

MISSOURI STATE EMPLOYEES' RETIREMENT SYSTEM

A Pension Trust Fund of the State of Missouri

ANNUAL COMPREHENSIVE FINANCIAL REPORT

Fiscal Year Ended June 30, 2022



MAKING A STATEMENT

MOSERS

MISSOURI STATE EMPLOYEES' RETIREMENT SYSTEM

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ANNUAL COMPREHENSIVE FINANCIAL REPORT

Fiscal Year Ended June 30, 2022



MAKING A STATEMENT

Ronda Stegmann
Executive Director

Abby Spieler
Deputy Executive Director
General Counsel

*Report prepared by the staff of the
Missouri State Employees' Retirement System*

MOSERS

Table of Contents

Introductory Section	5	Professional Awards
	6	Letter of Transmittal
	10	Letter from the Board Chairwoman
	11	Board of Trustees
	12	Administrative Organization
	13	About MOSERS
	16	Outside Professional Services
Financial Section	17	Independent Auditor's Report
	20	Management's Discussion and Analysis
		<i>Basic Financial Statements</i>
	24	Statements of Fiduciary Net Position
	25	Statements of Changes in Fiduciary Net Position
	26	Notes to the Basic Financial Statements
		<i>Required Supplementary Information</i>
	52	Schedule of Changes in Employers' Net Pension Liability
	56	Schedule of Employer Contributions – Pension Trust Funds
	57	Schedule of Annual Money-Weighted Rate of Return on Investments – Pension Trust Funds
	58	Notes to the Schedules of Required Supplementary Information – Pension Trust Funds
	59	Schedule of Proportionate Share of the Net OPEB Liability
	59	Schedule of Employer Contributions for OPEB
		<i>Additional Financial Information</i>
	60	Schedules of Investment Expenses
	62	Schedules of Internal Investment Activity Expenses
	63	Schedules of Administrative Expenses
64	Schedules of Professional Service Fees	
Investment Section	65	Chief Investment Officer's Report
	66	Investment Policy Summary
	70	Total Fund Review
	72	Schedule of Fees and Commissions
	73	Schedule of Investment Portfolios by Asset Class
	74	Total Fund – Top Ten Publicly Traded Separate Account Holdings
	75	Schedule of Investment Results
	77	Schedule of Investment Manager Fees
79	Asset Class Summary	

Table of Contents

Actuarial Section	89 Actuary's Certification Letter
	91 Summary of Actuarial Assumptions
	98 Employer Schedule of Funding Progress
	99 Summary of Member Data Included in Valuations
	100 Active Members by Attained Age and Years of Service
	101 Schedules of Active Member Valuation Data
	102 Retirees and Beneficiaries Added and Removed
	104 Short-Term Solvency Test
	105 Analysis of Financial Experience
	<i>Summary of Plan Provisions</i>
	106 Comparison of Plans for General State Employees
	108 Comparison of Plans for Legislators
	110 Comparison of Plans for Statewide Elected Officials
	112 Comparison of Plans for Judges
	114 Comparison of Plans for Uniformed Members of the Water Patrol
	116 Life Insurance Plans
	117 Long-Term Disability (LTD) Insurance Plans
	118 Changes in Plan Provisions
	119 Actuarial Present Values
Statistical Section	121 Overview
	122 Changes in Fiduciary Net Position
	124 Deductions from Net Position for Benefits and Refunds by Type
	126 Valuation Assets (Smoothed Market) vs. Pension Liabilities – Pension Trust Funds
	128 Employer Contribution Rates as a Percent of Payroll – Pension Trust Funds
	129 Membership in Retirement Plans
	130 Distribution of Benefit Recipients by Location
	131 Benefit Recipients by Type of Retirement and Option Elected
	133 Benefits Tabulated by Type of Benefit and by Option
	136 Average Monthly Benefit Amounts
	143 Retirees and Beneficiaries Tabulated by Fiscal Year of Retirement
	145 Benefits Tabulated by Attained Ages of Benefit Recipients
	147 Principal Participating Employers

MISSION

MOSERS exists to advance
the financial security of its members.

VISION

We endeavor to:

Exceed customer expectations

Educate stakeholders

Ensure sound investment practices

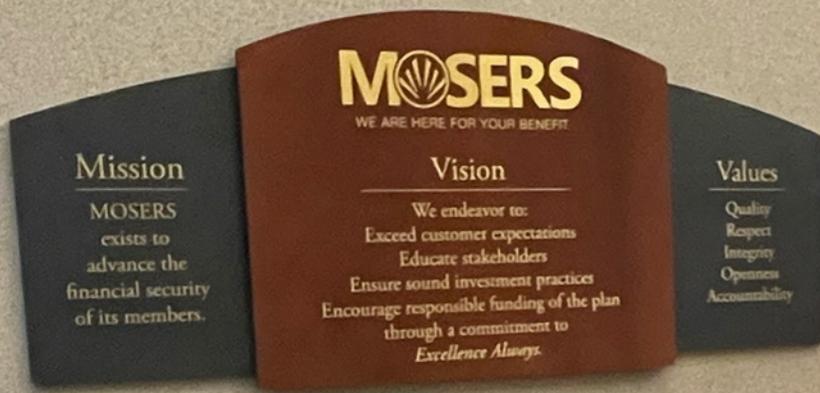
Encourage responsible funding
of the plan through a commitment to
Excellence. Always.

VALUES

Quality • Respect • Integrity

Openness • Accountability





Mission

MOSERS exists to advance the financial security of its members.

MOSERS

WE ARE HERE FOR YOUR BENEFIT

Vision

We endeavor to:
Exceed customer expectations
Educate stakeholders
Ensure sound investment practices
Encourage responsible funding of the plan through a commitment to *Excellence Always.*

Values

Quality
Respect
Integrity
Openness
Accountability

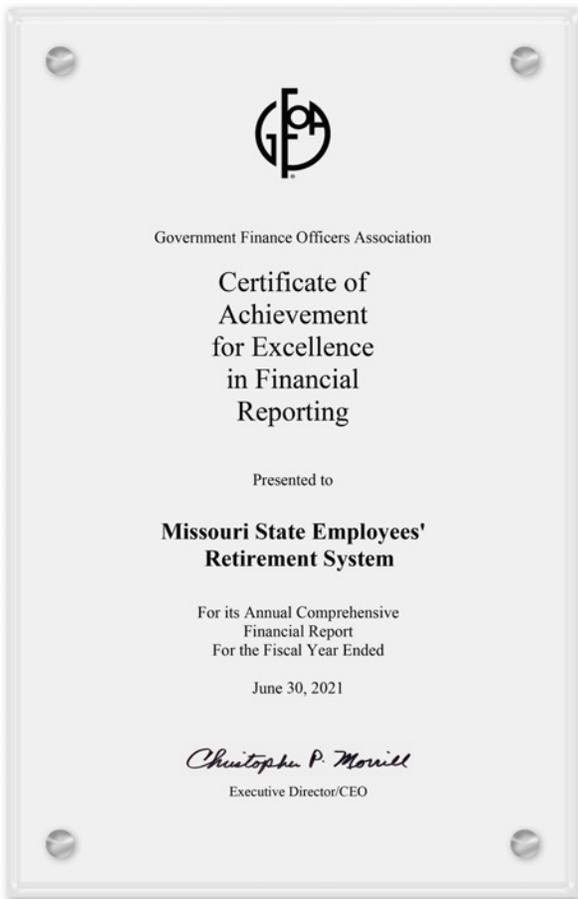
INTRODUCTORY SECTION

Mission Statement

MOSERS exists to advance the financial security of its members. This time-tested statement is embodied in everything we do.

MOSERS

Professional Awards



Certificate of Achievement for Excellence in Financial Reporting

MOSERS' *Annual Comprehensive Financial Report* for the fiscal year ended June 30, 2021, was awarded the Certificate of Achievement for Excellence in Financial Reporting by the Government Finance Officers Association of the United States and Canada (GFOA). This was the 33rd consecutive year that MOSERS has received this prestigious award. The Certificate of Achievement is the highest form of recognition for excellence in state and local government financial reporting. To be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized financial report. This financial report has been recently renamed by the Governmental Accounting Standards Board, and is now known as an Annual Comprehensive Financial Report (ACFR). The ACFR must satisfy generally accepted accounting principles, applicable legal requirements, and GFOA reporting standards.



Public Pension Standards Award

MOSERS received the Public Pension Standards Award from the Public Pension Coordinating Council (PPCC) in 2021, in recognition of meeting professional standards for plan design and administration as set forth in the Public Pension Standards. This award is presented by the PPCC, a confederation of the National Association of State Retirement Administrators (NASRA), the National Conference on Public Employee Retirement Systems (NCPERS), and the National Council on Teacher Retirement (NCTR).

Letter of Transmittal



PO Box 209, Jefferson City, MO 65102-0209
(573) 632-6100 • (800) 827-1063 | (573) 632-6103 (fax)
mosers@mosers.org (email)
Visit us at 907 Wildwood Drive or www.mosers.org

October 14, 2022

The Board of Trustees
Missouri State Employees' Retirement System
907 Wildwood Drive
Jefferson City, MO 65109

To the Board of Trustees and Members of MOSERS:

We are pleased to submit the *Annual Comprehensive Financial Report (ACFR)* of the Missouri State Employees' Retirement System (MOSERS) for the fiscal year ended June 30, 2022. During fiscal year 2022, the Board and staff worked extensively and collaboratively on solutions to ensure the fiscal sustainability of MOSERS for current and future members. I would like to thank our trustees for their dedication and commitment.

This ACFR is designed to provide an overview of the financial condition of MOSERS while also satisfying the reporting requirements of state law as stipulated in Sections 104.480, 104.1006, and 105.661 of the Revised Statutes of Missouri (RSMo), as amended. In addition to the *Introductory Section*, the MOSERS ACFR also contains a *Financial Section*, *Investment Section*, *Actuarial Section* and *Statistical Section*. This report is available on our website at www.mosers.org.

Profile of MOSERS

MOSERS is a cost-sharing multiple-employer defined benefit pension plan that was established in 1957 by state law for the purpose of providing retirement benefits to most state employees. MOSERS is governed by an 11-member Board of Trustees (the Board). As of June 30, 2022, MOSERS serves 42,010 active employees and pays 54,244 benefit recipients.

In addition to retirement benefits, MOSERS administers term life and long-term disability insurance for most state employees. MOSERS provides these benefits through insured plans with The Standard Insurance Company (The Standard). We maintain membership information on those eligible and manage a custodial fund to track premiums collected from employers and payments made to The Standard.

MOSERS oversees the State of Missouri Deferred Compensation Plan (MO Deferred Comp). We administer this plan through a contractual relationship with MissionSquare Retirement as the third-party record keeper. The plan provides various investment options to participants who retain responsibility for the investment of their individual accounts. MO Deferred Comp activity and administrative costs are reported via separate audited financial statements.

Additionally, MOSERS oversees the Colleges and Universities Retirement Plan (CURP), a mandatory 401(a) defined contribution plan for education employees hired after June 30, 2002 by the regional universities that participate in MOSERS. TIAA is responsible for third-party administration and for providing investment products to plan members. The activities of CURP are not included within this report.

Financial Statements

The financial statements in this report were prepared in accordance with accounting principles generally accepted in the United States. Management is responsible for the preparation of this report and the fairness and integrity of the information presented herein. Some amounts included in the financial statements and elsewhere may be based on estimates and judgments. Management is responsible for maintaining a system of adequate internal controls designed to provide reasonable, but not absolute, assurance that assets are properly safeguarded and that the financial statements are fairly stated. We believe that the internal controls currently in place support this purpose and that the financial statements and accompanying schedules are fairly presented in all material respects.

Eide Bailly, LLP, our independent external auditors, conducted an audit of the *Basic Financial Statements* in accordance with U.S. generally accepted auditing standards. This audit and the financial statements and related notes are presented in the *Financial Section* of this report.

Management's Discussion and Analysis in the *Financial Section* serves as an introduction to, and overview of, the financial statements. Additional financial information can be found in the financial statements and schedules included in the *Financial Section* of this report.

MOSERS retirement funds are pension trust funds of the state of Missouri for financial reporting purposes and, as such, the financial statements in this report are also included in the *Annual Comprehensive Financial Report* of the *State of Missouri*.

Investments

The MOSERS investment portfolio generated a time-weighted return of (9.0)%, net of fees, for fiscal year 2022. Despite it being a difficult year for the markets, the total fund returned 1.0% more than would have been expected through passive investing in the benchmarks.

The MOSERS Board of Trustees has adopted investment objectives, investment philosophies, and a strategic asset allocation to guide all investment related decisions. Investment objectives strive to maintain stable and reasonable contribution rates over long periods of time, while maximizing investment return by exposing assets to a prudent level of risk. Additional detailed information regarding MOSERS' investments, including policies and strategies, can be found in the *Investment Section* of this report.

Actuarial Information

The Board contracts with Cavanaugh Macdonald Consulting, LLC to perform an actuarial valuation of each plan every year. The valuations use economic and demographic assumptions adopted by the Board based upon experience studies conducted at least every five years. The most recent full experience study was adopted effective June 30, 2021.

To allow for more predictable and stable contribution rates, MOSERS' funding is based upon the actuarial value of assets, which smooths asset gains and losses over a five-year period. As of June 30, 2022, the MSEP was 57.7% pre-funded and the Judicial Plan was 32.4% pre-funded on an actuarial basis. The MSEP experienced a decrease from the June 30, 2021 funded status of 59.0%. The Judicial Plan reflected an increase from the June 30, 2021 funded status of 31.1%.

The required certification letter from the Board's retained actuary is included at the beginning of the *Actuarial Section*. Additional information regarding the financial condition of the pension trust funds can be found in the *Actuarial Section* of this report.

Legislative Changes

- **House Bill 3005** – The General Assembly authorized the Office of Administration's appropriation of \$610 million to MOSERS for fiscal year 2023. This appropriation funds the Board-certified employer contribution rates. This amount was generated from the employer contribution rates calculated in the annual actuarial valuations performed by MOSERS' retained actuarial professionals and certified by the MOSERS Board of Trustees at its September 2021 Board meeting. The bill also included a one-time extraordinary payment of \$500 million to MOSERS in fiscal year 2023.

Administrative Initiatives

MOSERS' staff was engaged in several administrative initiatives during the year. The more notable items are listed below.

- **Project Phoenix** – MOSERS' dedicated project team continues to work on the replacement of our pension administration system. MOSERS remains engaged with ICON Integration & Design for data profiling, analysis, and conditioning services, along with Linea Solutions for project oversight and change management services. Tegrit, utilizing their Arrivos platform, is proving to offer many opportunities for operational efficiency and further systems integration. We were approximately 85% complete at fiscal year end. Current projections indicate a 2023 deployment.
- **MOSERS' Strategic Plan** – The MOSERS Board of Trustees approved an organization-wide strategic plan for a three-year cycle beginning July 1, 2019 through June 30, 2022. The end of fiscal year 2022 marks the completion of the third and final year of the current MOSERS' Strategic Plan. During the third year, staff completed all the remaining initiatives by the end of the strategic planning cycle.
- **Modification of Board's Governing Policies** – The Board adopted modifications within the *MOSERS Governance Manual* and *Investment Policy Statement (IPS)* this fiscal year. The four sections that were amended in the governance manual were the personal trading, service provider selection, funding, and board expense reimbursement policies. The IPS was modified with the adoption of changes in benchmarks relative to the legacy private equity portfolio and the codification of a benchmarking philosophy, goals, framework, and routine benchmark review timing.
- **MOSERS Month** – In April 2022, we hosted the second annual MOSERS Month. The 2022 theme was "Once Upon a Pension" with unique weekly interactive video stories. Throughout the month, we encouraged active employees to explore the value of their benefits and learn more about retirement. The first weekly video story followed the MO Deferred Comp savings journey. The second weekly video story took members on a journey through the life insurance and long-term disability processes. The third weekly video story featured the retirement process and how you make the decision on what is best for you.

Awards

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to MOSERS for its Annual Comprehensive Financial Report for the fiscal year ended June 30, 2021. This was the 33rd consecutive year that MOSERS has received this prestigious award. In order to be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized Annual Comprehensive Financial Report. The report must satisfy generally accepted accounting principles and applicable legal requirements. A Certificate of Achievement is valid for a period of one year only. We believe that our current Annual Comprehensive Financial Report continues to meet the Certificate of Achievement Program's requirements and we are submitting it to the GFOA to determine its eligibility for another certificate.

MOSERS received the Public Pension Coordinating Council (PPCC), Public Pension Standards Award, in recognition of meeting the professional standards for plan design and administration as set forth in the Public Pension Standards. This award is presented by the PPCC, a confederation of the National Association of State Retirement Administrators (NASRA), the National Conference on Public Employee Retirement Systems (NCPERS), and the National Council on Teacher Retirement (NCTR).

Introductory Section

MOSERS received three awards from the National Association of Government Communicators (NAGC). These awards include the First-Place honors in two categories: *Website* and *Internal Communications* for *MOSERS Month 2021*. We also received Second-Place honors in the *Special Event or Conference* category for the *2021 Benefits U Online Conference* materials. The Blue Pencil & Gold Screen Competition is an annual international awards program that recognizes superior government communication products and those who produce them at all levels of government.

The State of Missouri Deferred Compensation Plan received a Communicator Award of Distinction for their automatic increase holiday savings campaign. The Communicator Awards is the leading international awards program honoring creative excellence for marketing and communications professionals. The Communicator Awards is an annual competition honoring the best digital, mobile, audio, video, and social content the industry has to offer and is widely recognized as one of the largest awards of its kind in the world.

The National Association of Government Defined Contribution Administrators, Inc. (NAGDCA) awarded the State of Missouri Deferred Compensation Plan the 2021 Leadership Recognition Award for their automatic increase holiday savings campaign. The Leadership Awards recognize defined contribution plans for their outstanding achievements in *Participant Education & Communication*.

Pension & Investments awarded the State of Missouri Deferred Compensation Plan a First-Place Eddy Award for their America Saves Week *Money Savings TipToks* campaign. In addition, the Plan was also awarded a Second-Place for their automatic increase holiday savings postcard.

These prestigious awards recognize MOSERS for financial and professional standards of excellence and reflect the dedication and competence of the MOSERS staff.

Conclusion

This report is a product of the combined efforts of the MOSERS staff and advisors functioning under the Board's leadership. It is intended to provide complete and reliable information that facilitates the management decision making process, serves as a means for determining compliance with legal requirements, and allows for the evaluation of responsible guardianship of System funds.

Digital copies of this report are provided to the Governor, State Auditor, and the Joint Committee on Public Employee Retirement of the General Assembly. Their support contributes to the success of MOSERS.

This year's ACFR theme, "Making a Statement," represents the many actions we perform and communications we convey as an organization. Through the embodiment of our mission statement "MOSERS exists to advance the financial security of its members" and receiving input and feedback from our stakeholders through their statements, our daily endeavors strive to be accountable and responsive to our members and each other. We understand that MOSERS is entrusted with meaningful resources on behalf of our members and know these same members rely on their benefits now and far into the future. The MOSERS staff will continue to "roll up our sleeves" and work hard for our members, the Board, and all our stakeholders into the future. It is our honor to work for this great state and its citizens.

Respectfully submitted,

Ronda Stegmann
Executive Director

Jeremy Pond, CPA, CFE, CGFM
Chief Financial Officer

Letter from the Board Chairwoman



PO Box 209, Jefferson City, MO 65102-0209
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mosers@mosers.org (email)
Visit us at 907 Wildwood Drive or www.mosers.org

October 14, 2022

Dear Members:

On behalf of the MOSERS Board of Trustees, I am pleased to present the *MOSERS Annual Comprehensive Financial Report* for the fiscal year ended June 30, 2022. This report is one of MOSERS' finest examples of collaboration and an organization-wide team effort.

During the year ended June 30, 2022, the Board of Trustees continued its work on behalf of the MOSERS membership. As the organization transitioned back to a more normalized workplace setting for our staff, we continued to work on key initiatives over the last fiscal year, some of which included:

- formation and adoption of MOSERS 3-year strategic plan beginning July 1, 2022;
- performance of the governance required actuarial audit; and
- securing an extraordinary payment of \$500 million from the state of Missouri to assist in moving the System to a better funding position.

MOSERS was very fortunate to have Board continuity, with no turnover, during fiscal year 2022. During my tenure as Board chairwoman, I have witnessed the substantial amount of time and service our trustees have dedicated to MOSERS. I am proud to lead this fine group of fiduciaries in acting in the best interest of our members. As a state employee elected to the MOSERS Board by our active membership, I understand the value of a future MOSERS pension benefit and the role this benefit has in the employers' recruitment and retention efforts. Total compensation is more than just the dollars received in a paycheck. The ongoing monthly contributions from the MOSERS-covered employers represent a significant financial commitment to our members, their families, their communities, and ultimately the citizens we serve. As we look to fiscal year 2023, the Board in conjunction with staff, will continue to further our core mission of advancing the financial security of our members.

I wish to express my appreciation to you, our members, for your commitment and service to this great state and its citizens. I am honored to serve as one of your representatives on the MOSERS Board.

If you ever have any questions, please contact us at MOSERS, P.O. Box 209, Jefferson City, MO 65102, call us at (800) 827-1063, or visit our website at www.mosers.org.

Sincerely,

Crystal Wessing, Chairwoman
Board of Trustees

Board of Trustees



Crystal Wessing – Chairwoman
Elected Active Member

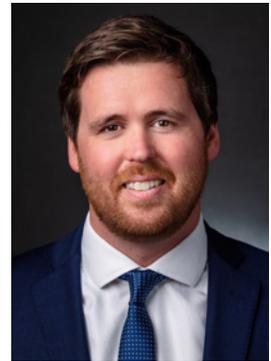


Gary Metzger – Vice Chairman
Governor Appointed Member

Representative Rusty Black
House Appointed Member

Gary Findlay
Elected Retired Member

Treasurer Scott Fitzpatrick
Ex-Officio Member



Jenny Jacobs, CPA
Elected Active Member



Joe Keifer
Governor Appointed Member



Senator John Rizzo
Senate Appointed Member

Commissioner Ken Zellers
Office of Administration
Ex-Officio Member

Senator Paul Wieland
Senate Appointed Member

Representative John Wiemann
House Appointed Member



Administrative Organization



Ronda Stegmann

Executive Director

- Cindy Rehmeier, CFP
Manager, Defined Contribution Plans
- Nicki Russell, CPA, CIA, MPA
Chief Auditor
- Lisa Verslues, PHR, SHRM-CP
Human Resources Officer



Abby Spieler, JD

Deputy Executive Director – Operations/General Counsel

- Andrea Binkley, CGBA
Chief Benefits Officer
- Carson Lepper, PMP
Project Manager
- Paul Moyer
Chief Technology Officer
- Jamie Mullen
Employer Services Manager
- Jeremy Pond, CPA, CFE, CGFM
Chief Financial Officer
- Candy Smith, MPA
Chief Communications Officer



TJ Carlson, MBA, CAIA, CTP

Deputy Executive Director – Investments/Chief Investment Officer

- Scott Hankins, CFA
Managing Director – Investment Risk & Operations
- Tyson Rehfeld, CFA
Deputy Chief Investment Officer

About MOSERS



Purpose

MOSERS was established September 1, 1957, and is governed by laws of the state of Missouri.

MOSERS administers retirement, survivor, life insurance, and long-term disability benefits, as well as deferred compensation plan management to its members.

MOSERS administers benefits for most state employees, including general state employees, employees of 10 regional colleges and universities, members of the Missouri General Assembly, statewide elected officials, judges, administrative judges, and legal advisors. MOSERS is responsible for administering benefits as set forth in state law and bears a fiduciary obligation to the state employees who are its members.

Administration

State law provides that responsibility for the administration of MOSERS is vested in an 11-member Board of Trustees. The Board is comprised of the following:

- two members of the Senate appointed by the President Pro Tem of the Senate;
- two members of the House of Representatives appointed by the Speaker of the House;
- two members appointed by the Governor;
- the State Treasurer;
- the Commissioner of Administration; and
- three System members: two active members elected by the active and inactive-vested members, and one retiree elected by the retired members.

Introductory Section

The day-to-day management of MOSERS is delegated to the executive director who is appointed by the Board. The executive director acts as advisor to the Board on all matters pertaining to the System, and employs the remaining staff needed to manage the System.

Organization

The executive director, deputy executive director, and chief investment officer are responsible for planning, organizing, and administering the operations of the System under the broad policy guidance and direction of the Board.

Executive

The executive staff provide administrative support by assisting the executive director and deputy executive director in the major legal, financial, operational, and oversight functions. Human resources, which includes oversight of general building maintenance, is also represented in this section. Responsible for business continuity preparation and planning, this section also coordinates activities and processes for the organization that facilitate strategic thinking, planning, and implementation.

Accounting

The staff in this section are responsible for all financial records of the programs administered by MOSERS, including the preparation of financial and statistical reports and purchasing functions for MOSERS. This team works with the investment custodian, internal investment managers, Office of Administration accounting team, state of Missouri, actuaries, banks, and the IRS.

Benefits Administration

Staff in the benefits administration section are responsible for all member data, benefit verifications and inceptions, as well as contact with members regarding the benefit programs administered by MOSERS (retirement, life insurance, and long-term disability insurance).

Communications and Education

Communications and education staff are responsible for presenting information in clear and concise ways to facilitate effective, well-informed decision-making, planning, and action. They produce materials for members regarding the benefits administered by MOSERS including publications such as newsletters, handbooks, forms, and brochures. This team works in conjunction with information technology staff on electronic materials and tools such as the public, Board, secure member and internal websites, social media, and member emails. This team also conducts educational seminars in 16-plus cities around the state each year and hosts webinars to inform members about their MOSERS benefits.

Employer Services

Staff in the employer services section facilitate the collection of member and employer contributions, maintain member benefit eligibility records, and provide technical assistance and general education to employer representatives regarding the timely and accurate submission of payroll and benefit eligibility data.

Information Technology

Staff in this section provides computer and technical design support for MOSERS' administrative activities. This team is responsible for developing and maintaining the automated systems used to administer benefits. They are also responsible for the document imaging system, network and data security, unified communication system, and personal computers.

Investments

The investments staff provides investment management and consulting services to the System. Primary functions include managing assets internally, selecting external managers for portions of the portfolio, researching and implementing portfolio allocation shifts and rebalancing, providing technical advice, serving as a liaison to the investment community, and informing and advising the Board and executive director on financial, economic, and political developments which may affect the System. This team works closely with external investment consultants, legal counsel, and the executive director.

Project Management

This team is responsible for implementing a new pension administration system to replace MOSERS' legacy system. This includes business process mapping and analysis to identify efficiencies and mitigate risk, as well as working closely with multiple external vendors focused on data preparation and system design.

Outside Professional Services

Actuary

- Cavanaugh Macdonald Consulting, LLC

Auditor

- Eide Bailly, LLP

Governmental Consultant

- Gamble & Schlemeier, Ltd.

Legal Counsel

- Ice Miller, LLP
- Thompson Coburn, LLP

Information Technology Consultants

- Avtex
- Huber & Associates

Pension System Administration Consultants

- ICON Integration and Design, Inc.
- Linea Solutions
- Tegrity

Risk Management Consultant

- Charlesworth & Associates, LLC

Third-Party Administrators

- MissionSquare Retirement
Deferred Compensation Plan
- The Standard Insurance Company
Life Insurance & Long-Term Disability Insurance
- TIAA
Colleges & Universities Retirement Plan

Investment Management Consultants

- Blackstone Alternative Asset Management, LP
Specialty Consultant - Hedge Funds
- Meketa Investment Group
Specialty Consultant - Public Markets
- NEPC, LLC
Specialty Consultant - Private Markets
- Verus Advisory, Inc.
Board Investment Consultant

Master Custodian

- Bank of New York Mellon

Business Bank

- Central Bank

The Schedule of Fees and Commissions can be found on page 72. Investment management, custodial and consulting fees can be found in the Schedule of Investment Expenses on pages 60-61. Additional information on investment managers can also be found in the Investment Section of this report.



FINANCIAL SECTION

Financial Statement

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

MOSERS



Independent Auditor's Report

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

Report on the Audit of the Financial Statements

Opinions

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

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

Basis for Opinion

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

Responsibilities of Management for the Financial Statements

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

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Auditor's Responsibilities for the Audit of the Financial Statements

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

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

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of MOSERS' internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.

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

Required Supplementary Information

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

Supplementary Information

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

Other Information

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

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

Other Reporting Required by Government Auditing Standards

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



Boise, Idaho

October 14, 2022

Management's Discussion and Analysis

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

Using This Financial Report

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

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

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

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

Funding Analysis

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

Funding Methodology for Determining Contribution Rates

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

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

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

Financial Reporting Methodology required by GASB Statement 67

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

Financial Reporting Highlights

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

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

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

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

Summary Comparative Statements of Fiduciary Net Position

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

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

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

Summary Comparative Statements of Changes in Fiduciary Net Position

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

Investment Results

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

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

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

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

Contribution Revenue

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

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

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

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

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

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

Benefits Expenses

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

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

Administrative Expenses

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

Requests for Information

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

Statements of Fiduciary Net Position

As of June 30, 2022

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

See accompanying Notes to the Basic Financial Statements.

Statements of Changes in Fiduciary Net Position

For the Year Ended June 30, 2022

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

See accompanying *Notes to the Basic Financial Statements*.

Notes to the Basic Financial Statements

Note 1 – Plan Descriptions and Contribution Information

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

Missouri State Employees' Plan (MSEP)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MSEP (closed plan)

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

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

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

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

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

MSEP 2000

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

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

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

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

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

MSEP 2011 Tier

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

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

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

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

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

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

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

Judicial Plan

The Judicial Plan is a single-employer, defined benefit public employee retirement plan administered in accordance with Sections 476.445 to 476.690, RSMo. Responsibility for the operation and administration of the Judicial Plan is vested in the MOSERS Board of Trustees. Due to the nature of MOSERS’ reliance on funding from the state of Missouri and the overall control of the plan document by the legislative and executive branches of state government, the Judicial Plan is considered a pension trust fund of the state of Missouri financial reporting entity and is included in the state’s financial reports as a pension trust fund.

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

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

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

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

Judicial Plan (closed plan)

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

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

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

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

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

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

Judicial Plan 2011 Tier

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

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

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

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

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

Administrative Law Judges and Legal Advisors' Plan

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

Missouri State Insured Defined Benefit Insurance Plan

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

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

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

State of Missouri Deferred Compensation Plan (MO Deferred Comp)

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

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

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

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

Colleges & Universities Retirement Plan (CURP)

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

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

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

Note 2 – Summary of Significant Accounting Policies

Basis of Accounting

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

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

Estimates

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

Method Used to Value Investments

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

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

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

Capital & Intangible Assets

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

Adoption of Accounting Standards

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

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

Note 3 – Cash and Investments

Cash Deposits with Financial Institutions

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

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

Investment Policy

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

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

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

Schedule of Internally Managed Leverage

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

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate rates of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future rates of return by the target asset allocation percentage and by adjusting for expected inflation, volatility, and correlations. Best estimates of the real rates of return for each major asset class included in MOSERS' target asset allocation as of June 30, 2022, are summarized in the table below.

Target Asset Allocation

Asset Class	Policy Allocation	Long-Term Expected Nominal Return*	Long-Term Expected Real Return	Weighted Average Long-Term Expected Nominal Return
Global public equities	30.0%	7.7%	5.8%	2.3%
Global private equities	15.0	9.3	7.4	1.4
Long treasuries	25.0	3.5	1.6	0.9
Core bonds	10.0	3.1	1.2	0.3
Commodities	5.0	5.5	3.6	0.3
TIPS	25.0	2.7	0.8	0.7
Private real assets	5.0	7.1	5.2	0.3
Public real assets	5.0	7.7	5.8	0.4
Hedge funds	5.0	4.8	2.9	0.2
Alternative beta	10.0	5.3	3.4	0.5
Private credit	5.0	9.5	7.6	0.5
Cash and cash equivalents**	(40.0)	0.0	0.0	0.0
	<u>100.0%</u>			
			Correlation/volatility adjustment	(0.6)
			Long-term expected net nominal return	7.2
			Less: investment inflation assumption	(1.9)
			Long-term expected geometric net real return	<u>5.3 %</u>

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

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

Money-Weighted Rate of Return

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

Fair Value Measurement

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

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

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

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

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

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

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

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

Investments and Derivative Instruments Measured at Fair Value

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

Investments Measured at the Net Asset Value

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

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

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

Credit Risk

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

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

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

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

Average Credit Quality and Exposure Levels of Nongovernment Guaranteed Securities

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

Ratings Dispersion Detail - Fair Value

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

Interest Rate Risk

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

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

Effective Duration of Fixed Income Assets by Security Type

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

Effective Duration Analysis of U.S. Treasuries

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

Repurchase Agreements

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

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

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

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

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

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

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

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

Tri-Party Repurchase Agreements by Collateral Type

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

Reverse Repurchase Agreements by Collateral Type

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

Foreign Currency Risk

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

Currency Exposures by Asset Class

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

Derivatives

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

Futures Contracts

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

Swap Contracts

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

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

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

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

Securities Lending Program

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

There was no securities lending activity in fiscal year 2022.

Note 4 – Capital Assets

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

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

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

Capital Assets

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

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

Right-to-Use Assets

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

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

Schedule of Minimum Lease Commitments

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

Note 5 – Employers’ Net Pension Liability

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

Schedule of Employers’ Net Pension Liability

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

An actuarial valuation of an ongoing plan involves estimates of the reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality, and future salary increases. Amounts determined regarding the net pension liability are subject to continual revision as actual results are compared with past expectations and new estimates are made about the future. The *Schedule of Changes in Employers’ Net Pension Liability* presents multi-year trend information about whether the plan fiduciary net positions are increasing or decreasing over time relative to the total pension liability. These schedules are presented in the *Required Supplementary Information*. The total pension liability, as of June 30, 2022, is \$15,408,995,032 for MSEP and \$630,043,013 for the Judicial Plan based on an actuarial valuation performed as of June 30, 2022, and a measurement date of June 30, 2022, using generally accepted actuarial procedures.

