COOPERATION
ACCOUNTABILITY

2020

MoDOT & Patrol Employees' Retirement System

Comprehensive Annual Financial Report

For the Fiscal Year Ended June 30, 2020

RELIABILITY
EXCELLENCE
SERVICE

MPERS

Serving those who keep us safe.

Missouri Department of Transportation and Highway Patrol Employees' Retirement System
A Component Unit of the State of Missouri

MoDOT and Patrol Employees' Retirement System

Comprehensive Annual Financial Report

For the Fiscal Year Ended June 30, 2020

Scott Simon
Executive Director

Jennifer Even
Chief Financial Officer

This is a digital publication of the Missouri Department of Transportation and Missouri State Highway Patrol Employees' Retirement System. No printing costs were incurred.

Missouri Department of Transportation and Highway Patrol Employees' Retirement System
A Component Unit of the State of Missouri

Mailing Address
PO Box 1930
Jefferson City, Missouri 65102-1930

Street Address
1913 William Street
Jefferson City, Missouri 65109

Contact MPERS
1-800-270-1271
www.mpers.org
mpers@mpers.org

C A R E S

Cooperation **Accountability** **Reliability** **Excellence** **Service**

MPERS *CARES*

At MPERS, our mission is simple: To provide a foundation for financial security to plan participants by delivering quality benefits and exceptional member service through professional plan administration and prudent management of assets, at a reasonable cost to the taxpayers of Missouri.

MPERS' Core Values

Our members are our number one focus; we work for them.

Our goal is to provide exceptional service ***always;*** no matter who is on the phone or sitting across from us.

We strive to preserve, protect, and grow our assets.

We are committed to the security and privacy of our members' information.

We make decisions in the best interest of our members based upon statutory guidance.

We conduct business at a reasonable cost to the taxpayers of Missouri.

Photo courtesy of the Missouri State Highway Patrol

Table of Contents

Notes

COOPERATION

INTRODUCTORY SECTION

The process of working together for a common purpose.

Core Value

Our members are our number one focus; we work for them.

MoDOT & Patrol Employees' Retirement System

November 11, 2020

To the Board of Trustees and System Members:

We are pleased to provide this Comprehensive Annual Financial Report (CAFR), of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS), for the fiscal year ending June 30, 2020. This report is intended to provide MPERS' stakeholders with a thorough review of the System's operations for the past fiscal year. The material presented in this report has been prepared in a manner intended to be useful and informative to MPERS' members, the management of the Missouri Department of Transportation (MoDOT) and the Missouri State Highway Patrol (MSHP), and the elected officials of the state of Missouri.

MPERS is a defined benefit pension plan designed to be a valuable employee recruitment and retention tool for covered employers. It provides lifetime retirement benefits to eligible MoDOT and MSHP employees. The monthly retirement and survivor benefits provided by MPERS are a valuable source of retirement income for the members we serve. These benefits, when combined with social security and personal savings, provide the basic foundation for our members to leave the workforce and enjoy their retirement years with the dignity they deserve.

The average monthly benefit of a new MPERS retiree in Fiscal Year 2020 retiring directly from active employment was $2,524, which equates to $30,288 per year. Given the increasing cost of living, this amount alone will not provide a life of luxury for the retiree. However, this monthly benefit and those provided by other traditional pension plans have a significant impact that reaches beyond the retirees served. Over the past 10 years alone, MPERS has paid over $2.39 billion in benefit payments to its members. Nearly 95% of these retirees and beneficiaries reside in Missouri, reinvesting their retirement dollars in housing, goods, and services. This reinvestment improves the local economy which in turn, helps to fuel the state's overall economy. The result is that defined benefit pensions have a long-term positive impact on our economy and the lives of our members.

Report Contents and Structure:
This CAFR is designed to comply with the statutory reporting requirements stipulated in sections 104.190, 104.1006, and 105.661 of the Missouri Revised Statutes (RSMo), as amended.

To the best of our knowledge, the information presented is accurate in all material respects and is reported in a manner designed to fairly represent the financial position of the fund. Some amounts included in the financial statements and elsewhere may be based on estimates and judgments. These estimates and judgments are products of best business practices. The accounting policies followed in preparing the basic financial statements conform with U.S. generally accepted accounting principles. Financial information presented throughout the CAFR is consistent with information displayed in the basic financial statements.

The MPERS Board of Trustees (Board) is ultimately responsible for the CAFR and the basic financial statements. MPERS' executive director and staff prepare the information contained in the CAFR and the financial statements to assist the Board in fulfilling its statutory duty.

Office Location: 1913 William St., Jefferson City, MO 65109 • **Mailing Address:** Post Office Box 1930, Jefferson City, MO 65102-1930
Telephone Number: (573) 298-6080 • **Toll Free:** 1-800-270-1271 • **Fax:** (573) 522-6111
Website: www.mpers.org • **E-Mail:** mpers@mpers.org

Systems of internal controls and supporting procedures are maintained to provide assurances that transactions are authorized, assets are safeguarded and proper records are maintained. These controls include standards in the hiring and training of employees, the establishment of an organizational structure, and the communication of policies and guidelines throughout the organization. Inherent limitations exist in all control systems. No evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud have been detected. The objective of internal controls is to provide reasonable assurance the financial statements are free of any material misstatements, recognizing that the cost of a control should not exceed the benefits to be derived.

In accordance with section 104.190 RSMo, an independent auditing firm, Williams-Keepers, LLC, has audited the financial statements included in this report and has issued an unmodified opinion (i.e., no audit concerns relating to MPERS' financial statements). The opinion letter of Williams-Keepers, LLC is presented in the "Financial Section" of this CAFR. "Management's Discussion and Analysis" immediately follows the "Independent Auditors' Report" and provides a narrative introduction, overview, and analysis of the basic financial statements.

Background Information:
MPERS was established by Senate Bill 66 in the 68th General Assembly. In accordance with this legislation, employees of MoDOT and the MSHP became members of the retirement system on September 1, 1955. Effective October 1, 1955, the System accepted 109 retirements. Employees of MPERS became members of the system after passage of Senate Bill 371 in 2001.

The plan provisions have changed many times over the years. The System offers not only enhanced retirement and disability benefits, but also benefits for survivors of active and retired members, benefits for vested former members, and death benefits.

MPERS 11-member board is responsible for the oversight of the System. The trustees serve as fiduciaries to the members and are responsible for selecting and retaining competent management. The trustees and management jointly establish sound policies and objectives, monitor operations for compliance, and oversee performance.

MPERS is considered a component unit of the state of Missouri for financial reporting purposes and, as such, the financial statements in this report are also included in the State of Missouri's Comprehensive Annual Financial Report.

Fiscal Year 2020 Highlights:
MPERS staff is committed to maintaining a superior level of service to its primary "customers"—members, retirees, survivors, and other beneficiaries. MPERS' customers have come to expect prompt, tailored, courteous, personalized, and professional service; timely payments made in compliance with the law; accurate and transparent communications; and timely, relevant information and education. That same resolve on the part of MPERS' staff was not diminished when presented with the unprecedented circumstances of the COVID-19 pandemic.

Over the years, MPERS has given due consideration to the importance of disaster recovery and business continuity exercises. Acknowledging the need for both a disaster recovery plan and business continuity drills, it was understood that the unimaginable was possible, but the general focus was on the more obvious risks: fires or tornadoes. It was also expected that working remotely would be an important aspect to the continuity of operations but here again, the expectation contemplated a short-term need of a few weeks rather than many months. The amount of time and effort that was put into these exercises seemed excessive given the low probability of anything significant actually occurring. The events of the last fiscal year demonstrate the work, forethought, and exercises were all worthwhile. The unprecedented occurred and the MPERS team rose to the occasion. Not a payment was missed or delayed and our service to our customers continues at the time of this writing. It should be noted that our interaction with customers and others has changed significantly. The virtual meeting has become common and will likely remain a fundamental component of our services going forward. Essentially, one day we were in the office and the next day we were working from home. If it were not for the fact that our members were unable to meet with us in person, I do not think anyone would have known we were not physically in the office. This positive experience is a result of sound planning and dedicated staff. Without a staff that is committed to successful service and managed risk, this experience would have been something less than what it has actually been.

Halfway through the year, Greg Beck, Assistant Executive Director at MPERS, retired. Greg was a relatively short-tenured MPERS team member but he came with a specific purpose – risk management. Greg was a career internal auditor, an accomplished and highly credentialed internal auditor. MPERS needed the focus of an auditor to expand risk management efforts in order to be good stewards of the operation. In just a few short years, Greg established a solid enterprise risk management (ERM) platform that will address key risk management concerns of the System into the future.

Following Mr. Beck's retirement, the duties of General Counsel and the Assistant Executive Director were combined. Admittedly, this may seem like an unexpected combination, but it is not when you consider the individual that assumed the role. Greta Bassett-Seymour came to us more than six years ago from private sector law practice as our General Counsel and has transitioned into this dual role by not only covering our legal needs, but also providing strong support for staff and the organization in a management role.We are taking advantage of the specialized skillsets throughout the office to make our operation more efficient and to address pressing staff needs. The consolidation of the two aforementioned roles has allowed us to take a part-time accounting specialist and make it into a full-time assistant chief financial officer. This position is important for succession planning purposes as well as to address expanded financial reporting requirements that have come about in the past few years. We also hope to fill a position in the near future to address investment operation needs that have also seen considerable expansion over the last several years. These moves are important for the continued forward progress of MPERS and come with payroll savings to boot.

The MPERS staff is comprised of dedicated, positive, success-oriented individuals. Nonetheless, it has been acknowledged that for a staff to continue to grow and improve it is important to provide training and interaction that supports perpetual professional development. It is also important to address communication challenges that are typically present within most organizations. As a result, the MPERS team has begun receiving regular training sessions and weekly insights from a newer team member with a background in Industrial/Organizational Psychology. Routine training and group exercises are intended to improve communication, enhance teamwork, and generally advance the conditions of the work environment and delivery of service. This focus is intended to move MPERS successfully into the future.

The pandemic environment limited the legislative process for the year and produced just one bill relevant to MPERS. SB 1024 included provisions that allow eligible retirees to modify previously elected spousal payment options to a single life annuity.

Lastly, the Board of Trustees periodically completes what is called an asset/liability study. In short, the purpose of this study is to identify investment portfolios that are most likely to meet the System's expected future spending needs while minimizing the risk that those needs will not be met. Something that has not been apparent in past studies that was clearly evident this time was the material funding progress of the System. The Board's aggressive funding policies have worked and are now providing a glimpse of funding relief that has not been conceivable in the past. The recent market environment has challenged that reality but MPERS is well positioned to weather this recent storm and continue the critical path of progress to support the benefits covered members have worked so hard to earn. Maintaining these important policies is essential to the long-term success of the plan.

Actuarial Funding Status:
MPERS' funding objective is to meet future benefit obligations of retirees and beneficiaries through investment earnings and payroll contributions that remain approximately level from generation to generation. Historical information relating to this objective is presented in the "Schedule of Funding Progress" in the "Actuarial Section" of this report. During the fiscal year ending June 30, 2020, the funded status of MPERS, which covers 18,660 participants, increased by 0.82% to 60.64%.

Each year an independent actuarial firm conducts a valuation study to determine the actuarial soundness of the Plan, based on its long-term obligations and the sufficiency of current contribution levels to fund the liabilities over a reasonable timeframe. In MPERS' most recent valuation dated June 30, 2020, the actuary concluded that the System continues to be financed in accordance with actuarial standards using the level percent of payroll financing method. The actuary's conclusion is based upon the fact that the employers are contributing to the System according to actuarially determined rates and presumes the continuation of payment of actuarially determined contributions. Additional information regarding the financial condition of the System can be found in the "Actuarial Section" of this report.

In an effort to address the System's underfunding situation, the Board has modified the actuarial funding policies over the course of the past 13 years. In September 2006, the Board adopted a permanent funding policy that was intended to improve MPERS' funded status over a shorter timeframe.

The permanent funding policy states the following:

- The total contribution is based on the Plan's normal cost with a 29-year amortization period for MPERS' unfunded actuarial accrued liabilities. The financing period is a closed period that started July 1, 2007.

On September 17, 2009, after the Great Recession, the Board adopted the following temporary accelerated funding policy:

- The total contribution is based on the Plan's normal cost with a 15-year amortization period for unfunded retiree liabilities and a 30-year amortization period for other unfunded liabilities. Both amortization periods are closed periods that started July 1, 2010.
- The temporary accelerated funding policy will remain in effect until such time as the retiree liability becomes 100% funded or the permanent funding policy produces a higher contribution rate.

On September 24, 2014, the Board adopted a Rate Stabilization Reserve Fund intended to further reinforce the aggressive funding polices noted in the temporary policy above. The reserve fund was developed by maintaining employer contribution rates at present levels by applying investment gains to the reserve fund rather than decreasing employer contribution rates. When actuarial losses are experienced the reserve fund would be used first rather than increasing employer contribution rates. The reserve fund provides a smoothing of the overall experience that further decreases the potential volatility of contributions for covered employers.

As of June 30, 2020, the permanent funding policy is at a closed amortization period of 16 years and the temporary accelerated funding policy is at a closed amortization period of 5 years for unfunded retiree liabilities and 20 years for other unfunded liabilities.

Investment Activities:

State statutes and other applicable laws require the fiduciaries of the System to make investments using the same care, skill, and diligence that prudent investors acting in a similar capacity would use. In fulfilling this obligation, the Board has established a formal investment policy to clearly define the roles and responsibilities of the Board, staff and consultants, and to ensure that System assets are invested in a diversified portfolio following prudent investment standards. The Board determines the broad asset allocation policies and return objectives of the Plan. To implement and execute these policies, the Board has retained investment staff, consultants, a master custodian, and other advisors.

As of June 30, 2020, MPERS' investment portfolio had a total fair value of $2.35 billion, representing a return of negative 0.46% for the fiscal year. While MPERS' longer-term returns remain good, it was a difficult year for the portfolio. Relative to MPERS' peer group, which is the InvestorForce Public Fund Universe, the negative 0.46% return for Fiscal Year 2020 ranked MPERS in the 95th percentile. The trailing three- and five-year performance of 5.18% and 5.51%, respectively, ranks MPERS in the 71% and 70%, respectively, of the peer group. The trailing 10-year performance of 8.8% ranks MPERS in the top 21% of the peer group.

Awards:
The GFOA awarded a Certificate of Achievement for Excellence in Financial Reporting to MPERS for its Fiscal Year 2019 CAFR. MPERS has achieved this prestigious award each year since Fiscal Year 2005. 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 CAFR. This report must satisfy both generally accepted accounting principles and applicable legal and GFOA reporting requirements.

A Certificate of Achievement is valid for a period of one year. We believe that our current CAFR continues to meet the program's requirements, and therefore, we are submitting this report to GFOA to determine its eligibility for another certificate.

MPERS also received the Public Pension Coordinating Council's (PPCC) Public Pension Standards Award in recognition of meeting professional standards for plan design and administration. MPERS has received the Council's award each year since 2004. his award is presented by the PPCC, a confederation of the National Association of State Retirement Administrators, the National Conference on Public Employee Retirement Systems, and the National Council on Teacher Retirement. MPERS' staff and Board is pleased to receive these prestigious awards for financial and professional standards of excellence and may be viewed after this transmittal letter.

Acknowledgements and Distribution:
This report, a product of the combined efforts of MPERS' staff and advisors, is intended to provide comprehensive and reliable information about the System, to demonstrate compliance with legal provisions, and to allow for the evaluation of responsible stewardship of the System's funds.

This report is provided to the governor, the state auditor, and the Joint Committee on Public Employee Retirement. It is also distributed electronically to all MoDOT divisions, district offices, MSHP general headquarters, and troop headquarters. These offices form the link between MPERS and its members, and their cooperation contributes significantly to the success of MPERS. We hope all readers of this report find it informative and useful. An electronic version of this report is available on the MPERS website at www.mpers.org/annual-reports.

We express our gratitude to the members of the Board, the staff, the consultants, and the many people who have worked so diligently to assure the continued successful operation of MPERS. The steady, monthly benefit payments offered by defined benefit plans, like MPERS, provide peace of mind and security for retirees and their families. For over 60 years, MPERS has been committed to providing a foundation for financial security to plan participants through the delivery of quality benefits, exceptional member service and professional plan administration.

Respectfully submitted,

Scott Simon
Executive Director

William "Bill" Seibert
Board Chair

Government Finance Officers Association

Certificate of
Achievement
for Excellence
in Financial
Reporting

Presented to

**Missouri Department of Transportation
and Highway Patrol Employees'
Retirement System**

For its Comprehensive Annual
Financial Report
For the Fiscal Year Ended

June 30, 2019

Christopher P. Morrill

Executive Director/CEO

Public Pension Coordinating Council

***Public Pension Standards Award
For Funding and Administration
2020***

Presented to

MoDOT & Patrol Employees' Retirement System

In recognition of meeting professional standards for
plan funding and administration as
set forth in the Public Pension Standards.

Presented by the Public Pension Coordinating Council, a confederation of

National Association of State Retirement Administrators (NASRA)
National Conference on Public Employee Retirement Systems (NCPERS)
National Council on Teacher Retirement (NCTR)

Alan H. Winkle

Alan H. Winkle
Program Administrator

Board of Trustees

MPERS is governed by an eleven-member Board of Trustees, as set out in section 104.160 of the Missouri Revised Statutes. Board members as of June 30, 2020:

William “Bill” Seibert

Board Chair
MSHP Retiree
Representative

Elected by Retired
Members of MSHP

Todd Tyler

Board Vice Chair
MoDOT Employee
Representative

Elected by MoDOT Employees

Senator Mike Bernskoetter

State Senator

District 6
Appointed by
President Pro-Tem
of the Senate

Robert "Bob" Brinkmann

Commission Member

Highways & Transportation
Commissioner

John Briscoe

Commission Member

Highways & Transportation
Commissioner

Sergeant Matt Broniec

**MSHP Employee
Representative**

Elected by MSHP Employees

Sue Cox

**MoDOT Retiree
Representative**

Elected by Retired
Members of MoDOT

Patrick McKenna

**Director of the Missouri
Department of
Transportation**

Ex-Officio Member

Colonel Eric Olson

**Superintendent
of the Missouri
State Highway Patrol**

Ex-Officio Member

Gregg Smith

Commission Member

Highways & Transportation
Commissioner

Representative Sara Walsh

State Representative

District 50
Appointed by
Speaker of the House

MPERS
Serving those who keep us safe.

Administrative Organization

The executive director of MPERS has charge of the offices and records of the System and hires such employees deemed necessary, subject to the approval of the Board of Trustees. The System employs seventeen full-time staff.

Board of Trustees

Scott Simon
Executive Director

Barbara Graessle
Senior Administrative Assistant

Lois Wankum
Senior Executive Assistant

Investments
Larry Krummen
Chief Investment Officer

- **Jennifer Johnson** — *Manager-Hedge Funds and Private Equity*
- **Bobby Hagedorn** — *Manager-Real Assets and Credit*
- **Tinisha Eickhoff** — *Manager-Investment Risk and Operations*

Financial Services
Jennifer Even
Chief Financial Officer

- **Lindsey Harris-Funk** — *Assistant Chief Financial Officer*

Member & Legal Services
Greta Bassett-Seymour
Assistant Executive Director and General Counsel

- **Mary Jordan** — *Senior Benefit Specialist*
- **Gabrielle Lewis** — *Benefit Specialist*
- **Julie West** — *Communications Specialist*
- **Bev Wilson** — *Benefit Audit Specialist*
  - **Angel Backes** — *Senior Account Technician*
  - **Tammy Kroll** — *Senior Account Technician*
  - **Leigh Love** — *Senior Account Technician*

Executive Team:
Larry Krummen–Chief Investment Officer
Jennifer Even–Chief Financial Officer
Scott Simon–Executive Director
Greta Bassett-Seymour–Assistant Executive Director and General Counsel

Administrative Organization

Director's Office

The Director's Office staff provides executive oversight for the System which includes, but is not limited, to administrative support in the areas of legislation, stakeholder communications, operations, benefits, risk management, and investments. The Director's Office is also responsible for providing the Board with information and reports on the activities of the System.

Financial Services

The Financial Services section is responsible for maintaining all the financial records of MPERS. The Financial Services section interacts with the investment custodian, the auditors, the depository bank, the Missouri Department of Revenue, and the Internal Revenue Service. In addition, they assist the Investments section in tracking and predicting target cash balances, participate in annual budget development, prepare monthly budget-to-actual reports, and calculate monthly premium payments to the long-term disability insurer. The Financial Services section also processes MPERS' semi-monthly office payroll, reconciles monthly benefit payments and contributions/payrolls posted, and reconciles investment activity.

Investments

The Investments section staff works closely with the general investment consultant to manage the investment portfolio and provide consulting services to the Board and the executive director. This includes, but is not limited to: (a) formulating investment policy and asset recommendations, (b) sourcing, selecting, monitoring, and evaluating external investment advisors, (c) measuring and reporting investment performance, (d) conducting market research on political, financial, and economic developments that may affect the System, and (e) serving as a liaison to the investment community.

Legal Services

The Legal Services section advises the executive director and Board on legal matters, reviews and approves investment and other contracts for MPERS, advises staff on the application of state and federal statutes affecting the administration of plan benefits, responds to requests from members and their attorneys related to plan benefits, engages in or oversees litigation affecting MPERS, and assists in developing policies, rules, and legislation impacting MPERS' operations or the administration of plan benefits

Member Services

The Member Services section consists of two units devoted to serving member needs.

The Benefits Unit is responsible for contact with the membership regarding the benefit programs administered by MPERS, which include retirement and disability. The benefits staff is responsible for preparing and delivering the pre-retirement and benefit basics seminars in addition to assisting with the development of member communication material. The benefits staff is the main point of contact with members who have questions about their retirement.

The Payroll Unit is responsible for establishing and maintaining all membership records including: (a) maintaining member data in the pension administration system, (b) verifying retirement calculations, (c) balancing payroll deductions, (d) verifying SAMII data against exception reports, and (e) entering payroll, service, and leave data into the System's computerized database. Payroll Unit staff will also create and publish communication materials, assist with pre-retirement seminars, provide data to the actuary, as well as review member records for accuracy and completeness.

Professional Services

Actuary

•Gabriel, Roeder, Smith & Company

Auditor

•Williams-Keepers, LLC

Investment General Consultant

•NEPC

Information Technology

•Levi, Ray & Shoup, Inc.
•Midwest Computech, Inc.

Legislative Consultant

•Michael G. Winter Consultants, LLC

Master Trustee/Custodian

•The Northern Trust Company

Risk Management/Insurance Consultant

•Charlesworth Benefits

Long-Term Disability Insurer

•The Standard Insurance Company

Investment Managers

•Aberdeen Asset Management
•ABRY Partners
•Acadian Asset Management
•AEW Partners
•Aisling Capital
•Albourne America
•Alpstone Capital
•Alyeska Investment Group
•American Infrastructure MLP
•American Timberlands Company
•Anchorage Capital Group
•Apollo Aviation Group
•Ares Management
•Arrowroot Capital
•Audax Group
•Banner Ridge Partners
•Blackstone
•Blue Road Capital
•Bridgewater Associates
•Capital Partners
•CarVal Investors (CVI)
•CatchMark Timber
•CBRE Investors
•Cevian Capital Limited
•CenterSquare Investment Management
•CIM Group
•Clarion Partners
•Colony Capital
•Corrum Capital
•DC Capital
•Deephaven Capital Management
•Drive Capital
•Dyal Capital Partners
•EIF Management
•Energy & Mineral Group
•Francisco Partners
•Golden Sciens Marine Investments
•Golub Capital
•Grey Rock Energy Partners
•Grove Street Advisors
•GSO Capital Partners
•Indus Capital
•Kennedy Capital
•KPS Capital Partners
•Long Ridge Equity Partners
•Longford Capital Management
•Luxor Capital
•M&G Investments
•MGG Investment Group
•MKH Land Company
•MiraVast
•Metacapital Management
•Millennium Management
•Monomoy Capital Partners
•Natural Gas Partners
•Ned Davis
•NewQuest Capital Partners
•New Mountain Capital
•Nexus Capital Management
•Northern Shipping
•Oak Street Real Estate Capital
•OCP Asia
•Opengate Capital Partners
•Orion Mine Finance Group
•Octagon Credit Investors
•Owl Rock Capital Partners
•Parametric
•Pentwater
•Pfingsten Partners
•Principal Global Investors
•Quantum Energy Partners
•Ridgewood Energy
•Riverstone Credit Partners
•Sculptor Real Estate
•Shore Capital Partners
•Shoreline Capital
•Sigular Guff and Company
•Silchester International Investors Limited
•Silver Point Capital
•Stark Investments (Shepherd)
•Stockdale Capital Partners
•Systematica Investments
•Timberland Investment Resources
•Torchlight Investors
•Tristan Capital Partners
•Turnbridge Capital Partners
•ValueAct Capital
•Varde Asia
•Vectis Healthcare

Notes

FINANCIAL SECTION

The quality or state of being accountable.

Core Value

We conduct business at a reasonable cost to the taxpayers of Missouri.

ACCOUNTABILITY

WILLIAMS KEEPERS LLC
CERTIFIED PUBLIC ACCOUNTANTS & CONSULTANTS

2005 West Broadway, Suite 100, Columbia, MO 65203
OFFICE (573) 442-6171 FAX (573) 777-7800
3220 West Edgewood, Suite E, Jefferson City, MO 65109
OFFICE (573) 635-6196 FAX (573) 644-7240
www.williamskeepers.com

INDEPENDENT AUDITORS' REPORT

The Board of Trustees
Missouri Department of Transportation and
Highway Patrol Employees' Retirement System

Report on the Financial Statements

We have audited the accompanying statement of fiduciary net position of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (the System), as of June 30, 2020, and the related statement of changes in fiduciary net position for the year then ended, and the related notes to the financial statements, which collectively comprise the System's basic 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 U.S. generally accepted accounting principles; 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.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with U.S. generally accepted auditing standards. 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 System'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 System'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.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the System at June 30, 2020, and the changes in fiduciary net position for the year then ended, in conformity with U.S. generally accepted accounting principles.

Other Matters

Required Supplementary Information

U.S. generally accepted accounting principles require that the management's discussion and analysis on pages 3 through 6 and the schedules of changes in the employers' net pension liability, employers' contributions, investment returns, changes in net OPEB liability and related ratios, MPERS' proportionate share of net OPEB liability, and related notes on pages 29 through 32 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 U.S. generally accepted auditing standards, 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 the System's basic financial statements. The additional information presented on pages 33 through 35 are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The additional information is the responsibility of management and was derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. The additional 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 U.S. generally accepted auditing standards. In our opinion, the additional information presented on pages 33 through 35 is fairly stated in all material respects in relation to the basic financial statements as a whole.

Williams-Keepers LLC

November 10, 2020

Management's Discussion and Analysis

The management of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (the System, or MPERS) provides this discussion and analysis of the System's financial performance for the fiscal year ended June 30, 2020. While this discussion is intended to summarize the financial status of MPERS, readers should consider this information in conjunction with the information that is furnished in the more detailed financial statements and corresponding notes.

DESCRIPTION OF BASIC FINANCIAL STATEMENTS

As required by the Governmental Accounting Standards Board (GASB) accounting standards, this financial report consists of Management's Discussion and Analysis (this section), the basic financial statements (including notes to the basic financial statements), and other required supplementary information.

Financial Statements report information about MPERS, using accounting methods similar to those used by private-sector companies, by using the economic resources measurement focus and accrual basis of accounting. These statements provide both long-term and short-term information about the System's overall financial status. These statements follow this Management's Discussion and Analysis section:

- The *Statement of Fiduciary Net Position* includes all the System's assets and deferred outflows of resources, and liabilities and deferred inflows of resources, with the difference reported as net position.
- The *Statement of Changes in Fiduciary Net Position* accounts for all the current year's additions (income) and deductions (expenses), regardless of when cash is received or paid.

Notes to the Financial Statements are included following the financial statements. The notes to the financial statements provide additional information that is essential for a full understanding of the data provided in the financial statements.

Required Supplementary Information follows the notes and further supports the information in the financial statements.

Supplementary Information follows the required supplementary information and provides additional detailed administrative and investment expense information.

ANALYSIS OF FINANCIAL POSITION AND RESULTS OF OPERATIONS

Overall, the financial position of MPERS declined by $61.7 million, reported as the "net decrease". This is primarily a result of the decrease in the fair value of investments for the year ended June 30, 2020. However, even with this decrease, the funded status of the plan showed an increase of 0.82%, primarily due to actuarial gains and MPERS' contribution stabilization reserve fund.

The following schedules present summarized comparative data from the System's financial statements for each of the fiscal years ended June 30, 2020 and 2019. Following each schedule is a brief summary providing explanation and analyses of the major reasons for changes in the condensed financial statements.

