Long Story Short

PENSIONS HAVE PURPOSE

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

Annual Comprehensive Financial Report
Fiscal Year Ended June 30, 2021

MOSERS

We recently asked members of our Retiree Connection group to write six-word stories describing their thoughts on being a MOSERS retiree, a member of the Retiree Connection group and/or retirement in general. What is a six-word story? It's just that—a story written in six words or less. According to legend, Ernest Hemingway popularized the six-word story while at lunch with a table full of fellow writers.

Rising to the challenge, our Retiree Connection group told some great stories and we are happy to share a few with you here. All of the six-word stories can be found on our website.

Six words. One story. What's yours?

Long Story Short

PENSIONS HAVE PURPOSE

Ronda Stegmann
Executive Director

Lori Woratzeck
Deputy Executive Director
Chief Financial Officer

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

Annual Comprehensive Financial Report
Fiscal Year Ended June 30, 2021

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

MOSERS

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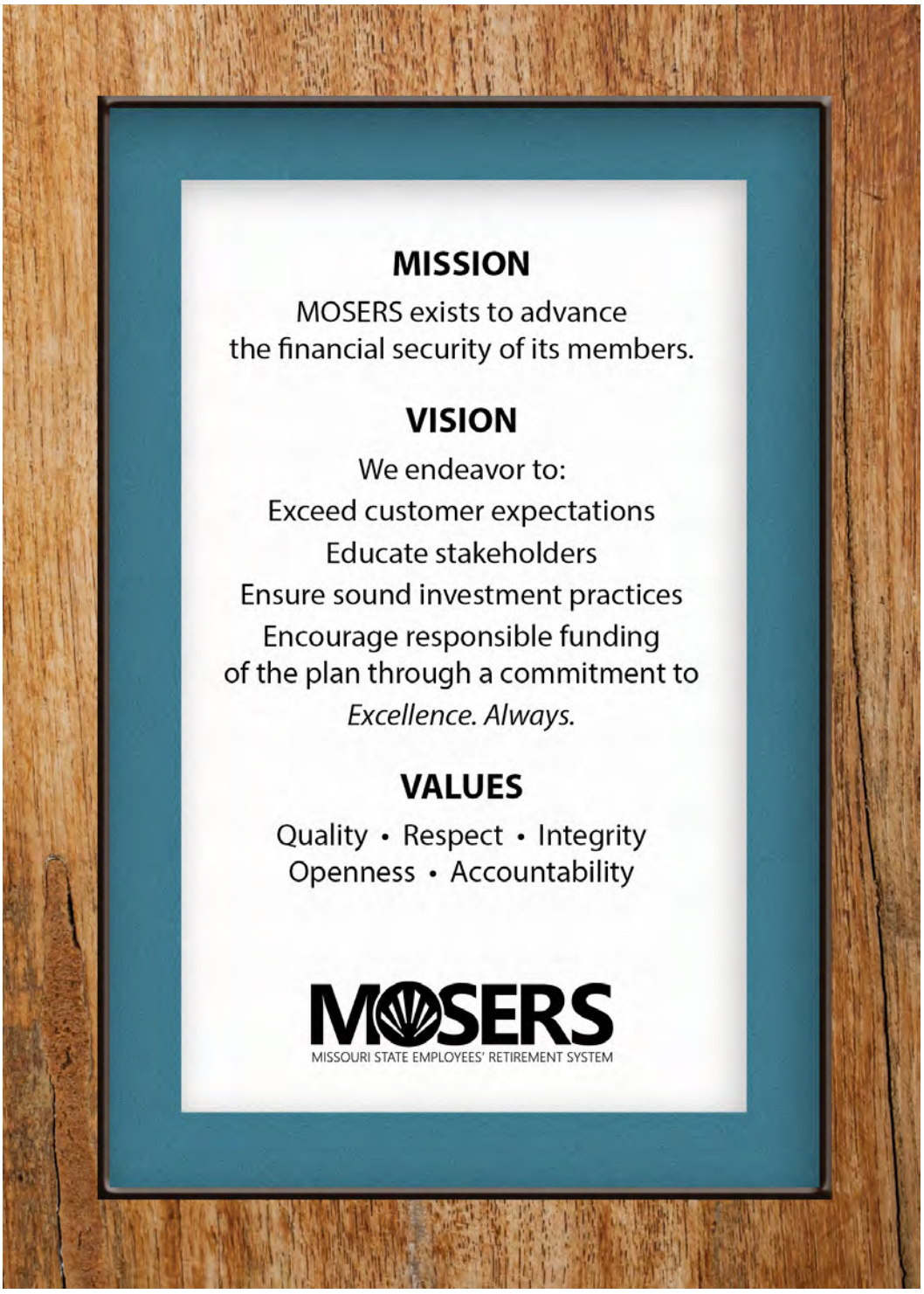

MISSION
MOSERS exists to advance
the financial security of its members.
VISION
We endeavor to:
Exceed customer expectations
Educate stakeholders
Ensure sound investment practices
Encourage responsible funding
of the plan through a commitment to
Excellence. Always.
VALUES
Quality • Respect • Integrity
Openness • Accountability
MOSERS
MISSOURI STATE EMPLOYEES' RETIREMENT SYSTEM

Introductory Section

Ms. Jacqueline Horton
Retiree From Mental Health
St. Louis, MO
Years of Service: 31 Years 7 Months
Year Retired: 2011

Professional Awards

Certificate of Achievement for Excellence in Financial Reporting

MOSERS' Comprehensive Annual Financial Report for the fiscal year ended June 30, 2020, 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 32nd 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 2020, 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

MOSERS
MISSOURI STATE EMPLOYEES' RETIREMENT SYSTEM

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 29, 2021

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, 2021. During fiscal year 2021, 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, 2021, MOSERS serves 43,247 active employees and pays 52,830 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 (formerly known as ICMA-RC), 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. The employer contribution rate is set at a flat 6% of pay with a 2% of pay employee contribution for employees hired after July 1, 2018. TIAA is responsible for third-party administration and for providing investment products to plan members.

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 26.4%, net of fees, for fiscal year 2021. The total fund returned 1.2% 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, 2021, the MSEP was 59.0% pre-funded and the Judicial Plan was 31.1% pre-funded on an actuarial basis. The MSEP experienced a decrease from the June 30, 2020 funded status of 61.10%. The Judicial Plan reflected an increase from the June 30, 2020 funded status of 28.9%.

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 5** – The General Assembly authorized the appropriation of $505 million to MOSERS for fiscal year 2022, which will fully fund the Board certified employer contribution rates. This dollar amount was generated from the 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 2020 meeting. On June 30, 2021, Governor Parson signed the fiscal year 2022 budget bills passed by the General Assembly, including the MOSERS appropriation contained in House Bill 5.

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 60% complete at year end. Current projections indicate an early 2023 deployment.
- **Transition of New Portfolio** – Staff completed the transition from the "Old" portfolio allocation to the "New" portfolio allocation at the end of February 2021 in 26 months, 10 months ahead of schedule. The Old portfolio represented approximately 42% of the total fund at the beginning of the fiscal year. We utilized six one-month advancements of the transition, as permitted by policy, in order to complete the transition in February.
- **Implementation of MOSERS Strategic Plan** – The MOSERS Board of Trustees approved an organizational-wide strategic plan for a three-year cycle beginning July 1, 2019 through June 30, 2022. The end of fiscal year 2021 marks the completion of the second year of MOSERS' strategic plan. During the second year, staff completed three additional initiatives and seven additional initiatives are in progress and are expected to be completed by the end of the strategic planning cycle.
- **Review and rewrite of the MOSERS Board Rules** – A review of *MOSERS Board Rules* began in fiscal year 2020. The Strategic Planning and Governance Committee, along with staff, worked together to review the current Board Rules and discussed changes to the current rules as well as the necessity of new rules. At the November 2020 Board meeting, the full Board adopted the comprehensive set of revised MOSERS Board Rules.
- **MOSERS Month** – In April 2021, we hosted the first annual MOSERS Month. Throughout the month, we invited active employees to explore the value of their benefits and start planning their retirement journey. Each week, we sent an email to all active employees and created social media posts encouraging them to participate in fun and informative activities. We developed a MOSERS Month web page dedicated specifically to this event where employees could watch a video about the event, choose to participate in any of a dozen activities or download the entire 12-page MOSERS Month Activity Guide. To kick off the event, we challenged members to test their knowledge with a benefits quiz designed specifically for their career stage. More than 900 members participated in the career stage vocabulary quiz.

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 Comprehensive Annual Financial Report for the fiscal year ended June 30, 2020. This was the 32nd 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).

MOSERS received three awards from the National Association of Government Communicators (NAGC). These awards include the Award of Excellence in two categories: *Electronic Publications* and *Internal Communications* for *A Moment with MOSERS*. We also received First-Place honors in *Internal Communications* for *"Meet Bob,"* the MOSERS COVID-19 staff safety video and poster campaign. 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 for their *Active Choice Splash Screen Campaign for Interactive Marketing Effectiveness.* 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 2020 Leadership Recognition Award for the plan's enhancement of participant outreach by implementing Web 1-on-1s and Webinars, an effort that began prior to the global pandemic. The Leadership Awards recognize defined contribution plans for their outstanding achievements in *Technology and Social Media.*

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.

The theme of this year's ACFR is "Long Story Short...Pensions Have Purpose". This message highlights important aspects of the System. We know public pensions, like MOSERS, are long-term entities that invest over long time horizons and span many generations of membership. Some of our retired membership are highlighted in this report through the sharing of their "six-word stories". These "stories" describe their thoughts on being a MOSERS retiree, a member of the Retiree Connection group and/or retirement in general. This theme also speaks to MOSERS mission statement "to advance the financial security of its members" as the hallmark of all we do. We know our 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 as we move into fiscal year 2022. It is our honor to work for this great state and its citizens.

Respectfully submitted,

Ronda Stegmann
Executive Director

Lori Woratzeck, CPA
Deputy Executive Director/Chief Financial Officer

Letter from the Board Chairwoman

MOSERS
MISSOURI STATE EMPLOYEES' RETIREMENT SYSTEM

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 29, 2021

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, 2021. This report is one of MOSERS' finest examples of collaboration and an organization-wide team effort.

During the year ended June 30, 2021, the Board of Trustees continued its work on behalf of the MOSERS membership. While the global pandemic required MOSERS to modify the way we conduct business, our Board and staff members continued to work on key initiatives over the last fiscal year, some of which included:

- comprehensive review and adoption of *MOSERS' Board Rules*;
- completing the transition of the Board-adopted investment portfolio while generating a return of 26.4%, net of fees; and
- maintaining robust communication with our membership during the ever-changing landscape of fiscal year 2021.

MOSERS was very fortunate to have Board continuity, with minimal turnover, during fiscal year 2021. The MOSERS Board received two new Senate-appointed members when both Senate-appointed members of the Board left the legislature due to term limits. I would like to thank Senator Wallingford and Senator Walsh for their dedicated service as a MOSERS Board Trustee. We welcomed Senator Rizzo and Senator Wieland to the MOSERS Board in 2021. Their participation and perspectives have already added to the Board's robust discussions and decision-making process.

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 2022, 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 Sarah Steelman
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
- Candy Smith, MPA
  Communications Manager & Public Information Officer
- Abby Spieler, JD
  General Counsel
- Lisa Verslues, PHR, SHRM-CP
  Human Resources Officer

Lori Woratzeck, CPA
Deputy Executive Director – Operations/Chief Financial Officer

- Andrea Binkley, CGBA
  Chief Benefits Officer
- Stacy Gillmore
  Chief Technology Officer
- Carson Lepper, PMP
  Project Manager
- Jeremy Pond, CPA, CFE, CGFM
  Controller

Shannon Davidson
Deputy Executive Director – Investments/Chief Investment Officer

- Scott Hankins, CFA
  Managing Director – Investment Risk & Operations
- Tyson Rehfeld, CFA
  Managing Director – Markets & Strategy

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.

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 and Education
Staff in the benefits administration and education 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). 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.

Communications
Communications 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. Additionally, 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.

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
- Norlem Technology Consulting

Pension System Administration Consultants
- ICON Integration and Design, Inc.
- Linea Solutions
- Tegrit

Risk Management Consultant
- Charlesworth & Associates, LLC

Third-Party Administrators
- MissionSquare Retirement (formerly ICMA-RC)

  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 71. Investment management, custodial and consulting fees can be found in the Schedule of Investment Expenses on page 58-59. Additional information on investment managers can also be found in the Investment Section of this report.

Financial Section

Mr. Myron Holder
Retiree From Economic Development
Chillicothe, MO
Years of Service: 32 Years
Year Retired: 2007

Independent Auditor's Report

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

Report on Financial Statements

We have audited the accompanying financial statements of the pension and other trust funds and aggregate remaining fund information of the Missouri State Employees' Retirement System (MOSERS), a pension (and other employee benefit) trust fund of the state of Missouri, which comprise the statements of fiduciary net position as of June 30, 2021, and the related statements of changes in fiduciary net position, for the year then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements

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

Auditor's Responsibility

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

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

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

Opinions

In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of the pension and other trust funds and aggregate remaining fund information of MOSERS as of June 30, 2021, and the respective changes in financial position and, where applicable, cash flows thereof for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Emphasis of Matter - Adoption of New Accounting Standard

As described in Note 2 to the financial statements, MOSERS early adopted the provisions of GASB Statement No. 97, *Certain Component Unit Criteria, and Accounting and Financial Reporting for Internal Revenue Code Section 457 Deferred Compensation Plans, an amendment of GASB Statements No. 14 and No. 84, and a supersession of GASB Statement No. 32.* As discussed in Note 2 to the financial statements, MOSERS has retroactively adjusted the financial statements to remove the administrative funds for the MO Deferred Compensation Plans and has adjusted the financial statements to include the activities of the insurance fund as a custodial fund. Our opinion is not modified with respect to this matter.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis and required supplementary information on pages 19-22 and 50-57 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise MOSERS' *Basic Financial Statements* as a whole. The *Introductory*, *Investment*, *Actuarial*, *Statistical Sections* and *Additional Supplemental Schedules* as listed in the table of contents are presented for purposes of additional analysis and are not a required part of the financial statements.

The additional supplementary information accompanying financial information listed as *Additional Supplemental Schedules* in the table of contents are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the *Basic Financial Statements*. Such information has been subjected to the auditing procedures applied in the audit of the *Basic Financial Statements* and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the *Basic Financial Statements* or to the *Basic Financial Statements* themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the accompanying financial information listed as supplemental schedules are fairly stated, in all material respects, in relation to the *Basic Financial Statements* as a whole.

The *Introductory*, *Investment*, *Actuarial*, *Statistical Sections* have not been subjected to the auditing procedures applied in the audit of the *Basic Financial Statements* and, accordingly, we do not express an opinion or provide any assurance on them.

Eide Bailly LLP

Boise, Idaho
October 29, 2021

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, 2021. 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 23 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 23. 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 $0.7 billion from $5.5 billion at June 30, 2020, to $6.2 billion at June 30, 2021, with a corresponding decrease in funded percentage from 61.1% to 59.0%.

The UAAL for the Judicial Plan decreased by $12.8 million from $444.1 million at June 30, 2020, to $431.3 million at June 30, 2021, with an increase in funded percentage from 28.9% to 31.1%.

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 increased from 55.5% at June 30, 2020, to 63.0% at June 30, 2021, for the MSEP Fund, and increased from 26.8% to 33.7% 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 84 issued by GASB. As part of adopting GASB Statement 84, MOSERS has changed the fund type of its insurance activities from being reported as an internal service fund to being reported as a custodial fund. As part of this change, the insurance activities are now reported in MOSERS' fiduciary statements, instead of being reported as internal service funds.

In addition to the reporting changes related to insurance activities, adopting GASB Statement 84 has also required changes related to how MOSERS reports the deferred compensation plan activities. The administrative activities related to the deferred compensation plan will no longer be included in MOSERS' *Annual Comprehensive Financial Report.* Prior year comparative amounts have been adjusted where applicable. The administrative activities related to the Missouri State Public Employees Deferred Compensation Plan, and the Missouri State Public Employees Deferred Compensation Incentive Plan will continue to be included in the separately issued statements for those respective plans.

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. Amounts presented for fiscal year 2020 have been adjusted to include insurance activities as a fiduciary fund due to the adoption of GASB Statement 84.

Summary Comparative Statements of Fiduciary Net Position

	As of June 30, 2021	As of June 30, 2020 (as adjusted)	Amount of Change	Percentage Change
Assets				
Administrative operating cash and equivalents	$ 7,386,658	$ 9,801,690	$ (2,415,032)	(24.64)%
Receivables	750,600,068	396,473,141	354,126,927	89.32
Investments	12,850,390,046	11,463,190,890	1,387,199,156	12.10
Capital assets, net of accumulated depreciation	11,070,763	7,530,526	3,540,237	47.01
Other assets	0	17,717	(17,717)	(100.00)
Total assets	13,619,447,535	11,877,013,964	1,742,433,571	14.67
Deferred outflow of resources	917,071	899,535	17,536	1.95
Liabilities				
Administrative and other payables	6,903,186	11,021,679	(4,118,493)	(37.37)
Investment related payables and obligations	3,869,974,406	3,777,012,632	92,961,774	2.46
MOSERS investment portfolio liability (MIP)	3,953,169	3,481,031	472,138	13.56
Net OPEB liability	7,682,560	7,695,160	(12,600)	(0.16)
Total liabilities	3,888,513,321	3,799,210,502	89,302,819	2.35
Deferred inflow of resources	718,655	465,011	253,644	54.55
Net position restricted for fiduciary activities	$ 9,731,132,630	$ 8,078,237,986	$ 1,652,894,644	20.46

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 and incentive 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. Investments, and investment related receivable and liability balances, increased this year because MOSERS experienced a 26.40% return on plan assets, which grew the size of MOSERS' investment portfolio significantly.

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 $3.6 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, 2021	Year Ended June 30, 2020 (as adjusted)	Amount of Change	Percentage Change
Additions				
Contributions	$ 577,738,031	$ 549,163,044	$ 28,574,987	5.20%
Net investment income	2,077,042,662	408,563,551	1,668,479,111	408.38
Miscellaneous income	560,195	618,027	(57,832)	(9.36)
Total additions	2,655,340,888	958,344,622	1,696,996,266	177.08
Deductions				
Benefit payments	953,049,815	904,429,822	48,619,993	5.38
Premium disbursements	31,597,820	32,549,567	(951,747)	(2.92)
Service transfers and refunds	8,425,724	9,041,675	(615,951)	(6.81)
Administrative expenses	9,372,885	8,952,734	420,151	4.69
Total deductions	1,002,446,244	954,973,798	47,472,446	4.97
Net increase	1,652,894,644	3,370,824	1,649,523,820	48,935.33
Net position beginning of year	8,078,237,986	8,074,867,162	3,370,824	0.04
Net positions restricted for pensions	$ 9,731,132,630	$ 8,078,237,986	$ 1,652,894,644	20.46

Investment Results

MOSERS' total fund net position increased by $1.7 billion, to end at $9.7 billion in fiscal year 2021. Net position increased significantly from last year, driven primarily by investment returns. The fund returned a time-weighted return of 26.40% in fiscal year 2021 compared to 5.20% in fiscal year 2020.

The investment markets experienced significant returns during the fiscal year, driven by continued economic recovery, reopening of establishments, and continued government stimulus as a response to the COVID-19 pandemic. As further discussed in the *Investment Section* of this report, while we welcome the high earnings and performance of certain asset classes of the portfolio this year, as long term investors, 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 5.20% 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 21.77% in fiscal year 2020 to 22.88% in fiscal year 2021. 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, however the number of MSEP 2011 members decreased slightly.

Covered payroll is the other primary factor that ultimately determines our contribution revenue. The growth rate of covered payroll, from which both employee and employer contributions are calculated, slowed from the level experienced last year. At the beginning of fiscal year 2021, we expected payroll growth of 2.25% for the year. Covered payroll generally met or exceeded financial forecasts during the first half of the year, however it started declining during the second half of the year, as did the population of active benefit eligible members, as various state agencies struggled to fill vacant positions.

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 2.6% 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, and contributions were slightly higher than last year, even though the fiscal year 2021 contribution rate was slightly lower than the fiscal year 2020 rate. Insurance fund premium contributions were lower than the prior year, which was an expected change due to The Standard Insurance Company offering lower rates for basic life insurance and LTD insurance as a result of our recent RFP process.

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 100-101 of the *Actuarial Section* of this report.

Cost-of-living adjustments 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 2021 was 0.987%.

Administrative Expenses

Administrative expenses totaled $9.4 million in fiscal year 2021, compared to $9.0 million in fiscal year 2020. MOSERS experienced an increase in administrative expense due to a variety of factors. There was a general increase in the cost of doing business, such as costs for postage and mailing, facility maintenance, insurance, and professional services. MOSERS completed an actuarial experience study this year, which is a cost that generally occurs once every five years. Administrative payroll costs increased due to recruiting for and filling vacant positions as well as employee wage adjustments.

Requests for Information

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

Statements of Fiduciary Net Position

As of June 30, 2021

	MSEP Fund	Judicial Fund	Insurance Fund	Total
Assets				
Administrative operating cash and cash equivalents	$ 4,559,828	$ 190	$ 2,826,640	$ 7,386,658
Receivables				
Contributions and premiums	18,248,213	1,740,251	842,868	20,831,332
Investment income	119,682,578	2,641,225	0	122,323,803
Investment sales	594,160,906	13,112,291	0	607,273,197
Other receivables	171,736	0	0	171,736
Total receivables	732,263,433	17,493,767	842,868	750,600,068
Investments and derivatives				
Investments - cash and cash equivalents	1,780,496,430	39,293,037	0	1,819,789,467
Investments - treasuries	4,728,883,304	104,359,764	0	4,833,243,068
Investments - fixed income	524,907,691	11,583,970	0	536,491,661
Investments - equities	2,024,391	44,675	0	2,069,066
Investments - real estate investment trusts	645,319,847	14,241,296	0	659,561,143
Investments - equity and fixed income commingled funds	1,899,205,289	41,912,773	0	1,941,118,062
Investments - alternatives and limited partnerships	2,978,559,817	65,732,601	0	3,044,292,418
Investments - derivative instruments	13,526,647	298,514	0	13,825,161
Total investments and derivatives	12,572,923,416	277,466,630	0	12,850,390,046
Capital assets, net of accumulated depreciation	11,070,763	0	0	11,070,763
Total assets	13,320,817,440	294,960,587	3,669,508	13,619,447,535
Deferred outflow of resources	896,172	20,899	0	917,071
Liabilities				
Administrative and benefit expense payables	2,493,744	43,940	3,548,300	6,085,984
Employee vacation and overtime liability	798,598	18,604	0	817,202
Payable for investments purchased	115,414,738	2,547,040	0	117,961,778
Management and incentive fees payable	21,200,638	467,868	0	21,668,506
Investment activities payable	6,878,867	151,807	0	7,030,674
Obligations under repurchase agreements	3,642,919,372	80,394,076	0	3,723,313,448
MOSERS investment portfolio liability (MIP)	3,867,812	85,357	0	3,953,169
Net OPEB liability	7,507,485	175,075	0	7,682,560
Total liabilities	3,801,081,254	83,883,767	3,548,300	3,888,513,321
Deferred inflow of resources	702,278	16,377	0	718,655
Net position restricted for fiduciary activities	$ 9,519,930,080	$ 211,081,342	$ 121,208	$ 9,731,132,630

See accompanying *Notes to the Basic Financial Statements.*

Statements of Changes in Fiduciary Net Position

For the Year Ended June 30, 2021

	MSEP Fund	Judicial Fund	Insurance Fund	Total
Additions				
Contributions and Premiums				
Employer contributions and premiums	$ 463,293,368	$ 39,996,509	$ 14,658,163	$ 517,948,040
Employee contributions and premiums	37,571,263	1,448,428	16,951,056	55,970,747
Member purchases of service credit	1,520,330	0	0	1,520,330
Service transfer contributions	2,298,914	0	0	2,298,914
Total contributions and premiums	504,683,875	41,444,937	31,609,219	577,738,031
Investment activity				
Investing activity income:				
Net appreciation in fair value of investments	2,104,682,949	45,537,184	0	2,150,220,133
Interest	19,170,915	419,539	1,869	19,592,323
Dividends	26,333,715	570,356	0	26,904,071
Other	669,317	14,482	0	683,799
Total investing activity income	2,150,856,896	46,541,561	1,869	2,197,400,326
Investing activity expenses:				
Management and incentives fees	89,866,889	1,952,923	0	91,819,812
Custody and other fees	752,291	16,278	0	768,569
Consultant fees	579,826	12,724	0	592,550
Internal investment activity expenses	5,654,724	51,194	0	5,705,918
Total investing activity expenses	96,853,730	2,033,119	0	98,886,849
Reverse repurchase agreement activity:				
Loss on assets in reverse repurchase funds	(13,132,424)	(288,967)	0	(13,421,391)
Interest expense from reverse repurchase agreements	(7,879,656)	(169,768)	0	(8,049,424)
Total net loss from reverse repurchase agreement activity	(21,012,080)	(458,735)	0	(21,470,815)
Total net investment income	2,032,991,086	44,049,707	1,869	2,077,042,662
Miscellaneous income	80,121	0	480,074	560,195
Total additions	2,537,755,082	85,494,644	32,091,162	2,655,340,888
Deductions				
Benefit payments	831,968,945	41,625,546	0	873,594,491
Premium disbursements	0	0	31,597,820	31,597,820
BackDROP payments	79,363,265	0	0	79,363,265
Buyout and lump-sum payments	92,059	0	0	92,059
Service transfer payments	2,520,166	0	0	2,520,166
Contribution and premium refunds	5,894,157	0	11,401	5,905,558
Administrative expenses	8,816,943	75,822	480,120	9,372,885
Total deductions	928,655,535	41,701,368	32,089,341	1,002,446,244
Net increase in net position	1,609,099,547	43,793,276	1,821	1,652,894,644
Net position restricted for fiduciary activities:				
Beginning of year	7,910,830,533	167,288,066	119,387	8,078,237,986
End of year	$ 9,519,930,080	$ 211,081,342	$ 121,208	$ 9,731,132,630

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, 2021, the employer contribution rate was 22.88% 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, 2021 the ratio of actuarial value of assets to fair value of assets was 93.59%, for the MSEP.

Per the June 30, 2021 actuarial valuation, membership in the MSEP consisted of the following:

Retirees and beneficiaries currently receiving benefits		52,223
Active		
Vested	27,557	
Nonvested	15,272	42,829
Inactive		
Vested (not yet receiving benefits)*	17,763	
Nonvested (with contribution balances)	25,613	43,376
Total membership		**138,428**

** Includes 191 members on leave of absence and 613 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, 2021 were 22.88% 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, 2021 actuarial valuation, membership in the Judicial Plan consisted of the following:

Retirees and beneficiaries currently receiving benefits		607
Active		
Vested	418	
Nonvested	0	418
Inactive		
Vested (not yet receiving benefits)		27
Total membership		**1,052**

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, 2021, the employer contribution rate was 63.38% 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 page 114-115 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, formerly known as ICMA-RC, 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 $2.1 billion and $697.0 million as of June 30, 2021 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 $4.0 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.modeferredcomp.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.

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. 84 *Fiduciary Activities,* and Statement No. 97 *Certain Component Unit Criteria, and Accounting and Financial Reporting for Internal Revenue Code Section 457 Deferred Compensation Plans—an amendment of GASB Statements No. 14 and No. 84, and a supersession of GASB Statement No. 32.*

As part of adopting GASB Statement No. 84, MOSERS has changed the fund type of its insurance activities from being reported as an internal service fund to being reported as a custodial fund. As part of this change, the insurance activities are now reported in MOSERS' fiduciary statements, instead of being reported as internal service funds.

