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Financial Section



Independent Auditor's Report

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

Report on Financial Statements

We have audited the accompanying financial statements of the pension and other trust funds and aggregate remaining fund information of the Missouri State Employees' Retirement System (MOESERS), a pension (and other employee benefit) trust fund of the State of Missouri, which comprise the statements of fiduciary net position as of June 30, 2019, and the related statements of changes in fiduciary net position, for the year then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes 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.

Auditor's Responsibility

Our responsibility is to express opinions on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

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

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Opinions

In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of the pension and other trust funds and aggregate remaining fund information of MOSERS as of June 30, 2019, and the respective changes in financial position and, where applicable, cash flows thereof for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Other Matters

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 19-25 and 54-61 be presented to supplement the basic financial statements. Such information, 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.

Other Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise MOSERS's basic financial statements as a whole. The introductory, investment, actuarial, statistical sections and additional supplemental schedules as listed in the table of contents are presented for purposes of additional analysis and are not a required part of the financial statements.

The additional supplementary information accompanying financial information listed as additional supplemental schedules in the table of contents are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. Such 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 accompanying financial information listed as supplemental schedules are fairly stated, in all material respects, in relation to the basic financial statements as a whole.

The introductory, investment, actuarial and statistical sections have not been subjected to the auditing procedures applied in the audit of the basic financial statements and, accordingly, we do not express an opinion or provide any assurance on them.

The image shows a handwritten signature in cursive script that reads "Eide Bailly LLP".

October 18, 2019

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, 2019. 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 Comprehensive Annual Financial Report (CAFR) 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 26. 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 CAFR consist of:

- The *Statements of Fiduciary Net Position* report the pension trust 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 pension trust funds at that specific point in time.
- The *Statements of Changes in Fiduciary Net Position* summarize the pension trust 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 *Statements of Net Position* of the internal service funds are similar to the *Statements of Fiduciary Net Position* in that it is also a snapshot of the financial position of the internal service funds where net position plus liabilities equals assets.
- The *Statements of Revenues, Expenses, and Changes in Net Position* of the internal service funds is similar to the *Statements of Changes in Fiduciary Net Position* in that it also reports a summary of the financial activity that occurred over the period of the fiscal year where revenues less expenses equals net revenue and supports the change to the prior year's net position.
- The *Statements of Cash Flows* of the internal service funds report the financial transactions of the fiscal year of the internal service funds on a cash basis. The focus of this statement is on the sources and uses of cash within the internal service funds.
- 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

The unfunded actuarial accrued liability (UAAL) for Missouri State Employees' Plan (MSEP) increased by \$0.4 billion from \$4.8 billion at June 30, 2018, to \$5.2 billion at June 30, 2019, with a corresponding decrease in funded percentage from 64.9% to 62.9%. The UAAL for the Judicial Plan increased by \$13.6 million from \$431.7 million at June 30, 2018, to \$445.3 million at June 30, 2019, with an increase in funded percentage from 27.3% to 27.9%. The primary reason for the increase in the UAAL in both plans was a reduction in the assumed rate of investment return from 7.25% to 7.10% and the recognition of prior year losses.

To determine the UAAL of the plans, MOSERS uses a smoothed value of assets which recognizes market gains and losses on the actuarial value of assets over a closed five-year period. For GASB 67 financial statement reporting purposes, the market value of assets is used to determine plan net position. The net position of the MSEP Fund at June 30, 2019, was \$6.0 billion, an increase from \$5.6 billion as of June 30, 2018. The net position of the Judicial Plan Fund at June 30, 2019, was \$0.5 billion, an increase from \$0.4 billion as of June 30, 2018. The net position as a percentage of total pension liability decreased from 59.0% at June 30, 2018, to 56.7% at June 30, 2019, for the MSEP Fund and increased from 25.3% to 25.6% for the Judicial Plan Fund.

Financial Reporting Highlights

- MOSERS' net position restricted for pensions decreased by \$109.9 million during the year ended June 30, 2019. On June 30, 2019, total plan assets (including net capital assets of \$4.9 million) were \$12.2 billion, exceeding total liabilities of \$4.1 billion, resulting in a net position held in trust for pension benefits of \$8.1 billion.
- Covered payroll, from which both employee and employer contributions are calculated, decreased \$1.2 million for the MSEP and increased \$1.2 million for the Judicial Plan, or (0.1%) and 2.0% respectively, over the last fiscal year.
- Total contributions during fiscal year 2019 were \$469.1 million, up from \$451.0 million in fiscal year 2018. Based upon the June 30, 2017 actuarial valuation, the fiscal year 2019 actuarial required employer contribution rates were determined to be 20.21% for the MSEP and 63.71% for the Judicial Plan.
- Investment income, net of related fees, was \$319.2 million. Investments of the pension trust funds generated a time-weighted rate of return of 4.3%, net of fees, for the year, down from the prior year's return of 7.4%. The money-weighted rate of return, net of investment expenses for fiscal year 2019, was 4.1%.
- Investment manager fees were \$40.7 million in fiscal year 2019, down from \$49.1 million in fiscal year 2018. The lower manager fees were driven by investment staff reducing exposure to higher fee managers. An accounting gain of \$3.8 million was experienced this year on incentive fees. This gain on incentive fees was due to poor performance on alternative assets that reversed fees incurred in prior years. Incentive fees expense was \$40.8 million in fiscal year 2018.
- Member benefit payments were \$880.4 million in fiscal year 2019, up \$26.6 million from \$853.8 million in fiscal year 2018. Service transfers and refunds totaled \$9.0 million in fiscal year 2019, down \$59.6 million from \$68.6 million in fiscal year 2018 due primarily to the buyout program offered during the prior year.
- Administrative expenses totaled \$9.3 million in fiscal year 2019, compared to \$10.2 million in fiscal year 2018. MOSERS experienced a decrease in administrative expense because it entered into the application development stage of the new pension administration system at the beginning of the fiscal year and began capitalizing project costs. MOSERS capitalized a total of \$2.1 million in project costs incurred during the year, which includes staff payroll costs of \$0.7 million.
- The internal service fund's net position increased by \$0.2 million. This change is primarily due to interest income earned on cash and short term instruments in the fund.
- In prior years, MOSERS financial statements netted interest paid to counterparties in reverse repurchase agreement with interest income. To improve transparency and better comply with GAAP, the current year financial statements separately disclose interest expense on reverse repurchase agreements. The respective income generated from assets purchased with the proceeds from reverse purchase agreements is also being separately disclosed in the *Statement of Changes in Fiduciary Net Position*. This change in reporting has no effect on beginning or ending net position.

The schedules on pages 21-25 present summary comparative financial statements of the pension trust funds and internal service funds for fiscal year 2019 and fiscal year 2018. For each schedule, there is a brief summary of the significant changes noted in those schedules.

Requests for Information

This financial report is designed to provide a general overview of the System's finances for all those interested in the System. 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 mosers@mosers.org.

Pension Trust Funds
Summary Comparative Statements of Fiduciary Net Position

	As of June 30, 2019	As of June 30, 2018	Amount of Change	Percentage Change
Assets				
Cash and short-term instruments	\$ 263,269,711	\$ 2,379,956	\$ 260,889,755	10,961.96%
Receivables	346,692,311	152,195,889	194,496,422	127.79
Investments	11,596,260,814	12,065,659,652	(469,398,838)	(3.89)
Capital assets, net of accumulated depreciation	4,887,103	3,237,785	1,649,318	50.94
Other assets	75,750	44,847	30,903	68.91
Total assets	12,211,185,689	12,223,518,129	(12,332,440)	(0.10)
Deferred outflow of resources	743,472	301,182	442,290	146.85
Liabilities				
Administrative expense payables	1,666,007	3,007,015	(1,341,008)	(44.60)
Investment activities payable	202,258,228	170,776,608	31,481,620	18.43
Obligations under repurchase agreements	3,921,700,618	3,853,968,794	67,731,824	1.76
MOSERS investment portfolio liability (MIP)	3,470,132	4,014,950	(544,818)	(13.57)
Net OPEB liability	7,666,038	7,272,038	394,000	5.42
Total liabilities	4,136,761,023	4,039,039,405	97,721,618	2.42
Deferred inflow of resources	369,869	71,907	297,962	414.37
Net positions restricted for pensions	\$ 8,074,798,269	\$ 8,184,707,999	\$ (109,909,730)	(1.34)

The largest components of the net position of the pension trust funds are the cash and short-term instruments, receivables, and investments, less obligations under repurchase agreements (which represents the amount of money MOSERS is borrowing to lever the portfolio).

MOSERS' net position restricted for pension benefits decreased by \$110 million from \$8.18 billion in fiscal year 2018 to \$8.07 billion in fiscal year 2019. The decrease was due to the negative cash flow generated by benefit payments in excess of contribution and investment revenue.

The increase in cash and receivables is primarily related to investment activity, including the timing of investment transactions that had not settled by June 30, and more accrued interest receivable on fixed income securities.

Administrative expense payables decreased and investment related payables increased as a result of the timing of normal business and investing activity.

Prior year amounts were reclassified to conform to the current year's presentation.

Detailed information regarding MOSERS' investment portfolio is included in the *Investment Section* of this report.

*Pension Trust Funds***Summary Comparative Statements of Changes in Fiduciary Net Position**

	Year Ended June 30, 2019	Year Ended June 30, 2018	Amount of Change	Percentage Change
Additions				
Contributions	\$ 469,065,954	\$ 450,974,449	\$ 18,091,505	4.01%
Net investment income	319,211,119	589,611,104	(270,399,985)	(45.86)
Miscellaneous income	500,793	548,581	(47,788)	(8.71)
Total additions	788,777,866	1,041,134,134	(252,356,268)	(24.24)
Deductions				
Benefit payments	880,399,391	853,758,969	26,640,422	3.12
Service transfers and refunds	9,015,238	68,609,753	(59,594,515)	(86.86)
Administrative expenses	9,272,967	10,209,941	(936,974)	(9.18)
Total deductions	898,687,596	932,578,663	(33,891,067)	(3.63)
Net increase (decrease)	(109,909,730)	108,555,471	(218,465,201)	(201.25)
Net position beginning of year	8,184,707,999	8,076,152,528	108,555,471	1.34
Net positions restricted for pensions	\$ 8,074,798,269	\$ 8,184,707,999	\$ (109,909,730)	(1.34)

The 4.01% increase in contributions received is primarily attributable to an increase in contribution rates from 19.45% in fiscal year 2018 to 20.21% in fiscal year 2019, and an increase in the growing percentage of MSEP 2011 tier members who contribute 4% of pay.