Summarized Comparative Statements of Fiduciary Net Position

	As of June 30, 2020	As of June 30, 2019	% Change 2020/2019
Cash and Receivables	$ 19,630,328	$ 19,474,188	0.8
Investments	2,352,666,839	2,419,349,739	-2.8
Invested Securities Lending Collateral	108,567,739	104,247,159	4.1
Capital Assets	321,676	569,044	-43.5
Total Assets	**2,481,186,582**	**2,543,640,130**	**-2.5**
Deferred Outflows of Resources	**31,054**	**32,014**	**-3.0**
Accounts Payable	2,868,289	7,708,336	-62.8
OPEB Obligation	1,552,393	1,538,442	0.9
Securities Lending Collateral	114,948,267	110,924,432	3.6
Total Liabilities	**119,368,949**	**120,171,210**	**-0.7**
Deferred Inflows of Resources	**248,799**	**239,104**	**4.1**
Net Position Restricted for Pensions	**$ 2,361,599,888**	**$ 2,423,261,830**	**-2.5**

The increase in cash and receivables is primarily attributable to an increase of investment sales receivable as of June 30, 2020. Fluctuations in this area are normal, based on investment activity.

The System's investments represent the main component of total assets. These investments include equities, fixed income, limited partnerships, hedge funds, and short-term investments. The decrease in fair value of investments as of June 30, 2020 is due to unfavorable market conditions experienced during the fiscal year. The volatile markets were a result of the global pandemic. The fiscal year 2020 investment return was negative 0.46% as calculated on a time-weighted rate of return methodology.

Capital assets decreased in fiscal year 2020 due to the depreciation of existing assets.

Deferred outflows of resources is related to Other Post-Employment Benefits (OPEB), required by Governmental Accounting Standards Board (GASB) Statement 75. The deferred outflows of resources relate to the timing of contributions paid.

The decrease in accounts payable for fiscal year 2020 is primarily attributable to lower investment purchases payable. Fluctuations in this area are normal, based on investment activity.

The largest component of liabilities is securities lending collateral. This represents the amount owed for collateral to be returned as the result of investment securities lent. The increase in securities lending collateral liability from fiscal year 2019 to fiscal year 2020 is due to more securities being utilized for lending. The corresponding securities lending collateral asset is valued at a lower amount than the securities lending collateral liability due to the fair value of the securities on loan being less than the collateral value.

Deferred inflows of resources is related to OPEB. The deferred inflows of resources relate primarily to the amortization of changes in actuarial assumptions.

The System's net position restricted for pensions was $2.362 billion at June 30, 2020, a $61.7 million decrease from the $2.423 billion net position at June 30, 2019.

Summarized Comparative Statements of Changes in Fiduciary Net Position

	Year Ended June 30, 2020	Year Ended June 30, 2019	% Change 2020 / 2019
Contributions	$ 220,902,777	$ 218,595,641	1.1
Net Investment (Loss) Income	(10,673,270)	154,326,511	-106.9
Other Income	5,412	307	1,662.9
Total Additions	**210,234,919**	**372,922,459**	**- 43.6**
Benefits	267,605,833	259,817,811	3.0
Administrative Expenses	4,291,028	4,372,966	-1.9
Total Deductions	**271,896,861**	**264,190,777**	**2.9**
Net (Decrease) Increase	(61,661,942)	108,731,682	-156.7
Net Position-Beginning	2,423,261,830	2,314,530,148	4.7
Net Position-Ending	**$ 2,361,599,888**	**$ 2,423,261,830**	**-2.5**

Net investment income, a primary component of plan additions, was negative $10.7 million for fiscal year 2020, which represented a negative 0.46% return for the fiscal year ended June 30, 2020. In comparison, the fiscal year 2019 gain of $154.3 million represented an investment return of 6.84%. Annual fluctuations within the broad investment markets are outside the control of the System and are expected to fluctuate from year to year; however, volatility in the markets due to the global pandemic resulted in a decrease in net investment income for fiscal year 2020. The Board of Trustees has approved a diversified asset allocation that, over long periods of time, is expected to realize the assumed actuarial rate of investment return of 7.00%.

Total benefits increased $7.8 million from 2019 to 2020. Benefits in 2020 increased due to an increase in the total number of retirees.

Administrative expenses were lower due to a decrease in building expenses incurred in 2019, and lower contracted expenses in the information technology category for 2020.

CURRENTLY KNOWN FACTS AND RECENT EVENTS

Based on the June 30, 2020 actuarial valuation, the Board of Trustees approved no change in the required state contribution rate, effective July 1, 2021. The rate applied to both non-uniformed payroll (MoDOT, civilian patrol, and MPERS) and uniformed patrol payroll remains at 58.00%.

Based on the June 30, 2019 actuarial valuation, the Board of Trustees approved no change in the required state contribution rate, effective July 1, 2020. The rate applied to both non-uniformed payroll (MoDOT, civilian patrol, and MPERS) and uniformed patrol payroll remains at 58.00%.

CONTACTING THE RETIREMENT SYSTEM'S MANAGEMENT

This financial report is designed to provide a general overview of the System's finances. Questions about this report or requests for additional financial information should be sent to:

MoDOT and Patrol Employees' Retirement System
PO Box 1930
Jefferson City, MO 65102-1930
mpers@mpers.org

Statement of Fiduciary Net Position

As of June 30, 2020

ASSETS:	
Cash	$ 617,479
Receivables	
Contributions	8,040,951
Accrued Interest and Income	5,695,747
Investment Sales	5,276,151
Total Receivables	19,012,849
Investments, at Fair Value	
Equities	308,896,711
Fixed Income	688,908,574
Limited Partnerships	998,139,973
Hedge Funds	109,891,158
Short-Term Investments	246,830,423
Total Investments	2,352,666,839
Invested Securities Lending Collateral	108,567,739
Capital Assets, Net of Depreciation	
Land	84,000
Building and Improvements	581,619
Furniture, Equipment and Software	3,430,652
Accumulated Depreciation	(3,774,595)
Capital Assets, net of Depreciation	321,676
TOTAL ASSETS	**$ 2,481,186,582**
DEFERRED OUTFLOWS OF RESOURCES	**$ 31,054**
LIABILITIES:	
Accounts Payable	$ 1,193,160
OPEB Obligation	1,552,393
Security Lending Collateral	114,948,267
Investment Purchases	1,675,129
TOTAL LIABILITIES	**$ 119,368,949**
DEFERRED INFLOWS OF RESOURCES	**$ 248,799**
NET POSITION RESTRICTED FOR PENSIONS	**$ 2,361,599,888**

See accompanying Notes to the Financial Statements.

Statement of Changes in Fiduciary Net Position

For the Year Ended June 30, 2020

ADDITIONS:	
Contributions-Employer	$ 210,871,852
Contributions-Employee	4,983,989
Contributions-Service Transfers from Other System	3,483,574
Contributions-Other	1,563,362
Total Contributions	220,902,777
Investment Income from Investing Activities	
Net Depreciation in Fair Value of Investments	(51,157,620)
Interest and Dividends	61,989,636
Less: Investment Expenses	21,698,678
Net Investment Loss	(10,866,662)
Income from Securities Lending Activities	
Securities Lending Gross Income	733,597
Less: Securities Lending Expenses, net	540,205
Net Income from Securities Lending Activities	193,392
Other Income	5,412
TOTAL ADDITIONS	**$ 210,234,919**
DEDUCTIONS:	
Benefits Expenses	
Retiree and Survivor Annuity Benefits	$ 245,194,376
BackDROP Payments	15,787,033
Disability Benefits	2,480,372
Death Benefits	890,000
Service Transfer Payments	2,457,945
Employee Contribution Refunds	796,107
Administrative Expenses	4,291,028
TOTAL DEDUCTIONS	**$ 271,896,861**
NET DECREASE	$ (61,661,942)
NET POSITION RESTRICTED FOR PENSIONS	
Beginning of Year	**$ 2,423,261,830**
End of Year	**$ 2,361,599,888**

See accompanying Notes to the Financial Statements.

NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

As established under Section 104.020 of the Revised Statutes of Missouri (RSMo.), the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS) is a body corporate and an instrumentality of the State of Missouri (State). Due to the nature of MPERS' reliance on funding from the Missouri Department of Transportation (MoDOT) and the Missouri State Highway Patrol (MSHP) and control of the overall plan document by the legislative and executive branches of state government, MPERS is considered a part of the State of Missouri financial reporting entity and is included in the State's financial reports as a component unit shown as a pension trust fund.

Note 1 (a) - Basis of Accounting

The financial statements were prepared using the accrual basis of accounting. Contributions are due to MPERS when employee services have been performed. Contributions are recognized as revenues when due, pursuant to statutory requirements. Benefits are recognized when due and payable and expenses are recorded when the corresponding obligations are incurred. Dividend income is recognized when dividends are declared. Interest income is recognized when earned.

Note 1 (b) - Method Used to Value Investments

Investments are reported at fair value on a trade date basis. Bonds and stocks traded on a national or international exchange are valued at the reported sales price at current exchange rates. Mortgages are valued on the basis of future principal and interest payments and are discounted at prevailing interest rates for similar instruments. The fair value of real estate and timber investments are based on net asset value estimates provided by the general partners' administrators or portfolio managers, which are compared to independent appraisals. Investments that do not have an established market are reported at estimated fair value. The fair value of the hedge fund portfolios and partnership portfolios are based on valuations of the underlying assets as reported by the general partner or portfolio manager.

Note 1 (c) - Net Investment in Capital Assets

MPERS capitalizes assets with an expected useful life greater than one year and a cost greater than $5,000. Capital assets are depreciated on the straight-line method over the estimated useful lives of the related assets. The estimated useful lives are as follows:

Furniture, Equipment and Software	3-10 years
Building and Improvements	30 years

Note 1 (d) - Use of 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 reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

NOTE 2 – PLAN DESCRIPTIONS AND CONTRIBUTION INFORMATION

MPERS is a body corporate and an instrumentality of the state as a multiple-employer, public employee retirement system with one plan that has three benefit structures known as the Closed Plan, the Year 2000 Plan, and the Year 2000 Plan-2011 Tier. The plan provides retirement, survivor, and disability benefits for employees of MoDOT, MSHP, and MPERS. The plan is administered in accordance with the requirements of a cost sharing, multiple-employer, public employee retirement plan under the Revised Statutes of Missouri. In MPERS are vested the powers and duties specified in sections 104.010 to 104.312, 104.601 to 104.805, and 104.1003 to 104.1093, 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 outlined pursuant to these sections. Responsibility for the operation and administration of the System is vested in the Board of Trustees, which consists of eleven members, four elected by the active and retired plan members, three Highway and Transportation Commissioners, a State Senator appointed by the President Pro-Tem of the Senate, a State Representative appointed by the Speaker of the House, and the MoDOT Director and MSHP Superintendent who serve as ex-officio members. Detailed information regarding contributions can be found in Note 5.

Generally, all covered employees hired before July 1, 2000, are eligible for membership in the Closed Plan. All covered employees hired on or after July 1, 2000, and before January 1, 2011, are eligible for membership in the Year 2000 Plan. All covered employees hired on or after January 1, 2011 are eligible for membership in the Year 2000 Plan's 2011 Tier.

Membership in the Closed Plan, Year 2000 Plan, and 2011 Tier As of June 30, 2020

	Closed	Year 2000	2011 Tier	Total
Retirees, Beneficiaries, and Disabilities				
Currently Receiving Benefits	4,936	4,271	19	9,226
Terminated Employees Entitled to				
But Not Yet Receiving Benefits	1,045	946	108	2,099
Active Employees				
Vested	1,953	2,199	951	5,103
Non-Vested	1	42	2,189	2,232
Total Membership	**7,935**	**7,458**	**3,267**	**18,660**

Closed Plan Description

Employees covered by the Closed Plan are fully vested for benefits upon receiving 5 years of creditable service. Under the Closed Plan, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:

- Age 65 with 4 or more years of creditable service (active);
- Age 65 with 5 or more years of creditable service (terminated & vested);
- Age 60 with 15 or more years of creditable service (active or terminated & vested); or
- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active or terminated & vested).

The following provisions apply for uniformed patrol members of the Closed Plan:

- Age 55 with 4 or more years of creditable service (active);
- Age 55 with 5 or more years of creditable service (terminated & vested);
- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active or terminated & vested); or
- Mandatory retirement at age 60 (active).
- All non-uniformed members may retire early, with reduced benefits, at age 55 with at least 10 years of creditable service.

The base benefit in the Closed Plan is equal to 1.6% multiplied by the final average pay multiplied by years of creditable service. For members of the uniformed patrol, the base benefit is calculated by applying the same formula, then multiplying the product by 1.333333.

Retired uniformed members will receive an additional benefit of $90 per month, plus cost-of-living adjustments (COLAs), until attainment of age 65. This payment, however, is reduced by any amount earned during gainful employment. This benefit is not available to uniformed members hired on or after January 1, 1995, or to vested deferred members.

For members employed prior to August 28, 1997, COLAs are provided annually based on 80% of the increase in the consumer price index for all urban consumers for the United States (CPI-U). The minimum rate is 4% and the maximum rate is 5%, until the cumulative amount of COLAs equals 65% of the original benefit. Thereafter, the 4% minimum rate is eliminated and the annual COLA rate will be equal to 80% of the increase in the CPI-U (annual maximum of 5%). For members employed on or after August 28, 1997, COLAs are provided annually based on 80% of the increase in the CPI-U, up to a maximum rate of 5%.

The BackDROP is a payment option that is available to eligible members upon retirement. This option provides for a benefit to be calculated as if the member elected to retire at a previous date. If the BackDROP is elected, the monthly benefit payable on the actual retirement date is based on the benefit that would have been received by the member had he/she left employment and retired on the BackDROP date. In addition, the member will receive a lump sum payment equal to 90% of the life income annuity amount the member would have received during the BackDROP period. This lump sum amount includes any COLAs and other benefit increases; also, credit will be received for the unused sick leave balance as of the date of retirement.

The life income annuity payment option (which contains no provision for survivorship) and the life income with 60 or 120 month guaranteed payment options are available to all members. Joint and 50% or 100% survivor options are available if married at the time of retirement. In the Closed Plan, the reduction for the joint & 100% survivor option is based on the difference between the age of the member and the survivor. There is no reduction for the joint and 50% survivor option.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse as beneficiary if:

- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect a payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving normal or work-related disability benefits, on or after September 28, 1985, are provided a $5,000 death benefit payable to designated beneficiaries.

Year 2000 Plan Description

Employees covered by the Year 2000 Plan are fully vested for benefits upon earning 5 years of creditable service. Under the Year 2000 Plan, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:

- Age 62 and with 5 or more years of creditable service (active or terminated & vested);
- “Rule of 80” – at least age 48 with sum of member’s age and service equaling 80 or more (active).

The following provisions apply for uniformed patrol members of the Year 2000 Plan:

- “Rule of 80” – at least age 48 with sum of member’s age and service equaling 80 or more (active);
- Mandatory retirement at age 60 (active only).

All members may retire early with reduced benefits at age 57 with at least 5 years of creditable service.

The base benefit in the Year 2000 Plan is equal to 1.7% multiplied by the final average pay multiplied by years of creditable service. Members retiring under the Rule of 80, and uniform patrol members retiring at the mandatory retirement age (currently 60), receive an additional temporary benefit until age 62. The temporary benefit is equivalent to 0.8% multiplied by final average pay multiplied by years of creditable service.

COLAs are provided annually based on 80% of the increase in the CPI-U, up to a maximum rate of 5%.

The BackDROP is a payment option that may be available to members upon retirement. This option provides for a monthly benefit to be calculated as if the member elected to retire at a previous date. If the BackDROP is elected, the monthly benefit payable on the actual retirement date is based on the benefit that would have been received by the member had he/she left employment and retired on the BackDROP date. In addition, the member will receive a lump sum payment equal to 90% of the life income annuity amount the member would have received during the BackDROP period. This lump sum amount includes any temporary benefits, COLAs and other benefit increases; also, credit will be received for the unused sick leave balance as of the date of retirement.

The life income annuity payment option (with no provision for survivorship) and the life income with 120 or 180 months guaranteed payment options are available to all members. Joint and 50% or 100% survivorship options are available if married at the time of retirement. The reduction for the joint and 50% or 100% survivor options is based on the member’s age at retirement, as well as the age difference between the member and the survivor.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse for survivor benefits if:

- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect the payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving work-related disability benefits, on or after July 1, 2000, are provided a $5,000 death benefit payable to designated beneficiaries.

Year 2000 Plan-2011 Tier Description

Employees covered by the 2011 Tier are fully vested for benefits upon earning 5 years of creditable service if they were active on or after January 1, 2018. Under the 2011 Tier, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:

- Age 67 and with 5 or more years of creditable service (active or terminated & vested);
- “Rule of 90” – at least age 55 with sum of member’s age and service equaling 90 or more (active only).

Active MoDOT and civilian employees may retire early with reduced benefits at age 62 with at least 5 years of creditable service.

The following provisions apply for uniformed patrol members of the 2011 Tier:

- Age 55 and with 5 or more years of creditable service (active only);
- Mandatory retirement at age 60 with no minimum service amount (active only).

Terminated and vested uniformed patrol employees may retire at age 67 with 5 or more years of creditable service.

The base benefit in the 2011 Tier is equal to 1.7% multiplied by the final average pay multiplied by years of creditable service. Members retiring under the Rule of 90, and uniform patrol members retiring at the mandatory retirement age (currently 60) or at age 55 with 5 years of creditable service, receive an additional temporary benefit until age 62. The temporary benefit is equivalent to 0.8% multiplied by final average pay multiplied by years of creditable service.

COLAs are provided annually based on 80% of the change in the CPI-U, up to a maximum rate of 5%.

The life income annuity payment option (with no provision for survivorship) and the life income with 120 or 180 months guaranteed payment options are available to all members. Joint and 50% or 100% survivorship options are available if married at the time of retirement. The reduction for the joint and 50% or 100% survivor options is based on the member’s age at retirement, as well as the age difference between the member and the survivor.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse for survivor benefits if:

- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect the payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving work-related disability benefits, on or after January 1, 2011, are provided a $5,000 death benefit payable to designated beneficiaries.

Contributions

Beginning January 1, 2011, employee contributions of 4% of gross pay are required for those covered by the Year 2000 Plan-2011 Tier.

Employer contributions are determined through annual actuarial valuations. Administrative expenses are financed through contributions from participating employers and investment earnings.

Participating employers are required to make contributions to the plan based on the actuarially determined rate. Detailed information regarding contributions can be found in Note 5.

NOTE 3 – DEPOSITS AND INVESTMENTS

The Board of Trustees has established policies and procedures by which funds are invested. Section 104.150, RSMo., provides the authority for the Board to invest MPERS funds. Plan assets are invested in a diversified portfolio following prudent standards for preservation of capital, with the goal of achieving the highest possible rate of return consistent with MPERS' tolerance for risk. The Board of Trustees establishes MPERS' asset allocation policy, and may amend the policy. The following is MPERS' current asset allocation policy:

Asset Class	Target Allocation
Public Equity	40.0%
Private Equity	10.0%
Traditional Fixed Income	22.5%
Opportunistic Debt	7.5%
Real Assets	10.0%
Real Estate	10.0%
Cash	0.0%

Note 3 (a) - Deposit and Investment Risk Policies

Concentration of Credit Risk

Concentration of credit risk is the risk of loss attributed to the magnitude of the System's investment in a single issuer. Within the traditional asset classes (equities and fixed income), the consultant will aggregate exposures across asset classes to create measures of concentration including industries, countries and security issuer for Investment staff review.

Investment Custodial Credit Risk

Custodial credit risk is an investment risk that, in the event of the failure of the counterparty to a transaction, the System will not be able to recover the value of its investment or the collateral securities that are in the possession of an outside party. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System, and are held by either: a) the counterparty or b) the counterparty's trust department or agent but not in the System's name. It is the policy of the System to require that all investments be clearly marked as to ownership and, to the extent possible, shall be registered in the name of the System.

Cash Deposit Custodial Credit Risk

Cash deposit custodial credit risk is the risk that, in the event of the failure of depository financial institution, the System will not be able to recover deposits or will not be able to recover collateral securities that are in the possession of an outside party. Missouri state law requires that all public funds must be collateralized with acceptable securities having fair values of at least 100% of the amount of funds on deposit (less any amount covered by FDIC insurance).

Market Risk

Market risk is the risk that the fair value of an investment will be adversely impacted due to a change in value of the underlying market. The three primary market risks prevalent in the System's investment portfolio are equity prices, interest rates, and foreign currencies. Equity risk is the risk that stock prices fall and/or the volatility in the equity market increases. Interest rate risk is the risk that fixed income securities (or any investment primarily valued on a yield basis) will drop in value due to an increase in interest rates. Currency risk is the risk that changes to foreign exchange rates will adversely impact the fair value of non-U.S. Dollar denominated assets. The System protects the portfolio against market risks by adopting a diversified asset allocation that limits the amount of exposure to each underlying market risk. Market risks are also controlled by monitoring the types, amounts, and degree of risk that each investment manager takes for their specific mandate.

Investment Credit Risk

Investment credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations. Unless authorized under a separate Investment Management Agreement or operating agreement, it is the policy of the System to limit fixed income managers to purchasing securities that possess a minimum credit rating of “Baa” by Moody’s and “BBB” by Standard & Poor’s. Issues subsequently downgraded below these ratings must be brought to the attention of the Chief Investment Officer. Where counterparty risk is present, the System’s investment managers seek to control credit risk through counterparty credit evaluations and approvals, counterparty credit limits and exposure monitoring procedures.

Note 3 (b) - Cash Deposits

Cash balances include short-term securities held by the custodial bank to meet future obligations and operating balances held by the depository bank. As of June 30, 2020, MPERS had a carrying amount of deposits of ($206,298), and a bank balance of $0. The FDIC covered the bank balances. To maximize investment income, cash is invested in overnight repurchase agreements, thus causing the negative cash amount disclosed above. The balances in these repurchase agreements at June 30, 2020 totaled $823,776. As of June 30, 2020, no investments were held as repurchase agreements that were uninsured or unregistered, with securities held by the counterparty or by its trust department or agent but not in MPERS’ name.

Note 3 (c) – Concentrations

No investments in any one organization (other than those issued or sponsored by the U.S. government and those in pooled investments) represent 5% of plan net position.

Note 3 (d) – Rate of Return

For the year ended June 30, 2020, the annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was negative 0.44%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

Note 3 (e) – Investments

The following table shows MPERS' investments by type.

Summary of Investments by Type at June 30, 2020

	Carrying Amount	Fair Value
Equities	$ 217,624,635	$ 308,896,711
Fixed Income	684,572,571	688,908,574
Limited partnerships	1,068,652,607	998,139,973
Hedge	83,659,462	109,891,158
Short Term Securities	247,632,298	247,654,199
Securities Lending Collateral	108,567,739	108,567,739
Total Investments	**$ 2,410,709,312**	$ 2,462,058,354

Reconciliation to Statement of Fiduciary Net Position:	
Less: Repurchase Agreements	$ (823,776)
Less: Securities Lending Collateral	(108,567,739)
Investments per Statement of Fiduciary Net Position	**$ 2,352,666,839**

Certain investments are not listed on national exchanges, over-the-counter markets, nor do they have quoted market prices. Their valuation is based on the most current net asset values, independent appraisals, and/or good faith estimates of the investment's fair value provided by the general partner or portfolio manager, cash flow adjusted through fiscal year end. The estimated fair value of these investments may differ significantly from values that would have been used had a ready market existed. The following investments were priced using those methods and comprised 48% of the total fair value of the System's investments as of June 30, 2020:

	Fair Value
Hedge Funds	$ 109,891,158
Limited Partnerships	998,139,973
	$ 1,108,031,131

Note 3 (f) – Fair Value Measurements

MPERS 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: Values derived from valuation techniques in which significant inputs are unobservable. Investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not classified in the fair value hierarchy.

Investments Measured at Fair Value, June 30, 2020

Investments by Fair Value Level	Fair Value	Level 1	Level 2	Level 3
Short Term Securities	$ 246,239,332	$ 246,239,332	$ 0	$ 0
Debt Securities				
Collateralized Debt Obligations	278,070,244	0	94,280,117	183,790,127
Commercial Mortgage-Backed Securities	32,506,233	0	27,807,796	4,698,437
Corporate Bonds	1,519,698	0	1,519,698	0
Government Commercial "Mortgage-Backed Securities"	10,881,701	0	0	10,881,701
Government Mortgage-Backed Securities	33,825,497	0	27,716,963	6,108,534
Municipal Bonds	160,505,772	0	52,631,474	107,874,298
U.S. Government Agencies	112,731,120	0	112,731,120	0
U.S. Treasury Securities	51,475,673	0	51,475,673	0
Total Debt Securities	681,515,938	0	368,162,841	313,353,097
Equity Securities				
Communication Services	585,017	585,017	0	0
Consumer Discretionary	3,223,281	3,223,281	0	0
Conumer Staples	1,799,082	1,799,082	0	0
Equity Other	23,283,733	23,283,733	0	0
Financials	54,661,189	54,336,233	324,956	0
Health Care	3,952,605	3,952,605	0	0
Industrials	3,714,684	3,714,684	0	0
Information Technology	5,313,291	5,313,291	0	0
Materials	223,721	223,721	0	0
Real Estate	3,041,281	3,041,281	0	0
Telecommunication Services	259,317	259,317	0	0
Utilities	542,532	542,532	0	0
Total Equity Securities	100,599,733	100,274,777	324,956	0
Private Markets				
Private Equity	345,236,079	0	0	345,236,079
Real Estate	126,229,335	7,102,266	0	119,127,069
Real Assets	281,649,907	0	0	281,649,907
Opportunistic Debt	207,227,716	(14,690)	0	207,242,406
Total Private Markets	960,343,037	7,087,576	0	953,255,461
Investment Derivative Instruments				
Equity Swaps	757,697	0	757,697	0
Total Investment Derivative Instruments	757,697	0	757,697	0
Total Investments by Fair Value Level	$1,989,455,737	**$ 353,601,685**	**$ 369,245,494**	**$1,266,608,558**
Investments Measured at Net Asset Value				
Activist Equity	13,294,378			
Commingled International Equity Fund	194,095,430			
Equity Long/Short	14,260,361			
Event	13,533,924			
Global Asset Allocation	28,836,899			
In-Liquidation	555,818			
Multi-Strategy	21,419,916			
Structured Credit - Relative Value	5,991,453			
Private Real Estate Fund	80,386,544			
Total Investments Measured at Net Asset Value	372,374,723			
Total Investments	**$2,361,830,460**			

Reconciliation to Statement of Fiduciary Net Position	
Total Investments Measured at Fair Value and Derivatives	$2,361,830,460
Investment Sales Receivable	(5,276,151)
Investment Purchases Payable	1,675,129
Accrued Interest and Income	(5,695,747)
Accrued Expenses	133,148
Total Investments per Statement of Fiduciary Net Position	**$2,352,666,839**

Investments listed as level 1 include equity securities and futures contracts where the price comes from an exchange.

Investments listed as level 2 include debt securities where an independent pricing evaluator had direct observable information including: trading volume, multiple sources of market data and benchmark spreads. The equity index swap is included because the valuation inputs include an observable interest rate and the underlying index.

Investments listed as level 3 include debt securities where an independent pricing evaluator did not have direct observable information and had limited market information for comparable securities. Significant inputs used in the valuation are not available aside from the evaluator providing the price. Direct investments in private equity, real estate, credit, and real assets are included because the valuation techniques utilize discounted cash flows or other non-observable market information by manager.

Private Markets Measured at Fair Value as of June 30, 2020

Private Markets	Fair Value	Unfunded Commitments
Private Equity	$ 345,236,079	$ 107,781,000
Real Estate	126,229,336	105,761,000
Real Assets	281,649,907	118,521,000
Opportunistic Debt	207,227,715	200,878,000
Total Private Markets	**$ 960,343,037**	**$ 532,941,000**

Private Markets
Private equity, real estate, real assets, and opportunistic debt are the four asset classes that fall into the category of private market funds. These funds invest in the equity or debt of private companies.

Private Equity: The private equity portfolio includes 23 direct fund investments and three fund of fund investments. These funds invest in private companies adding value through operational or industry expertise and vast networks. The majority of the private equity allocation is in buyout funds with a smaller portion in venture capital funds. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of six to ten years.

Real Estate: The real estate portfolio consists of 26 real estate funds. The noncore real estate book includes 22 real estate funds that invest in value-add or opportunistic strategies. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of six to ten years. The remaining three investments are in core real estate funds. Three of these funds are open-ended. Two are eligible for redemption on a daily basis and one on a quarterly basis.

Real Assets: The real asset portfolio contains 27 funds that invest in private energy, aviation, mining and shipping companies. The timber portfolio, which includes both ownership in timber funds and direct timber investments, is also within the real assets portfolio. The timber portfolio has 11 direct timber investments. These funds and investments are not eligible for redemption. Distributions are received as underlying investments and investments within the funds are liquidated, which on average can occur over the span of six to ten years.

Opportunistic Debt: The opportunistic debt portfolio, comprised of 31 funds, provide financing to private companies. While this portfolio has a U.S. bias, some funds invest internationally with exposures in Europe and Asia. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of three to five years.

