North Dakota Teachers' Fund For Retirement

NDTFFR Board Meeting
AGENDA

Thursday, October 24, 2019 - 1:00 pm
Peace Garden Room - State Capitol
Bismarck, ND

1. **Call to Order and Approval of Agenda** – Pres. Lech (Action)
2. **Approval of Minutes of September 26, 2019 Meeting** – Pres. Lech (Action)
3. **2019 Actuarial Valuation Report** – Kim Nicholl and Matt Strom, Segal (Action) 60 min.
4. **Education: Experience Study Basics -** Kim Nicholl and Matt Strom, Segal (Information) 20 min.
5. **Plan Management Policy (2nd reading)** – Fay Kopp (Action) 10 min.
6. **Legislative Update** – Fay Kopp (Information) 10 min.

   ********* **BREAK** approximately 2:45-3:00 pm**********

7. **Benefit Appeal #2019-1A – Executive Session** (Action)
   *Executive session required to discuss confidential member information and for attorney consultation pursuant to NDCC 15-39.1-30, NDCC 44-04-19.1 and 44-04-19.2.
8. **Employer Reporting Reviews** – Shelly Schumacher, Fay Kopp (Action) 15 min.
9. **Pension Administration System Project Update** – Fay Kopp (Information) 10 min.
10. **Governance & Policy Review (GPR) Committee Update –** Cody Mickelson, Com. Chair (Information) 10 min.
11. **Trustee Educational Conference Reports** – Board members (Information) 10 min.
12. **Board Retreat Planning** – Pres. Lech and Fay Kopp (Information) 10 min.
13. **Chief Retirement Officer Succession Planning –** Pres. Lech and Dave Hunter (Information) 10 min.
14. **Vision Statement Approval** – Pres. Lech (Action) 15 min.
15. **Core Values Development** – Pres. Lech (Information) 15 min.
16. **Other Business**
17. **Adjournment**

Next TFFR Board Meeting and Retreat: January 23, 2020

Any individual requiring an auxiliary aid or service should contact the Retirement and Investment Office (RIO) at 701-328-9885 at least three (3) days prior to the scheduled meeting.

North Dakota Teachers' Fund For Retirement

EXECUTIVE SUMMARY

TFFR Board Meeting
October 24, 2019 – 1 pm
Peace Garden Room
State Capitol

Highlights of the October Board meeting:

- **2019 actuarial valuation report** will be presented by Segal. The report shows TFFR's active members increased by 2.7% and retired members increased 2.0% over last year. TFFR's funding level slightly improved to 66.0%. The actuarially determined contribution rate decreased to 12.84%, so there is a small contribution deficiency of (0.09)% of payroll. The unfunded actuarial accrued liability increased to $1.36 billion. Long term projections show TFFR is on track to achieve full funding in 24 years IF all actuarial assumptions including the 7.75% investment return assumption are met. However, there is risk that investment returns may be different than expected which could affect the plan's future financial condition.

- Board education on demographic and economic actuarial assumptions and basics of an **Actuarial Experience Study**. Segal is scheduled to conduct an Experience Review for the 2015-19 time period to be delivered in March 2020. Reducing TFFR's current 7.75% investment return assumption is likely to be a consideration.

- 2nd reading and final approval of **TFFR Plan Management Policy** which Segal has worked with the Board and Staff on during the last 10 months. This risk management tool incorporates a risk assessment, stochastic modeling, policy metrics and scoring system to provide a more robust way to evaluate the ongoing financial health and long term sustainability of TFFR. 2019 policy score will be calculated after the 2019 valuation report is delivered.

- **Legislative Employee Benefits Program Committee** meets on October 23 to receive TFFR overview, SIB/RIO overview, and 2019 TFFR valuation report from Segal. Legislative update will be provided at Board meeting.

- **Member Benefit Appeal** which will be held in Executive Session due to confidentiality of member records being discussed. Appeal information will be sent to trustees prior to board meeting next week via secure ftp site.

- **Employer Reporting Review** process has changed, with communication of findings, exceptions, and recommendations and follow up responsibilities transferred from Audit to Retirement Services. School board acceptance or rejection of employer reporting reviews is required along with an explanation of how the employer will comply. Warwick and New England reports are being presented to TFFR Board for approval.

- **TFFR Pension Administration System Modernization Project** meetings are underway. RIO has provided information to the Governor's Office regarding the project underscoring the Board's fiduciary responsibilities to TFFR participants and the importance of making the most prudent decision for TFFR without regard to other interests. This includes following all state procurement guidelines to ensure a fair and competitive bidding process is used to identify the best solution for TFFR at the best price. Staff is also beginning work on the Project Charter.

- Updates will be given on **Governance & Policy Review Committee** and recent **Trustee Educational Conferences** attended by board members.

- A **TFFR Board retreat** has been scheduled to follow the Board Business Meeting on January 23, 2020. Agenda topics are welcome.

- **Chief Retirement Officer Succession Planning** has commenced with initial discussions with Pres. Lech, Dave Hunter, and HRMS on recruitment and selection process.

- **Vision Statement** discussion will include feedback from trustees and staff on vision statement options developed at the September meeting.

- The Board will participate in development of **Core Values** that build the organizational foundation of TFFR and are considered to be crucial to the success of TFFR.

NORTH DAKOTA TEACHERS' FUND FOR RETIREMENT
MINUTES OF THE
SEPTEMBER 26, 2019, BOARD MEETING

BOARD MEMBERS PRESENT: Rob Lech, President
Mike Burton, Vice President
Toni Gumeringer, Trustee
Cody Mickelson, Trustee
Mel Olson, Trustee
Kelly Schmidt, State Treasurer

BOARD MEMBER ABSENT: Kirsten Baesler, State Supt. DPI

STAFF PRESENT: Connie Flanagan, CFO
David Hunter, ED/CIO
Fay Kopp, Deputy ED/CRO
Missy Kopp, Retirement Assistant
Rich Nagel, IT Program Mgr
Sara Sauter, Internal Audit Supvr
Shelly Schumacher, Retirement Program Mgr
Dottie Thorsen, Internal Auditor

OTHERS PRESENT: Kim Nicholl, Segal Consultants (Vdcf)
Anders Odegaard, Attorney General's Office
Matt Strom, Segal Consultants (Vdcf)

CALL TO ORDER:

Dr. Rob Lech, President of the Teachers' Fund for Retirement (TFFR) Board of Trustees, called the meeting to order at 1:00 p.m. on Thursday, September 26, 2019, at the Retirement and Investment Office (RIO), Bismarck, ND.

THE FOLLOWING MEMBERS WERE PRESENT REPRESENTING A QUORUM: MR. BURTON, MRS. GUMERINGER, PRES. LECH, MR. MICKELSON, MR. OLSON AND TREASURER SCHMIDT.

ACCEPTANCE OF AGENDA:

The Board considered the agenda for the September 26, 2019, meeting.

IT WAS MOVED BY MR. BURTON AND SECONDED BY MR. OLSON AND CARRIED BY A VOICE VOTE TO ACCEPT THE AGENDA AS DISTRIBUTED.

AYES: TREASURER SCHMIDT, MR. BURTON, MR. MICKELSON, MRS. GUMERINGER, MR. OLSON, AND PRES. LECH
NAYS: NONE
MOTION CARRIED
ABSENT: SUPT. BAESLER

MINUTES:

The Board considered the minutes of the July 25, 2019, meeting and the July 26, 2019, special meeting.

IT WAS MOVED BY MR. OLSON AND SECONDED BY MR. BURTON AND CARRIED BY A VOICE VOTE TO ACCEPT THE JULY 25 AND 26, 2019, MINUTES AS DISTRIBUTED.

AYES: MR. MICKELSON, MR. OLSON, TREASURER SCHMIDT, MR. BURTON, MRS. GUMERINGER, AND PRES. LECH
NAYS: NONE
MOTION CARRIED
ABSENT: SUPT. BAESLER

TFFR PLAN MANAGEMENT POLICY 1ST READING:

Ms. Kim Nicholl and Mr. Matt Strom, Segal Consulting, presented the TFFR Plan Management Policy draft for a first reading. The Plan Management Policy is a risk assessment and management tool that monitors the ongoing health of TFFR using the most recent actuarial valuation results and stochastic projections. It provides a basis for balancing the Fund's obligations with current assets and expected future contributions in order to maintain its long-term health and viability. The Plan Management Policy also provides a framework the Board can follow in establishing metrics for future funding and benefit changes. The Plan Management Policy is based upon metrics and a scoring system. The Policy Score will be updated subsequent to each annual actuarial valuation.

Board discussion followed.

IT WAS MOVED BY MR. MICKELSON AND SECONDED BY MR. OLSON AND CARRIED BY A ROLL CALL VOTE TO APPROVE THE FIRST READING OF THE TFFR PLAN MANAGEMENT POLICY.

AYES: TREASURER SCHMIDT, MRS. GUMERINGER, MR. OLSON, MR. BURTON, MR. MICKELSON, AND PRES. LECH
NAYS: NONE
MOTION CARRIED
ABSENT: SUPT. BAESLER

BOARD EDUCATION – FIDUCIARY DUTIES:

Mr. Odegaard, Attorney General's office, presented board education on the fiduciary duties of TFFR board members which are set forth in North Dakota Century Code (NDCC)15-39.1-05.1. Fiduciary duties include loyalty, impartiality, independence, prudence, administration, skill, delegation, exclusive benefit rule, and prudent investor rule. Mr. Odegaard also discussed application of fiduciary duties related to administration of the plan, maintaining the confidentiality of member records, monitoring

and suggesting improvements to the plan, conflicts of interest, code of conduct, breach of fiduciary duties, and board member liability. Board discussion followed.

ANNUAL INVESTMENT REPORT:

Mr. Hunter provided the annual investment report for the periods ended June 30, 2019. Net investment income increased TFFR pension assets by $135 million in fiscal 2019. TFFR investments have averaged over $2 billion during the last 5 years and excess return has averaged over 0.50% per annum. Based on these values, TFFR's use of active management has enhanced net investment returns by $50 million for the 5-years ended June 30, 2019. This excess return has been achieved while adhering to prescribed risk limits.

TFFR's net investment return for the 1 year ended June 30, 2019 was 5.5%; 5 years was 6.2%; 10 years was 9.6%; 20 years was 5.7%; and 30 years was 7.7%. TFFR returns have approximated its actuarial return assumption of 7.75% over the last 30 years. TFFR has generated positive risk adjusted excess return for rolling 5-year periods since 2014. Investment fees and expenses increased from 0.55% in fiscal 2018 to 0.57% in fiscal 2019.

Board discussion followed.

IT WAS MOVED BY MR. OLSON AND SECONDED BY MRS. GUMERINGER AND CARRIED BY A ROLL CALL VOTE TO ACCEPT THE ANNUAL INVESTMENT REPORT.

AYES: MRS. GUMERINGER, MR. BURTON, MR. MICKELSON, MR. OLSON, TREASURER SCHMIDT, AND PRES. LECH
NAYS: NONE
MOTION CARRIED
ABSENT: SUPT. BAESLER

ANNUAL BUDGET AND EXPENSE REPORT:

Ms. Flanagan reviewed the annual TFFR budget and expense report for the fiscal year ending June 30,2019. She explained that about 93% of TFFR's expenditures are for member benefit claims, 6% investment expenses, 0.3% other continuing appropriations, and 0.7% appropriated expenditures including salaries, benefits, operating expenses, and SIB expenses allocated to TFFR. She also reviewed continuing appropriations, budgeted expenditures, consulting expenses, and the approved 2019-21 biennial budget including the $9 million PAS upgrade/replacement project.

IT WAS MOVED BY MR. BURTON AND SECONDED BY MR. MICKELSON AND CARRIED BY A ROLL CALL VOTE TO ACCEPT THE ANNUAL BUDGET AND EXPENSE REPORT.

AYES: MR. OLSON, MR. MICKELSON, MRS. GUMERINGER, TREASURER SCHMIDT, MR. BURTON, AND PRES. LECH
NAYS: NONE

MOTION CARRIED
ABSENT: SUPT. BAESLER

ANNUAL AUDIT SERVICES REPORT:

Ms. Sauter provided the annual audit services report. During fiscal year 2018-19 the following audits were completed for TFFR: four Employer Audits, Cost Benefit Audit, Purchase and Refund Audit, and Annual Salary Verification Project. The File Maintenance Audit was not completed in 2018-19, but is in progress. Other Audit activities include the Executive Limitations Audit, SIB Self-Assessment, Investment Due Diligence Audit, and Agency Risk Assessment.

IT WAS MOVED BY TREASURER SCHMIDT AND SECONDED BY MRS. GUMERINGER AND CARRIED BY A ROLL CALL VOTE TO ACCEPT THE ANNUAL AUDIT SERVICES REPORT.

AYES: MR. BURTON, MRS. GUMERINGER, MR. OLSON, TREASURER SCHMIDT, MR. MICKELSON, AND PRES. LECH
NAYS: NONE
MOTION CARRIED
ABSENT: SUPT. BAESLER

The Board recessed at 3:00 p.m. and reconvened at 3:15 p.m.

ANNUAL STATE INVESTMENT BOARD (SIB) CUSTOMER SATISFACTION SURVEY:

Pres. Lech reported on the SIB Customer Satisfaction Survey. The annual customer satisfaction survey was provided to all TFFR Board members. Pres. Lech compiled the results and a weighted average was used to determine Excellent ratings in all categories provided to the SIB. All individual comments were included in the compiled survey.

IT WAS MOVED BY MR. BURTON AND SECONDED BY MR. MICKELSON AND CARRIED BY A ROLL CALL VOTE TO APPROVE THE TFFR BOARD RESPONSE TO THE ANNUAL SIB CUSTOMER SATISFACTION SURVEY.

AYES: MRS. GUMERINGER, MR. MICKELSON, TREASURER SCHMIDT, MR. BURTON, MR. OLSON, AND PRES. LECH
NAYS: NONE
MOTION CARRIED
ABSENT: SUPT. BAESLER

PENSION ADMINISTRATION SYSTEM (PAS) PROJECT UPDATE:

Ms. Kopp provided an update on the PAS project. RIO staff contacted ND Information Technology (IT) staff this summer to request project resources, procurement and management assistance. Meetings were held on August and September with staff from RIO, PERS, ND IT and the Governor's Office to begin discussing the project. Questions have been brought up regarding whether TFFR and PERS could potentially share pension

administration software in the future. Ms. Kopp emphasized that as fiduciaries, trustees must act solely in the best interest of the members, retirees, and beneficiaries of TFFR for the exclusive purpose of providing benefits and paying reasonable expenses of administering the TFFR plan. No other State or outside interests may come before that of the TFFR members. Ms. Kopp will provide information regarding the Board's fiduciary duties and other issues impacting the Board's responsibility to prudently select the best vendor solution at the best price for this important project.
Board discussion followed.

GOVERNANCE & POLICY REVIEW (GPR) COMMITTEE UPDATE:

Mr. Mickelson and Ms. Kopp provided an update on the GPR Committee. The GPR Committee met in September to review the first draft of a revised TFFR Board Governance Policy Manual. At this meeting, the GPR Committee discussed and provided feedback on Sections A-J of the draft manual. The feedback from that discussion will be used to prepare another draft. The GPR Committee plans to meet again in late October or November to continue discussing the draft manual.

Board discussion followed.

MISSION STATEMENT APPROVAL:

Pres. Lech reported on the development of a new mission statement for the TFFR Board. At the July meeting, the Board members created three new statements. Those statements were sent to all Board members and RIO staff for feedback. Using that feedback and after further discussion, the Board considered the following mission statement:

"TFFR administers a comprehensive retirement program that provides North Dakota public educators with a foundation for retirement security."

IT WAS MOVED BY MR. OLSON AND SECONDED BY MRS. GUMERINGER AND CARRIED BY A ROLL CALL VOTE TO APPROVE THE NEW TFFR MISSION STATEMENT.

AYES: MR. BURTON, MRS. GUMERINGER, MR. OLSON, TREASURER SCHMIDT, MR. MICKELSON, AND PRES. LECH
NAYS: NONE
MOTION CARRIED
ABSENT: SUPT. BAESLER

VISION STATEMENT DEVELOPMENT:

Pres. Lech led the Board in an exercise to develop a TFFR vision statement. Board members worked in small groups to identify TFFR's cause, actions, and outcomes which were used to draft possible vision statements. Pres. Lech will send the draft statements out in a survey to RIO staff and the

TFFR Board for feedback. Survey results will be brought to the October meeting for further discussion.

ADJOURNMENT:

With no further business to come before the Board, President Lech adjourned the meeting at 4:40 p.m.

Respectfully Submitted:

_____
Dr. Rob Lech, President
Teachers' Fund for Retirement Board

_____
Missy Kopp
Reporting Secretary

North Dakota Teachers' Fund For Retirement

MEMORANDUM

TO: **TFFR Board**
FROM: **Fay Kopp**
DATE: **October 17, 2019**
SUBJ: **2019 Actuarial Valuation Report**

Kim Nicholl and Matt Strom, Segal Consultants, will be at the October board meeting to present the recently completed 2019 actuarial valuation of the NDTFFR plan (attached).

A few highlights from the 2019 valuation report:

- **Funded ratio** (based on actuarial value of assets or AVA) increased very slightly from 65.4% to **66.0%** as of July 1, 2019.

- **Actuarially determined contribution rate (ADC)** decreased from 12.94% **to 12.84%** this year. This rate is greater than the 12.75% statutory employer rate, so there is a **small contribution deficiency of (0.09)%** of payroll.

- **Unfunded actuarial accrued liability (UAAL)** increased from $1.34 billion to **$1.36 billion**.

GASB 67 information at the plan level is also part of the 2019 valuation report:

- **GASB Funded Ratio or Plan Net Position** (market basis) stayed the same at **65.5%** as of July 1, 2018 and 2019.

- **Net Plan Liability (NPL)** (UAAL on a market basis) increased from $1.33 billion to **$1.38 billion**.

A separate GASB 68 report is in the process of being completed which includes employer allocations and pension amounts.

Additionally, once the TFFR Plan Management Policy is approved, the Policy Score will be updated with the results of the 2019 valuation and stochastic projections.

These reports will be delivered to the Board at a later date.

BOARD ACTION
Board Motion to approve the 2019 actuarial valuation report.

North Dakota Teachers' Fund for Retirement

Actuarial Valuation and Review as of July 1, 2019

Segal Consulting

This report has been prepared at the request of the Board of Trustees to assist in administering the Fund. The measurements shown in this actuarial valuation may not be applicable for other purposes.

Segal Consulting
101 North Wacker Drive, Suite 500 Chicago, IL 60606
T 312.984.8500 www.segalco.com

October 15, 2019

Board of Trustees
North Dakota Teachers' Fund for Retirement
3442 East Century Avenue
Bismarck, ND 58507-7100

Dear Trustees:

We certify that the information contained in this report is accurate and fairly presents the actuarial position of the North Dakota Teachers' Fund for Retirement (TFFR) as of July 1, 2019.

All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion the results presented also comply with the State Code, and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board (GASB). The undersigned are independent actuaries. All are Fellows of the Society of Actuaries, Enrolled Actuaries, and Members of the American Academy of Actuaries, and are experienced in performing valuations for large public retirement systems. They meet the Qualification Standards of the American Academy of Actuaries.

ACTUARIAL VALUATION

The primary purposes of the valuation report are to determine the adequacy of the current employer contribution rate, to describe the current financial condition of TFFR, and to analyze changes in TFFR's financial condition. In addition, the report provides information required by TFFR in connection with the Governmental Accounting Standards Board Statement No. 67 (GASB 67) and it provides various summaries of the data. Valuations are prepared annually, as of July 1 of each year, the first day of TFFR's plan and fiscal year.

FINANCING OBJECTIVES

The member and employer contribution rates are established by statute. Member and employer rates are 11.75% and 12.75%, respectively. The 11.75% member contribution rate and 12.75% employer contribution rate will remain in effect until TFFR is 100% funded on an actuarial basis. At that point, the employer and member contribution rates will revert to 7.75%. The rates are intended to be sufficient to pay TFFR's normal cost and to amortize TFFR's unfunded actuarial accrued liability (UAAL) over a period of 24 years beginning July 1, 2019, although at any given time the statutory rates may be insufficient.

PROGRESS TOWARD REALIZATION OF FINANCING OBJECTIVES

In order to determine the adequacy of the 12.75% statutory employer contribution rate, it is compared to the actuarially determined contribution (ADC). The ADC is equal to the sum of (a) the employer normal cost rate and (b) the level percentage of pay required to amortize the UAAL over the 30-year closed period that began July 1, 2013 (24 years remaining as of July 1, 2019). For this calculation, payroll is assumed to increase 3.25% per year. As of July 1, 2019, the ADC is 12.84%, compared to 12.94% last year. This is greater than the 12.75% rate currently required by law. The decrease in ADC is driven by payroll and other demographic liability gains.

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) increased from last year. The funded ratio at July 1, 2018, was 65.4%, while it is 66.0% as of July 1, 2019. Based on the market value of assets rather than the actuarial value of assets, the funded ratio remained the same at 65.5%, compared to 65.5% last year.

The Plan has a net investment loss of $19.4 million from previous years that has not yet been recognized in the actuarial value of assets because of the five-year smoothing. This unrecognized asset loss is due to market losses during FY 2016 and FY 2019 offset by market gains in FY 2017 and FY 2018. As these losses are recognized over the next four years, the losses will tend to reduce the funded ratio. Despite this factor, the projections shown in this report indicate that the funded ratio is projected to increase over this period, assuming the plan's market return on assets meets the 7.75% assumption in the future.

REPORTING CONSEQUENCES

TFFR is required to disclose certain actuarial information in its Comprehensive Annual Financial Report (CAFR), including the Net Pension Liability (NPL), the sensitivity of the NPL to changes in the discount rate, a schedule of changes in NPL, and a comparison of actual contributions to the ADC. The State and the school districts need to comply with GASB 68, which also requires disclosure of certain actuarial information in their financial statements. This information will be provided in a separate report.

BENEFIT PROVISIONS

The actuarial valuation reflects the benefit and contribution provisions set forth in the North Dakota Century Code. These have not changed from the prior valuation.

ASSUMPTIONS AND METHODS

Actuarial assumptions and methods are set by the Board of Trustees, based upon recommendations made by the Plan's actuary. On April 30, 2015, the Board adopted new assumptions, effective for the July 1, 2015 valuation. In our opinion, the actuarial assumptions as approved by the Board are reasonable, taking into account the experience of the Plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience of the Plan. The actuarial assumptions and methods used for funding purposes meet the parameters set by Actuarial Standards of Practice.

Effective with the July 1, 2013, actuarial valuation, the Trustees adopted an Actuarial Funding Policy, which provides direction on how to calculate an actuarially determined contribution. The actuarially determined contribution is compared to statutory contribution rates as a measure of funding adequacy.

The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates, and funding periods.

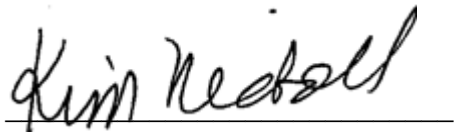
DATA

Member data for retired, active, and inactive participants was supplied as of July 1, 2019, by the staff of the Retirement Office. We have not subjected this data to any auditing procedures, but have examined the data for reasonableness and consistency with the prior year's data. Asset information was also supplied by the staff. That assistance is gratefully acknowledged.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By:



Kim Nicholl, FSA, MAAA, EA
Senior Vice President and Actuary

Matthew A. Strom, FSA, MAAA, EA
Senior Vice President and Actuary

Tatsiana Dybal, FSA, MAAA, EA
Senior Actuary

Table of Contents

North Dakota Teachers' Fund for Retirement Actuarial Valuation and Review as of July 1, 2019

Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal Consulting to present a valuation of the Plan as of July 1, 2019. The valuation was performed to determine whether the assets and contribution rates are sufficient to provide the prescribed benefits and to provide information for required disclosures under Governmental Accounting Standards Board (GASB) Statement No. 67. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

Certain disclosure information required by GASB Statements 67 and 68 as of July 1, 2019 for TFFR is provided in a separate report.

The contribution requirements presented in this report are based on:

- The benefit provisions set forth in the North Dakota Century Code, as administered by the TFFR Board of Trustees;
- The characteristics of covered active members, inactive members, and retirees and beneficiaries as of July 1, 2019, provided by the North Dakota Retirement and Investment Office;
- The assets of the Plan as of June 30, 2019, provided by the North Dakota Retirement and Investment Office;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.; and
- The funding policy adopted by the TFFR Board of Trustees.

Valuation Highlights

1. Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and a portion of the principal balance. The funding policy adopted by the TFFR meets this standard.
2. The employer statutory contribution rate for the fiscal year beginning July 1, 2019, under the North Dakota Century Code is equal to 12.75% of payroll for employers. Compared to the actuarially determined contribution of 12.84% of payroll, there is a contribution deficiency of 0.09% of payroll as of July 1, 2019. The actuarially determined contribution rate defined by the Plan's funding policy is based on a 24-year, level percent of payroll amortization of the unfunded actuarial accrued liability. The employer statutory contribution rate of 12.75% results in an effective amortization period of 24 years; the same number of years as the Plan's funding policy amortization period.
3. Actual employer contributions made during the fiscal year ending June 30, 2019, were $89,444,881, which is 98.5% of the actuarially determined contribution. In the prior fiscal year, actual contributions were $86,675,715, which was 98.2% of the prior year actuarially determined contribution.
4. The funded ratio based on the actuarial value of assets over the actuarial accrued liability as of July 1, 2019 is 66.0%, compared to 65.4% as of July 1, 2018. This ratio is a measure of funding status and its history is a measure of funded progress. These measurements are not necessarily appropriate for assessing the sufficiency of the Plan's assets to cover the estimated cost of settling the Plan's benefit obligation or the need for or the amount of future contributions.
5. For the year ended June 30, 2019, Segal has determined that the asset return on a market value basis was 5.4%. After gradual recognition of investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 6.4%. This represents an experience loss when compared to the assumed rate of 7.75%. As of June 30, 2019, the actuarial value of assets ($2.636 billion) represented 100.7% of the market value ($2.616 billion).
6. The portion of deferred investment gains and losses recognized during the calculation of the July 1, 2019, actuarial value of assets contributed to a loss of $34.8 million. The demographic and liability experience resulted in a $24.1 million gain.
7. As mentioned above, the current method used to determine the actuarial value of assets yields an amount that is 100.7% of the market value of assets as of June 30, 2019. 100.7% falls within the 20% corridor, so no further adjustment to the actuarial value of assets is necessary. Guidelines in Actuarial Standard of Practice No. 44 (Selection and Use of Asset Valuation Methods for Pension Valuations) recommend that asset values fall within a reasonable range around the corresponding market value. The actuarial asset method complies with these guidelines.

8. When measuring pension liability for GASB purposes, the same actuarial cost method (Entry Age Normal) is used to determine the funded status of the Plan, the actuarially determined contribution rate, and the effective amortization period. In addition, the GASB blended discount rate calculation results in the same discount rate (expected return on assets) as used for funding purposes (7.75%). This means that the Total Pension Liability (TPL) measure for financial reporting shown in this report is determined on the same basis as the Actuarial Accrued Liability (AAL) measure for funding. We note that the same is true for the Normal Cost component of the annual plan cost for funding and financial reporting.
9. The Net Pension Liability (NPL) is equal to the difference between the TPL and the Plan Fiduciary Net Position. The Plan Fiduciary Net Position is equal to the market value of assets and therefore, the NPL measure is the same as the Unfunded Actuarial Accrued Liability on a market value basis. The NPL increased from $1,332,858,315 as of June 30, 2018, to $1,377,253,104 as of June 30, 2019.
10. The Fund's net cash flow (contributions minus benefit payments, refunds, and expenses) as a percentage of the market value of assets is -1.9% as of June 30, 2019, compared to -1.6% as of June 30, 2018. The decrease in net cash flow is primarily due to the growth of benefit payments and expenses. It is not unusual for a mature pension system to operate with minor negative cash flow as returns on investments generally exceed the net cash outflow and assets continue to rise. However, as the degree of negative cash flow increases, the plan's vulnerability to investment market volatility increases.
11. This actuarial report as of July 1, 2019 is based on financial and demographic data as of that date. Changes subsequent to that date are not reflected and will affect future actuarial costs of the plan.
12. Since the actuarial valuation results are dependent on a given set of assumptions, there is a risk that emerging results may differ significantly as actual experience proves to be different from the assumptions. We have included a discussion of various risks that may affect the plan in Section 2.

Summary of Key Valuation Results

		2019	2018
Demographic data for plan year beginning July 1	• Number of retirees and beneficiaries	8,918	8,743
	• Number of inactive vested members	1,657	1,623
	• Number of inactive non-vested members contributions	1,035	971
	• Number of active members	11,175	10,881
	• Total payroll supplied by System, annualized	$680,481,816	$653,456,893
	• Average payroll supplied by System, annualized	$60,893	$60,055
Statutory contributions for fiscal year beginning July 1:	• Member rate	11.75%	11.75%
	• Employer rate	12.75%	12.75%
	• Actuarially determined contribution rate	12.84%	12.94%
	• Margin/(deficit)	-0.09%	-0.19%
Actuarial accrued liability for plan year beginning July 1:	• Retirees and beneficiaries	$2,314,016,956	$2,222,021,190
	• Inactive vested members	99,848,736	95,439,788
	• Inactive non-vested members	9,911,187	8,416,461
	• Active members	1,569,647,281	1,537,638,287
	• Total	$3,993,424,160	$3,863,515,726
	• Normal cost including administrative expenses for plan year beginning July 1	$85,956,750	$82,888,334
Assets for plan year beginning July 1:	• Market value of assets (MVA)	$2,616,171,056	$2,530,657,411
	• Actuarial value of assets (AVA)	2,635,557,447	2,526,058,269
	• Actuarial value of assets as a percentage of market value of assets	100.7%	99.8%
Funded status for plan year beginning July 1:	• Unfunded/(overfunded) actuarial accrued liability on market value of assets	$1,377,253,104	$1,332,858,315
	• Funded percentage on MVA basis	65.5%	65.5%
	• Unfunded/(overfunded) actuarial accrued liability on actuarial value of assets	$1,357,866,713	$1,337,457,457
	• Funded percentage on AVA basis	66.0%	65.4%
	• Effective amortization period	24 years	26 years
GASB information:	• Discount rate	7.75%	7.75%
	• Total pension liability	$3,993,424,160	$3,863,515,726
	• Plan fiduciary net position	2,616,171,056	2,530,657,411
	• Net pension liability	$1,377,253,104	$1,332,858,315
	• Plan fiduciary net position as a percentage of total pension liability	65.5%	65.5%
Gains/(losses):	• Asset experience	($34,821,389)	$4,586,416
	• Liability experience	24,138,806	28,564,402
	• Administrative expenses	(59,112)	115,624
	• Assumption/method changes	0	0
	• Total gain/(loss)	($10,741,695)	$33,266,442

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal Consulting ("Segal") relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by TFFR. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	The valuation is based on the market value of assets as of the valuation date, as provided by TFFR. TFFR uses an "actuarial value of assets" that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan's assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the TFFR. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the Plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the Plan.
- Actuarial results in this report are not rounded, but that does not imply precision.
- If the TFFR is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. TFFR should look to their other advisors for expertise in these areas.

As Segal Consulting has no discretionary authority with respect to the management or assets of the Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

Section 2: Actuarial Valuation Results

A. Member Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, inactive members, retirees and beneficiaries.

This section presents a summary of significant statistical data on these member groups.

More detailed information for this valuation year and the preceding valuation can be found in *Section 3, Exhibits A, B, C, D and E*.

MEMBER POPULATION: 2010 – 2019

As of July 1	Active Members	Inactive Vested Members	Inactive Non-vested Members	Retirees and Beneficiaries	Ratio of Non-Actives to Actives*
2010	9,907	1,472	331	6,672	0.82
2011	10,004	1,463	407	6,933	0.84
2012	10,014	1,483	468	7,151	0.86
2013	10,138	1,500	563	7,489	0.89
2014	10,305	1,509	661	7,747	0.90
2015	10,514	1,607	660	8,025	0.92
2016	10,813	1,601	779	8,249	0.91
2017	10,874	1,600	878	8,501	0.93
2018	10,881	1,623	971	8,743	0.95
2019	11,175	1,657	1,035	8,918	0.95

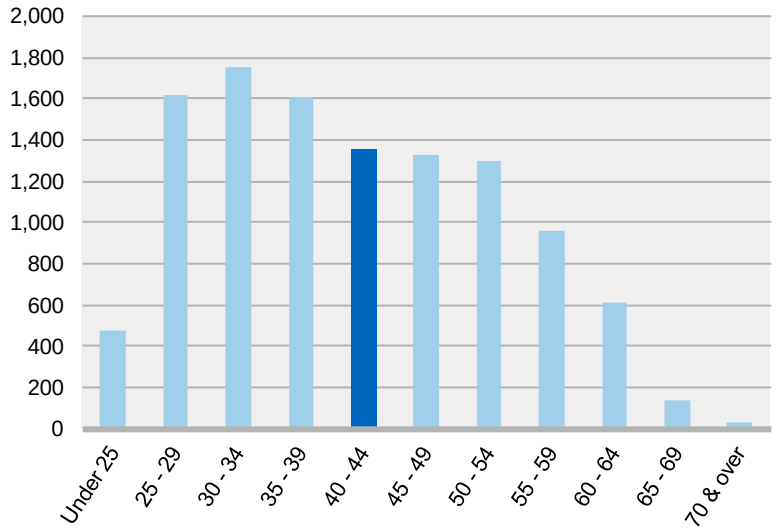
*Excluding inactive non-vested members

Active Members

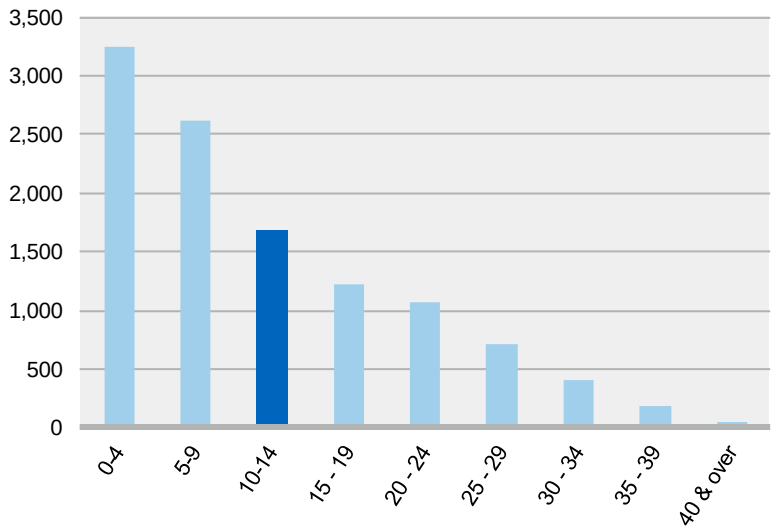
Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 11,175 active members with an average age of 41.8 and average years of service of 11.7 years. The 10,881 active members in the prior valuation had an average age of 41.9 and average service of 11.8 years.

