following:

Retirees and beneficiaries currently receiving benefits		53,648
Active		
Vested	26,174	
Nonvested	15,421	41,595
Inactive		
Vested (not yet receiving benefits)*	18,152	
Nonvested (with contribution balances)	28,444	46,596
Total membership		141,839

* Includes 115 members on leave of absence and 599 members on long-term disability

Generally, all full-time state employees, employed before July 2000, who became vested and were not covered under another state-sponsored retirement plan, are eligible for membership in the MSEP (closed plan). Full-time state employees who were employed after July 1, 2000, but before January 1, 2011, are members of the MSEP 2000.

Those first employed in a benefit-eligible position on or after January 1, 2011, are members of the MSEP 2011 tier of the MSEP 2000.

MOSERS participates as an employer in the MSEP and MSEP 2000, including the MSEP 2011 tier.

Unless otherwise delineated, data for MSEP is inclusive of members in the MSEP 2000 and MSEP 2011, which all provide defined benefit pension, survivor, life insurance, and long-term disability benefits.

Employer contributions for the MSEP are determined through annual actuarial valuations. The required contributions are expressed as a percentage of covered payroll. The state of Missouri and its component employers make required contributions to the plans. Employer contributions for the fiscal year ended June 30, 2022 were 23.51% of covered payroll. Members of MSEP and MSEP 2000 do not make employee contributions. Members of MSEP 2011 tier are required to contribute 4% of covered payroll.

Final average pay (FAP), is the average pay of a member for the 36 full, consecutive months of service before termination of employment when the member's pay was greatest. If the member was on workers compensation leave of absence or medical leave of absence due to an employee illness, or on long-term disability, FAP is the amount of pay the member would have received, but for such leave of absence as reported and verified by the employing department. If the member was employed for less than 36 months, FAP is the average monthly pay of a member during the period for which the member was employed.

For a summary of benefits for general state employees, legislators, and statewide elected officials under the MSEP, MSEP 2000, and MSEP 2011 tier, refer to the *Summary of Plan Provisions* in the *Actuarial Section* of this report.

MSEP (closed plan)

General state employees are fully vested for benefits upon accruing five years of credited service. Under the MSEP, general employees may retire with full benefits upon the earliest of attaining:

- Age 65 with 5 years of service;
- Age 60 with 15 years of service; or
- Age 48 with age and service equaling 80 or more – “Rule of 80.”

General employees may retire early at age 55 with at least 10 years of service with reduced benefits. The base benefit in the general employee plan is equal to 1.6% multiplied by the final average pay multiplied by years of credited service.

Members employed prior to August 28, 1997, receive cost-of-living adjustments (COLAs) annually based on 80% of the percentage increase in the average consumer price index (CPI) from one year to the next, with a minimum rate of 4% and maximum rate of 5% until the cumulative amount of COLAs equals 65% of the original benefit. Thereafter, the 4% minimum rate is eliminated. Members employed on or after August 28, 1997, and members who have met their COLA cap receive COLAs annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

Qualified, inactive-vested members may make a one-time election to receive the present value of their future benefit in a lump-sum payment rather than a monthly benefit at retirement age. To qualify, members must have left state employment on or after October 1, 1984, and prior to September 1, 2002, have less than 10 years of service, not be within five years of retirement eligibility, and meet age requirements. In addition, if members left state employment on or after August 28, 1997, and prior to September 1, 2002, the present value of their benefit must be less than \$10,000.

MSEP 2000

General state employees are fully vested for benefits upon accruing 5 years of credited service. Under the MSEP 2000, general employees may retire with full benefits upon the earliest of attaining:

- Age 62 with 5 years of service; or
- Age 48 with age and service equaling 80 or more – “Rule of 80.”

General employees may retire early at age 57 with at least five years of service with reduced benefits. The base benefit in the general employee plan is equal to 1.7% multiplied by final average pay multiplied by years of credited service.

Those retiring under the “Rule of 80” receive an additional temporary benefit equivalent to 0.8% multiplied by final average pay multiplied by years of credited service, which is payable until age 62.

COLAs are provided annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

MSEP 2011 Tier

On July 19, 2010, legislation was signed into law adding a new tier (MSEP 2011) to the MSEP 2000 defined benefit pension plan. This tier includes all members first employed in a benefit-eligible position on or after January 1, 2011.

Legislation signed into law on July 14, 2017, changed the original vesting requirement of 10 years to five years for actively employed members of the MSEP 2011, effective January 1, 2018.

Under the MSEP 2011, general employees may retire with full benefits upon the earliest of attaining:

- Age 67 with 5 years of service; or
- Age 55 with age and service equaling 90 or more – “Rule of 90.”

General employees may retire early at age 62 with at least five years of service with reduced benefits. The base benefit in the general employee plan is equal to 1.7% multiplied by final average pay multiplied by years of credited service.

Those retiring under “Rule of 90” receive an additional temporary benefit equivalent to 0.8% multiplied by final average pay multiplied by years of credited service, which is payable until age 62.

COLAs are provided annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

Judicial Plan

The Judicial Plan is a single-employer, defined benefit 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 of Trustees. 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 pension trust fund 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 any circuit court, probate court, magistrate court, court of common pleas, court of criminal corrections, justices of the peace, commissioners or deputy commissioners of the probate division of the circuit court appointed after February 29, 1972, in a first class county having a charter form of government in a city not within a county, commissioners of the juvenile division of the circuit court appointed pursuant to Section 211.023, RSMo, commissioners of the drug court or commissioners of any family court are eligible for membership in the Judicial Plan. The Judicial Plan provides defined benefit pension and survivor benefits. Members are immediately vested.

Per the June 30, 2022 actuarial valuation, membership in the Judicial Plan consisted of the following:

Retirees and beneficiaries currently receiving benefits		596
Active		
Vested	415	
Nonvested	0	415
Inactive		
Vested (not yet receiving benefits)		27
Total membership		1,038

Funding of the Judicial Plan on an actuarial basis began on July 1, 1998. Employer contributions are determined through annual actuarial valuations. For the year ended June 30, 2022, the employer contribution rate was 61.94% of covered payroll. The state of Missouri makes the employer contribution to the Judicial Plan. Members of Judicial Plan (closed plan) do not make employee contributions. Members of the Judicial Plan 2011 tier are required to contribute 4% of covered payroll.

Judicial Plan (closed plan)

Members of the Judicial Plan may retire with full benefits upon the earliest of attaining:

- Age 62 with 12 years of service; or
- Age 60 with 15 years of service; or
- Age 55 with 20 years of service.

Employees may retire early at age 62 with less than 12 years of service or age 60 with less than 15 years of service with a reduced benefit that is based upon years of service relative to 12 or 15 years.

In the Judicial Plan, the base benefit for members with 12 or more years of service is equivalent to 50% of compensation on the highest court served.

Members first employed prior to August 28, 1997, receive COLAs annually based on 80% of the percentage increase in the average CPI from one year to the next, with a minimum rate of 4% and a maximum rate of 5% until the cumulative amount of COLAs equals 65% of the original benefit. Thereafter, the 4% minimum rate is eliminated. Members first employed on or after August 28, 1997, and members who have met their COLA cap receive COLAs annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

Qualified, inactive-vested members may make a one-time election to receive the present value of their future benefit in a lump-sum payment rather than a monthly benefit at retirement age. To qualify, they must have left state employment on or after August 28, 1997, and prior to September 1, 2002, have less than 10 years of service, not be within five years of retirement eligibility, and have a benefit present value of less than \$10,000.

Judicial Plan 2011 Tier

On July 19, 2010, an additional tier of the defined benefit Judicial Plan was signed into law. This tier (Judicial Plan 2011) includes all new judicial members first employed as a judge on or after January 1, 2011.

Under the Judicial Plan 2011, members may retire with full benefits upon the earliest of attaining:

- Age 67 with 12 years of service; or
- Age 62 with 20 years of service;

Judicial Plan 2011 members may retire early at age 67 with less than 12 years of service with reduced benefits, or age 62 with less than 20 years of service with a reduced benefit based on years of service.

For a more detailed summary of benefits for members of the Judicial Plan, refer to the *Summary of Plan Provisions* in the *Actuarial Section* of this report.

Administrative Law Judges and Legal Advisors' Plan

On April 26, 2005, Senate Bill 202 was enacted, which terminated the Administrative Law Judges and Legal Advisors' Plan (ALJLAP) for new hires only. Under this legislation, administrative law judges and legal advisors (ALJs) who assume a position after April 26, 2005, who would have otherwise been covered by the ALJLAP, will instead participate in the MSEP or the MSEP 2000, depending on when they initially became state employees. For fiscal years 2005 and after, all liabilities and assets of the ALJLAP were transferred and combined with the MSEP. Membership totals for the ALJLAP are included in the MSEP in all relevant sections of this report.

Missouri State Insured Defined Benefit Insurance Plan

The Missouri State Insured Defined Benefit Insurance Plan is administered through, and underwritten by, The Standard Insurance Company (The Standard), which is a third-party administrator with oversight by MOSERS. It provides basic life insurance in an amount equal to one times annual salary while actively employed (with a \$15,000 minimum) to eligible members of the MSEP, MSEP 2000, and MSEP 2011 (except employees of the Missouri Department of Conservation and certain state universities), Judicial Plan, Judicial Plan 2011, and certain members of the Public School Retirement System (PSRS).

The plan also provides duty-related death benefits, optional life insurance for active employees and retirees who are eligible for basic coverage, and a long-term disability insurance plan for eligible members. For a more detailed description of insurance benefits, refer to pages 116-117 in the *Actuarial Section* of this report.

Due to the nature of MOSERS' reliance on funding from the state of Missouri and its component employers, and the overall control of the plan document by the legislative and executive branches of state government, the Missouri State Insured Defined Benefit Insurance Plan is considered a component unit of the state of Missouri financial reporting entity and is included in the state's financial reports.

State of Missouri Deferred Compensation Plan (MO Deferred Comp)

MO Deferred Comp is a retirement savings plan for state of Missouri employees, including faculty and staff at 10 state colleges and universities. Money invested in the plan provides income in retirement to supplement the member's defined benefit pension and Social Security benefits. Funds are automatically deducted from the employee's pay and placed in their account. The participant decides how the money will be invested. Employees may also roll over eligible pre-tax distributions from other qualified retirement plans.

The MO Deferred Comp plan is comprised of a 457 deferred compensation plan for employee contributions and a related 401(a) plan for an employer incentive match contribution. MOSERS uses MissionSquare Retirement as an external provider for record keeping for the plans. These plans have separately issued financial statements. The net position of these plans was approximately \$1.9 billion and \$613.6 million as of June 30, 2022 for the 457 and 401(a) plans, respectively.