Investments Measured at Net Asset Value, June 30, 2020

Investments by Fair Value Level	Fair Value	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period
Hedge Funds				
Activist Equity	$ 13,294,378	$ 0	Yearly, Every 3 Years	90 Days
Equity Long/Short	14,260,361	0	Quarterly	45 Days
Event Driven	13,533,924	0	Monthly	90 days
Global Asset Allocation	28,836,899	0	Monthly	5-60 Days
In-Liquidation	555,818	0	In liquidation	
Multi-Strategy	21,419,916	0	Monthly	60-90 Days
Structured Credit - Relative Value	5,991,453	0	Quarterly	60 Days
Total Hedge Funds	97,892,749	0		
Commingled International Equity Funds	194,095,430	0	Daily, Monthly	0-30 Days
Private Real Estate Funds	80,386,544	0	Daily	90 Days
Total Investments at Net Asset Value	**$ 372,374,723**	**$ 0**		

Hedge Funds

Activist Equity: Consisting of one fund, this strategy focuses on obtaining publicly traded shares of companies and effecting changes within the companies that it owns whether that be value creation through operational, financial or corporate governance changes. The fund's focus is on European and Nordic companies. Due to contractual lock-up restrictions and the necessity for activist managers to retain capital in order to realize the desired company changes, this strategy's investments are eligible for redemption on a rolling three-year basis.

Equity Long/Short: Consisting of one fund, this strategy invests in both long and short in Asia Pacific equity securities, with a goal of adding growth and minimizing market exposure. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next six months.

Event Driven: Consisting of one fund, this strategy seeks to gain an advantage from pricing inefficiencies that may occur at the onset or aftermath of a merger, corporate action or related event. Due to contractual lock-up restrictions, the value of this fund is eligible for redemption in the next four months.

Global Asset Allocation: Consisting of one fund, this strategy is highly diversified and uses fundamental research to develop systematic rules for trading positions. Due to contractual lock-up restrictions, the value of this fund is eligible for redemption in the next 35 days.

Hedge Funds in Liquidation: MPERS currently has a small investment in two hedge funds that are in liquidation. These funds have closed and MPERS is awaiting the sale of final assets.

Multi-Strategy: The two funds that make up this group aim to pursue varying strategies in order to diversify risks and reduce volatility. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next six months.

Structured Credit - Relative Value: Consisting of one fund, this strategy's main focus is to benefit from valuation discrepancies that may be present in related financial instruments by simultaneously purchasing or selling these instruments. As of June 30, a full redemption has been requested and will be received over the next four quarters.

Commingled International Equity Funds

MPERS invests in three international equity funds that are considered to be commingled in nature. Due to contractual lock-up restrictions, 65% of this capital is eligible for redemption in one month; the remaining 35% has daily liquidity.

Private Real Estate Funds

MPERS invests in three core private real estate funds that are commingled in nature. While each of these funds have daily liquidity, due to contractual restrictions, MPERS has to give 90 days notification of withdrawals.

Note 3 (g) – Investment Interest Rate Risk

The following table summarizes the maturities of government obligations, corporate bonds, convertible corporate bonds, mortgages, and asset-backed securities which are exposed to interest rate risk.

Summary of Weighted Average Maturities at June 30, 2020

	Fair	Investment Maturities (in years)			
Investment Type	**Value**	**less than 1**	**1 - 5**	**6 - 10**	**more than 10**
Asset-Backed Securities	$ 288,161,636	$ 0	$ 10,631,561	$ 82,460,074	$ 195,070,001
Commercial Mortgage-Backed Securities	23,424,024	0	0	0	23,424,024
Corporate Bonds	5,477,695	0	179,660	213,301	5,084,734
Government Agencies	94,097,841	0	0	23,394,774	70,703,067
Government Bonds	37,078,203	0	0	0	37,078,203
Government Mortgage-Backed Securities	26,402,792	0	280,931	1,474,317	24,647,544
Government-Issued Commercial Mortgage-Backed	1,941,588	0	0	0	1,941,588
Index Linked Govt Bonds	38,893,599	16,557,982	0	8,758,988	13,576,629
Municipal/Provincial Bonds	164,391,681	0	13,325,662	27,631,460	123,434,559
Non-Govt Backed C.M.O.s	9,039,514	0	0	130,013	8,909,501
Short Term Bills and Notes	10,364,973	10,364,973	0	0	0
Total	**$ 699,273,546**	**$ 26,922,955**	**$ 24,417,814**	**$ 144,062,927**	**$ 503,869,850**

Note 3 (h) – Investment Credit Ratings

The table below summarizes the credit ratings of the government obligations, corporate bonds, mortgages, and asset-backed securities.

Summary of Credit Ratings as of June 30, 2020

Investment Type	AAA	AA	A	BBB	BB	B	CCC	CC	D	Not Rated	USGovt Guar	Total
Asset Backed Securities	$ 64,337,056	$ 75,631,249	$ 8,791,303	$ 966,167	$ 4,992,261	$ 8,514,171	$ 0	$ 0	$ 0	$ 124,929,429	$ 0	$ 288,161,636
Commercial Mortgage-Backed	3,924,681	2,193,533	0	0	0	0	0	0	0	17,142,623	163,187	23,424,024
Corporate Bonds	0	5,084,233	0	213,301	0	0	0	0	0	180,161	0	5,477,695
Government Agencies	0	79,625,750	0	0	0	0	0	0	0	0	14,472,091	94,097,841
Government Bonds	0	0	0	0	0	0	0	0	0	6,123,125	30,955,078	37,078,203
Government Mortgage Backed Securities	0	0	0	0	0	0	0	0	0	175,413	26,227,379	26,402,792
Gov't-issued Commercial Mortgage-Backed	0	0	0	0	0	0	0	0	0	0	1,941,588	1,941,588
Index Linked Government Bonds	0	0	0	0	0	0	0	0	0	25,316,970	13,576,629	38,893,599
Municipal/Provincial Bonds	48,917,200	89,786,280	670,532	1,452,971	0	0	0	0	0	23,564,698	0	164,391,681
Non-Government Backed C.M.O.s	66,714	0	213,424	0	0	393,639	171,997	130,611	647,911	7,415,218	0	9,039,514
Short Term Bills and Notes	0	0	0	0	0	0	0	0	0	0	10,364,973	10,364,973
Total	**$ 117,245,651**	**$ 252,321,045**	**$ 9,675,259**	**$ 2,632,439**	**$ 4,992,261**	**$ 8,907,810**	**$ 171,997**	**$ 130,611**	**$ 647,911**	**$ 204,847,637**	**$ 97,700,925**	**$ 699,273,546**

Note 3 (i) – Investment Foreign Currency Risk

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

Exposure to Foreign Currency Risk As of June 30, 2020

Foreign Currency	Equities	Real Estate / Partnerships	Cash	Total
Australian Dollar	$ 244,300	$ 0	$ 0	$ 244,300
British Pound Sterling	267,106	6,228,251	0	6,495,357
Canadian Dollar	163,715	0	0	163,715
Euro	722,021	20,663,473	491,038	21,876,532
Hong Kong Dollar	517,339	0	0	517,339
Japanese Yen	820,355	0	0	820,355
Singapore Dollar	212,943	0	0	212,943
Swedish Krona	175,208	0	0	175,208
Total Exposure Risk	$ 3,122,987	$ 26,891,724	$ 491,038	$ 30,505,749

Note 3 (j) – Securities Lending

In accordance with the Board of Trustees' investment policy, MPERS participates in a securities lending program. The Northern Trust Company administers the program. There are no restrictions on the amount of securities that may be lent.

Securities that may be loaned include U.S. government and agency securities, corporate equity, and fixed income securities. Collateral may include cash, U.S. government securities and irrevocable letters of credit. U.S. securities are loaned in exchange for collateral valued at 102% of the fair value of the securities, plus any accrued interest. Non-U.S. securities are loaned in exchange for collateral valued at 105% of the fair value of the securities, plus any accrued interest. On June 30, 2020, MPERS had no credit risk exposure to borrowers, since the amount of collateral exceeded the amount of the loans.

Non-cash collateral cannot be pledged or sold unless the borrower defaults. The average term of the System's loans was approximately 227 days as of June 30, 2020. Cash open collateral is invested in a short-term investment pool, which had an interest sensitivity of 31 days as of June 30, 2020. Cash collateral may also be invested separately in "term loans", in which case the investments match the loan term. These loans can be terminated on demand by either lender or borrower. There were no known violations of legal or contractual provisions, or borrower or lending agent default losses. There were no dividends or coupon payments owing on the securities lent. Securities lending earnings are credited on approximately the fifteenth day of the following month.

Indemnification deals with a situation in which a client's securities would not be returned due to the insolvency of a borrower and Northern Trust would fail to live up to its contractual responsibilities relating to the lending of those securities. Northern Trust's responsibilities include performing appropriate borrower and collateral investment credit analyses and demanding adequate types and levels of collateral.

The collateral held (including both cash collateral recognized in the Statement of Fiduciary Net Position and non-cash collateral) is:

Collateral Held As of June 30, 2020

Investment Type	
Equities	$ 32,870,725
Government & Government Sponsored Securities	80,762,582
Agencies	1,314,960
Total	**$114,948,267**

Note 3 (k) – Derivatives

A derivative financial instrument is an investment whose value depends on the values of one or more underlying assets, financial indexes, or commodity prices. These investments include futures contracts, options contracts, and forward foreign currency exchange. Derivative financial instruments involve credit risk and market risk, as described in Note 3(a), in varying levels.

Through MPERS' external managers, MPERS holds investments in futures contracts, swaps contracts, options contracts, and forward foreign currency exchange contracts. MPERS enters into futures and swaps contracts to gain exposure to certain markets and enters into forward foreign exchange contracts primarily to hedge foreign currency exposure.

The notional value related to these derivative instruments is generally not recorded on the financial statements; however, the change in fair value of these instruments is incorporated in performance. The notional/fair value of $583,524,473 for the various contracts in MPERS' portfolio as of June 30, 2020, is recorded in investments on the Statement of Fiduciary Net Position. The change in fair value of $(22,337,749) for the year ended June 30, 2020, is recorded in investment income on the Statement of Changes in Fiduciary Net Position.

Investment Derivatives As of June 30, 2020

Type	**Classification**	**Notional/ Fair Value**	**Unrealized Loss**
Futures Contracts	Investments, at fair value	$ 438,617,374	$ (6,437,526)
Swaps Contracts	Investments, at fair value	144,907,099	(15,900,223)
	Total	**$ 583,524,473**	**$ (22,337,749)**

Through the use of derivatives, MPERS is exposed to risk that the counterparties involved in the contracts are unable to meet the terms of their obligation. MPERS' investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, and exposure monitoring procedures. MPERS anticipates the counterparties will be able to satisfy their obligations under contract. The associated counterparty's credit rating is an A+.

NOTE 4 – RECEIVABLES

Receivables As of June 30, 2020

Type	**Total**
Contributions-MoDOT	$ 4,753,939
Contributions-MSHP Non-Uniformed	1,230,506
Contributions-MSHP Uniformed	2,056,506
Investment Interest & Income	5,695,747
Investment Sales	5,276,151
Total	**$ 19,012,849**

NOTE 5 – CONTRIBUTIONS

MoDOT, MSHP, and MPERS make contributions to the System, as do employees covered under the Year 2000 Plan-2011 Tier. MPERS permanent funding policy provides for actuarially determined employer contributions using the entry-age normal cost method on a closed group basis (consisting of normal cost and amortization of any unfunded accrued liabilities over a 30-year period, beginning July 1, 2006). (The objective is to reduce the period by one year each year.) A temporary accelerated policy has been adopted where the total contribution is based on entry-age normal cost plus a 15-year amortization period for unfunded retiree liabilities and a 30-year amortization period for other unfunded liabilities. Both amortization periods are closed periods starting July 1, 2010. This temporary accelerated policy was adopted by the MPERS' Board of Trustees on September 17, 2009, and will remain in effect until such time as the retiree liability becomes 100% funded or the permanent policy produces a higher contribution rate. Actuarially determined rates, expressed as percentages of annual covered payroll, provide for amounts sufficient to fund those benefits designated by state statute to be funded in advance. Actuarial assumptions used to compute contribution requirements are the same as those used to compute the pension benefit obligation. The employee contribution rate for members of the Year 2000 Plan-2011 Tier is set by statute.

Required employer contributions totaling $210,871,852 for fiscal year 2020, represent funding of normal costs and amortization of the unfunded accrued liability. Actual contributions made were 100% of required contributions. Contribution rates as determined by the System's actuary for the year ended June 30, 2020, are shown in the following table. The Board established actual rates to be the same as the actuarially determined rates.

Contribution Rates

MoDOT, MPERS & Civilian Patrol	Uniformed Patrol	2011 Tier Employee
58.00%	58.00%	4.00%

At the September 26, 2014 Board meeting, the Board adopted the use of a contribution rate stabilization reserve that would result in an MPERS employer contribution rate similar to the fiscal year 2015 rates. The reserve is intended to keep the contribution relatively level over time and may be used if the investment market experiences a downturn in the future. The Board further adopted (in February 2015) that the employer contribution rate would not fall below 58% unless 1) the fund became fully funded or 2) the contribution stabilization reserve reached $250 million. The balance of the reserve as of June 30, 2020, was $143,863,600

NOTE 6 – DEFERRED RETIREMENT OPTION PROGRAM

MPERS currently provides a BackDROP option. This is an election made at the time of actual retirement. In effect, it provides members an option to elect to receive a portion of their benefits as cash. Since the election is not made until the member actually retires, the option is not treated as a DROP provision in accordance with generally accepted accounting principles.

NOTE 7 – NET PENSION LIABILITY OF EMPLOYERS

The components of the net pension liability of the employers at June 30, 2020, were as follows:

Total pension liability	$ 4,092,097,897
Plan fiduciary net position	(2,361,599,888)
Employers' net pension liability	$ 1,730,498,009
Plan fiduciary net position as a percentage of the total pension liability	57.71%
Covered Payroll	$ 363,980,262
Employers' net pension liability as a percentage of covered payroll	475.44%

Actuarial Assumptions

The total pension liability amounts were determined by actuarial valuations as of June 30, 2020, using the following actuarial assumptions, applied to all prior periods included in the measurement:

Inflation	3.0%
Salary Increases	3.0% to 12.45%
Investment Rate of Return	7.00%

The mortality tables, for post-retirement mortality, used in evaluating allowances to be paid to non-disabled pensioners were the RP-2014 Healthy Mortality Tables projected to 2022 using projection scale MP-2017.
Pre-retirement mortality used were the RP-2014 Employee Mortality Table projected to 2022 using projection scale MP-2017 and multiplied by a factor of 65%. Disabled pension mortality was based on RP-2014 Disabled Retiree Annuitant Mortality Tables projected to 2022 using projection scale MP-2017.

The long-term (30 year) expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges 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 real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return were adopted by the plan's trustees after considering input from the plan's investment consultants and actuary. These estimates for each major asset class included in MPERS' target asset allocation as of June 30, 2020, (see Note 3) are summarized in the following table:

Asset Class	Long-Term Expected Real Rate of Return
Global Equity	3.9%
Private Equity	7.2%
Fixed Income	0.3%
Opportunistic Debt	4.5%
Real Assets	5.3%
Real Estate	2.4%

Discount Rate

A single discount rate of 7.00% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 7.00%. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. The employers pay the same contribution rate for each employee regardless of the plan the employee was hired under. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Regarding the sensitivity of the net pension liability to changes in the single discount rate, the following presents the plan's June 30, 2020 net pension liability, calculated using a single discount rate of 7.00%, as well as what the plan's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower or 1-percentage-point higher:

Current Single Discount

	1% Decrease 6.00%	Rate Assumption 7.00%	1% Increase 8.00%
Net Pension Liability	$2,206,172,744	$1,730,498,009	$1,333,006,794

NOTE 8 – EMPLOYER PROPORTIONATE SHARE

MPERS, as the administrative agent for the pension system, is also an employer of the pension system. The administrative expenses of the pension system are included in the deductions to the pension system's fiduciary net position. While the employer contributions of the other participating employers are funded from outside revenue sources, the employer contributions of MPERS are funded from sources already recognized as revenues, such as earnings on plan investments or contributions paid by the other participating employers. Attempting to allocate a portion of the net pension liability to MPERS as an employer would result in an allocation of the net pension liability to the other participating employers. Accordingly, MPERS excludes its contributions from the employer proportionate share calculation for the reporting of a net pension liability, by assigning itself a proportionate share of 0%. This exclusion, in essence, shifts the portion of the net pension liability that would accrue to MPERS to the other participating employers.

NOTE 9 – PERSONAL SERVICES AND RETIREMENT PLAN

MPERS employed 17 full-time employees as of June 30, 2020. Eleven former MPERS employees have retired. Full-time employees are members of the System (see Note 8). For these employees, MPERS accrued 58.00% of payroll during fiscal year 2020, amounting to $987,743. The amounts for fiscal year 2020 and the four preceding years are shown below. These amounts are recorded as both a contribution and administrative expense. Information regarding the retirement plans can be found in Notes 2 and 5.

Net Obligations

Year Ended	Annual Contribution Accrual	
June 30	Percent	Dollars
2016	58.05%	$ 996,378
2017	58.00%	1,087,268
2018	58.00%	1,127,506
2019	58.00%	987,370
2020	58.00%	987,743

NOTE 10 – OTHER POST-EMPLOYMENT BENEFITS (OPEB)

In addition to the retirement benefits described previously, MPERS provides a portion of health care insurance through the MoDOT and MSHP Medical and Life Insurance Plan (Insurance Plan) in accordance with Missouri State statutes. The Insurance Plan is considered an agent multiple-employer defined benefit plan and is administered by MoDOT. The Insurance Plan is financed on a pay-as-you-go basis and is an internal service fund of MoDOT. At June 30, 2020, there were 9 inactive (retired) members and 17 active employees participating in the Insurance Plan.

Medical insurance benefits are established by the Insurance Plan's Board of Trustees and are approved by the Missouri Highways and Transportation Commission. Benefits include general inpatient and outpatient medical services; mental, nervous and substance abuse care; and prescriptions. Eligible members are employees who retired from the System with a minimum of 5 years of service and who participate in the Insurance Plan. MoDOT issues a publicly available financial report that includes financial statements and required supplementary information for the Insurance Plan. Requests for this report should be addressed to MoDOT, Financial Services Division, P.O. Box 270, Jefferson City, MO 65102.

Employer and member contributions are established by the Insurance Plan's Board of Trustees and are approved by the Missouri Highways and Transportation Commission. Premiums vary by coverage categories, which include retirees, certain disabled employees, spouses, certain dependents, and survivors of deceased employees and retirees.

Changes in Total OPEB Liability

MPERS' proportionate share (0.14%) of the Insurance Plan's net OPEB liability is $1,552,393 which was measured as of July 1, 2019 and the total OPEB liability used to calculate the net OPEB liability was determined by an actuarial valuation as of that date.

Summary of Changes in Net OPEB Liability for the Year Ended June 30, 2020

	Total
Beginning Balance	$1,538,442
Changes for the year:	
Service Cost	64,136
Interest Cost	61,346
Changes of benefit terms	0
Differences between expected and actual experience	(17,475)
Changes in assumptions	(58,897)
Benefit payments	(35,159)
Net changes	13,951
Ending Balance	**$1,552,393**

Deferred Outflows and Inflows

For the year ended June 30, 2020, MPERS recognized net OPEB expense of $58,805. MPERS reported deferred outflows of resources and deferred inflows of resources related to OPEB from the following sources:

Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB

	Deferred Outflows	Deferred Inflows
Differences between expected and actual experience	$ 0	$ 23,102
Changes of assumptions or other inputs	0	225,697
Contributions subsequent to measurement date	31,054	0
Total	**$ 31,054**	**$ 248,799**

Deferred outflows resulting from contributions subsequent to the measurement date will be recognized as a change to the net pension liability in each subsequent year. Other deferred mounts related to OPEB will be recognized in expenses as follows:

Amortization of Deferred Outflows/Inflows

Fiscal Year	Deferred Outflows	Deferred Inflows
2021	$ 31,054	$ (66,677)
2022	0	(66,677)
2023	0	(66,677)
2024	0	(32,436)
2025	0	(14,588)
Total Thereafter	0	(1,744)

Actuarial Assumptions

The following actuarial assumptions and other inputs, applied to all periods included in the measurement:

Cost method	Entry Age Normal based upon salary
Salary increases	2.50%
Discount rate	3.51%
Investment rate of return	n/a; the plan is unfunded
Health care cost trend rates	5.7%, decreasing to 4.5% in 2025
Retirees' share of benefit-related costs	43% - 60%
Admin Expense Trend (Inflation) Rate	3%

- The salary increases were based on projected salaries, which include COLAs, provided by MoDOT.
- The discount rate was based on Bond Buyer General Obligation 20-Bond Municipal Bond Index.
- Mortality rates were based on Pub-2010 Public Retirement Plans Safety Employees Mortality Table weighted by Headcount projected by MP-2018.
- The actuarial assumptions used in the June 30, 2019 valuation were based on the results of an actuarial experience study for the period July 1, 2018-June 30, 2019.
- It is assumed the current employer and member contributions will continue as approved by the Commission.

Changes of assumptions and other inputs reflect a change in the discount rate from 3.87% in 2019 to 3.51% in 2020.

The following table illustrates the impact of interest rate sensitivity on the Net OPEB Liability as of June 30, 2020:

Interest Rate Sensitivity

	1% Decrease	Current Discount Rate	1% Increase
Net OPEB Liability	$1,879,723	$1,552,393	$1,299,037

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability as of June 30, 2020:

Healthcare Cost Trend Sensitivity

	1% Decrease	Current Discount Rate	1% Increase
Net OPEB Liability	$1,263,873	$1,552,393	$1,936,082

NOTE 11 – CAPITAL ASSETS

Summary of Changes in Capital Assets

	June 30, 2019 Balance	Additions	Deletions/ Retirements	June 30, 2020 Balance
Land	$ 84,000	$ 0	$ 0	$ 84,000
Building	581,619	0	0	581,619
Furniture, Equipment and Software	3,430,652	0	0	3,430,652
Less: Accumulated Depreciation	(3,527,226)	(247,369)	0	(3,774,595)
Total	**$ 569,045**	**$ (247,369)**	**$ 0**	**$ 321,676**

NOTE 12 – COMMITMENTS

MPERS has committed $1,559,899,137 of which $1,026,958,137 has been invested, leaving total unfunded commitments to private equity, real estate, real assets and opportunistic debt of $532,941,000 as of June 30, 2020. The total unfunded investment commitments are not recorded in the accompanying Statement of Fiduciary Net Position.

NOTE 13 – RISK MANAGEMENT

MPERS is exposed to various risks of loss related to natural disasters, asset theft or damage, errors and omissions, torts, and employee injuries.

MPERS has purchased commercial insurance related to capital asset loss and damage. Ancillary coverage provided through the property policy includes coverage for accounts receivable, loss of money and securities, employee dishonesty, and forgery and alterations. MPERS carries a $2 million umbrella liability policy. MPERS has coverage through Missouri Highway and Transportation Commission's Self-Insurance Fund related to workers' compensation. MPERS has also purchased a directors and officers liability policy with $1 million aggregate coverage. This coverage is inclusive of legal defense costs and carries a $35,000 deductible. The State's Legal Expense Fund covers all state employees and officers, and MPERS has purchased surety bonds for the executive director and staff. Settlements have not exceeded coverages for each of the past three fiscal years.

MPERS has a disaster recovery plan that provides for continued computer operations at a remote location should the retirement office be unavailable for normal operations.

Schedule of Changes in the Employers' Net Pension Liability
Year Ended June 30,

	2020	2019	2018	2017
Total Pension Liability				
Service Cost	$ 44,048,083	$ 43,971,030	$ 46,621,377	$ 45,713,403
Interest on the Total Pension Liability	274,791,358	271,174,089	286,457,436	283,568,441
Benefit Changes	0	0	(7,684)	0
Difference Between				
Expected and Actual Experience	3,494,582	203,459	(37,173,164)	(37,286,966)
Assumption Change	0	0	142,556,109	0
Benefit Payments	(262,710,811)	(255,310,406)	(254,131,209)	(246,617,775)
Refunds	(796,107)	(780,538)	(503,007)	(321,328)
Disability Premiums	(1,640,971)	(1,615,860)	(1,601,605)	(1,620,418)
Transfers to Other Retirement Systems	(2,457,945)	(2,111,007)	(2,823,042)	(2,724,631)
Net Change in Total Pension Liability	**54,728,189**	**55,530,767**	**179,395,211**	**40,710,726**
Total Pension Liability - Beginning	**4,037,369,708**	**3,981,838,941**	**3,802,443,730**	**3,761,733,004**
Total Pension Liability - Ending (a)	**$ 4,092,097,897**	**$ 4,037,369,708**	**$ 3,981,838,941**	**$ 3,802,443,730**
Plan Fiduciary Net Position				
Contributions - Employer	$ 210,871,852	$ 210,166,927	$ 204,955,180	$ 206,562,924
Contributions - Employee	6,547,351	5,996,344	5,001,418	4,891,932
Pension Plan Net Investment Income	(10,667,857)	154,326,818	197,619,838	220,301,741
Benefit Payments	(262,710,811)	(255,310,406)	(254,131,209)	(246,617,775)
Refunds	(796,107)	(780,538)	(503,007)	(321,328)
Disabilty Premiums	(1,640,971)	(1,615,860)	(1,601,605)	(1,620,418)
Pension Plan Administrative Expense	(4,291,028)	(4,372,966)	(4,693,492)	(4,515,458)
Net Transfers	1,025,629	321,363	(955,597)	(980,524)
Net Change in Plan Fiduciary Net Position	**(61,661,942)**	**108,731,682**	**145,691,526**	**177,701,094**
Plan Fiduciary Net Position - Beginning	**2,423,261,830**	**2,314,530,148**	**2,168,838,622**	**1,992,073,946**
Plan Fiduciary Net Position - Ending (b)	**$ 2,361,599,888**	**$ 2,423,261,830**	**$ 2,314,530,148**	**$ 2,169,775,040**
Adjustment - GASB 75 Implementation				**(936,418)**
Plan Fiduciary Net Position - Ending as Restated				**$ 2,168,838,622**
Employers' Net Pension Liability - Ending (a) - (b)	**$ 1,730,498,009**	**$ 1,614,107,878**	**$ 1,667,308,793**	**$ 1,632,668,690**
Plan Fiduciary Net Position as a % of Total Pension Liability	57.71%	60.02%	58.13%	57.06%
Covered Payroll	$ 363,980,262	$ 362,747,630	$ 353,751,292	$ 356,515,416
Employers' Net Pension Liability as a % of Covered Payroll	475.44%	444.97%	471.32%	457.95%

Note: These schedules are intended to present information for 10 years, but may be built prospectively. Additional years will be displayed as they become available.

Continued on next page

Schedule of Changes in the Employers' Net Pension Liability

Year Ended June 30, *(continued)*

	2016	2015	2014	2013
Total Pension Liability				
Service Cost	$ 45,441,305	$ 45,358,095	$ 44,739,603	$ 44,446,279
Interest on the Total Pension Liability	280,432,068	275,284,910	270,525,608	265,339,848
Benefit Changes	0	0	0	0
Difference Between				
Expected and Actual Experience	(39,810,009)	(13,324,219)	(17,614,321)	(13,690,794)
Assumption Change	0	0	0	204,396,180
Benefit Payments	(236,488,629)	(236,905,323)	(227,958,108)	(220,623,394)
Refunds	(198,106)	(107,395)	(18,686)	(29,300)
Disability Premiums	(1,567,825)	(1,554,676)	(1,531,578)	(1,512,685)
Transfers to Other Retirement Systems	(1,921,451)	(3,147,482)	(1,876,336)	(629,246)
Net Change in Total Pension Liability	**45,887,353**	**65,603,910**	**66,266,182**	**277,696,888**
Total Pension Liability - Beginning	**3,715,845,651**	**3,650,241,741**	**3,583,975,559**	**3,306,278,671**
Total Pension Liability - Ending (a)	**$ 3,761,733,004**	**$ 3,715,845,651**	**$ 3,650,241,741**	**$ 3,583,975,559**
Plan Fiduciary Net Position				
Contributions - Employer	$ 199,609,396	$ 200,638,571	$ 183,353,841	$ 170,836,117
Contributions - Employee	3,482,513	3,294,162	2,260,563	1,139,450
Pension Plan Net Investment Income	21,432,095	92,645,571	319,445,780	198,141,088
Benefit Payments	(236,488,629)	(236,905,323)	(227,958,108)	(220,619,035)
Refunds	(198,106)	(107,395)	(18,686)	(29,300)
Disabilty Premiums	(1,567,825)	(1,554,676)	(1,531,578)	(1,512,685)
Pension Plan Administrative Expense	(4,370,860)	(4,066,944)	(3,736,355)	(2,997,225)
Net Transfers	808,228	(2,033,045)	(91,954)	(629,246)
Net Change in Plan Fiduciary Net Position	**(17,293,188)**	**51,910,921**	**271,723,503**	**144,329,164**
Plan Fiduciary Net Position - Beginning	**2,009,367,134**	**1,957,456,213**	**1,685,732,710**	**1,541,403,546**
Plan Fiduciary Net Position - Ending (b)	**$ 1,992,073,946**	**$ 2,009,367,134**	**$ 1,957,456,213**	**$ 1,685,732,710**
Adjustment - GASB 75 Implementation				
Plan Fiduciary Net Position - Ending as Restated				
Employers' Net Pension Liability - Ending (a) - (b)	**$ 1,769,659,058**	**$ 1,706,478,517**	**$ 1,692,785,528**	**$ 1,898,242,849**
Plan Fiduciary Net Position as a % of Total Pension Liability	52.96%	54.08%	53.63%	47.04%
Covered Payroll	$ 344,635,441	$ 342,264,593	$ 336,590,797	$ 323,205,767
Employers' Net Pension Liability as a % of Covered Payroll	513.49%	498.58%	502.92%	587.32%

Note: These schedules are intended to present information for 10 years, but may be built prospectively. Additional years will be displayed as they become available.