The decrease in investment income from fiscal year 2018 to fiscal year 2019 is attributable to market performance. The fund returned 4.3% in fiscal year 2019 compared to 7.4% in fiscal year 2018. The *Investment Section* of this report contains additional information regarding investments activity.

The total benefit payments increased as a result of an increase in the number of benefit recipients plus cost-of-living adjustments provided to existing benefit recipients. Detailed schedules of these changes can be viewed on pages 120-131 of the *Actuarial Section* of this report.

Service transfers and refunds decreased by \$59.6 million to more historically normal amounts with the conclusion of the buyout program that was offered briefly during the prior fiscal year.

MOSERS experienced a decrease in administrative expense because it entered into the application development stage of the new pension administration system at the beginning of the fiscal year and began capitalizing project costs. MOSERS capitalized a total of \$2.1 million in project costs incurred during the year, which includes \$0.7 million in staff payroll costs.

*Internal Service Funds***Summary Comparative Statements of Net Position**

	As of June 30, 2019	As of June 30, 2018	Amount of Change	Percentage Change
Assets				
Premiums receivable	\$ 957,787	\$ 945,148	\$ 12,639	1.34%
Short-term instruments	6,919,257	4,294,253	2,625,004	61.13
Capital assets, net of accumulated depreciation	6,947	12,800	(5,853)	(45.73)
Total assets	7,883,991	5,252,201	2,631,790	50.11
Liabilities				
Premiums payable	5,170,302	2,493,654	2,676,648	107.34
Deferred revenue	2,008,209	2,083,270	(75,061)	(3.60)
Other liabilities	239,771	397,165	(157,394)	(39.63)
Total liabilities	7,418,282	4,974,089	2,444,193	49.14
Unrestricted net position	\$ 465,709	\$ 278,112	\$ 187,597	67.45

The slight increase in premiums receivable is attributable to normal fluctuations in the month-end balance of life and long-term disability insurance premiums receivable during the year, which are dependent on the number of members participating and amount of their coverage.

The increase in short-term instruments and premiums payable is attributable to the timing of remitting premiums received to The Standard.

The slight decrease in other liabilities is due to expenses allocated from the pension trust fund to the internal service fund, but not yet paid for by the fund.

Long-term disability premiums are paid by the State on all active employees based upon a blended rate estimated by MOSERS. The Standard is paid the actual rate based upon active employees that are not yet eligible to retire. The deferred revenue balance represents amounts paid by the State in excess of that needed to pay the premiums. The reduction in deferred revenue during fiscal year 2019 reflects a lower amount received than was needed to pay the premiums. This amount reduced the deferred revenue balance. This balance is estimated to continue to decrease in the future.

Internal Service Funds
Summary Comparative Statements of Revenues, Expenses, and Changes in Net Position

	Year Ended June 30, 2019	Year Ended June 30, 2018	Amount of Change	Percentage Change
Operating revenues				
Premium receipts	\$ 31,342,778	\$ 31,119,232	\$ 223,546	0.72%
Deferred compensation receipts	1,215,000	800,000	415,000	51.88
Miscellaneous income	494,722	480,120	14,602	3.04
Total operating revenues	33,052,500	32,399,352	653,148	2.02
Operating expenses				
Premium disbursements	31,325,399	31,100,612	224,787	0.72
Premium refunds	17,379	14,211	3,168	22.29
Administrative expenses	1,649,467	1,587,344	62,123	3.91
Total operating expenses	32,992,245	32,702,167	290,078	0.89
Net operating income (loss)	60,255	(302,815)	363,070	119.90
Nonoperating revenues				
Gain on sale of capital assets	145	0	145	100.00
Investment income	127,197	85,806	41,391	48.24
Total nonoperating revenues	127,342	85,806	41,536	48.41
Net revenues over (under) expenses	187,597	(217,009)	404,606	186.45
Net position beginning of year	278,112	495,121	(217,009)	(43.83)
Net position end of year	\$ 465,709	\$ 278,112	\$ 187,597	67.45

Activity within the internal service fund during the year was consistent with prior years. There were less than a 1% differences between current and prior year amounts for premium receipts and disbursements.

Deferred compensation receipts and investment income were greater this year due to greater cash receipts from the State of Missouri Deferred Compensation Plan's third-party record keeper, which collects deferred compensation contributions directly from employers.

Internal Service Funds
Summary Comparative Statements of Cash Flows

	Year Ended June 30, 2019	Year Ended June 30, 2018	Amount of Change	Percentage Change
Cash flows from operating activities	\$ 2,497,662	\$ (81,359)	\$ 2,579,021	3,169.93%
Cash flows from noncapital financing activities	0	(13)	13	100.00
Cash flows from capital and related financing activities	145	0	145	100.00
Cash flows from investing activities	(2,497,807)	81,372	(2,579,179)	(3,169.61)
Net change in cash	0	0	0	
Cash balances beginning of year	0	0	0	
Cash balances end of year	\$ 0	\$ 0	\$ 0	

The increase in cash flows from operating activities, and the corresponding decrease in cash flows from investing activities is due to timing differences between the receipt of premiums from employers and participants, and the remittance of those funds to The Standard. The Standard is the insurance company that underwrites the Life and LTD programs.

Pension Trust Funds

Statements of Fiduciary Net Position

As of June 30, 2019

	MSEP	Judicial Plan	Total
Assets			
Cash and short-term instruments	\$ 258,150,981	\$ 5,118,730	\$ 263,269,711
Receivables			
Contributions	16,858,706	1,654,698	18,513,404
Investment income	130,844,194	2,594,436	133,438,630
Investment sales	190,586,775	3,779,038	194,365,813
Other receivables	373,154	1,310	374,464
Total receivables	338,662,829	8,029,482	346,692,311
Investments and derivatives			
Investments - cash equivalents	666,664,890	13,218,923	679,883,813
Investments - treasuries	5,548,030,564	110,008,773	5,658,039,337
Investments - fixed income	2,157,725,600	42,785,105	2,200,510,705
Investments - equity	36,997,220	733,597	37,730,817
Investments - real estate investments	103,453,514	2,051,321	105,504,835
Investments - alternatives and limited partnerships	2,833,673,274	56,187,311	2,889,860,585
Investments - derivative instruments	24,250,650	480,072	24,730,722
Total investments and derivatives	11,370,795,712	225,465,102	11,596,260,814
Capital assets, net of accumulated depreciation	4,849,082	38,021	4,887,103
Prepaid and other expenses	75,161	589	75,750
Total assets	11,972,533,765	238,651,924	12,211,185,689
Deferred outflow of resources	737,689	5,783	743,472
Liabilities			
Administrative and benefit expense payables	1,017,604	7,979	1,025,583
Employee vacation and overtime liability	635,443	4,981	640,424
Payable for investments purchased	128,066,274	2,539,354	130,605,628
Management and incentive fees payable	10,435,156	206,913	10,642,069
Investment activities payable	59,824,309	1,186,222	61,010,531
Obligations under repurchase agreements	3,845,451,330	76,249,288	3,921,700,618
MOSERS investment portfolio liability (MIP)	3,402,663	67,469	3,470,132
Net OPEB liability	7,606,404	59,634	7,666,038
Total liabilities	4,056,439,183	80,321,840	4,136,761,023
Deferred inflow of resources	366,992	2,877	369,869
Net position restricted for pensions	\$ 7,916,465,279	\$ 158,332,990	\$ 8,074,798,269

See accompanying *Notes to the Basic Financial Statements*.

Pension Trust Funds

Statements of Changes in Fiduciary Net Position

For the Year Ended June 30, 2019

	MSEP	Judicial Plan	Total
Additions			
Contributions			
Employer contributions	\$ 394,150,042	\$ 38,604,668	\$ 432,754,710
Member contributions	31,286,632	1,138,101	32,424,733
Member purchases of service credit	1,293,774	0	1,293,774
Service transfer contributions	2,592,737	0	2,592,737
Total contributions	429,323,185	39,742,769	469,065,954
Investment activity			
Investing activity income:			
Net appreciation in fair value of investments	(16,141,843)	(309,878)	(16,451,721)
Interest	85,188,242	1,635,402	86,823,644
Dividends	2,782,582	53,418	2,836,000
Other	272,180	5,226	277,406
Total investing activity income	72,101,161	1,384,168	73,485,329
Investing activity expenses:			
Management and incentives fees	(43,529,841)	(835,655)	(44,365,496)
Custody and other fees	(829,195)	(15,919)	(845,114)
Consultant fees	(432,091)	(8,295)	(440,386)
Internal investment activity expenses	(3,895,964)	(34,740)	(3,930,704)
Total investing activity expenses	(48,687,091)	(894,609)	(49,581,700)
Reverse repurchase agreement activity:			
Income from assets in reverse repurchase funds	380,096,337	7,296,900	387,393,237
Interest expense from reverse repurchase agreements	(90,351,229)	(1,734,518)	(92,085,747)
Total net income from reverse repurchase agreement activity	289,745,108	5,562,382	295,307,490
Total net investment income	313,159,178	6,051,941	319,211,119
Miscellaneous income	496,898	3,895	500,793
Total additions	742,979,261	45,798,605	788,777,866
Deductions			
Benefit payments	769,612,853	37,585,484	807,198,337
BackDROP payments	72,882,398	0	72,882,398
Buyout and lump sum payments	318,656	0	318,656
Service transfer payments	3,001,189	0	3,001,189
Contribution refunds	6,006,484	7,565	6,014,049
Administrative expenses	9,200,826	72,141	9,272,967
Total deductions	861,022,406	37,665,190	898,687,596
Net (decrease) increase in net position	(118,043,145)	8,133,415	(109,909,730)
Net position restricted for pensions:			
Beginning of year	8,034,508,424	150,199,575	8,184,707,999
End of year	\$ 7,916,465,279	\$ 158,332,990	\$ 8,074,798,269

See accompanying *Notes to the Basic Financial Statements*.

*Internal Service Funds***Statement of Net Position***As of June 30, 2019*

	Total
Assets	
<i>Current assets</i>	
Premiums receivable	\$ 957,787
Short-term instruments	6,919,257
Total current assets	7,877,044
Capital assets	27,250
Accumulated depreciation	(20,303)
Net capital assets	6,947
Total assets	7,883,991
Liabilities	
<i>Current liabilities</i>	
Premiums payable	5,170,302
Other liabilities	239,771
Total current liabilities	5,410,073
Deferred revenue	2,008,209
Total liabilities	7,418,282
Net Position	
Unrestricted net position	465,709
Total net position	\$ 465,709

See accompanying *Notes to the Basic Financial Statements*.