Distribution of Active Participants as of July 1, 2019

ACTIVES BY AGE



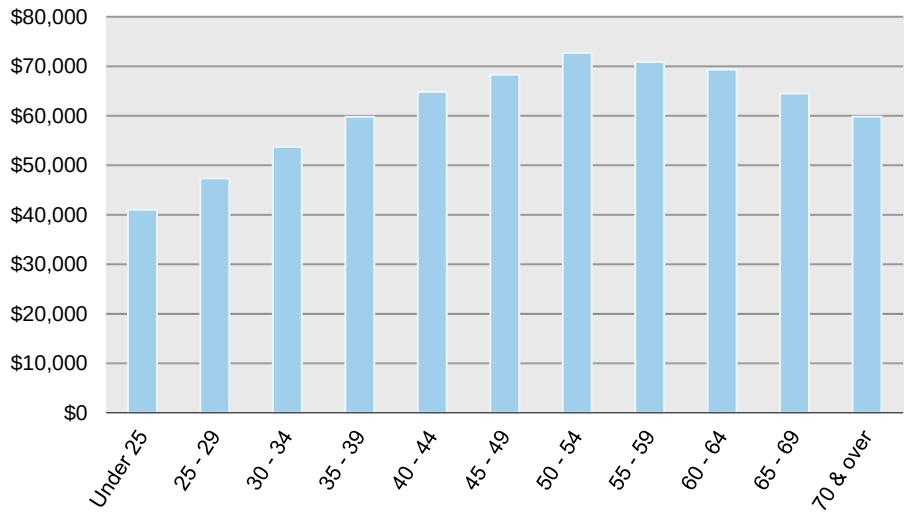
ACTIVES BY YEARS OF SERVICE



In this year's valuation, the 11,175 active members have an average compensation of $60,893. The 10,881 active members in the prior valuation had an average compensation of $60,055.

Distribution of Active Participants as of July 1, 2019

AVERAGE COMPENSATION OF ACTIVES BY AGE



Inactive Members

In this year's valuation, there were 1,657 members with a vested right to a deferred or immediate vested benefit.

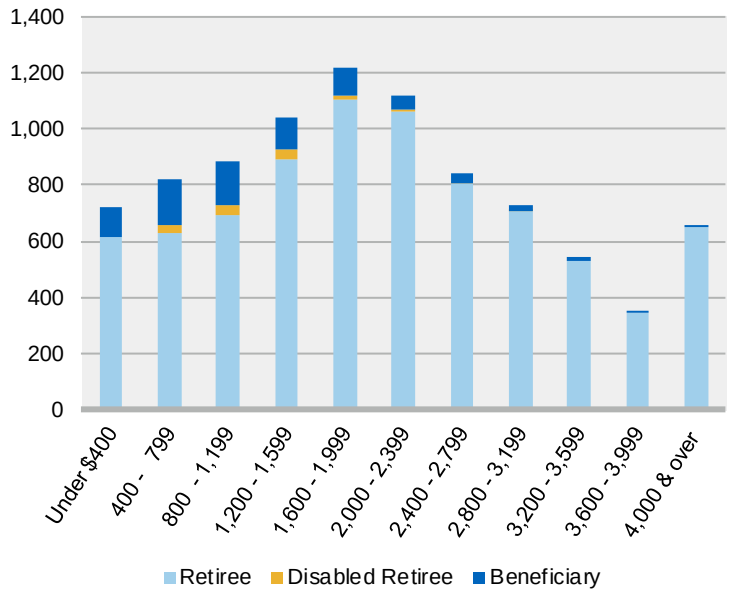
In addition, there were 1,035 non-vested members entitled to a return of their employee contributions.

Retirees and Beneficiaries

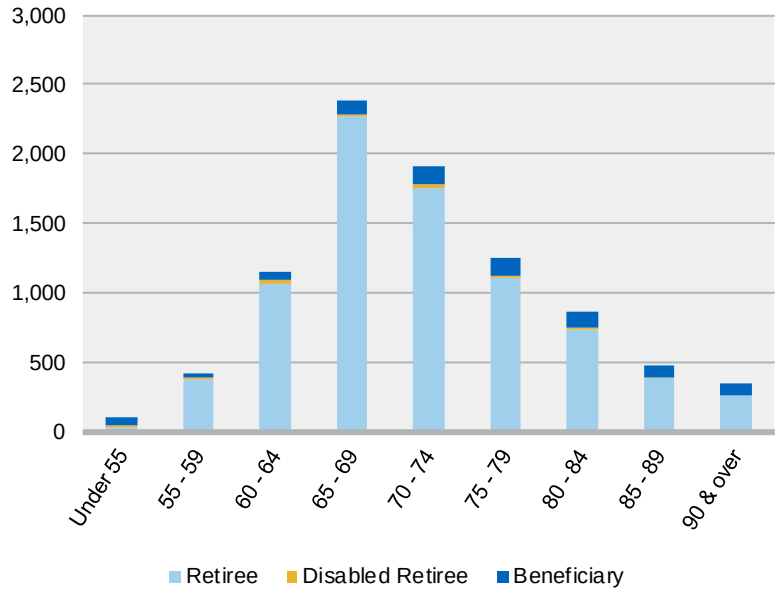
As of July 1, 2019, 8,146 retirees and 772 beneficiaries were receiving total monthly benefits of $18,435,515. For comparison, in the previous valuation, there were 8,002 retirees and 741 beneficiaries receiving monthly benefits of $17,617,313.

Distribution of Retirees and Beneficiaries as of July 1, 2019

RETIREES AND BENEFICIARIES BY TYPE AND MONTHLY AMOUNT



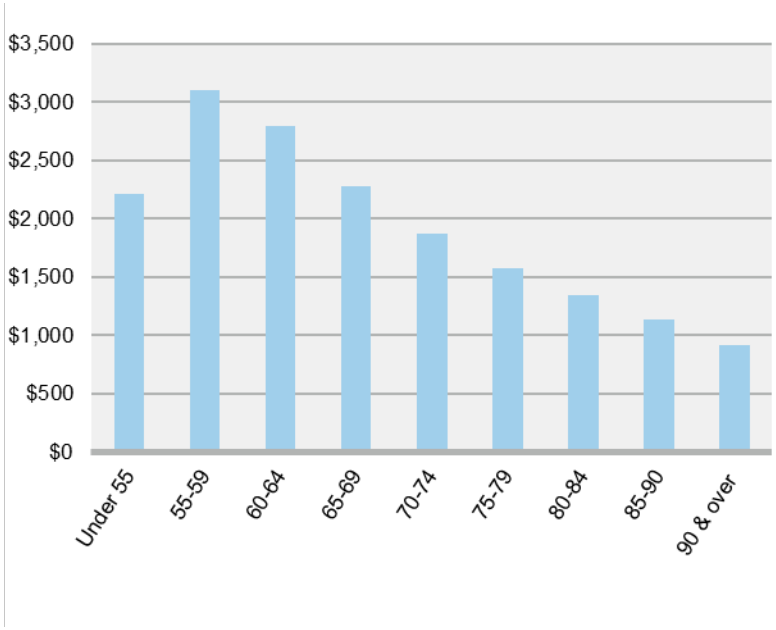
RETIREES AND BENEFICIARIES BY TYPE AND BY AGE



As of July 1, 2019, the average monthly benefit for retirees and beneficiaries is $2,067, compared to $2,015 in the previous valuation. The average age for retirees and beneficiaries is 72.2 in the current valuation, compared with 71.8 in the prior valuation.

Distribution of Retirees and Beneficiaries as of July 1, 2019

AVERAGE MONTHLY AMOUNT OF RETIREES AND BENEFICIARIES BY AGE



Historical Plan Population

The chart below demonstrates the progression of the active population over the last 20 years.

ACTIVE MEMBER DATA STATISTICS: 2000 – 2019

	Active Members		Total Payroll Supplied by System, Annualized		Average Salary			
As of July 1	Number	Percent Change	Amount in $ Millions	Percent Change	$ Amount	Percent Change	Average Age	Average Service
2000	10,025	-0.2%	323.0	2.7%	32,223	2.9%	43.9	14.1
2001	10,239	2.1%	342.2	5.9%	33,421	3.7%	44.4	14.4
2002	9,931	-3.0%	348.1	1.7%	35,052	4.9%	44.5	14.4
2003	9,916	-0.2%	367.9	5.7%	37,105	5.9%	44.8	14.6
2004	9,826	-0.9%	376.5	2.3%	38,321	3.3%	44.9	14.7
2005	9,801	-0.3%	386.6	2.7%	39,447	2.9%	44.9	14.7
2006	9,585	-2.2%	390.1	0.9%	40,703	3.2%	44.8	14.6
2007	9,599	0.1%	401.3	2.9%	41,810	2.7%	44.7	14.5
2008	9,561	-0.4%	417.7	4.1%	43,684	4.5%	44.6	14.4
2009	9,707	1.5%	440.0	5.3%	45,327	3.8%	44.5	14.3
2010	9,907	2.1%	465.0	5.7%	46,937	3.6%	44.2	14.0
2011	10,004	1.0%	488.8	5.1%	48,857	4.1%	43.9	13.8
2012	10,014	0.1%	505.3	3.4%	50,458	3.3%	43.7	13.7
2013	10,138	1.2%	526.7	4.2%	51,953	3.0%	43.2	13.2
2014	10,305	1.6%	557.2	5.8%	54,073	4.1%	42.9	12.8
2015	10,514	2.0%	589.8	5.8%	56,095	3.7%	42.5	12.4
2016	10,813	2.8%	627.0	6.3%	57,986	3.4%	42.3	12.1
2017	10,874	0.6%	650.1	3.7%	59,780	3.1%	42.1	11.9
2018	10,881	0.1%	653.5	0.5%	60,055	0.5%	41.9	11.8
2019	11,175	2.7%	680.5	4.1%	60,893	1.4%	41.8	11.7

The chart below shows the growth among the retired population over the last 10 years.

SERVICE RETIREES DATA STATISTICS: 2010 – 2019

	Service Retirees		Average Annual Amount		
As of July 1	Number	Percent Change	$ Amount	Percent Change	Average Age
2010	6,029	3.4%	19,445	3.4%	70.7
2011	6,252	3.7%	19,990	2.8%	70.7
2012	6,448	3.1%	20,739	3.7%	70.8
2013	6,754	4.7%	21,462	3.5%	70.8
2014	6,991	3.5%	22,230	3.6%	70.9
2015	7,250	3.7%	22,976	3.4%	71.0
2016	7,435	2.6%	23,593	2.7%	71.3
2017	7,664	3.1%	24,352	3.2%	71.5
2018	7,877	2.8%	25,187	3.4%	71.7
2019	8,019	1.8%	25,887	2.8%	72.0

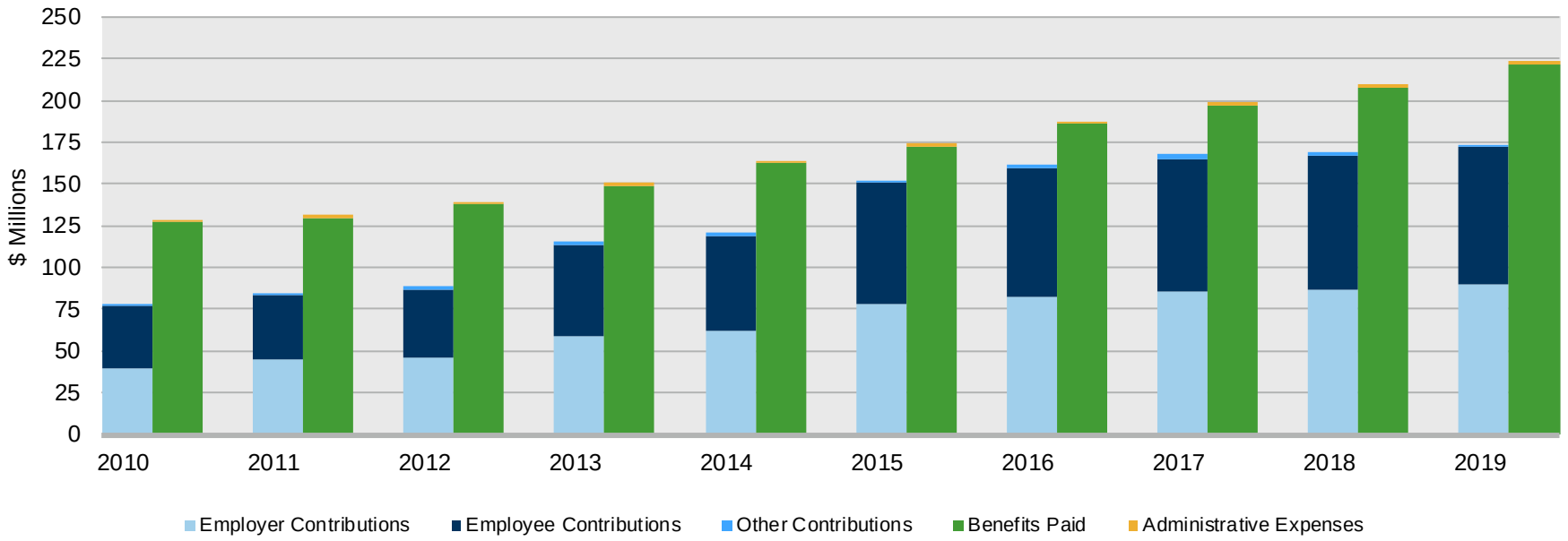
This table does not include disability retirees or beneficiaries.

B. Financial Information

Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and investment earnings (less investment fees) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of these transactions for the valuation year, is presented in *Section 3, Exhibits E, F* and *G*.

COMPARISON OF CONTRIBUTIONS WITH BENEFITS PAID FOR YEARS ENDED JUNE 30, 2010 – 2019



It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

DETERMINATION OF ACTUARIAL VALUE OF ASSETS FOR YEAR ENDED JUNE 30, 2019, AND JUNE 30, 2018

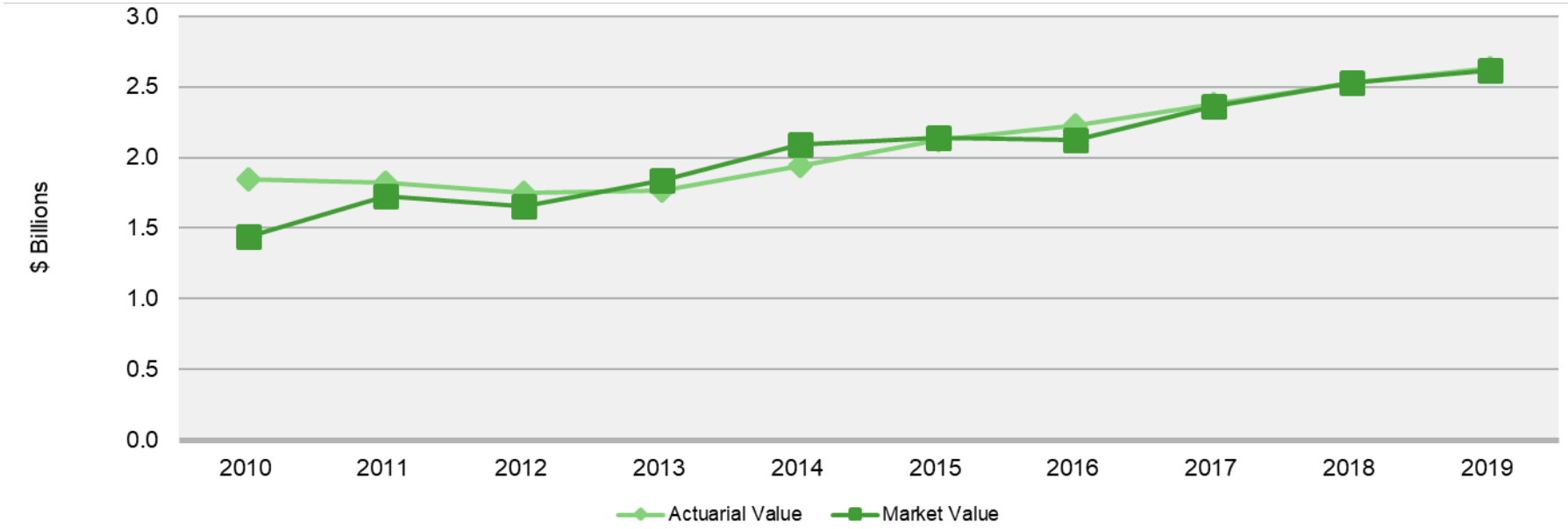
				2019		2018
1.	Market value of assets available for benefits			$2,616,171,056		$2,530,657,411
2.	Calculation of unrecognized return*	Original Amount**	% Not Recognized		% Not Recognized	
	a. Year ended June 30, 2019	-$59,163,355	80%	-$47,330,684		
	b. Year ended June 30, 2018	30,002,998	60%	18,001,800	80%	$24,002,398
	c. Year ended June 30, 2017	103,235,815	40%	41,294,326	60%	61,941,489
	d. Year ended June 30, 2016	-156,759,166	20%	-31,351,833	40%	-62,703,666
	e. Year ended June 30, 2015	-93,205,396		0	20%	-18,641,079
	f. Total unrecognized return			-$19,386,391		$4,599,142
3.	Actuarial value of assets (Current Assets): 1 – 2f			$2,635,557,447		$2,526,058,269
4.	Actuarial value as a percent of market value: 3 ÷ 1			100.7%		99.8%

* Recognition at 20% per year over five years

** Total return minus expected return on a market value basis

Both the actuarial value and market value of assets are representations of TFFR's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the Plan's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

ACTUARIAL VALUE OF ASSETS VS. MARKET VALUE OF ASSETS AS OF JUNE 30, 2010 – 2019



C. Actuarial Experience

To calculate any actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), any contribution requirement will decrease from the previous year. On the other hand, any contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total loss is $10,741,695, which includes $34,821,389 from investment losses and $24,079,694 in net gains from all other sources. The net experience variation from individual sources other than investments was 0.6% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

ACTUARIAL EXPERIENCE FOR YEAR ENDED JUNE 30, 2019

1.	Net gain/(loss) from investments*	-$34,821,389
2.	Net gain/(loss) from administrative expenses	-59,112
3.	Net gain/(loss) from liability and other experience	24,138,806
4.	Net experience gain/(loss): 1 + 2 + 3	-$10,741,695

* Details on next page.

Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Plan's investment policy. The rate of return on the market value of assets was 5.39% for the year ended June 30, 2019.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.75%. The actual rate of return on an actuarial basis for the 2019 plan year was 6.36%. Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended June 30, 2019 with regard to its investments.

INVESTMENT EXPERIENCE

		Year Ended June 30, 2019		Year Ended June 30, 2018	
		Market Value	Actuarial Value	Market Value	Actuarial Value
1.	Value assets at the beginning of year	$2,530,657,411	$2,526,058,269	$2,360,491,075	$2,379,811,205
2.	Contributions during the fiscal year	173,949,975	173,949,975	168,928,460	168,928,460
3.	Benefits and expense during the fiscal year	223,479,649	223,479,649	210,107,493	210,107,493
4.	Value of assets at end of year	2,616,171,056	2,635,557,447	2,530,657,411	2,526,058,269
5.	Net investment income: 4 – 1 – 2 + 3	$135,043,319	$159,028,852	$211,345,369	$187,426,097
6.	Average value of assets: 1 + [2 – 3] x ½	$2,505,892,574	$2,501,293,432	$2,339,901,559	$2,359,221,689
7.	Rate of return: 5 ÷ 6	5.39%	6.36%	9.03%	7.94%
8.	Assumed rate of return	7.75%	7.75%	7.75%	7.75%
9.	Expected investment income: 6 x 8	$194,206,674	$193,850,241	$181,342,371	$182,839,681
10.	Actuarial gain/(loss): 5 – 9	($59,163,355)	($34,821,389)	$30,002,998	$4,586,416

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the actual market value investment return for the last 20 years, including averages over select time periods.

INVESTMENT RETURN – MARKET VALUE VS. ACTUARIAL VALUE: 1990 - 2019

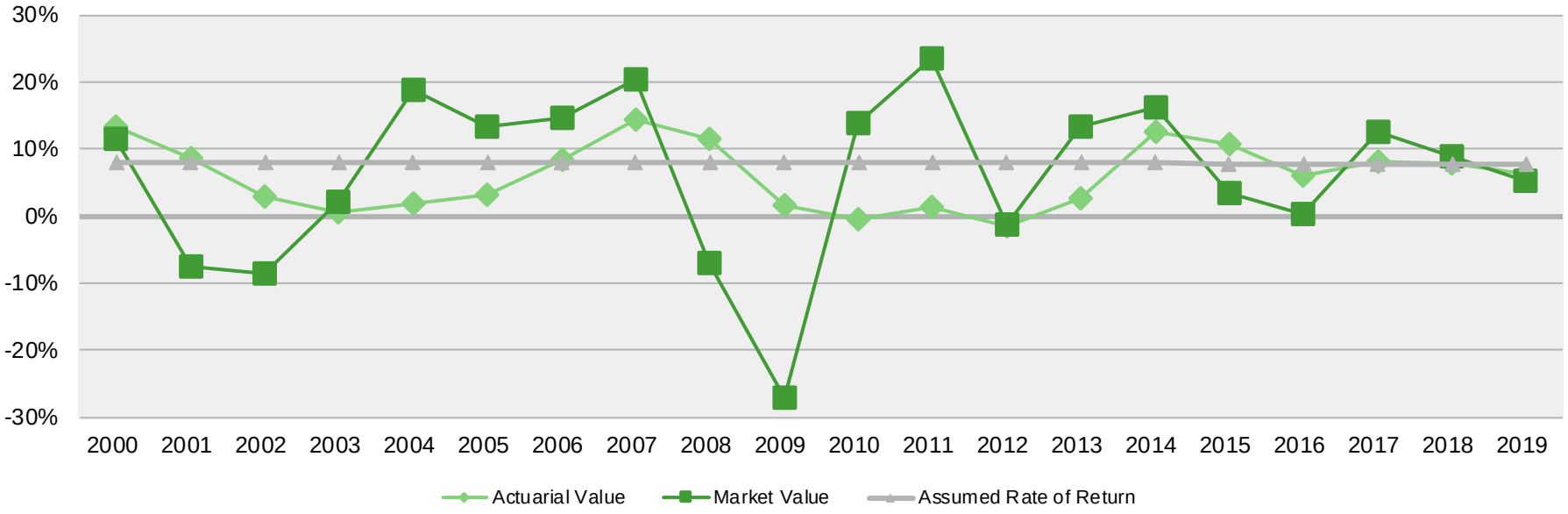
Year Ended June 30	Market Value	Actuarial Value	Year Ended June 30	Market Value	Actuarial Value	Year Ended June 30	Market Value	Actuarial Value
1990	6.7%	7.7%	2000	11.6%	13.3%	2010	13.9%	-0.5%
1991	7.5	5.8	2001	-7.6	8.6	2011	23.5	1.4
1992	12.4	6.5	2002	-8.6	3.0	2012	-1.4	-1.4
1993	14.7	8.1	2003	2.1	0.6	2013	13.4	2.7
1994	1.2	7.0	2004	18.9	1.9	2014	16.1	12.6
1995	13.6	9.1	2005	13.3	3.3	2015	3.5	10.7
1996	15.6	11.3	2006	14.6	8.5	2016	0.4	6.2
1997	18.5	12.6	2007	20.4	14.4	2017	12.6	8.2
1998	13.2	12.6	2008	-7.0	11.6	2018	9.0	7.9
1999	11.5	13.5	2009	-27.0	1.7	2019	5.4	6.4

Most recent five-year average return	6.1%	7.9%
Most recent ten-year average return	9.4%	5.3%
Most recent 15-year average return	6.6%	6.1%
Most recent 20-year average return	5.6%	5.9%
Most recent 30-year average return	7.5%	7.1%

Note: For 2011-2019, investment returns on market basis were determined by Segal.

Subsection B described the actuarial asset valuation method that gradually recognizes fluctuations in the market value rate of return. The goal of this is to stabilize the actuarial rate of return and to produce more level pension plan costs.

MARKET AND ACTUARIAL RATES OF RETURN FOR YEARS ENDED JUNE 30, 2000 - 2019



Administrative Expenses

Administrative expenses for the year ended June 30, 2019 totaled $2,251,083 compared to the assumption of $2,114,256. This resulted in a loss of $59,112 for the year, when adjusted for timing.

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among participants,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected), and
- salary increases (greater or smaller than projected).

The net gain from this other experience for the year ended June 30, 2019 amounted to $24,138,806, which is 0.6% of the actuarial accrued liability.

EXPERIENCE DUE TO CHANGES IN DEMOGRAPHICS FOR YEAR ENDED JUNE 30, 2019

Turnover	-$3,820,142
Retirement	-1,286,280
Deaths among retired members and beneficiaries	9,737,737
Salary/service increase for continuing actives	21,895,994
New entrants	-7,394,261
Miscellaneous	5,005,758
Total gain/ (loss)	**$24,138,806**

D. Changes in the Actuarial Accrued Liability

The actuarial accrued liability as of July 1, 2019 is $3,993,424,160, an increase of $129,908,434, or 3.4%, from the actuarial accrued liability as of the prior valuation date. The change in liability is due to interest, accumulation and payment of benefits, and actuarial experience (as discussed in the previous subsection).

Actuarial Assumptions

- There are no assumption changes reflected in this report.
- Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

Plan Provisions

- There were no changes in plan provisions since the prior valuation.
- A summary of plan provisions is in *Section 4, Exhibit II*.

E. Cash Flow

Cash flow is the difference between contributions and benefit payments, refunds, and expenses. Negative cash flow indicates that the payments made from the Fund exceed contributions made to the Fund.

HISTORY OF CASH FLOW: 2010 - 2019

Year Ended June 30	Contributions[1]	Disbursements or Expenditures				Net Cash Flow for the Year[2]	Market Value of Assets	Net Cash Flow as Percent of Market Value
		Benefit Payments	Refunds	Administrative Expenses	Total Disbursements			
2010	$78,105,830	($124,472,154)	($2,557,240)	($1,902,796)	($128,932,190)	($50,826,360)	$1,437,949,843	-3.5%
2011	84,923,250	(127,435,564)	(2,210,738)	(2,003,705)	(131,650,007)	(46,726,757)	1,726,179,317	-2.7%
2012	88,808,604	(135,250,568)	(2,479,194)	(1,596,976)	(139,326,738)	(50,518,134)	1,654,149,659	-3.1%
2013	115,849,348	(145,943,323)	(3,053,395)	(1,623,638)	(150,620,356)	(34,771,008)	1,839,583,960	-1.9%
2014	120,991,968	(158,350,355)	(3,908,921)	(1,586,045)	(163,845,321)	(42,853,353)	2,090,977,056	-2.0%
2015	152,463,762	(168,349,762)	(3,889,671)	(1,923,392)	(174,162,825)	(21,699,063)	2,141,920,800	-1.0%
2016	161,995,828	(180,617,784)	(5,350,896)	(1,851,656)	(187,820,336)	(25,824,508)	2,124,335,288	-1.2%
2017	168,157,111	(191,104,694)	(5,411,850)	(2,173,431)	(198,689,975)	(30,532,864)	2,360,491,075	-1.3%
2018	168,928,460	(202,417,031)	(5,561,668)	(2,128,794)	(210,107,493)	(41,179,033)	2,530,657,411	-1.6%
2019	173,949,975	(215,328,174)	(5,900,392)	(2,251,083)	(223,479,649)	(49,529,649)	2,616,171,056	-1.9%

[1] Includes employee and employer contributions, as well as any purchased service credits during the year
[2] Equal to Contributions + Total Disbursements

F. Development of Unfunded/(Overfunded) Actuarial Accrued Liability

DEVELOPMENT OF UNFUNDED/(OVERFUNDED) ACTUARIAL ACCRUED LIABILITY FOR YEAR ENDED JUNE 30, 2019, AND JUNE 30, 2018

		2019		2018	
1.	Unfunded/(overfunded) actuarial accrued liability at beginning of year		$1,337,457,457		$1,354,205,623
2.	Normal cost at beginning of year		79,870,221		80,199,924
3.	Total contributions		-173,949,975		-168,928,460
4.	Interest on:				
	a. Unfunded actuarial accrued liability and normal cost	$109,842,895		$111,166,430	
	b. Total contributions	-6,095,580		-5,919,617	
	c. Total interest: 4a + 4b		103,747,315		105,246,813
5.	Expected unfunded/(overfunded) actuarial accrued liability		$1,347,125,018		$1,370,723,899
6.	Changes due to (gain)/loss:				
	a. Investments	$34,821,389		-$4,586,416	
	b. Demographics	-24,079,694		-28,680,026	
	c. Total changes due to (gain)/loss: 6a + 6b		10,741,695		-33,266,442
7.	Changes due to plan amendments		0		0
8.	Changes in actuarial cost method		0		0
9.	Changes in actuarial assumptions		0		0
10.	Unfunded/(overfunded) actuarial accrued liability at end of year: 5 + 6c + 7 + 8 + 9		$1,357,866,713		$1,337,457,457

G. Actuarially Determined Contribution

The amount of the actuarially determined contribution is comprised of an employer normal cost payment and a payment on the unfunded/(overfunded) actuarial accrued liability. This total amount is divided by the projected payroll for active members to determine the actuarially determined contribution of 12.84% of payroll.

TFFR sets the methodology used to calculate the actuarially determined contribution based on a closed amortization period of 30 years, established as of July 1, 2013. As of July 1, 2019, there are 24 years remaining on this schedule. The employer contribution rate for TFFR set by statute is currently 12.75% of payroll. Since the actuarially determined contribution is 12.84% of payroll, there is a deficit of 0.09% of payroll. The calculated employer normal cost (including expenses) is 0.14% of payroll. The remaining 12.70% of payroll will amortize the unfunded actuarial accrued liability over a period of 24 years.

The contribution requirement as of July 1, 2019 is based on the data previously described, the actuarial assumptions and Plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

ACTUARIALLY DETERMINED CONTRIBUTION*

		Year Beginning July 1			
		2019		2018	
		Amount	% of Payroll	Amount	% of Payroll
1.	Total normal cost, adjusted for timing*	$85,956,750	11.89%	$82,888,334	11.95%
2.	Expected employee contributions	84,973,059	11.75%	81,514,258	11.75%
3.	Employer normal cost, adjusted for timing*: 1 - 2	$983,691	0.14%	$1,374,076	0.20%
4.	Actuarial accrued liability	3,993,424,160		3,863,515,726	
5.	Actuarial value of assets	2,635,557,447		2,526,058,269	
6.	Unfunded/(overfunded) actuarial accrued liability: 4 – 5	1,357,866,713		1,337,457,457	
7.	Payment on unfunded actuarial accrued liability, adjusted for timing*	91,842,615	12.70%	88,392,796	12.74%
8.	Actuarially determined contribution: 3 + 7	$92,826,306	12.84%	$89,766,872	12.94%
9.	Total payroll supplied by System, annualized	$680,481,816		$653,456,893	
10.	Projected annual payroll for fiscal year beginning July 1	$723,174,975		$693,738,366	

* Normal cost includes administrative expenses and contributions are assumed to be paid at the middle of every month

Reconciliation of Actuarially Determined Contribution

The chart below details the changes in the actuarially determined contribution from the prior valuation to the current year's valuation.

RECONCILIATION OF ACTUARIALLY DETERMINED CONTRIBUTION

		July 1, 2019	July 1, 2018
1.	Prior valuation	12.94%	12.99%
2.	Increases/(decreases) due to:		
	• Effect of change in amortization period (decrease from 26 years to 25 years remaining as of July 1, 2018 and decrease from 25 years to 24 years remaining as of July 1, 2019)	0.00%	0.00%
	• Effect of change in covered payroll and normal cost	-0.20%	0.25%
	• Effect of contributions (more)/less than actuarially determined contribution: 12.75% rather than 12.99% for FY2018 and 12.75% rather than 12.94% for FY2019	-0.02%	0.02%
	• Effect of gains and losses on accrued liability and administrative expenses	-0.21%	-0.28%
	• Effect of investment (gain)/loss	0.33%	-0.04%
	• Effect of legislative changes	0.00%	0.00%
	• Effect of change in actuarial assumptions	0.00%	0.00%
	• Net effect of other changes	0.00%	0.00%
	Total change	-0.10%	-0.05%
3.	Current valuation: 1 + 2	12.84%	12.94%
4.	Statutory employer contribution rate	12.75%	12.75%
5.	Margin available [contribution sufficiency/(deficiency)]: 4 – 3	-0.09%	-0.19%

H. History of Employer Contributions

Critical information to assess the funding progress is the historical comparison of the actuarially determined contribution (annual required contribution prior to July 1, 2014) to the actual contributions. A history of the most recent years of contributions is shown below.

HISTORY OF EMPLOYER CONTRIBUTIONS: 2010 – 2019

Fiscal Year Ended June 30	Actuarially Determined Employer Contribution (ADC)[1]		Actual Employer Contribution[2]		
	Amount[3]	Percentage of Payroll[4]	Amount	Percentage of Payroll	Percent Contributed
2010	$52,053,217	10.78%	$39,836,646	8.25%	76.5%
2011	65,112,696	12.79%	44,545,433	8.75%	68.4%
2012	69,373,794	13.16%	46,126,193	8.75%	66.5%
2013	52,396,153	9.49%[5]	59,352,860	10.75%	113.3%
2014	59,513,485	10.26%	62,355,146	10.75%	104.8%
2015	71,167,632	11.57%	78,422,098	12.75%	110.2%
2016	84,724,122	13.04%	82,839,932	12.75%	97.8%
2017	89,231,211	13.22%	86,058,868	12.75%	97.7%
2018	88,307,239	12.99%	86,675,715	12.75%	98.2%
2019	90,777,781	12.94%	89,444,881	12.75%	98.5%

[1] Prior to FY 2014, the ADC is the same as the GASB ARC determined under GASB 25.

[2] Prior to FY 2014, these amounts include prior year corrections.

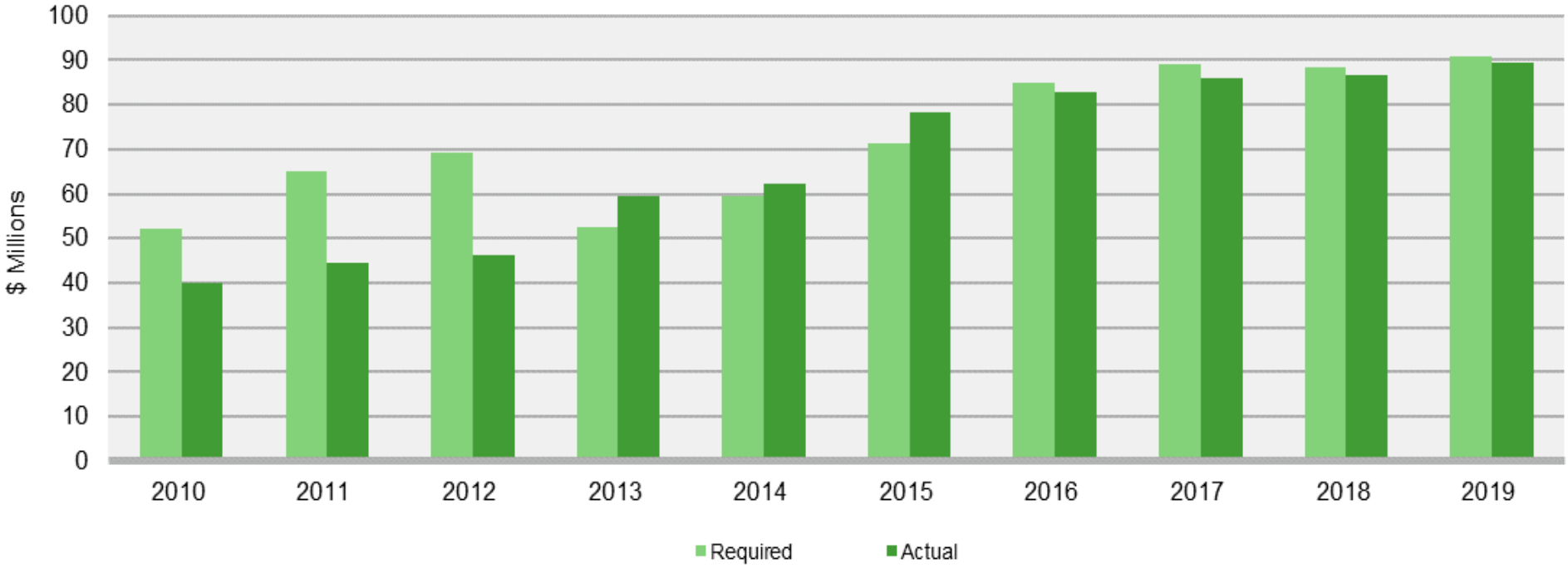
[3] The dollar amount of the ADC for FY 2014 through FY 2019 is based on actual payroll for the year and differs from the estimated dollar amount shown in the prior year's actuarial valuation report because of differences between estimated and actual payroll.