Schedule of Employers' Contributions
Last 10 Fiscal Years

	Actuarially Determined Contributions	Actual Contributions	Contribution Deficiency (Excess)	Covered Payroll*	Contributions as a Percentage of Covered Payroll
2011	$ 149,952,750	$ 149,952,750	$ 0	$ 363,345,651	41.27%
2012	164,884,467	164,884,467	0	344,514,139	47.86
2013	170,836,117	170,836,117	0	329,863,134	51.79
2014	183,353,841	183,353,841	0	336,799,855	54.44
2015	200,638,571	200,638,571	0	342,211,446	58.63
2016	199,609,396	199,609,396	0	344,154,131	58.00
2017	206,562,924	206,562,924	0	356,142,972	58.00
2018	204,955,180	204,955,180	0	353,371,000	58.00
2019	210,166,927	210,166,927	0	362,356,771	58.00
2020	210,871,852	210,871,852	0	363,572,159	58.00

**Values are estimated from contribution rate and actual contribution amount*

Schedule Of Investment Returns
Last 10 Fiscal Years

Fiscal Year Ended June 30	Annual Money-Weighted Rate of Return
2011	21.57 %
2012	2.80
2013	13.37
2014	17.58
2015	6.62
2016	1.02
2017	11.22
2018	9.20
2019	6.84
2020	(0.44)

Notes To Required Supplementary Information

The information presented in the required supplementary schedules was determined as part of the actuarial valuation at the dates indicated. Additional information as of the latest actuarial valuation follows:

Valuation Date .... June 30, 2020
Actuarial Cost Method .... Entry Age
Amortized Method .... Level Percentage of Payroll, Closed
Remaining Amortization Period .... 12 Years (single equivalent period)
Asset Valuation Method .... 3-Year Smoothed Market: 20% Corridor
Inflation .... 2.25% (price inflation)
Actuarial Assumptions
- Investment Rate of Return 7.0%
- Projected Salary Increase .... 3.0% to 12.45% (including 3.0% wage inflation)
- Cost-of-Living Adjustments .... 1.8% Compound

Other Post-Employment Benefit (OPEB) Plan
Schedule of Changes in Net OPEB Liability and Related Ratios for MoDOT and MSHP Medical and Life Insurance Plan

	2020	2019	2018
Total OPEB Liability			
Service Cost	$ 64,136	$ 66,676	$ 81,000
Interest Cost	61,346	54,714	49,929
Changes of benefit terms	0	0	0
Differences between expected and actual experience	(17,475)	(12,565)	0
Changes in assumptions	(58,897)	(81,559)	(238,129)
Benefit payments	(35,159)	(34,004)	(37,055)
Net Change in total OPEB Liability	13,951	(6,738)	(144,255)
Total OPEB Liability (Beginning)	**1,538,442**	**1,545,180**	**1,689,435**
Total OPEB Liability (Ending)	**$ 1,552,393**	**$ 1,538,442**	**$ 1,545,180**
Plan Fiduciary Net Position			
Contributions	$ 35,159	$ 34,004	$ 37,055
Benefit Payments	(35,159)	(34,004)	(37,055)
Net Change in Plan Fiduciary Net Position	**0**	**0**	**0**
Plan Fiduciary Net Position (Beginning)	**0**	**0**	**0**
Plan Fiduciary Net Position (Ending)	**$ 0**	**$ 0**	**$ 0**
Net OPEB Liability (Ending)	$ 1,552,393	$ 1,538,442	$ 1,545,180
Net Position as a Percentage of OPEB Liability	N/A	N/A	N/A
Covered-Employee Payroll	$ 1,760,722	$ 1,639,523	$ 790,000
Net OPEB Liability as a Percentage of Payroll	88.17%	93.83%	195.59%

Other Post-Employment Benefit (OPEB) Plan
Schedule of MPERS' Proportionate Share of Net OPEB Liability for MoDOT and MSHP Medical and Life Insurance Plan

Year Ended June 30	Proportion of Net OPEB Liability	Proportionate Share of Net OPEB Liability	Covered Employee Payroll	Net OPEB Liability as % of Covered Employee Payroll	Net Position as % of Total OPEB Liability
2018	0.14%	$1,545,180	$ 790,000	195.59%	N/A
2019	0.14%	1,538,442	1,639,523	93.83%	N/A
2020	0.15%	1,552,393	1,760,722	88.17%	N/A

Note: These schedules are intended to present information for 10 years, but may be built prospectively. Additional years will be displayed as they become available.

Schedule of Administrative Expenses

For the Year Ended June 30, 2020

Personnel Services	
Salary Expense	$ 1,816,908
Employee Benefit Expense	1,403,497
Total Personnel Services	**3,220,405**
Professional Services	
Actuarial Services	148,875
Audit Services	52,000
Legislative Consultant	30,600
Investment Special Consulting	15,000
Insurance Consultant	6,000
Other Consultant Fees	50,331
Fiduciary Insurance	18,286
IT Hosting and Support	232,002
Other	5,896
Total Professional Services	**558,990**
Miscellaneous	
Depreciation	247,368
Meetings/Travel/Education	62,958
Equipment/Supplies	66,784
Printing/Postage	24,490
Bank Service Charge	9,305
Building Expenses	39,822
Other	60,906
Total Miscellaneous	**511,633**
Total Administrative Expenses	**$ 4,291,028**

Schedule of Investment Expenses

For the Year Ended June 30, 2020

Investment Income Expenses	
Management and Performance Fees by Asset Class	
Equities	$ 2,780,847
Fixed Income Core	108,547
Opportunistic Debt	2,058,233
Real Estate	4,461,249
Private Equity	4,449,367
Real Assets	1,748,392
Hedge Funds	4,795,823
Total Management and Performance Fees	**20,402,458**
Investment Custodial Fee	63,737
Performance Management	214,617
General Consultant (Monitoring) Fee	342,089
Professional Fees	554,145
Other Fees/Expense	121,632
Total Investment Income Expenses	**$ 21,698,678**
Securities Lending Expenses	
Borrower Rebates (Refunds)	$ 457,450
Bank Fees	82,755
Total Securities Lending Expenses	**$ 540,205**

Schedule of Consultant and Professional Expenses

For the Year Ended June 30, 2020

Professional/Consultant	Nature of Service	
Gabriel, Roeder, Smith & Co.	Actuarial	$ 99,875
Cheiron	Actuarial Audit	49,000
LexisNexis Risk Data Management	Death Audit Services	1,800
MO Dept. of Health & Senior Services	Death Audit Services	630
MO Division of Employment Security	Death Audit Services	0
Pension Benefit Information	Death Audit Services	3,466
Naught-Naught	Director's & Officer's Insurance	17,168
Alliant Insurance Services, Inc.	Employee Crime Bond	1,118
Williams-Keepers, LLC	Financial Audit Services	52,000
Midwest Computech	Information Technology	28,362
Huber & Associates	Information Technology	1,925
Levi, Ray & Shoup, Inc.	Information Technology	192,118
Sikich, LLP	Information Technology	7,311
Intermedia	Information Technology	2,286
Thompson Coburn, LLP	Legal Consulting	50,331
Michael G. Winter Consultants, LLC	Legislative Consulting	30,600
Evercore Group LLC	Market Research	15,000
Charlesworth Benefits	Risk Management Consulting	6,000
CBIZ Human Capital Services	Compensation Study	0
Total Operating Consultant and Professional Expenses		**$ 558,990**
New England Pension Consultants	General Consulting/Monitoring	$ 342,089
The Northern Trust Company	Performance Management	214,617
The Northern Trust Company	Investment Custodian	63,737
Total Investment Consultant and Professional Expenses		**$ 620,443**

INVESTMENT SECTION

The quality of being trustworthy or of performing consistently well.

Core Value

We strive to preserve, protect, and grow our assets.

RELIABILITY

MPERS
Serving those who keep us safe.

MoDOT & Patrol Employees' Retirement System

September 23, 2020

To the Board of Trustees and System Members:

It is my pleasure to provide you with the Investment Section of this year's Comprehensive Annual Financial Report (CAFR). This letter provides an overview of investment performance over the past year and staff's view of the investment market in the years to come.

MPERS' portfolio generated a -0.49% return in Fiscal Year 2020 (net of all management fees and based on time-weighted rates of return and market valuations). While MPERS' longer-term returns remain excellent, it was a very difficult year for the investment portfolio. For the first time since the financial crisis, MPERS' portfolio failed to outperform the actuarial return target, the policy index return, the median public fund return, along with a passive 60/40 stock/bond allocation. When examining investment performance, the first place to look is the plan's asset allocation. A number of well-known studies suggest that roughly 90% of the variability in an investment portfolio is attributable to asset allocation. MPERS has a unique asset allocation that is designed for the long term, and includes a diversified mix of strategies to perform well throughout a wide range of investment markets. Fiscal Year 2020 was a particularly unusual year, dominated by the outbreak of COVID-19 and fears of a global economic shutdown. After ending calendar year 2019 at all-time highs, global equities dropped 21% in the first quarter of 2020 as businesses were forced to closed their doors and unemployment spiked. The uncertainty over future economic growth also sent interest rates to record lows, driving prices of government bonds to historic highs. Global banks and policy makers responded with an unprecedented amount of government stimulus, which stabilized markets and led to global equity markets rallying over 19% in the second quarter of 2020.

While nobody likes to underperform goals and objectives, it is hard to draw any hard conclusions during volatile short-term markets like those of Fiscal Year 2020. Diving deeper into the market's recovery, there is a market dominated by a handful of growth companies positioned to benefit from the "new normal" brought about by COVID-19. As businesses and consumers migrated to working from home, technology stocks that helped citizens cope with the pandemic such as Zoom (ZM), DocuSign (DOCU), and Peloton (PTON) had extraordinary gains, while traditional industries such as airlines, hotels and restaurants struggled to stay afloat. In the case of U.S. equities, where the Russell 3000 index earned a total of 6.5% for the year, growth companies generated a 21.9% return while traditional value strategies lost 9.4% of their value during the year. In the end, Fiscal Year 2020 was an extremely volatile market but one that ultimately rewarded a concentrated portfolio of publicly traded stocks and high quality government bonds. That is essentially the complete opposite of MPERS' total asset allocation, which relies more heavily on private markets and a mix of real asset strategies.

Keeping in mind all of the market uncertainty, MPERS' Board of Trustees completed an asset/liability study during the course of Fiscal Year 2020 to determine whether or not changes to the current asset allocation were desired. While market uncertainty brings additional risk to the investment portfolio, it is important to keep in mind that pension plans are in the business of managing risk, not simply avoiding risk. The risk exposures in the investment portfolio enable the fund to earn an attractive return, which

Office Location: 1913 William St., Jefferson City, MO 65109 • **Mailing Address:** Post Office Box 1930, Jefferson City, MO 65102-1930
Telephone Number: (573) 298-6080 • **Toll Free:** 1-800-270-1271 • **Fax:** (573) 522-6111
Website: www.mpers.org • **E-Mail:** mpers@mpers.org

helps provide the benefit payments promised to the members of the System. The asset allocation in place today is a culmination of 15 years of restructuring the portfolio with the goal of performing well across various market environments, not just when the stock market rallies. To date, those efforts have served the System well. MPERS' 10-year return ranks in the top 21% of the public fund peer universe, with a risk profile (as measured by volatility of returns) in the bottom 1% of the same peer universe. A lower volatility portfolio also lowers the volatility of contribution rates for the employers, which smooths the overall pension cost structure during a difficult budget environment. That consistent return profile has kept employer contributions stable for eight consecutive years.

After reviewing a number of alternative portfolios, the Board ultimately reaffirmed the current asset allocation targets, along with granting staff the flexibility to utilize leverage within the investment portfolio. The leverage authority, which is capped at 20% of the portfolio value, offers greater liquidity and improved flexibility for investing during periods of market volatility. The additional flexibility is projected to increase MPERS' annual investment returns as much as 0.7%, or roughly $16 million annually, and lower the total required employer contributions to the System by $277 million over a 15-year period. MPERS' staff commends the Board of Trustees for its extensive review of this initiative, and is pleased to have the asset allocation reaffirmed and the leverage authority approved.

Looking to Fiscal Year 2021 and beyond, the ultimate impact of COVID-19 remains unclear. Unemployment has spiked and economic growth has stalled; however, governments and central banks are doing everything they can to support the current the economy. This tug of war will likely continue for some time, especially given the looming U.S. presidential race in November of 2020. Given that interest rates remain at historically low yields and the equity markets are trading at or near all-time highs (despite all of the market uncertainty), tempering return expectations and building liquidity seems to be a prudent investment strategy over the intermediate term. The added flexibility built into the leverage authority provides MPERS' seasoned staff with more tools to manage MPERS' investment portfolio, and maintain the path of progress the System has enjoyed over the past decade. Given the low return environment and the difficult budget situation, all of these tools are critical in maintaining the health and stability of the retirement system for MPERS' current members and for generations to come.

Thank you for the opportunity to serve as your Chief Investment Officer, and I hope you enjoy this year's annual report.

Sincerely,

Larry Krummen, CFA
Chief Investment Officer

NEPC, LLC

KEVIN M. LEONARD
PARTNER

September 2020

The Board of Trustees
MoDOT & Patrol Employees' Retirement System
PO Box 1930
Jefferson City, MO 65102

Dear Board Members:

In our role as the general investment consultant, we assist the Board in several manners: determining and executing the overall asset allocation strategy of the Plan; advising on the investment policy of the Plan; facilitating investment manager searches (both traditional and alternative asset classes); conducting custodial service searches; providing ongoing performance evaluation for each individual investment manager and the overall investment portfolio; as well as providing pertinent education to the Board.

MPERS' objective is to provide service, disability, death and vested retirement benefits to members and their beneficiaries. To ensure a solid foundation for the future of the System, MPERS has developed an investment program designed to achieve the actuarially assumed rate of return over the long term, while prudently managing the risk of the portfolio. The pension plan is required to satisfy the need to pay accumulated/earned retirement benefits today, while at the same time be prepared for "uncertain" future benefits. This balancing of short-term versus long-term needs is a key tenant in the overall construction of the portfolio. To facilitate this balance, the Board has adopted a diversified asset allocation structure. Our goal is to diversify the System's assets within the traditional and non-traditional asset classes to reduce volatility, achieve above market returns, and to better protect the portfolio against difficult market conditions.

MPERS Fiscal Year 2020 Performance and Key Initiatives

For the fiscal-year-ending June 30, 2020, the MPERS Total Plan returned -0.47% on a net-of-fees basis, underperforming the policy index return of 4.03%. For the fiscal-year-ending June 30, 2020, relative to the peer group comparison (InvMetrics Public DB Net Universe), MPERS ranked in the 95th percentile (1st percentile being the highest, 100th percentile being the lowest). For the fiscal year, total Plan underperformance (relative to policy index) was driven by relative underperformance in the public equity, opportunistic debt and real assets portfolios. Although not enough to offset the underperforming asset classes, strong performance within the private equity, traditional fixed income and real estate portfolios was additive to total fund performance.

During Fiscal Year 2020, key initiatives accomplished included:

- Conducted a comprehensive/formal review of the Plan's asset allocation through an asset liability study and in concert with NEPC's 2020 Client Actions and Asset Class Assumptions
  - As part of the asset liability study, NEPC and Staff evaluated/modeled the Plan's existing asset allocation and presented various comparative asset allocation scenarios as discussed with and requested by the Board

55 State Street | Boston, MA 02109 | TEL: 617.374.1300 | www.nepc.com
BOSTON | ATLANTA | CHARLOTTE | CHICAGO | DETROIT | LAS VEGAS | PORTLAND | SAN FRANCISCO

- Based on the review and discussions, NEPC and Staff recommended that the no changes be made to the current investment target allocation due to the low return environment for traditional asset classes and the relative attractive return environment for alternative investments. Included in the recommendation was the consideration of utilizing leverage as a way to bridge the return gap between the expected returns and investment objectives
- After thorough discussions, the Board approved keeping the target allocation as is with the ability to apply leverage up to 20%
- The target allocation being:
    - 40% Global Equity
    - 10% Private Equity
    - 22.5% Fixed Income
    - 7.5% Private Debt
    - 10% Real Assets
    - 10% Real Estate

- Continued to work on the alternative investment portfolio
    - A private market pacing plan was conducted for the opportunistic debt, private equity, real assets, and real estate portfolios. Each pacing plan provided a recommended commitment amount for upcoming vintage years
    - New commitments were made to the opportunistic debt, private equity, real assets, and real estate portfolios
- Terminated the MLP allocation with the proceeds being redistributed within the equity portfolio

As the asset allocation strategy evolves year-after-year, diversification and risk mitigation will continue to be the pillars of MPERS' asset allocation structure.

NEPC, LLC appreciates the opportunity to serve as your consultant. It is a pleasure to work with MPERS and we look forward to continuing our relationship for the benefit of the Board, Staff, and most importantly, the members of the System.

Sincerely,

Kevin M. Leonard
Partner

Summary of Investment Policy

The primary objective of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS, Plan or System) is to provide active and retired employees with the retirement benefits provided under Missouri law. The investment portfolio is constructed to generate a total return that, when combined with employer contributions, is sufficient to meet these benefit obligations. Following prudent standards for preservation of capital, the goal is to achieve the highest possible rate of return consistent with the Plan's tolerance for risk as determined by the Board of Trustees (Board) in its role as fiduciary. The Board has adopted the following guiding principles to fulfill its fiduciary duty:

1. Preserve the long-term corpus of the fund.
2. Maximize total return within prudent risk parameters.
3. Act in the exclusive interest of the members of the System.

Risk awareness and risk management are essential to any organization. MPERS' Investment Policy is the starting point of our investment risk management process. Through the Investment Policy, the Board has defined the desired goals and outcomes of the investment program, including provisions that:

- define the assumed rate of return for the portfolio (currently 7%),
- establish an asset allocation that is expected to meet the assumed rate of return while minimizing the volatility of the fund's contribution rates,
- define the approved asset classes and investment strategies,
- delegate the day-to-day management of the investment portfolio to MPERS' staff and external asset managers,
- establish a range of asset class allocations from which the CIO can operate,
- establish procedures for hiring and terminating investment managers, and
- establish ongoing due diligence requirements for existing managers.

Throughout the Investment Policy, two key investment beliefs dominate the daily management of the investment portfolio.

1. Diversification is critical because the future is unknown.
2. Flexibility in investment policy implementation is critical because particular asset classes will be in or out of favor at various points in the economic cycle.

To ensure the fund is operating within the risk parameters established in the Investment Policy, staff monitors the performance of the fund relative to MPERS' policy index. The policy index is the return that would be generated if MPERS' portfolio were invested passively across the targeted asset allocation. MPERS' investment staff strive to achieve returns that are equal to or greater than the policy index while taking equal or less risk relative to the policy index (with risk defined by standard deviation of return). The table below shows how MPERS' portfolio compares to both the policy index and the median fund in MPERS' public fund peer universe as well as to commonly used risk measures.

Total Portfolio—Statistical Performance

Portfolio Characteristic	1-Year	3-Year	5-Year	10-Year
Annualized Total Plan Return (net of all fees and expenses)	**-0.46%**	**5.18%**	**5.51%**	**8.80%**
Annualized Policy Benchmark Return	*4.03%*	*6.81%*	*6.60%*	*8.18%*
Annualized Peer Median Return	*3.57%*	*6.00%*	*5.93%*	*8.08%*
Total Plan Standard Deviation[1]	**7.88**	**5.74**	**5.02**	**5.16**
Policy Benchmark Standard Deviation	*8.93*	*6.52*	*5.70*	*5.50*
Peer Median Standard Deviation	*13.97*	*10.66*	*9.31*	*8.71*
Total Plan Sharpe Ratio[2]	**-0.24**	**0.63**	**0.90**	**1.64**
Policy Benchmark Sharpe Ratio	*0.28*	*0.78*	*0.96*	*1.38*
Peer Median Sharpe Ratio	*0.17*	*0.42*	*0.52*	*0.87*
Correlation to Policy Benchmark[3]	**0.95**	**0.93**	**0.91**	**0.89**

1. *Standard Deviation* measures historical volatility and specifically measures the dispersion of a set of data points (i.e., monthly returns) from their mean. If the data points are further from the mean, the standard deviation is higher.
2. *Sharpe Ratio* measures historical volatility and specifically measures the dispersion of a set of data points (i.e., monthly returns) from their mean. If the data points are further from the mean, the standard deviation is higher.
3. *Correlation* measures how the System's portfolio and the policy benchmark moves are related and if both have reacted to market forces in the same manner. The System's portfolio has a correlation of less than 1, indicating that while it will typically move in the same direction as the policy benchmark, it will not move in lockstep with the total policy benchmark.

Investment Activity Overview

When evaluating these results, it is important to note that MPERS' policy index is comprised of a mix of asset classes, including several alternative asset classes, with benchmarks that are not investable (notably private equity with its S&P 500 + 3% illiquidity benchmark, real assets with its CPI + 4% real return benchmark, and the real estate benchmark). MPERS also evaluates investment performance on a net-of-fees basis, while acknowledging that most asset class benchmarks report performance on a gross-of-fees basis. Investment fees represent a significant hurdle for staff to overcome when comparing results to MPERS' policy index, which is demonstrated by how well MPERS' policy index has performed relative to the broader public fund peer universe. MPERS' strong risk-adjusted performance provides the Board with the confidence that it has adopted a prudent investment strategy, fulfilling the Board's fiduciary duty.

Fair Value of Investments

As of June 30, 2020, MPERS' investment portfolio had a total fair value of $2.36 billion, representing a decrease of $61 million from Fiscal Year 2019. Over the course of the year, $49 million was transferred out of the fund to make benefit payments and meet other obligations. When viewed together, the net decrease to the portfolio from investment activity equated to $12 million.

Investment Performance

MPERS' investment portfolio generated a -0.46% return for Fiscal Year 2020, net of all investment fees and based on time-weighted rates of return and market valuations. The performance across the major asset classes (and respective benchmarks) is listed below.

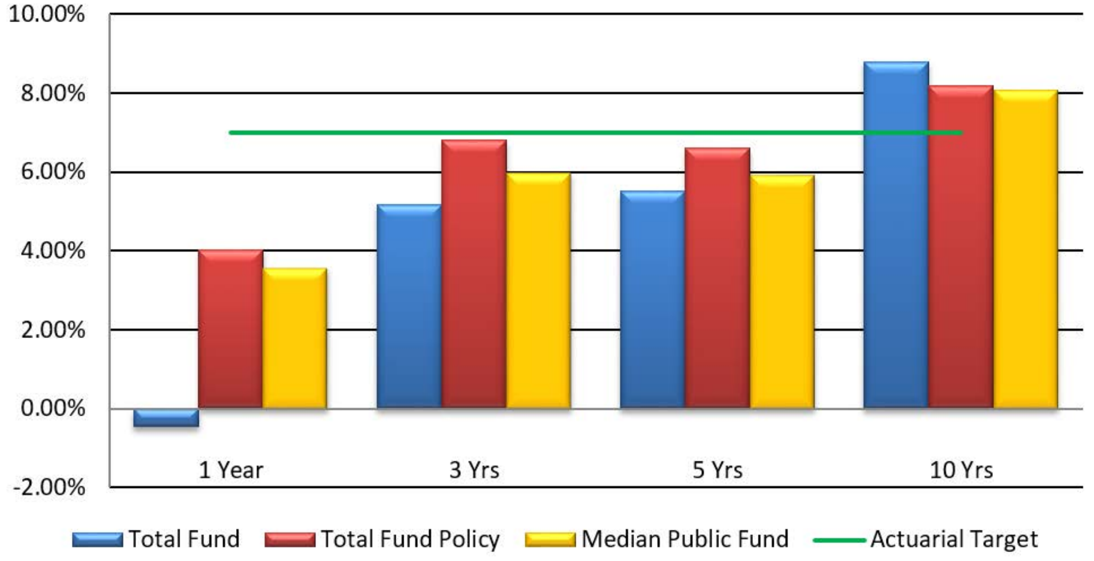
Investment Performance ***(including Benchmarks)***	**1-Year**	**3-Year**	**5-Year**	**10-Year**
Total Fund	**-0.46**	**5.18**	**5.51**	**8.80**
Policy Benchmark	*4.03*	*6.81*	*6.60*	*8.18*
Peer Universe Ranking (%)	*95*	*71*	*70*	*21*
Global Equity	**-4.62**	**1.92**	**4.14**	**9.04**
MSCI ACWI	*2.11*	*6.14*	*6.46*	*9.16*
Private Equity	**3.42**	**12.08**	**10.16**	**12.51**
S&P 500 + 3%	*-4.17*	*8.25*	*9.91*	*13.82*
Fixed Income	**10.88**	**7.10**	**6.51**	**7.04**
Barclays US Agg Gov/Credit	*10.02*	*5.87*	*4.85*	*4.33*
Opportunistic Debt	**-5.05**	**4.53**	**n/a**	**n/a**
Barclays US Corp HY	*0.03*	*3.33*	*n/a*	*n/a*
Real Estate	**3.80**	**8.2**	**8.40**	**12.06**
NFI-ODCE	*1.71*	*5.10*	*6.73*	*9.74*
Real Assets	**-11.37**	**0.07**	**0.78**	**n/a**
CPI + 4%	*4.67*	*5.78*	*5.61*	*n/a*

All of MPERS' investment returns are reported net of all investment fees

When evaluating performance, the Board of Trustees looks at three primary performance objectives: a) meet or exceed the actuarial assumed rate of return of 7% over long periods of time, b) outperform a policy benchmark that represents the return that could be achieved by investing passively in the broad markets in the same percentages to MPERS' target asset allocation, and c) rank at or above the public fund peer group's median investment return.

Investment Activity Overview

Historical returns compared to the three primary performance goals are listed graphically below:



The past two years have proved to be a difficult time for the portfolio, especially relative to MPERS' policy benchmark. Fiscal Year 2019 saw a significant shift in policy targets, which led to a mismatch between MPERS' current asset allocation versus the new policy targets (including a meaningful underweight to the public equity markets during a time when equity markets rallied), while Fiscal Year 2020 brought a new set of challenges associated with the COVID-19 pandemic. For the first time since the financial crisis, MPERS' fiscal year return failed to outperform the actuarial return target, the policy index return, the median public fund return, and a passive 60/40 stock/bond allocation. Perhaps the most concerning of those metrics is the underperformance relative to MPERS' policy index, which generated a 4.03% return. As a reminder, MPERS' policy index is the return expected to be earned if an investor could invest passively across the approved asset allocation over the entire measurement period. The underperformance relative to the policy index is primarily from two asset classes namely the traditional equity portfolio (which lost 4.6% for the year versus a benchmark return of 2.1%) and the real assets portfolio (which lost 11.4% versus a 4.7% return for the benchmark). Those two asset classes collectively account for 4.3% of the 4.5% underperformance relative to the overall policy index.

Despite the recent short-term performance shortfalls, MPERS' long-term performance remains strong according to any metric. MPERS' ten-year return ranks in the top 21% of the public fund peer universe, with a risk profile (as measured by volatility of returns) in the bottom 1% of the same peer universe. The strong long-term performance was an important factor for the Board of Trustees as they completed their asset/liability study during the year, which ultimately led to reaffirming the current asset allocation policy. It also serves as a reminder for MPERS' staff to focus on the long-term goals of the system, which includes not overreacting to the recent short-term performance during the middle of a pandemic.

Asset Allocation Overview

MPERS' Board of Trustees completed an asset/liability study during the course of Fiscal Year 2020 to determine if changes were desired to the current asset allocation. The asset allocation in place today is a culmination of 15 years of restructuring the portfolio with the goal of performing well across various market environments, not just when the stock market rallies. Those efforts have served the System well, generating consistent performance results with a lower risk profile (as measured by standard deviation of returns). MPERS' 10- and 15-year returns have a Sharpe ratio that ranks in the top 1% of the public fund peer universe (a Sharpe ratio measures a system's risk-adjusted returns, or the amount earned for a given level of risk). The reduced volatility in the portfolio has also lowered the volatility of contribution rates for the employers, which have now remained stable for eight consecutive years after climbing considerably after the financial crisis.

After reviewing a number of alternative portfolios, the Board ultimately reaffirmed the current asset allocation targets, along with granting staff the flexibility to utilize leverage within the investment portfolio. The leverage authority, which is capped at 20% of the portfolio value, offers greater liquidity and improved flexibility for investing during periods of market volatility. The additional flexibility is projected to increase MPERS' annual investment returns as much as 0.7%, or roughly $16 million annually, and lower the total required employer contributions to the system by $277 million over a 15-year period.

MPERS' breaks down all investment strategies into three broad beta groups (equities, interest rates and credit, and real assets). As of June 30, 2020, all of the sub-asset class allocations were within the acceptable ranges established by MPERS' Investment Policy. The table below lists the ending allocations as of June 30, 2019, along with the target and actual asset allocation as of June 30, 2020. Following the table are descriptions of each new beta group and its underlying assets.