Adopting GASB Statement No. 84, and GASB Statement No. 97, has also required changes related to how MOSERS reports the deferred compensation plan activities. The administrative activities related to the deferred compensation plan will no longer be included in MOSERS' *Annual Comprehensive Financial Report* as an internal service fund. Prior year comparative amounts have been adjusted where applicable by removing such amounts from the beginning net position. MOSERS deems these amounts to be immaterial to the financial statements. The administrative activities related to the Missouri State Public Employees Deferred Compensation Plan, and the Missouri State Public Employees Deferred Compensation Incentive Plan will continue to be included in the separately issued statements for those respective plans.

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, 2021, 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 transition the portfolio to a new asset allocation, which includes four broad categories: growth, income, inflation hedge, and alternative betas/absolute return. MOSERS completed the transition to this new asset allocation at the end of February 2021.

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 risk-weighted policy allocation that is designed to achieve the long-term required return objectives of the System, given certain risk constraints. The current asset allocation reflects a diversified portfolio, which will perform well in a variety of economic conditions and will help reduce the portfolio's overall volatility.

The Board has authorized staff to create and maintain an internally managed beta-balanced portfolio that utilizes a modest amount of leverage in order to balance the risk allocations equally across the 11 asset classes contained in the portfolio. The leverage 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 internally managed portfolio by asset class as of June 30, 2021.

Schedule of Internally Managed Leverage

	Fair Value Capital	Percent of Investments at Fair Value	Market Exposure	Percent of Investments at Market Exposure	Policy Exposure
Growth	$ 4,172,694,467	43.0%	$ 4,380,166,669	45.1%	45.1%
Income	1,839,886,154	19.0	3,094,962,979	31.9	31.9
Inflation hedge	1,810,016,709	18.6	3,866,527,154	39.9	39.9
Absolute return	1,878,952,910	19.4	1,874,459,987	19.3	19.3
Total new portfolio	$ 9,701,550,240	100.0%	$ 13,216,116,789	136.2%	136.2%

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, 2021, 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
	100.0%			
			Correlation/volatility adjustment	(0.6)
			Long-term expected net nominal return	7.2
			Less: investment inflation assumption	(1.9)
			Long-term expected geometric net real return	5.3 %

* *Long-term expected arithmetic returns of the asset classes at the time of the asset allocation study for 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 26.56% for the year ended June 30, 2021. 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 34-35 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 equity real estate investments are based on appraisals. Fair values of the limited partnership investments are based on valuations of the underlying companies of the limited partnerships as reported by the general partner. Certain limited partnerships reflect values and related performance on a quarter lag basis due to the nature of those investments and the time it takes to value them. Fair value of the commingled funds is determined based on the underlying asset values. The remaining assets are primarily valued by the System's master custodian using the last trade price information supplied by various pricing data vendors.

Investments and Derivative Instruments Measured at Fair Value

June 30, 2021	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	$ 4,833,243,068	$ 4,804,124,786	$ 0	$ 29,118,282
Repurchase agreements	900,000,000	0	900,000,000	0
Fixed income securities				
Corporate bonds and asset-backed securities	405,502,087	0	403,883,854	1,618,233
U.S. government agencies	109,129,285	42,316	109,086,969	0
Non U.S. sovereign	21,860,289	0	21,860,289	0
Total fixed income securities	536,491,661	42,316	534,831,112	1,618,233
Equity				
Real estate investment trusts	659,561,143	659,561,143	0	0
Equity securities	2,069,066	1,996,848	0	72,218
Total equities	661,630,209	661,557,991	0	72,218
Total investment by fair value level	6,931,364,938	5,465,725,093	1,434,831,112	30,808,733
Investments measured at the NAV				
Commingled funds - equity funds	1,652,557,886			
Commingled funds - fixed income funds	288,560,176			
Commingled funds - short-term investment funds	166,997,000			
Hedge funds	2,216,577,754			
Private equity funds	572,304,369			
Private real estate and timber funds	255,410,295			
Total investments measured at the NAV	5,152,407,480			
Total investments measured at fair value	12,083,772,418	5,465,725,093	1,434,831,112	30,808,733
Investment derivative instruments				
Future contracts	(2,956,383)	(2,956,383)	0	0
Swap contracts	16,781,544	0	0	16,781,544
Total investment derivative instruments	13,825,161	(2,956,383)	0	16,781,544
Investments at cost or cost plus accrued interest:				
Cash held in investment accounts	752,792,467			
Total investments	12,850,390,046	5,462,768,710	1,434,831,112	47,590,277
Obligations under repurchase agreements	(3,723,313,448)			
Total investments, net of obligations under repurchase agreements	$ 9,127,076,598	$ 5,462,768,710	$ 1,434,831,112	$ 47,590,277

Investments Measured at the Net Asset Value

	June 30, 2021	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period (Days)
Commingled fund - equity funds	$ 1,652,557,886		Daily, Monthly	1-10
Commingled fund - fixed income fund	288,560,176		Daily	2
Commingled fund - short-term investment funds	166,997,000		Daily	0
Active hedge funds				
Merger arbitrage	146,114,118		Monthly	45
Equity market neutral	109,396,165		Quarterly	90
Event driven	220,894,000		Semi-annually	60
Marco	63,489,185		Quarterly	30
Quantitative	70,742,658		Monthly	30
Multi strategy	549,511,856		Monthly, Quarterly	60-90
Fund-of-funds	1,044,482,180		Monthly	95
Pending liquidated hedge funds	11,947,592			
Private equity funds	572,304,369	$ 455,023,011		
Private real estate and timber funds	255,410,295	49,352,214		
Total investments measured at the net asset value (NAV)	$ 5,152,407,480	$ 504,375,225		

- **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** – Two 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.
- **Macro hedge fund** – Consisting of one fund, this strategy seeks to take advantage of macroeconomic dislocations between countries by trading a number of different markets and financial instruments. This investment is valued at the NAV, is redeemable quarterly, 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 fund** – Consisting of three 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 three 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 nine funds which have been fully redeemed as of June 30, 2021, 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, real estate, and timber funds** – MOSERS' private equity portfolio consists of 38 funds with exposure to buyout funds, distressed funds, infrastructure, energy, secondary, royalty funds, and special situations. The real estate portfolio, comprised of seven 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, 2021, MOSERS' fixed income assets that are not U.S. government guaranteed represented 0.3% 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 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, 2021	Percent of all Fixed Income Assets	Weighted Average Credit Quality	Ratings Dispersion Requiring Further Disclosure
U.S. government agencies	$ 107,796,677	1.4%	AA+	See below
U.S. government mortgages	803,528	0.0	AA+	See below
Asset-backed securities	655,023	0.0	AA-	See below
Collateralized mortgage obligations	7,682	0.0	AA+	See below
Corporate bonds	404,833,087	5.4	BBB+	See below
Municipal bonds	8,889,359	0.1	AA-	See below
Non-U.S. sovereign	13,506,305	0.2	BBB+	See below
Total nongov't fixed income securities	536,491,661	7.1		
Nongov't. guaranteed repurchase agreements	775,000,000	10.4	Not rated	None
Bank deposits	750,000,000	10.0	FDIC Insured	None
Commingled funds - investment grade fixed income	288,560,176	3.9	Not rated	None
Pooled instruments	166,997,000	2.2	AAA	None
Total nongov't. guaranteed securities	$ 2,517,048,837	33.6%		
U.S. government securities held in portfolio	$ 4,833,243,068	64.7%		
Repurchase agreement with U.S. government securities held as collateral	125,000,000	1.7		
Total fixed income securities	$ 7,475,291,905	100.0%		

Ratings Dispersion Detail - Fair Value

Credit Rating Level	U.S. Government Agencies	U.S. Government Mortgages	Asset-Backed Securities	Collateralized Mortgage Obligations	Corporate Bonds	Municipal Bonds	Non-U.S. Sovereign
AAA	$ 0	$ 0	$ 0	$ 0	$ 3,045,677	$ 1,139,656	$ 0
AA	107,796,677	803,528	458,434	7,676	14,090,126	4,632,779	1,868,364
A	0	0	170,938	0	125,371,373	2,966,558	2,269,348
BBB	0	0	0	0	258,189,275	150,366	8,261,866
BB	0	0	0	0	4,136,636	0	1,106,727
Not rated	0	0	25,651	6	0	0	0
	$ 107,796,677	$ 803,528	$ 655,023	$ 7,682	$ 404,833,087	$ 8,889,359	$ 13,506,305

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, 2021	Percent of all Fixed Income Assets	Weighted Average Effective Duration (Years)	Interest Rate Risk Requiring Further Disclosure
U.S. treasuries	$ 4,833,243,068	64.8%	9.1	See below
U.S. government agencies	107,796,677	1.4	0.5	None
U.S. government mortgages	803,528	0.0	3.3	None
Asset-backed securities	655,023	0.0	1.7	None
Collateralized mortgage obligations	7,682	0.0	0.1	None
Corporate bonds	404,833,087	5.4	7.0	None
Municipal bonds	8,889,359	0.1	13.2	None
Non-U.S. sovereign	13,506,305	0.2	11.5	None
Bank deposits	750,000,000	10.0	0.0	None
Repurchase agreements	900,000,000	12.0	0.0	None
Commingled funds - investment grade fixed income	288,560,176	3.9	4.2	None
Pooled instruments	166,997,000	2.2	0.0	None
	$ 7,475,291,905	100.0%	6.5	

Effective Duration Analysis of U.S. Treasuries

Maturity	Fair Value June 30, 2021	Average Effective Duration of the Security Type (Years)	Contribution to Effective Duration (Years)
Less than 1 year to maturity	$ 381,352,543	0.0	0.0
1- to 10-year maturities	2,680,323,319	4.7	2.6
Long coupon treasuries	1,771,452,954	17.7	6.5
Long stripped treasuries	114,252	26.2	0.0
	$ 4,833,243,068		9.1

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 0.02% to 0.25% with maturities of one to five days.

The yield earned by the counterparties on the reverse repo transactions ranged from (0.20)% to 0.22% 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 $48.0 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 $16.0 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, 2021	Fair Value Including Accrued Interest of Repurchase Agreements June 30, 2021	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries	$ 127,500,243	$ 125,000,000	$ 2,500,243	
U.S. government agencies	408,000,075	400,000,000	8,000,075	
Common stock	412,502,380	375,000,000	37,502,380	
Accrued interest	0	2,979	(2,979)	
	$ 948,002,698	$ 900,002,979	$ 47,999,719	5.3%

Reverse Repurchase Agreements by Collateral Type

Collateral Type	Fair Value of Collateral June 30, 2021	Fair Value Including Accrued Interest of Repurchase Agreements June 30, 2021	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries	$ 3,733,666,698	$ 3,723,313,448	$ 10,353,250	
Payables	7,796,446	0	7,796,446	
Accrued interest	0	2,166,446	(2,166,446)	
	$ 3,741,463,144	$ 3,725,479,894	$ 15,983,250	0.4 %

Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely impact the fair value of an investment. MOSERS' currency risk exposures, or exchange rate risk, primarily reside within MOSERS' international equity investment holdings. MOSERS' implementation policy allows external managers to decide what action to take regarding their respective portfolio's foreign currency exposures using currency forward contracts. MOSERS' exposure to foreign currency risk in U.S. dollars, as of June 30, 2021, is highlighted in the table below.

Currency Exposures by Asset Class

Currency	Cash & Cash Equivalents	Equities	Fixed Income	Alternatives	Total
Australian Dollar	$ 9,042,557	$ 0	$ 0	$ 0	$ 9,042,557
Brazilian Real	0	11,825,583	0	0	11,825,583
Canadian Dollar	6,001,851	3,904,304	0	0	9,906,155
Chilean Peso	0	905,507	0	0	905,507
Chinese Yuan Renminbi	0	10,672,365	0	0	10,672,365
Colombian Peso	7	249,705	276,022	0	525,734
Czech Koruna	(785)	286,763	3,157	0	289,135
Danish Krone	0	2,372,293	0	0	2,372,293
Egyptian Pound	0	178,470	0	0	178,470
Euro	6,670,760	65,768,234	(82,918)	43,727	72,399,803
Hong Kong Dollar	(7,202,437)	95,572,797	0	0	88,370,360
Hungarian Forint	0	542,720	0	0	542,720
Indian Rupee	0	23,244,828	1,211	0	23,246,039
Indonesian Rupiah	0	2,507,993	0	0	2,507,993
Israeli Shekel	0	22	0	0	22
Japanese Yen	1,219,578	155,739,531	0	0	156,959,109
Kuwaiti Dinar	0	1,199,304	0	0	1,199,304
Malaysian Ringgit	0	2,781,956	0	0	2,781,956
Mexican Peso	157	4,921,297	0	0	4,921,454
New Taiwan Dollar	0	45,182,681	0	0	45,182,681
Norwegian Krone	0	979,078	0	0	979,078
Pakistani Rupee	0	41,208	0	0	41,208
Philippine Peso	0	1,416,627	0	0	1,416,627
Polish Zloty	355	1,628,542	3,131	0	1,632,028
Qatari Riyal	0	1,502,681	0	0	1,502,681
Russian Ruble	0	4,958,154	116,587	0	5,074,741
Saudi Riyal	0	6,549,512	0	0	6,549,512
Singapore Dollar	0	9,042,826	0	0	9,042,826
South African Rand	(1,087,941)	15,602,082	0	0	14,514,141
South Korean Won	(313,430)	40,262,851	2,008,984	0	41,958,405
Swiss Franc	0	41,569,087	0	0	41,569,087
Thai Baht	0	8,534,903	0	0	8,534,903
Turkish Lira	0	4,169,123	0	0	4,169,123
United Arab Emirates Dirham	0	1,439,963	0	0	1,439,963
United Kingdom Pound Sterling	1,343,560	79,819,285	0	0	81,162,845
	$ 15,674,232	$ 645,372,275	$ 2,326,174	$ 43,727	$ 663,416,408

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, 2021.

Futures Contracts

Futures Contract	Notional Value	Exposure
Currency futures	$ 50,427,000	$ (1,855,142)
Fixed income futures	(251,685,786)	(1,065,222)
Equity index futures	37,982,465	619,748
Commodity futures	37,961,379	(655,767)
Total	$ (125,314,942)	$ (2,956,383)

Swap Contracts

Counterparty Credit Rating	Notional Value	Exposure
Total return swaps - equity		
A+	$ 1,295,793,199	$ 25,666,975
A	971,413,543	23,379,421
Total	$ 2,267,206,742	$ 49,046,396
Total return swaps - fixed income		
A+	$ 552,534,767	$ 14,473,658
A	15,279,026	68,274
Total	$ 567,813,793	$ 14,541,932
Total return swaps - commodities		
A+	$ 226,281,311	$ 0
A	290,243,828	0
Total	$ 516,525,139	$ 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, swap contracts, and forward foreign currency exchange. MOSERS enters into these certain derivative instruments as investments primarily to enhance the performance and reduce the volatility of its portfolio. It enters swaps and futures contracts to gain or hedge exposure to certain markets and to manage interest rate risk and enters into forward foreign currency exchange contracts primarily to hedge foreign currency exposure.

The notional values associated with these derivative instruments are generally not recorded in the financial statements; however, the fair values of these instruments are recorded in the *Statements of Fiduciary Net Position* and the total changes in fair value for the year are included as net appreciation in fair value of investments in the *Statements of Changes in Fiduciary Net Position*. For the year ended June 30, 2021, the change in fair value in the swap contracts resulted in a gain of $996 million of investment income. The change in fair value in the futures contracts resulted in a gain of $85 million of investment income. MOSERS does not anticipate additional significant market risk from the derivative arrangements.

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

Securities Lending Program

The Board of Trustees' *Investment Policy 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 2021.

Note 4 – Capital Assets

Office building, furniture, fixtures, equipment, and software costing $1,000 or more are capitalized. Capital assets are valued at cost and reported net of accumulated depreciation. Improvements, which increase the useful life of the property, are also capitalized. The cost of internally developed software incurred during the application development state, including staff payroll costs, are capitalized in accordance with GASB Statement 51. Maintenance and repairs are charged to expense as incurred. Depreciation is computed using the straight-line method over the estimated useful life of the related assets according to the following guidelines:

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

Schedules of the capital asset account balances for the year ended June 30, 2021 are as follows:

Capital Assets

	Land	CIP - Internally Developed Pension Admin. System	Building and Building Improvements	Furniture, Fixtures and Equipment	Software	Total Capital Assets
Capital assets						
Balances June 30, 2020	$ 267,286	$ 4,877,733	$ 3,985,044	$ 1,443,905	$ 743,824	$ 11,317,792
Additions	0	3,557,994	166,383	200,281	0	3,924,658
Deletions	0	0	(31,367)	(37,778)	(15,063)	(84,208)
Capital assets June 30, 2021	267,286	8,435,727	4,120,060	1,606,408	728,761	15,158,242
Accumulated depreciation						
Balances June 30, 2020	0	0	2,009,715	1,061,454	716,097	3,787,266
Depreciation expense	0	0	134,010	163,065	11,429	308,504
Deletions	0	0	0	(3,023)	(5,268)	(8,291)
Accumulated depreciation June 30, 2021	0	0	2,143,725	1,221,496	722,258	4,087,479
Net capital assets June 30, 2021	$ 267,286	$ 8,435,727	$ 1,976,335	$ 384,912	$ 6,503	$ 11,070,763

Note 5 – Employers' Net Pension Liability

The components of net pension liability as of June 30, 2021, are in the *Schedule of Employers' Net Pension Liability* below.

Schedule of Employers' Net Pension Liability

	MSEP	Judicial Plan
Total pension liability	$ 15,110,646,537	$ 626,284,219
MOSERS' fiduciary net position	9,519,930,080	211,081,342
Employers' net pension liability	$ 5,590,716,457	$ 415,202,877
Plan net position as a percentage of the total pension liability	63.00%	33.70%
Covered payroll	$ 2,024,883,601	$ 63,105,884
Employers' net pension liability as a percentage of covered payroll	276.10%	657.95%

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, 2021, is $15,110,646,537 for MSEP and $626,284,219 for the Judicial Plan based on an actuarial valuation performed as of June 30, 2021, and a measurement date of June 30, 2021, using generally accepted actuarial procedures.

Actuarial Assumptions Used to Determine Net Pension Liability

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

- Subsequent changes in the unfunded actuarial accrued liability due to actuarial gains/losses or assumption changes are now amortized over a closed 25 year period, instead of 30 years.
- Mortality assumptions are now based on generational tables.
- The merit component of the salary increase assumption was adjusted to partially reflect observed experience.

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

Valuation date	June 30, 2021
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.

Mortality Rates - Judicial Plan

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

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

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

Discount Rate

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

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

Sensitivity of Net Pension Liability to Changes in the Discount Rate

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

The funding status of the plans and *Employer Schedule of Funding Progress* can be found in the *Actuarial Section* on page 96.

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, 2021, 28,873 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, 2021, was $1,998,030. 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, 2021, 103 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 ($13,149 for the year ended June 30, 2021). 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 29,674 members covered under the program as of June 30, 2021. This insured defined benefit coverage is financed on a percentage of covered payroll (0.55% July 2020 through December 2020; .0445% January 2021 and later). Purchased as a group policy, LTD is administered by The Standard. The cost for the year ended June 30, 2021, was $7,830,471. 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, 2020, employers were required to contribute 4.40% of gross active employee payroll for the periods July 1, 2019, through December 31, 2019; 4.65% for the period January 15, 2020 through April 1, 2020; 4.02% for the period April 15, 2020 through June 1, 2020; and 3.41% for the period June 1, 2020, through June 30, 2020. Employees do not contribute to this plan.

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

At June 30, 2021, MOSERS reported a liability of $7,682,560 for its proportionate share of the net OPEB liability. The net OPEB liability was measured as of June 30, 2020, 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, 2020, MOSERS' proportionate share was 0.4313%. For the year ended June 30, 2021, MOSERS recognized OPEB expense of $507,122. As of June 30, 2021, 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	$ 323,607	$ 85,458
Changes of assumptions	0	540,713
Net difference between projected and actual earnings on plan investments	21,744	0
Changes in proportion and differences between MOSERS' contributions and proportionate share of contributions	288,107	92,484
MOSERS' contributions subsequent to the measurement date	283,613	0
	$ 917,071	$ 718,655

The $283,613 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, 2022. 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		
2022	$	9,399
2023		9,278
2024		11,364
2025		11,980
2026		14,301
Thereafter		28,875
Total	$	85,197

Actuarial Assumptions

The collective total OPEB liability for the June 30, 2020, measurement date was determined by an actuarial valuation as of July 1, 2020. This actuarial valuation used the following actuarial assumptions:

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

Valuation year	July 1, 2019 - June 30, 2020
Actuarial cost method	Entry age normal, level percentage of payroll
Asset valuation method	Market value
Discount rate (blended)	4.38%
Projected payroll growth rate	4.0%
Inflation rate	3.0%
Health care cost trend rate (medical & prescription drugs combined)	
Non-Medicare	6.0%
	(rate decreases by 0.25% per year until an ultimate rate of 5.0% in fiscal year 2023 and later)
Medicare	10.0%
(rate changes to 22.0% in fiscal year 2021, 10.0% in fiscal year 2022 and 2023, 9.5% in fiscal 2024, 9.0% in fiscal 2025, 8.5% in fiscal 2026, then 8.0% in fiscal 2027, decreasing by 1.0% per year to an ultimate rate of 5.0% in fiscal year 2030 and after.)	

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

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 retirees contributions were updated based on analysis of 2021 rates.

Change in Assumptions and Methods Since Prior Valuation

The discount rate was changed to 4.38% from 5.24%. The expected return on asset assumption was changed from 5.50% to 4.50%.

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

The non-medicare health care cost trend rate was 5.75% for fiscal year 2020. The rate will decrease by 0.25% per year to an ultimate rate of 5.0% in fiscal year 2023 and later. The medicare health care cost trend rate was 10.00% in fiscal year 2020. The medicare health care cost trend rate will be 22.00% in fiscal year 2021, 10.00% in fiscal year 2022 and 2023, 9.5% in fiscal year 2024, 9.00% in fiscal year 2025, 8.5% in fiscal year 2026 then 8.00% in fiscal year 2027 decreasing by 1.0% per year to an ultimate rate of 5.00% in fiscal year 2030 and after.

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	$ 6,465,488	$ 7,682,560	$ 9,237,124

Discount Rate

A discount rate of 4.38% 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 4.38%, 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 (3.38%)	Current Discount Rate (4.38%)	1% Increase in Discount Rate (5.38%)
Net OPEB liability	$ 9,208,142	$ 7,682,560	$ 6,487,312

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	17.0%	8.5%
Mid cap stocks	6.0	8.8
Small cap stocks	7.0	8.8
International stocks	4.0	8.9
BarCap aggregate bonds	64.0	2.4
Cash equivalents	2.0	2.1

Note 8 – Commitments

As of June 30, 2021, MOSERS has $504.4 million in unfunded commitments in the private asset class.

MOSERS has contracted with various software and consulting firms to provide and implement a pension administration system at a cost of approximately $9.3 million. In addition to the cost of the system, MOSERS has engaged consultants to assist with project governance, change management, and data validation. The contracts for these consulting services have an approximate cost of $2.5 million. As of June 30, 2021, the remaining commitments on these agreements was approximately $5.9 million.

Note 9 – Contingencies

There were no contingencies which would have a material impact on the financial statements as of June 30, 2021.

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.

Schedule of Changes in Employers' Net Pension Liability - MSEP

*For Years Ended June 30, 2014 – 2021**

	2021	2020	2019	2018
Total pension liability				
Service cost	$ 162,668,072	$ 159,559,528	$ 158,190,866	$ 157,351,979
Interest on the total pension liability	959,662,398	960,644,327	956,725,536	956,201,619
Benefit changes	0	0	0	0
Difference between expected and actual experience	133,886,066	(70,371,777)	7,426,685	(118,252,032)
Assumption changes	515,859,705	124,766,739	74,340,841	351,899,973
Benefit payments and member refunds	(919,838,592)	(873,816,238)	(851,821,580)	(886,711,473)
Net change in total pension liability	852,237,649	300,782,579	344,862,348	460,490,066
Total pension liability - beginning	14,258,408,888	13,957,626,309	13,612,763,961	13,152,273,895
Total pension liability - ending (a)	$15,110,646,537	$14,258,408,888	$13,957,626,309	$13,612,763,961
Plan fiduciary net position				
Employer contributions	$ 463,293,368	$ 436,895,653	$ 394,150,042	$ 379,557,962
Employee contributions	37,571,263	35,141,960	31,286,632	28,303,994
Pension plan net investment income (loss)	2,032,991,086	400,354,303	313,159,178	576,188,826
Benefit payments and member refunds	(919,838,592)	(873,816,238)	(851,821,580)	(886,711,473)
Pension plan administrative expense	(8,816,943)	(8,398,164)	(9,200,826)	(9,799,256)
Other	3,899,365	4,187,740	4,383,409	1,610,073
Net change in plan fiduciary net position	1,609,099,547	(5,634,746)	(118,043,145)	89,150,126
Plan fiduciary net position - beginning	7,910,830,533	7,916,465,279	8,034,508,424	7,945,358,298
Plan fiduciary net position - ending (b)	9,519,930,080	7,910,830,533	7,916,465,279	8,034,508,424
Net pension liability - ending (a)-(b)	$ 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	63.00%	55.48%	56.72%	59.02%
Covered payroll	$ 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	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.*

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

*For Years Ended June 30, 2014 – 2021**

	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.*

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

*For Years Ended June 30, 2014 – 2021**

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

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

*For Years Ended June 30, 2014 – 2021**

	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.*

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
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
2012	263,373,924	263,373,924	0	1,864,069,493	13.97

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
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
2012	26,324,526	26,324,526	0	45,835,501	57.30

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

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

Pension Trust Funds

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

Year Ended June 30	Annual Money-Weighted Rate of Return - Net of Investment Expense
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.*

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

Actuarial Methods and Assumptions for Valuations Performed as of June 30, 2021

The entry-age actuarial cost method of valuation is used in determining liabilities and normal cost. Regular actuarial valuations provide valuable information about the composite change in the unfunded actuarial accrued liabilities (whether or not the liabilities are increasing or decreasing, and by how much). Since the future cannot be predicted with precision, actual experience is expected to differ from assumed experience. Differences occurring in the past between assumed experience and actual experience (actuarial gains and losses) become part of actuarial accrued liabilities. Unfunded actuarial accrued liabilities are amortized to produce payments (principal and interest), which are expressed as a percent of payroll. A layered, closed 25-year amortization period was used for the June 30, 2021 valuations to determine the fiscal year 2023 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, 2021, 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	2021	2020	2019	2018	2017
Contribution rate for fiscal year	2023	2022	2021	2020	2019
Actuarial cost method	Entry Age Normal	Entry Age Normal	Entry Age Normal	Entry Age Normal	Entry Age Normal
Amortization method	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Single base approach - Level percentage of payroll
Amortization periods	Closed 25-year period	Closed 30-year period	Closed 30-year period	Closed 30-year period	Closed 30-year period
Inflation	2.25%	2.25%	2.35%	2.50%	2.50%
Cost-of-living adjustment	4% or 1.80%	4% or 1.80%	4% or 1.88%	4% or 2%	4% or 2%
Salary increase	varied	varied	varied	varied	varied
Payroll growth	2.25%	2.25%	2.35%	2.50%	3.00%
Investment rate of return	6.95%	6.95%	7.10%	7.25%	7.50%

Schedule of Proportionate Share of the Net OPEB Liability

*For Years Ended June 30, 2018 – 2021**

State Retiree Welfare Benefit Trust

	2021	2020	2019	2018
MOSERS' proportion of the net OPEB liability	0.4313%	0.4352%	0.4375%	0.4121%
MOSERS' proportionate share of the net OPEB liability	$ 7,682,560	$ 7,697,649	$ 7,666,038	$ 7,272,038
MOSERS' covered payroll	$ 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	101.50%	104.45%	108.64%	109.03%
Plan fiduciary net position as a percentage of the total OPEB liability	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 – 2021**

	2021	2020	2019	2018
Contractually required contribution	$ 283,613	$ 311,510	$ 331,275	$ 301,182
Contributions in relation to the contractually required contribution	$ 283,613	$ 311,510	$ 331,275	$ 301,182
Contribution deficiency (excess)	$ 0	$ 0	$ 0	$ 0
Covered payroll	$ 7,004,895	$ 7,569,252	$ 7,370,032	$ 7,056,668
Contributions as a percentage of covered payroll	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, 2021

Investing activity	MSEP	Judicial Plan	Total
Investment management and incentive fees			
Equity			
Kennedy Capital Management	$ 602,982	$ 13,104	$ 616,086
Silchester International Investors	2,560,100	55,634	2,615,734
State Street Global Advisors	17,619	383	18,002
Multi-asset			
Blackrock	430,751	9,361	440,112
NISA Investment Advisors	5,608,335	121,877	5,730,212
Alternatives			
Aberdeen Standard Investments	158,136	3,436	161,572
Actis Emerging Markets III	50,894	1,106	52,000
Actis Emerging Markets IV	2,839,298	61,702	2,901,000
AQR DELTA Sapphire Fund, LP	1,197,712	26,028	1,223,740
Axiom Asia Private Capital Fund II, LP	569,143	12,368	581,511
Axiom Asia Private Capital Fund III, LP	5,244,986	113,980	5,358,966
Axiom Asia Fund VI	158,813	3,451	162,264
Axxon Brazil Private Equity Fund II B, LP	172,415	3,747	176,162
Bayview Opportunity Domestic IIIb, LP	23,575	512	24,087
Blackstone Real Estate Partners IV	412,366	8,961	421,327
Blackstone Real Estate Partners V	363,876	7,907	371,783
Blackstone Real Estate Partners VI	42,602	926	43,528
Blackstone Real Estate Partners VII	(50,449)	(1,096)	(51,545)
Blackstone Topaz Fund, LP	3,641,691	79,139	3,720,830
Blackstone Topaz Private Credit	2,157,450	46,884	2,204,334
Brevan Howard Alpha Strategies Fund, LP	4,325,229	93,993	4,419,222
Bridgewater Associates - Diamond Ridge Fund, LLC	1,927,295	41,883	1,969,178
CarVal Investors CVI Global Value Fund A, LP - private debt	2,994	65	3,059
CarVal Investors CVI Global Value Fund A, LP - real estate	2,994	65	3,059
Catalyst Fund Limited Partnership III	156,499	3,401	159,900
Catalyst Fund Limited Partnership IV	22,220	483	22,703
Catalyst Fund Limited Partnership V	1,675,962	36,421	1,712,383
CBRE US Core Partners, LP	312,137	6,783	318,920
Cornwall Domestic, LP	72,404	1,573	73,977
DRI Capital - LSRC	509,964	11,082	521,046
EIG Energy Fund XIV, LP	166,369	3,615	169,984
EIG Energy Fund XV, LP	402,797	8,753	411,550
EIG Energy Fund XVI, LP	318,815	6,928	325,743
Eisler Capital Fund, LP	2,182,309	47,424	2,229,733
Elliott International, Ltd.	10,675,570	231,994	10,907,564
Exodus Point	7,122,987	154,792	7,277,779
Farallon Capital Institutional Partners, LP	140	3	143

Schedule of Investment Expenses continued on following page.