MOSERS unitizes investments for the purpose of allowing participants in the State of Missouri Deferred Compensation Plan the option to invest in the MOSERS investment portfolio (MIP). For financial reporting purposes, investments throughout this ACFR are reported in whole and include 0.04%, or approximately \$3.5 million, of the units invested in the MIP by Deferred Compensation participants. Effective June 30, 2017, the option to invest in the MIP fund was no longer available to Plan participants. All participants invested in the MIP fund as of that date may continue to defer into it, but no rollovers or new elections are permitted.

Audited financial statements for the State of Missouri Deferred Compensation Plan can be viewed online at www.modeferrredcomp.org.

Colleges & Universities Retirement Plan (CURP)

The Colleges & Universities Retirement Plan (CURP) is a defined contribution plan administered by MOSERS for education employees (as determined by the university) at nine Missouri state universities. Retirement income from the plan is dependent upon the employee's plan account balance at retirement. The employee's plan account balance is built from mandatory contributions to the plan and the investment returns generated from employee-selected investment options. To be eligible for the CURP, the employee must:

- meet the definition of "education employee" as defined by their employer, and
- be employed in this position for the first time on or after July 1, 2002, and
- not have previous employment in a position covered by another defined benefit pension plan administered by MOSERS, and
- be employed at a participating regional Missouri university.

After six years of participation in CURP, the employee may transfer to a MOSERS defined benefit pension plan and will immediately become a vested member of MSEP 2011. By transferring to MOSERS, the employee forfeits all rights to future participation in CURP (i.e., they can't go back to CURP). However, the employee will continue to own and control their CURP account. CURP activities are not included within this report.

Note 2 – Summary of Significant Accounting Policies

Basis of Accounting

The accompanying financial statements are prepared in accordance with accounting principles generally accepted in the U.S. that apply to governmental accounting on an accrual basis.

Contributions are recognized as revenues when due, pursuant to statutory requirements. Benefits, refunds, and backDROP payments are recognized when due and payable. Administrative and other expenses are recorded when the corresponding liabilities are incurred.

Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the accompanying financial statements and disclosures. Actual results could differ from those estimates.

Method Used to Value Investments

Investment assets are reported at fair value, in accordance with Standards issued by the Governmental Accounting Standards Board (see Note 3 for discussion of the valuation methodology for investment assets). The *Schedule of Investments and Derivative Instruments Measured at Fair Value* in Note 3 presents the fair value information of the investments as reported on the *Statements of Fiduciary Net Position*.

MOSERS Participation in Other Post-Employment Benefit (OPEB) Programs

Other Post-employment Benefit (OPEB) related items, including: Net OPEB liability, deferred outflows of resources, deferred inflows of resources, net OPEB expense, fiduciary net assets, additions to and deductions from fiduciary net assets have been determined on the same basis as they are reported by MCHCP. For this purpose, employer contributions are recognized as revenue when due and payable. Benefits are recognized when due and payable in accordance with the terms of the Plan (see *Note 7 – MCHCP Post-Employment Retiree Health Care OPEB Program*).

Capital & Intangible Assets

The MOSERS building and other capital assets are stated at cost less accumulated depreciation. Intangible assets include software applications and are stated at cost less accumulated amortization. Intangible assets are reported with capital assets in the *Statements of Changes in Fiduciary Net Position*. Capital and intangible assets are depreciated on a straight-line basis over their estimated useful lives.

Adoption of Accounting Standards

MOSERS has adopted Governmental Accounting Standards (GASB) Statement No. 87 *Leases*, and Statement No. 96 *Subscription-Based Information Technology Arrangements*.

Due to the adoption of GASB Statements 87 and 96, MOSERS is capitalizing leases and subscription-based information technology arrangements that have aggregate payments over the life of the contract in excess of \$50,000, and including it in capital assets as a right-to-use asset. MOSERS is also recording a lease liability for the present value of the future lease payments. The lease liability is reported with other administrative liabilities on the *Statement of Fiduciary Net Position*.

Note 3 – Cash and Investments

Cash Deposits with Financial Institutions

MOSERS requires its business bank to collateralize amounts on deposit that exceed the Federal Deposit Insurance Corporation (FDIC) insured amount. The types of collateral security shall be included on a list maintained by the State Treasurer's office in accordance with Section 30.270 RSMo. Securities pledged as collateral are held in agency by a separate bank. As of June 30, 2022, all deposit balances with MOSERS' business bank were fully collateralized.

Deposits with MOSERS' business bank are invested in short-term repurchase agreements to earn interest. These items are reported with administrative operating cash and cash equivalents in the *Statements of Fiduciary Net Position*.

Investment Policy

Section 104.440, RSMo allows the Board of Trustees to invest the trust fund assets in accordance with the prudent person rule. In June 2018, the Board voted to adopt a new asset allocation, which includes four broad categories: growth, income, inflation hedge, and absolute return.

MOSERS' policy, with respect to the allocation of invested assets, is established and may be amended by the Board of Trustees' majority vote. The Board's guiding principles with respect to the investment of MOSERS' assets are to maximize total return within prudent risk parameters, and act in the exclusive interest of the members of the System. The Board has developed a policy allocation that is designed to achieve the long-term required return objectives of the System, given certain risk constraints. The current asset allocation reflects a diversified portfolio, which will perform well in a variety of economic conditions and will help reduce the portfolio's overall volatility.

The Board has authorized staff to create and maintain a portfolio that utilizes a modest amount of leverage in order to diversify the risk across the four asset class categories contained in the portfolio. The market exposure is limited to 1.5 times capital. The limit may also be stated as 150% of capital. The table below illustrates the fair value, market exposure, and policy exposure of the portfolio by asset class as of June 30, 2022.

Schedule of Internally Managed Leverage

	Fair Value Capital	Percent of Portfolio at Fair Value	Market Exposure	Percent of Portfolio at Market Exposure	Policy Exposure
Growth	\$ 3,575,947,876	42.6%	\$ 3,765,332,234	44.8%	45.0%
Income	1,704,887,417	20.3%	2,976,331,010	35.4	35.0
Inflation hedge	1,373,615,113	16.3%	3,432,709,907	40.8	40.0
Absolute return	1,749,987,578	20.8%	1,756,000,738	20.9	20.0
Total portfolio	\$ 8,404,437,984	100.0%	\$ 11,930,373,889	141.9%	140.0%

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 real 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 asset allocation percentage and by adjusting for expected inflation, volatility, and correlations. Best estimates of the real rates of return for each major asset class included in MOSERS' target asset allocation as of June 30, 2022, are summarized in the table below.

Target Asset Allocation

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)	0.0	0.0	0.0
	<u>100.0%</u>			
			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	<u>5.3 %</u>

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

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

Money-Weighted Rate of Return

The annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was (8.75)% for the year ended June 30, 2022. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for changing amounts actually invested.

Fair Value Measurement

MOSERS categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The hierarchy is based on the valuation inputs used to measure the fair value of the asset and give the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements).

- **Level 1** – Unadjusted quoted prices for identical instruments in active markets.
- **Level 2** – Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations in which all significant inputs are observable.
- **Level 3** – Valuations derived from valuation techniques in which significant inputs are unobservable.

Investments that are measured at fair value using the net asset value (NAV) per share (or its equivalent) as a practical expedient are not classified in the fair value hierarchy.

The categorization of investments within the hierarchy is based upon the pricing transparency of the instrument and should not be perceived as the particular investment's risk.

In instances where inputs used to measure fair value fall into different levels in the fair value hierarchy, fair value measurements in their entirety are categorized based on the lowest level input that is significant to the valuation. MOSERS' assessment of the significance of particular inputs to these fair value measurements requires judgment and considers factors specific to each asset or liability. The tables on pages 35-36 show the fair value leveling of the investments and additional information for investments valued at net asset value.

Debt, equities, and investment derivatives classified in Level 1 of the fair value hierarchy are valued using prices quoted in active markets for those securities.

Debt securities classified in Level 2 have non-proprietary information that was readily available to market participants from multiple independent sources, which are known to be actively involved in the market. Pricing inputs may include market quotations, yields, maturities, call features, and ratings. Derivative securities classified in Level 2 are securities whose values are derived daily from associated traded securities.

Fair values for the private real estate investments are based on appraisals. Fair values of the limited partnership investments are based on valuations of the underlying companies of the limited partnerships as reported by the general partner. Certain limited partnerships reflect values and related performance on a quarter lag basis due to the nature of those investments and the time it takes to value them. Fair value of the commingled funds is determined based on the underlying asset values. The remaining assets are primarily valued by the System's master custodian using the last trade price information supplied by various pricing data vendors.

Investments and Derivative Instruments Measured at Fair Value

June 30, 2022	Total	Fair Value Measurement Using		
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investment by fair value level				
Treasuries				
U.S. government securities	\$ 4,342,499,288	\$ 4,342,499,288	\$ 0	\$ 0
Fixed income securities				
Corporate bonds and asset-backed securities	228,060,346	0	227,598,729	461,617
U.S. government agencies	403,892	0	403,892	0
Non U.S. sovereign	12,100,710	0	12,100,710	0
Total fixed income securities	240,564,948	0	240,103,331	461,617
Equity				
Real estate investment trusts	408,455,675	408,455,675	0	0
Equity securities	311,029,684	310,967,837	0	61,847
Total equities	719,485,359	719,423,512	0	61,847
Total investment by fair value level	5,302,549,595	5,061,922,800	240,103,331	523,464
Investments measured at the NAV				
Commingled funds - equity funds	1,266,130,275			
Commingled funds - fixed income funds	266,151,837			
Commingled funds - short-term investment funds	21,542,000			
Hedge funds	2,753,488,605			
Private equity and timber funds	716,187,133			
Private real estate	438,594,765			
Total investments measured at the NAV	5,462,094,615			
Total investments measured at fair value	10,764,644,210	5,061,922,800	240,103,331	523,464
Investment derivative instruments				
Future contracts	(687,713)	(687,713)	0	0
Credit default swap contracts	(4,926,539)	0	0	(4,926,539)
Total investment derivative instruments	(5,614,252)	(687,713)	0	(4,926,539)
Investments at cost or amortized cost:				
Cash held in investment accounts	755,686,352			
Repurchase agreements	725,000,000			
Total investments at cost or amortized cost	1,480,686,352			
Total investments	12,239,716,310	5,061,235,087	240,103,331	(4,403,075)
Obligations under repurchase agreements	(3,685,255,407)			
Total investments, net of obligations under repurchase agreements	\$ 8,554,460,903	\$ 5,061,235,087	\$ 240,103,331	\$ (4,403,075)