*Internal Service Funds***Statement of Revenues, Expenses, and Changes in Net Position***For the Year Ended June 30, 2019*

	Total
Operating revenues	
Premium receipts	\$ 31,342,778
Deferred compensation receipts	1,215,000
Miscellaneous income	494,722
Total operating revenues	<u>33,052,500</u>
Operating expenses	
Premium disbursements	31,325,399
Premium refunds	17,379
Administrative expenses	1,649,467
Total operating expenses	<u>32,992,245</u>
Net operating income	60,255
Nonoperating revenues	
Gain on sale of capital assets	145
Interest income	127,197
Total nonoperating revenues	<u>127,342</u>
Net revenues over expenses	187,597
Net position beginning of year	278,112
Net position end of year	<u>\$ 465,709</u>

See accompanying *Notes to the Basic Financial Statements*.

Internal Service Funds

Statement of Cash Flows

For the Year Ended June 30, 2019

	Total
Cash flows from operating activities	
Cash received from employers and members	\$ 32,961,861
Payments to outside carriers	(28,723,812)
Refund of premiums to members	(17,379)
Cash payments to employees for services	(1,307,186)
Cash payments to other suppliers of goods and services	(415,822)
Net cash provided by operating activities	<u>2,497,662</u>
Cash flows from capital and related financing activities	
Proceeds from the sale of capital assets	145
Net cash provided by capital and related financing activities	<u>145</u>
Cash flows from investing activities	
Purchase of short term instruments	(1,229,601,920)
Proceeds from sale and maturities of short term instruments	1,226,976,916
Cash received from investing activities	127,197
Net cash (used) by investing activities	<u>(2,497,807)</u>
Net increase (decrease) in cash	0
Cash balances beginning of year	0
Cash balances end of year	<u>\$ 0</u>
Reconciliation of net operating income to net cash provided by operating activities	
Net operating income	\$ 60,255
<i>Adjustments to reconcile net operating income to net cash provided (used) by operating activities</i>	
Depreciation expense	5,853
Change in assets and liabilities:	
(Increase) in operational accounts receivable	(12,639)
Increase in operational liabilities	2,444,193
Total adjustments	<u>2,437,407</u>
Net cash provided by operating activities	<u>\$ 2,497,662</u>

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. In the System are vested 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, 2019, the employer contribution rate was 20.21% 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 changes in the market value of assets over a closed, five year period helps ensure a more stable contribution rate.

At any point in time, the ratio of actuarial to fair 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, 2019 and 2018, the ratio of actuarial value of assets to market value of assets was 110.9% and 109.9%, respectively, for the MSEP.

Per the June 30, 2019 actuarial valuation, membership in the MSEP consisted of the following:

Retirees and beneficiaries currently receiving benefits		49,696
Active		
Vested	29,373	
Nonvested	17,491	46,864
Inactive		
Vested (not yet receiving benefits)*	16,873	
Nonvested (with contribution balances)	18,852	35,725
Total membership		132,285

**Includes 175 members on leave of absence and 682 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, 2019 were 20.21% 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; or if the member was on workers compensation leave of absence or medical leave of absence due to an employee illness, the amount of pay the member would have received, but for such leave of absence as reported and verified by the employing department; or if the member was employed for less than 36 months, 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 5 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 hired 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 hired 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 5 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 5 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 5 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 circuit court appointed after February 29, 1972, 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, survivor, life insurance, and disability benefits. Members are immediately vested.

Per the June 30, 2019 actuarial valuation, membership in the Judicial Plan consisted of the following:

Retirees and beneficiaries currently receiving benefits		585
Active		
Vested	414	
Nonvested	0	414
Inactive		
Vested (not yet receiving benefits)		36
Total membership		1,035

Funding of the Judicial Plan on an actuarial basis began on July 1, 1998. Employer contributions are determined through annual actuarial valuations. Employer contributions for fiscal year 2019 were 63.71% 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;
- 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 serving 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 (except employees of the Missouri Department of Conservation and certain state colleges and universities), MSEP 2011, 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 page 142-143 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 as an internal service fund.

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.

MOSERS uses ICMA-RC as an external provider for record keeping. Total plan assets were \$2,237,733,599 as of June 30, 2019.

Record keeping of individual accounts and management of investment options are paid from charges to the participants and investment option asset-based fee reimbursement arrangements. Participants in the plan manage individual accounts by choosing investment options from the available fund lineup. MOSERS' role is to oversee the plan, choose external providers and investment options, and develop communications to plan participants. During the year ended June 30, 2019, a total of \$2,904,187 was collected from a combination of \$1,922,242 in investment option asset-based fee reimbursements and \$981,945 in participant fees.

Effective July 1, 2012, new permanent full-time and part-time employees are automatically enrolled at 1% of pay into the State of Missouri Deferred Compensation Plan. As of June 30, 2019, 18,117 currently active employees have been automatically enrolled in the plan since inception. There are 16,570 employees who continue to contribute to the plan, making the opt-out rate 8.5%.

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 CAFR are reported in whole and include 0.03%, or \$3,470,132, of the units invested in the MIP by Deferred Compensation participants.

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 the MSEP 2000 or MSEP 2011, depending on their hire date. 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.

Note 2 – Summary of Significant Accounting Policies

Basis of Accounting

The financial statements of the MSEP, the Judicial Plan, the Missouri State Insured Defined Benefit Insurance Plan, and the State of Missouri Deferred Compensation Plan were prepared using the accrual 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.

Contributions are recognized as revenues when due, pursuant to statutory requirements. Benefits and refunds are recognized when due and payable and expenses are recorded when the corresponding liabilities are incurred regardless of when contributions are received or payment is made. The direct method of reporting cash flows is used.

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* of the pension trust funds.

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

For purposes of measuring the net OPEB liability, deferred outflows of resources and deferred inflows of resources related to OPEB, and OPEB expense, information about the fiduciary net position and additions to/deductions from fiduciary net position have been determined on the same basis as they are reported. 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 costs 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.

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, 2019, 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 cash and short-term instruments in the *Statements of Fiduciary Net Position* of the pension trust funds, and with short-term instruments in the *Statements of Net Position* of the internal service funds.

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 2015, MOSERS completed a transition to a portfolio that shifted from a return-driven process to a risk-driven process using an allocation approach that focuses on fundamental economic factors such as growth and inflation as well as other factors with expected return values such as credit, carry, and illiquidity. In June 2018, the Board voted to transition the portfolio to a new asset allocation, which includes four broad categories: growth, income, inflation hedge, and alternative betas/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 preserve the long-term corpus of the Fund, 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 an internally managed beta-balanced portfolio that utilizes a modest amount of leverage in order to balance the risk allocations equally across the five asset classes contained in that portfolio. The leverage is limited to 1.83 times beta-balanced capital. The limit may also be stated as 183% of beta-balanced capital. In June 2018, the Board authorized staff to transition to a new portfolio that utilizes a modest amount of leverage in order to more evenly distribute the risk allocations equally across the 11 asset classes contained in that portfolio. The leverage is limited to 1.50 times capital. The limit may also be stated as 150% of capital. The transition from the old portfolio to the new portfolio began in January 2019. The tables below illustrate the fair value, market exposure, and policy exposure of the old portfolio and the new portfolio by asset class as of June 30, 2019.

Schedule of Internally Managed Leverage - Old Portfolio

Old Portfolio (83% of Total Fund)	Fair Value Capital	Percent of Investments at Fair Value	Market Exposure	Percent of Investments at Market Exposure	Policy Exposure
Opportunistic global equities	\$ 1,986,279,605	31.0%	\$ 2,224,931,883	34.7%	38.0%
Nominal bonds	1,340,932,910	20.9	2,787,877,942	43.5	44.0
Commodities	337,258,691	5.3	1,086,644,833	16.9	20.0
Inflation-protected bonds	953,793,455	14.9	2,343,316,387	36.5	39.0
Alternative beta	1,796,780,647	28.0	1,796,780,647	28.0	31.0
Total old portfolio	\$ 6,415,045,308	100.0%	\$ 10,239,551,692	159.6%	172.0%

Schedule of Internally Managed Leverage - New Portfolio

New Portfolio (17% of Total Fund)	Fair Value Capital	Percent of Investments at Fair Value	Market Exposure	Percent of Investments at Market Exposure	Policy Exposure
Growth	\$ 548,167,871	40.5%	\$ 549,682,452	40.6%	45.0%
Income	290,260,212	21.4	483,073,724	35.7	35.0
Inflation hedge	258,022,015	19.1	521,526,262	38.5	40.0
Alternative beta	257,477,438	19.0	257,477,438	19.0	20.0
Total new portfolio	\$ 1,353,927,536	100.0%	\$ 1,811,759,876	133.8%	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 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 expected for both the old and new portfolio are summarized by asset class in the tables below.

Target Asset Allocation - Old Portfolio

Asset Class	Policy Allocation	Long-Term Expected Nominal Return*	Weighted Average Long-Term Expected Nominal Return
Opportunistic global equities	38.0%	8.3%	3.1%
Nominal bonds	44.0	3.3	1.5
Commodities	20.0	7.8	1.6
Inflation-protected bonds	39.0	2.4	0.9
Alternative beta	31.0	6.6	2.0
Cash and cash equivalents**	(72.0)	0.0	(0.7)
	100.0%		8.4%
		Correlation/Volatility Adjustment	(0.7)%
		Long-Term Expected Net Nominal Return	7.7
		Long-Term Expected Geometric Net Real Return	5.2

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

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

Target Asset Allocation - New Portfolio

Asset Class	Policy Allocation	Long-Term Expected Nominal Return*	Weighted Average Long-Term Expected Nominal Return
Global public equities	30.0%	7.7%	2.3%
Global private equities	15.0	9.3	1.4
Long treasuries	25.0	3.5	0.9
Core bonds	10.0	3.1	0.3
Commodities	5.0	5.5	0.3
TIPS	25.0	2.7	0.7
Private real assets	5.0	7.1	0.3
Public real assets	5.0	7.7	0.4
Hedge funds	5.0	4.8	0.2
Alternative beta	10.0	5.3	0.5
Private credit	5.0	9.5	0.5
Cash and cash equivalents**	(40.0)	0.0	0.0
	100.0%		7.8%
		Correlation/Volatility Adjustment	(0.6)%
		Long-Term Expected Net Nominal Return	7.2
		Long-Term Expected Geometric Net Real Return	5.3

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

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

Money-Weighted Rate of Return

The annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was 4.10% for the year ended June 30, 2019. 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 40-41 show the fair value leveling of the investments.