Schedules of Investment Expenses (continued)

For the Year Ended June 30, 2021

Investing activity	MSEP	Judicial Plan	Total
Gateway Energy & Resource Holdings, LLC	$ 16,037	$ 349	$ 16,386
Glenview Capital Opportunity Fund, LP	20,584	447	21,031
Global Forest Partners GTI7 Institutional Investors Company Ltd.	4,485	97	4,582
HBK Merger Strategies Offshore Fund, Ltd.	2,841,250	61,744	2,902,994
JLL Partners Fund V, LP	23,320	507	23,827
JLL Partners Fund VI, LP	588,870	12,797	601,667
King Street Capital, LP	71,274	1,549	72,823
King Street Capital, Ltd.	978	21	999
LaSalle Property Fund	161,117	3,501	164,618
Linden Capital Partners II, LP	700,040	15,213	715,253
Merit Energy Partners F-II, LP	28,975	630	29,605
MHR Institutional Partners IIA, LP	9,690,422	210,585	9,901,007
MHR Institutional Partners III, LP	162,924	3,541	166,465
MHR Institutional Partners IV, LP	3,589,589	78,006	3,667,595
Millennium Technology Value Partners II	2,987,615	64,925	3,052,540
OCM Opportunities Fund VIIb, LP	(1,577)	(34)	(1,611)
OCM Opportunities Fund VIIIb, LP	178,788	3,885	182,673
OCM Power Opportunities Fund III, LP	704,147	15,302	719,449
OCM/GFI Power Opportunities Fund II, LP	42,639	927	43,566
Perry Partners, LP	87	2	89
Pharo Macro Fund, Ltd.	3,120,020	67,802	3,187,822
Portfolio Advisors Secondary Fund IV, LP	424,319	9,221	433,540
Silver Creek Special Opportunities Fund I, LP	27,760	603	28,363
Silver Creek Special Opportunities Fund II, LP	33,531	729	34,260
Silver Lake Partners II, LP	(2,144)	(47)	(2,191)
Standard Investment Research Hedged Equity Fund	6,478,077	140,777	6,618,854
StepStone Capital Buyout Fund II, LP	38,453	836	39,289
TA Realty Core Property Fund, LP	26,330	572	26,902
Voleon Institutional Strategies Fund, LP	1,431,594	31,110	1,462,704
Voleon Investors Fund, LP	398,405	8,658	407,063
Total investment management and incentive fees	89,866,889	1,952,923	91,819,812
Other investment fees			
Investment consultant fees			
Meketa Investment Group	266,697	5,853	272,550
NEPC	313,129	6,871	320,000
Total investment consultant fees	579,826	12,724	592,550
Investment custodial and other fees			
BNY Mellon (custodial)	478,948	10,363	489,311
BNY Mellon (performance calculation)	273,343	5,915	279,258
Total investment custodial and other fees	752,291	16,278	768,569
Internal investment activity expenses	5,654,724	51,194	5,705,918
Total investing activity expenses	$ 96,853,730	$ 2,033,119	$ 98,886,849

Schedules of Internal Investment Activity Expenses

For the Year Ended June 30, 2021

Personnel services	
Salaries	$ 2,472,281
Fringe benefits	942,182
Total personnel services	3,414,463
Professional services	
Attorney services	1,772,804
Total professional services	1,772,804
Communications	
Telephone	4,959
Total communications	4,959
Facilities	
Utilities	8,426
Lease expense	84,088
Facility maintenance	10,170
Total facilities	102,684
Software and equipment	
Computer supplies and software	500
Total software and equipment	500
Education, meetings and travel	
Professional development including travel	19
Due diligence travel	0
Total education, meetings and travel	19
General	
Research and information services	389,494
Membership dues	9,540
Office supplies	1,197
Periodicals and publications	10,258
Total general	410,489
Total internal investment activity expenses	$ 5,705,918

Schedules of Administrative Expenses

For the Year Ended June 30, 2021

Personnel services	
Salaries	$ 4,195,208
Fringe benefits	2,473,564
Total personnel services	6,668,772
Professional services	
Consulting services	515,934
Attorney services	103,433
Auditing services	65,488
Actuarial services	223,887
Total professional services	908,742
Communications	
Postage and mailing	181,780
Telephone and internet	66,581
Printing	27,320
Video production	1,987
Total communications	277,668
Facilities	
Utilities	93,699
Facility maintenance	93,201
Vehicle maintenance and operation	1,072
Total facilities	187,972
Software and equipment	
Maintenance agreements and licenses	390,365
Computer supplies and software	58,239
Equipment rental	63,653
Gain on sale of equipment	(7,157)
Total software and equipment	505,100
Education, meetings and travel	
Professional development including travel	21,366
Board travel and meetings	5,431
MOSERS sponsored seminars	7,043
Tuition reimbursement	11,646
Total education, meetings and travel	45,486
General	
Depreciation and amortization	308,503
Insurance	199,197
Business continuity	99,310
Banking services	52,858
Research and information services	42,719
Office supplies and miscellaneous	36,101
Membership dues	25,138
Recruiting and outreach	15,319
Total general	779,145
Total administrative expenses	$ 9,372,885

Schedules of Professional Service Fees

For the Year Ended June 30, 2021

Professional Services		
Operations administrative expenses		
Actuarial services		
Cavanaugh Macdonald Consulting, LLC	$	223,887
Attorney services		
Ice Miller, LLP		37,125
Thompson Coburn, LLP		64,749
Other attorney services		1,559
Total attorney services		103,433
Auditing services		
Eide Bailly, LLP		65,488
Consulting services		
Avtex – information technology		1,468
Black Hills Information Security, LLC – information technology		86,760
CBIZ Talent and Compensation Solutions – human resources		17,000
Charlesworth & Associates – risk management		13,305
Gamble & Schlemeier, Ltd. – governmental affairs		27,337
Huber & Associates – information technology		19,711
Linea Solutions		62,729
McLagan Partners, Inc – human resources		7,000
Norlem Technology Consulting – information technology		12,280
Verus Advisory, Inc. – investment consulting		265,000
Other consulting services		3,344
Total consulting services		515,934
Total operations administrative expenses		908,742
Investment administrative expenses		
Attorney services		
Cassels Brock & Blackwell, LLC		24,446
Quinn Emanuel Urquhart & Sullivan, LLP		407,151
Thompson Coburn, LLP		1,341,207
Total attorney services		1,772,804
Total investment administrative expenses		1,772,804
Total professional services expenses	$	2,681,546

Information on investment management and consulting fees can be found in the Schedules of Investment Expenses on pages 58-59.

Capitalized professional service fees for the pension administration system		
Consulting services		
ICON Integration and Design, Inc.	$	254,129
Tegrit		2,609,877
Total consulting services	$	2,864,006

Investment Section

Mr. Robert Sprehe
Retiree From Truman State University
Kirksville, MO
Years of Service: 30 Years
Year Retired: 1992

Chief Investment Officer's Report

MOSERS
MISSOURI STATE EMPLOYEES' RETIREMENT SYSTEM

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 29, 2021

Dear Members,

I am pleased to present the *Investment Section* of the *MOSERS Annual Comprehensive Financial Report* for the fiscal year ended June 30, 2021.

The MOSERS portfolio generated a time-weighted rate of return based on fair market value of 26.4% for the year ended June 30, 2021, net of all fees and expenses. The 26.4% was the highest fiscal year return achieved by the fund since 1986. Other highlights for the year include the following:

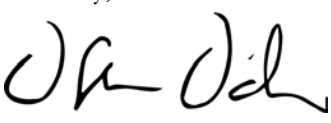
- At year end, pension fund assets totaled over $9.7 billion, a record high for total assets.
- The investment portfolio generated over $2 billion in net earnings during the year, representing another record high.
- The 26.4% actual return exceeded the policy return (i.e. the return expectations set by the Board) of 25.2% by 1.2%, resulting in $97.7 million of value added to the fund.

Defined by continued economic recovery, reopening of establishments, and continued government stimulus as a response to the COVID-19 pandemic, the year was certainly a risk-on investment environment. Equities and commodities led the way, each returning over 40% for the year. Public real assets, represented by real estate investment trusts (REITS) weren't far behind, generating returns in the mid 30%s. Not unexpectedly, safe haven assets, such as U.S. Long Treasuries, did not fare well during the year, returning a negative 10%. While we welcome the high earnings and performance of the portfolio this year due to the exposure to risk on assets; as long term investors, we recognize the importance of the diversifying safe haven assets to the portfolio in the long run.

As mentioned in the previous two CIO letters, the Board adopted a new asset allocation for MOSERS' portfolio in 2018. Staff began transitioning to this new portfolio in fiscal year 2019 and completed the transition at the end of February 2021, ten months ahead of schedule. The early completion of the transition proved beneficial to the fund for the year as the new allocation provided greater exposure to the risk-on assets that performed well during the year; however, the portfolio does retain some balance with meaningful exposure to diversifying safe haven assets.

I will be retiring from MOSERS before the end of 2021. As a lifetime Missourian, I have been honored to play a part in the secured retirement benefits of the fine members of this system during my 25+ year career at MOSERS. TJ Carlson has been named the successor to my CIO role. TJ brings with him years of experience as a CIO of several different public funds and he will inherit a talented, experienced staff of investment professionals. Overall, I am confident the investment program is in good hands going forward with this team.

Sincerely,



D. Shannon Davidson
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 of Trustees (the 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 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

Bank of New York 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.

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[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. The Board adopted a plan to transition from the old portfolio allocation to the new portfolio allocation over a period of time in order to lessen the impact of market volatility. The transition to the new portfolio allocation was completed in February 2021. 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, with the approval of the general asset consultants, 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 ASCWI
Global private equities	15%	5% - 20%	Burgiss All Equity Universe (weighted by vintage year)
Total income	**35%**	**30% - 40%**	**Blended**
Long treasuries	25%	20% - 30%	Bloomberg Barclays Long Treasury
Core bonds	10%	5% - 15%	Bloomberg Barclays Aggregate Bond
Total inflation hedge	**40%**	**35% - 45%**	**Blended**
Commodities	5%	0% - 10%	Bloomberg Commodity Index (BCOM)
TIPS	25%	20% - 30%	Bloomberg Barclays 1 - 10 yr TIPS
Private real assets	5%	0% - 10%	NCREIF ODCE
Public real assets	5%	0% - 10%	NAREIT Index
Total absolute return	**20%**	**15% - 25%**	**Blended**
Hedge funds	5%	0% - 10%	HFRI Fund Weighted Composite Index
Alternative beta	10%	5% - 15%	HRFX Macro/CTA
Private credit	5%	0% - 10%	S&P/LSTA U.S. Leveraged Loan Index + 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.*

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. Month-end reviews are conducted 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 reexamined 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 returns net of expenses equaling the RRO (4.70% in fiscal year 2021) plus inflation remains the primary performance objective for the total portfolio.

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:

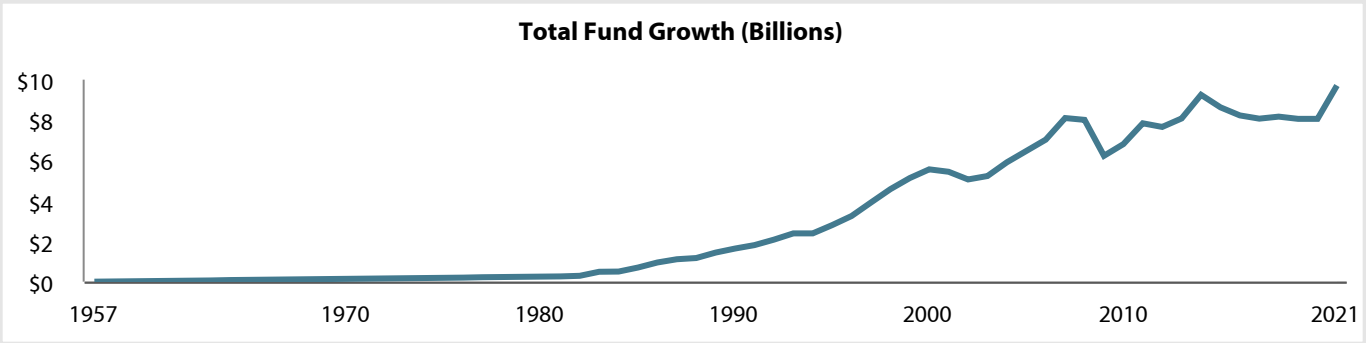
- **Board Decisions:** The value added through Board policy decisions is measured by the difference between the total fund policy benchmark return and the RRO. This difference captures the value added by the Board through their policy asset allocation decisions relative to the return necessary to fund 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, 2021, the MOSERS investment portfolio had a fair value of $9.7 billion. The graph below illustrates the growth of MOSERS' portfolio since the System's inception.



Investment Performance

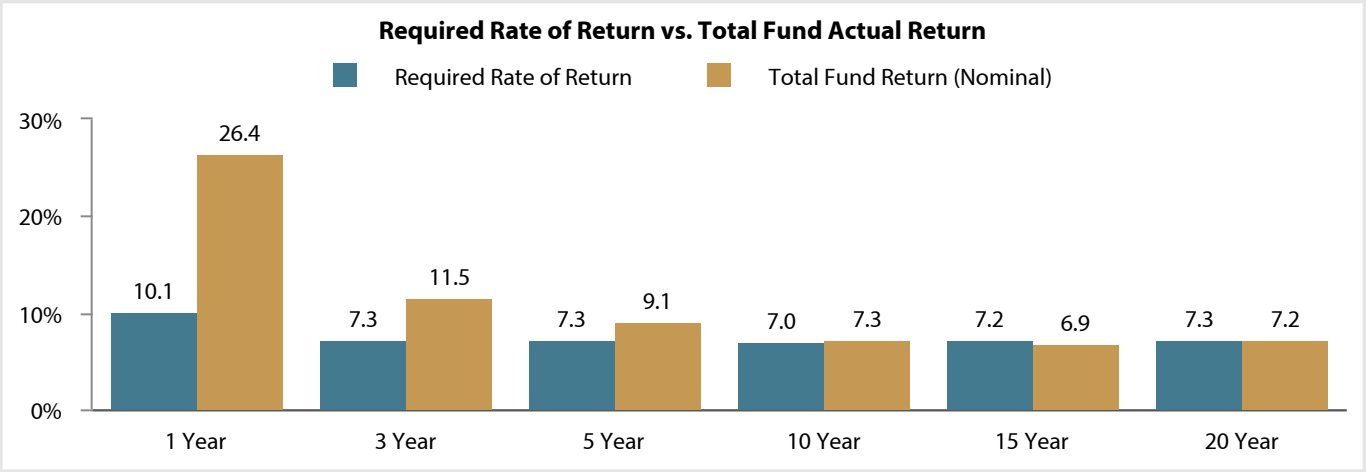
MOSERS' investments generated a time-weighted return of 26.4%, net of fees, for fiscal year 2021. The total fund return exceeded the 1-year policy benchmark of 25.2%. This additional 1.2% investment return produced $97.7 million in excess of what would have been earned if the fund had been invested passively 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 2021 is equal to the RRO of 4.70% plus inflation. The best known measure of inflation is the Consumer Price Index (CPI). [1]

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 0.1% over the 20-year period ended June 30, 2021. [2]

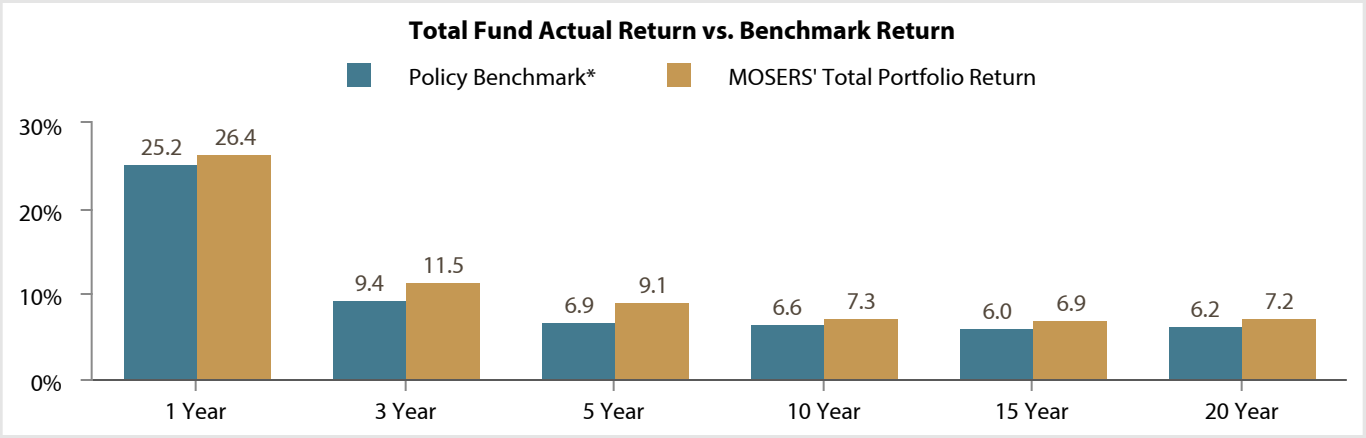


[1] *CPI Source: United States Department of Labor, Bureau of Labor Statistics (not seasonally adjusted).*

[2] *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, 2021, 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.*

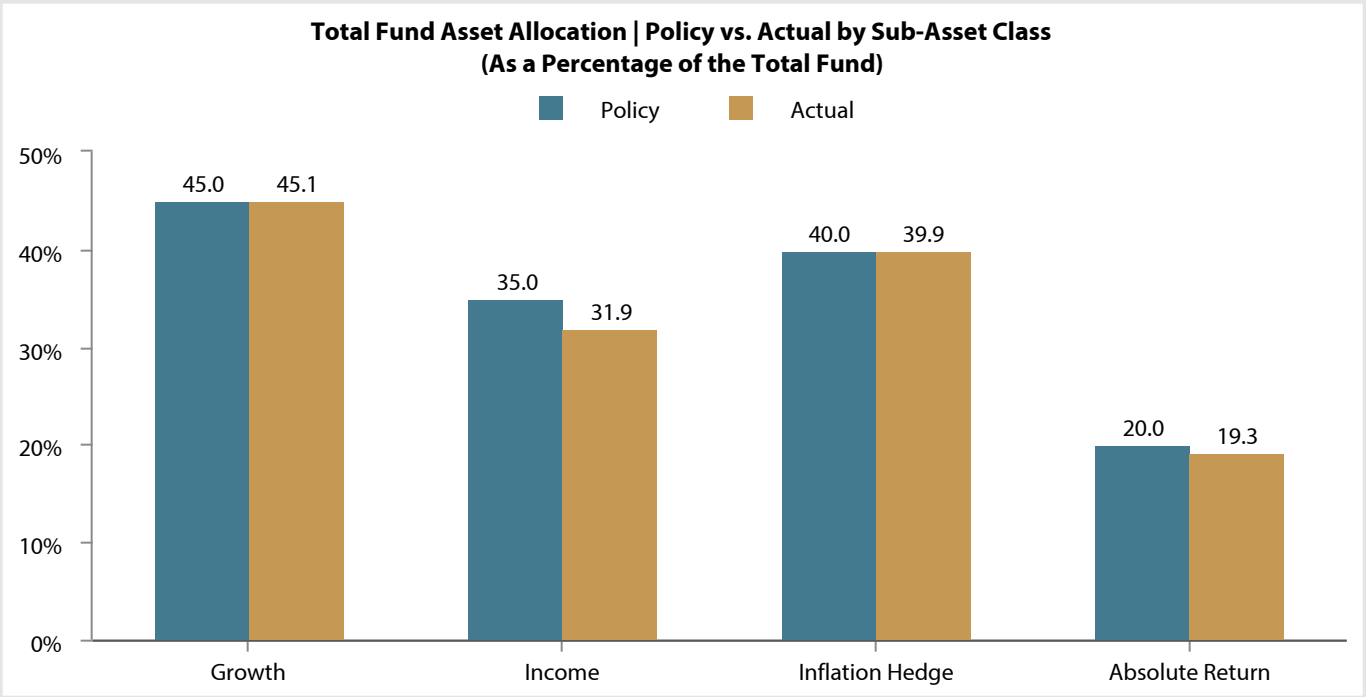
All policy return components are adjusted for financing cost associated with the program.

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 over performed its policy benchmark by 1.2%, 2.2%, 2.2%, 0.7%, 0.9%, and 1.0%, respectively.

Total Fund Policy Allocation Overview

As of June 30, 2021, 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, 2021, 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. This has allowed MOSERS to capitalize on investment opportunities at the margin by over-weighting asset classes that are viewed as "cheap" relative to their historical norm and under-weighting asset classes that are "expensive" relative to their historical norm.



Schedule of Fees and Commissions

	Commissions Paid	Volume of Trades*	Shares Traded
B Riley and Co., LLC	$ 2,606	$ 1,528,633	67,656
Barclays Capital, Inc.	27,076	322,688,326	5,414,994
BTIG, LLC	79,469	125,529,462	5,249,920
CJS Securities, Inc.	199	47,885	6,633
Credit Suisse	51,528	41,538,099	45,468
Davidson & Co., Inc.	1,521	653,211	38,016
Dougherty & Co., Inc.	1,265	346,909	39,616
Goldman Sachs & Co.	396	100,523	14,080
Guggenheim Capital Markets, LLC	537	164,124	14,410
J.P. Morgan Securities, Inc.	68	16,849	2,129
Jefferies & Co., Inc.	5,731	44,844,928	1,146,082
Jones Trading Institutional Services	3,417	1,530,975	170,863
Keefe Bruyette & Woods, Inc.	291	95,168	7,431
Keybanc Capital Markets, Inc.	1,018	354,069	26,039
Knight Equity Markets, LP	975	296,260	38,132
Ladenburg Thalman & Co.	4,081	1,029,146	128,755
MKM Partners, LLC	1,668	1,483,355	83,409
Morgan Stanley & Co.	451,225	400,076,890	1,542,343
National Financial Services Corporation	3,464	994,117	123,398
Needham & Co., LLC	225	134,508	9,482
Northland Securities, Inc.	4,559	1,184,711	162,571
Oppenheimer & Co., Inc.	182	90,849	5,143
Pershing, LLC	349	222,982	9,575
Piper Jaffray & Co.	21,853	31,184,332	2,141,222
Raymond James & Associates, Inc.	406	120,755	10,138
Robert W Baird & Co., Inc.	63	85,156	1,584
Roth Capital Partners, LLC	455	155,878	14,367
Sidoti and Co., LLC	2,329	824,782	62,715
Sterne Agee & Leach, Inc.	1,982	491,438	61,076
Stifel Nicolaus	92	24,271	3,070
Suntrust Capital Markets, Inc.	283	126,822	12,523
Virtu Americas, LLC	94,183	70,074,488	4,617,702
Wedbush Morgan Securities, Inc.	6,515	1,192,339	262,944
Wells Fargo Securities, LLC	10	3,446	252
William Blair & Co.	1,421	559,542	37,848
Total	$ 771,442	$ 1,049,795,228	21,571,586

** Volume does not include futures notional value*

Schedule of Investment Portfolios by Asset Class

As of June 30, 2021

	Portfolio Value	Percentage of Investments	Market Exposure	Percentage of Investments at Market Exposure
Growth	$ 4,172,694,467	43.0 %	$ 4,380,166,669	45.1 %
Income	1,839,886,154	19.0	3,094,962,979	31.9
Inflation hedge	1,810,016,709	18.6	3,866,527,154	39.9
Absolute return	1,878,952,910	19.4	1,874,459,987	19.3
Total portfolio	9,701,550,240	100.0	13,216,116,789	136.2
Residual accounts	6,883,904	0.1	6,883,904	0.1
Cash reserve	1,578,496	0.0	1,578,496	0.0
MOSERS Total Fund	$ 9,710,012,640	100.0 %	$ 13,224,579,189	136.2 %
Reconciliation to Statement of Fiduciary Net Position				
Total portfolio value	$ 9,710,012,640			
Obligations under repurchase agreements	3,723,313,448			
Receivable - investment income	(122,323,803)			
Receivable - investment sales	(607,273,197)			
Investment activities payable	7,030,674			
Management and incentive fee payable	21,668,506			
Payable for investments purchased	117,961,778			
Investments per *Statement of Fiduciary Net Position*	$ 12,850,390,046			

Total Fund – Top Ten Publicly Traded Separate Account Holdings

Ten Largest Holdings as of June 30, 2021*	Fair Value	Percent of the Total Fund
U.S. Treasury Bond - 3.375% 2048	$ 136,879,010	1.38%
U.S. Treasury Bond CPI Inflation - 0.125% 2023	108,816,995	1.12
U.S. Treasury Bond CPI Inflation - 0.625% 2024	107,132,362	1.10
U.S. Treasury Bond CPI Inflation - 0.375% 2023	105,853,014	1.09
U.S. Treasury Bond CPI Inflation - 0.125% 2024	105,686,731	1.09
U.S. Treasury Bond CPI Inflation - 0.125% 2031	98,428,580	1.01
U.S. Treasury Bond CPI Inflation - 0.250% 2025	97,567,569	1.00
U.S. Treasury Bond CPI Inflation - 0.375% 2025	95,995,005	0.99
U.S. Treasury Bond CPI Inflation - 0.125% 2030	92,125,856	0.95
U.S. Treasury Bond CPI Inflation - 0.625% 2023	91,081,465	0.94

** 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, 2021, 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, 2021, the total growth policy was 66.7% global public equities policy and 33.3% global private equities policy.