Actuarial Assumptions Used to Determine Net Pension Liability

An actuarial experience study covering the five-year period ended June 30, 2020, was performed in 2021. A summary of the assumptions used to calculate the net pension liability is contained in the table below.

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

Valuation date	June 30, 2022
Actuarial cost method	Entry Age Normal
Asset valuation method	Market value
Investment rate of return, net of investment expense	6.95 %
Projected salary increases	2.75 – 10.00% (MSEP) 3.00% (Judicial Plan)
Rate of payroll growth	2.25 %
COLAs	4% or 1.80% *
Price inflation	2.25%

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

Mortality Rates - MSEP

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

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

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

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

Mortality Rates - Judicial Plan

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

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

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

Discount Rate

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

The table below presents the net pension liability of the plans, as of June 30, 2022, calculated using the discount rate of 6.95%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1% lower (5.95%) or 1% higher (7.95%) than the current rate.

Sensitivity of Net Pension Liability to Changes in the Discount Rate

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

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

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

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

Retiree Life Insurance

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

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

Long-Term Disability Insurance (LTD)

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

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

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

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

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

Benefits

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

Contributions

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

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

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

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

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

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

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

Year Ending June 30

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

Actuarial Assumptions

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

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

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

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

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

Change in Assumptions and Methods Since Prior Valuation

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

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

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

Sensitivity to Changes in the Health Care Cost Trend Rates

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

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

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

Discount Rate

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

Sensitivity to Changes in the MCHCP Discount Rate

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

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

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

Long-Term Expected Rate of Return

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

MCHCP's Long-Term Expected Rate of Return

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

Note 8 – Commitments

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

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

Note 9 – Contingencies

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

Note 10 – Risk Management

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

Schedule of Changes in Employers' Net Pension Liability - MSEP

For Years Ended June 30, 2014 – 2022*

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

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

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

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

For Years Ended June 30, 2014 – 2022*

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

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

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

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

For Years Ended June 30, 2014 – 2022*

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

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

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

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

For Years Ended June 30, 2014 – 2022*

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

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

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

Pension Trust Funds
Schedule of Employer Contributions
 Last Ten Fiscal Years

MSEP

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

Judicial Plan

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

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

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

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

Pension Trust Funds

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

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

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

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

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

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

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

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

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

MSEP & Judicial

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

Schedule of Proportionate Share of the Net OPEB Liability

For Years Ended June 30, 2018 – 2022*

State Retiree Welfare Benefit Trust

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

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

Schedule of Employer Contributions for OPEB

For Years Ended June 30, 2018 – 2022*

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

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

Schedules of Investment Expenses

For the Year Ended June 30, 2022

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

Schedule of Investment Expenses continued on following page.

Schedules of Investment Expenses (continued)

For the Year Ended June 30, 2022

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

Schedules of Internal Investment Activity Expenses

For the Year Ended June 30, 2022

Personnel services

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

Professional services

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

Communications

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

Facilities

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

Software and equipment

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

Education, meetings, and travel

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

General

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

Schedules of Administrative Expenses*For the Year Ended June 30, 2022*

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

Schedules of Professional Service Fees

For the Year Ended June 30, 2022

Professional Services

Operations administrative expenses

Actuarial services

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

Attorney services

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

Auditing services

Eide Bailly, LLP	67,124
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Consulting services

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

Investment administrative expenses

Attorney services

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

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

Capitalized professional service fees for the pension administration system

Consulting services

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



INVESTMENT SECTION

Investment Policy Statement

The MOSERS Board of Trustees maintains a solid governance structure through the establishment of policies such as the Governance Manual and Investment Policy Statement.



Chief Investment Officer's Report



PO Box 209, Jefferson City, MO 65102-0209
(573) 632-6100 • (800) 827-1063 | (573) 632-6103 (fax)
mosers@mosers.org (email)
Visit us at 907 Wildwood Drive or www.mosers.org

October 14, 2022

Dear Members,

Having just finished my first year as Chief Investment Officer at MOSERS, I am pleased to present the *Investment Section* of the *MOSERS Annual Comprehensive Financial Report* for the fiscal year ended June 30, 2022. Over the last year, the markets have taken us on a bit of a wild ride; however, you can rest assured that the portfolio is built to be able to withstand these kinds of markets as they seem to happen about every 10- to 15- years.

The total MOSERS' portfolio generated a time-weighted rate of return of -9.0% for the fiscal year ended June 30, 2022, net of all fees and expenses. While this result is certainly disappointing on a nominal basis, the portfolio actually exceeded our policy benchmark return expectations, as set by the Board, by about 1%, resulting in over \$96 million of value added to the fund this fiscal year and the portfolio totaled approximately \$8.4 billion in assets.

This year's performance was driven by several converging factors that put pressure on both the equity markets and the fixed income markets in a material way, which was somewhat unusual. The economic reopening in the previous fiscal year that resulted in historically high portfolio returns gave way to supply chain issues and future growth concerns.

At the same time, the world experienced unexpectedly high, and persistent, inflation. Specifically, the higher-than-expected U.S. inflation has caused the Federal Reserve to raise interest rates materially, with more increases expected into the new fiscal year, increasing the risk that the economy may slip into a meaningful recession.

As long-term investors, we recognize the importance of the portfolio diversification and of maintaining those allocations in the portfolio over the long run. Specifically, as opposed to last fiscal year when the growth portion of the portfolio was a high performer on a nominal basis, this year the portfolio was led by the absolute return and inflation hedge allocations of the portfolio. The absolute return portfolio returned 4.1%, outperforming its benchmark by 3.6%, the inflation hedge allocation also had positive performance returning 4.2% versus a benchmark return of 3.5%. Growth assets (which includes both public and private equity) returned a -12.8% which, while disappointing on a nominal basis, also outperformed its benchmark by approximately 1.2%.

Finally, and not unexpectedly given the rising interest rate environment, safe haven income assets did not fare well during the year, returning a negative 15.7%, but still beat its specific portfolio benchmark return of -16.3%.

While it has certainly been a tumultuous first year as CIO, I look forward to continuing work with our highly talented and experienced staff of investment professionals to continue providing secure reliable retirement benefits to all our plan members.

Sincerely,

TJ Carlson
Chief Investment Officer

Investment Policy Summary

The investment policy summary serves as a reference point for management of System assets and outlines MOSERS' investment philosophy and practices. Investments within this report are presented on the basis of fair value using a variety of sources such as appraisals, valuations of underlying companies and assets for limited partnerships and commingled funds, and through fair values obtained from the investment custodian.

The purpose of MOSERS' investment program is to ensure that MOSERS' members and beneficiaries receive their benefits at a reasonable and predictable cost to the employers. Plan assets may be invested, reinvested, and managed by MOSERS' investment staff or third-party investment managers, subject to the terms, conditions, and limitations provided by law and contracts, where applicable.

The MOSERS Board charged with the responsibility for investing the assets of the System in a manner consistent with fiduciary standards set forth in the prudent person rule, has adopted the following objectives and philosophies to guide all investment related decisions.

Investment Objectives

- Develop a Real Return Objective (RRO) intended to keep contribution rates at a reasonable level over long periods of time, absent changes in actuarial assumptions.
- Establish an asset allocation policy that is expected to meet the RRO, while minimizing the impact of the portfolio investments' volatility on the contribution rate.
- Maximize long-term investment returns by exposing plan assets to a prudent level of risk in order to support the goal of having sufficient funds available to meet projected benefit payment obligations.
- Monitor costs associated with the efficient implementation of the asset allocation policy through the use of internal and external resources.

Investment Philosophy

- A key risk to the portfolio is asset shortfall where assets are insufficient to meet promised benefit obligations. As a result, the Board will strive to minimize the potential for long-term impact from disproportionate drawdowns.
- MOSERS is willing to take measured risks for which it expects to be compensated, and will seek to avoid risks, which may not be appropriately rewarded.
- The Board will employ a disciplined, objective, and quantitatively-driven asset/liability analysis process with the goal of determining the optimal asset allocation policy to meet the investment objectives.
- In order to meet the RRO, it is necessary for the portfolio to maintain a significant allocation to growth (i.e., equity) assets. As a result, equity risk is expected to be the key contributor to the overall risk of the portfolio's investments (Total Fund). In recognition of this, the Board's asset allocation policy will seek to mitigate the risk from large equity market declines.
- Strategic asset allocation is a significant factor influencing long-term investment performance and asset volatility. The asset allocation targets, determined by the Board, will be adhered to through clearly defined rebalancing guidelines.
- The Board will seek to cause the total fund to be broadly diversified and risk-balanced in view of the fact that not all strategies will add value at all times, which should mitigate the impact of negative market environments over its long-term investment horizon.
- Risk management and performance benchmarking are integral to the investment program. The Board will establish and regularly monitor appropriate absolute and relative return risk as well as other key risks that affect the total fund.
- The Board will employ industry-accepted benchmarks for all major asset classes, using published market indices where feasible.
- Costs meaningfully impact investment returns and will be a consideration in all investment program decisions. Investment performance shall be reported net of fees to incorporate the full impact of fees and costs.

Roles and Responsibilities

Board of Trustees

The Board bears the ultimate fiduciary responsibility for the investment of System assets. Members of the Board must adhere to state law and prudent standards of diligence with respect to their duties as investment fiduciaries. Accordingly, they are required to discharge their duties in the interest of plan participants. They must also “act with the same care, skill, prudence, and diligence under prevailing circumstances that a prudent person, acting in a similar capacity and familiar with those matters, would use in the conduct of a similar enterprise with similar aims.”¹ Specifically related to investments, the Board is responsible for prudent oversight, governance, and management of the System’s assets.

Executive Director

The executive director is appointed by, and serves at the pleasure of, the Board. Pursuant to its authority to delegate functions to employees of the System under Section 104.1069, RSMo, the Board of Trustees has delegated to the executive director the responsibility to manage the staff that oversees and executes MOSERS’ investment program. The executive director selects, evaluates, and terminates the chief investment officer and is responsible for monitoring the investment program compliance, as established by policies set forth by the Board.

Chief Investment Officer (CIO) and Internal Staff

The CIO serves at the pleasure of the executive director and has primary responsibility for the overall direction of the investment program. The CIO works with the Board investment consultant and executive director in advising the Board on policies related to the investment program. The CIO has primary responsibility to make hiring and termination decisions related to money managers with the approval of the staff investment consultant. The CIO is also charged with the responsibility of making strategic allocation decisions within parameters established by Board policy. Other responsibilities of the CIO include monitoring the investment of System assets, oversight of external money managers and the internally managed portfolios, and keeping the Board apprised of situations that merit their attention. The internal investment staff is accountable to the CIO.

External Consultants

The Board investment consultant serves at the pleasure of the Board. The Board investment consultant’s primary duty is to provide the Board with independent and objective investment advice and assist the Board in making decisions and overseeing the investment program. Specifically, the Board investment consultant assists the Board in developing investment policy, recommends asset allocation policy as requested by the Board, and assists the Board in oversight of the investment program.

Staff investment consultants serve at the pleasure of the CIO. The primary responsibilities of the staff investment consultants are to provide independent and objective investment advice to the staff. Among other duties, as applicable, each staff investment consultant agrees in writing to the CIO’s proposed hiring or termination of external investment management firms and third-party plan administrators.

Chief Auditor

The chief auditor reports directly to the executive director and if, in the opinion of the chief auditor circumstances warrant, may report directly to the Board. The chief auditor is independent of the System’s investment operations and, among other duties, is responsible for providing objective audit and review services for investment operations. It is the chief auditor’s objective to promote adequate and effective internal controls at a reasonable cost.

Master Custodian

BNY Mellon serves as the master custodian of the System’s assets except in cases where investments are held in partnerships, commingled accounts, or unique asset classes where it is impossible for them to do so. The master custodian is responsible for maintaining the official book of records, providing performance reports, and serving as an additional layer of risk control in the safekeeping of System assets.

¹ Section 105.688, RSMo - Investment Fiduciaries, Duties.

Asset Allocation

Determining the System's asset allocation is one of the most important decisions in the investment management process. The Board, with advice from the Board investment consultant and the CIO, adopted a new portfolio allocation in July 2018 that is designed to provide the highest probability of meeting or exceeding the System's investment objectives at a controlled level of risk and with liquidity that is acceptable to the Board. In determining the optimum mix of assets, the Board considers factors such as:

- The expected risk of each asset class.
- The expected rate of return for each asset class.
- The correlation between the rates of return of the asset classes.
- The investment objectives and risk constraints of the fund.
- The impact of the portfolio's volatility on the contribution rate.

While the Board maintains a set policy allocation mix, they have taken steps to provide flexibility by granting authority to the CIO to make strategic allocation decisions to capitalize on attractively valued opportunities within prudent risk constraints. This flexibility has allowed the System to take advantage of changing market conditions. The table below illustrates the policy asset allocation and ranges formally adopted by the Board for the new portfolio.

Asset Allocation

Asset Classes	Asset Allocation Policy	Asset Allocation Ranges ¹	Benchmark ²
Total growth	45%	35% - 55%	Blended
Global public equities	30%	15% - 45%	MSCI ACWI
Global private equities	15%	5% - 20%	Custom Private Equity Benchmark ³
Total income	35%	30% - 40%	Blended
Long treasuries	25%	20% - 30%	Bloomberg Long Treasury
Core bonds	10%	5% - 15%	Bloomberg Aggregate Bond
Total inflation hedge	40%	35% - 45%	Blended
Commodities	5%	0% - 10%	Bloomberg Commodity (BCOM)
TIPS	25%	20% - 30%	Bloomberg 1 - 10 yr TIPS
Private real assets	5%	0% - 10%	Custom Private Real Assets Benchmark ⁴
Public real assets	5%	0% - 10%	FTSE NAREIT
Total absolute return	20%	15% - 25%	Blended
Hedge funds	5%	0% - 10%	HFRI FoF: Conservative + 0.70%
Alternative beta	10%	5% - 15%	HFRX Macro/CTA
Private credit	5%	0% - 10%	S&P/LSTA U.S. Leveraged Loan + 2%

¹ The Board has granted the CIO the authority to operate within the risk allocation and policy asset allocation ranges.

² Benchmarks are net of MOSERS' actual leveraging costs on borrowed assets.

³ Custom Private Equity Benchmark is a weighted average rollup of the underlying manager benchmarks which include State Street Private Equity Buyout Index, MSCI ACWI Index, and Legacy Private Equity Returns.

⁴ Custom Private Real Assets Benchmark is a weighted average rollup of the underlying manager benchmarks which include NCREIF ODCE Index and FTSE NAREIT Index.

Rebalancing

It is the responsibility of staff to ensure that the asset allocation adheres to the System's rebalancing policy. MOSERS utilizes a combination of cash market and derivative transactions to maintain the total portfolio's allocation at the broad policy level. Reviews are conducted at least monthly to bring the portfolio back within allowable ranges of the broad policy targets.

Risk Controls

MOSERS' investment program faces numerous risks; however, the primary risk to MOSERS is that the assets will not support the liabilities over long periods of time. In order to control this risk and numerous other risks that face the System, the Board has taken the following steps, on an ongoing basis, to help protect the System:

- Actuarial valuations are performed each year to ensure the System is on track to meet the funding objectives of the plan. In addition, every five years an external audit of the actuary is conducted to ensure that the assumptions being made and calculation methods being utilized are resulting in properly computed liabilities.
- Asset/liability studies are conducted at least once every five years. The purpose of these studies is to ensure that the current portfolio design is structured to meet the System's liabilities. During these studies, investment expectations are also re-examined in more detail.
- An investment policy statement is in place to ensure that Board policies are clearly identified. Within these documents, desired outcomes are identified, responsibilities for individuals are identified in relation to particular areas of the portfolio's management, and details are provided for measuring outcomes. Reporting requirements are clearly identified to ensure appropriate checks and balances are in place. In addition, annual performance audits are conducted to ensure the performance measurement tools and methodologies being utilized are proper.

Performance Objectives and Monitoring Process

Generating a total nominal rate of return net of expenses of at least 6.95% is the primary performance objective for the total portfolio. This return objective is equal to the RRO plus expected inflation.

The reason for the long-term focus on this objective is to preclude the temptation to overreact to events in the marketplace that have no relevance in the management of the relationship between the System's assets and liabilities. The resulting dilemma is the conflicting need to evaluate investment policy implementation decisions over shorter time frames while maintaining the longer-term focus necessary to manage and measure the fund's performance relative to the RRO. To address this problem, the Board evaluates performance relative to policy benchmarks. This helps to evaluate the Board's broad policy decisions and the staff and external consultant's implementation decisions. Policy benchmarks measure broad investment opportunities of each sub-asset class in which MOSERS has chosen to invest. The difference between the policy benchmarks and the actual portfolio returns represent decisions made by the CIO to strategically deviate from the policy asset allocation for each sub-asset class.

The policy benchmarks are used in the following manner to evaluate Board and staff decisions:

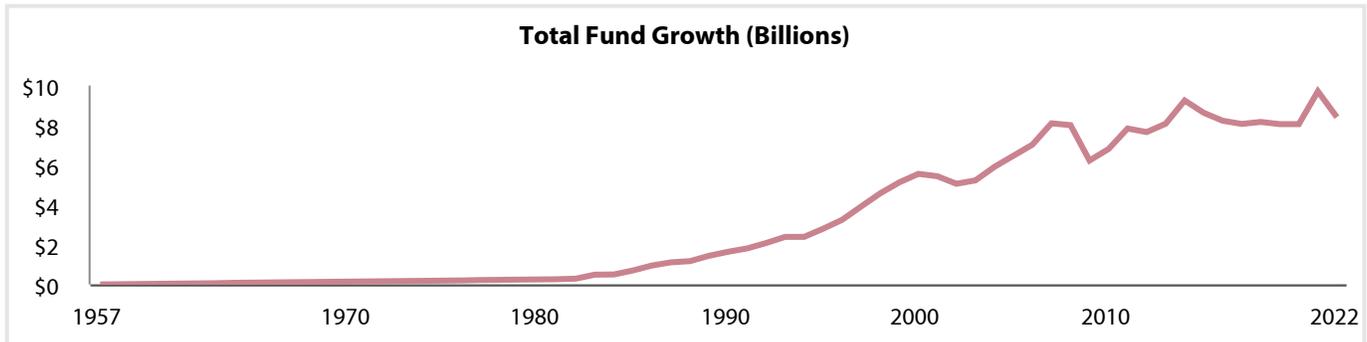
- **Board Decisions:** The value added through Board policy decisions is measured by the difference between the total fund policy benchmark return and the RRO. This difference captures the value added by the Board through their policy asset allocation decisions relative to the return necessary to fund the System's liabilities. A policy benchmark return greater than the RRO reflects the achievement of the RRO goals. A policy benchmark return less than the RRO reflects losses or shortfalls in performance in funding the liabilities. These policy decisions are measured over long periods of time.
- **CIO and External Consultants' Decisions:** There are two components to decisions made by the CIO and external consultants, which are monitored by the Board on an ongoing basis. They are: 1) strategic allocation decisions, and 2) implementation decisions.

Strategy decisions are made by the CIO to deviate from the policy benchmark weight. Implementation decisions are money manager selection choices made by the CIO with the agreement of the appropriate external consultant and the acknowledgement from the executive director that the decision was made in accordance with the Board's adopted policy. The value added through both strategic and implementation decisions is measured by the difference between the actual portfolio return and the policy benchmark return. An actual portfolio return greater than the policy benchmark return reflects value added through these decisions of the CIO and the external consultants. An actual portfolio return less than the policy benchmark return reflects losses to the fund's performance based upon these decisions. These CIO and external consultant decisions should be measured over all periods of time with a majority weight placed on outcomes that have occurred over a market cycle.

The Board reviews performance information on a quarterly basis to help ensure adequate monitoring of the fund's overall performance objectives.

Total Fund Review

As of June 30, 2022, the MOSERS investment portfolio had a fair value of \$8.4 billion. The graph below illustrates the growth of MOSERS’ portfolio since the System’s inception.



Investment Performance

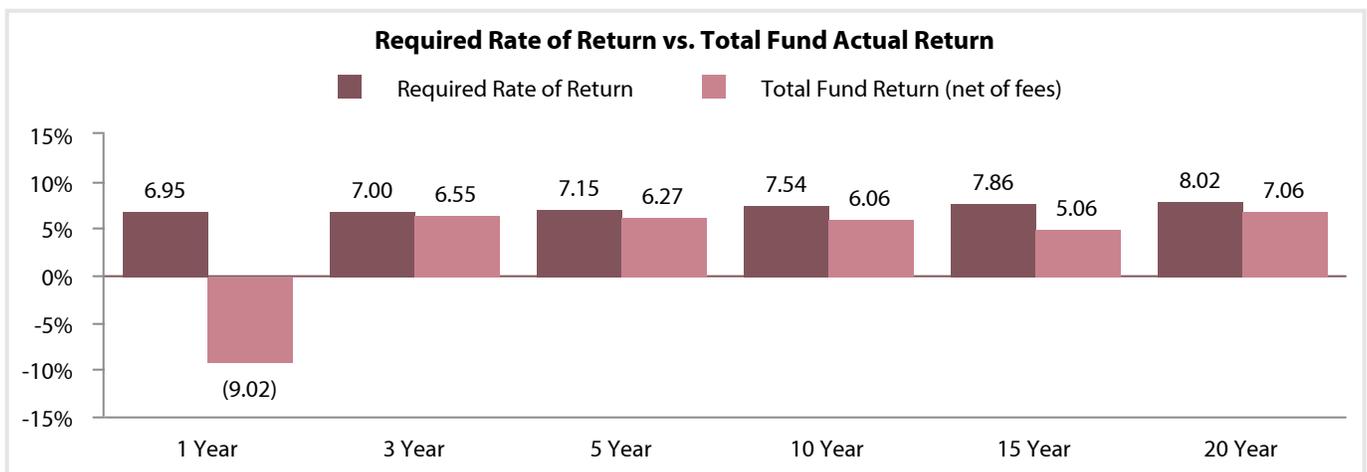
MOSERS’ investments generated a time-weighted return of (9.0)%¹, net of fees, for fiscal year 2022. The total fund return exceeded the 1-year policy benchmark of (10.0)%. This additional 1.0% investment return produced \$96.1 million in excess of what would have been earned if the fund had been invested passively in the policy benchmark.

Investment Performance vs. Required Rate of Return

The total fund investment return is compared to a required rate of return. The required rate of return is established by the Board to determine how well the fund is performing over the long term in order to meet future plan obligations after accounting for inflation. The required rate of return for fiscal year 2022 is 6.95%.

Given the volatility of the investment markets, the portfolio should not be expected to meet the required rate of return every year. A review of long periods of time is best to evaluate whether or not the total return has kept pace with the System’s funding objectives.

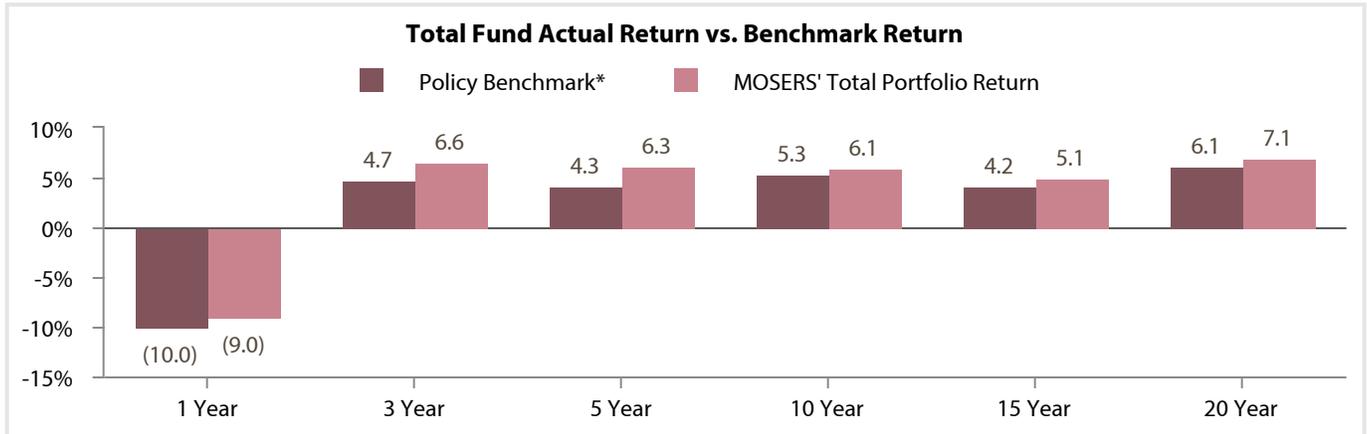
As indicated in the following bar chart, MOSERS’ investment returns trailed the required rate of return by 0.9% over the 20-year period ended June 30, 2022.¹



¹ Performance returns are calculated using a time-weighted rate of return on fair values.

Investment Performance vs. Benchmark Comparisons

In addition to measuring performance relative to the required rate of return, the Board also compares fund returns to the policy benchmark. Returns for the total fund versus policy benchmarks are displayed in the following bar chart.



** As of June 30, 2022, the total fund policy benchmark was comprised of the following components: 45% total growth policy, 35% total income policy, 40% total inflation hedge policy and 20% total absolute return policy.*

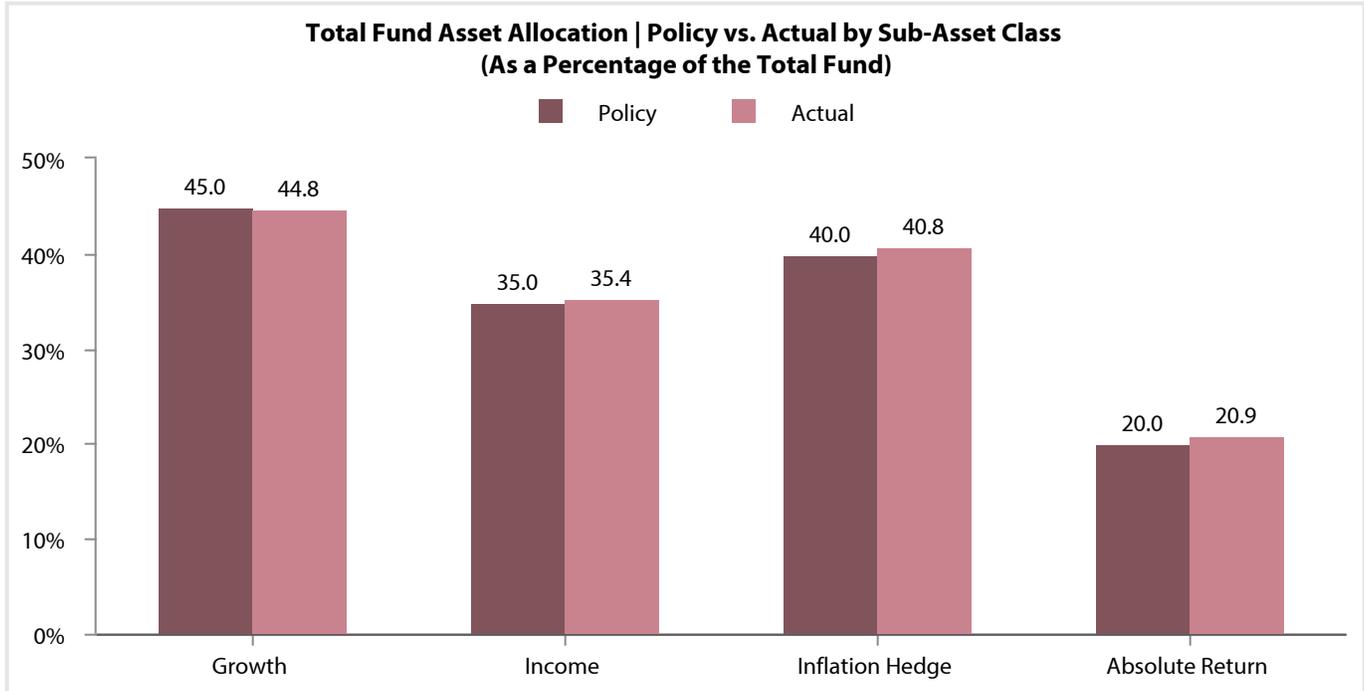
All policy return components are adjusted for financing costs associated with the program.

The policy benchmark provides an indication of the returns that could have been achieved (excluding transaction costs) by a portfolio invested in the designated benchmarks for each asset class at the percentage weights allocated to each asset class in MOSERS' policy asset allocation. Comparison of the total return to the policy benchmark reflects the total value added or detracted by the CIO through strategic and manager implementation decisions. Value is added when the total fund return exceeds the policy benchmark return. The total fund 1-, 3-, 5-, 10-, 15-, and 20-year actual performance outperformed its policy benchmark by 1.0%, 1.9%, 2.0%, 0.8%, 0.9%, and 1.0%, respectively.

Total Fund Policy Allocation Overview

As of June 30, 2022, the Board’s broad policy allocation mix was 45% growth assets, 35% income assets, 40% inflation assets, and 20% absolute return assets. The policy target, as of June 30, 2022, for each sub-asset class, along with the actual strategic allocation to each type of investment, is shown in the bar graph below.

The Board has granted authority to the CIO to make strategic decisions. A strategic decision should be thought of as any decision that might cause MOSERS’ actual portfolio to differ from the policy asset allocation.



Schedule of Fees and Commissions

	Commissions Paid	Volume of Trades*	Shares Traded
Barclays Capital LE, New York Total	\$ 1,057	\$ 10,364,204	251,114
BTIG LLC, New York Total	17,939	167,732,651	3,587,494
Credit Suisse, New York (CSUS) Total	2,877	1,812,351	(260)
Jefferies & Co Inc, New York Total	10,510	114,390,524	2,101,787
Morgan Stanley & Co Inc, NY Total	74,729	108,255,856	857,312
Total	\$ 107,112	\$ 402,555,586	6,797,447

* Volume does not include futures notional value

Schedule of Investment Portfolios by Asset Class

As of June 30, 2022

	Portfolio Value	Percentage of Portfolio	Market Exposure	Percentage of Investments at Market Exposure
Growth	\$ 3,575,947,876	42.6%	\$ 3,765,332,234	44.8%
Income	1,704,887,417	20.3	2,976,331,010	35.4
Inflation hedge	1,373,615,113	16.3	3,432,709,907	40.8
Absolute return	1,749,987,578	20.8	1,756,000,738	20.9
Total portfolio	8,404,437,984	100.0	11,930,373,889	141.9
Residual accounts	7,689,207	0.1	7,689,207	0.1
Cash reserve	112,988	0.0	112,988	0.0
MOSERS Total Fund	\$ 8,412,240,179	100.1%	\$ 11,938,176,084	141.9%
<i>Reconciliation to Statement of Fiduciary Net Position</i>				
Total fund value	\$ 8,412,240,179			
Obligations under repurchase agreements	3,685,255,407			
Receivable - investment income	(710,587,346)			
Receivable - investment sales	(242,623,699)			
Investment activities payable	963,396,890			
Management and incentive fee payable	1,316,367			
Payable for investments purchased	130,718,512			
Investments per <i>Statement of Fiduciary Net Position</i>	<u>\$ 12,239,716,310</u>			

Total Fund – Top Ten Publicly Traded Separate Account Holdings

Ten Largest Holdings as of June 30, 2022*	Fair Value	Percent of the Total Fund
U.S. Treasury Bond - 3.375% 2048	\$ 108,926,143	1.27%
U.S. Treasury Bond CPI Inflation - 0.125% 2023	101,669,568	1.21
U.S. Treasury Bond CPI Inflation - 0.625% 2024	97,021,067	1.15
U.S. Treasury Bond CPI Inflation - 0.375% 2025	87,200,444	1.04
U.S. Treasury Bond CPI Inflation - 0.125% 2031	83,536,377	0.99
U.S. Treasury Bond CPI Inflation - 0.125% 2024	83,502,290	0.99
U.S. Treasury Bond CPI Inflation - 0.125% 2025	79,729,345	0.95
U.S. Treasury Bond CPI Inflation - 0.375% 2031	79,715,576	0.95
U.S. Treasury Bond CPI Inflation - 0.375% 2027	78,756,353	0.94
U.S. Treasury Bond CPI Inflation - 0.125% 2026	78,182,889	0.93

* For a complete list of holdings, contact MOSERS.

Schedule of Investment Results

1-, 3-, 5-, 10-, 15-, and 20-Year Periods

Total fund – As of June 30, 2022, the total fund policy benchmark was comprised of the following components: 45% total growth policy, 35% total income policy, 40% total inflation hedge policy, and 20% total absolute return policy. This program did not begin until January 2019.

Growth – As of June 30, 2022, the total growth policy was 66.7% global public equities policy benchmark and 33.3% global private equities policy benchmark.

- Global public equities policy - As of June 30, 2022, the total global public equities policy was MSCI All Country World Index (ACWI).
- Global private equities policy - As of June 30, 2022, the global private equities policy benchmark was a blend of 56.8% MOSERS legacy private equity return/24.6% State Street Buyout Index (weighted by vintage year)/18.6% MSCI ACWI Index.

Income – As of June 30, 2022, the total income policy was 71.4% long treasury policy benchmark and 28.6% core bonds policy benchmark.

- Long treasuries - As of June 30, 2022, the long treasuries policy was Bloomberg Long Treasury Index.
- Core bonds - As of June 30, 2022, the core bonds policy was Bloomberg Aggregate Bond Index.

Inflation hedge – As of June 30, 2022, the total inflation hedge policy was 12.5% commodities policy benchmark, 62.5% TIPS policy benchmark, 12.5% private real assets policy benchmark, and 12.5% public real assets policy benchmark.

