CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM

(A COMPONENT UNIT OF THE CITY OF PHOENIX, ARIZONA)

ANNUAL COMPREHENSIVE FINANCIAL REPORT
FISCAL YEARS ENDING JUNE 30, 2022 AND 2021

COPERS

CITY OF PHOENIX
EMPLOYEES' RETIREMENT PLAN
(A Component Unit of the City of Phoenix, Arizona)

SEVENTY-SIXTH
ANNUAL COMPREHENSIVE FINANCIAL REPORT
FOR THE FISCAL YEARS ENDED
JUNE 30, 2022 and 2021

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Phoenix, Arizona 85003
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Prepared by:
City of Phoenix
Employees' Retirement System
and
City of Phoenix
Finance Department

COPERS

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*The **Introductory Section** contains the Certificate of Achievement for Excellence in Financial Reporting, the letter of transmittal, the Retirement Board structure, the administrative organization and the Chairperson's Report.*

COPERS

Government Finance Officers Association

Certificate of Achievement for Excellence in Financial Reporting

Presented to

City of Phoenix Employees' Retirement Plan
Arizona

For its Annual Comprehensive
Financial Report
For the Fiscal Year Ended

June 30, 2021

Christopher P. Morrill

Executive Director/CEO

Public Pension Coordinating Council

Public Pension Standards Award For Funding and Administration 2022

Presented to

City of Phoenix Employee's 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
Program Administrator

City of Phoenix
RETIREMENT SYSTEM

November 24, 2022

Chairperson and Members of the Retirement Board

City of Phoenix Employees' Retirement System:

I am pleased to submit this Annual Comprehensive Financial Report (ACFR) of the City of Phoenix Employees' Retirement System (COPERS or the Plan) as of and for the years ended June 30, 2022 and 2021. This report consists of the Introductory, Financial, Investment, Actuarial and Statistical sections.

The Plan is governed by the City of Phoenix Employees' Retirement Law of 1953 (Chapter XXIV of the City of Phoenix Charter). This law has been revised over the years, with the latest amendment approved by the City voters on August 25, 2015.

Financial Information

Responsibility for accuracy of the data, completeness, and fairness of the presentation of the ACFR, including all disclosures, rests with the Retirement Board. The Plan's record-keeping, financial statement and investment control responsibilities have been performed by the City's Finance Department. To the best of our knowledge and belief, this report is accurate in all material respects and is reported in a manner designed to present fairly the Fiduciary Net Position and Changes in Fiduciary Net Position. All disclosures necessary to enable the reader to gain an understanding of the Plan's financial activities have been included.

Readers of this ACFR are encouraged to review the Management's Discussion and Analysis starting on page 18, which provides a narrative analysis and highlights of our financial condition and activities for the fiscal years ended June 30, 2022 and 2021.

Internal Controls

Internal controls are procedures designed to accomplish the following: to protect assets from loss, theft or misuse; to check the accuracy and reliability of accounting data; to promote operational efficiency; and, to encourage compliance with managerial policies. The Board and the City of Phoenix (the City) management are responsible for establishing a system of internal controls designed to provide reasonable assurance that these objectives are met. Because the cost of internal controls should not outweigh their benefits, the City's comprehensive framework of internal controls has been designed to provide reasonable, rather than absolute, assurance that the financial statements are free of any material misstatements. Representatives from the City Auditor's Department meet periodically with the Board to review their audit plans and present the results of the audits. Moreover, representatives from the independent auditors meet annually with the Board to review their audit plans and receive input from the Board. The City also maintains budgetary controls designed to ensure compliance with legal provisions of the annual budget adopted by the City Council.

This report has been prepared in conformance with the principles of governmental accounting and reporting as set forth by the Governmental Accounting Standards Board. Transactions of COPERS are reported on the accrual basis of accounting. Revenues are recorded when earned, without regard to the date of collection, and expenses are recorded when incurred. The City's internal accounting and audit controls are designed to provide for the accuracy, reliability and integrity of all financial records.

COPERS History

COPERS was created to provide retirement, survivor and disability benefits to the City of Phoenix general employees. COPERS is a qualified retirement plan under the Internal Revenue Code. The City of Phoenix Employees' Retirement Board (the Board) is the trustee of the Plan.

The Mayor and City Council are covered by the Elected Officials Retirement Plan of Arizona (EORPA). Sworn police and fire employees are covered by the Arizona Public Safety Personnel Retirement System (APSPRS). The EORPA and the APSPRS were created by Arizona State Statute. EORPA and APSPRS benefit payments, investments and overall administration of the Plans are handled by centralized State Boards, and each of the retirement plans publish separate financial reports. However, the administration of the system and responsibility for making the APSPRS provisions effective for each employer are vested in Local Boards. For the City of Phoenix, this responsibility rests with the City of Phoenix Fire Pension Board and the City of Phoenix Police Pension Board. The COPERS Retirement Program Administrator oversees the Local Board Secretary for both Boards, and retirement office staff perform the administrative functions on behalf of those Boards.

Administrative Budget

The City provides an annual budgetary allocation to pay for the general administration of COPERS. The cost paid by the City for COPERS' administration was $2.122 million. Most investment-related expenses, such as investment custody costs, investment manager fees, and consultant fees, are paid directly from the Plan's assets. Certain administrative fees for legal, actuarial and computer services are also paid directly from Plan assets. The investment costs amounted to $18.035 million for the fiscal year ended June 30, 2022. These costs represented 0.54% of total Plan assets.

Professional Services

The Retirement Board retains professional consultants to prudently discharge its fiduciary responsibility for the proper administration of the Plan. Gabriel Roeder Smith & Company (GRS) provides actuarial services and the corresponding certification. BNY Mellon serves as the master custodian. Brokerage trade execution monitoring is compiled by Elkins/McSherry, LLC. Meketa Investment Group provides investment performance analysis, asset allocation review and investment consulting to the Retirement Board. Aksia provides consultative services to COPERS regarding its real estate investments. COPERS' financial statements are audited by FORVIS (formerly BKD, LLP) and reviews of operations are performed by the City Auditor's Department. Integrated Medical Evaluations, Inc., provides independent medical evaluation services related to disability retirement applications.

The City Attorney's office provides legal representation. COPERS also uses Ice Miller for outside legal services in the event the City Attorney's office has a conflict or for specialized legal work.

The guidance provided by the Retirement Board is greatly appreciated. The preparation of this report is a collaborative effort of many individuals. I would like to acknowledge the hard work of the COPERS staff, the Finance Department and the Retirement Board. This report is intended to provide important information crucial to the understanding of the pension plan.

Funding Status and Progress

COPERS contracts with an independent actuarial firm, Gabriel, Roeder, Smith & Company (GRS), to conduct an actuarial valuation each year. The purpose of the valuation is to measure COPERS' liability for pension payments and its funding progress, to determine the actuarially determined contribution and to analyze changes in experience. The City of Phoenix has adopted a Pension Funding Policy that serves as a roadmap to a fully funded pension plan.

Through the policy the City commits to contributing at least 100% of the actuarially determined contribution, as well as exploring other strategies that would have a positive impact on the security of the Plan.

The actuarial valuation as of June 30, 2022 reflects a funded ratio of 71.2% using a smoothed fair value of plan assets. This is a 0.5% improvement from the prior fiscal year. The unfunded actuarial accrued liability will be amortized as a level percent of payroll over future years.

Investment Activities

As of June 30, 2022, COPERS' net position is 3.243 billion. The fiscal year net return for the Plan is -4.7%, which is 11.7% below the assumed rate of return of 7.00%. The funded ratio on a fair value of assets basis decreased from 75.70% to 68.65%. For more information on COPERS' investment policies and performance, please refer to the Investment section in this report, beginning on page 51.

Major Initiatives Involving Plan Administration

In March of 2017, the Board adopted a revised asset allocation that more closely aligns the Board's risk tolerance with expected returns. The Retirement Board and COPERS staff have worked over the past year to move COPERS' investments within the approved target ranges for each of the asset classes. As of this report, this project is 100 percent completed. During the reporting period, COPERS has continued to work on the new pension administration system project with Levi, Ray & Shoup, Inc. (LRS). The project, scheduled to take approximately three years, is on schedule with the first three design phases completed. The new web-based system will allow greater automation and accuracy for staff, and enhanced member services through a web-based application. The Segal Group continues to serve as consultants for COPERS in assisting with the replacement software project.

In December 2021, oversight and management of the Deferred Compensation Plans (457, 401(a), and Post Employment Health Plan (PEHP) Investment trust was moved to the Retirement Office. This major service enhancement will allow for greater support and tools to ensure our members go into retirement with a better financial future.

Awards And Acknowledgements

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to COPERS for its annual comprehensive financial report for the fiscal year ended June 30, 2021. In order to be awarded a Certificate of Achievement, an organization must conform to the highest standards of fiduciary reporting and full disclosure. This is the 36th year COPERS has received this award.

The Plan also received the Public Pension Standards Award for Funding and Administration. This award was presented by the Public Pension Coordinating Council, 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. This is the twelfth year the Plan has applied for and received this award.

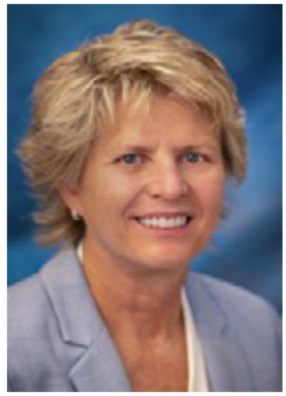
Sincerely,

Scott Steventon

Scott Steventon
Retirement Program Administrator

Retirement Board

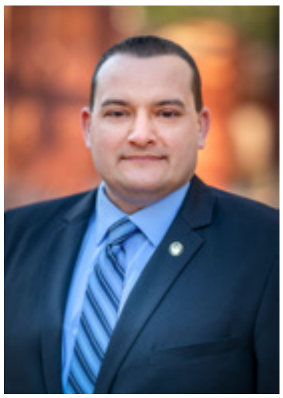




ALAN MAGUIRE
Chairperson, Retirement Board
Citizen Board Member

TAMMY RYAN
Vice Chairperson, Retirement Board
Retiree Board Member

INGER ERICKSON
Deputy City Manager
City of Phoenix
Ex-Officio Board Member


JOE JATZKEWITZ
Assistant Finance Director/City Treasurer
City of Phoenix
Ex-Officio Board Member

DAVE MATHEWS
Human Resources Director
City of Phoenix
Ex-Officio Board Member

KATHLEEN GITKIN
Chief Financial Officer
City of Phoenix
Ex-Officio Board Member



JASON STOKES
Elected Board Member

DAVID URBINATO
Elected Board Member

AARON AVILA
Elected Board Member

Retirement Board Committees

Investment Committee

Alan Maguire, Chairperson
Joe Jatzkewitz
Tammy Ryan
Aaron Avila
David Urbinato

Charter Amendments/ Policies & Procedures Committee

David Matthews, Chairperson
Kathleen Gitkin
Alan Maguire
Tammy Ryan
Jason Stokes

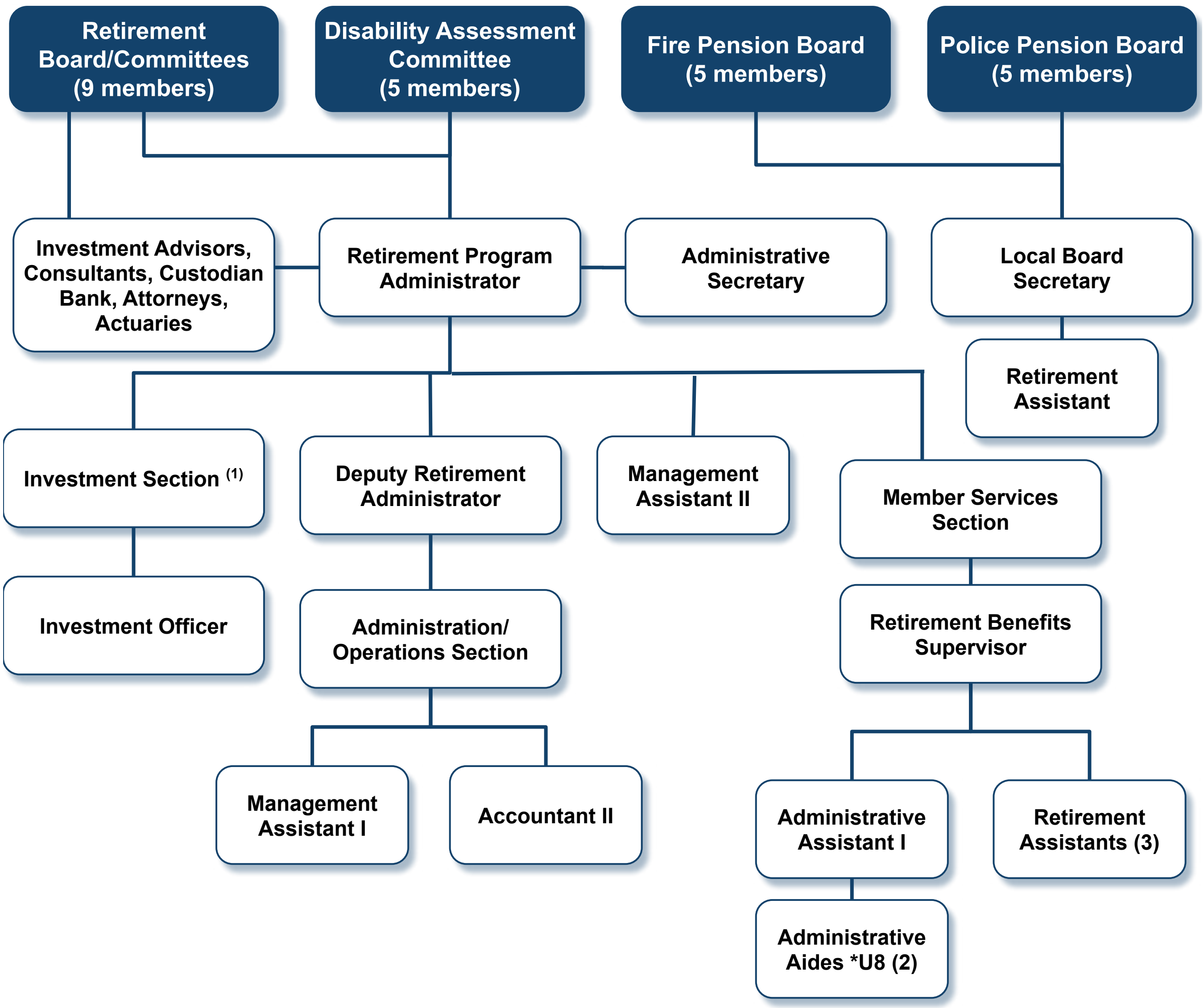
Legal Review Committee

Inger Erickson, Chairperson
Alan Maguire
Aaron Avila
David Urbinato
Jason Stokes

Disability Assessment Committee

Scott Steventon, Chairperson
Robert Jones, M.D.
Jennifer Shoop
Debra Payan
Ron Ramirez

Retirement Department Administrative Organization



(1) Please refer to the Investment Section for a list of Investment Managers on page 60 - 61, the Schedule of Investment Fees on pages 67 - 68 and the Schedule of Commissions of page 70.

Administrative Staff	
Scott Steventon	Retirement Program Administrator
Barbara Trollope	Assistant Retirement Administrator
Tina Esparza	Local Board Secretary
Stacy Osborne-Fry	Management Assistant II
Marissa Hernandez	Retirement Benefits Supervisor
Greg Fitchet	Investment Officer
Jenifer Padilla	Accountant II
Trista Eaden	Management Assistant I
Kyle Corbin	Administrative Assistant I
Marcia Wilson	Administrative Secretary
Adrianna Rodriguez	Retirement Assistant
Darrian Gutierrez	Retirement Assistant
Josie Romero	Retirement Assistant
Sonia Murrieta	Retirement Assistant
Alejandra Montoya	Administrative Aide
Corinna Apolinar	Administrative Aide

Accounting

Kathleen Gitkin — Chief Financial Officer, Finance Department

Treasurer

Joe Jatzkewitz — City Treasurer, Finance Department

Legal

Michelle Wood — Assistant City Attorney IV, Law Department

Actuary

Gabriel, Roeder Smith & Company — Denver, CO

Auditor

Forvis (FKA BKD, LLP) — Dallas, TX Certified Public Accountants

Brokerage

Elkins McSherry LLC — New York, NY

Investment Services

Refer to Investment Section for:
Investment Managers on page 60-61
Schedule of Investment Fees on page 67-68 and
Schedule of Commissions on page 70

Legal Services

ICE Miller — Indianapolis, IN
Ryan, Rapp & Underwood — Phoenix, AZ

Master Custodian

BNY Mellon — Pittsburgh, Pennsylvania

Medical Advisors

Integrated Medical Evaluations, Inc — Tempe, AZ

City of Phoenix
RETIREMENT SYSTEM

November 24, 2022

To COPERS Members and Retirees:

On behalf of the Retirement Board, it is my pleasure to present the City of Phoenix Employees' Retirement System (COPERS) Annual Comprehensive Financial Report (ACFR) for the fiscal years ended June 30, 2022 and June 30, 2021. This annual report contains information regarding the COPERS' administration, financial statements, investments, actuarial and statistical data.

COPERS' total fund assets decreased from $3.438 billion to $3.243 billion during the year ended June 30, 2022 and net performance for the year was -4.7%. The annualized net return for the past three and five years was 5.8% and 6.1%, respectively. Meketa, provided the Board with analysis of investment issues and portfolio performance measurement.

The Board recently modified the plan's asset allocation with the objective of maximizing returns with the lowest possible risk. The Board continued to oversee a diversified investment portfolio that includes diverse segments of the U.S. and International financial assets. The fixed income and real estate allocations are managed by several external managers. Real estate holdings are diversified across geographic locations and property types.

The COPERS funded ratio on an actuarial value of assets (AVA) as of June 30, 2022 was 71.1%, which was an increase from the June 30, 2021 funded ratio of 70.7%. The Board's independent, actuarial consultant, Gabriel Roeder Smith & Company (GRS), conducted the annual actuarial valuation. The plan's sponsor, the City of Phoenix, remains committed to fully funding their actuarially-computed contribution amount.

COPERS is annually audited by the the City of Phoenix Auditor Department and the Plan's independent external auditors, FORVIS (formerly BKD, LLP). The Board reviews their audit plans and reviews their findings and results.

COPERS was again recognized by the Government Finance Officers Association for the quality and completeness of its ACFR and the Popular Annual Financial Report (PAFR) for the fiscal year ended June 30, 2021. These reports are accessible through the COPERS' internet site.

The COPERS Board continues to focus on fulfilling its fiduciary obligation to the COPERS' active members, retirees and beneficiaries. Please contact the Retirement Office with any questions or comments. Finally, I would like to thank my fellow Board members and the COPERS staff for their diligent and committed service on behalf of all our members.

Sincerely,

Alan E. Maguire

Alan E. Maguire
Chairperson, Retirement Board

200 West Washington Street, 10th Floor Phoenix, Arizona 85003 602-534-4400 Fax: 602-495-2008 7-1-1 Relay Friendly

COPERS

Financial

section

*The **Financial Section** contains the opinion of the independent auditors, management's discussion and analysis, the audited financial statements, notes to the financial statements, and relevant supplemental information.*

COPERS

FORV/S

14241 Dallas Parkway, Suite 1100 / Dallas, TX 75254
P 972.702.8262 / F 972.702.0673
forvis.com

Independent Auditor's Report

Honorable Mayor and Members of the City Council
City of Phoenix Employees' Retirement System Retirement Board
Phoenix, Arizona

Opinion

We have audited the financial statements of the City of Phoenix Employees' Retirement System (Plan), a fiduciary fund of the City of Phoenix, Arizona, as of and for the years ended June 30, 2022 and 2021, and the related notes to the financial statements, which collectively comprise the Plan's basic financial statements as listed in the table of contents.

In our opinion, the accompanying financial statements referred to above present fairly, in all material respects, the fiduciary net position of the Plan as of June 30, 2022 and 2021, and the changes in fiduciary net position for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for Opinion

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

Responsibilities of Management for the Financial Statements

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

In preparing the financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the Plan's ability to continue as a going concern for 12 months beyond the financial statement date, including any currently known information that may raise substantial doubt shortly thereafter.

Honorable Mayor and Members of the City Council
City of Phoenix Employees' Retirement System Retirement Board
Page 2

Auditor's Responsibilities for the Audit of the Financial Statements

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

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Plan's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about the Plan's ability to continue as a going concern for a reasonable period of time.

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

Required Supplementary Information

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

Honorable Mayor and Members of the City Council
City of Phoenix Employees' Retirement System Retirement Board
Page 3

Supplementary Information

Our audits were conducted for the purpose of forming an opinion on the financial statements that collectively comprise the Plan's basic financial statements. The schedule of investment expenses, schedule of administrative expenditures and encumbrances, schedule of administrative expenses and schedule of payments to consultants are presented for purposes of additional analysis and are not a required part of the basic financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. The information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America.

In our opinion, the schedule of investment expenses, schedule of administrative expenditures and encumbrances, schedule of administrative expenses and schedule of payments to consultants are fairly stated, in all material respects, in relation to the basic financial statements as a whole.

Other Information

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

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

FORVIS, LLP

Dallas, Texas
November 21, 2022

Management's Discussion and Analysis (unaudited)

Dear Members and Retirees:

The City of Phoenix Employees' Retirement System ("COPERS" or the "Plan") is pleased to provide the following analysis of the financial activities for the fiscal years ended June 30, 2022 and 2021. This discussion is presented as a narrative overview only. Readers are encouraged to consider the information presented in this analysis in conjunction with the Transmittal Letter in the Introductory Section, the financial statements and the other information provided in this report.