- Global public equities policy - As of June 30, 2021, the total global public equities policy was MSCI All Country World Index (ACWI).
- Global private equities policy - As of June 30, 2021, the total global private equities policy was Burgiss All Equity Universe, weighted by vintage year.

Income – As of June 30, 2021, the total income policy was 71% long treasuries policy and 29% core bonds policy.

- Long treasuries - As of June 30, 2021, the long treasuries policy was Bloomberg Barclays Long Treasury Index.
- Core bonds - As of June 30, 2021, the core bonds policy was Bloomberg Barclays Aggregate Bond Index.

Inflation hedge – As of June 30, 2021, the total inflation hedge policy was 12.5% commodities policy, 62.5% inflation indexed bonds policy, 12.5 % private real assets policy and 12.5% public real assets policy.

- Commodities - As of June 30, 2021, the commodities policy was Bloomberg Commodities Index (BCOM).
- Treasury inflation protected securities (TIPS) - As of June 30, 2021, the TIPS policy was Barclays U.S. 1-10 Year TIPS.
- Private real assets - As of June 30, 2021, the private real assets policy was NCREIF ODCE.
- Public real assets - As of June 30, 2021, the public real assets policy was FTSE Nareit All REITS Index.

Absolute return – As of June 30, 2021, the total absolute return policy was 50.0% alternative beta policy, 25.0% hedge fund policy and 25.0% private credit policy.

- Alternative beta - As of June 30, 2021, the alternative beta policy was HFRX Macro/CTA Index.
- Hedge funds - As of June 30, 2021, the hedge fund policy was HFRI Fund Weighted Composite Index.
- Private credit - As of June 30, 2021, 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*	26.4%	11.5%	9.1%	7.3%	6.9%	7.2%
Total fund policy benchmark	25.2%	9.4%	6.9%	6.6%	6.0%	6.2%
Growth	44.9%	N/A	N/A	N/A	N/A	N/A
Growth policy benchmark	45.0%	N/A	N/A	N/A	N/A	N/A
Global public equities	40.0%	11.3%	13.0%	9.9%	8.4%	8.2%
Global public equities policy benchmark	39.5%	14.5%	14.7%	10.0%	7.5%	7.2%
Global private equities	63.0%	N/A	N/A	N/A	N/A	N/A
Global private equities policy benchmark	55.1%	N/A	N/A	N/A	N/A	N/A
Income	(7.2)%	N/A	N/A	N/A	N/A	N/A
Income policy benchmark	(7.8)%	N/A	N/A	N/A	N/A	N/A
Long treasuries	(10.0)%	7.0%	2.4%	N/A	N/A	N/A
Long treasuries policy benchmark	(10.7)%	6.8%	2.1%	N/A	N/A	N/A
Core bonds	0.6%	N/A	N/A	N/A	N/A	N/A
Core bonds policy benchmark	(0.3)%	N/A	N/A	N/A	N/A	N/A
Inflation hedge	16.2%	N/A	N/A	N/A	N/A	N/A
Inflation hedge policy benchmark	14.2%	N/A	N/A	N/A	N/A	N/A
Commodities	45.0%	3.1%	2.3%	(5.8)%	(4.7)%	0.0%
Commodities policy benchmark	45.4%	2.2%	2.6%	(6.1)%	(6.1)%	(1.4)%
Inflation-indexed bonds	6.4%	4.3%	2.5%	2.4%	3.9%	5.1%
Inflation-indexed bonds policy benchmark	6.3%	4.2%	2.2%	2.2%	3.9%	5.1%
Private real assets	21.6%	N/A	N/A	N/A	N/A	N/A
Private real assets policy benchmark	7.1%	N/A	N/A	N/A	N/A	N/A
Public real assets	34.1%	N/A	N/A	N/A	N/A	N/A
Public real assets policy benchmark	34.2%	N/A	N/A	N/A	N/A	N/A
Absolute return	13.2%	N/A	N/A	N/A	N/A	N/A
Absolute return policy benchmark	13.4%	N/A	N/A	N/A	N/A	N/A
Hedge funds	17.1%	N/A	N/A	N/A	N/A	N/A
Hedge funds policy benchmark	27.5%	N/A	N/A	N/A	N/A	N/A
Alternative beta	10.1%	(0.1)%	0.6%	N/A	N/A	N/A
Alternative beta policy benchmark	6.7%	(5.8)%	(4.2)%	N/A	N/A	N/A
Private credit	16.0%	N/A	N/A	N/A	N/A	N/A
Private credit policy benchmark	13.7%	N/A	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 new asset allocation adopted by the Board in 2018. Therefore, 3-, 5-, 10-, 15-, and 20-Year returns are not available yet as of June 30, 2021*

Schedule of Investment Manager Fees

For the Year Ended June 30, 2021

	Portfolio Fair Value	Total Fees	Manager Fees	Fund Pass Through Expenses *	Incentive Fees Earned
Equity					
Kennedy Capital Management	$ 0	$ 616,086	$ 616,086	$ 0	$ 0
Silchester International Investors	462,700,894	2,615,734	2,615,734	0	0
State Street Global Advisors	0	18,002	18,002	0	0
Total equity	462,700,894	3,249,822	3,249,822	0	0
Multi-asset					
Blackrock	926,245,781	440,112	440,112	0	0
NISA Investment Advisors	2,675,843,972	5,730,212	5,730,212	0	0
Total multi-asset	3,602,089,753	6,170,324	6,170,324	0	0
Alternatives					
Aberdeen Standard Investments	575,993,624	161,572	161,572	0	0
Actis Emerging Markets III	1,918,000	52,000	0	52,000	0
Actis Emerging Markets IV	26,368,867	2,901,000	554,000	55,000	2,292,000
AQR DELTA Sapphire Fund, LP	1,844,708	1,223,740	1,062,847	160,893	0
Axiom Asia Private Capital Fund II, LP	20,896,449	581,511	207,262	30,822	343,427
Axiom Asia Private Capital Fund III, LP	149,916,533	5,358,966	355,388	45,423	4,958,155
Axiom Asia Fund VI	5,641,858	162,264	117,808	44,456	0
Axxon Brazil Private Equity Fund II B, LP	11,046,445	176,162	151,790	24,372	0
Bayview Opportunity Domestic IIIb, LP	0	24,087	6,102	13,774	4,211
Blackstone Real Estate Partners IV	1,327,989	421,327	0	(1,363)	422,690
Blackstone Real Estate Partners V	3,298,850	371,783	0	(1,288)	373,071
Blackstone Real Estate Partners VI	2,633,610	43,528	0	15,491	28,037
Blackstone Real Estate Partners VII	26,955,627	(51,545)	349,710	33,324	(434,579)
Blackstone Topaz Fund, LP	286,913,837	3,720,830	2,296,273	269,508	1,155,049
Blackstone Topaz Private Credit	181,574,720	2,204,334	1,141,895	129,318	933,121
Brevan Howard Alpha Strategies Fund, LP	183,071,724	4,419,222	951,065	2,786,923	681,234
Bridgewater Associates - Diamond Ridge Fund, LLC	5,335	1,969,178	1,909,321	59,857	0
CarVal Investors CVI Global Value Fund A, LP - private debt	50,000	3,059	0	3,059	0
CarVal Investors CVI Global Value Fund A, LP - real estate	50,000	3,059	0	3,059	0
Catalyst Fund Limited Partnership III	13,433,546	159,900	224,801	(64,901)	0
Catalyst Fund Limited Partnership IV	3,430,750	22,703	50,641	(27,938)	0
Catalyst Fund Limited Partnership V	62,899,114	1,712,383	1,728,661	(16,278)	0
CBRE US Core Partners, LP	121,129,443	318,920	318,920	0	0
Cornwall Domestic, LP	6,175,599	73,977	0	73,977	0
DRI Capital - LSRC	4,986,871	521,046	0	264,568	256,478
EIG Energy Fund XIV, LP	2,301,044	169,984	0	169,984	0
EIG Energy Fund XV, LP	8,923,739	411,550	259,108	152,442	0
EIG Energy Fund XVI, LP	24,343,321	325,743	291,060	34,683	0
Eisler Capital Fund, LP	224,619,563	2,229,733	562,400	531,674	1,135,659

Schedule of Investment Manager Fees continued on following page

Schedule of Investment Manager Fees (continued)

For the Year Ended June 30, 2021

	Portfolio Fair Value	Total Fees	Manager Fees	Fund Pass Through Expenses*	Incentive Fees Earned
Elliott International, Ltd.	$ 220,894,000	$ 10,907,564	$ 3,012,022	$ 2,075,785	$ 5,819,757
Exodus Point	141,820,569	7,277,779	0	1,515,964	5,761,815
Farallon Capital Institutional Partners, LP	750,000	143	0	0	143
Gateway Energy & Resource Holdings, LLC	0	16,386	0	16,386	0
Glenview Capital Opportunity Fund, LP	0	21,031	15,549	5,482	0
Global Forest Partners GTI7 Institutional Investors Company, Ltd.	447,058	4,582	2,282	2,300	0
HBK Merger Strategies Offshore Fund, Ltd.	146,114,118	2,902,994	977,172	409,999	1,515,823
JLL Partners Fund V, LP	3,026,008	23,827	0	6,079	17,748
JLL Partners Fund VI, LP	1	601,667	32,752	16,802	552,113
King Street Capital, LP	1,828,657	72,823	28,521	0	44,302
King Street Capital, Ltd.	0	999	420	0	579
LaSalle Property Fund	69,698,776	164,618	149,497	15,121	0
Linden Capital Partners II, LP	20,335,979	715,253	82,157	87,960	545,136
Merit Energy Partners F-II, LP	0	29,605	27,066	2,539	0
MHR Institutional Partners IIA, LP	35,843,778	9,901,007	0	27,973	9,873,034
MHR Institutional Partners III, LP	47,821,967	166,465	137,267	29,198	0
MHR Institutional Partners IV, LP	17,788,821	3,667,595	874,344	165,603	2,627,648
Millennium Technology Value Partners II	22,353,842	3,052,540	320,297	101,679	2,630,564
OCM Opportunities Fund VIIb, LP	77,762	(1,611)	0	8,945	(10,556)
OCM Opportunities Fund VIIIb, LP	7,990,434	182,673	152,900	29,773	0
OCM Power Opportunities Fund III, LP	1,905,051	719,449	84,238	19,193	616,018
OCM/GFI Power Opportunities Fund II, LP	1	43,566	0	15,794	27,772
Perry Partners, LP	1	89	89	0	0
Pharo Macro Fund, Ltd.	63,489,185	3,187,822	1,298,621	47,183	1,842,018
Portfolio Advisors Secondary Fund IV, LP	28,401,976	433,540	122,613	310,927	0
Silver Creek Special Opportunities Fund I, LP	3,832,937	28,363	0	28,363	0
Silver Creek Special Opportunities Fund II, LP	6,647,168	34,260	0	34,260	0
Silver Lake Partners II, LP	13,305	(2,191)	0	786	(2,977)
Standard Investment Research Hedged Equity Fund	109,396,165	6,618,854	1,948,286	176,467	4,494,101
StepStone Capital Buyout Fund II, LP	0	39,289	0	39,289	0
TA Realty Core Property Fund, LP	30,366,001	26,902	26,902	0	0
Voleon Institutional Strategies Fund, LP	53,478,375	1,462,704	1,017,780	200,330	244,594
Voleon Investors Fund, LP	17,264,283	407,063	316,582	90,481	0
Total alternatives	3,003,337,384	82,399,666	23,327,981	10,323,500	48,748,185
Total fees	$ 7,068,128,031	$ 91,819,812	$ 32,748,127	$ 10,323,500	$ 48,748,185

* *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.*

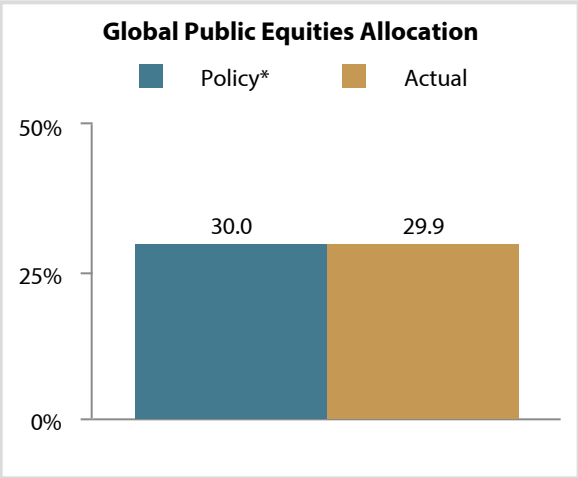
Asset Class Summary

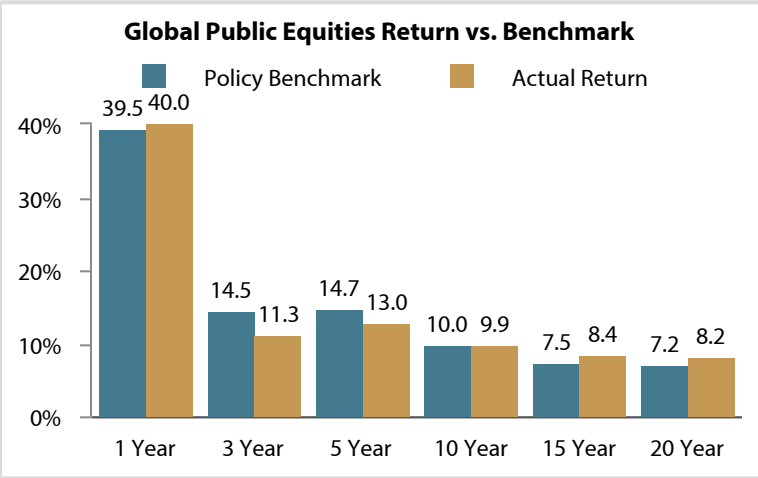
The portfolio consists of four broad investment allocations: growth, income, inflation hedge, and absolute return. Each of these allocations are made up of a number of different asset classes. Three of the four allocations had positive performance during the fiscal year. The growth allocation returned 44.9%, while the income allocation was down 7.2%. The inflation hedge allocation was up 16.2% and the absolute return allocation returned 13.2%.

Growth Allocation

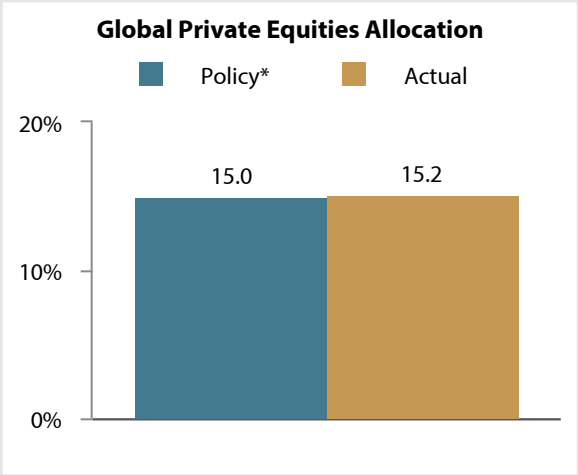
The growth allocation is designed to provide capital appreciation by accessing both an equity-risk premium and a liquidity risk premium. In addition, it is expected that investments in this category would perform well in periods of rising economic growth. Investments in this allocation include U.S. and 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.

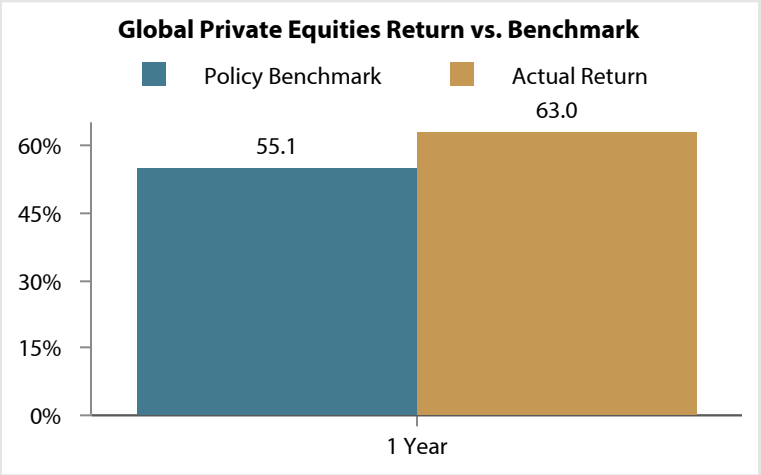
The growth allocation is made up of global public equities and global private equities. As of the fiscal year end, global public equities and global private equities were 66.7% and 33.3% of the growth allocation, respectively. For the fiscal year, public equities returned 40.0% versus 39.5% for the policy benchmark. Private equities, for the fiscal year, returned 63.0% compared to its policy benchmark return of 55.1%. This outperformance was the result of manager implementation that outperformed the benchmark.





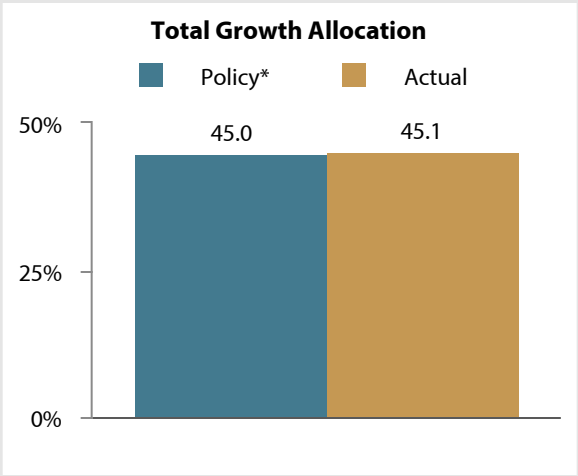
* *As of June 30, 2021, the global public equities policy benchmark was MSCI ACWI.*

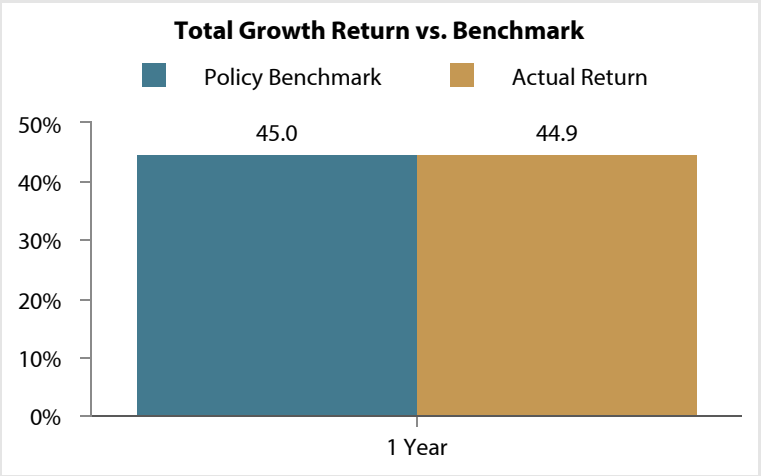




* *As of June 30, 2021, the global private equities policy benchmark was the Burgiss All Equity Universe, weighted by vintage year.*

The market exposure of the growth allocation on June 30, 2021, was $4.38 billion, representing 45.1% 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 44.9% versus 45.0% for the policy benchmark. The slight underperformance was due to being overweight public equities and underweight private equities during the fiscal year. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.



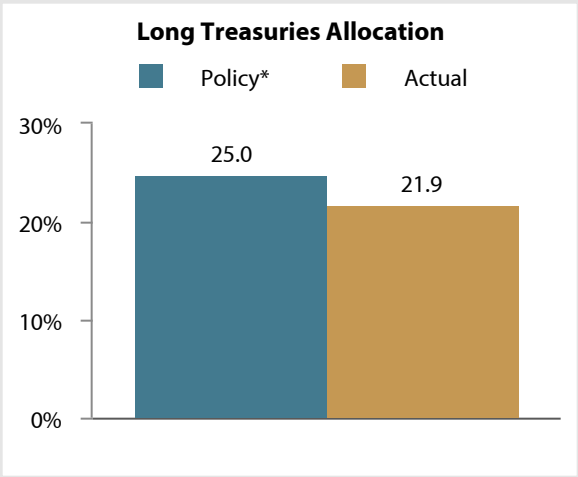


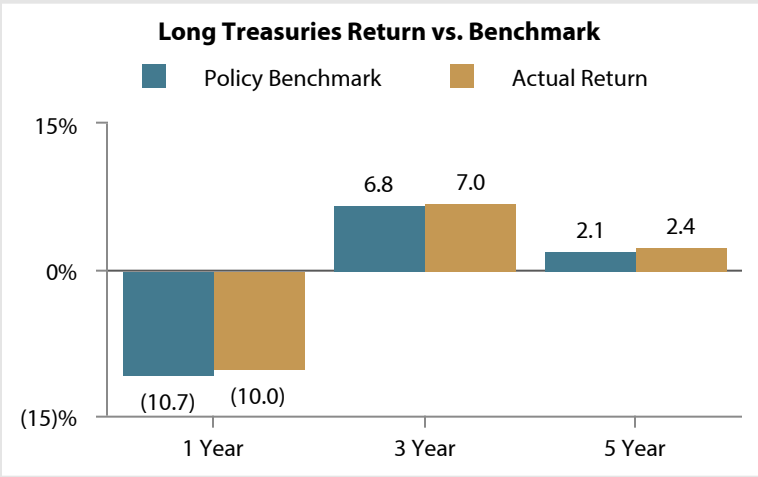
* *As of June 30, 2021, the total growth policy benchmark was comprised of 66.7% global public equities policy benchmark and 33.3% global private equities policy benchmark.*

Income Allocation

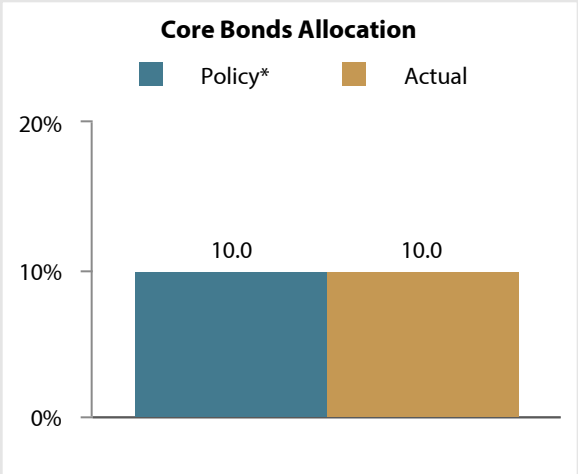
This allocation is designed to provide a source of current income and to reduce overall fund volatility. It is expected that investments in this asset class will perform well in periods of stable or falling economic growth and falling inflation. Investments in this asset class include U.S. bonds that 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.

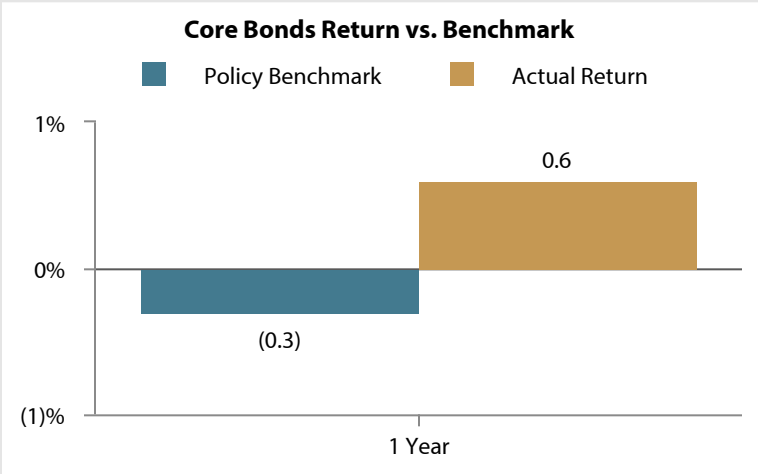
The income allocation is made up of long treasuries and core bonds. As of the fiscal year end, long treasuries and core bonds were 69% and 31% of the income allocation, respectively. For the fiscal year, long treasuries returned (10.0%) versus (10.7%) for the policy benchmark. The exposure to long treasuries is gained passively with minimal tracking error. Core bonds, for the fiscal year, returned 0.6% compared to its policy benchmark return of (0.3%). This outperformance was the result of manager implementation that outperformed the benchmark.





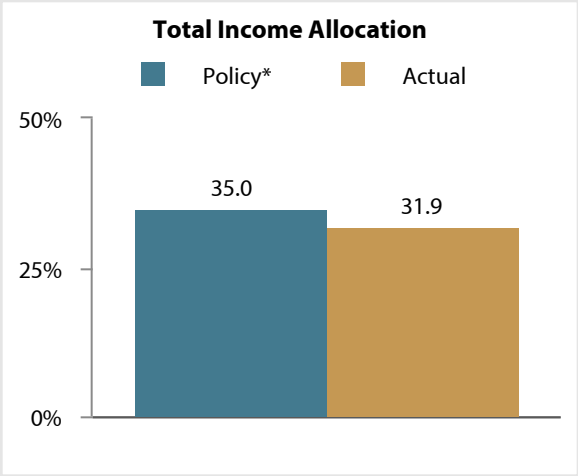
* *As of June 30, 2021, the long treasuries policy benchmark was Bloomberg Barclays Long Treasury Index.*

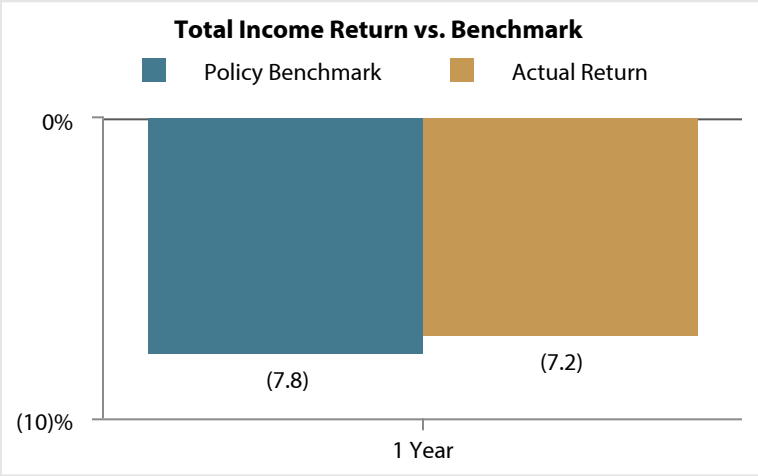




* *As of June 30, 2021, the core bonds strategy benchmark was Bloomberg Barclays Aggregate Bond Index.*

As of June 30, 2021, the market exposure of the income allocation was $3.09 billion, representing 31.9% 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 (7.2%) as compared to (7.8%) for the income allocation policy benchmark. The outperformance was mainly driven by core bonds that outperformed the policy benchmark by 0.9%. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.