- Commodities - As of June 30, 2022, the commodities policy was Bloomberg Commodity Index (BCOM).
- Treasury inflation protected securities (TIPS) - As of June 30, 2022, the TIPS policy was the Bloomberg 1 - 10 year TIPS Index.
- Private real assets - As of June 30, 2022, the private real assets policy benchmark was a blend of 93.0% NCREIF Fund Index - Open End Diversified Core Equity (ODCE) and 7.0% FTSE NAREIT ALL REITS Index.
- Public real assets - As of June 30, 2022, the public real assets policy was FTSE NAREIT ALL REITS Index.

Absolute return – As of June 30, 2022, the absolute return policy benchmark was comprised of 25.0% direct hedge funds policy benchmark, 50.0% alternative beta - beta policy benchmark, and 25.0% private credit policy benchmark.

- Alternative beta - As of June 30, 2022, the alternative beta policy was HFRX Macro/CTA Index.
- Hedge funds - As of June 30, 2022, the hedge funds policy benchmark was the HFRI Fund of Funds: Conservative Index + 0.70%.
- Private credit - As of June 30, 2022, the private credit policy was S&P/LSTA US Leveraged Loan Index + 2%.

Schedule of Investment Results (continued)

	1 Year	3 Year	5 Year	10 Year	15 Year	20 Year
Total fund	(9.0)%	6.6%	6.3%	6.1%	5.1%	7.1%
<i>Total fund policy benchmark</i>	(10.0)%	4.7%	4.3%	5.3%	4.2%	6.1%
Growth	(12.7)%	7.2%	N/A	N/A	N/A	N/A
<i>Growth policy benchmark</i>	(11.6)%	9.4%	N/A	N/A	N/A	N/A
Global public equities	(14.8)%	5.2%	5.6%	8.5%	5.7%	8.1%
<i>Global public equities policy benchmark</i>	(15.6)%	6.3%	7.1%	8.9%	4.8%	7.1%
Global private equities	(8.8)%	10.8%	N/A	N/A	N/A	N/A
<i>Global private equities policy benchmark</i>	(6.2)%	15.0%	N/A	N/A	N/A	N/A
Income	(15.7)%	(2.4)%	N/A	N/A	N/A	N/A
<i>Income policy benchmark</i>	(16.3)%	(2.7)%	N/A	N/A	N/A	N/A
Long treasuries	(18.4)%	(3.1)%	(0.3)%	N/A	N/A	N/A
<i>Long treasuries policy benchmark</i>	(18.7)%	(3.6)%	(0.5)%	N/A	N/A	N/A
Core bonds	(8.7)%	(0.1)%	N/A	N/A	N/A	N/A
<i>Core bonds policy benchmark</i>	(10.3)%	(0.9)%	N/A	N/A	N/A	N/A
Inflation hedge	4.2%	6.1%	N/A	N/A	N/A	N/A
<i>Inflation hedge policy benchmark</i>	3.5%	5.5%	N/A	N/A	N/A	N/A
Commodities	23.7%	15.2%	9.2%	(3.4)%	(2.4)%	1.5%
<i>Commodities policy benchmark</i>	23.8%	13.6%	9.1%	(3.0)%	(3.8)%	0.2%
Inflation-indexed bonds	(2.2)%	2.6%	2.0%	0.9%	3.4%	4.4%
<i>Inflation-indexed bonds policy benchmark</i>	(2.3)%	2.5%	2.2%	1.1%	3.5%	4.4%
Private real assets	30.3%	12.2%	N/A	N/A	N/A	N/A
<i>Private real assets policy benchmark</i>	23.1%	11.4%	N/A	N/A	N/A	N/A
Public real assets	(6.9)%	4.5%	N/A	N/A	N/A	N/A
<i>Public real assets policy benchmark</i>	(6.9)%	4.6%	N/A	N/A	N/A	N/A
Absolute return	4.1%	4.6%	N/A	N/A	N/A	N/A
<i>Absolute return policy benchmark</i>	0.5%	4.7%	N/A	N/A	N/A	N/A
Hedge funds	5.4%	7.8%	N/A	N/A	N/A	N/A
<i>Hedge funds policy benchmark</i>	0.8%	8.6%	N/A	N/A	N/A	N/A
Alternative beta	5.1%	2.9%	0.8%	N/A	N/A	N/A
<i>Alternative beta policy benchmark</i>	0.9%	(0.9)%	(4.7)%	N/A	N/A	N/A
Private credit	1.1%	5.3%	N/A	N/A	N/A	N/A
<i>Private credit policy benchmark</i>	(0.8)%	4.1%	N/A	N/A	N/A	N/A

Results are based on time-weighted rates of return on fair values adjusted for cash flows. Where applicable, benchmarks are calculated net of financing costs.

Broad asset allocations (Growth, Income, Inflation Hedge, and Absolute Return) were established with the asset allocation adopted by the Board in 2018. Therefore, 5-, 10-, 15-, and 20-Year returns are not available yet as of June 30, 2022.

Schedule of Investment Manager Fees

For the Year Ended June 30, 2022

	Portfolio Fair Value	Total Fees	Manager Fees	Fund Pass Through Expenses *	Incentive Fees Earned
Equity					
Artisan Partners	309,941,458	2,219,334	2,172,774	46,560	0
Baillie Gifford Intl. Alpha Private Equity	262,519,295	1,596,657	1,298,668	297,989	0
Baillie Gifford EM Private Equity	97,900,039	880,058	716,818	163,240	0
NS Partners	173,683,162	1,229,534	966,163	263,371	0
Silchester International Investors	365,988,012	2,294,675	2,294,675	0	0
Total equity	1,210,031,966	8,220,258	7,449,098	771,160	0
Multi-asset					
Blackrock	666,665,295	1,228,522	752,417	476,105	0
NISA Investment Advisors	922,149,010	5,435,768	5,435,768	0	0
Total multi-asset	1,588,814,305	6,664,290	6,188,185	476,105	0
Alternatives					
Aberdeen Standard Investments	488,422,025	1,775,880	704,840	1,071,040	0
Aberdeen Davi Alpha	202,666,409	1,090,833	601,798	489,035	0
Actis Emerging Markets 3	742,000	453,000	0	453,000	0
Actis Emerging Markets 4	26,854,616	2,622,000	534,000	25,000	2,063,000
AQR DELTA Sapphire Fund, LP	998,587	0	0	0	0
Axiom Asia Private Capital Fund II, LP	20,151,294	428,737	186,536	29,056	213,145
Axiom Asia Private Capital Fund III, LP	73,627,639	(3,012,517)	319,848	33,902	(3,366,267)
Axiom Asia Fund 6, LP	16,126,524	658,987	500,000	130,923	28,064
Axxon Brazil Private Equity Fund II B, LP	9,248,627	202,544	143,126	59,418	0
Blackstone Real Estate Partners IV	1,003,157	287,552	0	25,961	261,591
Blackstone Real Estate Partners V	115,996	562,982	0	30,560	532,422
Blackstone Real Estate Partners VI	2,084,106	152,809	0	16,268	136,541
Blackstone Real Estate Partners VII	17,693,319	3,270,903	345,182	506,944	2,418,777
Blackstone Topaz Fund, LP	368,748,580	5,335,702	2,531,945	311,218	2,492,539
Blackstone Topaz Private Credit	203,737,655	2,218,721	1,460,487	180,396	577,838
Brevan Howard Alpha	220,870,384	16,254,108	1,976,420	(1,227,093)	15,504,781
CarVal Investors CVI Global Value Fund A, LP - Private Debt	3,283	3,334	0	3,334	0
CarVal Investors CVI Global Value Fund A, LP - Real Estate	3,283	3,334	0	3,334	0
Catalyst Fund Limited Partnership III	14,064,880	317,018	261,284	55,734	0
Catalyst Fund Limited Partnership IV	2,915,397	91,106	65,277	25,829	0
Catalyst Fund Limited Partnership V	71,369,404	2,324,632	2,003,300	321,332	0
CBRE	172,534,564	1,167,090	872,567	124,083	170,440
Centiva Capital	128,429,903	3,732,313	0	923,385	2,808,928
Cornwall Domestic, LP	2,480,407	68,153	0	68,153	0
DRI Capital - LSRC	336,180	87,648	0	87,648	0
EIG Energy Fund XIV, LP	1,872,101	225,440	0	225,440	0
EIG Energy Fund XV, LP	8,475,183	316,423	121,497	194,926	0
EIG Energy Fund XVI, LP	25,747,409	330,993	267,548	63,445	0
EIG Co-Investment	632,679	56,614	0	56,614	0

Schedule of Investment Manager Fees continued on following page

Schedule of Investment Manager Fees (continued)

For the Year Ended June 30, 2022

	Portfolio Fair Value	Total Fees	Manager Fees	Fund Pass Through Expenses*	Incentive Fees Earned
Eilser Capital Fund	\$ 208,516,385	\$ 2,692,405	\$ 1,739,820	\$ 2,088,244	\$ (1,135,659)
Elliott International Limited	250,833,000	17,772,796	4,420,763	2,357,074	10,994,959
Exodus Point Partners Fund	150,592,168	10,521,504	0	3,476,368	7,045,136
Farallon Capital Institutional Partners, LP	712,592	248	0	0	248
Gateway Energy & Resource Holdings, LLC	3,820,821	43,752	0	43,752	0
Global Forest Partners GTI7 Institutional Investors Company, Ltd.	445,499	2,915	2,282	633	0
Gryphon Investors, Inc.	50,196,123	4,463,564	1,762,728	2,050,204	650,632
HBK Merger Strategies Offshore Fund, Ltd.	158,140,876	3,975,261	1,149,422	274,723	2,551,116
JLL Partners Fund V, LP	3,650,196	156,983	0	6,852	150,131
JLL Partners Fund VI, LP	1,511,580	1,292,165	0	18,266	1,273,899
King Street Capital, LP	1,435,474	125,034	26,302	0	98,732
LaSalle Property Fund	89,865,481	732,713	687,340	45,373	0
Linden Capital Partners II, LP	14,503,389	2,458,410	0	2,361	2,456,049
Merit Energy Partners F-II, LP	1,688,512	16,897	15,167	1,730	0
MHR Institutional Partners IIA, LP	10,718,647	(1,144,782)	0	32,575	(1,177,357)
MHR Institutional Partners III, LP	16,447,072	37,684	0	37,684	0
MHR Institutional Partners IV, LP	53,821,568	2,594,345	808,643	155,539	1,630,163
Millennium USA LP	36,076,601	1,076,119	0	809,784	266,335
Millennium Technology Value Partners II	17,903,276	419,440	287,864	38,014	93,562
OCM Opportunities Fund VIIIb, LP	49,254	2,242	0	2,837	(595)
OCM Opportunities Fund VIIIb, LP	9,619,292	154,395	143,030	11,365	0
OCM Power Opportunities Fund III, LP	455,156	(123,435)	1,198	12,998	(137,631)
Partners Group Holding AG	69,759,475	5,892,539	3,534,496	411,924	1,946,119
Pharo Macro Fund, LTD	0	852,877	829,863	23,014	0
Portfolio Advisors Secondary Fund IV, LP	129,059,056	813,849	681,464	132,385	0
Silver Creek Special Opportunities Fund I, LP	3,436,149	29,599	0	29,599	0
Silver Creek Special Opportunities Fund II, LP	6,173,918	36,475	0	36,475	0
Silver Lake Partners II, LP	0	(3,501)	0	779	(4,280)
Standard Investment Research Hedged Equity Fund	162,802,970	5,303,158	2,917,625	195,132	2,190,401
Stockbridge Core & Value Advisors, LLC	57,003,941	14,459	14,459	0	0
TA Realty Core Property Fund, LP	98,294,201	631,354	508,600	122,754	0
Thomas H. Lee Partners LP	10,639,118	2,812,785	1,736,059	907,149	169,577
Voleon Institutional Strategies Fund LP	58,015,287	2,447,071	1,111,301	336,805	998,965
Voleon Investors Fund LP	18,564,433	763,623	362,976	110,085	290,562
Total alternatives	3,776,707,101	107,891,282	35,637,057	18,061,362	54,192,863
Total fees	\$ 6,575,553,372	\$122,775,830	\$ 49,274,340	\$ 19,308,627	\$ 54,192,863

* Fund pass through expenses are administrative expenses charged to the fund and paid by the limited partners (including MOSERS), in addition to the management fee. These expenses may include, but are not limited to, accounting, audit, legal, and custody expenses directly related to the administration of the underlying fund investments.

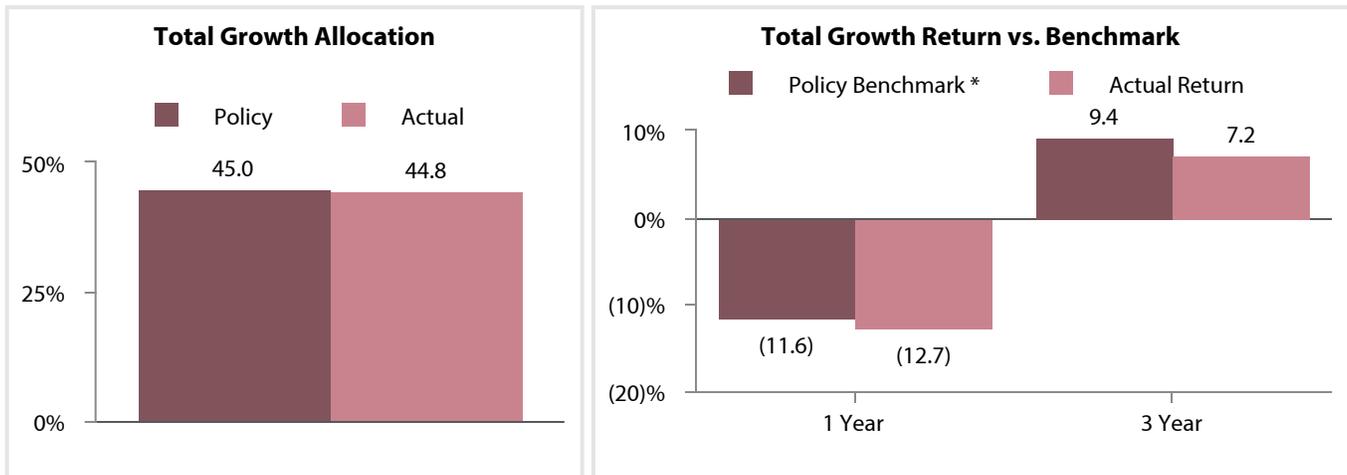
Asset Class Summary

The portfolio consists of four broad investment allocations: growth, income, inflation hedge, and absolute return. Each of these allocations are made up of a number of different asset classes. Two of the four allocations had positive performance during the fiscal year. The growth allocation was (12.7)%, and the income allocation returned (15.7)%. The inflation hedge allocation was 4.2% and the absolute return allocation returned 4.1%.

Growth Allocation

The growth allocation is designed to provide capital appreciation by accessing both an equity-risk premium and a liquidity risk premium. In addition, it is expected that investments in this category would perform well in periods of rising economic growth. Investments in this allocation include U.S. and non-U.S. equity investments with varying characteristics related to market capitalization and investment style. Because of the non-U.S. nature of some of these investments, this allocation is subject to foreign currency exposure. The growth allocation is made up of global public equities and global private equities.

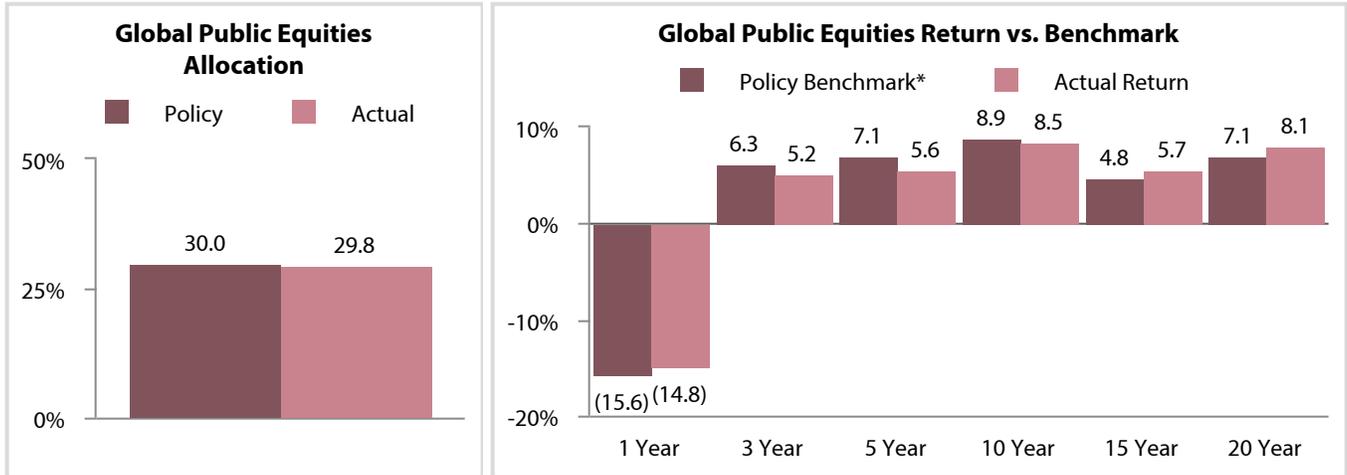
The market exposure of the growth allocation on June 30, 2022, was \$3.77 billion, representing 44.8% of total market value of the portfolio. The bar chart below (left) illustrates the actual exposure compared to policy. For the fiscal year, the growth allocation returned (12.7)% versus (11.6)% for the policy benchmark. This underperformance was the result of manager implementation that underperformed the benchmark. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.



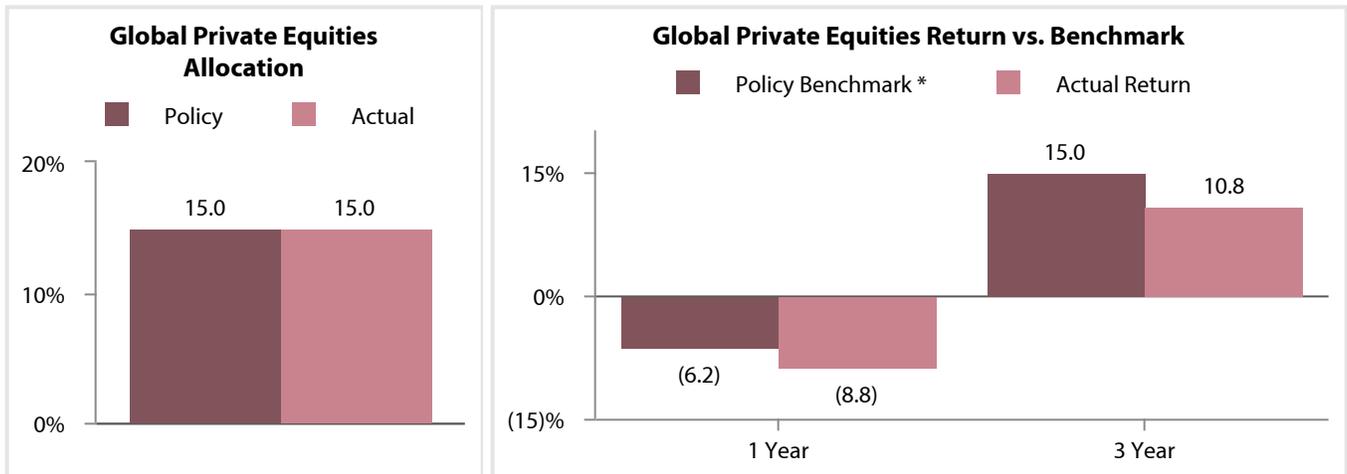
* As of June 30, 2022, the total growth policy benchmark was comprised of 66.7% global public equities policy benchmark and 33.3% global private equities policy benchmark.

Investment Section

For the fiscal year, public equities returned (14.8)% versus (15.6)% for the policy benchmark. This outperformance was the result of manager implementation that outperformed the benchmark. Private equities, for the fiscal year, returned (8.8)% compared to its policy benchmark return of (6.2)%. This underperformance was the result of manager implementation that underperformed the benchmark.



* As of June 30, 2022, the global public equities policy benchmark was MSCI All Country World Index (ACWI).

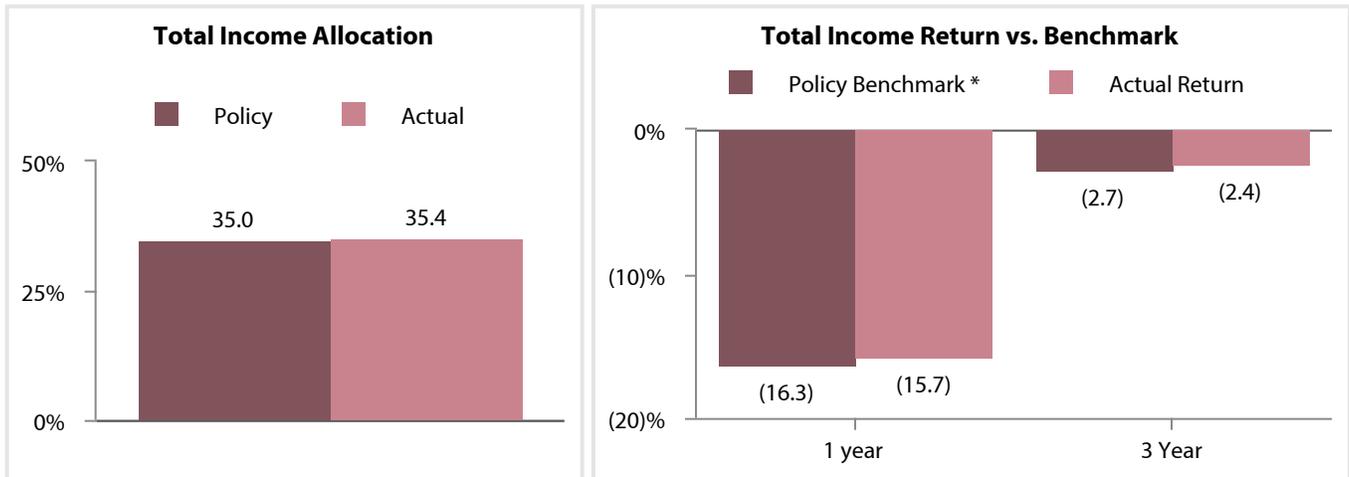


* As of June 30, 2022, the global private equities policy benchmark was a blend of 56.8% MOSERS legacy private equity return/ 24.6% State Street Buyout Index (weighted by vintage year)/ 18.6% MSCI ACWI Index.

Income Allocation

This allocation is designed to provide a source of current income and to reduce overall fund volatility. It is expected that investments in this asset class will perform well in periods of stable or falling economic growth and falling inflation. Investments in this asset class include U.S. bonds that have been issued, collateralized, or guaranteed by the U.S. Government, its agencies, or its instrumentalities. Core bonds may also include debt issued by corporations, or securitized debt. Because this asset class is invested in all U.S. bonds, there is currently not any foreign currency exposure as part of this allocation.

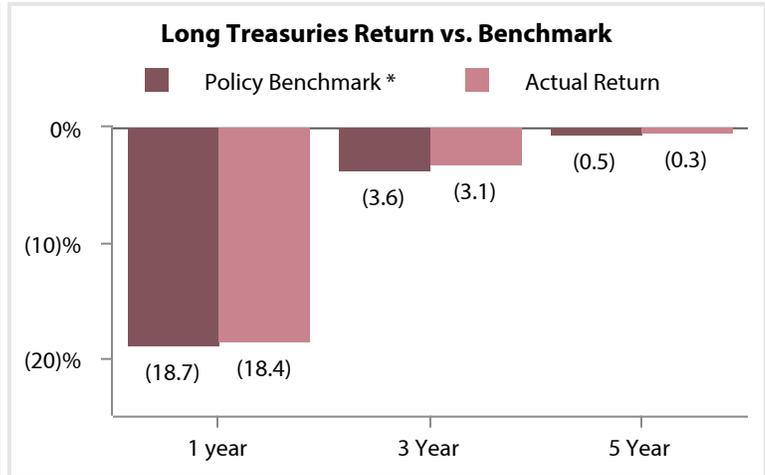
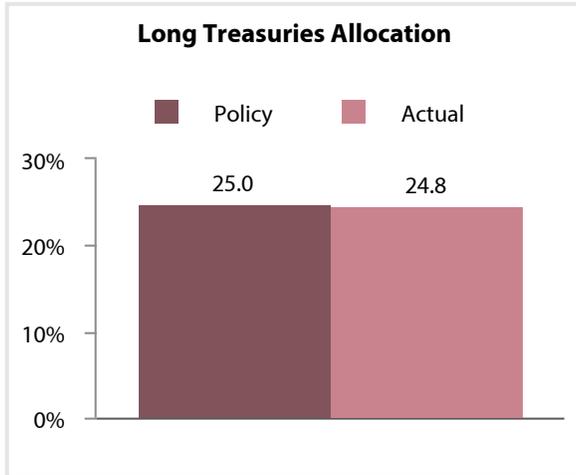
As of June 30, 2022, the market exposure of the income allocation was \$2.98 billion, representing 35.4% of total market value of the portfolio. The bar chart below (left) illustrates the actual exposure compared to policy. For the fiscal year, the income allocation returned (15.7)% as compared to (16.3)% for the income allocation policy benchmark. The outperformance was mainly driven by core bonds that outperformed the policy benchmark by 1.6%. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.



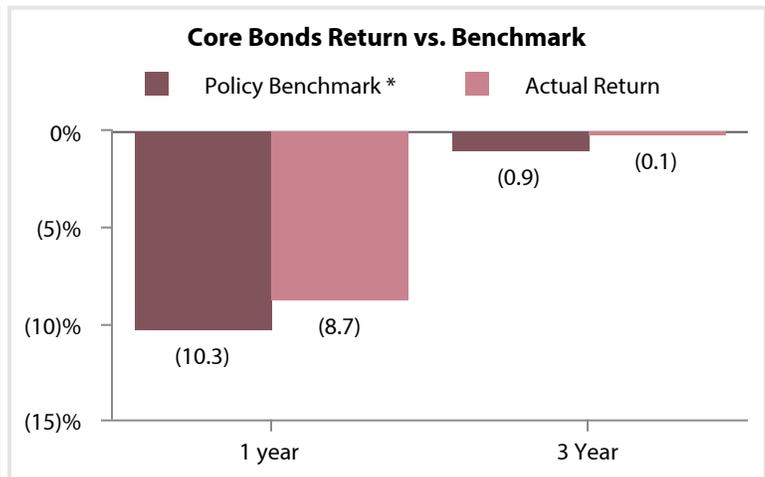
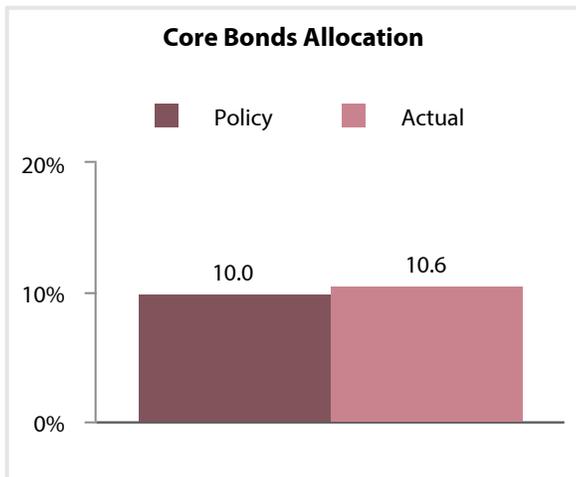
* As of June 30, 2022, the total income policy benchmark was comprised of 71.4% long treasury policy benchmark and 28.6% core bonds policy benchmark.

Investment Section

For the fiscal year, long treasuries returned (18.4)% versus (18.7)% for the policy benchmark. The exposure to long treasuries is gained passively with minimal tracking error. Core bonds, for the fiscal year, returned (8.7)% compared to its policy benchmark return of (10.3)%. This outperformance was the result of manager implementation that outperformed the benchmark.



* As of June 30, 2022, the long treasuries policy benchmark was Bloomberg Long Treasury Index.

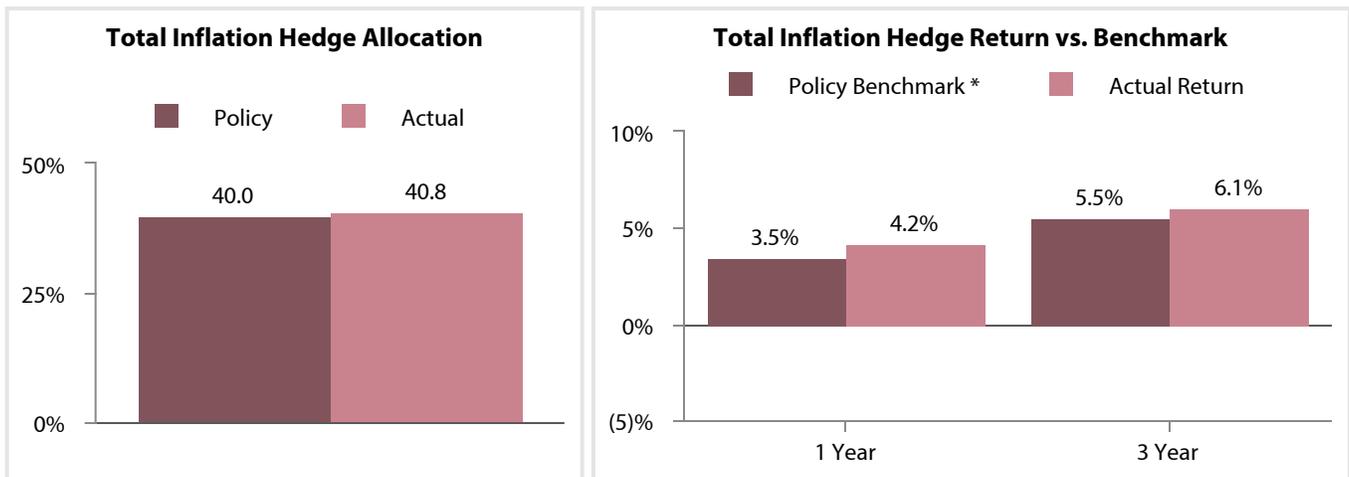


* As of June 30, 2022, the core bonds strategy benchmark was Bloomberg Aggregate Bond Index.

Inflation Hedge Allocation

It is expected that investments in this asset class will perform well during periods of rising inflation. Investments in this asset class include U.S. Government treasury inflation protected securities (TIPS), commodities, private real assets, and public real assets. TIPS are designed to provide a source of current income and protect against actual inflation. It is expected that investments in this asset class will perform well during periods of falling economic growth and rising inflation. Commodities are designed to provide protection from an unexpected rise in inflation. In addition, it is expected that investments in this category would perform well in periods of rising economic growth. Private real assets are designed to provide capital appreciation and income and provide access to a form of equity-risk premium and liquidity risk premium. It is expected that investments in this category would perform well in periods of rising economic growth and rising inflation. Public real assets are designed to provide capital appreciation and income and provide access to a form of equity risk premium. In addition, it is expected that investments in this category would perform well in periods of rising economic growth and rising inflation. Because this asset class is invested primarily in U.S. denominated assets, there is not expected to be meaningful foreign currency exposure as part of this allocation.

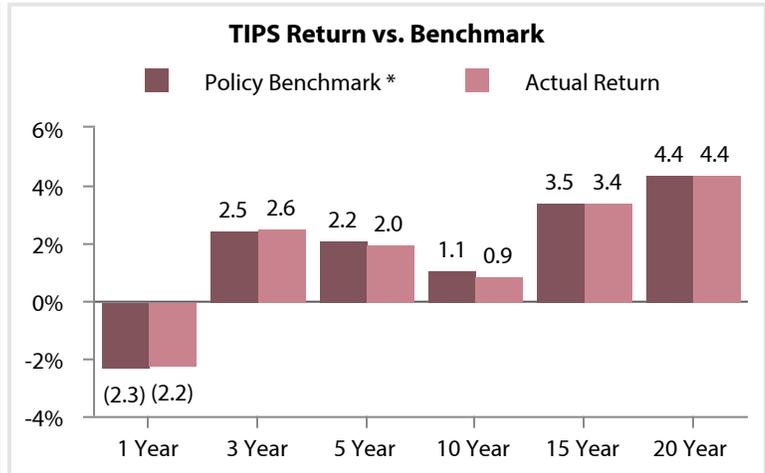
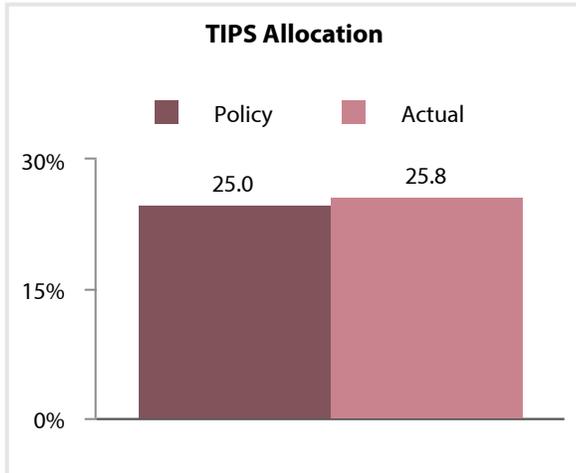
As of June 30, 2022, the market exposure of the inflation hedge allocation was \$3.43 billion representing 40.8% of total market value of the portfolio. The bar chart below (left) illustrates the actual exposure compared to policy. For the fiscal year, the inflation hedge allocation returned 4.2% versus 3.5% for the policy benchmark. The outperformance was mainly driven by private real assets that outperformed the policy benchmark by 7.2%. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.