Financial Highlights:
(in thousands)

- The Plan's Net Position Restricted for Pensions decreased by $195,340 or approximately 5.7% to $3,242,687 as of June 30, 2022 as reflected in the Statement of Fiduciary Net Position on page 24. The Net Position Restricted for Pensions as of June 30, 2021, was $3,438,027. The decrease during fiscal year 2022 was primarily attributable to unfavorable investment performance.
- Total additions to the Net Position Restricted for Pensions, as reported in the Statement of Changes in Fiduciary Net Position on page 25, for the fiscal year ended June 30, 2022 was $72,007 compared to $1,010,544 for fiscal year ended June 30, 2021. The decrease for the current year was primarily attributable to unfavorable investment performance and a reduction in additional employer contributions. In 2021, the City contributed $180,000 above the actuarially required amount. Total additions include employer and employee contributions of $231,669 and total net investment loss of $161,784 for the fiscal year ending June 30, 2022 compared to $397,943 and a gain of $610,554 in the prior year.
- The recent actuarial valuation prepared as of June 30, 2022 reported the funded ratio to be 71.2%, up from 70.7% the prior fiscal year. This is based on a total pension liability of $4,723,291 and the smoothed actuarial value of assets.
- On a market value basis, the investment rate of return for this fiscal year was -4.7% compared with 22.80% in fiscal year 2021.
- Retirement benefits paid to retirees and beneficiaries increased 4.7% to $257,782 for fiscal year 2022, compared to $246,214 in fiscal year 2021.

Using This Annual Report:

This report is prepared to provide information as a means for making management decisions, complying with statutory provisions, and demonstrating the responsible stewardship of the assets of the Plan. The financial statements starting on page 24 in the Financial Section identify the Net Position Restricted for Pensions and provide a comparison of the current fiscal year to the prior year.

Overview of Financial Statements:

The Financial Section includes the following:

- Statement of Fiduciary Net Position (Page 24)
- Statement of Changes in Fiduciary Net Position (Page 25)
- Notes to the Financial Statements (Page 26)
- Required Supplementary Information (Page 43)
- Supplementary Information (Page 47)

Statement of Fiduciary Net Position:

This statement presents information on all of the assets and liabilities of the Plan with the difference reported as Net Position Restricted for Pensions available to retirees and survivors. The current year information is provided in comparison to the previous year to assist the reader in evaluating the progress of the Plan.

Statement of Changes in Fiduciary Net Position:

The Statement of Changes in Fiduciary Net Position presents information showing how the Plan's net position changed during the stated fiscal year.

Notes to the Financial Statements:

The Notes to the Financial Statements are an integral part of the financial statements. The information provides the reader additional information that is essential to a full understanding of the data presented in the financial statements to further evaluate the financial condition and operation of the Plan.

Required Supplementary Information:

The Schedule of Changes in Net Pension Liability and Related Ratios provides the Plan's funding progress for the last nine years and the funding ratio that indicates the Plan's ability to meet its current and future benefit obligations. The Schedule of Employer Contributions reflects the City's Actuarial Determined Contribution and Actual Contributions for the last ten years. The Notes to the Required Supplementary Information provide additional information regarding actuarial assumptions and factors affecting trends.

Supplementary Information:

The Supplementary Information includes investment expenses and administrative expenditures for the current and previous fiscal years. The Schedule of Investment Expenses provides the reader with the cost to the Plan for managing and monitoring the Plan's assets.

Financial Analysis
(in thousands)

The evaluation of the Plan's net position provides a measurement tool in assessing the progress and performance of the Plan. COPERS' Net Position Restricted for Pensions as of June 30, 2022 was $3,242,687. This amount represents a decrease of nearly 6% from Net Position Restricted for Pensions of $3,438,027 as of June 30, 2021.

Uninvested cash is reflected as Cash & Cash Equivalents on the Statement of Fiduciary Net Position and may fluctuate due to the timing of investments, pension payroll and other transactions. Cash & Cash Equivalents increased from $143,738 as of June 30, 2020 to $183,915 as of June 30, 20212, an increase of $40,177.

The Plan had liabilities of $91,533 on June 30, 2022 compared to $123,378 on June 30, 2021. This change was primarily attributable to a decrease in payables related to securities lending collateral and unsettled investment broker transactions.

The overall return on investments for fiscal years 2022, 2021 and 2020 was -4.7%, 22.80% and 1.40%, respectively. The chart below illustrates the performance of major asset classes over the last three fiscal years.

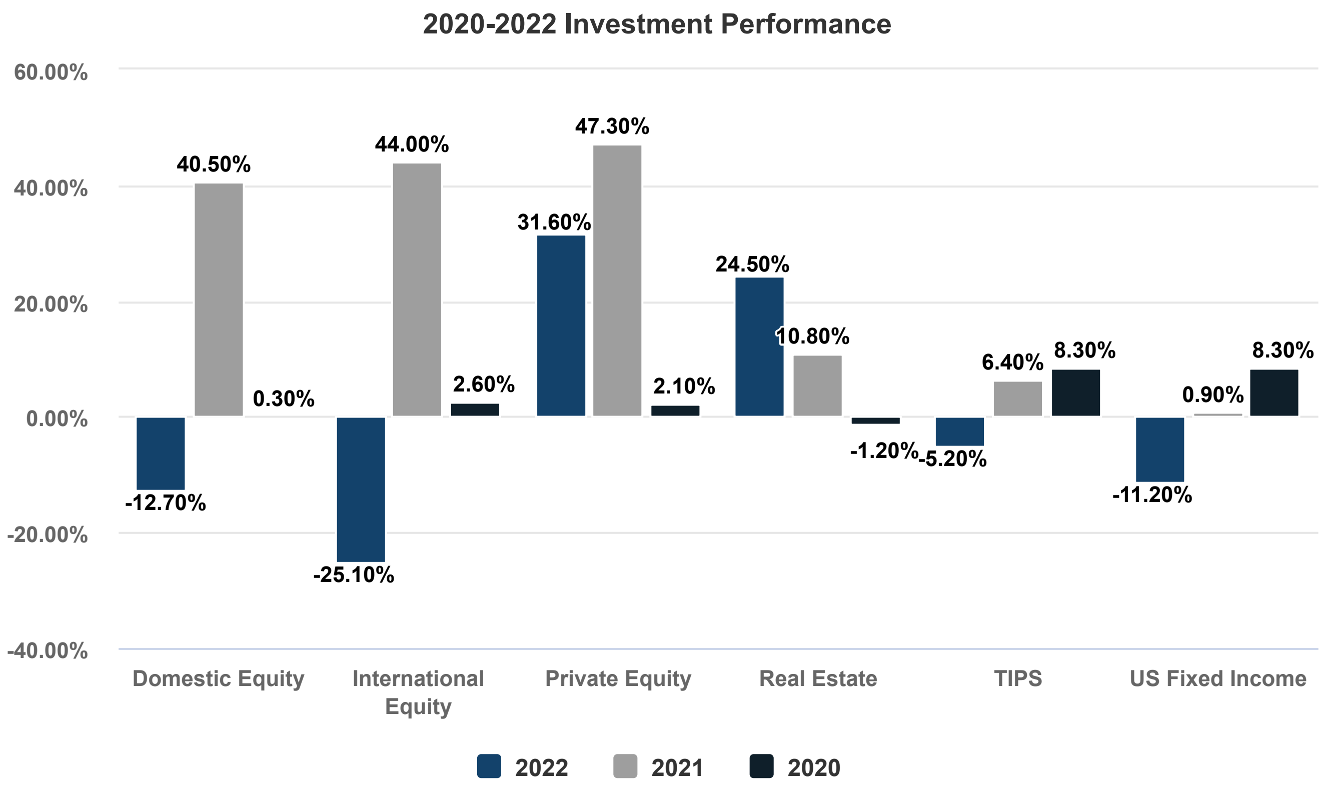

2020-2022 Investment Performance
60.00%
40.00%
20.00%
0.00%
-20.00%
-40.00%
40.50%
0.30%
-12.70%
44.00%
2.60%
-25.10%
31.60%
47.30%
2.10%
24.50%
10.80%
-1.20%
-5.20%
6.40%
8.30%
-11.20%
0.90%
8.30%
Domestic Equity
International Equity
Private Equity
Real Estate
TIPS
US Fixed Income
2022
2021
2020

Table 1: COPERS Fiduciary Net Position for Benefits for June 30, 2022 and 2021 (in thousands)

	2022	2021	Change	% Change
Cash & Cash Equivalents	$ 183,915	$ 143,738	$ 40,177	28.0%
Total Receivables	33,588	98,633	(65,045)	(65.9)
Total Investments	3,116,717	3,319,034	(202,317)	(6.1)
Total Assets	3,334,220	3,561,405	(227,185)	(6.4)
Total Liabilities	91,533	123,378	(31,845)	(25.8)
COPERS Net Position	**$ 3,242,687**	**$ 3,438,027**	**$ (195,340)**	**(5.7)%**

Table 2: COPERS Fiduciary Net Position for Benefits for June 30, 2021 and 2020 (in thousands)

	2021	2020	Change	% Change
Cash & Cash Equivalents	$ 143,738	$ 68,296	$ 75,442	110.5%
Total Receivables	98,633	19,219	79,414	413.2
Total Investments	3,319,034	2,709,090	609,944	22.5
Total Assets	3,561,405	2,796,605	764,800	27.3
Total Liabilities	123,378	115,432	7,946	6.9
COPERS Net Position	**$ 3,438,027**	**$ 2,681,173**	**$ 756,854**	**28.2%**

Reserves:

COPERS maintains five reserve funds to separately account for various transactions of the Plan. Additions to the reserves come from employer and member contributions, and investment income. Deductions from the reserves include monthly pension benefits and payments to investment managers. A schedule of reserve account balances is included in Note 3 to the Financial Statements.

COPERS' Activities:

(in thousands)

COPERS provides retirement pensions, survivor benefits and disability benefits to qualified members and their beneficiaries. These benefits are financed by income on COPERS investments and employer and member contributions.

Total net investment income, which includes net appreciation or depreciation in fair value of investments, bond interest, dividend income, net securities lending income and investment expenses for the fiscal year ended June 30, 2022 was negative $161,784. This compares to net investment income for June 30, 2021 and June 30, 2020 of $610,554 and $50,389, respectively.

Total employer contributions were $178,319 in fiscal year 2022, compared to $357,382 in fiscal year 2021 and $175,947 in fiscal year 2020. The City contributed $10,476 in excess of the Actuarially Determined Contribution in fiscal year 2022 and $179,292 in excess in fiscal year 2021 . Benefit payments for the fiscal years 2022, 2021 and 2020 were $257,782, $246,214 and $239,407, respectively. Total deductions increased by 5.4% over the prior fiscal year, primarily as a result of an increase in the number of retirees.

The summary of COPERS revenues (additions) and expenses (deductions) for the fiscal years ended June 30, 2022, 2021 and 2020 are provided in Table 3 and Table 4:

Table 3: Summary Statement of Changes in Net Position (in thousands)

	2022	2021	Change	% Change
Additions				
Employer Contributions	$ 178,319	$ 357,382	$ (179,063)	(50.1)%
Members' Contributions	53,350	40,561	12,789	31.5
Retirement Office Administration	2,122	2,047	75	3.7
Net Investment Income	(161,872)	610,422	(772,294)	(126.5)
Net Securities Lending Income	88	132	(44)	(33.3)
Total Additions	**$ 72,007**	**$ 1,010,544**	**$ (938,537)**	**(92.9)%**
Deductions				
Benefit Payments	$ 257,782	$ 246,214	$ 11,568	4.7%
Refunds	4,436	3,047	1,389	45.6
Inter-System Transfers	443	452	(9)	(2.0)
Retirement Office Administration	2,122	2,047	75	3.7
Administrative Expense	2,564	1,930	634	32.8
Total Deductions	**$ 267,347**	**$ 253,690**	**$ 13,657**	**5.4%**
Net Increase	**(195,340)**	**756,854**	**(952,194)**	**(125.8)%**
Net Position Restricted for Pensions	**$ 3,242,687**	**$ 3,438,027**	**$ (195,340)**	**(5.7)%**

Table 4: Summary Statement of Changes in Net Position (in thousands)

	2021	2020	Change	% Change
Additions				
Employer Contributions	$ 357,382	$ 175,947	$ 181,435	103.1%
Members' Contributions	40,561	39,356	1,205	3.1
Retirement Office Administration	2,047	2,134	(87)	(4.1)
Net Investment Income	610,422	50,181	560,241	1,116.4
Net Securities Lending Income	132	208	(76)	(36.5)
Total Additions	**$ 1,010,544**	**$ 267,826**	**$ 742,718**	**277.3%**
Deductions				
Benefit Payments	$ 246,214	$ 239,407	$ 6,807	2.8%
Refunds	3,047	2,526	521	20.6
Inter-System Transfers	452	211	241	114.2
Retirement Office Administration	2,047	2,134	(87)	(4.1)
Administrative Expense	1,930	2,509	(579)	(23.1)
Total Deductions	**$ 253,690**	**$ 246,787**	**$ 6,903**	**2.8%**
Net Increase	**756,854**	**21,039**	**735,815**	**3,497.4%**
Net Position Restricted for Pensions	**$ 3,438,027**	**$ 2,681,173**	**$ 756,854**	**28.2%**

Requests for Information:

This report is prepared to provide the Retirement Board, members, retirees and citizens with an overview of the plan, to assess COPERS' financial position and to show accountability for funds received. Questions regarding the information provided in this financial report or requests for additional information may be addressed to:

COPERS

200 W. Washington, 10th Floor

Phoenix, AZ 85003

(602) 534-4400

www.phoenix.gov/copers

Statement of Fiduciary Net Position as of June 30, 2022 and 2021 (in thousands)

	2022	2021
Assets		
Cash and Cash Equivalents	$ 183,915	$ 143,738
Receivables		
City of Phoenix Contributions	19,253	87,512
Member Contributions	2,179	1,874
Interest and Dividends	4,044	3,652
Unsettled Broker Transactions - Sales	8,112	5,595
Total Receivables	**33,588**	**98,633**
Investments		
Temporary Investments from Securities Lending Collateral	52,712	85,842
Fixed Income	487,948	546,064
Domestic Equities	781,752	846,629
Private Equity	347,164	274,568
Global Commingled	263,181	334,279
International Equities	532,661	696,558
Hedge Funds	140,952	132,995
Real Estate	510,347	402,099
Total Investments	**3,116,717**	**3,319,034**
Total Assets	**3,334,220**	**3,561,405**
Liabilities		
Payable for Securities Lending Collateral	52,712	85,842
Unsettled Broker Transactions - Purchases	10,888	12,045
Due to the City of Phoenix	22,450	21,046
Investment Management Fees Payable	2,999	2,557
Other Payables	2,484	1,888
Total Liabilities	**91,533**	**123,378**
Net Position Restricted for Pensions	**$ 3,242,687**	**$ 3,438,027**

The accompanying notes are an integral part of these financial statements.

Statement of Changes in Fiduciary Net Position for fiscal years ended June 30, 2022 and 2021 (in thousands)

	2022	2021
Additions		
Contributions		
City of Phoenix	$ 178,319	$ 357,382
Member	53,350	40,561
Retirement Office Administration	2,122	2,047
Total Contributions	**233,791**	**399,990**
Net Investment Income		
Net Appreciation/(Depreciation) in Fair Value of Investments	(198,029)	581,813
Interest	17,501	17,689
Dividends	19,732	17,400
Other	16,959	10,255
Total Income from Investing Activities	(143,837)	627,157
Less Investing Activities Expense	(18,035)	(16,735)
Net Income/(Loss) from Investing Activities	(161,872)	610,422
Security Lending Gross Income	201	165
Less Agent Fees	(38)	(56)
Less Broker Rebates/Collateral Management Fees	(75)	23
Net Security Lending Expenses	(113)	(33)
Net Income from Security Lending Activities	88	132
Total Net Investment Income/(Loss)	(161,784)	610,554
Total Additions	**72,007**	**1,010,544**
Deductions		
Benefit Payments	257,782	246,214
Refunds of Contributions	4,436	3,047
Retirement Office Administration	2,122	2,047
Inter-System Transfers	443	452
Administrative Expenses	2,564	1,930
Total Deductions	**267,347**	**253,690**
Increase/(Decrease) In Net Position	(195,340)	756,854
Net Position Restricted for Pensions		
Beginning of Year	3,438,027	2,681,173
End of Year	**$ 3,242,687**	**$ 3,438,027**

The accompanying notes are an integral part of these financial statements.

Note 1 - Summary of Significant Accounting Policies

The City of Phoenix Employees' Retirement Plan ("COPERS" or the "Plan") is a defined benefit single-employer public employees' retirement system for the City of Phoenix ("City") general municipal employees. The accounting policies of COPERS conform to accounting principles generally accepted in the United States of America ("GAAP") as applicable to governmental retirement plans.

A. Reporting Entity

COPERS prepares and distributes separate financial statements as required by the Charter of the City of Phoenix (Chapter XXIV, Article II, Employees' Retirement Law of 1953) ("Charter"). Its financial statements are also included as a component unit of the City due to the significance of COPERS' operational and financial relationships with the City. The cost of administering the Retirement Office is reflected as offsetting contributions and deductions on the Statement of Changes in Fiduciary Net Position although the costs are borne solely by the City. The City is the only non-employee contributor to the pension plan. Not all employees of the City are covered under COPERS. Police officers and firefighters are covered under the Arizona Public Safety Personnel Retirement System ("APSPRS") and elected officials are covered under the Elected Officials Retirement Plan of Arizona ("EORPA"). APSPRS and EORPA were established by Arizona State Statute and are administered by an independent Board of Trustees. The City's involvement with these plans is limited to the administration of benefits for APSPRS through the City of Phoenix Fire and Police Local Boards and making the required annual contributions.

B. Basis of Accounting

The accompanying financial statements have been prepared using the accrual basis of accounting in conformity with United States generally accepted accounting principles as prescribed by the Governmental Accounting Standards Board. COPERS' transactions are accounted for using the flow of economic resources measurement focus. Employee contributions are recognized as revenue in the period in which employee services are rendered and the contributions are therefore earned. Employer contributions are recognized at the same time, as the City is formally committed to contributing the actuarially determined amount each year. Pension payments and refunds are recognized when due and payable and expenses are recorded when the corresponding liabilities are incurred, regardless of when payments are made.

C. Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make a number of estimates and assumptions that affect the reported amounts of net position restricted for pensions and changes therein. Actual results could differ from those estimates.

D. Investments

Equity securities and fixed-income securities are reported at fair value (Note 14). Interest and dividends are recognized on the accrual basis as earned. Purchases and sales of investments are recorded on a trade-date basis. Cash equivalents are determined by using a maturity of no more than 90 days at time of purchase. The fair value of an investment is the price that would be received to sell an asset in an orderly transaction between market participants at the measurement date. The fair values of investments are generally based on published market prices and quotations obtained from major investment firms. Certain investments are reported at the net asset values calculated by the investment manager as a practical expedient.

In March of 2017, the Board significantly revised the Investment Policy Statement that was more than 10 years old. The Board considered it necessary to:

○ Update the objectives and guidelines that govern the investment of COPERS' assets;

○ Establish a long-term target asset allocation with a high likelihood of meeting COPERS' objectives; and

○ Protect the financial health of COPERS through the implementation of a stable, long-term investment policy.

Significant areas of revision include modifying the asset allocation, reflecting the changes in the Phoenix City Charter that previously limited the types of investments COPERS could make, and adding prudent investor language. In consultation with their investment manager and consulting actuary, the Board believes the revised asset allocation will have a greater probability of realizing the assumed rate of return. The revised asset allocation was adopted during fiscal year 2017, was implemented in phases and completed in 2020.

Note 1 - Summary of Significant Accounting Policies (Continued)

The table below reflects the target and actual allocation of the portfolio and the expected return on those asset classes:

Asset Class	FY 2022 Target Allocation	FY 2022 Actual Allocation	10-Year Expected Real Return
U.S. Equity	16.00%	20.10%	6.80%
Developed Market Equity (non-U.S.)	9.0	11.4	8.1
Emerging Market Equity	8.0	5.0	10.3
Private Equity	9.0	8.1	11.9
Investment Grade Bonds	15.0	11.0	1.8
TIPS	7.0	4.7	1.8
High Yield Bonds	5.0	4.4	3.8
Bank Loans	3.0	2.6	3.1
Emerging Market Bonds	3.0	2.1	4.2
Infrastructure	4.0	1.6	8.2
Natural Resources	4.0	1.0	9.2
Hedge Funds	5.0	4.3	3.6
Real Estate	12.0	15.7	7.5
GTAA	-	2.9	3.9
Cash	-	5.1	1.1

Note 2 - Description of Plan

A. Purpose

COPERS is a single-employer, defined benefit pension plan established by the City Charter. Its purpose is to provide retirement, disability retirement and survivor benefits for its members. Members are full-time employees on a work schedule which consists of the number of full-time hours per week designated for the class of employment for the employee's classification with a work schedule intended to be continuous over a period of twelve months. All full-time classified civil service employees and full-time appointive officials of the City are required, as a condition of employment, to contribute to COPERS.

B. Administration

The general administration, management and operation of COPERS are vested in a nine-member Retirement Board consisting of three elected employee members, four statutory members, a citizen member and a retiree member. The Retirement Board appoints the Retirement Program Administrator, a civil service position, and contracts other services necessary to properly administer the Plan.

