A Pension Trust Fund of the State of Minnesota

2018

Comprehensive Annual Financial Report

Teachers Retirement Association

for fiscal year ended June 30, 2018

Teachers Retirement Association of Minnesota
A Pension Trust Fund of the State of Minnesota

Comprehensive Annual Financial Report

for the fiscal year ended June 30, 2018

Retirement Systems of Minnesota Building

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J. Michael Stoffel
Executive Director

Report Prepared by the TRA accounting and executive staff

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Government Finance Officers Association

Certificate of Achievement for Excellence in Financial Reporting

Presented to

Minnesota Teachers Retirement Association

For its Comprehensive Annual Financial Report for the Fiscal Year Ended

June 30, 2017

Christopher P. Morrill

Executive Director/CEO

Public Pension Coordinating Council

Public Pension Standards Award For Funding and Administration 2018

Presented to

Minnesota Teachers Retirement Association

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

Presented by the Public Pension Coordinating Council, a confederation of

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

Alan H. Winkle

Alan H. Winkle
Program Administrator

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Letter of Transmittal

J. Michael Stoffel
Executive Director

December 27, 2018

Members of the Board of Trustees

Teachers Retirement Association
60 Empire Drive, Suite 400
Saint Paul, MN 55103-4000

Dear Trustee:

We are pleased to present this Comprehensive Annual Financial Report (CAFR) of the Teachers Retirement Association (TRA) for the fiscal year ended June 30, 2018, our 87th year of service.

The independent Office of the Legislative Auditor has issued an unmodified (clean) opinion on TRA's financial statements for the year ended June 30, 2018. The independent auditor's report is located at the front of the Financial section of this report. Management believes that the accompanying statements, schedules, and tables are fairly presented. We are solely responsible for the content of the report, including its financial statements, which should be useful in understanding information about TRA and comparing our operating results with those of other teacher retirement systems.

TRA management has implemented a system of internal controls to monitor and safeguard assets, ensure transactions are carried out in accordance with Minnesota statutes, and promote efficient operations. Internal controls are designed to provide reasonable, but not absolute assurance regarding the safeguarding of assets against loss. The concept of reasonable assurance recognizes that a cost-benefit analysis requires estimates and judgments by management. All internal control evaluations occur within this framework.

Readers are encouraged to refer to the Management Discussion and Analysis on pages 17-21 for an overview of additions to and deductions from the TRA Fund and additional financial reporting detail for the fiscal year.

TRA Profile

As of June 30, 2018, TRA had 590 reporting units, 82,495 active members and a total of 66,104 retirees, survivors, beneficiaries, and disabilitants who were receiving monthly benefits.

Although the TRA Board of Trustees has a broad scope of authority in the operations and management of TRA, the pension fund is also governed by federal laws and state statutes. For financial reporting purposes, TRA is considered a pension trust fund of the State of Minnesota, and TRA financial results are incorporated into the CAFR of the State of Minnesota.

TRA follows the provisions of statements promulgated by the Governmental Accounting Standards Board (GASB). TRA's CAFR also complies with Minnesota Statutes, Section 356.20. Transactions are reported on the accrual basis of accounting. Contributions from employers and members are recognized as revenue when earned. Expenses are recorded when corresponding liabilities are incurred, regardless of when payment is made.

We contract for actuarial services with the firm Cavanaugh Macdonald Consulting of Bellevue, Nebraska to prepare two annual actuarial valuation reports. One report is performed in accordance with the accounting and financial reporting requirements of GASB Statement 67. The second report is performed in accordance with actuarial assumptions and methods contained in Minnesota Statutes Sec. 356.215; it also provides results that assist board members and state policymakers in funding determinations. These statutes specify key funding policy elements including amortization period, actuarial cost method, asset smoothing method and investment earnings assumption. The Minnesota Office of the Attorney General provides legal counsel to the Board of Trustees. Most financial transactions, including disbursements from the pension fund, are processed through the centralized controls of the Statewide Integrated Financial Tools (SWIFT) system, under the statutory authority of the Department of Minnesota Management and Budget (MMB) and the Department of Administration.

Economic Condition

All TRA assets are invested under the authority and direction of the State Board of Investment (SBI). A listing of the pooled investments in the TRA Fund can be found on page 71. The SBI has developed strategic asset allocation and other investment policies based on the long-term investment horizon profile of our members and benefit recipients. The SBI, with advice from its Investment Advisory Council (IAC), continually reviews policies to ensure sufficient assets are available to finance benefits determined under statute. The executive directors of the three statewide retirement systems serve on the seventeen-member IAC and represent their members in advising the SBI on investment-related matters.

Economic Conditions and Outlook (from Minnesota Management and Budget)

Minnesota's steady economic performance continues, even as the U.S. economy has now expanded for 112 consecutive months, the second-longest expansion on record. The state continues to add jobs at a steady pace, driving the unemployment rate well below the U.S. rate. Together, high demand for labor and low unemployment continue to support growth in total Minnesota wage income and wages per worker. However, as retiring baby boomers dampen growth in the state's workforce, forecast employment growth is increasingly constrained. This means that more of Minnesota's growth in total wage income is expected to arise from higher wages per worker, and less from increases in the number of people working.

Strong demand for workers, combined with low unemployment, continues to tighten Minnesota's labor market. Statewide, there have been fewer unemployed job-seekers than open positions for the past 18 months. Other indicators, such as initial claims for unemployment insurance and temporary help employment, are at levels consistent with a tight labor market. In October, Minnesota's seasonally adjusted unemployment rate was 2.8 percent, 0.9 percent below the national rate, 0.5 percentage points lower than a year ago, and the lowest unemployment rate the state has seen in more than 18 years.

Job vacancies statewide have grown to a very high level: about 142,000 in the second quarter of calendar 2018, an increase of 16 percent over the second quarter of calendar 2017. Minnesota's job vacancy rate is now 5.2 percent (5.2 openings per 100 jobs), the highest level for this series (which originates in 2001). The ratio of unemployed persons to job vacancies statewide has been less than one at 0.9 for the past year and is now down to about 0.7. A ratio of unemployed persons to job vacancies less than one indicates that there are fewer unemployed job-seekers than open positions across the state. But now, the tight labor market is being felt across Minnesota. For the first time in the data series, both the Twin Cities and Greater Minnesota have a ratio of less than one unemployed persons to every job vacancy. The ratio is 0.5 in the Twin Cities and 0.7 in Greater Minnesota.

Robust labor demand has allowed the state to continue to add jobs, even as available workers have become scarce. In the 12 months ending in October 2018, employers added more than 36,000 jobs, bringing Minnesota's annual job growth to 1.2 percent, half a percentage point below the U.S. rate over that period. Minnesota has experienced more than eight years (99 months) of employment expansion. In this forecast, we expect annual employment growth of 1.8 percent in fiscal year 2019. In fiscal year 2020 and 2021, growth slows to 1.4 percent and 0.7 percent, respectively. As slow labor force growth constrains job gains, we expect employment growth to decelerate to less than one-half percent in the years of our planning estimates.

In the current forecast, Minnesota's continued-although slowing-employment growth combines with moderate acceleration in wage income per worker forecasts total wage and salary income to grow at a healthy rate of 5.6 percent per year in fiscal year 2019, followed by a deceleration to 5.2 percent in fiscal year 2020 and 4.5 percent in fiscal year 2021.

Legislation

An important pension reform bill was passed by the Legislature and signed by Governor Dayton on May 31, 2018. Previous attempts in passing legislation in 2016 and 2017 resulted in vetoes from the Governor. Under the leadership of Senator Julie Rosen and Representative Tim O'Driscoll the bill, Senate File 2620, received unanimous votes of approval in every committee hearing and on the floor of the Senate and the House. The bill also received unanimous support from all stakeholder groups representing active and retired members of TRA and all other public pension systems in the State.

The bill contained provisions that significantly reduces plan liabilities and increases plan funding. Some important assumption changes were also approved. The following key provisions were included:

Benefit Changes
Cost of living adjustment (COLA) reduced from 2% to 1% for five years, beginning January 1, 2019, then increases by 0.1% over each of next five years until it reaches 1.5%
Eligibility for first COLA changes to normal retirement age, beginning July 1, 2024, unless retiring under rule of 90 or under age 62 with 30 years of service provisions
A trigger that would automatically increase the COLA to 2.5% under certain conditions, is eliminated
Augmentation in early retirement benefits is phase out over five years beginning July 1, 2019, unless retiring under rule of 90 or under age 62 with 30 years of service provisions
Augmentation of deferred benefits is eliminated beginning July 1, 2019
Interest paid on refunds to members is reduced from 4% to 3% beginning July 1, 2018
Contributions
Employer contribution rate increases from 7.5% to 8.75%, phased in over six years beginning July 1, 2018
Employee contribution rate increases from 7.5% to 7.75% beginning July 1, 2023
Actuarial assumptions and methods
Investment return assumption lowered from 8.5% to 7.5% annually
Amortization period for amortization of the unfunded actuarial accrued liability is extended from June 30, 2039 to June 30, 2048

The bill lowered plan liabilities by over $2 billion. This, along with an investment return of 10.3% during fiscal year 2018, has placed the pension fund on a trajectory to be fully funded in 30 years.

Investment Results

The SBI continued implementation during fiscal year 2018 of its Strategic Asset Allocation Framework for the Combined Retirement Funds. The plan combines domestic and international equities into the Public Equity category. The new policy also includes a future target allocation of up to 25 percent into Private Markets that includes private equity, real estate, and resources. During the transition, a portion of the portfolio has been placed into Treasuries for protection purposes. Readers should refer to a more complete description of the changes beginning on page 27.

The Public Equity category returned 12.8 percent for the fiscal year ended June 30, 2018. The domestic portion of Public Equity returned 15.4 percent and the international portion returned 7.5 percent. The Private Markets produced a return of 14.8 percent for fiscal year 2018. The Fixed Income portion of the Combined Funds produced a return of 0.1 percent for the fiscal year.

Within this investment environment, TRA retirement assets under SBI investment management (see page 65), produced an investment return of 10.3 percent for the fiscal year ended June 30, 2018, net of fees and using the time-weighted performance method. This was well above the assumed rate of 8.5 percent for fiscal year 2017 as specified in Minnesota Statute. The 10.3 percent returned also exceeded the composite benchmark by 0.6 percent for the fiscal year. Over the latest ten-, twenty- and thirty-year periods, the Combined Funds have experienced an annualized investment return of 7.8 percent, 6.8 percent and 9.1 percent, respectively. For all three time periods, the performance of the Combined Funds exceeded the performance of the composite benchmark.

Since the benefit payments are not all immediately payable, SBI can maintain a long-term strategy. This approach, along with a well-diversified investment portfolio, helps weather periods of short-term volatility in the investment markets.

Statutory Funding Status

Passage of the 2018 Omnibus Pension Bill produced some major changes in the actuarial valuation results. A strong investment year fueled growth in the fund assets. The actuarial value of TRA assets increased as of June 30, 2018, compared to the previous year-end. For actuarial purposes, investment gains and losses are recognized over a five-year period. On June 30, 2018, the actuarial value of TRA assets was $22.0 billion, an increase from $21.1 billion on June 30, 2017. The five-year smoothing of investment gains and losses produced a deferred investment gain of $335 million as of June 30, 2018. The deferred gain will be recognized in future years.

In November 2017, TRA's actuarial consultant completed a limited experience study on TRA's economic assumptions. One main recommendation they provided was to lower the annual long-term investment earnings assumption from 8.5 percent to 7.5 percent. The investment earnings assumption is set in Minnesota Statute. The TRA Board of Trustees approved the actuary's recommendation and the 2018 Omnibus Pension Bill lowered the assumption in statute to 7.5 percent annually. Other economic assumptions were modified during the year by the Legislative Commission on Pensions and Retirement. A summary of the changes can be seen on page 51.

TRA's unfunded actuarial accrued liability – the amount for which the actuarial value of assets are not available to pay benefits earned to date – increased from $6.36 billion on June 30, 2017, to $6.62 billion on June 30, 2018. Significant changes underlie the 2018 calculation. The lowering of the investment earnings assumption to 7.50 percent annually and other economic assumptions resulted in an additional $3.25 billion of actuarial liability recognized. Most of the increase was offset by modification to plan provisions, including a permanent lowering of the annual COLA from 2.0 percent to 1.0 percent for five years and ultimately to 1.5 percent on January 1, 2028. The plan changes lowered plan liabilities by $2.86 billion.

Another key measure to assess TRA funding health is the adequacy of employee and employer contributions. As of July 1, 2018, the TRA contribution rate deficiency was 1.08 percent of active member covered payroll. Under this estimate, TRA will receive about $56 million less in contributions during fiscal year 2019 than is needed to meet the full funding target date of June 30, 2048. However, the 2018 legislature increased both employee and employer contribution rates in future years that are not recognized in the current valuation. Rates will increase gradually so that on July 1, 2023, the employee contribution will rise from the current 7.50 percent to 7.75 percent. Employer contribution rates will rise from 7.50 percent to 8.75 percent on July 1, 2023. If these future contribution rates had been reflected into the current valuation report, the contribution rate deficiency would have reversed, and become a slight contribution sufficiency.

TRA's funding ratio was nearly constant through these many changes. At June 30, 2018, the funding ratio stood at 76.9 percent, a slight improvement from 76.8 percent on June 30, 2017. Long-term, the funded ratio is expected to slope upward and is projected at more than 100 percent in 30 years, should all current assumptions be met over that time. As part of that analysis, the Board of Trustees will continue to monitor the results of future actuarial valuation annual reports and recommend any needed assumption changes or plan provision modifications to the Minnesota legislature.

Major Initiatives

To better serve and engage members at all stages of their lives and careers, TRA completed a rebranding project which resulted in a new website, brochures and logo in 2018. MinnesotaTRA.org was completely reimagined, with content reorganized for relevance to various demographic groups: early-career teachers, mid-career professionals, teachers nearing retirement and retirees. Content was carefully written and edited to be relatable and accessible. Visuals are elegant; navigation is intuitive.

TRA literature was redesigned to align visually with the new logo and website, echo the life stages organizing principles, and clarify and simplify educational material aimed at Minnesota's teaching workforce. The goal: help the state's educators better understand their pension plan.

TRA also continues the internal development of systems infrastructure to provide a wide array of member services and benefits processing. Retiring TRA members have consistently provided feedback that they highly value a private meeting with a TRA benefits counselor, away from their workplace. Although we are planning new and innovative ways to counsel members towards their retirement goals, the human interaction will continue to be the foundation of our member services.

Awards and Recognition

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to the Teachers Retirement Association for its Comprehensive Annual Financial Report for the fiscal year ended June 30, 2017. This was the 20th consecutive year that the Association has achieved this prestigious award. To be awarded a Certificate of Achievement, a governmental unit must publish an easily readable and efficiently organized comprehensive annual financial report. This report must satisfy both generally accepted accounting principles and applicable legal requirements. A Certificate of Achievement is valid for a period of only one year. We believe that our current comprehensive annual financial report continues to meet the Certificate of Achievement Program requirements, and we are submitting it to the GFOA to determine its eligibility for another certificate.

TRA was also awarded the Public Pension Coordinating Council's Recognition Award for Administration and Funding in 2017. This award recognizes TRA's meeting of professional standards in plan administration in categories such as benefits, actuarial valuations, financial reporting and communications to members. The funding award is given to retirement systems that meet funding and contribution adequacy measures.

The preparation of this report is possible only through the combined efforts of our employees, employer units and professional consultants. It is intended to provide a complete and reliable portrayal of the financial status of the pension fund as a basis for making management decisions and determining responsible stewardship over the assets held in trust for the members of the Association. We have notified members, employer unit officials and other interested persons about the availability of the report on the TRA website. A summary that highlights key aspects of the report will be provided to all members in the TRIB, TRA's periodic newsletter.

Lastly, our sincere appreciation is extended to all who assisted in and contributed toward the completion of this publication.

Respectfully submitted,

J. Michael Stoffel
Executive Director

John Wicklund
Chief Financial Officer

Board of Trustees

As of December 11, 2018

President

Martha Lee (Marti) Zins
Retiree Representative
Minnetonka, MN

Vice President

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Elected Member
St. Cloud, MN

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Elected Member
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Will Baumann
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Association Representative

Brenda Cassellius
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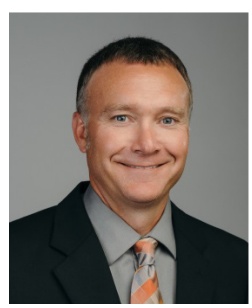
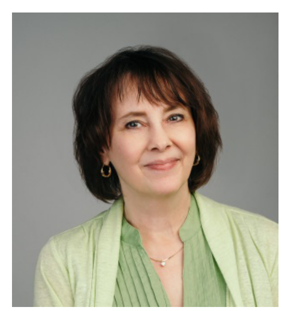
Executive Director

Rachel Barth
Legal and Legislative
Director

John Wicklund
Chief Financial Officer



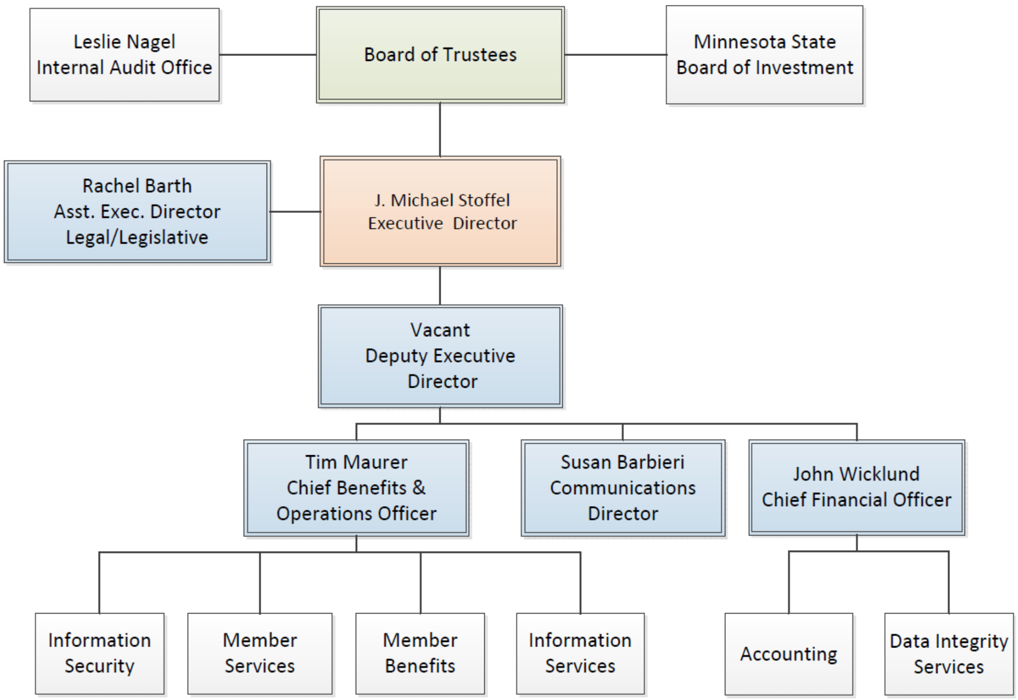
Tim Maurer
Chief Benefits &
Operations Officer



Susan Barbieri
Communications
Director

Administrative Organization

As of December 2018



Consulting Services

Actuary

Cavanaugh Macdonald Consulting, LLC

Bellevue, Nebraska

Auditor

Office of the Legislative Auditor

Saint Paul, Minnesota

Investment

Minnesota State Board of Investment

Saint Paul, Minnesota

(Schedule of Investment Management Fees is found on pages 69-70)

Legal Counsel

Office of the Attorney General

Saint Paul, Minnesota

Medical Advisor

ExamWorks

Minneapolis, Minnesota

Our Mission Statement

TRA provides retirement, disability and survivor benefits to Minnesota's public educators assisting them in achieving future income security.

TRA strives to provide benefits that attract and retain competent teachers who serve communities throughout the state, building a stronger education system.

TRA is committed to safeguarding the financial integrity of the fund and takes pride in providing exceptional, innovative services.

Our Vision

To be an outstanding retirement system pursuing benefits and services that **exceed members' expectations**.

Goals

Members and Stakeholders – Be responsive to the needs of TRA members and stakeholders by providing them with innovative, timely and relevant services and education, and adequate benefits that are properly funded.

Organizational Effectiveness – Be a proactive, flexible efficient organization by measuring performance and continuously improving work processes.

Staff Development – Make TRA an "employer of choice" for both existing and potential staff by providing a supportive and challenging environment that encourages teamwork and creativity, fosters professional growth and development, and values employee input.

Finance and Resources – Safeguard the financial integrity of the fund by ensuring adequate funding, legal compliance and responsibly managing fiscal resources.

Technology – Maintain the internal capacity to utilize cutting-edge technologies that continuously improve work processes and enhance service delivery and communication with our members and stakeholders.

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Teachers Retirement Association of Minnesota
A Pension Trust Fund of the State of Minnesota

Financial

OFFICE OF THE LEGISLATIVE AUDITOR
STATE OF MINNESOTA • James Nobles, Legislative Auditor

Independent Auditor's Report

Members of the Teachers Retirement Association of Minnesota Board of Trustees

Mr. J. Michael Stoffel, Executive Director
Teachers Retirement Association of Minnesota

Report on the Financial Statements

We have audited the accompanying financial statements of the Teachers Retirement Association of Minnesota (TRA), which included the Statement of Fiduciary Net Position as of June 30, 2018, the related Statement of Changes in Fiduciary Net Position, and notes to the financial statements, as listed in the Financial Section of the Table of Contents.

Management's Responsibility for the Financial Statements

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

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to TRA's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of TRA's internal control. Accordingly, we express no such opinion.

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An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Teachers Retirement Association of Minnesota as of June 30, 2018, and the changes in financial position for the fiscal year then ended in conformity with accounting principles generally accepted in the United States of America.

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that Management's Discussion and Analysis and the other required supplementary information, as listed in the Financial Section of the Table of Contents, be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, which 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 Management's Discussion and Analysis and the other required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information Included with the Financial Statements

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise TRA's basic financial statements. The supporting schedules in the Financial Section and the Introductory, Investment, Actuarial, and Statistical Sections, as listed in the Table of Contents, are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The supporting schedules, as listed in the Financial Section of the Table of Contents, are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. The supporting schedules have 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 supporting schedules are fairly stated, in all material respects, in relation to the basic financial statements as a whole.

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

Other Reporting Required by Government Auditing Standards

In accordance with *Government Auditing Standards*, we issued our report, also dated December 26, 2018, on our consideration of the Teachers Retirement Association of Minnesota's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, grant agreements, and other matters. The purpose of that report is to describe the scope and results of our testing of internal control over financial reporting and compliance and not to provide an opinion on the internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* and should be considered in assessing the results of our audit.

Chris Buse

Christopher Buse, CPA
Deputy Legislative Auditor

Tracy Gebhard

Tracy Gebhard, CPA
Audit Director

December 26, 2018
Saint Paul, Minnesota

Management Discussion and Analysis

June 30, 2018

This discussion and analysis of the Teachers Retirement Association (TRA) of Minnesota provides an overview of TRA financial activities for the fiscal year ended June 30, 2018. We encourage you to consider the information presented here in conjunction with the transmittal letter beginning on page 3 and the additional information presented in the financial statements and required supplementary information.

Financial Highlights

Financial highlights of fiscal year 2018 include:

- The Net Position Restricted for Pension Benefits increased in value by $1.10 billion during fiscal year 2018 for a total of $22.36 billion. Plan contributions and investment income totaled $2.95 billion during the fiscal year. Plan benefits and other expenses totaled $1.85 billion during the fiscal year.
- Investment returns for the 2018 fiscal year were 10.3 percent using the time-weighted value method, resulting in net investment income of $2.16 billion.
- Contributions paid by employees, employers, and non-employers during fiscal year 2018 totaled $788.9 million, an increase of $24.4 million from the fiscal year 2017 total of $764.5 million.
- Pension benefits paid to retirees and beneficiaries during fiscal year 2018 was $1.82 billion. The fiscal year 2017 total was $1.77 billion, an increase of $53.18 million during the year.
- Refunds of member contributions plus interest during fiscal year 2018 were $13.07 million, an increase of $1.83 million from the fiscal year 2017 total of $11.24 million.
- Administrative expenses of the fund during fiscal year 2018 were $15.67 million. The fiscal year 2017 total was $11.70 million, representing an increase of $3.97 million for the fiscal year.

Actuarial Highlights

The Association's funding objective is to meet long-term benefit obligations through the accumulation of contributions and investment income. This funding is structured so that the burden of paying retirement costs is shared equitably by present and future generations of members and taxpayers.

By state law, TRA and its actuarial consultant are required to prepare an actuarial funding valuation to assist decision-makers in assessing the funding strength and position of the TRA fund. The results of this actuarial valuation report will be used to describe key funding measures such as the funding ratio, the unfunded actuarial accrued liability and the contribution rate deficiency.

As of June 30, 2018, the accrued liability funding ratio for TRA was 76.9 percent, an increase from the comparable funding ratio of 76.8 percent as of June 30, 2017. TRA's unfunded actuarial accrued liability on June 30, 2017, was $6.36 billion. The June 30, 2018, unfunded actuarial liability was $6.62 billion, an increase of $255 million from the previous year. The net loss was based on economic assumption changes including the reduction in the investment earnings assumption from 8.5 percent annually to 7.5 percent annually. These assumption changes increased TRA's liabilities by $3.25 billion. However, actuarial liabilities were reduced by a package of plan provision cuts enacted by the 2018 legislature. TRA's unfunded liability, by state law, must be fully paid by June 30, 2048. Key actuarial funding measures are presented on page 83.

TRA's actuary has also prepared a separate actuarial valuation report under the requirements of GASB Statement 67 for presentations and disclosures within the financial section of this report. The GASB 67 valuation report is the foundation of a report TRA will issue in the first half of 2019 to assist employer units in their GASB 68 financial reporting presentations and disclosures later in 2019. The fiscal year 2018 results indicate a Net Pension Liability of $6.28 billion, a significant improvement from the $19.96 billion on July 1, 2017.

Overview of the Financial Statements

This discussion and analysis is intended to serve as an introduction to the financial report of TRA. The financial report consists of:

- the basic financial statements, comprised of the Statement of Fiduciary Net Position and the Statement of Changes in Fiduciary Net Position;
- the notes to the basic financial statements;
- required supplementary information; and
- other supplementary information.

The Statement of Fiduciary Net Position (page 22) presents information on the assets and liabilities of TRA, with the difference between the two reported as net position. The net position of the Association reflects the resources available to pay benefits to members when due. Over time, increases and decreases in net position measure whether the Association's financial position is improving or deteriorating. It can be thought of as a snapshot of the financial position of TRA at that specific point in time.

The Statement of Changes in Fiduciary Net Position (page 23) presents information detailing the changes in net position that occurred during the current fiscal year. All changes in net position are reported on an accrual basis. This means that the revenue or expense is recognized as soon as the underlying event giving rise to the change occurs, regardless of when the actual cash is received or paid. Thus, revenues and expenses are reported in this statement for some items that will not result in cash flows until future fiscal periods.

The notes to the financial statements (pages 24-46) provide additional information that is essential to a full understanding of the data provided in the financial statements.

The report also contains required supplementary information in addition to the basic financial statements. The required supplementary information (pages 47-53) will be built prospectively and in time, will form a ten-year historical trend. The Schedule of Changes in the Employers' Net Pension Liability includes a reconciliation of the fiscal year 2018 net pension liability for GASB 67 reporting purposes.

The Schedule of Employer and Non-Employer Contributions presents information about the annual required contributions and resulting contributions in relation to this requirement, covered payroll, and contributions as a percentage of covered payroll.

The Schedule of Investment Returns using the money-weighted method is presented. It will be developed prospectively over the next 10 years.

Two other supporting schedules are also presented. The Schedule of Administrative Expenses (page 56) presents the overall cost of administering the Association. The Schedule of Professional Consultant Expenses (page 57) provides further details about investment and other consulting expenses.

Financial Analysis of the TRA Fund

Plan Assets

Total plan assets of the TRA fund as of June 30, 2018, were $24.6 billion and were mostly comprised of cash, investments and contributions due from employers. Total plan assets increased $1.1 billion from the June 30, 2017 total of $23.5 billion. The primary reason for the increase in the fair value of TRA assets was due to strong investment performance during the fiscal year.

Plan Liabilities

Total liabilities as of June 30, 2018, were $2.25 billion, an increase of 2.4 percent from the June 30, 2017 liability amount of $2.20 billion. The primary reason for the increase in value of liabilities was increased liabilities in the securities lending program. In both years, the liability amounts were mostly comprised of obligations under security lending arrangements, accounts payable and long-term bonds payable for the building co-owned by the Association.

Net Position

Association assets exceeded liabilities on June 30, 2018, by $22.4 billion. The amount has increased from the June 30, 2017, amount of $21.3 billion by $1.1 billion. TRA relies heavily on investment earnings to help pay benefits and expenses over the long term, since annual employee and employer contributions are less than one-half of the amount needed to fund cash outflows. As a result, the fair value of assets of the TRA fund will generally decline during periods of weak investment performance, but rise during strong performance.

Revenues — Additions to Fiduciary Net Position

Total additions to the TRA Fund during fiscal year 2018 were $2.95 billion, a decrease of $670 million from $3.62 billion in fiscal year 2017. The decrease is due to weaker investment earnings in fiscal year 2018 than in the prior fiscal year.

Total employee and employer contributions for fiscal year 2018 increased $24.3 million from the previous fiscal year for a combined fiscal year total of about $788.9 million. The increase is attributable to higher covered salaries earned by active members for fiscal year 2018. Contributions during fiscal year 2018 were prescribed in statute at 7.5 percent employee and 7.5 percent employer for Coordinated Plan members of TRA.

A net investment gain of $2.16 billion was recorded for fiscal year 2018. This amount decreased by $695 million from the fiscal year 2017 gain amount of $2.86 billion.

Fiduciary Net Position

June 30, 2018 and June 30, 2017

Dollars in Thousands

	2018	2017	Change
Cash and Investments	$ 24,565,354	$ 23,410,585	$ 1,154,769
Receivables	24,885	21,280	3,605
Other	21,685	23,220	(1,535)
Total Assets	24,611,924	23,455,085	1,156,839
Total Liabilities	2,249,837	2,196,995	52,842
Fiduciary Net Position	$ 22,362,087	$ 21,258,090	$ 1,103,997

Changes in Fiduciary Net Position

For the Fiscal Year Ended June 30, 2018 and June 30, 2017

Dollars in Thousands

Additions	2018	2017	Change
Employee Contributions	$ 374,550	$ 361,175	$ 13,375
Employer Contributions	414,315	403,379	10,936
Net Investment Income/(Loss)	2,160,111	2,855,217	(695,106)
Other	4,518	4,399	119
Total Additions	$ 2,953,494	$ 3,624,170	$ (670,676)
Deductions			
Monthly Benefits	$ 1,820,751	$ 1,767,568	$ 53,183
Refunds of Contributions	13,073	11,240	1,833
Administrative Expenses	15,673	11,702	3,971
Total Deductions	$ 1,849,497	$ 1,790,510	$ 58,987
Change in Fiduciary Net Position	$ 1,103,997	$ 1,833,660	$ (729,663)

Expenses — Deductions from Fiduciary Net Position

The primary expenses of TRA include the payment of pension benefits to members and beneficiaries, refunds of contributions to former members, and the cost of administering the Fund. Retirement benefit expenses increased by $53.2 million due to an increase in the number of recipients and a 2.0 percent benefit increase paid to eligible recipients on January 1, 2018.

Administrative expenses increased by $4 million during the fiscal year from $11.7 million in fiscal year 2017 to $15.7 million in fiscal year 2018. The completion of the .NET Systems Project in 2017 meant that development costs would begin to be expensed as the systems became operational. Overall, fund deductions increased $59 million for fiscal year 2018.

Actuarial Funding Valuations Highlights

The financial health of a public pension plan is not exclusively assessed by analyzing the basic financial statements. To assist funding analysis, TRA's actuary prepared an actuarial valuation in accordance with Minnesota Statute 356.215. These financial statements should also be reviewed in conjunction with the Actuarial section of this CAFR.

Due to investment gain earned in fiscal year 2018, the actuarial value of assets increased from $21.06 billion on June 30, 2017 to $22.02 billion as of June 30, 2018. The actuarial value of assets smooths investment gains and losses over a five-year period to minimize the volatility associated with any one year. On fair value basis, TRA assets were $22.36 billion on June 30, 2018. The difference between the actuarial value and the fair value of assets is $335 million and represents deferred gains that will be recognized in future years or will be used to absorb investment losses should the markets decline.