[4] The ADC for each fiscal year is based on the actuarial valuation as of the beginning of the year. Therefore, the FY 2019 ADC is based on the July 1, 2018 valuation. The ADC is defined as the contribution rate required to pay the employer normal cost and to amortize the unfunded actuarial accrued liability over the closed 30-year period that began July 1, 2013 as a level percentage of payroll.

[5] The FY 2013 ADC reflects the actuarial present value of the increased statutory contributions scheduled to occur July 1, 2014.

The chart below presents a graphical representation of the historical comparison of the actuarially determined contribution to the actual contributions for TFFR.

ACTUARIALLY DETERMINED VERSUS ACTUAL EMPLOYER CONTRIBUTIONS, YEARS ENDED JUNE 30



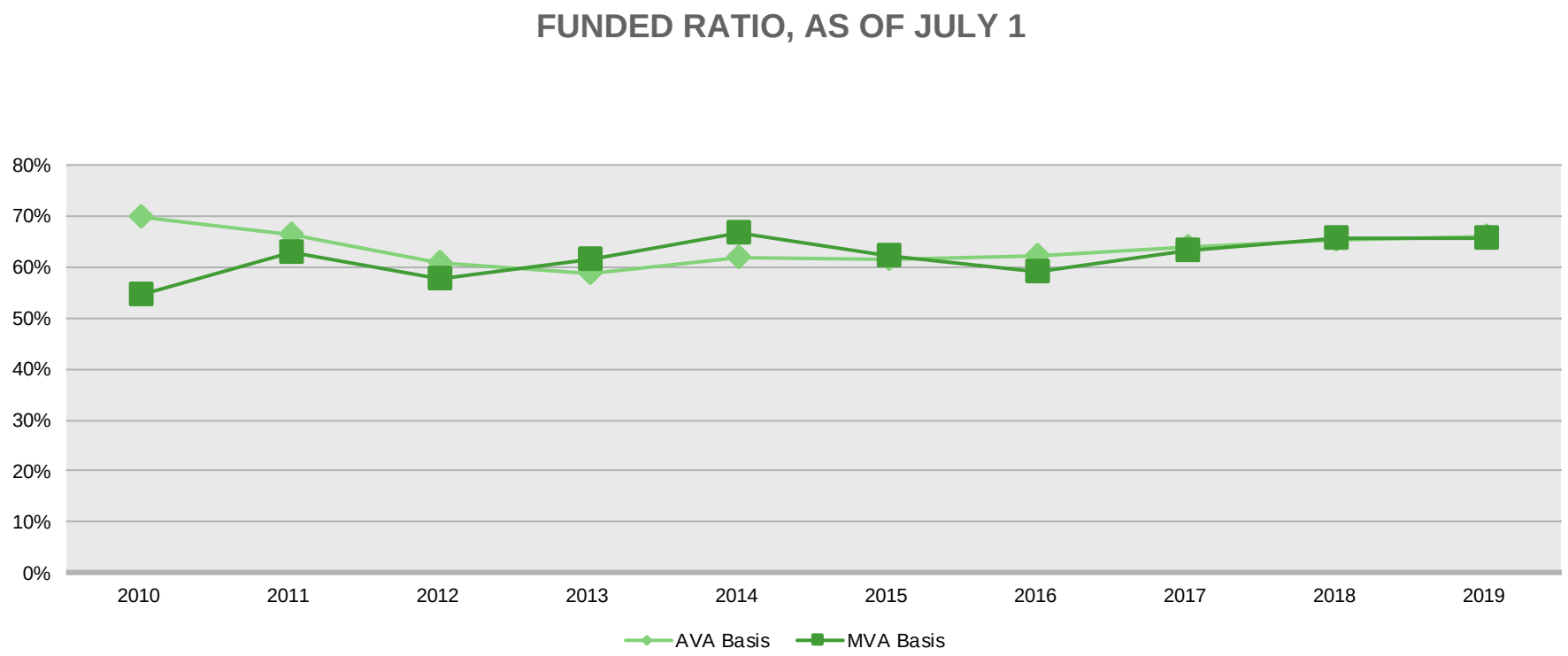
I. Additional Information

The other critical piece of information regarding TFFR's financial status is the funded ratio. This ratio compares the actuarial value of assets to the actuarial accrued liabilities of the Plan. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors. The chart below shows the funded ratio calculated using the actuarial value of assets.

SCHEDULE OF FUNDING PROGRESS

As of July 1	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded/ Accrued Liability (UAAL)	Funded Ratio	Total Payroll Supplied by System, Annualized	UAAL as a % of Compensation
2010	$1,841,960,220	$2,637,165,045	$795,204,825	69.8%	$465,007,110	171.0%
2011	1,822,598,871	2,749,751,755	927,152,884	66.3%	488,764,292	189.7%
2012	1,748,080,771	2,871,870,286	1,123,789,515	60.9%	505,285,069	222.4%
2013	1,762,321,644	2,997,139,087	1,234,817,443	58.8%	526,698,342	234.4%
2014	1,940,473,504	3,138,799,773	1,198,326,269	61.8%	557,222,917	215.1%
2015	2,125,017,451	3,449,775,982	1,324,758,531	61.6%	589,783,780	224.6%
2016	2,229,292,988	3,589,393,851	1,360,100,863	62.1%	627,002,353	216.9%
2017	2,379,811,205	3,734,016,828	1,354,205,623	63.7%	650,052,674	208.3%
2018	2,526,058,269	3,863,515,726	1,337,457,457	65.4%	653,456,893	204.7%
2019	2,635,557,447	3,993,424,160	1,357,866,713	66.0%	680,481,816	199.5%

The chart below shows the funded ratio calculated using both the actuarial value of assets and the market value of assets.



J. GFOA Solvency Test

The Actuarial Accrued Liability represents the present value of benefits earned, calculated using the Plan's actuarial cost method. The Actuarial Value of Assets reflects the financial resources available to liquidate the liability. The portion of the liability covered by assets reflects the extent to which accumulated plan assets are sufficient to pay future benefits, and is shown for liabilities associated with employee contributions, pensioner liabilities, and other liabilities. The Government Finance Officers Association (GFOA) recommends that the funding policy aim to achieve a funded ratio of 100 percent.

GFOA SOLVENCY TEST AS OF JULY 1

	2019	2018
Actuarial accrued liability (AAL)		
• Active member contributions	$941,512,724	$881,392,433
• Retirees and beneficiaries	2,314,016,956	2,222,021,190
• Active and inactive members (employer financed)	737,894,480	760,102,103
Total	$3,993,424,160	$3,863,515,726
Actuarial value of assets	$2,635,557,447	$2,526,058,269
Cumulative portion of AAL covered		
• Active member contributions	100.0%	100.0%
• Retirees and beneficiaries	73.2%	74.0%
• Active and inactive members (employer financed)	0.0%	0.0%

K. Summary of Actuarial Valuation Results

		July 1, 2019		July 1, 2018	
A.	**Determination of Actuarial Accrued Liability**				
1.	Active members				
	a. Retirement benefits	$2,221,580,016		$2,161,868,443	
	b. Disability benefits	37,445,914		35,619,428	
	c. Death benefits	39,168,167		37,705,085	
	d. Withdrawal benefits	170,765,844		159,411,742	
	e. Total		$2,468,959,941		$2,394,604,698
2.	Inactive vested members		99,848,736		95,439,788
3.	Inactive non-vested members		9,911,187		8,416,461
4.	Retirees and beneficiaries		2,314,016,956		2,222,021,190
5.	**Actuarial Present Value of Projected Benefits:** 1e + 2 + 3 + 4		**$4,892,736,820**		**$4,720,482,137**
6.	Actuarial Present Value of Future Normal Costs, Active Members				
	a. Retirement benefits	$698,093,917		$668,561,346	
	b. Disability benefits	16,788,356		15,997,612	
	c. Death benefits	16,995,532		16,351,408	
	d. Withdrawal benefits	167,434,855		156,056,045	
	e. Total		**$899,312,660**		**$856,966,411**
7.	**Actuarial Accrued Liability:** 5 – 6e		**$3,993,424,160**		**$3,863,515,726**
B.	**Determination of Unfunded Actuarial Accrued Liability**				
1.	Actuarial accrued liability		$3,993,424,160		$3,863,515,726
2.	Actuarial value of assets		2,635,557,447		$2,526,058,269
3.	Unfunded actuarial accrued liability: 1 – 2		$1,357,866,713		$1,337,457,457

L. Actuarial Balance Sheet

An overview of the Plan's funding is given by an Actuarial Balance Sheet. In this approach, first the amount and timing of all future payments that will be made by the Plan for current participants is determined. Then these payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value, referred to as the "liability" of the Plan.

Second, this liability is compared to the assets. The "assets" for this purpose include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future employer normal cost contributions, and the present value of future employer amortization payments for the unfunded actuarial accrued liability.

ACTUARIAL BALANCE SHEET

	As of	
	July 1, 2019	July 1, 2018
Liabilities		
• Present value of benefits for retirees and beneficiaries	$2,314,016,956	$2,222,021,190
• Present value of benefits for inactive members	109,759,923	103,856,249
• Present value of benefits for active members	$2,468,959,941	2,394,604,698
Total liabilities	**$4,892,736,820**	**$4,720,482,137**
Assets		
• Total valuation value of assets	$2,635,557,447	$2,526,058,269
• Present value of future contributions by members	971,523,395	922,733,395
• Present value of future employer contributions for:		
» Entry age normal costs	-72,210,735	-65,766,984
» Unfunded actuarial accrued liability	1,357,866,713	1,337,457,457
Total of current and future assets	**$4,892,736,820**	**$4,720,482,137**

M. Determination of Contribution Sufficiency

		July 1, 2019		July 1, 2018	
A.	**Statutory Contributions**	**%Payroll**	**$ Amount**	**% Payroll**	**$ Amount**
1.	Member contributions	11.75%	$84,973,059	11.75%	$81,514,258
2.	Employer contributions	12.75%	92,204,809	12.75%	88,451,642
3.	Total	24.50%	$177,177,868	24.50%	$169,965,900
B.	**Actuarially Determined Contribution**	**% Payroll**	**$ Amount**	**% Payroll**	**$ Amount**
1.	Normal cost				
	a. Retirement	8.78%	$63,476,011	8.87%	$61,494,846
	b. Disability	0.20%	1,448,195	0.20%	1,391,024
	c. Death	0.21%	1,530,204	0.21%	1,481,355
	d. Deferred termination benefit and refunds	1.95%	14,136,791	1.93%	13,388,740
	e. Total	11.14%	$80,591,201	11.21%	$77,755,965
	f. Normal cost, adjusted for timing	11.57%	83,636,558	11.63%	80,694,185
2.	Administrative expenses, adjusted for timing	0.32%	2,320,192	0.32%	2,194,149
3.	**Gross normal cost including administrative expenses, adjusted for timing:** 1f + 2	**11.89%**	**$85,956,750**	**11.95%**	**$82,888,334**
4.	Less member contribution rate	11.75%	84,973,059	11.75%	81,514,258
5.	Employer normal cost rate: 3– 4	0.14%	983,691	0.20%	1,374,076
6.	Unfunded actuarial accrued liability rate, adjusted for timing	12.70%	91,842,615	12.74%	88,392,796
7.	Total: 5 + 6	12.84%	92,826,306	12.94%	89,766,872
C.	**Contribution Sufficiency / (Deficiency): A2 – B7**	**-0.09%**	**-$621,497**	**-0.19%**	**-$1,315,230**
	Projected annual payroll for fiscal year beginning on the valuation date		$723,174,975		$693,738,366

N. Risk

The actuarial valuation results depend on a single set of assumptions; however, there is a risk that emerging results may differ significantly as actual experience proves to be different than projected from the current assumptions.

In 2019, the Board engaged Segal to perform a detailed analysis of the potential range of the impact of risks relative to the Plan's future financial condition. This study included an overview of risks that affect the Fund and stakeholders, as well as various stochastic and deterministic modeling, primarily focusing on investment returns. The study concluded with the development of a Plan Management Policy designed to assess the overall health of TFFR.

Below is a brief discussion of some of the risks that may affect the Plan. This discussion is focused on funding-related risks, but similar concerns may apply to risks regarding the level of expense and liabilities reported for Plan accounting purposes as well.

A detailed risk assessment is important for TFFR because:

- The negative cash flow position of the Plan could be exacerbated by relatively small deviations from assumed future experience.
- Retired and inactive participants account for more than half of the Plan's liabilities limiting options for reducing plan liabilities in the event of adverse experience.
- The employer contribution rate has been less than the actuarially determined contribution rate for several years, which may indicate additional funding challenges in the future.
- The risks identified below show significant potential for variability.

The following risks could significantly affect the Plan's future condition:

a. **Investment Risk** (the risk that returns will be different than expected)

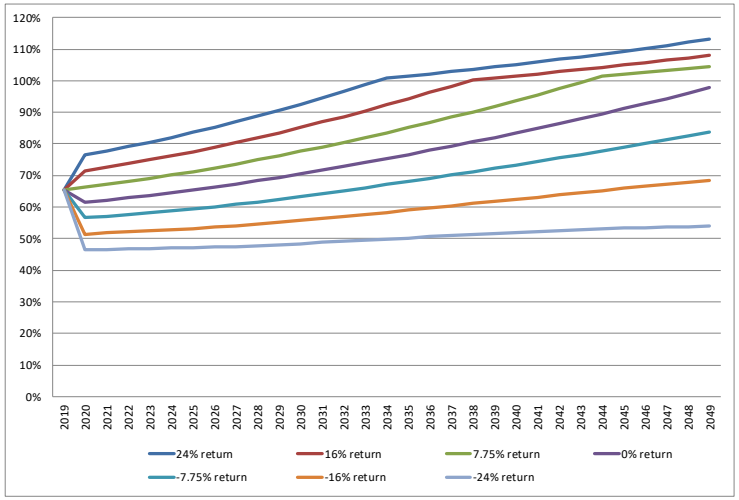
   If the actual market value return for the Plan Year were 1% different from the assumed (either higher or lower), the projected unfunded actuarial liability would change by about 2%, or about $25 million.

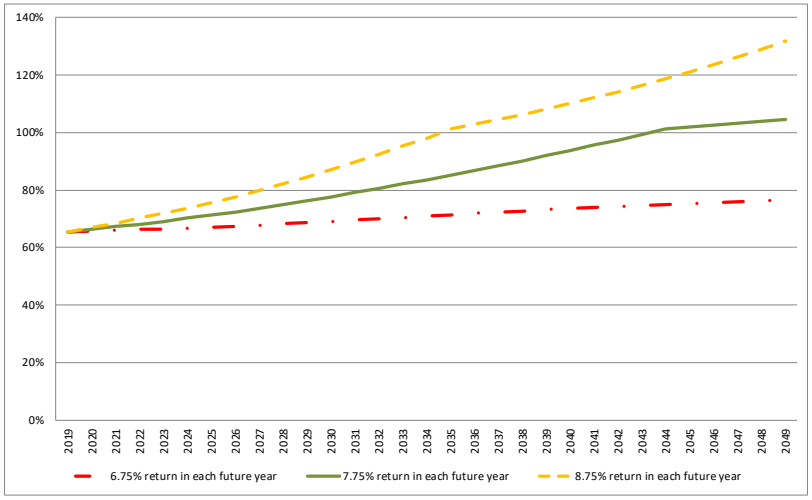
   If the prior year's investment performance resulted in a market value of assets that is 10% different than the current value, it would result in a change of $261.6 million in the asset value. A 10% increase in assets would cause the unfunded liability (market value basis) to decrease from $1,377.3 million to $1,115.7 million. Likewise, a 10% decrease in the asset value would cause the unfunded liability to increase from $1,377.3 million to $1,638.9 million.

Since the Plan's assets are much larger than contributions, investment performance may create volatility in the actuarially determined contribution requirements. For example, for each 1% difference in actual return, the actuarially determined contribution would increase or decrease by 0.05% of payroll. Ignoring the effects of the five-year phase-in of investment gains and losses, the actuarially determined contribution would change by 0.2% of payroll.

The market value rate of return over the last ten years has ranged from a low of -1.4% to a high of 23.5%, with an average of 9.4%. However looking over a longer historical period of 20 years, the fair value rate of return has an average of 5.6%.

The following graphs illustrate the impact on projected funded ratios (market value basis) under two scenarios: 1) market value returns for the next Plan year vary between -24% and +24%, and 2) market value returns in each future Plan year are +1% or -1% above or below the 7.75% assumption.





b. **Longevity Risk** (the risk that mortality experience will be different than expected)

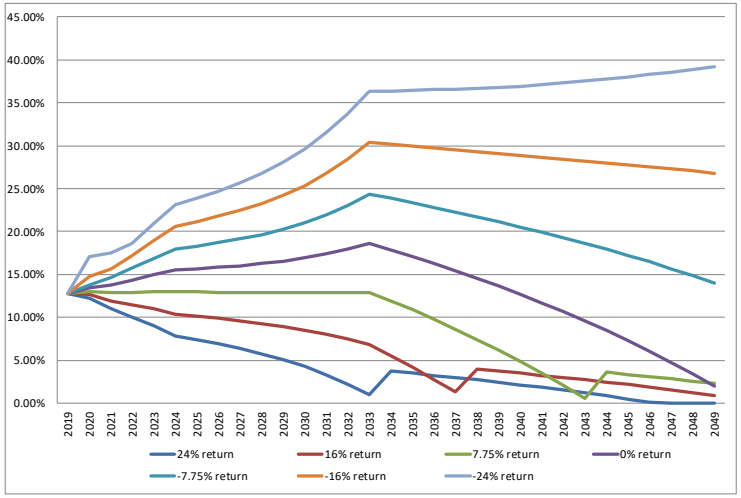
The actuarial valuation includes an expectation of future improvement in life expectancy. Emerging plan experience that does not match these expectations will result in either an increase or decrease in the actuarially determined contribution.

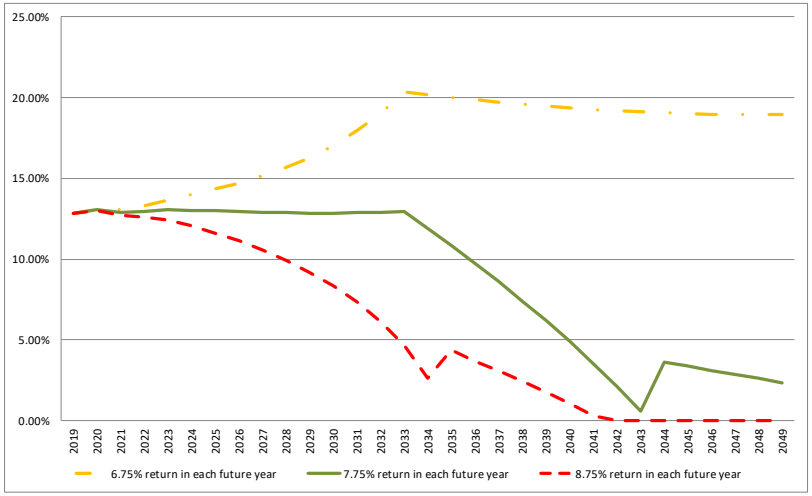
A 10% reduction in the assumed mortality rates results in an increase in the liabilities of roughly 3% for most plans. For TFFR, a 3% liability increase would result in an increase in the unfunded accrued liability of $119.8 million. The unfunded accrued liability (market value of assets basis) would increase from $1,377.3 million to $1,497.1 million.

c. **Contribution Risk** (the risk that actual contributions will be different from actuarially determined contribution)

Plan contributions are set by statute. If contributions remain at the current level and future experience matches the current assumptions, we project the unfunded actuarial accrued liability (market value basis) will be paid off in 2043 (in 24 years).

The following graphs illustrate the impact on projected actuarially determined contribution rates under two scenarios: 1) market value returns for the next Plan year vary between -24% and +24%, and 2) market value returns in each future Plan year are +1% or -1% above or below the 7.75% assumption.





d. **Demographic Risk** (the risk that participant experience will be different than assumed)

Examples of this risk include:

- Actual retirements occurring earlier or later than assumed. The value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.
- More or less active participant turnover than assumed.
- Salary increases more or less than assumed.

e. Actual Experience

- Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past nine years:
  - » The investment gain/loss for a year has ranged from a loss of $169 million to a gain of $80 million.
  - » The non-investment gain/loss for a year has ranged from a loss of $8.9 million to a gain of $28.7 million.
- The funded percentage on the actuarial value of assets has ranged from a low of 59% to a high of 102% since 2000.

f. Maturity Measures

The risk associated with a pension plan increases as it becomes more mature, meaning that the actives represent a smaller portion of the liabilities of the plan. When this happens, there is a greater risk that fluctuations in the experience of the non-active participants or of the assets of the plan can result in large swings in the contribution requirements.

- Over the past ten years, the ratio of non-active participants (excluding inactive non-vested members) to active participants has increased from a low of 0.82 to a high of 0.95. Currently the Plan has a non-active to active participant ratio of 0.95. For the prior year, benefits paid were $49.5 million more than contributions received. As the Plan matures, more cash will be needed from the investment portfolio to meet benefit payments.
- As of July 1, 2019, the retired life actuarial accrued liability represents 58% of the total actuarial accrued liability. In addition, the actuarial accrued liability for inactive vested participants represents 3% of the total. The higher the non-active actuarial accrued liability is as a percent of the total liability, the greater the danger of volatility in results.
- Benefits and administrative expenses less contributions totaled $49.5 million for the year ending June 30, 2019, 1.9% of the market value of assets. The Plan is dependent upon investment returns in order to pay benefits.

Section 3: Supplemental Information

MEMBERSHIP DATA

Membership data was provided on electronic files sent by the RIO staff. Data for active members includes sex, birth date, service, salary for the prior fiscal year, and accumulated contributions. Data for inactive members was similar, but also includes the members' unreduced benefit. For retired members, data includes status (service retiree, disabled retiree or beneficiary), sex, birth date, pension amount, date of retirement, form of payment, and beneficiary sex and birth date if applicable.

While not verifying the correctness of the data at the source, we performed various tests to ensure the internal consistency of the data and its overall reasonableness.

Membership statistics are summarized in Exhibit A. Exhibit B shows the age/service distribution of active members. Exhibit C-1 and Exhibit C-2 show the distribution of retirees by option and by benefit amount. Exhibit D shows a reconciliation of the member data from last year's valuation to this year's valuation.

The number of active members increased by 2.7% since last year, from 10,881 to 11,175. Note that normally the actual number of members employed during the year will be somewhat higher than the valuation count, since the July 1 count excludes most June and July retirees but does not include new teachers joining the system for the next school year.

Total payroll increased 4.1% since last year. For all comparative purposes, payroll is the amount supplied by the RIO staff (i.e., the 2018-2019 member pay), annualized. However, this figure is increased by one year's assumed pay increase to determine the member's rate of pay (and thus, total projected payroll) at July 1, 2019. Pay is assumed to change only at the beginning of a school/fiscal year.

Average pay increased by 1.4%, from $60,055 to $60,893. This change includes the impact of replacing more highly paid members who retire with new teachers. The average increase in salary for the 10,086 continuing members (members active in both this valuation and the preceding valuation) was 4.1%.

The average age of active members decreased from 41.9 years to 41.8 years, and their average service decreased from 11.8 years to 11.7 years.

The table below shows additional information about the active membership this year and last year. Tier 1 Grandfathered members are those who had 65 points as of June 30, 2013, or were at least age 55 and vested. Members who joined prior to June 30, 2008, and did not meet these criteria are considered Tier 1 Non-grandfathered members. Tier 2 members are those hired or rehired after June 30, 2008. All new members in future years will enter as Tier 2 members, so the number will increase over time. The Tier 1 Grandfathered and Non-grandfathered population will decrease each year as members leave due to retirement, termination, death, and disability.

ACTIVE STATISTICS

Category	July 1, 2019	July 1, 2018
Plan Eligibility:		
• Tier 1 Grandfathered	1,633	1,889
• Tier 1 Non-grandfathered	3,131	3,180
• Tier 2	6,411	5,812
• **Total**	**11,175**	**10,881**
Benefit Eligibility:		
• Non-Vested	3,239	3,185
• Vested	6,229	6,019
• Early Retirement	843	812
• Normal Retirement	864	865
• **Total**	**11,175**	**10,881**

In addition, this table shows the number of members who are non-vested, those who are vested but not eligible for retirement, those who are eligible only for an early retirement (reduced) benefit, and those eligible for a normal (unreduced) benefit. As of the valuation date, 1,707 members were eligible for either reduced or unreduced retirement, an increase over last year's figure of 1,677.

Exhibit A – Member Data

Category	July 1, 2019	July 1, 2018	Change From Prior Year
Active members:			
• Males	2,764	2,717	1.73%
• Females	8,411	8,164	3.03%
• Total number	11,175	10,881	2.70%
• Total payroll supplied by System, annualized	$680,481,816	$653,456,893	4.14%
• Average salary	$60,893	$60,055	1.40%
• Average age	41.8	41.9	-0.1
• Average service	11.7	11.8	-0.1
• Total contributions with interest	$941,512,724	$881,392,433	6.82%
• Average contribution with interest	$84,252	$81,003	4.01%
Vested inactive members:			
• Number	1,657	1,623	2.09%
• Total annual deferred benefits	$12,828,016	$12,348,432	3.88%
• Average annual deferred benefit	$7,742	$7,608	1.76%
• Average age	48.9	49.0	-0.1
Non-vested inactive members:			
• Number	1,035	971	6.59%
• Employee contributions with interest due	$7,347,557	$6,365,397	15.43%
• Average refund due	$7,099	$6,556	8.28%
• Average age	37.7	37.5	0.2
Service retirees:			
• Number	8,019	7,877	1.80%
• Total annual benefit	$207,589,824	$198,399,020	4.63%
• Average annual benefit	$25,887	$25,187	2.78%
• Average age	72.0	71.7	0.3
Disabled retirees:			
• Number	127	125	1.60%
• Total annual benefit	$1,911,396	$1,861,025	2.71%
• Average annual benefit	$15,050	$14,888	1.09%
• Average age	64.7	64.0	0.7
Beneficiaries:			
• Number	772	741	4.18%
• Total annual benefit	$11,724,954	$11,147,709	5.18%
• Average annual benefit	$15,188	$15,044	0.96%
• Average age	75.8	75.7	0.1

Exhibit B – Members in Active Service as of July 1, 2019
By Age, Years of Credited Service, and Average Compensation

		Years of Credited Service								
Age	Total	0-4	5-9	10-14	15 - 19	20 - 24	25 - 29	30 - 34	35 – 39	40 & over
Under 25	476	476	0	0	0	0	0	0	0	0
	$41,022	$41,022	0	0	0	0	0	0	0	0
25 - 29	1,620	1,209	411	0	0	0	0	0	0	0
	$47,356	$46,146	$50,915	0	0	0	0	0	0	0
30 - 34	1,751	476	1,007	266	2	0	0	0	0	0
	$53,716	$48,207	$54,639	$60,034	$60,217	0	0	0	0	0
35 - 39	1,606	327	409	672	197	1	0	0	0	0
	$59,809	$49,875	$57,218	$63,656	$68,527	$65,519	0	0	0	0
40 - 44	1,352	233	254	285	435	144	1	0	0	0
	$64,829	$50,214	$60,129	$66,190	$71,099	$75,084	$72,202	0	0	0
45 - 49	1,329	182	199	167	227	447	105	2	0	0
	$68,289	$52,755	$60,961	$67,973	$71,067	$74,918	$74,704	$103,784	0	0
50 - 54	1,302	147	122	125	160	245	368	134	1	0
	$72,712	$59,481	$64,195	$65,166	$69,291	$75,744	$78,703	$84,291	$48,834	0
55 - 59	959	111	109	81	104	137	166	193	58	0
	$70,849	$56,524	$61,315	$67,798	$69,374	$73,209	$75,826	$80,163	$72,278	0
60 - 64	610	58	70	60	70	80	56	67	116	33
	$69,328	$54,186	$62,192	$59,662	$68,054	$74,383	$74,410	$73,647	$77,110	$74,346
65 - 69	139	24	23	19	20	9	9	7	7	21
	$64,479	$53,531	$68,907	$58,039	$61,377	$64,650	$58,879	$72,552	$77,673	$76,159
70 & over	31	11	7	0	5	3	0	1	2	2
	$59,832	$49,870	$56,404	0	$66,567	$76,006	0	$74,966	$70,909	$59,832
Total	11,175	3,254	2,611	1,675	1,220	1,066	705	404	184	56
	$60,893	$47,900	$56,531	$64,049	$69,923	$74,778	$76,827	$80,424	$75,387	$74,760

Exhibit C-1 – Schedule of Annuitants by Type of Benefit as of July 1, 2019

Type of Benefits/Form of Payment	Number	Annual Benefits Amount	Average Monthly Benefits
Service:			
• Straight Life	2,994	$67,886,343	$1,890
• 100% J&S	3,483	102,067,017	2,442
• 50% J&S	689	19,482,961	2,356
• 5 Years C&L	17	257,967	1,265
• 10 Years C&L	175	3,895,757	1,855
• 20 Years C&L	143	3,819,636	2,226
• Level	518	10,180,147	1,638
Subtotal:	8,019	$207,589,828	$2,157
Disability:			
• Straight Life	98	$1,509,002	$1,283
• 100% J&S	21	297,384	1,180
• 50% J&S	5	70,842	1,181
• 5 Years C&L	1	6,254	521
• 10 Years C&L	0	0	0
• 20 Years C&L	2	27,913	1,163
• Level	0	0	0
Subtotal:	127	$1,911,395	$1,254
Beneficiaries:			
• Straight Life	717	$11,315,587	$1,315
• 10 Years Certain	4	28,081	585
• 20 Years Certain	23	154,519	560
• QDRO Alternate Payee	28	226,767	675
Subtotal:	772	$11,724,954	$1,266
Total:	**8,918**	**$221,226,177**	**$2,067**

Exhibit C-2 – Schedule of Annuitants by Monthly Benefit as of July 1, 2019

Monthly Benefit Amount	Number of Members	Female	Male	Average Service
Under $200	260	194	66	6.04
200 - 399	463	344	119	11.25
400 - 599	424	329	95	15.23
600 - 799	399	288	111	19.16
800 - 999	387	282	105	21.56
1,000 - 1,199	498	376	122	24.99
1,200 - 1,399	490	339	151	26.69
1,400 - 1,599	550	371	179	28.36
1,600 - 1,799	608	411	197	28.73
1,800 - 1,999	608	421	187	29.51
2,000 - 2,199	573	403	170	29.64
2,200 - 2,399	542	363	179	30.08
2,400 - 2,599	440	301	139	31.26
2,600 - 2,799	402	276	126	31.62
2,800 - 2,999	387	251	136	32.51
3,000 - 3,199	341	243	98	32.69
3,200 - 3,399	301	199	102	33.63
3,400 - 3,599	239	149	90	33.33
3,600 - 3,799	197	122	75	34.57
3,800 - 3,999	154	107	47	34.62
4,000 & over	655	356	299	36.38
Total:	**8,918**	**6,125**	**2,793**	**27.28**

Exhibit D – Reconciliation of Member Data by Status

	Active Members	Vested Terminated Members	Non-Vested Terminated Members	Service Retirees	Disabled Retirees	Beneficiaries	Total
Number as of July 1, 2018	**10,881**	**1,623**	**971**	**7,877**	**125**	**741**	**22,218**
• Additions and new members	969	0	0	0	0	0	969
• Retirements	-273	-53	0	326	0	0	0
• Disability	-3	-1	0	0	4	0	0
• Died with beneficiary	-4	-1	0	-54	0	66	7*
• Died without beneficiary	-3	-1	-2	-128	-1	-39	-174
• Terminated vested	-171	173	-1	0	-1	0	0
• Terminated non-vested	-178	0	178	0	0	0	0
• Refunds	-163	-25	-51	0	0	0	-239
• Rehired as active	120	-58	-60	-2	0	0	0
• Expired benefits	0	0	0	0	0	0	0
• New alternate payee	0	0	0	0	0	2	2
• Data adjustments	0	0	0	0	0	2	2
Number as of July 1, 2019	**11,175**	**1,657**	**1,035**	**8,019**	**127**	**772**	**22,785**

* Due to multiple beneficiaries

Exhibit E – Summary Statement of Income and Expenses on a Market Value Basis

	Year Ended June 30 , 2019		Year Ended June 30 , 2018	
Net assets at market value at the beginning of the year		$2,530,657,411		$2,360,491,075
Contribution:				
• Employee contributions	$82,429,594		$79,877,611	
• Employer contributions	89,444,881		86,675,715	
• Purchased service credit	1,916,787		2,181,106	
• Interest, penalties and other	158,713		194,028	
Total contribution income		*$173,949,975*		*$168,928,460*
Investment income:				
• Interest, dividends and other income	$56,434,954		$54,486,768	
• Securities lending income	224,713		231,448	
• Investment expenses	-6,272,801		-5,352,945	
• Securities lending expenses=	-44,927		-46,271	
Net investment income		*$50,341,939*		*$49,319,000*
Net realized and unrealized gains/(losses)		84,701,380		162,026,369
Total income available for benefits		**$308,993,294**		**$380,273,829**
Less benefit payments and expenses:				
• Regular annuity benefits	$214,091,045		$201,648,202	
• Partial lump-sum benefits paid	1,237,129		768,829	
• Refunds	5,900,392		5,561,668	
Total benefits and refunds	$221,228,566		$207,978,699	
• Administrative and miscellaneous expenses	2,251,083		2,128,794	
Total benefit payments and expenses		*$223,479,649*		*$210,107,493*
Change in reserve for future benefits		**$85,513,645**		**$170,166,336**
Net assets at market value at the end of the year		**$2,616,171,056**		**$2,530,657,411**

Exhibit F – Summary Statement of Plan Assets

	June 30 , 2019		June 30 , 2018	
Cash and cash equivalents (operating cash)		$20,309,990		$20,493,198
Invested securities lending collateral		8,495,437		7,413,200
Total accounts receivable		37,603,789		36,322,393
Investments:				
• Equities	$1,495,354,621		$1,441,132,463	
• Fixed Income	575,551,625		589,368,951	
• Short-term	35,025,659		28,631,157	
• Real assets	455,163,805		416,937,112	
Total investments at market value		$2,561,095,710		$2,476,069,683
Total assets		$2,627,504,926		$2,540,298,474
Deferred outflows of resources related to pensions		709,618		813,903
Total accounts payable		-11,939,417		-10,406,447
Deferred inflows related to pensions		-104,071		-48,519
Net assets at market value		**$2,616,171,056**		**$2,530,657,411**
Net assets at actuarial value		**$2,635,557,447**		**$2,526,058,269**

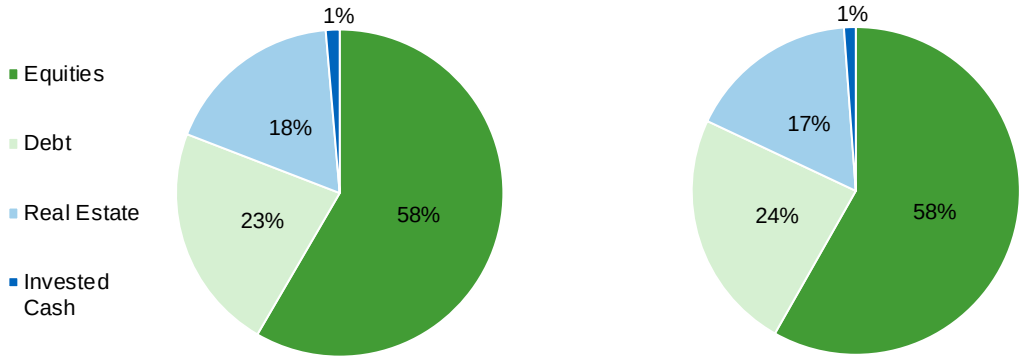


Exhibit G – Development of the Fund Through June 30, 2019

Year Ended June 30	Employer Contributions	Employee Contributions	Other Contributions	Net Investment Return*	Admin. Expenses	Benefit Payments	Market Value of Assets at Year-End**	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2010	$39,836,646	$36,848,481	$1,420,703	$179,059,473	($1,902,796)	($127,029,394)	$1,437,949,843	$1,841,960,220	128.1%
2011	44,545,433	38,869,260	1,508,557	332,952,526	(2,003,705)	(129,646,302)	1,726,179,317	1,822,598,871	105.6%
2012	46,126,193	40,254,562	2,427,849	(23,108,500)	(1,596,976)	(137,729,762)	1,654,149,659	1,748,080,771	105.7%
2013	59,352,860	53,824,557	2,671,931	218,581,671	(1,623,638)	(148,996,718)	1,839,583,960	1,762,321,644	95.8%
2014	62,355,146	56,554,767	2,082,055	292,660,404	(1,586,045)	(162,259,276)	2,090,977,056	1,940,473,504	92.8%
2015	78,422,098	72,268,451	1,773,213	73,204,806	(1,923,392)	(172,239,433)	2,141,920,800	2,125,017,451	99.2%
2016	82,839,932	76,342,685	2,813,211	8,238,996	(1,851,656)	(185,968,680)	2,124,335,288	2,229,292,988	104.9%
2017	86,058,868	79,309,153	2,789,090	266,688,651	(2,173,431)	(196,516,544)	2,360,491,075	2,379,811,205	100.8%
2018	86,675,715	79,877,611	2,375,134	211,345,369	(2,128,794)	(207,978,699)	2,530,657,411	2,526,058,269	99.8%
2019	89,444,881	82,429,594	2,075,500	135,043,319	(2,251,083)	(221,228,566)	2,616,171,056	2,635,557,447	100.7%

* On a market basis, net of investment fees; for 2010 and 2015-2019, net of investment fees and administrative expenses

** The market value of assets as of June 30, 2014 was restated by ($561,999) due to GASB 68 implementation. The restated amount is $2,090,415,057.