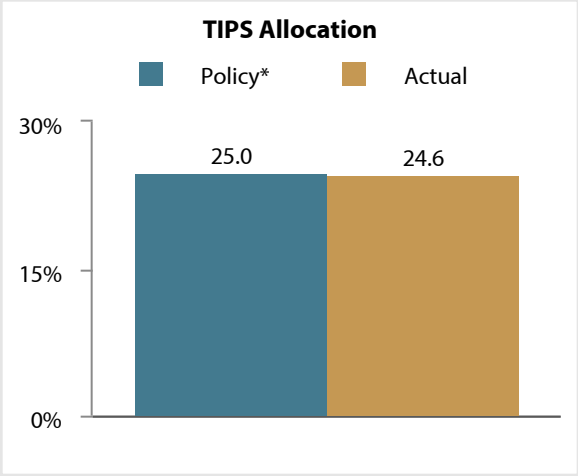


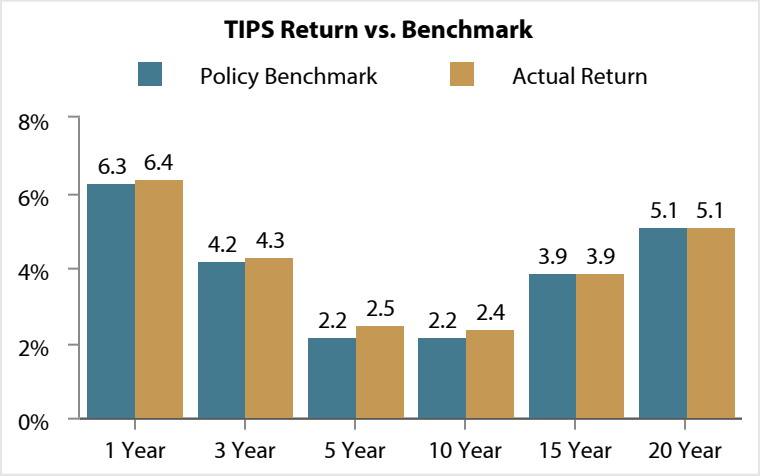
* *As of June 30, 2021, the total income policy benchmark was comprised of 71.4% long treasuries policy benchmark and 28.6% core bonds policy benchmark.*

Inflation Hedge Allocation

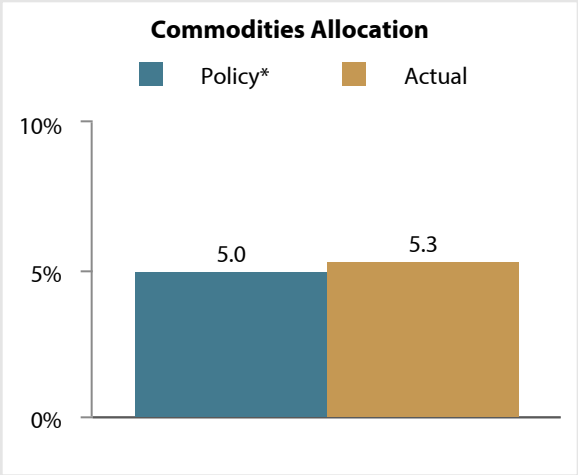
It is expected that investments in this asset class will perform well during periods of rising inflation. Investments in this asset class include U.S. Government treasury inflation protected securities (TIPS), commodities, private real estate, and public real estate. TIPS are designed to provide a source 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.

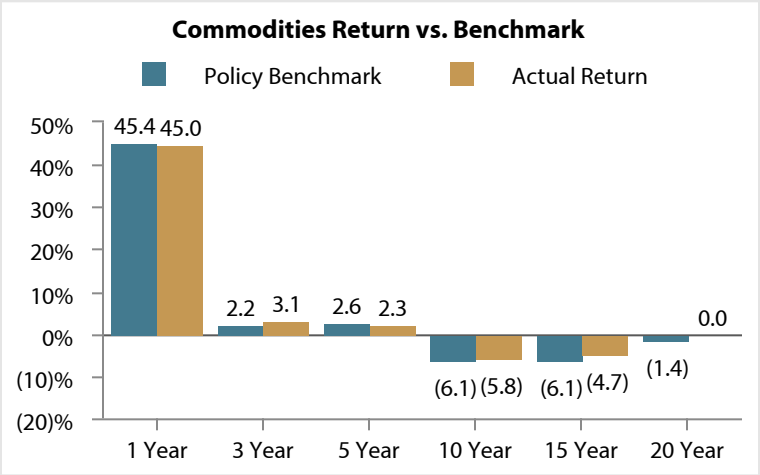
As of the fiscal year end, TIPS were 62.5% and commodities, private real assets and public real assets each made up 12.5% of the inflation hedge allocation. For the fiscal year, TIPS returned 6.4% versus 6.3% for the policy benchmark. There was no internal or external active management strategy utilized during the fiscal year; thus, providing a return that closely matched the benchmark. Commodities, for the fiscal year, returned 45.0% compared to its policy benchmark return of 45.4% providing a return similar to the benchmark. Public real assets returned 34.1%, for the fiscal year, compared to its policy benchmark return of 34.2%. 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 21.6% versus 7.1% for its policy benchmark. This outperformance was due to the portfolio holding publicly traded real estate investment trusts as a short-term placeholder for core real estate funds.



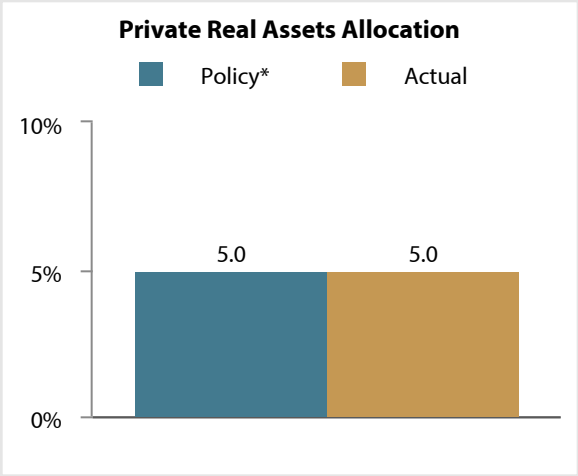


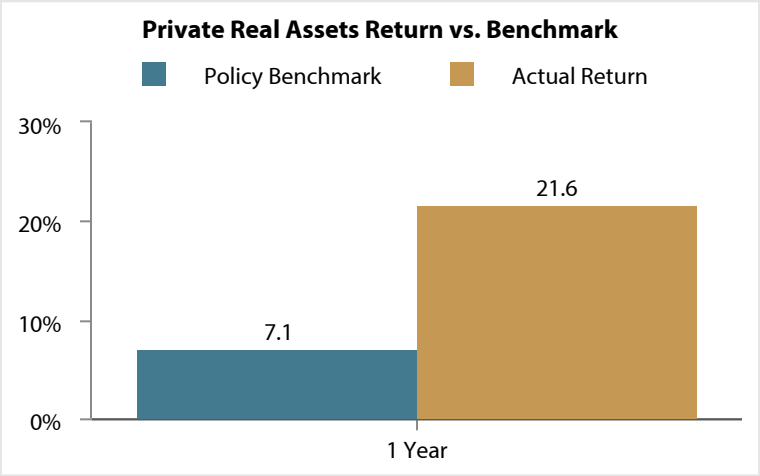
* *As of June 30, 2021, the TIPS policy benchmark was the Bloomberg Barclays 1 - 10 year TIPS Index.*



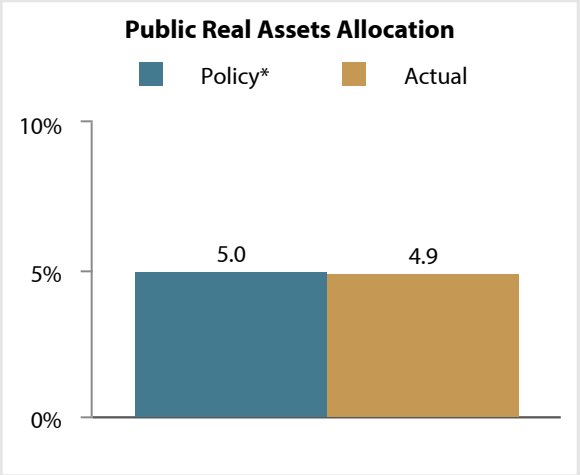


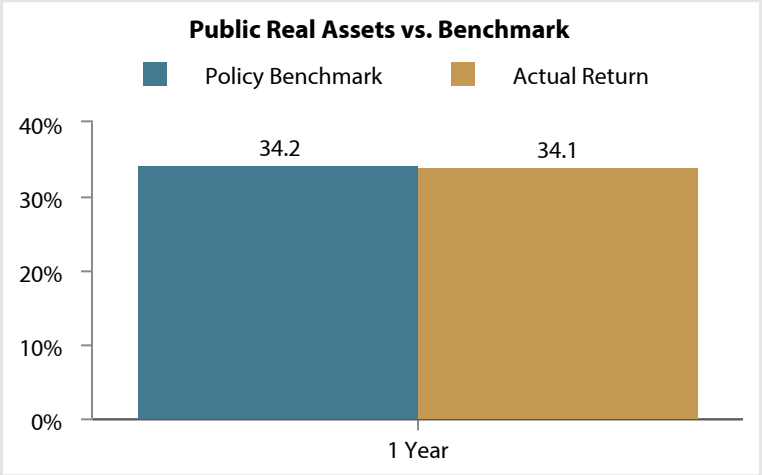
* *As of June 30, 2021, the commodities policy benchmark was the Bloomberg Commodity Index (BCOM).*





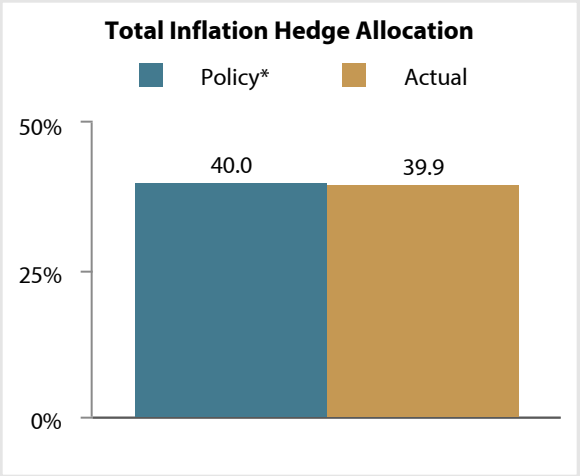
* *As of June 30, 2021, the private real assets policy benchmark was the NCREIF Fund Index - Open End Diversified Core Equity (ODCE).*

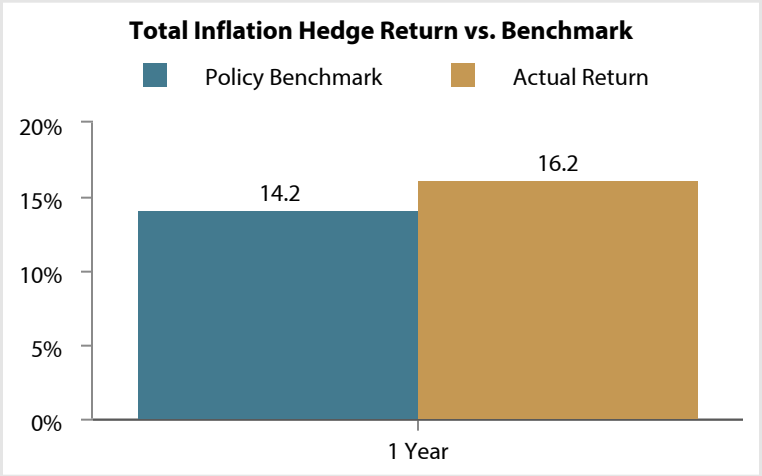




* *As of June 30, 2021, the public real assets policy benchmark was the FTSE Nareit All REITS Index.*

As of June 30, 2021, the market exposure of the inflation hedge allocation was $3.87 billion representing 39.9% 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 16.2% versus 14.2% for the policy benchmark. The outperformance was mainly driven by private real assets that outperformed the policy benchmark by 14.5%. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.





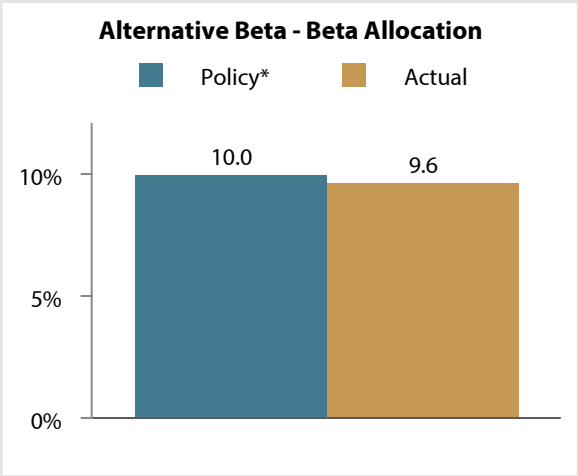
* *As of June 30, 2021, the total inflation hedge policy benchmark was comprised of 62.5% TIPS policy benchmark, 12.5% commodities policy benchmark, 12.5% private real assets policy benchmark, and 12.5% public real assets policy benchmark.*

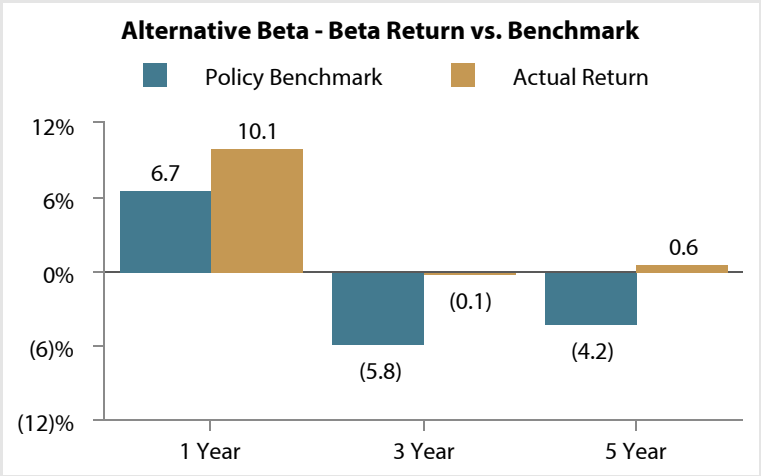
Absolute Return Allocation

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.

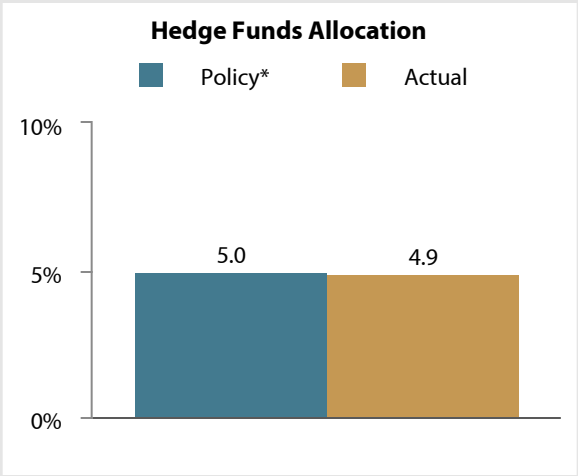
As a result of the multitude of strategies being deployed, it is expected that this asset class will provide meaningful diversification to the portfolio. While the sensitivities to economics will be dependent on positioning at the time, it is expected that these betas will have their best returns in 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.

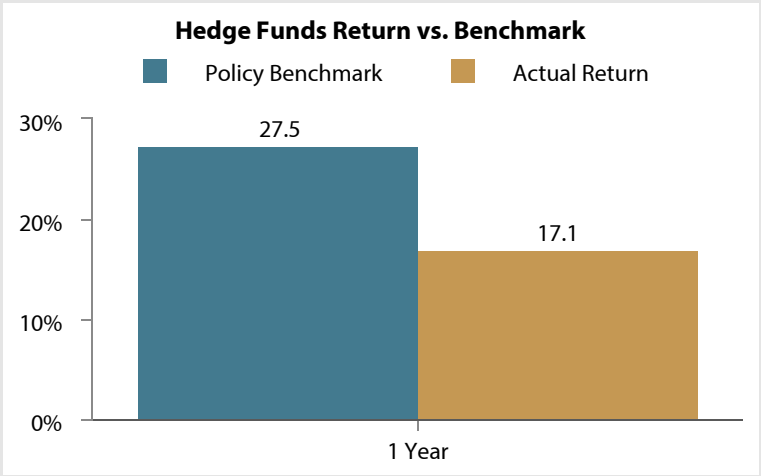
As of the fiscal year end, alternative betas were 50.0% of the allocation with hedge funds and private credit each making up 25.0% of the allocation. For the fiscal year, alternative betas returned 10.1% versus 6.7% for the policy benchmark. The outperformance was primarily related to a passive trend strategy implementation. Hedge funds, for the fiscal year, returned 17.1% compared to its policy benchmark return of 27.5%. The primary driver of the underperformance was manager selection and a lower equity beta exposure within the hedge fund class. For the fiscal year, private credit returned 16.0% versus 13.7% for its policy benchmark. This outperformance was largely due to the external managers within this portfolio outperforming the benchmark.



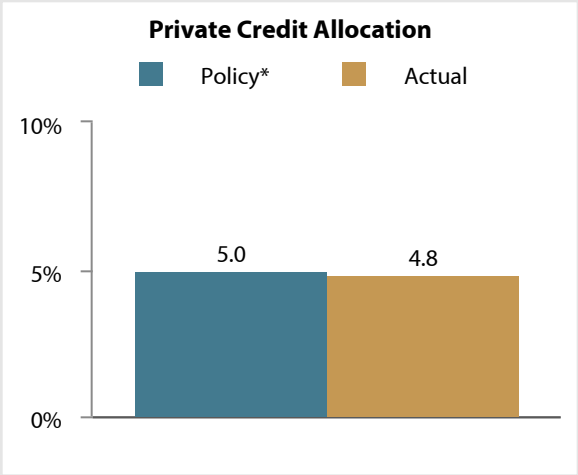


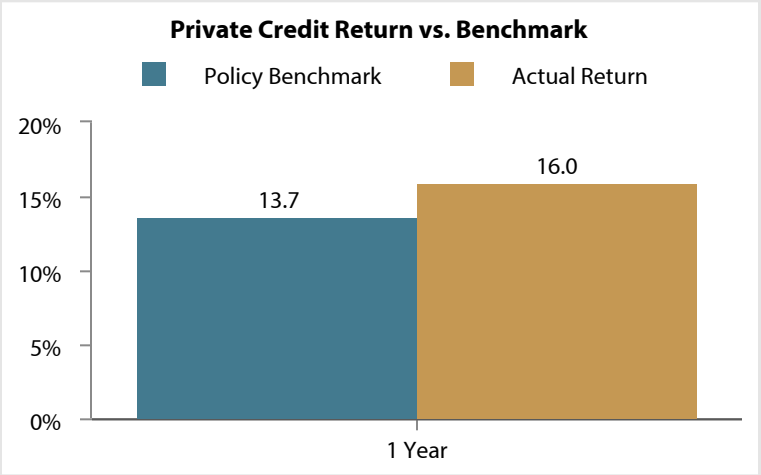
* *As of June 30, 2021, the alternative beta - beta policy benchmark was the HFRX Macro/CTA Index.*





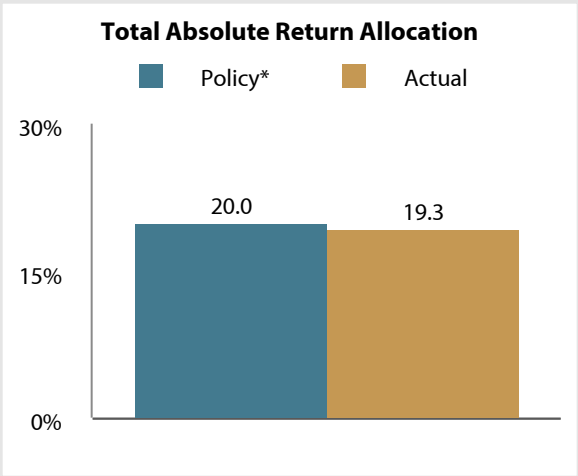
* *As of June 30, 2021, the hedge funds policy benchmark was the HFRI Fund Weighted Composite Index.*

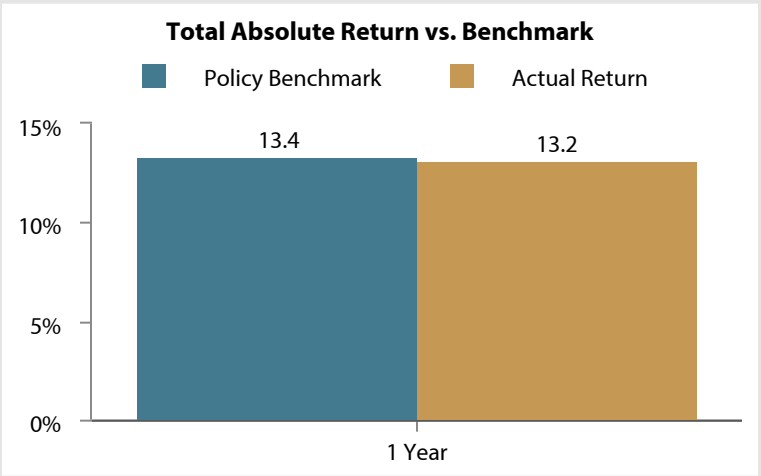




* *As of June 30, 2021, the private credit policy benchmark was the S&P/LSTA US Leveraged Loan Index + 2%.*

As of June 30, 2021, the market exposure of the absolute return allocation was $1.87 billion, representing 19.3% of total market value of the portfolio. The bar chart below (left) illustrates the actual exposure compared to policy. The absolute return allocation returned 13.2% for the fiscal year versus 13.4% for the policy benchmark. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.





* *As of June 30, 2021, the absolute return policy benchmark was comprised of 50.0% alternative beta policy benchmark, 25.0% direct hedge funds policy benchmark, and 25.0% private credit policy benchmark.*

Actuarial Section

Mr. Leon Wahlbrink
Retiree From Corrections
Osage Beach, MO
Years of Service: 11 Years 11 Months
Year Retired: 2000

Actuary's Certification Letter

Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

October 12, 2021

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, 2021 for the purpose of determining the employer required contribution rate for the fiscal year ending June 30, 2023. 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. The major findings of the valuations are contained in this section, which reflects the plan provisions in place on June 30, 2021, as amended by any legislation passed in the 2021 session.

A five-year comprehensive experience study was performed in 2021, including analysis of both the economic and demographic assumptions. All of the recommended changes to the assumptions and methods were adopted by the Board at their June 17, 2021 meeting. For more detail on the new set of assumptions, along with their impact on the current actuarial valuation results, please see the June 30, 2021 actuarial valuation report.

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.*

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In order to prepare the results in the actuarial valuation reports, we have utilized appropriate actuarial models that were developed for this purpose. These models use 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, 2021 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, 2021 valuation reports. Accordingly, additional determinations may be needed for other purposes.

Based upon the June 30, 2021 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, 2021, were also prepared as of June 30, 2021, 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, 2021 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,

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

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 30-year periods. Effective with the June 30, 2021 valuation, the amortization period for new bases will be amortized over a closed 25-year period. However, 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. Below is a summary of the changes to the actuarial methods and assumptions since the prior valuation:

- **Individual salary increase assumption** − The assumption was increased to partially reflect actual merit salary increases for MSEP plans and changed to a flat 3.0% for Judicial plans.
- **Mortality assumption** − The assumption for MSEP was changed to the Pub-2010 General Employees Below Median Tables with adjustments. The assumption for Judicial was changed to the Pub-2010 General Employees Median Mortality Table. Both use generational mortality with future improvements based on 75% of the MP-2020 Scale.
- **Retirement assumption** − The assumption was modified to partially reflect the observed experience with separate assumptions for MSEP, MSEP 2000 and MSEP 2011.
- **Termination assumption** − The assumption was changed to a single service-based assumption for MSEP plans and changed to 2.0% at all durations for the Judicial plans.
- **Disability assumption** − Minor adjustments to the disability assumption for the MSEP plans to partially reflect actual experience. The assumption was eliminated for the Judicial plans.
- **Refund assumption** − The refund election assumption was changed to assume the member elects the greater of the refund or the present value of the deferred monthly benefit.
- **Other assumptions –** Minor changes were made to the marriage assumption, military service assumption and the load for pre-retirement death benefits for terminated vested members.
- **Amortization method** – The amortization period for new bases established on or after June 30, 2021 is a closed 25-year period.

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 93 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** – 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
  - **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** – 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
  - **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 92-93 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

Retirement Age	Percent Retiring
62-69	5%
70	100

Normal Retirement

Retirement Age	Percent Retiring
55	10%
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*	
Years of Service	Rate
1	27.00%
5	12.75
10	7.00
15	4.30
20	2.25
25+	1.25

**Does not apply to elected officials and legislators.*

Disability	
Age	Rate
25	0.03%
30	0.07
35	0.11
40	0.22
45	0.32
50	0.43
55	0.54
60	0.59
65	0.64

MSEP

Pay Increase Assumptions

	Rates by Service*			
Years of 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, 2021

- **Form of payment**

  MSEP
  – 50% Joint and 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/MSEP 2011
  – 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
>50	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, 2021. It was brought forward to June 30, 2021, 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.

  Active members reported with less than a $100 annualized salary were assumed to receive the average active member pay.

  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, 2021. It was brought forward to June 30, 2021, 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.

  Active members reported with no annualized salary were assumed to receive the average active member pay.

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]
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
2012	7,897,167,203	10,793,651,577	2,896,484,374	73.2	1,864,069,493	155.4

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]
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
2012	102,266,706	413,332,538	311,065,832	24.7	45,835,501	678.7

See *Schedule of Employer Contributions* on page 54.