TRA's actuarial accrued liability on June 30, 2018, increased to $28.64 billion from the June 30, 2017, amount of $27.43 billion, an increase of 4.4 percent. Accrued liabilities increased markedly due to the investment earnings assumption change from 8.5 percent to 7.5 percent annually. The impact of the assumption changes were substantially offset by changes and cuts to plan provisions, including the retiree COLA, that lowered plan liabilities. A complete reconciliation can be seen on page 97.

TRA's unfunded actuarial liability increased from $6.36 billion on June 30, 2017 to $6.62 billion on June 30, 2018. This represents an increase of $256 million. By statute, the unfunded liability must be recovered in full by June 30, 2048.

TRA's funding objective is to meet long-term benefit obligations through the accumulation of contributions and investment income. As of June 30, 2018, the actuarial accrued liability funding ratio for TRA was 76.89 percent, a slight improvement from the comparable funding ratio of 76.79 percent as of June 30, 2017.

TRA's statutory contribution rate of 16.10 percent of member covered payroll is currently trailing the required contribution rate calculated by TRA's actuarial consultant. The required contribution rate to fund normal pension costs, amortizing the unfunded actuarial liability, plus TRA administrative costs was calculated as 17.18 percent. The resulting contribution deficiency is 1.08 percent of covered payroll, or about $56.0 million projected in fiscal year 2019. The 2018 legislature approved future employee and employer contribution rate increases which will be fully phased in by July 1, 2023. On July 1, 2023, the TRA employee contribution rate will be 7.75 percent of pay; the employer contribution rate will be 8.75 percent of member pay. If those rates had been in force for fiscal year 2019, the July 1, 2018, contribution deficiency of 1.08 percent would have been reversed and turned into a slight contribution sufficiency.

The 2018 Omnibus Pension Bill contained significant changes that impacted TRA's funded status and long-term funding outlook including changes to the financing of TRA, changes to benefit provisions, and a decrease in the investment return assumption from 8.5% to 7.5% (set in statute). The change in the investment return assumption resulted in a more realistic (and higher) measurement of the liabilities. The benefit changes in the 2018 legislation nearly offset the increase in liabilities due to the decrease in the investment return assumption. The benefit changes in the 2018 Omnibus Pension Bill had a significant positive financial impact on TRA. While the decrease in the investment return assumption increased the accrued actuarial liability by $3.3 billion, the benefit changes reduced liabilities by $2.9 billion, increased the funded ratio from 70% to 77%, and put the plan on track to be over 100% funded in 30 years, assuming all actuarial assumptions are met.

GASB 67-68 actuarial valuation results

The TRA Board of Trustees authorized a separate actuarial valuation report designed to comply with the provisions of GASB Statement 67. The Required Supplementary Information, beginning on page 47, details the results of this valuation report. The focus of this valuation is primarily for financial statement presentations rather than funding analysis. Under the set of assumptions used in this valuation, TRA had a net pension liability of $6.28 billion on June 30, 2018 and a contribution deficiency of $101.8 million for fiscal year 2018. The GASB 67 investment return for fiscal year 2018, using the money-weighted method, was 10.49 percent.

The Net Pension Liability of $6.28 billion on June 30, 2018, is a decrease of 68.5 percent from the $19.96 billion calculated at June 30, 2017. The decrease (improvement) is partially attributable to the strong investment return and an increase in fund net position that occurred by the end of fiscal year 2018. The lowered benefit plan provisions passed by the 2018 legislature also helped contribute to lower actuarial liabilities.

Under GASB 67 parameters, the actuary must calculate the date on which June 30, 2018 assets would be depleted, absent future cash flows and asset accumulations that would occur related to future members of the Association. The actuary has determined that using the GASB 67 methodology in fiscal year 2018, TRA assets will not be depleted in the future. Consequently the 2018 valuation report was able to discount all future benefit payments using 7.5 percent annually, as set by TRA management.

In fiscal year 2017, a lower discount rate of 5.12 percent was used in determining the GASB actuarial liability. The actuarial consultant determined at that point, the TRA assets would be depleted in the year 2053. Under GASB 67, that triggered the use of a blended Single Equivalent Interest Rate (SEIR) calculation of two discount rates into a single rate, applied for all years. The effect of using the SEIR rate in 2017 and not in 2018 was largely responsible for the substantially higher volatility in the liabilities and lower net pension liability.

TRA will allocate the results of the GASB 67 accounting valuation to each employer unit, including a substantially lower net pension liability amount. We plan to provide employer units with this information in the second quarter of calendar year 2019 to facilitate their compliance with the financial reporting requirements of GASB Statement 68 for their fiscal year 2019 financial reporting cycle.

The complete GASB 67 accounting valuation report is available at:
https://minnesotatra.org/financial/annual-reports/

Summary

Due to the long-term nature of defined benefit plans, one must review the financial performance of TRA over a period of years and not at any one point in time. The funding ratio of the TRA fund increased from 76.8 percent to 76.9 percent for fiscal year 2018. However, the 2018 legislature passed a package of plan provision cuts and contribution rate increases that will not be fully implemented until 2024. The plan provision changes lowered TRA's long-term liabilities by $2.86 billion.

The long-term financial health of TRA, like all retirement funds, is heavily dependent on two key items: (1) future investment returns and (2) contributions. A contribution deficiency of 1.08 percent of member payroll exists based on the assumptions used for the 2018 valuation. If the future employee and employer contribution rate increases had been reflected in this actuarial valuation the contribution deficiency would have been eliminated.

As of the July 1, 2018, the long-term funding ratio projections for the TRA Fund are encouraging. In 30 years, the actuarial projections indicate that if all actuarial assumptions are met, the funding ratio of the TRA Fund will exceed 100 percent during the decade of the 2040s. Ultimately, the actual investment market returns over the coming years will be the most significant factor in whether or not TRA's goal of amortizing the unfunded actuarial accrued liability by June 30, 2048, will be reached.

Teachers Retirement Fund
Statement of Fiduciary Net Position

June 30, 2018

Dollars in Thousands

Assets		
Cash and Short-term Investments		
Cash	$	9,532
Building Account Cash		30
Short-term Investments		352,442
Total Cash and short-term Investments	$	362,004
Accounts Receivable	$	24,885
Investments (at fair value)		
Bond Pool	$	3,484,119
Alternative Investments Pool		3,072,614
U.S. Stock Index Pool		6,877,133
U.S. Stock Actively Managed Pool		2,350,431
Broad International Stock Pool		4,268,602
Treasuries Pool		1,915,494
Total Investments	$	21,968,393
Securities Lending Collateral	$	2,234,957
Building		
Land	$	171
Building & Equipment Net of Depreciation		5,974
Total Building	$	6,145
Capital Assets Net of Depreciation and Amortization	$	15,540
Total Assets	$	24,611,924
Liabilities		
Current		
Accounts Payable	$	9,384
Accrued Compensated Absences		91
Accrued Expenses - Building		24
Bonds Payable		634
Bond Interest Payable		6
Securities Lending Collateral		2,234,956
Total Current Liabilities	$	2,245,095
Long Term		
Accrued Compensated Absences	$	795
Bonds Payable		3,947
Total Long Term Liabilities	$	4,742
Total Liabilities	$	2,249,837
Net Position Restricted For Pensions	$	22,362,087

The accompanying notes are an integral part of this statement.

Teachers Retirement Fund
Statement of Changes in Fiduciary Net Position

For the Fiscal Year Ended June 30, 2018

Dollars in Thousands

Additions		
Contributions		
Employee	$	374,550
Employer		378,728
Direct Aid (State/City/District)		35,587
Earnings Limitation Savings Account (ELSA)		1,937
Total Contributions	$	790,802
Investment Income		
Net Appreciation in Fair Value of Investments	$	2,168,525
Investment Expense		(23,448)
Net Investment Increase	$	2,145,077
Securities Lending Activities:		
Securities Lending Income	$	46,592
Securities Lending Expenses:		
Borrower Rebates	$	(29,786)
Management Fees		(1,772)
Total Securities Lending Expenses	$	(31,558)
Net Income from Securities Lending	$	15,034
Total Net Investment Income	$	2,160,111
Other Income	$	2,581
Total Additions	$	2,953,494
Deductions		
Retirement Benefits Paid	$	1,818,814
Earnings Limitation Savings Account		1,937
Refunds of Contributions to Members		13,073
Administrative Expenses		15,673
Total Deductions	$	1,849,497
Net Increase	$	1,103,997
Net Position Restricted for Pensions		
Beginning of Year	$	21,258,090
End of Year	$	22,362,087

The accompanying notes are an integral part of this statement.

Notes to the Financial Statements

1. Description of TRA

A. Organization

The Teachers Retirement Association (TRA) is an administrator of a multiple employer, cost-sharing retirement fund. TRA administers a Basic Plan (without Social Security coverage) and a Coordinated Plan (coordinated with Social Security coverage) in accordance with Minnesota Statutes, Chapters 354 and 356. Assets of the fund may be used to pay benefits to both Basic and Coordinated members without legal restriction.

B. Participating Members and Employers

Teachers employed in Minnesota's public elementary and secondary schools, charter schools, and certain educational institutions maintained by the state (except those teachers employed by the city of St. Paul and by the University of Minnesota system) are required to be TRA members.

State university, community college, and technical college teachers first employed by Minnesota State may elect TRA coverage within one year of eligible employment. Alternatively, these teachers may elect coverage through the Defined Contribution Retirement Plan (DCR) administered by Minnesota State. A teacher employed by Minnesota State and electing coverage by DCR is not a member of TRA except for purposes of Social Security coverage.

A schedule of employer units and membership is presented in *Figure 1, Employer Units and Membership*.

Figure 1. Employer Units and Membership

Employer Units	
Independent school districts	374
Colleges and universities	39
State agencies	4
Charter schools	169
Professional organizations	4
Total Employer Units	590
Membership	
Retirees, disabilitants and beneficiaries receiving benefits	66,104
Terminated employees with deferred vested benefits	14,936
Total	81,040
Current employees	
Vested	65,694
Non-vested	16,801
Total	82,495

C. Benefit Provisions

TRA provides retirement benefits, as well as disability benefits to members and benefits to survivors upon the death of eligible members. All benefits vest after three years of eligible service credit. The defined retirement benefits are based on a member's highest average salary for any consecutive 60 months of formula service, age and years of formula service credit at termination of service. TRA members belong to either the Basic or Coordinated Plan.

Two methods are used to compute benefits for TRA's Coordinated and Basic Plan members. Members first employed **before July 1, 1989**, receive the greater of the Tier I or Tier II benefits as described:

Tier I	Step Rate Formula	Percentage
Basic	1st ten years of service	2.2 percent per year
	All years after	2.7 percent per year
Coordinated	1st ten years if service years are prior to July 1, 2006	1.2 percent per year
	1st ten years if service years are July 1, 2006 or after	1.4 percent per year
	All other years of service if service years are prior to July 1, 2006	1.7 percent per year
	All other years of service if service years are July 1, 2006 or after	1.9 percent per year

With these provisions:

(a) Normal retirement age is 65 with less than 30 years of allowable service and age 62 with 30 or more years of allowable service.

(b) 3 percent per year early retirement reduction for all years under normal retirement age.

(c) Unreduced benefits for early retirement under a Rule-of-90 (age plus allowable service equals 90 or more).

Or

Tier II Benefits

For years of service prior to July 1, 2006, a level formula of 1.7 percent per year for Coordinated plan members and 2.7 percent per year for Basic Plan members. For years of service July 1, 2006 and after, a level formula of 1.9 percent per year for Coordinated members and 2.7 for Basic members applies. An actuarial reduction is applied to members retiring prior to age 65. Members who reach age 62 with 30 years of service have a lower (more favorable to the member) reduction rate applied.

Members first employed **after June 30, 1989**, receive only the Tier II benefit calculation with a normal retirement age that is their retirement age for full Social Security retirement benefits, but not to exceed age 66.

Other

Former Minneapolis Teachers Retirement Fund Association (MTRFA) members with Basic Program eligibility retain the plan provisions of the Basic Program as defined in the MTRFA Articles of Incorporation and Bylaws as they existed at merger on June 30, 2006. Fifteen former MTRFA active and inactive members retain Basic Program coverage.

Former members of the Duluth Teachers Retirement Fund Association (DTRFA) retain the plan provisions as defined in the DTRFA Articles of Incorporation and Bylaws as they existed at merger on June 30, 2015.

The benefit provisions stated in the preceding paragraphs of this section are current provisions and apply to active plan participants. Vested, terminated members who are entitled to benefits, but are not yet receiving them, are bound by the provisions in effect at the time they last terminated their public service. Pension benefits are funded from member and employer contributions and income from investment of fund assets.

D. Reporting Entity

TRA functions as a statutory entity created by the Minnesota Laws of 1931, Chapter 406. The Association maintains rights to sue or be sued in its own name and to hold property in its own name. For financial reporting purposes, TRA is considered a pension trust fund of the State of Minnesota and is included in the State's Comprehensive Annual Financial Report with its fiduciary funds.

The State of Minnesota acts as a fiduciary and trustee of TRA's funds. The eight member Board of Trustees is defined by Minnesota Statute, section 354.06, and consists of four active member representatives, one retired member representative, and three statutory officials. The Board has significant independence in the operations and management of the Association, though the State Legislature actually determines the contribution rates for members and employers and sets benefits levels. The Board of Trustees is responsible for TRA's administration, but the State Board of Investment (SBI) is responsible for investing plan assets.

2. Summary of Significant Accounting Policies

A. Basis of Presentation and Basis of Accounting

The basis of presentation in preparing the TRA accompanying financial statements is performed in accordance with generally accepted accounting principles (GAAP). TRA adhered to accounting and financial reporting standards established by the Governmental Accounting Standards Board (GASB). GASB is the independent, not-for-profit, standards-setting organization and the official source of GAAP for state and local governmental entities in the United States of America. TRA's financial reporting is performed in accordance with the GASB requirements through Statement No. 82.

The basis of accounting indicates the timing of transactions or events for recognition in the financial statements. TRA's financial statements are prepared using the accrual basis of accounting. Employee contributions, employer contributions, and related receivables are recognized as revenues when due, pursuant to statutory requirements. Annuity benefits, refunds and expenses are recognized when due and payable in accordance with Minnesota Statute. Administrative and other expenses, and the associated liabilities, are recognized when the liability is incurred.

TRA implemented no changes in accounting principles during fiscal year 2018.

B. Cash, Cash Equivalents and Accounts Receivable

TRA's defined benefit retirement funds, cash and cash equivalents include cash on deposit in the state's treasury, commingled with other state funds, and short- term investments. Cash on deposit consists of year-end receipts not yet processed as of the investment cutoff on June 30. Short-term investments, which the Minnesota State Board of Investment (SBI) staff manages, include U.S. Treasury issues, repurchase agreements, banker's acceptances, commercial paper, and certificates of deposit.

Amounts classified as accounts receivable consist primarily of employee contributions and employer contributions, calculated as a percentage of each employee's salary. They are direct statutory payments from employers received after the fiscal year end on salaries earned prior to June 30, 2018. Under Minnesota Statutes, section 354.52, subdivision 4, TRA employers must remit contributions within 14 days after the member is paid. A Schedule of Accounts Receivable as of June 30, 2018, is presented in Figure 2, Schedule of Accounts Receivable.

Figure 2. Schedule of Accounts Receivable
Dollars in Thousands

Description	Amount
Member Contributions	$ 11,468
Employer Contributions	11,469
Direct Aid (State/City/School)	1,125
SBI	371
Interest on Investments	445
St. Cloud Office Reimbursement	3
Bond Interest	4
Total Receivables	$ 24,885

C. Investment Policies

The Minnesota State Board of Investment (SBI) is established by Article XI of the Minnesota Constitution to invest all state funds. The membership is made up of the Minnesota Governor (who is designated as chair of the Board), State Auditor, Secretary of State, and Attorney General. The legislature has also established a 17- member Investment Advisory Council (IAC) to advise the SBI and its staff on investment related matters. TRA's Executive Director is a permanent member of the IAC.

All investments undertaken by the SBI are governed by the prudent person rule and other standards codified in Minnesota Statutes, Chapter 11A and Chapter 356A.

Within the requirements defined by Minnesota Statutes, Section 11A.04, the SBI, with assistance of the SBI staff and the IAC, has the authority for establishing and amending investment policy for all funds under its control. The policy outlines the investment philosophy and guidelines within which the Combined Fund's investments will be managed. Studies that guide the ongoing management of the funds and are updated periodically.

The state's public retirement fund assets are commingled in various pooled investment accounts, commonly referred to as the Combined Funds, as established in Minnesota Statutes Section 11A.14. Each participating retirement fund owns an undivided participation in all of the assets of the Combined Funds' pooled investment accounts.

Description of Significant Investment Policy Changes During the Year

The SBI formally adopted a set of ten Investment Beliefs for managing the assets of the Combined Funds. Additionally, the SBI approved changes to the asset allocation policy and adopted a new Strategic Asset Category Framework. The investment policy changes were recommended by SBI staff, investments consultants, and the Investment Advisory Committee (IAC).

SBI Investment Beliefs

In September 2017, the State Board of Investment adopted a set of ten Investment Beliefs. The primary purpose of these beliefs is to guide the SBI toward sound principles related to investing on behalf of the Combined Funds. The beliefs help provide context for SBI's actions, reflect SBI's investment values, and acknowledge SBI's role in supporting the State's retirement systems. The ten SBI Investment Beliefs are:

1. The SBI is a long-term investor whose primary mission is to maintain the viability of the retirement systems it supports.
2. The SBI's strategic allocation policy is the primary determinant of the asset portfolio's long-term investment return and asset portfolio's risk.
3. While the SBI can sacrifice some short-term liquidity to pursue a greater long-term return, the investment portfolio's net cash flows and ability to pay benefits on a year-by-year basis are key risk considerations.
4. Diversification improves the risk-adjusted return profile of the SBI investment portfolio.
5. There are long-term benefits to SBI managing investment costs.
6. The equity risk premium is significantly positive over a long-term investment horizon although it can vary over time.
7. Private market investments have an illiquidity premium that the SBI can capture.
8. It is extremely challenging for a large institutional investor to add significant value over market-representative benchmarks, particularly in the highly- competitive public global equity markets.
9. The SBI benefits significantly when roles and levels of authority are clearly defined and followed.
10. Utilizing engagement initiatives to address economic, social, and governance-related issues can lead to positive portfolio and governance outcomes.

Strategic Asset Category Framework

In December 2017, the SBI approved a Strategic Asset Category Framework for the Combined Funds. The framework defined a broader array of asset classes and assigned asset classes to Strategic Allocation Categories. Using the Strategic Asset Category approach better defines the role that asset classes play in a portfolio, better identifies the relative risk levels of the asset classes, and allows the SBI to focus less on what they invest in, but why they invest in it.

The strategic allocation categories are as follows:

- Growth - Appreciation: This is the primary return- seeking category with the objective of generating long-term capital appreciation. Growth - Appreciation asset classes include U.S Equity, Non-U.S Developed Market Equity, Emerging Market Equity, Private Equity, and Non-Core Real Estate.
- Growth - Income Oriented: This category has attributes that include generating stable levels of current income and capital appreciation at

lower levels of risk than growth-appreciation assets. Asset classes in this category include Investment Grade Credit, Private Credit, Debt-Related Private Credit, Debt-Related Real Estate, and Global Diversified Credit.

- Real Return: The Real Return category provides diversification through investments in assets which have inflation-sensitive characteristics and the ability to hedge against inflation. This category has two subcategories: Real Assets are considered to be hard whereas Inflation Protection Assets are considered to be soft. Asset classes include Private and Public Real Assets, Core Real Estate, Treasury Inflation Protected Securities, and Inflation-Linked Bonds.
- Protection: The Protection category provides stability, protection during a crisis, and can act as a hedge against deflation. Asset classes include U.S. Treasuries and U.S. Government Bonds.
- Liquidity: This category provides liquidity to meet daily obligations, primarily benefit payments and capital commitment calls. Asset classes consist of cash and cash equivalents.
- Opportunity: The opportunity category's purpose is to allow for investment in new strategies that do not fit within clearly-defined asset class lines. Classes in this category include niche opportunities in multiple asset categories.

Additionally, the SBI approved ranges for adoption of the Strategic Allocation Category Framework, which are shown in *Figure 3* below. Due to the nature of the Opportunity allocation category, no specific target ranges are assigned. Private investments, which include private equity, real estate, resource funds, and yield-oriented investments, are limited to 30 percent of the total fund.

Figure 3: Strategic Allocation Framework

Strategic Allocation Category	Minimum Percent of Total Fund	Maximum Percent of Total Fund	Investments Percent of Total Fund
Growth - Appreciation	50%	75%	20%
Growth - Income Oriented	15	30	15
Real Return*	0	20	15
Protection	5	20	0
Liquidity	0	5	NA

**Real Return contains the Real Assets and Inflation Protection strategic allocation categories.*

Valuation of Investments

Investments in the Combined Funds are reported on a trade date basis and at fair value. Fair value is the proportionate share of the combined market value of the investment portfolio of the SBI investment pool in which the funds participate. All securities within the pools are valued at fair value except for U.S. government short-term securities and commercial paper, which are valued at fair value less accrued interest. Accrued interest is recognized as short-term income. The SBI values long-term fixed income securities by using various valuation systems which provide prices for both actively traded and privately placed bonds. For equity securities, the SBI uses various valuation services. Fair value is the last reported sales price for securities traded on national or international exchanges. If a security is not actively traded, then the fair value is based on the analysis of financial statements, analysis of future cash flows and independent appraisals.

Assumptions made in valuing securities are as follows:

- Values of actively traded securities determined by recognized exchanges are objectively negotiated purchase prices between willing buyers and sellers, and are not subject to either undue influence or market manipulation. Securities traded on a national or international exchange are valued using the last reported trade price.

- Values of securities not actively traded are determined by objective appraisals by qualified professional analysts whose results would not vary materially from those of other similarly qualified professionals. The fair value of investments is based upon valuations provided by a recognized pricing service. Short-term investments are reported at cost, which approximates fair value. The fair value of real estate investments is based on independent yearly appraisals. Investments that do not have an established market are reported at estimated fair value.

The term "market value" is used when describing asset valuation methods for actuarial purposes, and is used consistently throughout the Actuarial Section and in other places in the CAFR when referring to funded status. "Market value" is equivalent to "fair value."

Investment Income

Investment income is recognized as it is earned. Accrued investment income of the pooled investment accounts is included in participation in the accounts. Gains and losses on sales or exchanges are recognized on the transaction date.

Investment Expenses

For financial reporting purposes, the cost of security transactions is included in the transaction price. Investment expenses include administrative expenses of the SBI to manage the state's comprehensive investment portfolio and investment management fees paid to the external money managers and the state's master custodian for pension fund assets. These expenses are allocated proportionately to the funds participating in the pooled investment accounts. Details of these expenses are presented in the Schedule of Investment Management Fees (pages 69-70) found within the unaudited Investment Section of this comprehensive annual financial report. TRA's portion of the management fees totaled 21.9 million. A more detailed schedule of fees and commissions the SBI paid to brokerage firms, along with the number of shares traded, total commissions, commissions per share for the pooled investment accounts, and other investment information may be obtained from:

Minnesota State Board of Investment
Retirement Systems of Minnesota Building
60 Empire Drive, Suite 355
Saint Paul, Minnesota 55103

Asset Allocation

To match the long-term nature of pension obligations, the SBI maintains a strategic asset allocation for the Combined Funds that includes allocations to public equity (both domestic and international), fixed income, private markets, treasuries, and cash equivalents. The asset allocation through December 2017 is shown in *Figure 4.*

Figure 4. Asset Allocation for the Combined Funds (December 2017)

Asset Class	Target Allocation
Public Equity	58%
Domestic Equity	*39%*
International Equity	*19%*
Fixed Income	20%
Private Markets	20%
Cash	2%
Total	**100%**

During Fiscal Year 2018, the SBI made Board-approved changes to the asset allocation policy, resulting in the long-term asset allocation as shown in *Figure 5.*

Figure 5. Final Target Asset Allocation

Asset Class	Target Allocation
Public Equity	53%
Domestic Equity	*36%*
International Equity	*17%*
Fixed Income	20%
Private markets	25%
Cash	2%
Total	**100%**

The Executive Director of the SBI implemented the approved Board changes beginning in January 2018. The Private Markets allocation was increased from 20 percent to 25 percent. Until the allocation to Private Markets reaches its target of 25 percent, the uninvited portion of the allocation will continue to be invested in the Public Equity pool. In order to increase the Private Markets allocation, the Public Equities target allocation was reduced from 58 percent to 53 percent.

The Combined Funds Fixed Income allocation is undergoing a transition which may continue through the end of fiscal year 2019.

The target allocation for Fixed Income remains at 20 percent.

However, during the transitional period from January 1, 2018, through the end of fiscal year 2019, there may be combined asset classes (Treasuries , Core Fixed Income, or any new asset class which may be initiated during this period) which in total will be composed of fixed income investment instruments and may exceed 20 percent in aggregate. A new asset class called Treasuries was created which holds U.S. Treasury Bonds and has a current allocation of 8 percent. The fixed income asset classes will be drawn down through the end of fiscal year 2019 from the current allocations to a level where the aggregation of the fixed income investment asset classes will total 20 percent.

The SBI's long-term expected rate of return was determined using a building-block method. Best estimates of future real rates of return (expected returns, net of inflation) were developed for each asset class using both long-term historical returns and long-term capital market expectations from a number of investment management and consulting organizations. The asset class estimates and target allocations were then combined to produce a geometric, long-term expected real rate of return for the portfolio. This information is shown in *Figure 6.*

Figure 6: Transitional Asset Allocation and Long Term Expected Real Rate of Return

Asset Class	Allocation as of June 30, 2018	Final Target Allocation	Long-term Expected Real Rate of Return (Geometric Mean)
Domestic Equity *	33%	36%	5.10%
International Equity **	16	17	5.30
Fixed income ***	16	20	0.75
Treasuries	8	0	0.50
Private Markets ****	25	25	5.90
Cash	2	2	0.00
Total	100	100	

*Domestic Equity includes U.S. Stock Actively Managed and the U.S. Stock Index Fund.

**International Equity includes Broad International Stock Fund.

***Fixed income includes the Bond Pool. The final target allocation will combine Fixed Income and Treasuries.

****Private Markets includes the Alternative Investment Pool. If a 25 percent allocation cannot be achieved, the uncommitted allocation is invested in Domestic and International Equities.

The pooled accounts have not been rated for credit quality. *Figure 7*, TRA Investment Portfolio, provides a summary of the cost and fair values of the investments as of June 30, 2018, as reported on the Statement of Fiduciary Net Position.

Figure 7. TRA Investment Portfolio

Dollars in Thousands

TRA Investment Portfolio: June 30, 2018				
TRA Fund		**Cost**		**Fair Value**
Pooled Accounts				
Bond Pool	$	3,462,274	$	3,484,119
US Stock Index Pool		5,065,669		6,877,133
Broad International Stock Pool		3,495,101		4,268,602
Alternative Investment		2,919,950		3,072,614
Small Cap Active		650,118		774,496
Large Cap Active		1,863,631		1,575,935
Treasuries Pool		1,914,651		1,915,494
Total	$	19,371,394	$	21,968,393
Short-Term Cash Equivalents				
Money Market	$	254,114	$	254,437
CD Repo Pool		97,883		98,005
Total	$	351,997	$	352,442
Total Invested	$	19,723,391	$	22,320,835

Portfolio Rate of Return	5.05%
Inflation	2.25%
Nominal Rate of Return	7.30%

Included in the short-term investment category is a program managed by the SBI in which it purchases certificates of deposits (CD) in Minnesota financial institutions. The SBI receives a market rate of return on these investments. The CD investments are insured by the Federal Deposit Insurance Corporation.

Net investment income is summarized on the Statement of Changes in Fiduciary Net Position. The summarized amounts show net investment income of $2.16 billion for fiscal year 2018.

Annual money-weighted return on plan investments

For the year ended June 30, 2018, the annual money-weighted rate of return on the assets of the combined retirement fund, net of investment expense, was 10.485 percent (*Figure 8, 10-Year Schedule of Investment Returns using the Money-Weighted Method*). The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

Explanation of money-weighted return

The money-weighted rate of return is a method of calculating period-by-period returns on a pension plan investments that adjusts for the changing amounts actually invested. For purposes of GASB Statement 67, the money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

Figure 8. 10-Year Schedule of Investment Returns using the Money-Weighted Method

Year	Investment Return
FY2018	10.485%
FY2017	15.182%
FY2016	(0.118%)
FY2015	4.479%
FY2014	18.696%

Ten years are not available. Additional years will be provided when they become available.

D. Capital Assets

Capital assets are capitalized at the time of acquisition at cost. Assets with a cost in excess of $5,000 and internally generated software development costs in excess of $1,000,000 are capitalized.

Depreciation and amortization is computed on a straight-line method over the useful life of the related assets. The estimated useful lives by major category are: computer equipment (3 years), general office equipment (5 years), modular office furniture (10 years) and internally generated software (10 years).

Capital assets are presented on the June 30, 2018, Statement of Fiduciary Net Position. The year-end balance plus changes during the year are shown in *Figure 9, Schedule of Capital Assets*.

E. Accrued Compensated Absences

Employees of TRA accrue vacation leave, sick leave, and compensatory leave at various rates within limits specified in collective bargaining agreements. Accumulated amounts for compensated absences are accrued when incurred. Such leave is liquidated in cash primarily at the time of termination of employment. The total liability at June 30, 2018, is $885,351. Of this, $90,820 is considered a short-term liability and $794,531 is shown as a long-term liability on the Statement of Fiduciary Net Position. The total decreased by $47,666 during fiscal year 2018.

Figure 9. Schedule of Capital Assets

Dollars in Thousands

Description	Balance 7/01/2017	Additions	Deletions	Balance 6/30/2018
Furniture and equipment	$ 2,367	$ 968	$ (257)	$ 3,078
Reserve for depreciation	(2,180)	(210)	253	(2,137)
Internally developed software	20,116	-	-	20,116
Reserve for amortization	(3,505)	(2,012)	-	(5,517)
Net Capital Assets	$ 16,798	$ (1,254)	$ (4)	$ 15,540

3. Deposits and Investment Risk Disclosures

A. Fair Value Reporting

GASB Statement No. 72, Fair Value Measurement and Application, sets forth the framework for measuring the fair value of investments based on a hierarchy of valuation inputs. The hierarchy has three Levels:

Level 1: Market valuation approach using quoted prices (unadjusted) in active markets for identical assets or liabilities that the reporting entity can access at the measurement date.

Level 2: Market valuation approach using inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly or indirectly. Inputs for Level 2 include:

- Quoted prices for similar assets or liabilities in active markets;
- Quoted prices for identical or similar assets or liabilities in inactive markets;
- Inputs other than quoted prices that are observable for the asset or liability;
- Inputs derived principally from or corroborated by observable market data by correlation or other means.

Level 3: Unobservable inputs for the asset or liability. Unobservable inputs reflect the SBI's assumptions about the inputs that market participants would use in pricing an asset or liability. Assets classified as a Level 3 typically use the cost approach, income approach, or consensus pricing for a valuation technique.

Net Asset Value (NAV): Investments that do not have a readily determinable fair value are measured using the NAV per share (or its equivalent) as a practical expedient, and are not classified in the fair value hierarchy.

Cash and cash equivalents (investments with less than 12 months to maturity) are not leveled per GASB 72. All non-cash investments, including derivative investments that are not hedging derivatives, are required to be measured at fair value on a recurring basis. The SBI maintains investment pools that participants can invest in; participants own a proportionate share of the investment pools. The fair value of the investment pools is priced daily by the SBI custodian, when a daily price is available, by using independent pricing sources.

In *Figure 10, Fair Value of TRA Investments*, Level 3 investments primarily consist of assets where the asset is distressed, or there is not an active market. The fair values of the assets measured at NAV have been determined using the March 31, 2018 values adjusted for cash flows. The investments measured at NAV are typically not eligible for redemption. Distributions are received as underlying investments when the funds are liquidated, which occur over the life of the investment.

The SBI has 52 investments that are valued at NAV that are currently in the liquidation mode, totaling 3 percent of the NAV value. The majority of the remaining value of investments in liquidation mode will be returned to the SBI within a time period of three to five years. TRA has a total of $2,495,089,465 in unfunded commitments to the investments valued at NAV. Unfunded commitments are money that has been committed to an investment but not yet transferred to the General Partner (Investor).