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 equity 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, 2019	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	\$ 5,658,039,337	\$ 5,658,039,337	\$ 0	\$ 0
Repurchase agreements	1,380,000,000	0	1,380,000,000	0
Fixed income securities				
Corporate bonds and asset backed securities	321,681,140	0	321,681,140	0
U.S. government agencies	298,915,000	0	298,915,000	0
Non U.S. sovereign	51,947,866	0	51,947,866	0
Collateralized mortgage obligations	15,441,083	0	15,441,083	0
Total fixed income securities	687,985,089	0	687,985,089	0
Equities				
Real estate	105,504,835	105,504,835	0	0
Master limited partnerships	37,730,817	37,730,817	0	0
Total equities	143,235,652	143,235,652	0	0
Exchange traded funds				
U.S. fixed income index	132,525,616	132,521,866	3,750	0
Total investment by fair value level	8,001,785,694	5,933,796,855	2,067,988,839	0
Investments measured at the NAV				
Commingled international equity funds	777,779,669			
Hedge funds	1,506,550,860			
Private equity funds	549,054,295			
Private real estate and timber funds	56,475,761			
Total investments measured at the NAV	2,889,860,585			
Total investments measured at fair value	10,891,646,279	5,933,796,855	2,067,988,839	0
Investment derivative instruments				
Future contracts	24,686,818	24,686,818	0	0
Interest rate swap	43,904	0	43,904	0
Total investment derivative instruments	24,730,722	24,686,818	43,904	0
Investments at cost or cost plus accrued interest:				
Cash held in investment accounts	679,883,813			
Total investments	11,596,260,814	5,958,483,673	2,068,032,743	0
Obligations under repurchase agreements	(3,921,700,618)			
Total investments, net of obligations under repurchase agreements	\$ 7,674,560,194	\$ 5,958,483,673	\$ 2,068,032,741	\$ 0

Investments Measured at the Net Asset Value

	June 30, 2019	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period (Days)
Commingled international equity funds	\$ 777,779,669	\$ 0	Daily, Monthly	1-10
Active hedge funds				
Long/short equity	111,107,188	0	Quarterly, Annually	30-45
Merger arbitrage	129,416,249	0	Monthly	45
Equity market neutral	87,891,420	0	Quarterly	90
Event driven	240,034,000	0	Semi-annually	60
Macro	183,388,222	0	Monthly, Quarterly	30
Risk premia	287,917,786	0	Monthly	30
Risk parity	213,626,740	0	Monthly	15
Fund-of-funds	216,254,099	0	Monthly	95
Pending liquidated hedge funds	36,915,156	0		
Private equity funds	549,054,295	229,224,115		
Private real estate and timber funds	56,475,761	9,796,918		
Total investments measured at net asset value (NAV)	<u>\$ 2,889,860,585</u>	<u>\$ 239,021,033</u>		

- **Commingled international equity funds** – Two international equity funds are considered to be commingled in nature.
- **Long/short equity hedge funds** – Consisting of two funds, this strategy invests both long and short in U.S. and global equity securities, with a goal of adding growth and minimizing market exposure. Due to contractual lock-up restrictions, these investments remain restricted for anywhere ranging from four to 12 months.
- **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 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 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. Due to contractual lock-up restrictions, approximately 50% of the value of these investments is eligible for redemption semi-annually. The remaining 50% of the value of these investments remains restricted for 12 months.
- **Macro hedge funds** – Consisting of two funds, this strategy seeks to take advantage of macroeconomic dislocations between countries by trading a number of different markets and financial instruments. These investments are redeemable monthly and quarterly, and are not subject to lock-up restrictions.
- **Risk premia hedge fund** – Consisting of one fund, this strategy seeks to capture hedge fund betas through the use of systematic, bottoms up security selection across major hedge fund strategies. Style premia such as value, momentum and carry help build the long/short portfolios. This investment is redeemable at least monthly, and is not subject to lock-up restrictions.
- **Risk parity fund** – Consisting of one fund, this strategy attempts to build a more efficient portfolio through an equal risk methodology. The fund takes long only positions across equity indices, developed nominal bonds, TIPS, commodities and credit. Diversification benefits decrease both the expected return and volatility, thus requiring leverage to maintain a similar return to a more conventional portfolio. This investment is redeemable monthly, and not subject to lock-up restrictions.
- **Fund-of-funds** – Consisting of one fund, this fund seeks to provide diversification by holding a number of funds within a single fund structure. This investment is redeemable monthly, and is not subject to lock-up restrictions.
- **Pending liquidated hedge funds** – Consisting of 12 funds which have been fully redeemed as of June 30, 2019, for which MOSERS is awaiting final distribution of the proceeds.
- **Private equity, real estate, and timber funds** – MOSERS' private equity portfolio consists of 44 funds with exposure to buyout funds, distressed funds, infrastructure, energy, royalty funds, and special situations. The real estate portfolio, comprised of four funds, invests mainly in U.S. commercial real estate. The timber portfolio consists of one fund which invests in global timberland. The fair values of the majority of these funds has 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 within 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, 2019, MOSERS' fixed income assets that are not U.S. Government guaranteed represented 33% 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 below 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 on page 46 of the notes.

Average Credit Quality and Exposure Levels of Nongovernment Guaranteed Securities

Fixed Income Security Type	Fair Value June 30, 2019	Percent of all Fixed Income Assets	Weighted Average Credit Quality	Ratings Dispersion Requiring Further Disclosure
U.S. government agencies	\$ 298,915,000	3.6%	AA+	See below
Asset-backed securities	31,469	0.0	Not rated	See below
Collateralized mortgage obligations	15,441,083	0.2	AA+	See below
Corporate bonds	321,689,006	3.8	BBB+	See below
Non-U.S. sovereign	51,908,531	0.6	BBB	See below
Total nongov't fixed income securities	687,985,089	8.2		
Bank deposits	650,000,000	7.7	FDIC insured	None
Nongov't. guaranteed repurchase agreements	870,000,000	10.3	Not rated	None
Pooled investments	30,033,000	0.4	AAA	None
Total nongov't. guaranteed securities	\$ 2,238,018,089	26.6%		
U.S. government securities held in portfolio	\$ 5,658,039,337	67.3		
Repurchase agreement with U.S. government securities held as collateral	510,000,000	6.1		
Total fixed income securities	\$ 8,406,057,426	100.0%		

Ratings Dispersion Detail - Fair Value

Credit Rating Level	U.S. Government Agencies	Asset-Backed Securities	Collateralized Mortgage Obligations	Corporate Bonds	Non-U.S. Sovereign
AAA	\$ 0	\$ 0	\$ 0	\$ 494,028	\$ 0
AA	298,915,000	0	15,441,083	23,777,138	1,241,335
A	0	0	0	122,422,338	12,124,404
BBB	0	0	0	166,104,710	25,595,691
BB	0	0	0	8,890,791	12,530,173
B	0	0	0	0	416,927
Not rated	0	31,469	0	0	0
	\$ 298,915,000	\$ 31,469	\$ 15,441,083	\$ 321,689,006	\$ 51,908,531

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, 2019	Percent of all Fixed Income Assets	Weighted Average Effective Duration (Years)	Interest Rate Risk Requiring Further Disclosure
U.S. treasuries	\$ 5,658,039,337	67.3%	9.8	See below
U.S. government agencies	298,915,000	3.6	0.2	None
Asset-backed securities	31,469	0.0	0.1	None
Collateralized mortgage obligations	15,441,083	0.2	0.1	None
Corporate bonds	321,689,006	3.8	4.3	None
Non-U.S. sovereign	51,908,531	0.6	5.7	None
Bank deposits	650,000,000	7.7	0.0	None
Repurchase agreements	1,380,000,000	16.4	0.0	None
Pooled investments	30,033,000	0.4	0.0	None
	<u>\$ 8,406,057,426</u>	<u>100.0%</u>	<u>6.8</u>	

Effective Duration Analysis of U.S. Treasuries

Maturity	Fair Value June 30, 2019	Average Effective Duration of the Security Type (Years)	Contribution to Effective Duration (Years)
Less than 1 year to maturity	\$ 149,908,827	0.0	0.0
1- to 10-year maturities	3,023,162,223	4.1	2.2
Long coupon treasuries	2,484,968,287	17.3	7.6
	<u>\$ 5,658,039,337</u>		<u>9.8</u>

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 1.82% to 3.00% with maturities of one to five days.

The yield earned by the counterparties on the reverse repo transactions ranged from 1.76% to 2.66% 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 market value greater than the value of the loan and revalues the collateral on a daily basis. As of fiscal year end, MOSERS held approximately \$65.5 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. As of fiscal year end, counterparties held approximately \$11.5 million of MOSERS' collateral in excess to the reverse repo balance.

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, 2019	Fair Value Including Accrued Interest of Repurchase Agreements June 30, 2019	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries	\$ 520,254,684	\$ 510,000,000	\$ 10,254,684	
U.S. government agencies	326,400,000	320,000,000	6,400,000	
Common stock	599,136,726	550,000,000	49,136,726	
Accrued interest	0	289,367	(289,367)	
	<u>\$ 1,445,791,410</u>	<u>\$ 1,380,289,367</u>	<u>\$ 65,502,043</u>	4.7%

Reverse Repurchase Agreements by Collateral Type

Collateral Type	Fair Value of Collateral June 30, 2019	Fair Value Including Accrued Interest of Reverse Repos June 30, 2019	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries	\$ 3,959,129,607	\$ 3,921,700,618	\$ 37,428,989	
Receivables	(692,723)	0	(692,723)	
Accrued interest	0	25,252,407	(25,252,407)	
	<u>\$ 3,958,436,884</u>	<u>\$ 3,946,953,025</u>	<u>\$ 11,483,859</u>	0.3%

Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely impact the fair value of an investment. MOSERS' currency risk exposures, or exchange rate risk, primarily reside within MOSERS' international equity investment holdings. MOSERS' implementation policy allows external managers to decide what action to take regarding their respective portfolio's foreign currency exposures using currency forward contracts. MOSERS' exposure to foreign currency risk in U.S. dollars, as of June 30, 2019, is highlighted in the table below.