Pension Trust Funds

Summary of Member Data Included in Valuations

June 30, 2021

Active Members

Valuation Group	Number	Annual Covered Payroll	Group Averages: Annual Salary	Age (Yrs)	Service (Yrs)
MSEP					
Regular state employees	40,667	$ 1,839,915,686	$ 45,243	45.7	10.8
Elected officials	6	659,976	109,996	48.7	4.1
Legislative clerks	4	133,884	33,471	69.5	23.0
Legislators	195	7,013,774	35,968	51.5	3.7
Uniformed water patrol	9	695,171	77,241	43.8	17.9
Conservation department	1,261	59,803,569	47,426	45.1	14.5
School-term salaried employees	673	52,076,345	77,379	57.2	21.9
Administrative law judges	14	1,676,647	119,761	62.9	26.7
Total MSEP group	42,829	$ 1,961,975,052	45,809	45.9	11.0
Judicial Plan	418	$ 63,031,506	$ 150,793	55.5	10.8

Retired Members and Beneficiaries

Type of Benefit Payment	Number	Annual Benefits	Group Averages: Benefit	Age (Yrs.)
MSEP				
Retirement	46,305	$ 765,376,860	$ 16,529	70.9
Disability	1	2,340	2,340	65.0
Survivor of active member	1,759	20,095,272	11,424	63.7
Survivor of retired member	4,158	56,187,312	13,513	76.1
Total MSEP group	52,223	$ 841,661,784	16,117	71.1
Judicial Plan	607	$ 42,306,144	$ 69,697	76.8

Other Members

Plans	Number Inactive-Vested	Number Inactive-Nonvested	Number Leave of Absence	Number Long-Term Disability
MSEP	16,959	25,613	191	613
Judicial Plan	27	0	0	0

Active Members by Attained Age and Years of Service

June 30, 2021

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
< 24	1,897	12							1,909	$ 66,836,538
25-29	3,020	583	1						3,604	138,496,639
30-34	2,347	1,640	311	8					4,306	182,640,076
35-39	1,824	1,358	1,064	349	15				4,610	208,711,321
40-44	1,458	1,163	955	1,047	454	15			5,092	239,425,213
45-49	1,294	929	789	903	1,255	399	16		5,585	269,220,642
50-54	1,220	899	766	797	1,228	981	261	28	6,180	300,279,415
55-59	1,187	948	802	841	1,007	594	393	113	5,885	281,296,123
60-64	756	702	608	571	631	350	220	161	3,999	190,588,848
65+	269	302	274	236	209	131	92	146	1,659	84,480,237
Totals	15,272	8,536	5,570	4,752	4,799	2,470	982	448	42,829	$ 1,961,975,052

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

Group Averages: Age – 45.9 years • Service – 11.0 years • Annual pay – $45,809

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
< 39	22	3						25	$ 3,609,515
40-44	28	12	4					44	6,493,592
45-49	22	13	8					43	6,328,225
50-54	25	14	16	12	2			69	10,384,961
55-59	20	23	19	9	8	2		81	12,357,972
60-64	11	25	24	6	19	12	1	98	14,837,692
65+	1	4	15	4	11	11	12	58	9,019,549
Totals	129	94	86	31	40	25	13	418	$ 63,031,506

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

Group Averages: Age – 55.5 years • Service – 10.8 years • Annual pay – $150,793

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
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
2012	18	51,332	1,864,069,493	36,314	0.02

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
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
2012	1	398	45,835,501	115,165	0.14

Retirees and Beneficiaries Added and Removed - MSEP

Last Ten Fiscal Years

Fiscal Year Ended June 30	Added to Rolls		Removed from Rolls		Rolls at End of Year			Percentage Increase/(Decrease)	
Benefit Type	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Average Annual Allowances	Annual Allowances	Average Annual Allowances
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
2012									
Retirees	2,655	39,865,026	908	11,424,712	33,473	516,637,638	15,434	5.83	0.30
Beneficiaries	371	4,966,813	195	1,666,285	4,192	44,193,984	10,542	8.07	3.53

Retirees and Beneficiaries Added and Removed - Judicial Plan

Last Ten Fiscal Years

Fiscal Year Ended June 30	Added to Rolls		Removed from Rolls		Rolls at End of Year			Percentage Increase/(Decrease)	
Benefit Type	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Average Annual Allowances	Annual Allowances	Average Annual Allowances
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
2012									
Retirees	18	1,490,554	14	1,074,572	356	22,365,845	62,825	1.90	0.75
Beneficiaries	8	394,339	6	218,310	140	4,618,147	32,987	3.96	2.48

Short-Term Solvency Test

Last Ten Fiscal Years

MSEP

Fiscal Year	Actuarial Accrued Liabilities for: 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)
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
2012	5,431,451	5,749,411,068	5,038,809,058	7,897,167,203	100.0	100.0	42.5

Judicial Plan

Fiscal Year	Actuarial Accrued Liabilities for: 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)
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
2012	209,817	258,642,149	154,450,572	102,266,706	100.0	39.5	0.0

Analysis of Financial Experience

Year Ended June 30, 2021

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		
Unfunded actuarial accrued liability (UAAL) at beginning of year	$	5,547,184,737
Normal cost from last valuation		152,097,309
Actual employer and member contributions		(500,864,631)
Miscellaneous income		(80,121)
Administrative expenses		8,816,943
Interest accrual		379,285,901
Expected UAAL before changes		5,586,440,138
Change from any changes in benefits, assumptions, or methods		515,859,705
Expected UAAL after changes		6,102,299,843
Less: Actual UAAL at end of year		(6,201,395,486)
Gain (loss) during year from experience	$	(99,095,643)
Gain (loss) as a percent of actuarial accrued liabilities at start of year ($14,464,720,010)		(0.7)%

Valuation Date June 30	Actuarial Gain (Loss) as a % of Beginning Accrued Liabilities
2021	(0.7)%
2020	(2.3)
2019	(1.8)
2018	(0.9)
2017	(1.6)
2016	(3.2)
2015	(0.9)
2014	2.1
2013	(2.8)
2012	(4.7)

Judicial		
Unfunded actuarial accrued liability (UAAL) at beginning of year	$	444,133,701
Normal cost from last valuation		12,036,133
Actual employer and member contributions		(41,444,937)
Administrative expenses		75,822
Interest accrual		30,290,372
Expected UAAL before changes		445,091,091
Change from any changes in benefits, assumptions, or methods		(4,928,456)
Expected UAAL after changes		440,162,635
Less: Actual UAAL at end of year		(431,296,066)
Gain (loss) during year from experience	$	8,866,569
Gain (loss) as a percent of actuarial accrued liabilities at start of year ($638,098,784)		1.4 %

Valuation Date June 30	Actuarial Gain (Loss) as a % of Beginning Accrued Liabilities
2021	1.4 %
2020	(0.2)
2019	(0.8)
2018	(0.3)
2017	(0.3)
2016	0.1
2015	(1.5)
2014	1.5
2013	(2.6)
2012	(0.6)

Comparison of Plans for General State Employees

June 30, 2021

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Membership *Eligible members employed in positions which normally require at least 1,040 hours of work per year*	• Employed prior to July 1, 2000 and vested in the MSEP	• 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	• First employed on or after January 1, 2011, or • Returned to employment after electing the buyout option
Member Contributions	• None	• None	• 4% of pay
Vesting *Eligible for future pension*	• 5 years	• 5 years	• 5 years
Service Purchases	• 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	• 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	• May purchase qualifying public sector service at full actuarial cost
Service Transfers	• 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.	• 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.	• 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	• **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 average compensation. *Payable the month following the member's death*	• **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 average compensation. *Payable the month following the member's death*	• **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. Payable the month following the member's death; for inactive-vested, payable when member would have reached normal retirement eligibility. • **Duty-related death** *(no min. service requirement)* Survivor benefit to eligible spouse or children no less than 50% of average compensation. *Payable the month following the member's death*

Comparison of Plans for General State Employees (continued)

June 30, 2021

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Early Retirement *Eligible for reduced pension benefit once age and service requirements are met*	• Age 55 + 10 years of service *Base benefit reduced ½ of 1% (.005) for each month age is younger than normal retirement*	• Age 57 + 5 years of service *Base benefit reduced ½ of 1% (.005) for each month age is younger than normal retirement*	• Age 62 + 5 years of service at time of termination *Base benefit reduced ½ of 1% (.005) for each month age is younger than normal retirement* *Inactive-vested members ineligible*
Normal Retirement *Eligible for unreduced pension benefit once age and service requirements are met*	• 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 *Age 50 if first became eligible prior to Aug. 28, 2003*	• Age 62 + 5 years of service or • Rule of 80 – (at least age 48) Age + years of service = 80 or more *Age 50 if first became eligible prior to Aug. 28, 2003* *Inactive-vested members ineligible for Rule of 80*	• 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 *Payable for life*	• .016 x FAP x Service *Future formula increases, if any, may be passed along to retirees.*	• .017 x FAP x Service *Future formula increases, if any, will not be passed along to retirees.*	• .017 x FAP x Service *Future formula increases, if any, will not be passed along to retirees.*
Temporary Benefit *Stops at age 62*	• Not available	• .008 x FAP x Service *Available to members retiring under Rule of 80*	• .008 x FAP x Service *Available to members retiring under Rule of 90*
BackDROP *Lump-sum payment at retirement in addition to reduced monthly pension*	• Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable)	• Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable)	• Not available
Benefit Payment Options *Determines whether or not a benefit will be paid to anyone after member's death*	• Life Income Annuity • Unreduced Joint & 50% Survivor • Joint & 100% Survivor • Life Income with 60 Guaranteed Payments • Life Income with 120 Guaranteed Payments	• Life Income Annuity • Joint & 50% Survivor • Joint & 100% Survivor • Life Income with 120 Guaranteed Payments • Life Income with 180 Guaranteed Payments	• 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) *Helps offset effects of inflation increasing the cost of goods and services*	• **Employed before Aug. 28, 1997** Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, the 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%)	• Based on 80% of the percentage increase in the average CPI (0-5%)	• Based on 80% of the percentage increase in the average CPI (0-5%)
In-Service COLA *Service beyond age 65*	• Applicable COLA rate (if eligible)	• Not available	• Not available

Comparison of Plans for Legislators

June 30, 2021

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Membership *Elected Members of the General Assembly*	• Employed prior to July 1, 2000 and vested in the MSEP	• 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	• First employed on or after January 1, 2011, or • Returned to employment after electing the buyout option
Member Contributions	• None	• None	• 4% of pay
Vesting *Eligible for future pension*	• 3 biennial assemblies (6 years)	• 3 biennial assemblies (6 years)	• 3 biennial assemblies (6 years)
Service Purchases	• 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	• 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	• May purchase qualifying public sector service at full actuarial cost
Service Transfers	• 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.	• 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.	• 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	• **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*	• **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*	• **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. *Payable the month following the member's death; for inactive-vested, payable when member would have reached normal retirement eligibility* • **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*
Early Retirement *Eligible for reduced pension benefit once age and service requirements are met*	• Not available	• Not available	• Not available

Comparison of Plans for Legislators (continued)

June 30, 2021

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Normal Retirement *Eligible for unreduced pension benefit once age and service requirements are met*	• Age 55 + 3 biennial assemblies or • Rule of 80 – (at least age 48) Age + years of service = 80 or more	• Age 55 + 3 biennial assemblies or • Rule of 80 – (at least age 50) Age + years of service = 80 or more *Inactive-vested members ineligible for Rule of 80*	• Age 62 + 3 biennial assemblies 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 *Payable for life*	• Biennial Assemblies x $150 *Future formula increases, if any, may be passed along to retirees.*	• (Active Pay ÷ 24) x Service *Capped at 100% of pay; future formula increases, if any, will not be passed along to retirees.*	• (Active Pay ÷ 24) x Service *Capped at 100% of pay; future formula increases, if any, will not be passed along to retirees.*
Temporary Benefit *Stops at age 62*	• Not available	• Not available	• Not available
BackDROP *Lump-sum payment at retirement in addition to reduced monthly pension*	• Not available	• Not available	• Not available
Benefit Payment Options *Determines whether or not a benefit will be paid to anyone after member's death*	• Life Income Annuity • Unreduced Joint & 50% Survivor • Joint & 100% Survivor • Life Income with 60 Guaranteed Payments • Life Income with 120 Guaranteed Payments	• Life Income Annuity • Joint & 50% Survivor • Joint & 100% Survivor • Life Income with 120 Guaranteed Payments • Life Income with 180 Guaranteed Payments	• 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) *Helps offset effects of inflation increasing the cost of goods and services*	• **Sworn in before Aug. 28, 1997** Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, the 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%)	• Benefit adjustment based on increase in pay for an active member	• Benefit adjustment based on increase in pay for an active member
In-Service COLA *Service beyond age 65*	• Applicable COLA rate (if eligible)	• Not available	• Not available

Comparison of Plans for Statewide Elected Officials

June 30, 2021

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Membership *Members elected to state office*	• Employed prior to July 1, 2000 and vested in the MSEP	• 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	• First employed on or after January 1, 2011, or • Returned to employment after electing the buyout option
Member Contributions	• None	• None	• 4% of pay
Vesting *Eligible for future pension*	• 4 years (1 term)	• 4 years (1 term)	• 4 years (1 term)
Service Purchases	• 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	• 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	• May purchase qualifying public sector service at full actuarial cost
Service Transfers	• 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.	• 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.	• 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	• **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*	• **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*	• **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. *Payable the month following the member's death; for inactive-vested, payable when member would have reached normal retirement eligibility* • **Duty-related death** *(no min. service requirement)* Survivor benefit to eligible spouse or children no less than 50% of current pay. *Payable the month following the member's death*
Early Retirement *Eligible for reduced pension benefit once age and service requirements are met*	• Age 55 + 10 years of service *Base benefit reduced ½ of 1% (.005) for each month age is younger than normal retirement*	• Not available	• Not available

Comparison of Plans for Statewide Elected Officials (continued)

June 30, 2021

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Normal Retirement *Eligible for unreduced pension benefit once age and service requirements are met*	• 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	• Age 55 + 4 years of service or • Rule of 80 – (at least age 50) Age + years of service = 80 or more *Inactive-vested members ineligible for Rule of 80*	• 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 *Inactive-vested members ineligible for Rule of 90*
Base Benefit *Payable for life*	• Less than 12 years of service .016 x FAP x Service • 12+ years of service Monthly Statutory Comp. x .50 *Future formula increases, if any, may be passed*	• (Active Pay ÷ 24) x Service *Capped at 12 years of service or 50% of pay; future formula increases, if any, will not be passed along to retirees.*	• (Active Pay ÷ 24) x Service *Capped at 12 years of service or 50% of pay; future formula increases, if any, will not be passed along to retirees*
Temporary Benefit *Stops at age 62*	• Not available	• Not available	• Not available
BackDROP *Lump-sum payment at retirement in addition to reduced monthly pension*	• Not available	• Not available	• Not available
Benefit Payment Options *Determines whether or not a benefit will be paid to anyone after member's death*	• Life Income Annuity • Unreduced Joint & 50% Survivor • Joint & 100% Survivor • Life Income with 60 Guaranteed Payments • Life Income with 120 Guaranteed Payments	• Life Income Annuity • Joint & 50% Survivor • Joint & 100% Survivor • Life Income with 120 Guaranteed Payments • Life Income with 180 Guaranteed Payments	• 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) *Helps offset effects of inflation increasing the cost of goods and services*	• **Sworn in before Aug. 28, 1997** Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, the 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.	• Benefit adjustment based on increase in pay for an active member	• Benefit adjustment based on increase in pay for an active member
In-Service COLA *Service beyond age 65*	• Applicable COLA rate (if eligible)	• Not available	• Not available

Comparison of Plans for Judges

June 30, 2021

Benefit Provisions	Judicial Plan (Closed Plan)	Judicial Plan 2011
Membership	• Must be employed prior to January 1, 2011 in a MOSERS benefit-eligible positon 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.	• 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.
Member Contributions	• None	• 4% of pay
Vesting *Eligible for future pension*	• Automatic the day you become a member	• Automatic the day you become a member
Service Purchases	• 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	• May purchase qualifying public sector service at full actuarial cost
Service Transfers	• May transfer state service to other positions covered by MOSERS under 104.800 or under 105.691 with written agreements to transfer required funds	• 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	• **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. *Payable the month following the member's death*	• **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. *Payable the month following the member's death*
Early Retirement *Eligible for reduced pension benefit once age and service requirements are met*	• **Less than 12 years of service** *Age 62 or* • **Less than 15 years of service** *Age 60*	• **Less than 12 years of service** *Age 67 or* • **Less than 20 years of service** *Age 62*
Normal Retirement *Eligible for unreduced pension benefit once age and service requirements are met*	• Age 62 + 12 years of service or • Age 60 + 15 years of service or • Age 55 + 20 years of service	• Age 67 + 12 years of service or • Age 62 + 20 years of service

Comparison of Plans for Judges (continued)

June 30, 2021

Benefit Provisions	Judicial Plan (Closed Plan)	Judicial Plan 2011
Base Benefit *Payable for life*	• *Monthly pay x .50 = Monthly Base Benefit*	• *Monthly pay x .50 = Monthly Base Benefit*
Temporary Benefit *Stops at age 62*	• Not available	• Not available
BackDROP *Lump-sum payment at retirement in addition to reduced monthly pension*	• Not available	• Not available
Benefit Payment Options *Determines whether or not a benefit will be paid to anyone after member's death*	• Life Income Annuity (if unmarried) • Automatic Unreduced Joint & 50% Survivor	• 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) *Helps offset effects of inflation increasing the cost of goods and services*	• **Sworn in before Aug. 28, 1997** Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, the 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%)	• Based on 80% of the percentage increase in the CPI (0-5%)
In-Service COLA Service beyond age 60	• Judges who work beyond normal retirement have increased benefits upon retirement.	• Not available

Comparison of Plans for Uniformed Members of the Water Patrol*

June 30, 2021

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000
Membership *Eligible members employed in positions which normally require at least 1,040 hours of work per year*	• Employed prior to July 1, 2000 and vested in the MSEP	• 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
Member Contributions	• None	• None
Vesting *Eligible for future pension*	• 5 years	• 5 years
Service Purchases	• 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	• 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	• May transfer state service to other positions covered by MOSERS under 104.800	• May transfer state service to other positions covered by MOSERS under 104.1090
Death Prior to Retirement	• **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 average compensation. *Payable the month following the member's death*	• **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 average compensation. *Payable the month following the member's death*
Early Retirement *Eligible for reduced pension benefit once age and service requirements are met*	• Not available	• Age 57 + 10 years of service
Normal Retirement *Eligible for unreduced pension benefit once age and service requirements are met*	• Age 55 + 5 years of service or • Rule of 80 – (at least age 48) Age + years of service = 80 or more *Age 50 if first became eligible prior to Aug. 28, 2003*	• Age 62 + 5 years of service or • Rule of 80 – (at least age 48) Age + years of service = 80 or more *Age 50 if first became eligible prior to Aug. 28, 2003* *Inactive-vested members ineligible for Rule of 80*
Base Benefit *Payable for life*	• .016 x FAP x Service increased by 33% *Future formula increases, if any, may be passed along to retirees*	• .017 x FAP x Service *Future formula increases, if any, will not be passed along to retirees*

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

June 30, 2021

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000
Temporary Benefit *Stops at age 62*	• Not available	• .008 x FAP x Service *Available to members retiring under Rule of 80*
BackDROP *Lump-sum payment at retirement in addition to reduced monthly pension*	• Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable)	• Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable)
Benefit Payment Options *Determines whether or not a benefit will be paid to anyone after member's death*	• Life Income Annuity • Unreduced Joint & 50% Survivor • Joint & 100% Survivor • Life Income with 60 Guaranteed Payments • Life Income with 120 Guaranteed Payments	• 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) *Helps offset effects of inflation increasing the cost of goods and services*	• **Employed before Aug. 28, 1997** Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, the 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%)	• Based on 80% of the percentage increase in the average CPI (0-5%)
In-Service COLA *Service beyond age 65*	• COLA given for service beyond age 65 *COLA provisions determined by employment date*	• 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, 2021

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

Active Members*

Plan Provision	Requirement
• **Basic life insurance** An amount equal to one times annual salary (with a minimum of $15,000) while actively employed.	• Actively employed in an eligible state position resulting in membership in MOSERS.
• **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.	• Actively employed in an eligible state position resulting in membership in MOSERS.
• **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.	• 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
• **Basic life insurance at retirement** $5,000 basic life insurance during retirement.	• Must retire directly from active employment.
• **Optional life insurance at retirement (MSEP)** An employee 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.	• Must retire directly from active employment.
• **Optional life insurance at retirement (MSEP 2000)** Under "Rule of 80", an employee 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.	• Must retire directly from active employment.
• **Optional life insurance at retirement (MSEP 2011)** Under "Rule of 90", an employee 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.	• 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, 2021

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

Active Members

Classification	Requirement
• **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.	• 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.
• Water patrol	• 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.
• Judges	• 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 2021 legislative session ended on May 14. While the MOSERS clean-up bill (House Bill 701) remained viable until the last week of the legislative session, the bill did not pass nor did any other provisions that would have directly affected MOSERS' statutes. The General Assembly maintained its long-standing commitment to fully funding the Board's certified employer contribution rates through passage of MOSERS' appropriation in House Bill 5.

House Bill 5 - The General Assembly authorized the appropriation of $505 million to MOSERS for fiscal year 2022. 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 2020 Board meeting.

Actuarial Present Values

June 30, 2021

MSEP

Actuarial Present Value June 30, 2021	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	$ 5,603,652,696	$ 716,391,681	$ 4,887,261,015
Disability benefits likely to be paid to present active members who become totally and permanently disabled	103,634,873	58,855,653	44,779,220
Survivor benefits likely to be paid to widows/widowers and children of present active members who die before retiring	60,406,791	16,087,169	44,319,622
Separation benefits likely to be paid to present active members	381,830,475	285,616,219	96,214,256
Active member totals	$ 6,149,524,835	$ 1,076,950,722	5,072,574,113
Members on leave of absence & LTD			
Service retirement benefits based on service rendered before the valuation date			77,977,265
Inactive-vested members			
Service retirement benefits based on service rendered before the valuation date			886,871,740
Retired lives			9,037,922,330
Pending refunds			35,301,089
Total actuarial accrued liability			15,110,646,537
Less: actuarial value of assets			8,909,251,051
Unfunded actuarial accrued liability			$ 6,201,395,486
Funded ratio			59.0%

Actuarial Present Values

June 30, 2021

Judicial Plan

Actuarial Present Value June 30, 2021	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	$ 253,705,742	$ 78,533,391	$ 175,172,351
Survivor benefits likely to be paid to widows/widowers and children of present active members who die before retiring	4,523,749	3,279,523	1,244,226
Separation benefits likely to be paid to present active members	15,415,657	14,397,266	1,018,391
Active member totals	$ 273,645,148	$ 96,210,180	177,434,968
Inactive-vested members			10,311,392
Retired lives			438,537,859
Total actuarial accrued liability			626,284,219
Less: actuarial value of assets			194,988,153
Unfunded actuarial accrued liability			$ 431,296,066
Funded ratio			31.1%

Statistical Section

Ms. Edith Nelson
Retiree From the Judiciary
Strafford, MO
Years of Service: 25 Years, 3 Months
Year Retired: 2005

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 10 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 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 – 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

	2021	2020	2019	2018	2017
MSEP					
Additions					
Employer contributions	$ 463,293,368	$ 436,895,653	$ 394,150,042	$ 379,557,962	$ 335,217,422
Employee contributions	37,571,263	35,141,960	31,286,632	28,303,993	25,439,343
Member service purchases	1,520,330	1,388,992	1,293,774	2,020,720	1,691,046
Service transfers in	2,298,914	2,664,796	2,592,737	3,297,251	3,977,803
Investment income (net of expenses)	2,032,991,086	400,354,303	313,159,178	578,883,501	272,073,643
Other	80,121	133,952	496,898	538,600	522,025
Total additions to plan net assets	2,537,755,082	876,579,656	742,979,261	992,602,027	638,921,282
Deductions					
Benefit payments	911,424,269	864,807,554	842,813,907	879,148,738	787,300,328
Contribution refunds	5,894,157	5,224,489	6,006,484	5,502,698	4,820,737
Service transfers out	2,520,166	3,784,195	3,001,189	2,060,037	1,843,792
Administrative expenses	8,816,943	8,398,164	9,200,826	10,024,178	8,759,341
Total deductions from plan net position	928,655,535	882,214,402	861,022,406	896,735,651	802,724,198
Change in net position	$ 1,609,099,547	$ (5,634,746)	$ (118,043,145)	$ 95,866,376	$ (163,802,916)
Judicial Plan					
Additions					
Employer contributions	$ 39,996,509	$ 39,174,515	$ 38,604,668	$ 36,892,203	$ 34,246,826
Employee contributions	1,448,428	1,314,570	1,138,101	902,320	786,745
Investment income (net of expenses)	44,049,707	8,162,709	6,051,941	10,727,603	4,671,168
Other	0	0	3,895	9,981	8,963
Total additions to plan net position	85,494,644	48,651,794	45,798,605	48,532,107	39,713,702
Deductions					
Benefit payments	41,625,546	39,622,268	37,585,484	35,651,489	33,979,837
Contribution refunds	0	0	7,565	5,760	4,888
Administrative expenses	75,822	74,450	72,141	185,763	150,387
Total deductions from plan net position	41,701,368	39,696,718	37,665,190	35,843,012	34,135,112
Change in net position	$ 43,793,276	$ 8,955,076	$ 8,133,415	$ 12,689,095	$ 5,578,590
Insurance Activities					
Additions					
Premium receipts	$ 31,609,219	$ 32,582,558	$ 31,342,778	$ 31,119,232	$ 28,779,398
Investment income	1,869	46,539	121,298	79,389	33,984
Miscellaneous income	480,074	484,075	494,722	480,120	480,120
Total operating revenues	32,091,162	33,113,172	31,958,798	31,678,741	29,293,502
Deductions					
Premium disbursements	31,597,820	32,549,567	31,325,399	31,100,612	28,769,588
Premium refunds	11,401	32,991	17,379	14,211	9,810
Administrative expenses	480,120	480,120	501,018	526,023	532,169
Total deductions from net position	32,089,341	33,062,678	31,843,796	31,640,846	29,311,567
Change in net position	$ 1,821	$ 50,494	$ 115,002	$ 37,895	$ (18,065)

Changes in Net position continued on following page

**Amounts presented for prior years have been adjusted to report insurance activities as a fiduciary fund and remove deferred compensation activities due to the adoption of GASB Statement 84.*

Changes in Fiduciary Net Position (continued)

Last Ten Fiscal Years

	2016	2015	2014	2013	2012
MSEP					
Additions					
Employer contributions	$ 329,957,369	$ 329,752,832	$ 326,370,336	$ 274,655,284	$ 263,373,924
Employee contributions	21,684,920	18,099,455	14,025,328	9,698,883	4,955,399
Member service purchases	2,815,749	1,859,005	2,909,423	3,475,123	2,869,085
Service transfers in	2,107,873	3,575,815	2,252,206	2,446,627	2,675,339
Investment income (net of expenses)	1,194,422	(237,603,530)	1,484,709,539	778,008,348	158,102,123
Other	545,847	533,001	450,453	489,193	448,463
Total additions to plan net assets	358,306,180	116,216,578	1,830,717,285	1,068,773,458	432,424,333
Deductions					
Benefit payments	750,440,412	723,994,041	677,097,411	646,708,308	611,522,451
Contribution refunds	3,798,199	2,479,264	1,421,856	622,341	123,709
Service transfers out	3,071,892	1,792,495	1,916,840	1,911,665	588,180
Administrative expenses	8,489,375	8,077,692	7,336,922	7,575,883	7,017,057
Total deductions from net position	765,799,878	736,343,492	687,773,029	656,818,197	619,251,397
Change in net position	$ (407,493,698)	$ (620,126,914)	$ 1,142,944,256	$ 411,955,261	$ (186,827,064)
Judicial Plan					
Additions					
Employer contributions	$ 33,642,497	$ 32,696,686	$ 29,264,877	$ 28,330,649	$ 26,324,526
Employee contributions	661,206	488,193	294,810	211,936	149,859
Investment income (net of expenses)	19,273	(3,618,469)	21,388,261	10,724,252	2,061,916
Other	8,808	8,117	6,489	6,743	5,849
Total additions to plan net position	34,331,784	29,574,527	50,954,437	39,273,580	28,542,150
Deductions					
Benefit payments	32,979,706	31,245,906	29,406,625	27,802,871	26,821,412
Contribution refunds	10,008	0	0	0	0
Administrative expenses	136,983	123,015	105,693	104,428	91,514
Total deductions from net position	33,126,697	31,368,921	29,512,318	27,907,299	26,912,926
Change in net position	$ 1,205,087	$ (1,794,394)	$ 21,442,119	$ 11,366,281	$ 1,629,224
Insurance Activities					
Additions					
Premium receipts	$ 30,360,162	$ 30,177,918	$ 29,563,054	$ 28,961,637	$ 28,578,326
Investment income	15,207	9,749	11,886	12,075	11,025
Miscellaneous income	480,120	(519,880)	1,480,120	480,120	480,120
Total operating revenues	30,855,489	29,667,787	31,055,060	29,453,832	29,069,471
Deductions					
Premium disbursements	30,328,802	30,157,271	29,544,110	28,930,950	28,556,036
Premium refunds	31,360	20,646	18,942	30,687	22,291
Administrative expenses	550,843	516,782	435,830	472,792	433,500
Total deductions from net position	30,911,005	30,694,699	29,998,882	29,434,429	29,011,827
Change in net position	$ (55,516)	$ (1,026,912)	$ 1,056,178	$ 19,403	$ 57,644