Beta Group *Sub Asset Allocation*	**Ending FY 19 Allocation**	**FY 20 Target Allocation**	**Ending FY 20 Allocation**
Equity Beta	**50.26%**	**50%**	**52.51%**
Public Equity	*34.94%*	*40%*	*37.90%*
Private Equity	*15.32%*	*10%*	*14.62%*
Rates and Credit	**27.03%**	**30%**	**26.28%**
Traditional Fixed Income	*15.95%*	*22.5%*	*15.66%*
Opportunistic Debt	*11.08%*	*7.5%*	*10.62%*
Real Assets	**22.31%**	**20%**	**20.75%**
Real Assets	*12.14%*	*10%*	*11.93%*
Real Estate	*10.17%*	*10%*	*8.83%*
Cash	**0.40%**	**0%**	**0.46%**

Equity Beta

The equity beta group is comprised of three asset types: public equity, private equity and hedged equity. The equity beta group currently represents 52.51% of the overall portfolio. Within that overall equity allocation, the fund is overweight private equity structures (14.62% versus the new target of 10%), which is offset by an underweight to public equity (37.9% versus new target of 40%). In addition, 5.2% of the 40% of public equity is within the hedged equity allocation which did not have the same market exposure as the broad equity benchmarks for the majority of the fiscal year. The result of the current positioning is a modest underweight to the traditional equity markets.

Public Equity

The outbreak of COVID-19 sent a new wave of volatility through the public equity markets in Fiscal Year 2020. After ending calendar year 2019 at all-time highs, global equities dropped 21% in the first quarter of 2020 over fears of a global economic shutdown. After global banks and policy makers responded with an unprecedented amount of government stimulus, the markets stabilized and subsequently rallied over 19% in the second quarter of 2020. A deeper look into the recovery shows a market dominated by a handful of growth companies that were positioned to benefit from the "new normal" brought about by a global pandemic. As businesses and consumers migrated to working from home, technology stocks that helped citizens cope with the pandemic witnessed extraordinary gains, while traditional (and value based) industries such as airlines, hotels and restaurants struggled to stay afloat. In the case of U.S. equities, where the Russell 3000 index earned a total of 6.5% for the year, growth companies generated a 21.9% return while traditional value strategies lost 9.4% of their value during the year. In the end, Fiscal Year 2020 was an extremely volatile market but one that ultimately rewarded a concentrated portfolio of growth oriented stocks.

MPERS' public equity portfolio was unable to keep up with the policy benchmarks for the year, generating a negative return of 4.62% return relative to the global equity benchmark return of 2.11%. The underperformance stems primarily from two sources, namely the exposure to master limited partnerships (MLPs) during the falling energy markets and the value bias within the roster of active managers. Staff has since terminated the relationship with Tortoise (MPERS' MLP manager), which proved to be fortunate timing as it occurred directly before the COVID-19 outbreak, but the value bias in the portfolio remains in place. Staff is confident that the value bias will serve the portfolio well over the long term, but is working with NEPC to perform a top-down review of the equity portfolio to see if adjustments are necessary.

Hedged Equity

As part of the revised asset allocation on January 1, 2019, MPERS moved away from a standalone hedge fund target of 10% in favor of using certain hedge funds within a portable alpha construct in the global equity portfolio. Alpha is the return that is earned over the overall market return. The use of portable alpha involves taking the alpha that hedge fund managers can generate, and "porting" that alpha over the overall market return. To implement this approach, staff monitors the overall equity market risk (beta) within the hedge fund managers. Staff has brought the beta in the hedge fund portfolio down to around 0.3% as it has transitioned from a standalone portfolio with a beta of 0.5% to a low beta portfolio. It is expected that the hedge fund portfolio will continue to transition closer to a market neutral (or low to no beta portfolio) over the next few years, but regardless there must be an appropriate adjustment to account for the market risk embedded in the hedge fund portfolio relative to the broader equity markets. After calculating the current beta of the hedge fund managers, staff overlays additional equity exposure to move the beta of the entire portfolio closer to 90-100%. Hedged equity implies an overall less volatile equity portfolio given the hedge fund managers ability to deliver alpha, and an overall beta (market risk) below 100%. As of June 30, 2020, hedged equity represented 4.1% of the overall portfolio (or approximately 10.8% of the public equity portfolio), using the S&P 500 as the desired market exposure.

Private Equity

On January 1, 2019, MPERS lowered the target to private equity from 15% to 10%. While private equity continues to be the best performing asset class in MPERS' portfolio over the long term, staff is cognizant of the massive amounts of money raised in the sector over the past several years and the risks that it brings to future performance. Staff remains disciplined by slowing the investment pace and not "following the herd" of capital that is aggressively coming to the market during this late stage of an economic recovery. New commitments are focused on existing managers who are coming back to market and who have performed well. Distributions from existing investments have slowed but continue to outpace capital calls. As less money is committed to new funds during the coming years, the allocation to private equity should gradually decline in the direction of the new targeted allocation.

Private equity generated a 3.4% fiscal year return, surpassing the benchmark (S&P 500 + 3%) return of -4.17%. The "public equity plus" benchmark has been difficult to outperform given the strength of public equity markets coming out of the financial crisis and will continue to prove difficult to beat in a Fed-financed asset market environment. However, staff believes that private markets can provide additional diversification and opportunities to the long term success of the plan that public equities do not provide. The portfolio continues to mature nicely as evidenced by Fiscal Year 2020 being the sixth consecutive year where distributions from investments outpaced new capital calls.

Rates and Credit Beta

The rates and credit beta group consists of the traditional fixed income portfolio and the opportunistic debt portfolio. The overall allocation stands at 26% versus the new target of 30%. During Fiscal Year 2020, the traditional portfolio delivered a 10.88% return (versus the benchmark of 10.02%) and the opportunistic debt portfolio lost -5.05% in value (versus the benchmark of 0.03%).

Traditional Fixed Income

MPERS remained consistently underweight the targeted fixed income allocation of 20% throughout Fiscal Year 2020 and ended the year with a 15.66% allocation compared to the new target asset allocation of 22.5%. Yields on the U.S. Treasury bonds fell considerably during the year, with the 10-year Treasury bond falling from 2.02% to 0.65% and the 30-year Treasury bond dropping from 2.53% down to 1.41%. The falling interest rate environment sent existing bond prices higher, which led to a 10.9% return for MPERS' traditional fixed income portfolio.

The falling yields in traditional fixed income markets continues to create a dilemma for pension investors looking forward. While fixed income strategies (particularly long duration treasuries) offer the best diversification against equity market risk, their low yields create challenges in meeting MPERS' long-term actuarial return target of 7.0%. At the time of this report, the 30-year Treasury bond had a yield of roughly 1.4%. Simple mathematics show that for every dollar invested that earns 1.4%, another dollar must be invested in "something" that earns 12.6% to generate an average return of 7.0%. Given the uncertainty in the markets, very few strategies have the potential to generate those returns. The dilemma is that investing in the asset class that offers the best protection against equity market risk is also the same asset class that virtually guarantees underperformance of the actuarial hurdle in the coming years. For these reasons, opportunistic debt strategies are favored over the traditional fixed income markets.

Opportunistic Debt

The offset to MPERS' underweight position to traditional fixed income is the overweight position to opportunistic debt strategies. The year began with an 11.08% allocation relative to a 7.5% policy target and ended the year at 10.62%. The asset class generated a -5.05% return which underperformed the publicly traded high yield benchmark return of 0.03%. The benchmark had an especially volatile year, which included a drawdown of roughly 20% and subsequent dramatic rally to finish the year flat. While trailing the benchmark during a volatile one-year period, the portfolio's relative performance remains strong over the longer term.

The opportunistic debt portfolio is diversified among direct lending, public market investments and distressed investments. To date, the portfolio is largely built out and most of the focus in recent years has been on pivoting commitments away from direct lending and toward strategies that have flexibility to be more opportunistic. Recent commitments to opportunistic strategies were done in anticipation of a more volatile environment in future years. Those commitments had an active year given the global dislocation caused by COVID-19. Many of those strategies continue to have dry powder and staff expects those strategies to benefit from continued uncertainty in the global economy. Underperformance during the year was driven by a group of strategies exposed to the liquid credit markets. MPERS' remaining business development company (BDC) exposure and CLO debt tranches both suffered during the market sell-off and lagged in the rally late in year. Staff remains comfortable with the long-term performance of the asset class and expects recent investments to drive improved performance going forward. The pace of new commitments is expected to be in line with past years and should be partially funded by rotating exposure from underperforming legacy investments to strategies expected to benefit in a post-COVID investing environment

Real Assets Beta

The real assets beta group includes MPERS' real estate holdings along with the broader real asset strategies, e.g., energy, infrastructure, timber, and mining. Overall, this beta group underperformed in Fiscal Year 2020, with real assets generating a -11.37% return (versus the benchmark of 4.67%) and real estate generating a 3.80% return (versus the benchmark of 1.71%).

Real Estate

The underlying real estate allocation has a target of 10% of assets and includes a mix of public and private equity strategies, along with tactical exposures to public and private debt strategies. MPERS started the year with a 10.17% allocation and ended with an 8.83% allocation. The portfolio generated a 3.8% return for the year, outperforming the policy benchmark return of 1.71%. The core real estate portfolio (primarily stabilized and fully leased properties) generated a 2.86% return, while the non-core portfolio (value-added or opportunistic real estate strategies) returned 6.06% return. The publicly traded REIT (real estate investment trust) portfolio detracted from performance, returning -14.87% for the year. The allocation to REITS was lowered during the year ahead of this underperformance, which helped mitigate the impact of that weakness.

The COVID-19 pandemic will likely lead to dramatic changes in the real estate markets and impact the investing environment for years to come. The continued decline in interest rates will force investors to value the current income present in many real estate assets, but there will certainly be winners and losers within the overall real estate sector. As the world adapts to working from home, the number of office and retail centers will need to adjust to the lower demand, while industrial and multi-family strategies seem to be more stable sources of income. With that in mind, the core real estate allocation was reduced during the year, with the expectation of deploying those proceeds into more opportunistic strategies in the coming years. Several opportunistic managers in the portfolio have substantial dry powder (ability to deploy new capital), and are well positioned to benefit from the changing investment climate. Given the current underweight position, the pace of new commitments is expected to increase in the coming years.

Real Assets

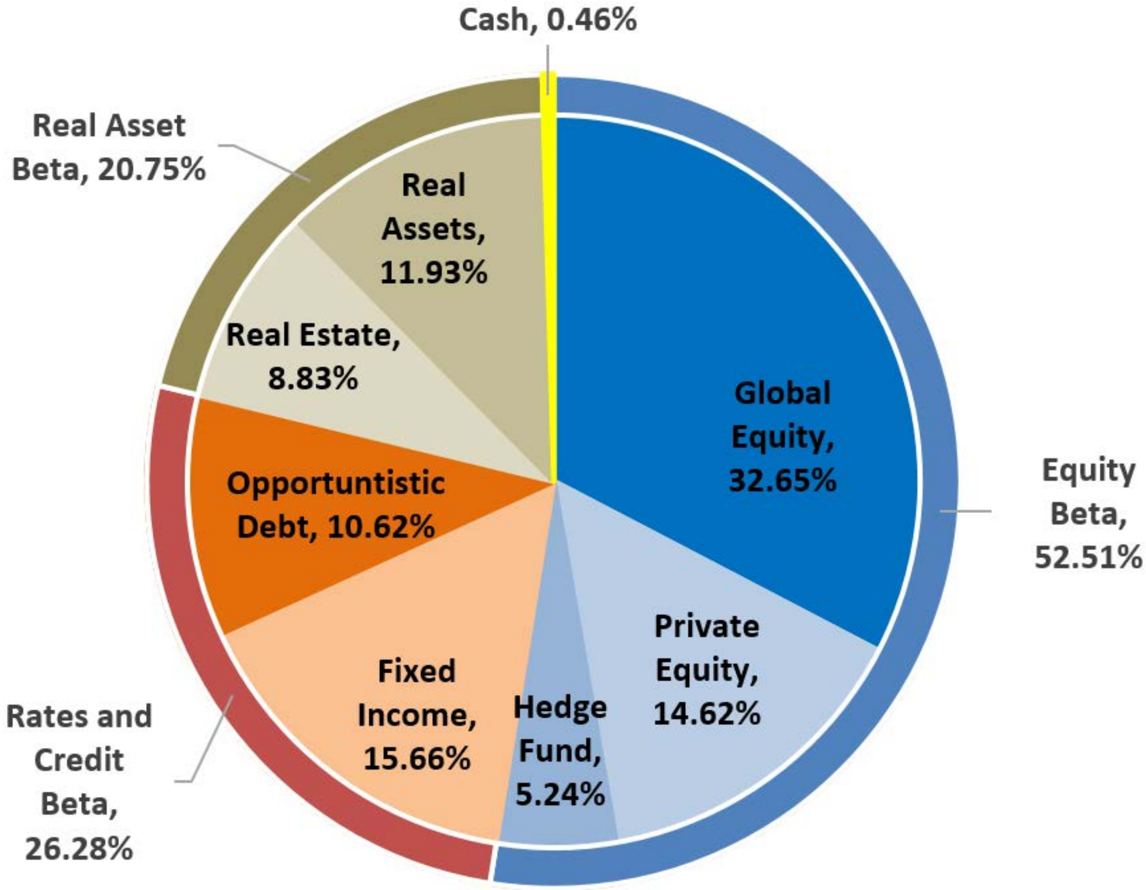
The underlying real asset allocation has a target of 10% of assets and includes a mix of natural resource strategies, infrastructure and transportation and timber strategies. MPERS started the year with a 12.14% allocation and ended with an 11.93% allocation. The portfolio generated a -11.37% return for the year, underperforming the policy benchmark return of 4.67%. Underperformance was driven by the dramatic decline in oil prices which fell to multi-decade lows as a result of falling demand from lockdowns put in place to slow the spread of COVID-19 and a price war between OPEC nations and Russia. Approximately 50% of the real assets portfolio is exposed to the oil and gas space, making it a challenging year for the portfolio. The real assets benchmark is defined by the Consumer Price Index plus a 4% return premium, so the absolute return nature of the benchmark is very difficult to compete with in years when the energy markets go through one of their worst markets in history. The timber exposure was also down slightly for the year, but should benefit from increased recreational land interest and higher lumber prices following the outbreak of COVID-19. On a positive note, MPERS' infrastructure assets generated good performance during the year as their defensive nature proved resilient.

Longer term, the asset class has underperformed the policy benchmark as a result of weak performance from energy managers. Staff continues to diversify the asset class including timber, metals and mining, and infrastructure assets. While COVID-19 led to dramatic demand destruction in the oil and gas markets in the short term, it has also resulted in significant cuts in supply as producers scale back exploration activity. Over time, this could set the stage for an improved commodity price environment and a better return environment. Commitment pacing is expected to slow as a result of the overweight position in the asset class and the focus will be on targeted investments which complement the existing exposures.

Looking Forward

The outbreak of COVID-19 brought an end to longest economic expansion in history, and is a stark reminder that risks are always present in the markets. Looking forward, the overall impact of COVID-19 remains unclear. Unemployment has spiked and economic growth has stalled, but the Federal Reserve and global central banks are doing everything they can to support the economy and stimulate growth. The low yields in traditional fixed income markets and relatively high valuations in the equity markets bring a new set of challenges. At the time of this report, the 30-year Treasury had a yield of roughly 1.4%, while government bonds across most of developed Europe remain at negative yields. Bond markets are clearly expecting minimal growth out of the global economy for the foreseeable future. The combination of low interest rates and low economic growth, together with equity valuations at historically high levels, suggests a low return environment going forward. Pension fund investors will need every tool available to meet long-term goals and objectives, and will likely have to look outside the traditional stock and bond markets to find strategies capable of generating attractive returns. Fortunately, MPERS' diversified asset allocation includes a mix of strategies that are designed to perform well throughout a wide range of investment markets, and staff is confident the portfolio is well positioned to meet the long-term goals of the system.

Investment Summary



Amounts Reported by Beta Groups and Management-Type Allocation 6/30/2020

	Fair Value	% of Fair Value
Global Equity		
Global Public Equity	$ 771,199,360	32.65%
Private Equity	345,207,198	14.62%
Hedged Equity	123,841,088	5.24%
Rates and Credit		
Fixed Income	369,830,439	15.66%
Opportuntistic Debt	250,886,734	10.62%
Real Assets		
Real Estate	208,436,563	8.82%
Real Assets	281,649,907	11.93%
Cash	10,779,171	0.46%
Total Investments	**$ 2,361,830,460**	**100.00%**

Reconciliation to Statement of Plan Net Assets:	
Less Accrued Investment Interest and Income	$ (5,695,747)
Less Investment Sales Receivable	(5,276,151)
Plus Investment Purchases Payable	1,675,129
Currency Adjustment	133,148
	$ 2,352,666,839

Largest Investment Holdings

Largest Equity Securities

(Non-Commingled Funds)

Security	Fair Value	% of Total
FLAGSTAR BANCORP INC COM PAR$.001	$ 891,464	0.106%
STEEL PARTNERS HLDGS L P PREFERRED UNITS SER A	$ 872,235	0.104%
CLARUS CORPORATION COM USD0.0001	$ 852,659	0.102%
SUNOPTA INC COM	$ 840,553	0.100%
BANCORP INC DEL COM STK	$ 810,548	0.097%
XPERI HLDG CORP COM	$ 807,623	0.096%
COMMUNITY BANKERS TR CORP COM STK	$ 790,482	0.094%
INVESTORS BANCORP INC NEW COM	$ 764,176	0.091%
ORASURE TECHNOLOGIES INC COM	$ 723,467	0.086%
PVTPL FIRST FNDTN INC COM	$ 703,878	0.084%

Largest Fixed Income Securities

(Non-Commingled Funds)

Par Value	Security	Fair Value
25,644,000	TN VY AUTH FED BOOK ENTRY PRIN STRIPS GENERIC PRIN PMT 04-01-2056 (UNDDATE)	$ 10,397,464
21,158,000	PVTPL ED LN AST-BACKED TR I 2013-1 SR NTCL A2 144A VAR RT DUE 04-26-2032 BEO	20,705,775
15,052,000	TVA 6.235 BD DUE 07-15-2045 ONE-TIME OPTPUT PAY 7-15-2001 @ PAR LAST NOTF 1**PUT	15,079,441
15,000,000	FEDERAL FARM CR BKS 3.1% 01-04-2035	18,073,050
15,000,000	PVTPL U S ED LN TR III LLC SER 2004 SUB NT 144A CL B VAR DUE 06-01-2039 BEO	13,853,454
14,000,000	USA TREASURY NTS 1.125% TIPS 15/1/21 USD1000 01-15-2021	16,557,982
12,050,000	NORTHSTAR ED FIN INC DEL 2007-1 STUDENT LN ASSET BKD NT CL 1A-6 01-29-2046 BEO	10,899,120
11,920,000	CONNECTICUT STUDENT LN FNDTN STUDENT LN ARCS-SR SER A-1 01 JUN 2046	11,504,469
10,138,444	MISSOURI HIGHER ED LN AUTH STUD LN REV VAR-SER A-1 VAR RT DUE 11-26-2032 REG	9,353,222
10,000,000	UNITED STATES OF AMER TREAS BONDS 0.75 DEB TIPS 02-15-2042	13,576,629
10,000,000	UNITED STATES OF AMER TREAS BONDS DTD 05/15/2016 2.5% DUE 05-15-2046 REG	12,402,734
10,000,000	UNITED STATES TREAS BDS DTD 00247 2.5% DUE 02-15-2046 REG	12,384,766
10,000,000	FFCB DTD 2.93 04-27-2029	11,647,239
10,000,000	PVTPL SLM STUDENT LN TR SER-03-14 CL-A7 VAR 10-25-2065 BEO	9,545,445
10,000,000	ACCESS GROUP INC DEL 2004-1 STUD LN AST BKD NT CL A-4 12-27-2032/09-27-2007 REG	8,863,650
9,600,000	EDUCATION LN ASSET BACKED TR I VAR RT 4.25% 08-01-2043 REG	8,304,000
9,150,000	BRAZOS HIGHER ED AUTH INC STUD LN BKD NT2007-1 CL I-A-4 VAR RT DUE 06-25-2043	8,889,683
8,175,000	CONNECTICUT STUDENT LN FNDTN STUDENT LN ARCS-SR SER A-2 01 JUN 2046	7,890,020
6,995,000	FFCB 3.89% DUE 06-01-2043	9,309,319
6,000,000	UNITED STATES TREAS BDS INDEX LINKED 1.75 DUE 01-15-2028 REG	8,758,988

Space and cost restrictions make it impractical to print the entire investment portfolio in this report. However, a portfolio listing is available for review in the office of the executive director of MPERS.

Schedule of Investment Expenses

Investment Fees

Historically, MPERS has reported investment management fees and accrued incentive fees (performance fees), and this year MPERS has expanded reporting to include fund pass-through expenses and portfolio company expenses. MPERS reports returns net of all fees and expenses; the additional fee categories reported have no impact on investment performance or returns. Comparing fees among peers is challenging given the lack of industry standard governing fee reporting. MPERS has taken a very conservative approach and reports all fees.

The strongest driver of fees is MPERS' asset allocation and use of private assets. Private assets have served an important role in MPERS' asset allocation including diversification and alpha generation. MPERS continues to monitor fees during the manager due diligence process and considers fees to be one factor when making investment decisions. MPERS strives to produce the highest net-of-fee returns regardless of the investment structure.

Summary of Investment Expenses

For the Year Ended June 30, 2020

Investment Income Expenses:	
Management and Performance Fees by Asset Class	
Equities	$ 2,780,847
Fixed Income Core	108,547
Opportunistic Debt	2,058,233
Real Estate	4,461,249
Private Equity	4,449,367
Real Assets	1,748,392
Hedge Funds	4,795,823
Total Management and Performance Fees	**$ 20,402,458**
Investment Custodial Fee	63,737
Performance Management	214,617
General Consultant (Monitoring) Fee	342,089
Professional Fees	554,145
Other Fees/Expenses	121,632
Total Investment Income Expenses	**$ 21,698,678**

Schedule of Investment Expenses

Expenses Accrued, Fiscal Year 2020

Manager	Base Fees	Expenses (1)	Performance Fees	Port. Co. Expenses (2)	Total
Aberdeen Asset Management	$ 9,787	$ 0	$ 0	$ 0	$ 9,787
ABRY Partners	17,621	5,972	(233,561)	0	(209,968)
Acadian Asset Managers	602,827	0	0	0	602,827
Aisling Capital	149,210	25,766	704,095	0	879,071
Alpstone Capital	194,644	16,290	(152,562)	0	58,372
American Infrastructure	38,176	61,240	0	0	99,416
American Timberland Co.	271,802	0	0	0	271,802
Anchorage Advisors	271,241	0	(269,890)	0	1,351
Apollo Real Estate	(2,541)	4,879	0	0	2,338
Ares Management	222,682	(94,867)	(111,651)	0	16,164
Arrowroot Capital	287,387	169,178	(180,996)	0	275,569
Audax Group	553	488	(2,152)	0	(1,111)
Banner Ridge Partners	179,755	14,821	31,540	0	226,116
Blackstone Investment	655,501	180,096	(1,368,267)	0	(532,670)
Blue Road	131,252	13,016	0	0	144,268
Bridgewater	531,236	28,705	0	0	559,941
Brooke Private Equity Advisors	88,125	0	28,717	0	116,842
Capital Partners	203,365	41,912	(198,658)	0	46,619
Car Val Investors	142,285	45,936	(879,796)	0	(691,575)
Carlyle Aviation Partners	206,686	12,493	(118,258)	0	100,921
Catchmark	51,860	0	737,218	0	789,078
Centersquare Investment Management	725,263	64,067	0	0	789,330
Cevian Capital	204,308	9,076	34,281	0	247,665
CIM Group	187,500	38,210	0	37,719	263,429
Clarion Partners	357,336	71,115	0	0	428,451
Colony Investors	0	1,000	0	0	1,000
Corrum Capital	109,658	61,721	(114,961)	0	56,418
DC Capital	63,713	7,536	(375,633)	128,287	(176,097)
Drive Capital	284,508	0	0	0	284,508
Dyal Capital Partners	400,824	29,746	0	0	430,570
Energy & Mineral Group	572,062	81,952	(1,861,735)	0	(1,207,721)
Franscisco Partners	1,606	37,849	0	0	39,455
GMO	173,797	0	0	0	173,797
Grey Rock Energy Partners	387,764	176,121	(737,327)	0	(173,442)
Grove Street Partners	458,567	0	(707,994)	0	(249,427)
Indus Capital Partners	181,234	26,047	0	0	207,281
Kennedy Capital	630,383	0	0	0	630,383
KKR	134,071	43,461	0	0	177,532
KPS Capital Partners	94,611	46,448	(146,272)	0	(5,213)
Long Ridge Equity Partners	200,000	62,411	1,198,211	0	1,460,622
Longford Investments	400,000	63,817	(67,078)	0	396,739
Luxor Capital Group	8,175	0	0	0	8,175

Continued on next page

1. *Fund pass through expenses* are administrative expenses charged to the fund and paid by the limited partners (or investors, including MPERS), 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.
2. *Portfolio company charges* are fees or costs paid to the general partners (fund managers) of private equity funds which are not applied as offsets to gross management fees. These charges are paid by the underlying portfolio companies of the funds, and therefore, are indirectly paid by MPERS.

Schedule of Investment Expenses

Expenses Accrued, Fiscal Year 2020 *(continued)*

Manager	Base Fees	Expenses (1)	Performance Fees	Port. Co. Expenses (2)	Total
M&G Investments	$ 122,247	$ 212,683	$ 202,383	$ 0	$ 537,313
Metacapital Management	167,034	0	211,857	0	378,891
MGG Investment Group	258,831	177,778	210,183	0	646,792
Millennium Management	2,564,171	0	748,596	0	3,312,767
Miravast	97,147	(53,056)	2,797	0	46,888
MKH	69,162	0	0	0	69,162
Monomoy Capital Partners	80,746	82,935	0	144,234	307,915
Natural Gas Partners	233,247	22,310	(921,251)	0	(665,694)
New Mountain Capital	0	20,328	0	0	20,328
New Quest Capital Partners	116,291	20,627	116,461	0	253,379
Nexus Investments	200,000	24,447	660,195	0	884,642
Northern Shipping	279,711	17,860	103,215	0	400,786
Oak Street Real Estate	85,349	109,890	(10,628)	0	184,611
OCP Asia Limited	318,864	64,540	99,619	0	483,023
Octagon Credit Investors	206,193	0	0	0	206,193
OpenGate Capital	126,233	7,724	(545,776)	0	(411,819)
Orion Mine Finance	379,987	401,119	(77,176)	0	703,930
Owl Rock Capital	395,365	107,909	50,388	0	553,662
Parametric	247,261	0	0	0	247,261
Pentwater Capital Management	285,483	0	(366,137)	0	(80,654)
Pfingsten Partners	128,519	7,781	0	0	136,300
Principal Real Estate Investors	967,207	0	0	0	967,207
Quantum Energy Partners	254,184	18,536	(64)	0	272,656
Ridgewood Energy	362,752	34,278	0	0	397,030
Riverstone Credit	295,753	277,811	(138,966)	0	434,598
Sciens	93,928	4,946	0	0	98,874
Sculptor Real Estate	127,400	169,143	210,632	0	507,175
Shore Capital	0	11,547	0	0	11,547
Shoreline Capital	17,447	7,459	(100,640)	588	(75,146)
Sigular Guff & Co.	0	22,043	(4,911)	0	17,132
Silchester International Investors	835,010	0	0	0	835,010
Silver Point Capital	15,004	28,883	0	0	43,887
Stockdale	0	13,799	0	0	13,799
Timberland Investment Resources	335,243	0	0	0	335,243
Torchlight Investors	111,944	17,672	(59,398)	0	70,218
Tortoise Investment Management	291,568	0	0	0	291,568
Tristan Capital	645,818	407,882	0	0	1,053,700
Turnbridge Capital	167,099	36,618	(17,326)	0	186,391
ValueAct Capital	103,387	0	0	0	103,387
Varde Partners	26,350	47,543	0	0	73,893
Total Manager Expenses	**$ 20,840,769**	**$ 3,669,537**	**$ (4,418,676)**	**$ 310,828**	**$20,402,458**
Professional Expenses					
Investment Custodial Fee	$ 63,737	$ 0	$ 0	$ 0	$ 63,737
Performance Management	214,617	0	0	0	214,617
General Consultant (monitoring) Fee	342,089	0	0	0	342,089
Professional Fees	554,145	0	0	0	554,145
Other Investment Expenses	121,632	0	0	0	121,632
Total Professional Expenses	**$ 1,296,220**	**$ 0**	**$ 0**	**$ 0**	**$ 1,296,220**
TOTAL INVESTMENT EXPENSES	**$ 22,136,989**	**$ 3,669,537**	**$(4,418,676)**	**$ 310,828**	**$21,698,678**

Schedule of Brokerage Commissions

Brokerage Firm	Total Commission	Number of Shares	Commission Rate
D. A. DAVIDSON & CO.	$ 54,694	1,553,337	$ 0.0352
BTIG LLC	53,156	2,768,176	0.0192
PIPER JAFFRAY & CO	30,900	2,172,726	0.0142
VIRTU AMERICAS LLC	17,354	1,013,561	0.0171
NORTHERN TRUST SECURITIES, INC.	16,939	841,411	0.0201
BARCLAYS BANK PLC (ALL U.K. OFFICES)	13,939	1,819,420	0.0077
KEEFE BRUYETTE	8,004	293,420	0.0273
RAYMOND JAMES & ASSOCIATES, INC.	6,697	189,331	0.0354
CREDIT SUISSE SECURITIES (USA) LLC	3,849	526,171	0.0073
BOFA SECURITIES, INC.	3,847	512,870	0.0075
NORTHLAND SECURITIES INC.	3,092	106,924	0.0289
B. RILEY AND CO., LLC	2,177	89,916	0.0242
WEEDEN AND CO	1,954	195,354	0.0100
WELLS FARGO BANK MINNESOTA NA	1,871	38,203,268	0.0000
J.P. MORGAN SECURITIES LLC	1,823	4,720,945	0.0004
BMO CAPITAL MARKETS CORP	1,774	170,040	0.0104
ISI GROUP INC.	1,763	184,588	0.0095
SANDLER O'NEILL & PARTNERS L.P.	1,735	43,363	0.0400
MORGAN STANLEY & CO. LLC	1,714	2,896,480	0.0006
CANACCORD GENUITY INC.	1,532	39,089	0.0392
DOUGHERTY & COMPANY LLC	1,325	40,459	0.0327
J.P. MORGAN SECURITIES PLC	1,198	92,031	0.0130
DAIWA CAPITAL MARKETS AMERICA INC.	1,175	235,666	0.0050
RBC CAPITAL MARKETS, LLC	1,153	75,426,424	0.0000
MACQUARIE BANK LIMITED	1,115	405,978	0.0027
LIQUIDNET INC	1,048	104,848	0.0100
MKM PARTNERS LLC	1,011	30,453	0.0332
OTHERS	25,335	1,166,430,806	0.0000
Total	**$ 262,174**	**1,301,107,055**	
Average Commission Rate			**$ 0.0002**

ACTUARIAL SECTION

The quality of being outstanding or extremely good.