Explanations of investment types follow *Figure 10, Fair Value of TRA Investments*.

Figure 10. Fair Value of TRA Investments
As of June 30, 2018
Dollars in Thousands

Investments	Fair Value	Level 1	Level 2	Level 3
Equity				
Common Stock	$ 12,494,935	$ 12,469,674	$ 23,877	$ 1,384
Real Estate Investment Trust	378,563	378,366	197	-
Other Equity	417,369	272,482	39,775	105,112
Equity Total	$ 13,290,867	$ 13,120,522	$ 63,849	$ 106,496
Fixed Income				
Asset-Backed Securities	$ 17,612	$ -	$ 17,612	$ -
Mortgage-Backed Securities	1,242,834	-	1,215,255	27,579
Corporate Bonds	1,203,120	-	1,197,765	5,355
Government Issues	2,827,680	-	2,827,680	-
Other Debt Instruments	307,849	-	296,517	11,332
Fixed Income Total	$ 5,599,095	$ -	$ 5,554,829	$ 44,266
Investment Derivatives				
Options	$ (55)	$ (55)	$ -	$ -
Derivative Total	$ (55)	$ (55)	$ -	$ -
Total Investments by Fair Value	$ 18,889,907	$ 13,120,467	$ 5,618,678	$ 150,762

Investments Measured at the Net Asset Value (NAV)

	NAV	Unfunded Commitments
Private Equity	$ 1,841,771	$ 1,657,874
Real Estate	222,149	263,080
Resource	686,632	298,174
Yield Oriented	277,220	275,962
NAV total	$ 3,027,772	$ 2,495,090

Note: *Cash, cash equivalents, and derivative futures (hedge type instruments) are not leveled under GASB Statement 72, so are not included in this figure. Any variance between recorded account balances and the fair value of investments as reported in the exhibit are accounts payable and accounts receivable items on June 30, 2018, and not leveled under GASB Statement No. 72.*

Investment types used in Figure 10:

Equity

Common Stock: Securities representing equity ownership in a corporation, providing voting rights, and entitling the holder to a share of the company's success through dividends and/or capital appreciation.

Real Estate Investment Trust (REIT): An investment pool established by a group of investors for the purpose of investing in real estate or mortgages. REITs are generally exempt from federal taxes, provided that 95 percent of earned income is distributed and that the various investors are not treated differently.

Other Equity: Includes Preferred Stock, Depository Receipts, Limited Partnership Units, Common Stock Units, and Mutual Funds.

Fixed Income

Asset Backed Securities: Bonds or notes backed by financial assets, including auto loans and credit card receivables.

Mortgage Backed Securities: An asset-backed security that is secured by a mortgage or collection of mortgages. The mortgages are sold to a government agency or investment bank that will package the loans together into a security that can be purchased by investors.

Corporate Bonds: Debt obligations issued by corporations as an alternative to offering equity ownership by issuing stock. Like most municipal bonds and Treasuries, most corporate bonds pay semi-annual interest and promise to return their principal when they mature. Maturities range from 1 to 30 years.

Government Issue: Securities or bonds issued by any of the fifty states, the territories and their subdivisions, counties, cities, towns, villages and school districts, agencies (such as authorities and special districts created by the states), and certain federally sponsored agencies such as local housing authorities.

Other Debt Instruments: Includes STIF (Short Term Investment Funds) type instruments.

Investment Derivatives

Options – Futures: A contract that gives the holder the right to buy from or sell to the writer a specified amount of securities at a specified price, good for a specified period of time.

Investments Measured at the Net Asset Value (NAV)

Private Equity: The private equity investment strategy is to establish and maintain a broadly diversified private equity portfolio composed of investments that provide diversification by industry type, stage of corporate development and location.

Real Estate: The real estate investment strategy calls for the establishment and maintenance of a broadly diversified real estate portfolio composed of investments that provide overall diversification by property type and location. The main components of this portfolio consist of investments in closed-end commingled funds. The remaining portion of the portfolio may include investments in less diversified, more focused (specialty) commingled funds and REITs.

Resource Funds: The strategy for resource investments is to establish and maintain a portfolio of resource investment vehicles that provide an inflation hedge and additional diversification. Resource investments will include oil and gas investments and energy service industry investments that are diversified by geographic area as well as by type.

Yield Oriented: The strategy for yield-oriented investments is to target funds that typically provide a current return and may have an equity component. Structures such as subordinated debt investments and mezzanine investments are typical yield-oriented investments.

B. Investment Risk

The Minnesota State Board of Investment (SBI) is responsible for the investing of TRA assets under the authority of Minnesota Statutes, section 11A.24. The following disclosures apply to TRA investments.

C. Custodial Credit Risk

Custodial credit risk for cash deposits and investments is the risk that, in the event of a bank or custodian failure, TRA will not be able to recover the value of its investments or collateral securities. Cash consists of year-end receipts not processed as of the investment cutoff deadline on June 30. TRA cash funds are held in the state treasury, commingled with other state funds. Minnesota Statute Sec. 9.031 requires that deposits be secured by depository insurance or a combination of depository insurance and collateral securities held in the state's name by an agent of the state. Such insurance and collateral shall be in amounts sufficient to ensure that deposits do not exceed 90 percent of the sum of the insured amount and the market value of the collateral. Throughout fiscal year 2018, the combined depository insurance and collateral was sufficient to meet legal requirements and secure all TRA deposits, eliminating exposure to custodial credit risk.

D. Credit Risk

Credit risk is the risk that an issuer or counterparty to an investment will be unable to fulfill its obligations. The State Board of Investment (SBI) has policies designed to minimize credit risk. They may invest funds in governmental obligations provided the issue is backed by the full faith and credit of the issuer or the issue is rated among the top four quality rating categories by a nationally recognized rating agency. They may invest funds in corporate obligations provided the issue is rated among the top four quality categories by a nationally recognized rating agency. They may also invest in unrated corporate obligations or in corporate obligations that are not rated among the top four quality categories provided that:

- The aggregate value of these obligations may not exceed 5 percent of the fund for which the state board is investing;
- Participation is limited to 50 percent of a single offering; and
- Participation is limited to 25 percent of an issuer's obligations.

SBI may also invest in bankers acceptances, deposit notes of U.S. banks, certificates of deposit, mortgage securities, and asset backed securities rated in the top four quality categories by a nationally recognized rating agency. Commercial paper must be rated in the top two categories.

As of June 30, 2018 TRA's proportionate share of the SBI's exposure to credit risk, based on the lower Standard and Poor's or Moody's Quality ratings for debt securities and short-term investments, is shown in *Figure 11*. For clarity of reporting, Moody's ratings are displayed in this figure using the comparable Standard and Poor's rating. If only one rating exists, that rating is used.

Figure 11. Credit Risk Exposure

Dollars in Thousands

Quality Rating	Fair Value
AAA	$ 210,064
AA	3,978,472
A	202,424
BBB	743,053
BB	336,256
B	21,885
CCC	8,925
CC	8,374
C	1,825
D	247
Unrated	597,797
U.S. Government	48,659
Total	$ 6,157,981

E. Concentration of Credit Risk

Concentration of credit risk is the risk of loss that may be attributed to the magnitude of an investment in a single issuer. SBI determines concentration of credit risk based on security identification number.

TRA does not have exposure to a single issuer that equals or exceeds five percent; therefore, there is no material concentration of credit risk.

F. Interest Rate Risk

Interest rate risk is the risk that changes in interest rates of debt instruments, which could adversely affect the fair value of an investment. The State Board of Investment controls interest rate risk through guidelines developed for each portfolio. TRA's share of the debt securities are held in external investment pools and have the weighted average maturities as shown in *Figure 12, Interest Rate Risk*.

Figure 12. Interest Rate Risk

Security Type	Weighted Average Maturity (in years)
Foreign Country Bonds	23.47
Municipal	18.14
U.S. Treasury	11.18
Corporate Debt	12.14
Yankee	11.95
Commercial Mortgage Backed Securities	3.28
Agency	6.09
Collateralized Mortgage Obligation	9.56
Mortgage Pass Through	6.62
Asset Backed	7.04
Cash Equivalent	0.34

G. Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates between the U.S. dollar and foreign currencies could adversely affect the fair value of an investment. Under SBI manager guidelines, approved by the Investment Advisory Committee (IAC) and SBI, each money manager may hedge foreign currency transactions at their own option. Government obligations, including guaranteed or insured issues of the International Bank for Reconstruction and Development, the Inter-American Development Bank, the Asian Development Bank, and the African Development Bank, must pay interest and principal in U.S. dollars. The principal and interest of obligations of corporations, including those corporations incorporated or organized under the laws of the Dominion of Canada or any province thereof must also be paid in U.S. dollars. TRA's share of investments as of June 30, 2018, was distributed among the currencies as shown in *Figure 13, Schedule of Foreign Currency Risk*.

Figure 13. Schedule of Foreign Currency Risk - Dollars in Thousands

Currency	Cash	Fixed Income or Debt	Equity	Total
Australian Dollar	$ 3,526	$ -	$ 192,920	$ 196,446
Brazilian Real	23	-	41,168	41,191
Canadian Dollar	3,887	100	282,541	286,528
Chilean Peso	29	-	7,367	7,396
Colombian Peso	-	-	2,948	2,948
Czech Koruna	-	-	5,086	5,086
Danish Krone	82	-	56,412	56,494
Egyptian Pound	1	-	1,509	1,510
Euro Currency	6,605	1,466	1,187,829	1,195,900
Hong Kong Dollar	1,249	-	301,748	302,997
Hungarian Forint	-	-	8,203	8,203
Indian Rupee	53	-	35,507	35,560
Indonesian Rupiah	30	-	21,310	21,340
Japanese Yen	4,550	1,707	676,217	682,474
Malaysian Ringgit	66	-	19,811	19,877
Mexican Peso	52	-	23,050	23,102
Moroccan Dirham	-	-	-	-
New Israeli Shekel	55	-	11,765	11,820
New Taiwan Dollar	701	-	94,072	94,773
New Zealand Dollar	285	-	6,556	6,841
Norwegian Krone	57	-	23,210	23,267
Philippine Peso	6	-	9,608	9,614
Polish Zloty	4	-	12,892	12,896
Pound Sterling	8,481	3,912	539,578	551,971
Qatari Rial	7	-	1,996	2,003
Singapore Dollar	874	-	44,097	44,971
South African Rand	48	-	49,681	49,729
South Korean Won	(72)*	-	127,513	127,441
Swedish Krona	114	-	70,841	70,955
Swiss Franc	8	-	210,015	210,023
Thailand Baht	21	-	13,773	13,794
Turkish Lira	2	-	7,283	7,285
UAE Dirham	15	-	2,395	2,410
Yuan Renminbi	88	-	1,576	1,664
Total	**$ 30,847**	**$ 7,185**	**$ 4,090,477**	**$ 4,128,509**

** Timing issues resulted in an overdrawn account and negative cash and cash equivalents.*

H. Derivative Financial Instruments

Governmental Accounting Standards Board (GASB) Statement 53 Disclosures

On behalf of TRA, SBI invests in various types of derivative financial instruments. Derivatives are financial instruments, the value of which are derived, in whole or in part, from the value of any one or more underlying securities or assets, or index of securities or assets.

Minnesota Statutes, section 11A.24, provides that any agreement for put and call options and futures contracts may only be entered into with a fully offsetting amount of cash or securities. This applies to foreign currency forward contracts used to offset the currency risk of a security. All other derivatives are exchange-traded. The purpose of the SBI's derivative activity is to equitize cash in the portfolio, to adjust the duration of the portfolio, or to offset current futures positions.

Explanations of each derivative instrument type are presented below. The fair value balances and notional amounts (or face value) at June 30, 2018, classified by derivative instrument type (e.g., futures, options, currency forwards, and stock warrants and rights), and the changes in fair value for fiscal year 2018 are shown in *Figure 14, Schedule of Derivative Financial Instruments*.

- **Futures** are contract commitments to purchase (asset) or sell (liability) at a future date. The net change in the values of futures contracts is settled on a regular basis and gains and losses are included in investment income.
- **Options** are contracts that give buyers or sellers the right to buy (calls) or sell (puts) a security at a predetermined price on a future date. Gains and losses result from variances in the market value of the security that is the subject of the contract that occur prior to or on the contract specified date. The gains and losses are included in investment income.
- **Currency Forward Contracts** are used to manage portfolio foreign currency risk. The provisions of the contract vary based on what is negotiated between the two parties.
- **Stock Warrants and Rights**, similar to options, are the right to purchase shares of a stock at a certain price by a certain date. They usually have a longer term before expiration, e.g., five years or more. When exercised, new shares are issued by the company. Rights are the same but are issued to current stock owners to enable them to retain their relative ownership share. Gains and losses from the sale or exercise of stock warrants and rights are included in investment income.

SBI is exposed to credit risk through multiple counterparties in foreign currency forward contracts that are used to offset the currency risk of a security. TRA's proportionate share of the maximum loss that SBI would have recognized as of June 30, 2018, if all counter parties failed to perform as contracted is $587,391. These counter parties have S&P ratings of BBB+ or better. There is no collateral held or any liabilities included in netting arrangements with those counterparties that would have reduced SBI's exposure to credit risk.

Figure 14. Schedule of Derivative Financial Instruments

Dollars in Thousands

Derivative Investment Type	Changes in Fair Value During FY 2018	Fair Value at June 30, 2018	Notional Amount
Futures			
Index Futures – Long	$ 24,341	$ -	$ 1,341
Index Futures – Short	$ (1,267)	$ -	$ (25)
Fixed Income Futures – Long	$ (5,100)	$ -	$ 1,033,108
Fixed Income Futures – Short	$ 8,228	$ -	$ (640,685)
Options			
Futures Options Bought	$ (1,909)	$ 272	$ 1,097
Futures Options Written	$ 1,441	$ (327)	$ (2,229)
Currency Forwards			
Foreign Currency Forwards	$ (2,499)	$ (376)	$ 182,810
Stock Warrants and Rights			
Stock Warrants	$ (501)	$ 23	$ 50
Stock Rights	$ 93	$ 227	$ 2,792

I. Securities Lending

Governmental Accounting Standards Board (GASB) Statement 28 Disclosures

TRA does not own specific securities, but instead owns shares in pooled funds invested by SBI. The SBI is authorized to use securities lending transactions in accordance with Minnesota Statutes, section 356A.06, subdivision 7, and has, pursuant to a Custodial Trust Agreement, authorized State Street Bank and Trust Company, Boston, Massachusetts, to act as agent in lending securities to approved borrowers.

During the fiscal year, State Street lent, at the direction of the SBI, certain securities held by State Street as custodian and received cash (United States and foreign currency) or other collateral including securities issued or guaranteed by the United States government. State Street did not have the ability to pledge or sell collateral securities absent a borrower default. Under Minnesota Statutes, section 11A.24, borrowers were required to deliver collateral for each loan in amounts at least equal to the market value of the loaned securities.

SBI did not impose any restrictions during the fiscal year on the amount of the loans that State Street made on its behalf. There were no failures by any borrowers to return loaned securities or pay distributions thereon during the fiscal year. Moreover, there were no losses during the fiscal year resulting from a default of the borrowers or State Street.

During the fiscal year, SBI and the borrowers maintained the right to terminate all securities lending transactions on demand. The cash collateral received on each loan was invested in a separate investment pool. As of June 30, 2018, such investment pool had an average duration of 14.42 days and an average weighted maturity of 99.84 days. Because the loans were terminable at will, their duration did not generally match the duration of the investments made with cash collateral. On June 30, 2018, SBI had no credit risk exposure to borrowers. TRA's portion of the market value of the collateral held and the fair value of securities on loan from SBI as of June 30, 2018, were $3,316,025,538 and $3,201,365,493 respectively. Cash collateral totaling $2,234,956,312 is reported on the Statement of Fiduciary Net Position as an asset. Liabilities resulting from these securities lending transactions are also reported on the Statement of Fiduciary Net Position.

4. Other Notes

A. Administrative Expenses and Budget

The annual budget of TRA operations is developed by TRA management and approved by the Board of Trustees. The budget is also sent to the Department of Minnesota Management & Budget for policy analysis and is included in the Governor's Biennial Budget presentation to the legislature. The legislature adopts appropriation and expenditure amounts resulting in an approved budget for the Association.

TRA administrative costs are not financed by any specific type of contribution or other income of the Fund. Administrative costs are budgeted in the annual determination of the actuarial required contribution rate (page 98, line B3).

B. Earnings Limitation Savings Account (ELSA)

Teachers under their Social Security normal retirement age who resume teaching service for a TRA-covered employer after retirement are subject to a $46,000 annual earnings limitation. If a retired member earns more than the limitation, the annuity payable during the following calendar year will be offset one dollar for each two dollars earned in excess of the limitation.

The pension offset amounts are redirected to a separate individual savings account, called the Earnings Limitation Savings Account (ELSA), and later distributed to the retiree. Effective January 1, 2011, ELSA accounts no longer accrue interest. A member may apply for a lump-sum payment or rollover of their ELSA account balance, as long as it has been at least one year after the last deferred amount was redirected to the ELSA account.

As of June 30, 2018, TRA had 295 retirees with an ELSA account established. The total of all ELSA account balances was $4.5 million. The dollar amount of pension benefits withheld due to excess earnings during fiscal year 2018 was $1,936,883. ELSA assets are invested in the TRA Fund until distribution. TRA distributed 151 ELSA refunds during fiscal year 2018. They totaled $2.02 million and are included as a deduction in the Statement of Changes in Fiduciary Net Position as a component of Refund of Contributions to Members.

C. Participating Pension Plan

All 90 employees of the Teachers Retirement Association are covered by the multiple employer cost sharing defined benefit plan administered by TRA. All TRA employees participate in the Coordinated Plan and are eligible for the plan provisions described in Note 1, C.

Minnesota Statutes section 354.42 sets the rates for the employee and employer contributions. These statutes are established and amended by the state legislature. During fiscal year 2018, Coordinated members were required to contribute 7.5 percent of their annual covered salary. Employers contributed 7.5 percent of their annual covered salary for Coordinated members. The total covered payroll salaries for all TRA employees during fiscal year 2018 was approximately $6.65 million or 0.14 percent of total membership-covered salaries. The total covered payroll salaries for the entire membership of TRA for fiscal year 2018 was approximately $4.83 billion. TRA paid 100 percent of its required employer contributions listed in *Figure 15*.

Figure 15. Schedule of TRA Employer Pension Contributions for TRA Employees

Dollars in Thousands

2018	2017	2016
$490	$347	$342

D. Ownership of Office Building

The 1999 Legislature enacted authorization permitting TRA, the Public Employees Retirement Association (PERA), and the Minnesota State Retirement System (MSRS) to purchase land and construct a 140,000 square foot office building to house the administrative offices of these three state entities. Ownership of the facility is prorated based on the amount of square footage each retirement fund occupies in the building. The building is located on 4.3 acres of land at 60 Empire Drive in Saint Paul. TRA has occupied the 4th Floor of the building since September 2001.

Effective July 1, 2015, TRA's ownership interest decreased from 36.7 percent to 36.0 percent.

In June 2000, the State of Minnesota, under the authority of the Commissioner of Minnesota Management and Budget, issued 30-year revenue bonds totaling $29 million to pay for the construction of the facility. Each owner (retirement fund) is responsible for principal and interest payments based on its ownership percentage.

In August, 2012, the bonds were refunded with the proceeds of a new, lower-interest rate bond issue. The 2013 series $21,880,000 Retirement System Revenue Refunding bonds are secured by the value of the total assets of the retirement systems, excluding any fund related to or dedicated to defined contribution plans administered by the retirement systems. The goal of the 2012 refunding bonds was not only to attempt to approximate the debt service payments that had existed under the 2000 revenue bonds, but to also shorten the repayment period by five years.

Through the issuance of the refunding bonds, which received a AAA rating from both Standard & Poor's and Fitch, the bond term was reduced by five years and the present value of the savings to the retirement systems was $9.58 million. The bonds mature on June 1, 2025. TRA's share of the present value savings of the 2012 bond issuance was approximately $3.51 million.

At fiscal year end, TRA's share of the bonds payable is $4,855,500, which includes bond principal of $4,325,400 and bond premium of $255,647. Interest expected to be paid over the remaining term of the bonds is $274,453. TRA's share of the long-term bond repayment schedule including interest is summarized in *Figure 16*, *Schedule of Building Debt Service Payments*.

TRA is depreciating its share of the facility over 40 years. The depreciation schedule, shown in *Figure 17, Schedule of Office Building and Equipment,* summarizes the asset valuation of the office building, building equipment and deferred bond charges.

Figure 16. Schedule of Building Debt Service Payments

Dollars in Thousands

(TRA Share @ 36.0%) Effective: July 1, 2015				
Fiscal Year	**Principal**	**Interest**	**Premium**	**Total**
2019	$ 634	$ 72	$ 49	$ 755
2020	642	61	47	750
2021	661	50	45	756
2022	675	40	43	758
2023	689	28	40	757
2024	664	17	24	705
2025	360	6	8	374
Totals	$ 4,325	$ 274	$ 256	$ 4,855

Figure 17. Schedule of Office Building and Equipment

Dollars in Thousands

(TRA Share @ 36.0%)				
Description	**Balance 7/01/2017**	**Additions**	**Deletions**	**Balance 6/30/2018**
Land	$ 171	$ -	$ -	$ 171
Building	10,637	-	$ -	10,637
Reserve for Building Depreciation	(4,397)	(266)	-	(4,663)
Net Building	$ 6,240	$ (266)	$ -	$ 6,145
Building Equipment	$ 108	$ -	$ -	$ 108
Reserve for Bld. Equip Deprec.	(97)	(11)	-	(108)
Net Building Equipment	$ 11	$ (11)	$ -	$ -

5. Contributions Required and Made

The TRA actuary performs an annual actuarial funding valuation in accordance with Minnesota Statute and the Minnesota Legislative Commission on Pensions and Retirement's (LCPR) *Standards for Actuarial Work*. The report is meant to assist the legislature in determining the funding progress made towards paying off TRA's unfunded liabilities.

Minnesota Statutes, Chapter 354 sets the rates (page 98, Line A4) for employee and employer contributions. TRA also uses the level percentage of payroll method to amortize the fund's unfunded liability over a closed period ending June 30, 2048.

Contributions totaling $788,865,468 ($374,549,890 employee and $414,315,578 employer and employer direct aid) were received in accordance with the statutory contribution rates and amounts. On page 98, Line C, statutory contributions are projected as insufficient to meet the actuarially determined required contributions. The deficiency is 1.08 percent of covered payroll. This translates into a contribution deficiency of about $55.97 million projected for fiscal year 2019.

The 2018 legislature approved contribution rate increases phased in over a six year period ending on July 1, 2023. When future scheduled increases in the Statutory Contribution Rate are considered, the Contribution Deficiency is eliminated which is expected to result in an improvement on the funded ratio over time, assuming all assumptions are met.

6. Net Pension Liability

TRA's actuarial consultant performs another actuarial valuation to comply with the requirements of GASB Statement 67.

The components of the net pension liability of the TRA plan as of June 30, 2018, are as follows for participating employers and nonemployers:

Net Pension Liability ***Dollars in Thousands***	
Total Pension Liability (TPL)	$ 28,643,023
Fiduciary Net Position (FNP)	$ 22,362,087
Net Pension Liability (NPL)	$ 6,280,936
Plan net position as a percentage of the total pension liability	78.07%

Key Methods and Assumptions Used in Valuation of Total Pension Liability	
Actuarial Information	
Price inflation	2.50 percent
Salary increases, including price inflation	2.85 to 8.85 percent for 10 years and 3.25 to 9.25 percent, thereafter
Wage growth rate	2.85 percent for 10 years and 3.25 percent, thereafter
Payroll growth rate	3.00 percent
Long-term rate of return, net of investment expense, including price inflation	7.50 percent
Municipal bond index rate	
Prior measurement date	3.56 percent
Measurement date	3.89 percent
Year FNP is projected to be deleted	N/A
Single equivalent interest rate, net of investment expense, including price inflation	
Prior measurement date	5.12 percent
Measurement date	7.50 percent

Cost of living adjustment	1.0% for January 2019 through January, 2023, then increasing by 0.1% each year up to 1.5% annually.
Mortality Assumptions Pre-retirement mortality rates were based on the RP-2014 white collar employee table, male rates set back 6 years and female rates set back 5 years. Generational projection uses the MP-2015 scale. Post-retirement mortality rates were based on the RP-2014 white collar annuitant table, male rates set back 3 years and female rates set back 3 years, with further adjustments of the rates. Generational projection uses the MP-2015 scale. Post-disability mortality rates were based on the RP-2014 disabled retiree mortality table, without adjustment.	

Discount Rate (SEIR) – volatility of SEIR

The discount rate used to measure the TPL as of the Measurement Date was 7.50 percent. The projection of cash flows used to determine the discount rate was performed in accordance with GASB 67. On that basis, the FNP was not projected to be depleted and, as a result, the Municipal Bond Index Rate was not used in the determination of the SEIR. The SEIR at the prior measurement date was 5.12 percent.

Projected Cash Flows

The projection of cash flows used to determine the discount rate assumed that plan contributions from members and employers will be made at the current contribution rates as set out in state statute and supplemental aid will be received as currently provided in statute.

- Employee contribution rates: 11.00% for Basic members and 7.50% for Coordinated members. Effective July 1, 2023, employee contribution rates will increase to 11.25% for Basic members and 7.75% for Coordinated members.
- Employer contribution rates: 11.71% for Basic members and 7.71% for Coordinated members. In addition, a supplemental amount equal to 3.64% of Salary for Special School District #1 members until the Fund is fully funded. Employer rates will increase by 0.21% per year until they reach 12.75% for Basic members and 8.75% for Coordinated members.
- Supplemental aid: $35,587,410 every year until the amortization date of June 30, 2048 or full actuarial funding is achieved.
- Administrative expenses in the prior year were projected forward with price inflation as an estimate for administrative expenses in current and future years. The portion of expenses in future years allocated to the current members was based on the proportionate share of covered payroll in each year for the remainder of the existing members to the total covered payroll for all members.

Based on those assumptions, the System's FNP was projected to be available to make all projected future benefit payments of current System members. Therefore, the long-term expected rate of return on System investments of 7.50% was applied to all periods of projected benefit payments to determine the TPL.

The FNP projections are based on TRA's financial status on the Measurement Date, the indicated set of methods and assumptions, and the requirements of GASB 67. As such, the FNP projections are not reflective of the cash flows and asset accumulations that would occur on an ongoing basis reflecting the impact of future members. Therefore, the results of this test do not necessarily indicate whether or not the TRA Fund will actually run out of money, the financial condition of the TRA Fund, or TRA's ability to make benefit payments in future years.

Long-Term Rate of Return

The long-term expected rate of return on pension plan investments is reviewed regularly as part of the experience study. An experience study of the economic assumptions was prepared in 2017 that resulted in a recommendation to reduce the long-term rate of return to 7.50 percent. Generally, several factors are considered in evaluating the long-term rate of return assumption including long-term historical data, estimates inherent in current market data, and an analysis in which best-estimate ranges of expected future real rates of return (expected returns, net of investment expense and inflation) were developed using assumptions for each major asset class, as well as estimates of variability and correlations, provided by the State Board of Investment. These ranges were combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and then adding expected inflation. The assumption is intended to be a long-term assumption (30 to 50 years) and is not expected to change absent a significant change in the asset allocation, a change in the inflation assumption, or a fundamental change in the market that alters expected returns in future years.

Municipal Bond Rate

A municipal bond rate was not used in determining the discount rate. If it were required, the rate would be 3.89% on the Measurement Date.

Periods of Projected Benefit Payments

Projected future benefit payments for all current plan members were projected through 2117.

Assumed Asset Allocation

The target asset allocation and best estimates of geometric real rates of return for each major asset class, as provided by the Minnesota State Board of Investment (SBI), are summarized in *Figure 6, Transitional Asset Allocation and Long Term Expected Real Rate of Return.*

Sensitivity Rate Analysis

GASB 67 requires disclosures of the sensitivity of the NPL to changes in the discount rate. The range is plus 1 and minus 1 percent of the current discount rate determined as summarized in *Figure 18, Sensitivity Rate Analysis.*

Figure 18. Sensitivity Rate Analysis.

Dollars in Thousands

Sensitivity of Net Pension Liability (NPL) to Changes in the Discount Rate			
	1% Decrease (6.50%)	Current Discount Rate (7.50%)	1% Increase (8.50%)
NPL	$ 9,967,820	$ 6,280,936	$ 3,239,281

The complete *2018 Actuarial Valuation Accounting Report* is available https://minnesotatra.org/financial/annual-reports/.

Required Supplementary Information

Schedule of Changes in the Employers' Net Pension Liability

For the Five Fiscal Years Ended June 30, 2018

Dollars in Thousands

	2018	2017	2016
Total Pension Liability			
Service cost	$ 1,056,681	$ 1,267,304	$ 438,938
Interest	2,064,148	1,975,771	2,062,775
Benefit term changes	(3,681,114)	-	-
Differences between expected and actual experience *	(17,461)	(167,572)	(798)
Assumptions changes **	(10,167,248)	(3,355,602)	15,871,845
Benefit payments, including member refunds	(1,831,887)	(1,776,814)	(1,728,023)
Net change in Total Pension Liability	($ 12,576,881)	($ 2,056,913)	$ 16,644,737
Total Pension Liability – beginning* **	$ 41,219,904	$ 43,276,817	$ 26,632,080
Total Pension Liability – ending (a)	$ 28,643,023	$ 41,219,904	$ 43,276,817
Employer contributions	$ 378,728	$ 367,791	$ 354,961
Non-employer contributions-Direct Aid (State/City/District)	35,587	35,587	35,587
Employee contributions	374,550	361,175	347,256
Net investment income	2,160,111	2,855,218	(23,672)
Benefit payments, including member refunds	(1,831,887)	(1,776,814)	(1,728,023)
Administrative expenses	(15,673)	(11,702)	(11,338)
Other	2,581	2,404	3,569
Net Change in Plan Fiduciary Net Position	$ 1,103,997	$ 1,833,659	$ (1,021,660)
Plan Fiduciary Net Position – beginning	$ 21,258,090	$ 19,424,431	$ 20,446,091
Plan Fiduciary Net Position - ending (b)	$ 21,362,087	$ 21,258,090	$ 19,424,431
Net Pension Liability - ending (a)-(b)	$ 6,280,936	$ 19,961,814	$ 23,852,386
Plan Fiduciary Net Position as a percentage of the Total Pension Liability	78.07%	51.57%	44.88%
Covered Payroll	$ 4,832,917	$ 4,688,875	$ 4,515,699
Employers' Net Pension Liability as a percentage of covered payroll	129.96%	425.73%	528.21%

** For 2017 and prior, includes impact of date change for expected increase in COLA to 2.50 percent.*

*** 2018 assumption changes are due to the change in the SEIR.*

**** 2015 beginning of period TPL and FNP do not match the 2014 end-of-period amounts due to the DTRFA merger.*

Note: *Schedule is intended to show 10-year trend. Additional years will be reported as they become available.*

Schedule of Changes in the Employers' Net Pension Liability

For the Five Fiscal Years Ended June 30, 2018

Dollars in Thousands

2015	2014
$ 399,228	$ 367,621
2,019,707	1,895,469
-	-
7,113	475,265
576,075	-
(1,669,607)	(1,592,686)
$ 1,332,516	$ 1,145,669
$ 25,299,564	$ 23,755,943
$ 26,632,080	$ 24,901,612
$ 340,208	$ 299,300
41,587	21,001
334,826	294,632
887,280	3,257,693
(1,669,607)	(1,592,686)
(11,509)	(9,430)
3,550	3,855
$ (73,665)	$ 2,274,365
$ 20,519,756	$ 18,019,319
$ 20,446,091	$ 20,293,684
$ 6,185,989	$ 4,607,928
76.77%	81.50%
$ 4,306,426	$ 4,056,482
143.65%	113.59%

Note: *Schedule is intended to show 10-year trend. Additional years will be reported as they become available.*

Schedule of Employer and Non-Employer Contributions

For the Ten Fiscal Years Ended June 30, 2018

Dollars in Thousands	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Actuarially determined employer contribution*	$ 516,157	$ 516,582	$ 459,699	$495,235	$ 492,731	$ 463,788	$ 401,725	$ 384,943	$ 421,813	$ 355,189
Actual non-employer contributions	$ 35,587	$ 35,587	$ 35,587	$ 41,587	$ 21,001	$ 19,954	$ 21,726	$ 21,510	$ 21,550	$ 20,448
Actual employer contributions	$ 378,728	$ 367,791	$ 354,961	$340,208	$ 299,300	$ 270,708	$ 244,935	$ 222,723	$ 220,538	$ 220,270
Total contributions	$ 414,315	$ 403,378	$ 390,548	$381,795	$ 320,301	$ 290,662	$ 266,661	$ 244,233	$ 242,088	$ 240,718
Annual contribution deficiency (excess)	$ 101,842	$ 113,204	$ 69,151	$113,440	$ 172,430	$ 173,126	$ 135,064	$ 140,710	$ 179,725	$ 114,471
Covered payroll	$4,832,917	$4,688,875	$4,515,699	$4,306,426	$4,056,482	$3,917,310	$3,871,809	$3,838,111	$3,787,757	$3,761,484
Actual contributions as a percent of covered-employee payroll	8.57%	8.60%	8.65%	8.87%	7.90%	7.42%	6.89%	6.36%	6.39%	6.40%

** The 2015 actuarially determined employer contribution includes the required amount for both DTRFA ($11,039) and TRA ($484,196).*

Schedule of Investment Returns

Annual money-weighted rates of return net of investment expense.