C. Plan Amendment and Termination

COPERS is administered in accordance with the Charter and can be amended or repealed only by a vote of the people. There are no provisions for termination of COPERS. Voters approved changes to the City of Phoenix retirement system in an election held on August 25, 2015. New employees hired on or after January 1, 2016 were placed in Tier 3. The employee contribution rate for Tier 3 is based on 50% of the actuarially determined rate or 11% whichever is lower.

D. Membership Data

	June 30	
	2022	2021
Retirees, beneficiaries and survivors	7,596	7,406
Alternate payees	184	181
Terminated vested members	1,109	1,053
Active members:		
Tier 1	4,110	4,522
Tier 2	541	587
Tier 3	3,287	2,860
Total Members	**16,827**	**16,609**

Note 2 - Description of Plan (Continued)

E. Pension Benefits

Benefits are calculated on the basis of a given rate, final average salary and service credit. Members are eligible for retirement benefits at age 60 plus ten or more years of service credit, age 62 with five or more years of service credit, or where age and service credits equal 80 for Tier 1 employees and 87 for Tier 2 and 3 employees. The below table outlines the benefits for each tier.

Tier 1	Tier 2	Tier 3
• Up to 32.5 yrs service @ 2.0%	• Less than 20 yrs service @ 2.10%	• Less than 10 yrs service @1.85%
• 32.5 to 35.5 yrs service @ 1.0%	• 20 yrs but less than 25 yrs service @ 2.15%	• 10 yrs but less than 20 yrs service @ 1.9%
• 35.5 yrs service & over @ 0.5%	• 25 yrs but less than 30 yrs service @ 2.20%	• 20 yrs but less than 30 yrs service @ 2.0%
	• 30 yrs or more @ 2.30%	• 30 yrs or more @ 2.1%

A deferred pension is available at age 62 to members who end their City employment with five or more years of service credit and leave their accumulated contributions in COPERS.

A supplemental post-retirement payment and a permanent benefit increase (under the Pension Equalization Program) may be provided to Tier 1 and Tier 2 retirees if sufficient reserves are available at the end of the fiscal year. The reserve is funded if the five-year average investment return exceeds 8%.

F. Disability Benefits

A member who becomes permanently disabled for the performance of duty is eligible for a disability benefit if the disability is 1) due to a personal injury or disease and the member has ten or more years of service credit or 2) due to injuries sustained on the job, regardless of service credit.

G. Survivor Benefits

Dependents of deceased members may qualify for survivor benefits if the deceased member had ten or more years of service credit or if the member's death was in the line of duty with the City and compensable under the Workmen's Compensation Act of the State of Arizona. Chapter XXIV, Section 25 of the Charter of the City of Phoenix specifies conditions for eligibility of survivor benefits.

H. Refunds

Upon separation from employment, a member or beneficiary not entitled to a pension may withdraw the member's contribution plus applicable interest. Acceptance of a refund revokes the individual's rights and benefits in COPERS. Employer contributions to COPERS are not refundable. An interest rate of 3.75%, the rate cap imposed by the City Charter, was granted by the Retirement Board to be applied effective June 30, 2022 to the members' mean account balances during the fiscal year. The interest rate granted in fiscal year 2021 was also 3.75%.

I. Tax Exempt Status of Member Contributions

COPERS has received a favorable letter of determination of qualification from the Internal Revenue Service under Section 401(a) of the Internal Revenue Code. Continued tax-exempt status of COPERS is contingent on future operations remaining in compliance with Section 401(a).

Under Internal Revenue Code Section 414(h)(2) and Revenue Ruling 81-36, effective January 1, 1985 the City of Phoenix authorized that a portion of its contributions be earmarked as being made by the members of COPERS, and "picked up" that portion of the designated active member contributions. The member contribution that is picked up by the City of Phoenix is treated as an employer contribution for federal and state income tax purposes and excluded from the member's gross income until distributed by COPERS.

Note 3 – Net Position Restricted for Pensions

Five reserve funds have been established to separately account for transactions of the Plan:

- The Income Account is used to account for COPERS' investment income and loss, including net appreciation or depreciation in fair value and miscellaneous income. At year-end, the Income Account is closed to the Employees' Savings Account, the Pension Accumulation Account, the Pension Reserve Account and the Pension Equalization Reserve Account, which results in no fund balance in the Income Account.
- The Employees' Savings Account is used to account for member contributions, member refunds, and the member portion of investment income. As a condition of employment, a member hired before July 1, 2013 is required to contribute 5% of his/her covered compensation; a member hired after this date is required to contribute 50% of the actuarially determined rate, while the City contributes the other 50%. Effective with the election on August 25, 2015, the employee contribution for Tiers 2 and 3 cannot exceed 11%. Accumulated contributions receive regular interest that is computed at the end of each fiscal year on the mean balance in the members' accounts during the year. The rate of interest is established each year by the Board and is capped at 3.75% by the City Charter. Transfers are made from the Employees' Savings Account to the Pension Reserve Account when a member retires or becomes eligible for disability benefits.
- The Pension Accumulation Account is used to account for employer contributions and for a portion of investment income. The Charter requires the City to contribute an amount that is determined annually by COPERS' retained actuaries. Contributions are based upon a level percentage of payroll. The Pension Accumulation Account may carry a negative balance as the City contribution rate includes a component for the unfunded actuarial liability (UAL). Transfers are made from the Pension Accumulation Account to the Pension Reserve Account when a member retires or becomes eligible for disability benefits.
- The Pension Reserve Account is used to account for distributions to retirees and the balance receives regular interest that is computed at the end of each fiscal year on the mean balance during the year. The rate of interest is the actuarial assumed rate.
- The Pension Equalization Reserve Account is used for funding increases to eligible pensions under the Pension Equalization Program and the "13th Check." The Pension Equalization Program was established on October 1, 1991, when voters of the City of Phoenix approved an amendment to the City Charter, allowing pension adjustments to be paid to retired members of COPERS. These adjustments are to be made exclusively from COPERS' investment earnings in excess of 8% (per Charter) over the preceding 5-year period and may not exceed the Phoenix Area Consumer Price Index (CPI). This amendment was effective January 1, 1992, and will benefit only retirees who, as of January 1 of each year, have received at least 36 pension payments.

Following are the fiscal year-end reserve balances as of June 30, 2022 and 2021 respectively, based on amortized cost for fixed income investments and cost for equity investments (in thousands):

	2022	2021
Employees' Savings	$ 552,132	$ 532,394
Pension Accumulation	(2,430,526)	(2,070,205)
Pension Reserve	4,619,139	4,156,691
Pension Equalization Reserve	-	-
Convert to Fair Value	501,942	819,147
Total Based on Fair Value	**$ 3,242,687**	**$ 3,438,027**

Note 4 - Investment Fees (in thousands)

The investment costs paid from Plan assets were $18,035 and $16,735 for the fiscal years 2022 and 2021, respectively. This information is provided in greater detail in the Supplementary Information section of this document.

Employer contributions are actuarially determined amounts, which together with member contributions are sufficient to cover both (i) normal costs of the plan and (ii) financing of unfunded actuarial costs over a selected period of future years (See Note 6).

Note 5 - Funding Requirement Determinations and Actual Contributions (in thousands)

City of Phoenix contributions for fiscal year 2022 were $178,319, which is equivalent to 29.95% of the estimated annual active member payroll, compared to $357,382 or 61.57% for the fiscal year 2021. Member contributions for the fiscal years 2022 and 2021 were $53,350 and $40,561, respectively. The Tier 1 employee contribution rate is 5%. The Tier 2 and Tier 3 employee contribution rate is 11%.

Note 6 – Funded Status and Funding Progress (as of most recent valuation)

Unfunded actuarial liabilities are determined annually by the consulting actuary, applying actuarial assumptions to reflect the time value of money (through discounts for interest) and the probability of payment (by means of decrements, such as for death, disability, withdrawal or retirement) between the valuation date and the expected date of payment.

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

	Methods/Assumptions	
Description Valuation Date	**June 30, 2022**	**June 30, 2021**
Actuarial Cost Method	Individual Entry Age Normal	Individual Entry Age Normal
Amortization Method	Level Percentage of Payroll	Level Percentage of Payroll
Amortization Method	• The UAL of June 30, 2013 is amortized over a closed 25-year period. • The impact of September 2013 assumption changed is amortized over a closed 25-year period. • The impact of August 2015 assumption changed is amortized over a closed 25-year period with a four-year phase-in. • Future gains and losses are amortized over closed 20year period.	
Actuarial Assumptions		
Investment Rate of Return	7.00%	7.00%
Projected Salary Increases	2.8%-7.0%	2.8%-7.0%
Cost-of-Living Adjustments	0.5% to 1.25%	1.25%
Wage Inflation	2.80%	2.80%
Payroll Growth Rate	2.50%	2.50%

The actuarial assumptions used for the June 30, 2022 valuation, include the following:

1. Salary Scale – Salary increases are composed of a price inflation component, a real wage growth component and a merit or longevity component that varies by age. Growth in total payroll is assumed to be 2.50%.
2. Multiple Decrement Tables:
   a. Death - For determination of member, retiree and beneficiary mortality, the Pub-2010.
   b. Disability – Based on 20% of the Arizona State Retirement System disability table.
   c. Withdrawal - Based upon COPERS' experience, measures the probability of members terminating employment for reasons other than retirement, death or disability.

The foregoing actuarial assumptions are based on the presumption that COPERS will continue as presently chartered. If COPERS is amended, different actuarial assumptions and other factors might be applicable in determining actuarial present values.

Discount Rate

A single discount rate of 7.00% was used to measure the total pension liability as of June 30, 2022 and June 30, 2021. This single discount rate was based on the expected rate of return on pension plan investments. The projection of cash flows used to determine the discount rate assumed that Tier 1 member contributions remain at 5% of payroll, Tier 2 and 3 member contributions are set equal to half of the total actuarially determined contribution rate, not to exceed 11%, and City contributions will be made at rates equal to the difference between the actuarially

Note 6 – Funded Status and Funding Progress (as of most recent valuation) (Continued)

determined contribution rates and the member rates. Based on those assumptions, the pension plan's fiduciary net position was projected to be sufficient 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.

Sensitivity of the Net Position Liability to Changes in the Discount Rate

The table below presents the net pension liability of the Plan calculated using the discount rate of 7.00%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1.0% lower (6.00%) or 1.0% higher (8.00%) than the rates at June 30, 2022 and June 30, 2021. Changes in the discount rate affect the measurement of the TPL (Total Pension Liability). Lower discount rates produce a higher TPL and higher discount rates produce a lower TPL. Because the discount rate does not affect the measurement of assets, the percentage change in the NPL (Net Pension Liability) can be significant for a relatively small change in the discount rate. A 1.0% decrease in the discount rate increases the TPL by approximately 12.2% and increases the NPL by approximately 38.8% . A 1.0% increase in the discount rate. decreases the TPL by approximately 10.0%,and decreases the NPL by approximately 32.0%. The table below shows the sensitivity of the NPL to the discount rate.

Sensitivity of Net Pension Liability to Changes in Discount Rate (in thousands):

Sensitivity as of June 30, 2022	**1% Decrease 6.00%**	**Discount Rate 7.00%**	**1% Increase 8.00%**
Total Pension Liability	$ 5,297,458	$ 4,723,291	$ 4,249,305
Plan Fiduciary Net Position	3,242,687	3,242,687	3,242,687
Net Pension Liability	**2,054,771**	**1,480,604**	**1,006,618**
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	61.2%	68.7%	76.3%

Sensitivity as of June 30, 2021	**1% Decrease 6.00%**	**Discount Rate 7.00%**	**1% Increase 8.00%**
Total Pension Liability	$ 5,095,035	$ 4,541,799	$ 4,080,890
Plan Fiduciary Net Position	3,438,027	3,438,027	3,438,027
Net Pension Liability	**1,657,008**	**1,103,772**	**642,863**
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	67.5%	75.7%	84.2%

Note 7 - Funding Policy

The City has formally adopted a pension funding policy that requires payment of at least 100 percent of the actuarially determined contribution every year. Under current actuarial calculations and amortization periods COPERS will be fully funded by June 30, 2044.

As a condition of employment, COPERS members are also required to contribute a percentage of their salary as provided in Chapter XXIV, Section 27, of the City Charter. The table below outlines the contribution rates for Tiers 1, 2, and 3.

Tier	Contribution Rate
Tier 1	5%
Tier 2	Capped at 11%
Tier 3	Capped at 11%

Present members' accumulated contributions at June 30, 2022 were $552,132, including interest compounded annually, compared to $532,394 at June 30, 2021, and are included in the Employee Savings Account as discussed on page 29.

Note 8 – Investments

The Board has a fiduciary duty to invest and manage the assets of the Plan solely in the interests of members and beneficiaries. The Board invests and manages trust assets as a prudent investor would, considering the purposes, terms, distribution requirements, and other circumstances of the Plan. In satisfying this standard, the Board exercises reasonable care, skill, and caution.

In fulfilling its responsibilities, the Board has contracted with various investment management firms and a master global custodian. The Board's investment policy addresses permissible investment categories and appropriate allocation.

A summary of investments at June 30, 2022 and 2021 is as follows (in thousands):

	2022		2021	
	Fair Value	Amortized Cost	Fair Value	Amortized Cost
Temporary Investments from Securities Lending Collateral (Note 9)	$ 52,712	$ 52,712	$ 85,842	$ 85,842
Fixed Income	487,948	541,761	546,064	530,418
Domestic Equity	781,752	641,602	846,629	625,113
Private Equity	347,164	210,013	274,568	169,984
International Equities	532,661	510,299	696,558	489,653
Global Commingled	263,181	190,154	334,279	181,262
Hedge Funds	140,952	107,666	132,995	107,790
Real Estate	510,347	360,569	402,099	309,826
Total Investments	**$ 3,116,717**	**$ 2,614,776**	**$ 3,319,034**	**$ 2,499,888**
Cash and Cash Equivalents	183,915	183,915	143,738	143,738
Total	**$ 3,300,632**	**$ 2,798,690**	**$ 3,462,772**	**$ 2,643,626**

COPERS investments are managed by professional fund managers and are held by a global master custodian who acts as COPERS' agent.

Note 8 - Investments (Continued)

The following schedule provides the fair value of each investment category at June 30, 2022 and 2021 (in thousands):

Investment Categories	2022 Fair Value	2021 Fair Value
Cash	$ 1,021	$ 654
Short-Term Investment Fund	182,894	143,084
Cash and Cash Equivalents	$ 183,915	$ 143,738
Temporary Investments from Securities Lending Collateral	$ 52,712	$ 85,842
Fixed Income:		
Derivatives	$ 975	$ 933
U S Government Guaranteed Securities	42,314	45,341
Government Agencies Securities	882	991
Mortgage Backed Securities-Residential	60,630	57,948
Asset Backed Securities	18,434	20,536
Municipal Bonds	5,763	7,061
Corporate Bonds	282,798	319,387
Foreign Commingled	76,152	93,867
	$ 487,948	$ 546,064
Domestic Equities	$ 781,752	$ 846,629
Global Commingled	$ 263,181	$ 334,279
International Equities	$ 532,661	$ 696,558
Private Equity	$ 347,164	$ 274,568
Hedge Funds	$ 140,952	$ 132,995
Real Estate Funds	$ 510,347	$ 402,099
Total with Securities Lending Collateral	**$ 3,300,632**	**$ 3,462,772**

Note 8 - Investments (Continued)

Custodial Credit Risk – Deposits

Custodial credit risk for deposits is the risk that in the event of a depository institution failure, a government will not be able to recover deposits or collateral held by an outside party. As of June 30, 2022, COPERS did not realize any losses related to custodial credit risk for deposits.

Annual Money-Weighted Rate of Return

The rate of return for the year ended June 30, 2022, which is the annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was -4.7%, compared to 22.80% for the prior year. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

Custodial Credit Risk – Investments

Custodial credit risk for investments is the risk that in the event of a failure of a counterparty to a transaction, a government will not be able to recover the value of investment or collateral securities that are in the possession of an outside party. As of June 30, 2022, COPERS did not realize any losses due to custodial credit risk for investments or securities lending arrangements. Note 9 on page 38 provides detailed information regarding securities lending. COPERS' policy requires all investments to be collateralized and registered in COPERS' or its nominee's name.

Concentration of Credit Risk

Concentration of Credit Risk is the risk of loss attributed to the magnitude of a government's investment in a single issuer. COPERS' investment policy does not allow for an investment in any one issuer in excess of 5% of COPERS' total investments which includes futures, options and swaps, except investments issued or explicitly guaranteed by the U.S. government. As of June 30, 2022, COPERS did not have any investments with any one issuer in excess of 5%.

Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates may adversely affect the fair value of an investment or a deposit. COPERS' investment in foreign fixed income is managed by Longfellow and Western Asset. The managers' report dollar and non-dollar denominated holdings and provide for direct ownership of the underlying security. The following table presents the foreign currency exposure for the Plan's fixed income investments.

Foreign Currency Exposure June 30, 2022 and 2021 (in thousands):

Currency	2022	2021
British Pound	8	8
Canadian Dollar	(37)	(46)
Chinese Renminbi	252	252
Euro	151	156
Japanese Yen	(54)	(54)
Mexican Peso	12	12
Totals	**$ 332**	**$ 328**

Commitments (in thousands)

In connection with the purchase of various real estate investments, COPERS had commitments totaling $356,018 as of June 30, 2022 and $402,099 as of June 30, 2021. Remaining unfunded commitments for real estate were

Note 8 - Investments (Continued)

$121,798 as of June 30, 2022. COPERS is not in any redemption queues. All non-core real estate is self-liquidating. COPERS also had $234,220 in other unfunded alternative investment commitments as of June 30, 2022 .

Credit Risk

Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations. COPERS' investment policy permits purchasing securities included in the Barclays Capital US Aggregate Index and relies on the methodology used by Barclays Capital to determine if a security is investment grade. For fixed income securities and their futures or options derivatives, emphasis is on high-quality securities.

COPERS currently has two managers responsible for fixed income investments. Longfellow Investment Management and Western Asset Management Company ("Western") are active bond managers. As part of their portfolios, Longfellow and Western may enter into futures, options, and swap contracts for hedging purposes and/or as a part of the overall portfolio strategy and will be incidental to its securities trading activities for the account. COPERS also invests in index funds SSgA U.S. Aggregate Bond Index and SSgA U.S. TIPS.

The table on page 36 provides fixed income investments as of June 30, 2022 subject to credit risk along with current credit ratings.

Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. Typically, the longer the maturity of an investment, the greater the sensitivity of its fair value to interest rate changes. COPERS' contract with Western directs them to maintain an average weighted duration of portfolio security holdings including futures and options positions within +/- 20% of the Barclays Capital US Aggregate Index. COPERS' contract with Longfellow specifies a weighted average duration of +/- 20% of the Barclays Capital US Aggregate Index. The contracts with Brigade and DDJ Capital Management require a weighted average duration of +/- two years of the Barclays Capital US Aggregate Index.

Information about the interest rate risk exposure of COPERS is provided in the table on page 36. COPERS assets include several collateralized mortgage obligations and mortgage-backed securities, which could be considered as highly sensitive to interest rate changes, depending upon the exercise of prepayment options.

COPERS' investment policy permits the following investments, which include investments that are considered to be highly sensitive to interest rate changes due to long maturities, prepayment options, coupon multipliers, reset dates and similar terms:

- Obligations issued or guaranteed by the U.S. Federal Government, U.S. Federal Agencies or U.S. government-sponsored corporations and agencies.
- Obligations of U.S. and non-U.S. corporations such as mortgage bonds, convertible and non-convertible notes and debentures.
- Mortgage-backed and asset-backed securities, swaps, forwards, options on swaps, and options on forwards.
- Obligations denominated in U.S. dollars of international agencies, supranational entities and foreign governments (or their subdivisions or agencies).
- Securities defined under Rule 144A and Commercial paper defined under Section 4(2) of the Securities Act of 1933.
- Bank Loans, TBA Securities and Mortgage Dollar Rolls.
- General obligation bonds, revenue bonds, improvement district bonds, or other evidences of indebtedness of any state of the United States, or any of the counties or incorporated cities, towns and duly organized school districts in the State of Arizona which are not in default as to principal and interest.