Core Value

We make decisions in the best interest of our members based upon statutory guidance.

EXCELLENCE

GRS Retirement Consulting

800.521.0498 | P: 248.799.9000 | F: 248.799.9020 | www.grsconsulting.com

September 15, 2020

Retirement Board
Missouri Department of Transportation
and Highway Patrol Employees' Retirement System
1913 William Street
Jefferson City, Missouri 65102-1930

Ladies and Gentlemen:

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report. This report should not be relied on for any purpose other than the purpose described.

The basic financial objective of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS) is to establish and receive contributions which:

(1) when expressed in terms of percents of active member payroll, will remain approximately level from generation to generation of Missouri citizens; and

(2) when combined with present assets and future investment returns, will be sufficient to meet the present and future financial obligations of MPERS.

In order to measure progress toward this fundamental objective, MPERS has annual actuarial valuations performed. The valuations: (i) measure the present financial position, and (ii) establish contribution rates that provide for the current cost and level percent-of-payroll amortization of unfunded actuarial liabilities over a reasonable period. An actuarial valuation was performed based upon benefit conditions, data and assumptions as of June 30, 2020. This valuation indicates that contribution rates for the period beginning July 1, 2021 that are at least equal to the calculated contribution rates will meet the Board's financial objective. The calculated contribution rates are 58.00% of payroll for the 6,151 Non-Uniformed employees and 58.00% of payroll for the 1,204 Uniformed patrol employees.

The plan administrative staff provides the actuary with data for the actuarial valuation. The actuary relies on the data after reviewing it for internal and year to year consistency. Member data was not audited by the actuary. The actuary summarizes and tabulates population data in order to analyze longer term trends. We are not responsible for the accuracy or completeness of the data provided by MPERS.

Retirement Board
September 15, 2020
Page 2

Gabriel, Roeder, Smith & Company was responsible for the following schedules found in the Actuarial Section:

- Summary of Actuarial Assumptions and Methods
  - Probabilities of Separation from Active Employment
  - Individual Salary Increases
  - Joint Life Retirement Values
  - Probabilities of Retirement for Members
  - Probabilities of Disability for Members
- Summary of Member Data Included in Valuations
  - Active Members by Attained Age and Years of Service
  - Schedule of Active Member Valuation Data
- Solvency Test
- Derivation of Financial Experience
- Schedule of Retirees and Beneficiaries Added and Removed
- Summary of Plan Provisions
- Legislative Changes

Gabriel, Roeder, Smith & Company was responsible for the following schedules found in the Financial Section:

- Schedule of Changes in the Employer's Net Pension Liability
- Schedule of Employer's Net Pension Liability
- Schedule of Employer Contributions
- Schedule of the Actuarially Determined Contributions

Actuarial valuations are based upon assumptions regarding future activity in specific risk areas including the rates of investment return and payroll growth, eligibility for the various classes of benefits, and longevity among retired lives. These assumptions are adopted by the Board. The assumptions and the methods comply with the requirements of the Governmental Accounting Standards Board. Each actuarial valuation takes into account all prior differences between actual and assumed experience in each risk area and adjusts the contribution rates as needed. Actuarial methods and assumptions were adopted by the Board pursuant to the June 30, 2017 Experience Study. Gabriel, Roeder, Smith & Company has produced the following reports as of June 30, 2020:

Annual Actuarial Valuation Report
GASB Nos. 67 and 68 Valuation Report

In order to gain a full understanding of the condition of this plan, these reports should be read in their entirety.

Retirement Board
September 25, 2020
Page 3

To the best of our knowledge, the report is complete and accurate and was made in accordance with standards of practice promulgated by the Actuarial Standards Board. The assumptions and methods used for funding purposes meet the parameters set by Actuarial Standards of Practice. The actuarial assumptions used for the valuation produce results which, individually and in the aggregate, are reasonable.

The employer contributions determined in this report are based on Board funding policy. This policy is discussed on page 4 of the annual actuarial valuation report. We commend the Board for its aggressive monitoring and updating of the funding policy over the recent past. However, continued employer contributions at the current level do not guarantee benefit security. We therefore encourage the Board to continue to routinely monitor and update its funding policy and to continue to consider benefit security when doing so.

Future actuarial measurements may differ significantly from the current measurements presented in this report 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 (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

This report has been prepared by individuals who have substantial experience valuing public employee retirement systems. Heidi G. Barry and Jamal Adora are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The signing individuals are independent of the plan sponsor.

Based upon the valuation results, it is our opinion that the Missouri Department of Transportation and Highway Patrol Employees' Retirement System continues to operate in accordance with actuarial principles of level percent-of-payroll financing. It is important to the well-being of the System that it continues to receive contributions at the actuarially determined levels. It is also important to continue to monitor both the total funded status and the funded status of the retiree liabilities to ensure that the funding policy is consistent with the expected life span of the respective unfunded obligation.

Respectfully submitted,

Heidi G. Barry

Heidi G. Barry, ASA, FCA, MAAA

Jamal Adora, ASA, MAAA

Kenneth G. Alberts

Summary of Actuarial Assumptions and Methods

Valuation Date	June 30, 2020
Actuarial Cost Method	Entry Age
Amortized Method	Closed, level percent-of-payroll
Remaining Amortization Period	12 years*
Asset Valuation Method	3-year smoothing
Actuarial Assumptions	
Investment Rate of Return	7.00%
Projected Salary Increase	3.00% to 12.45%
Cost-of-Living Adjustments	1.80% Compound
Includes Wage Inflation at	3.00%

**Single equivalent period*

An actuarial valuation is based upon an actuarial cost method, an asset valuation method, and actuarial assumptions. These methods and assumptions are chosen by the Board of Trustees after consultation with the Actuary and other advisors.

The actuarial cost method is called the Entry Age Actuarial Cost Method. This method is consistent with the Board's level percent-of-payroll funding objective. With this method, the level percent-of-payroll is determined that will fund a member's retirement benefit over the member's entire working lifetime, from date of hire (Entry Age) to date of exit from the active member population. Differences in the past between assumed and actual experience become part of unfunded actuarial accrued liabilities and are amortized with level percent-of-payroll contributions. This cost method was first used in the **June 30, 1999** valuation.

The asset valuation method is a three-year smoothed market value method in which assumed investment return is recognized immediately each year and differences between actual and assumed investment return are phased-in over a closed three-year period. This asset valuation method is intended to give recognition to the long-term accuracy of market values while filtering out and dampening short-term market swings. This method was first used in the **June 30, 1999** valuation.

The actuarial assumptions used in producing the valuation fall into two broad classes: economic assumptions, and demographic assumptions. Economic assumptions refer to long-term rates of investment return, wage growth, covered population growth, and inflation. Demographic assumptions refer to retirement rates, turnover rates, disability rates, merit and seniority pay increases, and mortality rates. The current assumptions are based upon a 2012-2017 study of experience of the MPERS. The assumptions are reviewed from time to time to keep them reasonably current with expected experience. The next experience study is scheduled to follow the June 30, 2022 valuation.

Economic Assumptions

The investment return rate used in making the valuation was 7.00% per year, compounded annually (net after administrative expenses). This rate of return is not the assumed real rate of return. The real rate of return over wage inflation is defined to be the portion of investment return which is more than the wage inflation rate. Considering wage inflation recognition of 3.00%, the 7.00% rate translates to an assumed real rate of return over wage inflation of 4.00%. This rate was first used for the **June 30, 2018** valuation.

Pay increase assumptions for individual active members are shown on Table I. Part of the assumption for each year of service is for a merit and/or seniority increase, and the other 3.00% recognizes wage inflation. These rates were first used for the **June 30, 2018** valuation.

Price Inflation is assumed to be 2.25%. This results in a 1.8% annual COLA assumption. It is assumed that the 1.8% COLA will always be paid.

The Active Member Group size is assumed to remain constant at its present level.

The active member payroll for all members is assumed to increase 3.00% annually.

Non-Economic Assumptions

The mortality table used to measure Post-Retirement Healthy Mortality Rates are from the RP-2014 Healthy Annuitant Mortality Tables projected to 2022 using projection scale MP-2017, shown in Table II. Post-Retirement Disabled Mortality Rates use the RP-2014 Disabled Retiree Annuitant Mortality Tables projected to 2022 using projection scale MP-2017, shown in Table III. Pre-Retirement Mortality Rates use the RP-2014 Employee Mortality Tables projected to 2022 using projection scale MP-2017 and multiplied by a factor of 65%, shown in Table IV. These tables were first used for the **June 30, 2018** valuation.

The probabilities of retirement for members eligible to retire are shown on Table VI. The rates for full retirement were first used in the **June 30, 2018** valuation. The rates for reduced retirement were first used in the **June 30, 2018** valuation. Upon retirement, members are assumed to pick the BackDROP period that when combined with the remaining annuity produces the highest liability.

The probabilities of disability for members eligible to retire are shown on Table VII. The rates for disability were first used in the **June 30, 2018** valuation.

The probabilities of withdrawal from service, death-in-service and disability are shown for sample ages on Table VIII. The death-in-service and disability rates were first used in the **June 30, 2018** valuation. The withdrawal rates were first used in the **June 30, 2018** valuation.

The data about persons now covered and about present assets was furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the Actuary. Data was furnished as of May 31 and assumed to be statistically equivalent to June 30.

The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (MAAA).

Probabilities of Separation From Active Employment
Less Than 5 Years of Service

	MoDOT, Civilian Patrol and MPERS		Uniformed Patrol	
Service	Male	Female	Male	Female
0-1	30.00%	20.00%	12.00%	12.00%
1-2	16.00	14.00	6.00	6.00
2-3	9.00	11.00	2.50	2.50
3-4	7.00	9.00	2.50	2.50
4-5	5.50	6.00	2.50	2.50

Probabilities of Separation From Active Employment
More Than 5 Years of Service

	MoDOT, Civilian Patrol and MPERS		Uniformed Patrol	
Age	Male	Female	Male	Female
25	5.60%	6.00%	1.89%	1.89%
30	5.60	6.00	1.89	1.89
35	5.25	6.00	1.34	1.34
40	4.90	5.54	0.79	0.79
45	2.80	4.32	0.55	0.55
50	2.10	3.00	0.32	0.32
55	1.40	3.00	0.16	0.16
60	1.40	3.00	0.12	0.12

Salary Increase Assumptions
Service Based
% Merit Increases in Salaries Next Year

Service Index	MoDOT, Civilian Patrol and MPERS Rate	Uniformed Patrol Rate
1	6.80%	9.45%
2	4.50	5.00
3	2.80	2.75
4	1.50	2.50
5	1.00	2.00
6	0.80	1.50
7	0.00	1.25
8	0.00	1.25
9	0.00	1.00
10	0.00	0.75
11	0.00	0.75
12	0.00	0.75
13	0.00	0.50
14	0.00	0.50
15	0.00	0.25
16	0.00	0.25
17	0.00	0.25
18	0.00	0.25
19	0.00	0.25
20	0.00	0.25
21	0.00	0.00
22	0.00	0.00
23	0.00	0.00
24	0.00	0.00
25	0.00	0.00

Joint Life Retirement Values
(7.00% Interest)

Sample Attained Ages	Present Value of $1 Monthly for Life		Percent Dying Next Year		Future Life Expectancy (years)	
	Men	Women	Men	Women	Men	Women
50	$149.37	$153.84	0.3922%	0.2660%	32.36	34.85
55	142.00	147.02	0.5582%	0.3734%	28.05	30.34
60	132.97	138.52	0.7938%	0.5667%	23.89	25.97
65	122.06	128.13	1.1511%	0.8398%	19.90	21.76
70	109.01	115.45	1.7034%	1.2770%	16.11	17.74
75	93.80	100.44	2.6823%	2.0723%	12.58	13.97
80	76.99	83.55	4.5024%	3.5553%	9.41	10.56

The present values shown above are for illustrative purposes only and include a 50% survivor benefit but do not include the value of future post-retirement increases. Males are assumed to be 3 years older than their spouses.

Percent of Eligible Active Members Retiring Next Year
(Rates of Retirement)

Closed and Year 2000 Plans

	MoDOT, Civilian Patrol and MPERS				Uniformed Patrol	
	Male		Female		Male	Female
Age	Normal	Early	Normal	Early	Normal	Normal
50	40.00%	0.00%	25.00%	0.00 %	45.00%	45.00%
55	27.00	3.00	32.00	3.00	25.00	25.00
60	19.00	5.00	22.00	5.00	100.00	100.00
65	35.00	0.00	35.00	0.00	100.00	100.00
70	40.00	0.00	50.00	0.00	100.00	100.00

Year 2000 Plan – 2011 Tier

	MoDOT, Civilian Patrol and MPERS Normal		Uniformed Patrol	
Age	Age & Service	Rule of 90	Early	Normal
55	0.00%	30.00%	0.00%	30.00%
60	0.00	30.00	0.00	100.00
65	0.00	30.00	10.00	100.00
70	100.00	100.00	0.00	100.00

Percent of Members Becoming Disabled at the Indicated Age
(Rates of Disability)

	MoDOT, Civilian Patrol and MPERS		Uniformed Patrol	
Age	Male	Female	Male	Female
25	0.08%	0.08%	0.10%	0.10%
30	0.10	0.10	0.10	0.10
35	0.13	0.13	0.10	0.10
40	0.17	0.17	0.10	0.10
45	0.27	0.27	0.10	0.10
50	0.46	0.46	0.10	0.10
55	0.86	0.86	0.10	0.10
60	1.49	1.49	0.10	0.10

Schedule of Funding Progress

Year Ended June 30	Actuarial Asset Value	Accrued Liability – Entry Age	Unfunded Accrued Liability (UAAL)	Funded Ratio	Actuarial Covered Payroll(1)	UAAL as a Percentage of Covered Payroll
2011	1,427,290,718	3,297,589,869	1,870,299,151	43.28%	362,654,376	515.72%
2012(2)	1,531,033,613	3,306,278,671	1,775,245,058	46.31%	341,637,559	519.63%
2013(2)	1,657,402,393	3,583,975,559	1,926,573,166	46.24%	329,481,506	584.73%
2014	1,795,264,291	3,650,241,741	1,854,977,450	49.18%	336,590,797	551.11%
2015	1,967,001,509	3,715,845,651	1,748,844,142	52.94%	342,264,593	510.96%
2016	2,086,654,348	3,761,733,004	1,675,078,656	55.47%	344,275,147	486.55%
2017	2,172,787,144	3,802,443,730	1,629,656,586	57.14%	356,142,973	457.58%
2018(2)	2,274,248,122	3,981,838,941	1,707,590,819	57.12%	353,371,000	483.23%
2019	2,415,343,431	4,037,369,708	1,622,026,277	59.82%	362,356,771	447.63%
2020	2,481,329,531	4,092,097,897	1,610,768,366	60.64%	363,572,158	443.04%

(1) Values are estimated from contribution rate and amount.
(2) New assumptions and/or methods adopted.

See Note 5 of Notes to the Financial Statement in the Financial Section for Funding policy information.

Member and Employer Contribution Rates

Year Ended June 30	Employer Contributions All Benefit Structures		Member Contributions
	Uniformed Patrol Group	Non-Uniformed Group	2011 Tier All Groups
2011	**49.53%**	**39.46%**	**4.00%**
2012	**58.63%**	**45.45%**	**4.00%**
2013	**55.03%**	**50.92%**	**4.00%**
2014	**55.23%**	**54.25%**	**4.00%**
2015	**58.19%**	**58.76%**	**4.00%**
2016	**57.76%**	**58.05%**	**4.00%**
2017	**58.00%**	**58.00%**	**4.00%**
2018	**58.00%**	**58.00%**	**4.00%**
2019	**58.00%**	**58.00%**	**4.00%**
2020	**58.00%**	**58.00%**	**4.00%**

See Required Supplementary Information, Schedule of Employers' Contributions for more information.

Summary of Member Data Included In Valuations

	Non-Uniformed				
	Civilian Patrol	MoDOT and MPERS	Non-Uniformed Total	Uniformed Patrol	Grand Total
Active Members					
Closed Plan	236	1,283	1,519	454	1,973
Year 2000 Plan (also closed)	377	1,511	1,888	363	2,251
Year 2000 Plan - 2011 Tier (open)	477	2,267	2,744	387	3,131
Total Active Members	1,090	5,061	6,151	1,204	7,355
Total Active Members Prior Year	1,113	5,097	6,160	1,211	7,391
Retiree - Regular Pensioners					
Closed Plan	493	3,331	3,824	1,001	4,825
Year 2000 Plan (also closed)	606	3,595	4,201	8	4,209
Year 2000 Plan - 2011 Tier (open)	5	5	10	0	10
Total Regular Pensioners	1,104	6,931	8,035	1,009	9,044
Self Insured Disability Pensioners	2	40	42	3	45
Fully Insured Disability Pensioners	11	76	87	6	93
Terminated Vested Members	255	1,662	1,917	177	2,094
Total	**2,462**	**13,770**	**16,232**	**2,399**	**18,631**
Active Member Valuation Payroll	$ 49,999,727	$ 226,738,711	$ 276,738,438	$ 84,113,107	$ 360,851,545
Active Member Valuation Payroll Prior Year	$ 49,980,131	$ 224,584,899	$ 274,565,030	$ 84,731,026	$ 359,296,056
Unfunded Actuarial Accrued Liability	N/A	N/A	$1,158,661,344	$ 452,107,022	$1,610,768,366

Member data for actuarial valuation is as of May 31, 2020.

Active Members By Attained Age and Years of Service

MoDOT and MPERS

Closed Plan

Attained Age	Counted by Complete Years of Service to Valuation Date: 0-4	5-9	10-14	15-19	20-24	25-29	30+	Totals: No.	Valuation Payroll
Under 20	0	0	0	0	0	0	0	0	$ 0
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	0	0	0	1	1	0	0	2	121,655
40-44	0	1	2	5	120	1	0	129	6,485,741
45-49	0	0	1	2	189	101	1	294	16,556,060
50-54	0	2	1	7	152	198	47	407	22,666,166
55-59	0	2	2	2	113	81	79	279	15,064,626
60-64	0	1	0	1	58	47	31	138	7,068,420
65-69	0	0	0	0	11	10	10	31	1,625,996
70+	0	0	0	0	0	0	3	3	312,844
Totals	**0**	**6**	**6**	**18**	**644**	**438**	**171**	**1,283**	**$69,901,508**

Average Age	**52.4 years**
Average Service	**25.3 years**
Average Pay	**$54,483**

Year 2000 Plan

Attained Age	Counted by Complete Years of Service to Valuation Date: 0-4	5-9	10-14	15-19	20-24	25-29	30+	Totals: No.	Valuation Payroll
Under 20	0	0	0	0	0	0	0	0	$ 0
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	4	8	62	0	0	0	0	74	3,307,343
35-39	4	12	134	81	0	0	0	231	11,007,745
40-44	4	20	104	183	2	0	0	313	15,217,826
45-49	9	16	86	133	5	0	0	249	11,617,230
50-54	6	12	83	118	6	0	0	225	9,979,209
55-59	8	11	81	121	9	0	1	231	9,864,869
60-64	0	9	54	80	4	1	0	148	6,367,671
65-69	2	2	14	18	0	0	1	37	1,706,707
70+	0	0	1	2	0	0	0	3	136,815
Totals	**37**	**90**	**619**	**736**	**26**	**1**	**2**	**1,511**	**$69,205,415**

Average Age	**48.0 years**
Average Service	**14.7 years**
Average Pay	**$45,801**

Member data for actuarial valuation is as of May 31, 2020.

Active Members By Attained Age and Years of Service

MoDOT and MPERS

Year 2000 Plan - 2011 Tier

Attained Age	Counted by Complete Years of Service to Valuation Date: 0-4	5-9	10-14	15-19	20-24	25-29	30+	Totals: No.	Valuation Payroll
Under 20	10	0	0	0	0	0	0	10	$ 327,430
20-24	206	2	0	0	0	0	0	208	7,305,573
25-29	390	76	0	0	0	0	0	466	18,687,711
30-34	275	128	0	0	0	0	0	403	15,997,741
35-39	200	90	0	0	0	0	0	290	11,003,145
40-44	181	71	0	0	0	0	0	252	9,820,682
45-49	139	55	0	0	0	0	0	194	7,446,648
50-54	124	62	0	0	0	0	0	186	7,273,927
55-59	93	60	0	1	0	0	0	154	5,784,889
60-64	42	40	0	0	0	0	0	82	3,118,555
65-69	12	8	0	0	0	0	0	20	791,325
70+	2	0	0	0	0	0	0	2	74,163
Totals	**1,674**	**592**	**0**	**1**	**0**	**0**	**0**	**2,267**	**$ 87,631,789**

Average Age	**37.7 years**
Average Service	**23.3 years**
Average Pay	**$38,655**

Member data for actuarial valuation is as of May 31, 2020.

Uniformed Patrol

Closed Plan

Attained Age	Counted by Complete Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	Valuation Payroll
Under 20	0	0	0	0	0	0	0	0	$ 0
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	0	1	0	0	0	0	0	1	53,138
40-44	0	0	0	0	26	0	0	26	2,106,266
45-49	0	0	0	2	108	51	0	161	13,133,847
50-54	1	0	0	0	59	117	36	213	17,799,590
55-59	0	0	0	0	10	14	28	52	4,324,795
60-64	0	0	0	0	0	0	1	1	85,555
65-69	0	0	0	0	0	0	0	0	0
70+	0	0	0	0	0	0	0	0	0
Totals	**1**	**1**	**0**	**2**	**203**	**182**	**65**	**454**	**$ 37,503,191**

Average Age	**50.3 years**
Average Service	**25.5 years**
Average Pay	**$82,606**

Year 2000 Plan

Attained Age	Counted by Complete Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	Valuation Payroll
Under 20	0	0	0	0	0	0	0	0	$ 0
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	6	44	0	0	0	0	50	3,111,385
35-39	0	1	87	25	0	0	0	113	7,669,354
40-44	0	2	21	97	2	0	0	122	9,240,968
45-49	0	1	19	38	1	0	0	59	4,132,085
50-54	0	0	4	11	0	0	0	15	1,054,088
55-59	0	0	1	3	0	0	0	4	274,085
60-64	0	0	0	0	0	0	0	0	0
65-69	0	0	0	0	0	0	0	0	0
70+	0	0	0	0	0	0	0	0	0
Totals	**0**	**10**	**176**	**174**	**3**	**0**	**0**	**363**	**$ 25,481,965**

Average Age	**40.3 years**
Average Service	**14.7 years**
Average Pay	**$70,198**

Member data for actuarial valuation is as of May 31, 2020.

Uniformed Patrol

Year 2000 Plan - 2011 Tier

Attained Age	Counted by Complete Years of Service to Valuation Date 0-4	5-9	10-14	15-19	20-24	25-29	30+	Totals No.	Totals Valuation Payroll
Under 20	0	0	0	0	0	0	0	0	$ 0
20-24	58	0	0	0	0	0	0	58	3,063,581
25-29	103	42	0	0	0	0	0	145	7,687,147
30-34	33	96	0	0	0	0	0	129	7,242,431
35-39	4	28	0	0	0	0	0	32	1,827,557
40-44	4	14	0	0	0	0	0	18	1,022,735
45-49	0	2	0	0	0	0	0	2	119,320
50-54	1	2	0	0	0	0	0	3	165,180
55-59	0	0	0	0	0	0	0	0	0
60-64	0	0	0	0	0	0	0	0	0
65-69	0	0	0	0	0	0	0	0	0
70+	0	0	0	0	0	0	0	0	0
Totals	**203**	**184**	**0**	**0**	**0**	**0**	**0**	**387**	**$ 21,127,951**

Average Age	**29.7 years**
Average Service	**4.7 years**
Average Pay	**$54,594**

Member data for actuarial valuation is as of May 31, 2020.

Civilian Patrol

Closed Plan

Attained Age	0-4	5-9	10-14	15-19	20-24	25-29	30+	Totals No.	Totals Valuation Payroll
Under 20	0	0	0	0	0	0	0	0	$ 0
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	0	0	0	0	0	0	0	0	0
40-44	0	0	0	1	18	2	0	21	1,074,528
45-49	0	1	0	0	31	14	0	46	2,337,487
50-54	0	2	2	1	28	26	16	75	4,201,105
55-59	0	1	2	3	18	20	17	61	3,275,215
60-64	0	0	1	0	11	7	7	26	1,197,948
65-69	0	0	0	0	2	1	2	5	323,693
70+	0	0	0	0	1	0	1	2	68,355
Totals	**0**	**4**	**5**	**5**	**109**	**70**	**43**	**236**	**$ 12,478,331**

Counted by Complete Years of Service to Valuation Date

Average Age	**53.1 years**
Average Service	**25.3 years**
Average Pay	**$52,874**

Year 2000 Plan

Attained Age	0-4	5-9	10-14	15-19	20-24	25-29	30+	Totals No.	Totals Valuation Payroll
Under 20	0	0	0	0	0	0	0	0	$ 0
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	5	16	0	0	0	0	21	1,030,570
35-39	0	8	43	20	0	0	0	71	3,578,147
40-44	3	7	30	42	0	0	0	82	4,378,073
45-49	1	1	21	24	1	0	0	48	2,313,012
50-54	3	7	24	25	3	0	0	62	2,897,619
55-59	1	3	18	21	5	0	0	48	2,166,715
60-64	0	2	14	12	2	1	0	31	1,396,400
65-69	1	3	5	3	0	0	0	12	444,734
70+	0	0	2	0	0	0	0	2	46,088
Totals	**9**	**36**	**173**	**147**	**11**	**1**	**0**	**377**	**$ 18,251,358**

Counted by Complete Years of Service to Valuation Date

Average Age	**47.2 years**
Average Service	**14.0 years**
Average Pay	**$48,412**

Member data for actuarial valuation is as of May 31, 2020.

Civilian Patrol

Year 2000 Plan - 2011 Tier

Attained Age	Counted by Complete Years of Service to Valuation Date 0-4	5-9	10-14	15-19	20-24	25-29	30+	Totals No.	Valuation Payroll
Under 20	0	0	0	0	0	0	0	0	$ 0
20-24	26	0	0	0	0	0	0	26	951,578
25-29	91	16	0	0	0	0	0	107	4,630,702
30-34	47	45	0	0	0	0	0	92	3,947,188
35-39	28	25	0	0	0	0	0	53	2,286,185
40-44	23	20	0	0	0	0	0	43	1,694,590
45-49	27	17	0	0	0	0	0	44	1,680,056
50-54	22	22	0	0	0	0	0	44	1,708,442
55-59	23	12	0	0	0	0	0	35	1,217,570
60-64	12	15	0	0	0	0	0	27	943,525
65-69	2	4	0	0	0	0	0	6	210,201
70+	0	0	0	0	0	0	0	0	0
Totals	**301**	**176**	**0**	**0**	**0**	**0**	**0**	**477**	**$19,270,037**

Average Age	**39.0 years**
Average Service	**4.2 years**
Average Pay	**$40,398**

Member data for actuarial valuation is as of May 31, 2020.