Investments Measured at the Net Asset Value

	June 30, 2022	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period (Days)
Commingled fund - equity funds	\$ 1,266,130,275		Daily, Monthly	1-10
Commingled fund - fixed income fund	266,151,837		Daily	2
Commingled fund - short-term investment funds	21,542,000		Daily	0
Active hedge funds				
Merger arbitrage	158,140,876		Monthly	45
Equity market neutral	162,802,970		Quarterly	90
Event driven	250,833,000		Semi-annually	60
Quantitative	76,579,720		Monthly	30
Multi strategy	744,485,440		Monthly, Quarterly	60-90
Fund-of-funds	1,353,676,481		Monthly	95
Pending liquidated hedge funds	6,970,118			
Private equity and timber funds	716,187,133	\$ 453,996,808		
Private real estate	438,594,765	27,241,686		
Total investments measured at the net asset value (NAV)	<u>\$ 5,462,094,615</u>	<u>\$ 481,238,494</u>		

- **Commingled fund - equity funds** – Six equity funds are considered to be commingled in nature. Each are valued at the NAV held at the end of the period based upon the fair value of the underlying investments.
- **Commingled fund - fixed income fund** – One fixed income fund is considered to be commingled in nature. It is valued at the NAV held at the end of the period based upon the fair value of the underlying investment.
- **Commingled fund - short term investment funds** – One short-term investment funds are considered to be commingled in nature. Each are valued at the NAV held at the end of the period based upon the fair value of the underlying investments.
- **Merger arbitrage hedge fund** – Consisting of one fund, this strategy invests in the common stock of companies that are involved in publicly announced mergers and seeks to generate attractive returns while dampening volatility. This investment is valued at the NAV, is redeemable monthly, and is not subject to lock-up restrictions.
- **Equity market neutral hedge fund** – Consisting of one fund, this strategy invests both long and short in U.S. and global equity securities, with the goal of having little to no net market exposure. This investment is valued at the NAV, is redeemable quarterly, and is not subject to lock-up restrictions.
- **Event driven hedge fund** – Consisting of one fund, this strategy seeks to gain an advantage from pricing inefficiencies that may occur in the onset or aftermath of a corporate action or related event. This investment is valued at the NAV, is redeemable semi-annually, and is not subject to lock-up restrictions.
- **Quantitative hedge funds** – Consisting of two funds, this strategy attempts to achieve uncorrelated returns using advanced statistical methods to select securities across liquid public markets. These investments are valued at the NAV, are redeemable monthly, and are not subject to lock-up restrictions.
- **Multi strategy hedge funds** – Consisting of five funds, these funds aim to pursue varying strategies in order to diversify risks and reduce volatility. These investments are valued at the NAV, are redeemable monthly or quarterly, but are subject to lock-up restrictions.
- **Fund-of-funds** – Consisting of five funds, these funds seek to provide diversification by holding a number of funds within a single fund structure. These investments are valued at the NAV, are redeemable monthly, and are subject to liquidation of the underlying funds.
- **Pending liquidated hedge funds** – Consisting of eight funds which have been fully redeemed as of June 30, 2022, for which MOSERS is awaiting final distribution of the proceeds, which will be received upon sale of the underlying investments or upon completion of the audit of the firm's annual financial statements.

- **Private equity, timber, and real estate funds** – MOSERS' private equity portfolio consists of 41 funds with exposure to buyout funds, distressed funds, infrastructure, energy, secondary, royalty funds, and special situations. The real estate portfolio, comprised of eight funds, invests mainly in U.S. commercial real estate. The timber portfolio consists of one fund in liquidation which invests in global timberland. The fair values of the majority of these funds have been determined using net assets valued one quarter in arrears plus current quarter cash flows. These funds are not eligible for redemption. Distributions are received as underlying investments when the funds are liquidated, which, on average, can occur over the span of five to 10 years.

Credit Risk

Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations to MOSERS. As of June 30, 2022, MOSERS' fixed income assets that are not U.S. government guaranteed represented 30.4% of fixed income securities. In preparing this report, credit risk associated with all fixed income holdings, including collateral for repurchase agreements has been included. The tables on the following page summarize MOSERS' fixed income security exposure levels and credit qualities.

As a matter of practice, there are no overarching limitations for credit risk exposures within the overall fixed income portfolio. Each individual portfolio within fixed income is managed in accordance with operational guidelines that are specific as to permissible credit quality ranges, exposure levels within individual quality tiers, and average credit quality.

Credit risk for derivative instruments held by the System results from counterparty risk assumed by MOSERS. This is essentially the risk that the counterparty to a MOSERS transaction will be unable to meet its obligation. Information regarding MOSERS' credit risk related to derivatives is found under the derivatives disclosures beginning on page 41 of the notes.

The commingled funds - investment grade fixed income is invested and reinvested primarily in a portfolio of U.S. dollar denominated investment grade securitized debt obligations, with the objective of approximating the total rate of return of the market for debt securities as defined by the *Bloomberg U.S. Securitized Index*. The average rating for the underlying securities within this fund is AA+.

Average Credit Quality and Exposure Levels of Nongovernment Guaranteed Securities

Fixed Income Security Type	Fair Value June 30, 2022	Percent of all Fixed Income Assets	Weighted Average Credit Quality	Ratings Dispersion Requiring Further Disclosure
U.S. government mortgages	\$ 33,371	0.0%	AA+	See below
Asset-backed securities	1,010,161	0.0	AA	See below
Collateralized mortgage obligations	370,520	0.0	AA+	See below
Corporate bonds	224,959,377	3.6	BBB+	See below
Municipal bonds	8,779,584	0.1	AA-	See below
Non-U.S. sovereign	5,411,935	0.1	BBB+	See below
Total nongov't. fixed income securities	240,564,948	3.8		
Nongov't. guaranteed repurchase agreements	650,000,000	10.2	Not rated	None
Bank deposits	750,000,000	11.8	FDIC insured	None
Commingled funds - investment grade fixed income	266,151,837	4.2	Not rated	None
Pooled instruments	21,542,000	0.4	AAA	None
Total nongov't. guaranteed securities	\$ 1,928,258,785	30.4%		
U.S. government securities held in portfolio	\$ 4,342,499,288	68.4%		
Repurchase agreement with U.S. government securities held as collateral	75,000,000	1.2		
Total fixed income securities	\$ 6,345,758,073	100.0%		

Ratings Dispersion Detail - Fair Value

Credit Rating Level	U.S. Government Mortgages	Asset-Backed Securities	Collateralized Mortgage Obligations	Corporate Bonds	Municipal Bonds	Non-U.S. Sovereign
AAA	\$ 0	\$ 833,133	\$ 0	\$ 5,004,470	\$ 2,739,026	\$ 0
AA	33,371	0	370,520	9,657,745	2,483,609	723,240
A	0	140,858	0	69,124,232	3,292,758	1,430,275
BBB	0	0	0	139,392,465	264,191	3,258,420
BB	0	0	0	1,780,465	0	0
Not rated	0	36,170	0	0	0	0
	\$ 33,371	\$ 1,010,161	\$ 370,520	\$ 224,959,377	\$ 8,779,584	\$ 5,411,935

Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. This risk is managed by using the effective duration or option adjusted methodology. It is widely used in the management of fixed income assets by quantifying the risk of interest rate changes. This methodology takes into account optionality on bonds and scales the risk of price changes on bonds depending upon the degree of change in rates and the slope of the yield curve. Within the investment policy, operational guidelines specify the degree of interest rate risk taken within the System’s fixed income portfolios, with the exception of some portfolios in which credit risk is the predominant factor and is also controlled by specific guidelines. MOSERS believes that the reporting of effective duration found in the tables below quantifies to the fullest extent possible the interest rate risk of the System’s fixed income securities.

MOSERS invests in mortgage-backed securities, which have embedded within them the option of being called, whereby the issuer has the option to keep the debt outstanding in rising interest rate environments or repay the debt in declining interest rate environments, a factor that advantages the issuer. This risk is incorporated within the effective duration calculation used in the interest rate risk analysis.

Effective Duration of Fixed Income Assets by Security Type

Fixed Income Security Type	Fair Value June 30, 2022	Percent of all Fixed Income Assets	Weighted Average Effective Duration (Years)	Interest Rate Risk Requiring Further Disclosure
U.S. treasuries	\$ 4,342,499,288	68.4%	8.8	See below
U.S. government mortgages	33,371	0.0	4.1	None
Asset-backed securities	1,010,161	0.0	2.2	None
Collateralized mortgage obligations	370,520	0.0	0.1	None
Corporate bonds	224,959,377	3.6	7.2	None
Municipal bonds	8,779,584	0.1	9.6	None
Non-U.S. sovereign	5,411,935	0.1	11.4	None
Bank deposits	750,000,000	11.8	0.0	None
Repurchase agreements	725,000,000	11.4	0.0	None
Commingled funds - investment grade fixed income	266,151,837	4.2	5.8	None
Pooled instruments	21,542,000	0.4	0.0	None
	\$ 6,345,758,073	100.0%	6.5	

Effective Duration Analysis of U.S. Treasuries

Maturity	Fair Value June 30, 2022	Average Effective Duration of the Security Type (Years)	Contribution to Effective Duration (Years)
Less than 1 year to maturity	\$ 350,563,630	0.0	0.0
1- to 10-year maturities	2,337,086,605	4.6	2.4
Long coupon treasuries	1,654,849,053	16.7	6.4
	\$ 4,342,499,288		8.8

Repurchase Agreements

Tri-party repurchase agreements (repos) are a secured loan by a financial institution with the collateral held at a custodian bank. In a tri-party repo transaction, MOSERS transfers cash to a financial institution and the financial institution transfers securities to the custodian bank. Simultaneously, the financial institution promises to repay the loan in the future plus interest in exchange for the return of the securities.

Reverse repurchase agreements (reverse repos) are used to convert securities into cash. In a reverse repo transaction, MOSERS transfers securities that are owned in the portfolio to a financial institution and the financial institution transfers cash to MOSERS. Simultaneously, MOSERS promises to repay the loan in the future plus interest in exchange for the return of the securities.

Typical collateral for repos and reverse repos include treasury securities, agency securities, mortgage-backed securities, investment grade corporate bonds, commercial paper, and common stock. Repos and reverse repos are typically done for an overnight term; however, they can be done for a longer term. MOSERS enters into repo transactions to earn interest on short-term funds and enters into reverse repos to finance the purchase of additional securities.