Teachers Retirement Association Plan – FY 2018	10.49%
Teachers Retirement Association Plan – FY 2017	15.18%
Teachers Retirement Association Plan – FY 2016	(0.12%)
Teachers Retirement Association Plan – FY 2015	4.48%
Teachers Retirement Association Plan – FY 2014	18.70%

Note: *Schedule is intended to show 10-year trend. Additional years will be reported as they become available.*

Notes to Required Supplementary Information for the Fiscal Year Ended June 30, 2018

Changes of Benefit and Funding Terms

The following changes were made by the Minnesota Legislature and reflected in the valuation performed as of July 1:

2018	The 2018 Omnibus Pension Bill contained a number of changes: • The COLA was reduced from 2.0% each January 1 to 1.0%, effective January 1, 2019. Beginning January 1, 2024, the COLA will increase 0.1% each year until reaching the ultimate rate of 1.5% in January 1, 2028. • Beginning July 1, 2024, eligibility for the first COLA changes to normal retirement age (age 65 to 66, depending on date of birth). However, members who retire under Rule of 90 and members who are at least age 62 with 30 years of service credit are exempt. • The COLA trigger provision, which would have increased the COLA to 2.5% if the funded ratio was at least 90% for two consecutive years, was eliminated. • Augmentation in the early retirement reduction factors is phased out over a five-year period beginning July 1, 2019 and ending June 30, 2024 (this reduces early retirement benefits). Members who retire and are at least age 62 with 30 years of service are exempt. • Augmentation on deferred benefits will be reduced to zero percent beginning July 1, 2019. Interest payable on refunds to members was reduced from 4.0% to 3.0%, effective July 1, 2018. Interest due on payments and purchases from members, employers is reduced from 8.5% to 7.5%, effective July 1, 2018. • The employer contribution rate is increased each July 1 over the next 6 years, (7.71% in 2018, 7.92% in 2019, 8.13% in 2020, 8.34% in 2021, 8.55% in 2022, and 8.75% in 2023). In addition, the employee contribution rate will increase from 7.50% to 7.75% on July 1, 2023. The state provides funding for the higher employer contribution rate through an adjustment in the school aid formula.
2017	None
2016	None
2015	The Duluth Teachers Retirement Fund Association was merged into TRA on June 30, 2015. This resulted in an additional state-provided contribution stream of $14.377 million until TRA becomes fully funded.
2014	The increase in the post-retirement benefit adjustment will be made once the fund is 90 percent funded for two consecutive years, rather than just one year. Legislation provided for the merger of the Duluth Teachers Retirement Fund Association into TRA. The merger will not occur until June 30, 2015, so it had no impact on the July 1, 2014, valuation results.
2013	The early retirement reduction factors applicable for Level formula benefits to plan members were changed.

2010	The post-retirement benefit increases were suspended for 2011 and 2012, resuming in 2013 at 2.0 percent, and returning to 2.5 percent once the funding ratio of the plan reaches 90 percent. Also in 2010, changes were made to the interest rate credited on employee contributions, future increases on deferred vested benefits, and the requirement to receive a full post-retirement benefit adjustment. In addition, employee and employer contribution rates were increased 0.50 percent per year beginning July 1, 2011, through July 1, 2014. The legislation also created the "stabilizer," whereby the Board was also granted authority to adjust contribution rates under certain circumstances.

Changes in Actuarial Assumptions

7/1/2018 Valuation	• The investment return assumption was changed from 8.50% to 7.50%. • The price inflation assumption was lowered from 3.00% to 2.50%. • The payroll growth assumption was lowered from 3.50% to 3.00%. • The wage inflation assumption (above price inflation) was reduced from 0.75% to 0.35% for the next 10 years, and 0.75% thereafter. • The total salary increase assumption was adjusted by the wage inflation change. • The amortization date for the funding of the Unfunded Actuarial Accrued Liability (UAAL) was reset to June 30, 2048 (30 years). • A mechanism in the law that provided the TRA Board with some authority to set contribution rates was eliminated. Note: Most of these changes were made previously for GASB purposes in the 2017 GASB valuation
7/1/2017 Valuation	The Cost of Living Adjustment was assumed to increase from 2.0 percent annually to 2.5 percent annually on July 1, 2045. Adjustments were made to the combined service annuity loads. The active load was reduced from 1.4 percent to 0.0 percent, the vested inactive load increased from 4.0 percent to 7.0 percent and the non-vested inactive load increased from 4.0 percent to 9.0 percent. For GASB valuation: • The investment return assumption was changed from 8.00 percent to 7.50 percent. • The COLA was not assumed to increase to 2.5 percent, but remain at 2.0 percent for all future years. • The price inflation assumption was lowered from 2.75 percent to 2.50 percent. • The payroll growth assumption was lowered from 3.50 percent to 3.00 percent. • The general wage growth assumption was lowered from 3.50 percent to 2.85 percent for 10 years followed by 3.25 percent, thereafter. • The salary increase assumption was adjusted to reflect the changes in the general wage growth assumption.

7/1/2016 Valuation	The Cost of Living Adjustment was not assumed to increase for funding or GASB calculation (it remained at 2.0 percent for all future years). The price inflation assumption was lowered from 3.00 percent to 2.75 percent. The general wage growth and payroll growth assumptions were lowered from 3.75 percent to 3.50 percent. Minor changes as some durations for the merit scale of the salary increase assumption. The pre-retirement mortality assumption was changed to the RP-2014 white collar employee table, male rates set back 6 years and female rates set back 5 years. Generational projection uses the MP-2015 scale. The post-retirement mortality assumption was changed to the RP-2014 white collar annuitant table, male rates set back 3 years and female rates set back 3 years, with further adjustments of the rates. Generational projection uses the MP-2015 scale. The post-disability mortality assumption was changed to the RP-2014 disabled retiree mortality table, without adjustment. Separate retirement assumptions for members hired before or after July 1, 1989, were created to better reflect each group's behavior in light of different requirement for retirement eligibility. Assumed termination rates were changed to be based solely on years of service in order to better fit the observed experience. A minor adjustment and simplification of the assumption regarding the election of optional form of annuity payment at retirement were made.
7/1/2015 Valuation	The cost-of-living (COLA) adjustment was assumed to increase from 2.0 percent annually to 2.5 percent annually on July 1, 2037, for funding calculations. The COLA was not assumed to increase for GASB calculations. The investment return assumption was changed from 8.25 percent to 8.00 percent.
7/1/2014 Valuation	Post-retirement benefit adjustments are now assumed to increase from 2.0 percent annually to 2.5 percent annually once the legally specified criteria are met. This is estimated to occur July 1, 2034 for GASB calculations and July 1, 2031 for funding calculations.
7/1/2012 Valuation	The investment return assumption was changed from 8.5 percent for all years to 8.0 percent for the next five years and 8.5 percent thereafter. This applies to funding calculations only.
7/1/2011 Valuation	The salary increase assumption was changed to a service based assumption. The payroll growth assumption was decreased from 4.00 percent to 3.75 percent. The post-retirement mortality assumption was changed to the RP-2000 Mortality Tables, with white-collar adjustments and male rates set back two years and female rates set back three years. The disabled mortality assumption was changed to the RP-2000 Disabled Retiree Mortality Tables. Assumed disability rates were changed to more closely reflect actual experience. Assumed retirement rates for Coordinated members were changed to more closely reflect

	actual experience. Assumed form of annuity selection was changed to more closely reflect actual experience. Assumed difference in ages between spouses was changed to more closely reflect actual experience.
7/1/2008 Valuation	Ultimate salary increase rates were lowered. The payroll growth assumption was lowered. Retirement rates were revised.

Method and Assumptions Used in Calculations of Actuarially Determined Contributions

TRA is funded with contributions from members and their employers. The actuarially determined contributions in the *Schedule of Employer and Non-Employer Contributions* on page 49 are calculated as of the beginning of the fiscal year in which contributions were reported.

The following methods and assumptions were used to calculate the actuarially determined employer contributions reported for the most recent Measurement Date, June 30, 2018, based on the July 1, 2017 valuation).

Actuarial cost method	Entry Age Normal
Amortization method	Level percentage of payroll, closed
Remaining amortization period	22 years
Asset valuation method	5-year moving average
Inflation	2.75 percent
Wage growth rate	3.50 percent
Salary increase, including inflation	3.50 to 9.50 percent
Long-term rate of return, net of investment expense including price inflation	8.50 percent
Cost of living adjustment	2.00 percent per year, increasing to 2.50 percent on July 1, 2045

Please see the information presented earlier for detailed information on the benefit changes and assumption changes that may have impacted the Actuarially Determined Contributions shown in the *Schedule of Employer and Non-Employer Contributions* on page 49.

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Supporting Schedules to Financial Section

Teachers Retirement Fund
Schedule of Administrative Expenses

For the Fiscal Year Ended June 30, 2018

Dollars in Thousands

Personnel Services		
Salaries	$	6,648
Employer contributions to Teachers Retirement Association		490
Employer contributions to Social Security		480
Insurance contributions		1,337
Employee training		82
Workers' compensation		5
Subtotal	$	9,042
Communication		
Duplicating and printing expenses	$	96
Postage		189
Telephone		82
Subtotal	$	367
Office Building Maintenance		
Lease of office and storage space	$	185
Building operating expenses		555
Rental of office machines/furnishings		87
Repairs and maintenance		384
Building equipment depreciation		11
Building depreciation		266
Bond interest expense		81
Subtotal	$	1,569
Professional Services		
Actuarial services	$	186
Audit fees		150
Legal fees		40
Management consultant services		48
Medical services		22
Subtotal	$	446
Other Operating Expenses		
Computer and system services	$	1,770
Department head expenses		2
Depreciation of office equipment		210
Dues and subscriptions		26
Insurance expense		5
Miscellaneous administrative expenses		88
Amortization		2,012
State indirect costs		39
Office supplies		42
Travel - director and staff		97
Travel - trustees		17
(Gain)/Loss on disposal of assets		(59)
Subtotal	$	4,249
Total Administrative Expenses	$	15,673

Teachers Retirement Fund
Schedule of Professional Consultant Expenses

For the Fiscal Year Ended June 30, 2018

Dollars in Thousands

Investment Pool Managers		
State Board of Investment	$	1,161
Aon Hewitt Investment Consulting, Inc.		168
Pension Consultants		94
QED		101
Domestic equity pool managers		6,906
Global equity pool managers		10,103
Domestic bond pool managers		3,395
Semi-passive equity pool managers		804
Passive equity pool managers		338
Treasury protection pool managers		378
Total investment pool managers	$	23,448
Actuarial		
Cavanaugh Macdonald Consulting	$	186
Total Actuarial Expenses	$	186
Audit		
Legislative auditor	$	74
State auditor		76
Total audit expenses	$	150
Computer Support Services		
Fulcrum Consulting	$	375
International Projects Consultancy		312
SDK Software		64
Talent Software		168
Sogheti USA		53
Hollstadt & Associate		64
Total computer support service expenses	$	1,036
Legal		
Attorney General	$	40
Total legal expenses	$	40
Management Consulting		
Rajan Law	$	5
Minnesota Budget and Management		41
Kirby Kennedy & Associates		2
Total management consulting expenses	$	48
Medical		
Examworks Inc.	$	22
Total medical expenses	$	22
Total Consultant Expenditures	$	24,930

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Teachers Retirement Association of Minnesota
A Pension Trust Fund of the State of Minnesota

Investments

State Board of Investment Letter

MINNESOTA STATE BOARD OF INVESTMENT

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INVESTMENT AUTHORITY

The assets of the Minnesota Teachers Retirement Association (TRA) are invested along with the assets of the Minnesota Public Employees Retirement Association and the Minnesota State Retirement System under the direction and authority of the State Board of Investment (SBI) in accordance with Minnesota Statutes, Chapters 11A and 356A. The SBI includes Minnesota's governor, auditor, secretary of state and attorney general. The Legislature has established a 17-member Investment Advisory Council (IAC) to advise the SBI and its staff on investment related matters. TRA's executive director is a member of the IAC.

INVESTMENT POLICY

Investment policy states that the SBI will operate within standard investment practices of the prudent person. The SBI is to "exercise that degree of judgment and care, under circumstances then prevailing, which persons of prudence, discretion, and intelligence exercise in the management of their own affairs, not for speculation, but for investment, considering the probable safety of their capital as well as the probable income to be derived therefrom." (See M.S., section 11A.09.) The SBI is authorized to own government obligations, corporate obligations, various short-term obligations, corporate stocks, venture capital interests, resource investments, and real estate interests subject to specific constraints. (See M.S., section 11A.24.) In particular, pension fund assets are to be invested for the exclusive benefit of the members of the fund.

INVESTMENT OBJECTIVES AND PERFORMANCE

TRA's pension contributions from employees and employers are invested in the Combined Funds. The Combined Funds include the assets of active and retired public employees who participate in the defined benefit plans administered by TRA, the Minnesota State Retirement System, and the Public Employees Retirement Association. TRA does not own any underlying assets, but instead owns a participation in the pooled Combined Funds. Because these assets normally accumulate for thirty to forty years, SBI's objective is to take advantage of the long investment time horizon offered by equities and alternative assets in order to meet its actuarial return target and ensure that sufficient funds are available to finance promised benefits at the time of retirement. The 2018 Legislature reduced the actuarial interest rate assumption for TRA to 7.5%.

The long term objectives of the Combined Funds are:

- Provide returns that are 3-5 percentage points greater than inflation over the latest 20-year period; and

- Outperform a composite market index weighted in a manner that reflects the actual asset mix of the Combined Funds over the latest 10-year period.

Consistent with these objectives, the SBI maintains a long-term asset allocation for the Combined Funds as follows:

- Public Equity 53%
- Domestic Bonds 20%
- Private Markets 25%
- Cash 2%

Based on values on June 30, 2018, the Combined Funds returned 4.6 percentage points above the CPI over the last 20 years and returned 0.4 percentage point above the composite index over the past 10 years. Investment returns ranked in the 8th percentile over the past five years and in the 8th percentile over the past 10 years, compared to similar funds in the Trust Universe Comparison Service.

INVESTMENT PRESENTATION

Investment returns were prepared using time-weighted rate of return methodology based upon fair market value, net of investment expenses.

Respectfully submitted,

Mansco Perry III
Executive Director
Minnesota State Board of Investment
November 26, 2018

Investment Summary

Prepared by TRA management with data obtained from the State Board of Investment's Fiscal Year 2018 Quarterly Investment Reports

The assets of the Minnesota Teachers Retirement Association (TRA) are invested under the direction and authority of the State Board of Investment (SBI). The investment portfolio of TRA had a fair value of approximately $22.3 billion as of June 30, 2018.
The four-member SBI Board consists of Governor Mark Dayton (Chair), Attorney General Lori Swanson, Secretary of State Steve Simon, and State Auditor Rebecca Otto.

The Legislature has established a 17-member Investment Advisory Council (IAC) to advise the SBI and its staff on investment-related matters.

- The mission statement of the Investment Advisory Council is: The IAC fulfills its statutory duty to the SBI by providing advice and independent due diligence review of the investment policy and implementation recommendations that guide the SBI's investment of assets.
- SBI appoints ten members experienced in finance and investment. These members traditionally have come from the Minneapolis and Saint Paul pension, foundation, and endowment investment community.
- The Commissioner of Minnesota Management and Budget (MMB) and the executive directors of TRA, the Minnesota State Retirement System and the Public Employees Retirement Association are permanent members of the Council.
- Two active employee representatives and one retiree representative are appointed to the Council by the Governor.
- All proposed investment policies are reviewed by the full Council before they are presented to SBI for action.

Investment Advisory Council

As of December 2018

Gary Martin, Chair
Chief Investment Officer
Macalester College

Kim Faust, Vice Chair
Vice President and Treasurer
Fairview Health Services

Denise Anderson
Governor's Appointee
Active Employee Rep.

Doug Anderson
Executive Director
Public Employees Retirement Association

Kerry Brick
Manager, Pension Investments
Cargill, Inc.

Dennis Duerst
Director, Benefit Funds Investment
3M Company

Myron Frans
Commissioner
Minnesota Management & Budget

Susanna Gibbons
Director
Carlson School Fixed Income Fund

Morris Goodwin, Jr.
Senior Vice President and CFO
American Public Media Group

Erin Leonard
Executive Director
MN State Retirement System

Malcolm W. McDonald
Director and Corporate Secretary (Retired)
Space Center, Inc.

Carol Peterfeso
Chief Treasury and Investment Officer
University of St. Thomas

Jay Stoffel
Executive Director
Teachers Retirement Association

Shawn Wischmeier
Chief Investment Officer
Margaret A. Cargill Philanthropies

3 Vacancies

Aon Hewitt Investment Consulting, Inc., of Chicago is general consultant to the SBI. Pension Consulting Alliance of Studio City, California, serves as a special project consultant. Investment performance methodology is reported in compliance with the mandatory requirements of the Chartered Financial Analyst (CFA) Institute. All investments made by SBI are governed by the prudent person rule and other standards codified in Minnesota Statutes, Chapters 11A and 356.

Combined Retirement Funds

Investment Objectives

All TRA assets are accounted for within the Combined Funds managed by the Minnesota State Board of Investment (SBI). The Combined Funds consist not only of the TRA Fund, but also the assets of the Public Employees Retirement Association (PERA) and the Minnesota State Retirement System (MSRS). The SBI has one primary responsibility with respect to its management of the Combined Funds: to ensure that sufficient funds are available to finance pension benefits at the time of retirement. All assets in the Combined Funds, including TRA, are managed externally by outside money management firms retained by contract.

The Combined Funds include the pension contributions of most Minnesota public employees, including TRA members, during their working years. Employee and employer contribution rates are specified in state law as a percentage of an employee's salary. The rates are set so that contributions plus expected investment earnings cover the projected cost of promised pension benefits. In order to meet these projected pension costs, the Combined Funds need to generate annual investment returns of at least 7.5 percent, as specified in Minnesota statute.

While an active member is working, employee and employer contributions are placed into the TRA Fund. The pre-funding of future pension benefits provides the SBI with a long investment time horizon to take advantage of long run return opportunities offered by equities and other investments, in order to meet its actuarial return target.

SBI measures the performance of the Combined Funds relative to a composite of market indices that is weighted in a manner that reflects their long-term asset allocation policy. The Combined Funds are expected to match or exceed the composite index over a ten-year period. The Combined Funds are also expected to generate returns 3 to 5 percentage points greater than inflation over the latest 20-year period. Investment returns are prepared using a time-weighted rate of return methodology, based upon fair value, net of investment expenses. Performance is measured net of all fees and costs to ensure that SBI's focus is on the Combined Funds' true net return.

Asset Allocation

The allocation of assets among equities, fixed income (bonds) and alternative investments can have a dramatic impact on investment results. In fact, asset allocation decisions overwhelm the impact of individual security selection within a total portfolio. Consequently, SBI focuses considerable attention on the selection of an appropriate long-term asset allocation policy for the Combined Funds.

Changes Made During Fiscal Year 2018

The SBI formally adopted a set of ten Investment Beliefs for managing the assets of the Combined Funds. Additionally, the SBI approved changes to the asset allocation policy and adopted a new Strategic Allocation Category Framework. The investment policy changes were recommended by SBI staff, investment consultants, and the Investment Advisory Committee (IAC).

Each of these policy changes are described in more detail in the Notes to the Financial Statements (page 24).

Total Return Vehicles

SBI invested the majority of the Combined Funds' assets in common stocks (both domestic and international equities) and other equity investments. A large allocation is consistent with the long investment time horizon of the Combined Funds and the advantageous long-term risk-return characteristics of common stocks. Including international equities in the asset mix allowed SBI to diversify its holdings across world markets, offered the opportunity to enhance returns and reduced the risk/volatility of the total portfolio. The rationale underlying the inclusion of private equity alternative assets (e.g., venture capital) is similar.

SBI recognized that this sizable policy allocation to common stock and private equity likely produced more volatile portfolio returns than a more conservative policy focused on fixed income securities. It is understood that this policy may result in quarters or even years of disappointing results. Nevertheless, the long run return benefits of this policy are expected to compensate for the additional volatility.

Diversification Vehicles

Other asset classes are included in the Combined Funds to provide some insulation against highly inflationary or deflationary environments. The classes also diversify the portfolio sufficiently to avoid excessive return volatility.

Real estate and real assets (oil and gas) investments provide an inflation hedge that other financial assets do not offer. Under more normal financial conditions, such as low to moderate inflation, the returns on these assets are not highly correlated with common stocks. As a result, their inclusion in the Combined Funds serves to dampen return volatility.

Private credit investments provide the opportunity for higher long-term returns than those typically available from bonds yet still generate sufficient current income. Typically, these investments, including subordinated debt, mezzanine or resource income investments such as income-producing properties, are structured more like fixed income securities with the opportunity to participate in the appreciation of the underlying assets. While these investments may have an equity component, they display a return pattern more like a bond. As such, they help reduce the volatility of the total portfolio, while generating higher returns relative to more traditional bond investments.

The allocation to fixed income (bonds) act as a hedge against a deflationary economic environment. In the event of a major deflation, high-quality fixed income assets, particularly long-term bonds, are expected to protect principal and generate significant capital gains. And, like real estate and real assets, under normal financial conditions, bonds help diversify the Combined Funds and thereby control return volatility.

Rate of Return Results

The Combined Funds produced a total rate of return of 10.3 percent for fiscal year 2018. Over the last five years, the Combined Funds generated an annualized return of 9.5 percent.

As stated earlier, the Combined Funds are expected to exceed the return of a composite of market indices over a ten-year period. Performance relative to this standard measured two effects:

- The ability of the investment managers selected by SBI, in aggregate, to add value to the returns available from the broad capital markets.
- The impact of SBI's rebalancing activity. (SBI rebalances the total fund when market movements take the stock or bond segments measurably above or below their long-term asset allocation targets. The policy imposes a low risk, buy low sell high discipline among asset classes on a total fund basis.)

Combined Funds Performance vs. Composite Index

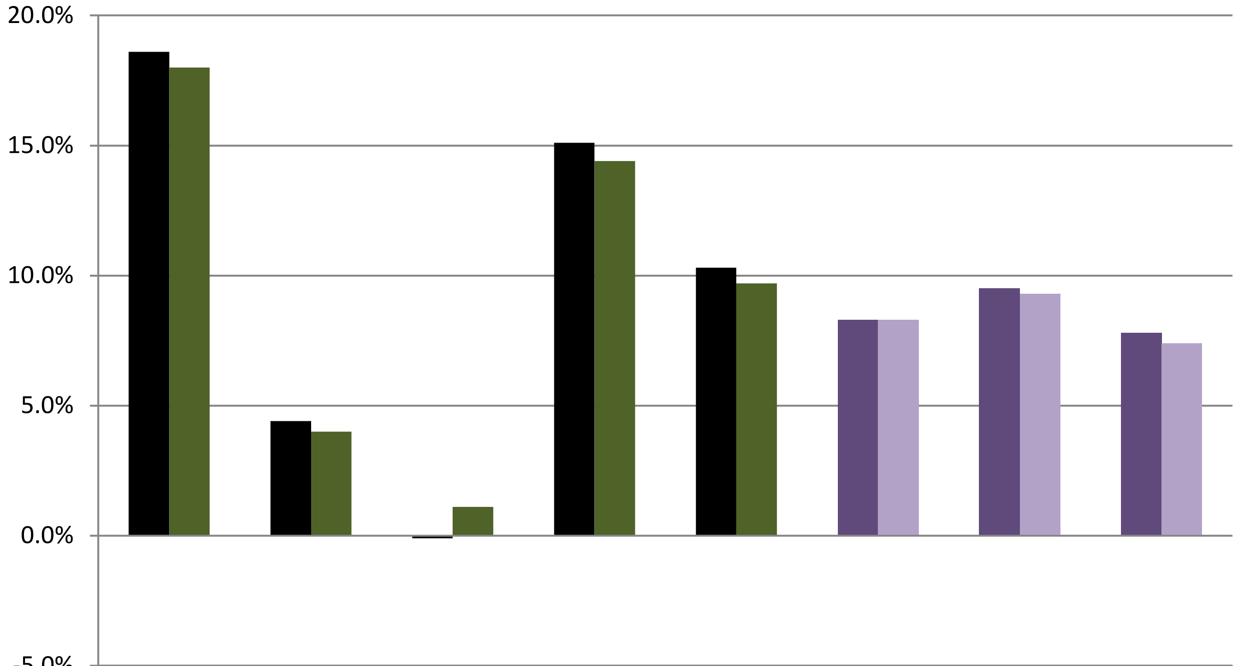
The investment return for the Combined Funds for the fiscal year ended June 30, 2018 was 10.3 percent. For the ten-year period ending June 30, 2018, the Combined Funds returned 7.8 percent and exceeded the composite index investment performance by 0.4 percent annualized. The Funds exceeded the composite index over the last five years by 0.2 percent annualized, and outperformed the index over the most recent fiscal year by 0.6 percentage points. Actual returns relative to the total fund composite index over the last five years are shown in the graph on the following page.

Combined Funds

Investment Performance

Combined Funds Performance vs. Composite Index (Past Five Fiscal Years)

Fiscal Year Ended June 30, 2018



	2014	2015	2016	2017	2018	3 Yr.	5 Yr.	10 Yr.
Combined Funds	18.6%	4.4%	-0.1%	15.1%	10.3%	8.3%	9.5%	7.8%
Composite Index	18.0%	4.0%	1.1%	14.4%	9.7%	8.3%	9.3%	7.4%

All investment performance methodology is reported in compliance with the mandatory requirements of the Chartered Financial Analyst (CFA) Institute. Investment returns are prepared using a time-weighted rate of return methodology, based on fair value, net of investment expense.

Combined Funds
Performance of Asset Pools (Net of Fees)

June 30, 2018

Rates of Return (Annualized)

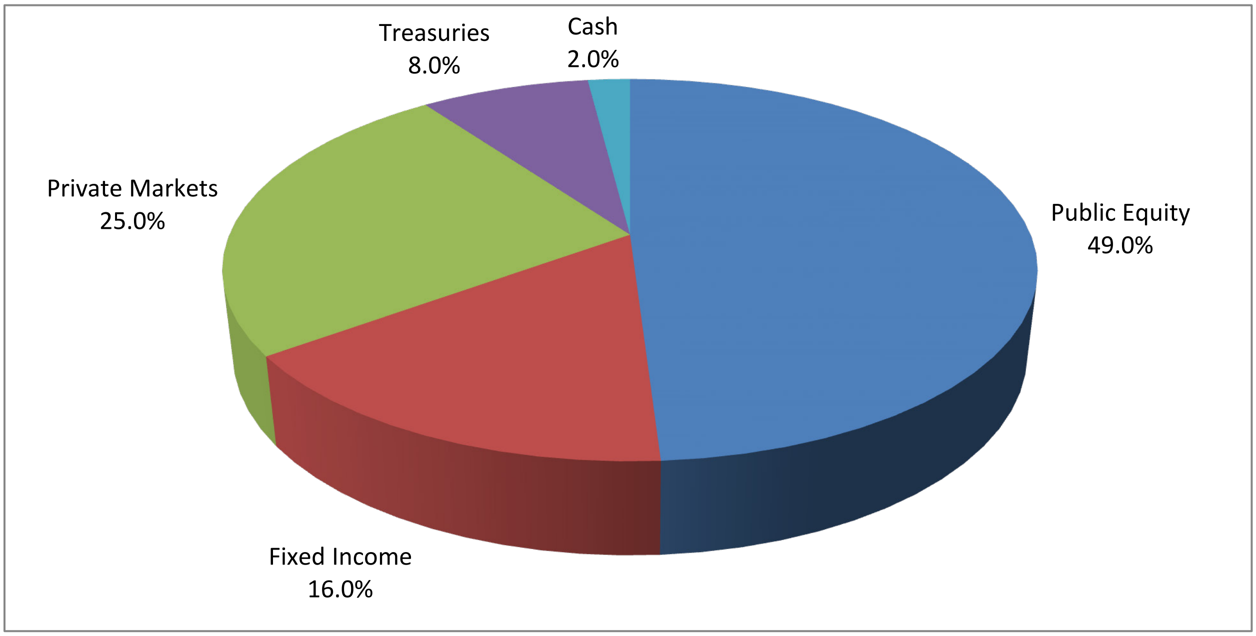
	1 Year %	3 Year %	5 Year %	10 Year %	20 Year %	30 Year %
Public equity	12.8	9.7	11.5	8.4	6.2	9.5
Public equity benchmark	12.3					
Excess	0.5					
Domestic equity	15.4	11.3	13.3	10.2	6.5	9.9
Domestic equity benchmark	14.8	11.6	13.3	10.2	6.6	10.1
Excess	0.7	-0.3	0.0	0.0	-0.1	-0.2
International equity	7.5	5.3	6.4	3.0	5.2	
International equity benchmark	7.3	5.1	6.0	2.5	4.9	
Excess	0.2	0.2	0.4	0.5	0.3	
Fixed Income (Bond) Pool	0.1	2.3	2.8	4.4	5.0	6.5
Asset Class Target (Barclays Capital Aggregate Bond Index)	-0.4	1.7	2.3	3.7	4.7	6.1
Excess	0.5	0.5	0.5	0.7	0.3	0.3
Treasuries – Asset Class began in fiscal year 2018 Quarter Performance for April 1 – June 30, 2018 = 0.0% Treasury Benchmark = 0.1% **Excess** = -0.1%						
Total private markets	14.8	11.3	12.0	9.2	12.1	12.2
Private equity	19.7	15.1	15.5	11.7	12.7	
Private credit	12.0	14.2	14.4	11.2	13.0	
Resources	4.3	-0.3	0.9	4.9	13.8	
Real estate	12.1	9.4	13.1	4.8	8.7	

All investment performance methodology is reported in compliance with the mandatory requirements of the Chartered Financial Analyst (CFA) Institute. Investment returns are prepared using a time-weighted rate of return methodology, based on fair value, net of investment expense.

Combined Funds

Portfolio Distribution: Transitional Target Allocation*

As of June 30, 2018

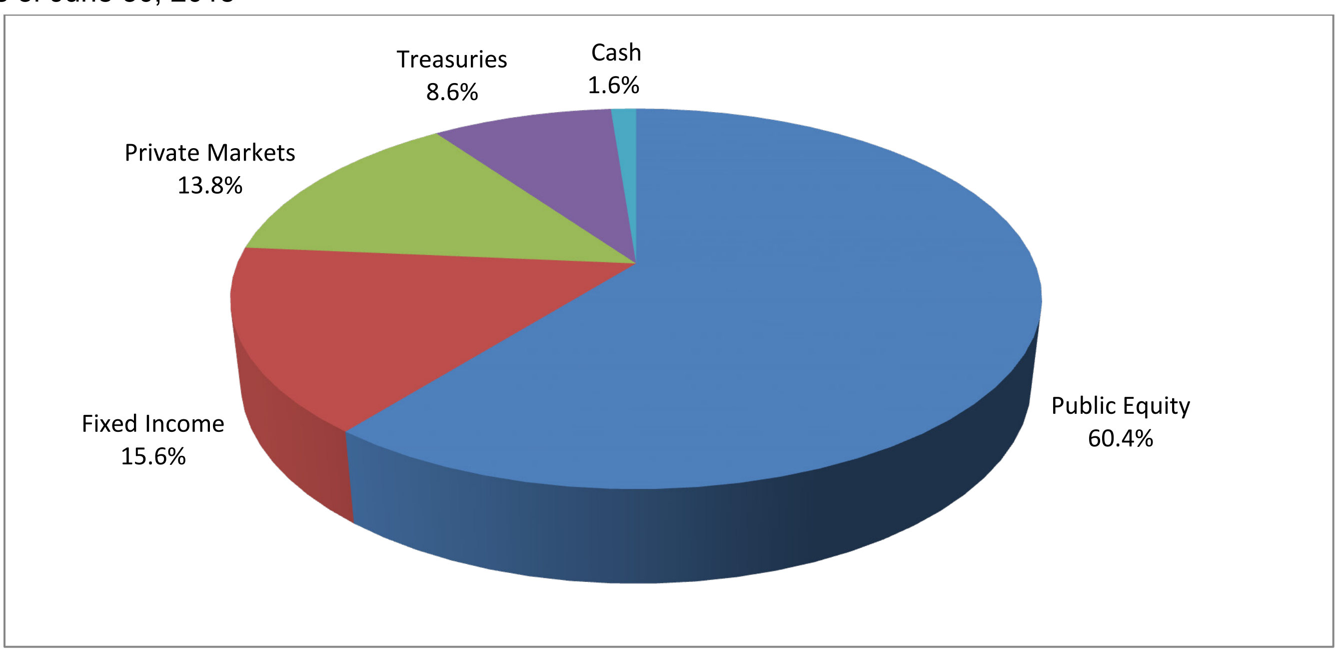


See note on page 27.