Currency Exposures by Asset Class

Currency	Cash & Cash Equivalents	Equities	Fixed Income	Alternatives	Total
Australian Dollar	\$ 5,329,037	\$ 577,281	\$ 543,859	\$ 0	\$ 6,450,177
Brazilian Real	0	7,017,956	5,141,884	0	12,159,840
Canadian Dollar	3,450,505	10,546,835	400,214	0	14,397,554
Chilean Peso	0	710,102	2,308,611	0	3,018,713
Chinese Yuan Renminbi	0	547,438	0	0	547,438
Colombian Peso	0	255,204	4,139,040	0	4,394,244
Czech Koruna	2,025	142,883	1,165,891	0	1,310,799
Danish Krone	0	3,256,824	0	0	3,256,824
Egyptian Pound	0	105,950	0	0	105,950
Euro	(523,936)	104,027,274	2,154,676	633,856	106,291,870
Hong Kong Dollar	(4,346,710)	81,161,335	0	0	76,814,625
Hungarian Forint	0	259,575	0	0	259,575
Indian Rupee	0	8,245,427	0	0	8,245,427
Indonesian Rupiah	0	1,940,756	6,326,554	0	8,267,310
Israeli Shekel	0	23	0	0	23
Japanese Yen	(1,647,314)	208,991,454	0	0	207,344,140
Kazakhstani Tenge	0	0	127,825	0	127,825
Malaysian Ringgit	0	1,980,640	1,644,468	0	3,625,108
Mexican Peso	0	3,794,954	6,769,746	0	10,564,700
New Taiwan Dollar	0	41,073,334	0	0	41,073,334
Pakistani Rupee	0	15,919	0	0	15,919
Peruvian Nuevo Sol	0	0	1,388,584	0	1,388,584
Philippine Peso	0	1,020,402	0	0	1,020,402
Polish Zloty	0	1,052,473	6,111,912	0	7,164,385
Qatari Riyal	0	907,215	0	0	907,215
Romanian New Leu	0	0	1,036,469	0	1,036,469
Russian Ruble	0	1,565,910	5,193,799	0	6,759,709
Saudi Riyal	0	1,247,444	0	0	1,247,444
Singapore Dollar	0	21,661,903	0	0	21,661,903
South African Rand	(994,436)	9,303,293	5,948,124	0	14,256,981
South Korean Won	(1,081,385)	28,027,576	569,198	0	27,515,389
Swiss Franc	0	63,964,158	0	0	63,964,158
Thai Baht	10,365	13,830,532	3,192,826	0	17,033,723
Turkish Lira	0	6,702,137	1,877,223	0	8,579,360
United Arab Emirates Dirham	0	602,206	0	0	602,206
United Kingdom Pound Sterling	(1,553,229)	96,365,542	363,446	0	95,175,759
Uruguayan Peso	0	0	105,151	0	105,151
	\$ (1,355,078)	\$ 720,901,955	\$ 56,509,500	\$ 633,856	\$ 776,690,233

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, 2019.

Futures Contracts

Futures Contract	Notional Value	Exposure
Currency futures	\$ (287,392,982)	\$ (2,371,900)
Fixed income futures	343,899,815	15,157,528
Equity index futures	417,679,461	8,952,603
Commodity futures	(45,464,215)	2,948,587
Total	\$ 428,722,079	\$ 24,686,818

Foreign Currency Forward Contracts

Currency	Net Notional Long (Short)	Exposure
Argentine Peso	\$ 754,005	\$ 42,956
Brazilian Real	1,432,602	45,405
Chilean Peso	137,767	1,422
Czech Koruna	1,611,780	47,471
Euro	57,623	416
Hungarian Forint	1,630,257	7,023
Indonesian Rupiah	(201,737)	1,228
Mexican Peso	(2,025,983)	1,622
Polish Zloty	(567,929)	(11,387)
Romanian Leu	(519,029)	(5,704)
Russian Ruble	(915,595)	(42,979)
Thai Baht	372,832	7,029
Turkish Lira	(204,361)	141
South African Rand	(1,253,862)	(18,291)
U.S. Dollar	(232,018)	0
Foreign currency forward contract asset	\$ 76,352	\$ 76,352

Swap Contracts

Counterparty Credit Rating	Notional Value	Exposure
Total return swaps - equity		
A+	\$ 970,886,368	\$ 18,711,150
A	34,269,765	1,404,422
Total	\$ 1,005,156,133	\$ 20,115,572
Total return swaps - fixed income		
A+	\$ 1,150,878,936	\$ 26,292,770
Total	\$ 1,150,878,936	\$ 26,292,770
Total return swaps - commodities		
A+	\$ 571,551,161	\$ 19,758,845
Total	\$ 571,551,161	\$ 19,758,845

While the Board has no formal policy specific to derivatives, the MOSERS investment implementation program, through its external managers, holds investments in futures contracts, swap contracts, and forward foreign currency exchange. 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 and enters into forward foreign currency exchange contracts primarily to hedge foreign currency exposure.

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, 2019, the change in fair value in the swap contracts resulted in a loss of \$113.0 million of investment income. The change in fair value in the futures contracts resulted in a gain of \$13.8 million of investment income. The change in fair value in the foreign exchange contracts resulted in a loss of \$0.7 million of investment income. 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 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 market value for domestic loans and 105% of market 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 2019.

Note 4 – Capital Assets

Office building, furniture, fixtures, equipment and software costing \$1,000 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 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

Below are schedules of the capital asset account balances for the pension trust funds and the internal service funds – State of Missouri Deferred Compensation Plan for the year ended June 30, 2019.

Pension Trust Funds

Capital Assets

	Land	CIP - Internally Developed Pension Admin. System	Building and Building Improvements	Furniture, Fixtures and Equipment	Software	Total Capital Assets
Capital assets						
Balances June 30, 2018	\$ 267,286	\$ 0	\$ 4,243,182	\$ 1,401,509	\$ 736,316	\$ 6,648,293
Additions	0	2,140,057	0	225,103	5,268	2,370,428
Deletions	0	0	(163,366)	(270,690)	(3,028)	(437,084)
Capital Assets June 30, 2019	267,286	2,140,057	4,079,816	1,355,922	738,556	8,581,637
Accumulated depreciation						
Balances June 30, 2018	0	0	1,990,155	1,075,926	344,427	3,410,508
Depreciation expense	0	0	106,038	213,490	280,717	600,245
Deletions	0	0	(52,555)	(261,752)	(1,912)	(316,219)
Accumulated depreciation June 30, 2019	0	0	2,043,638	1,027,664	623,232	3,694,534
Net capital assets June 30, 2019	\$ 267,286	\$ 2,140,057	\$ 2,036,178	\$ 328,258	\$ 115,324	\$ 4,887,103

Internal Service Funds

Capital Assets

	Furniture, Fixtures and Equipment	Software	Total Capital Assets
Capital assets			
Balances June 30, 2018	\$ 22,300	\$ 4,950	\$ 27,250
Additions	0	0	0
Capital Assets June 30, 2019	22,300	4,950	27,250
Accumulated depreciation			
Balances June 30, 2018	9,959	4,491	14,450
Depreciation expense	5,394	459	5,853
Deletions	0	0	0
Accumulated depreciation June 30, 2019	15,353	4,950	20,303
Net capital assets June 30, 2019	\$ 6,947	\$ 0	\$ 6,947

Note 5 – Employers’ Net Pension Liability

The components of net pension liability as of June 30, 2019, are in the *Schedule of Employers’ Net Pension Liability* below.

Schedule of Employers’ Net Pension Liability

	MSEP	Judicial Plan
Total pension liability	\$ 13,957,626,309	\$ 617,482,705
MOSERS' fiduciary net position	7,916,465,279	158,332,990
Employers' net pension liability	\$ 6,041,161,030	\$ 459,149,715
Plan net position as a percentage of the total pension liability	56.72%	25.64%
Covered payroll	\$ 1,950,272,350	\$ 60,594,362
Employers' net pension liability as a percentage of covered payroll	309.76%	757.74%

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, 2019, is \$13,957,626,309 for MSEP and \$617,482,705 for the Judicial Plan based on an actuarial valuation performed as of June 30, 2019, and a measurement date of June 30, 2019, using generally accepted actuarial procedures.

Actuarial Assumptions Used to Determine Net Pension Liability

In July 2018, the Board made several changes to actuarial methods and assumptions based upon a review of actuarial methods and economic assumptions performed by its outside actuarial consultant. Based upon this study, the Board voted to reduce the investment return assumption to 7.25% with a 2.5% inflation assumption, effective June 30, 2018; then to 7.10% with a 2.35% inflation assumption, effective June 30, 2019; and then to 6.95% with a 2.25% inflation assumption, effective June 30, 2020, and thereafter.

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

Valuation date	June 30, 2019
Actuarial cost method	Entry age normal
Amortization period	30 years
Asset valuation method	Market value
Investment rate of return	7.10%
Projected salary increases	2.85 – 8.35% (MSEP) 2.6 – 4.8% (Judicial Plan)
Rate of payroll growth	2.35%
COLAs	4.00%/1.88%*
Price inflation	2.35%

Mortality rates are based on the RP-2014 Healthy Annuitant mortality table, projected from 2006 to 2026 with Scale MP-2015 and scaled by 120% for the MSEP and 98% for the Judicial Plan. The preretirement mortality table used was the RP-2014 Employee mortality table, projected from 2006 to 2026 with Scale MP-2015 and scaled by 95% for males and 90% for females for the MSEP.

An experience study covering the five-year period ended June 30, 2015, was performed in 2016.

* On a compound basis, 4.00% for the first 12 years, 3.06% for the 13th year, and 1.88% per year thereafter. When no minimum COLA is in effect, the annual COLA is assumed to be 1.88% (80% of the 2.35% price inflation), on a compounded basis.

The discount rate used to measure the total pension liability was 7.10%. 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 7.10% 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, 2019, calculated using the discount rate of 7.10%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1% lower (6.10%) or 1% higher (8.10%) than the current rate.

Sensitivity of Net Pension Liability to Changes in the Discount Rate

Employers’ Net Pension Liability	1% Decrease (6.10)%	Current Discount Rate (7.10)%	1% Increase (8.10)%
MSEP	\$ 7,621,213,358	\$ 6,041,161,030	\$ 4,712,721,302
Judicial Plan	\$ 522,723,811	\$ 459,149,715	\$ 404,862,436

The funding status of the plans and *Employer Schedule of Funding Progress* can be found in the *Actuarial Section* on page 116.

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, 2019, 27,641 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, 2019, was \$1,876,577. 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, 2019, 146 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 (\$19,110 for the year ended June 30, 2019). 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 32,431 members covered under the program as of June 30, 2019. This insured defined benefit coverage is financed on a percentage of covered payroll (0.55%). Purchased as group policy, LTD is administered by The Standard. The cost for the year ended June 30, 2019, was \$8,226,590. 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 Comprehensive Annual 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, 2018, employers were required to contribute 4.29% for the period July 1, 2017, through December 31, 2017, and 4.24% for the period January 1, 2018, through June 30, 2018, of gross active employee payroll toward their required contributions. Employees do not contribute to this plan. No payables to the plan were outstanding at year end.