Exhibit H – Definition of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability for Actives:	The value of all projected benefit payments for current members less the portion that will be paid by future normal costs.
Actuarial Accrued Liability for Pensioners:	The single-sum value of lifetime benefits to existing pensioners. This sum takes into account life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the Actuarially Determined Contribution (ADC).
Actuarial Gain or Loss:	A measure of the difference between actual experience and expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge that may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
Actuarially Equivalent:	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is: a. Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.) b. Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and c. Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits:	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation:	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).
Actuarial Value of Assets (AVA):	The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Fund is calculated, including: a. Investment return - the rate of investment yield that the Fund will earn over the long-term future; b. Mortality rates - the death rates of employees and pensioners; life expectancy is based on these rates; c. Retirement rates - the rate or probability of retirement at a given age; d. Withdrawal rates - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement; e. Salary increase rates - the rates of salary increase due to inflation and productivity growth.
Closed Amortization Period:	A specific number of years that is counted down by one each year and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Employer Normal Cost:	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
Experience Study:	A periodic review and analysis of the actual experience of the Fund that may lead to a revision of one or more Actuarial Assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
Funded Ratio:	The ratio of the Actuarial Value of Assets (AVA) to the Actuarial Accrued Liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

Funding Period or Amortization Period:	The term “Funding Period” is used in two ways. First, it is the period used in calculating the Amortization Payment as a component of the ADC. Second, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.
GASB:	Governmental Accounting Standards Board.
GASB 67 and GASB 68:	Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.
Investment Return:	The rate of earnings of the Fund from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Margin:	The difference, whether positive or negative, between the statutory employer contribution rate and the Actuarially Determined Contribution (ADC).
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
Normal Cost:	That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member form hire until ultimate termination, death, disability, or retirement.
Open Amortization Period:	An open amortization period is one that is used to determine the Amortization Payment, but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the Actuarial Assumptions are realized.
Plan Fiduciary Net Position:	Market value of assets.
Real Rate of Return:	Nominal rate of return on investments, adjusted for inflation.

Total Pension Liability (TPL):	The actuarial accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
Unfunded Actuarial Accrued Liability (UAAL):	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

Section 4: Actuarial Valuation Basis

Exhibit I – Actuarial Assumptions and Actuarial Cost Method

Investment Return Rate:

7.75% per annum, compounded annually, equal to an assumed 2.75% inflation rate plus a 5.50% real rate of return, less 0.50% for expected investment expenses. (Adopted effective July 1, 2015).

Mortality Rates:

The mortality rates were based on historical and current demographic data, as used in the experience study dated April 30, 2015. The underlying tables reasonably reflect the mortality experience of the Fund as of the measurement date.

Post-Retirement Non-Disabled:

RP-2014 Healthy Annuitant Mortality Table set back one year, multiplied by 50% for ages under 75 and grading up to 100% by age 80, projected generationally using Scale MP-2014. (Adopted effective July 1, 2015). Sample 2014 mortality rates are as follows:

Age	Male	Female
50	0.20%	0.14%
55	0.27%	0.17%
60	0.37%	0.24%
65	0.51%	0.37%
70	0.77%	0.58%
75	1.22%	0.95%
80	3.62%	2.82%
85	6.93%	5.40%
90	12.15%	9.56%
95	20.11%	16.30%
100	29.38%	25.11%

The mortality tables are adjusted forward from 2014 using a generational projection to reflect future mortality improvement.

Post-Retirement Disabled:

RP-2014 Disabled Mortality Table set forward 4 years. (Adopted effective July 1, 2015).

Pre-Retirement Non-Disabled:

RP-2014 Employee Mortality Table, projected generationally using Scale MP-2014. (Adopted effective July 1, 2015).

Retirement Rates:

The following rates of retirement are assumed for members eligible to retire. (Adopted effective July 1, 2015).

	Unreduced Retirement*		Reduced Retirement
Age	Male	Female	Male/Female
50-54	15.00%	15.00%	
55-57	15.00%	15.00%	2.00%
58	15.00%	15.00%	3.00%
59	15.00%	15.00%	3.50%
60	15.00%	15.00%	4.00%
61	25.00%	25.00%	6.50%
62	35.00%	35.00%	9.00%
63	25.00%	30.00%	12.00%
64	35.00%	40.00%	12.00%
65	40.00%	50.00%	
66	30.00%	40.00%	
67	30.00%	30.00%	
68	25.00%	30.00%	
69	25.00%	30.00%	
70-74	25.00%	25.00%	
75	100.00%	100.00%	

*If a member reaches eligibility for unreduced retirement before age 65 under the rule of 85 (Grandfathered Tier 1) or the Rule of 90/Age 60 (Non-grandfathered Tier 1 and Tier 2), 10% is added to the rate at the age (and only this age) the member becomes first eligible for an unreduced retirement benefit.

Disability Rates:

Shown below for selected ages. (Adopted effective July 1, 2010).

Age	Rates
20	0.011%
25	0.011%
30	0.011%
35	0.011%
40	0.033%
45	0.055%
50	0.088%
55	0.154%
60	0.297%

Termination Rates:

Termination rates based on years of service, for causes other than death, disability, or retirement. (Adopted effective July 1, 2015).

Years from Hire	Male	Female	Years from Hire	Male	Female
0	20.00%	20.00%	10	2.50%	2.50%
1	14.00%	12.00%	11	2.00%	2.50%
2	11.00%	9.00%	12	2.00%	2.50%
3	8.00%	7.00%	13	2.00%	2.50%
4	6.50%	6.00%	14	2.00%	2.50%
5	5.00%	5.00%	15-18	1.50%	2.00%
6	4.00%	4.00%	19	0.75%	2.00%
7	3.50%	3.50%	20-24	0.75%	1.50%
8	3.00%	3.00%	25 & over	0.75%	0.75%
9	2.50%	2.50%			

Termination rates eliminated at first retirement eligibility

Salary Increase Rates:

Inflation rate of 2.75% plus productivity increase rate of 1.50%, plus step-rate/promotional increase as shown below. (Adopted effective July 1, 2015).

Years from Hire	Annual Step-Rate Promotional Component	Annual Total Salary Increase
0	10.25%	14.50%
1	3.50	7.75
2	3.25	7.50
3	3.00	7.25
4	2.75	7.00
5	2.50	6.75
6	2.25	6.50
7	2.00	6.25
8-9	1.75	6.00
10-11	1.50	5.75
12-13	1.25	5.50
14-15	1.00	5.25
16-18	0.75	5.00
19-22	0.50	4.75
23-24	0.25	4.50
25 & over	0.00	4.25

Payroll Growth Rate:

3.25% per annum. This assumption does not include any allowance for future increase in the number of members. (Adopted effective July 1, 2010).

Percent Married:

For valuation purposes, 75% of members are assumed to be married. Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses. (Adopted effective July 1, 1992).

Percent Electing a Deferred Termination Benefit:

Terminating members are assumed to elect the most valuable benefit at the time of termination. Termination benefits are assumed to commence at the first age at which unreduced benefits are available. (Adopted effective July 1, 1990).

Loading Factor for New Retirees:	The liability includes a 3% load for members who retired during the year ended June 30, 2019, to reflect that their benefits are not finalized as of the valuation date.
Annual Administrative Expenses:	Administrative expenses of $2,312,987 (actual expenses for the previous year, increased with inflation) are expected to be paid monthly for the year beginning July 1, 2019.
Asset Valuation Method:	The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (or less than) expected investment income. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The actual investment return for this purpose is determined net of all investment expenses. The actuarial value is further adjusted, if necessary, to be within 20% of the market value.
Actuarial Cost Method:	Normal cost and actuarial accrued liability are calculated on an individual basis and are allocated by salary. Entry age is determined as the age at member's enrollment in TFFR. The actuarial accrued liability is the difference between the total present value of future benefits and the actuarial present value of future normal costs. The unfunded actuarial accrued liability (UAAL) is the excess of the actuarial accrued liability over the actuarial value of assets.
Amortization Period and Method:	The actuarially determined contribution (ADC) is determined as the sum of (a) the employer normal cost rate, and (b) a level percentage of payroll required to amortize the unfunded actuarial accrued liability over the 30-year closed period that began July 1, 2013.

Exhibit II – Summary of Plan Provisions

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

<table>
<tr><td>Effective Date:</td><td>July 1, 1971</td></tr>
<tr><td>Plan Year:</td><td>July 1 through June 30</td></tr>
<tr><td>Administration:</td><td>The Teachers' Fund for Retirement (TFFR) is administrated by a Board of Trustees. A separate State Investment Board is responsible for the investment of the trust assets, although TFFR's Board establishes the asset allocation policy. The Retirement and Investment Office is the administrative agency for TFFR.</td></tr>
<tr><td>Type of Plan:</td><td>TFFR is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is a cost-sharing multiple-employer public employee retirement system.</td></tr>
<tr><td>Eligibility:</td><td>All certified teachers of any public school in the State participate in TFFR. This includes teachers, supervisors, principals, administrators, etc. Non-certified employees such as teacher's aides, janitors, secretaries, drivers, etc. are not allowed to participate in TFFR. Eligible employees become members at their date of employment.</td></tr>
<tr><td>Member Contributions:</td><td>All active members contribute 11.75% of their salary per year. The employer may "pick up" the member's contribution under the provisions of Internal Revenue Code Section 414(h). The member contribution rate was increased from 7.75% to 9.75% effective July 1, 2012, and was increased to 11.75% effective July 1, 2014. The total addition of 4.00% to the member contribution rate will remain in effect until TFFR is 100% funded on an actuarial basis. At that point, the member contribution rate will revert to 7.75%.</td></tr>
<tr><td>Salary:</td><td>A member's total earnings are used for salary purposes, including overtime, etc., and including nontaxable wages under a Section 125 plan, but excluding certain extraordinary compensation, such as fringe benefits or unused sick and vacation leave.</td></tr>
<tr><td>Employer Contributions:</td><td>The district or other employer that employs a member contributes a percentage of the member's salary. This percentage consists of a base percentage of 7.75%, plus, since July 1, 2008, additions as shown below.
<table>
<tr><th>Effective Date</th><th>Addition to 7.75% Base Rate</th><th>Employer Contribution Rate</th></tr>
<tr><td>July 1, 2008</td><td>0.50%</td><td>8.25%</td></tr>
<tr><td>July 1, 2010</td><td>1.00%</td><td>8.75%</td></tr>
<tr><td>July 1, 2012</td><td>3.00%</td><td>10.75%</td></tr>
<tr><td>July 1, 2014</td><td>5.00%</td><td>12.75%</td></tr>
</table>
However, the additions are subject to a "sunset" provision, so the contribution rate will revert to 7.75% once the funded ratio reaches 100%, measured using the actuarial value of assets. The contribution rate will not automatically increase if the funded ratio later falls back below 100%.</td></tr>
</table>

Service:	Employees receive credit for service while a member. A member may also purchase credit for certain periods, such as time spent teaching at a public school in another state, by paying the actuarially determined cost of the additional service. Special rules and limits govern the purchase of additional service.
Tiers:	Members who join TFFR by June 30, 2008 are in Tier 1, while members who join later are in Tier 2. If a Tier 1 member terminates, takes a refund, and later rejoins TFFR after June 30, 2008, that member will be in Tier 2. As of June 30, 2013, Tier 1 members who are at least age 55 and vested (3 years of service) as of the effective date, or the sum of the member's age and service is at least 65, are considered Grandfathered, and previous plan provisions will not change. Tier 1 members who do not fit these criteria as of June 30, 2013, are considered Non-grandfathered. These members, along with Tier 2, have new plan provisions, as described below.
Final Average Compensation (FAC):	The average of the member's highest three (Tier 1 members) or five (Tier 2 members) plan year salaries. Monthly benefits are based on one-twelfth of this amount.
Normal Retirement:	a. Eligibility: • Tier 1 members may retire upon Normal Retirement on or after age 65 with credit for 3 years of service, or if earlier, when the sum of the member's age and service is at least 85. Effective as of June 30, 2013, Tier 1 members who are at least age 55 and vested (3 years of service) as of the effective date, or the sum of the member's age and service is at least 65, normal retirement eligibility will not change (participants are Grandfathered). For those who did not meet these criteria as of June 30, 2013 (Non-grandfathered), members may retire upon Normal Retirement on or after age 65 with credit for 3 years of service, or if earlier, when the sum of the member's age and service is at least 90, with a minimum age of 60. • Tier 2 members may retire upon Normal Retirement on or after age 65 with credit for 5 years of service, or, if earlier, when the sum of the member's age and service is at least 90. Effective July 1, 2013, Tier 2 members may retire upon Normal Retirement on or after age 65 with credit for 5 years of service, or if earlier, when the sum of the member's age and service is at least 90, with a minimum age of 60. b. Monthly Benefit: 2.00% of FAC (monthly) times years of service. c. Payment Form: Benefits are paid as a monthly life annuity, with a guarantee that if the payments made do not exceed the member's contributions plus interest, determined as of the date of retirement, the balance will be paid in a lump-sum to the member's beneficiary. Optional forms of payment are available; see below.

Early Retirement:	a. Eligibility: Tier 1 members may retire early after reaching age 55 with credit for three years of service, while Tier 2 members may retire early after reaching age 55 with credit for five years of service. b. Monthly Benefit: 2.00% of FAC (monthly) times years of service, multiplied by a factor that reduces the benefit 6% for each year from the earlier of (i) age 65, or (ii) the age at which current service plus age equals 85 (Tier 1 members) or 90 (Tier 2 members). Effective July 1, 2013 for members who are either Non-grandfathered Tier 1 or Tier 2: 2.00% of FAC (monthly) times years of service, multiplied by a factor that reduces the benefit 8% for each year from the earlier of (i) age 65, or (ii) the age at which current service plus age equals 90 with a minimum age of 60. c. Payment Form: Same as for Normal Retirement above.
Disability Retirement:	a. Eligibility: A member is eligible provided he/she has credit for at least one year of service. Effective July 1, 2013, a member is eligible provided he/she has credit for at least five years of service. b. Monthly Benefit: 2.00% of FAC (monthly) times years of service with a minimum 20 years of service. Effective July 1, 2013, 2.00% of FAC (monthly) times years of service. c. Payment Form: The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement that is in excess of the sum of payments already received will be paid in a lump sum to the member's beneficiary. d. All alternative forms of payment other than level income and the partial lump-sum option are also permitted in the case of disability retirement. For basis recovery only, disability benefits are converted to normal retirement benefits when the member reaches normal retirement age or age 65, whichever is earlier.
Deferred Termination Benefit:	a. Eligibility: A Tier 1 member with at least three years of service, or a Tier 2 member with at least five years of service, who does not withdraw his/her contributions from the fund, is eligible for a deferred termination benefit. b. Monthly Benefit: 2.00% of FAC (monthly) times years of service. Both FAC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 65 or when the sum of the member’s age and service is 85 (Grandfathered Tier 1 members) or 90 with a minimum age of 60 (Non-grandfathered Tier 1 and Tier 2 members). Reduced benefits may commence at or after age 55 if the member is not eligible for an unreduced benefit. Reductions are the same as for Early Retirement. c. Payment Form: The form of payment is the same as for Normal Retirement above. d. Death Benefit: A member who dies after leaving active service but before retiring is entitled to receive a benefit as described below.
Withdrawal (Refund) Benefit:	a. Eligibility: Tier 1 members leaving covered employment with less than three years of service, and Tier 2 members leaving covered employment with less than five years of service, are eligible. Optionally, vested members may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due. b. Benefit: The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 6% per year prior to benefit commencement (0.5% per month).

Death Benefit:	a. Eligibility: Death must have occurred while an active or an inactive, non-retired member. b. Benefit: Upon the death of a nonvested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, the beneficiary may elect (i) the refund benefit above, or (ii) a life annuity of the normal retirement benefit, determined under Option One below, based on FAC and service as of the date of death, but without applying any reduction for the member's age at death. In determining the reduction for Option One, members not eligible for normal retirement benefits use the Fund's option tables for disabled members.
Optional Forms of Payment:	There are optional forms of payment available on an actuarially equivalent basis, as follows: Option 1 - A life annuity payable while either the participant or his beneficiary is alive, "popping-up" to the original life annuity if the beneficiary predeceases the member. Option 2 - A life annuity payable to the member while both the member and beneficiary are alive, reducing to 50% of this amount if the member predeceases the beneficiary, and "popping-up" to the original life annuity if the beneficiary predeceases the member. Option 3a - A life annuity payable to the member, with a guarantee that, should the member die prior to receiving 60 payments (five years), the payments will be continued to a beneficiary for the balance of the five-year period. (This option has been replaced by Option 3b. It is not available to employees who retire on or after August 1, 2003. Retirees who elected this option prior to that date are unaffected.) Option 3b - A life annuity payable to the member, with a guarantee that, should the member die prior to receiving 240 payments (twenty years), the payments will be continued to a beneficiary for the balance of the twenty-year period. (This option replaced Option 3a effective August 1, 2003.) Option 4 - A life annuity payable to the member, with a guarantee that, should the member die prior to receiving 120 payments (10 years), the payments will be continued to a beneficiary for the balance of the ten-year period. Option 5 - A non-level annuity payable to the member, designed to provide a level total income when combined with the member's Social Security benefit. This option is not available to disabled retirees. In addition, members may elect a partial lump-sum option (PLSO) at retirement. Under this option, a member receives an immediate lump sum equal to 12 times the monthly life annuity benefit and a reduced annuity. The reduction is determined actuarially. The member can then elect to receive the annuity benefit in one of the other optional forms, except that members who receive a PLSO may not elect Option 5 – the level income option. The PLSO is not available to disabled retirees or retirees who are not eligible for an unreduced retirement benefit. Actuarial equivalence is based on tables adopted by the Board of Trustees.
Cost-of-living Increase:	From time to time, TFFR has been amended to grant certain post-retirement benefit increases. However, TFFR has no automatic cost-of-living increase features.

Exhibit III – Summary of Plan Changes

1991 Legislative Sessions:

1. Benefit multiplier increased form 1.275% to 1.39% for all future retirees.
2. Provide a post retirement benefit increases for all annuitants receiving a monthly benefit on June 30, 1991. The monthly increase is the greater of a 10% increase or a level increase based on years of service and retirement date:
    a. $3 per year of service for retirements before 1980
    b. $2 per year of service for retirements between 1980 and 1983
    c. $1 per year of service for retirements from 1984 through June 30, 1991

    Minimum increase is $5 per month. Maximum increase is $75 per month

1993 Legislative Session:

1. Benefit multiplier increased from 1.39% to 1.55% for all future retirees.
2. Provide a post-retirement benefit increase for all annuitants receiving a monthly benefit on June 30, 1993. The monthly increase is the greater of a 10% increase or a level increase based on years of service and retirement date:
    a. $3 per year of service for retirements before 1980
    b. $2.50 per year of service for retirements between 1980 and 1983
    c. $1 per year of service for retirements from 1984 through June 30, 1993

    Minimum increase is $5 per month. Maximum increase is $100 per month.
3. Minimum retirement benefit increased to $10 times years of service up to 25, plus $15 times years of service greater than 25. (Previously was $6 up to 25 years of service plus $7.50 over 25 years of service.)
4. Disability benefit changed to 1.55% of FAC times years of service using a minimum of 20 years of service.

1995 Legislative Session:

There were no material changes made during the 1995 legislative session.

1997 Legislative Session:

1. Benefit multiplier increased from 1.55% to 1.75% for all future retirees.
2. Member contribution rate and employer contribution rate increased from 6.75% to 7.75%.
3. A $30.00/month benefit improvement was granted to all retirees and beneficiaries.

1999 Legislative Session:

1. Active members will now be fully vested after three years (rather than five years) of service.
2. Early retirement benefits will be reduced 6% per year from the earlier of (i) age 65, or (ii) the date as of which age plus service equals 85 (rather than from age 65 in all cases).
3. An ad hoc COLA was provided for all retirees and beneficiaries. This increase is equal to an additional $2.00 per month for each year of service plus $1.00 per month for each year since the member's retirement.
4. The formula multiplier was increased from 1.75% to 1.88% effective July 1, 1999.

2001 Legislative Session:

1. An ad hoc COLA was provided for all retirees and beneficiaries. The ad hoc COLA increase is equal to an additional $2.00 per month for each year of service plus $1.00 per month for each year since the member's retirement. Retirees and beneficiaries will also receive two additional increases equal to 0.75% times the monthly benefit, payable July 1, 2001 and July 1, 2002. The two 0.75% increases are conditional. If the actuarial margin is a shortfall, i.e., is negative, by 60 basis points or more, or if the margin has been negative by 30 or more basis points for two years, the Board could elect to suspend the increase.
2. The formula multiplier was increased from 1.88% to 2.00% effective July 1, 2001.

2003 Legislative Session:

1. Partial lump-sum option adopted, equal to twelve times the monthly life annuity benefit. Not available if level-income option is elected. Not available for reduced retirement or disability retirement.
2. Five-year certain and life option replaced with 20-year certain and life. This does not impact retirees who retired under the five-years certain and life option.
3. Employer service purchase authorized.
4. Active members of the Department of Public Instruction are permitted to make a one-time irrevocable election to transfer to the State Public Employees Retirement System in FY 2004. Both assets and liabilities for all TFFR service will be transferred for electing employees. Transferred assets will be based on the actuarial present value of the member's accrued TFFR benefit, or the member's contribution account balance if larger.

2005 Legislative Session:

There were no material changes made during the 2005 legislative sessions.

2007 Legislative Session:

1. For active members hired on or after July 1, 2008 (called Tier 2 members):
    a. Members will be eligible for an unreduced retirement benefit when they reach age 65 with at least five years of service (rather than three years of service); or if earlier, when the sum of the member's age and service is at least 90 (rather than 85).
    b. Members will be eligible for a reduced (early) retirement benefit when they reach age 55 with five years of service, rather than three years of service.
    c. Members will be fully vested after five years of service (rather than three year of service).
    d. The Final Average Compensation for Tier 2 members is the average of the member's highest five plan year salaries, rather than the average of the three highest salaries.
2. The employer contribution rate increases from 7.75% to 8.25% effective July 1, 2008, but this rate will be reset to 7.75% once the Fund reaches a 90% funded ratio, measured using the actuarial value of assets. (If the funded ratio later falls below 90% again, the contribution rate will not automatically return to 8.25%.)
3. Employer contributions are required on the salary of reemployed retirees.
4. Active members of the Department of Career and Technical Education are permitted to make a one-time irrevocable election to transfer to the State Public Employees Retirement System in FY 2008. Both assets and liabilities for all TFFR service will be transferred for electing employees. Transferred assets will be the actuarial present value of the member's accrued TFFR benefit, or the member's contribution account balance, if larger.

2009 Legislative Session:

1. An individual who retired before January 1, 2009, and is receiving monthly benefits is entitled to receive a supplemental payment from the fund. The supplemental payment is equal to an amount determined by taking twenty dollars multiplied by the member's number of years of service credit plus fifteen dollars multiplied by the number of years since the member's retirement as of January 1, 2009. The supplemental payment may not exceed the greater of 10% of the member's annual annuity or $750.00. TFFR will make the supplemental payment in December 2009.
2. The employer contribution rate increases from 8.25% to 8.75% effective July 1, 2010, but this rate will be reset to 7.75% once the Fund reaches a 90% funded ratio, measured using the actuarial value of assets. (If the funded ratio later falls below 90% again, the contribution rate will not automatically return to 8.75%.)

2011 Legislative Session:

1. The employer contribution rate increases from 8.75% to 10.75% effective July 1, 2012, and increases thereafter to 12.75% effective July 1, 2014. The member contribution rate increases from 7.75% to 9.75% effective July 1, 2012, and increases thereafter to 11.75% effective July 1, 2014. Employer and member contributions will be reset to 7.75% once the Fund reaches a 90% funded ratio, measured using the actuarial value of assets.
2. For current Tier 1 members who, as of June 30, 2013, are vested (at least 3 years of service), and at least age 55, OR the sum of the member's age and service is at least 65, are considered a Tier 1 Grandfathered member. Current Tier 1 members, who will not meet this criteria as of June 30, 2013, are considered a Tier 1 Non-grandfathered member.
3. Eligibility for normal/ unreduced retirement benefits do not change for Tier 1 Grandfathered members. For Tier 1 Non-grandfathered and Tier 2 members, effective after June 30, 2013, unreduced retirement benefits start when the member reaches age 65 and is vested (3 years for Tier 1 Non-grandfathered, 5 years for Tier 2); or if earlier, when the sum of the member's age and service is at least 90, with a minimum age of 60.
4. Early retirement benefits do not change for Tier 1 Grandfathered members. For Tier 1 Non-grandfathered and Tier 2 members, effective after June 30, 2013, the normal retirement benefit will be reduced by 8% per year from the earlier of age 65 OR the age at which the sum of the member's age and service is at least 90, with a minimum age of 60.
5. Effective after June 30, 2013, all members may retire on disability after a period of at least five years of service (rather one year of service). The amount of the benefit is based on a 2% multiplier and actual service (rather than a minimum of twenty years of service in the current calculation).
6. Effective July 1, 2012, re-employed retirees are required to pay member contributions.
7. Effective August 1, 2011, beneficiary and death benefit provisions were updated, and the 60-month death payment benefit was removed.

2013 Legislative Session:

1. Employer and member contribution rates will be reset to 7.75% once the Fund reaches a 100% funded ratio (rather than the 90% funded ratio enacted with the 2011 Legislation), measured using the actuarial value of assets.
2. Various technical and administrative changes that do not have an actuarial effect on the Plan were enacted.

2015 Legislative Session:

1. Various technical and administrative changes that do not have an actuarial effect on the Plan were enacted.

2017 Legislative Session:

There were no material changes made during the 2017 legislative sessions.

2019 Legislative Session:

There were no material changes made during the 2019 legislative sessions.

Section 5: GASB Information

Exhibit 1 – Net Pension Liability

The components of the net pension liability at were as follows:

	July 1, 2019	July 1, 2018
Total pension liability	$3,993,424,160	$3,863,515,726
Plan fiduciary net position	(2,616,171,056)	(2,530,657,411)
Net pension liability	$1,377,253,104	$1,332,858,315
Plan fiduciary net position as a percentage of the total pension liability	65.5%	65.5%

The net pension liability was measured as of June 30, 2019, and is determined based on the total pension liability from the July 1, 2019, actuarial valuation.

Plan provisions. The plan provisions used in the measurement of the net pension liability are the same as those used in the actuarial valuation as of July 1, 2019.

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of July 1, 2019, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.75%
Salary increases	4.25% to 14.50%, varying by service, including inflation and productivity
Investment rate of return	7.75%, net of pension plan investment expense, including inflation
Cost-of-living adjustments	None

For active and inactive members, mortality rates were based on the RP-2014 Employee Mortality Table, projected generationally using Scale MP-2014. For healthy retirees, mortality rates were based on the RP-2014 Healthy Annuitant Mortality Table set back one year, multiplied by 50% for ages under 75 and grading up to 100% by age 80, projected generationally using Scale MP-2014. For disabled retirees, mortality rates were based on the RP-2014 Disabled Mortality Table set forward four years.

The actuarial assumptions used were based on the results of an experience study dated April 30, 2015. They are the same as the assumptions used in the July 1, 2019 funding actuarial valuation.

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of July 1, 2019, are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return*
Global Equities	58%	6.9%
Global Fixed Income	23%	2.1%
Global Real Assets	18%	5.4%
Cash Equivalents	1%	0.0%
Total	100%	

*As reported by the North Dakota Retirement and Investment Office.

Discount rate: The long-term expected rate of return on pension plan investments is 7.75%. The high quality tax-exempt general obligation municipal bond rate (20-Bond GO Index) as of the closest date prior to the valuation date of June 30, 2019, is 3.50%, as published by The Bond Buyer.

The discount rate used to measure the total pension liability was 7.75% as of June 30, 2019. The projection of cash flows used to determine the discount rate assumed plan member and employer contributions will be made at rates equal to those based on this July 1, 2019, Actuarial Valuation Report. For this purpose, only employer contributions that are intended to fund benefits of current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs of future plan members and their beneficiaries, as well as projected contributions from future plan members, are not included. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members as of June 30, 2019 Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability as of June 30, 2019.

Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability, calculated using the discount rate of 7.75%, as well as what the net pension liability would be if it were calculated using a discount rate that is one-percentage-point lower (6.75%) or one-percentage-point higher (8.75%) than the current rate:

	1% Decrease (6.75%)	Current Discount (7.75%)	1% Increase (8.75%)
Net pension liability as of June 30, 2016	$1,900,291,033	$1,465,058,563	$1,102,551,032
Net pension liability as of June 30, 2017	1,826,126,843	1,373,525,753	996,748,988
Net pension liability as of June 30, 2018	1,799,744,383	1,332,858,315	944,554,161
Net pension liability as of June 30, 2019	1,859,994,289	1,377,253,104	976,082,834

Exhibit 2 – Schedules of Changes in Net Pension Liability

	2019	2018
Total pension liability		
• Service cost	$77,755,965	$78,041,335
• Interest	296,875,949	287,375,333
• Change of benefit terms	0	0
• Differences between expected and actual experience	(23,494,914)	(27,939,071)
• Changes of assumptions	0	0
• Benefit payments, including refunds of employee contributions	(221,228,566)	(207,978,699)
Net change in total pension liability	**$129,908,434**	**$129,498,898**
Total pension liability – beginning	**3,863,515,726**	**3,734,016,828**
Total pension liability – ending (a)	**$3,993,424,160**	**$3,863,515,726**
Plan fiduciary net position		
• Contributions – employer	$89,444,881	$86,675,715
• Contributions – employee	82,429,594	79,877,611
• Contributions – purchased service credit	1,916,787	2,181,106
• Contributions – other	158,713	194,028
• Net investment income	135,043,319	211,345,369
• Benefit payments, including refunds of employee contributions	(221,228,566)	(207,978,699)
• Administrative expense	(2,251,083)	(2,128,794)
• Other	0	0
Net change in plan fiduciary net position	**85,513,645**	**170,166,336**
Plan fiduciary net position – beginning	**2,530,657,411**	**2,360,491,075**
Plan fiduciary net position – ending (b)	**$2,616,171,056**	**$2,530,657,411**
Net pension liability – ending (a) – (b)	**$1,377,253,104**	**$1,332,858,315**
Plan fiduciary net position as a percentage of the total pension liability	**65.5%**	**65.5%**
Covered payroll	**$701,528,450**	**$679,809,385**
Net pension liability as percentage of covered payroll	**196.3%**	**196.1%**

Exhibit 3 – Schedule of Employer Contributions

Fiscal Year Ended June 30	Actuarially Determined Contributions	Contributions in Relation to the Actuarially Determined Contributions	Contribution Deficiency (Excess)	Covered Payroll	Contributions as a Percentage of Covered Payroll
2013	$52,396,153	$59,300,720	($6,904,567)	$551,655,590	10.75%
2014	59,513,485	62,355,146	(2,841,661)	580,053,235	10.75%
2015	71,167,632	78,422,098	(7,254,466)	615,104,860	12.75%
2016	84,724,122	82,839,932	1,884,190	649,724,868	12.75%
2017	89,231,211	86,058,868	3,172,343	674,971,342	12.75%
2018	88,307,239	86,675,715	1,631,524	679,809,385	12.75%
2019	90,777,781	89,444,881	1,332,900	701,528,450	12.75%

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NORTH DAKOTA RETIREMENT AND INVESTMENT OFFICE
Teachers' Fund for Retirement
State Investment Board

Segal Consulting

North Dakota Teachers' Fund for Retirement

Actuarial Valuation as of July 1, 2019

October 24, 2019

Presented By:

Kim Nicholl, FSA, MAAA, EA
Senior Vice President and Actuary

Matt Strom, FSA, MAAA, EA
Senior Vice President and Actuary

This document has been prepared by Segal Consulting for the benefit of the Board of Trustees of the North Dakota Teachers' Fund for Retirement and is not complete without the presentation provided at the October 24, 2019 meeting of the Board of Trustees.