Schedule of Active Member Valuation Data

Actuarial Valuation for June 30,	Number of Participating Employers	Number of Active Members	Covered Payroll	Average Pay	Percent Change in Average Pay from Prior Year
2011	3	8,231	361,639,001	43,936	0.4%
2012	3	7,458	329,293,168	44,153	0.5%
2013	3	7,319	323,205,767	44,160	0.0%
2014	3	7,390	332,085,689	44,937	1.8%
2015	3	7,358	334,400,980	45,447	1.1%
2016	3	7,441	339,799,379	45,666	0.5%
2017	3	7,456	348,979,212	46,805	2.5%
2018	3	7,391	351,496,555	47,557	1.6%
2019	3	7,421	359,296,056	48,416	1.8%
2020	3	7,355	360,851,545	49,062	1.3%
				Ten-Year Average	**1.2%**

Member data for actuarial valuation is as of May 31, 2020.

Solvency Test

The MPERS funding objective is to meet long term benefit promises through contributions that remain approximately level from year to year as a percent of member payroll. If the contributions to the System are level in concept and soundly executed, the System will pay all promised benefits when due – the ultimate test of financial soundness.

A solvency test is one means of checking a system's progress under its funding program. In a solvency test for a non-contributory plan, the plan's present assets (cash and investments) are compared with: 1) The liabilities for future benefits to present retired lives and 2) The liabilities for service already rendered by members. In a system that has been following the discipline of level percent-of-payroll financing, the liabilities for future benefits to present retired lives (liability 1) will be fully covered by present assets (except in rare circumstances). In addition, the liabilities for service already rendered by members (liability 2) will be partially covered by the remainder of present assets. The larger the funded portion of liability 2, the stronger the condition of the system.

The schedule below illustrates the history of liability 2 of the System.

Valuation Date June 30	(1) Member Contributions	(2) Retirees and Beneficiaries	(3) Active and Inactive Members	Present Valuation Assets	Portion of Present Values Covered by Present Assets			
					(1)	(2)	(3)	Total
	---Millions---							
2011	0	2,045	1,253	1,427	100%	70%	0%	43%
2012*	0	2,133	1,173	1,531	100%	72%	0%	46%
2013*	1	2,333	1,250	1,657	100%	71%	0%	46%
2014	2	2,384	1,264	1,795	100%	75%	0%	49%
2015	3	2,444	1,269	1,967	100%	80%	0%	53%
2016	5	2,470	1,287	2,087	100%	84%	0%	55%
2017	8	2,488	1,306	2,173	100%	87%	0%	57%
2018*	11	2,598	1,373	2,274	100%	87%	0%	57%
2019	14	2,656	1,367	2,415	100%	90%	0%	60%
2020	18	2,726	1,348	2,481	100%	90%	0%	61%

** New assumptions and/or methods adopted.*

Derivation of Financial Experience

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 sizeable year-to-year variations from assumed experience are common. Detail on the derivation of the experience gain (loss) is shown below.

UAAL Beginning of Year (at July 1)	$ 1,622,026,277
Normal Cost	48,532,753
Transer In and Service Purchase - Libaility	5,046,936
Contributions	(220,902,777)
Interest	107,677,522
Net Change in LTD Assets	0
Expected UAAL Before Any Changes	1,562,151,902
Effect of Benefit Changes	0
Effect of Changes in Assumptions & Methods	0
Effect of Adjustment	0
Expected UAAL After Changes	1,562,151,902
End of Year UAAL (at June 30)	1,610,768,366
Gain/(Loss) for Year	$ (48,616,464)
Gain/(Loss) as a percent of actuarial accrued liabilities at start of year ($3,802.4 million)	(1.2)%

** Result of receiving disability information on retired members who are at or past normal retirement age.*

Valuation Date June 30	**Experience Gain (Loss) as % of Beginning Accrued Liability**
2011	2.2%
2012	3.2%
2013	2.1%
2014	2.1%
2015	2.4%
2016	1.1%
2017	0.1%
2018	0.6%
2019	0.7%
2020	(1.2)%

Schedule of Retirees and Beneficiaries Added and Removed

Valuation Date	Added to Rolls		Removed from Rolls		Rolls End of Year		Average Annual Allowances	% Increase	
	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances		in Annual Allowance	in Average Annual Allowance
FY2020									
Retirees	339	$4,389,004	204	$360,775	7,208	$203,365,258	$28,214	2.39%	0.53%
Beneficiaries	129	1,441,941	122	1,316,530	1,879	$37,200,605	19,798	3.35%	2.64%
Disabilities	7	0	26	750	139	$839,398	6,039	-1.93%	0.89%
FY2019									
Retirees	308	$4,104,217	187	$2,746,320	7,077	$198,618,027	$28,065	2.54%	0.78%
Beneficiaries	133	1,424,022	130	1,211,576	1,866	$35,993,556	19,289	3.04%	2.87%
Disabilities	22	0	27	31,787	143	$855,947	5,986	1.26%	4.80%
FY2018									
Retirees	311	$3,842,195	201	$2,780,558	6,956	$193,705,411	$27,847	1.96%	0.34%
Beneficiaries	112	1,103,494	124	855,794	1,863	$34,930,984	18,750	1.97%	2.62%
Disabilities	18	0	25	26,921	148	$845,327	5,712	-2.82%	2.44%
FY2017									
Retirees	352	$4,642,501	196	$3,023,457	6,846	$189,990,373	$27,752	1.29%	-1.02%
Beneficiaries	127	1,536,955	134	1,099,249	1,875	$34,257,599	18,271	3.49%	3.88%
Disabilities	24	0	24	15,898	155	$869,833	5,576	-3.92%	-4.54%
FY2016									
Retirees	300	$3,820,071	193	$3,032,208	6,690	$187,571,039	$28,038	2.31%	0.68%
Beneficiaries	129	1,205,294	121	889,494	1,882	$33,100,896	17,588	3.18%	2.74%
Disabilities	20	0	29	5,787	155	$905,306	5,841	0.21%	6.05%
FY2015									
Retirees	406	$4,669,565	188	$2,712,395	6,583	$183,337,549	$27,850	2.61%	-0.79%
Beneficiaries	113	1,290,336	139	900,991	1,874	$32,080,172	17,119	2.65%	4.07%
Disabilities	21	0	30	22,387	164	$903,386	5,508	-3.43%	1.87%
FY2014									
Retirees	307	$4,434,888	176	$2,317,420	6,365	$178,670,075	$28,071	3.54%	1.41%
Beneficiaries	112	1,163,441	126	863,108	1,900	$31,253,184	16,449	3.91%	4.68%
Disabilities	19	6,760	25	19,831	173	$935,492	5,407	3.41%	6.40%
FY2013									
Retirees	395	$5,001,943	174	$2,761,791	6,234	$172,564,478	$27,681	4.56%	0.85%
Beneficiaries	130	1,349,835	96	717,434	1,914	$30,077,515	15,714	6.79%	5.00%
Disabilities	27	0	23	6,788	179	$904,683	5,082	-1.88%	-3.00%
FY2012									
Retirees	413	$5,988,784	171	$2,119,116	6,013	$165,042,751	$27,448	4.10%	-0.09%
Beneficiaries	130	1,206,259	105	610,931	1,880	$28,166,374	14,966	5.20%	3.69%
Disabilities	34	0	25	16,712	175	$922,027	5,239	0.39%	-5.31%
FY2011									
Retirees	311	$3,955,409	146	$2,406,006	5,771	$158,543,113	$27,472	0.74%	-2.14%
Beneficiaries	102	891,718	109	710,880	1,855	$26,772,995	14,433	-1.17%	-0.79%
Disabilities	38	0	14	10,399	166	$918,403	5,533	1.69%	-13.00%

New disabilities are covered / paid by the Standard Insurance Co.
Data of this chart is as of June 30, 2020.

Summary of Plan Provisions *

Comparison of the Closed Plan, the Year 2000 Plan, and the Year 2000 Plan - 2011 Tier
For the Year Ended June 30, 2020

Plan Provision	Closed Plan	Year 2000 Plan	Year 2000 Plan - 2011 Tier
Membership Eligibility	• Members hired prior to July 1, 2000, who became vested, and worked or continue to work in a position normally requiring at least 1,040 hours of work annually	• Members hired for the first time on or after July 1, 2000, in a position normally requiring at least 1,040 hours of work annually • Members who left state employment prior to becoming vested and return to work (for 12 continuous months) on or after July 1, 2000, in a position normally requiring at least 1,040 hours of work annually	• Members hired for the first time on or after January 1, 2011, in a position normally requiring at least 1,040 hours of work annually
Normal Retirement Eligibility	• Age 65 & active with 4 years of service • Age 65 with 5 years of service • Age 60 with 15 years of service • "Rule of 80"/minimum age 48 Uniformed Members Only: • Age 55 & active with 4 years of service • Age 55 with 5 years of service • Mandatory retirement at age 60; no minimum service requirement (active only)	• Age 62 with 5 years of service • "Rule of 80"/minimum age 48 Uniformed Members Only: • Mandatory retirement at age 60; no minimum service requirement (active only)	• Age 67 with 5 years of service • "Rule of 90"/minimum age 55 Uniformed Members Only: • Age 55 & active with 5 years of creditable service (active only) • Mandatory retirement at age 60; no minimum service requirement (active only)
Early (Reduced) Retirement Eligibility	• Age 55 with 10 years creditable service	• Age 57 with 5 years creditable service	• Age 62 & active with 5 years of creditable service (active only)
Life Benefit	16% x FAP** x service (base benefit is increased by 33 1/3% for uniformed patrol members only)	17% x FAP** x service	17% x FAP** x service
Temporary Benefit	Not available	08% x FAP** x service Until age 62, only if retiring under "Rule of 80"	08% x FAP** x service Until age 62, only if retiring under "Rule of 90"
Special Benefit	Uniformed Members Only: $90/mo payable until age 65, offset by any amount earned from gainful employment (does not apply if hired on or after January 1, 1995)	Uniformed Members Only: Until age 62, if retiring under "Rule of 80" or at mandatory age 60	Uniformed Members Only: Until age 62, if retiring under either normal retirement eligibility provision
Death Benefit	$5,000 benefit paid to named beneficiary • Available to active employees or LTD recipients who retired after September 28, 1985 • Available to work-related disability recipients after September 28, 1985	$5,000 benefit paid to named beneficiary • Available to active employees or LTD recipients who retire • Available to work-related disability recipients	$5,000 benefit paid to named beneficiary • Available to active employees or LTD recipients who retire • Available work-related disability recipients
Vesting	5 years of service	5 years of service	5 years of service, if active on or after January 1, 2018

Summary of Plan Provisions *

Comparison of the Closed Plan, the Year 2000 Plan, and the Year 2000 Plan - 2011 Tier
For the Year Ended June 30, 2020

Plan Provision	Closed Plan	Year 2000 Plan	Year 2000 Plan - 2011 Tier
Cost-of-Living Allowance (COLA)	Annual COLA is equal to 80% of the change in the CPI-U with a maximum rate of 5%. Exception: If hired before August 28, 1997, annual COLA is a minimum of 4% until benefit increases reach 65% of the original benefit (cap). After 65% cap is reached, annual COLA will be equal to 80% of the change in the CPI-U, with a maximum rate of 5%.	Annual COLA is equal to 80% of the change in the CPI-U with a maximum rate of 5%.	Annual COLA is equal to 80% of the change in the CPI-U with a maximum rate of 5%.
Survivor Benefit (death before retirement) Non Duty-Related Death	If employee is vested: • Survivor benefit to eligible spouse calculated using the Joint & 100% survivor option or 80% of the member's life income annuity paid to eligible children under age 21 • If at least 3, but less than 5, years of service, the survivor benefit is calculated using 25% of the member's base benefit calculated as if the member retired on his/her date of death	If employee is vested: • Survivor benefit to eligible spouse calculated using the joint & 100% survivor option or 80% of the member's life income annuity paid to eligible children under age 21	If employee is vested: • Survivor benefit to eligible spouse calculated using the joint & 100% survivor option or 80% of the member's life income annuity paid to eligible children under age 21
Duty-Related Death	• Survivor benefit to eligible spouse or children no less than 50% of final average pay (no minimum service requirement)	• Survivor benefit to eligible spouse or children no less than 50% of final average pay (no minimum service requirement)	• Survivor benefit to eligible spouse or children no less than 50% of final average pay (no minimum service requirement)
Optional Forms of Payment	Payment options include: • Life income annuity • Unreduced joint & 50% survivor • Joint & 100% survivor • 60 or 120 guaranteed payments • BackDROP	Payment options include: • Life income annuity • Joint & 50% survivor • Joint & 100% survivor • 120 or 180 guaranteed payments • BackDROP	Payment options include: • Life income annuity • Joint & 50% survivor • Joint & 100% survivor • 120 or 180 guaranteed payments
Disability	Long-term disability and work-related disability	Long-term disability and work-related disability	Long-term disability and work-related disability
Employee Contributions	Non-contributory	Non-contributory	4% of gross pay

*This summary describes the plan provisions in chapter 104 of the Missouri Revised Statutes. It does not overrule any other applicable statute or administrative rule and, in the event of a conflict, the applicable statute or rule would apply. The Year 2000 Plan was effective July 1, 2000 and the Year 2000 Plan – 2011 Tier was effective January 1, 2011. A complete summary is available at the MPERS office.

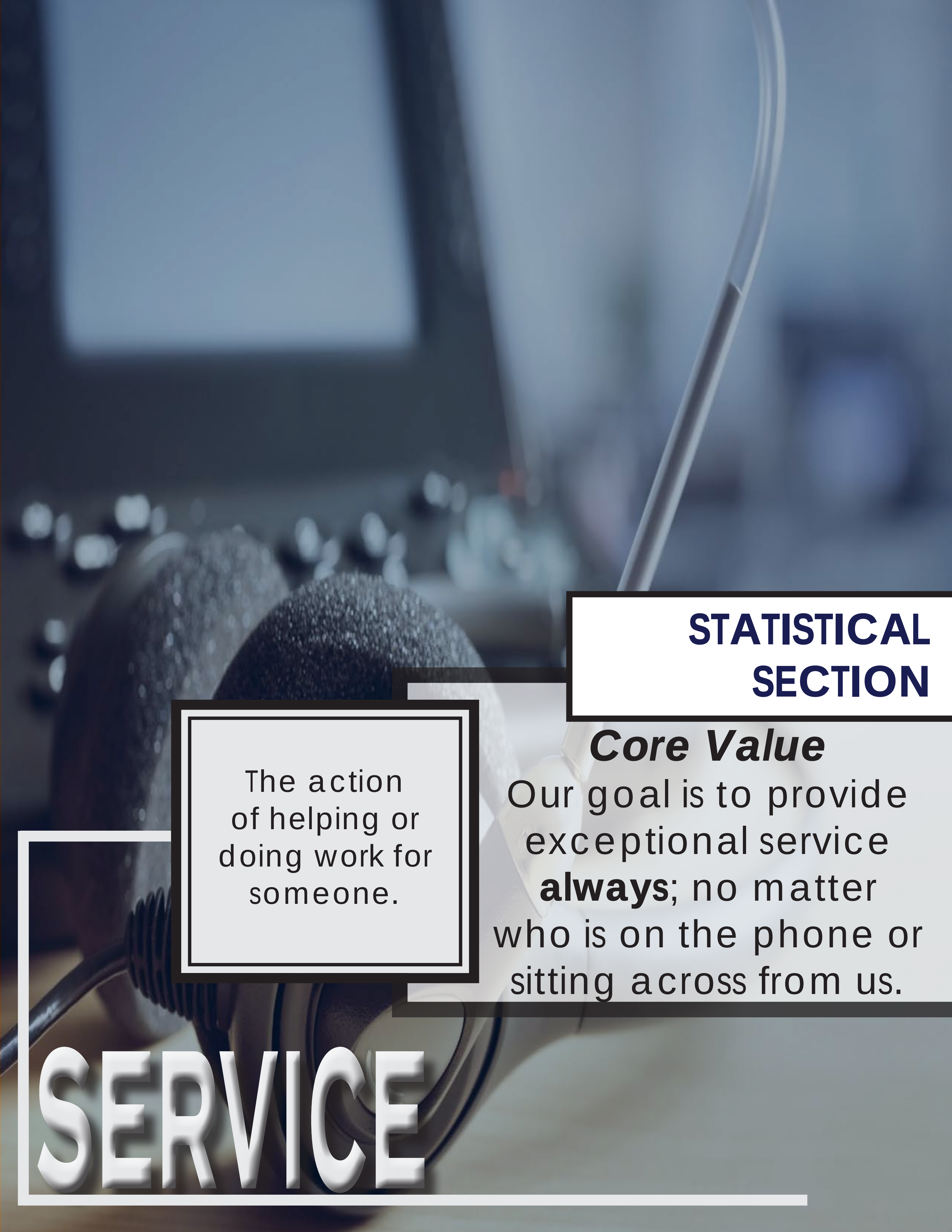
**Final average pay (FAP) – average of highest 36 consecutive months of pay.

See Note 2 of Notes to the Financial Statements for more information.

Legislative Changes

Effective January 1, 2021, a retiree who elected a survivor option at retirement and divorces after retirement may elect to have the benefit revert to a single life income annuity. Per the statute, MPERS must approve a divorce decree or amended divorce decree dated January 1, 2021, or after, that provides sole ownership by the member of all rights in the annuity and must further state that the former spouse shall not be entitled to any survivor benefits (per sections 104.090.7 and 104.1027). In addition, the member must submit a completed application.

Notes



STATISTICAL SECTION

Core Value

Our goal is to provide exceptional service **always**; no matter who is on the phone or sitting across from us.

The action of helping or doing work for someone.

SERVICE

Statistical Summary

Financial Information
The chart on page 80 details a 10-year history of the additions (revenues) and deductions (expenses) of MPERS.

The chart on page 81 details a 10-year history of benefit payments by type.

Plan Membership
Overall, MPERS' membership increased by 107. Retired members and their beneficiaries increased by 140, terminated-vested members increased by 48, and active members decreased by 81.

Other charts and graphs in this section detail demographic information concerning our members and employers.

Sources: All non-accounting data in this section was derived from internal sources and the annual actuarial valuation reports. Member data may differ between some schedules because the valuations are performed using data as of May 31 each year.

MoDOT and Patrol Employees' Retirement System
Changes in Net Position, Last Ten Fiscal Years

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Additions										
Employer Contributions	$150,022,169	$164,880,140	$170,836,117	$183,353,841	$200,638,571	$199,609,396	$206,562,924	$204,955,180	$210,166,927	$210,871,852
Employee Contributions (1)	45,361	202,843	503,550	1,282,379	2,086,000	2,503,824	3,238,502	3,721,983	4,449,428	4,983,989
Transfers from Other Systems (2)	17,609,276	264,954	1,727,834	1,784,382	1,114,437	2,729,679	1,752,050	1,867,445	2,432,370	3,483,574
Other Contributions	453,984	908,898	635,900	978,184	1,208,162	978,689	1,645,487	1,279,434	1,546,916	1,563,362
Net Investment Income	279,612,052	42,091,564	198,139,438	319,445,655	92,645,423	21,432,090	220,301,127	197,619,367	154,326,511	(10,673,270)
Other Income	33,141	13,760	1,650	125	148	5	614	472	307	5,412
Total Additions to Fiduciary Net Position	447,775,983	208,362,159	371,844,489	506,844,566	297,692,741	227,253,683	433,500,704	409,443,881	372,922,459	210,234,919
Deductions										
Benefit Payments	202,153,768	219,704,320	224,518,100	231,384,708	241,714,876	240,176,011	251,284,152	259,058,863	259,817,811	267,605,833
Administrative Expenses	2,658,849	2,934,969	2,997,225	3,736,355	4,066,944	4,370,860	4,515,458	4,693,492	4,372,966	4,291,028
Total Deductions from Fiduciary Net Position	204,812,617	222,639,289	227,515,325	235,121,063	245,781,820	244,546,871	255,799,610	263,752,355	264,190,777	271,896,861
Change in Net Position	**$242,963,366**	**$(14,277,130)**	**$144,329,164**	**$271,723,503**	**$51,910,921**	**$(17,293,188)**	**$177,701,094**	**$145,691,526**	**$108,731,682**	**$(61,661,942)**

(1) Employee contributions began January 1, 2011 for members in the Year 2000 Plan - 2011 Tier.
(2) 2011 transfer from MOSERS for Water Patrol employees.

Benefit Payments By Type

MoDOT and Patrol Employees' Retirement System
Benefit Payments by Type, Last Ten Fiscal Years

Type of Benefit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Age and Service Benefits:										
Retiree and Survivor Annuity Payments	$188,171,369	$195,964,396	$205,617,640	$212,840,210	$218,827,986	$224,098,038	$227,997,513	$237,850,981	$238,205,549	$245,194,376
BackDROP Payments	10,792,932	18,138,891	13,426,923	13,438,730	16,366,338	10,677,166	16,887,349	14,546,108	15,424,880	15,787,033
Disability Benefits:										
Long-Term Disability	101,875	85,240	79,964	79,184	76,061	66,389	60,352	49,613	35,987	26,488
Work-Related Disability	648,320	668,821	691,227	774,541	716,047	718,009	707,953	714,197	711,990	698,794
Normal Disability	167,427	166,140	138,281	121,872	108,891	109,027	109,455	110,310	112,000	114,119
Insured Disability	1,696,845	1,592,517	1,512,685	1,531,578	1,554,676	1,567,825	1,620,418	1,601,605	1,615,860	1,640,971
Death Benefits	575,000	675,000	665,000	703,571	810,000	820,000	855,153	860,000	820,000	890,000
Service Transfer Payments[2]	0	2,410,526	2,357,080	1,876,336	3,147,482	1,921,451	2,724,631	2,823,042	2,111,007	2,457,945
Employee Contribution Refunds[1]	0	2,789	29,300	18,686	107,395	198,106	321,328	503,007	780,538	796,107
Total Benefits	**$202,153,768**	**$219,704,320**	**$224,518,100**	**$231,384,708**	**$241,714,876**	**$240,176,011**	**$251,284,152**	**$259,058,863**	**$259,817,811**	**$267,605,833**

(1) Employee contributions began January 1, 2011 for members in the Year 2000 Plan - 2011 Tier.
(2) Reciprocal transfer legislation enacted effective August 28, 2011.

Budget to Actual Report

As of June 30, 2020

	Annual Budget	Actual Year End	Actual % Spent	Budget Variance Favorable (Unfavorable)
Administrative Expenses				
Salary/Benefits	$ 2,254,831	$ 2,023,782	89.8%	$ 231,049
Professional Services	304,330	312,292	102.6%	(7,962)
Meetings/Travel/Education	30,000	17,088	57.0%	12,912
Member Education	14,580	4,219	28.9%	10,361
Office Supplies	6,000	4,183	69.7%	1,817
Printing/Postage	32,500	24,350	74.9%	8,150
Membership Dues/Subscriptions	20,477	20,518	100.2%	(41)
Utilities	40,220	30,561	76.0%	9,659
Building Expenses/Maintenance	44,960	39,822	88.6%	5,138
Rental/Lease	8,550	10,096	118.1%	(1,546)
Equipment/Furniture	8,400	4,671	55.6%	3,729
Information Technology	266,320	248,213	93.2%	18,107
Administrative Sub-total	$ 3,031,168	$ 2,739,795	90.4%	$ 291,373
Investment Expenses				
Salary/Benefits	$ 1,832,876	$ 1,172,017	63.9%	660,859
Investment Services	642,720	635,443	98.9%	7,277
Meetings/Travel/Education	58,350	40,771	69.9%	17,579
Direct Operating Expenses	43,840	42,471	96.9%	1,369
Investment Sub-total	$ 2,577,786	$ 1,890,702	73.3%	$ 687,084
TOTALS	**$ 5,608,954**	**$ 4,630,497**	**82.6%**	**$ 978,457**

Reconciliation to Statement of Changes in Fiduciary Net Position, Administrative Expenses:

Total Administrative Expenses	$ 4,291,028
Investment General Consultant	342,089
Investment Custodian	278,354
Actuarial Experience Study	(9,000)
Depreciation Expense	(247,368)
OPEB Expense	(55,660)
OPEB Deferred Outflow	31,054
Capitalized Equipment Costs	0
	$ 4,630,497

Schedule of Retired Members By Type of Benefit

All Members*

Amount of Monthly Benefit	Retirement: Normal	Retirement: Early	Disability: Normal	Disability: Work-Related	Disability: Long-Term	Survivor	Total Recipients
1 - 200	31	91	3	29	65	75	294
201 - 400	184	225	3	0	2	155	569
401 - 600	182	169	1	0	2	141	495
601 - 800	213	118	1	0	0	160	492
801 - 1000	167	69	3	2	1	146	388
1001 - 1200	270	38	1	1	0	138	448
1201 - 1400	328	20	0	0	0	133	481
1401 - 1600	435	13	1	2	0	121	572
1601 - 1800	458	7	1	1	0	97	564
1801 - 2000	497	4	0	5	0	92	598
2001 - 2200	457	2	0	4	0	84	547
2201 - 2400	336	2	0	1	0	74	413
2401 - 2600	291	0	0	3	0	64	358
2601 - 2800	278	2	0	1	0	51	332
2801 - 3000	257	0	0	2	0	45	304
> 3000	2,062	2	0	4	0	303	2,371
TOTALS	**6,446**	**762**	**14**	**55**	**70**	**1,879**	**9,226**

** This chart includes eleven retirement system staff retirees.*

MoDOT

Amount of Monthly Benefit	Retirement: Normal	Retirement: Early	Disability: Normal	Disability: Work-Related	Disability: Long-Term	Survivor	Total Recipients
1 - 200	24	68	3	24	53	70	242
201 - 400	135	186	3	0	2	132	458
401 - 600	132	141	1	0	1	122	397
601 - 800	157	106	1	0	0	143	407
801 - 1000	116	62	3	2	1	122	306
1001 - 1200	203	30	1	1	0	122	357
1201 - 1400	268	16	0	0	0	123	407
1401 - 1600	356	12	1	2	0	103	474
1601 - 1800	381	7	1	1	0	81	471
1801 - 2000	422	4	0	5	0	79	510
2001 - 2200	394	2	0	3	0	73	472
2201 - 2400	292	2	0	1	0	56	351
2401 - 2600	253	0	0	1	0	40	294
2601 - 2800	237	2	0	1	0	35	275
2801 - 3000	218	0	0	2	0	29	249
> 3000	1,184	1	0	3	0	210	1,398
TOTALS	**4,772**	**639**	**14**	**46**	**57**	**1,540**	**7,068**

Schedule of Retired Members By Type of Benefit

Uniformed Patrol

Amount of Monthly Benefit	Retirement (Type of Benefit)		Disability (Type of Benefit)			Survivor (Type of Benefit)	Total Recipients
	Normal	Early	Normal	Work-Related	Long-Term		
1 - 200	0	0	0	4	2	0	6
201 - 400	8	0	0	0	0	5	13
401 - 600	9	0	0	0	0	5	14
601 - 800	16	0	0	0	0	2	18
801 - 1000	8	0	0	0	0	6	14
1001 - 1200	12	0	0	0	0	3	15
1201 - 1400	3	0	0	0	0	0	3
1401 - 1600	5	0	0	0	0	5	10
1601 - 1800	1	0	0	0	0	8	9
1801 - 2000	4	0	0	0	0	4	8
2001 - 2200	1	0	0	1	0	7	9
2201 - 2400	3	0	0	0	0	11	14
2401 - 2600	2	0	0	1	0	19	22
2601 - 2800	3	0	0	0	0	14	17
2801 - 3000	4	0	0	0	0	15	19
> 3000	746	0	0	1	0	87	834
TOTALS	**825**	**0**	**0**	**7**	**2**	**191**	**1,025**

Civilian Patrol

Amount of Monthly Benefit	Retirement (Type of Benefit)		Disability (Type of Benefit)			Survivor (Type of Benefit)	Total Recipients
	Normal	Early	Normal	Work-Related	Long-Term		
1 - 200	6	23	0	1	10	5	45
201 - 400	41	39	0	0	0	18	98
401 - 600	41	28	0	0	1	14	84
601 - 800	40	12	0	0	0	15	67
801 - 1000	43	7	0	0	0	18	68
1001 - 1200	55	8	0	0	0	13	76
1201 - 1400	57	4	0	0	0	10	71
1401 - 1600	73	1	0	0	0	13	87
1601 - 1800	76	0	0	0	0	8	84
1801 - 2000	71	0	0	0	0	9	80
2001 - 2200	61	0	0	0	0	4	65
2201 - 2400	41	0	0	0	0	7	48
2401 - 2600	35	0	0	1	0	5	41
2601 - 2800	38	0	0	0	0	2	40
2801 - 3000	35	0	0	0	0	1	36
> 3000	126	0	0	0	0	6	132
TOTALS	**839**	**122**	**0**	**2**	**11**	**148**	**1,122**