Note 8 – Investments (Continued)

Credit Rating and Maturity for COPERS' Fixed Income Investments (in thousands)

	2022			2021		
	Credit Quality Ratings	Fair Value	Weighted Average Maturity (Years)	Credit Quality Ratings	Fair Value	Weighted Average Maturity (Years)
Derivatives	Not Rated	$ 975	31.416	Not Rated	$ 933	20.337
Total Derivatives		**975**			**933**	
U.S. Government Guaranteed	AAA	$ 41,678	14.687	AAA	-	-
U.S. Government Guaranteed	B	10	1.376	B	-	-
U.S. Government Guaranteed	CCC	-	-	CCC	10	2.378
U.S. Government Guaranteed	Not Rated	626	27.374	Not Rated	45,331	12.779
Total U. S. Government Guaranteed		**42,314**			**45,341**	
Government Agency	AAA	490	0.126	AAA	-	-
Government Agency	AA	-	-	AA	500	1.126
Government Agency	Not Rated	392	4.666	Not Rated	491	5.666
Total Government Agency		**882**			**991**	
Mortgage Backed	AAA	$ 3,882	22.776	AAA	$ 1,449	23.187
Mortgage Backed	AA	2,053	21.400	AA	335	22.567
Mortgage Backed	A	64	24.961	A	810	17.916
Mortgage Backed	BBB	-	-	BBB	962	7.890
Mortgage Backed	B	475	13.844	B	146	23.003
Mortgage Backed	CCC	-	-	CCC	200	14.667
Mortgage Backed	CC	-	-	CC	372	15.912
Mortgage Backed	C	325	14.766	C	-	-
Mortgage Backed	Not Rated	53,831	25.636	Not Rated	53,674	24.727
Total Mortgage Backed		**60,630**			**57,948**	
Asset Backed	AAA	$ 3,444	15.034	AAA	$ 3,234	10.148
Asset Backed	AA	1,676	9.558	AA	440	27.687
Asset Backed	A	-	-	A	843.00	0.046
Asset Backed	BBB	807	27.786	BBB	2,353	28.214
Asset Backed	B	819	11.352	B	753	11.063
Asset Backed	Not Rated	11,688	16.043	Not Rated	12,913	14.968
Total Asset Backed		**18,434**			**20,536**	
Municipal Bonds	AAA	$ 623	16.603	AAA	$ 1,363	14.067
Municipal Bonds	AA	2,235	16.297	AA	2,459	17.547
Municipal Bonds	A	699	23.392	A	1,320	23.311
Municipal Bonds	BBB	-	-	BBB	508	17.970
Municipal Bonds	BB	-	-	BB	211	16.389
Municipal Bonds	B	1,589	18.288	B	-	-
Municipal Bonds	C	-	-	C	1,200	17.093
Municipal Bonds	Not Rated	617	29.361	Not Rated	-	-
Total Municipal Bonds		**5,763**			**7,061**	

Note 8 – Investments (Continued)

Credit Rating and Maturity for COPERS' Fixed Income Investments (in thousands)

	2022			2021		
	Credit Quality Ratings	Fair Value	Weighted Average Maturity (Years)	Credit Quality Ratings	Fair Value	Weighted Average Maturity (Years)
Corporate Bonds	AAA	$ 18,965	10.410	AAA	$ 2,747	21.355
Corporate Bonds	AA	7,060	9.587	AA	6,472	16.249
Corporate Bonds	A	18,045	10.195	A	18,537	12.795
Corporate Bonds	BBB	-	-	BBB	48,316	12.683
Corporate Bonds	BB	-	-	BB	27,089	8.161
Corporate Bonds	B	53,900	7.812	B	57,660	5.307
Corporate Bonds	CCC	1,005	3.099	CCC	48,653	4.631
Corporate Bonds	CC	-	-	CC	1,332	6.388
Corporate Bonds	C	19,142	4.715	C	152	3.507
Corporate Bonds	D	-	-	D	630	4.850
Corporate Bonds	Not Rated	164,681	6.587	Not Rated	107,799	5.288
Total Corporate Bonds		**282,798**			**319,387**	
Foreign	AAA	$ 532	26.800	AAA	-	-
Foreign	AA	-	-	AA	1,262	7.780
Foreign	A	1,308	19.258	A	1,297	6.523
Foreign	BBB	475	22.725	BBB	4,037	18.480
Foreign	BB	498	17.170	BB	1,142	21.090
Foreign	B	1,342	9.517	B	-	-
Foreign	C	310	1.564	C	-	-
Foreign	Not Rated	71,687	4.614	Not Rated	86,129	10.418
Total Foreign		**76,152**			**93,867**	
Total Fixed Income Investments		**$ 487,948**			**$ 546,064**	

Note 9 – Securities Lending Program

State statutes and City Charter do not prohibit COPERS from participating in securities lending transactions, and COPERS has, via a Securities Lending Authorization Agreement effective May 6, 2015, authorized Bank of New York Mellon ("BNY") to lend its securities to broker-dealers and banks pursuant to a form of loan agreement.

During 2022 and 2021, BNY lent, on behalf of COPERS, certain securities held by BNY as custodian and received cash (United States and foreign currency), securities issued or guaranteed by the United States government and irrevocable letters of credit as collateral. BNY did not have the ability to pledge or sell collateral securities delivered absent a borrower default. Borrowers were required to deliver collateral for each loan equal to: (i) in the case of loaned securities denominated in United States dollars or whose primary trading market was located in the United States or sovereign debt issued by foreign governments, 102% of the fair value of the loaned securities; and (ii) in the case of loaned securities not denominated in United States dollars or whose primary trading market was not located in the United States, 105% of the fair value of the loaned securities.

At June 30, 2022 and 2021, COPERS had the following securities out-on-loan (in thousands).

June 30, 2022	Fair Value of Securities Lent	Cash Collateral Value	Non-Cash Collateral Value
U.S. Equities	$ 27,126	$ 24,631	$ 2,495
U.S. Corporate Securities	14,591	14,254	337
U.S. Government Securities	10,995	10,699	296
Total	**$ 52,712**	**$ 49,584**	**$ 3,128**

June 30, 2021	Fair Value of Securities Lent	Cash Collateral Value	Non-Cash Collateral Value
U.S. Equities	$ 49,653	$ 35,736	$ 13,917
U.S. Corporate Securities	24,729	23,634	1,095
U.S. Government Securities	11,460	8,224	3,236
Total	**$ 85,842**	**$ 67,594**	**$ 18,248**

During 2022 and 2021, COPERS and the borrowers maintained the right to terminate all securities lending transactions on demand. The cash collateral received on each loan was invested, together with the cash collateral of other qualified tax-exempt plan lenders, in a liquidity pool and a duration pool. As of June 30, 2022, the collateral pool had a weighted average maturity (WAM) of 2 days and a weighted average life (WAL) of 99 days. Because the loans were terminable at will, their duration did not generally match the duration of the investments made with cash collateral.

Note 10 – Risk and Uncertainties

COPERS invest in various investment securities. Investment securities are exposed to various risks such as interest rate, market and credit risks. Due to the level of risk associated with certain investment securities, it is at least reasonably possible that changes in the values of investment securities will occur in the near term and such changes could materially affect the amounts reported in the statement of fiduciary net position. Because the values of individual investments fluctuate with market conditions, the amount of investment gains or losses that COPERS will recognize in its future financial statements cannot be determined.

Note 11 – Funds To/From Other Systems

Under the provisions of Arizona Revised Statutes, Sections 38-730 and 38-922 as amended, transfers between COPERS and the Arizona State Retirement System ("ASRS") are allowed when the City hires an employee who

Note 11 – Funds To/From Other Systems (Continued)

was formerly covered by ASRS, or a COPERS member who separates from City of Phoenix employment goes to work for an entity whose employees are covered under ASRS. Effective July 2011, an amendment in statute changed the calculation method of retirement service credit transfers between COPERS and ASRS. Previously, retirement service credits (time) were transferred between systems without possible service reduction or member cost. Beginning July 2011, retirement service credit transfers are based on an actuarial present value (APV) methodology to the extent the prior retirement system is funded on a fair value basis. With this calculation method a member may have to pay for a portion of the transferred service or accept a reduced transfer of service credits.

Also, City employees previously employed by other government entities may purchase prior service credits.

Note 12 – Interfund Balances

Because COPERS does not have a local bank account, the City of Phoenix Payroll Section acts as a paying and collecting agent for COPERS. Payroll issues pension payments and employee retirement contribution refunds from the City's bank account and handles payment reclamations through the City's bank account. This type of activity, if any, is reflected in the Statement of Fiduciary Net Position as a liability or receivable, as applicable.

Note 13 – Contingent Liabilities

Management is not aware of any pending or threatened claims against COPERS.

Note 14 – Fair Value Measurements (in thousands)

Investment valuation

COPERS categorizes the fair value measurements of its investments based on the hierarchy established by generally accepted accounting principles. The fair value hierarchy, which has three levels, is based on the valuation inputs used to measure an asset's fair value: Level 1 inputs are quoted prices in active markets for identical assets; Level 2 inputs are significant other observable inputs; Level 3 inputs are significant unobservable inputs.

Investments

Investments, including derivative instruments that are not hedging derivatives, are measured at fair value on a recurring basis. Recurring fair value measurements are those that Governmental Accounting Standards Board (GASB) Statements require or permit in the statement of fiduciary net position at the end of each reporting period. Fair value investments measurements are as follows at June 30, 2022 and 2021 (in thousands).

Note 14 – Fair Value Measurements (in thousands) (Continued)

	Fair Value June 30, 2022	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investments by Fair Value Level				
Domestic Equities	$ 781,752	$ 266,395	$ -	$ 515,357
International Equities	532,661	353,570	-	179,091
Fixed Income				
Derivatives	975	(702)	1,677	-
US Government and Agency	43,196	43,196	-	-
Mortgage Backed - Residential	60,630	-	60,630	-
Asset Backed	18,434	-	18,434	-
Municipal Bonds	5,763	-	5,763	-
Corporate Bonds	282,798	-	167,784	115,014
Foreign	76,152	69,446	6,706	-
Global Commingled	95,632	95,632	-	
Temporary Investments from Securities Lending	3,128	3,128	-	-
Total Investments by Fair Value Level	**$ 1,901,121**	**$ 830,665**	**$ 260,994**	**$ 809,462**
Investments measured at net asset value (NAV)				
Private Equity	347,164			
Hedge Funds	140,952			
Global Commingled	167,549			
Real Estate Funds	510,347			
Total Investments Measured at NAV	**$ 1,166,012**			
Cash Equivalents in Securities Lending	49,584			
Total Investments	**$ 3,116,717**			

Note 14 – Fair Value Measurements (in thousands) (Continued)

	Fair Value June 30, 2021	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investments by Fair Value Level				
Domestic Equities	$ 846,629	$ 313,456	$ -	$ 533,173
International Equities	696,558	301,763	-	394,795
Fixed Income				
Derivatives	933	(56)	989	-
US Government and Agency	46,332	45,341	991	-
Mortgage Backed - Residential	57,948	-	57,948	-
Asset Backed	20,536	-	20,536	-
Municipal Bonds	7,061	-	7,061	-
Corporate Bonds	319,387	29	196,700	122,658
Foreign	93,867	-	8,552	85,315
Global Commingled	106,086	106,086	-	-
Temporary Investments from Securities Lending	18,249	-	18,249	-
Total Investments by Fair Value Level	**$ 2,213,586**	**$ 766,619**	**$ 311,026**	**$ 1,135,941**
Investments measured at net asset value (NAV)				
Private Equity	274,568			
Hedge Funds	132,995			
Global Commingled	228,193			
Real Estate Funds	402,099			
Total Investments Measured at NAV	**$ 1,037,855**			
Cash Equivalents in Securities Lending	67,593			
Total Investments	**$ 3,319,034**			

Note 14 – Fair Value Measurements (in thousands) (Continued)

Alternative investments measured at NAV include private equity funds, hedge funds, real estate, opportunistic and global fixed income. Below is a description of the various investment strategies:

- COPERS has one private equity fund manager that focuses on limited partnership arrangements.
- COPERS invests in four direct hedge funds which all have a global macro strategy.
- COPERS' portfolio consists of one commingled fixed income fund and five fixed income separate accounts. These accounts have a core-plus strategy.
- COPERS has two global commingled funds, one with a global large cap growth mandate and the second fund with a large cap value mandate.
- COPERS' real estate investments consist of three core real estate funds and 18 non-core real estate partnerships. The core funds permit redemptions with a 90-day notice, the non-core fund investments have a limited liquidity and redemptions are restricted.

Certain investments are reported at the net asset values calculated by the investment manager as a practical expedient and are not classified by level in the fair value hierarchy. The fair value amounts included above are intended to permit reconciliation of the fair value hierarchy to the amounts presented in the statement of fiduciary net position. These investments (in thousands), at June 30, 2022, detailed in the following table, are subject to capital calls and specific redemption terms:

	6/30/2022	Unfunded Commitments	Redemption Frequency	Redemption Notice Period
Hedge Funds	140,952	-	Quarterly	90 Days
Global Commingled	167,549	-	Monthly	30 Days
Private Equity	347,164	234,220	Quarterly	0-90 Days
Real Estate Funds	510,347	121,798	Quarterly	0 - 90 Days

Debt and equity securities categorized as Level 1 are valued based on prices quoted in active markets for those debts and securities. Debt and equity securities categorized as Level 2 are valued using matrix pricing techniques maintained by the various pricing vendors for these securities. Matrix pricing is used to value securities based on the relationship to benchmark quoted prices. Investment derivative instruments categorized as Level 2 are valued using market approaches that consider, as applicable, benchmark interest rates or foreign exchange rates. Mortgage-backed securities categorized as Level 2 are valued using discounted cash flow techniques. Debt and equity securities categorized as Level 3 are debt and securities whose stated market price is unobservable by the marketplace, many of these securities are priced by the issuers or industry groups for these securities. Collateralized debt obligations categorized as Level 3 are valued using consensus pricing. The fair value of international equity funds and related short-term investments classified as Level 3 represent the value of unit positions in funds that are not publicly traded on an exchange. Fair value of these securities can be impacted by redemption restrictions imposed by the fund managers.

Required Supplementary Information

The schedule below shows the changes in Net Pension Liability and related ratios required by GASB. As more information becomes available, additional years will be presented.

Schedule of Changes in Net Pension Liability and Related Ratios (in thousands) *

Total Pension Liability	2022	2021	2020	2019	2018	2017	2016	2015	2014
Service cost	$ 79,869	$ 78,643	$ 81,119	$ 73,255	$ 73,072	$ 72,876	$ 80,757	$ 75,310	$ 78,331
Interest on total pension liability	311,636	303,102	313,397	300,543	293,883	293,258	293,206	266,355	257,219
Changes of benefit terms	-	-	-	-	-	-	(3,229)	-	-
Difference between expected and actual experience	52,647	(4,347)	(77,698)	39,370	(42,785)	429	(76,891)	(31,009)	(20,336)
Changes of assumptions	-	-	(62,386)	-	-	2,420	(69,420)	254,870	-
Benefit payments, including refunds of member contributions	(262,660)	(249,713)	(242,143)	(237,389)	(227,576)	(223,667)	(216,193)	(204,403)	(179,877)
Net change in pension liability	**$ 181,492**	**$ 127,685**	**$ 12,289**	**$ 175,779**	**$ 96,594**	**$ 145,315**	**$ 8,230**	**$ 361,123**	**$ 135,337**
Total Pension liability - beginning	**$4,541,799**	**$4,414,114**	**$4,401,825**	**$4,226,046**	**$4,129,452**	**$3,984,137**	**$3,975,907**	**$3,614,784**	**$3,479,447**
Total Pension liability - ending	**$4,723,291**	**$4,541,799**	**$4,414,114**	**$4,401,825**	**$4,226,046**	**$4,129,452**	**$3,984,137**	**$3,975,907**	**$3,614,784**
Plan Fiduciary Net Position									
Contributions - employer	178,319	357,382	175,947	165,796	229,006	152,153	119,844	117,092	110,629
Contributions - member	53,350	40,561	39,356	35,042	33,340	30,870	29,523	27,861	27,760
Net investment income/(loss)	(161,785)	610,554	50,389	142,964	166,514	243,210	9,171	47,148	298,736
Benefit payments, including refunds of member contributions and transfer outs	(262,660)	(249,713)	(242,143)	(237,389)	(227,576)	(223,667)	(216,409)	(204,403)	(179,877)
Administrative Expenses	(2,564)	(1,930)	(2,509)	(793)	(377)	(380)	(234)	(414)	(628)
Net change in plan fiduciary net position	**$ (195,340)**	**$ 756,854**	**$ 21,039**	**$ 105,620**	**$ 200,907**	**$ 202,186**	**$ (58,105)**	**$ (12,716)**	**$ 256,620**
Plan fiduciary net position - beginning	**$3,438,027**	**$2,681,173**	**$2,660,134**	**$2,554,514**	**$2,353,607**	**$2,151,421**	**$2,209,526**	**$2,222,242**	**$1,965,622**
Plan fiduciary net position - ending	**$3,242,687**	**$3,438,027**	**$2,681,173**	**$2,660,134**	**$2,554,514**	**$2,353,607**	**$2,151,421**	**$2,209,526**	**$2,222,242**
Net Pension Liability	**$1,480,604**	**$1,103,772**	**$1,732,941**	**$1,741,691**	**$1,671,532**	**$1,775,845**	**$1,832,716**	**$1,766,381**	**$1,392,542**
Plan fiduciary net position as a percentage of the total pension liability	**68.65%**	**75.70%**	**60.74%**	**60.43%**	**60.45%**	**57.00%**	**54.00%**	**55.57%**	**61.48%**
Covered payroll	**$ 595,304**	**$ 580,451**	**$ 568,089**	**$ 561,938**	**$ 526,667**	**$ 521,295**	**$ 473,974**	**$ 460,441**	**$ 485,227**
Net pension liability as a percentage of covered payroll	**248.71%**	**190.16%**	**305.05%**	**309.94%**	**317.38%**	**340.66%**	**386.67%**	**383.63%**	**286.99%**

* May not sum due to rounding

Required Supplementary Information (Continued)

Schedule of Employer Contributions – Last 10 Fiscal Years (in thousands)

Schedule of Employer Contributions	Actuarial Determined Contribution	Actual Contributions	Contribution Deficiency (Excess)	Covered Payroll	Actual Contributions As A Percentage of Covered Payroll
2021-22	$ 167,843	$ 178,319	$ (10,476)	$ 595,304	29.95%
2020-21	178,090	357,382	(179,292)	580,451	61.57%
2019-20	175,947	175,947	-	568,089	30.97%
2018-19	165,796	165,796	-	561,938	29.50%
2017-18	159,006	229,006	(70,000)	526,667	43.48%
2016-17	152,153	152,153	-	521,295	29.19%
2015-16	119,844	119,844	-	473,974	25.28%
2014-15	117,092	117,092	-	484,309 *	24.18%
2013-14	110,629	110,629	-	518,746 *	21.33%
2012-13	115,244	115,244	-	524,648	21.97%

* For fiscal years 2013-14 and 2014-15, the Plan's actuary was calculating covered payroll based on their assumption this was an estimated amount. For subsequent reports, the actuary began using actual amounts which slightly changed the amounts previously reported.

Schedule of Investment Returns

	2022	2021	2020	2019	2018
Annual money-weighted rate of return, net of investment expenses	-4.70%	22.80%	1.40%	6.20%	7.10%

	2017	2016	2015	2014	2013
Annual money-weighted rate of return, net of investment expenses	7.30%	0.60%	2.19%	15.42%	11.35%

Notes to the Required Supplementary Information

In July 2020, the COPERS Board adopted several new actuarial assumptions based upon the recommendations from its actuary, GRS, for the purpose of determining contribution rates. The 2020 adopted changes are:

1. The discount rate was lowered to 7.00%.
2. The rate of inflation was lowered to 2.30%.
3. The payroll growth rate lowered to 2.50%.
4. Pension Equalization Reserve (PER) was valued for future benefits payable through the PER as a 1.25% annual compound cost-of-living adjustment (COLA).
5. Wage inflation was lowered to 2.80%.
6. Individual merit/promotion increases were changed to be service based rates ranging from 4.20% to 0.00%.
7. Unused sick leave, vacation time and compensation time was updated to be valued explicitly with a 1.50% load included for adverse experience.
8. Post-retirement, active life and disable life mortality was updated to be based on the Pub-2010 tables with multipliers for healthy annuitant mortality and projected with the ultimate rates from the MP projection scales.
9. Rates of disability, retirement and termination were updated to reflect recent experience.

In July and August 2017, the COPERS Board adopted several new actuarial assumptions based upon the recommendations from its actuary, GRS, for the purpose of determining contribution rates. The 2017 adopted changes were:

1. The discount rate was lowered to 7.25%.
2. The rate of inflation was lowered to 2.50%.
3. The payroll growth rate lowered to 3.00%.
4. Pension Equalization Reserve (PER) was valued for future benefits payable through the PER as a 1.5% annual compound cost-of-living adjustment (COLA).

In August and October 2015, the COPERS Board adopted new actuarial assumptions and methods, based upon the recommendations from its actuary, Cheiron, for the purpose of determining contributions and to meet the GASB 67 implementation requirements to be applied to the financial reporting for the fiscal year ending June 30, 2015. The 2015 adopted changes were the following:

1. PER was valued for future benefits payable through the PER as a 1.5% annual compound COLA. Amortization method for the unfunded actuarial liability (UAL) was amortized over a 20-year period as a level percentage of payroll with a four-year phase-in to the full amortization rate. Future gains and losses are amortized over closed 20-year periods as a level percentage of payroll from the valuation date in which they are first recognized. For Tier 1, members contribute 5% of pay and the City contributes the remainder of the total contribution rate. For the Tier 2, the members and the City each pay half of the total contribution rate.
2. Revised data tables for merit/salary increases, retirement rates, termination rates, disability incidence rates, and mortality rates.

In September 2013, the COPERS Board adopted new assumptions and methods, based upon the recommendations from its actuary, Cheiron, for the purpose of determining contributions and to meet the GASB 67 implementation requirements to be applied to the financial reporting for the fiscal year ending June 30, 2014. The September 2013 adopted changes were the following:

1. Discount rate was lowered to 7.5% based on the expected return on assets.
2. Salary increase rate was changed for price inflation to 3.00%, real wage growth to 0.50% and wage inflation to 3.5%.
3. Amortization method for the unfunded actuarial liability (UAL) was amortized over a 25-year period as a level percentage of payroll with a four-year phase-in to the full amortization rate. Future gains and losses are amortized over closed 20-year periods as a level percentage of payroll from the valuation date in which they are first recognized. For Tier 1, members contribute 5% of pay and the City contributes the remainder of the total contribution rate. For the Tier 2, the members and the City each pay half of the total contribution rate.
4. The administrative expense assumption was added. In prior years, the discount rate was assumed to be net of administrative expenses.