Discussion Topics

Agenda

- Overview of Valuation Process
- Valuation Results and Projections

Purposes of the Actuarial Valuation

- Report the Fund's actuarial assets
- Calculate the Fund's liabilities
- Determine the funding policy Actuarially Determined Contribution (ADC) for fiscal year 2020 and compare to the statutory employer contribution
- Determine the effective amortization period
- Explore the reasons why the current valuation differs from the prior valuation
- Provide information for annual financial statements
- Basis for Plan Management Policy scoring

The Valuation Process

Input

Member Data

Asset Information

Benefit Provisions

Actuarial Assumptions

Funding Methodology

Results

Actuarial Value of Assets

Normal Cost and Actuarial Liability

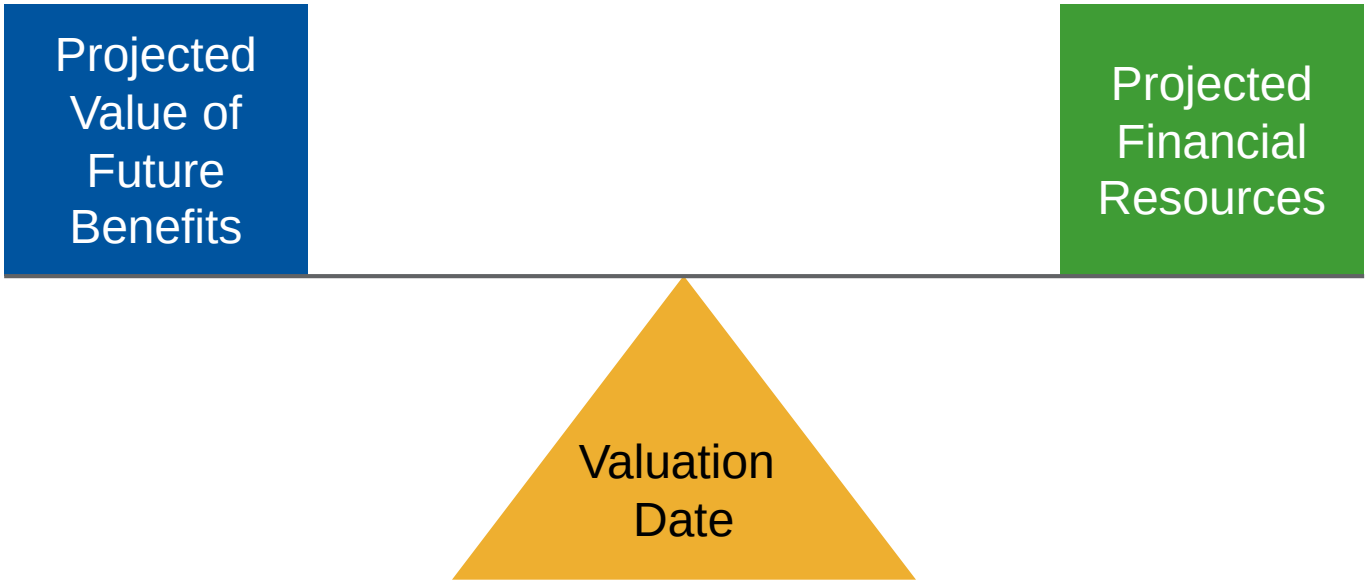
Unfunded Liability and Funded Ratio

Funding Period

Actuarially Determined Employer Contribution

Accounting Results

Actuarial Balance



Over the life of a pension system,

Benefits + **E**xpenses = **C**ontributions + **I**nvestment Return

Contributions = Benefits + Expenses - Investment Return

Actuarially Determined Contribution vs. Funding Period

Actuarially Determined Contribution (ADC)

- Equal to the normal cost plus amortization of the unfunded actuarial accrued liability (UAAL)
- The funding policy components:
  - Asset valuation method
  - Cost method
  - Amortization period

Funding Period

- Number of years that the UAAL is expected to be amortized based upon the fixed member and employer contribution rates
- Funding period is compared to the ADC's amortization period to assess the progress toward amortizing the unfunded accrued liability

The employer contribution rate is compared to the ADC as a measure of the adequacy of the employer (and member) contribution rates.

Actuarial Assumptions

Two types:

Demographic	Economic
• Retirement • Disability • Death in active service • Withdrawal • Death after retirement	• Inflation – 2.75% • Investment return – 7.75% • Salary increases – 14.50% for new members to 4.25% for members with 25+ years • Payroll growth – 3.25%

Actuaries make assumptions as to when and why a member will leave active service, and estimate the amount and duration of the pension benefits paid.

Actuarial Methods

Asset Valuation Method (Actuarial Assets)

- Investment gains and losses recognized over a number of years
- TFFR uses a five-year smoothing method
- A 20% market value corridor is applied – actuarial value of assets must fall within 80% to 120% of market value

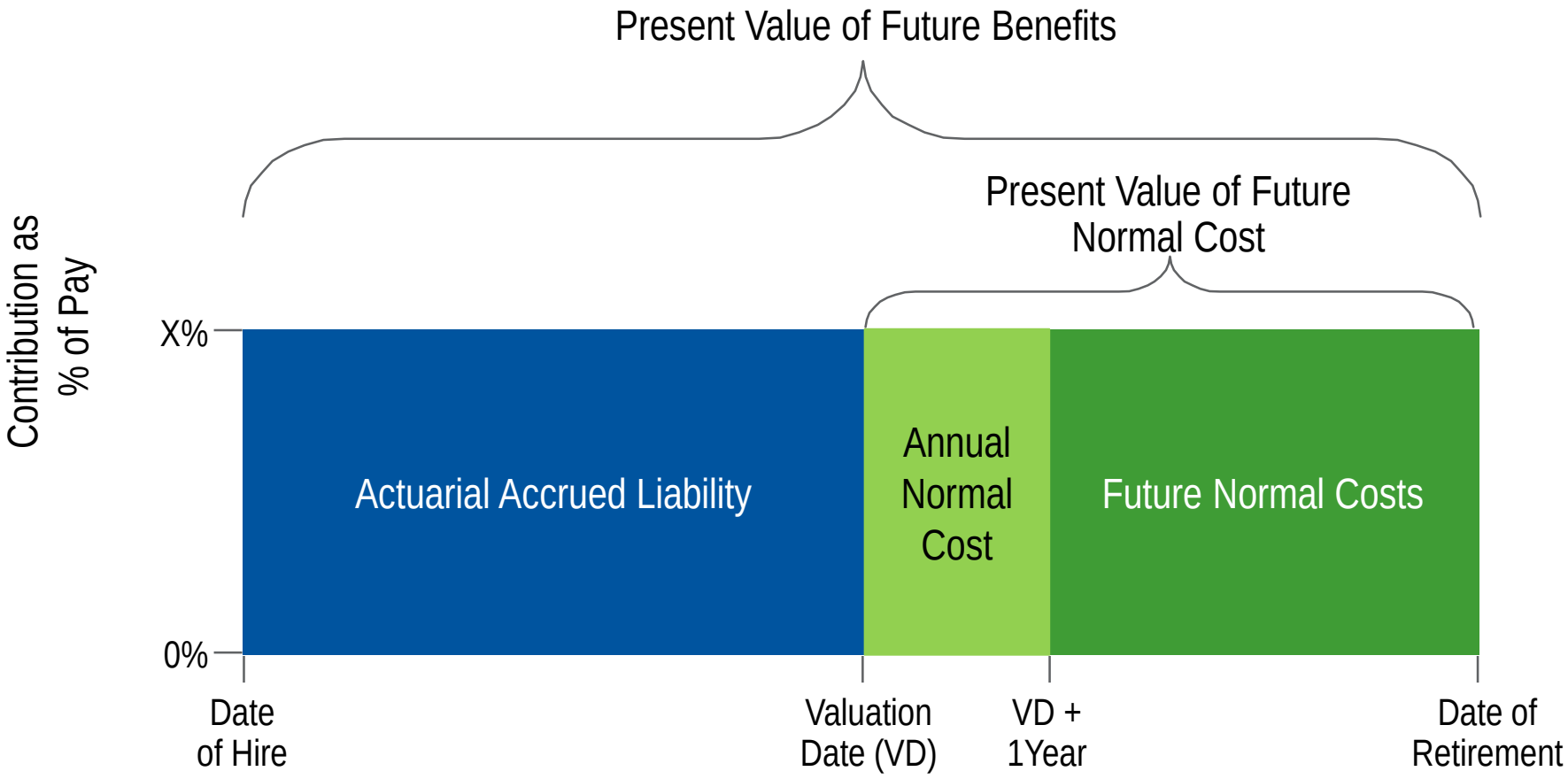
Cost Method

- Allocation of liability to past and future service
- TFFR uses the entry age normal cost method
  - Allocates cost of member's retirement benefit over expected career as a level % of salary
  - Most common cost method among public sector retirement systems
  - Required by GASB for financial statement reporting purposes

Amortization Method

- Relies on two inputs:
  - Number of years to amortize the UAL
  - Level dollar or level percentage of payroll approach
- TFFR's amortization method:
  - 30-year closed period that began July 1, 2013
  - 24 years remaining
  - Level percentage of payroll

Funding Process



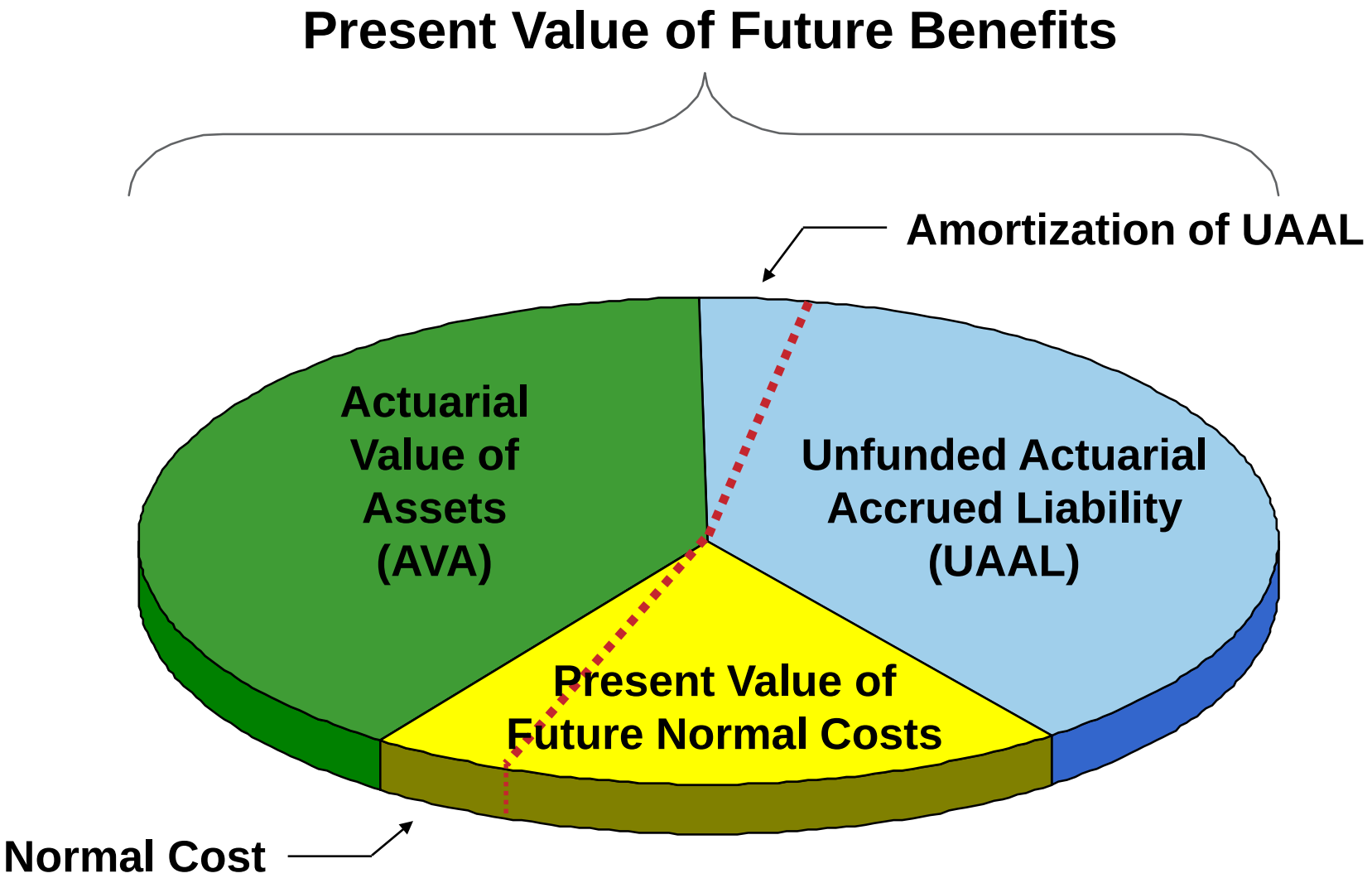
Actuarial Accrued Liability - Assets = Unfunded Actuarial Accrued Liability

Entry Age Normal Cost Method

Allocates cost between past and future service

- **Normal Cost:** Cost of annual benefit accrual as a level percent of salary
- **Actuarial Accrued Liability:** Represents accumulated value of past normal costs (or difference between total cost and future normal costs)
- **Unfunded Actuarial Accrued Liability:** Actuarial accrued liability minus actuarial value of assets

Actuarially Determined Contribution



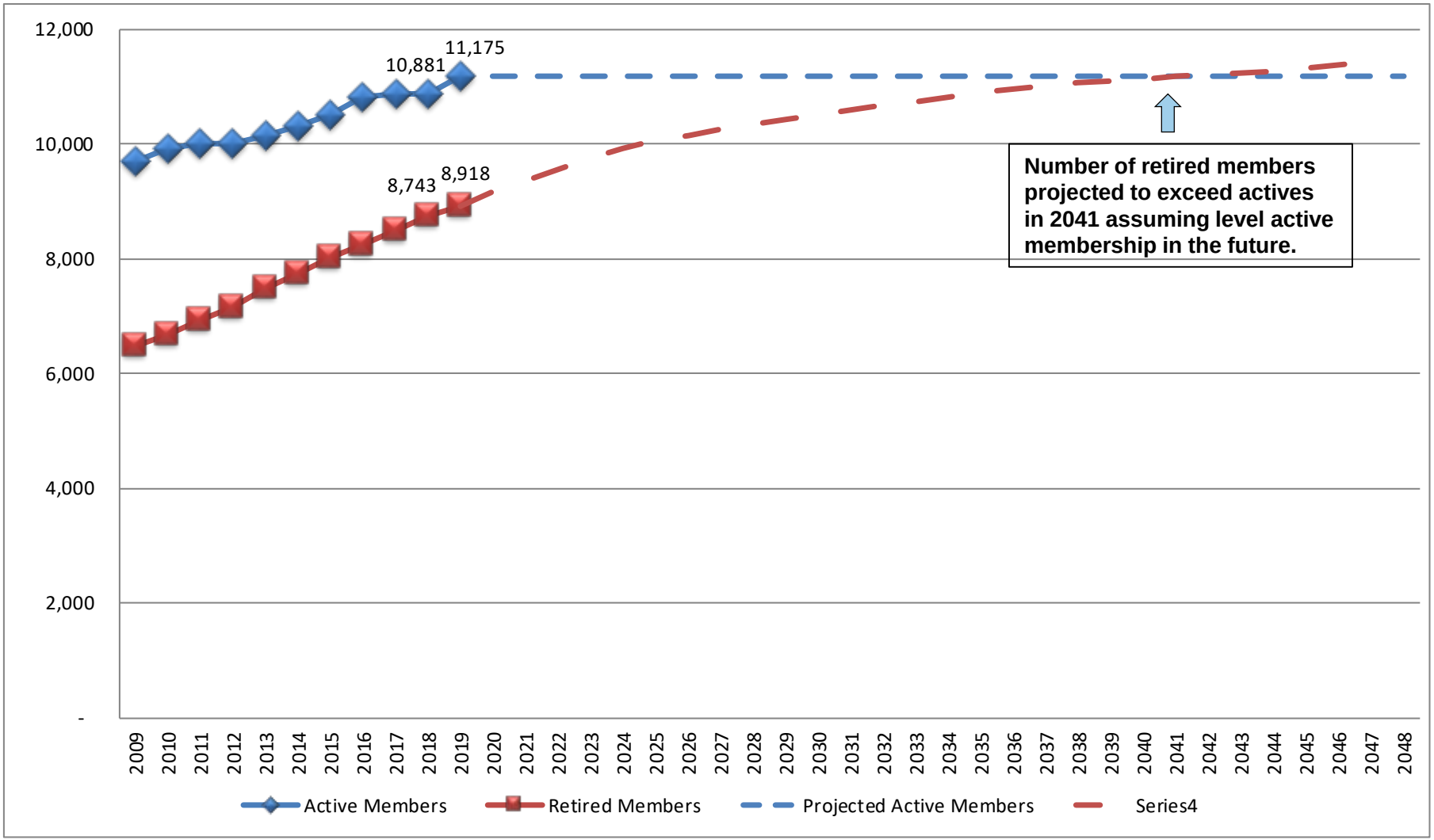
Summary of Valuation Highlights

- Market value of assets returned 5.4% for year ending 6/30/19 (Segal calculation)
  - Gradual recognition of deferred losses resulted in 6.4% return on actuarial value of assets
- Net impact on funded ratio was an increase from 65.4% (as of 7/1/2018) to 66.0% (as of 7/1/2019)
- Effective amortization period decreased from 26 years to 24 years
- Net impact on actuarially determined contribution (ADC) was a decrease from 12.94% of payroll to 12.84% of payroll
  - Based on the employer contribution rate of 12.75%, the contribution deficiency has decreased from 0.19% of payroll to 0.09% of payroll
- GASB Net Pension Liability increased from $1.33 billion as of 6/30/18, to $1.38 billion as of 6/30/19

Membership

	2019	2018	Change
Active			
• Number	11,175	10,881	+2.7%
• Payroll (annualized)	$680.5 mil	$653.5 mil	4.1%
• Average Age	41.8 years	41.9 years	- 0.1 years
• Average Service	11.7 years	11.8 years	- 0.1 years
Retirees and Beneficiaries			
• Number	8,918	8,743	+2.0%
• Total Annual Benefits	$221.2 mil	$211.4 mil	+4.6%
• Average Monthly Benefit	$2,067	$2,015	+2.6%

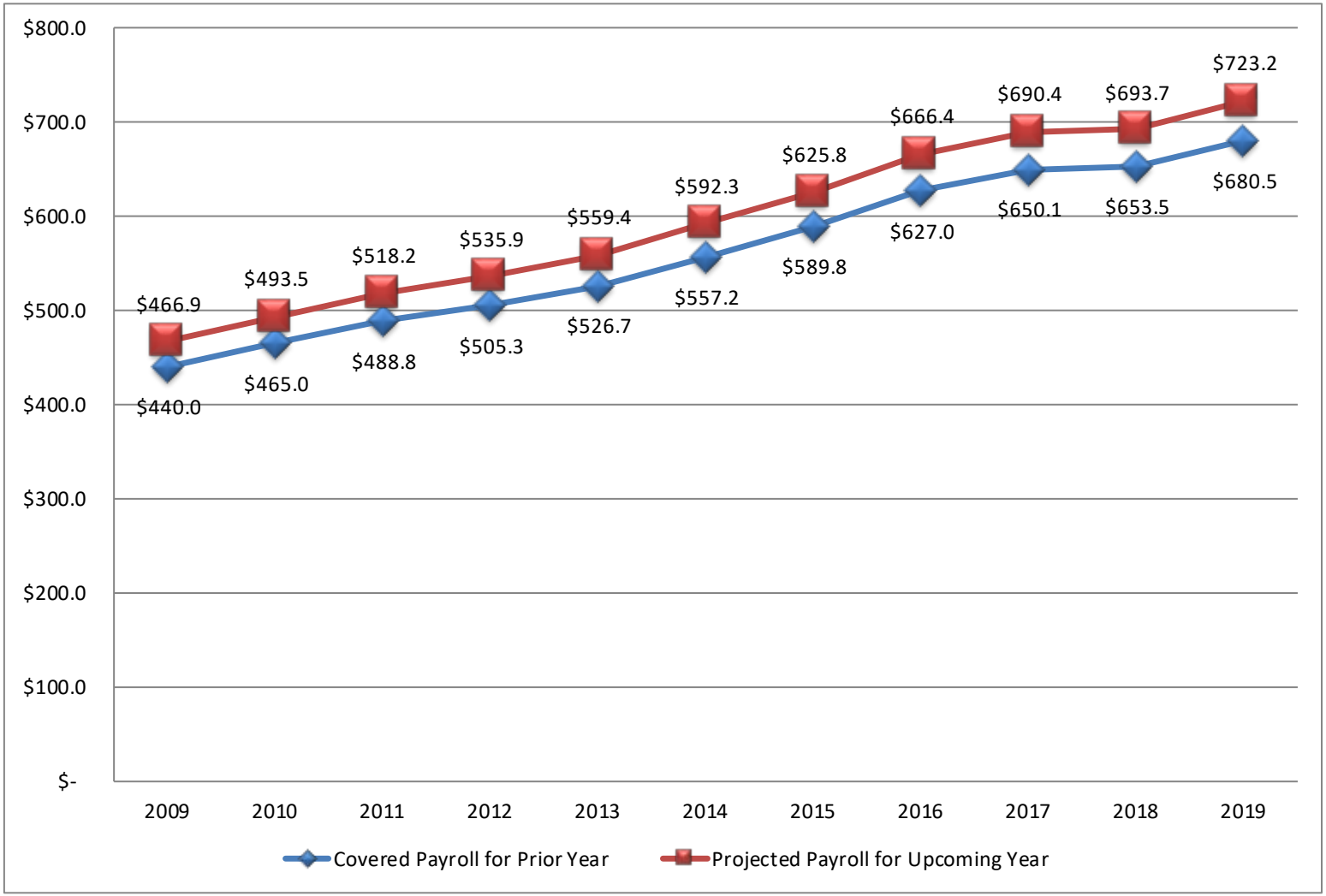
Active and Retired Membership



Since 2009, number of retirees and beneficiaries has increased 3.3% per year on average.

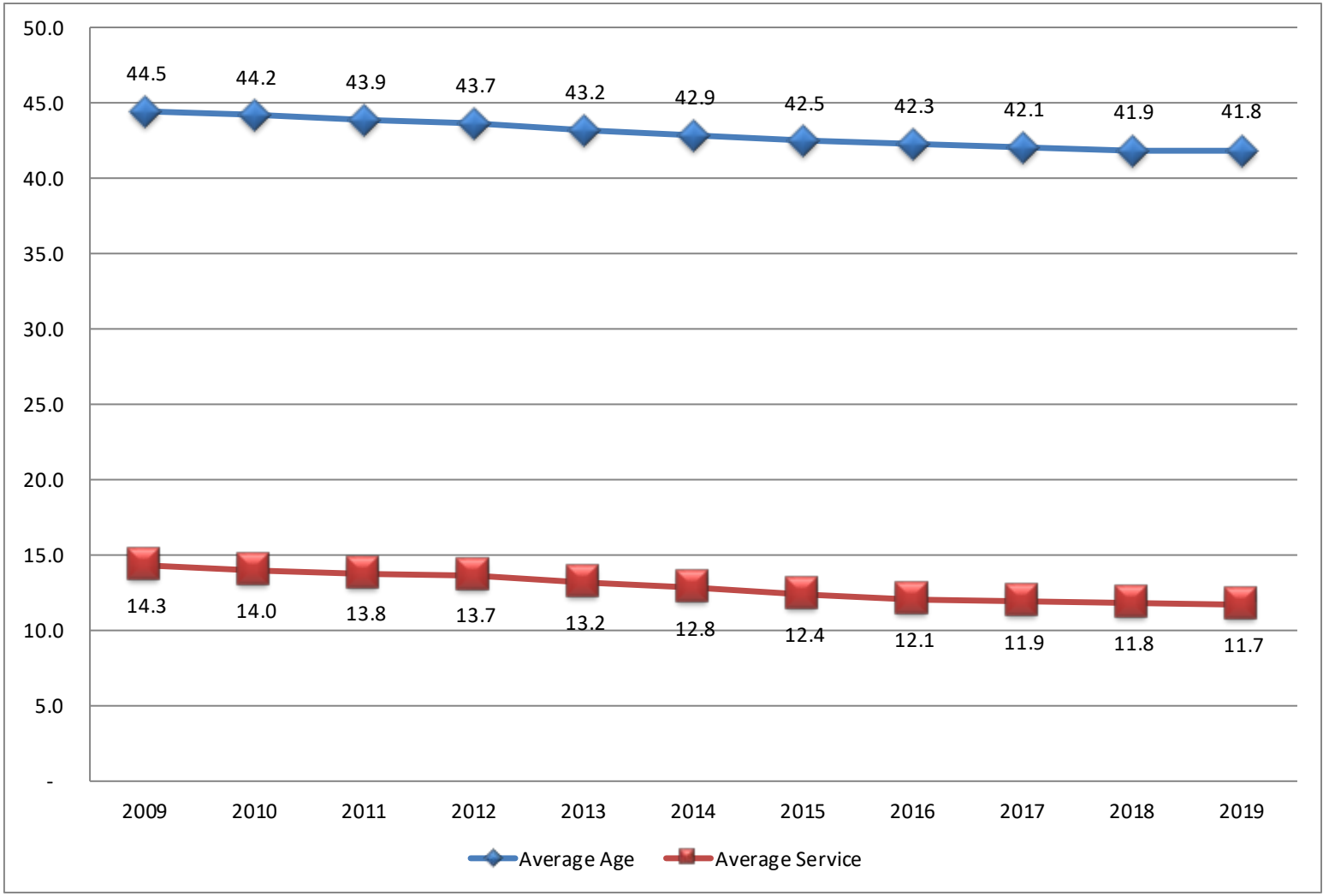
Active Payroll

$ Millions

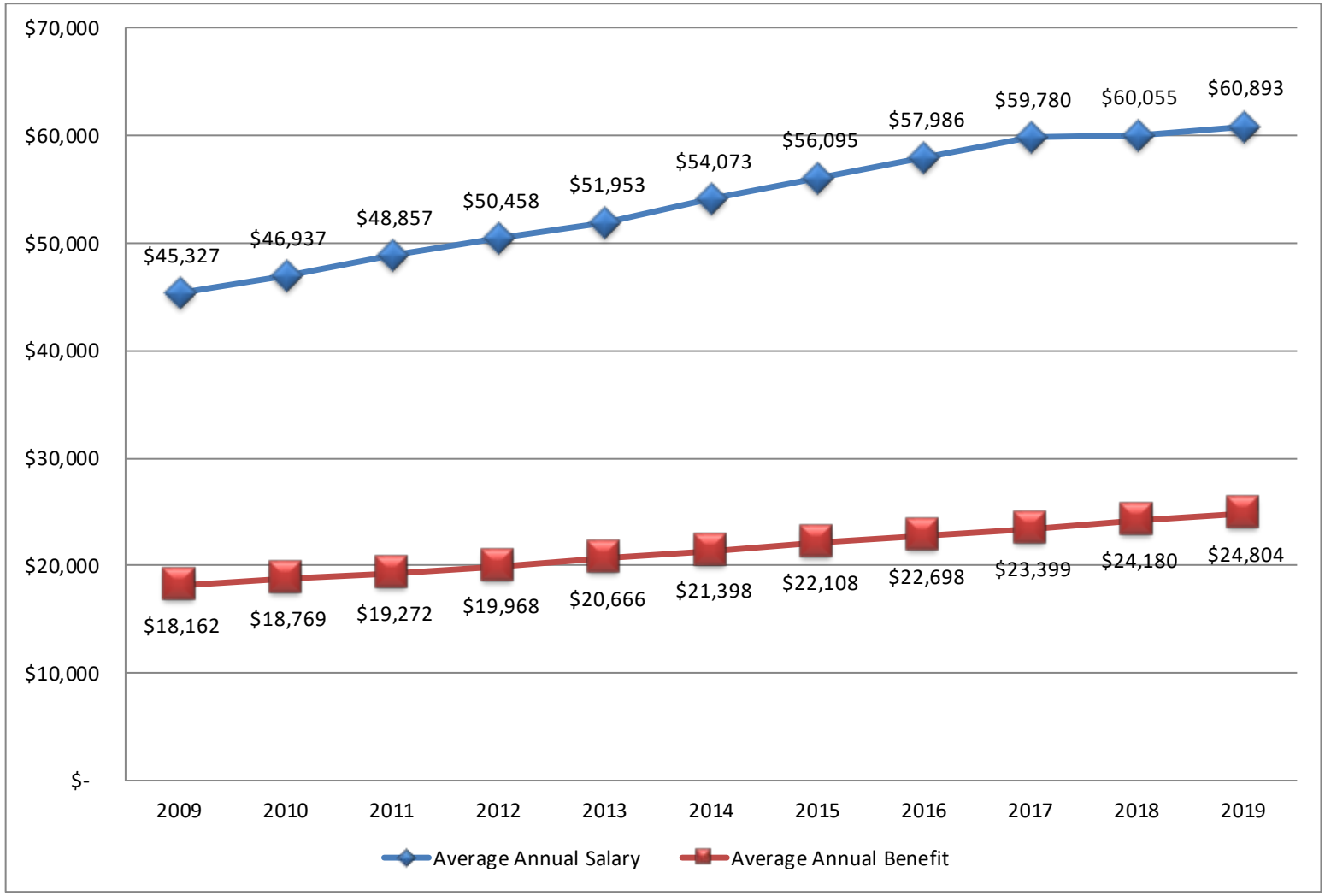


Since 2009, active payroll has increased, on average, 4.5% per year.

Average Age and Service of Active Members



Average Salary and Average Benefit



Since 2009, average salary has increased, on average, 3.0% per year, and, average annual benefit has increased, on average, 3.2% per year.

Assets

- The market value of assets increased from $2.53 billion (as of 6/30/18) to $2.62 billion (as of 6/30/19)
  - Segal determined the investment return was 5.39%, net of investment expenses
- The actuarial value of assets increased from $2.53 billion (as of 6/30/18) to $2.64 billion (as of 6/30/19)
  - Investment return of 6.36%, net of investment expenses
  - Compared to the return assumption of 7.75%
  - Actuarial value is 100.7% of market
  - There is a total of $19 million of deferred net investment losses that will be recognized in future years
- Average annual returns are:

	Market Value	Actuarial Value
10-year average	9.4%	5.3%
20-year average	5.6%	5.9%
30-year average	7.5%	7.1%

Market Value of Assets ($ in millions)

	Fiscal Year Ending June 30, 2019	Fiscal Year Ending June 30, 2018
Beginning of Year	$2,531	$2,360
Contributions:		
• Employer	89	87
• Member	82	80
• Service Purchases	2	2
• Total	173	169
Benefits and Refunds	(223)	(210)
Investment Income (net)	135	211
End of Year	$2,616	$2,531
Rate of Return	5.39%	9.03%

Note: numbers may not add due to rounding

Actuarial Value of Assets ($ in millions)

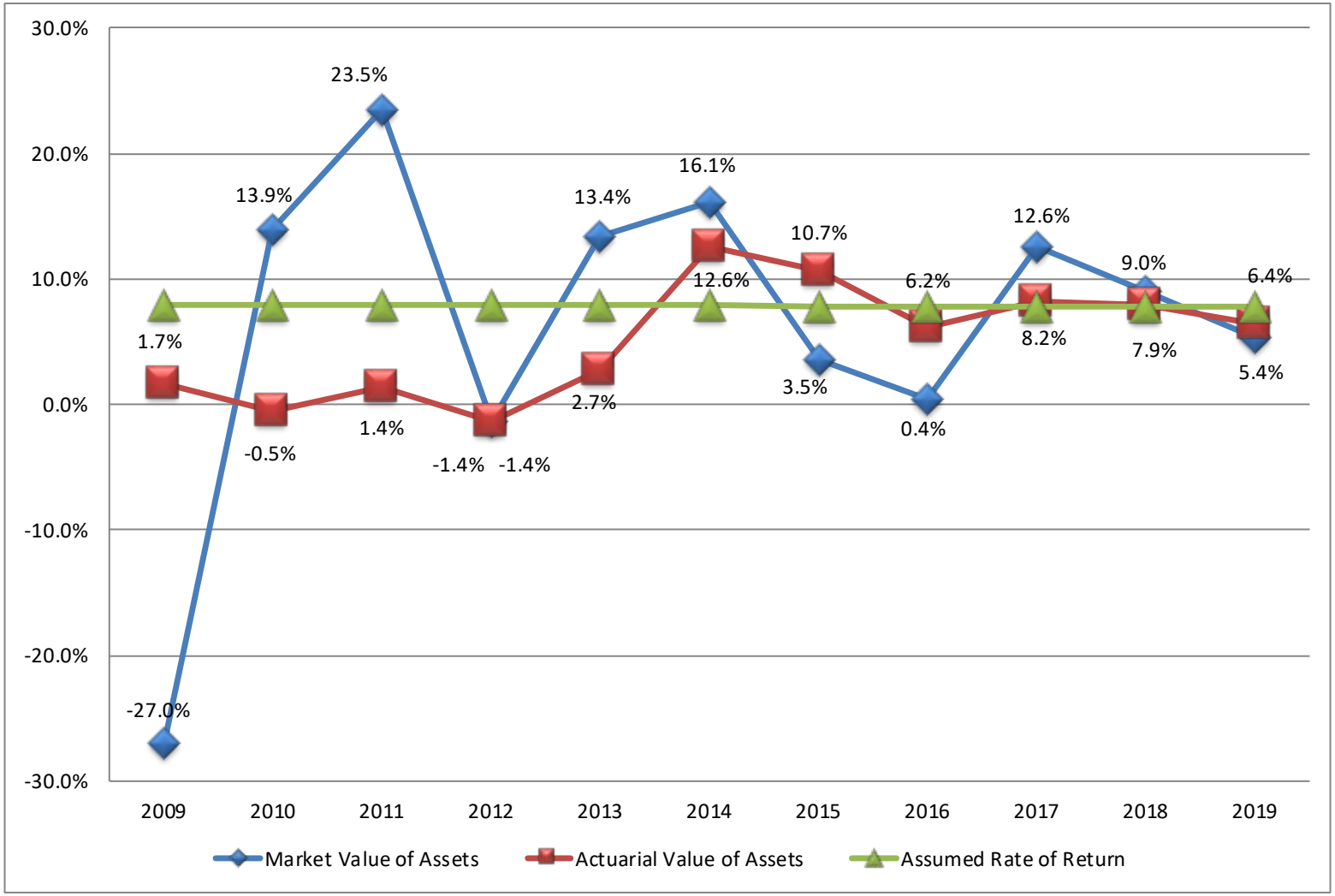
1. Market Value of Assets as of June 30, 2018	$2,531
2. Cash Flow Items for FYE June 30, 2019	(49)
3. Expected Return	194
4. Expected Market Value of Assets (1) + (2) + (3)	$2,675
5. Actual Market Value of Assets on June 30, 2019	**2,616**
6. Excess/(Shortfall) for FYE June 30, 2019 (5) – (4)	(59)
Excess/(Shortfall) Returns:	

Year	Initial Amount	Deferral %	Unrecognized Amount
2019	($59)	80%	($47)
2018	30	60%	18
2017	103	40%	41
2016	(157)	20%	(31)
2015	(93)	0%	0
7. Total			**($19)**

8. Actuarial Value of Assets as of June 30, 2019 (5) - (7)	**$2,636**
Actuarial Value of Assets as a % of Market Value of Assets	100.7%