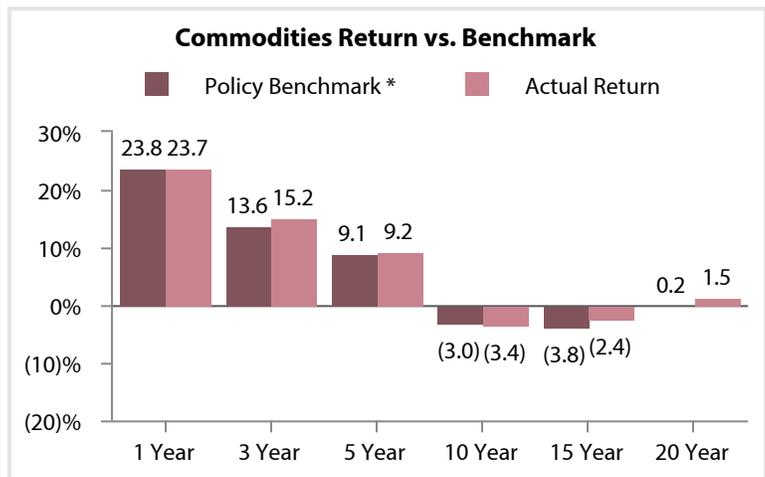
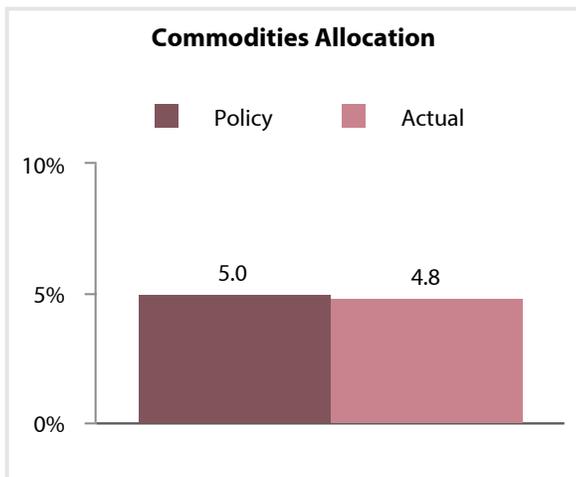
* As of June 30, 2022, 12.5% commodities policy benchmark, 62.5% TIPS policy benchmark, 12.5% private real assets policy benchmark, and 12.5% public real assets policy benchmark.

Investment Section

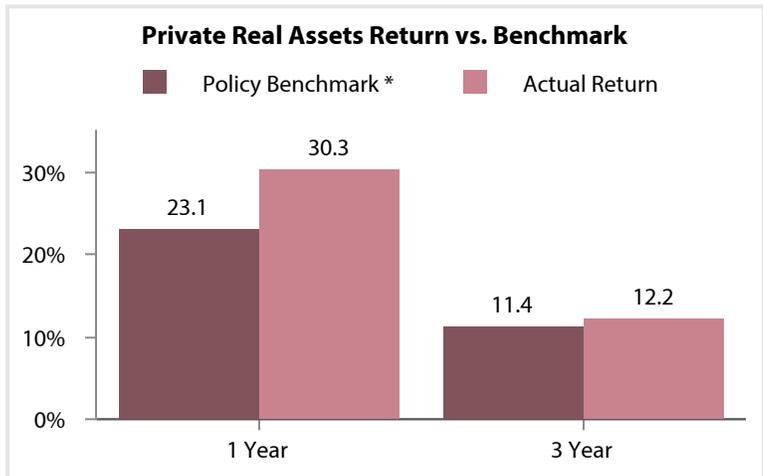
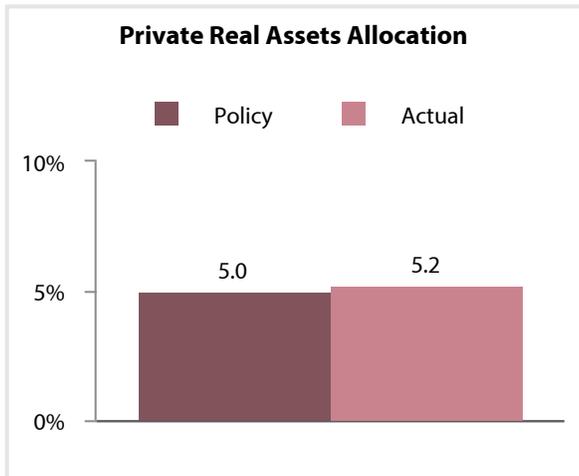
For the fiscal year, TIPS returned (2.2)% versus (2.3)% for the policy benchmark. There was no internal or external active management strategy utilized during the fiscal year; thus, providing a return that closely matched the benchmark. Commodities, for the fiscal year, returned 23.7% compared to its policy benchmark return of 23.8% providing a return similar to the benchmark. Public real assets returned (6.9)%, for the fiscal year, compared to its policy benchmark return of (6.9)%. There was no internal or external active management strategy utilized during the fiscal year; thus, providing a return that closely matched the benchmark. For the fiscal year, private real assets returned 30.3% versus 23.1% for its policy benchmark. This outperformance was the result of manager implementation that outperformed the benchmark.



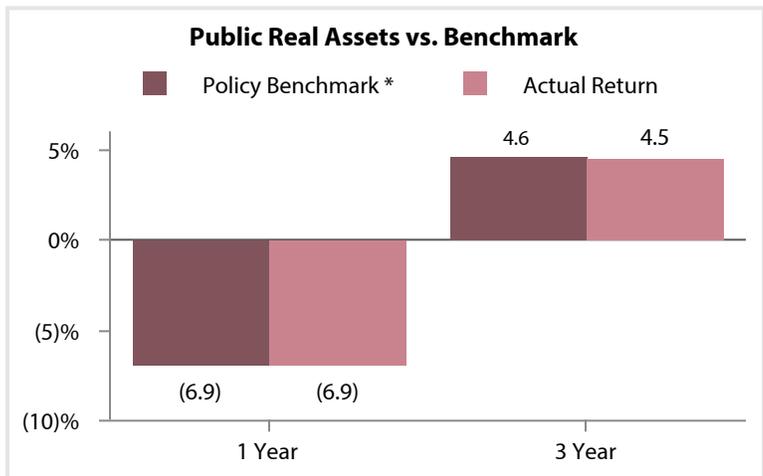
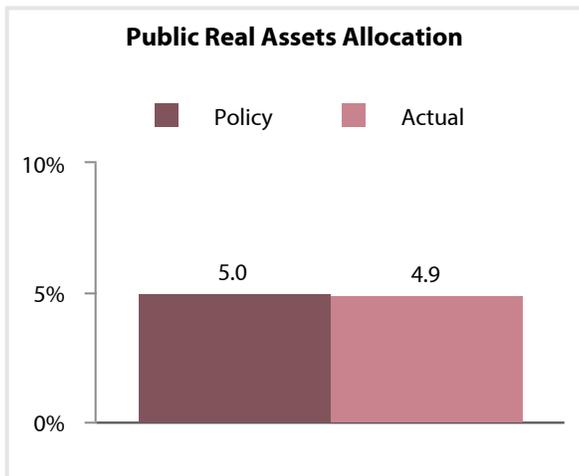
* As of June 30, 2022, the TIPS policy benchmark was the Bloomberg 1 - 10 year TIPS Index.



* As of June 30, 2022, the commodities policy benchmark was the Bloomberg Commodity Index (BCOM).



* As of June 30, 2022, the private real assets policy benchmark was 93.0% NCREIF Fund Index - Open End Diversified Core Equity (ODCE) and 7.0% FTSE NAREIT ALL REITS Index.



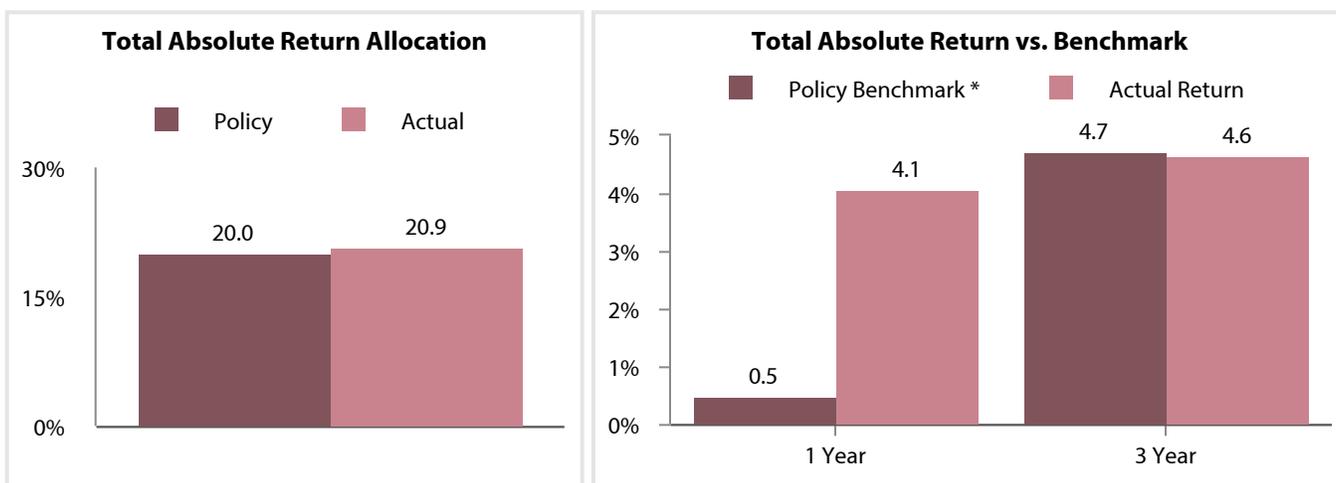
* As of June 30, 2022, the public real assets policy benchmark was the FTSE NAREIT ALL REITS Index.

Absolute Return Allocation

This asset class represents alternative betas, hedge funds, and private credit. Alternative betas and hedge funds are designed to provide a source of stable returns and low correlations with traditional asset strategies. In addition, it is expected that investments in this category would perform well across multiple economic environments. Private credit is designed to provide a source of current income and provide access to a form of credit risk premium. It is expected that investments in this category would perform well in periods of rising economic growth.

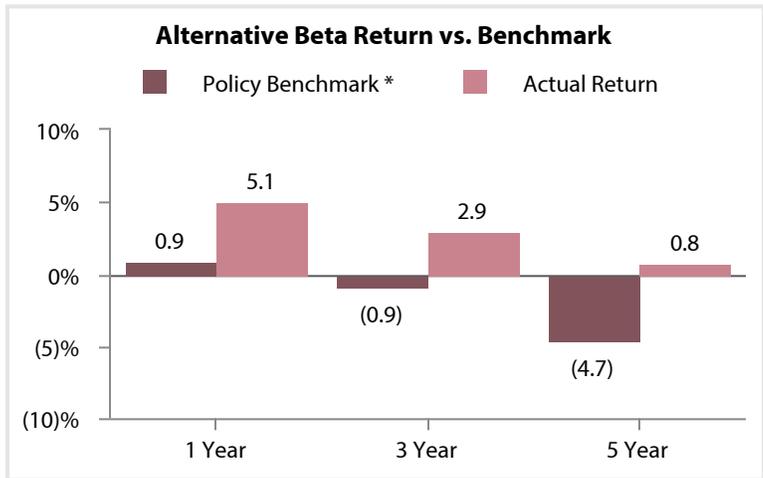
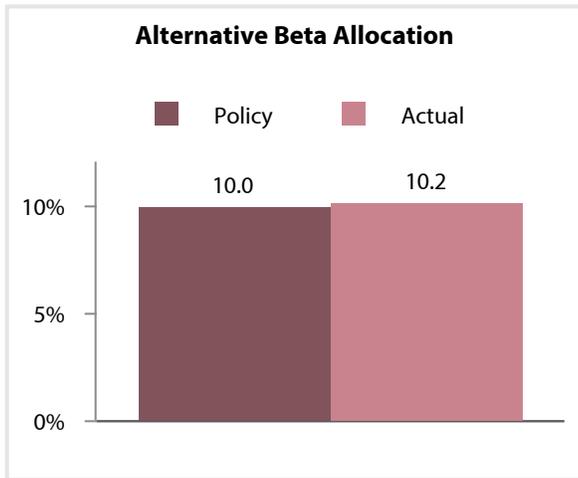
As a result of the multitude of strategies being deployed, it is expected that this asset class will provide meaningful diversification to the portfolio. While the sensitivities to economics will be dependent on positioning at the time, it is expected that these betas will have their best returns in rising growth environments and their worst returns in falling growth environments. Because of the non-U.S. nature of some of these investments, this allocation is subject to foreign currency exposure.

As of June 30, 2022, the market exposure of the absolute return allocation was \$1.76 billion, representing 20.9% of total market value of the portfolio. The bar chart below (left) illustrates the actual exposure compared to policy. The absolute return allocation returned 4.1% for the fiscal year versus 0.5% for the policy benchmark. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.

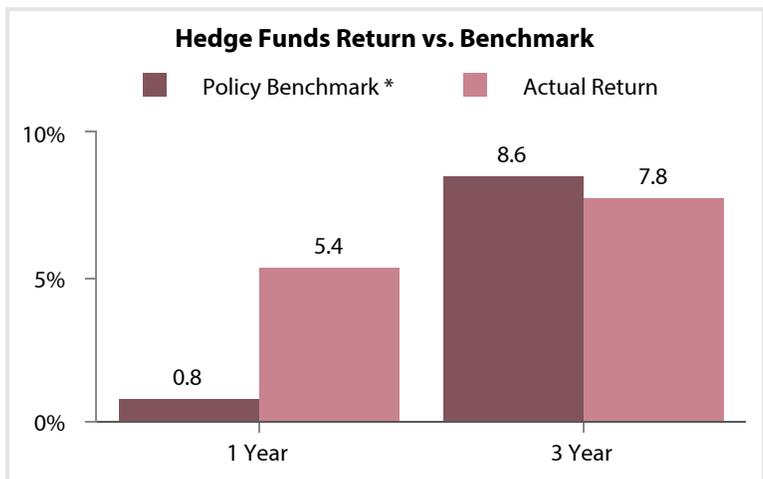
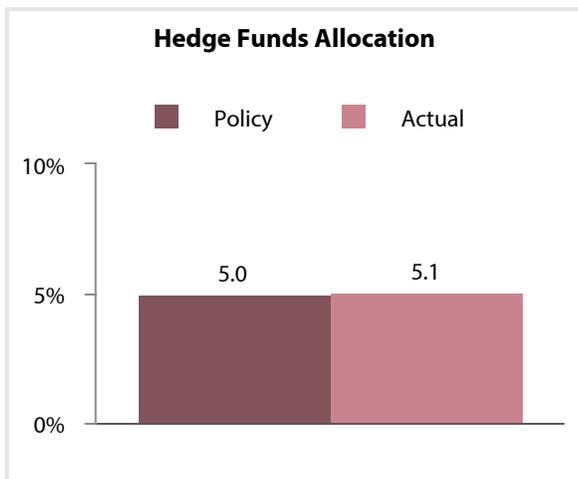


* As of June 30, 2022, the absolute return policy benchmark was comprised of 25.0% direct hedge funds policy benchmark, 50.0% alternative beta - beta policy benchmark, and 25.0% private credit policy benchmark.

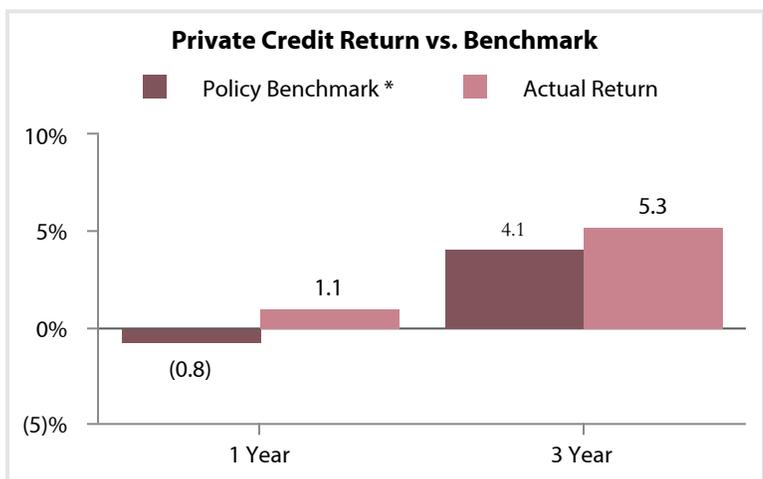
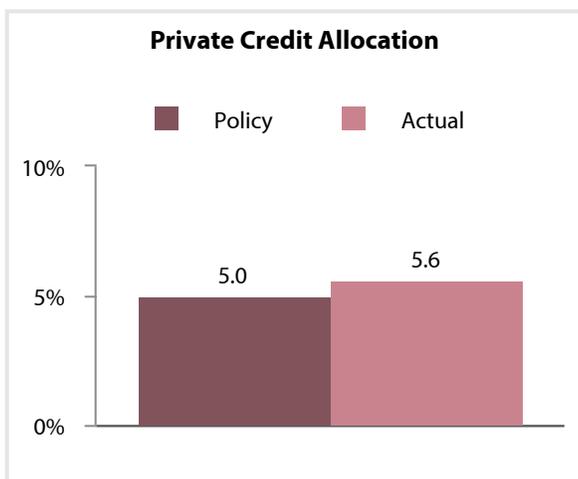
For the fiscal year, alternative betas returned 5.1% versus 0.9% for the policy benchmark. The outperformance was primarily related to a passive trend strategy implementation. Hedge funds, for the fiscal year, returned 5.4% compared to its policy benchmark return of 0.8%. The primary driver of the outperformance was manager implementation within the hedge fund class. For the fiscal year, private credit returned 1.1% versus (0.8)% for its policy benchmark. This outperformance was due to manager implementation that outperformed the benchmark.



* As of June 30, 2022, the alternative beta - beta policy benchmark was the HFRX Macro/CTA Index.

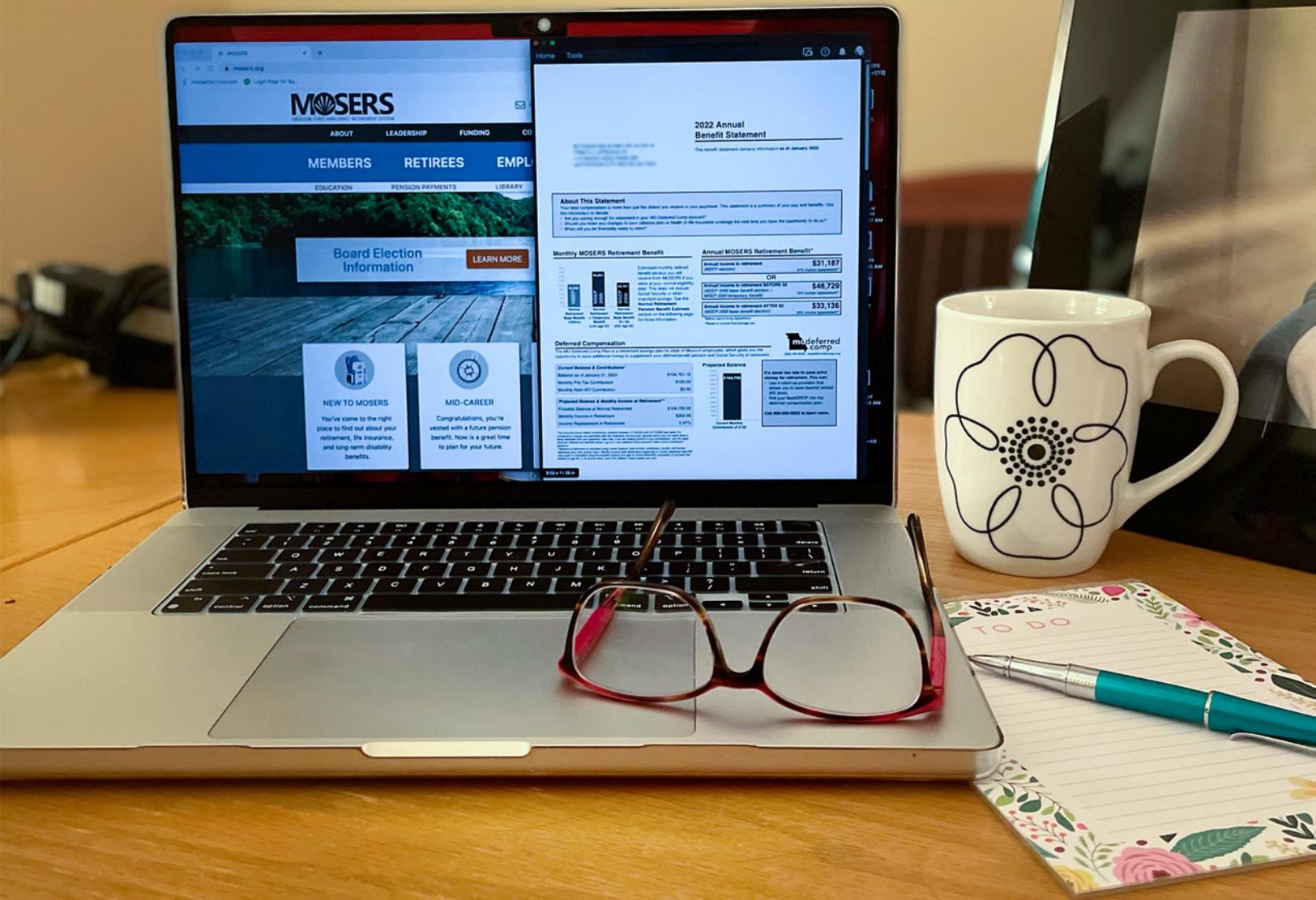


* As of June 30, 2022, the hedge funds policy benchmark was the HFRI Fund of Funds: Conservative Index + 0.70%.



* As of June 30, 2022, the private credit policy benchmark was the S&P/LSTA US Leveraged Loan Index + 2%.

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ACTUARIAL SECTION

Annual Benefit Statement

MOSERS strives to increase awareness of the total compensation members receive as state employees. We send personalized annual benefit statements to all active members each year to highlight the valuable benefits we administer.



Actuary's Certification Letter



Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

October 6, 2022

The Board of Trustees
Missouri State Employees' Retirement System
907 Wildwood Drive
Jefferson City, Missouri 65109

Dear Members of the Board:

At your request, we have performed an actuarial valuation of the Missouri State Employees' Retirement System (MOSERS) as of June 30, 2022 for the purpose of determining the employer required contribution rate for the fiscal year ending June 30, 2024. Actuarial valuations are prepared annually for the Missouri State Employees' Plan (MSEP) and the Judicial Retirement Plan. The funding policy for both plans includes the Entry Age Normal actuarial cost method and the level percent of payroll methodology for the unfunded actuarial accrued liability (UAAL), which are set statutorily. The board of trustees is responsible for selecting the asset valuation method, amortization period and methodology for both plans. The selection of the amortization period reflects the Board's desire to fully fund the System within a reasonable period of time that complies with actuarial standards. There have been no changes to the plan provisions or actuarial assumptions since the prior valuation. The major findings of the valuations are contained in this section, which reflects the plan provisions in place on June 30, 2022, as amended by any legislation passed in the 2022 session.

During the 2022 Missouri General Assembly, legislation was passed and signed by the Governor that provided for an additional contribution of \$500 million to the Missouri State Employees' Retirement System. The funds were received by MOSERS on July 13, 2022, which is after the valuation date of June 30 and therefore are not reflected in the asset values in the valuation. At the Board's direction, the additional contribution of \$500 million will be excluded from the valuation assets when calculating the actuarial required contribution rate. It will, however, be reflected in the valuation assets in future valuations for calculations of the funded ratio and the unfunded actuarial accrued liability.

In preparing our report, we relied, without audit, on information (some oral and some in writing) supplied by the System's staff. This information includes, but is not limited to, statutory provisions, member data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete, our results may be different and our calculations may need to be revised.

We further certify that all costs, liabilities, and other factors for the plans have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the plans and reasonable expectations); meet applicable Actuarial Standards of Practice (ASOPs); and which, in combination, offer our best estimate of anticipated experience affecting the plans. Nevertheless, the emerging costs of the plans will vary from those presented herein to the extent actual experience differs from that projected by the actuarial assumptions. The board of trustees has the final decision regarding the appropriateness of the assumptions and adopted the assumptions, as indicated in Appendix D of our *MSEP Actuarial Valuation Report* and Appendix C of our *Judges Actuarial Valuation Report*.

3802 Raynor Parkway, Suite 202, Bellevue, NE 68123
www.CavMacConsulting.com
Offices in Kennesaw, GA • Bellevue, NE

The Board of Trustees
October 6, 2022
Page 2



In order to prepare the results in the actuarial valuation report, we have utilized actuarial models that were developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results. Future actuarial measurements may differ significantly from the current measurements presented in the June 30, 2022 valuation reports due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements.

Actuarial computations presented in this section are for purposes of determining the funding amounts for MSEP and the Judicial Retirement Plan as set out in the Missouri state statutes. The calculations have been made on a basis consistent with our understanding of the plans' funding policy. Determinations for purposes other than meeting these requirements may be significantly different from the results shown in the June 30, 2022 valuation reports. Accordingly, additional determinations may be needed for other purposes.

Based upon the June 30, 2022 valuation results, annual projection forecasting and the presumption that future contributions will be made at the full actuarial contribution rate, it is our opinion that the current funding policy will systematically accumulate assets sufficient to fund all future benefits of both the Missouri State Employees' Retirement System and the Judicial Retirement Plan, if all actuarial assumptions are met.

We provided the information used by staff to prepare the following schedules in the Actuarial Section: *Schedules of Funding Progress, Active Members by Attained Age and Years of Service, Schedules of Active Member Valuation Data, Short-Term Solvency Test, and Analysis of Financial Experience*. We also provided the information used by staff to prepare the following schedules in the Financial Section: *Schedule of Employers' Net Pension Liability, Sensitivity of Net Pension Liability to Changes in the Discount Rate, Schedule of Changes in Employers' Net Pension Liability* and the *Schedule of Employer Contributions*.

Actuarial computations, based on the actuarial valuations performed as of June 30, 2022, were also prepared as of June 30, 2022, for purposes of fulfilling financial accounting requirements for the plans under Governmental Accounting Standard Number 67 (GASB 67). The Missouri State Employees' Plan (MSEP) is a cost-sharing multiple employer plan, and the Judicial Retirement Plan is a single employer plan. The assumptions used in the funding valuation were also used for GASB 67 calculations including the 6.95% assumed rate of return used in the funding valuation. In addition, the entry age normal actuarial cost method, which is required to be used under GASB 67, is also used in the funding valuations. The actuarial assumptions and methods meet the parameters set by Actuarial Standards of Practice, as issued by the Actuarial Standards Board, and generally accepted accounting principles (GAAP) applicable in the United States of America as promulgated by the Governmental Accounting Standards Board (GASB). Additional information related to GASB 67 can be found in the *Financial Section* of this report.

The consultants who worked on this assignment are pension actuaries. Cavanaugh Macdonald Consulting, LLC's advice is not intended to be a substitute for qualified legal or accounting counsel. We certify that, to the best of our knowledge and belief, the June 30, 2022 actuarial valuation reports are complete and accurate and have been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

Sincerely,

Handwritten signature of Patrice A. Beckham in cursive.

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

Handwritten signature of Bryan K. Hoge in cursive.

Bryan K. Hoge, FSA, EA, FCA, MAAA
Consulting Actuary

Summary of Actuarial Assumptions

Actuarial Methods

Calculation of Normal Cost and Actuarial Accrued Liability

The funding method used to determine the normal cost and actuarial accrued liability was the entry age actuarial cost method described below.

- **Entry age actuarial cost method** – Under the entry age normal cost method, the actuarial present value of each member’s projected benefit is allocated on a level basis over the member’s compensation between the entry age of the member and their assumed exit age. The portion of the actuarial present value allocated to the valuation year is called the normal cost. The actuarial present value of benefits allocated to prior years of service is called the actuarial accrued liability. The unfunded actuarial accrued liability represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains/losses.
- **Calculation of the actuarial value of assets (AVA)** – The Board adopted the current asset smoothing method effective with the June 30, 2018 valuation. Under the current method, the difference between the actual and assumed investment return on the fair value of assets is recognized evenly over a five-year period. No corridor is used with this method. 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.
- **Amortization of the unfunded actuarial accrued liability (UAAL)** – Beginning with the June 30, 2018, valuation, the UAAL is amortized using a “layered” approach. Under this method, the “Legacy UAAL,” as determined in the June 30, 2018 valuation, is amortized over a closed 30-year period. Subsequent changes in the UAAL due to actuarial gains/losses or assumption changes are separately financed by establishing amortization bases and payments, as a level percentage of payroll, over closed 25-year periods. The bases established prior to June 30, 2021 continue to be amortized on their original schedule. Any change in the System’s benefit structure shall be amortized over a closed period of 20 years, as set out in state statutes. The total UAAL amortization payment is the sum of the payments for each of the amortization bases.

Changes in Methods and Assumptions Since the Prior Year

An experience study which analyzed the System’s economic and demographic assumptions was performed in 2021 and the results were presented to the Board. There have been no changes to the benefit provisions or actuarial assumptions since the prior valuation. However, during the 2022 Missouri General Assembly, legislation for the fiscal year 2023 budget appropriation was passed and signed by the Governor that provided for an additional contribution to the System of \$500 million. The funds were received by MOSERS on July 13, 2022, which is after the valuation date of June 30, and therefore not reflected in the asset values in the current valuation. In calculating the actuarial contribution rate, the unfunded actuarial accrued liability (UAAL) contribution rate, calculated in the current valuation, is determined by amortizing the UAAL, projected to June 30, 2023, using the layered amortization method. At the Board’s direction, the additional contribution of \$500 million will be excluded from the valuation assets when calculating the UAAL contribution rate which then impacts the actuarial required contribution rate. As a result, the additional contribution had no impact on the current valuation results. It will be reflected in the valuation assets in future valuations for calculations of the funded ratio and unfunded actuarial accrued liability. The determination of the actuarial contribution rate in future years will not reflect the impact of the additional contribution until so directed by the MOSERS Board.

Actuarial Assumptions

Economic Assumptions

- **Investment return** – 6.95%, compounded annually, net of investment expenses
- **Inflation** – 2.25% per year
- **Payroll growth** – 2.25% per year
- **Cost-of-living adjustment (COLA)** – 4.00% on a compounded basis when a minimum COLA of 4.00% is in effect; 1.80% on a compounded basis when no minimum COLA is in effect
- **Interest on member contributions** – 1.50% per year
- **Administrative expenses** – actual prior year expenses are assumed for current year
- **Pay Increases** –
 - **MSEP** – 2.75% - 10.00% based on years of service; General Assembly members have a flat 2.50% assumption; See table on page 95 for pay increase assumptions by years of service.
 - **Judicial Plan** – 3.00% per year

Demographic Assumptions

- **Mortality** – The mortality assumption includes an appropriate level of conservatism that reflects expected future mortality improvement

MSEP/MSEP 2000/MSEP 2011

- **Post-retirement (Retirees)** – Pub-2010 General Members Below Median Healthy Retiree mortality table, scaled by 104%, set back two years for males and set forward one year for females and projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Post-retirement (Beneficiaries)** – Pub-2010 General Members Below Median Contingent Survivor mortality table, set back two years for males and set forward one year for females and projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Pre-retirement** – Pub-2010 General Members Below Median Employee mortality table, set back two years for males and set forward one year for females, projected generationally from 2010 to 2020 with Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Long-term disability** – Pub-2010 Non-Safety Disabled Retiree mortality table, without mortality projection

Judicial Plan

- **Post-retirement (Retirees)** – Pub-2010 General Members Median Healthy Retiree mortality table, projected generationally from 2010 to 2020 with Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Post-retirement (Beneficiaries)** – Pub-2010 General Members Median Contingent Survivor mortality table, projected generationally from 2010 to 2020 with Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Pre-retirement** – Pub-2010 General Members Median Employee mortality table, projected generationally from 2010 to 2020 with Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Long-term disability** – None

- **Termination** –

- **MSEP** – 1.25% - 27.00% based on years of service; Elected Officials and Legislators 5.00% - 35.00% based on years of service; See tables on pages 94-95 for termination assumptions by years of service.
- **Judicial Plan** – 2.00% per year

The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (MAAA). Assumptions were adopted based on the findings of the experience study covering the five-year period ending June 30, 2020, and presented to the Board in 2021.

MSEP

Percent of Eligible Active Members Retiring Within the Next Year

MSEP	
Early Retirement	
Retirement Age	Percent Retiring
55-56	1%
57-59	2
60-61	8
62	25
63-64	5

MSEP 2000	
Early Retirement	
Retirement Age	Percent Retiring
57-59	3%
60-61	5

MSEP 2011	
Early Retirement	
Retirement Age	Percent Retiring
62-64	10%
65	15
66	20

MSEP	
Normal Retirement	
Retirement Age	Percent Retiring
48-61	17%
62	21
63-64	17
65-66	30
67-69	25
70	40
71-77	25
78	100

MSEP 2000	
Normal Retirement	
Retirement Age	Percent Retiring
48-57	35%
58-60	20
61	12
62	16
63	12
64	20
65	27
66	30
67-69	25
70	30
71-77	25
78	100

MSEP 2011	
Normal Retirement	
Retirement Age	Percent Retiring
55-57	40%
58-66	15
67-77	20
78	100

Judicial Plan

Percent of Eligible Active Members Retiring Within the Next Year

Judicial Plan

Early Retirement		Normal Retirement	
Retirement Age	Percent Retiring	Retirement Age	Percent Retiring
62-69	5%	55	10%
70	100	56-63	3
		64-66	10
		67	17.5
		68	25
		69	35
		70	100

Judicial Plan 2011

Normal Retirement

Retirement Age	Percent Retiring
62	10%
63-66	3
67	25
68-69	20
70	100

Elected Officials and Legislators

Percent of Active Members Terminating Within the Next Year

Years of Service	Percent Terminating
0-3	5%
4-7	12
8+	35

MSEP

Separations From Active Employment Before Service Retirement Assumptions

Termination*		Disability	
Years of Service	Rate	Age	Rate
1	27.00%	25	0.03%
5	12.75	30	0.07
10	7.00	35	0.11
15	4.30	40	0.22
20	2.25	45	0.32
25+	1.25	50	0.43
		55	0.54
		60	0.59
		65	0.64

*Does not apply to elected officials and legislators.