Supplementary Information

Schedule of Investment Expenses for the Fiscal Years Ended June 30, 2022 and 2021 (in thousands)

Payee	Fees 2022	Fees 2021	Nature of Services
American Landmark	$ 494	-	Investment Management
Artisan Global Opportunities	1,665	1,543	Investment Management
Ascentris Value Add Fund III	176	177	Investment Management
Baillie Gifford	1,056	910	Investment Management
BH-DG	367	-	Investment Management
BNY Mellon	113	225	Master Custodian
Brevan Howard (BH-DG)	-	256	Investment Management
Brigade Capital Management	446	415	Investment Management
Carlson Capital	707	632	Investment Management
Cramer Rosenthal McGlynn	462	408	Investment Management
DDJ Capital Management	411	386	Investment Management
Driehaus	198	52	Investment Management
Eagle Asset Management	421	425	Investment Management
Fir Tree	791	672	Investment Management
First Eagle	573	333	Investment Management
FOCUS Healthcare Partners	252	241	Investment Management
GQG	619	608	Investment Management
Hammes Partners III	350	350	Investment Management
HSI Real Estate V	36	143	Investment Management
J P Morgan	826	722	Investment Management
JDM Partners	-	242	Investment Management
Logan Circle	528	548	Investment Management
Longfellow	288	293	Investment Management
LSV Asset Management	437	390	Investment Management
Morgan Stanley	760	673	Investment Management
Neuberger Sonoran A	594	594	Investment Management
Neuberger Sonoran B	363	363	Investment Management
Neuberger Sonoran C	300	325	Investment Management
Neuberger Sonoran D	300	325	Investment Management
Northwood GP, LLC IV	195	143	Investment Management
Northwood Series V	253	194	Investment Management
PAAMCO	-	4	Investment Management
Pacific Asset Management	312	273	Investment Management
PIMCO All Asset	913	1,096	Investment Management
Realterm Logistics	180	54	Investment Management
RECAP III	16	30	Investment Management
RECAP IV	197	212	Investment Management
RECAP V	375	375	Investment Management
Robeco Investment Management	644	547	Investment Management
SC Core Fund	246	233	Investment Management
SSgA FTSE RAFI Developed ex-U.S. Low Volatility	80	73	Investment Management
SSgA FTSE RAFI U.S. Low Volatility	125	107	Investment Management
SSgA U.S. TIPS	50	49	Investment Management
SSgA US Aggregate Bond	44	55	Investment Management
Western Asset	318	324	Investment Management

Supplementary Information (Continued)

Schedule of Investment Expenses for the Fiscal Years Ended June 30, 2022 and 2021 (in thousands) (continued)

Payee	Fees 2022	Fees 2021	Nature of Services
Wheelock I	3	(74)	Investment Management
Wheelock II	89	217	Investment Management
Wheelock V	217	272	Investment Management
Wheelock VI	245	300	Investment Management
Total	**$ 18,035**	**$ 16,735**	
Net Securities Lending Expenses	$ 113	$ 33	Agent Fees/Broker Rebates

Supplementary Information (Continued)

Schedule of Administrative Expenditures and Encumbrances (Non-GAAP Budgetary Basis) Paid by the City of Phoenix for the Fiscal Years Ended June 30, 2022 and 2021

	2022		2021	
	Original Budget	Actual	Original Budget	Actual
Personal Services				
Staff Salaries and Benefits	$ 1,411,457	$ 1,277,331	$ 1,218,503	$ 1,164,549
Insurance	278,081	237,225	231,794	241,394
Social Security and Medicare	94,680	87,161	86,003	78,621
Retirement Contributions	431,131	440,295	407,439	432,232
Total Personal Services	**$ 2,215,349**	**$ 2,042,012**	**$ 1,943,739**	**$ 1,916,796**
Professional Services				
Consultants	$ 980	$ 615	$ 500	$ 371
Audit and Accounting	127,000	58,607	117,664	136,363
Medical Advisors	-	4,271	-	-
Total Professional Services	**$ 127,980**	**$ 63,493**	**$ 118,164**	**$ 136,734**
Communications				
Printing	$ 12,225	$ 14,562	$ 11,950	$ 19,450
Postage and Mailing	15,300	20,403	9,200	21,749
Telephone	3,700	5,240	1,732	2,355
Subscriptions and Memberships	2,680	2,080	2,580	1,286
Total Communications	**$ 33,905**	**$ 42,285**	**$ 25,462**	**$ 44,840**
Miscellaneous				
Supplies	$ 10,555	$ 4,295	$ 7,965	$ 3,907
Computer Equipment	-	1,319	300	-
Other	2,631	(31,012)	2,972	(55,019)
Total Miscellaneous	**$ 13,186**	**$ (25,398)**	**$ 11,237**	**$ (51,112)**
Total Administrative Expenditures and Encumbrances	**$ 2,390,420**	**$ 2,122,392**	**$ 2,098,602**	**$ 2,047,258**

Note: The schedule above represents administrative expenditures of COPERS that are budgeted and paid by the City of Phoenix through the general fund. They are recognized as offsetting contributions and deductions on the Statement of Changes in Fiduciary Net Position.

Schedule of Administrative Expenses (Plan Assets) for the Fiscal Years Ended June 30, 2022 and 2021

	Fees Paid	
Expense Category	**2022**	**2021**
Technology	$ 1,976,503	$ 1,375,896
Consulting	384,034	372,846
Actuarial Consulting	45,093	119,801
Legal Services	46,092	57,873
Administrative - Other	112,458	3,826
Total	**$ 2,564,180**	**$ 1,930,242**

Supplementary Information (Continued)

Schedule of Payments to Consultants (Plan Assets) for the Fiscal Years Ended June 30, 2022 and 2021

Consultant	2022	2021
Alignium	$ 110,869	$ 107,346
Elkins Mc Sherry	10,000	10,000
Meketa Investment Group	263,165	255,500
Total	**$ 384,034**	**$ 372,846**

COPERS

Investment
section

*The **Investment Section** contains the Plan's report on investment activity, its investment policies, schedules of investment results and related information.*

COPERS

MEKETA
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October 20, 2022

Board of Trustees
City of Phoenix Employees' Retirement System
c/o Scott Steventon
Retirement Program Administrator
200 W. Washington Street, 10th Floor
Phoenix, AZ 85003

Dear Board Members,

Please find below a summary of the market environment and System performance for the 2022 fiscal year.

Fiscal 2022 Year in Review

We entered fiscal year 2022 in an environment of improvements related to COVID-19, supportive monetary policy, relatively low interest rates, and the belief that inflation would be transitory. As the year progressed it became clear that as supply chain issues lingered, inflation was going to remain high. The inflation picture was further complicated by the war in Ukraine and China's strict policies related to the virus, as well as relatively strong demand here in the US driven by policy support. With inflation levels at multi-decade highs, the US central bank, and others, were forced to aggressively start increasing interest rates. This led to one of the worst starts to a calendar year on record and weighed heavily on the overall fiscal year results.

Related to COVID-19, there was a global push for vaccine development and distribution, as well as advances in therapeutics. This led to increased optimism that there was a path to normal life and a return to typical economic patterns that we had not seen since early 2020. Despite these improvements, there were pockets of disruption related to the virus during the fiscal year with various outbreaks reintroducing restrictions. Here in the US, the Omicron variant led to a massive spike in cases toward the end of 2021 and into 2022.

While COVID-19 was still present worldwide, it evolved into a less virulent form and much of the world has learned to live with it. Many restrictions on travel were removed, and spending patterns among individuals and businesses adjusted to reflect that. Early in the pandemic, much of consumer spending in the US was on real estate, home renovation, and other goods to make living and for some working solely at home more comfortable. As the global economy reopened, spending patterns shifted to reflect preferences for travel and leisure.

One exception to the reopening of the global economy has been China. The Chinese government has continued the "COVID Zero" policy instituted early in the pandemic that includes mass testing,

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restrictions on mobility, and the closure of commercial and manufacturing centers. The policy also weighs on the resolution of supply chain issues and contributes to inflation globally.

At the beginning of fiscal year 2022 (July 2021), CPI stood at 5.4%[1]. At the time, many market commentators and the Federal Reserve were labeling increases in inflation as "transitory," a result of pandemic-induced supply chain issues and accumulated savings over a year of stay-at-home orders. The Federal Reserve declined to act at the time, citing elevated unemployment levels and an incomplete recovery. Capital markets started to digest the high inflation numbers, with the Bloomberg Commodity index increasing 6.6%[1] and the Bloomberg TIPS index returning 1.8%[1] in the third calendar year quarter of 2021. Ultimately for the July-September period, US equity markets were slightly positive. Developed equity markets outside the US were slightly negative (in US dollar terms), while the MSCI Emerging Markets index declined 8.1%[1] for the period driven by concerns in China related to the property market and the government's crackdown on the technology sector. Rates stayed largely unchanged through September in the US as investors waited for clarity on the path of the economy and monetary policy.

It was also late in 2021 that news of a new COVID-19 variant of concern, Omicron, were beginning to come out of South Africa. Early reports were that it was significantly more transmissible, and possibly less virulent. Depending on the region of the world, restrictions were reintroduced, exacerbating supply chain issues. Additionally, high natural gas prices were threatening the economic recovery in Europe and troubles related to China's overleveraged property sector and crackdown on the technology sector continued to rattle markets.

By December of 2021, CPI had increased to 7.0%, well above trend and at risk of becoming entrenched in consumer expectations. It was at this time that the Federal Reserve acknowledged that increases in inflation may not be "transitory" and gave indications that price increases were broadening out to goods and services not directly related to pandemic dislocations. The change in tone from the Federal Reserve did not significantly affect capital markets in the fourth quarter of 2021, as many asset classes were still positive. The S&P 500 returned 11.0%[1] for the September to December quarter, with developed market equities registering lower (+2.7%) but positive returns, and emerging market equities declining (-1.3%).[1] The broad US bond market was flat, while TIPS (+2.4%) benefited from increasing inflation concerns.[1]

In early 2022, market participants in the US started to digest the hawkish pivot of the Federal Reserve in December given inflation pressures were not easing. US and non-US equity markets posted negative returns in January, with non-US equities generally outperforming US equities. Rates began to increase across the US yield curve, but the curve also began to flatten, given policy expectations. Bond markets also posted negative returns on concerns of higher interest rates in the inflationary environment, marking an unusual positive correlation between the two asset classes.

Russia invaded Ukraine during the last week of February and the West responded with sweeping sanctions that exceeded market expectations. Restricting access to foreign reserves was key, leading

[1] Source: Bloomberg and InvestMetrics.

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to Russia's central bank dramatically increasing policy rates (9.5% to 20%) to try to protect the currency. Food and energy prices added to inflation pressures in Europe and the US, pushing interest rates higher. During the first quarter of 2022, all major asset classes declined except for commodities. Value stocks in the US significantly outperformed growth stocks, given higher rates and a preference by many investors for companies presumably better able to weather the tightening financial conditions. An increase in inflation expectations, and the pricing in of higher policy rates, proved to be a challenging headwind for nearly all bond indices. The broad US bond market experienced one of its worst quarters on record, down 5.9%.[1]

The Federal Reserve began lifting interest rates in the last quarter of the fiscal year. It started with a 25 basis point hike in April and followed that with a 50 basis point increase in early May. In June, reacting to a CPI reading of 8.6%[5], the Federal Reserve hiked rates by 75 basis points, which was the largest one-time increase since 1994. A similar increase took place in July 2022 with further increases expected into 2023. All major equity indices suffered steep declines in June weighing on overall second quarter 2022 results, with the S&P hitting bear market territory by the end of the second calendar quarter. Emerging markets proved slightly more resilient than developed markets on a partial re-opening in China from pandemic-related lockdowns. The global bond selloff continued, as inflation fears, and policy expectations weighed on all major global bond markets.

Over the full fiscal year, US stocks outperformed other regions, with the S&P 500 returning -10.6%[2] for the year, compared to the MSCI EAFE at -17.8%,[1] and a decline of 25.3% for the MSCI Emerging Market index. Despite positive performance in June, the MSCI China index declined the most among major regions with a full fiscal year return of -31.8%.[1] Within fixed income, higher inflation and higher rates led the Bloomberg TIPS index to decrease 5.1% over the full fiscal year, while the Bloomberg Aggregate index declined by 10.3%.[1] Economic growth in the US fell in the first and second quarters of 2022, at -1.6% and -0.9%, respectively.[3] Europe's economic output moderated but was still positive in the first two quarters of 2022. Japan's economic growth was slightly negative to begin 2022, while China's GDP remained positive but below the prior trend. Inflation remained stubbornly high, with CPI increasing 8.6%[4] in the US over the fiscal year, the highest reading since 1981. The Eurozone matched the US with an 8.6%[5] inflation print for the fiscal year ending in June.

2023 Outlook

Fiscal year 2022 was a tale of two periods in the context of economic growth and market returns. Outsized economic growth and positive returns globally in the last six months of 2021 coupled with slowing economic growth and negative returns in the first six months of 2022. Above trend price increases continued for the entirety of fiscal year 2022. One of the central questions now, is whether central banks around the world can rein in inflation without sending global economies into a deep

[1] Source: Bloomberg and InvestMetrics.
[2] Source: Bloomberg.
[3] Source: Bureau of Economic Analysis.
[4] Source: US Bureau of Labor Statistics.
[5] Source: Eurostat.

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recession, all while the war in Ukraine continues and some supply chain dislocations remain. Economic uncertainties abound. These include:

→ Central Banks find themselves potentially behind the curve on inflation, with available tools that may not be the most effective in dealing with the cost-push type of inflation we are experiencing. This dynamic creates the risk of creating a stagflationary environment. Longer-term, we could also see a slowing or decline in globalization creating more persistent inflationary pressures.

- Supply chain issues and geopolitical risks have placed a premium on supply chain stability relative to supply chain efficiency. Beginning in the 1990s and accelerating after the inclusion of China in the World Trade Organization in 2001, many companies globalized their sourcing and production and embraced lean manufacturing techniques to drive efficiency. But the move toward globalization, though greatly reducing most costs, exposed companies to an abundance of supply chain risks, which the pandemic and Russian invasion of Ukraine laid bare. As a result, many companies are focused on making supply chains more resilient and robust. This often entails the reshoring of large segments of the supply chain and an embrace of redundancies, including input and inventory stockpiling, and diversifying sourcing from nearshored, and/or reshored suppliers. Ultimately, with a focus on supplier reliability over cost. This transition is likely a secular change which could lead to pricing pressure for years to come, that is largely unaffected by monetary policy.

→ Current levels of inflation may not come down as much as market metrics imply.

- Measures of breakeven inflation, or the difference in yields between TIPS and nominal bonds, imply that inflation will return to sub-3% levels over the next 5 years. Additionally, because of expectations of rapid declines in inflation, some metrics are even implying a pause or rate cuts next year. If inflation does not come down quickly enough, further rate increases may be necessary, leading to potentially more losses in bond markets.

→ Unemployment levels are low, and back near levels consistent with full employment, but the labor force participation rate has not recovered. There also continues to be an imbalance between job openings and the available workers to fulfill them.

- Potential for a wage-price spiral: early retirements and other trends associated with the pandemic and the "Great Resignation" have left millions more job openings than available workers in the US.[1] The labor force participation rate[1] was at 63.4% in January of 2020, prior to the pandemic, and was still only at 62.2%[1] at the end of fiscal year 2022. As companies look to respond to increased demand as the economy reopens, they have faced a distinct shortage in available workers. In response, some companies have been aggressively raising wages to fill vacancies. As companies look to offset the higher input costs, often they respond by raising the prices of the goods and services they sell, further contributing to pricing pressure. This dynamic can then feed into wage expectations and ultimately additional wage growth eventually can lead to a cyclical feedback loop. Ultimately, such a condition may only exist during a strong economic

[1] Source: US Bureau of Labor Statistics.

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expansion and ultra-tight labor markets. As a result, inflation arising from this process should be sensitive to monetary policy to the extent that the central bank is willing to slow economic growth to break the cycle.

→ The invasion of Ukraine by Russia evolves into a long-term conflict and threatens to pull in other nations to the fight.

- This development increases the possibility of lower economic growth worldwide, and most likely causes prices to stay elevated for longer periods of time, versus the absence of global conflict.

→ Economic growth continues to slow globally.

- After growth in calendar year 2021 that exceeded historical norms, growth forecasts continue to be revised downward across countries as economies adjust to higher prices and tighter monetary conditions.

→ Another COVID-19 variant of concern emerges that may be more dangerous.

- The novel coronavirus is still out there, and as it continues to spread there is always a chance that a new, more virulent variant could emerge.

While there are many risks to markets as the pandemic continues, prices are higher, rates are increasing, and global conflicts persist, there are reasons to remain optimistic as well. These include:

→ Inflation potentially peaks in fiscal year 2023, and central banks reduce the pace of monetary tightening or end it altogether. It is also possible that we could even start seeing rate decreases in the coming years.

→ Despite the recent rate increases, interest rates in the US are still low relative to historical levels and economic projections remain positive.

→ As a result of equity market declines in fiscal year 2022, valuations are more reasonable and near historical averages. The recent decline in equities also leads to higher expected returns going forward. Similarly, higher interest rates also lead to increases in expected returns for bonds.

→ Spending by the US consumer has held up well in the face of higher prices, and if inflation peaks while the job market is still strong, positive economic growth would be expected to occur.

Retirement System Investment Results

The fair value of the City of Phoenix Employees' Retirement System was $3.25 billion as of June 30, 2022. This was a decrease of $125.1 million from June 30, 2021 due to negative investment performance of $144.3 million and $19.2 million in net cash inflows. The System's net of fees return was -4.7% over the fiscal year vs. a return of -3.7% for the policy benchmark. Over the most recent three year period, the System's net of fee return was +5.8%, +6.1% over five years, and +7.0% over ten years. As of June 30, 2022, the System's actuarial assumed rate of return was 7.0%. The System uses a time-weighted rate of return methodology. Returns are calculated by an independent third party (Meketa Investment Group) using data provided by the custodian.

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As of June 30, 2022, the System's assets were allocated to equity (44.6%), rate-sensitive (15.7%), credit (9.1%), real assets (18.3%), hedge funds (4.3%), GTAA (2.9%), and cash (5.1%).

In March 2017, the Board approved a new asset allocation policy with an expected return of 7.26%, in line with the actuarial assumed rate of return at the time of 7.25% (the actuarial assumed rate of return was lowered to 7% as of June 30, 2020). During the fiscal year, the System made continued progress towards implementing the approved asset allocation policy. We look forward to continuing our work with Staff and the Board to move the Retirement System towards its new policy targets, with the ultimate goal of allowing the Retirement System to continue to meet its obligations to participants.

If you have any questions, please contact us at (760) 795-3450.

Sincerely,

Larry Witt, CFA
Managing Principal

Paola Nealon
Managing Principal

Imran Zahid
Investment Analyst

LW/PN/IZ/nca

COPERS' asset allocation targets (at fair value) as of June 30, 2022 were:

Asset Class	Target Allocation
Domestic Equity	16%
Developed Market Equity	9%
Emerging Market Equities	8%
Private Equity	9%
Investment Grade Bonds	15%
TIPS	7%
High Yield Bonds	5%
Bank Loans	3%
Emerging Market Bonds	3%
Real Estate	12%
Infrastructure	4%
Natural Resources	4%
Hedge Funds	5%
GTAA	0%
Cash Equivalents	0%

A. In March 2017, the COPERS Board adopted a new asset allocation that more closely aligns the Board's risk tolerance and expected returns.

B. Each asset class will be broadly diversified to be similar to the market for the asset class. The market for equities shall be represented by the Russell 3000 Value Index, MSCI EAFE Index, MSCI Emerging Markets. The market for bonds shall be represented by the Barclays Capital Aggregate and Barclays High Yield. The market for real estate shall be represented by the NCREIF ODCE Property Index.

C. Multiple managers will be employed. Allocations among the managers will be controlled by the Trustees to maintain both diversification and policy guidelines.

D. Investments will conform to the Phoenix City Charter, Chapter XXIV, Part II, Section 34 (See Note 8).

E. COPERS' main investment objective is to achieve a rate of return that exceeds inflation by at least 3% over time. The actuarial assumed rate of return is 7.00%.