Combined Funds

Portfolio Distribution: Actual Asset Mix

As of June 30, 2018



The fair value of the TRA Fund investment portfolio is approximately $22.3 billion.

Teachers Retirement Fund
List of Largest Assets Held

June 30, 2018

Composite Holdings of Top Ten Equities
By Fair Value

Security	$ Fair Value (Millions)	% of Portfolio
Apple Inc	$ 262.6	1.18
Amazon.com, Inc	$ 236.5	1.06
Microsoft Corp	$ 227.1	1.02
Facebook, Inc A	$ 155.1	0.69
Alphabet, Inc. Cl A	$ 112.1	0.50
JPMorgan Chase + Co	$ 111.1	0.50
Berkshire Hathaway, Inc. Cl B	$ 102.9	0.46
Alphabet, Inc. Cl C	$ 101.8	0.46
Exxon Mobil Corp	$ 101.1	0.45
Johnson & Johnson	$ 100.5	0.45

Composite Holdings of Top Ten Bond Holdings
By Fair Value

Security	% Coupon	$ Fair Value (Millions)	% of Portfolio
US TREASURY N/B	2.25	$ 118.5	0.53
US TREASURY N/B	2.125	$ 112.2	0.50
US TREASURY N/B	3.75	$ 81.2	0.36
US TREASURY N/B	2.25	$ 67.2	0.30
FNMA TBA 30 YR 3.5	4.50	$ 64.6	0.29
US TREASURY N/B	3.00	$ 57.1	0.26
US TREASURY N/B	2.00	$ 54.1	0.24
US TREASURY N/B	2.75	$ 53.5	0.24
US TREASURY N/B	1.75	$ 52.1	0.23
US TREASURY N/B	2.125	$ 51.9	0.23

TRA's assets are commingled in various pooled investment accounts administered by the State Board of Investment (SBI). TRA does not own specific values of the underlying assets. The percentages and fair value shown are those attributable to the TRA Fund based on TRA's participation in the SBI's Combined Funds. Information on investment activity, a listing of specific investments owned by the pooled accounts and a schedule of fees and commissions can be obtained from SBI.

Teachers Retirement Fund
Schedule of Investment Management Fees

For the Fiscal Year Ended June 30, 2018

Domestic Activity Equity Pool Managers	
Barrow, Hanley	$ 193,645
Earnest Partners	134,030
Goldman Equity	715,200
Hotchkis and Wiley	771,868
LSV Asset	464,478
Martingale	601,604
McKinley Cap	168,240
Peregrine Capital	696,857
Sands Capital	393,594
Winslow Capital	204,010
Zevenbergen Capital	533,715
Arrowpoint Asset Mgmt LLC	497,901
Hood River Capital Mgmt. LLC	561,756
Rice Hall James & Assoc., LLC	491,057
Wellington Mgmt. Co, LLP	478,012
Total Domestic Activity Equity Pool Managers	$ 6,905,967
Passive Domestic Equity Pool Managers	
Blackrock	$ 151,696
Total Passive Domestic Equity Pool Managers	$ 151,696
Large Cap Passive Domestic Equity Pool Managers	
Blackrock	$ 185,961
Total Passive Domestic Equity Pool Managers	$ 185,961
Semi Passive Equity Pool Managers	
Blackrock	$ 317,134
JP Morgan	487,091
Total Semi Passive Equity Pool Managers	$ 804,225
Domestic Bonds Pool Managers	
Columbia Invest	$ 367,699
Blackrock Financial Mgmt.	341,580
Dodge & Cox	557,588
Goldman	528,238
Neuberger	212,189
PIMCO	920,566
Western Asset Management	467,452
Total Domestic Bonds Pool Managers	$ 3,395,312
Page Subtotal	$ 11,443,161

Teachers Retirement Fund
Schedule of Investment Management Fees (cont.)

For the Fiscal Year Ended June 30, 2018

Subtotal from Previous Page	$ 11,443,161
Global Equity Pool Managers	
Acadian Asset	$ 582,907
State Street Emerging	182,594
AQR Capital Mgmt.	608,268
Fidelity Investments	417,305
Fidelity Investments	389,922
JP Morgan Fleming	399,227
Earnest Partners, LLC	650,377
Macquarie/Delaware Investments	568,834
Martin Currie, Inc.	598,845
Marathon Asset	903,456
McKinley Capital Management	417,864
Morgan Stanley Dean	1,432,125
Neuberger Berman Investment	792,056
Pzena Investment Management	744,493
Rock Creek	772,158
Columbia Investments	411,434
State Street Alpha	12,327
State Street	218,589
Total Global Equity Pool Managers	$ 10,102,781
Treasury Protection Pool	
BlackRock	$ 125,157
Goldman Sachs	131,635
Neuberger Berman	121,033
Total Treasury Protection Pool	$ 377,825
Total Investment Management Fees	$ 21,923,767

Note: *The investment portfolio of TRA had a fair value of approximately $22.3 billion as of June 30, 2018.*

Teachers Retirement Fund
Summary of Investments

Dollars in Thousands

As of June 30, 2018

	Cost Value	Fair Value	% of Investments at Fair Value
Fixed Income Investments			
Bond Pool	$ 3,462,274	$ 3,484,119	15.61%
Treasuries Pool	1,914,651	1,915,494	8.58%
Total Fixed Income Investments	$ 5,376,925	$ 5,399,613	24.19%
Equity Investments			
US Stock Index Pool	$ 5,065,669	$ 6,877,133	30.81%
Broad International Stock Pool	3,495,101	4,268,602	19.12%
Small Cap Active	650,118	774,496	3.47%
Large Cap Active	1,863,631	1,575,935	7.06%
Total Equity Investments	$ 11,074,519	$ 13,496,166	60.46%
Alternative Investments			
Alternative Investment Pool	$ 2,919,950	$ 3,072,614	13.77%
Short Term Investments			
CD Repo Pool	$ 97,883	$ 98,005	0.44%
Short Term Cash Equivalents	254,114	254,437	1.14%
Total Short Term Investments	$ 351,997	$ 352,442	1.58%
Total Investments	$ 19,723,391	$ 22,320,835	100.00%

General Information Regarding Investment of Funds

TRA's investments are made by SBI and external managers as prescribed by law, and are made only in such securities as are duly authorized legal investments in accordance with Minnesota Statutes, section 11A.24. State Street Bank and Trust of Boston acts as custodian of securities for the Combined Funds. Wells Fargo, Saint Paul, Minnesota, is the current custodian of short term investments of SBI. Examination and verification of securities held by the custodians is performed periodically by the Minnesota Office of the Legislative Auditor. Investment returns are prepared using a time-weighted rate of return methodology, based upon fair values, net of investment expenses.

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Teachers Retirement Association of Minnesota
A Pension Trust Fund of the State of Minnesota

Actuarial

Actuary's Certification Letter

Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

December 5, 2018

Board of Trustees
Teachers Retirement Association of Minnesota
60 Empire Drive, Suite 400
St. Paul, MN 55103

Dear Board Members:

At your request, we have prepared an actuarial funding valuation of the Teachers Retirement Association of Minnesota (TRA or System) as of July 1, 2018 for the plan year ending June 30, 2019. Such valuations, which analyze the funding progress of the System, are required to be performed annually under state law. To the best of our knowledge and belief, the funding valuation was performed in accordance with the requirements of Minnesota Statutes, Section 356.215, and the requirements of the Standards for Actuarial Work established by the State of Minnesota Legislative Commission on Pensions and Retirement (LCPR). The valuation results reflect the benefit provisions in place on July 1, 2018, including the changes in the 2018 legislation.

The 2018 Omnibus Pension Bill contained significant changes that impacted TRA's funded status and long-term funding outlook including changes to the financing of TRA, changes to benefit provisions, and a decrease in the investment return assumption from 8.5% to 7.5% (set in statute). The change in the investment return assumption resulted in a more realistic (and higher) measurement of the liabilities. The benefit changes in the 2018 legislation nearly offset the increase in liabilities due to the decrease in the investment return assumption. The benefit changes in the 2018 Omnibus Pension Bill had a significant positive financial impact on TRA. While the decrease in the investment return assumption increased the actuarial accrued liability by $3.3 billion, the benefit changes reduced the liability by $2.9 billion, increased the funded ratio from 70% to 77%, and put the plan on track to be over 100% funded in 30 years, assuming all actuarial assumptions are met. The specific changes are summarized below:

BENEFIT CHANGES

- **Reduced COLA:** The COLA was reduced from 2.0 percent each January 1 to 1.0 percent, effective January 1, 2019. Beginning January 1, 2024, the COLA will increase 0.1% each year until reaching the ultimate rate of 1.5% in January 1, 2028.
- **COLA Eligibility:** Beginning July 1, 2024, eligibility for the first COLA changes to normal retirement age (age 65 to 66, depending on date of birth). However, members who retire under Rule of 90 and members who are at least age 62 with 30 years of service credit are exempt.
- **COLA Trigger:** The COLA trigger provision, which would have increased the COLA to 2.5% if the funded ratio was at least 90 percent for two consecutive years, was eliminated.

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- **Early Retirement Benefits**: Augmentation in the early retirement reduction factors is phased out over a five-year period beginning July 1, 2019 and ending June 30, 2024 (this reduces early retirement benefits). Members who retire and are at least age 62 with 30 years of service are exempt.
- **Deferred Benefits:** Augmentation on deferred benefits will be reduced to zero percent beginning July 1, 2019. Interest payable on refunds to members will be reduced from 4.0% to 3.0%, effective July 1, 2018. Interest due on payments and purchases from members, employers is reduced from 8.5% to 7.5%, effective July 1, 2018.
- **Contribution Rates:** The employer contribution rate is increased each July 1 over the next 6 years, (7.71% in 2018, 7.92% in 2019, 8.13% in 2020, 8.34% in 2021, 8.55% in 2022, 8.75% in 2023. In addition, the employee contribution rate will increase from 7.50% to 7.75% on July 1, 2023. The state provides funding for the higher employer contribution rate through an adjustment in the school aid formula.

CHANGES AFFECTING TRA FINANCING

- **Investment Return Assumption:** The investment return assumption was lowered from 8.5% to 7.5%.
- **Amortization Period:** The amortization date for the funding the Unfunded Actuarial Accrued Liability (UAAL) was reset to June 30, 2048 (30 years).
- **Contribution Stabilizer:** A mechanism in the law that provided the TRA Board with some authority to set contribution rates was eliminated.

In 2017, the TRA Board commissioned Cavanaugh Macdonald Consulting to perform a review of the economic assumptions to be used in the actuarial funding valuation. The findings and recommendations of that analysis, which were provided to the Board at their November 2017 meeting, included lowering the investment return assumption from 8.5% to 7.5%, lowering the general wage increase assumption from 3.75% to 2.85% for the next ten years and 3.25% thereafter, and lowering the payroll growth assumption from 3.5% to 3.0%. Therefore, the current statutorily required investment return assumption, along with the other economic assumptions adopted by the TRA Board, are consistent with the recommended assumptions in our 2017 analysis and, in our opinion, meet actuarial standards of practice.

The net impact of all of these changes was an increase in the actuarial accrued liability of $397 million. The Required Contribution Rate decreased from 18.25% to 17.18% and the contribution deficiency decreased from 2.36% to 1.08%. If the future scheduled contribution increases are considered, the contribution deficiency is eliminated. The following table summarizes the key valuation results first showing the results with no change in assumptions (baseline), the impact of the change in the set of economic assumptions, including the reduction in the investment assumption to 7.5%, and then reflecting the impact of the benefit provision and contribution changes along with the extension of the amortization period:

	July 1, 2018 Valuation Results ($ billions)		
	Baseline	Economic Assumption Changes	All Changes
Actuarial Accrued Liability	$ 28.246	$ 31.500	$ 28.643
Actuarial Value of Assets	22.023	22.023	22.023
Unfunded Actuarial Accrued Liability	6.223	9.477	6.620
Funded Ratio (Actuarial Assets)	77.97%	69.91%	76.89%
Normal Cost Rate	8.77%	10.59%	9.16%
UAAL Amortization Payment	9.16%	12.73%	7.70%
Expenses	0.32%	0.32%	0.32%
Total Required Contribution	18.25%	23.64%	17.18%
Statutory Contribution	15.89%	15.89%	16.10%
Contribution (Deficiency)/Sufficiency	(2.36%)	(7.75%)	(1.08%)

As described in the funding valuation report, the results of the valuation indicate that the System is 76.89% funded and the current statutory contribution rates are deficient by 1.08% of payroll to meet the target of full funding by 2048. The deficiency is determined using the actuarial value of assets which is lower than the market value of assets. If the net deferred investment gain is recognized, i.e., the fair value of assets is used, the contribution deficiency decreases to 0.70% of payroll. In addition, if the scheduled future increases in the contribution rate are considered, the contribution deficiency is eliminated. The funding report was prepared exclusively for TRA and the LCPR to determine the annual required contribution rate using the statutory investment return assumption of 7.50%.

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

The actuarial contribution rates are developed using the Entry Age Normal (EAN) cost method. An asset smoothing method, defined in statute, is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded actuarial accrued liability and are amortized as a level percentage of payroll over a closed period set in state statute. Actuarial assumptions, including discount rates, mortality tables and others identified in the valuation report are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the Board of Trustees. Collectively, these parties are responsible for selecting the plan's funding policy, actuarial valuation methods, asset valuation method, and actuarial assumptions. If all assumptions are met, the current funding policy is expected to result in the Plan reaching full funding in about 30 years. However, actual experience that varies from that assumed may impact the sufficiency of the scheduled contribution rates to meet the Plan's funding goals so the long-term funding should be monitored on a regular basis. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in Appendix C of the valuation report.

Future actuarial results may differ significantly from the current results presented in this report due to factors such as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal actuarial valuation, an analysis of the range of potential results is not presented herein.

The actuary prepared the following supporting schedules in the Actuarial Section of the Comprehensive Annual Financial Report:

- Reconciliation of Member Data
- Actuarial Asset Value
- Actuarial Valuation Balance Sheet
- Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate
- Changes in the Unfunded Actuarial Accrued Liability
- Determination of Contribution Sufficiency /(Deficiency) – Total
- Solvency Test
- Schedule of Funding Progress
- Schedule of Active Member Valuation Data

We also provided the following schedules in the Financial Section of the Comprehensive Annual Financial Report:

- Total Pension Liability
- Schedule of Changes in the Employers' Net Pension Liability
- Schedule of the Employers' Net Pension Liability
- Sensitivity Analysis on the Net Pension Liability

In addition, we provided the *Schedule of Contributions from Employers and Non-employer Contributing Entities* found in the Required Supplementary Information. The schedules are presented prospectively and in time, trend analysis will become evident. Actuarial computations presented in the July 1, 2018 actuarial valuation report are for purposes of determining the recommended funding amounts for the System. The calculations have been made on a basis consistent with our understanding of the System's funding requirements and goals, and on a basis consistent with our understanding of the plan provisions described in Appendix B of the valuation report. Determinations for purposes other than meeting these requirements may be significantly different from the results shown in the July 1, 2018 actuarial valuation report. Accordingly, additional determinations may be needed for other purposes.

We also prepared actuarial computations as of June 30, 2018 for purposes of fulfilling financial accounting requirements for the System under Governmental Accounting Standards Board (GASB) Statement No. 67. The results are presented in a separate report dated November 30, 2018. For GASB 67 purposes, TRA is a cost-sharing multiple employer plan. The actuarial assumptions used in the funding valuation report were also used for GASB 67 reporting. In addition, the entry age normal actuarial cost method, which is required to be used under GASB 67, is also used in the statutory funding valuation report. The actuarial assumptions and methods used in both the funding and the GASB 67 accounting valuation reports meet the parameters set by Actuarial Standard of Practice (ASOPs), as issued by the Actuarial Standards Board, and generally accepted accounting principles (GAAP) applicable in the United State of America as promulgated by the Governmental Accounting Standards Board.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this information is complete and accurate and that the valuation was prepared in accordance with principles of practice which are consistent with the Actuarial Standards of Practice promulgated by the Actuarial Standards Board and the applicable Guides to Professional Conduct, amplifying Opinions, and supporting recommendation of the American Academy of Actuaries. In addition, the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement System. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein. Also, we meet the requirements of "approved actuary" under Minnesota Statutes, Section 356.215, Subdivision 1, Paragraph (c).

Respectfully submitted,

Patrice Beckham

Brent A. Banister

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

Brent Banister PhD, FSA, EA, FCA, MAAA
Chief Actuary

Summary of Actuarial Assumptions and Methods

Summary of Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the plan. A description of plan provisions is provided beginning on page 123.

The Allowance for Combined Service Annuity was based on the recommendation of a prior actuary. We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of this assignment.

All assumptions are prescribed by Statute, the Legislative Commission on Pensions and Retirement (LCPR), or the Board of Trustees. The assumptions prescribed are based on the full experience study dated June 5, 2015 and the study of economic assumptions presented to the Board in November, 2017 and approved by the LCPR on February 19, 2018.

Investment return	7.50 percent compounded annually. (Enacted into Minnesota Statute, May 31, 2018)
Future post-retirement adjustments	1.0% for January, 2019 through January, 2023, then increasing by 0.1% each year up to 1.5% annually.
Salary increases	Reported salary for prior fiscal year, with new hires annualized, is increased according to the salary increase table shown in the rate table for current fiscal year and annually for each future year. See table of sample rates.
Payroll growth	3.00 percent per year
Future service	Members are assumed to earn future service at a full-time rate.
Mortality: Pre-retirement	RP 2014 white collar employee table, male rates set back 6 years and female rates set back 5 years. Generational projection uses the MP-2015 scale.
Post-retirement	RP 2014 white collar annuitant table, male rates set back 3 years and female rates set back 3 years, with further adjustments of the rates. Generational projection uses the MP-2015 scale.
Post-disability	RP 2014 disabled retiree mortality, without adjustment.
Disability	Age-related rates based on experience; see table of sample rates (page 82).
Withdrawal	Rates vary by service based on actual plan experience, as shown in the rate table.
Expenses	Prior year administrative expenses expressed as percentage of prior year payroll.
Retirement age	Graded rates beginning at age 55 as shown in rate table. Members who have attained the highest assumed retirement age will retire in one year.
Percentage married	85 percent of male members and 65 percent of female members are assumed to be married. Members are assumed to have no children.
Age difference – married	Females two years younger than males.
Allowance for Combined Service Annuity	Liabilities for vested former members are increased by 7.00 percent and liabilities for non-vested former members are increased by 9.00 percent to account for the effect of some participants being eligible for a Combined Service Annuity.

Refund of contributions	All employees withdrawing after becoming eligible for a deferred benefit are assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.
Interest on member contributions	Members and former members who are eligible for the money purchase annuity are assumed to receive interest credits equal to the Pre-Retirement interest rate. All other members and former members receive the interest crediting rate as specified in statutes.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at unreduced retirement age.
Form of payment	Married members are assumed to elect subsidized joint and survivor (J&S) form of annuity as follows: Males: 10% elect 50% J&S option 10% elect 75% J&S option 60% elect 100% J&S option 20% elect Straight Life option Females: 13.5% elect 50% J&S option 6.5% elect 75% J&S option 35% elect 100% J&S option 45.0% elect Straight Life option Members eligible for deferred annuities (including current terminated deferred members) and future disability benefits are assumed to elect a life annuity.
Missing data for members	Membership data was supplied by TRA as of the valuation date. This information has not been audited by CMC. We have reviewed the information for internal consistency and we have no reason to doubt its substantial accuracy. In the small number of cases where submitted data was missing or incomplete and could not be recovered from prior years, the following assumptions were applied if needed: Data for active members: Salary, service, and date of birth: Based on current active demographics Gender: Female Data for terminated members: Date of birth: July 1, 1970 Average salary: $40,000 Date of termination: Derived from date of birth, original entry age, and service Data for in-pay members: Beneficiary date of birth: Wife two years younger than husband Gender: Based on first name Form of payment: Life annuity for retirees and beneficiaries, 100% J&S option for disabled retirees.
Changes in actuarial assumptions since the previous valuation	The investment return assumption was reduced from 8.5% to 7.5%. The price inflation assumption was reduced from 3.0% to 2.5%. The payroll growth assumption was reduced from 3.5% to 3.0%. The wage inflation assumption (above price inflation) was reduced from 0.75% to 0.35% for the next 10 years, and 0.75% thereafter. The total salary increase assumption was adjusted by the wage inflation change.

Summary of Actuarial Assumptions *(continued)*

Pre-Retirement Mortality Rates (%)*

Age	Male	Female
20	0.023	0.013
25	0.026	0.014
30	0.036	0.014
35	0.031	0.018
40	0.035	0.024
45	0.041	0.033
50	0.061	0.055
55	0.105	0.092
60	0.175	0.140
65	0.292	0.204

**Rates shown are for 2014, the base year of the tables.*

Annuitant Mortality Rates (%)

	Retirement*		Disability	
Age	Male	Female	Male	Female
55	0.267	0.196	2.337	1.448
60	0.353	0.267	2.660	1.700
65	0.486	0.430	3.169	2.086
70	0.945	0.706	4.035	2.820
75	2.015	1.352	5.429	4.105
80	4.126	2.682	7.662	6.104
85	7.358	5.456	11.330	9.042
90	13.560	9.947	17.301	13.265
95	24.351	18.062	24.717	19.588
100	38.292	29.731	32.672	27.819

**Rates shown are for 2014, the base year of the tables.*

Termination Rates

Service	Male	Female
Less than 1	32.00%	29.00%
1	15.00%	13.00%
2	11.00%	11.00%
3	8.50%	9.00%
4	6.25%	7.00%
5	5.25%	5.50%
6	4.60%	4.00%
7	4.10%	3.50%
8	2.80%	3.00%
9	2.30%	2.50%
10	2.00%	2.10%
15	1.10%	1.10%
20	0.60%	0.60%
25 or more	0.50%	0.50%

Summary of Actuarial Assumptions *(continued)*

Disability Rates (%)

Age	Male	Female
20	0.00	0.00
25	0.00	0.00
30	0.00	0.00
35	0.01	0.01
40	0.03	0.03
45	0.05	0.05
50	0.10	0.10
55	0.16	0.16
60	0.25	0.25
65	0.00	0.00

Retirement Rates for Coordinated Members (%)

Coordinated Tier 2 members age 62 or older with 30 or more years of service have 5 percent added to their early retirement rates.

Age	Tier 1 Early	Tier 1 Unreduced	Tier 2 Early	Tier 2 Unreduced
55	5	35	5	
56	10	35	5	
57	10	35	5	
58	10	35	5	
59	14	35	5	
60	17	35	6	
61	20	35	15	
62	25	35	15	
63	25	35	15	
64	25	35	20	
65		40	30	
66		35		35
67		30		30
68		30		25
69		30		25
70		35		35
71 and over		100		100

Salary Scale

Service (Yrs)	Select Salary Increase Before July 1, 2028	Utlimate Salary Increase After June 30, 2028
1	8.85%	9.25%
5	6.75%	6.75%
10	5.60%	6.00%
15	4.35%	4.75%
20	3.45%	3.85%
25	2.95%	3.35%
26 or more	2.85%	3.25%

Valuation Report Highlights

Summary of Key Valuation Results

	Actuarial Valuation as of	
	July 1, 2018	**July 1, 2017**
Participant Data		
Active members		
Number	82,495	81,811
Projected annual earnings for fiscal year *(000s)*	$ 5,173,114	$ 5,043,499
Average projected annual earnings for the next fiscal year	$ 62,708	$ 61,648
Average age	43.2	43.2
Average service	11.9	11.9
Service retirements	60,128	58,989
Survivors	5,476	5,268
Disability retirements	500	517
Deferred retirements	14,936	14,030
Non-vested terminated members	34,375	33,344
Total	**197,910**	**193,959**
Liabilities and Funding Ratios (*Dollars in Thousands*)		
Accrued Benefit Funding Ratio		
Current assets (AVA)	$ 22,022,842	$ 21,062,789
Current benefit obligations	27,403,889	25,942,767
Funding ratio	80.36%	81.19%
Accrued Liability Funding Ratio		
Current assets (AVA)	$ 22,022,842	$ 21,062,789
Fair value of assets (MVA)	22,357,570	21,253,486
Actuarial accrued liability	28,643,023	27,427,702
Unfunded actuarial accrued liability	6,620,181	6,364,913
Funding ratio (AVA)	76.89%	76.79%
Funding ratio (MVA)	78.06%	77.49%
Projected Benefit Funding Ratio		
Current and expected future assets	$ 32,688,097	$ 30,180,088
Current and expected future benefit obligations	33,620,108	31,871,009
Funding ratio (AVA)	97.23%	94.69%
Contributions (% of payroll)		
Normal Cost Rate	9.16%	8.77%
UAAL Amortization Payment	7.70%	9.41%
Expenses	0.32%	0.25%
Total Required Contribution (Chapter 356)	17.18%	18.43%
Statutory Contribution (Chapter 354)	16.10%	15.93%
Contribution (Deficiency)/Sufficiency	(1.08%)	(2.50%)

Actuary's Selected Commentary

July 1, 2018 Valuation

The Teachers Retirement Association of Minnesota (TRA or System) provides retirement, disability, and death benefits to Minnesota public school teachers, administrators, and certain college faculty. This report presents the results of the July 1, 2018 actuarial funding valuation. The primary purposes of performing the actuarial funding valuation are to:

- determine the required contribution rate as set forth in Chapter 356 of the Minnesota statutes;
- determine the sufficiency of the statutory contribution rate as set forth in Chapter 354 of the Minnesota statutes;
- determine the experience of the fund since the last valuation date;
- disclose asset and liability measures as of the valuation date; and
- analyze and report on trends in contributions, assets, and liabilities over the past several years.

The 2018 Omnibus Pension Bill contained significant changes that impacted TRA's funded status and long- term funding outlook including changes to the financing of TRA, changes to benefit provisions, and a decrease in the investment return assumption from 8.5% to 7.5% (set in statute). The change in the investment return assumption resulted in a more realistic (and higher) measurement of the liabilities. The benefit changes in the 2018 legislation nearly offset the increase in liabilities due to the decrease in the investment return assumption. As shown in the following pages, the benefit changes in the 2018 Omnibus Pension Bill had a significant positive financial impact on TRA. While the decrease in the investment return assumption increased the accrued actuarial liability by $3.3 billion, the benefit changes reduced liabilities by $2.9 billion, increased the funded ratio from 70% to 77%, and put the plan on track to be over 100% funded in 30 years, assuming all actuarial assumptions are met. The specific changes are summarized below:

Benefit Changes

- Reduced COLA: The COLA was reduced from 2.0 percent each January 1 to 1.0 percent, effective January 1, 2019. Beginning January 1, 2024, the COLA will increase 0.1% each year until reaching the ultimate rate of 1.5% in January 1, 2028.
- COLA Eligibility: Beginning July 1, 2024, eligibility for the first COLA changes to normal retirement age (age 65 to 66, depending on date of birth). However, members who retire under Rule of 90 and members who are at least age 62 with 30 years of service credit are exempt.
- COLA Trigger: The COLA trigger provision, which would have increased the COLA to 2.5% if the funded ratio was at least 90 percent for two consecutive years, was eliminated.
- Early Retirement Benefits: Augmentation in the early retirement reduction factors is phased out over a five-year period beginning July 1, 2019 and ending June 30, 2024 (this reduces early retirement benefits). Members who retire and are at least age 62 with 30 years of service are exempt.
- Deferred Benefits: Augmentation on deferred benefits will be reduced to zero percent beginning July 1, 2019. Interest payable on refunds to members will be reduced from 4.0% to 3.0%, effective July 1, 2018. Interest due on payments and purchases from members, employers is reduced from 8.5% to 7.5%, effective July 1, 2018.
- Contribution Rates: The employer contribution rate is increased each July 1 over the next 6 years, (7.71% in 2018, 7.92% in 2019, 8.13% in 2020, 8.34% in 2021, 8.55% in 2022, 8.75% in 2023.

In addition, the employee contribution rate will increase from 7.50% to 7.75% on July 1, 2023. The state provides funding for the higher employer contribution rate through an adjustment in the school aid formula.

Changes Affecting TRA Financing

- Investment Return Assumption: The investment return assumption was lowered from 8.5% to 7.5%.
- Amortization Period: The amortization date for the funding the Unfunded Actuarial Accrued Liability (UAAL) was reset to June 30, 2048 (30 years).
- Contribution Stabilizer: A mechanism in the law that provided the TRA Board with some authority to set contribution rates was eliminated.

In 2017, the TRA Board commissioned Cavanaugh Macdonald Consulting to perform a review of the economic assumptions to be used in the actuarial funding valuation. The findings and recommendations of that analysis, which were provided to the Board at their November 2017 meeting, included lowering the investment return assumption from 8.5% to 7.5%, lowering the general wage increase assumption from 3.75% to 2.85% for the next ten years and 3.25% thereafter, and lowering the payroll growth assumption from 3.5% to 3.0%.

The TRA Board adopted the general wage increase and payroll growth assumptions, but the investment return assumption is set in statute. The LCPR also approved these revised assumption on February 19, 2018. As a result of the 2018 Omnibus Pension Bill, the set of economic assumptions used in the July 1, 2018 valuation (including the statutorily required investment return assumption of 7.5%), is consistent with the recommended assumptions in our 2017 analysis and, in our opinion, meet actuarial standards of practice.

The net impact of all of these changes was an increase in the actuarial accrued liability of $397 million. The Required Contribution Rate decreased from 18.25% to 17.18% and the contribution deficiency decreased from 2.36% to 1.08%. If the future scheduled contribution increases are considered, the contribution deficiency is eliminated. The following table summarizes the key valuation results first showing the results with no change in assumptions (baseline), the impact of the change in the set of economic assumptions, including the reduction in the investment assumption to 7.5%, and then reflecting the impact of the benefit provision and contribution changes along with the extension of the amortization period:

	July 1, 2018 Valuation Results (*Dollars in Billions*)		
	Baseline	**Economic Assumption Changes**	**All Changes**
Actuarial Accrued Liability	$ 28.246	$ 31.500	$ 28.643
Actuarial Value of Assets	22.023	22.023	22.023
Unfunded Actuarial Accrued Liability	6.223	9.477	6.620
Funded Ratio (Actuarial Assets)	77.97%	69.91%	76.89%
Normal Cost Rate	8.77%	10.59%	9.16%
UAAL Amortization Payment	9.16%	12.73%	7.70%
Expenses	0.32%	0.32%	0.32%
Total Required Contribution	18.25%	23.64%	17.18%
Statutory Contribution	15.89%	15.89%	16.10%
Contribution (Deficiency)/Sufficiency	(2.36%)	(7.75%)	(1.08%)

The actuarial valuation results provide a "snapshot" view of the System's financial condition on July 1, 2018. The results reflect net favorable experience for the past plan year as demonstrated by an UAAL that was lower than expected, after taking changes in assumptions, methods and benefit provisions into account. The UAAL on July 1, 2018 is $6.620 billion as compared to an expected UAAL of $6.956 billion (reflecting the $397 million net increase due to the 2018 Omnibus Pension Bill). The aggregate favorable experience of $336 million was the combined result of an experience gain of $254 million on the actuarial value of assets and an experience gain of $82 million on the System liabilities. The majority of the liability gain was a result of salary increases that were lower than expected, based on the actuarial assumptions.