The yield earned by MOSERS on the repo transactions ranged from 0.20% to 1.72% with maturities of one to five days.

The yield earned by the counterparties on the reverse repo transactions ranged from 0% to 1.81% and had maturities of one month to one year. The maturities of the investments made with reverse repo proceeds generally have maturities of one to 30 years.

In repo transactions, MOSERS may have credit risk if the counterparty fails to repay the loan and the value of the securities held as collateral falls below the loan balance. To minimize this risk, MOSERS requires the financial institution to send collateral with a fair value greater than the value of the loan and revalues the collateral on a daily basis. As of fiscal year end, MOSERS held approximately \$35.1 million of counterparty collateral in excess to the repo balance.

In a reverse repo transaction, MOSERS may be subject to credit risk if the counterparty fails to return the securities and the value of the securities held as collateral rise above the loan balance. To minimize this risk, MOSERS sends the minimum amount of collateral required by the financial institution and requires the financial institution to revalue the collateral and return excess collateral on a daily basis. Counterparties held approximately \$4.8 million of MOSERS' collateral in excess to the reverse repo balance as of the end of the fiscal year.

The tables below summarize MOSERS' exposure for repo and reverse repo transactions.

Tri-Party Repurchase Agreements by Collateral Type

Collateral Type	Fair Value of Collateral June 30, 2022	Fair Value Including Accrued Interest of Repurchase Agreements June 30, 2022	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries	\$ 76,503,256	\$ 75,000,000	\$ 1,503,256	
U.S. government agencies	408,000,000	400,000,000	8,000,000	
Common stock	275,591,818	250,000,000	25,591,818	
Accrued interest	0	32,000	(32,000)	
	<u>\$ 760,095,074</u>	<u>\$ 725,032,000</u>	<u>\$ 35,063,074</u>	4.8%

Reverse Repurchase Agreements by Collateral Type

Collateral Type	Fair Value of Collateral June 30, 2022	Fair Value Including Accrued Interest of Repurchase Agreements June 30, 2022	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries	\$ 3,685,224,187	\$ 3,685,255,407	\$ (31,220)	
Payables	12,559,624	0	12,559,624	
Accrued interest	0	7,748,527	(7,748,527)	
	<u>\$ 3,697,783,811</u>	<u>\$ 3,693,003,934</u>	<u>\$ 4,779,877</u>	0.1 %

Foreign Currency Risk

Foreign currency risk is the risk that changes to foreign exchange rates will adversely impact the fair value of non-U.S. Dollar denominated assets. The following table summarizes MOSERS' exposure to foreign currencies for all assets that are held in custody at the System's custodial bank. MOSERS has exposure to foreign currencies in other areas of the portfolio, such as commingled international funds, hedge funds, and private partnerships, which are held in the custody of other banks acting as administrators for the funds. MOSERS' exposure to foreign currency risk in U.S. dollars, as of June 30, 2022, is highlighted in the table below.

Currency Exposures by Asset Class

Currency	Cash & Cash Equivalents	Equities	Fixed Income	Total
Australian Dollar	\$ 8,282,537	\$ 0	\$ 0	\$ 8,282,537
Canadian Dollar	5,761,535	0	0	5,761,535
Euro	6,284,763	161,053	758,903	7,204,719
Hong Kong Dollar	(7,127,998)	0	0	(7,127,998)
Japanese Yen	687,121	(127,172)	0	559,949
South African Rand	(949,360)	0	0	(949,360)
South Korean Won	(470,541)	946,356	0	475,815
United Kingdom Pound Sterling	1,180,652	0	0	1,180,652
	\$ 13,648,709	\$ 980,237	\$ 758,903	\$ 15,387,849

Derivatives

Derivative instruments are financial contracts whose values depend on the values of one or more underlying assets, reference rates, or financial indexes. They include futures contracts, swap contracts, options contracts, and forward foreign currency exchange. The following tables summarize the various contracts in the portfolio as of June 30, 2022.

Futures Contracts

Futures Contract	Notional Value	Exposure
Currency futures	\$ (45,537,738)	\$ 1,217,452
Fixed income futures	(81,069,753)	606,089
Equity index futures	532,499	834,304
Commodity futures	25,819,482	(3,345,559)
Total	\$ (100,255,510)	\$ (687,714)

Swap Contracts

Counterparty Credit Rating	Notional Value	Exposure
Total return swaps - equity		
A+	\$ 494,503,956	\$ (59,374,599)
A	1,020,191,357	(66,271,804)
Total	\$ 1,514,695,313	\$ (125,646,403)
Total return swaps - fixed income		
A+	\$ 433,918,359	\$ (7,651,896)
A	319,293,705	(2,663,122)
Total	\$ 753,212,064	\$ (10,315,018)
Total return swaps - commodities		
A+	\$ 116,363,812	\$ 0
A	290,650,270	0
Total	\$ 407,014,082	\$ 0

While the Board has no formal policy specific to derivatives, the MOSERS investment implementation program, through its external managers, holds investments in futures contracts and swap contracts. MOSERS enters into these certain derivative instruments as investments primarily to enhance the performance and reduce the volatility of its portfolio. It enters swaps and futures contracts to gain or hedge exposure to certain markets and to manage interest rate risk.

The notional values associated with these derivative instruments are generally not recorded in the financial statements; however, the fair values of these instruments are recorded in the *Statements of Fiduciary Net Position* and the total changes in fair value for the year are included as net appreciation in fair value of investments in the *Statements of Changes in Fiduciary Net Position*. For the year ended June 30, 2022, the change in fair value in the swap contracts resulted in a gain of \$133 million of investment income. The change in fair value in the futures contracts resulted in a gain of \$25 million of investment income. Foreign currency risk risk associated with derivative activities is included in the *Currency Exposures by Asset Class* table. MOSERS does not anticipate additional significant market risk from the derivative arrangements.

MOSERS could be exposed to risk if the counterparties to the contracts are unable to meet the terms of the contracts. MOSERS' investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, and exposure monitoring procedures. MOSERS anticipates that the counterparties will be able to satisfy their obligations under the contracts. Investments in limited partnerships and commingled funds may include derivatives that are not shown in the derivative totals.

Securities Lending Program

The Board of Trustees' *Investment Policy Statement* permits the pension trust funds to participate in a securities lending program. Fixed income, international equity and domestic equity securities of the pension trust funds are loaned to participating brokers who provide collateral in the form of cash, U.S. Treasury or government agency securities, or letters of credit issued by approved banks. Collateral must be provided in the amount of 102% of fair value for domestic loans and 105% of fair value for international loans. MOSERS does not have the authority to pledge or sell collateral securities, without borrower default.

There was no securities lending activity in fiscal year 2022.

Note 4 – Capital Assets

Office building, furniture, fixtures, equipment, and software costing \$10,000 or more are capitalized. Capital assets are valued at cost and reported net of accumulated depreciation. Improvements, which increase the useful life of the property, are also capitalized. The cost of internally developed software incurred during the application development state, including staff payroll costs, are capitalized in accordance with GASB Statement No. 51. Maintenance and repairs are charged to expense as incurred. Depreciation is computed using the straight-line method over the estimated useful life of the related assets according to the following guidelines:

- 5 years for furniture, fixtures, and equipment
- 40 years for building
- 5 years for software and licensing

Schedules of the capital asset account balances for the year ended June 30, 2022 are as follows:

Capital Assets

	Right-to-Use Assets	CIP - Internally Developed Pension Admin. System	Building and Building Improvements *	Furniture, Fixtures and Equipment	Software	Total Capital Assets
Capital assets						
Balances June 30, 2021	\$ 0	\$ 8,435,727	\$ 4,387,346	\$ 1,606,408	\$ 728,761	\$ 15,158,242
Additions	782,185	2,290,398	5,538	527,452	0	3,605,573
Deletions	0	0	0	(15,229)	0	(15,229)
Capital assets June 30, 2022	782,185	10,726,125	4,392,884	2,118,631	728,761	18,748,586
Accumulated depreciation						
Balances June 30, 2021	0	0	2,143,725	1,221,496	722,258	4,087,479
Depreciation expense	190,195	0	102,887	143,025	1,895	438,002
Deletions	0	0	0	(14,702)	0	(14,702)
Accumulated depreciation June 30, 2022	190,195	0	2,246,612	1,349,819	724,153	4,510,779
Net capital assets June 30, 2022	\$ 591,990	\$ 10,726,125	\$ 2,146,272	\$ 768,812	\$ 4,608	\$ 14,237,807

* Building and Building Improvements includes \$267,286 of land that the building is situated on.

Right-to-Use Assets

Right-to-use assets consist of leased office space and subscription-based software. The intangible right-to-use assets and related liabilities are recorded under GASB Statement No. 87, *Leases*, and GASB Statement No. 96, *Subscription-Based Information Technology Arrangements*. The capitalized value of right-to-use assets and lease liabilities has been calculated based on the future lease payments, discounted to present value. Accounting standards require organizations to determine their discount rate based on their incremental borrowing costs. As an institutional investor, treasury rates were the primary factor MOSERS used to determine a discount rate for the purpose of present valuing right-to-use assets and lease liabilities. MOSERS used a 3% discount rate to calculate the present value of the lease liabilities recognized during the fiscal year ended June 30, 2022. The difference between the liability booked to record the present value of these future payment obligations, and the actual lease payments, is reported as interest expense.

The recording of these liabilities resulted in a future minimum lease commitment, as follows:

Schedule of Minimum Lease Commitments

Year Ended June 30	Building			Software		
	Principal	Imputed Interest	Total	Principal	Imputed Interest	Total
2023	\$ 89,223	\$ 6,041	\$ 95,264	\$ 174,967	\$ 7,372	\$ 182,339
2024	94,834	3,288	\$ 98,122	154,511	4,004	\$ 158,515
2025	57,649	578	\$ 58,227	20,807	624	\$ 21,431

Note 5 – Employers’ Net Pension Liability

The components of net pension liability as of June 30, 2022, are in the *Schedule of Employers’ Net Pension Liability* below.