Investment Services Under Contract (as of June 30, 2022)

Equity Managers		
Artisan Partners	Ting Rattanaphasouk	San Francisco, CA
Baillie Gifford	Kathrin Hamilton	Edinburgh, SCT
Cramer Rosenthal McGlynn	Alison Silverman	Greenwich, CT
Driehaus	Sarah Greene	Chicago, IL
Eagle Asset Management	Clay Lindsey	St. Petersburg, FL
GQG	Laura Clement	Ft. Lauderdale, FL
LSV	Jason Ciaglo	Chicago, IL
Robeco Investment Management	William Supple	Boston, MA

Fixed Income Managers		
Brigade Capital Management	Lauren Stelzer	New York, NY
DDJ Capital Management	Matt Hensher	Waltham, MA
MetLife Investment Management	Angus Campbell	Philadelphia, PA
Longfellow Investment Management	Corrine Larson	Boston, MA
Pacific Asset Management	Michael Spitler	Newport Beach, CA
PIMCO	Kerrisha Jenkins	Newport Beach, CA
State Street Global Advisors	Sonya Park	San Francisco, CA
Western Asset Management	Kevin Gore	Pasadena, CA

Hedge Fund Managers		
Brevan Howard US LLC	Janna Keatseangsilp	New York, NY
Carlson Capital	Kaleigh Olsen	Dallas, TX
Fir Tree Partners	Benjamin Ghriskey	New York, NY

Transition Managers		
Russell Implementation Services, Inc	Steve Cauble	Seattle, WA

Private Equity		
Neuberger Berman	Kaci Boyer	Dallas, TX

Real Estate Managers		
Adler Real Estate	John Meyer	Miami, FL
American Landmark Apartments	David Tepperman	New York, NY
Ascentris	Rob Toomey	Denver, CO
FOCUS Healthcare Partners	Michael Feinstein	Chicago, IL
Hammes Partners	Patrick Hammes	Milwaukee, WI
JP Morgan	Darren Smith	San Francisco, CA
Hemisferio Sul Investments	Diogo Bustani	Sao Paulo, BRA
Morgan Stanley	Candice Todd	Atlanta, GA

Investment Services Under Contract (as of June 30, 2022) (Continued)

Real Estate Managers (continued)		
Northwood Real Estate Partners	Blair Drossner	New York, NY
Realterm Logistics Income	Sean Mintz	Annapolis, MD
RECAP II, III, IV, SC Core	Chris Van Beek	Singapore, CHN
Wheelock Street Real Estate	Lawrence Settanni	Greenwich, CT

Real Estate Consultant		
Aksia	Dan Krivinksas	Chicago, IL
	Mark Bartmann	

Investment Consultant		
Meketa Investment Group	Larry Witt	Carlsbad, CA
	Imran Zahid	

Schedule of Investment Results
For the Fiscal Year Ended June 30, 2022

	Annualized		
	1-Year	3-Years	5-Years
Total Portfolio:			
COPERS	(4.7)	5.8%	6.1%
Policy Benchmark	(3.7)	6.8	7.0
Meketa All Pension Plans > $1B Net Median	(9.6)	5.7	6.2
Bank Loans			
Pacific Asset Management [1]	(2.6)	2.0	-
Equity Funds			
Artisan Global Opportunities	(26.6)	6.7	8.7
MSCI ACWI	(15.8)	6.2	7.0
Baillie Gifford	(34.1)	(1.0)	1.8
MSCI ACWI Ex USA	(25.8)	1.6	3.4
Cramer Rosenthal McGlynn	(15.0)	1.4	3.1
Russell 2000 Value Index	(16.3)	6.2	4.9
Driehaus International [2]	(27.8)	-	-
MSCI ACWI Ex USA Small Cap	(27.3)	2.8	3.0
Eagle Asset Management	(31.1)	3.3	7.5
Russell 2000 Growth Index	(33.4)	1.4	4.8
First Eagle [11]	(10.1)	-	-
MSCI EAFE Value	(11.9)	0.2	0.5
GQG [3]	(23.6)	-	-
MSCI Emerging Markets Growth NR	(31.2)	1.9	2.9
LSV [7]	(15.6)	-	-
MSCI Emerging Markets Growth NR	(18.6)	(1.0)	1.2
Robeco Investment Management	(3.7)	9.5	8.7
Russell 1000 Value Index	(6.8)	6.9	7.2
SSgA FTSE RAFI US Low Vol	4.0	9.1	9.3
FTSE RAFI US Low Vol Index	4.3	9.3	9.4
SSgA FTSE RAFI Dev ex-US Low Vol	(7.1)	1.0	2.4
FTSE RAFI US Dev ex-US Low Vol Index	(7.0)	0.8	2.2
Fixed Income Funds			
Longfellow Core Fixed Income [6]	(10.7)	(0.6)	-
Bloomberg US Aggregate	(10.3)	(0.9)	0.9
SSgA US AGG Bond Index [5]	(10.3)	(0.9)	-
Bloomberg US Aggregate	(10.3)	(0.9)	0.9
SSgA US TIPS [4]	(5.2)	3.0	-
Bloomberg US TIPS	(5.1)	3.0	3.2
Western Asset Management	(13.1)	(1.4)	0.9
Bloomberg US Aggregate	(10.3)	(0.9)	0.9
Hedge Fund of Funds			
BH-DG Systematic Trading [10]	32.8	17.7	-
Carlson	12.3	7.7	4.8
Fir Tree International	(17.1)	3.2	0.3

Schedule of Investment Results (continued)
For the Fiscal Year Ended June 30,

	Annualized		
	1-Year	3-Years	5-Years
High Yield Bonds			
Brigade Capital Management [8]	(9.7)	2.6	-
Bloomberg US High Yield	(12.8)	0.2	2.1
Polen Capital Management [9]	(8.5)	1.3	-
Bloomberg US High Yield	(12.8)	0.2	2.1
MetLife Emerging Markets Debt [14]	(18.6)	-	-
MetLife Custom Benchmark	(17.5)	(3.6)	(0.6)
Private Equity Funds			
Neuberger Berman Sonoran	28.8	24.9	20.9
Real Estate Funds			
Core [12]	29.2	12.1	10.0
Non-Core [13]	17.2	9.8	10.4
Real Return Fund			
PIMCO All Asset	(9.9)	4.5	4.6
All Asset Index	(9.4)	2.0	3.2

(1) Pacific Asset Management was added as a bank loan manager effective September 1, 2018. Performance figures would not be representative of the benchmark index.

(2) Driehaus International was added as an equity manager effective May 1, 2021. Performance figures would not be representative of the benchmark index.

(3) GQG was added as an equity manager effective January 1, 2020. Performance figures would not be representative of the benchmark index.

(4) SSgA US TIPS was added as a fixed income manager effective February 1, 2018. Performance figures would not be representative of the benchmark index.

(5) SSgA US AGG Bond Index Fund was added as a fixed income manager effective April 1, 2018. Performance figures would not be representative of the benchmark index.

(6) Longfellow Core Fixed Income was added as a core plus fixed income manager effective May 1, 2018. Performance figures would not be representative of the benchmark index.

(7) LSV was added as an equity manager effective November 1, 2019. Performance figures would not be representative of the benchmark index.

(8) Brigade Capital Management was added as a high yield bonds manager effective August 1, 2018.

(9) Polen Capital (fka DDJ) was added as a high yield bonds manager effective September 1, 2018. Performance figures would not be representative of the benchmark index.

(10) BH-DG Systematic Trading was added as a hedge fund manager effective March 1, 2018. Performance figures would not be representative of the benchmark index.

(11) First Eagle was added as an equity manager effective December 1, 2020. Performance figures would not be representative of the benchmark index.

(12) Core Real Estate performance was reported as the net time-weighted returns.

(13) Non-Core Real Estate performance was reported as the net time-weighted returns.

(14) MetLife was added as a high yield bonds manager effective March 27, 2019.

The calculations above were prepared by COPERS' consultant, using a time-weighted rate of return, based on fair value. Core and Non-Core real estate performance is calculated as an IRR.

Asset Allocation by Manager
For the Fiscal Year Ended June 30, 2022

Manager	Style	Management (in thousands)	% of Portfolio
Cash And Cash Equivalents Funds			
Brigade Capital Management	Fixed Income	$ 2,018	0.06%
COPERS Cash Account	Core Plus Fixed Income	165,598	5.10
Cramer Rosenthal McGlynn	Small Cap Growth	2,273	0.07
DDJ Capital Management	Small Cap Growth	3,091	0.10
Eagle Asset Management	Core Plus Fixed Income	1,620	0.05
Longfellow Core Fixed	Core Plus Fixed Income	878	0.03
Robeco Investment Management	Large Cap Value	7,101	0.22
Western Asset Management	Core Plus Fixed Income	1,336	0.04
Total Cash & Cash Equivalent Funds		**183,915**	**5.66**
Domestic Equities Funds			
Brigade Capital Management	Bonds	2,323	0.07
Cramer Rosenthal McGlynn	Small Cap Value	49,815	1.53
DDJ Capital Management	Bonds	2,244	0.07
Eagle Asset Management	Small Cap Growth	57,811	1.78
State St US Low Vol	Large Cap Core	209,913	6.46
Robeco Investment Management	Large Cap Value	154,201	4.75
State St US Ag Bnd Ind	Bonds	155,440	4.79
State St US TIPS Ind	Bonds	150,005	4.62
Total Domestic Equities Funds		**781,752**	**24.07**
Fixed Income Funds			
Brigade Capital Management	Fixed Income	68,978	2.12
DDJ Capital Management	Fixed Income	62,267	1.92
MetLife Investment Management	Fixed Income	69,446	2.14
Longfellow Core Fixed	Core Plus Fixed Income	100,239	3.09
Pacific Asset Management	Bank Loans	83,955	2.58
Western Asset Management	Core Plus Fixed Income	103,063	3.17
Total Fixed Income Funds		**487,948**	**15.02**
Hedge Funds			
BH DG SYS TRD FD	Hedge Fund of Funds	47,215	1.45
Carlson Capital	Hedge Fund of Funds	49,604	1.53
Fir Tree Partners	Hedge Fund of Funds	43,898	1.35
PAAMCO	Hedge Fund of Funds	235	0.01
Total Hedge Funds		**140,952**	**4.34**
Global Commingled Funds			
Artisan Partners	International	167,549	5.16
PIMCO All Asset Custom Index	International	95,632	2.94
Total Global Commingled Funds		**263,181**	**8.10**

Asset Allocation by Manager
For the Fiscal Year Ended June 30, 2022

Manager	Style	Management (in thousands)	% of Portfolio
International Equities Funds			
Baillie Gifford	Large Cap Growth	198,828	6.12%
DDJ Capital Management	Large Cap Growth	88	0.00
Driehaus International	International	19,391	0.60
First Eagle	International	70,605	2.17
State St Dev ex-US	Large Cap Core	82,339	2.54
GQG Emerging Market	International	84,048	2.59
LSV Emerging Market	International	77,362	2.38
Total International Equities Funds		**532,661**	**16.40**
Private Equity Funds			
Neuberger	Private Equity	347,164	10.69
Total Private Equity Funds		**347,164**	**10.69**
Real Estate Funds			
American Landmark III	Non-Core Real Estate	33,148	1.02
Ascentris Fund A III	Non-Core Real Estate	15,798	0.49
Ascentris Fund B III	Non-Core Real Estate	26	0.00
Focus Sh Fund I	Non-Core Real Estate	28,239	0.87
Focus Sh Fund II	Non-Core Real Estate	433	0.01
Hammes Partners III	Non-Core Real Estate	16,007	0.49
HSI Real Estate V	Non-Core Real Estate	910	0.03
JPM Strategic Property	Core Real Estate	96,030	2.96
Morgan Stanley Prime Property	Core Real Estate	101,428	3.12
Northwood IV	Non-Core Real Estate	26,984	0.83
Northwood V	Non-Core Real Estate	37,100	1.14
RealTerm LIF	Core Real Estate	40,331	1.24
RECAP III	Non-Core Real Estate	2,276	0.07
RECAP IV	Non-Core Real Estate	17,047	0.52
RECAP V	Non-Core Real Estate	22,000	0.68
SC Core Fund LP	Non-Core Real Estate	34,750	1.07
Wheelock Street Partners I	Non-Core Real Estate	2,712	0.08
Wheelock Street Partners II	Non-Core Real Estate	10,610	0.33
Wheelock Street Partners V	Non-Core Real Estate	14,470	0.45
Wheelock Street Partners VI	Non-Core Real Estate	10,048	0.31
Total Real Estate Funds		**510,347**	**15.71**
Total Portfolio Before Securities Lending		**$ 3,247,920**	**100.00%**
Securities Lending		52,712	
Total Investments		**$ 3,300,632**	

List of Largest Assets Held
As of June 30, 2022 (in thousands)

Ten Largest Bond Holdings (Fair Value)

Par Value	Description	Interest Rate	Due	Rating	Fair Value
$ 3,748	US Treasury Note	2.50	4/30/2024	AAA	$ 3,735
3,742	US Treasury Bond	1.25	5/15/2050	AAA	3,297
3,196	US Treasury Note	1.25	4/30/2028	AAA	2,909
2,824	US Treasury Note	1.50	1/31/2027	AAA	2,800
2,867	US Treasury Note	1.38	12/31/2028	AAA	2,736
3,442	US Treasury Bond	1.88	2/15/2051	AAA	2,686
2,678	US Treasury Bond	2.00	11/15/2041	AAA	2,484
2,072	US Treasury Note	0.25	4/15/2023	AAA	2,028
1,947	US Treasury Note	1.38	11/15/2031	AAA	1,931
2,630	US Treasury Bond	1.38	8/15/2050	AAA	1,827

Ten Largest Stock Holdings (Fair Value)

Shares	Stock	Fair Value
37,312	Johnson & Johnson	6,623
54,909	Conoco Phillips	4,931
17,158	Berkshire Hathaway Inc	4,684
2,133	Autozone Inc	4,584
8,347	United Health Group Inc	4,287
1,826	Alphabet Inc	3,979
34,049	JPMorgan Chase & Co	3,834
25,658	Proctor & Gamble Co	3,689
13,664	Cigna Corp	3,601
66,100	Sanofi	3,307

A complete list of portfolio holdings is available at the COPERS office.

Schedule of Investment Related Fees (in thousands)
For the Fiscal Year Ended June 30, 2022

	Management	Fees
Cash And Cash Equivalents Funds		
Brigade Capital Management	$ 2,018	$ -
COPERS Cash Account	165,598	-
Cramer Rosenthal McGlynn	2,273	-
DDJ Capital Management	3,091	-
Eagle Asset Management	1,620	-
Longfellow Core Fixed	878	-
Robeco Investment Management	7,101	-
Western Asset Management	1,336	-
Total Cash & Cash Equivalent Funds	**183,915**	**-**
Domestic Equities Funds		
Brigade Capital Management	2,323	-
Cramer Rosenthal McGlynn	49,815	462
DDJ Capital Management	2,244	-
Eagle Asset Management	57,811	421
State St US Low Vol	209,913	125
Robeco Investment Management	154,201	644
State St US Ag Bond Ind	155,440	44
State St US TIPS Ind	150,005	50
Total Domestic Equities Funds	**781,752**	**1,746**
Fixed Income Funds		
Brigade Capital Management	68,978	446
DDJ Capital Management	62,267	-
MetLife Investment Management	69,446	528
Longfellow Core Fixed	100,239	288
Pacific Asset Management	83,955	312
Western Asset Management	103,062	318
Total Fixed Income Funds	**487,948**	**1,892**
Global Commingled Funds		
Artisan Partners	167,549	1,665
PIMCO All Asset	95,632	913
Total Global Commingled Funds	**263,181**	**2,578**
Hedge Funds		
BH DG Sys Trd FD LP	47,215	367
Carlson Capital	49,604	707
Fir Tree Partners	43,898	791
PAAMCO	235	-
Total Hedge Funds	**140,952**	**1,865**
International Equities Funds		
Baillie Gifford	198,828	1,056
DDJ Capital Management	88	411
Driehaus International	19,391	198

Schedule of Investment Related Fees (in thousands) (continued)
For the Fiscal Year Ended June 30, 2022

	Management	Fees [1]
First Eagle	70,605	573
GQG	82,339	80
LSV	84,048	619
State St Dev ex-US	77,362	437
Total International Equities	**532,661**	**3,374**
Private Equity		
Neuberger	347,164	1,557
Total Private Equity Funds	**347,164**	**1,557**
Real Estate Funds		
American Landmark	33,148	494
Ascentris	15,824	176
Focus	28,672	252
Hammes Partners III	16,007	350
HSI Real Estate V	910	36
JP Morgan Strategic Property	96,030	826
Morgan Stanley Prime Property	101,428	760
Northwood GP LLC IV	26,984	195
Northwood Series V	37,100	253
RealTerm LIF	40,331	180
RECAP III	2,276	16
RECAP IV	17,047	197
RECAP V	22,000	375
SC Core	34,750	246
Wheelock Street Partners I	2,712	3
Wheelock Street Partners II	10,610	89
Wheelock Street Partners V	14,470	217
Wheelock Street Partners VI	10,048	245
Total Real Estate	**510,347**	**4,910**
Master Custodian Fees		
BNY Mellon	-	113
Total Master Custodian Fees	**-**	**113**
Total Securities Lending [1]	52,712	
Total Investments	**$ 3,116,717**	**$ 18,035**
Cash And Cash Equivalents	183,915	
Total Cash & Cash Equivalents And Investments	**$ 3,300,632**	

[1] No separate billing for the securities lending program, the fees are netted from the securities lending income.

Investment Summary by Sector
For the Fiscal Year Ended June 30, 2022

Type of Investment	Fair Value (in thousands)	Percent of Total Fair Value
Cash and Cash Equivalents:		
Cash & Cash Equivalents	$ 183,915	5.66
Total Cash and Cash Equivalents	**183,915**	**5.66**
Domestic Equities:		
Basic Materials	6,675	0.21
Commingled	515,357	15.87
Consumer Discretionary	7,965	0.25
Consumer Goods	14,164	0.44
Consumer Services	28,934	0.89
Energy Related	17,566	0.54
Financials	40,655	1.25
Health Care	47,486	1.46
Industrials	44,207	1.36
Information Technology	7,577	0.23
Oil and Gas	5,518	0.17
Real Estate Fund	7,000	0.22
Technology	36,405	1.12
Utilities	2,243	0.07
Total Domestic Equities	**781,752**	**24.07**
Fixed Income:		
Asset Backed	16,679	0.51
Corporate Bonds	290,174	8.93
Derivatives	1,815	0.06
Foreign Bonds	5,489	0.17
Foreign Debt	69,446	2.14
Government Agency	882	0.03
Mortgage Backed	58,969	1.82
Municipal Bond	2,614	0.08
US Government Guaranteed	41,880	1.29
Total Fixed Income	**487,948**	**15.02**
Global Commingled:		
Global Commingled	95,632	2.94
Other	167,549	5.16
Total Global Commingled	**263,181**	**8.10**
Hedge Funds:		
Other	140,952	4.34
Total Hedge Funds	**140,952**	**4.34**
International Equities:		
Commingled	281,166	8.66
International	251,495	7.74
Total International Equities	**532,661**	**16.40**

Investment Summary by Sector (continued)
For the Fiscal Year Ended June 30, 2022

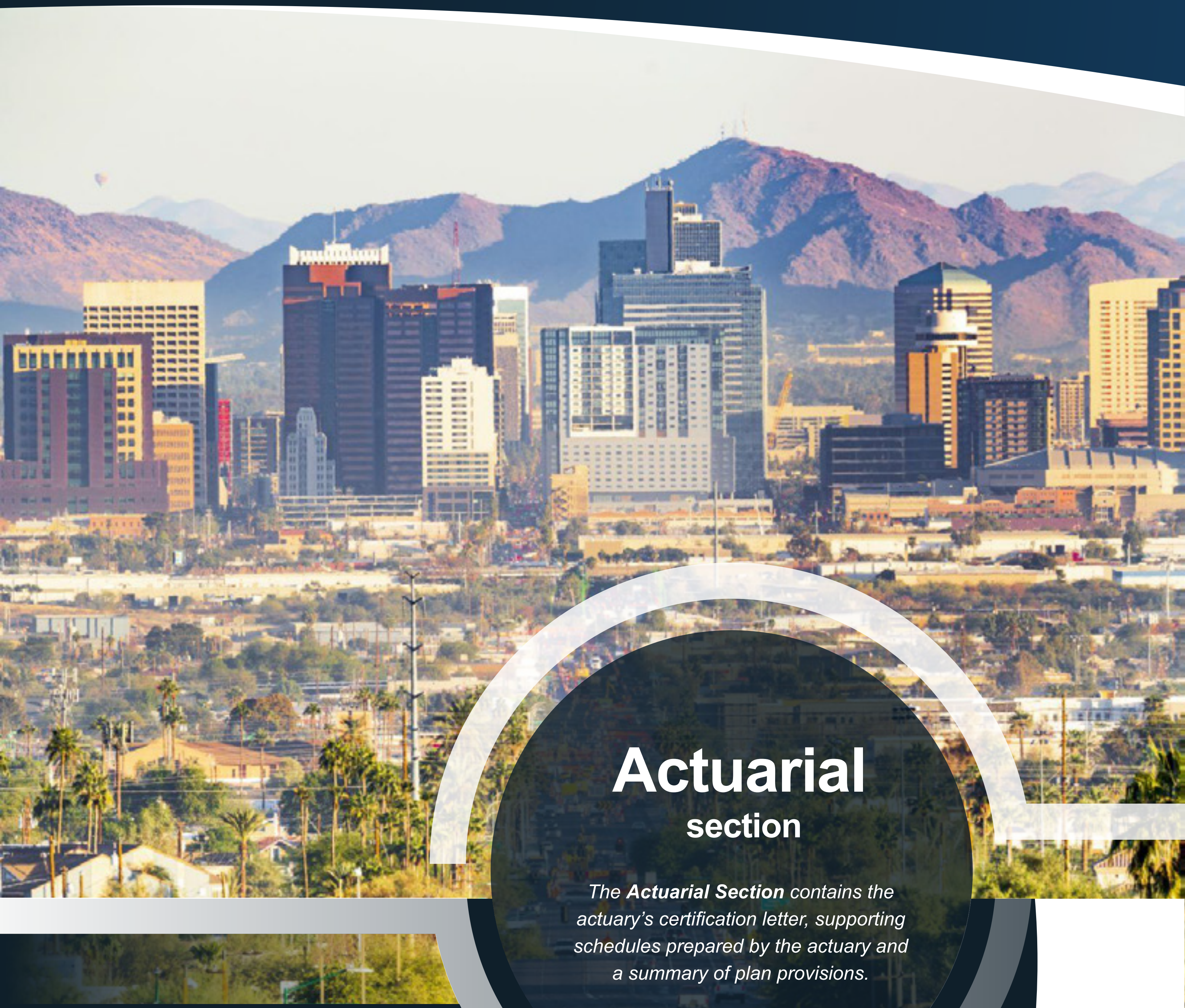
Type of Investment	Fair Value (in thousands)	Percent of Total Fair Value
Private Equity:		
Private Equity	347,164	10.69
Total Private Equity	**347,164**	**10.69**
Real Estate:		
Real Estate Fund	510,347	15.71
Total Real Estate	**510,347**	**15.71**
Securities Lending	**52,712**	**1.60**
Total Investments	**$ 3,300,632**	**100%**

Schedule of Commissions
For the Fiscal Year Ended June 30, 2022

Brokerage Firm	Number of Shares Traded	Total Commissions	Commissions Per Share
GOLDMAN SACHS & CO, NY	480,317	$ 11,797	$ 0.025
All Other Brokers [1]	4,582,164	134,026	
Total	**5,062,481**	**$ 145,824**	

[1] Includes brokers with total commissions less than $10,000 each.