A summary of the key valuation results from the July 1, 2018 actuarial valuation, compared to the July 1, 2017 valuation, is shown in the following table. Further detail on the valuation results can be found on the following pages.

	Actuarial Valuation as of	
	July 1, 2018	**July 1, 2017**
Total Required Contribution Rate (Chapter 356)	17.18%	18.43%
Statutory Contribution Rate (Chapter 354)	16.10%	15.93%
Sufficiency/(Deficiency)	(1.08%)	(2.50%)
Unfunded Actuarial Accrued Liability ($M)	$6,620	$6,365
Funded Ratio (Actuarial Assets)	76.89%	76.79%

The contribution deficiency decreased from 2.50% of payroll in last year's valuation to 1.08% of payroll in the 2018 valuation. This is the net impact of an increase in the deficiency arising from the change in economic assumptions including the reduction to the investment return assumption and a decrease in the contribution deficiency from the benefit provision changes, increased employer contribution rate and extended amortization period for the UAAL. If the future scheduled increases in the contribution rates for both the employers and members are considered, the contribution deficiency is eliminated.

Experience for the Last Plan Year

Numerous factors contributed to the change in assets, liabilities and actuarial contribution rate between July 1, 2017, and July 1, 2018. The components are examined in the following discussion.

Assets

As of June 30, 2018, TRA had net assets of $22.4 billion, when measured on a market value basis. This was an increase of approximately $1.1 billion from the prior year.

The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the Required Contribution Rate. An asset valuation method, which smoothes the effect of market fluctuations, is used to determine the value of assets used in the valuation, called the "actuarial value of assets." In this year's valuation, the actuarial value of assets as of June 30, 2018 was $22.0 billion, an increase of $1.0 billion from the value in the prior valuation. The components of change in the asset values are shown in the following table:

(Dollars in millions)	**Fair Value**	**Actuarial Value**
Net Position, June 30, 2017	**$21,253**	**$21,063**
Employer & Member Contributions	+ $789	+ $789
Benefit Payments and Administrative Expenses	– $1,848	– $1,848
Investment Income	+2,164	+ $2,019
Net Position, June 30, 2018	**$22,358**	**$22,023**
Asset Return	**10.3%**	**9.8%**

On a market value basis, the rate of return was 10.3 percent as reported by the State Board of Investment (SBI). Due to the application of the asset smoothing method, including the scheduled recognition of the deferred investment experience, the rate of return, measured on the actuarial value of assets, was 9.8 percent. Because this rate of return was higher than the assumed rate of return for this period of 8.5 percent, there was an actuarial gain of $254 million. Please see page 94 of this report for more detailed information on the fair (market) and actuarial value of assets.

Liabilities

The actuarial accrued liability is that portion of the present value of future benefits that will not be paid by future normal costs. The difference between this liability and the actuarial value of assets at the same date is called the unfunded actuarial accrued liability (UAAL). The dollar amount of unfunded actuarial accrued liability is reduced if the contributions to the System exceed the normal cost for the year plus interest on the prior year's UAAL.

The unfunded actuarial accrued liability is shown as of July 1, 2018, in the following table:

(Dollars in Millions)	Fair Value of Assets	Actuarial Value of Assets
Actuarial Accrued Liability	$28,643	$28,643
Value of Assets	$22,358	$22,023
Unfunded Actuarial Accrued Liability	$ 6,285	$ 6,620
Funded Ratio	78.06%	76.89%

See pages 96-97 of the report for the detailed development of the unfunded actuarial accrued liability.

Changes in the UAAL occur for various reasons. The net increase in the UAAL from July 1, 2017, to July 1, 2018, was $255 million. The components of this net change are shown in the table below:

(Dollars in Millions)

Unfunded Actuarial Accrued Liability, July 1, 2017	**$ 6,365**
Expected increase from amortization method	$ 47
Expected increase from contributions below required rate	131
Investment experience	(254)
Liability experience	(82)
Other experience	16
Assumption changes	3,254
Benefit Provision changes	(2,857)
Subtotal	255
Unfunded Actuarial Accrued Liability, July 1, 2018	**$ 6,620**

As shown above, various components impacted the UAAL. Actuarial gains (losses), which result from actual experience that is more (less) favorable than anticipated based on the actuarial assumptions, are reflected in the UAAL and are measured as the difference between the expected unfunded actuarial accrued liability and the actual unfunded actuarial accrued liability, taking into account any changes due to actuarial assumptions and methods or benefit provision changes. Overall, the System experienced a net actuarial gain of $336 million. The actuarial gain may be explained by considering the separate experience of assets and liabilities. As noted earlier, there was a $254 million gain on the actuarial value of assets and an $82 million gain on liabilities. The change in the economic assumptions (including the investment return assumption) and the changes to the benefit provisions have a large, but nearly offsetting, impact on the unfunded actuarial accrued liability as well.

An evaluation of the unfunded actuarial accrued liability on a pure dollar basis may not provide a complete analysis since only the difference between the assets and liabilities (which are both very large numbers) is reflected. Another way to evaluate the unfunded actuarial accrued liability and the progress made in its funding is to track the funded ratio, the ratio of the actuarial value of assets to the actuarial accrued liability. Note that if the funded status were calculated using the market value of assets, the results could differ. The funded ratios and unfunded actuarial accrued liability measures, as shown, are not indicative of whether or not the System could settle all current benefit obligations with existing assets. Furthermore, these results do not, on their own, indicate whether or not future funding of the System will be required, nor the amount. The funded status information is shown below.

(Dollars in Millions)

Date	Funded Ratio	Unfunded Actuarial Accrued Liability
7/1/13	71.6%	$6,644
7/1/14	74.1%	$6,347
7/1/15	77.1%	$5,865
7/1/16	75.6%	$6,522
7/1/17	76.8%	$6,365
7/1/18	76.9%	$6,620

Contribution Rate

Under the Entry Age Normal cost method, the actuarial contribution rate consists of three components:

- a "normal cost" for the portion of projected liabilities allocated by the actuarial cost method to service of members during the year following the valuation date,
- an "unfunded actuarial accrued liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets (unfunded actuarial accrued liability); and
- an amount to cover estimated administrative expenses for the plan year.

See page 98 of the report for the detailed development of these contribution rates is shown in the following table.

Contribution Rates	July 1, 2018	July 1, 2017
Normal Cost Rate	9.16%	8.77%
UAAL Contribution Rate	7.70%	9.41%
Expenses	0.32%	0.25%
Total Required Contribution	17.18%	18.43%
Statutory Contribution Rate	16.10%	15.93%
Deficiency	(1.08%)	(2.50%)
Contribution **Sufficiency** reflecting future scheduled contributions	0.21%	(2.50%)

When a system is funded with fixed contribution rates (Statutory Contribution Rate), it is expected that the fixed contribution rate may be either higher or lower than the actuarial contribution rate (Required Contribution Rate for TRA), as determined in the actuarial valuation each year. However, when the Statutory Contribution Rate is consistently lower than the Required Contribution Rate for a long period, it can significantly impact the funding progress of the system and result in an increasing UAAL and declining funded ratio. For TRA, the Statutory Contribution Rate has been significantly below the Required Contribution Rate for over ten years. Over this time, the funded status of the system has declined from 92% to 77%. Actual investment experience over this time period also had a significant impact on the system's funding, but the long-term pattern of actual contributions that are significantly less than the actuarial contribution rate is a concern from an actuarial standpoint. The benefit and contribution changes enacted by the 2018 legislature had a significant positive impact on the projected long term funding of TRA. While the funded ratio, as of July 1, 2018, did not increase materially, the Contribution Deficiency was reduced from 2.50% in the 2017 valuation to 1.08% in the current valuation. When future scheduled increases in the Statutory Contribution Rate are considered, the Contribution Deficiency is eliminated which is expected to result in an improvement in the funded ratio over time, assuming all assumptions are met.

The actuarial contribution rate (Required Contribution Rate) is determined based on the snapshot of the System taken on the valuation date, July 1, 2018. The actuarial contribution rate in future years will change each year as the deferred actuarial investment experience is recognized and other experience (both investment and demographic) impacts the System. The most volatile component of the actuarial contribution rate is typically the actual investment return, although the asset smoothing method helps to dampen the impact

Summary

The investment return on the market value of assets for FY 2018 was 10.3%, as reported by SBI. However, due to the application of the asset smoothing method, the return on the actuarial value of assets was 9.8%. Since this return was above the assumed rate of return of 8.5% for the fiscal year ending 2018, there was an actuarial gain on the actuarial value of assets. Coupled with the change to the set of economic assumptions (including the investment return assumption), changes to the benefit provisions, and demographic experience for the year, the funded ratio increased slightly from 76.79% in last year's valuation to 76.89% this year.

As mentioned earlier, the System utilizes an asset smoothing method in the valuation process. While this is a common procedure for public retirement systems, it is important to identify the potential impact of the deferred investment experience. The asset smoothing method impacts only the timing of when the actual market experience is recognized in the valuation process. The net deferred investment gain of $335 million represents about 1.5% of the market value of assets.

The key valuation results from the July 1, 2018 actuarial valuation are shown below, using both actuarial and market value of assets.

	Fair Value	Actuarial Value
Statutory Rate	16.10%	16.10%
Required Contribution		
Normal Cost	9.16%	9.16%
UAAL Contribution	7.32%	7.70%
Expenses	0.32%	0.32%
Total Required Contribution	16.80%	17.18%
Deficiency	(0.70%)	(1.08%)
UAAL (millions)	$6,285	$6,620
Funded Ratio	78.06%	76.89%

If the Total Required Contribution Rate is calculated, based on the UAAL using the market value of assets, the Required Contribution Rate decreases to 16.80% and the resulting Contribution Deficiency for FY 2019, reflecting the current contribution rates, is 0.70%.

The long-term financial health of this System, like all retirement systems, is heavily dependent on two key items: (1) future investment returns and (2) contributions to the System. Changes were made by the 2018 Legislature to strengthen the funding of TRA and enhance its long-term sustainability. Contributions were increased by a total of 1.5%, phased-in over six years beginning July 1, 2018, and benefit reductions were implemented. These changes are expected to lead to improvement in the long-term funding of the System. Of course, actual experience over time will unfold differently from what is assumed, so additional adjustments may be necessary in the future. It is especially important to note that it is the actual investment returns, not the assumed investment return, that will ultimately determine the cost to provide the promised benefits.

The complete Actuarial Valuation Funding Report is available on the TRA website at

https://minnesotatra.org/financial/annual-reports/

Reconciliation of Member Data*

Fiscal Year Ended June 30, 2018

	Active** Members	Former*** Members	Benefit Recipients**** Service Retirements	Disability Retirements	Survivors	Total
Members on 6/30/2017	81,811	47,374	58,989	517	5,268	193,959
New hires	5,490	-	-	-	-	5,490
Transfer from active to inactive	(4,519)	4,519	-	-	-	0
Transfer from inactive to active	1,530	(1,530)	-	-	-	0
Return from zero balance	420	14	-	-	-	434
Return from disability	7	2	-	-	-	9
Refunded	(221)	(596)	-	-	-	(817)
Refunded (non-repayable)	(7)	(35)	-	-	-	(42)
Retirements	(1,967)	(486)	2,460	(47)	-	(40)
Benefits began	-	-	-	52	497	549
Benefits ended	-	-	-	(4)	(56)	(60)
Deaths	(31)	(72)	(1,322)	(16)	(232)	(1,673)
Adjustments	(18)	121	1	(2)	(1)	101
Net changes	684	1,937	1,139	(17)	208	3,951
Members on 6/30/2018	82,495	49,311	60,128	500	5,476	197,910

* *All figures in this chart were provided by the Teachers Retirement Association. Recipient counts include all pensions in force, including double counting of multiple benefit types. Service Retirements include Supplemental, Variable and optional joint annuitants. We found these results to be reasonable.*

** *Active members include 2 Basic and 82,493 Coordinated members.*

*** *Former members include 13 Basic and 49,298 Coordinated members.*

**** *Benefit recipients include 3,615 Basic members and 62,489 Coordinated members.*

Former Member Statistics	Vested	Non-Vested	Total
Number	14,936	34,375	49,311
Average Age	48.5	46.5	47.1
Average Service (years)	7.6	0.8	2.9
Average annual benefits, with augmentation to Normal Retirement Date and Combined Service Annuity load	$8,035	NA	NA
Average refund value, with Combined Service Annuity load	$34,818	$2,628	$12,378

Statement of Fiduciary Net Position

Fiscal Year Ended June 30, 2018

(Dollars in Thousands)

Assets	Fair Value
Cash and short term investments	
Cash	$ 9,533
Building account cash	30
Short-term investments	254,436
Total cash and short-term investments	$ 263,999
Receivables	24,885
Investments (at fair value)	
Bond pool	$ 5,497,619
Alternative investments pool	3,072,614
Indexed equity pool	0
Domestic equity pool	9,227,563
International stock fund	5,268,602
Total investments	$ 22,066,398
Securities lending collateral	2,234,956
Building	
Land	$ 171
Building and equipment – net of depreciation	5,974
Total building	$ 6,145
Capital assets net of depreciation	$ 15,541
Total Assets	**$ 24,611,924**

Statement of Fiduciary Net Position *(continued)*

Fiscal Year Ended June 30, 2018

(Dollars in Thousands)

Liabilities		Fair Value
Current		
Accounts payable	$	9,384
Accrued compensated absences		91
Accrued expenses - building		24
Bonds payable		634
Bonds interest payable		6
Securities lending collateral		2,234,956
Total current liabilities	$	2,245,095
Long term		
Accrued compensated absences	$	795
Bonds payable		3,947
Total long-term liabilities	$	4,742
Total Liabilities	**$**	**2,249,837**
Net Position Restricted for Pension Benefits	**$**	**22,362,087**
Earnings Limitation Savings Account (ELSA) accounts payable*		(4,517)
Net Position Restricted, after adjustment for ELSA accounts	**$**	**22,357,570**

** Not calculated by Cavanaugh Macdonald; TRA determined.*

Statement of Changes in Fiduciary Net Position

Fiscal Year Ended June 30, 2018

The following exhibit shows the revenue, expenses and resulting assets of the Fund as reported by the Teachers Retirement Association for the Plan's fiscal year July 1, 2017 to June 30, 2018.

(Dollars in Thousands)

Change in Assets	Fair Value
Additions	
Contributions	
Employee	$ 374,550
Employer	378,728
Direct aid (state/city/county)	35,587
Earnings Limitation Savings Account (ELSA)	1,937
Total contributions	$ 790,802
Investment income	
Investment appreciation in fair value	$ 2,168,525
Less investment expenses	(23,448)
Net investment income	$ 2,145,077
Securities lending activities	
Securities lending income	$ 46,592
Securities lending expenses	
Borrowing rebates	$ (29,786)
Management fees	(1,772)
Total securities lending expenses	(31,558)
Net income from securities lending	15,034
Total net investment income	$ 2,160,111
Other income	2,581
Total additions	**$ 2,952,494**
Deductions	
Benefits Paid	
Retirement benefits	$ (1,818,814)
Refunds of contributions to members	(13,073)
Total benefits paid	$ (1,831,887)
Administrative Expenses	(15,763)
Total deductions	$ (1,847,560)
Increase/(Decrease) in ELSA account value	**(1,850)**
Net position restricted for pensions	**$ 1,104,084**
Beginning of year	**$ 21,253,486**
End of year	**$ 22,357,570**

Actuarial Value of Assets

Fiscal Year Ended June 30, 2018

(Dollars in Thousands)

1. Fair value of assets available for benefits				**$**	**22,357,570**
2. Determination of average balance					
a. Assets available at July 1, 2017*				$	21,258,090
b. Assets available at June 30, 2018*					22,362,087
c. Net investment income for fiscal year ending June 30, 2018					2,160,111
d. Average balance *[a. + b. - c.] / 2*				$	20,730,033
3. Expected return *[8.5 percent * 2.d.]*					1,762,053
4. Actual return					2,160,111
5. Current year unrecognized asset return					398,058
6. Unrecognized asset returns					
		Original Amount	**% Not Recognized**		
a. Year ended June 30, 2018	$	398,058	80%	$	318,446
b. Year ended June 30, 2017	$	1,342,126	60%		805,276
c. Year ended June 30, 2016	$	(1,619,440)	40%		(647,776)
d. Year ended June 30, 2015	$	(706,091)	20%		(141,218)
e. Total return not yet recognized				$	334,728
7. Actuarial value at June 30, 2018 *(1. - 6.e.)*				**$**	**22,022,842**

* *Before recognition of ELSA accounts payable.*

Actuarial Valuation Balance Sheet

Fiscal Year Ended June 30, 2018

The actuarial balance sheet is based on the fundamental equation that, at any given time, the present value of benefits to be paid in the future must be equal to the assets on hand plus the present value of future contributions to be received. The total rate of contribution is determined as that amount which will make the total present and potential assets balance with the total present value of future benefits.

The contributions made in excess of amounts required for current benefit payments are accumulated as a reserve to help meet benefit payments in later years. This reserve fund enables the establishment of a level rate of contribution each year.

(dollars in thousands)

A. Actuarial Value of Assets			$ 22,022,842
B. Expected Future Assets			
1. Present value of expected future statutory supplemental contributions*			$ 5,688,170
2. Present value of expected future normal cost contributions			4,977,085
3. Total expected future assets *(1. + 2.)*			$ 10,665,255
C. Total Current and Expected Future Assets**			$ 32,688,097
D. Current Benefit Obligations	Non-Vested	Vested	Total
1. Benefit recipients			
a. Service retirements	$ 0	$ 17,135,810	$ 17,135,810
b. Disability	0	147,761	147,761
c. Survivors	0	1,140,657	1,140,657
2. Deferred retirements with augmentation to Normal Retirement Date	0	636,756	636,756
3. Former members without vested rights***	90,338	0	90,338
4. Active members	68,805	8,183,762	8,252,567
5. Total current benefit obligations	$ 159,143	$ 27,244,746	$ 27,403,889
E. Expected Future Benefit Obligations			6,216,219
F. Total Current and Expected Future Benefit Obligations			33,620,108
G. Unfunded Current Benefit Obligations *(D.5 – A)*			5,381,047
H. Unfunded Current and Future Benefit Obligations *(F. – C.)*			932,011

* *Under LCPR guidelines, this amount does not include supplemental payments, which could occur after the expiration of the remaining 30-year amortization period.*

** *Does not reflect deferred investment experience in the asset smoothing method. Total expected future assets on a fair value basis are $30,370,785.*

*** *Former members with insufficient service to vest who have not collected a refund of member contributions as of the valuation date.*

Determination of Unfunded Actuarial Accrued Liability (UAAL) and Supplemental Contribution Rate

July 1, 2018

Dollars in Thousands	Actuarial Present Value of Projected Benefits	Actuarial Present Value of Future Normal Costs	Actuarial Accrued Liability
A. Determination of Actuarial Accrued Liability (AAL)			
1. Active Members			
a. Retirement annuities	$ 13,643,619	$ (4,129,293)	$ 9,514,326
b. Disability benefits	318,719	(135,028)	183,691
c. Survivor benefits	107,439	(41,361)	66,078
d. Deferred retirements	383,778	(487,171)	(103,393)
e. Refunds	15,231	(184,232)	(169,001)
f. Total	$ 14,468,786	$ (4,977,085)	$ 9,491,701
2. Deferred retirements with future augmentation to Normal Retirement Age	636,756	0	636,756
3. Former members without vested rights	90,338	0	90,338
4. Benefit recipients	18,424,228	0	18,424,228
5. Total	$ 33,620,108	$ (4,977,085)	$ 28,643,023

B. Determination of Unfunded Actuarial Accrued Liability (UAAL)*	
1. Actuarial accrued liability	$ 28,643,023
2. Actuarial value of assets (page 94, line 7)	$ 22,022,842
3. Unfunded actuarial accrued liability	$ 6,620,181
C. Determination of Supplemental Contribution Rate*	
1. Present value of future payrolls through the amortization date of June 30, 2048	$ 85,924,015
2. Supplemental contribution rate *(A.3/B.1)***	7.70%

* *On a fair value of assets basis, the unfunded actuarial accrued liability is $6,285,453 and the supplemental contribution rate is 7.32 percent of payroll.*

** *The amortization factor as of July 1, 2018 is 16.6097.*

Changes in Unfunded Actuarial Accrued Liability

Fiscal Year Ended June 30, 2018

Dollars in Thousands		Amount
A. Unfunded actuarial accrued liability at beginning of year	$	6,364,913
B. Changes due to interest requirements and current rate of funding*		
1. Normal cost and actual administrative expenses	$	458,013
2. Contributions		(790,802)
3. Interest on A., B.1 and B.2		527,162
4. Total *(B.1. + B.2. + B.3.)*	$	194,373
C. Expected unfunded actuarial accrued liability at end of year *(A. + B.4.)*	$	6,559,286
D. Increase (decrease) due to actuarial losses (gains) because of experience deviations from expected		
1. Salary increases	$	(150,903)
2. Investment return (AVA)		(254,145)
3. Mortality of active members		(810)
4. Mortality of benefit recipients		(11,710)
5. Retirement from active service		67,530
6. Other items		14,243
7. Total	$	(335,795)
E. Unfunded actuarial accrued liability at end of year before plan amendments and changes in actuarial assumptions *(C. + D.7.)*	$	6,223,491
F. Change in unfunded actuarial accrued liability due to new provisions	$	(2,857,204)
G. Change in unfunded actuarial accrued liability due to change in assumptions	$	3,253,894
H. Unfunded actuarial accrued liability at end of year (E. + F. + G.)	$	6,620,181

* *The amortization of the unfunded actuarial accrued liability (UAAL) using the current amortization method results in initial payments less than the "interest only" payment on the UAAL. Payments less than the interest only amount will result in the UAAL increasing in the absence of actuarial gains.*

Determination of Contribution Sufficiency/(Deficiency) — Total

July 1, 2018

The annual required contribution (ARC) is the sum of the normal cost, a supplemental contribution to amortize the UAAL, and an allowance for expenses.

Dollars in Thousands	Percent of Payroll		Dollar Amount
A. Statutory Contributions - Chapter 354			
1. Employee contributions	7.50%	$	387,991
2. Employer contributions*	7.91%		409,208
3. Supplemental contributions**			
a. 1993 Legislation	0.10%		5,000
b. 1996 Legislation	0.06%		3,256
c. 1997 Legislation	0.25%		12,954
d. 2014 Legislation	0.28%		14,377
4. Total	16.10%	$	832,786
B. Required Contributions - Chapter 356			
1. Normal cost			
a. Retirement benefits	7.66%	$	396,274
b. Disability benefits	0.23%		11,899
c. Survivor benefits	0.08%		4,139
d. Deferred retirement benefits	0.85%		43,972
e. Refunds	0.34%		17,589
f. Total	9.16%	$	473,873
2. Supplemental contribution for the amortization of the Unfunded Actuarial Accrued Liability by June 30, 2048	7.70%		398,330
3. Allowance for expenses	0.32%	$	16,554
4. Total annual contribution for fiscal year ending June 30, 2019***	17.18%	$	888,757
C. Contribution Sufficiency / (Deficiency) (A.4. - B.4.)***	(1.08%)	$	(55,971)
Note: Projected annual payroll for fiscal year beginning on the valuation date		$	5,173,114

* *Employer contribution rate is blended to reflect rates of 15.35 percent of pay for Basic members, 7.71 percent for pay for Coordinated members not employed by Special School District #1, and 11.35 percent of pay for Coordinated members who are employed by Special School District #1.*

** *Includes contributions from Special School District #1 and the City of Minneapolis, matching state contributions.*

*** *On a fair value of assets basis, the total required contribution is 16.80 percent of payroll and the contribution deficiency is 0.70 percent of payroll.*

Solvency Test

Dollars in Thousands

Valuation as of June 30	Aggregate Accrued Liabilities (1) Member Contributions	(2) Retirees and Beneficiaries	(3) Members (Employer Financed Portion)	Valuation Assets	Portion of Actuarial Accrued Liabilities Covered by Reported Assets (1)	(2)	(3)
2009	$ 2,038,749	$ 14,203,926	$ 6,872,127	$ 17,882,408	100%	100%	23.9%
2010	$ 2,128,600	$ 13,650,631	$ 6,302,403	$ 17,323,146	100%	100%	24.5%
2011	$ 2,308,427	$ 13,964,552	$ 5,898,514	$ 17,132,383	100%	100%	14.6%
2012	$ 2,407,626	$ 14,664,333	$ 5,952,546	$ 16,805,077	100%	98.2%	0.0%
2013	$ 2,482,123	$ 15,145,239	$ 5,791,267	$ 16,774,626	100%	94.4%	0.0%
2014	$ 2,510,604	$ 15,798,610	$ 6,219,292	$ 18,181,932	100%	99.2%	0.0%
2015	$ 2,637,237	$16,500,275	$ 6,424,643	$ 19,696,893	100%	100%	8.7%
2016	$ 3,033,160	$ 17,187,332	$ 6,495,724	$ 20,194,279	100%	99.8%	0.0%
2017	$ 3,246,851	$ 17,634,270	$ 6,546,581	$ 21,062,789	100%	100%	2.8%
2018	$ 3,442,582	$ 18,424,228	$ 6,776,213	$ 22,022,842	100%	100%	2.3%

Schedule of Active Member Valuation Data

Year Ended June 30	Active Members	*($ in thousands)* Annual Covered Payroll	% Increase in Covered Payroll	Average Annual Member Salary
2009	77,162	$3,761,484	3.2%	$48,748
2010	77,356	$3,787,757	0.7%	$48,965
2011	76,755	$3,838,111	1.3%	$50,005
2012	76,649	$3,871,809	0.9%	$50,514
2013	76,765	$3,917,310	1.2%	$51,030
2014	77,243	$4,056,482	3.5%	$52,516
2015	79,406	$4,306,426	6.2%	$54,233
2016	80,530	$4,515,699	4.9%	$56,075
2017	81,811	$4,688,875	3.8%	$57,314
2018	82,495	$4,832,917	3.1%	$58,584

Schedule of Retirees and Beneficiaries Added To and Removed From Retirement Rolls

Through June 1, 2018 – End of Budget Year for Benefit Payments – Prepared by TRA**

	Added To Rolls		Removed From Rolls		June 1 Payment		
Fiscal Year	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Avg. Annual Allowances
2018							
Retirement	2423	$ 71,176,463	1,352	$ 42,530,337	59,703	$ 1,655,206,770	$ 27,725
Disability	50	$ 1,169,477	71	$ 1,752,096	515	$ 10,959,775	$ 21,181
Beneficiaries	524	$ 12,771,988	318	$ 9,805,060	5,768	$ 156,474,569	$ 27,114
2017							
Retirement	2,362	$ 67,444,049	1,264	$ 38,365,148	58,632	$ 1,608,549,654	$ 27,436
Disability	73	$ 1,774,135	75	$ 1,683,296	536	$ 11,352,435	$ 21,180
Beneficiaries	512	$ 13,397,711	327	$ 8,017,689	5,562	$ 150,944,018	$ 27,124
2016							
Retirement	2,700	$ 74,501,674	1,253	$ 40,121,659	57,534	$ 1,559,304,348	$ 27,102
Disability	56	$ 1,333,271	101	$ 1,987,290	538	$ 11,126,018	$ 20,680
Beneficiaries	569	$ 13,400,450	282	$ 6,445,318	5,377	$ 142,825,257	$ 26,562
2015*							
Retirement	3,901	$139,486,500	1,219	$ 113,360,695	56,087	$ 1,507,085,583	$ 26,871
Disability	91	$ 4,201,093	74	$ 5,046,531	583	$ 11,561,844	$ 19,832
Beneficiaries	623	$ 25,490,532	269	$ 17,055,001	5,090	$ 134,071,302	$ 26,340
2014							
Retirement	2,657	$ 72,823,770	1,082	$ 33,357,350	53,405	$ 1,438,959,431	$ 26,944
Disability	71	$ 1,371,630	76	$ 1,731,701	566	$ 10,884,969	$ 19,231
Beneficiaries	428	$ 11,562,063	217	$ 4,779,599	4,736	$ 123,918,462	$ 26,165
2013							
Retirement	2,719	$ 73,367,192	1,079	$ 33,267,557	51,830	$ 1,393,126,889	$ 26,879
Disability	54	$ 1,049,388	80	$ 1,799,928	571	$ 11,051,118	$ 19,354
Beneficiaries	449	$ 11,519,816	237	$ 6,491,835	4,525	$ 116,204,127	$ 25,680
2012							
Retirement	2,770	$ 77,169,833	1,040	$ 30,234,280	50,193	$ 1,342,791,637	$ 26,753
Disability	72	$ 1,481,314	80	$ 1,816,246	597	$ 11,565,197	$ 19,372
Beneficiaries	402	$ 11,820,962	213	$ 3,969,446	4,310	$ 110,302,448	$ 25,592
2011							
Retirement	2,573	$ 71,896,835	1,012	$ 30,381,621	48,463	$ 1,320,885,728	$ 27,256
Disability	59	$ 1,365,130	72	$ 1,841,934	605	$ 11,896,607	$ 19,664
Beneficiaries	400	$ 9,199,307	224	$ 4,179,950	4,121	$ 104,083,869	$ 25,257
2010							
Retirement	2,034	$ 57,221,454	922	$ 28,024,798	46,902	$ 1,296,882,008	$ 27,651
Disability	51	$ 1,283,512	67	$ 1,578,194	618	$ 12,400,315	$ 20,065
Beneficiaries	391	$ 9,945,588	193	$ 4,237,320	3,945	$ 100,367,532	$ 25,442
2009							
Retirement	2,282	$ 65,082,777	874	$ 25,678,679	45,790	$ 1,271,277,327	$ 27,763
Disability	48	$ 959,551	26	$ 507,524	634	$ 12,364,085	$ 19,502
Beneficiaries	343	$ 7,938,855	213	$ 2,997,929	3,747	$ 94,308,262	$ 25,169

**2015 data reflects higher additions and removals associated with the conversion of former DTRFA benefit recipient rolls into TRA benefit payment systems.*

***Timing differences exist between the data used for statistical information and that used for actuarial valuation purposes.*

Schedule of Funding Progress (Unaudited)

Dollars in Thousands

Actuarial Valuation Date	Actuarial Value of Assets (A)	Actuarial Accrued Liability (AAL) (B)	Unfunded AAL (UAAL) (B–A)	Funded Ratio (A / B)	Actual Covered Payroll (Previous FY) (C)	UAAL as Percentage of Covered Payroll (B–A) / (C)
07/01/09	$17,882,408	$23,114,802	$ 5,232,394	77.36%	$3,761,484	139.10%
07/01/10	$17,323,146	$22,081,634	$ 4,758,488	78.45%	$3,787,757	125.63%
07/01/11	$17,132,383	$22,171,493	$ 5,039,110	77.27%	$3,838,111	131.29%
07/01/12	$16,805,077	$23,024,505	$ 6,219,428	72.99%	$3,871,809	160.63%
07/01/13	$16,774,626	$23,418,629	$ 6,644,003	71.63%	$3,917,310	169.61%
07/01/14	$18,181,932	$24,528,506	$ 6,346,574	74.13%	$4,056,482	156.46%
07/01/15	$19,696,893	$25,562,155	$ 5,865,262	77.05%	$4,306,426	136.20%
07/01/16	$20,194,279	$26,716,216	$ 6,521,937	75.59%	$4,515,699	144.43%
07/01/17	$21,062,789	$27,427,702	$ 6,364,913	76.79%	$4,688,875	135.74%
07/01/18	$22,022,842	$28,643,023	$ 6,620,181	76.89%	$4,832,917	136.98%

Schedule of Contributions From the Employer and Other Contributing Entities (Unaudited)

Dollars in Thousands

Year End June 30	Actuarially* Required Contribution Rate (a)	Actual Covered Payroll (b)	Actual Member Contributions (c)	ARC Annual Required Contributions [(a) x (b)] - (c)	Actual Employer Contribution	Percentage Contributed
2008	13.44%	$ 3,645,230	$ 209,592	$ 280,327	$ 231,562	82.60%
2009	15.08%	$ 3,761,484	$ 212,043	$ 355,189	$ 240,718	67.72%
2010	16.81%	$ 3,787,757	$ 214,909	$ 421,813	$ 242,088	57.39%
2011	15.71%	$ 3,838,111	$ 218,024	$ 384,943	$ 244,233	63.45%
2012	16.57%	$ 3,871,809	$ 239,834	$ 401,725	$ 266,661	66.38%
2013	18.75%	$ 3,917,310	$ 270,708	$ 463,788	$ 290,662	62.67%
2014	19.41%	$ 4,056,482	$ 294,632	$ 492,731	$ 320,301	65.01%
2015	19.15%	$ 4,261,626	$ 331,905	$ 484,196	$ 358,367	74.01%
2016	17.86%	$ 4,515,699	$ 347,256	$ 459,699	$ 390,548	84.96%
2017	18.72%	$ 4,688,875	$ 361,175	$ 516,582	$ 403,378	78.09%
2018	18.43%	$ 4,832,917	$ 374,550	$ 516,157	$ 414,315	80.27%

**Actuarially Required Contributions calculated according to parameters of GASB 25.*

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Teachers Retirement Association of Minnesota
A Pension Trust Fund of the State of Minnesota

Statistical

Statistical Summary

TRA complies with GASB Statement No. 44, Economic Condition Reporting: The Statistical Section, issued in May 2004. The pronouncement establishes and modifies requirements related to the supplementary information presented in this section of the report. This section of the report provides detailed information about TRA as a context for understanding what the information in the financial statement note disclosures and required supplementary information indicates about the Association's overall financial condition.