Schedule of Employers’ Net Pension Liability

	MSEP	Judicial Plan
Total pension liability	\$ 15,408,995,032	\$ 630,043,013
MOSERS’ fiduciary net position	8,248,414,597	190,449,086
Employers’ net pension liability	<u>\$ 7,160,580,435</u>	<u>\$ 439,593,927</u>
Plan net position as a percentage of the total pension liability	53.53%	30.23%
Covered payroll	\$ 2,004,688,456	\$ 63,333,626
Employers’ net pension liability as a percentage of covered payroll	357.19%	694.09%

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* presents multi-year trend information about whether the plan fiduciary net positions are increasing or decreasing over time relative to the total pension liability. These schedules are presented in the *Required Supplementary Information*. The total pension liability, as of June 30, 2022, is \$15,408,995,032 for MSEP and \$630,043,013 for the Judicial Plan based on an actuarial valuation performed as of June 30, 2022, and a measurement date of June 30, 2022, 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. A summary of the assumptions used to calculate the net pension liability is contained in the table below.

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

Valuation date	June 30, 2022
Actuarial cost method	Entry Age Normal
Asset valuation method	Market value
Investment rate of return, net of investment expense	6.95 %
Projected salary increases	2.75 – 10.00% (MSEP) 3.00% (Judicial Plan)
Rate of payroll growth	2.25 %
COLAs	4% or 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.

Disabled mortality rates were based on the Pub-2010 Non-Safety Disabled Retiree mortality table, without mortality projection.

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, 2022, 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.

Sensitivity of Net Pension Liability to Changes in the Discount Rate

	1% Decrease 5.95%	Current Discount Rate 6.95%	1% Increase 7.95%
Employers’ Net Pension Liability			
MSEP	\$ 8,956,852,513	\$ 7,160,580,435	\$ 5,659,933,910
Judicial Plan	\$ 501,993,691	\$ 439,593,927	\$ 386,114,715

The funding status of the plans and *Employer Schedule of Funding Progress* can be found in the *Actuarial Section* on page 98.

Note 6 – Retiree Life Insurance and Long-Term Disability Insurance Programs

In addition to the defined benefit pension provided through MOSERS, the state of Missouri also funds, either partially or in its entirety, retiree life insurance, and long-term disability insurance programs for eligible members. These insurance programs are underwritten by The Standard. MOSERS collects premiums for participants of these programs and remits them to the The Standard on behalf on the state of Missouri.

Retiree Life Insurance

Members who retire on or after October 1, 1985, are eligible for \$5,000 of state-sponsored basic life insurance coverage if they retire directly from active employment. As of June 30, 2022, 29,650 retirees were participating in the program. This insured defined benefit coverage is financed on a percentage of payroll (.115%) and is purchased as a group policy through The Standard. The cost for the year ended June 30, 2022, was \$1,961,068. Premiums are contributed entirely by the state and its component employers as provided by Section 104.515, RSMo.

Retirees of the Department of Labor and Industrial Relations (DOLIR), who retired prior to January 1, 1996, are eligible for state-sponsored insured defined benefit insurance coverage in the same amount of coverage they were receiving through the DOLIR. As of June 30, 2022, 89 retirees were participating in the program. The coverage for this closed group is purchased as a group policy at a current cost of \$2.07 per thousand dollars of coverage, per month, per eligible participant (\$11,589 for the year ended June 30, 2022). Premiums are paid entirely by the DOLIR as provided by Section 288.225, RSMo. Retirees of the DOLIR who retired on or after January 1, 1996, are eligible for \$5,000 of state-sponsored life insurance coverage if they retire directly from active employment. They are included in the group described in the preceding paragraph.

Long-Term Disability Insurance (LTD)

MOSERS provides LTD coverage for eligible members and generally includes those active members of MOSERS' retirement plans who do not have other disability coverage and are not yet eligible to receive normal (unreduced) retirement benefits.

There were 29,503 members covered under the program as of June 30, 2022. This insured defined benefit coverage is financed on a percentage of covered payroll (0.0445%). Purchased as a group policy, LTD is administered by The Standard. The cost for the year ended June 30, 2022, was \$6,886,446. Premiums are contributed by the state and its component employers as provided for by Section 104.515, RSMo.

Note 7 – MCHCP Post-Employment Retiree Health Care OPEB Program

MOSERS participates as an employer in a cost-sharing, multiple-employer, defined benefit, other post-employment benefits plan, the State Retiree Welfare Benefit Trust (SRWBT), operated by Missouri Consolidated Health Care Plan (MCHCP). Employees may participate at retirement if eligible to receive a monthly retirement benefit from MOSERS. The terms and conditions governing post-employment benefits are vested with the MCHCP Board of Trustees within the authority granted under Chapter 103, Sections 103.003 through 103.178, RSMo. The SRWBT does not issue a separate stand-alone financial report. Financial activity of the SRWBT is included in the *MCHCP Annual Comprehensive Financial Report* as a fiduciary fund and is intended to present only the financial position of the activities attributable to the SRWBT. Additionally, MCHCP is considered a component unit of the state of Missouri reporting entity and is included in the state's financial report.

The Plan's financial statements are available on MCHCP's website at www.mchcp.org.

Benefits

The SRWBT was established and organized on June 27, 2008, pursuant to Sections 103.003 through 103.178, RSMo, to provide health and welfare benefits for the exclusive benefit of current and future retired employees of the state and their dependents who meet eligibility requirements, except for those retired members covered by other OPEB plans of the state. MCHCP's three medical plans offer the same basic coverage such as preventative care, freedom to choose care from a nationwide network of primary care providers, specialists, pharmacies, and hospitals, usually at a lower negotiated group discount and the same covered benefits for both medical and pharmacy. Benefits are the same in all three plans; other aspects differ such as premium, deductible, and out-of-pocket costs. Retiree benefits are the same as for active employees, until they are Medicare eligible.

Contributions

Contributions are established, and may be amended by the MCHCP Board of Trustees, with the authority granted under Chapter 103, Sections 103.003 through 103.178, RSMo. For the fiscal year ended June 30, 2021, employers were required to contribute 4.29% of gross active employee payroll for the period July 1, 2020, through December 31, 2020 and 4.22% for the period January 1, 2021, through June 30, 2021. Employees do not contribute to this plan.

OPEB Liabilities, OPEB Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources

At June 30, 2022, MOSERS reported a liability of \$6,413,236 for its proportionate share of the net OPEB liability. The net OPEB liability was measured as of June 30, 2021, and the total OPEB liability used to calculate the net OPEB liability was determined by an actuarial valuation as of that date. MOSERS' proportion of the net OPEB liability was based on a projection of its long-term share of contributions to the OPEB plan relative to the projected contributions of all participating entities, actuarially determined. At June 30, 2021, MOSERS' proportionate share was 0.3760%. For the year ended June 30, 2022, a greater share of the net OPEB liability was allocated to the MO Deferred Comp plans, and MOSERS recognized a net decrease in administrative costs of \$333,277 related to OPEB expense. As of June 30, 2022, MOSERS reported deferred outflows of resources and deferred inflows of resources as follows:

Deferred Outflows/Inflows of Resources Related to Post-Employment Retiree Health Care

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience	\$ 270,051	\$ 67,815
Changes of assumptions	0	815,406
Net difference between projected and actual earnings on plan investments	0	18,750
Changes in proportion and differences between MOSERS' contributions and proportionate share of contributions	208,520	314,232
MOSERS' contributions subsequent to the measurement date	291,661	0
	<u>\$ 770,232</u>	<u>\$ 1,216,203</u>

The \$291,661 currently reported as deferred outflows of resources related to OPEB resulting from MOSERS' contributions subsequent to the measurement date will be recognized as a reduction of the net OPEB liability in the year ended June 30, 2023. Other amounts reported as deferred inflows of resources related to OPEB will be recognized in OPEB expense as follows:

Deferred Outflows/Inflows of Resources Related to Post-Employment Retiree Health Care to be Recognized in Future Years

Year Ending June 30

2023	\$	106,275
2024		109,029
2025		109,843
2026		112,906
2027		98,702
Thereafter		200,877
Total	\$	737,632

Actuarial Assumptions

The collective total OPEB liability for the June 30, 2021, measurement date was determined by an actuarial valuation as of July 1, 2021. This actuarial valuation used the following actuarial assumptions:

Summary of MCHCP's Actuarial Assumptions for Post-Employment Retiree Health Care

Valuation year	July 1, 2020 - June 30, 2021
Actuarial cost method	Entry age normal, level percentage of payroll
Asset valuation method	Market value
Discount rate (blended)	4.50%
Projected payroll growth rate	4.0%
Inflation rate	3.0%
Health care cost trend rate (medical & prescription drugs combined)	
Non-Medicare	6.5% *
	* (rate decreases by 0.25% per year until an ultimate rate of 5.0% in fiscal year 2028 and later)
Medicare	9% **
	** (rate changes to 13.5% in fiscal year 2023, 12.5% in fiscal year 2024, 11.5% in fiscal 2025, 10.5% in fiscal 2026, 9.75% in fiscal 2027, 9.0% in fiscal 2028, 8.25% in fiscal 2029, 7.5% in fiscal 2030, 6.75% in fiscal 2031, 6.0% in fiscal 2032, 5.25% in fiscal 2033, then 5.0% in fiscal 2034 and after.)

Mortality: Pri-2012 for Employees/Annuitants without collar adjustments using Scale MP-2021.

The last experience study was conducted in 2020. Termination rates and retirement rates are updated based on an experience study conducted in 2020. Participation and dependent coverage assumptions were updated based upon an experience study conducted in July 2020. Per capita claims costs, administrative expenses, and retiree contributions were updated based on analysis of 2022 rates.

Change in Assumptions and Methods Since Prior Valuation

The discount rate was changed to 4.50% from 4.38%. The mortality base tables were changed from RP-2016 to Pri-2012; the mortality projection scales were changed from MP-2016 to MP-2021. Per capita claims costs, administrative expenses and retiree contributions were updated based on analysis of 2022 rates. Trend rates were updated based on anticipated future experience.

Health Care Cost Trend Rate (Medical & Prescription Drugs Combined)

The non-medicare health care cost trend rate was 6.50% for fiscal year 2022. The rate will decrease by 0.25% per year to an ultimate rate of 5.0% in fiscal year 2028 and later. The medicare health care cost trend rate was 9.0% for fiscal year 2022. The rate changes to 13.5% in fiscal year 2023, 12.5% in fiscal year 2024, 11.5% in fiscal 2025, 10.5% in fiscal 2026, 9.75% in fiscal 2027, 9.0% in fiscal 2028, 8.25% in fiscal 2029, 7.5% in fiscal 2030, 6.75% in fiscal 2031, 6.0% in fiscal 2032, 5.25% in fiscal 2033, then 5.0% in fiscal 2034 and later.