Schedule of Average Monthly Benefit Payments

MoDOT

By Years of Service

Retired In Fiscal Year		0 - 10	11 - 15	16 - 20	21 - 25	26 - 30	31 - 35	36 - 40	41+
2011	**Average Benefit**	**$ 337**	**688**	**1,221**	**1,757**	**2,419**	**2,953**	**3,317**	**4,842**
2011	Average FAP	$ 2,650	2,651	3,140	3,610	3,936	3,932	3,863	4,167
2011	**Current Retirees**	**20**	**33**	**21**	**39**	**63**	**35**	**6**	**3**
2012	**Average Benefit**	**$ 381**	**568**	**1,258**	**1,671**	**2,673**	**3,257**	**2,906**	**0**
2012	Average FAP	$ 3,190	2,810	3,447	3,438	4,195	4,303	3,777	0
2012	**Current Retirees**	**31**	**21**	**37**	**61**	**99**	**54**	**3**	**0**
2013	**Average Benefit**	**$ 318**	**635**	**1,375**	**1,814**	**2,966**	**3,068**	**5,682**	**2,963**
2013	Average FAP	$ 2,691	2,977	3,509	3,818	4,335	3,982	5,516	2,802
2013	**Current Retirees**	**32**	**33**	**40**	**64**	**98**	**27**	**2**	**1**
2014	**Average Benefit**	**$ 317**	**760**	**1,271**	**1,828**	**3,165**	**3,422**	**3,033**	**0**
2014	Average FAP	$ 2,444	3,138	3,493	3,879	4,509	4,606	3,781	0
2014	**Current Retirees**	**27**	**23**	**19**	**41**	**75**	**14**	**2**	**0**
2015	**Average Benefit**	**$ 335**	**664**	**1,211**	**1,774**	**3,079**	**3,765**	**3,243**	**0**
2015	Average FAP	$ 2,660	3,057	3,412	3,605	4,380	4,659	4,286	0
2015	**Current Retirees**	**50**	**59**	**37**	**50**	**77**	**19**	**2**	**0**
2016	**Average Benefit**	**$ 328**	**530**	**903**	**1,896**	**3,011**	**3,522**	**4,279**	**0**
2016	Average FAP	$ 2,828	2,695	2,889	3,754	4,325	4,727	5,147	0
2016	**Current Retirees**	**30**	**24**	**24**	**45**	**80**	**14**	**2**	**0**
2017	**Average Benefit**	**$ 345**	**551**	**956**	**1,813**	**3,098**	**3,782**	**2,691**	**0**
2017	Average FAP	$ 2,568	2,707	3,055	3,616	4,639	4,801	3,717	0
2017	**Current Retirees**	**38**	**31**	**29**	**54**	**83**	**12**	**3**	**0**
2018	**Average Benefit**	**$ 325**	**611**	**1,010**	**2,024**	**3,061**	**3,819**	**3,032**	**0**
2018	Average FAP	$ 2,578	3,009	3,386	3,933	4,559	4,957	3,909	0
2018	**Current Retirees**	**31**	**33**	**39**	**51**	**69**	**10**	**1**	**0**
2019	**Average Benefit**	**$ 325**	**663**	**1,057**	**1,873**	**2,960**	**3,317**	**3,144**	**0**
2019	Average FAP	$ 2,617	3,037	3,444	3,868	4,704	4,594	4,015	0
2019	**Current Retirees**	**33**	**22**	**37**	**49**	**64**	**14**	**4**	**0**
2020	**Average Benefit**	**$ 326**	**590**	**1,208**	**1,821**	**3,028**	**3,586**	**3,622**	**4,735**
2020	Average FAP	$ 2,715	3,118	3,453	3,797	4,654	4,890	5,237	5,540
2020	**Current Retirees**	**28**	**26**	**35**	**59**	**89**	**7**	**3**	**2**

FAP = Final Average Pay

Schedule of Average Monthly Benefit Payments

Uniformed Patrol

By Years of Service

Retired In Fiscal Year		0-10	11-15	16-20	21-25	26-30	31-35	36-40	41+
2011	**Average Benefit**	**$ 699**	**1,270**	**0**	**3,115**	**5,477**	**6,955**	**8,344**	**0**
2011	Average FAP	$ 2,245	3,051	0	4,595	6,000	6,366	6,746	0
2011	**Current Retirees**	**1**	**2**	**0**	**2**	**7**	**8**	**1**	**0**
2012	**Average Benefit**	**$ 0**	**797**	**0**	**4,233**	**5,411**	**6,842**	**0**	**0**
2012	Average FAP	$ 0	2,463	0	5,098	6,012	6,429	0	0
2012	**Current Retirees**	**0**	**1**	**0**	**1**	**9**	**15**	**0**	**0**
2013	**Average Benefit**	**$ 613**	**0**	**1,828**	**4,644**	**5,549**	**6,563**	**9,256**	**0**
2013	Average FAP	$ 1,972	0	3,917	6,507	6,419	6,505	7,510	0
2013	**Current Retirees**	**2**	**0**	**2**	**2**	**8**	**8**	**1**	**0**
2014	**Average Benefit**	**$ 527**	**0**	**0**	**0**	**5,584**	**6,799**	**0**	**0**
2014	Average FAP	$ 2,503	0	0	0	6,528	6,580	0	0
2014	**Current Retirees**	**5**	**0**	**0**	**0**	**24**	**11**	**0**	**0**
2015	**Average Benefit**	**$ 823**	**934**	**0**	**4,347**	**5,582**	**6,886**	**0**	**0**
2015	Average FAP	$ 3,119	4,458	0	6,736	6,655	6,951	0	0
2015	**Current Retirees**	**1**	**1**	**0**	**2**	**20**	**10**	**0**	**0**
2016	**Average Benefit**	**$ 301**	**1,100**	**0**	**4,293**	**5,126**	**6,558**	**0**	**0**
2016	Average FAP	$ 2,599	3,804	0	6,405	6,607	7,039	0	0
2016	**Current Retirees**	**1**	**1**	**0**	**4**	**13**	**4**	**0**	**0**
2017	**Average Benefit**	**$ 577**	**1,114**	**3,095**	**4,253**	**5,131**	**7,156**	**7,453**	**0**
2017	Average FAP	$ 2,791	3,804	5,548	5,621	6,786	7,148	7,077	0
2017	**Current Retirees**	**2**	**2**	**1**	**1**	**29**	**2**	**1**	**0**
2018	**Average Benefit**	**$ 401**	**1,073**	**1,547**	**3,872**	**4,988**	**0**	**0**	**0**
2018	Average FAP	$ 2,566	3,430	3,943	7,001	6,771	0	0	0
2018	**Current Retirees**	**2**	**3**	**1**	**4**	**25**	**0**	**0**	**0**
2019	**Average Benefit**	**$ 357**	**1,078**	**1,870**	**3,656**	**4,788**	**6,019**	**0**	**0**
2019	Average FAP	$ 2,748	3,589	4,417	6,051	6,930	7,472	0	0
2019	**Current Retirees**	**3**	**1**	**2**	**4**	**33**	**6**	**0**	**0**
2020	**Average Benefit**	**$ 535**	**753**	**2,284**	**3,373**	**4,628**	**5,576**	**0**	**0**
2020	Average FAP	$ 3,004	3,047	5,530	6,246	6,906	6,915	0	0
2020	**Current Retirees**	**5**	**1**	**3**	**5**	**26**	**4**	**0**	**0**

FAP = Final Average Pay

Schedule of Average Monthly Benefit Payments

Civilian Patrol

By Years of Service

Retired In Fiscal Year		0-10	11-15	16-20	21-25	26-30	31-35	36-40	41+
2011	**Average Benefit**	**$ 52**	**586**	**1,009**	**1,743**	**2,645**	**2,824**	**0**	**0**
2011	Average FAP	$ 2,526	2,265	2,469	3,496	4,096	3,842	0	0
2011	**Current Retirees**	**4**	**6**	**6**	**11**	**13**	**8**	**0**	**0**
2012	**Average Benefit**	**$ 297**	**575**	**1,432**	**1,474**	**2,277**	**2,344**	**0**	**0**
2012	Average FAP	$ 2,133	2,537	3,501	3,086	3,690	3,458	0	0
2012	**Current Retirees**	**7**	**4**	**4**	**7**	**16**	**6**	**0**	**0**
2013	**Average Benefit**	**$ 339**	**581**	**1,158**	**1,625**	**2,009**	**3,255**	**0**	**0**
2013	Average FAP	$ 2,723	2,551	2,888	3,332	3,359	4,003	0	0
2013	**Current Retirees**	**13**	**9**	**7**	**9**	**9**	**6**	**0**	**0**
2014	**Average Benefit**	**$ 316**	**593**	**1,034**	**1,755**	**2,683**	**2,420**	**0**	**0**
2014	Average FAP	$ 2,319	2,802	2,505	3,580	3,792	3,105	0	0
2014	**Current Retirees**	**9**	**12**	**7**	**7**	**13**	**3**	**0**	**0**
2015	**Average Benefit**	**$ 311**	**634**	**1,149**	**1,691**	**2,429**	**3,455**	**0**	**0**
2015	Average FAP	$ 2,342	2,586	2,999	3,453	3,785	4,911	0	0
2015	**Current Retirees**	**12**	**11**	**8**	**13**	**13**	**6**	**0**	**0**
2016	**Average Benefit**	**$ 176**	**591**	**929**	**1,900**	**2,494**	**4,581**	**0**	**0**
2016	Average FAP	$ 2,457	2,629	2,989	3,532	3,820	5,718	0	0
2016	**Current Retirees**	**6**	**9**	**5**	**8**	**15**	**1**	**0**	**0**
2017	**Average Benefit**	**$ 315**	**663**	**1,209**	**1,506**	**2,823**	**3,296**	**3,054**	**0**
2017	Average FAP	$ 2,614	2,712	3,460	3,301	4,270	4,425	3,919	0
2017	**Current Retirees**	**7**	**5**	**7**	**13**	**18**	**5**	**1**	**0**
2018	**Average Benefit**	**$ 182**	**672**	**1,047**	**1,963**	**2,619**	**2,489**	**5,307**	**0**
2018	Average FAP	$ 1,955	3,030	3,452	4,002	3,996	3,379	7,510	0
2018	**Current Retirees**	**3**	**6**	**6**	**7**	**11**	**4**	**1**	**0**
2019	**Average Benefit**	**$ 436**	**746**	**852**	**1,490**	**2,205**	**2,811**	**0**	**0**
2019	Average FAP	$ 3,000	3,094	3,111	3,228	3,507	3,912	0	0
2019	**Current Retirees**	**5**	**6**	**6**	**6**	**6**	**5**	**0**	**0**
2020	**Average Benefit**	**$ 337**	**497**	**1,039**	**1,788**	**2,461**	**2,314**	**0**	**3,666**
2020	Average FAP	$ 2,804	2,638	3,176	3,711	4,141	3,125	0	4,079
2020	**Current Retirees**	**5**	**4**	**7**	**9**	**15**	**2**	**0**	**1**

FAP = Final Average Pay

Schedule of Average Monthly Benefit Payments

MPERS

By Years of Service

Retired In Fiscal Year		0-10	11-15	16-20	21-25	26-30	31-35	36-40	41+
2012	**Average Benefit**	**$ 0**	**0**	**0**	**0**	**3,251**	**0**	**0**	**0**
2012	Average FAP	$ 0	0	0	0	7,087	0	0	0
2012	**Current Retirees**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
2013	**Average Benefit**	**$ 0**	**0**	**0**	**0**	**0**	**7,049**	**0**	**0**
2013	Average FAP	$ 0	0	0	0	0	11,108	0	0
2013	**Current Retirees**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
2015	**Average Benefit**	**$ 0**	**0**	**0**	**0**	**0**	**3,060**	**0**	**0**
2015	Average FAP	$ 0	0	0	0	0	4,764	0	0
2015	**Current Retirees**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
2016	**Average Benefit**	**$ 0**	**0**	**0**	**3,683**	**0**	**0**	**0**	**0**
2016	Average FAP	$ 0	0	0	9,414	0	0	0	0
2016	**Current Retirees**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
2020	**Average Benefit**	**$ 0**	**0**	**0**	**0**	**0**	**9,476**	**0**	**0**
2020	Average FAP	$ 0	0	0	0	0	12,079	0	0
2020	**Current Retirees**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**

Note: There were no retirements during the years not shown above.
FAP = Final Average Pay

Active Member Data

Schedule of Participating Employers

	MoDOT		Patrol		MPERS		Total	
	Employees	%	Employees	%	Employees	%	Employees	%
2011	5,796	71.03	2,350	28.80	14	0.17	8,160	100
2012	5,093	68.42	2,337	31.39	14	0.19	7,444	100
2013	4,985	67.95	2,336	31.84	15	0.21	7,336	100
2014	5,041	67.98	2,357	31.79	17	0.23	7,415	100
2015	4,993	67.72	2,364	32.06	16	0.22	7,373	100
2016	5,059	67.70	2,398	32.09	16	0.21	7,473	100
2017	5,056	67.86	2,379	31.93	16	0.21	7,451	100
2018	5,065	68.31	2,334	31.48	16	0.22	7,415	100
2019	5,081	68.51	2,318	31.26	17	0.23	7,416	100
2020	5,031	68.59	2,287	31.18	17	0.23	7,335	100

Data for this chart is as of June 30, 2020.

Active Member Data

For the Year Ended June 30, 2020

By Age

Closed Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	0	0	0	0	0
31 - 35	0	0	0	0	0
36 - 40	26	21	3	1	1
41 - 45	256	172	24	60	0
46 - 50	625	367	55	201	2
51 - 55	621	378	80	161	2
56 - 60	306	227	51	28	0
61 - 65	107	90	17	0	0
66+	13	11	2	0	0
Total	**1,954**	**1,266**	**232**	**451**	**5**
Average Age		**51**	**52**	**49**	**48**

Year 2000 Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	8	6	1	1	0
31 - 35	248	122	38	88	0
36 - 40	481	274	84	121	2
41 - 45	454	290	67	97	0
46 - 50	340	245	49	43	3
51 - 55	275	202	58	14	1
56 - 60	284	233	51	0	0
61 - 65	124	104	20	0	0
66+	27	19	8	0	0
Total	**2,241**	**1,495**	**376**	**364**	**6**
Average Age		**47**	**46**	**39**	**46**

Year 2000 Plan - 2011 Tier

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	41	40	1	0	0
21 - 25	482	322	63	97	0
26 - 30	709	454	98	157	0
31 - 35	562	382	83	95	2
36 - 40	355	284	48	22	1
41 - 45	261	212	38	10	1
46 - 50	251	201	45	4	1
51 - 55	225	177	47	1	0
56 - 60	172	138	33	0	1
61 - 65	71	52	19	0	0
66+	11	8	3	0	0
Total	**3,140**	**2,270**	**478**	**386**	**6**
Average Age		**37**	**38**	**29**	**41**

Active Member Data

For the Year Ended June 30, 2020

By Years of Service

Closed Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	0	0	0	0	0
01 - 05	1	0	0	1	0
06 - 10	13	7	5	1	0
11 - 15	13	8	4	1	0
16 - 20	231	181	24	26	0
21 - 25	925	568	116	239	2
26 - 30	578	369	56	151	2
31 - 35	150	102	17	30	1
36 - 40	29	19	8	2	0
41 - 45	11	10	1	0	0
46+	3	2	1	0	0
Total	**1,954**	**1,266**	**232**	**451**	**5**
Average Service		**25**	**25**	**25**	**26**

Year 2000 Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	14	9	5	0	0
01 - 05	41	36	5	0	0
06 - 10	253	132	74	46	1
11 - 15	1,056	703	165	185	3
16 - 20	858	605	121	131	1
21 - 25	15	7	6	1	1
26 - 30	2	2	0	0	0
31 - 35	1	0	0	1	0
36 - 40	0	0	0	0	0
41 - 45	1	1	0	0	0
46+	0	0	0	0	0
Total	**2,241**	**1,495**	**376**	**364**	**6**
Average Service		**14**	**14**	**14**	**14**

Year 2000 Plan - 2011 Tier

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	551	465	63	22	1
01 - 05	1,957	1,455	285	217	0
06 - 10	631	349	130	147	5
11 - 15	0	0	0	0	0
16 - 20	1	1	0	0	0
21 - 25	0	0	0	0	0
26 - 30	0	0	0	0	0
31 - 35	0	0	0	0	0
36 - 40	0	0	0	0	0
41 - 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**3,140**	**2,270**	**478**	**386**	**6**
Average Service		**3**	**4**	**4**	**6**

Terminated Vested Member Data
For the Year Ended June 30, 2020

By Age

Closed Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	0	0	0	0	0
31 - 35	0	0	0	0	0
36 - 40	17	16	1	0	0
41 - 45	122	99	15	7	1
46 - 50	298	215	32	51	0
51 - 55	343	278	26	39	0
56 - 60	231	198	31	2	0
61 - 65	34	30	4	0	0
66+	0	0	0	0	0
Total	**1,045**	**836**	**109**	**99**	**1**
Average Age	**0**	**51**	**51**	**49**	**43**

Year 2000 Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	3	2	1	0	0
31 - 35	118	81	20	17	0
36 - 40	242	193	35	14	0
41 - 45	211	174	20	17	0
46 - 50	171	138	26	7	0
51 - 55	117	104	11	2	0
56 - 60	72	60	11	1	0
61 - 65	12	11	1	0	0
66+	0	0	0	0	0
Total	**946**	**763**	**125**	**58**	**0**
Average Age	**0**	**44**	**43**	**40**	**0**

Year 2000 Plan - 2011 Tier

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	27	18	5	4	0
31 - 35	35	16	10	9	0
36 - 40	10	7	0	3	0
41 - 45	13	12	0	1	0
46 - 50	12	5	5	2	0
51 - 55	3	1	2	0	0
56 - 60	8	6	2	0	0
61 - 65	0	0	0	0	0
66+	0	0	0	0	0
Total	**108**	**65**	**24**	**19**	**0**
Average Age	**0**	**37**	**39**	**34**	**0**

Terminated Vested Member Data

For the Year Ended June 30, 2020

By Years of Service

Closed Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	0	0	0	0	0
01 - 05	124	92	16	16	0
06 - 10	431	331	42	57	1
11 - 15	276	229	30	17	0
16 - 20	164	140	18	6	0
21 - 25	48	42	3	3	0
26 - 30	2	2	0	0	0
31 - 35	0	0	0	0	0
36 - 40	0	0	0	0	0
41 - 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**1,045**	**836**	**109**	**99**	**1**
Average Service		**11**	**11**	**9**	**8**

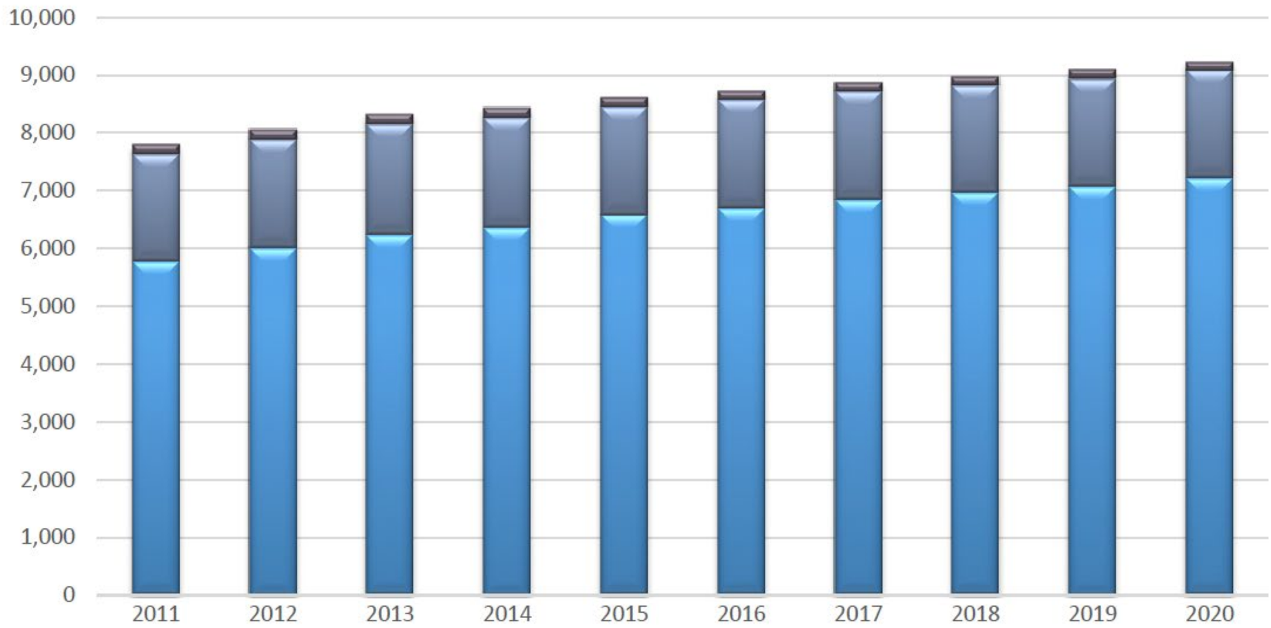
Year 2000 Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	0	0	0	0	0
01 - 05	123	100	19	4	0
06 - 10	567	458	71	38	0
11 - 15	221	179	31	11	0
16 - 20	35	26	4	5	0
21 - 25	0	0	0	0	0
26 - 30	0	0	0	0	0
31 - 35	0	0	0	0	0
36 - 40	0	0	0	0	0
41 - 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**946**	**763**	**125**	**58**	**0**
Average Service		**9**	**9**	**10**	**0**

Year 2000 Plan - 2011 Tier

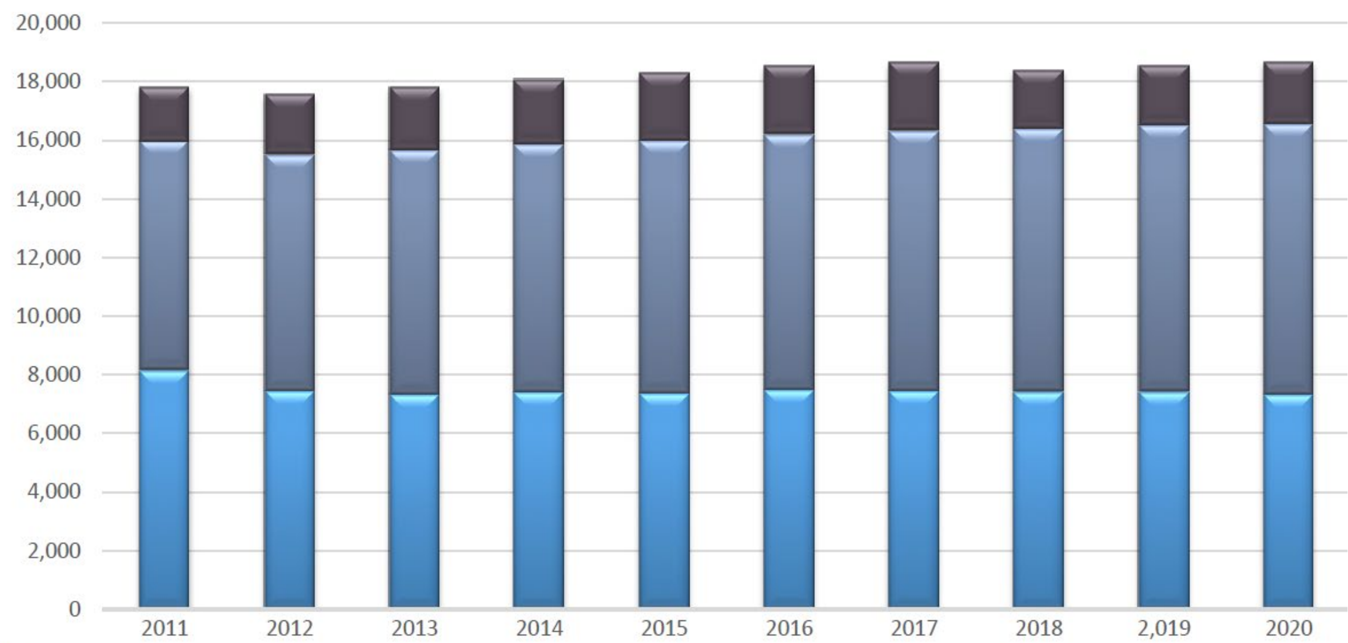
Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	0	0	0	0	0
01 - 05	57	41	8	8	0
06 - 10	51	24	16	11	0
11 - 15	0	0	0	0	0
16 - 20	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	0	0	0	0	0
31 - 35	0	0	0	0	0
36 - 40	0	0	0	0	0
41 - 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**108**	**65**	**24**	**19**	**0**
Average Service		**5**	**6**	**6**	**0**

Benefit Recipients



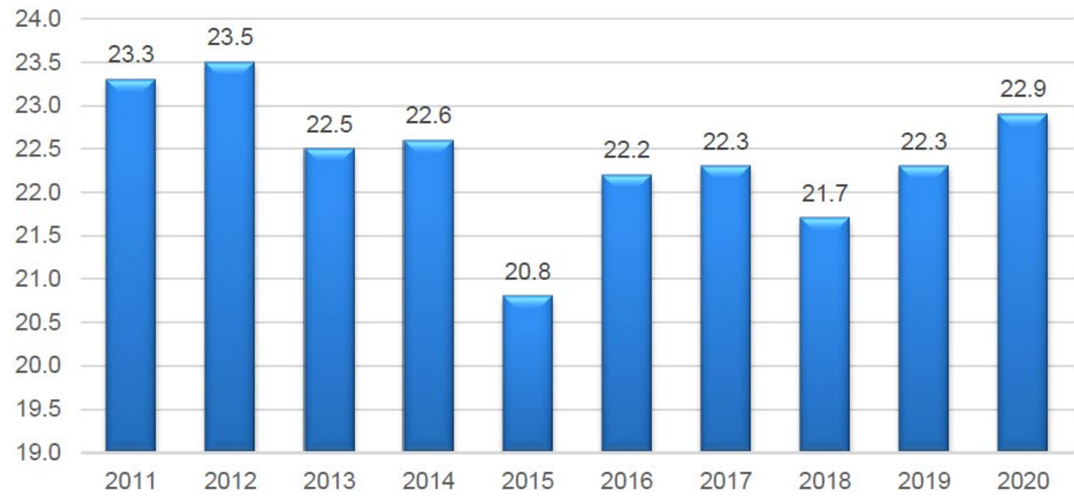
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Disabilities	166	175	178	173	164	155	155	148	143	139
Survivors	1,855	1,880	1,914	1,900	1,874	1,882	1,875	1,863	1,866	1,879
Retirees	5,771	6,013	6,234	6,365	6,583	6,690	6,846	6,956	7,077	7,208

Membership Distribution



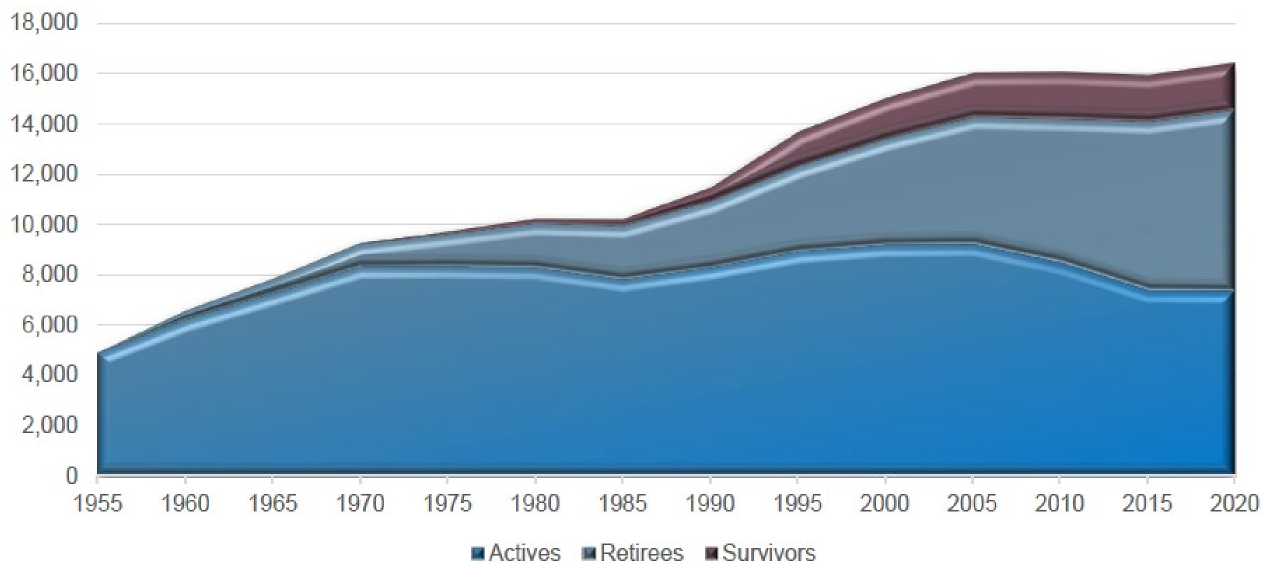
	2011	2012	2013	2014	2015	2016	2017	2018	2,019	2020
Term Vested Members	1,864	2,038	2,153	2,222	2,300	2,329	2,319	1,985	2,051	2,099
Benefit Recipients	7,792	8,068	8,326	8,438	8,621	8,727	8,876	8,967	9,086	9,226
Active Members	8,160	7,444	7,336	7,415	7,373	7,473	7,451	7,415	7,416	7,335

Average Years of Service for New Retirees



Final Average Pay for New Retirees

MPERS Membership Over the Years



Location of MPERS Retirees

For the Year Ended June 30, 2020

This map represents the demographic distribution of retirees by state and country.