The schedules and graphs beginning on page 105 show trend information about the growth of TRA assets over the past 10 years. These schedules, and others, provide detailed information about the trends of key sources of additions and deductions to plan assets.

The Contribution Rate chart on page 105 provides historical information on the total member and employer contribution rates.

The schedule of Pension Assets Compared to Pension Liabilities, found on pages 106-107, show the funding progress of the plan for the past 10 years on accumulating assets to cover projected pension liabilities which will ultimately be due at retirement.

The schedules on pages 108-113 include detailed information regarding the number and type of benefit recipients, and information as to the benefit amount.

The chart on page 114 provides a profile of TRA active members on June 30, 2017, by age and service credit totals.

The chart on page 115 contains information on the total number of members by type.

The schedules on pages 116-117 detail the largest TRA employer units by covered employees and by types of employer.

All data is derived from TRA internal sources and the actuarial consultant.

The projected benefit payments (page 121) for the next 25 years have been supplied by TRA's actuarial advisor, Cavanaugh Macdonald Consulting.

10-Year History of TRA Fiduciary Net Position

Dollars in Thousands

Fiscal Year	Fiduciary Net Position	% Change From Prior Year
2009	$ 13,833,826	-23.6%
2010	$ 14,939,540	8.0%
2011	$ 17,303,576	15.8%
2012	$ 16,689,941	-3.6%
2013	$ 18,019,319	8.0%
2014	$ 20,293,685	12.6%
2015	$ 20,446,091	0.8%
2016	$ 19,424,431	-5.0%
2017	$ 21,258,090	9.4%
2018	$ 22,362,087	5.2%

10-Year History of TRA Contribution Rates

Fiscal Year	Basic Program Employee Contribution Rate	Basic Program Employer Contribution Rate	Basic Program Total Contribution Rate	Coordinated Employee Contribution Rate	Coordinated Employer Contribution Rate	Coordinated Total Contribution Rate
2009	9.00%	9.50%	18.50%	5.50%	5.50%	11.00%
2010	9.00%	9.50%	18.50%	5.50%	5.50%	11.00%
2011	9.00%	9.50%	18.50%	5.50%	5.50%	11.00%
2012	9.50%	10.00%	19.50%	6.00%	6.00%	12.00%
2013	10.00%	10.50%	20.50%	6.50%	6.50%	13.00%
2014	10.50%	11.00%	21.50%	7.00%	7.00%	14.00%
2015	11.00%	11.50%	22.50%	7.50%	7.50%	15.00%
2016	11.00%	11.50%	22.50%	7.50%	7.50%	15.00%
2017	11.00%	11.50%	22.50%	7.50%	7.50%	15.00%
2018	11.00%	11.50%	22.50%	7.50%	7.50%	15.00%

Teachers Retirement Association
10-Year History of Changes in Fiduciary Net Position

Dollars in Thousands

Fiscal Year ended June 30	2009	2010	2011	2012
Additions				
Member Contributions	$ 212,043	$ 214,909	$ 218,024	$ 239,834
Employer Contributions	240,718	242,088	244,233	266,661
Net Income (Loss) From Investing Activity	(3,318,368)	2,087,640	3,390,130	383,187
Other Income, Net	6,526	4,850	5,562	4,929
Total Additions to Fiduciary Net Position	$ (2,859,081)	$ 2,549,487	$ 3,857,949	$ 894,611
Deductions				
Pension Benefits	$ 1,383,668	$ 1,422,578	$ 1,460,836	$ 1,486,387
Refunds	14,429	11,607	23,813	11,836
Administrative Expenses	10,608	9,588	9,264	10,023
Other	5,354	0	0	0
Total Deductions from Fiduciary Net Position	$ 1,414,059	$ 1,443,773	$ 1,493,913	$ 1,508,246
Net Increase (Decrease)	$ (4,273,140)	$ 1,105,714	$ 2,364,036	$ (613,635)
Net Position Held in Trust, Beginning of Year	$ 18,106,966	$ 13,833,826	$ 14,939,540	$ 17,303,576
Net Position Held in Trust, End of Year	$ 13,833,826	$ 14,939,540	$ 17,303,576	$ 16,689,941

***"Net position held in trust, beginning of year" were restated to reflect $226,071,060 of assets assumed as a result of merger with DTRFA.*

10-Year History of Pension Assets vs. Pension Liabilities

Dollars in Thousands

Fiscal Year ended June 30	2009	2010	2011	2012
Pension Assets (Actuarial Value)	$ 17,882,408	$ 17,323,146	$ 17,132,383	$ 16,805,077
Accrued Liabilities	$ 23,114,802	$ 22,081,634	$ 22,171,493	$ 23,024,505
Unfunded Liabilities (Sufficiency)	$ (5,232,394)	$ (4,758,488)	$ (5,039,110)	$ (6,219,42)
Funded Ratio	77.4%	78.5%	77.3%	73.0%

10-Year History of Changes in Fiduciary Net Position *(cont'd)*

2013	2014	2015**	2016	2017	2018
$ 265,809	$ 294,632	$ 334,8256	$ 347,256	$ 361,175	$ 374,550
290,662	320,301	381,795	390,549	403,379	414,315
2,310,295	3,257,693	887,280	(23,672)	2,855,217	2,160,111
5,475	5,502	4,897	5,529	4,398	4,518
$ 2,872,241	$ 3,878,128	$ 1,608,798	$ 719,662	$ 3,624,169	$ 2,953,494
$ 1,523,269	$ 1,581,766	$ 1,659,069	$ 1,718,694	$ 1,767,568	$ 1,820,751
10,463	12,566	11,885	11,290	11,240	13,073
9,131	9,430	11,509	11,338	11,702	15,673
0	0	0	0	0	0
$ 1,542,863	$ 1,603,762	$ 1,682,463	$ 1,741,322	$ 1,790,510	$ 1,849,497
$ 1,329,378	$ 2,274,366	$ (73,665)	$ (1,021,660)	$ 1,833,659	$ 1,103,997
$ 16,689,941	$ 18,019,319	$ 20,519,756	$ 20,446,091	$ 19,424,431	$ 21,258,090
$ 18,019,319	$ 20,293,685	$ 20,446,091	$ 19,424,431	$ 21,258,090	$ 22,362,087

10-Yr History/Pension Assets vs. Pension Liabilities *(cont'd)*

2013	2014	2015	2016	2017	2018
$ 16,774,626	$ 18,181,932	$ 19,696,893	$ 20,194,279	$ 21,062,789	$ 22,022,542
$ 23,418,629	$ 24,528,506	$ 25,562,155	$ 26,716,216	$ 27,427,702	$ 28,643,023
$ (6,644,003)	$ (6,346,574)	$ (5,865,262)	$ (6,521,937)	$ (6,364,913)	$ (6,620,181)
71.6%	74.1%	77.1%	75.6%	76.8%	76.9%

10-Year History of TRA Benefits and Refunds by Type

Fiscal year ended June 30

Dollars in Thousands

Pension Benefits	2009	2010	2011	2012
Annuities	$ 1,352,742	$ 1,391,181	$ 1,429,843	$ 1,456,296
Disabilities	12,077	13,076	12,469	12,303
Survivor Benefits	16,548	17,124	17,238	16,929
Total Pension Benefits	$ 1,381,367	$ 1,421,381	$ 1,459,550	$ 1,485,528
Annuities Redirected to Earnings Limitation Savings Account (ELSA)	$ 2,301	$ 1,197	$ 1,286	$ 859
Member Refunds				
Regular	$ 8,632	$ 6,809	$ 7,669	$ 7,836
Death	1,968	1,273	990	929
ELSA Refunds	3,550	3,341	14,948	2,865
Employer Refunds	279	184	206	206
Total Refunds	$ 14,429	$ 11,607	$ 23,813	$ 11,836
Total Benefits and Refunds	$ 1,398,097	$ 1,434,185	$ 1,484,649	$ 1,498,223

10-Year History of TRA Benefit Recipients by Category

Fiscal year ended June 30

Year	Annuitants	Disabilitants	Survivors	Total
2009	46,009	624	3,575	50,208
2010	47,556	615	3,682	51,853
2011	49,079	602	3,856	53,537
2012	50,780	591	4,054	55,425
2013	52,331	568	4,269	57,168
2014	53,774	563	4,472	58,809
2015	56,589	571	4,826	61,986
2016	57,892	521	5,092	63,505
2017	58,991	517	5,268	64,776
2018	60,128	500	5,476	66,104

10-Year History of TRA Benefits and Refunds by Type *(cont'd)*

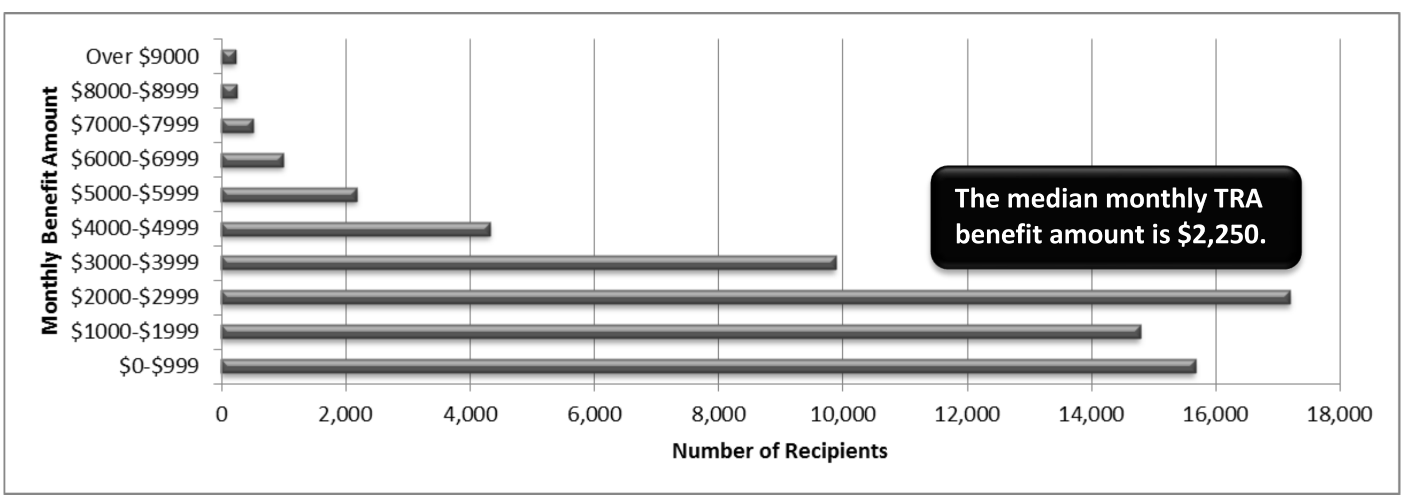
Fiscal year ended June 30

2013	2014	2015	2016	2017	2018
$ 1,492,612	$ 1,551,120	$ 1,626,703	$ 1,687,085	$ 1,741,265	$ 1,789,400
11,775	11,681	12,063	11,967	11,985	11,559
17,090	17,318	18,956	17,681	12,323	17,855
$ 1,521,477	$ 1,580,119	$ 1,657,722	$ 1,716,733	$ 1,765,573	$ 1,818,814
$ 1,792	$ 1,647	$ 1,347	$ 1,961	$ 1,995	$ 1,937
$ 7,597	$ 9,152	$ 8,696	$ 8,284	$ 7,847	$ 8,799
1,192	1,609	1,361	1,184	1,589	2,050
1,367	1,580	1,659	1,621	1,632	2,020
307	225	169	201	172	204
$ 10,463	$ 12,566	$ 11,885	$ 11,290	$ 11,240	$ 13,073
$ 1,533,732	$ 1,594,332	$ 1,670,954	$ 1,729,984	$ 1,778,808	$ 1,833,824

Schedule of Benefit Amounts Paid

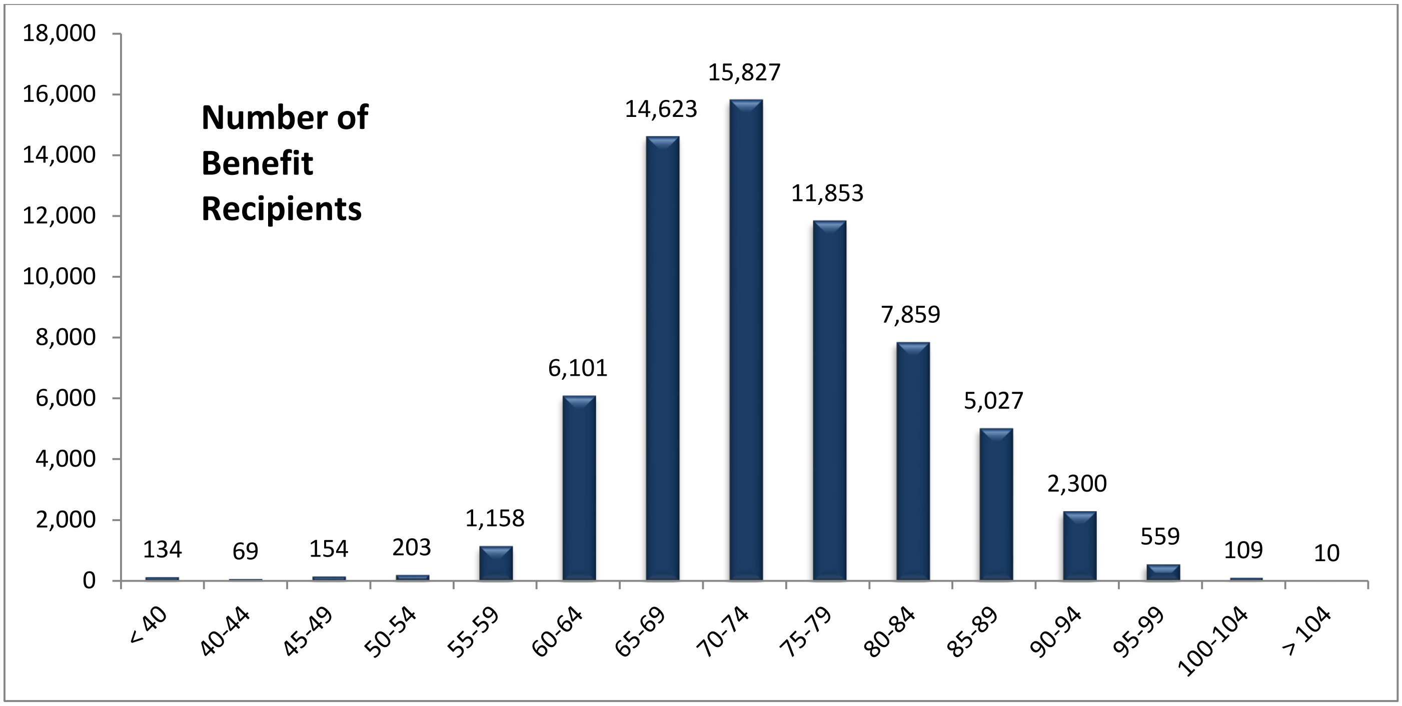
For Month of June 2018 – Payment Made June 1, 2018

Monthly Benefit Amount	Number of Recipients	Cumulative Total	Percent	Cumulative Percent
$ 0 – 499	9,098	9,098	13.79%	13.79%
$ 500 – 999	6,565	15,663	9.95%	23.74%
$ 1,000 – 1,499	6,609	22,272	10.02%	33.75%
$ 1,500 – 1,999	8,172	30,444	12.38%	46.14%
$ 2,000 – 2,499	8,994	39,438	13.63%	59.77%
$ 2,500 – 2,999	8,200	47,638	12.43%	72.19%
$ 3,000 – 3,499	6,014	53,652	9.11%	81.31%
$ 3,500 – 3,999	3,862	57,514	5.85%	87.16%
$ 4,000 – 4,499	2,608	60,122	3.95%	91.11%
$ 4,500 – 4,999	1,711	61,833	2.59%	93.71%
$ 5,000 – 5,499	1,274	63,107	1.93%	95.64%
$ 5,500 – 5,999	904	64,011	1.37%	97.01%
$ 6,000 – 6,499	577	64,588	0.87%	97.88%
$ 6,500 – 6,999	416	65,004	0.63%	98.51%
$ 7,000 – 7,499	288	65,004	0.44%	98.95%
$ 7,500 – 7,999	222	65,514	0.34%	99.28%
$ 8,000 – 8,499	155	65,669	0.23%	99.52%
$ 8,500 – 8,999	92	65,761	0.14%	99.66%
$ 9,000 – 9,499	78	65,761	0.12%	99.78%
$ 9,500 – 9,999	41	65,880	0.06%	99.84%
$ 10,000 – 10,499	32	65,912	0.05%	99.89%
$ 10,500 – 10,999	22	65,934	0.03%	99.92%
$ 11,000 – 11,499	17	65,951	0.03%	99.95%
$ 11,500 – 11,999	13	65,964	0.02%	99.97%
$ 12,000 – 12,499	4	65,968	0.01%	99.97%
$ 12,500 and over	18	65,986	0.03%	100.00%



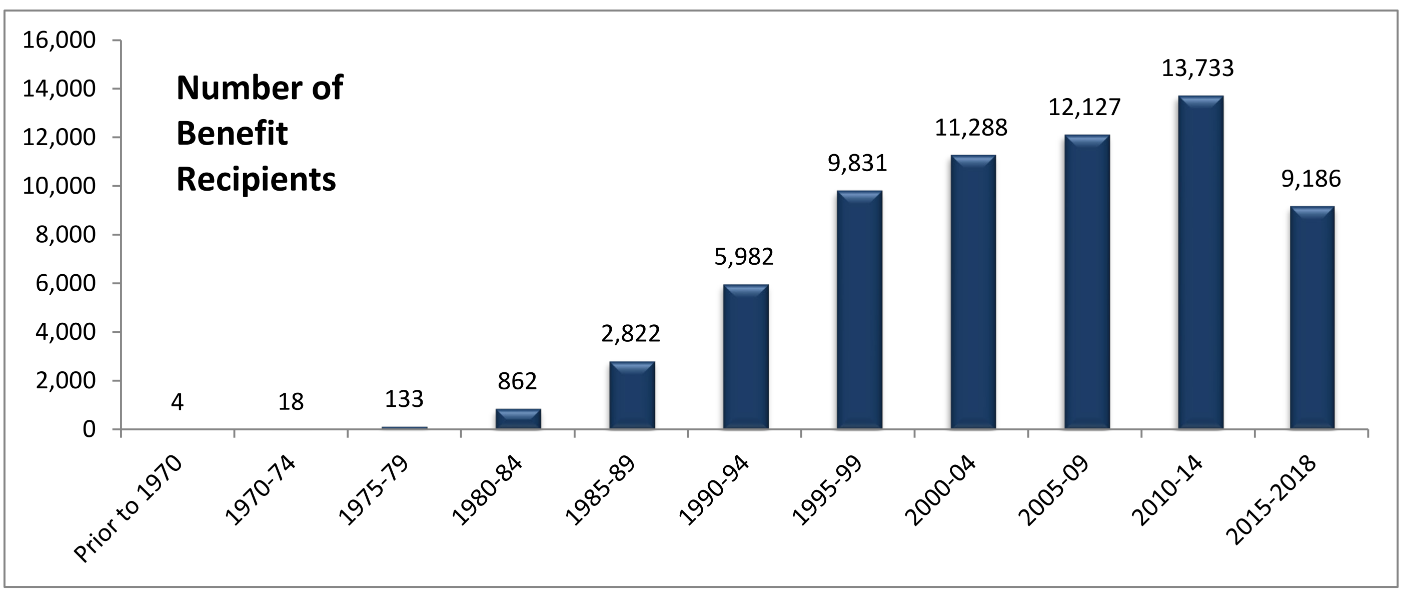
Schedule of TRA Benefit Recipients by Current Age

For Month of June 2018 – Payment Made June 1, 2018 Total Recipients: 65,986



Benefit Recipients by Effective Date of Retirement

For Month of June 2018 – Payment Made June 1, 2018 Total Recipients: 65,986



Schedule of New TRA Retirees and Initial Benefit Paid

For the Ten Fiscal Years Ending June 30

	Years of Formula Service							
Fiscal Year	<10	10-15	16-20	21-25	26-30	>30 (FY 2000-2008) 31-35 (FY 2009)	>35	Total
2009								
Avg. Monthly Benefit	$ 295	$885	$1,319	$1,975	$2,670	$3,463	$3,859	$2,507
Final Average Salary	$25,301	$39,270	$50,616	$59,550	$63,268	$66,179	$69,949	$56,972
Number of Retirees	285	139	160	180	223	793	257	2,037
2010								
Avg. Monthly Benefit	$299	$919	$1,497	$1,911	$2,636	$3,447	$3,884	$2,441
Final Average Salary	$24,488	$43,105	$54,513	$60,302	$64,611	$67,443	$70,941	$57,729
Number of Retirees	326	162	205	224	276	733	323	2,249
2011								
Avg. Monthly Benefit	$318	$883	$1,458	$2,076	$2,777	$3,576	$3,941	$2,410
Final Average Salary	$24,106	$43,245	$56,574	$63,832	$68,358	$71,541	$73,031	$58,957
Number of Retirees	431	212	240	270	278	685	428	2,544
2012								
Avg. Monthly Benefit	$388	$935	$1,485	$2,011	$2,747	$3,592	$4,004	$2,301
Final Average Salary	$28,337	$44,368	$55,772	$63,085	$68,043	$70,400	$74,259	$58,233
Number of Retirees	518	254	253	337	345	668	371	2,746
2013								
Avg. Monthly Benefit	$349	$921	$1,431	$1,995	$2,772	$3,591	$4,063	$2,318
Final Average Salary	$26,267	$44,588	$55,793	$62,310	$69,357	$70,648	$73,864	$58,305
Number of Retirees	458	231	272	344	338	605	387	2,635
2014								
Avg. Monthly Benefit	$362	$991	$1,468	$2,127	$2,798	$3,578	$4,111	$2,287
Final Average Salary	$26,345	$46,119	$56,872	$67,321	$69,205	$73,092	$76,236	$58,990
Number of Retirees	496	224	264	300	329	589	349	2,551
2015								
Avg. Monthly Benefit	$361	$935	$1,493	$2,099	$2,748	$3,583	$4,162	$2,276
Final Average Salary	$26,624	$45,288	$58,477	$65,827	$70,081	$73,802	$76,641	$59,482
Number of Retirees	503	247	287	322	378	533	375	2,645
2016								
Avg. Monthly Benefit	$390	$980	$1,561	$2,147	$2,834	$3,699	$4,312	$2,357
Avg. Final Salary	$29,988	$46,588	$57,103	$66,988	$71,615	$76,136	$78,332	$61,320
Number of Retirees	478	234	276	368	358	501	365	2,580
2017								
Avg. Monthly Benefit	$344	$1,016	$1,583	$2,171	$3,028	$3,804	$4,459	$2,455
Final Average Salary	$38,355	$48,505	$61,936	$70,094	$75,721	$78,127	$81,997	$65,530
Number of Retirees	463	182	264	293	363	519	321	2,405
2018								
Avg. Monthly Benefit	$360	$1,006	$1,603	$2,227	$2,882	$3,963	$4,470	$2,548
Final Average Salary	$43,494	$50,267	$63,619	$70,647	$75,591	$80,068	$81,024	$67,818
Number of Retirees	436	191	250	296	373	604	311	2,460

Schedule of Benefit Recipients by Type

For Month of June 2018 – Payment Made June 1, 2018

Monthly Benefit Amount				Number of Recipients	Type of Retirement Regular	Disability	Beneficiary
$	0	–	1,000	15,677	14,124	136	1,417
$	1,001	–	2,000	14,791	13,044	184	1,563
$	2,001	–	3,000	17,183	15,729	133	1,321
$	3,001	–	4,000	9,881	9,148	49	684
$	4,001	–	5,000	4,312	3,936	13	363
$	5,001	–	6,000	2,174	1,977	0	197
$	6,001	–	7,000	988	874	0	114
$	7,001	–	8,000	509	453	0	56
$	8,001	–	9,000	249	222	0	27
$	9,001	–	10,000	116	102	0	14
$	10,001	–	11,000	54	45	0	9
$	11,001	–	12,000	30	28	0	2
$	12,001	–	13,000	11	10	0	1
$	13,001	–	14,000	8	5	0	3
$	14,001	–	15,000	2	2	0	0
$	15,001	–	16,000	0	0	0	0
$	16,001		and over	1	1	0	0
			Totals:	65,986	59,700	515	5,771

TRA Membership Data

June 30, 2018

Distribution of Active Members*

Average Earnings in Dollars

Years of Service as of June 30, 2018**

Age	<3**	3-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 +	Total
<25	2,590	73									2,663
Avg. Earnings	29,801	44,668									30,209
25-29	4,227	3,264	1,886								9,377
Avg. Earnings	34,013	46,228	51,492								41,780
30-34	2,262	1,816	5,192	1,324							10,594
Avg. Earnings	33,751	47,356	55,050	64,598							50,377
35-39	1,947	1,124	2,746	4,901	1,255						11,973
Avg. Earnings	30,330	50,037	56,532	68,029	76,622						58,473
40-44	1,517	816	1,648	2,226	4,353	1,061					11,621
Avg. Earnings	26,918	48,602	55,579	67,396	77,459	82,082					64,227
45-49	1,321	590	1,376	1,496	2,370	3,908	819				11,880
Avg. Earnings	25,519	47,666	55,494	65,489	74,711	81,261	85,840				67,433
50-54	961	428	938	1,070	1,370	2,082	2,745	569			10,163
Avg. Earnings	24,514	44,682	53,218	64,068	73,349	79,283	84,041	84,849			69,436
55-59	752	306	712	852	1,149	1,180	1,576	1,675	169		8,371
Avg. Earnings	20,171	40,808	49,019	61,740	71,691	76,269	82,030	83,696	83,253		68,220
60-64	569	198	393	455	569	695	645	350	301	68	4,243
Avg. Earnings	14,446	35,961	43,469	58,146	69,548	76,528	78,209	86,119	84,276	86,850	62,102
65-69	424	79	107	110	137	105	95	47	30	54	1,188
Avg. Earnings	7,713	26,463	31,504	60,361	64,630	74,133	78,233	89,726	92,060	91,644	43,240
70 +	231	31	53	21	16	13	16	9	6	26	422
Avg. Earnings	5,295	18,827	18,077	50,397	69,611	81,689	72,067	94,663	95,983	92,260	26,201
Total	16,801	8,725	15,051	12,455	11,219	9,044	5,896	2,650	506	148	82,495
Avg. Earnings	28,709	46,484	53,974	66,017	75,123	79,805	82,989	84,408	84,535	90,076	58,866

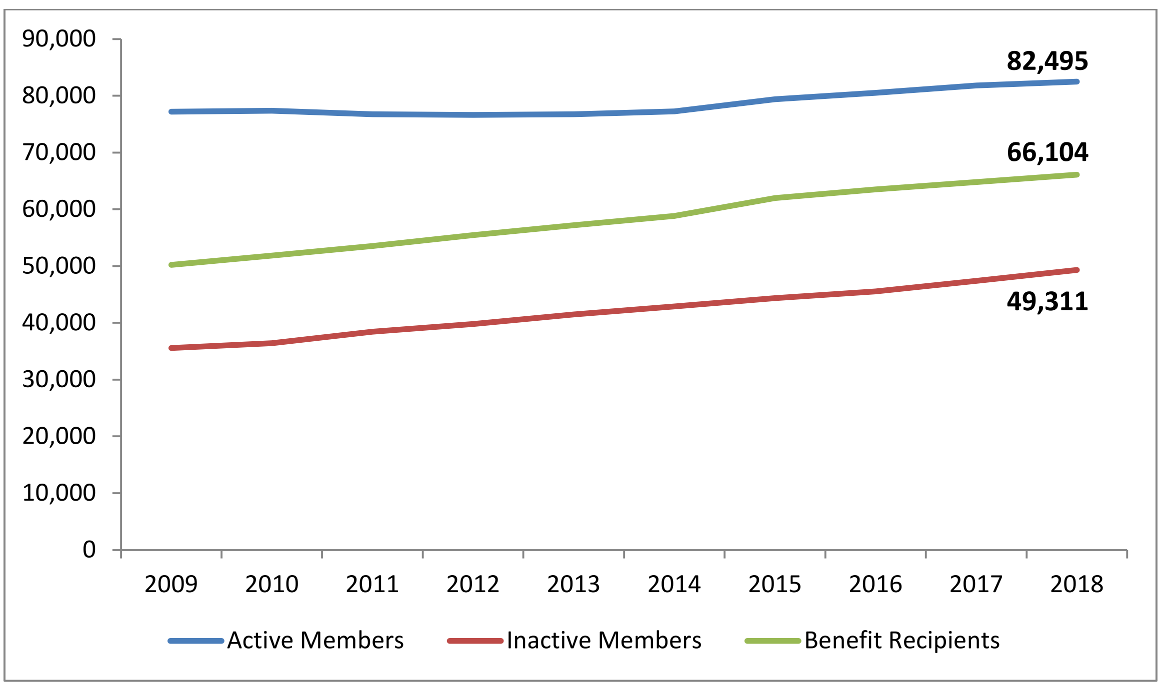
* *Active members include 2 Basic and 82,493 Coordinated members.*

** *This exhibit does not reflect service earned in Combined Service Annuity benefits. It should not be relied upon as an indicator of non-vested status.*

In each cell, the top number is the count of active members for the age/service combination and the bottom number is the amount of average annual earnings. Earnings shown in this exhibit are actual salaries earned during the fiscal year ending June 30, 2018, as reported by the Teachers Retirement Association of Minnesota.