Sensitivity to Changes in the Health Care Cost Trend Rates

The following table presents MOSERS’ net OPEB liability, calculated using the current trend rate, as well as what the net OPEB liability would be if it were calculated using a trend rate that is one percent lower or one percent higher:

Sensitivity of the Net MCHCP OPEB Liability to Changes in Health Care Cost Trend Rates

	1% Decrease in Trend Rates	Current Trend Rates	1% Increase in Trend Rates
Net OPEB liability	\$ 5,406,806	\$ 6,413,236	\$ 7,686,325

Discount Rate

A discount rate of 4.5% was used to measure the total OPEB liabilities. The projection of cash flows used to determine the discount rate assumed that contributions from plan members will be made at the current contribution rates and the contributions will be made at statutorily required rates, actuarially determined. This discount rate was determined as a blend of the best estimate of the expected return on plan assets and the 20-year high quality municipal bond rate as of the measurement date. For years where expected benefit payments can be covered by projected trust assets, expected returns are used. For years where payments are not expected to be covered by trust assets, the municipal Bond Buyer 20-Bond General Obligation Index rate is utilized.

Sensitivity to Changes in the MCHCP Discount Rate

The following table presents MOSERS’ net OPEB liability, calculated using a discount rate of 4.5%, as well as what the net OPEB liability would be if it were calculated using a discount rate that is one percent lower or one percent higher:

Sensitivity of the Net MCHCP OPEB Liability to Changes in Discount Rate

	1% Decrease in Discount Rate (3.5%)	Current Discount Rate (4.5%)	1% Increase in Discount Rate (5.5%)
Net OPEB liability	\$ 7,666,088	\$ 6,413,236	\$ 5,422,557

Long-Term Expected Rate of Return

The target allocation and expected real rate of return for each major asset class are listed below:

MCHCP's Long-Term Expected Rate of Return

Asset Class	Target Allocation	Expected Real Rate of Return
Large cap stocks	18.0%	8.5%
Mid cap stocks	7.0	8.8
Small cap stocks	9.0	8.8
International stocks	5.0	8.9
BarCap aggregate bonds	59.0	2.7
Cash equivalents	2.0	2.2

Note 8 – Commitments

As of June 30, 2022, MOSERS has \$481.2 million in unfunded commitments in the private asset class.

MOSERS has contracted with various software and consulting firms to provide and implement a pension administration system at a cost of approximately \$10.0 million. In addition to the cost of the system, MOSERS has engaged consultants to assist with project governance, change management, and data validation. The contracts for these consulting services have an approximate cost of \$2.5 million. As of June 30, 2022, the remaining commitments on these agreements was approximately \$3.5 million.

Note 9 – Contingencies

There were no contingencies which would have a material impact on the financial statements as of June 30, 2022.

Note 10 – Risk Management

MOSERS is exposed to various risks of loss related to natural disasters, errors and omissions, loss of assets, torts, etc. MOSERS has chosen to cover such losses through the purchase of commercial insurance to help mitigate some of the exposure to those risks. In the previous three years, MOSERS has not experienced any losses that exceeded our insurance coverage limits.

Schedule of Changes in Employers' Net Pension Liability - MSEP

For Years Ended June 30, 2014 – 2022*

	2022	2021	2020	2019	2018
Total pension liability					
Service cost	\$ 166,110,518	\$ 162,668,072	\$ 159,559,528	\$ 158,190,866	\$ 157,351,979
Interest on the total pension liability	1,017,493,541	959,662,398	960,644,327	956,725,536	956,201,619
Benefit changes	0	0	0	0	0
Difference between expected and actual experience	77,335,262	133,886,066	(70,371,777)	7,426,685	(118,252,032)
Assumption changes	0	515,859,705	124,766,739	74,340,841	351,899,973
Benefit payments and member refunds	(962,590,826)	(919,838,592)	(873,816,238)	(851,821,580)	(886,711,473)
Net change in total pension liability	298,348,495	852,237,649	300,782,579	344,862,348	460,490,066
Total pension liability - beginning	15,110,646,537	14,258,408,888	13,957,626,309	13,612,763,961	13,152,273,895
Total pension liability - ending (a)	\$15,408,995,032	\$15,110,646,537	\$14,258,408,888	\$13,957,626,309	\$13,612,763,961
Plan fiduciary net position					
Employer contributions	\$ 471,302,256	\$ 463,293,368	\$ 436,895,653	\$ 394,150,042	\$ 379,557,962
Employee contributions	39,809,873	37,571,263	35,141,960	31,286,632	28,303,994
Pension plan net investment income (loss)	(816,407,543)	2,032,991,086	400,354,303	313,159,178	576,188,826
Benefit payments and member refunds	(962,590,826)	(919,838,592)	(873,816,238)	(851,821,580)	(886,711,473)
Pension plan administrative expense	(9,248,916)	(8,816,943)	(8,398,164)	(9,200,826)	(9,799,256)
Other	5,619,673	3,899,365	4,187,740	4,383,409	1,610,073
Net change in plan fiduciary net position	(1,271,515,483)	1,609,099,547	(5,634,746)	(118,043,145)	89,150,126
Plan fiduciary net position - beginning	9,519,930,080	7,910,830,533	7,916,465,279	8,034,508,424	7,945,358,298
Plan fiduciary net position - ending (b)	8,248,414,597	9,519,930,080	7,910,830,533	7,916,465,279	8,034,508,424
Net pension liability - ending (a)-(b)	\$ 7,160,580,435	\$ 5,590,716,457	\$ 6,347,578,355	\$ 6,041,161,030	\$ 5,578,255,537
Plan fiduciary net position as a percentage of total pension liability	53.53%	63.00%	55.48%	56.72%	59.02%
Covered payroll	\$ 2,004,688,456	\$ 2,024,883,601	\$ 2,006,870,248	\$ 1,950,272,350	\$ 1,951,454,817
Net pension liability as a percentage of covered payroll	357.19%	276.10%	316.29%	309.76%	285.85%

* Schedule is intended to show last 10 fiscal years and will be displayed as it becomes available.

See accompanying Notes to the Schedules of Required Supplementary Information - Pension Trust Funds.

Schedule of Changes in Employers' Net Pension Liability - MSEP (continued)

For Years Ended June 30, 2014 – 2022*

	2017	2016	2015	2014
Total pension liability				
Service cost	\$ 152,766,134	\$ 149,021,755	\$ 150,412,577	\$ 158,116,026
Interest on the total pension liability	945,654,398	913,877,923	896,451,618	869,878,195
Benefit changes	(1,696,059)	0	0	0
Difference between expected and actual experience	(104,203,260)	61,150,083	(27,983,267)	12,376,237
Assumption changes	202,554,786	656,805,085	(57,568,553)	0
Benefit payments and member refunds	(793,964,857)	(757,310,503)	(728,265,800)	(680,436,107)
Net change in total pension liability	401,111,142	1,023,544,343	233,046,575	359,934,351
Total pension liability - beginning	12,751,162,753	11,727,618,410	11,494,571,835	11,134,637,484
Total pension liability - ending (a)	\$13,152,273,895	\$12,751,162,753	\$11,727,618,410	\$11,494,571,835
Plan fiduciary net position				
Employer contributions	\$ 335,217,422	\$ 329,957,369	\$ 329,752,832	\$ 326,370,336
Employee contributions	25,439,343	21,684,920	18,099,455	14,025,328
Pension plan net investment income (loss)	272,595,668	1,740,269	(237,070,529)	1,193,952,121
Benefit payments and member refunds	(793,964,857)	(757,310,503)	(728,265,800)	(680,436,107)
Pension plan administrative expense	(8,759,341)	(8,489,375)	(8,077,692)	(7,336,922)
Other	5,668,849	4,923,622	5,434,820	296,369,500
Net change in plan fiduciary net position	(163,802,916)	(407,493,698)	(620,126,914)	1,142,944,256
Plan fiduciary net position - beginning	8,109,161,214	8,516,654,912	9,136,781,826	7,993,837,570
Plan fiduciary net position - ending (b)	7,945,358,298	8,109,161,214	8,516,654,912	9,136,781,826
Net pension liability - ending (a)-(b)	\$ 5,206,915,597	\$ 4,642,001,539	\$ 3,210,963,498	\$ 2,357,790,009
Plan fiduciary net position as a percentage of total pension liability	60.41%	63.60%	72.62%	79.49%
Covered payroll	\$ 1,975,353,105	\$ 1,921,528,936	\$ 1,918,527,768	\$ 1,902,719,928
Net pension liability as a percentage of covered payroll	263.59%	241.58%	167.37%	123.92%

* Schedule is intended to show last 10 fiscal years and will be displayed as it becomes available.

See accompanying Notes to the Schedules of Required Supplementary Information - Pension Trust Funds.

Schedule of Changes in Employers' Net Pension Liability - Judicial Plan

For Years Ended June 30, 2014 – 2022*

	2022	2021	2020	2019	2018
Total pension liability					
Service cost	\$ 13,303,763	\$ 12,872,644	\$ 13,119,646	\$ 13,573,453	\$ 12,997,198
Interest on the total pension liability	42,073,646	42,004,675	42,458,800	41,710,768	41,018,371
Benefit changes	0	0	0	0	0
Difference between expected and actual experience	(9,088,237)	(6,886,109)	(14,933,643)	978,884	(1,319,696)
Assumption changes	0	(4,928,456)	6,341,771	5,024,057	12,332,042
Benefit payments and member refunds	(42,530,378)	(41,625,546)	(39,622,268)	(37,593,049)	(35,657,248)
Net change in total pension liability	3,758,794	1,437,208	7,364,306	23,694,113	29,370,667
Total pension liability - beginning	626,284,219	624,847,011	617,482,705	593,788,592	564,417,925
Total pension liability - ending (a)	\$ 630,043,013	\$ 626,284,219	\$ 624,847,011	\$ 617,482,705	\$ 593,788,592
Plan fiduciary net position					
Employer contributions	\$ 39,228,848	\$ 39,996,509	\$ 39,174,515	\$ 38,604,668	\$ 36,892,203
Employee contributions	1,550,712	1,448,428	1,314,570	1,138,101	902,319
Pension plan net investment income (loss)	(18,801,946)	44,049,707	8,162,709	6,051,941	10,677,666
Benefit payments	(42,530,378)	(41,625,546)	(39,622,268)	(37,593,049)	(35,657,248)
Pension plan administrative expense	(79,492)	(75,822)	(74,450)	(72,141)	(181,595)
Other	0	0	0	3,895	(68,711)
Net change in plan fiduciary net position	\$ (20,632,256)	\$ 43,793,276	\$ 8,955,076	\$ 8,133,415	\$ 12,564,634
Plan fiduciary net position - beginning	211,081,342	167,288,066	158,332,990	150,199,575	137,634,941
Plan fiduciary net position - ending (b)	190,449,086	211,081,342	167,288,066	158,332,990	150,199,575
Net pension liability - ending (a)-(b)	\$ 439,593,927	\$ 415,202,877	\$ 457,558,945	\$ 459,149,715	\$ 443,589,017
Plan fiduciary net position as a percentage of total pension liability	30.23%	33.70%	26.77%	25.64%	25.30%
Covered payroll	\$ 63,333,626	\$ 63,105,884	\$ 61,402,061	\$ 60,594,362	\$ 59,417,302
Net pension liability as a percentage of covered payroll	694.09%	657.95%	745.18%	757.74%	746.57%

* Schedule is intended to show last 10 fiscal years and will be displayed as it becomes available.