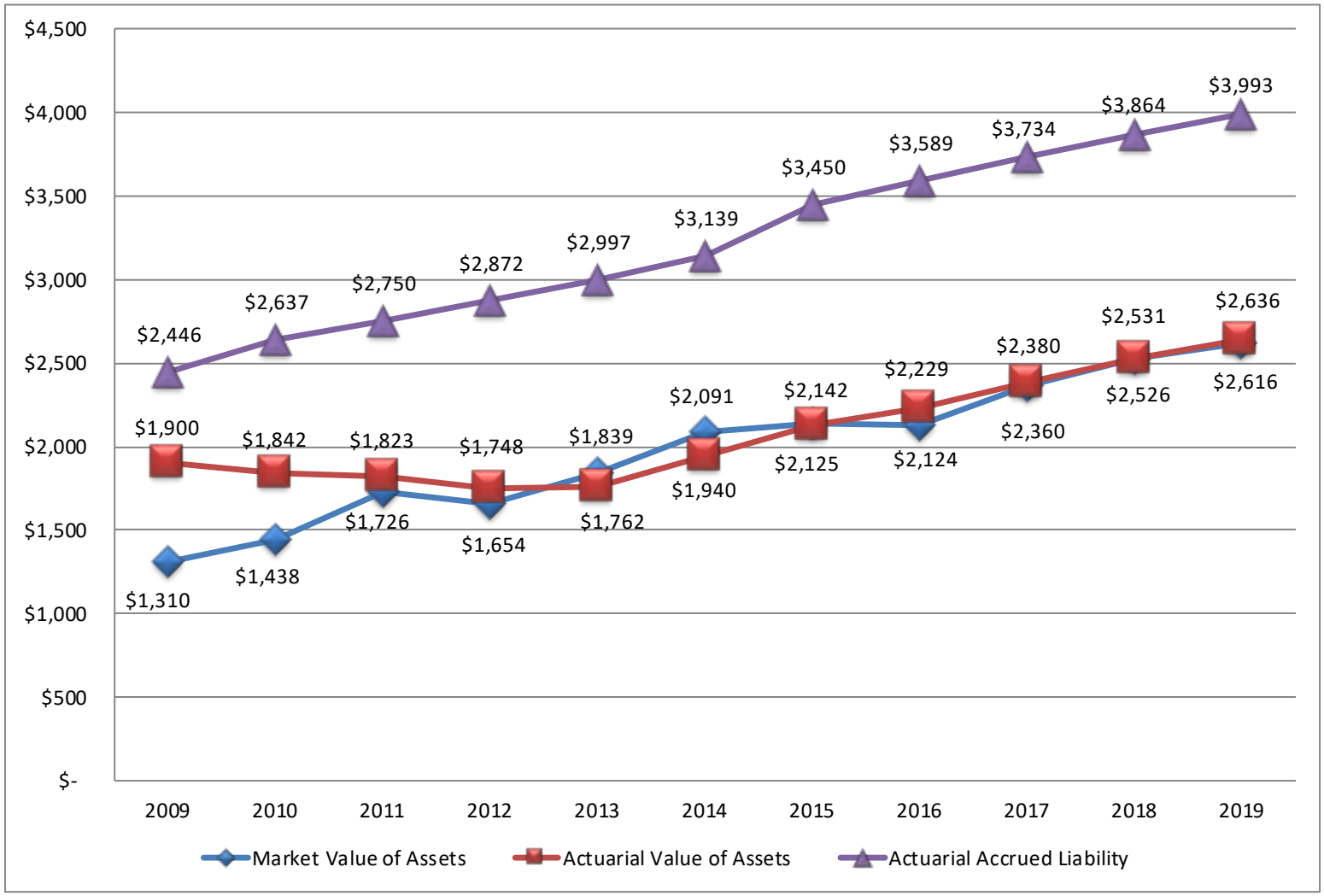
Note: numbers may not add due to rounding

Asset Returns



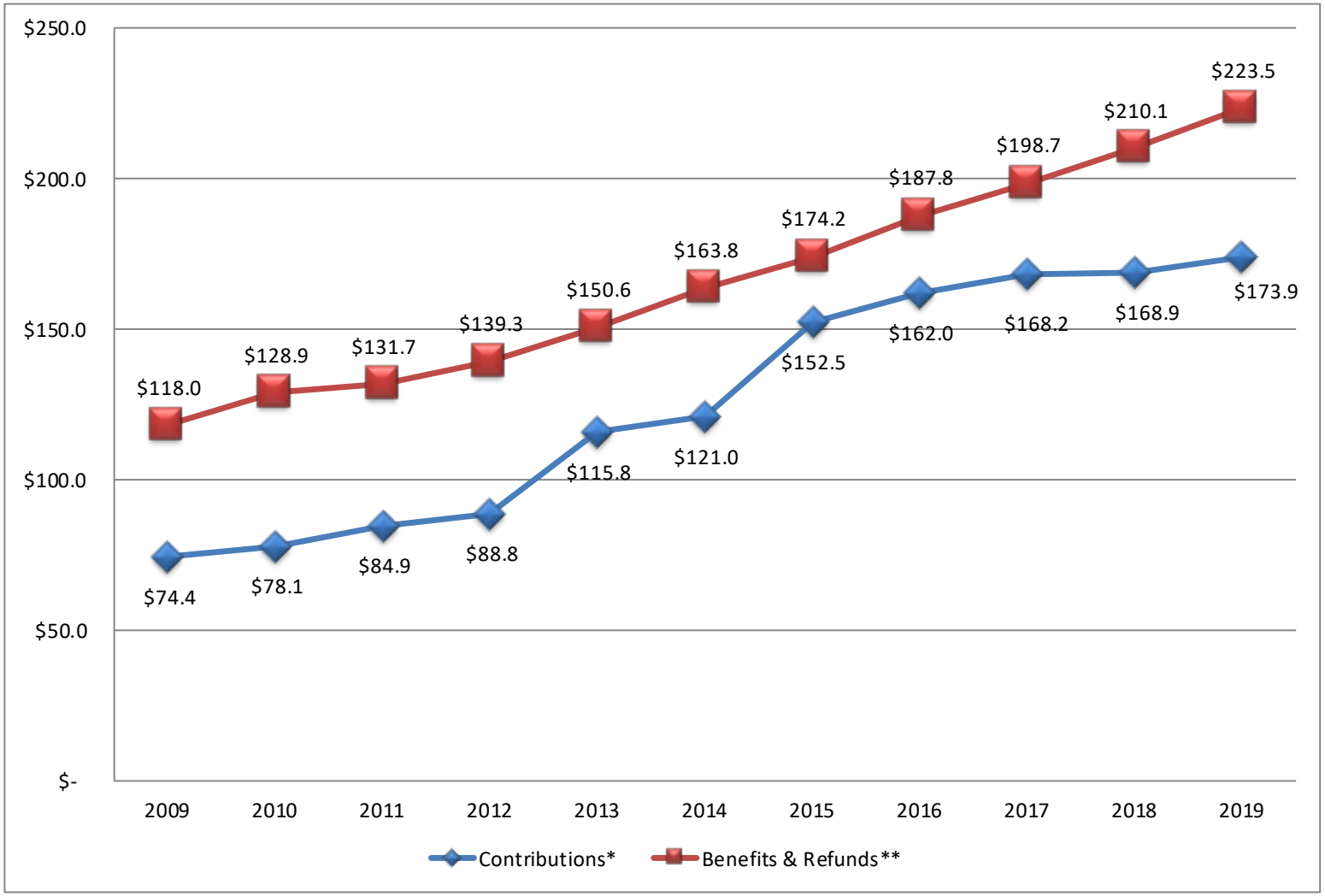
Market and Actuarial Values of Assets Compared to Actuarial Accrued Liability

$ Millions



Contributions vs. Benefits and Refunds

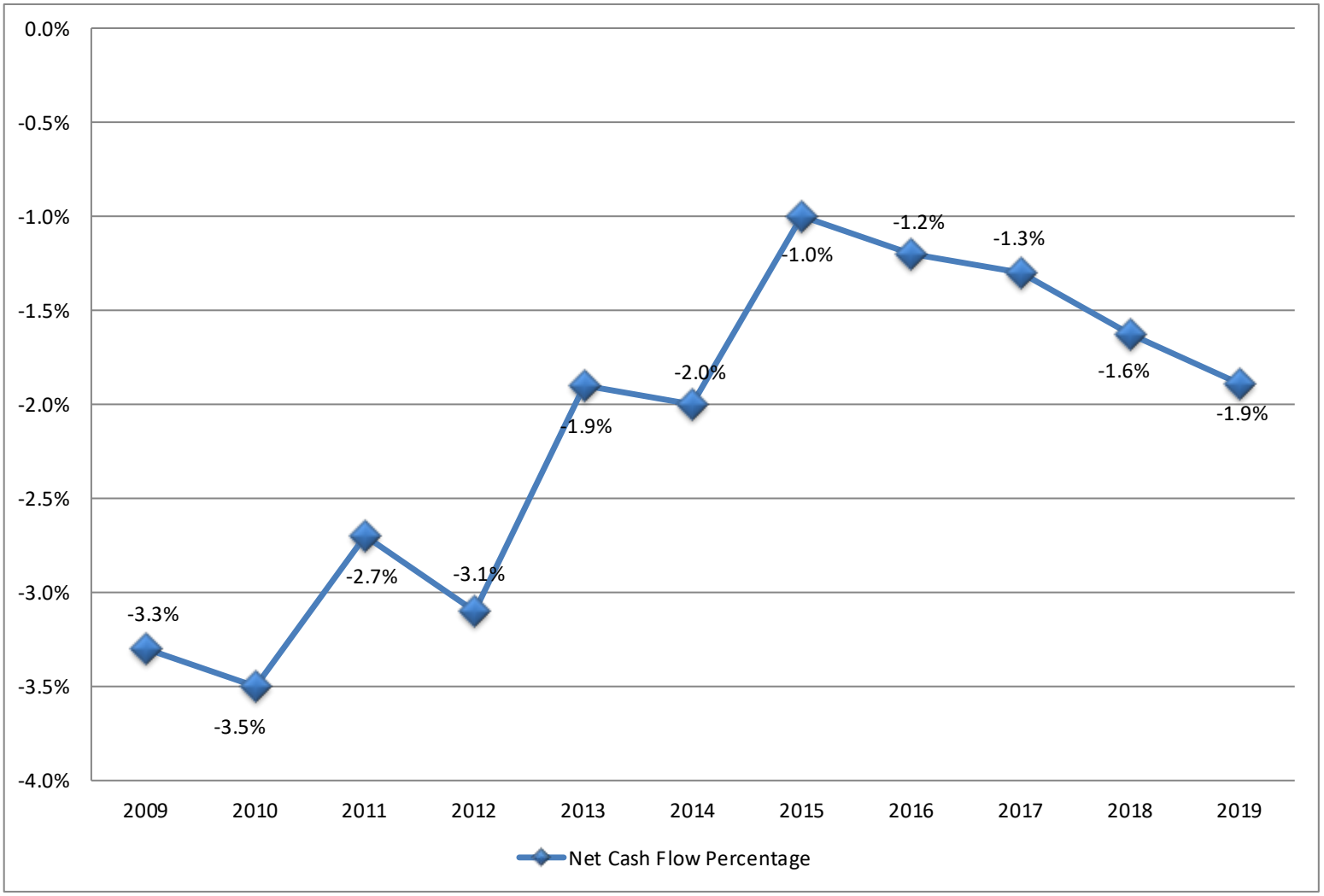
$ Millions



* Includes member and employer contributions, and service purchases

** Includes administrative expenses

Net Cash Flow as a % of Market Value



Valuation Results ($ in millions)

	July 1, 2019	July 1, 2018
Actuarial Accrued Liability:		
• Active Members	$1,570	$1,538
• Inactive Members	110	104
• Retirees and Beneficiaries	2,314	2,222
Total	**$3,993**	**$3,864**
Actuarial Assets	2,636	2,526
Unfunded Accrued Liability	$1,358	$1,337
Funded Ratio	66.0%	65.4%

Note: numbers may not add due to rounding

Five-Year History of Gain/(Loss)

$ in thousands	July 1, 2019	July 1, 2018	July 1, 2017	July 1, 2016	July 1, 2015
Investments	($34,821)	$4,586	$9,464	($33,588)	$51,873
Admin expenses	(59)	116	(275)	113	n/a
Demographics					
• Turnover	($3,820)	($1,696)	($2,013)	($2,923)	($2,128)
• Retirement	(1,286)	(3,038)	(1,503)	57	5,123
• Mortality	9,738	6,945	9,358	(44)	(2,775)
• Salary/service	21,896	29,231	9,408	536	1,457
• New entrants	(7,394)	(4,463)	(4,865)	(6,978)	(6,908)
• Miscellaneous	5,006	1,584	986	1,631	1,608
• Subtotal	$24,139	$28,564	$11,371	($7,721)	($3,624)
Total	**($10,742)**	**$33,266**	**$20,560**	**($41,197)**	**$48,249**

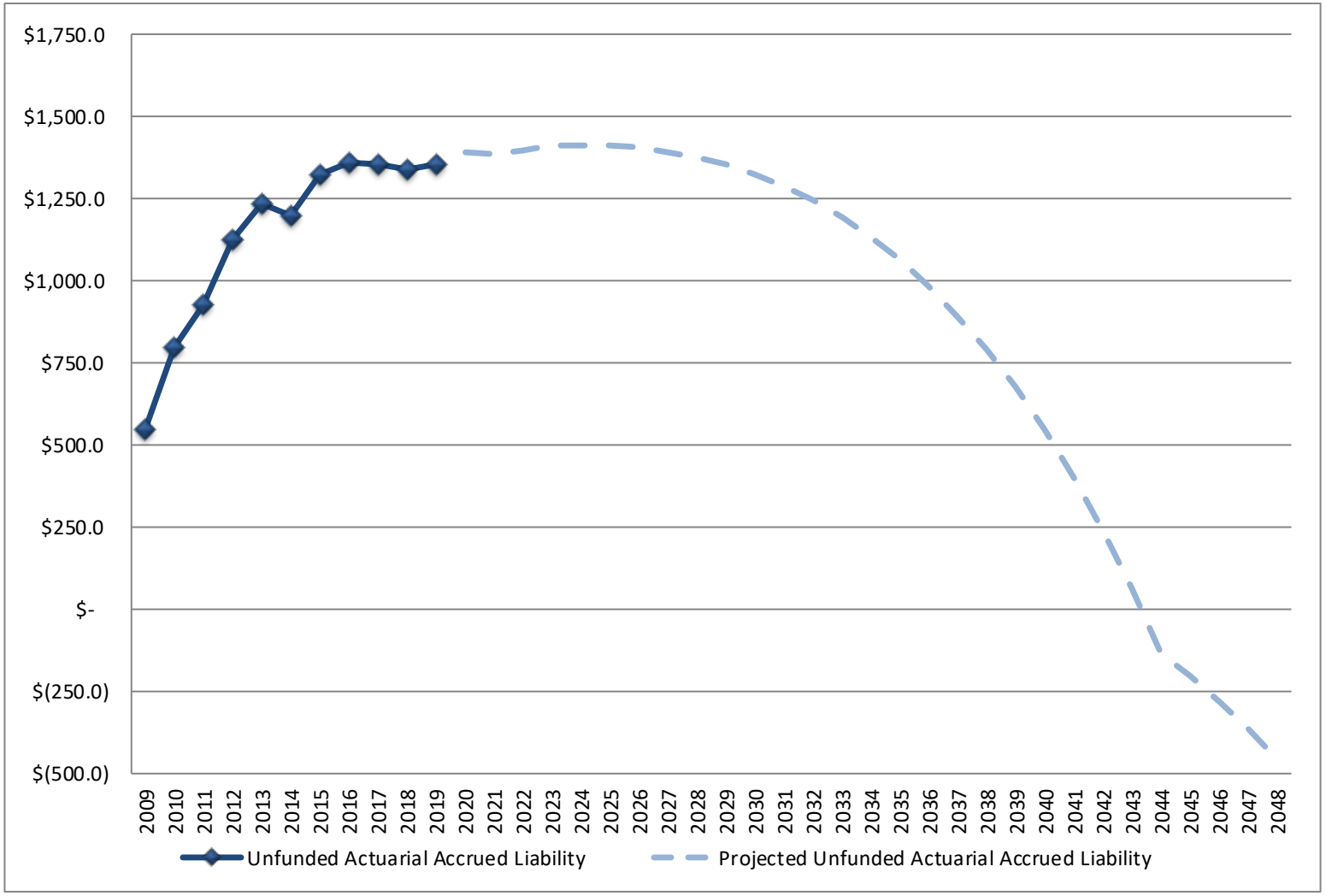
Note: numbers may not add due to rounding

Actuarially Determined Contribution

	For the Year Beginning	
	July 1, 2019	**July 1, 2018**
Normal Cost Rate	11.87%	11.95%
Member Rate	11.75%	11.75%
Employer Normal Cost Rate	0.12%	0.20%
Amortization of UAAL	12.72%	12.74%
Actuarially Determined Contribution	12.84%	12.94%
Statutory Employer Rate	12.75%	12.75%
Contribution Sufficiency/(Deficiency)	(0.09%)	(0.19%)

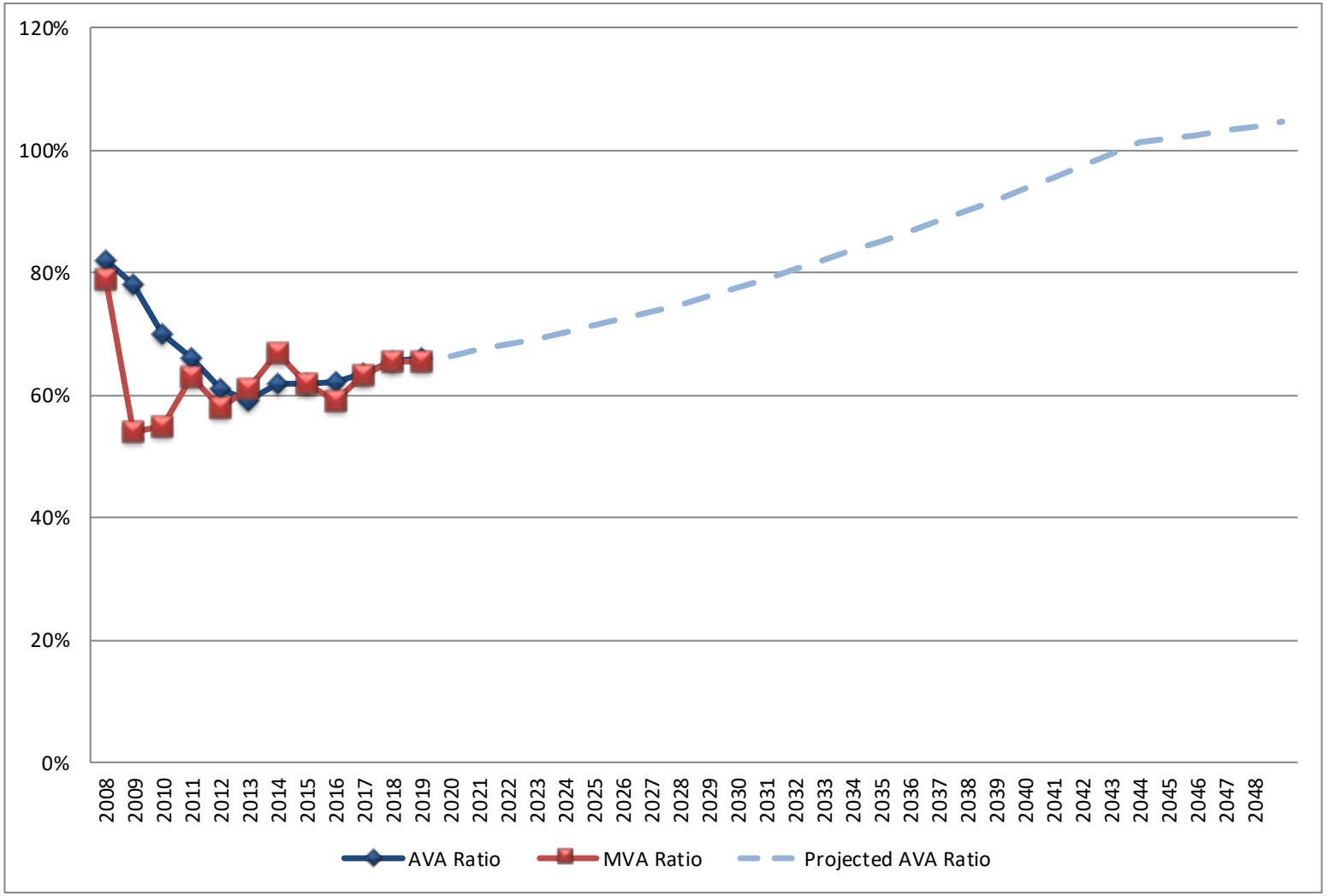
Unfunded Actuarial Accrued Liability

$ Millions



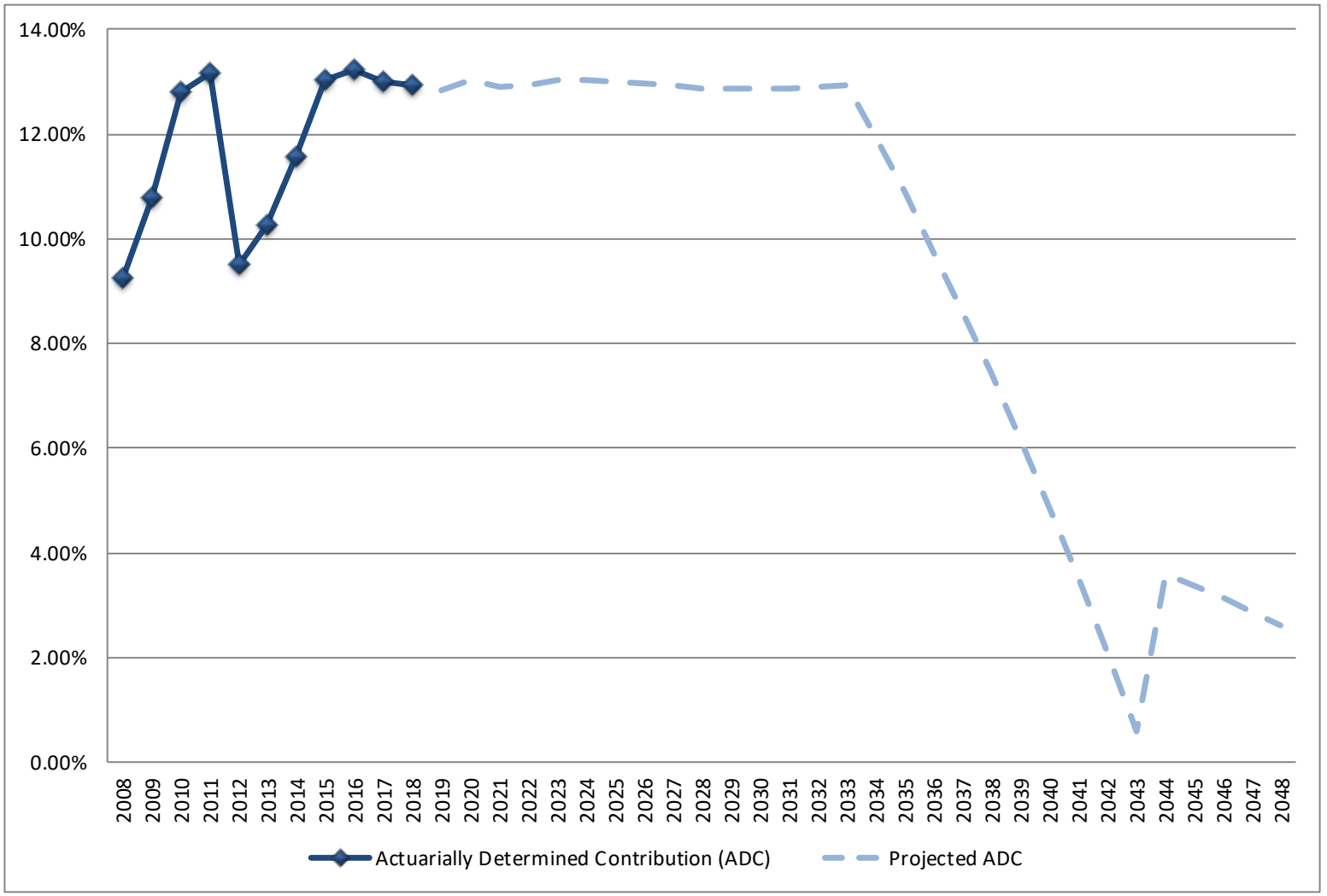
Projection based on all assumptions, including 7.75% investment return, realized as expected

Funded Ratio



Projection based on all assumptions, including 7.75% investment return, realized as expected

Actuarially Determined Contribution (ADC)



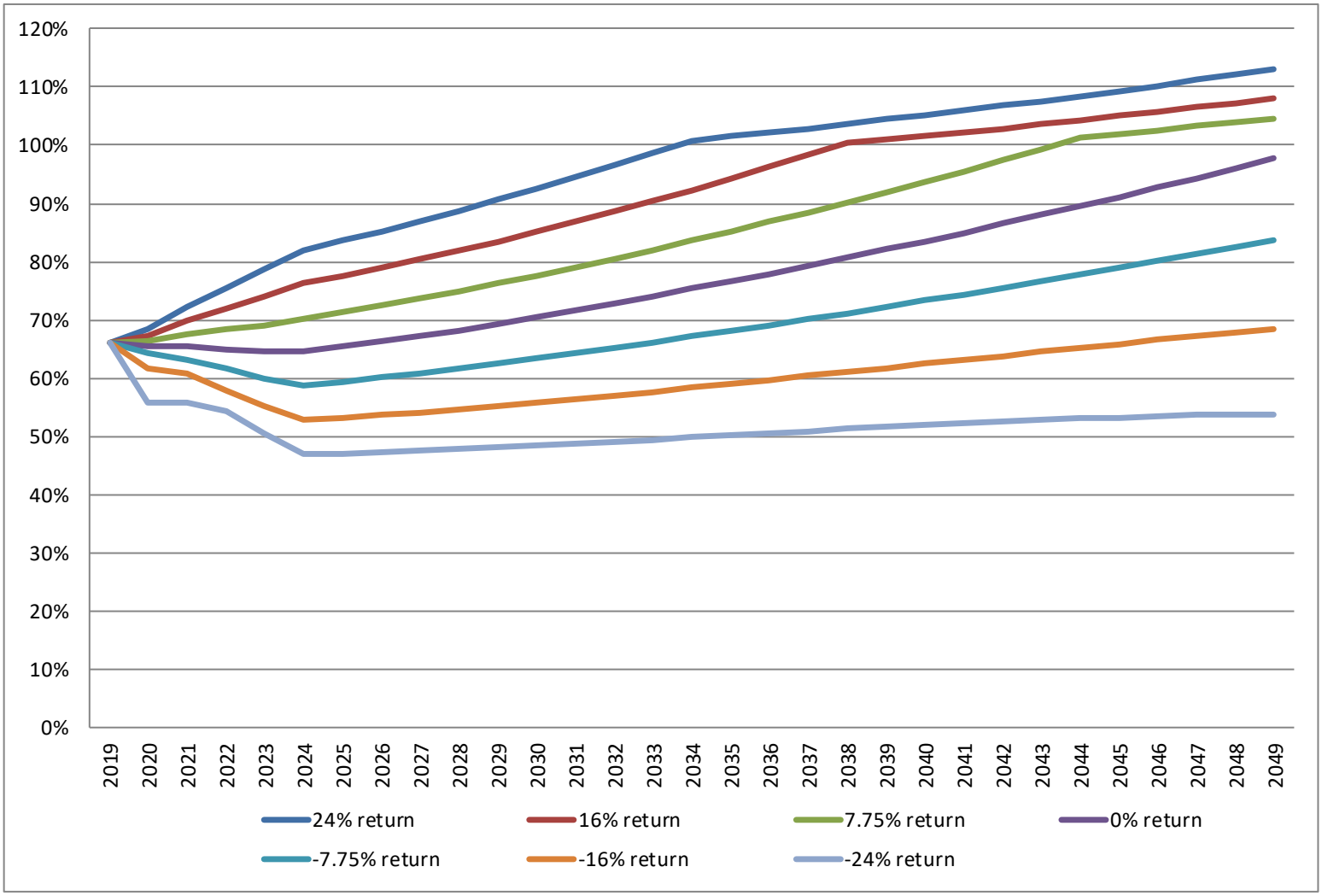
- For 2008 - 2013, the calculation of the ADC was based on a 30-year open level percentage of payroll amortization.
- Beginning in 2013, the period is 30-year closed. In 2033, when the remaining period reaches 10 years, it is assumed to operate as 10-year open
- 2012 and 2013 reflect the actuarial present value of contribution increases effective July 1, 2014.

Projection based on all assumptions, including 7.75% investment return, realized as expected

Sensitivity Projections

- Projections of estimated funded ratios for 30 years
  - Based on FY20 investment return scenarios ranging from -24% to +24%
  - Assumes Fund earns 7.75% per year in FY21 and each year thereafter
  - Additional projections assuming Fund earns 6.75% or 8.75% per year every year
  - Administrative expenses increase by 2.75% each year
  - All other experience is assumed to emerge as expected
- Includes contribution rates from HB 1134
  - Member rate is 11.75%
  - Employer rate is 12.75%
  - Member and Employer Contribution rates “sunset” back to 7.75% once the funded ratio reaches 100% (based on actuarial assets)

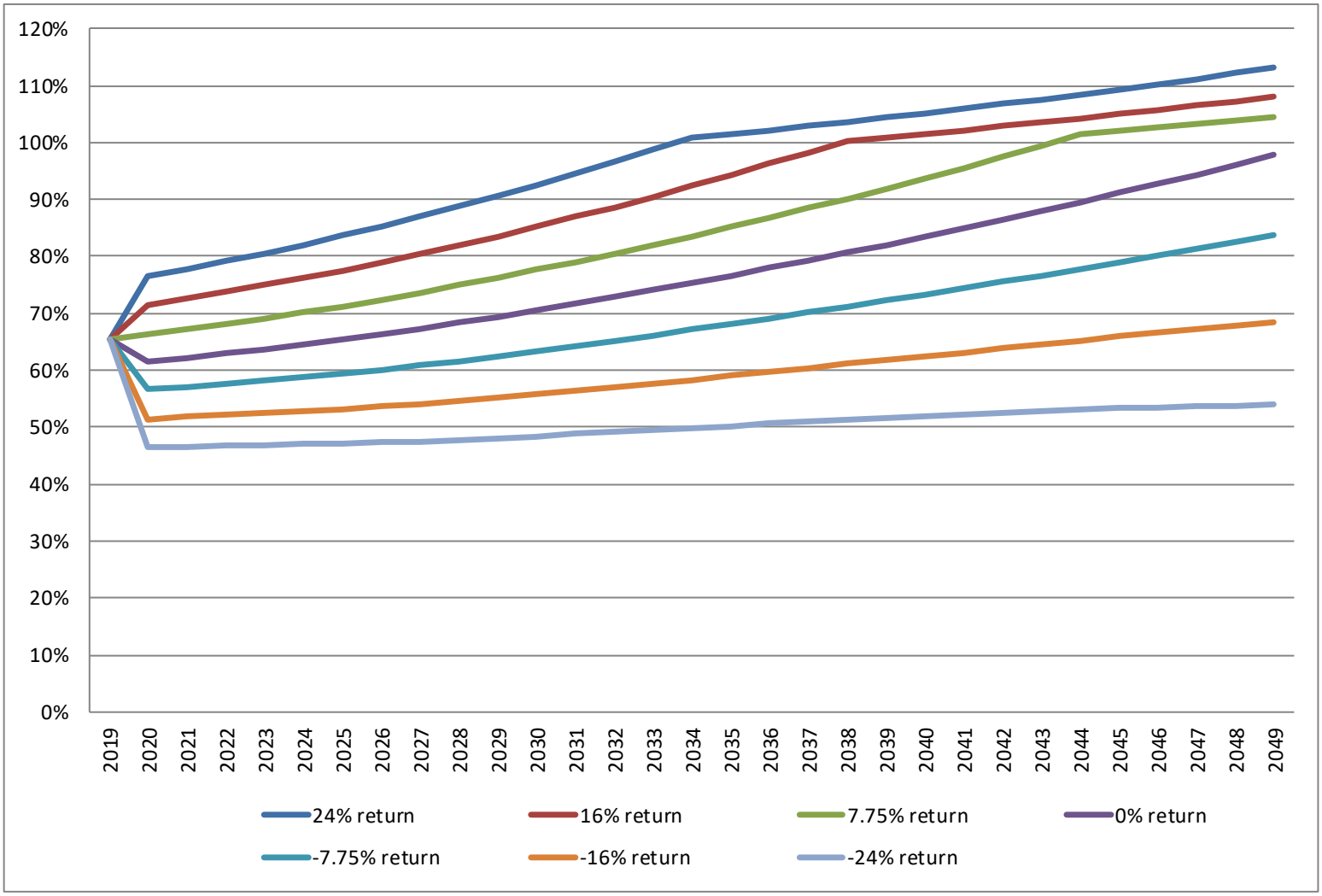
Projected Funded Ratios (AVA Basis)



Projected Funded Ratios (AVA Basis)

Valuation Year	24% for FY2020	16% for FY2020	7.75% for FY2020	0% for FY2020	-7.75% for FY2020	-16% for FY2020	-24% for FY2020
2019	66%	66%	66%	66%	66%	66%	66%
2020	68%	67%	66%	65%	64%	62%	56%
2021	72%	70%	68%	65%	63%	61%	56%
2022	76%	72%	68%	65%	62%	58%	54%
2023	79%	74%	69%	65%	60%	55%	50%
2024	82%	76%	70%	65%	59%	53%	47%
2029	91%	84%	76%	69%	63%	55%	48%
2034	101%	92%	84%	75%	67%	58%	50%
2039	104%	101%	92%	82%	72%	62%	52%
2044	108%	104%	101%	90%	78%	65%	53%
2049	113%	108%	105%	98%	84%	69%	54%

Projected Funded Ratios (MVA Basis)



Projected Funded Ratios (MVA Basis)

Valuation Year	24% for FY2020	16% for FY2020	7.75% for FY2020	0% for FY2020	-7.75% for FY2020	-16% for FY2020	-24% for FY2020
2019	66%	66%	66%	66%	66%	66%	66%
2020	76%	71%	66%	61%	57%	51%	46%
2021	78%	73%	67%	62%	57%	52%	47%
2022	79%	74%	68%	63%	58%	52%	47%
2023	81%	75%	69%	64%	58%	52%	47%
2024	82%	76%	70%	65%	59%	53%	47%
2029	91%	84%	76%	69%	63%	55%	48%
2034	101%	92%	84%	75%	67%	58%	50%
2039	104%	101%	92%	82%	72%	62%	52%
2044	108%	104%	101%	90%	78%	65%	53%
2049	113%	108%	105%	98%	84%	69%	54%

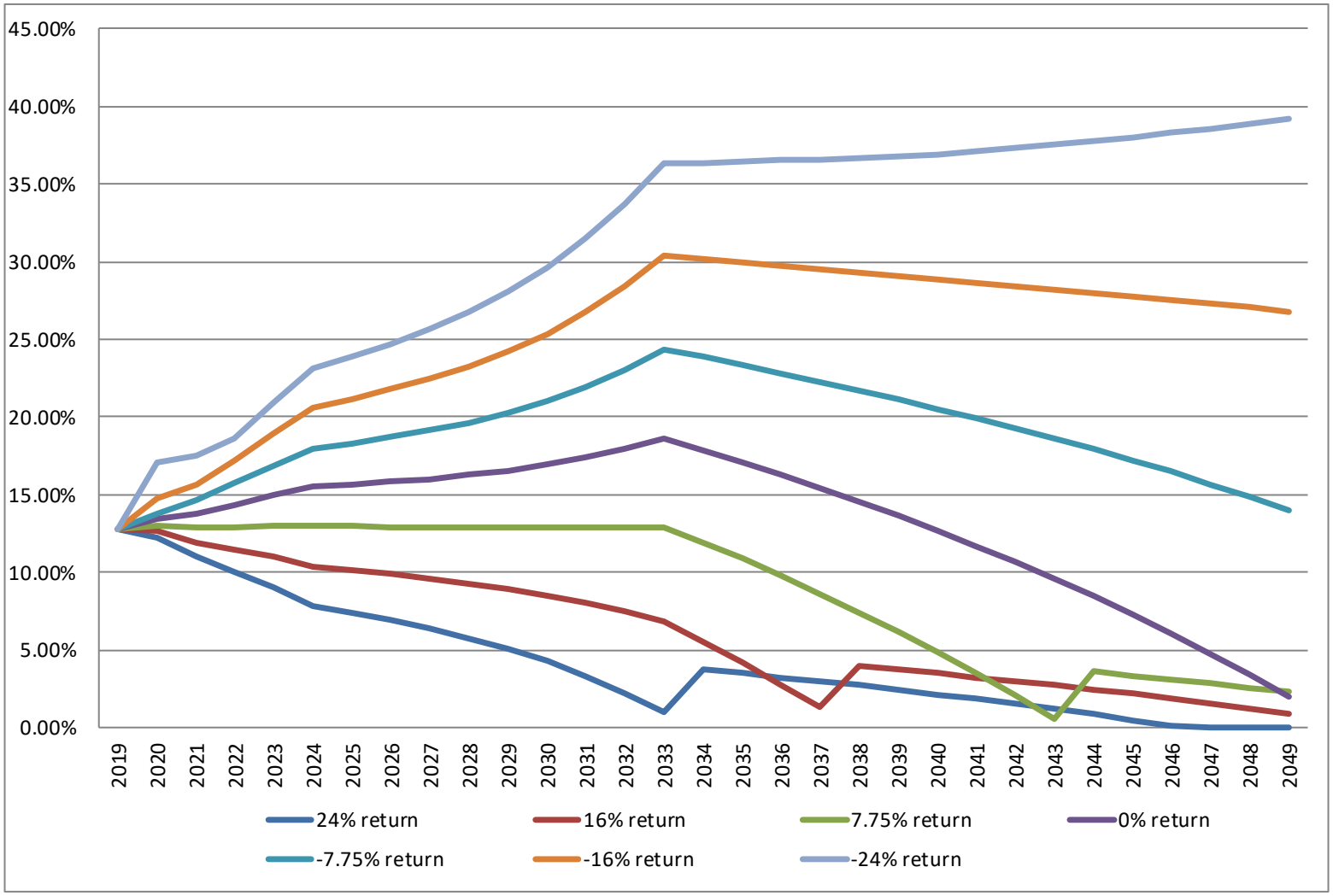
Projected Margin (AVA Basis)

Valuation Year	24% for FY2020	16% for FY2020	7.75% for FY2020	0% for FY2020	-7.75% for FY2020	-16% for FY2020	-24% for FY2020
2019	-0.09%	-0.09%	-0.09%	-0.09%	-0.09%	-0.09%	-0.09%
2020	0.49%	0.10%	-0.29%	-0.66%	-1.04%	-2.06%	-4.36%
2021	1.70%	0.79%	-0.15%	-1.03%	-1.91%	-2.85%	-4.77%
2022	2.74%	1.30%	-0.19%	-1.59%	-2.99%	-4.47%	-5.92%
2023	3.74%	1.76%	-0.29%	-2.21%	-4.14%	-6.19%	-8.17%
2024	4.89%	2.35%	-0.28%	-2.75%	-5.21%	-7.84%	-10.39%
2029	7.67%	3.84%	-0.11%	-3.83%	-7.54%	-11.49%	-15.33%
2034	4.02%	7.18%	0.83%	-5.14%	-11.11%	-17.46%	-23.62%
2039	5.29%	4.02%	6.56%	-0.91%	-8.39%	-16.34%	-24.06%
2044	6.89%	5.28%	4.14%	4.25%	-5.19%	-15.25%	-25.00%
2049	7.75%	6.87%	5.42%	10.70%	-1.29%	-14.05%	-26.42%

* The projected margin is based on a 30-year closed period starting July 1, 2013. Once the period declines to 10 years remaining, the projected margin is based on a 10-year open period.