10-Year Summary of TRA Membership

Year Ended June 30	Active Members	Inactive Members	Benefit Recipients
2009	77,162	35,563	50,208
2010	77,356	36,407	51,853
2011	76,755	38,433	53,537
2012	76,649	39,792	55,425
2013	76,765	41,495	57,168
2014	77,243	42,891	58,809
2015	79,406	44,340	61,986
2016	80,530	45,530	63,503
2017	81,811	47,374	64,774
2018	82,495	49,311	66,104



TRA Principal Participating Employers

Fiscal year ended June 30, 2018 and June 30, 2009

	2018			2009		
Employer Unit Name	Covered Employees	Rank	Percentage of Active Membership	Covered Employees	Rank	Percentage of Active Membership
Minneapolis – Special School District #1	4,325	1	5.22%	3,473	1	4.50
Anoka-Hennepin – ISD #11	3,399	2	4.10%	3,466	2	4.49
MnSCU (MN State Colleges & Universities)	2,870	3	3.46%	3,019	3	3.91
Rosemount-Apple Valley-Eagan – ISD #196	2,711	4	3.27%	2,741	4	3.55
Osseo – ISD #279	1,849	5	2.23%	1,745	5	2.62
South Washington County – ISD #833	1,772	6	2.14%	1,476	7	1.91
Rochester – ISD #535	1,713	7	2.07%	1,483	6	1.92
Robbinsdale – ISD #281	1,209	8	1.46%	1,086	8	1.41
Bloomington – ISD #271	1,090	9	1.32%	1,033	9	1.34
Mounds View – ISD #621	1,044	10	1.26%			
Burnsville – ISD #191				976	10	1.26
All Other	60,892		73.48%	56,664		73.45
Total	82,874		100.00%	77,162		100.00%

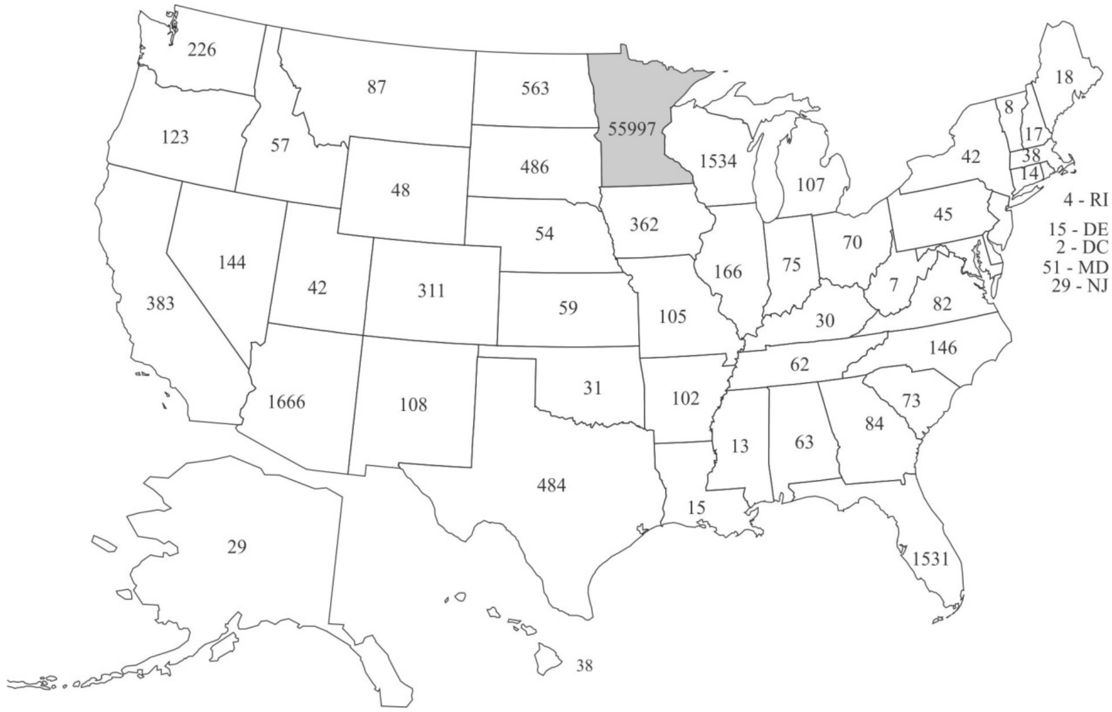
Number of TRA Employer Units

As of June 30, 2018

Year	Independent School Districts	Joint Power Units	MN State Colleges and Universities (MnSCU)	Charter Schools	State Agencies	Others	Total
2009	347	34	39	156	5	2	583
2010	342	37	39	154	4	2	578
2011	342	37	39	155	4	2	579
2012	344	34	39	158	4	6	585
2013	347	35	39	160	4	6	591
2014	341	37	39	163	5	5	590
2015	373	0	39	167	5	5	589
2016	373	0	39	174	4	5	595
2017	373	0	39	173	4	4	593
2018	374	0	39	169	4	4	590

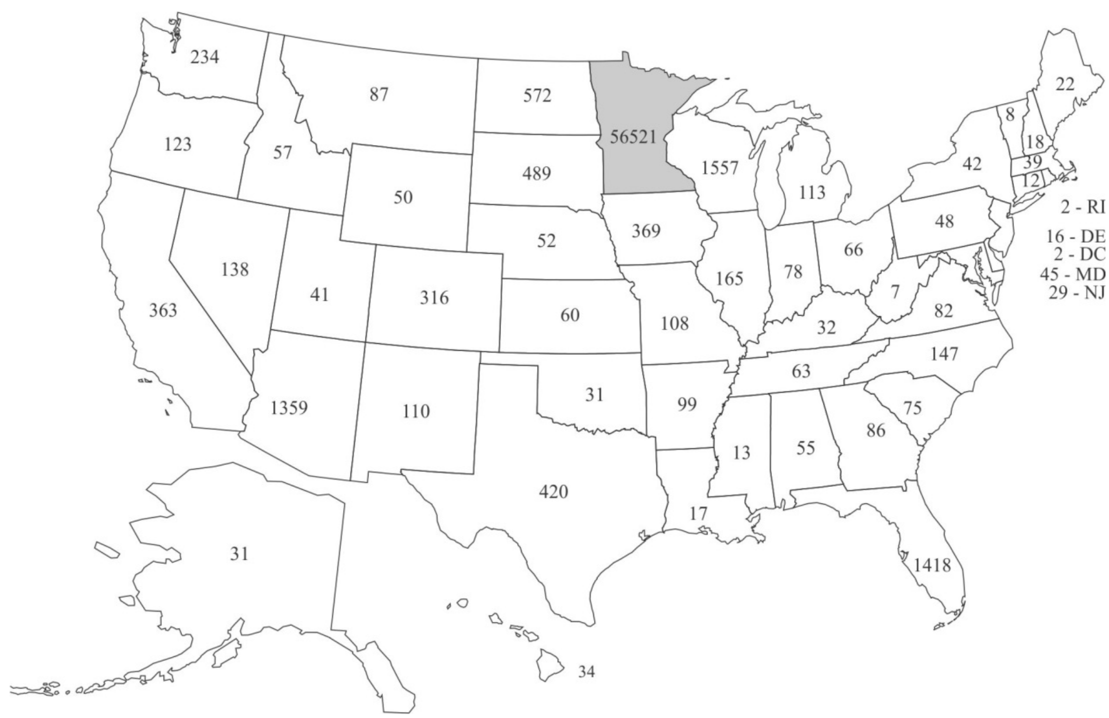
Distribution of TRA Benefits
Mailing Address of Benefit Recipient

February 1, 2018



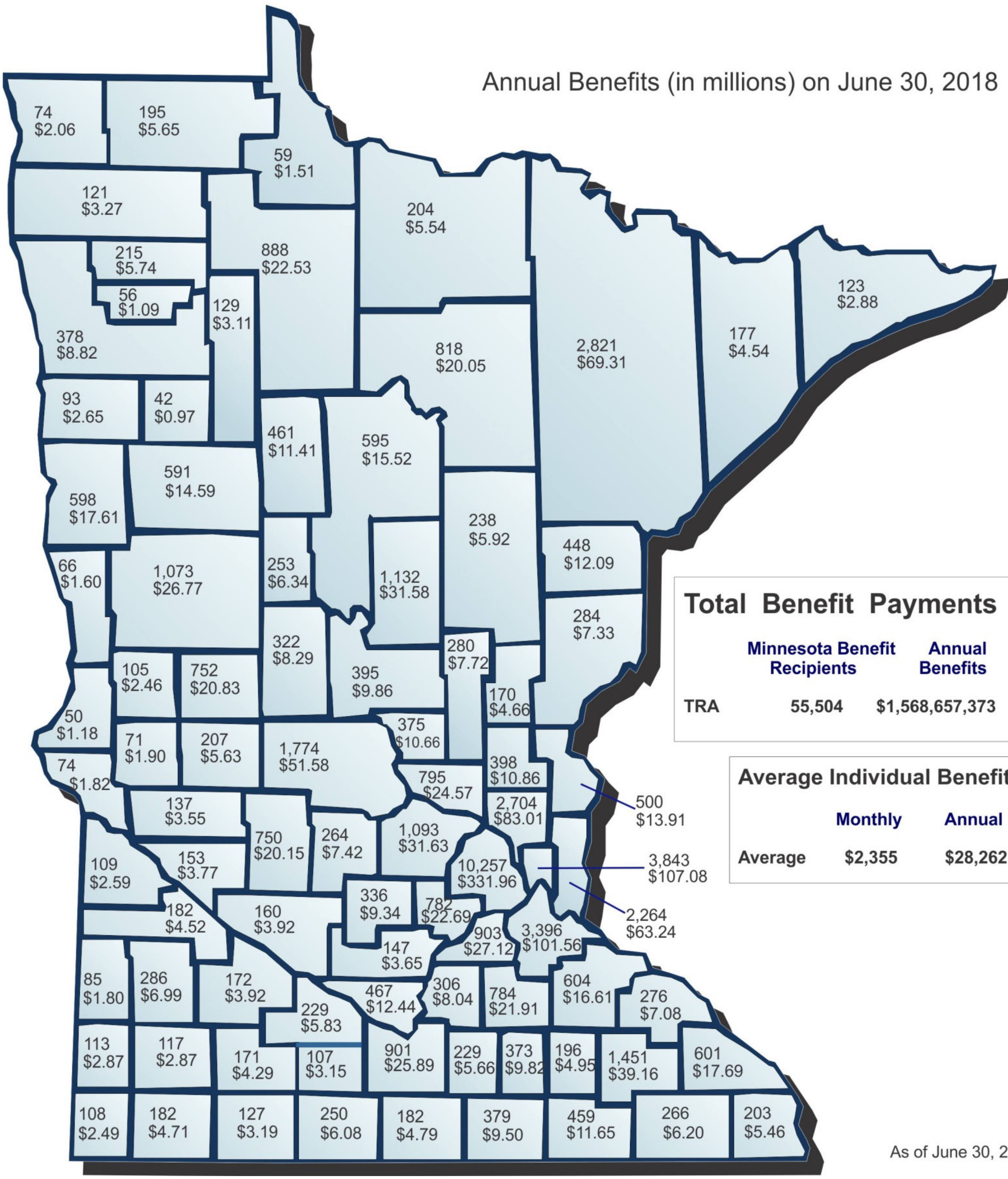
Total Recipients: 65,910
Note: 64 recipients reside outside the United States
Minnesota Recipients = 99.9 percent

June 1, 2018



Total Recipients: 65,986
Note: 65 recipients reside outside the United States
Minnesota Recipients = 99.9 percent

Annual Benefits for Minnesota TRA Benefit Recipients by County



Total Benefit Payments

	Minnesota Benefit Recipients	Annual Benefits
TRA	55,504	$1,568,657,373

Average Individual Benefit

	Monthly	Annual
Average	$2,355	$28,262

As of June 30, 2018

Annual Benefits and Recipients by County for the Teachers Retirement Association (TRA)

As of June 30, 2018

County	Members	Annual Benefit
Aitkin	238	$ 5,921,586
Anoka	2,704	$ 83,006,371
Becker	591	$ 14,592,955
Beltrami	888	$ 22,526,371
Benton	375	$ 10,662,371
Big Stone	74	$ 1,820,380
Blue Earth	901	$ 25,886,462
Brown	229	$ 5,833,370
Carlton	448	$ 12,086,655
Carver	782	$ 22,688,624
Cass	595	$ 15,515,951
Chippewa	153	$ 3,772,294
Chisago	500	$ 13,914,652
Clay	598	$ 17,605,203
Clearwater	129	$ 3,105,980
Cook	123	$ 2,884,840
Cottonwood	171	$ 4,286,306
Crow Wing	1,132	$ 31,583,362
Dakota	3,396	$ 101,556,441
Dodge	196	$ 4,952,479
Douglas	752	$ 20,831,999
Faribault	182	$ 4,787,506
Fillmore	266	$ 6,201,499
Freeborn	379	$ 9,500,993
Goodhue	604	$ 16,608,182
Grant	105	$ 2,459,489
Hennepin	10,257	$ 331,956,592
Houston	203	$ 5,461,611
Hubbard	461	$ 11,412,147
Isanti	398	$ 10,863,540
Itasca	818	$ 20,051,775
Jackson	127	$ 3,192,022
Kanabec	170	$ 4,660,093
Kandiyohi	750	$ 20,150,939
Kittson	74	$ 2,060,347
Koochiching	204	$ 5,536,440
Lac Qui Parle	109	$ 2,593,045
Lake	177	$ 4,541,729
Lake Of The Woods	59	$ 1,513,408
Le Sueur	306	$ 8,036,113
Lincoln	85	$ 1,804,628
Lyon	286	$ 6,994,967
Mahnomen	42	$ 970,493
Marshall	121	$ 3,270,580

County	Members	Annual Benefit
Martin	250	$ 6,080,911
McLeod	336	$ 9,341,935
Meeker	264	$ 7,416,924
Mille Lacs	280	$ 7,718,822
Morrison	395	$ 9,855,424
Mower	459	$ 11,651,785
Murray	117	$ 2,866,147
Nicollet	467	$ 12,440,605
Nobles	182	$ 4,713,703
Norman	93	$ 2,652,104
Olmsted	1,451	$ 39,156,081
Otter Tail	1,073	$ 26,767,780
Pennington	215	$ 5,738,092
Pine	284	$ 7,326,374
Pipestone	113	$ 2,867,442
Polk	378	$ 8,819,794
Pope	207	$ 5,633,105
Ramsey	3,843	$ 107,084,630
Red Lake	56	$ 1,094,086
Redwood	172	$ 3,919,339
Renville	160	$ 3,922,241
Rice	784	$ 21,907,467
Rock	108	$ 2,491,907
Roseau	195	$ 5,650,140
Saint Louis	2,821	$ 69,312,726
Scott	903	$ 27,117,871
Sherburne	795	$ 24,568,575
Sibley	147	$ 3,645,249
Stearns	1,774	$ 51,575,287
Steele	373	$ 9,818,646
Stevens	71	$ 1,895,647
Swift	137	$ 3,551,681
Todd	322	$ 8,293,787
Traverse	50	$ 1,179,918
Wabasha	276	$ 7,083,552
Wadena	253	$ 6,341,791
Waseca	229	$ 5,658,261
Washington	2,264	$ 63,237,611
Watonwan	107	$ 3,153,603
Wilkin	66	$ 1,604,498
Winona	601	$ 17,689,795
Wright	1,093	$ 31,633,036
Yellow Medicine	182	$ 4,516,214
Grand Total	55,504	$ 1,568,657,373

Projected TRA Benefit Payments

Fiscal Year Ended June 30, 2018

The table below shows estimated benefits expected to be paid over the next 25 years, based on the assumptions used in the valuation. The Active column shows benefits expected to be paid to members currently active on July 1, 2018. The Retirees column shows benefits expected to be paid to all other members. This includes those who, as of July 1, 2018, are receiving benefit payments or who terminated employment and are entitled to a deferred benefit.

Dollars in Thousands

Year Ending June 30	Active	Retirees	Total
2019	$ 67,807	$ 1,847,173	$ 1,914,980
2020	120,397	1,810,355	1,930,752
2021	171,403	1,780,096	1,951,499
2022	223,220	1,749,384	1,972,604
2023	274,748	1,719,857	1,994,605
2024	324,979	1,689,551	2,014,530
2025	374,850	1,660,469	2,035,319
2026	426,503	1,631,729	2,058,232
2027	481,685	1,603,054	2,084,739
2028	541,946	1,574,784	2,116,730
2029	608,618	1,546,016	2,154,634
2030	682,383	1,514,415	2,196,798
2031	764,692	1,480,666	2,245,358
2032	855,821	1,443,885	2,299,706
2033	956,031	1,404,525	2,360,556
2034	1,063,972	1,362,901	2,426,873
2035	1,178,849	1,319,798	2,498,647
2036	1,300,195	1,273,798	2,573,993
2037	1,427,973	1,225,755	2,653,728
2038	1,560,356	1,174,945	2,735,301
2039	1,696,930	1,121,187	2,818,117
2040	1,838,579	1,065,739	2,904,318
2041	1,985,140	1,008,363	2,993,503
2042	2,135,637	949,426	3,085,063
2043	2,289,062	889,237	3,178,299

Note: *Numbers may not add due to rounding.*

Cash flows are the expected future non-discounted payments to current members. These numbers exclude refund payouts to current nonvested inactives and assume future retirees and future terminated members make benefit elections according to valuation assumptions.

Plan Statement

TRA Plan Statement

June 30, 2018

Purpose

The Minnesota Teachers Retirement Association (TRA) was established on July 1, 1931, by the state legislature. Its purpose is to improve educational service and better compensate teachers in order to make the occupation of teaching in Minnesota more attractive to qualified persons by providing a retirement benefit schedule that rewards faithful and continued service.

Administration

TRA is managed by eight trustees – three are statutorily appointed and five are elected. The statutory trustees are the Commissioner of Education, the Commissioner of the Minnesota Department of Management and Budget (MMB) and a representative of the Minnesota School Boards Association. Four of the five elected trustees are active members and one is a retiree. Administrative management of the fund is vested in an Executive Director who is appointed by the Board of Trustees. The Board also contracts with an actuary and uses legal counsel provided by the office of the Attorney General.

Membership

All teachers employed in public elementary and secondary schools, joint powers, charter schools and all other educational institutions maintained by the State of Minnesota (except those teachers employed by the city of St. Paul or by the University of Minnesota) are required to be members of TRA.

Teachers employed by Minnesota State may elect TRA coverage within one year of their eligible employment. Newly-tenured Minnesota State members also have a one-year period to elect TRA coverage. If electing TRA, the individual must pay for the past service covered by TRA, and the cost of past service is based on full actuarial cost. No Minnesota State teacher is a member except for purposes of Social Security coverage if that teacher has coverage by the Defined Contribution Retirement Plan administered by the Minnesota State Board.

Retirement Service Credit

Service credit earned for benefit determination is based on a teacher's earned salary relative to an annual base salary established for an employer unit. Minnesota statute defines the base salary for each employer as the lowest salary paid to a full-time Bachelor of Arts (BA) base contract in the previous fiscal year. For example, a school district's annual base salary is determined to be $40,000. A teacher with an earned salary of $30,000 for that year will earn 0.75 year of service credit.

Service credit for Minnesota State members is based on a full-time equivalence method.

No more than one year of service credit may be earned by any member during a fiscal year, and no more than 0.111 per year may be earned during any one month.

Financing

Benefits are financed by employee contributions, employer contributions, investment earnings and turnover gains. Turnover gains are employer contributions retained by the fund when members take refunds of their employee contributions.

Vesting

In a pension plan, vesting means a member has earned sufficient service credit to be eligible for a monthly benefit.

TRA members who have performed covered service after May 15, 1989, are vested after three years of teaching service. TRA members who last worked prior to May 16, 1989, require five years or, in some cases, ten years of service credit earned in order to be eligible for a monthly annuity benefit.

Employee Contributions

TRA members pay a percentage of their gross annual salary as determined by their membership plan. Basic Plan members (without Social Security coverage) contribute 11.0 percent of their annual salary, while Coordinated Plan members (coordinated with Social Security coverage) contribute 7.5 percent of their annual salary.

Employer Contributions

Local school districts and other TRA-covered employer units provide contributions of 11.5 percent of total salary for members in the Basic Plan and 7.5 percent of total salary for members in the Coordinated Plan. For Coordinated Plan members the employer unit also makes the required matching contribution to the Social Security Administration. Beginning July 1, 2018, the employer contribution rate increased by 0.21 percent for both plans.

Minneapolis Special School District #1 pays an employer additional contribution of 3.64 percent of annual salary for TRA members employed by that school district.

TRA also receives approximately $35 million annually in state and local direct aid. The aid payments are designed to offset unfunded liabilities assumed with the 2006 merger of the Minneapolis Teachers Retirement Fund Association (MTRFA) and the 2015 merger of the Duluth Teachers Retirement Fund Association (DTRFA).

Retirement Benefit

The retirement benefit is determined by a formula based on the member’s average salary earned on the highest five successive years of formula service credit, an accumulated percentage factor based on the total years of service credit, and the member’s age at retirement. The retirement benefits for members who were first hired before July 1, 1989, are different from the retirement benefits for members who were first hired after June 30, 1989.

Coordinated Members First Hired *Before* July 1, 1989

For members first hired before July 1, 1989, the retirement benefits (with average salary defined as the average of the highest five successive annual salaries) are the greater of:

The sum of:

- 1.20 percent of average salary for the first 10 years of allowable service;
- 1.70 percent of average salary for each subsequent year prior to July 1, 2006; and
- 1.90 percent of average salary for each year of allowable service July 1, 2006 and after.
- No actuarial reduction if age plus years of service totals 90. Otherwise, reduction of 0.25 percent for each month the member is under age 65 (or age 62 if 30 years of allowable service) at the time of retirement.

or

The sum of:

- 1.70 percent of average salary for each year of allowable service prior to July 1, 2006; and
- 1.90 percent of average salary for each year of allowable service beginning July 1, 2006.
- Actuarial reduction (averaging 4.0 percent to 5.5 percent per year) applies if the member is under full Social Security benefit retirement age, but not to exceed age 65.

or

- For certain eligible members first hired prior to July 1, 1969, money purchase annuity equal to the actuarial equivalent of 220.00 percent of the member's accumulated deductions plus interest thereon.

Effective July 1, 2015, the actuarial reduction factors for retirement before Normal Retirement Age will be modified for members first hired prior to July 1, 1989. The actuarial reductions will be based on a statutory definition rather than actuarial equivalence factors. The factors will be phased-in over a five-year period ending June 30, 2020.

Members who reach age 62 with 30 years of service are eligible for a special group of reduction factors. The following example illustrates how these special reduction factors will be applied to an eligible person of the normal retirement age of 65:

Age 62	10.40%
Age 63	6.64%
Age 64	3.18%
Age 65	0.00%

Members who do not reach age 62 with 30 years of service credit are eligible for a different group of factors. The following example illustrates how these reduction factors will be applied to an eligible person of the normal retirement age of 65:

Age 55	43.56%	Age 61	18.96%
Age 56	39.98%	Age 62	13.68%
Age 57	36.66%	Age 63	8.76%
Age 58	33.59%	Age 64	4.21%
Age 59	30.75%	Age 65	0.00%
Age 60	24.65%		

Coordinated Members First Hired *After* June 30, 1989

For members first hired after June 30, 1989, the retirement benefits (with average salary defined as the average of the highest five successive annual salaries) is the sum of:

- 1.70 percent of average salary for each year of allowable service prior to July 1, 2006; and
- 1.90 percent of average salary for each year of allowable service beginning July 1, 2006.

Effective July 1, 2015, the actuarial reduction factors for retirement before Normal Retirement Age were modified. The actuarial reduction will be based on a statutory definition rather than actuarial equivalence factors. The factors will be phased-in over a five-year period ending June 30, 2020.

Reduction factors for members of the normal retirement age of 66 first hired from July 1, 1989 through June 30, 2006 and who reach age 62 with 30 years of service credit:

Age 62	14.46%
Age 63	10.40%
Age 64	6.64%
Age 65	3.18%
Age 66	0.00%

Reduction factors for members of the normal retirement age of 66 first hired from July 1, 1989 through June 30, 2006 and who <u>do not</u> reach age 62 with 30 years of service credit:

Age 55	51.55%	Age 61	24.65%
Age 56	47.59%	Age 62	18.96%
Age 57	43.90%	Age 63	13.68%
Age 58	40.46%	Age 64	8.76%
Age 59	37.28%	Age 65	4.21%
Age 60	30.75%	Age 66	0.00%

Reduction factors for members of the normal retirement age of 66 first hired on or after July 1, 2006 and who reach age 62 with 30 years of service credit:

Age 62	16.11%
Age 63	11.70%
Age 64	7.55%
Age 65	3.65%
Age 66	0.00%

Reduction factors for members of the normal retirement age of 66 first hired on or after July 1, 2006 and who <u>do not</u> reach age 62 with 30 years of service credit:

Age 55	54.08%	Age 61	26.46%
Age 56	50.08%	Age 62	20.53%
Age 57	46.30%	Age 63	14.93%
Age 58	42.74%	Age 64	9.65%
Age 59	39.38%	Age 65	4.68%
Age 60	32.74%	Age 66	0.00%

Basic Members (Former MTRFA)

TRA has 13 active and inactive Basic members from the former Minneapolis Teachers Retirement Fund Association (MTRFA) who were transferred to TRA effective June 30, 2006. Under the merger legislation, this group of former MTRFA members retains eligibility for the benefit provisions as provided by the MTRFA Articles of Incorporation and by-laws as they existed on June 30, 2006.

The retirement benefits for these members (with average salary defined as the average of the highest five successive annual salaries) are:

- 2.50 percent of average salary for each year of teaching service.
- No actuarial reduction applies if the retiring member is age 60 or any age with 30 years of teaching service.

If the member is age 55 with less than 30 years of teaching service, the retirement benefit is the greater of:

a. 2.25 percent of average salary for each year of teaching service with reduction of 0.25 percent for each month the member is under the age first eligible for a normal retirement benefit.

or

b. 2.50 percent of average salary for each year of teaching service assuming augmentation to the age first eligible for a normal retirement benefit at 3.00 percent per year, and actuarial reduction for each month the member is under the age first eligible for a normal retirement benefit.

An alternative benefit is available to members who are at least age 50 and have seven years of teaching service. The benefit is based on the accumulation of the 6.50 percent "city deposits" to the retirement fund. Other benefits are also provided under this alternative benefit, depending on the member's age and teaching service.

Basic Members (Non-MTRFA)

As of June 30, 2018, TRA had 4 inactive members who retain eligibility for the Basic Plan and who do not have eligibility for the provisions for former MTRFA Basic members. The retirement benefits (with average salary defined as the average of the highest five successive annual salaries) are the greater of:

a. 2.20 percent of average salary for each of the first ten years of allowable service and 2.70 percent of average salary for each subsequent year with reduction of 0.25 percent for each month the member is under age 65 at time of retirement, or under age 62 if 30 years of allowable service. No reduction if age plus years of allowable service totals 90.

b. 2.70 percent of average salary for each year of allowable service assuming augmentation to age 65 at 3.00 percent per year, and actuarial reduction for each month the member is under age 65.

or

c. For eligible members, a money purchase annuity equal to the actuarial equivalent of 220.00 percent of the member's accumulated deductions plus interest thereon

All members in this group have reached normal retirement age and are no longer subject to early retirement penalties.

Deferred Retirement

Members with three or more years of allowable service (ten or more years of allowable service if termination of teaching service occurs before July 1, 1987, and five or more years of allowable service if termination of teaching service occurs after June 30, 1987, but before May 16, 1989) who terminate teaching service in schools covered by the association may have their retirement benefit deferred until they attain age 55 or older.

Members who defer their benefits will receive a deferral increase as follows:

Members hired prior to July 1, 2006	Prior to July 1, 2012: 3.0 percent annually through December 31 of the year in which the member would have reached 55 and 5.0 percent annually thereafter each year the benefit is deferred After July 1, 2012: 2.0 percent
Members hired on or after July 1, 2006	Prior to July 1, 2012: 2.5 percent After July 1, 2012: 2.0 percent

The deferral period must be at least three months. If on a leave of absence, the member is not eligible for the deferral increase on a deferred annuity for any portion of time on leave.

Annuity Plan Options

Six different annuity plan options are available to TRA members that provide monthly benefit payments for as long as the annuitant lives. The No Refund Plan provides the highest possible monthly benefit, but terminates upon the member's death. A member may choose to provide survivor benefits to a designated beneficiary (ies) by selecting one of the five plans that have survivorship features.

A married member must choose one of the three survivorship plans (plans 4 through 6) listed below at retirement, unless the member's spouse waives the right to this type of annuity.

1. No Refund, For Life of Member
2. Guaranteed Refund
3. 15-Years Guaranteed
4. 100% Survivorship with Bounceback
5. 50% Survivorship with Bounceback
6. 75% Survivorship with Bounceback

Annual Post-Retirement Increases

Once retired, each January, if specified by law, a post-retirement increase may be made to a member's monthly benefit.

Under 2018 legislation and first applicable on January 1, 2019, the annual post-retirement increase is 1.0 percent for a five-year period. Beginning January 1, 2024, the adjustment will rise to 1.1 percent and on January 1, 2025, the adjustment will be 1.2 percent. The adjustment will be 1.3 percent on January 1, 2026 and 1.4 percent on January 1, 2027. Beginning January 1, 2028 and years following, the annual adjustment will be 1.5 percent.

On January 1,

- a benefit recipient who has been receiving an annuity or benefit for at least 12 full months as of June 30 of the calendar year before the adjustment will receive the full post-retirement increase in statute for that January 1.
- a benefit recipient who has been receiving an annuity or benefit for at least one full month, but less than 12 months as of June 30 of the calendar year before the adjustment will receive a prorated post-retirement increase.

Combined Service Annuity

Any vested member having combined service credit with any two or more Minnesota public retirement funds that participates in the combined service annuity program, may elect to receive a combined service annuity upon compliance with eligibility requirements for retirement.

Refunds

Upon termination of teaching service and application, TRA will issue a refund of a member's accumulated contributions plus interest compounded annually. Contributions made prior to June 30, 2011 accrue an annual interest rate of 6 percent. Contributions from July 1, 2011 to June 30, 2018 accrue interest at an annual rate of 4 percent. Beginning July 1, 2018, contributions will accrue interest at a rate of 3 percent annually.

A refund will be issued only if the member has officially resigned from employment and the official refund application form is submitted no sooner than 30 days after termination of teaching service.

Repayment of Refunds

Members who return to teaching service after previously withdrawing their contributions may repay these contributions upon completing two years of allowable service. The repayment must include interest of 8.5 percent, compounded annually from the date of the refund(s) through June 30, 2018. The interest rate for the repayment accrues at 7.5 percent from July 1, 2018 until date of the repayment. If a member has more than two years of refunded service, they may repay a minimum portion, which is at least 1/3 of the total service credit period for all refunds previously taken.

Disability Benefits

An active member who becomes disabled after at least three years of allowable service is eligible to apply for a total and permanent disability benefit provided at least two of the required three years of allowable service are performed after last becoming a member. State statute defines total and permanent disability as the inability to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to be of a long, continued and indefinite duration. An indefinite duration is a period of at least one year.

Survivor Benefits of Members Prior to Retirement

Certain benefits are available to the survivor(s) of members who die before officially retiring with TRA. Beneficiary designation options vary for single members and married members.

Single Members

Non-Vested

- A lump-sum death benefit equal to a member's accumulated deductions plus interest to the date of death is payable to either the designated beneficiary or estate, whichever is applicable. Interest is compounded annually at 4 percent. Contributions made by the employer are not included in this benefit. A member may designate any person(s), trust, or organization(s) as a beneficiary.

Vested

- For a member without a surviving spouse at the time of death, survivor benefits will *automatically* be paid for a period certain to all dependent children under the age of 20, *unless* the member has chosen the lifetime monthly benefit option explained in the next paragraph. These payments are made from the date of death to the date each dependent child attains age 20 if the child is under age 15 on the date of death. If the dependent child is 15 years or older on the date of death, payments will be made for five years. Payments for children under the age of 18 would be made to a custodial parent or court-appointed guardian. A dependent child is a biological or adopted child who is under 20 years of age and who is dependent on the member for more than one-half of his or her financial support.
- A member may designate payment of lifetime monthly benefits for either former spouse(s), or dependent and non-dependent, biological or adopted child(ren), instead of the above described surviving dependent child(ren) benefits being paid.
- For a member without a former spouse or dependent child (ren) at the time of death, either the designated beneficiary or estate, whichever is applicable, is entitled to a lump-sum death benefit equal to accumulated deductions plus interest to the date of death. Interest on account balances is compounded annually at 4 percent. Contributions made by the employer are not included in this benefit. A member may designate any person(s), trust, or organization(s) as a beneficiary.

Married Members

A surviving spouse has precedence over any designated beneficiary.

Non-Vested

- A member's spouse is entitled to a lump-sum death benefit equal to the accumulated deductions plus interest to the date of death. Interest on account balances is compounded annually at 4 percent. Contributions made by the employer are not included in this benefit.

Vested

- A member's surviving spouse may elect to receive a lifetime annuity in lieu of a lump-sum benefit. The lifetime annuity is payable on a monthly basis for the lifetime of the spouse. Payments terminate upon the death of the spouse with no benefits remaining for other beneficiaries.
- Instead of a lifetime annuity, a member's spouse may elect to receive actuarially equivalent payments for a term certain annuity of 5, 10, 15 or 20 years. The amount of the annuity is based upon a formula, the member's age at the time of death and the age of the spouse when benefits begin to accrue, although monthly benefit payments cannot exceed 75 percent of the member's average High-5 monthly salary.
- A member and their spouse may *jointly* make a specification to waive the spouse’s benefits so that designated beneficiary (ies) will receive a lifetime survivor annuity benefit. The designated beneficiary may be ***either*** the member’s former spouse(s) ***or*** the member’s biological or adopted child (ren). Under a joint specification, a designated beneficiary cannot elect a term certain annuity of 5, 10, 15 or 20 years. If a joint specification is not on file, the annuity is payable only to the surviving spouse.

Non-Vested or Vested

- A member and their spouse may *jointly* make a specification to waive the spouse’s benefits so that any person, trust or organization will receive a lump-sum death benefit equal to the accumulated deductions plus interest to the date of death.

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