MSEP

Pay Increase Assumptions

Years of Service	Rates by Service*			
	Inflation	Productivity	Merit	Total
0	2.25%	0.25%	7.50%	10.00%
1	2.25	0.25	2.50	5.00
2	2.25	0.25	2.25	4.75
3	2.25	0.25	2.00	4.50
4	2.25	0.25	1.85	4.35
5	2.25	0.25	1.70	4.20
10	2.25	0.25	1.00	3.50
15	2.25	0.25	0.75	3.25
20	2.25	0.25	0.50	3.00
25+	2.25	0.25	0.25	2.75

*General assembly members have a flat 2.5% assumption.

Other Assumptions June 30, 2022

- **Form of payment**

MSEP

- 50% Joint & survivor

MSEP 2000/MSEP 2011

- Straight life annuity

Judicial Plan

- **First employed before January 1, 2011** – 50% Joint & survivor
- **First employed on or after January 1, 2011** – Straight life annuity

- **Marital status**

MSEP/MSEP 2000/MSEP 2011

- **Percent married** – 65% married at retirement, 50% of those dying in active service are married
- **Spouse’s age** – Females assumed to be three years younger than males

Judicial Plan

- **Percent married** – 90% married
- **Spouse’s age** – Females assumed to be four years younger than males

- **Pay increase timing** – Pay increases are assumed to occur at the beginning of the fiscal year.
- **Decrement timing** – Decrements of all types are assumed to occur mid-year.
- **Eligibility testing** – Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
- **Benefit service** – Exact fractional service is used to determine the amount of the benefit payable.
- **Decrement relativity** – Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
- **Decrement operation** – Disability and withdrawal do not operate during normal retirement eligibility.
- **Other liability adjustments**

MSEP/MSEP 2000

- Pre-retirement survivor benefits for spouse of an inactive-vested member. These factors are used to estimate the cost of immediate unreduced survivor annuities upon the death of a vested member.

Age	Male	Female
<30	1.56	1.42
30-39	1.26	1.20
40-49	1.11	1.08
>49	1.02	1.02

- **Incidence of contributions** – Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report and the actual payroll payable at the time contributions are made. New entrant normal cost contributions are applied to the funding of new entrant benefits.
 - **Retirement election**
- MSEP 2000*
- All regular state employees first employed on or before June 30, 2000, are assumed to elect MSEP 2000 prior to age 62 and MSEP on or after age 62.
 - Elected officials, general assembly members, and uniformed water patrol members first employed before July 1, 2000, are assumed to elect MSEP at retirement.

- **Service adjustment**

MSEP/MSEP 2000/MSEP 2011

- It is assumed that each member will be granted seven months of service credit; four months for unused leave upon retirement and three months for military service purchases. For members first employed on or after January 1, 2011, it is assumed that each member will be granted five months for unused leave.

- **Forfeitures**

MSEP 2011/Judicial Plan

- For those first employed on or after January 1, 2011, employees are assumed to take a refund and forfeit their deferred pension if the refund amount is greater than the present value of their deferred benefit.

- **Salary and benefit limits** – For purposes of the valuation, no limits were applied to member compensation or benefits.

- **Commencement age for deferred vested benefit** – normal retirement date.

- **Data Adjustments**

MSEP/MSEP 2000/MSEP 2011

Active and retired member data was reported as of May 31, 2022. It was brought forward to June 30, 2022, by adding one month of service for all active members, one month of contributions and interest for MSEP 2011 members, and the June COLA for certain retired members. Financial information continues to be reported annually as of June 30. This procedure was instituted to provide sufficient time for the Board of Trustees to certify the appropriate contribution rate prior to the October 1 statutory deadline.

When the option of choosing plans is available, inactive-vested members are reported with two records, one with benefits under the MSEP and one with benefits under the MSEP 2000. Because it is unknown what the member will elect at retirement, both records are valued and the plan that produces the higher present value of future benefits is used for valuation purposes.

For any retired member who has elected a joint and survivor benefit, yet has no beneficiary date of birth provided, it was assumed that the beneficiary is three years younger for male retirees and three years older for female retirees.

Judicial Plan

Active and retired member data was reported as of May 31, 2022. It was brought forward to June 30, 2022, by adding one month of service for all active members, one month of contributions and interest for Judicial Plan 2011 members, and the June COLA for certain retired members. Financial information continues to be reported annually as of June 30. This procedure was instituted to provide sufficient time for the Board of Trustees to certify the appropriate contribution rate prior to the statutory deadline.

Other Technical Valuation Procedures

Salary increases are assumed to apply to annual amounts.

Decrements are assumed to occur mid-year, except that immediate retirement is assumed for those who are at or older than the age at which retirement rates are 100%. Standard adjustments are made for multiple decrements.

No actuarial liability is included for participants who terminated without being vested prior to the valuation date, except those due a refund of contributions.

Pension Trust Funds

Employer Schedule of Funding Progress

Last Ten Fiscal Years

MOSERS uses the entry age normal actuarial cost method which allocates the actuarial present value of each member's projected benefits on a level basis over the member's pensionable compensation between the entry age of the member and assumed exit ages.

MSEP

Actuarial Valuation Date as of June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b-a)	Percent Funded (a/b)	Annual Covered Payroll (c)	UAAL Percentage of Covered Payroll [(b-a)/c]
2022	\$ 8,894,328,756	\$ 15,408,995,032	\$ 6,514,666,276	57.7%	\$ 1,972,872,754	330.2%
2021	8,909,251,051	15,110,646,537	6,201,395,486	59.0	1,961,975,052	316.1
2020	8,711,224,151	14,258,408,888	5,547,184,737	61.1	1,980,910,473	280.0
2019	8,782,383,977	13,957,626,309	5,175,242,332	62.9	1,930,764,635	268.0
2018	8,830,410,210	13,612,763,961	4,782,353,751	64.9	1,915,143,002	249.7
2017	8,872,381,848	13,152,273,895	4,279,892,047	67.5	1,941,969,786	220.4
2016	8,878,057,191	12,751,162,753	3,873,105,562	69.6	1,921,528,936	201.6
2015	8,792,485,658	11,727,618,410	2,935,132,752	75.0	1,918,527,768	153.0
2014	8,637,758,955	11,494,571,835	2,856,812,880	75.1	1,902,719,928	150.1
2013	8,096,436,929	11,134,637,484	3,038,200,555	72.7	1,880,212,950	161.6

Judicial Plan

Actuarial Valuation Date as of June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b-a)	Percent Funded (a/b)	Annual Covered Payroll (c)	UAAL Percentage of Covered Payroll [(b-a)/c]
2022	\$ 203,997,065	\$ 630,043,013	\$ 426,045,948	32.4%	\$ 63,317,888	672.9%
2021	194,988,153	626,284,219	431,296,066	31.1	63,031,506	684.3
2020	180,713,310	624,847,011	444,133,701	28.9	61,450,808	722.7
2019	172,224,529	617,482,705	445,258,176	27.9	60,380,734	737.4
2018	162,135,045	593,788,592	431,653,547	27.3	59,551,874	724.8
2017	151,828,631	564,417,925	412,589,294	26.9	58,150,935	709.5
2016	143,468,860	547,621,617	404,152,757	26.2	57,421,016	703.8
2015	134,349,908	482,969,311	348,619,403	27.8	55,656,457	626.4
2014	124,269,105	462,336,255	338,067,150	26.9	49,587,936	681.8
2013	111,140,339	435,378,358	324,238,019	25.5	48,697,726	665.8

See *Schedule of Employer Contributions* on page 56.

Pension Trust Funds

Summary of Member Data Included in Valuations

June 30, 2022

Active Members

Valuation Group	Number	Annual Covered Payroll	Group Averages		
			Annual Salary	Age (Yrs)	Service (Yrs)
MSEP					
Regular state employees	40,751	\$ 1,912,225,449	\$ 46,925	45.6	10.7
Elected officials	6	666,851	111,142	49.7	5.0
Legislative clerks	4	138,012	34,503	70.5	24.1
Legislators	190	6,904,840	36,341	52.4	4.7
Uniformed water patrol	9	696,108	77,345	44.8	19.1
School-term salaried employees	622	50,663,336	81,452	57.4	22.0
Administrative law judges	13	1,578,158	121,397	63.5	27.7
Total MSEP group	41,595	\$ 1,972,872,754	47,431	45.8	10.9
Judicial Plan	415	\$ 63,317,888	\$ 152,573	55.7	11.0

Retired Members and Beneficiaries

Type of Benefit Payment	Number	Annual Benefits	Group Averages	
			Benefit	Age (Yrs)
MSEP				
Retirement	47,537	\$ 802,671,888	\$ 16,885	71.1
Survivor of active member	1,784	20,933,484	11,734	63.9
Survivor of retired member	4,327	60,183,588	13,909	76.2
Total MSEP group	53,648	\$ 883,788,960	16,474	71.3
Judicial Plan	596	\$ 42,906,432	\$ 71,991	76.9

Other Members

Plans	Number Inactive-Vested	Number Inactive-Nonvested	Number Leave of Absence	Number Long-Term Disability
MSEP	17,438	28,444	115	599
Judicial Plan	27	0	0	0

Active Members by Attained Age and Years of Service

June 30, 2022

MSEP

Attained Age	Years of Service to Valuation Date								Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	No.	Valuation Payroll
< 25	1,970	9							1,979	\$ 73,645,424
25-29	2,947	555	5						3,507	141,228,295
30-34	2,314	1,497	300	19					4,130	180,730,532
35-39	1,747	1,291	895	432	18				4,383	206,393,884
40-44	1,507	1,096	867	1,028	496	22			5,016	243,244,242
45-49	1,390	863	684	797	1,130	469	14		5,347	267,810,624
50-54	1,240	952	690	759	1,111	1098	229	19	6,098	305,395,668
55-59	1,190	865	668	768	920	595	378	111	5,495	273,176,066
60-64	799	694	535	573	595	381	196	177	3,950	193,273,320
65+	317	298	265	222	217	116	100	155	1,690	87,974,699
Totals	15,421	8,120	4,909	4,598	4,487	2,681	917	462	41,595	\$ 1,972,872,754

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Group Averages: Age – 45.8 years • Service – 10.9 years • Annual pay – \$47,431

Judicial Plan

Attained Age	Years of Service to Valuation Date								Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	Valuation Payroll	
< 40	20	1	1					22	\$ 3,330,566	
40-44	31	12	1					44	6,517,162	
45-49	19	16	7	3				45	6,724,935	
50-54	20	21	11	12	2			66	10,004,203	
55-59	16	27	18	17	5	1		84	13,018,855	
60-64	9	22	18	11	14	12	2	88	13,470,295	
65+	2	10	13	7	10	15	9	66	10,251,872	
Totals	117	109	69	50	31	28	11	415	\$ 63,317,888	

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Group Averages: Age – 55.7 years • Service – 11.0 years • Annual pay – \$152,573

Schedules of Active Member Valuation Data

Last Ten Fiscal Years

MSEP

Schedule of Active Member Valuation Data

Valuation Date as of June 30	Participating Employers	Number	Annual Payroll	Average Annual Pay	% Increase in Average Pay
2022	17	41,595	\$ 1,972,872,754	\$ 47,431	3.54%
2021	17	42,829	1,961,975,052	45,809	6.37
2020	17	45,999	1,980,910,473	43,064	4.53
2019	17	46,864	1,930,764,635	41,199	2.84
2018	18	47,806	1,915,143,002	40,061	0.90
2017	18	48,910	1,941,969,786	39,705	2.21
2016	18	49,464	1,921,528,936	38,847	1.20
2015	18	49,980	1,918,527,768	38,386	2.12
2014	18	50,621	1,902,719,928	37,588	1.62
2013	18	50,833	1,880,212,950	36,988	1.86

Judicial Plan

Schedule of Active Member Valuation Data

Valuation Date as of June 30	Participating Employers	Number	Annual Payroll	Average Annual Pay	% Increase in Average Pay
2022	1	415	\$ 63,317,888	\$ 152,573	1.18%
2021	1	418	63,031,506	150,793	2.57
2020	1	418	61,450,808	147,012	0.80
2019	1	414	60,380,734	145,847	1.64
2018	1	415	59,551,874	143,498	1.17
2017	1	410	58,150,935	141,832	0.78
2016	1	408	57,421,016	140,738	2.41
2015	1	405	55,656,457	137,423	12.24
2014	1	405	49,587,936	122,439	0.57
2013	1	400	48,697,726	121,744	5.71

Retirees and Beneficiaries Added and Removed - MSEP

Last Ten Fiscal Years

Benefit Type	Fiscal Year Ended June 30		Added to Rolls		Removed from Rolls		Rolls at End of Year		Percentage Increase/(Decrease)	
	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Annual Allowances	Average Annual Allowances
2022										
Retirees	2,852	\$ 63,494,964	1,628	\$ 26,000,820	48,068	\$ 806,569,096	\$ 16,780	4.88%	2.20%	
Beneficiaries	633	9,697,992	409	4,179,852	6,170	82,246,499	13,330	7.19	3.30	
2021										
Retirees	2,679	52,111,212	1,558	24,543,024	46,844	769,074,952	16,418	3.72	1.24	
Beneficiaries	623	8,799,852	397	4,270,596	5,946	76,728,359	12,904	6.27	2.23	
2020										
Retirees	2,393	47,592,468	1,347	21,088,044	45,723	741,506,764	16,217	3.71	1.33	
Beneficiaries	506	7,538,112	358	3,849,576	5,720	72,199,103	12,622	5.38	2.66	
2019										
Retirees	2,510	49,663,164	1,247	20,068,656	44,677	715,002,340	16,004	4.32	1.37	
Beneficiaries	513	7,606,344	321	3,395,964	5,572	68,510,567	12,296	6.55	2.88	
2018										
Retirees	2,875	51,096,000	1,295	17,429,136	43,414	685,407,832	15,788	5.17	1.34	
Beneficiaries	480	6,373,080	334	3,124,044	5,380	64,300,187	11,952	5.32	2.46	
2017										
Retirees	2,810	44,397,240	1,282	17,552,484	41,834	651,740,968	15,579	4.30	0.49	
Beneficiaries	473	5,953,224	276	2,599,608	5,234	61,051,151	11,664	5.81	1.83	
2016										
Retirees	2,829	41,259,384	1,165	15,963,864	40,306	624,896,212	15,504	4.22	(0.08)	
Beneficiaries	475	5,779,596	283	2,563,344	5,037	57,697,535	11,455	5.90	1.87	
2015										
Retirees	2,885	43,895,520	1,066	14,075,772	38,642	599,600,692	15,517	5.23	0.28	
Beneficiaries	465	5,649,900	246	2,203,788	4,845	54,481,283	11,245	6.75	1.93	
2014										
Retirees	2,631	37,702,375	956	12,406,774	36,823	569,780,944	15,474	4.65	(0.11)	
Beneficiaries	421	5,141,385	197	1,842,199	4,626	51,035,171	11,032	6.91	1.73	
2013										
Retirees	2,676	41,153,143	1,001	13,305,438	35,148	544,485,343	15,491	5.39	0.37	
Beneficiaries	431	5,418,267	221	1,876,266	4,402	47,735,985	10,844	8.01	2.86	

Source: MOSERS' Pension Administration System

Retirees and Beneficiaries Added and Removed - Judicial Plan

Last Ten Fiscal Years

Benefit Type	Fiscal Year Ended June 30		Added to Rolls		Removed from Rolls		Rolls at End of Year		Percentage Increase/(Decrease)	
	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Annual Allowances	Average Annual Allowances
2022										
Retirees	20	\$ 2,572,248	18	\$ 1,531,644	462	\$ 37,004,006	\$ 80,095	2.89%	2.45%	
Beneficiaries	12	594,912	20	729,228	142	5,722,233	40,297	(2.29)	3.21	
2021										
Retirees	26	2,674,404	13	824,256	460	35,963,402	78,181	5.42	2.44	
Beneficiaries	10	411,408	11	469,104	150	5,856,549	39,044	(0.98)	(0.32)	
2020										
Retirees	21	2,245,320	9	753,144	447	34,113,254	76,316	4.57	1.77	
Beneficiaries	7	397,068	11	449,532	151	5,914,245	39,167	(0.88)	1.75	
2019										
Retirees	39	3,749,292	17	1,357,068	435	32,621,078	74,991	7.91	2.46	
Beneficiaries	12	643,452	15	555,528	155	5,966,709	38,495	1.50	3.46	
2018										
Retirees	23	2,642,868	15	1,074,540	413	30,228,854	73,193	5.47	3.43	
Beneficiaries	9	470,700	8	322,200	158	5,878,785	37,208	2.59	1.94	
2017										
Retirees	21	2,128,128	16	1,239,612	405	28,660,526	70,767	3.20	1.93	
Beneficiaries	12	507,360	2	87,936	157	5,730,285	36,499	7.90	1.03	
2016										
Retirees	16	1,671,084	14	1,078,356	400	27,772,010	69,430	2.18	1.67	
Beneficiaries	8	383,940	11	397,176	147	5,310,861	36,128	(0.25)	1.79	
2015										
Retirees	39	3,599,880	21	1,395,888	398	27,179,282	68,290	8.82	3.90	
Beneficiaries	18	739,788	5	198,348	150	5,324,097	35,494	11.32	1.67	
2014										
Retirees	18	1,671,667	8	443,807	380	24,975,290	65,724	5.17	2.40	
Beneficiaries	7	320,389	7	216,813	137	4,782,657	34,910	2.21	2.21	
2013										
Retirees	27	2,233,387	13	851,802	370	23,747,430	64,182	6.18	2.16	
Beneficiaries	8	383,692	11	322,758	137	4,679,081	34,154	1.32	3.54	

Source: MOSERS' Pension Administration System

Short-Term Solvency Test

Last Ten Fiscal Years

MSEP

Actuarial Accrued Liabilities for

Fiscal Year	Member Contributions (1)	Current Retirees and Beneficiaries (2)	Active and Inactive Members, Employer Financed Portion (3)	Actuarial Value of Assets Available for Benefits	Percentage of Actuarial Liabilities Covered by Actuarial Value of Assets Available for		
					(1)	(2)	(3)
2022	\$ 217,318,884	\$ 9,463,674,203	\$ 5,728,001,945	\$ 8,894,328,756	100.0%	91.7%	0.0%
2021	187,797,531	9,037,922,330	5,884,926,676	8,909,251,051	100.0	96.5	0.0
2020	157,133,312	8,701,290,590	5,399,984,986	8,711,224,151	100.0	98.3	0.0
2019	128,255,311	8,430,014,973	5,399,356,055	8,782,383,977	100.0	100.0	4.2
2018	103,784,514	8,073,692,664	5,435,286,783	8,830,410,210	100.0	100.0	12.0
2017	78,979,370	7,559,623,100	5,513,671,425	8,872,381,848	100.0	100.0	22.4
2016	60,618,379	7,305,895,284	5,384,649,090	8,878,057,191	100.0	100.0	28.1
2015	42,731,658	6,695,631,737	4,989,255,015	8,792,485,658	100.0	100.0	41.2
2014	27,111,467	6,347,728,717	5,119,731,651	8,637,758,955	100.0	100.0	44.2
2013	14,507,994	6,062,654,441	5,057,475,049	8,096,436,929	100.0	100.0	39.9

Judicial Plan

Actuarial Accrued Liabilities for

Fiscal Year	Member Contributions (1)	Current Retirees and Beneficiaries (2)	Active and Inactive Members, Employer Financed Portion (3)	Actuarial Value of Assets Available for Benefits	Percentage of Actuarial Liabilities Covered by Actuarial Value of Assets Available for		
					(1)	(2)	(3)
2022	\$ 8,675,309	\$ 440,091,330	\$ 181,276,374	\$ 203,997,065	100.0%	44.4%	0.0%
2021	7,294,197	438,537,859	180,452,163	194,988,153	100.0	42.8	0.0
2020	5,991,360	436,014,583	182,841,068	180,713,310	100.0	40.1	0.0
2019	4,421,019	434,204,353	178,857,333	172,224,529	100.0	38.6	0.0
2018	3,124,482	401,725,610	188,938,500	162,135,045	100.0	39.6	0.0
2017	2,232,405	377,099,534	185,085,986	151,828,631	100.0	39.7	0.0
2016	1,855,955	354,715,048	191,050,614	143,468,860	100.0	39.9	0.0
2015	1,204,757	316,042,514	165,722,040	134,349,908	100.0	42.1	0.0
2014	716,564	285,124,436	176,469,255	124,269,105	100.0	43.3	0.0
2013	421,753	274,911,416	160,045,189	111,140,339	100.0	40.3	0.0

Analysis of Financial Experience

Year Ended June 30, 2022

Actual experience will never coincide exactly with assumed experience (except by coincidence). Gains and losses may offset each other over a period of years, but sizable year-to-year variations from assumed experience are common. Detail on the analysis of the financial experience is shown below.

MSEP		Valuation Date June 30	Actuarial Gain (Loss) as a % of Beginning Accrued Liabilities
Unfunded actuarial accrued liability (UAAL) at beginning of year	\$ 6,201,395,486	2022	(1.3)%
Normal cost from last valuation	155,316,052	2021	(0.7)
Actual employer and member contributions	(511,112,129)	2020	(2.3)
Miscellaneous income	(5,852)	2019	(1.8)
Administrative expenses	9,248,916	2018	(0.9)
Interest accrual	424,644,427	2017	(1.6)
Expected UAAL before changes	6,279,486,900	2016	(3.2)
Refinement of COLA programming	41,659,013	2015	(0.9)
Expected UAAL after changes	6,321,145,913	2014	2.1
Less: Actual UAAL at end of year	(6,514,666,276)	2013	(2.8)
Gain (loss) during year from experience	<u>\$ (193,520,363)</u>		
Gain (loss) as a percent of expected actuarial accrued liabilities at start of year (\$15,337,273,591)			(1.3)%

Judicial		Valuation Date June 30	Actuarial Gain (Loss) as a % of Beginning Accrued Liabilities
Unfunded actuarial accrued liability (UAAL) at beginning of year	\$ 431,296,066	2022	0.5 %
Normal cost from last valuation	12,439,236	2021	1.4
Actual employer and member contributions	(40,779,560)	2020	(0.2)
Administrative expenses	79,492	2019	(0.8)
Interest accrual	29,449,031	2018	(0.3)
Expected UAAL before changes	432,484,265	2017	(0.3)
Refinement of COLA programming	(3,007,064)	2016	0.1
Expected UAAL after changes	429,477,201	2015	(1.5)
Less: Actual UAAL at end of year	(426,045,948)	2014	1.5
Gain (loss) during year from experience	<u>\$ 3,431,253</u>	2013	(2.6)
Gain (loss) as a percent of expected actuarial accrued liabilities at start of year (\$639,131,250)			0.5 %

Comparison of Plans for General State Employees

June 30, 2022

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Membership <i>Eligible members employed in positions which normally require at least 1,040 hours of work per year</i>	<ul style="list-style-type: none"> Employed prior to July 1, 2000 and vested in MSEP 	<ul style="list-style-type: none"> First employed on or after July 1, 2000, but prior to January 1, 2011 Left state employment prior to becoming vested and returned to employment on or after July 1, 2000 	<ul style="list-style-type: none"> First employed on or after January 1, 2011, or Returned to employment after electing the buyout option
Employee Contributions	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> 4% of pay
Vesting <i>Eligible for future pension</i>	<ul style="list-style-type: none"> 5 years 	<ul style="list-style-type: none"> 5 years 	<ul style="list-style-type: none"> 5 years
Service Purchases	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase qualifying public sector service at full actuarial cost
Service Transfers	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800; under 105.691 with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 104.1090 or 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service.
Death Prior to Retirement	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of average compensation. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of average compensation. <i>Payable the month following the member's death</i> 	<p>Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Payable the month following the member's death; for inactive-vested, payable when member would have reached normal retirement eligibility. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of average compensation. Payable the month following the member's death</p>
Early Retirement <i>Eligible for reduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 55 + 10 years of service <i>Base benefit reduced 1/2 of 1% (.005) for each month age is younger than normal retirement</i> 	<ul style="list-style-type: none"> Age 57 + 5 years of service <i>Base benefit reduced 1/2 of 1% (.005) for each month age is younger than normal retirement</i> 	<ul style="list-style-type: none"> Age 62 + 5 years of service at time of termination <i>Base benefit reduced 1/2 of 1% (.005) for each month age is younger than normal retirement</i> <i>Inactive-vested members ineligible</i>

Comparison of Plans for General State Employees (continued)

June 30, 2022

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Normal Retirement <i>Eligible for unreduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 65 + 5 years of service or Age 60 + 15 years of service or Rule of 80 – (at least age 48) Age + years of service = 80 or more <i>Age 50 if first became eligible prior to Aug. 28, 2003</i> 	<ul style="list-style-type: none"> Age 62 + 5 years of service or Rule of 80 – (at least age 48) Age + years of service = 80 or more <i>Age 50 if first became eligible prior to Aug. 28, 2003</i> Inactive-vested members ineligible for Rule of 80 	<ul style="list-style-type: none"> Age 67 + 5 years of service or Rule of 90 – (at least age 55) Age + years of service = 90 or more at time of termination Inactive-vested members ineligible for Rule of 90
Base Benefit <i>Payable for life</i>	<ul style="list-style-type: none"> .016 x FAP x Service Future formula increases, if any, may be passed along to retirees. 	<ul style="list-style-type: none"> .017 x FAP x Service Future formula increases, if any, will not be passed along to retirees. 	<ul style="list-style-type: none"> .017 x FAP x Service Future formula increases, if any, will not be passed along to retirees.
Temporary Benefit <i>Stops at age 62</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> .008 x FAP x Service Available to members retiring under Rule of 80 	<ul style="list-style-type: none"> .008 x FAP x Service Available to members retiring under Rule of 90
BackDROP <i>Lump-sum payment at retirement in addition to reduced monthly pension</i>	<ul style="list-style-type: none"> Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable) 	<ul style="list-style-type: none"> Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable) 	<ul style="list-style-type: none"> Not available
Benefit Payment Options <i>Determines whether or not a benefit will be paid to anyone after member's death</i>	<ul style="list-style-type: none"> Life Income Annuity Unreduced Joint & 50% Survivor Joint & 100% Survivor Life Income with 60 Guaranteed Payments Life Income with 120 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments
Cost-of-Living Adjustment (COLA) <i>Helps offset effects of inflation increasing the cost of goods and services</i>	<ul style="list-style-type: none"> Employed before Aug. 28, 1997 Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, rate is based on 80% of the percentage increase in the average CPI (0-5%) Employed on/after Aug. 28, 1997 Based on 80% of the percentage increase in the average CPI (0-5%) 	<ul style="list-style-type: none"> Based on 80% of the percentage increase in the average CPI (0-5%) 	<ul style="list-style-type: none"> Based on 80% of the percentage increase in the average CPI (0-5%)
In-Service COLA <i>Service beyond age 65</i>	<ul style="list-style-type: none"> Applicable COLA rate (if eligible) 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available

Comparison of Plans for Legislators

June 30, 2022

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Membership <i>Elected Members of the General Assembly</i>	<ul style="list-style-type: none"> Employed prior to July 1, 2000 and vested in MSEP 	<ul style="list-style-type: none"> First employed on or after July 1, 2000, but prior to January 1, 2011 Left state employment prior to becoming vested and returned to employment on or after July 1, 2000 	<ul style="list-style-type: none"> First employed on or after January 1, 2011, or Returned to employment after electing the buyout option
Employee Contributions	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> 4% of pay
Vesting <i>Eligible for future pension</i>	<ul style="list-style-type: none"> 3 biennial assemblies (6 years) 	<ul style="list-style-type: none"> 3 biennial assemblies (6 years) 	<ul style="list-style-type: none"> 3 biennial assemblies (6 years)
Service Purchases	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase qualifying public sector service at full actuarial cost
Service Transfers	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800; under 105.691 with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 104.1090 or 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service.
Death Prior to Retirement	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of rate of compensation. Payable the month following the member's death 	<p>Nonduty-related death (vested members) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (no min. service requirement) Survivor benefit to eligible spouse or children no less than 50% of rate of compensation. Payable the month following the member's death</p>	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Payable the month following the member's death; for <i>inactive-vested</i>, payable when member would have reached normal retirement eligibility Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of rate of compensation. Payable the month following the member's death
Early Retirement <i>Eligible for reduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available

Comparison of Plans for Legislators (continued)

June 30, 2022

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Normal Retirement <i>Eligible for unreduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 55 + 3 biennial assemblies or Rule of 80 – (at least age 48) Age + years of service = 80 or more 	<ul style="list-style-type: none"> Age 55 + 3 biennial assemblies or Rule of 80 – (at least age 50) Age + years of service = 80 or more <i>Inactive-vested members ineligible for Rule of 80</i> 	<ul style="list-style-type: none"> Age 62 + 3 biennial assemblies or Rule of 90 – (at least age 55) Age + years of service = 90 or more at time of termination <i>Inactive-vested members ineligible for Rule of 90</i>
Base Benefit <i>Payable for life</i>	<ul style="list-style-type: none"> Biennial Assemblies x \$150 <i>Future formula increases, if any, may be passed along to retirees.</i> 	<ul style="list-style-type: none"> (Active Pay ÷ 24) x Service <i>Capped at 100% of pay; future formula increases, if any, will not be passed along to retirees.</i> 	<ul style="list-style-type: none"> (Active Pay ÷ 24) x Service <i>Capped at 100% of pay; future formula increases, if any, will not be passed along to retirees.</i>
Temporary Benefit <i>Stops at age 62</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available
BackDROP <i>Lump-sum payment at retirement in addition to reduced monthly pension</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available
Benefit Payment Options <i>Determines whether or not a benefit will be paid to anyone after member's death</i>	<ul style="list-style-type: none"> Life Income Annuity Unreduced Joint & 50% Survivor Joint & 100% Survivor Life Income with 60 Guaranteed Payments Life Income with 120 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments
Cost-of-Living Adjustment (COLA) <i>Helps offset effects of inflation increasing the cost of goods and services</i>	<ul style="list-style-type: none"> Sworn in before Aug. 28, 1997 Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, rate is based on 80% of the percentage increase in the average CPI (0-5%) Sworn in on/after Aug. 28, 1997 Based on 80% of the percentage increase in the average CPI (0-5%) 	<ul style="list-style-type: none"> Benefit adjustment based on increase in pay for an active member 	<ul style="list-style-type: none"> Benefit adjustment based on increase in pay for an active member
In-Service COLA <i>Service beyond age 65</i>	<ul style="list-style-type: none"> Applicable COLA rate (if eligible) 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available

Comparison of Plans for Statewide Elected Officials

June 30, 2022

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Membership <i>Members elected to state office</i>	<ul style="list-style-type: none"> Employed prior to July 1, 2000 and vested in MSEP 	<ul style="list-style-type: none"> First employed on or after July 1, 2000, but prior to January 1, 2011 Left state employment prior to becoming vested and returned to employment on or after July 1, 2000 	<ul style="list-style-type: none"> First employed on or after January 1, 2011, or Returned to employment after electing the buyout option
Employee Contributions	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> 4% of pay
Vesting <i>Eligible for future pension</i>	<ul style="list-style-type: none"> 4 years (1 term) 	<ul style="list-style-type: none"> 4 years (1 term) 	<ul style="list-style-type: none"> 4 years (1 term)
Service Purchases	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase qualifying public sector service at full actuarial cost
Service Transfers	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800; under 105.691 with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 104.1090 or 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service.
Death Prior to Retirement	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of rate of compensation. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of rate of compensation. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. <i>Payable the month following the member's death; for inactive-vested, payable when member would have reached normal retirement eligibility</i> Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of current pay. <i>Payable the month following the member's death</i>
Early Retirement <i>Eligible for reduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 55 + 10 years of service <i>Base benefit reduced ½ of 1% (.005) for each month age is younger than normal retirement</i> 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available

Comparison of Plans for Statewide Elected Officials (continued)

June 30, 2022

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Normal Retirement <i>Eligible for unreduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 65 + 4 years of service or Age 60 + 15 years of service or Rule of 80 – (at least age 50) Age + years of service = 80 or more 	<ul style="list-style-type: none"> Age 55 + 4 years of service or Rule of 80 – (at least age 50) Age + years of service = 80 or more <i>Inactive-vested members ineligible for Rule of 80</i> 	<ul style="list-style-type: none"> Age 62 + 4 years of service or Rule of 90 – (at least age 55) Age + years of service = 90 or more at time of termination <i>Inactive-vested members ineligible for Rule of 90</i>
Base Benefit <i>Payable for life</i>	<ul style="list-style-type: none"> Less than 12 years of service .016 x FAP x Service 12+ years of service Monthly Statutory Comp. x .50 <i>Future formula increases, if any, may be passed along to retirees</i> 	<ul style="list-style-type: none"> (Active Pay ÷ 24) x Service <i>Capped at 12 years of service or 50% of pay; future formula increases, if any, will not be passed along to retirees.</i> 	<ul style="list-style-type: none"> (Active Pay ÷ 24) x Service <i>Capped at 12 years of service or 50% of pay; future formula increases, if any, will not be passed along to retirees</i>
Temporary Benefit <i>Stops at age 62</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available
BackDROP <i>Lump-sum payment at retirement in addition to reduced monthly pension</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available
Benefit Payment Options <i>Determines whether or not a benefit will be paid to anyone after member's death</i>	<ul style="list-style-type: none"> Life Income Annuity Unreduced Joint & 50% Survivor Joint & 100% Survivor Life Income with 60 Guaranteed Payments Life Income with 120 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments
Cost-of-Living Adjustment (COLA) <i>Helps offset effects of inflation increasing the cost of goods and services</i>	<ul style="list-style-type: none"> Sworn in before Aug. 28, 1997 Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, rate is based on 80% of the percentage increase in the average CPI (0-5%) Sworn in on/after Aug. 28, 1997 Based on 80% of the percentage increase in the average CPI (0-5%) 12+ years of service In addition to applicable COLA above, benefit will be recalculated for increases in statutory compensation for highest position held. 	<ul style="list-style-type: none"> Benefit adjustment based on increase in pay for an active member 	<ul style="list-style-type: none"> Benefit adjustment based on increase in pay for an active member
In-Service COLA <i>Service beyond age 65</i>	<ul style="list-style-type: none"> Applicable COLA rate (if eligible) 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available