**Amounts presented for prior years have been adjusted to report insurance activities as a fiduciary fund and remove deferred compensation activities due to the adoption of GASB Statement 84.*

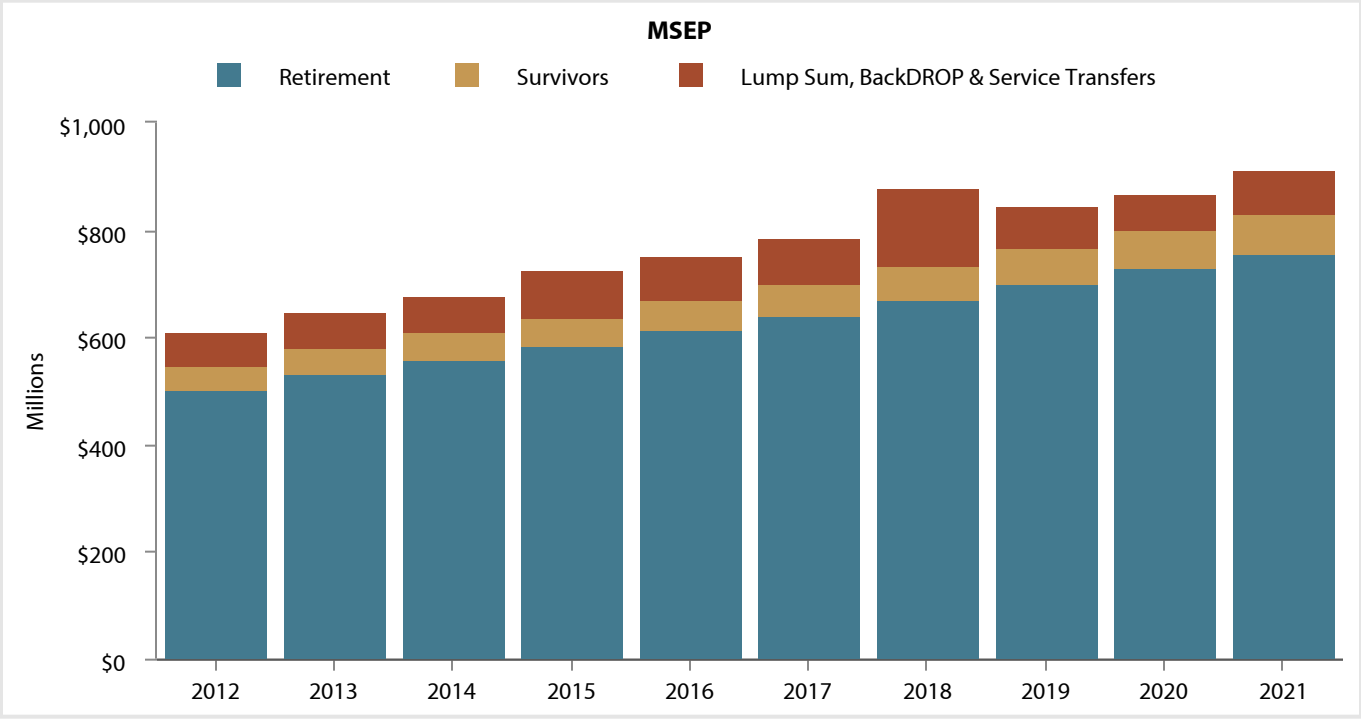
Deductions from Net Position for Benefits and Refunds by Type

Last Ten Fiscal Years

MSEP

Type of benefit	2012	2013	2014	2015	2016
Retirement	$ 504,555,055	$ 533,962,630	$ 560,553,490	$ 586,597,187	$ 615,708,229
Survivors	42,963,959	46,659,381	49,922,170	52,940,062	56,495,787
Disability	29,503	27,255	22,468	16,857	15,470
Lump-sum	229,650	191,320	286,184	57,525	267,198
BackDROP & service transfers	64,332,464	67,779,388	68,229,937	86,174,905	81,025,620
Total benefits	$ 612,110,631	$ 648,619,974	$ 679,014,249	$ 725,786,536	$ 753,512,304
Refunds	$ 123,709	$ 622,341	$ 1,421,856	$ 2,479,264	$ 3,798,199

Type of benefit	2017	2018	2019	2020	2021
Retirement	$ 640,637,749	$ 670,663,932	$ 703,117,097	$ 730,310,371	$ 757,076,179
Survivors	59,628,687	63,081,129	66,493,496	70,583,387	74,890,437
Disability	14,821	5,223	2,260	2,300	2,328
Lump-sum	123,005	61,041,258	318,656	245,297	92,059
BackDROP & service transfers	88,739,858	86,417,233	75,883,587	67,450,394	81,883,431
Total benefits	$ 789,144,120	$ 881,208,775	$ 845,815,096	$ 868,591,749	$ 913,944,434
Refunds	$ 4,820,737	$ 5,502,698	$ 6,006,484	$ 5,224,489	$ 5,894,157



** Disability benefits are included, but amounts are too minimal to visually display in graph.*

Source: MOSERS' financial records

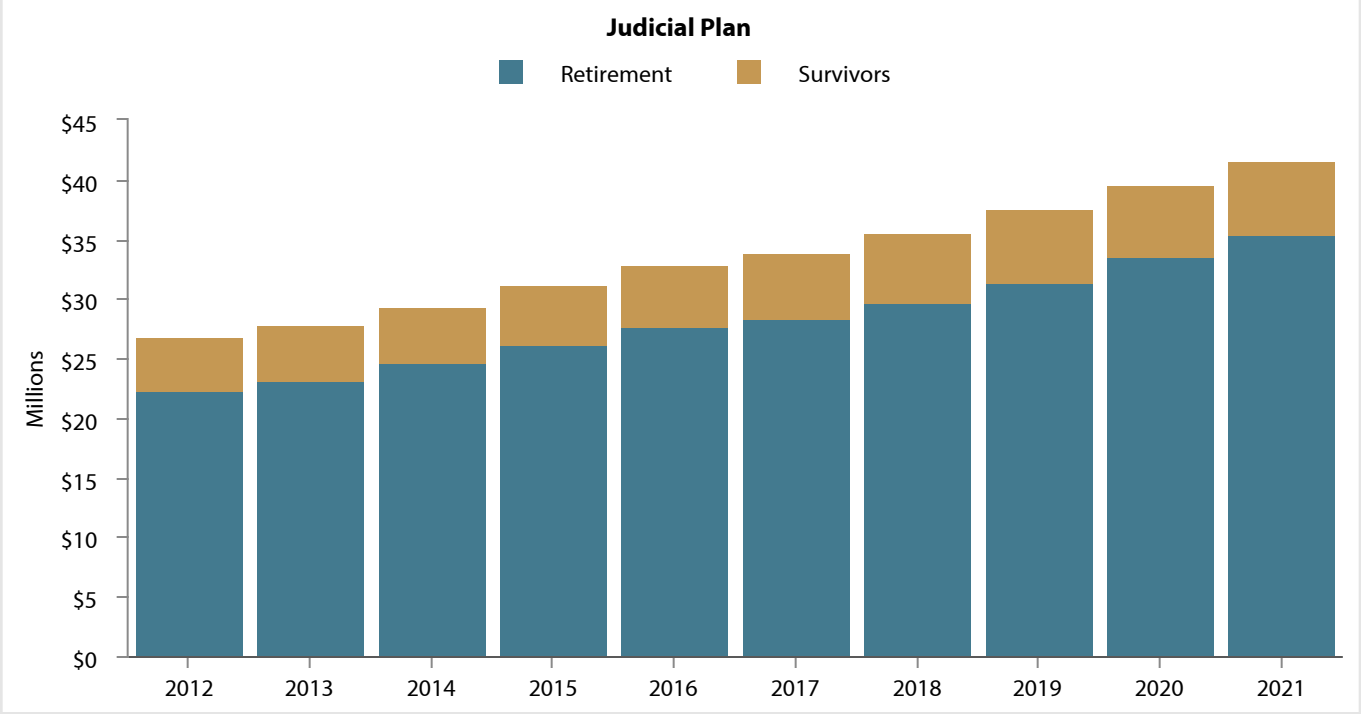
Deductions from Net Position for Benefits and Refunds by Type (continued)

Last Ten Fiscal Years

Judicial Plan

Type of benefit	2012	2013	2014	2015	2016
Retirement	$ 22,284,844	$ 23,123,707	$ 24,609,421	$ 26,181,505	$ 27,641,108
Survivors	4,536,569	4,679,169	4,797,204	5,064,400	5,338,598
Total benefits	$ 26,821,413	$ 27,802,876	$ 29,406,625	$ 31,245,905	$ 32,979,706
Refunds	$ 0	$ 0	$ 0	$ 0	$ 10,008

Type of benefit	2017	2018	2019	2020	2021
Retirement	$ 28,304,733	$ 29,655,995	$ 31,463,475	$ 33,577,616	$ 35,487,401
Survivors	5,675,104	5,995,494	6,122,009	6,044,652	6,138,145
Total benefits	$ 33,979,837	$ 35,651,489	$ 37,585,484	$ 39,622,268	$ 41,625,546
Refunds	$ 4,888	$ 5,760	$ 7,565	$ 0	$ 0



** Disability benefits are included, but amounts are too minimal to visually display in graph.*

Source: MOSERS' financial records

Pension Trust Funds

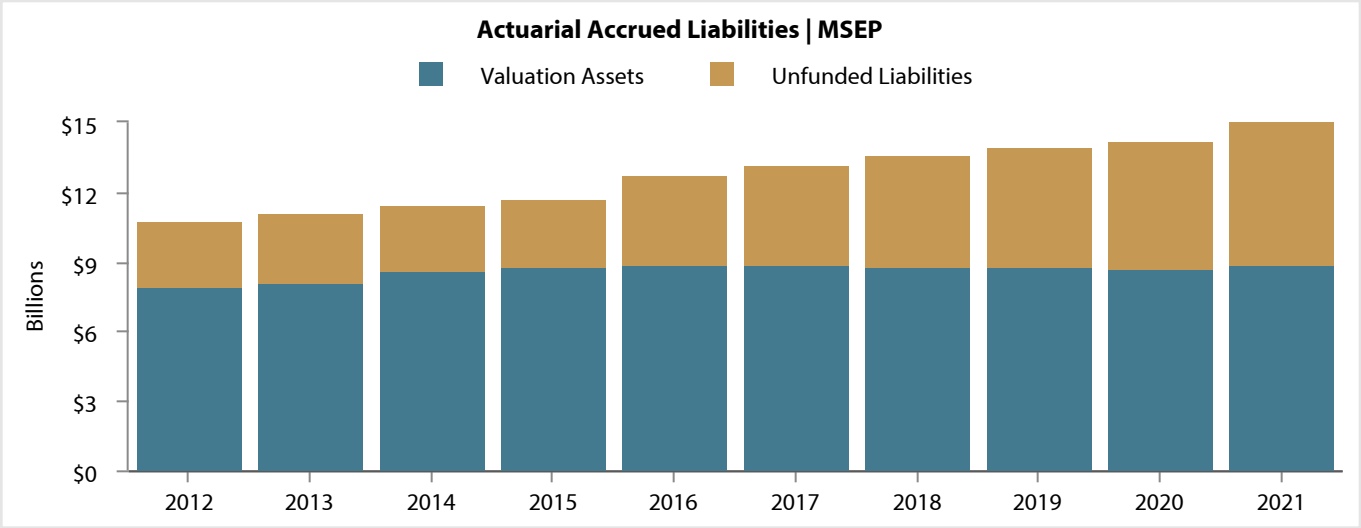
Valuation Assets (Smoothed Market) vs. Pension Liabilities

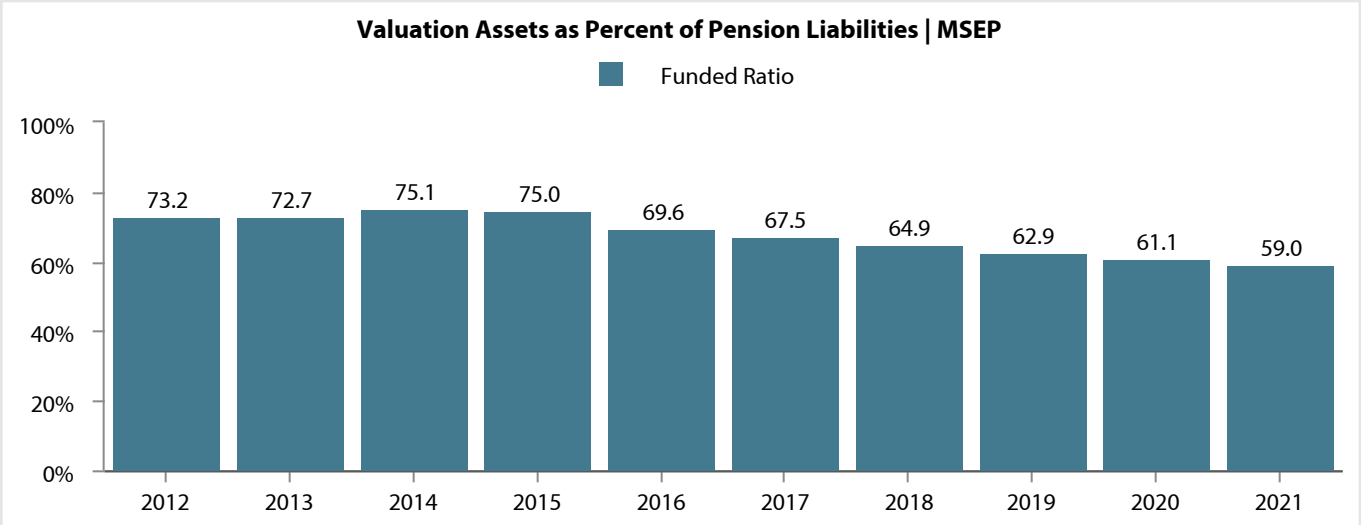
Last Ten Fiscal Years

MSEP

Dollars in Billions

Fiscal Year	Valuation Assets	Unfunded Liabilities	Accrued Liabilities	Funded Ratio
2012	$7.8972	$2.8965	$10.7937	73.2%
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





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

Pension Trust Funds

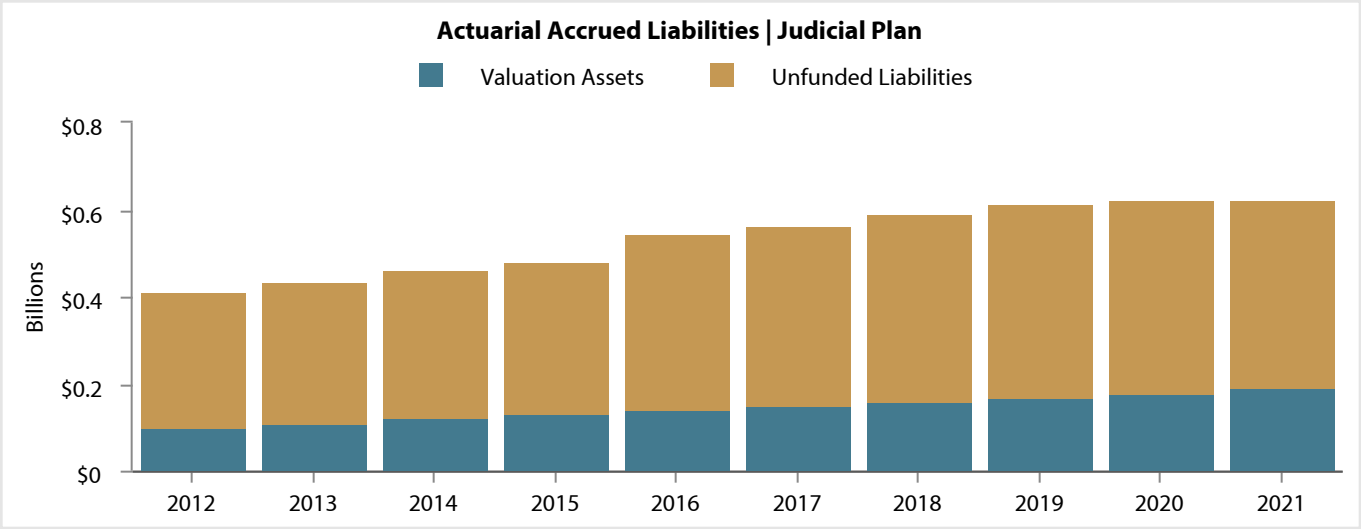
Valuation Assets (Smoothed Market) vs. Pension Liabilities (continued)

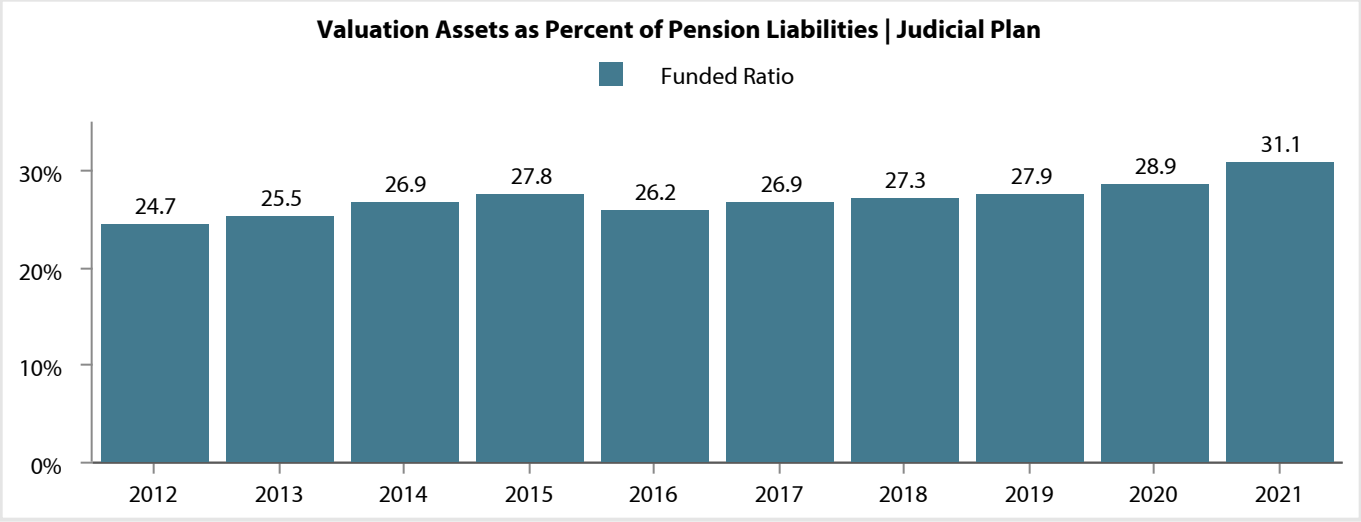
Last Ten Fiscal Years

Judicial Plan

Dollars in Billions

Fiscal Year	Valuation Assets	Unfunded Liabilities	Accrued Liabilities	Funded Ratio
2012	$0.1023	$0.3111	$0.4133	24.7%
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





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

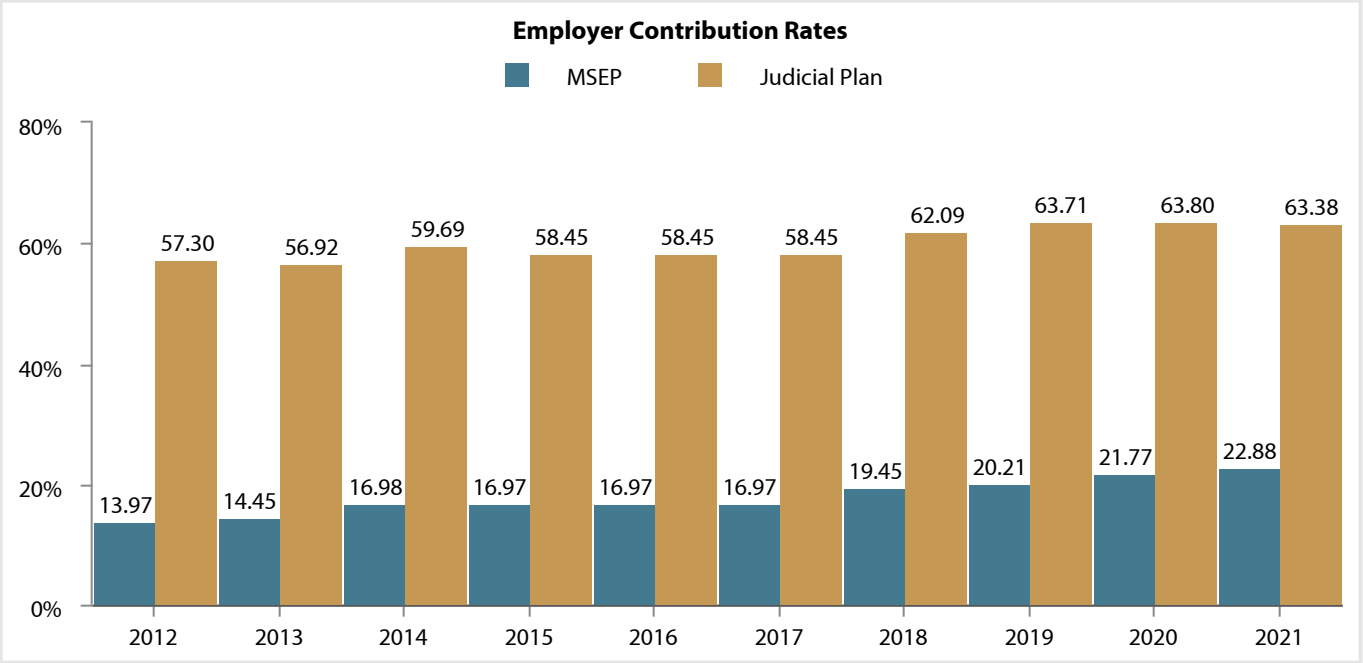
Pension Trust Funds

Employer Contribution Rates as a Percent of Payroll

Last Ten Fiscal Years

Fiscal Year	MSEP	Judicial
2012	13.97%	57.30%
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

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

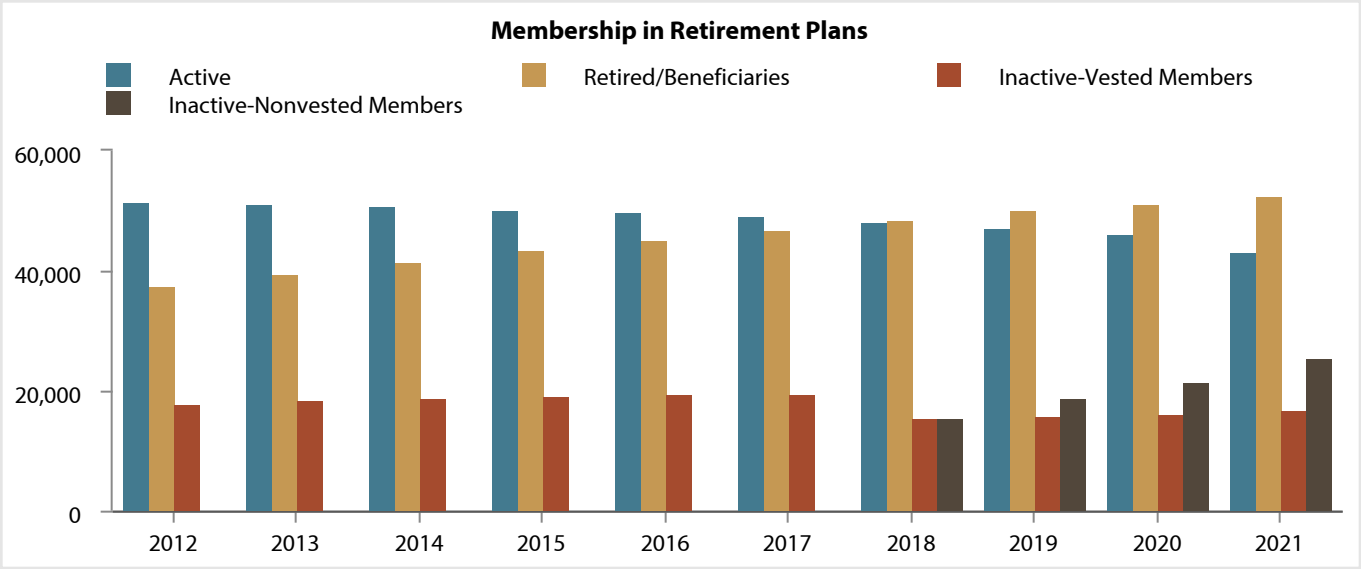
Last Ten Fiscal Years

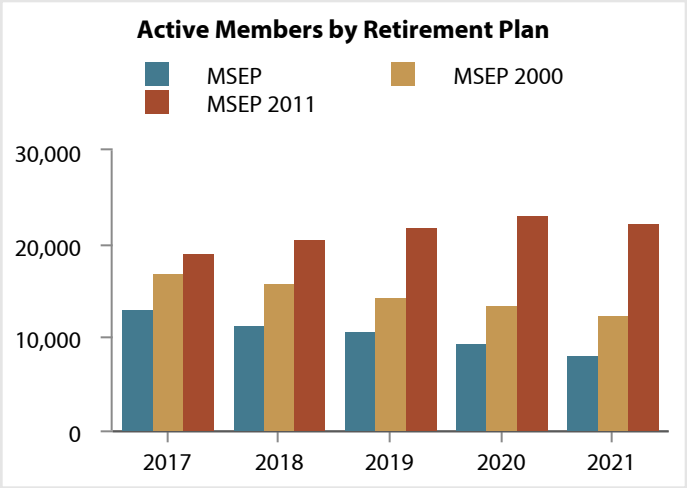
MSEP & Judicial Plans Combined

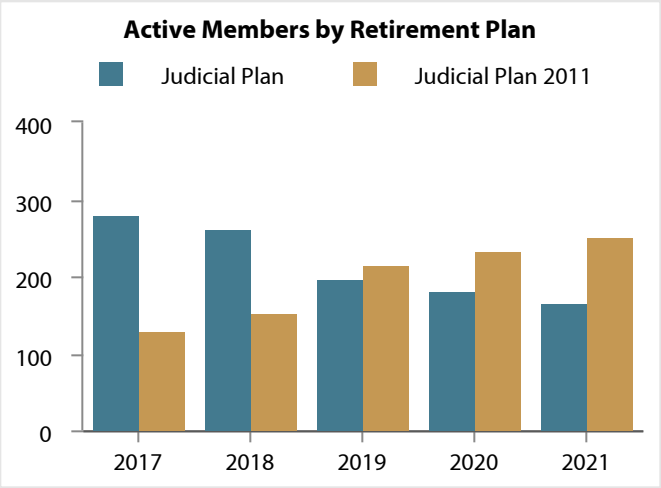
Fiscal Year	Active Members	Retirees and Beneficiaries	Inactive-Vested Members*	Inactive-Nonvested Members**	Totals
2012	51,730	37,796	18,075		107,601
2013	51,233	39,636	18,581		109,450
2014	51,026	41,511	18,957		111,494
2015	50,385	43,503	19,319		113,207
2016	49,872	45,368	19,538		114,778
2017	49,320	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