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

At June 30, 2019, MOSERS reported a liability of \$7,666,038 for its proportionate share of the net OPEB liability. The net OPEB liability was measured as of June 30, 2018, 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, 2018, MOSERS proportionate share was 0.4375%. For the year ended June 30, 2019, MOSERS recognized OPEB expense of \$581,214. As of June 30, 2019, 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	\$ 0	\$ 117,406
Changes of assumptions	0	201,517
Net difference between projected and actual earnings on plan investments	11,607	0
Changes in proportion and differences between MOSERS contributions and proportionate share of contributions	400,590	50,946
MOSERS contributions subsequent to the measurement date	331,275	0
	<u>\$ 743,472</u>	<u>\$ 369,869</u>

The \$331,275 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, 2020. 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

2020	\$	5,311
2021		5,311
2022		5,310
2023		5,487
2024		2,453
Thereafter		18,456
Total	\$	42,328

Actuarial Assumptions

The collective total OPEB liability for the June 30, 2018, measurement date was determined by an actuarial valuation as of July 1, 2017, with updated procedures used to roll forward the total OPEB liability to June 30, 2018. This actuarial valuation used the following actuarial assumptions:

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

Valuation year	July 1, 2017 - June 30, 2018
Actuarial cost method	Entry age normal, level percent of payroll
Asset valuation method	Market value
Discount rate (blended)	5.90%
Projected payroll growth rate	4.0%
Inflation rate	3.0%
Health care cost trend rate (medical & prescription drugs combined)	
Nonmedicare	6.25%
	(rate decreases by 0.25% per year until an ultimate rate of 5.0% in fiscal year 2023 and later)
Medicare	7.25%
	(rate decreases by 0.25% per year until an ultimate rate of 5.0% in fiscal year 2027 and later)

Mortality: RP-2016 for Employees/Annuitants without collar adjustments using Scale MP-2016.

The last experience study was conducted for the period July 1, 2008, through June 30, 2012. The last independent actuarial review of the reasonableness and accuracy of actuarial assumptions, actuarial cost methods, and valuations was conducted as of June 30, 2018.

Discount Rate

A discount rate of 5.9% 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 of MOSERS' proportionate share of the Net OPEB Liability to Changes in the Discount Rate

The following table presents MOSERS' net OPEB liability, calculated using a discount rate of 5.9%, 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 (4.9%)	Current Discount Rate (5.9%)	1% Increase in Discount Rate (6.9%)
Net OPEB liability	\$ 9,017,390	\$ 7,666,038	\$ 6,592,711

Sensitivity of MOSERS' proportionate share of the Net OPEB Liability 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	\$ 6,561,768	\$ 7,666,038	\$ 9,058,438

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	20.0%	5.7%
Mid cap stocks	10.0	6.0
Small cap stocks	10.0	6.0
High-yield bonds	10.0	2.9
BarCap aggregate bonds	20.0	1.4
Long government/credit	25.0	1.6
Cash equivalents	5.0	0.3

Note 8 – Commitments

As of June 30, 2019, MOSERS has \$239.0 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 \$9.3 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 \$2.0 million. As of June 30, 2019, the remaining commitments on these agreements was approximately \$9.0 million.

Note 9 – Contingencies

There were no contingencies which would have a material impact on the financial statements as of June 30, 2019.

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.

Pension Trust Funds

Schedule of Changes in Employers' Net Pension Liability

For Years Ended June 30, 2014 – 2019*

MSEP

	2014	2015
Total pension liability		
Service cost	\$ 158,116,026	\$ 150,412,577
Interest on the total pension liability	869,878,195	896,451,618
Benefit changes	0	0
Difference between expected and actual experience	12,376,237	(27,983,267)
Assumption changes	0	(57,568,553)
Benefit payments and member refunds	(680,436,107)	(728,265,800)
Net change in total pension liability	359,934,351	233,046,575
Total pension liability - beginning	11,134,637,484	11,494,571,835
Total pension liability - ending (a)	\$ 11,494,571,835	\$ 11,727,618,410
Plan fiduciary net position		
Employer contributions	\$ 326,370,336	\$ 329,752,832
Employee contributions	14,025,328	18,099,455
Pension plan net investment income (loss)	1,193,952,121	(237,070,529)
Benefit payments and member refunds	(680,436,107)	(728,265,800)
Pension plan administrative expense	(7,336,922)	(8,077,692)
Other	296,369,500	5,434,820
Net change in plan fiduciary net position	1,142,944,256	(620,126,914)
Plan fiduciary net position - beginning	7,993,837,570	9,136,781,826
Plan fiduciary net position - ending (b)	9,136,781,826	8,516,654,912
Net pension liability - ending (a)-(b)	\$ 2,357,790,009	\$ 3,210,963,498
Plan fiduciary net position as a percentage of total pension liability	79.49%	72.62%
Covered payroll	\$ 1,902,719,928	\$ 1,918,527,768
Net pension liability as a percentage of covered payroll	123.92%	167.37%

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

** Some balances have been reclassified since the completion of the GASB 67 valuation. This is due to the adoption of GASB Statement No. 75 (Other Post-Employment Benefits).

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

	2016	2017	2018	2019
\$	149,021,755	\$ 152,766,134	\$ 157,351,979	\$ 158,190,866
	913,877,923	945,654,398	956,201,619	956,725,536
	0	(1,696,059)	0	0
	61,150,083	(104,203,260)	(118,252,032)	7,426,685
	656,805,085	202,554,786	351,899,973	74,340,841
	(757,310,503)	(793,964,857)	(886,711,473)	(851,821,580)
	1,023,544,343	401,111,142	460,490,066	344,862,348
	11,727,618,410	12,751,162,753	13,152,273,895	13,612,763,961
\$	12,751,162,753	\$ 13,152,273,895	\$ 13,612,763,961	\$ 13,957,626,309
\$	329,957,369	\$ 335,217,422	\$ 379,557,962	\$ 394,150,042
	21,684,920	25,439,343	28,303,994	31,286,632
	1,740,269	272,595,668	576,188,826	313,159,178
	(757,310,503)	(793,964,857)	(886,711,473)	(851,821,580)
	(8,489,375)	(8,759,341)	(9,799,256)	(9,200,826)
	4,923,622	5,668,849	1,610,073	4,383,409
	(407,493,698)	(163,802,916)	89,150,126	(118,043,145)
	8,516,654,912	8,109,161,214	7,945,358,298	8,034,508,424
	8,109,161,214	7,945,358,298	8,034,508,424	7,916,465,279
\$	4,642,001,539	\$ 5,206,915,597	\$ 5,578,255,537	\$ 6,041,161,030
	63.60%	60.41%	59.02%	56.72%
\$	1,921,528,936	\$ 1,975,353,105	\$ 1,951,454,817	\$ 1,950,272,350
	241.58%	263.59%	285.85%	309.76%

Pension Trust Funds

Schedule of Changes in Employers' Net Pension Liability

For Years Ended June 30, 2014 – 2019*

Judicial Plan

	2014	2015
Total pension liability		
Service cost	\$ 8,990,293	\$ 10,613,686
Interest on the total pension liability	34,013,615	36,161,612
Benefit changes	0	0
Difference between expected and actual experience	13,360,614	5,103,664
Assumption changes	0	0
Benefit payments and member refunds	(29,406,625)	(31,245,906)
Net change in total pension liability	26,957,897	20,633,056
Total pension liability - beginning	435,378,358	462,336,255
Total pension liability - ending (a)	<u>\$ 462,336,255</u>	<u>\$ 482,969,311</u>
Plan fiduciary net position		
Employer contributions	\$ 29,264,877	\$ 32,696,686
Employee contributions	294,810	488,193
Pension plan net investment income (loss)	17,199,701	(3,610,352)
Benefit payments	(29,406,625)	(31,245,906)
Pension plan administrative expense	(105,693)	(123,015)
Other	4,195,049	0
Net change in plan fiduciary net position	\$ 21,442,119	\$ (1,794,394)
Plan fiduciary net position - beginning	111,203,538	132,645,657
Plan fiduciary net position - ending (b)	132,645,657	130,851,263
Net pension liability - ending (a)-(b)	<u>\$ 329,690,598</u>	<u>\$ 352,118,048</u>
Plan fiduciary net position as a percentage of total pension liability	28.69%	27.09%
Covered payroll	\$ 49,587,936	\$ 55,656,457
Net pension liability as a percentage of covered payroll	664.86%	632.66%

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

** Some balances have been reclassified since the completion of the GASB 67 valuation.

This is due to the adoption of GASB Statement No. 75 (Other Post-Employment Benefits).

Schedule of Changes in Employers' Net Pension Liability continued from page 56

2016		2017		2018		2019	
\$	10,932,097	\$	12,945,567	\$	12,997,198	\$	13,573,453
	37,755,240		40,617,091		41,018,371		41,710,768
	0		0		0		0
	(5,036,696)		(10,687,091)		(1,319,696)		978,884
	53,991,379		7,905,466		12,332,042		5,024,057
	(32,989,714)		(33,984,725)		(35,657,248)		(37,593,049)
	64,652,306		16,796,308		29,370,667		23,694,113
	482,969,311		547,621,617		564,417,925		593,788,592
\$	547,621,617	\$	564,417,925	\$	593,788,592	\$	617,482,705
\$	33,642,498	\$	34,246,826	\$	36,892,203	\$	38,604,668
	661,206		786,745		902,319		1,138,101
	28,081		4,680,131		10,677,666		6,051,941
	(32,989,714)		(33,984,725)		(35,657,248)		(37,593,049)
	(136,983)		(150,387)		(181,595)		(72,141)
	0		0		(68,711)		3,895
\$	1,205,088	\$	5,578,590	\$	12,564,634	\$	8,133,415
	130,851,263		132,056,351		137,634,941		150,199,575
	132,056,351		137,634,941		150,199,575		158,332,990
\$	415,565,266	\$	426,782,984	\$	443,589,017	\$	459,149,715
	24.11%		24.39%		25.30%		25.64%
\$	57,421,016	\$	58,591,661	\$	59,417,302	\$	60,594,362
	723.72%		728.40%		746.57%		757.74%

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
2010	\$ 251,226,187	\$ 251,226,187	\$ 0	\$ 1,945,095,321	12.92%
2011	263,418,048	263,418,048	0	1,875,569,816	14.04
2012	263,373,924	263,373,924	0	1,864,069,493	14.13
2013	274,655,284	274,655,284	0	1,880,212,950	14.61
2014	326,370,336	326,370,336	0	1,902,719,928	17.15
2015	329,752,832	329,752,832	0	1,918,527,768	17.19
2016	310,124,928	329,957,369	(19,832,414)	1,921,528,936	17.17
2017	322,772,697	335,217,422	(12,444,725)	1,975,353,105	16.97
2018	379,557,962	379,557,962	0	1,951,454,817	19.45
2019	394,150,042	394,150,042	0	1,950,272,350	20.21

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
2010	\$ 27,029,198	\$ 27,029,198	\$ 0	\$ 46,112,730	58.62%
2011	27,702,682	27,702,682	0	45,888,020	60.37
2012	26,324,526	26,324,526	0	45,835,501	57.43
2013	28,330,649	28,330,649	0	48,697,726	58.18
2014	29,264,877	29,264,877	0	49,587,936	59.02
2015	32,696,686	32,696,686	0	55,656,457	58.75
2016	31,604,527	33,642,498	(2,037,971)	57,421,016	58.59
2017	32,670,710	34,246,826	(1,576,116)	58,591,661	58.45
2018	36,892,203	36,892,203	0	59,417,302	62.09
2019	38,604,668	38,604,668	0	60,594,362	63.71

* 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.