Comparison of Plans for Judges

June 30, 2022

Benefit Provisions	Judicial Plan (Closed Plan)	Judicial Plan 2011
Membership	<ul style="list-style-type: none"> Must be employed prior to January 1, 2011 in a MOSERS benefit-eligible position as a judge or commissioner of the supreme court, court of appeals, any circuit court (does not include municipal judge), probate court, magistrate court, court of common pleas, criminal corrections, justice of the peace; commissioner or deputy commissioner of the probate division of the circuit court appointed after February 29, 1972, in a first class county having a charter form of government or in a city not within a county; commissioner of the juvenile division of the circuit court appointed pursuant to RSMo 211.023 or drug treatment court pursuant to RSMo 478.466, or any family court. 	<ul style="list-style-type: none"> Employed for the first time on or after January 1, 2011 as a judge or commissioner of the supreme court, court of appeals, any circuit court (does not include municipal judge), probate court, magistrate court, court of common pleas, criminal corrections, justice of the peace; commissioner or deputy commissioner of the probate division of the circuit court appointed after February 29, 1972, in a first class county having a charter form of government or in a city not within a county; commissioner of the juvenile division of the circuit court appointed pursuant to RSMo 211.023 or drug treatment court pursuant to RSMo 478.466, or any family court.
Employee Contributions	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> 4% of pay
Vesting <i>Eligible for future pension</i>	<ul style="list-style-type: none"> Automatic the day you become a member 	<ul style="list-style-type: none"> Automatic the day you become a member
Service Purchases	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase qualifying public sector service at full actuarial cost
Service Transfers	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800 or under 105.691 with written agreements to transfer required funds 	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800 or under 105.691 with written agreements to transfer required funds
Death Prior to Retirement	<ul style="list-style-type: none"> Nonduty-related death Survivor benefit paid to eligible spouse equal to 50% of benefit the member would have received based on service to age 70. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death Survivor benefit paid to eligible spouse equal to 50% of benefit the member would have received based on service to age 70. <i>Payable the month following the member's death</i>
Early Retirement <i>Eligible for reduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Less than 12 years of service <i>Age 62 or</i> Less than 15 years of service <i>Age 60</i> 	<ul style="list-style-type: none"> Less than 12 years of service <i>Age 67 or</i> Less than 20 years of service <i>Age 62</i>
Normal Retirement <i>Eligible for unreduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 62 + 12 years of service or Age 60 + 15 years of service or Age 55 + 20 years of service 	<ul style="list-style-type: none"> Age 67 + 12 years of service or Age 62 + 20 years of service

Comparison of Plans for Judges (continued)

June 30, 2022

Benefit Provisions	Judicial Plan (Closed Plan)	Judicial Plan 2011
Base Benefit <i>Payable for life</i>	<ul style="list-style-type: none"> • <i>Monthly pay x .50 = Monthly Base Benefit</i> 	<ul style="list-style-type: none"> • <i>Monthly pay x .50 = Monthly Base Benefit</i>
Temporary Benefit <i>Stops at age 62</i>	<ul style="list-style-type: none"> • Not available 	<ul style="list-style-type: none"> • Not available
BackDROP <i>Lump-sum payment at retirement in addition to reduced monthly pension</i>	<ul style="list-style-type: none"> • Not available 	<ul style="list-style-type: none"> • Not available
Benefit Payment Options <i>Determines whether or not a benefit will be paid to anyone after member's death</i>	<ul style="list-style-type: none"> • Life Income Annuity (if unmarried) • Automatic Unreduced Joint & 50% Survivor 	<ul style="list-style-type: none"> • Life Income Annuity • Joint & 50% Survivor • Joint & 100% Survivor • Life Income with 120 Guaranteed Payments • Life Income with 180 Guaranteed Payments
Cost-of-Living Adjustment (COLA) <i>Helps offset effects of inflation increasing the cost of goods and services</i>	<ul style="list-style-type: none"> • Sworn in before Aug. 28, 1997 Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, rate is based on 80% of the percentage increase in the average CPI (0-5%) • Sworn in on/after Aug. 28, 1997 Based on 80% of the percentage increase in the average CPI (0-5%) 	<ul style="list-style-type: none"> • Based on 80% of the percentage increase in the average CPI (0-5%)
In-Service COLA <i>Service beyond age 60</i>	<ul style="list-style-type: none"> • Judges who work beyond normal retirement have increased benefits upon retirement. 	<ul style="list-style-type: none"> • Not available

Comparison of Plans for Uniformed Members of the Water Patrol

June 30, 2022

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000
Membership <i>Eligible members employed in positions which normally require at least 1,040 hours of work per year</i>	<ul style="list-style-type: none"> Employed prior to July 1, 2000 and vested in MSEP 	<ul style="list-style-type: none"> Employed for the first time on or after July 1, 2000, but prior to January 1, 2011 Left state employment prior to becoming vested and returned to employment on or after July 1, 2000
Employee Contributions	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Vesting <i>Eligible for future pension</i>	<ul style="list-style-type: none"> 5 years 	<ul style="list-style-type: none"> 5 years
Service Purchases	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost
Service Transfers	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800 	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.1090
Death Prior to Retirement	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of average compensation. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of average compensation. <i>Payable the month following the member's death</i>
Early Retirement <i>Eligible for reduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Age 57 + 10 years of service
Normal Retirement <i>Eligible for unreduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 55 + 5 years of service or Rule of 80 – (at least age 48) Age + years of service = 80 or more <i>Age 50 if first became eligible prior to Aug. 28, 2003</i> 	<ul style="list-style-type: none"> Age 62 + 5 years of service or Rule of 80 – (at least age 48) Age + years of service = 80 or more <i>Age 50 if first became eligible prior to Aug. 28, 2003</i> <i>Inactive-vested members ineligible for Rule of 80</i>
Base Benefit <i>Payable for life</i>	<ul style="list-style-type: none"> .016 x FAP x Service increased by 33% <i>Future formula increases, if any, may be passed along to retirees</i> 	<ul style="list-style-type: none"> .017 x FAP x Service <i>Future formula increases, if any, will not be passed along to retirees</i>

Eligibility for membership in the MSEP and MSEP 2000 is closed for uniformed members of the water patrol. Employees hired on or after January 1, 2011, are members of the Missouri Department of Transportation and Patrol Employees' Retirement System (MPERS).

Comparison of Plans for Uniformed Members of the Water Patrol (continued)

June 30, 2022

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000
Temporary Benefit <i>Stops at age 62</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> .008 x FAP x Service <i>Available to members retiring under Rule of 80</i>
BackDROP <i>Lump-sum payment at retirement in addition to reduced monthly pension</i>	<ul style="list-style-type: none"> Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable) 	<ul style="list-style-type: none"> Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable)
Benefit Payment Options <i>Determines whether or not a benefit will be paid to anyone after member's death</i>	<ul style="list-style-type: none"> Life Income Annuity Unreduced Joint & 50% Survivor Joint & 100% Survivor Life Income with 60 Guaranteed Payments Life Income with 120 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments
Cost-of-Living Adjustment (COLA) <i>Helps offset effects of inflation increasing the cost of goods and services</i>	<ul style="list-style-type: none"> Employed before Aug. 28, 1997 Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, rate is based on 80% of the percentage increase in the average CPI (0-5%) Employed on/after Aug. 28, 1997 Based on 80% of the percentage increase in the average CPI (0-5%) 	<ul style="list-style-type: none"> Based on 80% of the percentage increase in the average CPI (0-5%)
In-Service COLA <i>Service beyond age 65</i>	<ul style="list-style-type: none"> COLA given for service beyond age 65 <i>COLA provisions determined by employment date</i> 	<ul style="list-style-type: none"> Not available

Eligibility for membership in the MSEP and MSEP 2000 is closed for uniformed members of the water patrol. Employees hired on or after January 1, 2011, are members of the Missouri Department of Transportation and Patrol Employees' Retirement System (MPERS).

Life Insurance Plans

June 30, 2022

MOSERS administers basic and optional term life insurance plans for eligible state employees and retirees.

Active Members*

Plan Provision	Requirement
<ul style="list-style-type: none"> • Basic life insurance An amount equal to one times annual salary (with a minimum of \$15,000) while actively employed. 	<ul style="list-style-type: none"> • Actively employed in an eligible state position resulting in membership in MOSERS.
<ul style="list-style-type: none"> • Duty-related death benefit Duty-related death benefit equivalent to two times the annual salary the member was earning at the time of death in addition to the basic life insurance amount of one times annual salary. 	<ul style="list-style-type: none"> • Actively employed in an eligible state position resulting in membership in MOSERS.
<ul style="list-style-type: none"> • Optional life insurance Additional life insurance may be purchased in a flat amount in multiples of \$10,000 not to exceed the maximum (lesser of six times annual salary or \$800,000). Spouse coverage may be purchased in multiples of \$10,000 up to a maximum of \$100,000; however, the amount of spouse coverage cannot exceed the amount of optional life insurance coverage the member has purchased. Coverage for children is available in a flat amount of \$10,000 per child. 	<ul style="list-style-type: none"> • Actively employed in an eligible state position resulting in membership in MOSERS.

* Terminating employees may convert coverage up to the amount they had as an active employee at individual rates. Not available to employees of the Department of Conservation and universities except Lincoln University and State Technical College of Missouri.

Retired Members

Plan Provision	Requirement
<ul style="list-style-type: none"> • Basic life insurance at retirement \$5,000 basic life insurance during retirement. 	<ul style="list-style-type: none"> • Must retire directly from active employment.
<ul style="list-style-type: none"> • Optional life insurance at retirement (MSEP) A member may retain up to the lesser of \$60,000 or the amount of optional life insurance coverage held at the time of retirement at the group rate and may convert any remaining basic and optional life insurance at individual rates. Coverage for spouse ends at member's retirement and may be converted at individual rates. 	<ul style="list-style-type: none"> • Must retire directly from active employment.
<ul style="list-style-type: none"> • Optional life insurance at retirement (MSEP 2000) Under "Rule of 80", a member may retain the current amount of coverage prior to retirement until age 62 at which time coverage is reduced to \$60,000, and may convert any remaining basic and optional life insurance at individual rates. Coverage for spouse ends at member's retirement and may be converted at individual rates. 	<ul style="list-style-type: none"> • Must retire directly from active employment.
<ul style="list-style-type: none"> • Optional life insurance at retirement (MSEP 2011) Under "Rule of 90", a member may retain the current amount of coverage prior to retirement until age 62 at which time coverage is reduced to \$60,000, and may convert any remaining basic and optional life insurance at individual rates. Coverage for spouse ends at member's retirement and may be converted at individual rates. 	<ul style="list-style-type: none"> • Must retire directly from active employment.

Note: Insured employees may port their life insurance and their dependent life insurance when their coverage has been reduced or terminated if they meet certain qualifications.

Long-Term Disability (LTD) Insurance Plans

June 30, 2022

MOSERS administers the LTD Plan for eligible state employees who become disabled during active employment.

Active Members

Classification	Requirement
<ul style="list-style-type: none"> • General state employees, legislators, and elected state officials Members of MOSERS in a position normally requiring 1,040 hours of work a year are covered under the LTD plan, unless they work for a state agency which has its own LTD plan. 	<ul style="list-style-type: none"> • Eligible participants receive 60% of their compensation minus primary Social Security, Workers' Compensation, and employer provided income. Benefits commence after 90 days of disability or when sick leave benefits are no longer payable, whichever occurs last. LTD benefits cease upon the earliest of (i) when disability ends, (ii) when the member is first eligible for normal retirement benefits or is receiving early retirement benefits, (iii) upon a member's death, (iv) the date benefits become payable under any other group long-term disability insurance plan, or (v) the date the member fails to provide proof of continued disability and entitlement to LTD benefits.
<ul style="list-style-type: none"> • Water patrol 	<ul style="list-style-type: none"> • Uniformed members who are eligible for statutory occupational disability receive benefits equal to 50% of compensation with no offset for Social Security at the time of disability. For nonoccupational disabilities, eligible participants receive the same benefit as general employees.
<ul style="list-style-type: none"> • Judges 	<ul style="list-style-type: none"> • In addition to the disability benefits provided to general employees, judges may receive benefits under the state constitution. Participants may receive 50% of salary until the current term expires.

Changes in Plan Provisions

The 2022 legislative session ended on May 13th. Although the MOSERS clean-up bill (House Bill 2234) moved quickly through the House Pensions Committee, it unfortunately did not receive a hearing with the House Rules - Administrative Oversight Committee. The General Assembly maintained its long-standing commitment to fully funding the Board's certified employer contribution rates through passage of the Office of Administration's appropriation to MOSERS in House Bill 3005. Additionally, the Governor and Legislature approved a \$500 million one-time extraordinary fiscal year 2023 payment to MOSERS.

House Bill 3005 - The General Assembly authorized the Office of Administration's appropriation of \$610 million to MOSERS for fiscal year 2023. This appropriation funds the Board-certified employer contribution rate. This amount was generated from the employer contribution rates calculated in the annual actuarial valuations performed by MOSERS' retained actuarial professionals and certified by the MOSERS Board of Trustees at its September 2021 Board meeting. The bill also included the one-time extraordinary payment of \$500 million to MOSERS.

Actuarial Present Values

June 30, 2022

MSEP

Actuarial Present Value June 30, 2022	Actuarial Present Value	Portion Covered by Future Normal Cost Contributions	Actuarial Accrued Liabilities
Active members			
Service retirement benefits based on services rendered before and likely to be rendered after valuation date	\$ 5,510,691,860	\$ 702,441,507	\$ 4,808,250,353
Disability benefits likely to be paid to present active members who become totally and permanently disabled	102,953,045	58,768,817	44,184,228
Survivor benefits likely to be paid to widows/widowers and children of present active members who die before retiring	60,632,750	17,539,552	43,093,198
Separation benefits likely to be paid to present active members	378,012,536	288,046,311	89,966,225
Active member totals	\$ 6,052,290,191	\$ 1,066,796,187	4,985,494,004
Members on leave of absence & LTD			
Service retirement benefits based on service rendered before the valuation date			72,118,749
Inactive-vested members			
Service retirement benefits based on service rendered before the valuation date			847,197,428
Retired lives			9,463,674,203
Pending refunds			40,510,648
Total actuarial accrued liability			15,408,995,032
Less: actuarial value of assets			8,894,328,756
Unfunded actuarial accrued liability			\$ 6,514,666,276
Funded ratio			57.7%

Actuarial Present Values

June 30, 2022

Judicial Plan

Actuarial Present Value June 30, 2022	Actuarial Present Value	Portion Covered by Future Normal Cost Contributions	Actuarial Accrued Liabilities
Active members			
Service retirement benefits based on services rendered before and likely to be rendered after valuation date	\$ 253,772,230	\$ 76,769,137	\$ 177,003,093
Survivor benefits likely to be paid to widows/widowers and children of present active members who die before retiring	4,453,709	3,215,902	1,237,807
Separation benefits likely to be paid to present active members	15,693,125	14,347,981	1,345,144
Active member totals	\$ 273,919,064	\$ 94,333,020	179,586,044
Inactive-vested members			10,365,639
Retired lives			440,091,330
Total actuarial accrued liability			630,043,013
Less: actuarial value of assets			203,997,065
Unfunded actuarial accrued liability			\$ 426,045,948
Funded ratio			32.4%



STATISTICAL SECTION

Your Statement Matters

MOSERS strives to provide the very best customer service to all stakeholders. To ensure this goal is met and maintained, we utilize customer service surveys to measure satisfaction with MOSERS processes, education, and communication endeavors.



Overview

The *Statistical Section* presents detailed information as a context for understanding what the information in the *Financial Statements*, note disclosures, and *Required Supplementary Information* says about MOSERS' overall financial health.

Financial Trends Information

- *Changes in Fiduciary Net Position* – This schedule presents financial trend information for the most recent ten fiscal years.
- *Deductions from Net Position for Benefits and Refunds by Type* – This information is intended to help the reader assess how benefit payments have changed over time.
- *Valuation Assets (Smoothed Market) vs. Pension Liabilities* – This information is intended to help the reader assess how MOSERS' funded status has changed over time.

Revenues Information

- *Employer Contribution Rates as a Percent of Payroll* – This information is intended to help the reader assess how MOSERS' contribution requirements have changed over time.

Operating & Economic Information

- *Membership in Retirement Plans* – This information is intended to help the reader assess how MOSERS' membership has changed over time.
- *Distribution of Benefit Recipients by Location* – This information is intended to help the reader evaluate where MOSERS distributes annuity payments.
- *Benefit Recipients by Type of Retirement and Option Elected* – This information is intended to help the reader understand the stratification of benefit payments by amount and elected option.
- *Benefits Tabulated by Type of Benefit and by Option* – This information is intended to help the reader understand the actuarially determined annual and average monthly benefit amounts by benefit type and option.
- *Average Monthly Benefit Amounts* – This information is intended to help the reader evaluate how benefit payments have changed over time. Figures have been stratified based on years of credited service.
- *Retirees and Beneficiaries Tabulated by Fiscal Year of Retirement* – This information is intended to help the reader understand how long current retirees have been in retirement.
- *Benefits Tabulated by Attained Ages of Benefit Recipients* – This information is intended to help the reader understand the actuarially determined annual and average monthly benefit amounts by type of recipient, and age of recipient.
- *Principal Participating Employers* – This information is intended to help the reader understand MOSERS' most significant sources of contribution revenue, and how it has changed over time.

Changes in Fiduciary Net Position

Last Ten Fiscal Years

	2022	2021	2020	2019	2018
MSEP					
<i>Additions</i>					
Employer contributions	\$ 471,302,256	\$ 463,293,368	\$ 436,895,653	\$ 394,150,042	\$ 379,557,962
Employee contributions	39,809,873	37,571,263	35,141,960	31,286,632	28,303,993
Member service purchases	2,119,195	1,520,330	1,388,992	1,293,774	2,020,720
Service transfers in	3,494,626	2,298,914	2,664,796	2,592,737	3,297,251
Investment income (net of expenses)	(816,407,543)	2,032,991,086	400,354,303	313,159,178	578,883,501
Other	5,852	80,121	133,952	496,898	538,600
Total additions to plan net position	(299,675,741)	2,537,755,082	876,579,656	742,979,261	992,602,027
<i>Deductions</i>					
Benefit payments	949,501,630	911,424,269	864,807,554	842,813,907	879,148,738
Contribution refunds	8,417,124	5,894,157	5,224,489	6,006,484	5,502,698
Service transfers out	4,672,072	2,520,166	3,784,195	3,001,189	2,060,037
Administrative expenses	9,248,916	8,816,943	8,398,164	9,200,826	10,024,178
Total deductions from plan net position	971,839,742	928,655,535	882,214,402	861,022,406	896,735,651
Change in net position	\$ (1,271,515,483)	\$ 1,609,099,547	\$ (5,634,746)	\$ (118,043,145)	\$ 95,866,376
Judicial Plan					
<i>Additions</i>					
Employer contributions	\$ 39,228,848	\$ 39,996,509	\$ 39,174,515	\$ 38,604,668	\$ 36,892,203
Employee contributions	1,550,712	1,448,428	1,314,570	1,138,101	902,320
Investment income (net of expenses)	(18,801,946)	44,049,707	8,162,709	6,051,941	10,727,603
Other	0	0	0	3,895	9,981
Total additions to plan net position	21,977,614	85,494,644	48,651,794	45,798,605	48,532,107
<i>Deductions</i>					
Benefit payments	42,513,238	41,625,546	39,622,268	37,585,484	35,651,489
Contribution refunds	17,140	0	0	7,565	5,760
Administrative expenses	79,492	75,822	74,450	72,141	185,763
Total deductions from plan net position	42,609,870	41,701,368	39,696,718	37,665,190	35,843,012
Change in net position	\$ (20,632,256)	\$ 43,793,276	\$ 8,955,076	\$ 8,133,415	\$ 12,689,095
Insurance Activities					
<i>Additions</i>					
Premium receipts	\$ 29,924,611	\$ 31,609,219	\$ 32,582,558	\$ 31,342,778	\$ 31,119,232
Investment income	4,258	1,869	46,539	121,298	79,389
Miscellaneous income	480,120	480,074	484,075	494,722	480,120
Total operating revenues	30,408,989	32,091,162	33,113,172	31,958,798	31,678,741
<i>Deductions</i>					
Premium disbursements	29,896,004	31,597,820	32,549,567	31,325,399	31,100,612
Premium refunds	28,608	11,401	32,991	17,379	14,211
Administrative expenses	480,122	480,120	480,120	501,018	526,023
Total deductions from net position	30,404,734	32,089,341	33,062,678	31,843,796	31,640,846
Change in net position	\$ 4,255	\$ 1,821	\$ 50,494	\$ 115,002	\$ 37,895

Changes in Net position continued on following page

Changes in Fiduciary Net Position (continued)

Last Ten Fiscal Years

	2017	2016	2015	2014	2013
MSEP					
<i>Additions</i>					
Employer contributions	\$ 335,217,422	\$ 329,957,369	\$ 329,752,832	\$ 326,370,336	\$ 274,655,284
Employee contributions	25,439,343	21,684,920	18,099,455	14,025,328	9,698,883
Member service purchases	1,691,046	2,815,749	1,859,005	2,909,423	3,475,123
Service transfers in	3,977,803	2,107,873	3,575,815	2,252,206	2,446,627
Investment income (net of expenses)	272,073,643	1,194,422	(237,603,530)	1,484,709,539	778,008,348
Other	522,025	545,847	533,001	450,453	489,193
Total additions to plan net position	638,921,282	358,306,180	116,216,578	1,830,717,285	1,068,773,458
<i>Deductions</i>					
Benefit payments	787,300,328	750,440,412	723,994,041	677,097,411	646,708,308
Contribution refunds	4,820,737	3,798,199	2,479,264	1,421,856	622,341
Service transfers out	1,843,792	3,071,892	1,792,495	1,916,840	1,911,665
Administrative expenses	8,759,341	8,489,375	8,077,692	7,336,922	7,575,883
Total deductions from plan net position	802,724,198	765,799,878	736,343,492	687,773,029	656,818,197
Change in net position	\$ (163,802,916)	\$ (407,493,698)	\$ (620,126,914)	\$ 1,142,944,256	\$ 411,955,261
Judicial Plan					
<i>Additions</i>					
Employer contributions	\$ 34,246,826	\$ 33,642,497	\$ 32,696,686	\$ 29,264,877	\$ 28,330,649
Employee contributions	786,745	661,206	488,193	294,810	211,936
Investment income (net of expenses)	4,671,168	19,273	(3,618,469)	21,388,261	10,724,252
Other	8,963	8,808	8,117	6,489	6,743
Total additions to plan net position	39,713,702	34,331,784	29,574,527	50,954,437	39,273,580
<i>Deductions</i>					
Benefit payments	33,979,837	32,979,706	31,245,906	29,406,625	27,802,871
Contribution refunds	4,888	10,008	0	0	0
Administrative expenses	150,387	136,983	123,015	105,693	104,428
Total deductions from plan net position	34,135,112	33,126,697	31,368,921	29,512,318	27,907,299
Change in net position	\$ 5,578,590	\$ 1,205,087	\$ (1,794,394)	\$ 21,442,119	\$ 11,366,281
Insurance Activities					
<i>Additions</i>					
Premium receipts	\$ 28,779,398	\$ 30,360,162	\$ 30,177,918	\$ 29,563,054	\$ 28,961,637
Investment income	33,984	15,207	9,749	11,886	12,075
Miscellaneous income	480,120	480,120	(519,880)	1,480,120	480,120
Total operating revenues	29,293,502	30,855,489	29,667,787	31,055,060	29,453,832
<i>Deductions</i>					
Premium disbursements	28,769,588	30,328,802	30,157,271	29,544,110	28,930,950
Premium refunds	9,810	31,360	20,646	18,942	30,687
Administrative expenses	532,169	550,843	516,782	435,830	472,792
Total deductions from net position	29,311,567	30,911,005	30,694,699	29,998,882	29,434,429
Change in net position	\$ (18,065)	\$ (55,516)	\$ (1,026,912)	\$ 1,056,178	\$ 19,403

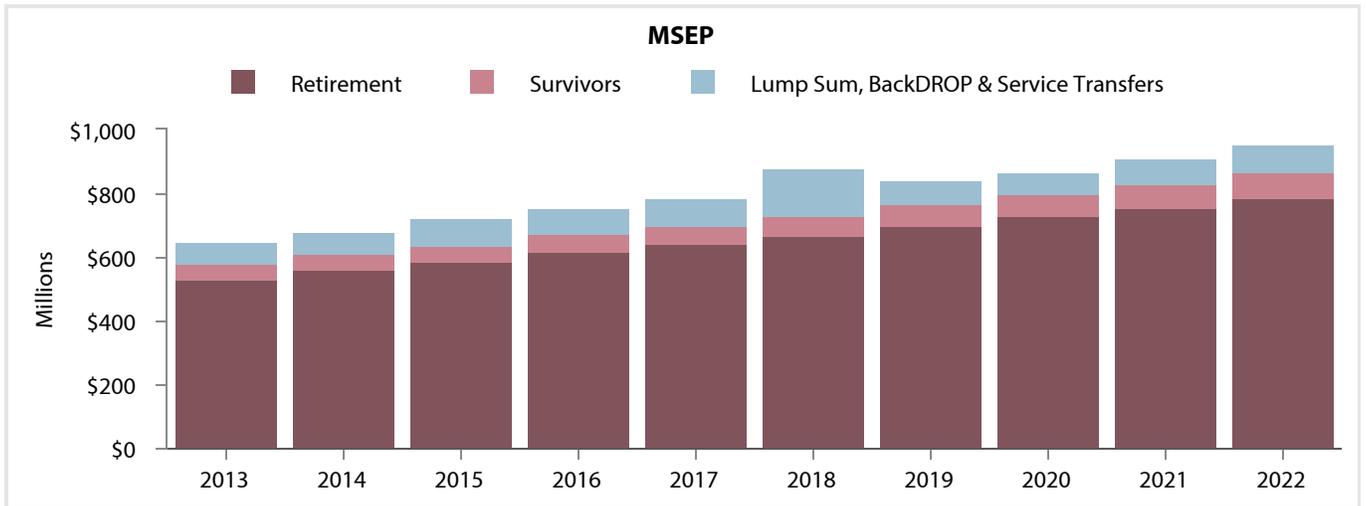
Deductions from Net Position for Benefits and Refunds by Type

Last Ten Fiscal Years

MSEP

Type of benefit	2013	2014	2015	2016	2017
Retirement	\$ 533,962,630	\$ 560,553,490	\$ 586,597,187	\$ 615,708,229	\$ 640,637,749
Survivors	46,659,381	49,922,170	52,940,062	56,495,787	59,628,687
Disability	27,255	22,468	16,857	15,470	14,821
Lump-sum	191,320	286,184	57,525	267,198	123,005
BackDROP	65,867,723	66,313,097	84,382,410	77,953,728	86,896,066
Service transfers	1,911,665	1,916,840	1,792,495	3,071,892	1,843,792
Total benefits	\$ 648,619,974	\$ 679,014,249	\$ 725,786,536	\$ 753,512,304	\$ 789,144,120
Refunds - separation of service	\$ 617,563	\$ 1,409,958	\$ 2,435,771	\$ 3,750,757	\$ 4,777,245
Refunds - death	4,778	11,898	43,493	47,442	43,492
Total contribution refunds	\$ 622,341	\$ 1,421,856	\$ 2,479,264	\$ 3,798,199	\$ 4,820,737

Type of benefit	2018	2019	2020	2021	2022
Retirement	\$ 670,663,932	\$ 703,117,097	\$ 730,310,371	\$ 757,076,179	\$ 789,168,797
Survivors	63,081,129	66,493,496	70,583,387	74,890,437	79,635,271
Disability	5,223	2,260	2,300	2,328	1,171
Lump-sum	61,041,258	318,656	245,297	92,059	695,778
BackDROP	84,357,196	72,882,398	63,666,199	79,363,265	80,000,613
Service transfers	2,060,037	3,001,189	3,784,195	2,520,166	4,672,072
Total benefits	\$ 881,208,775	\$ 845,815,096	\$ 868,591,749	\$ 913,944,434	\$ 954,173,702
Refunds - separation of service	\$ 5,396,418	\$ 5,930,152	\$ 5,143,987	\$ 5,704,491	\$ 8,257,062
Refunds - death	106,280	76,332	80,502	189,666	160,062
Total contribution refunds	\$ 5,502,698	\$ 6,006,484	\$ 5,224,489	\$ 5,894,157	\$ 8,417,124



Source: MOSERS' financial records

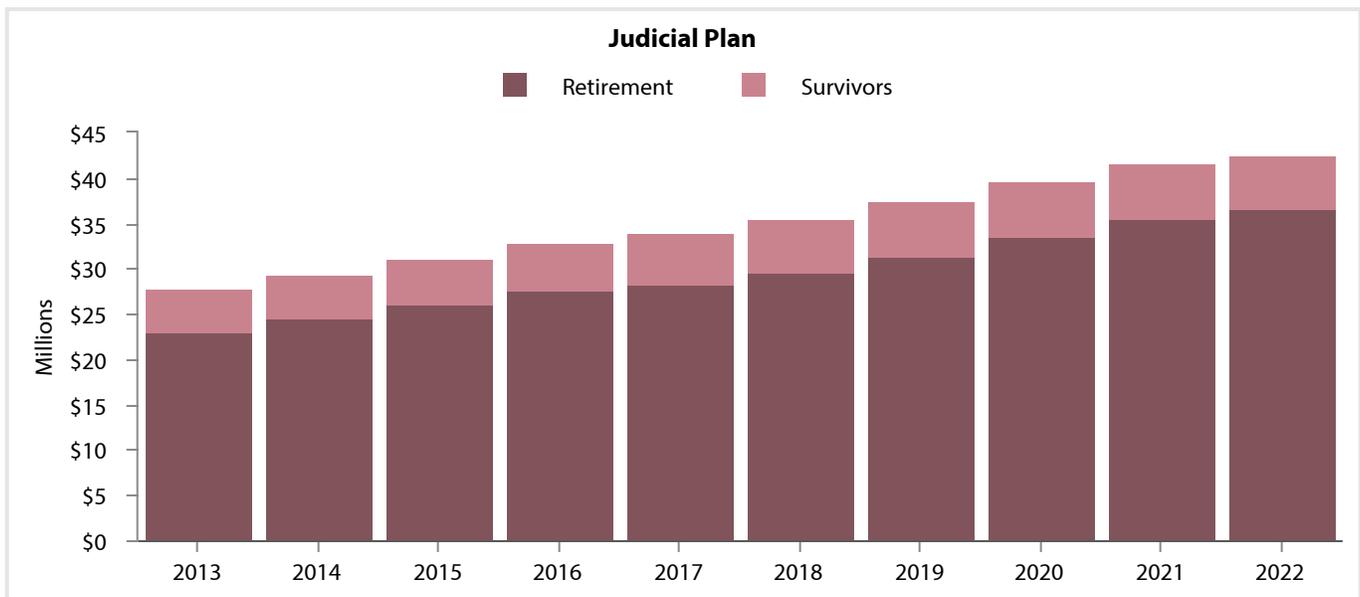
Deductions from Net Position for Benefits and Refunds by Type (continued)

Last Ten Fiscal Years

Judicial Plan

Type of benefit	2013	2014	2015	2016	2017
Retirement	\$ 23,123,707	\$ 24,609,421	\$ 26,181,505	\$ 27,641,108	\$ 28,304,733
Survivors	4,679,169	4,797,204	5,064,400	5,338,598	5,675,104
Total benefits	\$ 27,802,876	\$ 29,406,625	\$ 31,245,905	\$ 32,979,706	\$ 33,979,837
Refunds - separation of service	\$ 0	\$ 0	\$ 0	\$ 10,008	\$ 4,888

Type of benefit	2018	2019	2020	2021	2022
Retirement	\$ 29,655,995	\$ 31,463,475	\$ 33,577,616	\$ 35,487,401	\$ 36,654,586
Survivors	5,995,494	6,122,009	6,044,652	6,138,145	5,858,652
Total benefits	\$ 35,651,489	\$ 37,585,484	\$ 39,622,268	\$ 41,625,546	\$ 42,513,238
Refunds - separation of service	\$ 5,760	\$ 7,565	\$ 0	\$ 0	\$ 17,140