See accompanying Notes to the Schedules of Required Supplementary Information - Pension Trust Funds.

Schedule of Changes in Employers' Net Pension Liability - Judicial Plan (continued)

For Years Ended June 30, 2014 – 2022*

	2017	2016	2015	2014
Total pension liability				
Service cost	\$ 12,945,567	\$ 10,932,097	\$ 10,613,686	\$ 8,990,293
Interest on the total pension liability	40,617,091	37,755,240	36,161,612	34,013,615
Benefit changes	0	0	0	0
Difference between expected and actual experience	(10,687,091)	(5,036,696)	5,103,664	13,360,614
Assumption changes	7,905,466	53,991,379	0	0
Benefit payments and member refunds	(33,984,725)	(32,989,714)	(31,245,906)	(29,406,625)
Net change in total pension liability	16,796,308	64,652,306	20,633,056	26,957,897
Total pension liability - beginning	547,621,617	482,969,311	462,336,255	435,378,358
Total pension liability - ending (a)	\$ 564,417,925	\$ 547,621,617	\$ 482,969,311	\$ 462,336,255
Plan fiduciary net position				
Employer contributions	\$ 34,246,826	\$ 33,642,498	\$ 32,696,686	\$ 29,264,877
Employee contributions	786,745	661,206	488,193	294,810
Pension plan net investment income (loss)	4,680,131	28,081	(3,610,352)	17,199,701
Benefit payments	(33,984,725)	(32,989,714)	(31,245,906)	(29,406,625)
Pension plan administrative expense	(150,387)	(136,983)	(123,015)	(105,693)
Other	0	0	0	4,195,049
Net change in plan fiduciary net position	\$ 5,578,590	\$ 1,205,088	\$ (1,794,394)	\$ 21,442,119
Plan fiduciary net position - beginning	132,056,351	130,851,263	132,645,657	111,203,538
Plan fiduciary net position - ending (b)	137,634,941	132,056,351	130,851,263	132,645,657
Net pension liability - ending (a)-(b)	\$ 426,782,984	\$ 415,565,266	\$ 352,118,048	\$ 329,690,598
Plan fiduciary net position as a percentage of total pension liability	24.39%	24.11%	27.09%	28.69%
Covered payroll	\$ 58,591,661	\$ 57,421,016	\$ 55,656,457	\$ 49,587,936
Net pension liability as a percentage of covered payroll	728.40%	723.72%	632.66%	664.86%

* Schedule is intended to show last 10 fiscal years and will be displayed as it becomes available.

See accompanying Notes to the Schedules of Required Supplementary Information - Pension Trust Funds.

Pension Trust Funds
Schedule of Employer Contributions
 Last Ten Fiscal Years

MSEP

Year Ended June 30	Actuarially Determined Contribution	Contributions in Relation to the Actuarially Determined Contribution*	Contribution Deficiency (Excess)	Covered Payroll**	Contributions as a Percentage of Covered Payroll
2022	\$ 471,302,256	\$ 471,302,256	\$ 0	\$ 2,004,688,456	23.51%
2021	463,293,368	463,293,368	0	2,024,883,601	22.88
2020	436,895,653	436,895,653	0	2,006,870,248	21.77
2019	394,150,042	394,150,042	0	1,950,272,350	20.21
2018	379,557,962	379,557,962	0	1,951,454,817	19.45
2017	322,772,697	335,217,422	(12,444,725)	1,975,353,105	16.97
2016	310,124,928	329,957,369	(19,832,414)	1,921,528,936	16.97
2015	329,752,832	329,752,832	0	1,918,527,768	16.97
2014	326,370,336	326,370,336	0	1,902,719,928	16.98
2013	274,655,284	274,655,284	0	1,880,212,950	14.45

Judicial Plan

Year Ended June 30	Actuarially Determined Contribution	Contributions in Relation to the Actuarially Determined Contribution*	Contribution Deficiency (Excess)	Covered Payroll**	Contributions as a Percentage of Covered Payroll
2022	\$ 39,228,848	\$ 39,228,848	\$ 0	\$ 63,333,626	61.94%
2021	39,996,509	39,996,509	0	63,105,884	63.38
2020	39,174,515	39,174,515	0	61,402,061	63.80
2019	38,604,668	38,604,668	0	60,594,362	63.71
2018	36,892,203	36,892,203	0	59,417,302	62.09
2017	32,670,710	34,246,826	(1,576,116)	58,591,661	58.45
2016	31,604,527	33,642,498	(2,037,971)	57,421,016	58.45
2015	32,696,686	32,696,686	0	55,656,457	58.45
2014	29,264,877	29,264,877	0	49,587,936	59.69
2013	28,330,649	28,330,649	0	48,697,726	56.92

* Since the percent of payroll contributions rate was applied to the pension payroll during the fiscal year, the actuarially determined contribution is equal to the actual contribution. In fiscal years 2016 and 2017, excess contributions were made because the actuarially determined contribution rate fell below the Board-established minimum contribution rate.

** For fiscal years 2016 and prior, covered payroll totals from the valuation report were used, which includes actual covered payroll from July through May with estimated amounts for June. For fiscal years 2017 and forward, covered payroll totals used are actual covered payroll from July through June, as reported in the GASB 67 report.

See accompanying Notes to the Schedules of Required Supplementary Information - Pension Trust Funds.

Pension Trust Funds

Schedule of Annual Money-Weighted Rate of Return on Investments*

Year Ended June 30	Annual Money-Weighted Rate of Return - Net of Investment Expense
2022	(8.75)%
2021	26.56
2020	5.25
2019	4.10
2018	7.57
2017	3.51
2016	0.08
2015	(2.60)
2014	19.25

* Schedule is intended to show last 10 fiscal years and will be displayed as it becomes available.

See accompanying *Notes to the Schedules of Required Supplementary Information - Pension Trust Funds*.

Notes to the Schedules of Required Supplementary Information - Pension Trust Funds

Actuarial Methods and Assumptions for Valuations Performed as of June 30, 2022

The entry age normal actuarial cost method of valuation is used in determining liabilities and normal cost. Regular actuarial valuations provide valuable information about the composite change in the unfunded actuarial accrued liabilities (whether or not the liabilities are increasing or decreasing, and by how much). Since the future cannot be predicted with precision, actual experience is expected to differ from assumed experience. Differences occurring in the past between assumed experience and actual experience (actuarial gains and losses) become part of actuarial accrued liabilities. Unfunded actuarial accrued liabilities are amortized to produce payments (principal and interest), which are expressed as a percent of payroll. A layered, closed 25-year amortization period was used for the June 30, 2022 valuations to determine the fiscal year 2024 contribution rates. The actuarial value is calculated by recognizing the difference between the actual and expected return on the fair value of assets each year over a closed five-year period. In addition, the total unrecognized investment experience as of June 30, 2017, will be recognized evenly over a seven-year period beginning June 30, 2018.

The investment return rate assumption remained constant at 6.95% per year, as of June 30, 2022, compounded annually (net of investment expenses). The price inflation assumption used was 2.25% per year. Projected salary assumptions were 2.75% to 10.00% for the MSEP and 3.00% for the Judicial Plan. The assumption used for annual post-retirement benefit increases (COLAs) is 4.0% (on a compound basis) when a minimum COLA is in effect. When no minimum COLA is in effect, the annual COLA is assumed to be 1.80% (80% of the 2.25% price inflation), on a compounded basis.

Actuarial Assumptions and Methods Used to Set the Actuarially Determined Contributions - Five-Year Review

MSEP & Judicial

Valuation year	2022	2021	2020	2019	2018
Contribution rate for fiscal year	2024	2023	2022	2021	2020
Actuarial cost method	Entry Age Normal				
Amortization method	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll
Amortization periods	Closed 25-year period	Closed 25-year period	Closed 30-year period	Closed 30-year period	Closed 30-year period
Inflation	2.25%	2.25%	2.25%	2.35%	2.50%
Cost-of-living adjustment	4% or 1.80%	4% or 1.80%	4% or 1.80%	4% or 1.88%	4% or 2%
Salary increase	varied	varied	varied	varied	varied
Payroll growth	2.25%	2.25%	2.25%	2.35%	2.50%
Investment rate of return	6.95%	6.95%	6.95%	7.10%	7.25%

Schedule of Proportionate Share of the Net OPEB Liability

For Years Ended June 30, 2018 – 2022*

State Retiree Welfare Benefit Trust

	2022	2021	2020	2019	2018
MOSERS' proportion of the net OPEB liability	0.3760%	0.4313%	0.4352%	0.4375%	0.4121%
MOSERS' proportionate share of the net OPEB liability	\$ 6,413,236	\$ 7,682,560	\$ 7,697,649	\$ 7,666,038	\$ 7,272,038
MOSERS' covered payroll	\$ 7,004,895	\$ 7,569,252	\$ 7,370,032	\$ 7,056,668	\$ 6,669,717
MOSERS' proportionate share of the net OPEB liability as a percentage of its covered payroll	91.55%	101.50%	104.45%	108.64%	109.03%
Plan fiduciary net position as a percentage of the total OPEB liability	10.14%	8.24%	7.31%	6.90%	6.64%

* The amounts presented in this schedule were determined as of the previous fiscal year end. Intended to show information for 10 years, data for additional years will be displayed as it becomes available.

Schedule of Employer Contributions for OPEB

For Years Ended June 30, 2018 – 2022*

	2022	2021	2020	2019	2018
Contractually required contribution	\$ 291,661	\$ 283,613	\$ 311,510	\$ 331,275	\$ 301,182
Contributions in relation to the contractually required contribution	\$ 291,661	\$ 283,613	\$ 311,510	\$ 331,275	\$ 301,182
Contribution deficiency (excess)	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Covered payroll	\$ 7,262,074	\$ 7,004,895	\$ 7,569,252	\$ 7,370,032	\$ 7,056,668
Contributions as a percentage of covered payroll	4.02%	4.05%	4.12%	4.49%	4.27%

* Intended to show information for 10 years, data for additional years will be displayed as it becomes available.