*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
2014	19.25%
2015	(2.60)
2016	0.08
2017	3.51
2018	7.57
2019	4.10

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

Pension Trust Funds

Notes to the Schedules of Required Supplementary Information

Actuarial Methods and Assumptions for Valuations Performed as of June 30, 2019

The entry-age 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 30-year amortization period was used for the June 30, 2019 valuations to determine the FY21 contribution rates. The actuarial value is calculated by recognizing the difference between the actual and expected return on the market 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 was reduced from 7.25%, as of June 30, 2018, to 7.10% per year, as of June 30, 2019, compounded annually (net of investment expenses). The price inflation assumption used was 2.35% per year. Projected salary assumptions were 2.85% to 8.35% for the MSEP and 2.60% to 4.80% 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 1.88% (80% of the 2.35% price inflation), on a compounded basis.

**Actuarial Assumptions and Methods Used to Set
the Actuarially Determined Contributions - Five-Year Review**
MSEP & Judicial

Valuation year	2019	2018	2017	2016	2015
Contribution rate for fiscal year	2021	2020	2019	2018	2017
Actuarial cost method	Entry Age Normal	Entry Age Normal	Entry Age Normal	Entry Age Normal	Entry Age Normal
Amortization method	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Single base approach - Level percentage of payroll	Single base approach - Level percentage of payroll	Single base approach - Level percentage of payroll
Amortization periods	Closed 30-year period	Closed 30-year period	Closed 30-year period	Closed 30-year period	Closed 30-year period
Inflation	2.35%	2.50%	2.50%	2.50%	2.50%
Cost-of-living adjustment	4% or 1.88%	4% or 2%	4% or 2%	4% or 2%	4% or 2%
Salary increase	varied	varied	varied	varied	varied
Payroll growth	2.35%	2.50%	3.00%	3.00%	3.00%
Investment rate of return	7.10%	7.25%	7.50%	7.65%	8.00%

Schedule of Proportionate Share of the Net OPEB Liability

For the Year Ended June 30, 2019*

State Retiree Welfare Benefit Trust

	2018	2019
MOSERS' proportion of the net OPEB liability	0.4121%	0.4375%
MOSERS' proportionate share of the net OPEB liability	\$ 7,272,038	\$ 7,666,038
MOSERS' covered payroll	\$ 6,669,717	\$ 7,056,668
MOSERS' proportionate share of the net OPEB liability as a percentage of its covered payroll	109.03%	108.64%
Plan fiduciary net position as a percentage of the total OPEB liability	6.64%	6.90%

* 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 the Year Ended June 30, 2019*

State Retiree Welfare Benefit Trust

	2018	2019
Contractually required contribution	\$ 301,182	\$ 331,275
Contributions in relation to the contractually required contribution	\$ 301,182	\$ 331,275
Contribution deficiency (excess)	\$ 0	\$ 0
MOSERS' covered payroll	\$ 7,056,668	\$ 7,370,032
Contributions as a percentage of covered payroll	4.27%	4.49%

* 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, 2019

Investing activity	MSEP	Judicial Plan	Total
Investment management and incentive fees			
Actis Emerging Markets III & IV - private equity	\$ 779,307	\$ 14,961	\$ 794,268
Alinda Infrastructure Fund I, LP - private equity	14,757	283	15,040
AQR DELTA Sapphire Fund, LP - hedge funds	3,458,155	66,388	3,524,543
AQR Global Risk Premium Fund, LP - beta-balanced	815,548	15,656	831,204
Axiom Asia Private Capital Fund II & III, LP - private equity	1,334,385	25,617	1,360,002
Axxon Brazil Private Equity Fund II - private equity	242,149	4,649	246,798
Bayview Opportunity Domestic, LP - high yield	15,059	289	15,348
Bayview Opportunity Domestic III, LP - real estate	631,296	12,119	643,415
Blackstone Real Estate Partners IV, V, VI, & VII - real estate	758,357	14,559	772,916
Blackstone Topaz Fund, LP - hedge funds	2,994,123	57,480	3,051,603
Blakeney Onyx, LP - emerging markets	116,233	2,231	118,464
Bridgewater Associates Diamond Ridge Fund, LLC - hedge funds	4,158,124	79,826	4,237,950
Bridgewater All Weather, LLC - beta-balanced	1,352,046	25,956	1,378,002
CarVal Investors CVI Global Value Fund A, LP - real estate	13,153	252	13,405
CarVal Investors CVI Global Value Fund A, LP - private debt	13,153	252	13,405
Catalyst Fund III, IV & V, LP - private debt	2,231,370	42,837	2,274,207
Catterton Partners V, LP - private equity	10,806	207	11,013
Cornwall Domestic, LP - hedge funds	132,034	2,535	134,569
DRI Capital LSRC - private equity	165,313	3,174	168,487
EIG Energy Fund XIV, XV, & XVI, LP - private equity	276,130	5,301	281,431
Elliott International, Ltd. - hedge funds	7,483,802	143,670	7,627,472
Farallon Capital Institutional Partners, LP - hedge funds	25,745	494	26,239
Gaoling Fund, LP - hedge funds	(1,712,133)	(32,869)	(1,745,002)
Garnet Sky Investors Company, Ltd. - timber	(768,992)	(14,763)	(783,755)
Gateway Energy & Resource Holdings, LLC - real estate	333,978	6,412	340,390
GCM Equity Partners & Glenview Capital Opportunity Fund, LP - hedge funds	750,463	14,407	764,870
Global Forest Partners GTI7 Institutional Investors Company, Ltd. - timber	33,300	639	33,939
Harvest Fund Advisors - equities	172,204	3,306	175,510
HBK Merger Strategies Offshore Fund, Ltd. - hedge funds	2,911,051	55,885	2,966,936
JLL Partners V & VI, LP - private equity	139,516	2,678	142,194
King Street Capital, LP - hedge funds	(222,556)	(4,273)	(226,829)
Linden Capital Partners II - private equity	633,942	12,170	646,112
Mast Credit Opportunities I, LP - hedge funds	513,265	9,853	523,118
Merit Energy Partners F-II, LP - real estate	83,152	1,596	84,748
MHR Institutional Partners IIA, III & IV, LP - private debt	(1,348,381)	(25,886)	(1,374,267)
Millennium Technology Partners II, LP - private equity	983,002	18,871	1,001,873
NISA Investment Advisors, LLC - passive beta strategies	5,649,461	108,456	5,757,917
OCM Real Estate Opportunities Fund III, LP - real estate	520	10	530
OCM Opportunities Fund IVb, VII & VIIIb, LP - private debt	242,337	4,652	246,989
OCM/GFI Power Opportunities Fund II & III, LP - private equity	349,668	6,713	356,381

Schedules of Investment Expenses continued on page 63

Schedules of Investment Expenses continued from page 62

Investing Activity	MSEP	Judicial Plan	Total
Perry Capital - hedge funds	149	3	152
Pharo Macro Fund, Ltd. - hedge funds	1,901,097	36,496	1,937,593
Resource Management Service Wildwood Timberlands, LLC - timber	(818,801)	(15,719)	(834,520)
Silchester International Investors - int'l developed equity	4,100,393	78,717	4,179,110
Silver Creek Special Opportunities Fund I & II - private equity	63,072	1,211	64,283
Silver Lake Partners II, LP - private equity	83,923	1,611	85,534
SIR Hedged Equity Fund, Ltd. - hedge funds	2,875,526	55,203	2,930,729
State Street Global Advisors - emerging markets	82,585	1,585	84,170
StepStone Capital Buyout Fund I & II, LP - private equity	(709,561)	(13,622)	(723,183)
StepStone Opportunities Fund II, LP - private equity	36,396	699	37,095
Stone Harbor Investment Partners, LP - emerging markets	150,220	2,878	153,098
Total investment management and incentive fees	43,529,841	835,655	44,365,496
Other investment fees			
<i>Investment consultant fees</i>			
Cortex	5,397	103	5,500
Meketa Investment Group	65,002	1,248	66,250
NEPC	105,529	2,026	107,555
Pension Consulting Alliance, LLC	43,335	832	44,167
Summit Strategies, Inc.	150,279	2,885	153,164
TimberLink Consulting	13,491	259	13,750
Verus Advisory, Inc.	49,058	942	50,000
Total investment consultant fees	432,091	8,295	440,386
<i>Investment custodial and other fees</i>			
BNY Mellon (custodial)	370,574	7,115	377,689
BNY Mellon (performance calculation)	170,262	3,269	173,531
MSCI Barra One and Bloomberg (risk management)	288,359	5,535	293,894
Total investment custodial and other fees	829,195	15,919	845,114
Internal investment activity expenses	3,895,964	34,740	3,930,704
Total investing activity expenses	\$ 48,687,091	\$ 894,609	\$ 49,581,700

Pension Trust Funds

Schedules of Internal Investment Activity Expenses

For the Year Ended June 30, 2019

	MSEP	Judicial Plan	Total
Personnel services			
Salaries	\$ 2,362,749	\$ 18,524	\$ 2,381,273
Fringe benefits	939,974	7,369	947,343
Total personnel services	3,302,723	25,893	3,328,616
Professional services			
Attorney services	92,266	723	92,989
Total professional services	92,266	723	92,989
Communications			
Telephone	10,076	79	10,155
Total communications	10,076	79	10,155
Facilities			
Utilities	2,768	22	2,790
Lease expense	84,020	659	84,679
Facility maintenance	9,437	74	9,511
Vehicle maintenance and operation	65	1	66
Total facilities	96,290	756	97,046
Software and equipment			
Computer supplies and software	3,412	27	3,439
Loss on sale of equipment	17,623	138	17,761
Total software and equipment	21,035	165	21,200
Education, meetings and travel			
Tuition reimbursement	4,453	35	4,488
Professional development including travel	17,934	141	18,075
Due diligence travel	1,709	13	1,722
Total education, meetings and travel	24,096	189	24,285
General			
Research and information services	317,790	6,683	324,473
Membership dues	19,443	152	19,595
Office supplies	644	5	649
Periodicals and publications	11,601	95	11,696
Total general	349,478	6,935	356,413
Total internal investment activity expenses	\$ 3,895,964	\$ 34,740	\$ 3,930,704