Source: MOSERS' financial records

Pension Trust Funds

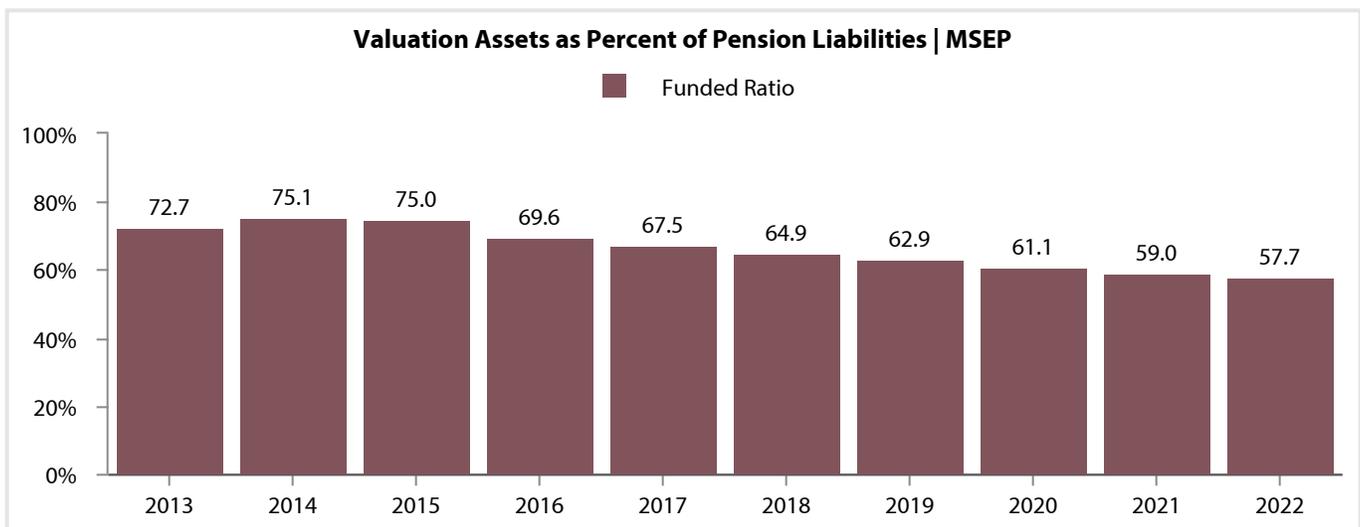
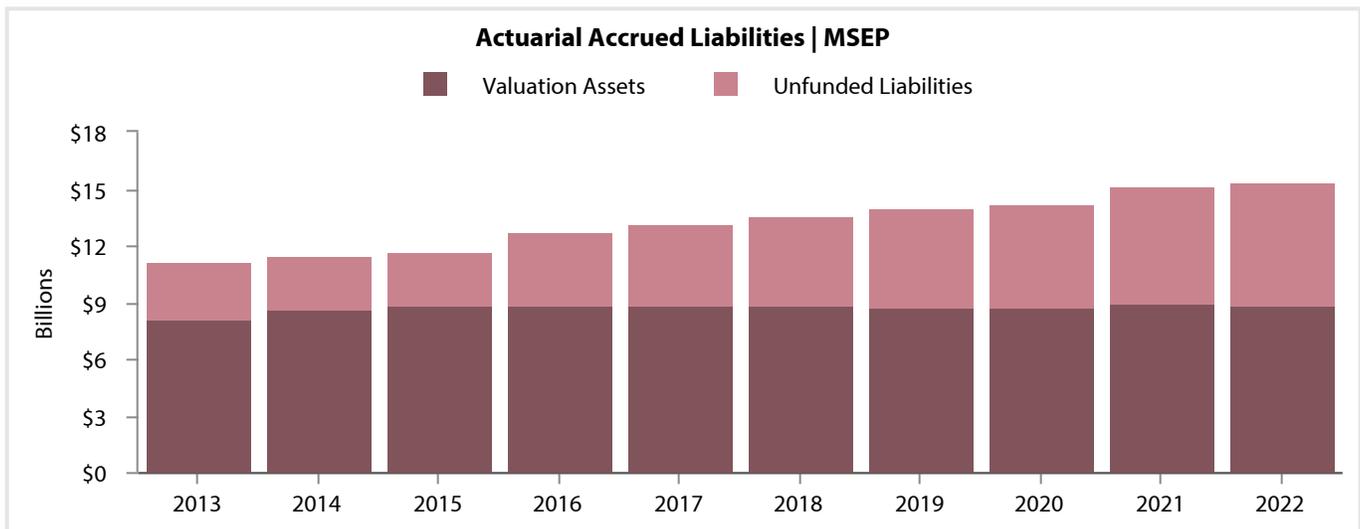
Valuation Assets (Smoothed Market) vs. Pension Liabilities

Last Ten Fiscal Years

MSEP

Dollars in Billions

Fiscal Year	Valuation Assets	Unfunded Liabilities	Accrued Liabilities	Funded Ratio
2013	\$8.0964	\$3.0382	\$11.1346	72.7%
2014	8.6378	2.8568	11.4946	75.1
2015	8.7925	2.9351	11.7276	75.0
2016	8.8781	3.8731	12.7512	69.6
2017	8.8724	4.2799	13.1523	67.5
2018	8.8304	4.7824	13.6128	64.9
2019	8.7824	5.1752	13.9576	62.9
2020	8.7112	5.5472	14.2584	61.1
2021	8.9093	6.2014	15.1106	59.0
2022	8.8943	6.5147	15.4090	57.7



Source: MOSERS' MSEP Actuarial Valuation Reports, most recent 10 years

Pension Trust Funds

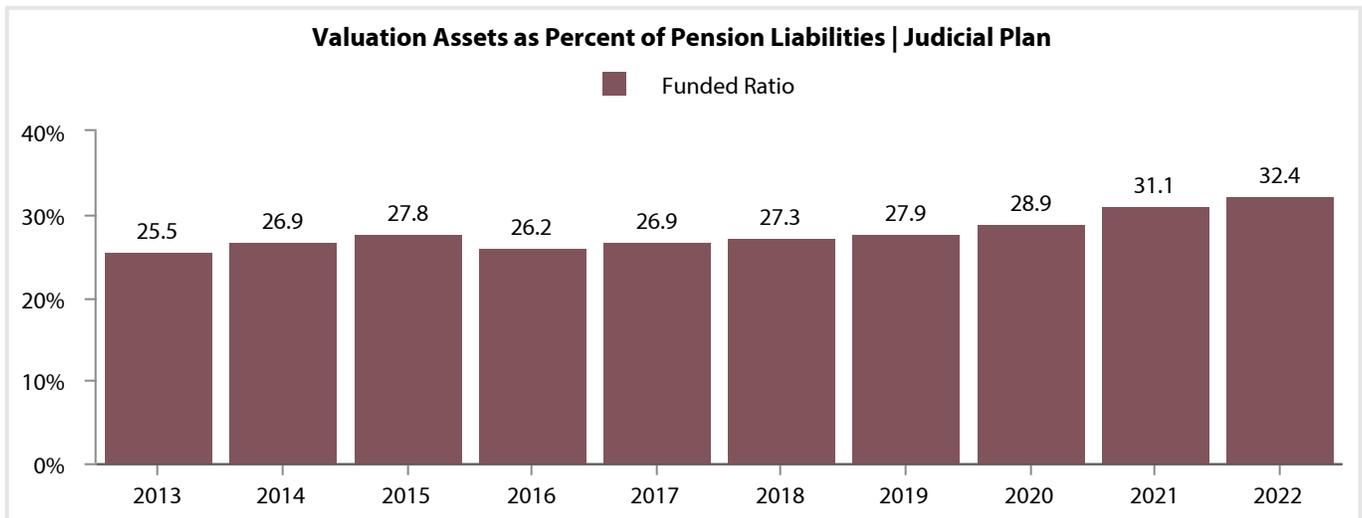
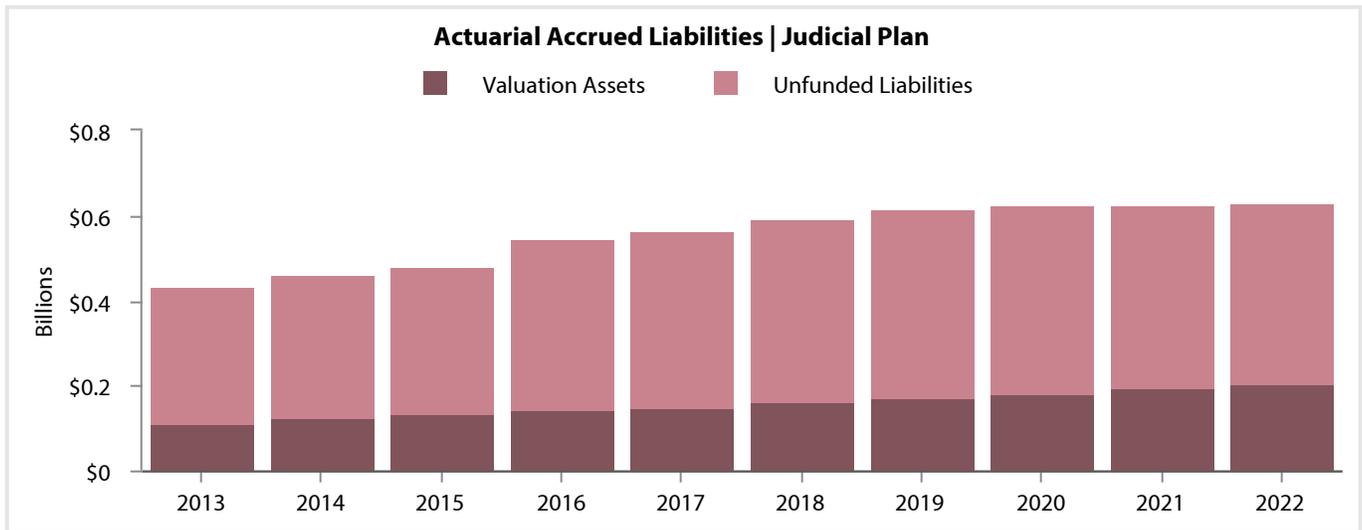
Valuation Assets (Smoothed Market) vs. Pension Liabilities (continued)

Last Ten Fiscal Years

Judicial Plan

Dollars in Billions

Fiscal Year	Valuation Assets	Unfunded Liabilities	Accrued Liabilities	Funded Ratio
2013	\$0.1111	\$0.3242	\$0.4354	25.5%
2014	0.1243	0.3381	0.4623	26.9
2015	0.1343	0.3486	0.4830	27.8
2016	0.1435	0.4042	0.5476	26.2
2017	0.1518	0.4126	0.5644	26.9
2018	0.1621	0.4317	0.5938	27.3
2019	0.1722	0.4453	0.6175	27.9
2020	0.1807	0.4441	0.6248	28.9
2021	0.1950	0.4313	0.6263	31.1
2022	0.2040	0.4260	0.6300	32.4



Source: MOSERS' Judicial Plan Actuarial Valuation Reports, most recent 10 years

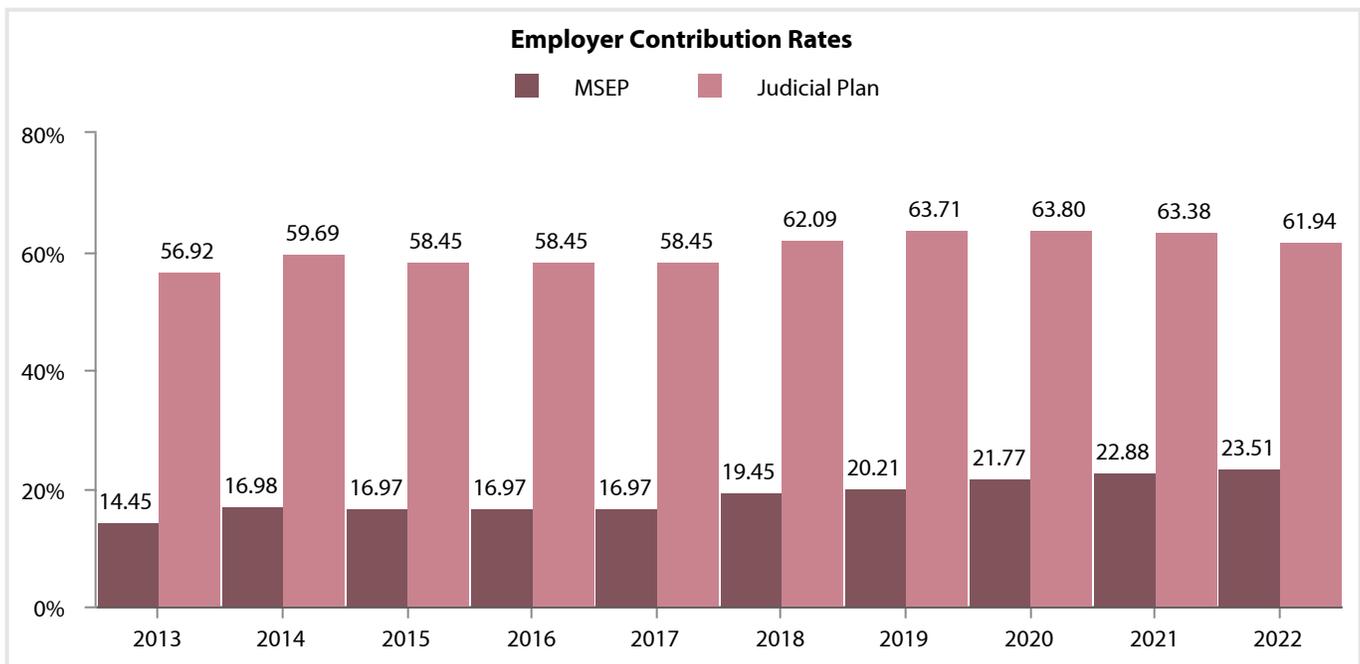
Pension Trust Funds

Employer Contribution Rates as a Percent of Payroll

Last Ten Fiscal Years

Fiscal Year	MSEP	Judicial
2013	14.45%	56.92%
2014	16.98	59.69
2015	16.97	58.45
2016	16.97	58.45
2017	16.97	58.45
2018	19.45	62.09
2019	20.21	63.71
2020	21.77	63.80
2021	22.88	63.38
2022	23.51	61.94

Note: In addition to the employer contribution rates, MOSERS also receives a fixed 4% employee contribution from MSEP 2011 and Judicial Plan 2011 members.



Source: MOSERS' MSEP and Judicial Plan Actuarial Valuation Reports, most recent 10 years

Membership in Retirement Plans

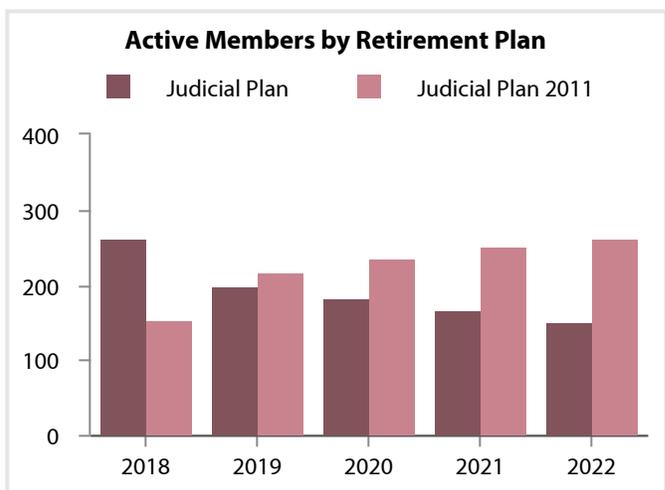
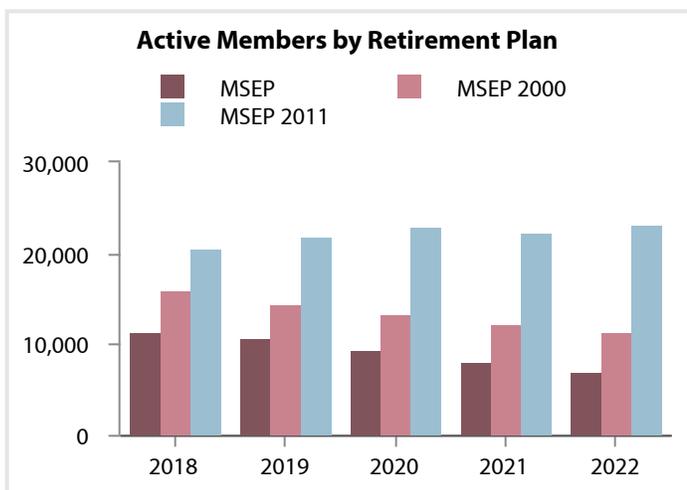
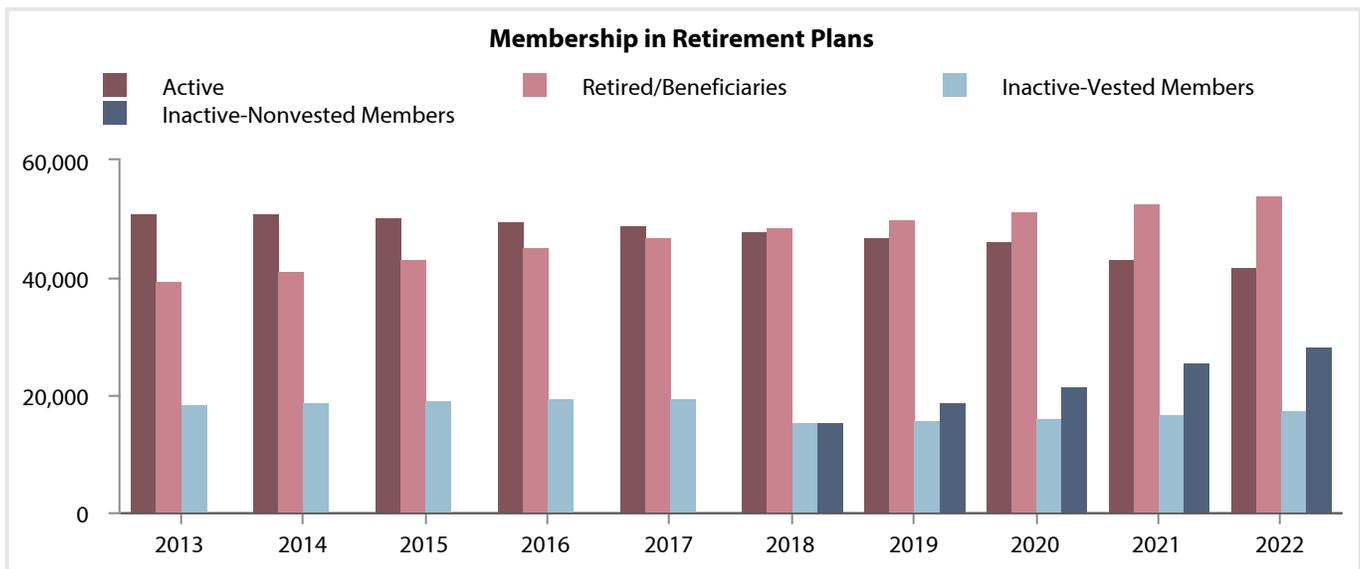
Last Ten Fiscal Years

MSEP & Judicial Plans Combined

Fiscal Year	Active Members	Retirees and Beneficiaries	Inactive-Vested Members*	Inactive-Nonvested Members**	Totals
2013	51,233	39,636	18,581		109,450
2014	51,026	41,511	18,957		111,494
2015	50,385	43,503	19,319		113,207
2016	49,872	45,368	19,538		114,778
2017	49,320	47,119	19,603		116,042
2018	48,221	48,776	15,502	15,619	128,118
2019	47,278	50,281	16,052	18,852	132,463
2020	46,417	51,447	16,335	21,735	135,934
2021	43,247	52,830	16,986	25,613	138,676
2022	42,010	54,244	17,465	28,444	142,163

* Excludes members on leave of absence and long-term disability.

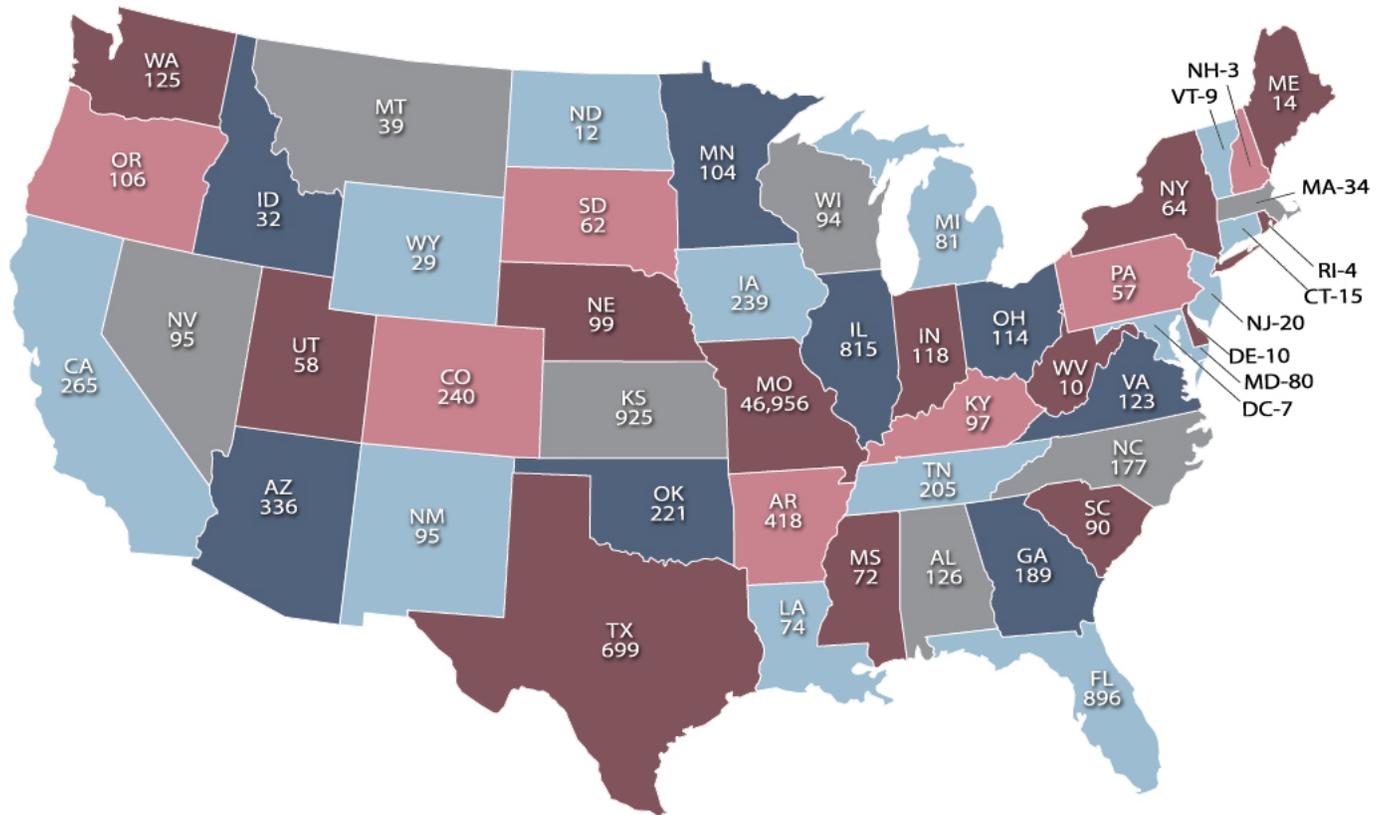
** Inactive-nonvested members of the MSEP 2011 who have not requested a refund of their contributions are now being included in the membership data.



Source: MOSERS' MSEP and Judicial Plan Actuarial Valuation Reports, most recent 10 years

Distribution of Benefit Recipients by Location

June 30, 2022



Benefit Recipients Outside the Continental United States

22 Alaska	2 Guam	1 Northern Mariana Islands
15 Hawaii	1 Germany	3 Puerto Rico
2 APO	1 Hong Kong	1 Philippines
1 Argentina	1 India	1 Spain
2 Australia	1 Ireland	2 Sweden
1 Belgium	1 Israel	2 Thailand
12 Canada	3 Italy	5 United Kingdom
1 Costa Rica	1 Latvia	5 Virgin Islands
1 Czech Republic	1 Mexico	
1 Ecuador	1 Marshall Islands	

Source: MOSERS' Pension Administration System

Benefit Recipients by Type of Retirement and Option Elected

June 30, 2022

MSEP

Amount of Monthly Benefit	Number of Benefit Recipients	Type of Retirement						
		A	B	C	D	E	F	G
1-250	5,462	2,033	2,544	233	540	0	0	112
251-500	8,690	4,215	3,121	433	803	0	0	118
501-750	6,217	3,572	1,548	311	731	0	0	55
751-1000	5,284	3,687	811	215	529	0	0	42
1001-1250	5,269	4,278	409	154	407	0	0	21
1251-1500	4,513	3,910	178	116	301	0	0	8
1501-1750	3,837	3,435	109	82	206	0	0	5
1751-2000	3,071	2,798	61	46	162	0	0	4
Over 2000	11,891	10,915	110	197	663	0	0	6
Total	54,234	38,843	8,891	1,787	4,342	0	0	371

Judicial Plan

Amount of Monthly Benefit	Number of Benefit Recipients	Type of Retirement						
		A	B	C	D	E	F	G
1-250	2	0	1	0	1	0	0	0
251-500	10	0	6	0	3	0	0	1
501-750	8	0	5	0	1	0	0	2
751-1000	5	0	1	1	2	0	0	1
1001-1250	5	0	4	0	0	0	0	1
1251-1500	4	0	1	1	2	0	0	0
1501-1750	10	0	5	1	1	0	0	3
1751-2000	7	1	1	2	2	0	0	1
Over 2000	560	362	61	26	104	0	0	7
Total	611	363	85	31	116	0	0	16

Type of Retirement

- A - Normal retirement
- B - Early retirement
- C - Survivor of active
- D - Survivor of retired
- E - Disability
- F - Occupational disability (Water Patrol)
- G - Ex-spouse

Source: MOSERS' Pension Administration System

Benefit Recipients by Type of Retirement and Option Elected (continued)

June 30, 2022

MSEP

Amount of Monthly Benefit	Option Elected									
	1	2	3	4	5	6	7	8	9	10
1-250	0	12	260	244	344	0	1,262	264	42	3,034
251-500	6	26	307	321	583	1	1,910	611	28	4,897
501-750	8	24	183	132	474	0	1,307	807	20	3,262
751-1000	9	23	113	89	406	1	1,240	830	5	2,568
1001-1250	6	15	88	51	520	0	1,232	808	5	2,544
1251-1500	7	15	58	49	516	0	1,057	616	2	2,193
1501-1750	5	10	59	32	473	0	843	481	3	1,931
1751-2000	3	5	39	25	433	0	675	384	0	1,507
Over 2000	78	28	113	59	1,599	0	3,166	1,613	1	5,234
Total	122	158	1,220	1,002	5,348	2	12,692	6,414	106	27,170

Judicial Plan

Amount of Monthly Benefit	Option Elected									
	1	2	3	4	5	6	7	8	9	10
1-250	2	0	0	0	0	0	0	0	0	0
251-500	9	0	0	0	0	0	0	0	0	1
501-750	4	0	0	0	1	0	1	0	0	2
751-1000	2	0	0	0	0	0	1	0	0	2
1001-1250	3	0	0	0	0	0	0	0	0	2
1251-1500	4	0	0	0	0	0	0	0	0	0
1501-1750	6	0	0	0	1	0	0	0	0	3
1751-2000	6	0	0	0	0	0	0	0	0	1
Over 2000	526	0	0	1	15	0	2	0	1	15
Total	562	0	0	1	17	0	4	0	1	26

Option Elected

- 1 - Automatic Joint & 50% Survivor
- 2 - Life Income with 60 Guaranteed Payments
- 3 - Life Income with 120 Guaranteed Payments
- 4 - Life Income with 180 Guaranteed Payments
- 5 - Joint & 50% Survivor
- 6 - Joint & 75% Survivor
- 7 - Joint & 100% Survivor
- 8 - Unreduced Joint & 50% Survivor
- 9 - Automatic Minor Survivor
- 10 - No Survivor Option (includes pop-ups)

Benefits Tabulated by Type of Benefit and by Option

June 30, 2022

MSEP Combined

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	26,648	\$ 403,835,556	\$ 15,154
Unreduced joint & 50% survivor	9,787	209,167,512	21,372
Joint & 100% survivor	9,019	168,317,448	18,663
Life income with 60 guaranteed payments	155	2,403,732	15,508
Life income with 120 guaranteed payments	1,110	11,850,540	10,676
Life income with 180 guaranteed payments	818	7,097,100	8,676
Survivor beneficiary	4,327	60,183,588	13,909
Total	51,864	862,855,476	16,637
Death-in-service	1,784	20,933,484	11,734
Grand totals	53,648	\$ 883,788,960	16,474

Judicial Plan Combined

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	5	\$ 293,304	\$ 58,661
Unreduced joint & 50% survivor	439	36,556,908	83,273
Joint & 100% survivor	4	121,632	30,408
Life income with 180 guaranteed payments	1	64,848	64,848
Survivor beneficiary	116	4,746,600	40,919
Total	565	41,783,292	73,953
Death-in-service	31	1,123,140	36,230
Grand totals	596	\$ 42,906,432	71,991

Source: MOSERS' MSEP and Judicial Plan Actuarial Valuation Reports as of June 30, 2022

Benefits Tabulated by Type of Benefit and by Option (continued)

June 30, 2022

MSEP (Closed Plan)

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	5,844	\$ 102,819,360	\$ 17,594
Unreduced joint & 50% survivor	5,040	112,346,400	22,291
Joint & 100% survivor	3,132	76,148,772	24,313
Life income with 60 guaranteed payments	138	2,114,616	15,323
Life income with 120 guaranteed payments	180	2,488,440	13,825
Survivor beneficiary	2,722	43,710,228	16,058
Total	17,056	339,627,816	19,913
Death-in-service	1,399	18,723,528	13,384
Grand totals	18,455	\$ 358,351,344	19,418

MSEP 2000

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	20,499	\$ 299,650,872	\$ 14,618
Unreduced joint & 50% survivor	4,713	96,674,196	20,512
Joint & 100% survivor	5,782	91,701,708	15,860
Life income with 60 guaranteed payments	17	289,116	17,007
Life income with 120 guaranteed payments	914	9,285,948	10,160
Life income with 180 guaranteed payments	792	6,972,612	8,804
Survivor beneficiary	1,600	16,461,768	10,289
Total	34,317	521,036,220	15,183
Death-in-service	361	2,101,152	5,820
Grand totals	34,678	\$ 523,137,372	15,086

MSEP 2011

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	305	\$ 1,365,324	\$ 4,476
Unreduced joint & 50% survivor	34	146,916	4,321
Joint & 100% survivor	105	466,968	4,447
Life income with 120 guaranteed payments	16	76,152	4,760
Life income with 180 guaranteed payments	26	124,488	4,788
Survivor beneficiary	5	11,592	2,318
Total	491	2,191,440	4,463
Death-in-service	24	108,804	4,534
Grand totals	515	\$ 2,300,244	4,466

Benefits Tabulated by Type of Benefit and by Option (continued)

June 30, 2022

Judicial Plan

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	2	\$ 171,168	\$ 85,584
Unreduced joint & 50% survivor	437	36,461,412	83,436
Survivor beneficiary	116	4,746,600	40,919
Total	555	41,379,180	74,557
Death-in-service	29	1,079,412	37,221
Grand totals	584	\$ 42,458,592	72,703

Judicial Plan 2011

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	3	\$ 122,136	\$ 40,712
Unreduced joint & 50% survivor	2	95,496	47,748
Joint & 100% survivor	4	121,632	30,408
Life income with 180 guaranteed payments	1	64,848	64,848
Total	10	404,112	40,411
Death-in-service	2	43,728	21,864
Grand totals	12	\$ 447,840	37,320

Source: MOSERS' MSEP and Judicial Plan Actuarial Valuation Reports as of June 30, 2022

Average Monthly Benefit Amounts

Last Ten Fiscal Years

MSEP

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2013	Average monthly benefit	\$ 251	\$ 326	\$ 523	\$ 753	\$ 1,243	\$ 1,697	\$ 2,017	\$ 928
	Average final salary	\$ 3,744	\$ 2,665	\$ 2,593	\$ 2,814	\$ 3,314	\$ 3,637	\$ 3,689	\$ 3,011
	Number of retirees	5	600	558	386	438	388	204	2,579
2014	Average monthly benefit	\$ 280	\$ 308	\$ 520	\$ 809	\$ 1,199	\$ 1,691	\$ 2,207	\$ 937
	Average final salary	\$ 4,426	\$ 2,675	\$ 2,614	\$ 3,029	\$ 3,229	\$ 3,650	\$ 3,999	\$ 3,066
	Number of retirees	5	636	507	370	436	392	199	2,545
2015	Average monthly benefit	\$ 219	\$ 315	\$ 522	\$ 801	\$ 1,268	\$ 1,723	\$ 2,217	\$ 999
	Average final salary	\$ 5,058	\$ 2,596	\$ 2,624	\$ 2,954	\$ 3,416	\$ 3,729	\$ 4,016	\$ 3,119
	Number of retirees	6	644	519	437	450	487	250	2,793
2016	Average monthly benefit	\$ 151	\$ 307	\$ 506	\$ 819	\$ 1,300	\$ 1,838	\$ 2,360	\$ 1,016
	Average final salary	\$ 3,284	\$ 2,623	\$ 2,600	\$ 3,020	\$ 3,445	\$ 3,968	\$ 4,204	\$ 3,175
	Number of retirees	6	611	502	430	505	423	215	2,692
2017	Average monthly benefit	\$ 309	\$ 339	\$ 562	\$ 946	\$ 1,365	\$ 1,860	\$ 2,391	\$ 1,116
	Average final salary	\$ 4,658	\$ 2,731	\$ 2,849	\$ 3,426	\$ 3,641	\$ 4,030	\$ 4,291	\$ 3,406
	Number of retirees	9	518	508	459	440	477	239	2,650
2018	Average monthly benefit	\$ 402	\$ 338	\$ 584	\$ 922	\$ 1,420	\$ 1,887	\$ 2,511	\$ 1,148
	Average final salary	\$ 5,977	\$ 2,815	\$ 2,899	\$ 3,323	\$ 3,802	\$ 4,096	\$ 4,538	\$ 3,488
	Number of retirees	7	523	475	486	520	515	208	2,734
2019	Average monthly benefit	\$ 198	\$ 369	\$ 609	\$ 886	\$ 1,356	\$ 1,840	\$ 2,321	\$ 1,131
	Average final salary	\$ 5,081	\$ 2,907	\$ 2,900	\$ 3,076	\$ 3,637	\$ 3,978	\$ 4,206	\$ 3,390
	Number of retirees	3	484	388	409	456	428	225	2,393
2020	Average monthly benefit	\$ 270	\$ 321	\$ 602	\$ 901	\$ 1,375	\$ 1,822	\$ 2,391	\$ 1,110
	Average final salary	\$ 5,379	\$ 2,677	\$ 3,012	\$ 3,149	\$ 3,707	\$ 3,967	\$ 4,329	\$ 3,390
	Number of retirees	8	475	378	378	447	441	172	2,299
2021	Average monthly benefit	\$ 526	\$ 353	\$ 624	\$ 966	\$ 1,420	\$ 1,952	\$ 2,554	\$ 1,195
	Average final salary	\$ 5,705	\$ 2,763	\$ 3,054	\$ 3,337	\$ 3,798	\$ 4,257	\$ 4,651	\$ 3,561
	Number of retirees	9	481	456	390	568	464	207	2,575
2022	Average monthly benefit	\$ 330	\$ 332	\$ 630	\$ 987	\$ 1,418	\$ 1,934	\$ 2,556	\$ 1,197
	Average final salary	\$ 5,506	\$ 2,822	\$ 3,123	\$ 3,448	\$ 3,772	\$ 4,201	\$ 4,634	\$ 3,584
	Number of retirees	7	576	414	398	579	532	222	2,728
Ten Years Ended June 30, 2022									
	Average monthly benefit	\$ 312	\$ 329	\$ 564	\$ 880	\$ 1,342	\$ 1,830	\$ 2,352	\$ 1,077
	Average final average salary	\$ 4,967	\$ 2,721	\$ 2,808	\$ 3,163	\$ 3,590	\$ 3,965	\$ 4,254	\$ 3,319
	Number of retirees	65	5,548	4,705	4,143	4,839	4,547	2,141	25,988

Note: COLA increases and temporary benefits payable under MSEP 2000 until age 62 are excluded from the above for comparison purposes.