** If an overfunding exists, the surplus is amortized over a 30-year open period.

Projected ADC



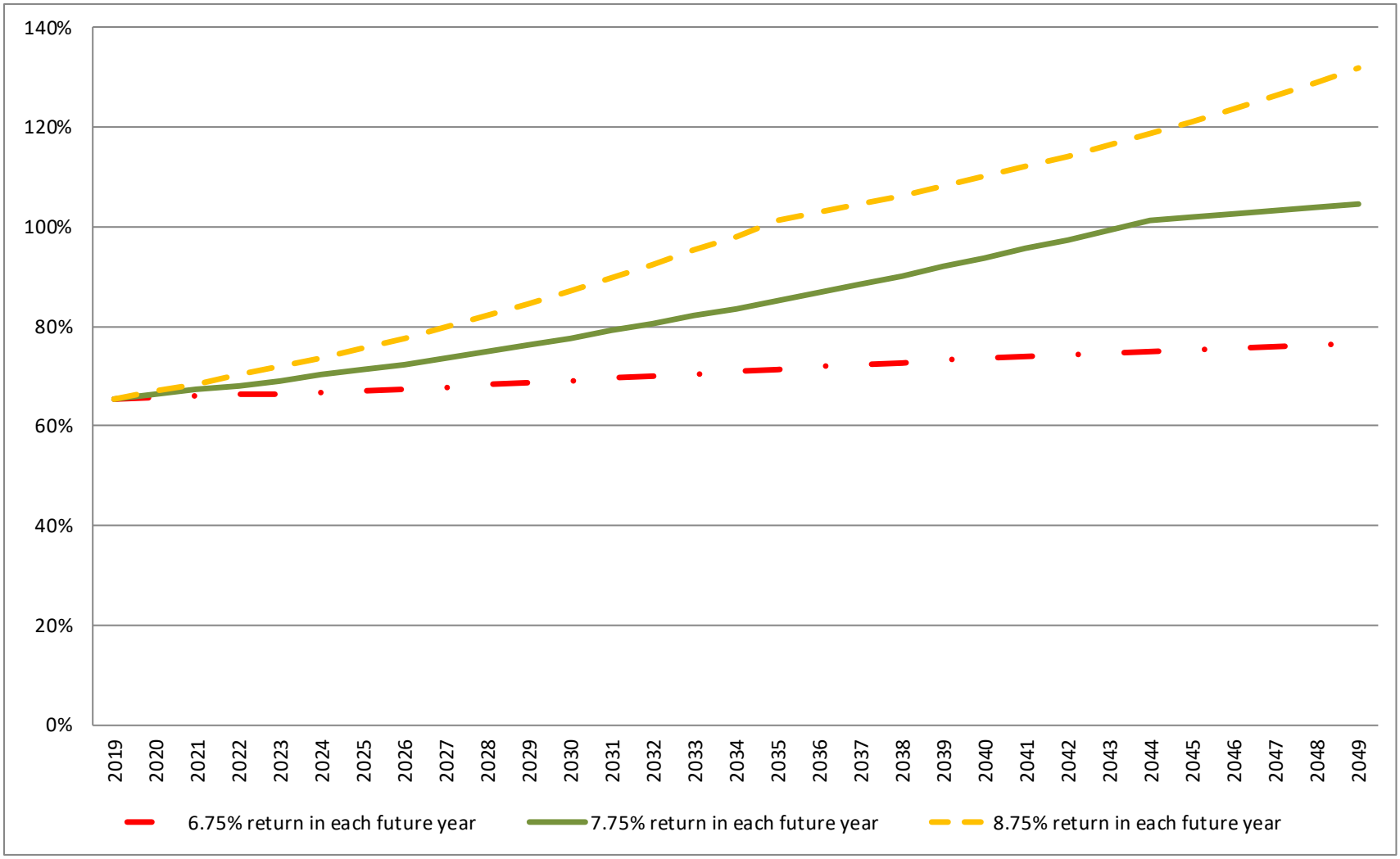
Projected ADC

Valuation Year	24% for FY2020	16% for FY2020	7.75% for FY2020	0% for FY2020	-7.75% for FY2020	-16% for FY2020	-24% for FY2020
2019	12.84%	12.84%	12.84%	12.84%	12.84%	12.84%	12.84%
2020	12.26%	12.65%	13.04%	13.41%	13.79%	14.81%	17.11%
2021	11.05%	11.96%	12.90%	13.78%	14.66%	15.60%	17.52%
2022	10.01%	11.45%	12.94%	14.34%	15.74%	17.22%	18.67%
2023	9.01%	10.99%	13.04%	14.96%	16.89%	18.94%	20.92%
2024	7.86%	10.40%	13.03%	15.50%	17.96%	20.59%	23.14%
2029	5.08%	8.91%	12.86%	16.58%	20.29%	24.24%	28.08%
2034	3.73%	5.57%	11.92%	17.89%	23.86%	30.21%	36.37%
2039	2.46%	3.73%	6.19%	13.66%	21.14%	29.09%	36.81%
2044	0.86%	2.47%	3.61%	8.50%	17.94%	28.00%	37.75%
2049	0.00%	0.88%	2.33%	2.05%	14.04%	26.80%	39.17%

* The projected ADC is based on a 30-year closed period starting July 1, 2013. Once the period declines to 10 years remaining, the projected ADC is based on a 10-year open period.

** If an overfunding exists, the surplus is amortized over a 30-year open period.

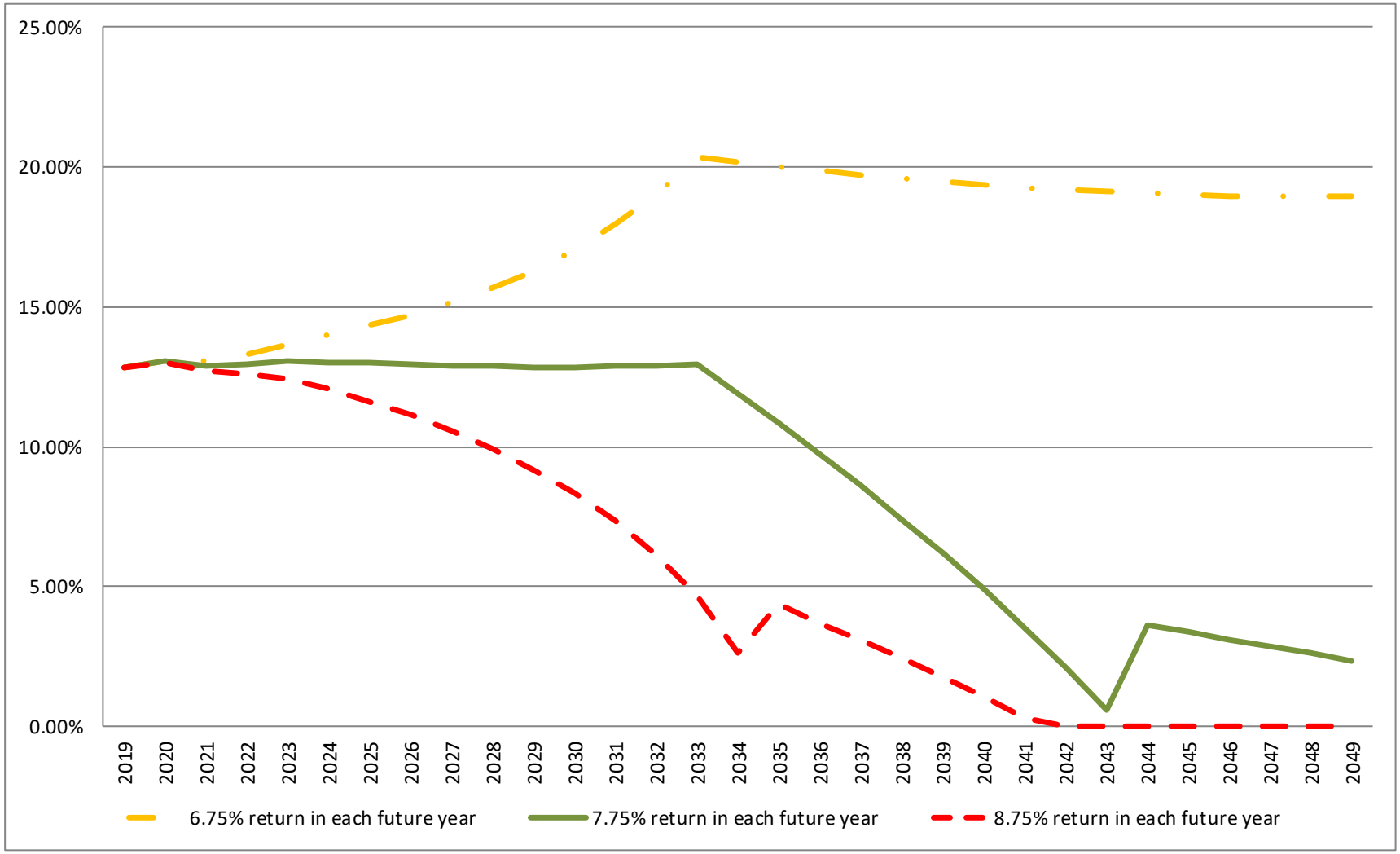
Projected Funded Ratios (MVA Basis)
Actual Returns +1% or -1% of Assumed



Projected Funded Ratios (MVA Basis)
Actual Returns +1% or -1% of Assumed

Valuation Year	6.75% Return in Each Future Year	7.75% Return in Each Future Year	8.75% Return in Each Future Year
2019	66%	66%	66%
2020	66%	66%	67%
2021	66%	67%	68%
2022	66%	68%	70%
2023	67%	69%	72%
2024	67%	70%	74%
2029	69%	76%	85%
2034	71%	84%	98%
2039	73%	92%	108%
2044	75%	101%	119%
2049	76%	105%	132%

Projected ADC
Actual Returns +1% or -1% of Assumed



Projected ADC
Actual Returns +1% or -1% of Assumed

Valuation Year	6.75% Return in Each Future Year	7.75% Return in Each Future Year	8.75% Return in Each Future Year
2019	12.84%	12.84%	12.84%
2020	13.09%	13.04%	12.99%
2021	13.06%	12.90%	12.73%
2022	13.29%	12.94%	12.59%
2023	13.65%	13.04%	12.42%
2024	13.98%	13.03%	12.05%
2029	16.30%	12.86%	9.18%
2034	20.17%	11.92%	2.62%
2039	19.48%	6.19%	1.79%
2044	19.06%	3.61%	0.00%
2049	18.94%	2.33%	0.00%

Appendix

Items

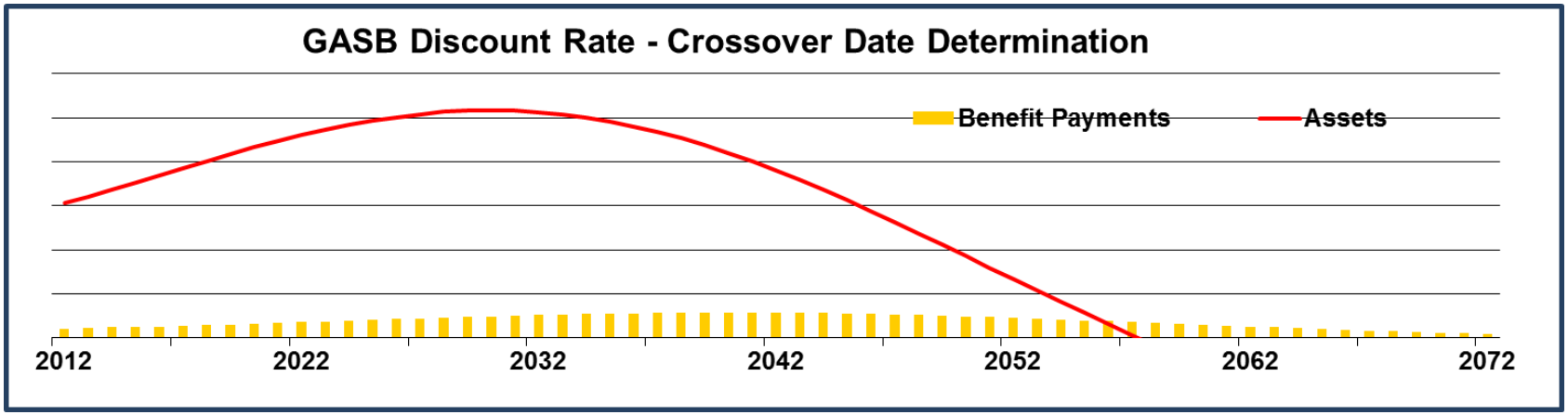
- GASB Accounting Information
- Glossary

GASB Discount Rate

- Determined annually based on a projection of benefit payments and assets
  - Benefit payment projection is for current members
  - Asset projection is based on expected investment return assumption (7.75%) and contributions on behalf of current members
- If projected assets are always sufficient to pay projected benefit payments, the GASB discount rate is equal to the expected investment return assumption
- If not, a blended discount rate must be used
  - For projected benefit payments that are covered by projected assets, the expected return assumption is used
  - For projected benefit payments that are not covered by projected assets, the 2-year AA/Aa tax-exempt municipal bond index is used (3.50%).
    - The date at which projected assets are not sufficient to cover projected benefit payments is called the “crossover date”

GASB Discount Rate

- As an example, the graph below shows the crossover occurring in 2058 for a hypothetical plan.



- Determination if a plan has a crossover date depends on
  - The Fund's current funded ratio
  - Projected future contributions and benefit payments
  - Expected investment return
- As of July 1, 2019, TFFR does not have a crossover date

Net Pension Liability ($ in millions)

Collective TFFR	June 30, 2019	June 30, 2018
Total Pension Liability at 7.75%	$3,993	$3,864
Fiduciary Net Plan Position (i.e., MVA)	2,616	2,531
Net Pension Liability (NPL)	1,377	1,333
Sensitivity to changes in discount rate		
• 1% decrease (6.75%)	$1,860	$1,780
• Current discount rate (7.75%)	1,377	1,333
• 1% increase (8.75%)	976	945

Reconciliation of Collective Net Pension Liability

($ in millions)	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
Balance as of June 30, 2018	$3,864	$2,531	$1,333
Changes for the year			
Service cost	78		78
Interest	297		297
Difference between expected and actual experience	(23)		(23)
Contributions – employer		89	(89)
Contributions – member		82	(82)
Contributions – purchased service credit and other		2	(2)
Net investment income		135	(135)
Benefit payments and refunds of contributions	(221)	(221)	-
Administrative expense		(2)	2
Changes of assumptions	-		-
Change of benefit terms	-		-
Net changes	130	86	44
Balance as of June 30, 2019	$3,993	$2,616	$1,377

Note: numbers may not add due to rounding

Collective Pension Expense ($ in millions)

	Year ending June 30, 2019	Year ending June 30, 2018
Service cost	$78	$78
Interest on the total pension liability	297	287
Projected earning on plan investments	(194)	(181)
Contributions – member	(82)	(80)
Contributions – purchased service credit and other	(2)	(2)
Administrative expense	2	2
Current year of recognition of:		
• Change of assumptions	24	24
• Difference between expected and actual experience	(8)	(5)
• Difference between projected and actual earning on pension plan investments	35	(6)
• Change of benefit terms	0	0
Total pension expense	$149	$117

Note: numbers may not add due to rounding

Glossary

Actuarial Accrued Liability For Actives: The equivalent of the accumulated Normal Costs allocated to the years before the valuation date.

Actuarial Accrued Liability For Pensioners: The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

Actuarial Cost Method: A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the Actuarially Determined Contribution.

Actuarial Gain or Actuarial Loss: A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two actuarial valuation dates. Through the Actuarial Assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the plan's assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the Actuarial Assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield in actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period

Actuarially Equivalent: Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.), multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Glossary

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the ADC and the NPL.

Actuarial Value of Assets (AVA): The value of the plan's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.

Actuarially Determined: Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Actuarially Determined Contribution (ADC): The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation. The ADC consists of the Employer Normal Cost and the Amortization Payment.

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Glossary

Amortization Payment: The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Assumptions or Actuarial Assumptions: The estimates on which the cost of a plan is calculated including:

(a) Investment return - the rate of investment yield that the plan will earn over the long-term future;

(b) Mortality rates - the death rates of employees and pensioners; life expectancy is based on these rates;

(c) Retirement rates - the rate or probability of retirement at a given age;

(d) Turnover rates - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;

(e) Salary increase rates - the rates of salary increase due to inflation and productivity growth

Closed Amortization Period: A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.

Decrements: Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.

Defined Benefit Plan: A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.

Defined Contribution Plan: A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.

Employer Normal Cost: The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

Glossary

Experience Study: A periodic review and analysis of the actual experience of a plan that may lead to a revision of one or more Actuarial Assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the actuary.

Funded Ratio: The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

Funding Period or Amortization Period: The term "Funding Period" is used in two ways. First, it is the period used in calculating the Amortization Payment as a component of the ADC. Second, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.

GASB: Governmental Accounting Standards Board.

GASB 67 and GASB 68: Governmental Accounting Standards Board Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.

Investment Return: The rate of earnings of a plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the plan's assets. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.

Margin: The difference, whether positive or negative, between the statutory employer contribution rate and the Actuarially Determined Contribution.

Net Pension Liability (NPL): The Net Pension Liability is equal to Total Pension Liability minus Plan Fiduciary Net Position.

Glossary

Normal Cost: That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability, or retirement.

Open Amortization Period: An Open Amortization Period is one that is used to determine the Amortization Payment, but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the Actuarial Assumptions are realized.

Plan Fiduciary Net Position: GASB term for the market value of assets.

Total Pension Liability (TPL): The actuarial accrued liability based on the blended discount rate as described in GASB 67/68.

Unfunded Actuarial Accrued Liability (UAAL): The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or Actuarial Valuation Date: The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

Caveats

This presentation is based on the results of the July 1, 2019, actuarial valuation performed for the Board of Trustees of the North Dakota Teachers' Fund for Retirement. The actuarial valuation report has information on the plan provisions, data, methods and assumptions used in the valuation. Use of the information in this presentation is subject to the caveats described in that document. The measurements in this presentation may not be appropriate for purposes other than those described in the actuarial valuation report.

North Dakota Teachers' Fund For Retirement

MEMORANDUM

TO: **TFFR Board**
FROM: **Fay Kopp**
DATE: **October 17, 2019**
SUBJ: **Actuarial Experience Study Basics**

TFFR Board Policy B-9 requires that the Fund's actuarial assumptions be reviewed every 5 years through an Actuarial Experience Study. TFFR's last Experience Review was for the 2009-2014 time frame and was delivered in 2015.

An Actuarial Experience Study reviews the differences between the plan's assumed experience and actual experience over 5 years. The Study is based on a review of data, emerging trends, and future expectations, and provides the foundation for recommending assumption changes, if necessary.

There are two broad categories of assumptions:

1. **Demographic assumption**s are related to a pension plan's membership such as future rates of retirement, turnover, disability and death before and after retirement.

2. **Economic assumptions** are related to other factors such as future rates of investment return, inflation, payroll growth, and pay increases among plan participants.

Kim Nicholl and Matt Strom, Segal Consulting, will provide Board Education related to Experience Studies, and setting appropriate actuarial assumptions.

BOARD INFORMATION AND DISCUSSION.

NORTH DAKOTA RETIREMENT AND INVESTMENT OFFICE
Teachers' Fund for Retirement
State Investment Board

Segal Consulting

North Dakota Teachers' Fund for Retirement

Experience Study Planning

October 24, 2019

Presented By:

Kim Nicholl, FSA, MAAA, EA
Senior Vice President and Actuary

Matt Strom, FSA, MAAA, EA
Senior Vice President and Actuary

This document has been prepared by Segal Consulting for the benefit of the Board of Trustees of the North Dakota Teachers' Fund for Retirement and is not complete without the presentation provided at the October 24, 2019 meeting of the Board of Trustees.

Experience Study Planning

Agenda

- Purpose of an Experience Study
- Economic Assumptions
- Considerations for Salary Scale
- Demographic Assumptions

Purpose of an Experience Study

- Each actuarial valuation involves a projection of benefits expected to be paid in the future to all members of TFFR
  - The projection of benefit payments is based on assumptions of future events and conditions
- Assumptions are grouped into two broad categories:
  - Demographic assumptions – primarily selected on the basis of recent experience
  - Economic assumptions – rely more on a long-term outlook of expected future trends
- Gains and losses result from actual experience that differs from expected
  - A pattern of gains or losses with respect to one or more assumptions is the basis for recommended changes to the assumptions
- Actuarial experience studies are undertaken periodically and serve as the basis for recommended changes in actuarial assumptions and methods

Economic Assumptions

- Economic assumptions include:
  - Inflation
  - Salary scale
  - Investment rate of return
  - Payroll growth rate
- "Building block" approach is the common method to develop economic assumptions
  - Inflation is the basis for all economic assumptions
    - Investment rate of return = inflation + expected risk premium for each asset class
    - Salary scale = inflation + productivity + merit increases
    - Payroll growth = inflation + productivity
- Recommended investment return assumption will be based on weighted average "real" returns using TFFR's target asset allocation and capital market assumptions from TFFR's investment consultant
- Payroll growth assumption represents the expected annual increase in total covered payroll from one year to the next
  - Typically determined with respect to a level active population

Considerations For Salary Increase Assumption

- Salary increase assumption will primarily be based on observations from historical data relative to increases in pay for existing active members over the experience period
  - Data will be analyzed based on age and service to determine the best “fit”
  - Experience data is adjusted for actual inflation to isolate actual increases due to merit and productivity

Demographic Assumptions

- Demographic assumptions should reflect the expected occurrences of various events among participants
  - A reasonable assumption is one that is expected to model the contingency being measured and not expected to produce significant gains or losses
- Actual experience period data is analyzed and compared to expected outcomes based on existing assumptions
  - Ratios of "actual to expected" are generated based on subsets such as age, service, gender, etc.
    - A ratio of 100% means the actual experience was exactly equal to the expected experience
    - Ratios above and below 100% are analyzed to determine whether assumption should be changed
  - Recommended assumptions are formulated to achieve desirable ratios of "actual to proposed"
- Mortality assumption should reflect anticipated improvement in life expectancies and is best accomplished using a generational approach
  - I.e., mortality rates in the following year reflect one year of improvement, rates 20 years from now reflect 20 years of improvement, etc.
  - E.g., the mortality rate at age 65 is less for someone currently age 35 as compared to someone currently age 60

Timing

- Plan Management Policy will be updated in November 2019 based on the results of the July 1, 2019 actuarial valuation
- Experience study will be presented at the March 2020 Board meeting
- Plan Management Policy will be updated based on the results of the experience study in 2020

North Dakota Teachers' Fund For Retirement

MEMORANDUM

TO: **TFFR Board**
FROM: **Fay Kopp**
DATE: **October 17, 2019**
SUBJ: **TFFR Plan Management Policy**
2nd Reading and Final Approval

In order to provide a more robust way to evaluate the ongoing financial health and long term sustainability of TFFR, in January 2019 the Board approved Segal's proposal to develop a TFFR Plan Management Policy.

- Phase 1 of the Plan Management Policy project included an initial risk assessment and stochastic modeling based on the 2018 valuation results which was presented to the Board in April (attached).

- Phase 2 included identifying policy metrics and establishing scoring system which was presented to the Board in July (attached).

- Introduction and 1st reading of the TFFR Plan Management Policy was conducted at the September meeting (attached). No feedback on the draft policy was received, and no changes have been made to the draft policy.

- 2nd reading and final approval of the draft policy is being requested at the October 24 meeting. (Note: once the TFFR Plan Management Policy is approved, Segal will update the Policy Score with the results of the 2019 valuation and stochastic projections.)

BOARD ACTION
Board Motion for Final Approval of TFFR Plan Management Policy.

1st Reading0 9.26.19
2nd Reading 10.24.19

North Dakota Teachers' Fund for Retirement
Plan Management Policy Draft

I. Plan Management Policy Overview

The North Dakota Teachers' Fund for Retirement (TFFR) Plan Management Policy is a risk assessment and management tool that monitors the ongoing health of TFFR using the most recent actuarial valuation results and stochastic projections. The objective of the Plan Management Policy is to provide a basis for balancing the Fund's obligations with current assets and expected future contributions in order to maintain its long-term health and viability. The Policy also provides a framework that the Board can follow in establishing metrics for future funding and benefit changes. The Plan Management Policy is based upon metrics and a scoring system that were established at the July 24, 2019 Board meeting. The Plan Management Policy Score will be updated subsequent to each annual actuarial valuation.

II. Background

The Plan Management Policy is different from the Funding Policy. The Funding Policy sets parameters for the determination of the actuarially determined contribution (ADC) as of each actuarial valuation date. The Plan Management Policy establishes the parameters for a forward-looking assessment of TFFR.

An ADC is used as a benchmark to compare to the statutory contribution rate. An ADC reflects an asset valuation method (i.e., smoothing method), actuarial cost method (e.g., entry age normal), and amortization method for paying down unfunded liabilities or recognizing surplus assets. A description of the ADC is contained in a separate document ("Actuarial Funding Policy Statement"). In summary, the current TFFR funding policy relies on an ADC that is equal to the sum of (a) the employer normal cost rate and (b) the level percentage of pay required to amortize the unfunded actuarial accrued liability over the 30-year closed period that began July 1, 2013 (24 years remaining as of July 1, 2019).

III. Risk Assessment and Management

The Plan Management Policy is a risk assessment tool. The risks facing TFFR can be broadly classified into three categories: risks related to economic variables, risks related to demographic events, and risks related to external forces. An overview of the primary risks facing TFFR stakeholders follows.

Risks related to economic variables:

- Investment return – the risk that actual returns will be different than expected and more volatile than desired.
- Inflation (price inflation, wage inflation) – the risk that measures of inflation will be inconsistent with other economic measures.

Risks related to demographic events:

- Mortality/longevity – the risk that participants will live longer than expected
- Payroll and/or population growth – the risk that aggregate payroll will increase at a rate less than expected. This is relevant since contributions to TFFR are collected as a percentage of member payroll.

- Retirement/disability/termination experience – the risk that members leave active service in a manner than generates actuarial gains or losses relative to the assumptions.

There are even risks related to external forces (e.g., governance risk, regulatory risk, litigation risk, political risk), but these risks are difficult – or impossible – to manage.

The Plan Management Policy is a tool that measures investment return risk, since investment return risk has the most significant impact on TFFR's long term financial health.

IV. Scoring System Metrics

The scoring system metrics that will be monitored on a periodic basis are:

- ***The current funded ratio***: This is equal to the ratio of the market value of assets to the actuarial accrued liability as of the latest actuarial valuation date. The purpose of this metric is to assess the current funded status of TFFR.
- ***The downside funded ratio as of July 1, 2030***: Based on stochastic projections, determine the probability that the funded ratio will be less than 65%. The purpose of this metric is to assess the likelihood of the funded ratio not improving over the short term. The lower the likelihood that the funded ratio will not increase, the higher the score.
- ***The target funded ratio as of July 1, 2040***: Based on stochastic projections, determine whether the funded ratio is projected to increase above certain thresholds over a longer time horizon with 51% or more probability.
- ***Improvement in the funded ratio over a 10-year period***: Based on stochastic projections, determine the probability that the funded ratio will improve by 5% over the following 10 years.
- ***Ability to recover/withstand from a market downturn***: Based on stochastic projections, determine the probability that the funded ratio improves by 5% over 10 years following a market downturn. A market downturn is defined as a two-year period with a compound average return of -10% or worse.

V. Policy Score

The Policy Score is the sum of the points that have been assigned to each metric and can range from 0 to 14 and correspond to a color ranging from red to green. A higher score indicates better overall health of TFFR. The Policy Score is grouped into the following categories:

Color	Policy Score	Indication
Green	11 to 14	TFFR objectives are being met or likely to be met
Yellow	7 to 10	TFFR objectives may be met over a longer period
Orange	4 to 6	Continue to monitor TFFR
Red	0 to 3	Changes to TFFR should be considered

VI. Policy Scoring System

Each metric is assigned a score based upon the results of the annual actuarial valuation and resulting analysis as follows:

Metric	Criteria	Score
The current funded ratio	• Funded ratio of 90% or higher • Funded ratio between 80% and 90% • Funded ratio between 70% and 80% • Funded ratio less than 70%	• +3 • +2 • +1 • +0
The downside funded ratio as of July 1, 2030	• Under 65% funded ratio with less than 20% probability • Under 65% funded ratio with less than 30% probability • Under 65% funded ratio with less than 40% probability • Under 65% funded ratio with more than 40% probability	• +3 • +2 • +1 • +0
The target funded ratio as of July 1, 2040	• 85% or higher with 51% or more probability • Between 80% and 85% with 51% or more probability • Between 75% and 80% with 51% or more probability • Between 70% and 75% with 51% or more probability • Not more than 70% with 51% or more probability	• +4 • +3 • +2 • +1 • +0
Improvement in the funded ratio over a 10-year period	• Funded ratio improves by +5% over 10 years with 66% probability • Funded ratio improves by +5% over 10 years with 50% probability • Funded ratio does not improve by +5% over 10 years with 50% probability	• +2 • +1 • +0
Ability to recover from or withstand a market downturn	• Funded ratio after downturn improves by +5% over 10 years with 50% probability • Funded ratio after downturn improves by +5% over 10 years with 33% probability • Funded ratio after downturn does not improve by +5% over 10 years with 33% probability	• +2 • +1 • +0

For purposes of scoring, probabilities and funded ratios will be rounded to the nearest whole percentage. For example, a probability of 49.6% would be rounded up to 50%.

VII. Actuarial Assumptions

The actuarial assumptions used will be the same as those used for the annual actuarial valuation. The actuarial assumptions are described in detail in the actuarial valuation report. The funded ratio used in the plan management policy is based upon the market value of assets.

In order to stochastically model investment returns, Capital Market Assumptions are used. Capital Market Assumptions are developed by investment firms and represent expectations for future risk and returns

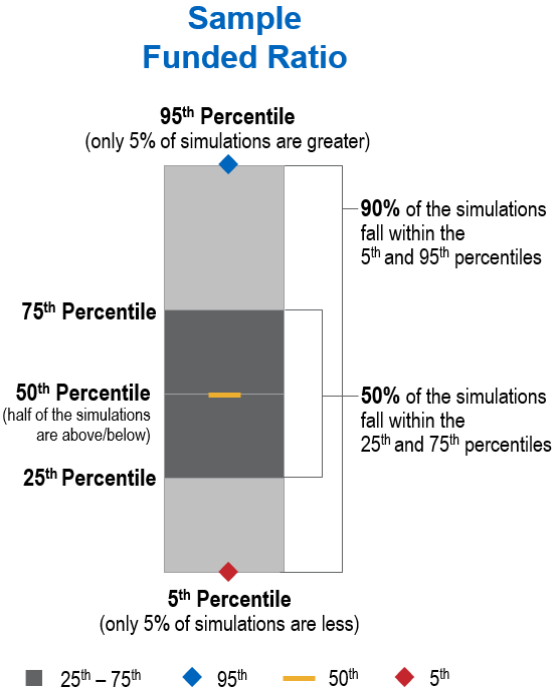
for different asset classes. The Capital Market Assumptions used for the analysis are those published in the most recently available Horizon's Annual Survey of Capital Market Assumptions. If Horizon discontinues the publication of this survey, a suitable replacement or alternative will be used.

Projected liabilities are based upon an "open group" liability forecast. An open group projection generates projected populations for each future valuation date based on assumptions related to retirement, termination, salary increases, mortality, etc. New entrant records are generated to replace active members that decrement in the model in order to maintain a level active membership in the future. The profile of new entrants is based on recent demographics of new hires, subject to input from TFFR staff and Board.

VIII. Stochastic Modeling

The Capital Market Assumptions are used with TFFR's target asset allocation in order to simulate 5,000 investment portfolio return scenarios, each simulation representing a 20-year period. The simulated investment returns, along with open group liability forecasts, are used to model the projected funded ratio. The results are grouped into percentiles and summarized as a range:

- **Best Case**: Better cases would occur only 5% of the time (above the 95th percentile in the example below)
- **Most Likely**: Better or worse cases (50th percentile) are equally likely
- **Worst Case**: Worse cases would occur only 5% of the time (below the 5th percentile in the example below)



TFFR Board Adopted:

NORTH DAKOTA RETIREMENT AND INVESTMENT OFFICE
Teachers' Fund for Retirement
State Investment Board

Segal Consulting

North Dakota Teachers' Fund for Retirement

Risk Assessment/Plan Management Policy – Phase 1

April 25, 2019

Presented By:

Kim Nicholl, FSA, MAAA, EA
Senior Vice President and Actuary

Matt Strom, FSA, MAAA, EA
Vice President and Actuary

This document has been prepared by Segal Consulting for the benefit of the Board of Trustees of the North Dakota Teachers' Fund for Retirement and is not complete without the presentation provided at the April 25, 2019 meeting of the Board of Trustees.