COPERS



Actuarial
section

*The **Actuarial Section** contains the actuary's certification letter, supporting schedules prepared by the actuary and a summary of plan provisions.*

COPERS

P: 720.274.7270 | www.grsconsulting.com

November 3, 2022

Mr. Scott Steventon
Retirement Program Administrator
City of Phoenix Employees' Retirement System
200 W. Washington Street, 10th Floor
Phoenix, Arizona 85003

Re: City of Phoenix Employees' Retirement System Actuarial Certification

Dear Mr. Steventon:

At the request of the City of Phoenix Employees' Retirement System ("COPERS"), Gabriel Roeder Smith & Company (GRS) has performed the actuarial valuation of the benefits associated with the COPERS defined benefit pension plan. The information in the Actuarial Section is based on our annual actuarial valuation report, with the most recent valuation conducted as of June 30, 2022. The Actuarial Section is intended to be used in conjunction with the full report.

The information in the Financial Section is based on the GASB 67 and 68 valuation report, with the most recent report conducted as of June 30, 2022. The Financial Section is intended to be used in conjunction with the full report.

This letter and the schedules listed below represent GRS' certification of the funded status as required for the financial report for the fiscal year ended June 30, 2022. GRS prepared the following schedules (information prior to 2017 was provided by COPERS):

- Actuarial Section
  - Summary of Benefit Provisions
  - Summary of Census Data
  - Summary of Actuarial Assumptions and Methods
  - Added To and Removed From Rolls
  - Solvency Test
  - Analysis of Financial Experience
- Financial Section
  - Sensitivity of Net Pension Liability to Changes in Discount Rate
  - Schedule of Changes in Net Pension Liability and Related Ratios
  - Schedule of Employer Contributions

Data

The valuation was based upon information as of June 30, 2022, furnished by COPERS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by COPERS staff.

Actuarial Assumptions and Methods

The Board accepted GRS's recommendations on both the economic and demographic assumptions based on the most recent experience study that analyzed data from July 1, 2014 through June 30, 2019. The new assumptions were adopted in July 2020. The assumptions regarding sick leave, vacation time, and compensation time were adopted in August 2020.

We believe the assumptions are internally consistent and are reasonable, based on the actual experience of COPERS.

The actuarial assumptions and methods used to develop the Net Pension Liability, Discount Rate Sensitivity, Schedule of Changes in the Net Pension Liability, and Schedule of Net Pension Liability, noted above, meet the parameters set forth in the disclosures presented in the Financial Section by Government Accounting Standards Board Statement No. 67 including the use of the Entry Age Normal actuarial cost method to calculate the total pension liability.

Furthermore, the assumptions and methods used for funding purposes meet the parameters set by Actuarial Standards of Practice.

The results of the actuarial valuation are dependent upon the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. A review of the impact of a different set of assumptions on the funded status of COPERS is outside the scope of this actuarial valuation.

The current actuarial assumptions are outlined in the section titled "Summary of Actuarial Assumptions and Methods."

Benefits

There were no changes to the plan provisions during the past year. The current benefit provisions are outlined in the section titled "Summary of Benefit Provisions."

Funding Policy and Objectives

The Actuarially Determined Contribution is determined by taking the sum of the normal cost, a component to amortize the unfunded liability and a component to cover administrative expenses. The Board's current funding policy is to contribute an amount each year based on the most recently calculated Actuarially Determined Contribution.

The unfunded accrued liability is comprised of experience gains and losses, assumption changes, and benefit changes. A base is established in each year for changes in the unfunded accrued liability arising from these sources. In September 2013, the Board adopted amortization payment methods that amortize the pre-assumption change liability as of July 1, 2013 over a closed 25-year period as a level percentage of payroll; amortizes the assumption change liability as of July 1, 2013 over a closed 25-year period as a level percentage of payroll; amortizes the assumption change liability as of July 1, 2015 over a closed 20-year period as a level percentage of payroll with a four-year phase in; and amortizes future gains and losses over a closed 20-year period. Future gains cannot be amortized over a period shorter than the period remaining on the 25-year amortization schedule. Since the 2021 actuarial valuation, the actuarially determined contribution has increased from 34.14% of pay to 35.24% of pay. The increase is primarily due to asset and COLA losses.

Assuming all actuarial assumptions are met, this method of payment of the unfunded liability will result in full funding of the unfunded accrued liability in 20 years. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions.

Certification

All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code, and ERISA.

The signing actuaries are independent of COPERS sponsor. All signing actuaries are Members of the American Academy of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries. Finally, all of the undersigned are experienced in performing valuations for large public retirement systems.

Respectfully submitted,

Gabriel, Roeder, Smith & Company

Paul Wood, ASA, FCA, MAAA
Senior Consultant

Bill Detweiler, ASA, EA, FCA, MAAA
Consultant

Summary Of Benefit Provisions

Membership

Full-time employees of the City of Phoenix other than police officers, firefighters, or elected officials who are covered by another retirement system to which the City contributes.

Members who were hired before July 1, 2013, as well as members who joined the City between July 1, 2013 and December 31, 2015 who were members of ASRS prior to July 1, 2011 and did not withdraw their contributions are Tier 1 members.

Members hired into employment with the City between July 1, 2013 and December 31, 2015 who are not Tier 1 members are Tier 2 members.

Members hired into employment with the City on or after July 1, 2016 who are not Tier 1 members or Tier 2 members are Tier 3 members.

Final Average Compensation (FAC)

Tier 1/Tier 2

The average of annual compensation for the period of 3 consecutive years producing the highest average contained within the last 10 years immediately preceding retirement.

Tier 3

The average of annual compensation for the period of 5 consecutive years producing the highest average contained within the last 10 years immediately preceding retirement. Annual compensation will be limited to the first $125,000 of compensation, indexed to inflation (CPI-U) each January 1, commencing on January 1, 2017.

Credited Service

Credited service is determined based on Section 14 of Chapter XXIV of the Phoenix City Charter as well as COPERS administrative policy number 43. In no case is more than a year of service credited to any member for all service rendered in any calendar year. The amount of service credited to members varies by Tier, as detailed below.

Tier 1

A member is credited with a month of service for each calendar month in which the member performs at least 10 days of City service. A member is credited with a year of service for any calendar year in which the member has at least 10 months of credited service. If a member has less than 10 months of credited service for any calendar year, they are credited for the actual number of months.

Tier 2/Tier 3

A member is credited with a month of service for each calendar month in which the member performs at least 20 days of City service. A member is credited with a year of service for any calendar year in which the member has at least 12 months of credited service. If a member has less than 12 months of credited service for any calendar year, they are credited for the actual number of months.

Summary of Benefit Provisions (Continued)

Voluntary Retirement (no reduction for age)

Tier 1

Eligibility:

Sum of age and credited service equals 80 or more, age 60 with 10 or more years of credited service or age 62 with 5 or more years of credited service.

Annual Benefit:

Eligible unused sick leave service multiplied by 2% of FAC plus 2% of FAC times credited service up to 32.5 years plus 1% of FAC times service in excess of 32.5 years plus 0.5% of FAC times service in excess of 35.5 years. Minimum monthly pension is $250 ($500 if member has 15 or more years of service).

Tier 2/Tier3

Eligibility:

Sum of age and credited service equals 87 or more, age 60 with 10 or more years of credited service or age 62 with 5 or more years of credited service.

Annual Benefit:

Eligible unused sick leave service multiplied by 2% of FAC for Tier 2 members only plus FAC times credited service times the corresponding accrual rate:

Tier 2		Tier 3	
Years of Service	**Accrual Rate**	**Years of Service**	**Accrual Rate**
0 < Service < 20	2.10%	0 < Service < 10	1.85%
20 < Service < 25	2.15%	10 < Service < 20	1.90%
25 < Service < 30	2.20%	20 < Service < 30	2.00%
Service >30	2.30%	Service >30	2.10%

Note that for Tier 2 and Tier 3, the same accrual rate will apply for each year of service based on the total years of service.

Deferred Vested Retirement

Eligibility:

Termination of City employment prior to age 62 with 5 or more years of credited service.

Annual Benefit:

Accrued regular retirement amount based on credited service, unused sick leave service, and FAC at time of termination, payable beginning at age 62.

Summary of Benefit Provisions (Continued)

Duty Disability Retirement

Eligibility:

Total and permanent disability incurred in line of duty with the City.

Annual Benefit:

Computed in the same manner as the regular retirement amount based on FAC and credited service at time of disability retirement. Minimum is 15% of FAC for Tier 1 members and 15.75% for Tier 2 and Tier 3 members. Maximum during workers' compensation period is the difference between final compensation and annualized workers' compensation. At expiration of workers' compensation period, amount is recomputed to include years during which workers' compensation was paid.

Non-Duty Disability Retirement

Eligibility:

Total and permanent disability after 10 or more years of credited service.

Annual Benefit:

Computed in the same manner as the regular retirement amount based on FAC and credited service at time of disability retirement.

Pre-Retirement Duty Death Benefit

Eligibility:

Death in line of duty with the City and compensable under worker's compensation.

Annual Benefit:

To the spouse: Joint and 100% survivor actuarial equivalent of accrued regular retirement amount based on FAC and credited service and unused sick leave service at time of death. Minimum of 10 years of service is credited. To the children of a deceased member with 10 or more years of credited service: each child shall receive a monthly pension of $200 until adoption, marriage, death or attainment of age 18.

Pre-Retirement Non-Duty Death Benefit

Eligibility:

10 or more years of credited service.

Annual Benefit:

Same as Pre-Retirement Duty Death Benefit.

Summary of Benefit Provisions (Continued)

Refund of Contributions

Eligibility:

Termination of covered service employment prior to eligibility for any other benefits.

Annual Benefit:

No annual benefit. Accumulated member contribution with interest at no more than 3.75% annually after July 1, 2016.

Pension Equalization Reserve (PER)

The PER is credited with Excess Earnings, if any, each calendar year. Excess Earnings are defined as the excess over 8.00% of the annual average of the time-weighted rates of return for the immediately preceding five calendar years. The amounts credited to the PER are either used to fund percentage increases to pension amounts or one-time post retirement distribution benefits (13th checks).

On January 1 of each year, persons in receipt of a pension for at least 36 months receive a percentage increase based on the lesser of:

1. Phoenix area Consumer Price Index (CPI) and
2. The amount the balance in the PER can fully fund

The increase, subject to the availability of funds in the PER, is payable beginning with the April 1 payment each year, retroactive to January 1 of the same year.

Also, after each plan year's return is known, all pensioners (excluding minors) as of the end of the plan year are eligible to receive a one-time post retirement distribution (13th check). The 13th check is a percentage of the pensioner's annual benefits based on the lesser of:

1. One half of the Phoenix Area Consumer Price Index (CPI) and
2. The excess of the rate of return over the assumed interest rate

The percentage cannot be more than three percent, but must be at least one percent and is subject to the availability of funds in the PER. The 13th check is payable on December 1.

The PER is only applicable for Tiers 1 and 2.

Projected Percentage

Actuarially determined normal cost rate plus an amortization rate on the unfunded actuarial liability and a rate for administrative expenses, stated as a percentage of projected member compensation.

Member Contribution Rates

Tier 1:	5% of pay
Tier 2/Tier 3:	50% of the Projected Percentage not to exceed 11% of pay on or after January 1, 2016

City Contribution Rates

Total Projected Percentage less Member Contribution Rates for each Tier.

Summary of Census Data

	2022	2021	2020	2019	2018
Active Members					
Counts	7,938	7,969	8,027	7,941	7,977
Annual Compensation	$ 595,761,181	$ 580,866,220	$ 568,646,484	$ 562,988,925	$ 527,160,824
Average Annual Compensation	$ 75,052	$ 72,891	$ 70,842	$ 70,896	$ 66,085
Change in Average Annual Compensation	3.0%	2.9%	-0.1%	7.3%	1.7%
Average Age	46.7	46.8	46.8	46.6	46.6
Average Service	11.8	12.2	12.1	12.2	12.4
Deferred Vested Members					
Counts	1,109	1,053	1,033	1,008	943
Annual Deferred Benefits	$ 15,707,186	$ 14,506,046	$ 14,115,513	$ 13,619,208	$ 12,167,691
Average Benefit	$ 14,163	$ 13,776	$ 13,665	$ 13,511	$ 12,903
Retired Members					
Counts	6,363	6,183	6,109	6,013	5,813
Annual Deferred Benefits	$ 234,156,480	$ 221,252,111	$ 214,952,799	$ 210,707,173	$ 202,550,837
Average Benefit	$ 36,800	$ 35,784	$ 35,186	$ 35,042	$ 34,844
Disability					
Counts	222	233	233	245	249
Annual Deferred Benefits	$ 3,885,565	$ 3,898,236	$ 3,830,503	$ 3,963,226	$ 4,069,714
Average Benefit	$ 17,503	$ 16,731	$ 16,440	$ 16,176	$ 16,344
Beneficiaries and QDROs					
Counts	1,195	1,171	1,160	1,110	1,076
Annual Benefits	$ 25,842,433	$ 24,608,323	$ 23,551,335	$ 22,007,859	$ 21,231,243
Average Benefit	$ 21,625	$ 21,015	$ 20,303	$ 19,827	$ 19,732
Total Members Included in Valuation	**16,827**	**16,609**	**16,562**	**16,317**	**16,058**

	2017	2016	2015	2014	2013
Active Members					
Counts	8,030	7,783	7,463	7,731	8,090
Annual Compensation	$ 521,709,266	$ 496,332,801	$ 484,853,108	$ 509,267,263	$ 508,031,593
Average Annual Compensation	$ 64,970	$ 63,771	$ 64,968	$ 65,873	$ 62,797
Change in Average Annual Compensation	1.9%	-1.8%	-1.4%	4.9%	3.3%
Average Age	46.5	46.5	46.7	46.8	46.6
Average Service	12.3	12.2	12.6	12.8	12.8
Deferred Vested Members					
Counts	925	885	901	816	788
Annual Deferred Benefits	$ 11,638,455	$ 11,080,138	$ 11,207,455	$ 9,956,781	$ 9,526,523
Average Benefit	$ 12,582	$ 12,520	$ 12,439	$ 12,202	$ 12,089
Retired Members					
Counts	5,661	5,576	5,419	5,080	4,653
Annual Deferred Benefits	$ 195,912,247	$ 191,137,835	$ 185,103,085	$ 168,443,463	$ 150,600,135
Average Benefit	$ 34,607	$ 34,279	$ 34,158	$ 33,158	$ 32,366
Disability					
Counts	247	249	251	249	246
Annual Deferred Benefits	$ 4,000,756	$ 3,895,823	$ 3,873,354	$ 3,639,564	$ 3,557,536
Average Benefit	$ 16,197	$ 15,646	$ 15,432	$ 14,617	$ 14,462
Beneficiaries and QDROs					
Counts	1,072	1,060	1,018	961	925
Annual Benefits	$ 20,639,481	$ 20,103,429	$ 18,896,049	$ 17,301,146	$ 16,199,651
Average Benefit	$ 19,253	$ 18,965	$ 18,562	$ 18,003	$ 17,513
Total Members Included in Valuation	**15,935**	**15,553**	**15,052**	**14,837**	**14,702**

Summary of Actuarial Cost Methods and Assumptions

The assumptions were adopted by the City of Phoenix Employees' Retirement System based on the most recent experience study covering the period of July 1, 2014 through June 30, 2021. New assumptions, including updated mortality and economic assumption, were adopted in July of 2020 and were first used in the June 30, 2020 valuation.

Valuation Date

The valuation date is June 30th of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

Actuarial Cost Method

The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the employer contribution rate is the sum of (i) the employer normal cost rate, and (ii) a rate that will amortize the unfunded actuarial liability.

1. The valuation is prepared on the projected benefit basis. The present value of each participant's expected benefit payable at retirement or termination is determined, based on age, service, sex, compensation, and the interest rate assumed to be earned in the future (7.00%). The calculations take into account the probability of a participant's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his terminating with a service benefit. Future salary increases are also anticipated. The present value of the expected benefits payable on account of the active participants is added to the present value of the expected future payments to retired participants and beneficiaries to obtain the present value of all expected benefits payable from the Plan on account of the present group of participants and beneficiaries.
2. The employer contributions required to support the benefits of the Plan are determined following a level percent of pay funding approach and consist of a normal cost contribution and an unfunded accrued liability contribution, plus a component to cover administrative expenses.
3. The normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using the individual entry age actuarial cost method having the following characteristics of (i) the annual normal costs for each active member, payable from the date of entry into the system to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement, and (ii) each annual normal cost is constant percentage of the member's year-by-year projected covered pay.
4. The unfunded accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability. Amortization bases are established each year and amortized over periods in accordance with the following amortization methods.
    a. The UAL as of June 30, 2013, developed prior to implementing the September 2013 assumption changes, is amortized over a closed 25-year period as a level percentage of payroll.
    b. The impact of the September 2013 assumption changes on the UAL is amortized over a closed 25-year period as a level percentage of payroll with a four-year phase-in to the full amortization rate. The phase-in is calculated by multiplying the first year amortization payment by 25 percent. For the second year, the amortization schedule is recalculated reflecting the 25 percent payment in the first year and the remaining 24-year period and the calculated amortization payment is then multiplied by 50 percent. The process is repeated until the full amortization payment is made beginning in the fourth year of the 25-year period.
    c. The impact of the August 2015 assumption changes on the UAL is amortized over a closed 20-year period as a level percentage of payroll with a four-year phase-in to the full amortization rate. The phase-in is calculated by multiplying the first year amortization payment by 25 percent. For the second year, the amortization schedule is recalculated reflecting the 25 percent payment in the first year and the remaining 19-year period and the calculated amortization payment is then multiplied by 50 percent. The process is repeated until the full amortization payment is made beginning in the fourth year of the 20-year period.
    d. Future gains and losses are amortized over closed 20-year periods as a level percentage of payroll from the valuation date in which they are first recognized. However, gains will not be amortized over a shorter period than the remaining period on the amortization of the 2013 UAL.

Summary of Actuarial Cost Methods and Assumptions (Continued)

Actuarial Value of Assets

The actuarial value of assets is determined by recognizing market value gains and losses over a four-year period. Gain and loss bases to be spread over the four-year period are determined by comparing expected returns based on the market value of assets and cash flows during the year to actual investment returns. The actuarial value of assets must be between 80 and 120% of market value.

Actuarial Assumptions

Economic Assumptions

1. Investment return: 7.00% per annum, compounded annually. Inflation is assumed to be 2.30%.
2. Salary increase rate: Individual salary increases are composed of a price inflation component, a real wage growth component, and a merit or longevity component that varies by age. The table below combines the various components of salary increases for sample ages. Growth in the total payroll is assumed to be 2.50%.

	Percentage Increase in Salary			
Attained Years of Service	Price Inflation	Real Wage Growth	Merit or Longevity	Total
1-7	2.30%	0.5%	4.20%	7.00%
8-14	2.30%	0.5%	1.30%	4.10%
15+	2.30%	0.5%	0.00%	2.80%

3. COLA Due to Pension Equalization Reserve (PER): The PER only applies to Tier 1 and Tier 2 benefits. Future benefits payable through the PER are valued as an annual compound cost-of-living adjustment (COLA) equal to 0.50% through 2024, 1.00% from 2025-2029, and then 1.25% thereafter.
4. Administrative expenses are assumed to be equal to the prior year's amount, increased by 2.50%.

Demographic Assumptions

1. Rates of Mortality for Healthy and Disabled Lives: Mortality rates are based on the sex- distinct employee and annuitant mortality tables described below, including adjustment factors applied to the published tables for each group. Half of active member deaths are assumed to be duty related. Future mortality improvements are reflected by applying the ultimate rates of the MP projection scales on a generational basis to the adjusted base tables from the base year shown below.

(i) Non-Annuitant – Pub-2010, Amount-Weighted, General, Employee Mortality Table

Gender	Adjustment Factor	Base Year
Male	1.000	2010
Female	1.000	2010

(ii) Healthy Annuitant - Pub-2010, Amount-Weighted, General, Health Retiree Mortality Table

Gender	Adjustment Factor	Base Year
Male	1.090	2010
Female	1.040	2010

Summary of Actuarial Cost Methods and Assumptions (Continued)

(iii) Disabled Annuitant - Pub-2010, Amount-Weighted, General, Disabled Retiree Mortality Tables

Gender	Adjustment Factor	Base Year
Male	1.000	2010
Female	1.000	2010

Sample Rates with Projections to 2022 (not including adjustment factors)

	Probability of Death Pre-Retirement		Probability of Death Post-Retirement		Probability of Death Post-Disability	
Age	Men	Women	Men	Women	Men	Women
20	0.033%	0.012%	0.036%	0.012%	0.365%	0.207%
25	0.025	0.008	0.027	0.008	0.246	0.145
30	0.032	0.013	0.035	0.014	0.314	0.228
35	0.042	0.020	0.045	0.021	0.406	0.355
40	0.059	0.032	0.064	0.033	0.572	0.558
45	0.087	0.050	0.106	0.060	0.893	0.873
50	0.132	0.074	0.288	0.205	1.423	1.315
55	0.194	0.109	0.416	0.264	1.874	1.544
60	0.283	0.165	0.594	0.354	2.219	1.734
65	0.415	0.262	0.882	0.565	2.698	2.000
70	0.623	0.433	1.474	0.980	3.458	2.537
75	0.971	0.716	2.581	1.736	4.602	3.548
80	1.533	1.179	4.612	3.097	6.513	5.325
85	6.402	4.727	8.300	5.720	9.586	8.271
90	13.116	10.269	14.296	10.679	14.529	12.216

2. Disability Rates. The disability incidence rates are 20% of the Arizona State Retirement System disability table. Half of disabilities are assumed to be duty-related. Sample disability rates of active members are provided in the table below. The rates apply to both male and female COPERS members.