* *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.*



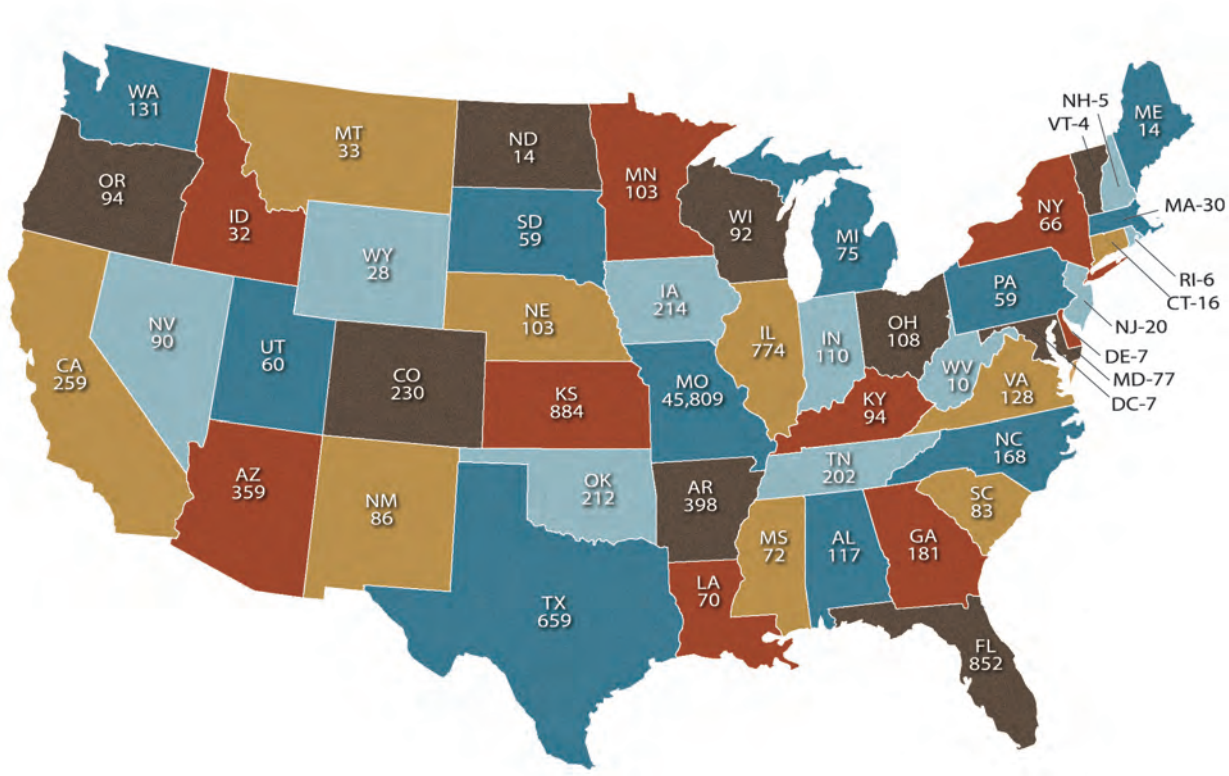




Source: MOSERS' MSEP and Judicial Plan Actuarial Valuation Reports, most recent 10 years

Distribution of Benefit Recipients by Location

June 30, 2021



Benefit Recipients Outside the Continental United States

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

Source: MOSERS' Pension Administration System

Benefit Recipients by Type of Retirement and Option Elected

June 30, 2021

MSEP

Amount of Monthly Benefit	Number of Benefit Recipients	Type of Retirement						
		A	B	C	D	E	F	G
1-250	5,576	2,066	2,589	239	570	1	0	111
251-500	8,553	4,198	3,029	439	777	0	0	110
501-750	6,102	3,568	1,493	310	678	0	0	53
751-1000	5,291	3,756	778	208	514	0	0	35
1001-1250	5,176	4,222	389	144	400	0	0	21
1251-1500	4,376	3,794	166	119	285	0	0	12
1501-1750	3,677	3,301	108	71	196	0	0	1
1751-2000	2,974	2,723	50	49	146	0	0	6
Over 2000	11,063	10,177	103	179	598	0	0	6
Total	52,788	37,805	8,705	1,758	4,164	1	0	355

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	7	0	2	0	0	1
501-750	6	0	4	0	1	0	0	1
751-1000	7	0	3	1	2	0	0	1
1001-1250	6	0	3	0	2	0	0	1
1251-1500	3	0	2	1	0	0	0	0
1501-1750	9	1	4	0	1	0	0	3
1751-2000	7	0	1	3	2	0	0	1
Over 2000	565	364	58	30	107	0	0	6
Total	615	365	83	35	118	0	0	14

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, 2021

MSEP

Amount of Monthly Benefit	Option Elected 1	2	3	4	5	6	7	8	9	10
1-250	0	13	271	245	346	0	1,268	303	43	3,087
251-500	6	30	301	292	553	1	1,884	643	28	4,815
501-750	10	23	179	116	469	0	1,290	850	16	3,149
751-1000	9	23	109	81	390	1	1,236	878	5	2,559
1001-1250	6	17	76	48	510	0	1,193	843	7	2,476
1251-1500	7	13	59	47	506	0	1,009	600	2	2,133
1501-1750	7	9	62	36	452	0	807	475	2	1,827
1751-2000	3	4	33	17	421	0	686	364	0	1,446
Over 2000	79	28	102	52	1,515	0	2,941	1,530	1	4,815
Total	127	160	1,192	934	5,162	2	12,314	6,486	104	26,307

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	3	0	0	0	0	0	1	0	0	1
751-1000	4	0	0	0	0	0	1	0	0	2
1001-1250	4	0	0	0	0	0	0	0	0	2
1251-1500	3	0	0	0	0	0	0	0	0	0
1501-1750	6	0	0	0	0	0	0	0	0	3
1751-2000	5	0	0	0	0	0	0	0	0	2
Over 2000	530	0	0	1	19	0	1	0	1	13
Total	566	0	0	1	19	0	3	0	1	24

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, 2021

MSEP Combined

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	25,782	$ 381,415,032	$ 14,794
Unreduced joint & 50% survivor	9,741	202,624,872	20,801
Joint & 100% survivor	8,766	161,070,348	18,374
Life income with 60 guaranteed payments	158	2,363,268	14,957
Life income with 120 guaranteed payments	1,084	11,228,124	10,358
Life income with 180 guaranteed payments	774	6,675,216	8,624
Survivor beneficiary	4,158	56,187,276	13,513
Total	50,463	821,564,136	16,281
Disability retirement	1	2,340	2,340
Death-in-service	1,759	20,095,272	11,424
Grand totals	52,223	$ 841,661,748	16,117

Judicial Plan Combined

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	5	$ 339,408	$ 67,882
Unreduced joint & 50% survivor	441	35,673,996	80,893
Joint & 100% survivor	3	61,536	20,512
Life income with 180 guaranteed payments	1	62,496	62,496
Survivor beneficiary	122	4,907,820	40,228
Total	572	41,045,256	71,757
Death-in-service	35	1,260,888	36,025
Grand totals	607	$ 42,306,144	69,697

Source: MOSERS' MSEP and Judicial Plan Actuarial Valuation Reports as of June 30, 2021

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

June 30, 2021

MSEP (Closed Plan)

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	5,911	$ 99,074,460	$ 16,761
Unreduced joint & 50% survivor	5,125	109,808,628	21,426
Joint & 100% survivor	3,119	74,106,816	23,760
Life income with 60 guaranteed payments	139	2,060,796	14,826
Life income with 120 guaranteed payments	176	2,276,292	12,933
Survivor beneficiary	2,709	41,603,676	15,358
Total	17,179	328,930,668	19,147
Disability retirement	1	2,340	2,340
Death-in-service	1,414	18,212,580	12,880
Grand totals	18,594	$ 347,145,588	18,670

MSEP 2000

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	19,681	$ 281,505,768	$ 14,303
Unreduced joint & 50% survivor	4,592	92,706,684	20,189
Joint & 100% survivor	5,574	86,646,108	15,545
Life income with 60 guaranteed payments	19	302,472	15,920
Life income with 120 guaranteed payments	898	8,902,008	9,913
Life income with 180 guaranteed payments	759	6,593,352	8,687
Survivor beneficiary	1,446	14,577,516	10,081
Total	32,969	491,233,908	14,900
Death-in-service	336	1,839,924	5,476
Grand totals	33,305	$ 493,073,832	14,805

MSEP 2011

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	190	$ 834,804	$ 4,394
Unreduced joint & 50% survivor	24	109,560	4,565
Joint & 100% survivor	73	317,424	4,348
Life income with 60 guaranteed payments	0	0	0
Life income with 120 guaranteed payments	10	49,824	4,982
Life income with 180 guaranteed payments	15	81,864	5,458
Survivor beneficiary	3	6,084	2,028
Total	315	1,399,560	4,443
Death-in-service	9	42,768	4,752
Grand totals	324	$ 1,442,328	4,452

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

June 30, 2021

Judicial Plan

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	3	$ 254,532	$ 84,844
Unreduced joint & 50% survivor	439	35,579,424	81,047
Joint & 100% survivor	0	0	0
Survivor beneficiary	122	4,907,820	40,228
Total	564	40,741,776	72,237
Death-in-service	34	1,237,428	36,395
Grand totals	598	$ 41,979,204	70,199

Judicial Plan 2011

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	2	$ 84,876	$ 42,438
Unreduced joint & 50% survivor	2	94,572	47,286
Joint & 100% survivor	3	61,536	20,512
Life income with 180 guaranteed payments	1	62,496	62,496
Survivor beneficiary	0	0	0
Total	8	303,480	37,935
Death-in-service	1	23,460	23,460
Grand totals	9	$ 326,940	36,327

Source: MOSERS' MSEP and Judicial Plan Actuarial Valuation Reports as of June 30, 2021

Average Monthly Benefit Amounts

Last Ten Fiscal Years

MSEP

Members Retiring During Fiscal Year		Years Credited Service by Category <5	5-10	11-15	16-20	21-25	26-30	31+	All Members
2012	Average monthly benefit	$ 126	$ 303	$ 521	$ 818	$ 1,232	$ 1,624	$ 2,271	$ 939
	Average final average salary	$ 7,854	$ 2,572	$ 2,648	$ 3,050	$ 3,295	$ 3,488	$ 4,109	$ 3,055
	Number of retirees	5	592	537	407	473	373	196	2,583
2013	Average monthly benefit	$ 251	$ 326	$ 523	$ 753	$ 1,243	$ 1,697	$ 2,017	$ 928
	Average final average 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 average 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 average 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 average 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 average 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 average 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 average 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 average 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 average 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
Ten Years Ended June 30, 2021									
	Average monthly benefit	$ 295	$ 326	$ 553	$ 864	$ 1,322	$ 1,800	$ 2,323	$ 1,051
	Average final average salary	$ 5,136	$ 2,694	$ 2,763	$ 3,125	$ 3,538	$ 3,896	$ 4,201	$ 3,264
	Number of retirees	63	5,564	4,828	4,152	4,733	4,388	2,115	25,843

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 <5	5-10	11-15	16-20	21-25	26-30	31+	All Members
2012	Average monthly benefit	$ 126	$ 290	$ 502	$ 805	$ 1,232	$ 1,617	$ 2,271	$ 932
	Average final salary	$ 7,854	$ 2,557	$ 2,626	$ 3,036	$ 3,295	$ 3,475	$ 4,109	$ 3,045
	Number of retirees	5	584	532	404	473	372	196	2,566
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
Ten Years Ended June 30, 2021									
	Average monthly benefit	$ 242	$ 308	$ 543	$ 856	$ 1,312	$ 1,797	$ 2,316	$ 1,046
	Average final average salary	$ 5,337	$ 2,682	$ 2,755	$ 3,122	$ 3,523	$ 3,891	$ 4,189	$ 3,258
	Number of retirees	53	5,428	4,795	4,128	4,719	4,384	2,109	25,616

** 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 <5	5-10	11-15	16-20	21-25	26-30	31+	All Members
2012	Average monthly benefit	$ 0	$ 1,069	$ 1,659	$ 2,225	$ 0	$ 0	$ 0	$ 1,335
	Average final salary	$ 0	$ 2,993	$ 2,993	$ 2,993	$ 0	$ 0	$ 0	$ 2,993
	Number of retirees	0	7	3	1	0	0	0	11
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
Ten Years Ended June 30, 2021									
	Average monthly benefit	$ 408	$ 986	$ 1,563	$ 2,090	$ 2,744	$ 0	$ 0	$ 1,172
	Average final average salary	$ 2,993	$ 2,993	$ 2,993	$ 2,993	$ 2,993	$ 0	$ 0	$ 2,993
	Number of retirees	7	128	24	18	2	0	0	179

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 <5	5-10	11-15	16-20	21-25	26-30	31+	All Members
2012	Average monthly benefit	$ 0	$ 0	$ 3,781	$ 0	$ 0	$ 0	$ 0	$ 3,781
	Average final salary	$ 0	$ 0	$ 8,093	$ 0	$ 0	$ 0	$ 0	$ 8,093
	Number of retirees	0	0	2	0	0	0	0	2
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
Ten Years Ended June 30, 2021									
	Average monthly benefit	$ 1,496	$ 3,114	$ 3,788	$ 0	$ 5,576	$ 0	$ 0	$ 3,556
	Average final average salary	$ 8,979	$ 9,341	$ 8,093	$ 0	$ 11,152	$ 0	$ 0	$ 8,898
	Number of retirees	1	2	4	0	1	0	0	8

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 <5	5-10	11-15	16-20	21-25	26-30	31+	All Members
2012	Average monthly benefit	$ 0	$ 0	$ 0	$ 959	$ 0	$ 0	$ 0	$ 959
	Average final salary	$ 0	$ 0	$ 0	$ 2,794	$ 0	$ 0	$ 0	$ 2,794
	Number of retirees	0	0	0	1	0	0	0	1
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
Ten Years Ended June 30, 2021									
	Average monthly benefit	$ 0	$ 69	$ 726	$ 1,177	$ 0	$ 0	$ 4,502	$ 2,306
	Average final average salary	$ 0	$ 1,291	$ 5,166	$ 9,987	$ 0	$ 0	$ 21,023	$ 36,296
	Number of retirees	0	1	2	3	0	0	4	10

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							
		<5	5-10	11-15	16-20	21-25	26-30	31+	All Members
2012	Average monthly benefit	$ 0	$ 2,493	$ 0	$ 4,378	$ 0	$ 4,204	$ 0	$ 3,692
	Average final salary	$ 0	$ 8,756	$ 0	$ 8,756	$ 0	$ 8,408	$ 0	$ 8,640
	Number of retirees	0	1	0	1	0	1	0	3
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
Ten Years Ended June 30, 2021									
	Average monthly benefit	$ 701	$ 1,919	$ 3,623	$ 4,152	$ 4,636	$ 4,938	$ 4,862	$ 3,827
	Average final average salary	$ 5,373	$ 6,635	$ 7,247	$ 8,303	$ 9,272	$ 9,876	$ 9,723	$ 8,384
	Number of retirees	2	5	3	3	11	4	2	30

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+	
2012	Average monthly benefit	$ 1,740	$ 2,353	$ 4,561	$ 4,621	$ 0	$ 5,020	$ 0	$ 3,684
	Average final salary	$ 9,114	$ 7,797	$ 10,179	$ 9,241	$ 0	$ 10,040	$ 0	$ 9,055
	Number of retirees	1	5	4	4	0	1	0	15
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
Ten Years Ended June 30, 2021									
	Average monthly benefit	$ 842	$ 3,139	$ 5,255	$ 5,681	$ 5,929	$ 5,988	$ 6,022	$ 5,320
	Average final average salary	$ 9,746	$ 9,695	$ 10,745	$ 11,361	$ 11,862	$ 11,976	$ 12,043	$ 11,258
	Number of retirees	7	22	52	55	45	29	23	233

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, 2021

MSEP

Fiscal Year of Retirement	Number	Total Annual Benefit	Average Monthly Benefit
1981 and prior	27	$ 143,169	$ 442
1982	9	79,011	732
1983	3	23,511	653
1984	20	177,033	738
1985	26	209,793	672
1986	37	311,071	701
1987	57	653,035	955
1988	70	1,084,398	1,291
1989	97	1,700,104	1,461
1990	101	1,568,491	1,294
1991	147	2,917,564	1,654
1992	194	3,393,728	1,458
1993	283	5,422,425	1,597
1994	283	5,235,244	1,542
1995	406	7,668,473	1,574
1996	445	9,140,690	1,712
1997	492	9,628,913	1,631
1998	600	12,455,561	1,730
1999	735	15,381,763	1,744
2000	812	16,418,546	1,685
2001	1,767	35,743,795	1,686
2002	1,227	21,356,128	1,450
2003	1,371	24,971,538	1,518
2004	1,906	33,193,282	1,451
2005	1,366	21,540,715	1,314
2006	1,544	23,155,476	1,250
2007	1,855	28,488,074	1,280
2008	1,897	28,288,037	1,243
2009	1,994	30,159,974	1,260
2010	2,075	30,388,675	1,220
2011	2,672	41,090,970	1,282
2012	2,506	35,879,788	1,193
2013	2,624	36,270,707	1,152
2014	2,636	37,148,416	1,174
2015	2,944	43,539,857	1,232
2016	2,951	44,017,677	1,243
2017	2,900	47,447,366	1,363
2018	3,061	49,902,137	1,359
2019	2,781	45,298,684	1,357
2020	2,739	42,646,886	1,298
2021	3,128	51,278,931	1,366
	52,788	$ 845,419,636	$ 1,335

Source: MOSERS' Pension Administration System

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

As of June 30, 2021

Judicial Plan

Fiscal Year of Retirement	Number	Total Annual Benefit	Average Monthly Benefit
1981 and prior	3	$ 51,855	$ 1,440
1982	0	0	0
1983	1	22,694	1,891
1984	0	0	0
1985	0	0	0
1986	0	0	0
1987	5	231,200	3,853
1988	1	80,168	6,681
1989	2	66,377	2,766
1990	3	144,180	4,005
1991	7	353,455	4,208
1992	1	86,111	7,176
1993	4	185,395	3,862
1994	3	129,202	3,589
1995	10	765,714	6,381
1996	5	265,290	4,421
1997	4	257,063	5,355
1998	10	614,128	5,118
1999	11	723,046	5,478
2000	11	813,007	6,159
2001	14	1,274,777	7,588
2002	13	1,036,392	6,644
2003	14	1,055,267	6,281
2004	14	952,427	5,669
2005	13	1,168,383	7,490
2006	12	480,188	3,335
2007	43	3,016,230	5,845
2008	23	1,584,588	5,741
2009	31	1,875,266	5,041
2010	12	774,228	5,377
2011	35	2,211,860	5,266
2012	17	920,484	4,512
2013	28	2,025,787	6,029
2014	23	1,488,095	5,392
2015	51	3,939,668	6,437
2016	22	1,560,278	5,910
2017	31	2,145,054	5,766
2018	31	2,421,866	6,510
2019	48	3,387,001	5,880
2020	27	1,787,634	5,517
2021	32	2,071,209	5,394
	615	$ 41,965,567	$ 5,686

Source: MOSERS' Pension Administration System

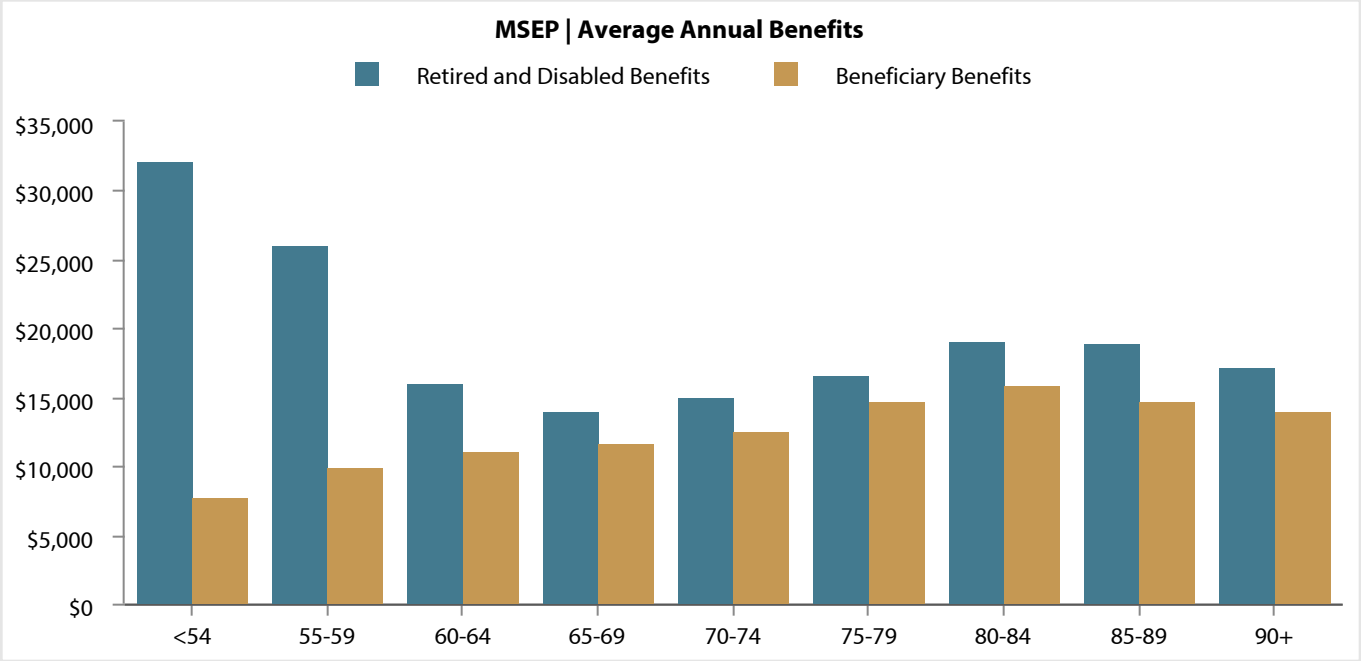
Benefits Tabulated by Attained Ages of Benefit Recipients

As of June 30, 2021

MSEP

	Retired and Disabled		Beneficiaries		Totals	
Attained Ages	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
<54	441	$ 14,245,128	567	$ 4,414,344	1,008	$ 18,659,472
55-59	2,819	73,734,036	332	3,335,844	3,151	77,069,880
60-64	7,873	126,595,932	551	6,177,396	8,424	132,773,328
65-69	11,783	165,237,048	735	8,628,840	12,518	173,865,888
70-74	11,056	166,812,732	1002	12,633,360	12,058	179,446,092
75-79	6,239	103,887,468	849	12,634,800	7,088	116,522,268
80-84	3,446	66,139,752	819	13,028,124	4,265	79,167,876
85-89	1,721	32,734,524	651	9,610,944	2,372	42,345,468
90+	928	15,992,580	411	5,818,896	1,339	21,811,476
Totals	46,306	$ 765,379,200	5,917	$ 76,282,548	52,223	$ 841,661,748

Average age at retirement: 61.7 years • Average age now: 71.1 years



Average annual benefit : $16,529 retired and disabled • $12,892 beneficiaries

Source: MOSERS' MSEP Actuarial Valuation Report as of June 30, 2021

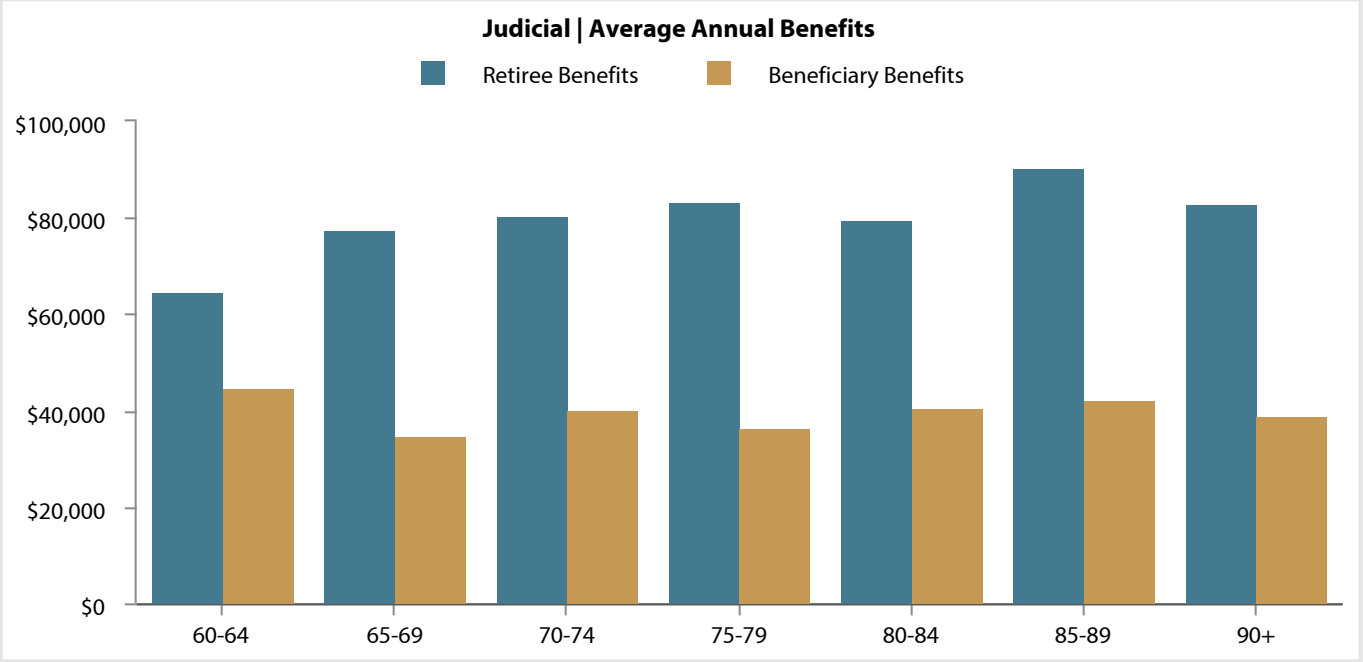
Benefits Tabulated by Attained Ages of Benefit Recipients (continued)

As of June 30, 2021

Judicial Plan

	Retirees		Beneficiaries		Totals	
Attained Ages	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
60-64	27	$ 1,752,540	10	$ 447,696	37	$ 2,200,236
65-69	78	6,056,532	13	452,652	91	6,509,184
70-74	157	12,657,432	20	807,204	177	13,464,636
75-79	86	7,158,036	31	1,131,888	117	8,289,924
80-84	52	4,147,452	24	976,908	76	5,124,360
85-89	29	2,621,724	18	759,012	47	3,380,736
90+	21	1,743,720	41	1,593,348	62	3,337,068
Totals	450	$ 36,137,436	157	$ 6,168,708	607	$ 42,306,144

Average age at retirement: 65.4 years • Average age now: 76.8 years



Average benefit paid: $80,305 retirees • $39,291 beneficiaries

Source: MOSERS' Judicial Plan Actuarial Valuation Report as of June 30, 2021

Principal Participating Employers

Current Year and Nine Years Ago

	2021			2012		
Participating Employer	Covered Employees	Rank	Percent of Membership	Covered Employees	Rank	Percent of Membership
State of Missouri	37,369	1	86.6%	44,896	1	86.8%
Missouri State University	1,710	2	4.0	1,810	2	3.5
University of Central Missouri	811	3	1.9	1,079	3	2.1
Southeast Missouri State University	755	4	1.7	925	4	1.8
Northwest Missouri State University	546	5	1.3	600	6	1.2
Truman State University	483	6	1.1	661	5	1.3
Missouri Southern State University	360	7	0.8	433	7	0.8
Missouri Western State University	314	8	0.7	401	9	0.8
Lincoln University	303	9	0.7	414	8	0.8
Harris-Stowe State University	185	10	0.4	177	10	0.3
All others	317		0.7	336		0.6
Total	43,153		100.0%	51,732		100.0%

Source: MOSERS' Pension Administration System

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