Source: MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

General Employees in the MSEP*

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2013	Average monthly benefit	\$ 169	\$ 301	\$ 502	\$ 746	\$ 1,234	\$ 1,697	\$ 1,995	\$ 921
	Average final salary	\$ 4,244	\$ 2,653	\$ 2,568	\$ 2,813	\$ 3,295	\$ 3,637	\$ 3,645	\$ 3,001
	Number of retirees	3	574	551	384	437	388	203	2,540
2014	Average monthly benefit	\$ 262	\$ 298	\$ 514	\$ 803	\$ 1,195	\$ 1,691	\$ 2,207	\$ 935
	Average final salary	\$ 5,382	\$ 2,663	\$ 2,612	\$ 3,029	\$ 3,230	\$ 3,650	\$ 3,999	\$ 3,065
	Number of retirees	3	629	503	368	435	392	199	2,529
2015	Average monthly benefit	\$ 219	\$ 301	\$ 517	\$ 786	\$ 1,268	\$ 1,723	\$ 2,208	\$ 994
	Average final salary	\$ 5,058	\$ 2,581	\$ 2,623	\$ 2,947	\$ 3,416	\$ 3,729	\$ 4,007	\$ 3,116
	Number of retirees	6	633	517	433	450	487	249	2,775
2016	Average monthly benefit	\$ 151	\$ 297	\$ 506	\$ 819	\$ 1,285	\$ 1,838	\$ 2,343	\$ 1,011
	Average final salary	\$ 3,284	\$ 2,617	\$ 2,600	\$ 3,020	\$ 3,420	\$ 3,968	\$ 4,184	\$ 3,168
	Number of retirees	6	603	502	430	502	423	213	2,679
2017	Average monthly benefit	\$ 230	\$ 313	\$ 551	\$ 934	\$ 1,355	\$ 1,853	\$ 2,379	\$ 1,109
	Average final salary	\$ 5,026	\$ 2,710	\$ 2,839	\$ 3,414	\$ 3,624	\$ 4,016	\$ 4,265	\$ 3,395
	Number of retirees	6	500	504	456	439	476	238	2,619
2018	Average monthly benefit	\$ 220	\$ 329	\$ 577	\$ 921	\$ 1,397	\$ 1,887	\$ 2,511	\$ 1,142
	Average final salary	\$ 5,477	\$ 2,813	\$ 2,889	\$ 3,321	\$ 3,762	\$ 4,096	\$ 4,538	\$ 3,477
	Number of retirees	6	517	474	485	517	515	208	2,722
2019	Average monthly benefit	\$ 198	\$ 340	\$ 594	\$ 868	\$ 1,345	\$ 1,840	\$ 2,321	\$ 1,126
	Average final salary	\$ 5,081	\$ 2,903	\$ 2,885	\$ 3,077	\$ 3,624	\$ 3,978	\$ 4,206	\$ 3,390
	Number of retirees	3	463	384	403	454	428	225	2,360
2020	Average monthly benefit	\$ 237	\$ 307	\$ 597	\$ 901	\$ 1,360	\$ 1,814	\$ 2,391	\$ 1,105
	Average final salary	\$ 5,720	\$ 2,658	\$ 3,012	\$ 3,149	\$ 3,682	\$ 3,952	\$ 4,329	\$ 3,381
	Number of retirees	7	468	376	378	445	440	172	2,286
2021	Average monthly benefit	\$ 467	\$ 319	\$ 616	\$ 958	\$ 1,413	\$ 1,946	\$ 2,542	\$ 1,191
	Average final salary	\$ 5,797	\$ 2,747	\$ 3,055	\$ 3,340	\$ 3,787	\$ 4,245	\$ 4,636	\$ 3,560
	Number of retirees	8	457	452	387	567	463	206	2,540
2022	Average monthly benefit	\$ 300	\$ 326	\$ 627	\$ 987	\$ 1,418	\$ 1,928	\$ 2,556	\$ 1,196
	Average final salary	\$ 5,912	\$ 2,820	\$ 3,123	\$ 3,448	\$ 3,772	\$ 4,189	\$ 4,634	\$ 3,583
	Number of retirees	6	571	413	398	579	531	222	2,720
Ten Years Ended June 30, 2022									
	Average monthly benefit	\$ 259	\$ 312	\$ 556	\$ 874	\$ 1,333	\$ 1,827	\$ 2,345	\$ 1,073
	Average final average salary	\$ 5,168	\$ 2,710	\$ 2,802	\$ 3,162	\$ 3,575	\$ 3,960	\$ 4,243	\$ 3,313
	Number of retirees	54	5,415	4,676	4,122	4,825	4,543	2,135	25,770

* Excludes legislators, elected officials, water patrol, and administrative law judges.

Note: COLA increases and temporary benefits payable under MSEP 2000 until age 62 are excluded from the above for comparison purposes.

Source: MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

Legislators in the MSEP

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2013	Average monthly benefit	\$ 374	\$ 907	\$ 1,513	\$ 2,120	\$ 0	\$ 0	\$ 0	\$ 1,036
	Average final salary	\$ 2,993	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	2	25	5	2	0	0	0	34
2014	Average monthly benefit	\$ 307	\$ 1,051	\$ 1,496	\$ 1,995	\$ 2,744	\$ 0	\$ 0	\$ 1,296
	Average final salary	\$ 2,993	\$ 2,993	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 2,993
	Number of retirees	2	6	3	2	1	0	0	14
2015	Average monthly benefit	\$ 0	\$ 977	\$ 1,735	\$ 2,162	\$ 0	\$ 0	\$ 0	\$ 1,315
	Average final salary	\$ 0	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	0	10	2	3	0	0	0	15
2016	Average monthly benefit	\$ 0	\$ 1,048	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,048
	Average final salary	\$ 0	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	0	7	0	0	0	0	0	7
2017	Average monthly benefit	\$ 499	\$ 954	\$ 1,580	\$ 1,995	\$ 0	\$ 0	\$ 0	\$ 1,041
	Average final salary	\$ 2,993	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	2	17	3	1	0	0	0	23
2018	Average monthly benefit	\$ 0	\$ 1,122	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,122
	Average final salary	\$ 0	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	0	6	0	0	0	0	0	6
2019	Average monthly benefit	\$ 0	\$ 1,017	\$ 1,496	\$ 2,117	\$ 2,744	\$ 0	\$ 0	\$ 1,327
	Average final salary	\$ 0	\$ 2,993	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 2,993
	Number of retirees	0	21	2	6	1	0	0	30
2020	Average monthly benefit	\$ 499	\$ 956	\$ 1,621	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,053
	Average final salary	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	1	6	2	0	0	0	0	9
2021	Average monthly benefit	\$ 0	\$ 984	\$ 1,507	\$ 1,995	\$ 0	\$ 0	\$ 0	\$ 1,155
	Average final salary	\$ 0	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	0	23	4	3	0	0	0	30
2022	Average monthly benefit	\$ 511	\$ 964	\$ 1,864	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,028
	Average final salary	\$ 3,068	\$ 3,068	\$ 3,068	\$ 0	\$ 0	\$ 0	\$ 0	\$ 3,068
	Number of retirees	1	5	1	0	0	0	0	7
Ten Years Ended June 30, 2022									
	Average monthly benefit	\$ 421	\$ 981	\$ 1,563	\$ 2,082	\$ 2,744	\$ 0	\$ 0	\$ 1,156
	Average final average salary	\$ 3,002	\$ 2,996	\$ 2,996	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 2,996
	Number of retirees	8	126	22	17	2	0	0	175

Note: COLA increases are excluded from the above for comparison purposes.

Source: MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

Elected Officials in the MSEP

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2013	Average monthly benefit	\$ 0	\$ 0	\$ 4,489	\$ 0	\$ 0	\$ 0	\$ 0	\$ 4,489
	Average final salary	\$ 0	\$ 0	\$ 8,979	\$ 0	\$ 0	\$ 0	\$ 0	\$ 8,979
	Number of retirees	0	0	1	0	0	0	0	1
2014	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2015	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2016	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2017	Average monthly benefit	\$ 0	\$ 2,993	\$ 3,099	\$ 0	\$ 5,576	\$ 0	\$ 0	\$ 3,889
	Average final salary	\$ 0	\$ 8,979	\$ 7,207	\$ 0	\$ 11,152	\$ 0	\$ 0	\$ 9,113
	Number of retirees	0	1	1	0	1	0	0	3
2018	Average monthly benefit	\$ 1,496	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,496
	Average final salary	\$ 8,979	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 8,979
	Number of retirees	1	0	0	0	0	0	0	1
2019	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2020	Average monthly benefit	\$ 0	\$ 3,234	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 3,234
	Average final salary	\$ 0	\$ 9,703	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 9,703
	Number of retirees	0	1	0	0	0	0	0	1
2021	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2022	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
Ten Years Ended June 30, 2022									
Average monthly benefit		\$ 1,496	\$ 3,114	\$ 3,794	\$ 0	\$ 5,576	\$ 0	\$ 0	\$ 3,481
Average final average salary		\$ 8,979	\$ 9,341	\$ 8,093	\$ 0	\$ 11,152	\$ 0	\$ 0	\$ 9,167
Number of retirees		1	2	2	0	1	0	0	6

Note: COLA increases are excluded from the above for comparison purposes.

Source: MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

Uniformed Water Patrol in the MSEP

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2013	Average monthly benefit	\$ 0	\$ 69	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 69
	Average final salary	\$ 0	\$ 1,291	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,291
	Number of retirees	0	1	0	0	0	0	0	1
2014	Average monthly benefit	\$ 0	\$ 0	\$ 780	\$ 0	\$ 0	\$ 0	\$ 0	\$ 780
	Average final salary	\$ 0	\$ 0	\$ 2,507	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,507
	Number of retirees	0	0	1	0	0	0	0	1
2015	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 4,539	\$ 4,539
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 6,321	\$ 6,321
	Number of retirees	0	0	0	0	0	0	1	1
2016	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 4,221	\$ 4,221
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 6,375	\$ 6,375
	Number of retirees	0	0	0	0	0	0	2	2
2017	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 1,079	\$ 0	\$ 0	\$ 0	\$ 1,079
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 2,846	\$ 0	\$ 0	\$ 0	\$ 2,846
	Number of retirees	0	0	0	1	0	0	0	1
2018	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 1,492	\$ 0	\$ 0	\$ 0	\$ 1,492
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 4,347	\$ 0	\$ 0	\$ 0	\$ 4,347
	Number of retirees	0	0	0	1	0	0	0	1
2019	Average monthly benefit	\$ 0	\$ 0	\$ 671	\$ 0	\$ 0	\$ 0	\$ 0	\$ 671
	Average final salary	\$ 0	\$ 0	\$ 2,659	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,659
	Number of retirees	0	0	1	0	0	0	0	1
2020	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2021	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 5,026	\$ 5,026
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 7,809	\$ 7,809
	Number of retirees	0	0	0	0	0	0	1	1
2022	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
Ten Years Ended June 30, 2022									
	Average monthly benefit	\$ 0	\$ 69	\$ 726	\$ 1,286	\$ 0	\$ 0	\$ 4,502	\$ 2,455
	Average final average salary	\$ 0	\$ 1,291	\$ 5,166	\$ 7,193	\$ 0	\$ 0	\$ 26,880	\$ 40,530
	Number of retirees	0	1	2	2	0	0	4	9

Note: COLA increases and temporary benefits payable under MSEP 2000 until age 62 are excluded from the above for comparison purposes.

Source: MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

Administrative Law Judges and Legal Advisors in the MSEP

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2013	Average monthly benefit	\$ 0	\$ 0	\$ 2,657	\$ 0	\$ 4,134	\$ 0	\$ 4,450	\$ 3,747
	Average final salary	\$ 0	\$ 0	\$ 5,314	\$ 0	\$ 8,267	\$ 0	\$ 8,900	\$ 7,494
	Number of retirees	0	0	1	0	1	0	1	3
2014	Average monthly benefit	\$ 0	\$ 2,433	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,433
	Average final salary	\$ 0	\$ 8,146	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 8,146
	Number of retirees	0	1	0	0	0	0	0	1
2015	Average monthly benefit	\$ 0	\$ 2,259	\$ 0	\$ 3,012	\$ 0	\$ 0	\$ 0	\$ 2,636
	Average final salary	\$ 0	\$ 7,936	\$ 0	\$ 6,023	\$ 0	\$ 0	\$ 0	\$ 6,980
	Number of retirees	0	1	0	1	0	0	0	2
2016	Average monthly benefit	\$ 0	\$ 853	\$ 0	\$ 0	\$ 3,811	\$ 0	\$ 0	\$ 3,072
	Average final salary	\$ 0	\$ 3,508	\$ 0	\$ 0	\$ 7,623	\$ 0	\$ 0	\$ 6,594
	Number of retirees	0	1	0	0	3	0	0	4
2017	Average monthly benefit	\$ 401	\$ 0	\$ 0	\$ 5,065	\$ 0	\$ 5,298	\$ 5,273	\$ 4,009
	Average final salary	\$ 5,777	\$ 0	\$ 0	\$ 10,129	\$ 0	\$ 10,596	\$ 10,546	\$ 9,262
	Number of retirees	1	0	0	1	0	1	1	4
2018	Average monthly benefit	\$ 0	\$ 0	\$ 3,860	\$ 0	\$ 5,313	\$ 0	\$ 0	\$ 4,950
	Average final salary	\$ 0	\$ 0	\$ 7,720	\$ 0	\$ 10,625	\$ 0	\$ 0	\$ 9,899
	Number of retirees	0	0	1	0	3	0	0	4
2019	Average monthly benefit	\$ 0	\$ 0	\$ 4,353	\$ 0	\$ 5,115	\$ 0	\$ 0	\$ 4,734
	Average final salary	\$ 0	\$ 0	\$ 8,707	\$ 0	\$ 10,230	\$ 0	\$ 0	\$ 9,469
	Number of retirees	0	0	1	0	1	0	0	2
2020	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 4,630	\$ 5,323	\$ 0	\$ 4,861
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 9,260	\$ 10,647	\$ 0	\$ 9,722
	Number of retirees	0	0	0	0	2	1	0	3
2021	Average monthly benefit	\$ 1,001	\$ 1,559	\$ 0	\$ 0	\$ 5,115	\$ 4,926	\$ 0	\$ 3,150
	Average final salary	\$ 4,969	\$ 4,828	\$ 0	\$ 0	\$ 10,230	\$ 9,851	\$ 0	\$ 7,470
	Number of retirees	1	1	0	0	1	1	0	4
2022	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 5,323	\$ 0	\$ 5,323
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 10,647	\$ 0	\$ 10,647
	Number of retirees	0	0	0	0	0	1	0	1
Ten Years Ended June 30, 2022									
Average monthly benefit		\$ 701	\$ 1,776	\$ 3,623	\$ 4,039	\$ 4,636	\$ 5,218	\$ 4,862	\$ 3,894
Average final average salary		\$ 5,373	\$ 6,105	\$ 7,247	\$ 8,076	\$ 9,272	\$ 10,435	\$ 9,723	\$ 8,437
Number of retirees		2	4	3	2	11	4	2	28

Note: COLA increases are excluded from the above for comparison purposes.

Source: MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

Judicial Plan

Members Retiring During Fiscal Year	Years Credited Service by Category							All Members
	<5	5-10	11-15	16-20	21-25	26-30	31+	
2013 Average monthly benefit	\$ 0	\$ 2,277	\$ 4,234	\$ 4,625	\$ 5,444	\$ 5,452	\$ 5,293	\$ 4,699
Average final salary	\$ 0	\$ 8,123	\$ 8,696	\$ 9,251	\$ 10,888	\$ 10,904	\$ 10,585	\$ 9,767
Number of retirees	0	2	6	4	5	4	2	23
2014 Average monthly benefit	\$ 0	\$ 2,310	\$ 4,571	\$ 5,151	\$ 5,117	\$ 4,869	\$ 5,293	\$ 4,313
Average final salary	\$ 0	\$ 8,259	\$ 9,143	\$ 10,303	\$ 10,233	\$ 9,738	\$ 10,585	\$ 9,435
Number of retirees	0	4	6	3	3	1	1	18
2015 Average monthly benefit	\$ 1,114	\$ 3,140	\$ 5,572	\$ 5,572	\$ 5,970	\$ 5,572	\$ 5,848	\$ 5,392
Average final salary	\$ 11,143	\$ 9,419	\$ 11,143	\$ 11,143	\$ 11,940	\$ 11,143	\$ 11,697	\$ 11,253
Number of retirees	1	3	7	10	7	4	7	39
2016 Average monthly benefit	\$ 0	\$ 4,193	\$ 5,575	\$ 5,452	\$ 6,166	\$ 5,844	\$ 0	\$ 5,545
Average final salary	\$ 0	\$ 11,688	\$ 11,503	\$ 10,903	\$ 12,332	\$ 11,688	\$ 0	\$ 11,569
Number of retirees	0	2	3	5	4	2	0	16
2017 Average monthly benefit	\$ 602	\$ 4,487	\$ 5,506	\$ 6,054	\$ 5,878	\$ 6,178	\$ 5,931	\$ 5,293
Average final salary	\$ 8,136	\$ 11,696	\$ 11,367	\$ 12,108	\$ 11,756	\$ 12,355	\$ 11,861	\$ 11,574
Number of retirees	2	3	2	4	6	4	2	23
2018 Average monthly benefit	\$ 0	\$ 4,549	\$ 5,525	\$ 6,114	\$ 5,989	\$ 6,238	\$ 6,365	\$ 5,955
Average final salary	\$ 0	\$ 12,477	\$ 11,947	\$ 12,227	\$ 11,978	\$ 12,477	\$ 12,730	\$ 12,259
Number of retirees	0	1	4	4	4	4	3	20
2019 Average monthly benefit	\$ 603	\$ 0	\$ 5,658	\$ 6,025	\$ 6,037	\$ 6,074	\$ 6,074	\$ 5,653
Average final salary	\$ 9,520	\$ 0	\$ 11,371	\$ 12,051	\$ 12,075	\$ 12,147	\$ 12,147	\$ 11,758
Number of retirees	2	0	10	13	7	2	4	38
2020 Average monthly benefit	\$ 0	\$ 3,163	\$ 5,389	\$ 6,415	\$ 6,237	\$ 6,256	\$ 6,415	\$ 5,875
Average final salary	\$ 0	\$ 12,653	\$ 10,927	\$ 12,830	\$ 12,501	\$ 12,511	\$ 12,830	\$ 12,132
Number of retirees	0	1	5	1	7	4	1	19
2021 Average monthly benefit	\$ 633	\$ 4,525	\$ 5,961	\$ 6,229	\$ 6,319	\$ 7,049	\$ 6,672	\$ 6,017
Average final salary	\$ 12,653	\$ 13,164	\$ 11,923	\$ 12,457	\$ 12,638	\$ 14,099	\$ 13,345	\$ 12,738
Number of retirees	1	1	5	7	2	3	3	22
2022 Average monthly benefit	\$ 0	\$ 2,710	\$ 6,218	\$ 6,469	\$ 6,729	\$ 6,606	\$ 6,616	\$ 6,173
Average final salary	\$ 0	\$ 9,374	\$ 12,736	\$ 12,937	\$ 13,459	\$ 13,211	\$ 13,233	\$ 12,779
Number of retirees	0	2	4	3	5	3	4	21
Ten Years Ended June 30, 2022								
Average monthly benefit	\$ 693	\$ 3,301	\$ 5,382	\$ 5,803	\$ 6,009	\$ 6,079	\$ 6,110	\$ 5,498
Average final average salary	\$ 9,851	\$ 10,160	\$ 10,942	\$ 11,606	\$ 12,022	\$ 12,158	\$ 12,220	\$ 11,530
Number of retirees	6	19	52	54	50	31	27	239

Note: COLA increases are excluded from the above for comparison purposes.

Source: MOSERS' Pension Administration System

Retirees and Beneficiaries Tabulated by Fiscal Year of Retirement

As of June 30, 2022

MSEP

Fiscal Year of Retirement	Number	Total Annual Benefit	Average Monthly Benefit
1982 and prior	27	\$ 157,938	\$ 487
1983	2	9,160	382
1984	14	112,740	671
1985	23	191,293	693
1986	30	259,427	721
1987	49	521,623	887
1988	57	887,772	1,298
1989	78	1,403,282	1,499
1990	81	1,272,418	1,309
1991	123	2,552,965	1,730
1992	171	3,140,022	1,530
1993	229	4,525,359	1,647
1994	248	4,729,329	1,589
1995	359	6,848,871	1,590
1996	401	8,417,698	1,749
1997	455	9,211,948	1,687
1998	549	11,789,969	1,790
1999	664	14,345,440	1,800
2000	748	15,616,645	1,740
2001	1,670	34,691,293	1,731
2002	1,172	21,046,893	1,497
2003	1,310	24,657,352	1,569
2004	1,834	32,779,800	1,489
2005	1,302	21,229,280	1,359
2006	1,487	22,987,920	1,288
2007	1,789	28,356,833	1,321
2008	1,835	28,143,251	1,278
2009	1,927	29,996,555	1,297
2010	2,013	30,149,961	1,248
2011	2,585	40,685,516	1,312
2012	2,433	35,533,017	1,217
2013	2,545	36,128,954	1,183
2014	2,570	36,902,049	1,197
2015	2,888	43,227,496	1,247
2016	2,895	44,033,919	1,268
2017	2,838	47,213,401	1,386
2018	3,006	49,731,534	1,379
2019	2,736	45,448,944	1,384
2020	2,692	42,803,563	1,325
2021	3,100	51,747,460	1,391
2022	3,299	54,922,385	1,387
	54,234	\$ 888,411,275	\$ 1,365

Source: MOSERS' Pension Administration System

Retirees and Beneficiaries Tabulated by Fiscal Year of Retirement (continued)

As of June 30, 2022

Judicial Plan

Fiscal Year of Retirement	Number	Total Annual Benefit	Average Monthly Benefit
1982 and prior	3	\$ 52,367	\$ 1,455
1983	0	0	0
1984	0	0	0
1985	0	0	0
1986	0	0	0
1987	5	237,008	3,950
1988	1	83,180	6,932
1989	1	30,798	2,567
1990	3	147,748	4,104
1991	6	269,733	3,746
1992	1	89,347	7,446
1993	3	145,668	4,046
1994	2	96,046	4,002
1995	9	699,298	6,475
1996	3	171,407	4,761
1997	4	261,782	5,454
1998	8	430,280	4,482
1999	7	427,455	5,089
2000	8	602,654	6,278
2001	13	1,205,255	7,726
2002	13	1,071,936	6,871
2003	13	1,039,856	6,666
2004	13	889,923	5,705
2005	13	1,204,252	7,720
2006	11	451,377	3,420
2007	41	3,031,159	6,161
2008	21	1,478,456	5,867
2009	31	1,932,511	5,195
2010	12	793,889	5,513
2011	34	2,198,106	5,388
2012	16	837,657	4,363
2013	27	2,053,194	6,337
2014	22	1,448,078	5,485
2015	49	4,016,949	6,832
2016	21	1,564,347	6,208
2017	31	2,206,821	5,932
2018	31	2,491,837	6,698
2019	44	3,318,820	6,286
2020	27	1,837,334	5,671
2021	33	2,150,528	5,431
2022	31	1,924,811	5,174
	611	\$ 42,891,867	\$ 5,850

Source: MOSERS' Pension Administration System

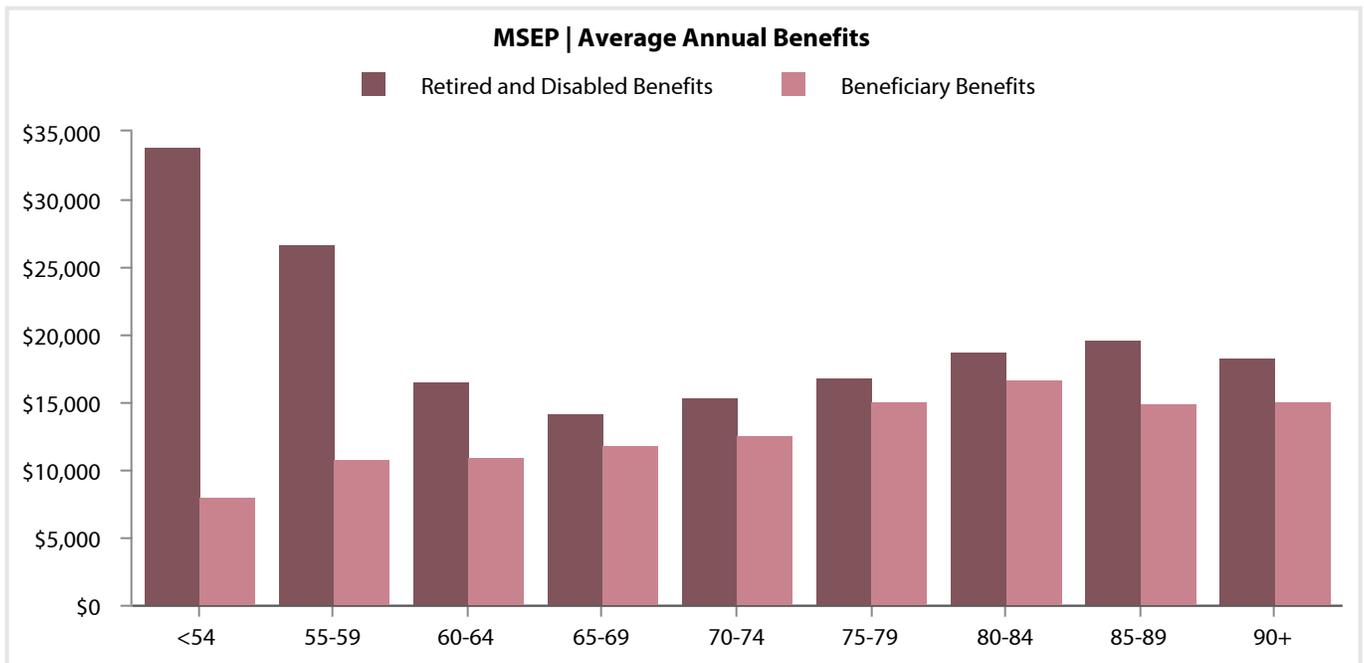
Benefits Tabulated by Attained Ages of Benefit Recipients

As of June 30, 2022

MSEP

Attained Ages	Retired and Disabled		Beneficiaries		Totals	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
<54	471	\$ 15,973,500	582	\$ 4,676,388	1,053	\$ 20,649,888
55-59	2,849	76,064,376	311	3,398,868	3,160	79,463,244
60-64	7,733	128,637,288	561	6,211,620	8,294	134,848,908
65-69	11,706	166,440,012	753	8,921,892	12,459	175,361,904
70-74	11,195	172,335,408	1,018	12,864,564	12,213	185,199,972
75-79	7,169	121,377,456	928	14,049,708	8,097	135,427,164
80-84	3,687	69,492,540	861	14,421,516	4,548	83,914,056
85-89	1,773	34,834,968	663	9,992,496	2,436	44,827,464
90+	954	17,516,340	434	6,580,020	1,388	24,096,360
Totals	47,537	\$ 802,671,888	6,111	\$ 81,117,072	53,648	\$ 883,788,960

Average age at retirement: 61.2 years • Average age now: 71.3 years



Average annual benefit : \$16,885 retired and disabled • \$13,274 beneficiaries

Source: MOSERS' MSEP Actuarial Valuation Report as of June 30, 2022

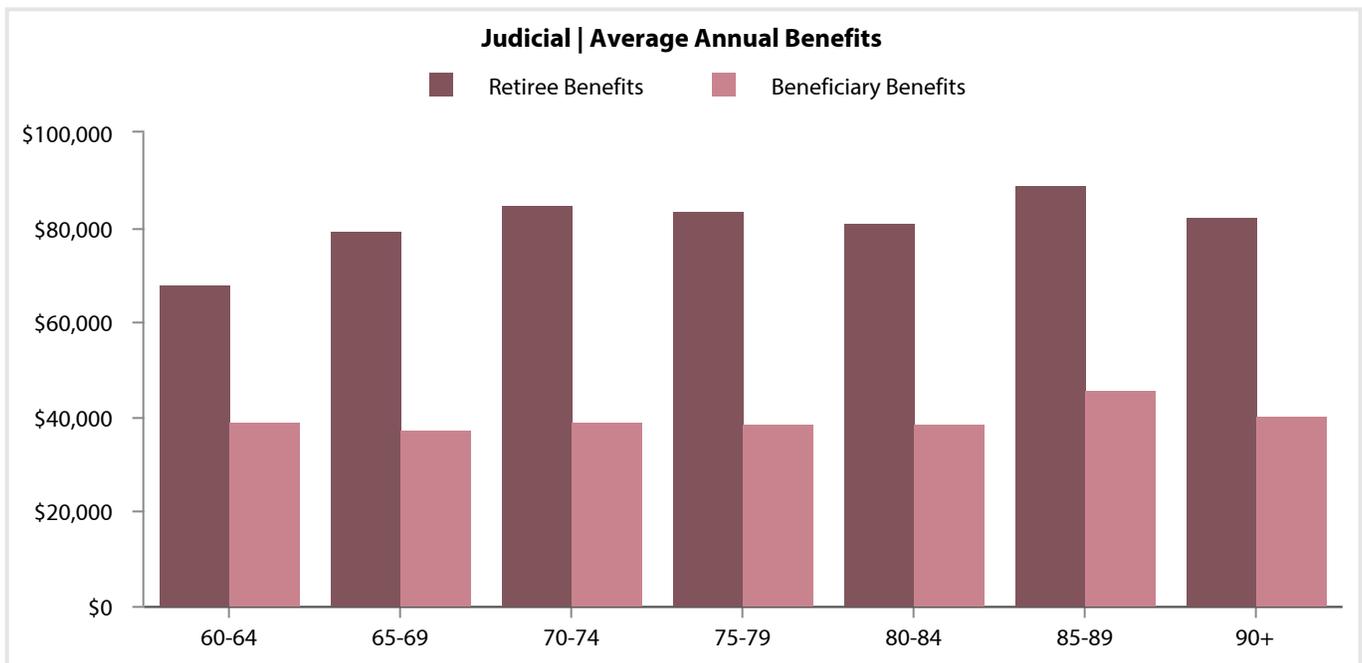
Benefits Tabulated by Attained Ages of Benefit Recipients (continued)

As of June 30, 2022

Judicial Plan

Attained Ages	Retirees		Beneficiaries		Totals	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
60-64	28	\$ 1,904,580	10	\$ 390,384	38	\$ 2,294,964
65-69	50	3,976,032	14	525,060	64	4,501,092
70-74	160	13,572,408	15	587,040	175	14,159,448
75-79	100	8,349,816	34	1,313,136	134	9,662,952
80-84	64	5,192,004	21	811,488	85	6,003,492
85-89	25	2,231,124	20	913,416	45	3,144,540
90+	22	1,810,728	33	1,329,216	55	3,139,944
Totals	449	\$ 37,036,692	147	\$ 5,869,740	596	\$ 42,906,432

Average age at retirement: 65.5 years • Average age now: 76.9 years



Average benefit paid: \$82,487 retirees • \$39,930 beneficiaries

Source: MOSERS' Judicial Plan Actuarial Valuation Report as of June 30, 2022

Principal Participating Employers

Current Year and Nine Years Ago

Participating Employer	2022			2013		
	Covered Employees	Rank	Percent of Membership	Covered Employees	Rank	Percent of Membership
State of Missouri	36,506	1	86.5%	44,450	1	86.8%
Missouri State University	1,712	2	4.1	1,852	2	3.6
University of Central Missouri	801	3	1.9	1,053	3	2.1
Southeast Missouri State University	725	4	1.7	933	4	1.8
Northwest Missouri State University	555	5	1.3	569	6	1.1
Truman State University	479	6	1.1	638	5	1.2
Missouri Southern State University	344	7	0.8	446	7	0.9
Missouri Western State University	298	8	0.7	394	9	0.8
Lincoln University	277	9	0.7	396	8	0.8
State Technical College of Missouri	183	10	0.4	168	11	0.3
All others	303		0.7	335		0.7
Total	42,183		100.0%	51,234		100.0%

Source: MOSERS' Pension Administration System

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