Sample Attained Ages	Probability of Disablement
25	0.0100%
30	0.0121
35	0.0185
40	0.0294
45	0.0454
50	0.0677
55	0.0794
60	0.0863

Summary of Actuarial Cost Methods and Assumptions (Continued)

3. Termination rates (for causes other than death, disability or retirement): Termination rates are based on age and service. Termination rates are not applied after a member becomes eligible for a retirement benefit. Rates at selected ages are shown.

Probability of Termination Years of Service						
Age	**0**	**1**	**2**	**3**	**4**	**5+**
20	19.00%	17.00%	11.00%	10.00%	8.25%	8.00%
25	19.00	17.00	11.00	10.00	8.25	8.00
30	17.00	13.25	10.00	8.75	7.25	5.00
35	17.00	10.75	9.00	7.50	6.50	4.00
40	17.00	9.50	8.25	6.50	6.00	3.10
45	17.00	8.50	7.50	6.50	6.00	2.10
50	14.00	9.00	5.00	5.00	4.50	1.50
55	14.00	9.00	5.00	5.00	4.50	1.50
60	14.00	9.00	5.00	5.00	4.50	1.50

4. Retirement Rates

Probability of Retirement Years of Service				
Age	**< 15**	**15-24**	**25-31**	**≥ 32**
50-51	0.00%	0.00%	40.00%	42.50%
52	0.00	0.00	40.00	35.00
53	0.00	0.00	40.00	27.50
54	0.00	0.00	30.00	27.50
55	0.00	0.00	30.00	27.50
56	0.00	37.50	25.00	27.50
57	0.00	37.50	22.50	22.50
58	0.00	25.00	22.50	22.50
59	0.00	22.50	20.00	22.50
60	10.00	22.50	20.00	22.50
61	10.00	20.00	20.00	22.50
62	13.00	20.00	25.00	32.50
63	13.00	20.00	25.00	37.50
64	10.00	17.50	15.00	25.00
65	20.00	27.50	25.00	35.00
66	25.00	32.50	40.00	37.50
67	25.00	35.00	40.00	37.50
68	25.00	35.00	40.00	37.50
69	25.00	35.00	40.00	47.50
70	100.00	100.00	100.00	100.00

Other Assumptions

1. Percent married: 90% of employees are assumed to be married.
2. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.
3. Unused Vacation and Compensatory Time: For Tier 1 and Tier 2 members, compensatory service credits and lump sum payments for unused vacation and compensatory time are explicitly valued. An additional load of 1.5% is also included as margin for adverse deviation.
4. Member Contribution Crediting Rate: Member contributions are assumed to be credited with interest at 3.75% per annum.

Summary of Actuarial Cost Methods and Assumptions (Continued)

5. Decrement Timing: Middle of the Year.

Schedule of Retired Members Added to and Removed from Rolls

	Added to Rolls		Removed		Total			
Year Ended	Count	Annual Pensions*	Count	Annual Pensions*	Count	Annual Pensions*	Average Annual Pension	% Increase in Pensions
6/30/2013	426	$ 12,574	201	$ 3,996	5,703	$ 168,843	$ 29,606	5.4
6/30/2014	597	21,948	145	3,232	6,155	187,559	30,473	11.1
6/30/2015	578	22,483	192	4,225	6,541	205,816	31,466	9.7
6/30/2016	375	11,573	182	4,329	6,734	213,061	31,640	3.5
6/30/2017	321	9,317	233	4,395	6,822	218,364	32,009	2.5
6/30/2018	370	11,314	218	4,825	6,974	225,644	32,355	3.3
6/30/2019	417	13,109	196	4,398	7,195	234,341	32,570	3.9
6/30/2020	378	12,025	251	6,530	7,322	239,836	32,756	2.3
6/30/2021	396	14,487	309	7,105	7,406	247,218	33,367	3.1
6/30/2022	477	21,208	287	7,196	7,599	261,231	34,377	5.7

* Represents in thousands

Solvency Test (in thousands)

	Aggregated Accrued Liabilities for				Portion of Actuarial Liability Covered by Reported Assets		
Valuation Date	Active Member Contributions	Retirees and Beneficiaries and Vested Terminations	Members (Employer Financed Portion)	Actuarial Value Assets	(5)/(2)	[(5) - (2)]/(3)	[(5) - (2)] - (3)]/(4)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
6/30/2013	396,583	1,881,123	1,201,741	1,962,533	100.00%	83.2%	0.0
6/30/2014	393,754	2,099,274	1,121,756	2,120,700	100.00%	82.3%	0.0
6/30/2015	383,029	2,465,862	1,127,017	2,202,923	100.00%	73.8%	0.0
6/30/2016	393,626	2,522,989	1,067,522	2,283,216	100.00%	74.9%	0.0
6/30/2017	406,651	2,638,084	1,084,717	2,402,707	100.00%	75.7%	0.0
6/30/2018	417,314	2,704,971	1,103,761	2,562,847	100.00%	79.3%	0.0
6/30/2019	420,431	2,804,775	1,176,619	2,677,353	100.00%	80.5%	0.0
6/30/2020	437,719	2,857,254	1,119,141	2,811,163	100.00%	83.1%	0.0
6/30/2021	453,509	2,945,664	1,142,626	3,211,142	100.00%	93.6%	0.0
6/30/2022	456,197	3,124,986	1,142,108	3,361,409	100.00%	93.0%	0.0

Summary of Actuarial Cost Methods and Assumptions (Continued)

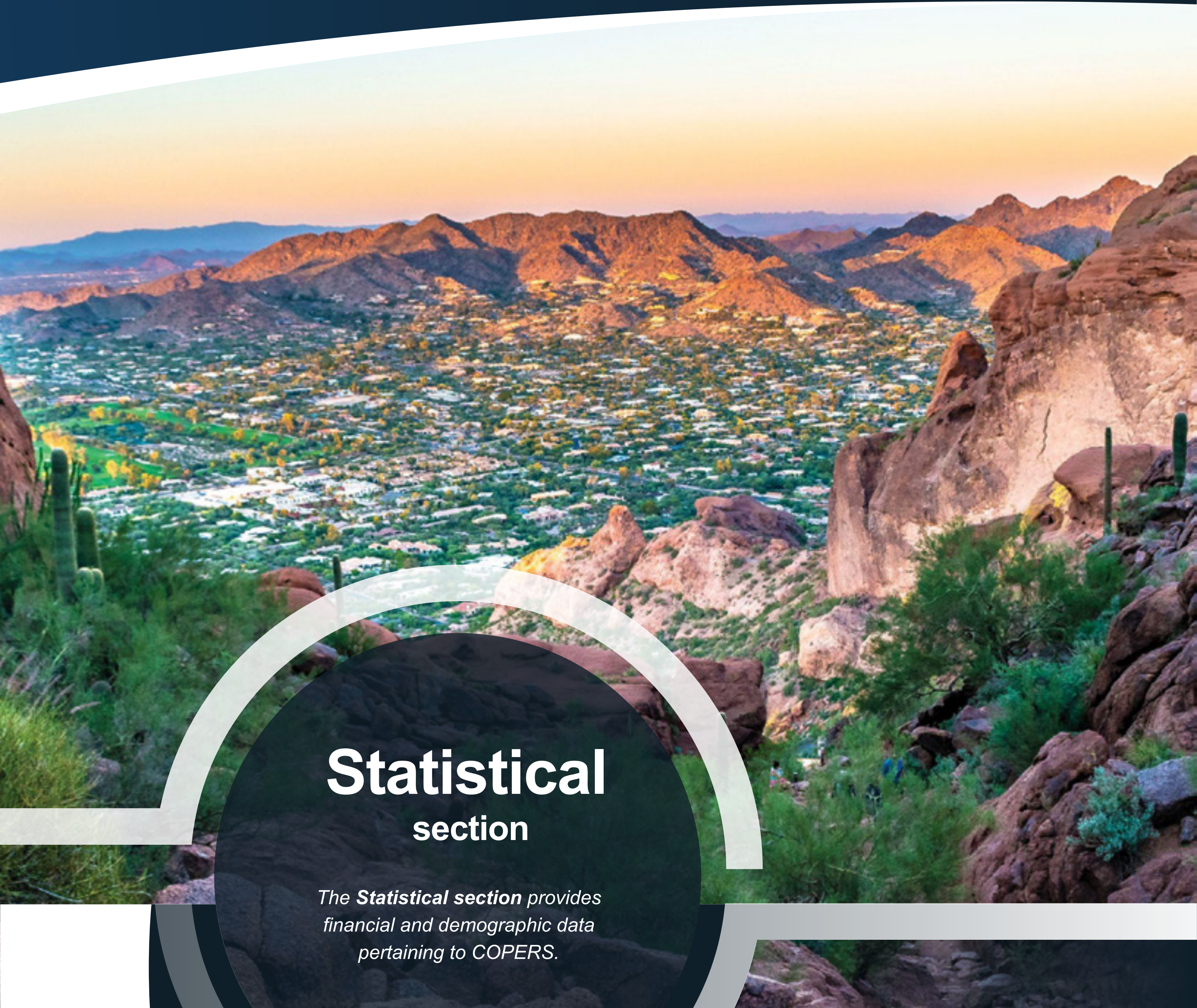
Analysis of Financial Experience (in thousands)

	2022	2021	2020	2019	2018
(1) UAAL at Start of Year	1,330,656	1,602,951	1,724,473	1,663,199	1,726,745
(2) Normal Cost for Year*	82,433	80,573	83,628	74,048	73,449
(3) Expected Contributions	(218,122)	(222,103)	(213,142)	(198,860)	(187,324)
(4) Assumed Investment Income Accrual on (1), (2) and (3)	88,477	107,337	120,412	116,137	121,133
(5) Expected UAAL Before Changes	1,283,444	1,568,758	1,715,371	1,654,524	1,734,003
(6) Effect of Assumption/Method Changes	-	-	(62,386)	-	-
(7) Effect of Benefit Changes	-	-	-	-	-
(8) Expected UAAL After Changes	1,283,444	1,568,758	1,652,985	1,654,524	1,734,003
(9) Actual UAAL	1,361,882	1,330,656	1,602,951	1,724,473	1,663,199
(10) Gain/Loss [8. - 9.]	(78,438)	238,102	50,034	(69,949)	70,804
(11) As % of AAL at Start of Year	-1.73%	5.39%	1.14%	-1.66%	1.71%

	2017	2016	2015	2014	2013
(1) UAAL at Start of Year	1,700,921	1,772,985	1,494,084	1,516,915	1,111,845
(2) Normal Cost for Year	73,256	80,757	75,310	78,331	71,828
(3) Expected Contributions	(183,023)	(178,288)	(157,314)	(153,885)	(143,502)
(4) Assumed Investment Income Accrual on (1), (2) and (3)	123,527	129,383	109,037	110,987	86,136
(5) Expected UAAL Before Changes	1,714,681	1,804,837	1,521,117	1,552,348	1,126,307
(6) Effect of Assumption/Method Changes	2,420	(69,420)	254,870	-	423,247
(7) Effect of Benefit Changes	-	(3,229)	-	-	-
(8) Expected UAAL After Changes	1,717,101	1,732,188	1,775,987	1,552,348	1,549,554
(9) Actual UAAL	1,726,745	1,700,921	1,772,985	1,494,084	1,516,915
(10) Gain/Loss [8. - 9.]	(9,644)	31,267	3,002	58,264	32,639
(11) As % of AAL at Start of Year	-0.24%	0.80%	0.10%	1.70%	1.10%

*Includes administrative expenses beginning in 2017

COPERS



Statistical
section

*The **Statistical section** provides financial and demographic data pertaining to COPERS.*

Introduction

The purpose of the statistical section is to provide the reader with data which is considered to be pertinent to the financial and economic condition of the retirement plan. Each schedule is defined below with an explanation of the schedule and an identification of the source of the data.

Schedule of Changes in Fiduciary Net Position

This schedule provides the additions and deductions to the plan for the past ten years. The change in net position is provided to illustrate whether the plan’s assets are growing or not. This schedule is developed using the Statement of Changes in Fiduciary Net Position for the past ten years.

Schedule of Benefit Expenses by Type

This schedule provides the benefit expenses of the plan by type for the last ten years. COPERS benefits include service retirement payments, disability benefits, death in service benefits, child benefits, payment to alternate payees and survivor benefits. This schedule is developed using reports from the pension administration system. The total expenses can be found in COPERS’ Statement of Changes in Fiduciary Net Position for the past ten years.

Schedule of Refunds by Type

This schedule provides the annual amount of refunds issued to employees and beneficiaries upon separation from City employment. This schedule is compiled using information from the pension administration system and the payroll system.

Schedule of Retired Members by Type of Benefit

This schedule provides the number of retired members in each benefit category. COPERS plan benefits include payments for deferred benefits, normal retirement benefits, disability benefits, survivor benefits, death benefits and payments to alternate payees. The schedule is developed using the pension administration system.

Schedule of Average Benefit Payment Amounts

This schedule provides the average benefit payments by years of credited service. This information is provided to illustrate how benefit payments increase as the years of credited service increases. This schedule is developed using the pension administration system.

Schedule of Changes in Fiduciary Net Position (in thousands)
Last Ten Fiscal Years

	2022	2021	2020	2019	2018
Additions					
Employer Contributions	$ 178,319	$ 357,382	$ 175,947	$ 165,796	$ 229,006
Member Contributions	53,350	40,561	39,356	35,042	33,340
Inter-System Transfers	-	-	-	375	484
Retirement Office Administration	2,122	2,047	2,134	1,986	1,863
Net Investment Income (Loss)	(161,784)	610,554	50,389	142,964	166,514
Total Additions	**72,007**	**1,010,544**	**267,826**	**346,163**	**431,207**
Deductions					
Benefit Payments	$ 257,782	$ 246,214	$ 239,407	$ 234,301	$ 224,454
Refunds of Contributions	4,436	3,047	2,526	3,012	3,472
Inter-System Transfers (Note 11)	443	452	211	451	134
Retirement Office Administration	2,122	2,047	2,134	1,986	1,863
Administrative Expenses	2,564	1,930	2,509	793	377
Total Deductions	**267,347**	**253,690**	**246,787**	**240,543**	**230,300**
Change In Net Position Restricted For Pensions	**$ (195,340)**	**$ 756,854**	**$ 21,039**	**$ 105,620**	**$ 200,907**

	2017	2016	2015	2014	2013
Additions					
Employer Contributions	$ 152,153	$ 119,844	$ 117,092	$ 115,244	$ 27,738
Member Contributions	30,870	29,306	27,861	28,815	110,094
Funds from Other Systems	-	217	199	160	105
Inter-System Transfers	43	-	-	-	-
Net Investment Income (Loss)	243,210	9,171	47,149	298,576	195,305
Total Additions	**426,276**	**158,538**	**192,301**	**442,795**	**333,242**
Deductions					
Benefit Payments	$ 220,276	$ 213,047	$ 201,178	$ 177,447	$ 165,521
Refunds of Contributions	3,227	3,047	3,004	2,192	2,464
Inter-System Transfers (Note 11)	207	315	-	-	-
Funds to Other Systems	-	-	421	238	606
Administrative Expenses	380	234	414	628	389
Total Deductions	**224,090**	**216,643**	**205,017**	**180,505**	**168,980**
Change In Net Position Restricted For Pensions	**$ 202,186**	**$ (58,105)**	**$ (12,716)**	**$ 262,290**	**$ 164,262**

Schedule of Benefit Expenses by Type (in thousands)
Last Ten Fiscal Years

	Age & Service		Death & Disability Benefits (Retirees)						
Fiscal Year	Benefits (Retirees)	Death In Service	Duty	Non-Duty	Survivors	Deferred	Child	Alternate Payee	Total Benefits
2021-2022	$ 223,163	$ 3,595	$ 561	$ 3,313	$ 19,212	$ 4,238	$ 42	$ 3,658	$ 257,782
2020-2021	214,074	3,292	587	3,390	18,378	3,979	45	2,469	246,214
2019-2020	209,454	3,341	606	3,278	16,639	3,675	47	2,367	239,407
2018-2019	205,349	3,260	625	3,409	15,985	3,422	51	2,200	234,301
2017-2018	196,573	3,281	642	3,426	15,256	3,085	58	2,133	224,454
2016-2017	193,048	3,271	672	3,311	15,038	2,801	61	2,074	220,276
2015-2016	186,802	3,324	686	3,273	14,150	2,721	62	2,029	213,047
2014-2015	176,699	3,109	710	3,184	12,958	2,582	47	1,889	201,178
2013-2014	154,684	2,921	711	2,898	12,157	2,373	32	1,701	177,477
2012-2013	143,970	2,812	702	2,880	11,581	2,158	31	1,387	165,521

Schedule Refunds by Type (in thousands)
Last Ten Fiscal Years

Fiscal Year	Beneficiaries	Separation	Total Refunds
2021-2022	$ 1,224	$ 3,212	$ 4,436
2020-2021	942	2,105	3,047
2019-2020	481	2,045	2,526
2018-2019	496	2,516	3,012
2017-2018	332	3,140	3,472
2016-2017	518	2,709	3,227
2015-2016	589	2,413	3,002
2014-2015	725	2,279	3,004
2013-2014	515	1,677	2,192
2012-2013	821	1,643	2,464

Schedule of Retired Members by Type of Benefit
For the Fiscal Year ended June 30, 2022

		Type of Retirement						
Monthly Benefit	Number of Retirees	Deferred	Normal or Voluntary	Duty Disability	Non-Duty Disability	Survivor Payment	Death Benefit	Alternate Payee
Deferred	1,109	1,109						
$1 - $300	83		40	0	0	15	17	11
$301 – $400	120		81	4	1	22	1	11
$401 – $500	124		76	5	2	29	0	12
$501 – $600	146		101	5	5	22	3	10
$601 – $700	158		88	3	5	47	3	12
$701 – $800	174		100	1	8	47	6	12
$801 – $900	172		94	3	19	34	7	15
$901 – $1,000	163		107	1	8	32	6	9
$1,001 – $1,100	197		124	3	13	36	7	14
$1,101 – $1,200	206		130	2	12	41	8	13
$1,201 – $1,300	173		116	1	14	32	2	8
$1,301 – $1,400	174		117	0	12	30	6	9
$1,401 – $1,500	184		137	0	12	24	7	4
$1,501 – $2,000	867		645	14	32	120	37	19
$2,001 – $2,500	903		767	1	12	99	15	9
$2,501 – $3,000	882		781	0	12	69	12	8
$3,001 – $4,000	1,322		1,216	0	8	76	19	3
$4,001 – $5,000	829		788	0	4	28	6	3
$5,001+	903		855	0	0	43	3	2
Totals	**8,889**	**1,109**	**6,363**	**43**	**179**	**846**	**165**	**184**

Schedule of Average Benefit Payment Amounts By Year of Retirement (Last Five Fiscal Years)

Retirement Effective Dates	Years of Credited Service					
For Fiscal Years Ending June 30:	5-9	10-14	15-19	20-24	25-29	30+
2022						
Average Monthly Benefit	$ 1,032.43	$ 1,332.74	$ 1,957.11	$ 2,856.56	$ 4,119.39	$ 5,022.63
Mean Monthly Final Average Compensation	7,828.58	5,449.40	6,024.17	6,578.22	7,608.57	7,631.67
Number of New Retirees	18	21	57	90	94	64
2021						
Average Monthly Benefit	$ 794.64	$ 1,417.07	$ 1,856.51	$ 2,828.72	$ 3,881.98	$ 4,913.68
Mean Monthly Final Average Compensation	6,229.33	5,603.37	5,495.05	6,477.60	7,131.53	7,595.83
Number of New Retirees	25	37	42	74	75	43
2020						
Average Monthly Benefit	$ 595.25	$ 1,292.48	$ 1,959.94	$ 2,726.63	$ 3,573.48	$ 4,472.53
Mean Monthly Final Average Compensation	4,524.39	5,386.73	5,734.01	6,178.95	6,618.61	6,940.39
Number of New Retirees	27	31	39	69	61	57
2019						
Average Monthly Benefit	$ 779.83	$ 1,412.91	$ 1,850.93	$ 2,783.23	$ 3,804.91	$ 4,162.13
Mean Monthly Final Average Compensation	6,036.56	5,746.03	5,460.68	6,178.63	6,967.71	6,453.55
Number of New Retirees	18	24	44	72	85	65
2018						
Average Monthly Benefit	$ 485.88	$ 1,247.90	$ 1,864.62	$ 2,831.05	$ 3,702.93	$ 4,536.18
Mean Monthly Final Average Compensation	3,717.43	5,233.92	5,715.12	6,283.43	6,669.52	6,924.99
Number of New Retirees	25	37	47	75	58	47
From July 1, 2018 to June 30, 2022						
Average Monthly Benefit	$ 737.61	$ 1,340.62	$ 1,897.82	$ 2,805.24	$ 3,816.54	$ 4,621.43
Mean Monthly Final Average Compensation	5,667.26	5,483.89	5,685.81	6,339.37	6,999.19	7,109.29
Average Number of New Retirees	23	30	46	76	75	55

City of Phoenix
Employees' Retirement System
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Phoenix, AZ 85003

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