Pension Trust Funds
Schedules of Administrative Expenses
For the Year Ended June 30, 2019

	MSEP	Judicial Plan	Total
Personnel services			
Salaries	\$ 3,874,955	\$ 30,380	\$ 3,905,335
Fringe benefits	2,158,277	16,921	2,175,198
Total personnel services	6,033,232	47,301	6,080,533
Professional services			
Actuarial services	150,294	1,178	151,472
Attorney services	152,136	1,193	153,329
Auditing services	34,989	274	35,263
Banking services	40,489	317	40,806
Consulting services	769,499	6,033	775,532
Total professional services	1,147,407	8,995	1,156,402
Communications			
Video production	2,256	18	2,274
Telephone	57,042	447	57,489
Printing	21,067	165	21,232
Postage and mailing	122,752	962	123,714
Total communications	203,117	1,592	204,709
Facilities			
Depreciation	105,213	825	106,038
Utilities	47,690	374	48,064
Facility maintenance	92,061	722	92,783
Vehicle maintenance and operation	4,273	33	4,306
Total facilities	249,237	1,954	251,191
Software and equipment			
Computer supplies and software	22,523	177	22,700
Depreciation	490,363	3,844	494,207
Maintenance agreements	301,006	2,360	303,366
Equipment rental	137,252	1,076	138,328
Gain on sale of equipment	6,482	51	6,533
Total software and equipment	957,626	7,508	965,134
Education, meetings and travel			
Board travel and meetings	22,658	178	22,836
Professional development including travel	82,661	648	83,309
MOSERS sponsored seminars	86,522	678	87,200
Tuition reimbursement	7,727	61	7,788
Total education, meetings and travel	199,568	1,565	201,133
General			
Advertising	16,520	136	16,656
Research and information services	51,668	405	52,073
Insurance	178,408	1,399	179,807
Membership dues	16,015	126	16,141
Business continuity	55,022	431	55,453
Office supplies	1,559	12	1,571
Periodicals and publications	85,589	671	86,260
Miscellaneous	5,858	46	5,904
Total general	410,639	3,226	413,865
Total administrative expenses	\$ 9,200,826	\$ 72,141	\$ 9,272,967

Schedules of Professional Service Fees

For the Year Ended June 30, 2019

Professional Services	Pension Trust Funds			Internal Service Funds		
	MSEP	Judicial Plan	Total	Life and LTD	Deferred Compensation	Total
Operations administrative expenses						
<i>Actuarial services</i>						
Cavanaugh Macdonald Consulting, LLC	\$ 150,294	\$ 1,178	\$ 151,472	\$ 0	\$ 0	\$ 0
<i>Attorney services</i>						
Thompson Coburn, LLP	152,136	1,193	153,329	0	6,112	6,112
<i>Auditing services</i>						
Eide Bailly	7,442	58	7,500	0	0	0
Williams-Keepers, LLC	27,547	216	27,763	2,430	37,900	40,330
Total auditing services	34,989	274	35,263	2,430	37,900	40,330
<i>Banking services</i>						
Central Bank	40,489	317	40,806	472	0	472
JetPay Services	0	0	0	251	0	251
Total banking services	40,489	317	40,806	723	0	723
<i>Consulting services</i>						
Avtex – information technology	3,119	24	3,143	0	0	0
Charlesworth & Associates – risk management	9,806	77	9,883	0	0	0
CherryRoad Technologies – information technology	79,378	622	80,000	0	0	0
Election America – trustee election	66,672	523	67,195	0	0	0
Gamble & Schlemeier, Ltd. – governmental affairs	26,307	206	26,513	0	0	0
ICON Integration and Design, Inc. – pension administration system	303,338	2,378	305,716	0	0	0
McAfee Public Sector – policy consulting	25,480	200	25,680	0	0	0
Mosaic Governance Advisors, LLC – strategic planning	16,758	131	16,889	0	0	0
Verus Advisory, Inc. – investment consulting	218,289	1,711	220,000	0	0	0
World Wide Technology – information technology	20,239	159	20,398	0	0	0
Other services	113	2	115	0	0	0
Total consulting services	769,499	6,033	775,532	0	0	0
Total operations administrative expenses	1,147,407	8,995	1,156,402	3,153	44,012	47,165
Investment administrative expenses						
<i>Attorney services</i>						
Purrington Moody Weil, LLP	16,402	129	16,531	0	0	0
Thompson Coburn, LLP	75,681	592	76,273	0	0	0
Other services	183	2	185	0	0	0
Total attorney services	92,266	723	92,989	0	0	0
Total investment administrative expenses	92,266	723	92,989	0	0	0
Total professional fees	\$1,239,673	\$ 9,718	\$1,249,391	\$ 3,153	\$ 44,012	\$ 47,165

Information on investment management and consulting fees can be found in the Schedule of Investment Expenses on pages 62-63.

Internal Service Funds
Combined Statements of Net Position
As of June 30, 2019

	Life and LTD	Deferred Compensation	Total
Assets			
<i>Current assets</i>			
Premiums receivable	\$ 957,787	\$ 0	\$ 957,787
Short-term instruments	6,466,825	452,432	6,919,257
Total current assets	7,424,612	452,432	7,877,044
Capital assets	0	27,250	27,250
Accumulated depreciation	0	(20,303)	(20,303)
Net capital assets	0	6,947	6,947
Total assets	7,424,612	459,379	7,883,991
Liabilities			
<i>Current liabilities</i>			
Premiums payable	5,170,302	0	5,170,302
Other liabilities	177,208	62,563	239,771
Total current liabilities	5,347,510	62,563	5,410,073
Deferred revenue	2,008,209	0	2,008,209
Total liabilities	7,355,719	62,563	7,418,282
Net Position			
Unrestricted net position	68,893	396,816	465,709
Total net position	\$ 68,893	\$ 396,816	\$ 465,709

Internal Service Funds
Combined Statements of Revenues, Expenses, and Changes in Net Position
For Year Ended June 30, 2019

	Life & LTD	Deferred Compensation	Total
Operating revenues			
Premium receipts	\$ 31,342,778	\$ 0	\$ 31,342,778
Deferred compensation receipts	0	1,215,000	1,215,000
Miscellaneous income	494,722	0	494,722
Total operating revenues	31,837,500	1,215,000	33,052,500
Operating expenses			
Premium disbursements	31,325,399	0	31,325,399
Premium refunds	17,379	0	17,379
Administrative expenses	501,018	1,148,449	1,649,467
Total operating expenses	31,843,796	1,148,449	32,992,245
Net operating (loss) income	(6,296)	66,551	60,255
Nonoperating revenues			
Gain on sale of capital assets	0	145	145
Interest income	121,298	5,899	127,197
Total nonoperating revenues	121,298	6,044	127,342
Net revenues over expenses	115,002	72,595	187,597
Net position (deficit) beginning of year	(46,109)	324,221	278,112
Net position end of year	\$ 68,893	\$ 396,816	\$ 465,709

Internal Service Funds

Combined Statements of Cash Flows

For the Year Ended June 30, 2019

	Life & LTD	Deferred Compensation	Total
Cash flows from operating activities			
Cash received from employers and members	\$ 31,746,861	\$ 1,215,000	\$ 32,961,861
Payments to outside carriers	(28,723,812)	0	(28,723,812)
Refund of premiums to members	(17,379)	0	(17,379)
Cash payments to employees for services	(400,122)	(907,064)	(1,307,186)
Cash payments to other suppliers of goods and services	(233,396)	(182,426)	(415,822)
Net cash provided by operating activities	2,372,152	125,510	2,497,662
Cash flows from capital and related financing activities			
Proceeds from the sale of capital assets	0	145	145
Net cash provided by capital and related financing activities	0	145	145
Cash flows from investing activities			
Purchase of short term instruments	(1,160,871,800)	(68,730,120)	(1,229,601,920)
Proceeds from sale and maturities of short term instruments	1,158,378,350	68,598,566	1,226,976,916
Cash received from investing activities	121,298	5,899	127,197
Net cash (used) by investing activities	(2,372,152)	(125,655)	(2,497,807)
Net increase (decrease) in cash	0	0	0
Cash balances beginning of year	0	0	0
Cash balances end of year	\$ 0	\$ 0	\$ 0
Reconciliation of net operating (loss) income to net cash provided by operating activities			
Net operating income (loss)	\$ (6,296)	\$ 66,551	\$ 60,255
<i>Adjustments to reconcile net operating (loss) to net cash provided (used) by operating activities</i>			
Depreciation expense	0	5,853	5,853
Change in assets and liabilities:			
(Increase) in operational accounts receivable	(12,639)	0	(12,639)
Increase in operational liabilities	2,391,087	53,106	2,444,193
Total adjustments	2,378,448	58,959	2,437,407
Net cash provided by operating activities	\$ 2,372,152	\$ 125,510	\$ 2,497,662

Internal Service Funds
Schedules of Administrative Expenses
For the Year Ended June 30, 2019

	Life and LTD	Deferred Compensation	Total
Personnel services			
Salaries	\$ 269,077	\$ 668,463	\$ 937,540
Employee fringe benefits	131,044	289,357	420,401
Total personnel services	400,121	957,820	1,357,941
Professional services			
Attorney services	0	6,112	6,112
Auditing services	2,430	37,900	40,330
Banking services	723	0	723
Total professional services	3,153	44,012	47,165
Communications			
Postage and mailing	8,111	136	8,247
Telephone	3,961	8,778	12,739
Printing	1,463	914	2,377
Video production expense	157	118	275
Total communications	13,692	9,946	23,638
Facilities			
Building use charge	52	10,577	10,629
Utilities	3,312	0	3,312
Maintenance	6,689	0	6,689
Total facilities	10,053	10,577	20,630
Software and equipment			
Computer supplies and equipment	1,406	7,115	8,521
Depreciation	0	5,853	5,853
Equipment maintenance	20,849	11,619	32,468
Equipment rental	9,531	0	9,531
Total software and equipment	31,786	24,587	56,373
Education, meetings and travel			
Board travel and meetings	1,573	0	1,573
Professional development including travel	6,179	13,946	20,125
MOSERS sponsored seminars	6,008	54,678	60,686
Due diligence travel	0	3,108	3,108
Total education, meetings and travel	13,760	71,732	85,492
General			
Advertising	1,145	7,386	8,531
Research and information services	3,588	19,104	22,692
Insurance	12,389	0	12,389
Membership dues	1,112	2,100	3,212
Business continuity	5,943	0	5,943
Office supplies	3,761	920	4,681
Periodicals and publications	108	265	373
Miscellaneous	407	0	407
Total general	28,453	29,775	58,228
Total administrative expenses	\$ 501,018	\$ 1,148,449	\$ 1,649,467