Schedules of Investment Expenses

For the Year Ended June 30, 2022

Investing activity	MSEP	Judicial Plan	Total
Investment management and incentive fees			
Equity			
Artisan Partners	\$ 2,170,051	\$ 49,283	\$ 2,219,334
Baillie Gifford Intl. Alpha Private Equity	1,561,202	35,455	1,596,657
Baillie Gifford EM Private Equity	860,515	19,543	880,058
NS Partners	1,202,231	27,303	1,229,534
Silchester International Investors	2,243,719	50,956	2,294,675
Multi-asset			
Blackrock	1,201,241	27,281	1,228,522
NISA Investment Advisors	5,315,061	120,707	5,435,768
Alternatives			
Aberdeen Standard Investments	1,736,445	39,435	1,775,880
Aberdeen Davi Alpha	1,066,610	24,223	1,090,833
Actis Emerging Markets 3	442,941	10,059	453,000
Actis Emerging Markets 4	2,563,776	58,224	2,622,000
Axiom Asia Private Capital Fund II, LP	419,216	9,521	428,737
Axiom Asia Private Capital Fund III, LP	(2,945,621)	(66,896)	(3,012,517)
Axiom Asia Fund 6, LP	644,353	14,634	658,987
Axxon Brazil Private Equity Fund II B, LP	198,046	4,498	202,544
Blackstone Real Estate Partners IV	281,167	6,385	287,552
Blackstone Real Estate Partners V	550,480	12,502	562,982
Blackstone Real Estate Partners VI	149,416	3,393	152,809
Blackstone Real Estate Partners VII	3,198,269	72,634	3,270,903
Blackstone Topaz Fund, LP	5,217,217	118,485	5,335,702
Blackstone Topaz Private Credit	2,169,452	49,269	2,218,721
Brevan Howard Alpha	15,893,168	360,940	16,254,108
CarVal Investors CVI Global Value Fund A, LP - Private Debt	3,260	74	3,334
CarVal Investors CVI Global Value Fund A, LP - Real Estate	3,260	74	3,334
Catalyst Fund Limited Partnership III	309,978	7,040	317,018
Catalyst Fund Limited Partnership IV	89,083	2,023	91,106
Catalyst Fund Limited Partnership V	2,273,011	51,621	2,324,632
CBRE	1,141,174	25,916	1,167,090
Centiva Capital	3,649,433	82,880	3,732,313
Cornwall Domestic, LP	66,640	1,513	68,153
DRI Capital - LSRC	85,702	1,946	87,648
EIG Energy Fund XIV, LP	220,434	5,006	225,440
EIG Energy Fund XV, LP	309,396	7,027	316,423
EIG Energy Fund XVI, LP	323,643	7,350	330,993
EIG Co-Investment	55,357	1,257	56,614
Eilser Capital Fund	2,632,617	59,788	2,692,405
Elliott International Limited	17,378,133	394,663	17,772,796
Exodus Point Partners Fund	10,287,863	233,641	10,521,504
Farallon Capital Institutional Partners, LP	242	6	248
Gateway Energy & Resource Holdings, LLC	42,780	972	43,752
Global Forest Partners GTI7 Institutional Investors Company Ltd.	2,850	65	2,915

Schedule of Investment Expenses continued on following page.

Schedules of Investment Expenses (continued)

For the Year Ended June 30, 2022

Investing activity	MSEP	Judicial Plan	Total
Gryphon Investors, Inc.	\$ 4,364,446	\$ 99,118	\$ 4,463,564
HBK Merger Strategies Offshore Fund, Ltd.	3,886,986	88,275	3,975,261
JLL Partners Fund V, LP	153,497	3,486	156,983
JLL Partners Fund VI, LP	1,263,471	28,694	1,292,165
King Street Capital, LP	122,257	2,777	125,034
LaSalle Property Fund	716,442	16,271	732,713
Linden Capital Partners II, LP	2,403,818	54,592	2,458,410
Merit Energy Partners F-II, LP	16,522	375	16,897
MHR Institutional Partners IIA, LP	(1,119,361)	(25,421)	(1,144,782)
MHR Institutional Partners III, LP	36,847	837	37,684
MHR Institutional Partners IV, LP	2,536,735	57,610	2,594,345
Millennium USA LP	1,052,223	23,896	1,076,119
Millennium Technology Value Partners II	410,126	9,314	419,440
OCM Opportunities Fund VIIIb, LP	2,192	50	2,242
OCM Opportunities Fund VIIIb, LP	150,966	3,429	154,395
OCM Power Opportunities Fund III, LP	(120,694)	(2,741)	(123,435)
Partners Group Holding AG	5,761,689	130,850	5,892,539
Pharo Macro Fund, LTD	833,938	18,939	852,877
Portfolio Advisors Secondary Fund IV, LP	795,777	18,072	813,849
Silver Creek Special Opportunities Fund I, LP	28,942	657	29,599
Silver Creek Special Opportunities Fund II, LP	35,665	810	36,475
Silver Lake Partners II, LP	(3,423)	(78)	(3,501)
Standard Investment Research Hedged Equity Fund	5,185,396	117,762	5,303,158
Stockbridge Core & Value Advisors, LLC	14,138	321	14,459
TA Realty Core Property Fund, LP	617,334	14,020	631,354
Thomas H. Lee Partners LP	2,750,324	62,461	2,812,785
Voleon Institutional Strategies Fund LP	2,392,731	54,340	2,447,071
Voleon Investors Fund LP	746,666	16,957	763,623
Total investment management and incentive fees	120,049,461	2,726,369	122,775,830
Other investment fees			
<i>Investment consultant fees</i>			
Meketa Investment Group	271,827	6,165	277,992
NEPC	312,903	7,097	320,000
Total investment consultant fees	584,730	13,262	597,992
<i>Investment custodial and other fees</i>			
BNY Mellon (custodial)	636,523	14,384	650,907
BNY Mellon (performance calculation)	212,594	4,804	217,398
Total investment custodial and other fees	849,117	19,188	868,305
Internal investment activity expenses	6,933,575	62,238	6,995,813
Total investing activity expenses	\$ 128,416,883	\$ 2,821,057	\$ 131,237,940

Schedules of Internal Investment Activity Expenses

For the Year Ended June 30, 2022

Personnel services

Salaries	\$ 2,085,438
Fringe benefits	903,075
Total personnel services	<u>2,988,513</u>

Professional services

Attorney services	3,464,261
Total professional services	<u>3,464,261</u>

Communications

Telephone	4,960
Total communications	<u>4,960</u>

Facilities

Utilities	8,113
Lease expense	84,088
Facility maintenance	10,610
Total facilities	<u>102,811</u>

Software and equipment

Computer supplies and software	30,355
Total software and equipment	<u>30,355</u>

Education, meetings, and travel

Professional development including travel	13,678
Due diligence travel	3,751
Total education, meetings, and travel	<u>17,429</u>

General

Research and information services	371,369
Membership dues	9,505
Office supplies	2,269
Periodicals and publications	4,341
Total general	<u>387,484</u>
Total internal investment activity expenses	<u>\$ 6,995,813</u>

Schedules of Administrative Expenses

For the Year Ended June 30, 2022

Personnel services	
Salaries	\$ 4,801,992
Fringe benefits	1,853,999
Total personnel services	<u>6,655,991</u>
Professional services	
Consulting services	606,944
Attorney services	191,100
Auditing services	67,124
Actuarial services	267,335
Total professional services	<u>1,132,503</u>
Communications	
Postage and mailing	154,194
Telephone and internet	57,325
Printing	12,205
Video production	3,130
Total communications	<u>226,854</u>
Facilities	
Utilities	91,343
Facility maintenance	63,994
Vehicle maintenance and operation	3,461
Total facilities	<u>158,798</u>
Software and equipment	
Maintenance agreements and licenses	628,981
Computer supplies and software	80,695
Equipment rental	51,833
Gain on sale of equipment	(6,609)
Total software and equipment	<u>754,900</u>
Education, meetings, and travel	
Professional development including travel	76,159
Board travel and meetings	4,835
MOSERS sponsored seminars	59,505
Due diligence	5,128
Tuition reimbursement	9,388
Total education, meetings, and travel	<u>155,015</u>
General	
Depreciation and amortization	247,807
Insurance	213,279
Business continuity	83,496
Banking services	45,935
Research and information services	37,267
Office supplies and miscellaneous	54,959
Membership dues	21,821
Recruiting and outreach	19,905
Total general	<u>724,469</u>
Total administrative expenses	<u>\$ 9,808,530</u>

Schedules of Professional Service Fees

For the Year Ended June 30, 2022

Professional Services

Operations administrative expenses

Actuarial services

Cavanaugh Macdonald Consulting, LLC	\$ 217,335
Gabriel, Roeder, Smith & Company	50,000
Total actuarial services	267,335

Attorney services

Ice Miller, LLP	48,000
DLA Piper, LLP	27,884
Thompson Coburn, LLP	115,216
Total attorney services	191,100

Auditing services

Eide Bailly, LLP	67,124
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Consulting services

Avtex – information technology	16,688
Charlesworth & Associates – risk management	12,708
Eide Bailly, LLP – audit consulting	31,200
Gamble & Schlemeier, Ltd. – governmental affairs	28,810
Huber & Associates – information technology	46,878
Linea Solutions – information technology	116,957
Metaformers, Inc. – information technology	49,238
Verus Advisory, Inc. – investment consulting	265,000
Other consulting services	39,465
Total consulting services	606,944
Total operations administrative expenses	1,132,503

Investment administrative expenses

Attorney services

Brattle Group	113,846
Froese Forensic Partners, Ltd.	151,365
Guru Discovery, LLC	229,969
Quinn Emanuel Urquhart & Sullivan, LLP	2,300,620
Thompson Coburn, LLP	619,459
Other attorney services	49,002
Total investment administrative expenses	3,464,261
Total professional services expenses	\$ 4,596,764

Information on investment management and consulting fees can be found in the Schedules of Investment Expenses on pages 60-61.

Capitalized professional service fees for the pension administration system

Consulting services

ICON Integration and Design, Inc.	\$ 185,634
Tegrit	1,429,293
Total consulting services	\$ 1,614,927