Project Phases

- Project consists of two phases:

- **Phase 1 – initial risk assessment and stochastic modeling**
  - **Baseline liabilities, normal costs, and benefit payments projected using an open group forecast**
  - **Combination of stochastic and deterministic projections to evaluate the financial health of TFFR**

- Phase 2 – develop Plan Management Policy
  - Identify Policy metrics and establish “ideal” and “problematic” conditions
  - Construct a scoring system with the idea of meeting TFFR’s long-term funding goals
  - Discuss and fine-tune Policy and scoring system

Risks Facing TFFR

Risks related to economic variables

- **Investment return**
- Inflation
  - Price inflation
  - Wage inflation

Risks related to demographic events

- Mortality
- **Payroll and/or population growth**
- Retirement, disability, termination

Risks related to external forces

- Governance risk
- Regulatory risk
- Litigation risk
- Political risk

These risks are challenging to manage effectively

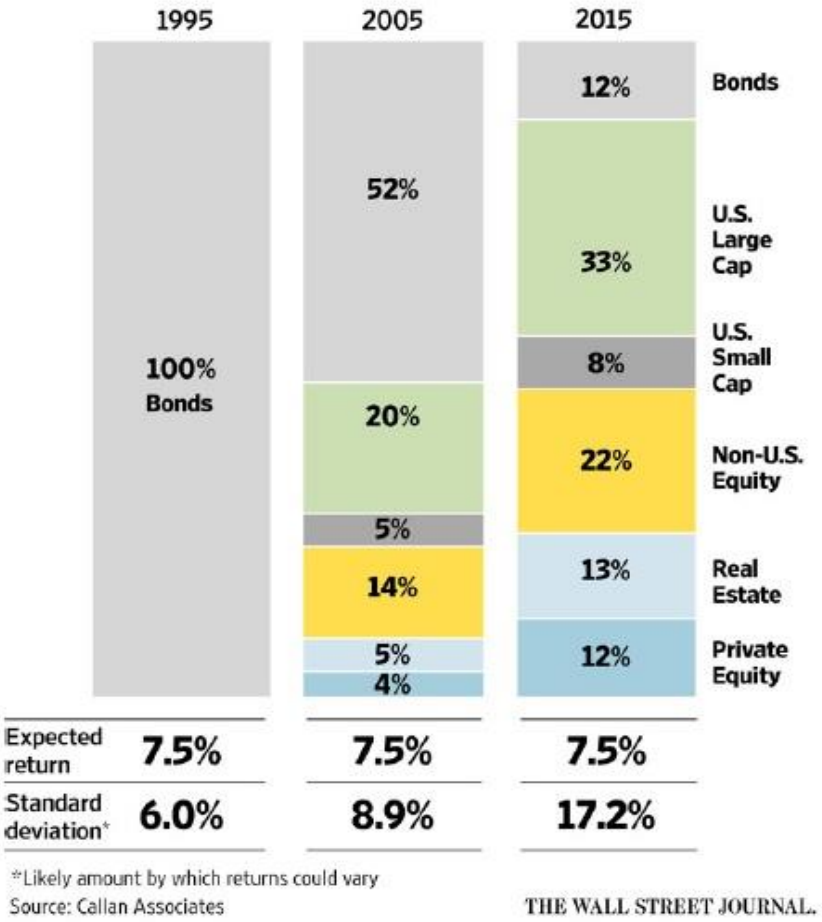
The risks that could potentially impact TFFR the most are investment risk and payroll/population growth risk

Creating a 7.5% Return Portfolio

Portfolio Evolution

Investors grappling with lower interest rates have to take bigger risks if they want to equal returns of two decades ago.

Estimates of what investors needed to earn 7.5%



*Likely amount by which returns could vary

Source: Callan Associates

THE WALL STREET JOURNAL.

- Reduced inflation expectation has reduced investment returns
- More risk is required now to achieve the same expected return obtainable from a 100% fixed income portfolio twenty years ago
  - Standard deviation of 17% now compared to 6% twenty years ago

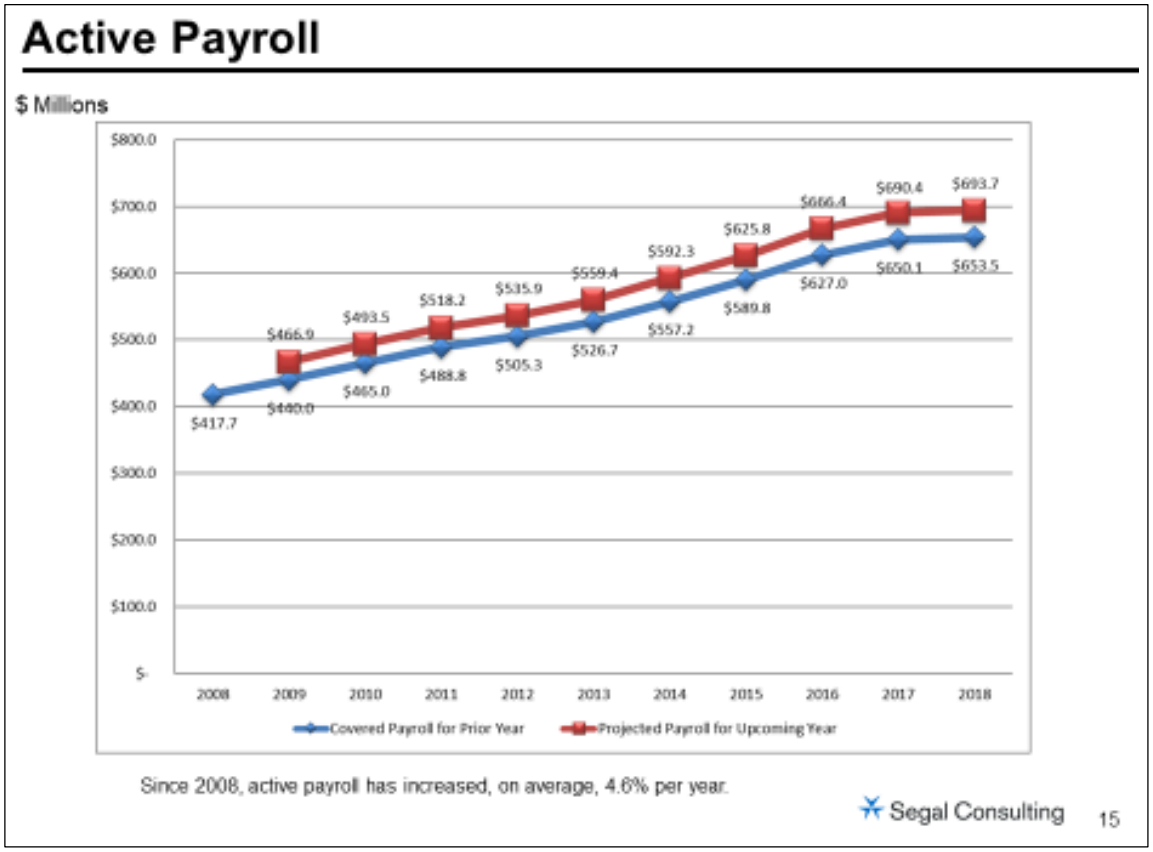
Mortality/Longevity Risk

- Continued improvements in mortality = longer periods of payment and higher costs
- The new Public Plan mortality tables along with the Society of Actuaries' mortality improvement scales represents the best estimate of life expectancy
  - Longevity risk arises if these tables turn out to be insufficient

	Life expectancy of a female retiree at age 65		
Age at July 1, 2019	**65**	**45**	**25**
TFFR assumption used in 2008	87.4	87.4	87.4
TFFR assumption used in 2018	91.7	93.1	94.5
PubT-2010 Teacher Healthy Retiree w/Scale MP-2018	90.3	91.8	93.2

Payroll and/or Population Growth Risk

- Current assumption used in assessing TFFR's financial position is that total covered payroll will increase, on average, 3.25% per year
  - This assumption drives expected future member and employer contributions
  - Used in the determination of actuarially-determined contribution and effective amortization period
- To the extent this assumption is not achieved over time, contribution losses will occur



- Since 2008, actual increases in total payroll have exceeded the assumption
- However, last year, total payroll only increased by 0.5%

Workforce Demographic Risk

- Pension plan populations are getting older
  - Baby boomers aging and retiring
- Older participants are closer to payment and generally more expensive than those that are younger
- Higher ratios of actuarial accrued liability to payroll and market value of assets to payroll exacerbates the impact investment losses on contributions
  - For TFFR, a 1% loss on assets (earning 6.75% as opposed to 7.75%) is ~$25.3M and equivalent to 3.7% of covered payroll
- Ratio of non-actives to actives
  - Sign of Plan maturity
  - More pressure on investments as benefit payments increase
  - Difficult to restore financial health after losses
    - Less future benefits to reduce
    - Less contributions to increase

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Plan Maturity Measures

Valuation Date July 1	Ratio of Retirees to Actives	Net Cash Flow as a Percentage of MVA
2018	80.4%	-1.6%
2017	78.2%	-1.3%
2016	76.3%	-1.2%
2015	76.3%	-1.0%
2014	75.2%	-2.0%
2013	73.9%	-1.9%
2012	71.4%	-3.1%
2011	69.3%	-2.7%
2010	67.3%	-3.5%

Membership is approaching the point where there will be one retiree for each active member.

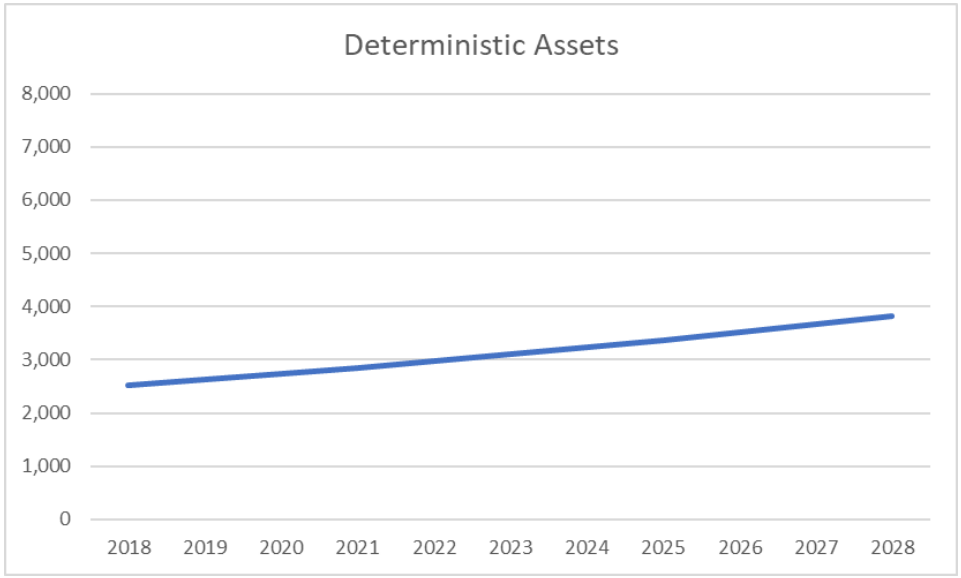
Contribution rate increases were effective in 2012 and 2014, which incrementally improved negative cash flow. However, the negative cash flow continues to increase.

Plan Maturity Measures

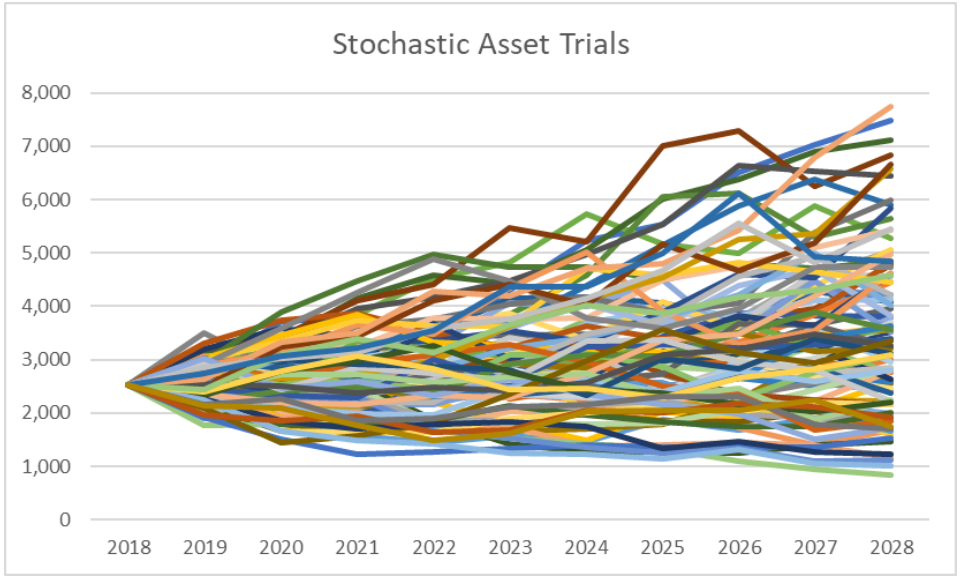
Valuation Date July 1	Ratio of Total Liability to Payroll	Ratio of Assets to Payroll	Ratio of Retiree Liability to Total
2018	591%	387%	58%
2017	574%	363%	56%
2016	572%	339%	55%
2015	585%	363%	54%
2014	563%	375%	53%
2013	569%	349%	52%
2012	568%	327%	50%
2011	563%	353%	48%
2010	567%	309%	47%

- The ratio of total liability to payroll helps assess how a change in unfunded liabilities will affect the actuarially determined contribution (ADC). The larger the ratio, the greater the effect.
- The ratio of assets to payroll is a measure of market risk and the effect on the ADC if such risks occur.
- Higher ratios of retiree liability to total liability make it more difficult for benefit or contribution changes to address funding issues.

Explanation of Deterministic vs. Stochastic



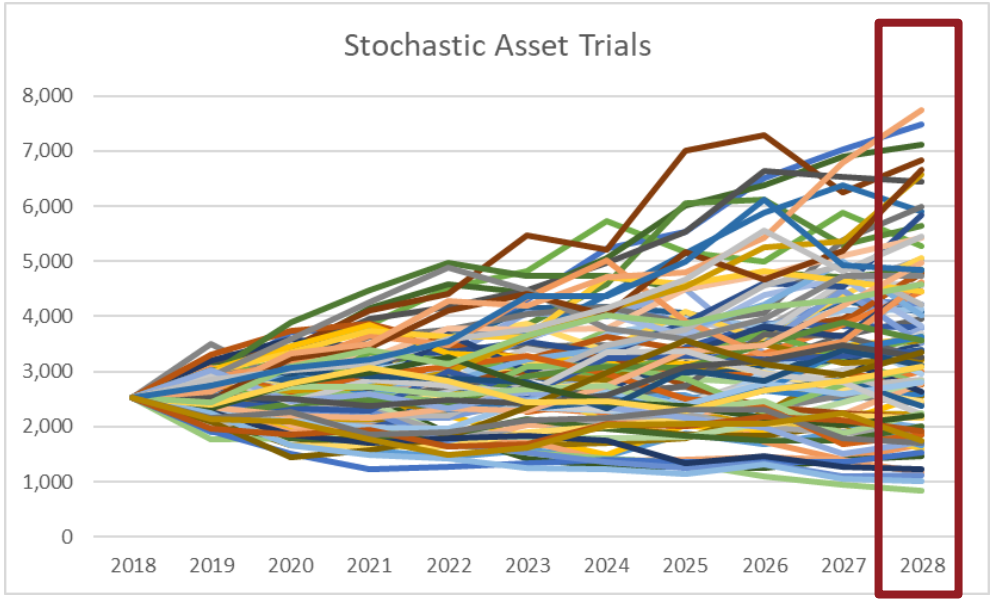
- Deterministic projections convey ***expectation*** and directional trend, but give no sense of the possible volatility of results
- They are ***simpler and easier*** to understand but are difficult to use in assessing alternative and do not measure risk/reward trade-offs

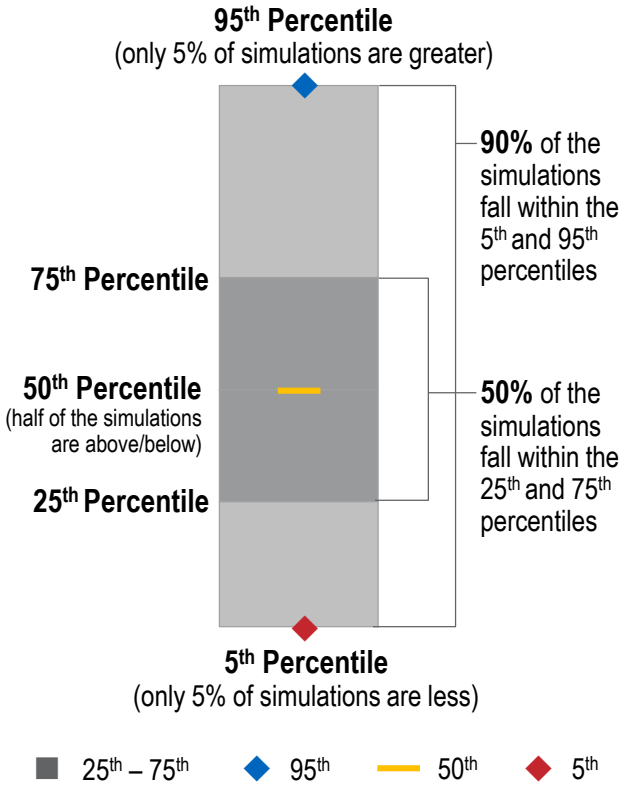


- Stochastic projections produce a distribution of results so expectation and ***volatility*** around expected results can be calculated
- They are ***complex*** and require many assumptions but are superior in terms of aiding decisions that require the weighing of ***risk/reward*** trade-offs
- Typically 2,500 to 5,000 trials are run

Explanation of Deterministic vs. Stochastic

The data is grouped into percentiles and summarized as a range





- The median is represented by the yellow line at the center of the distribution
- The dark gray shaded rectangle represents 50% of all outcomes around the median
- The large, light gray rectangle (inclusive of the dark gray area) represents 90% of all outcomes around the median
- Other percentile results/probabilities are calculated as well

Stochastic Results – Scenarios and Output Modeled

Output

- Portfolio investment return
- Funded percentage
- Effective amortization period
- Unfunded actuarial accrued liability
- Employer contribution rate

Scenarios

- Baseline
  - Assumed rate of return of 7.75% (i.e., liabilities are discounted at 7.75%)
- One year of poor investment performance
  - 0% for fiscal 2019
- Lower assumed rate of return
  - Both 7.50% and 7.25%
- Active population increase
  - 1% growth in active member population for the next 10 years
- Accelerated retirements
  - Retirement rates used in demographic projection are increased by 10%
- Increase life expectancy by 1 year
- Decrease total contribution rate by 2%

Stochastic Modeling of Investment Return

- Modeling of future simulated return trials is based on:
  - The Horizon Survey of Capital Market Assumptions (2018 Edition)
    - This survey compiles and averages the capital market assumptions of 35 investment consultants
  - TFFR's target asset allocation, shown below:

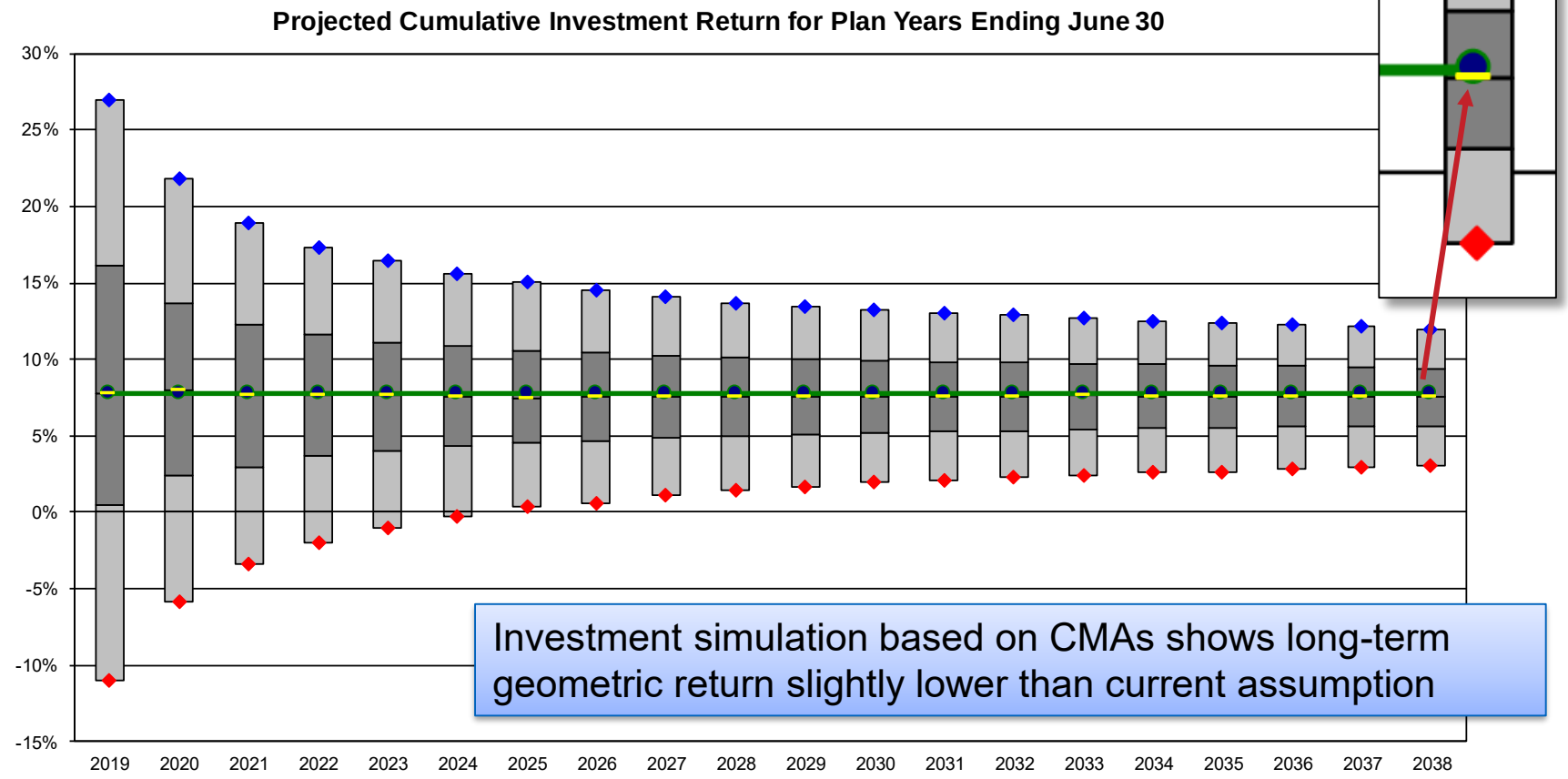
	Asset Class	Target Allocation
Fixed/Alternative	US Core	17%
	Real Estate	10%
	High Yield	7%
	Commodity	2%
	Infrastructure	5%
	Cash	1%
Equity	US Large Cap	25%
	US Small Cap	7%
	International Developed	16%
	Emerging Markets	4%
	Private Equity	6%

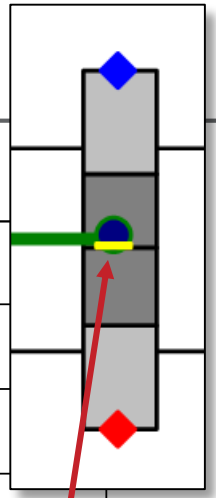
Capital Market Assumptions

	Asset Class	Expected Return*/ Standard Deviation		Target Allocation	Weighted Return
Fixed/Alternative	US Core	4.6%	5.7%	17%	0.79%
	Real Estate	7.7%	13.9%	10%	0.77%
	High Yield	6.4%	10.2%	7%	0.45%
	Commodity	6.5%	17.6%	2%	0.13%
	Infrastructure	8.2%	14.7%	5%	0.41%
	Cash	3.1%	2.7%	1%	0.03%
Equity	US Large Cap	8.7%	16.4%	25%	2.18%
	US Small Cap	10.1%	20.2%	7%	0.71%
	International Developed	9.5%	18.7%	16%	1.51%
	Emerging Markets	11.9%	24.9%	4%	0.48%
	Private Equity	12.2%	22.2%	6%	0.73%
	Total			**100%**	**8.19%**
	Adjustment to Geometric				(0.64%)
	Total Long-term Return				**7.55%**

* Based on 20-year arithmetic assumptions and reflects long-term inflation of 2.48%

Investment Return



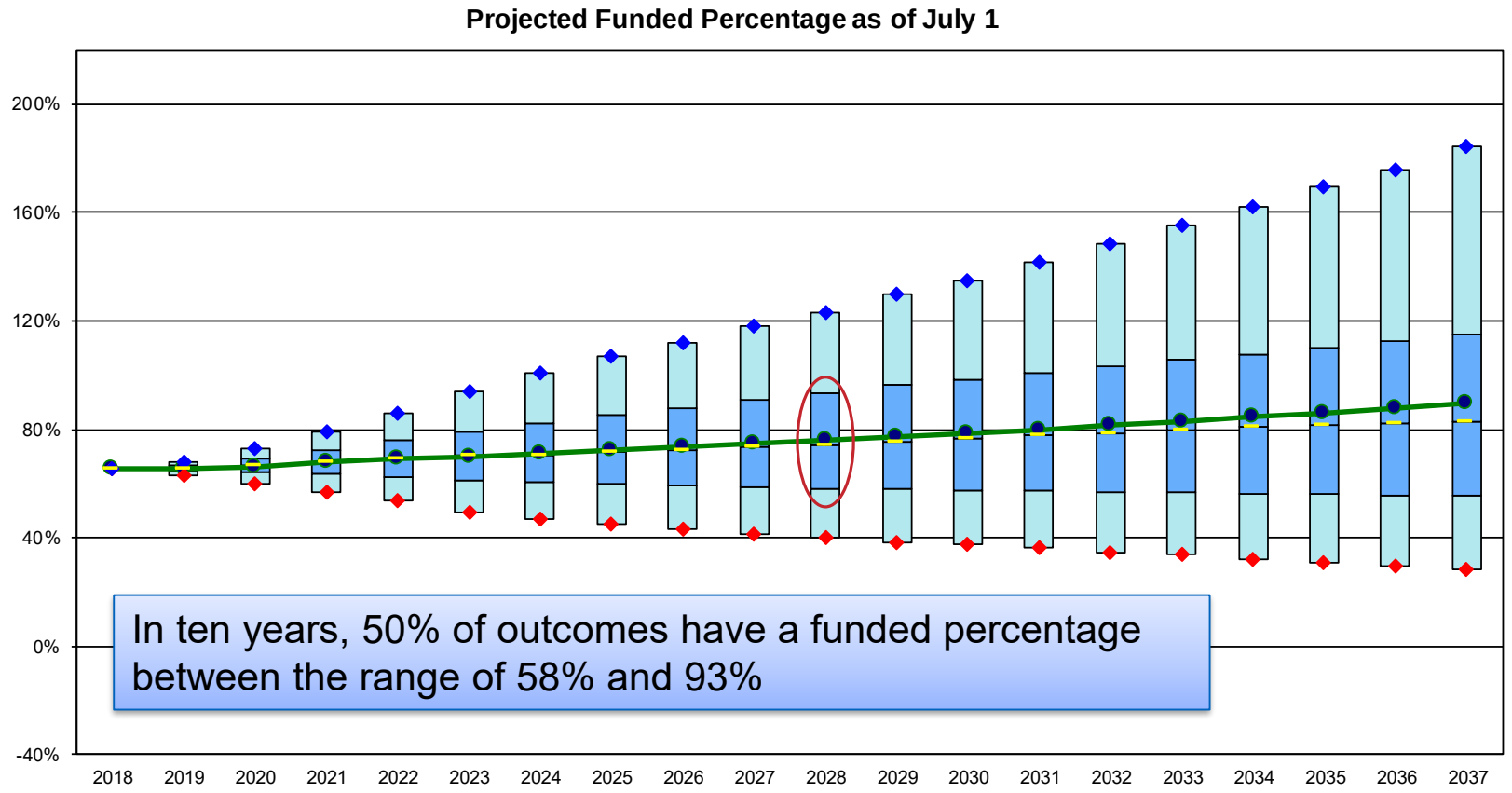


Investment simulation based on CMAs shows long-term geometric return slightly lower than current assumption

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
95th	27.0%	21.8%	18.9%	17.3%	16.4%	15.6%	15.0%	14.5%	14.1%	13.7%	13.5%	13.2%	13.0%	12.9%	12.7%	12.5%	12.4%	12.3%	12.1%	12.0%
75th	16.1%	13.7%	12.3%	11.6%	11.1%	10.9%	10.6%	10.4%	10.2%	10.1%	10.0%	9.9%	9.8%	9.8%	9.7%	9.7%	9.6%	9.5%	9.5%	9.4%
50th	7.8%	8.0%	7.7%	7.6%	7.6%	7.5%	7.5%	7.5%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%
25th	0.5%	2.4%	3.0%	3.7%	4.0%	4.3%	4.6%	4.7%	4.9%	5.0%	5.1%	5.2%	5.3%	5.4%	5.5%	5.5%	5.5%	5.6%	5.7%	5.7%
5th	-11.0%	-5.9%	-3.4%	-2.0%	-1.0%	-0.3%	0.3%	0.6%	1.1%	1.4%	1.7%	1.9%	2.1%	2.3%	2.4%	2.6%	2.7%	2.8%	3.0%	3.0%
	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%

Current investment return assumption

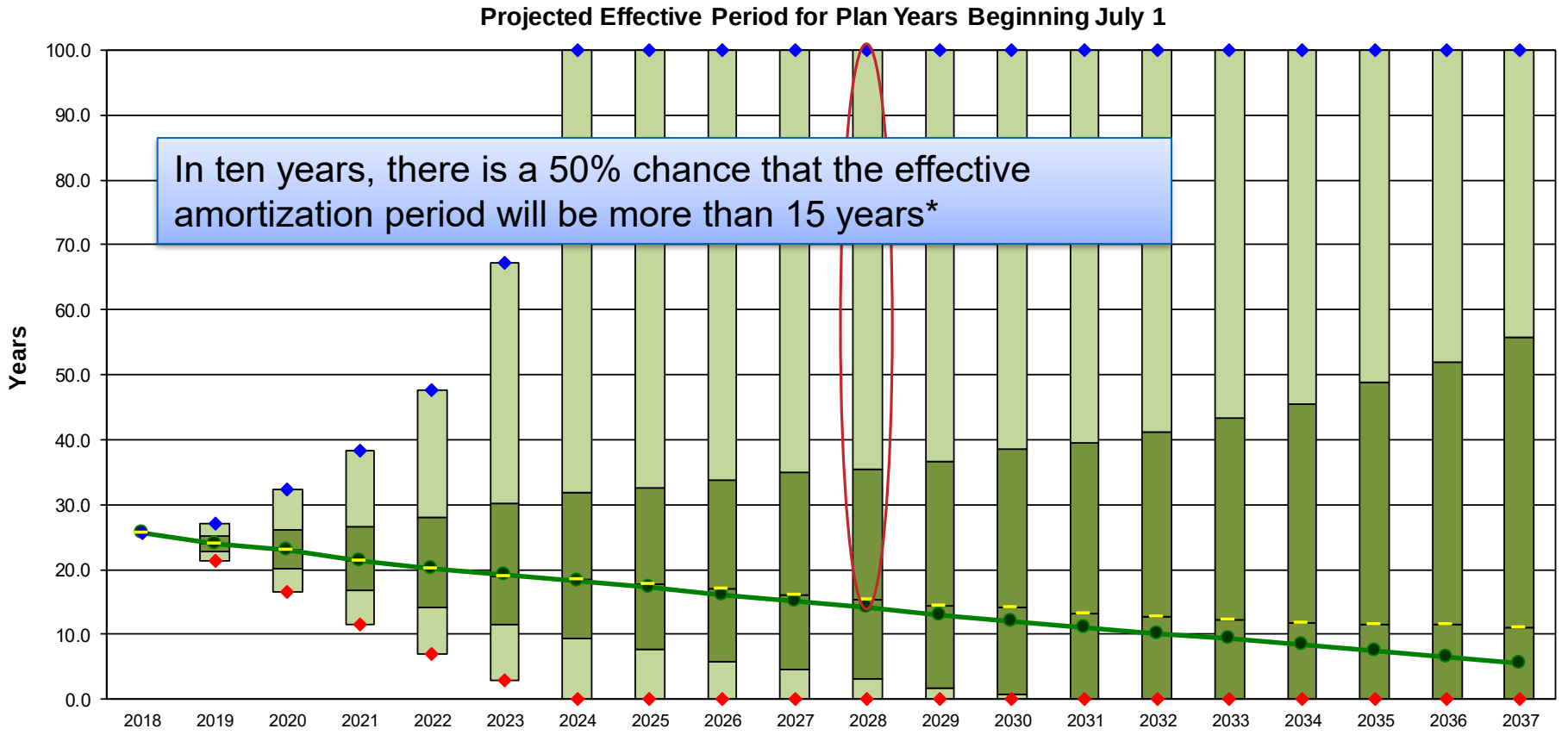
Funded Percentage – Baseline



	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
95th	65%	68%	73%	79%	86%	94%	101%	107%	112%	118%	123%	130%	135%	142%	148%	155%	162%	169%	176%	185%
75th	65%	67%	69%	73%	76%	79%	82%	85%	88%	91%	93%	96%	99%	101%	103%	106%	108%	110%	113%	115%
50th	65%	66%	67%	68%	69%	70%	71%	72%	72%	73%	74%	76%	76%	78%	79%	80%	81%	82%	82%	83%
25th	65%	65%	64%	64%	63%	61%	60%	60%	59%	58%	58%	58%	57%	57%	57%	57%	56%	56%	56%	55%
5th	65%	63%	60%	57%	54%	50%	47%	45%	43%	42%	40%	38%	38%	37%	35%	34%	32%	31%	29%	28%
	65%	66%	66%	68%	69%	70%	71%	72%	73%	75%	76%	77%	79%	80%	81%	83%	85%	86%	88%	89%

Baseline deterministic projection using current 7.75% investment return assumption

Effective Amortization Period – Baseline



	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
95th	25.7	27.1	32.4	38.2	47.6	67.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
75th	25.7	25.1	26.0	26.5	28.0	30.1	31.8	32.6	33.7	35.0	35.5	36.6	38.6	39.6	41.2	43.3	45.5	48.7	51.9	55.8
50th	25.7	24.0	23.0	21.3	20.1	19.0	18.5	17.8	16.9	16.1	15.4	14.4	14.1	13.2	12.6	12.3	11.7	11.5	11.4	11.1
25th	25.7	22.8	20.2	16.9	14.1	11.6	9.4	7.6	5.9	4.5	3.2	1.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5th	25.7	21.3	16.5	11.4	7.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	25.7	24.0	23.1	21.3	20.2	19.2	18.2	17.1	16.1	15.1	14.0	13.0	12.1	11.1	10.2	9.3	8.3	7.4	6.4	5.5

Baseline deterministic projection using current 7.75% investment return assumption

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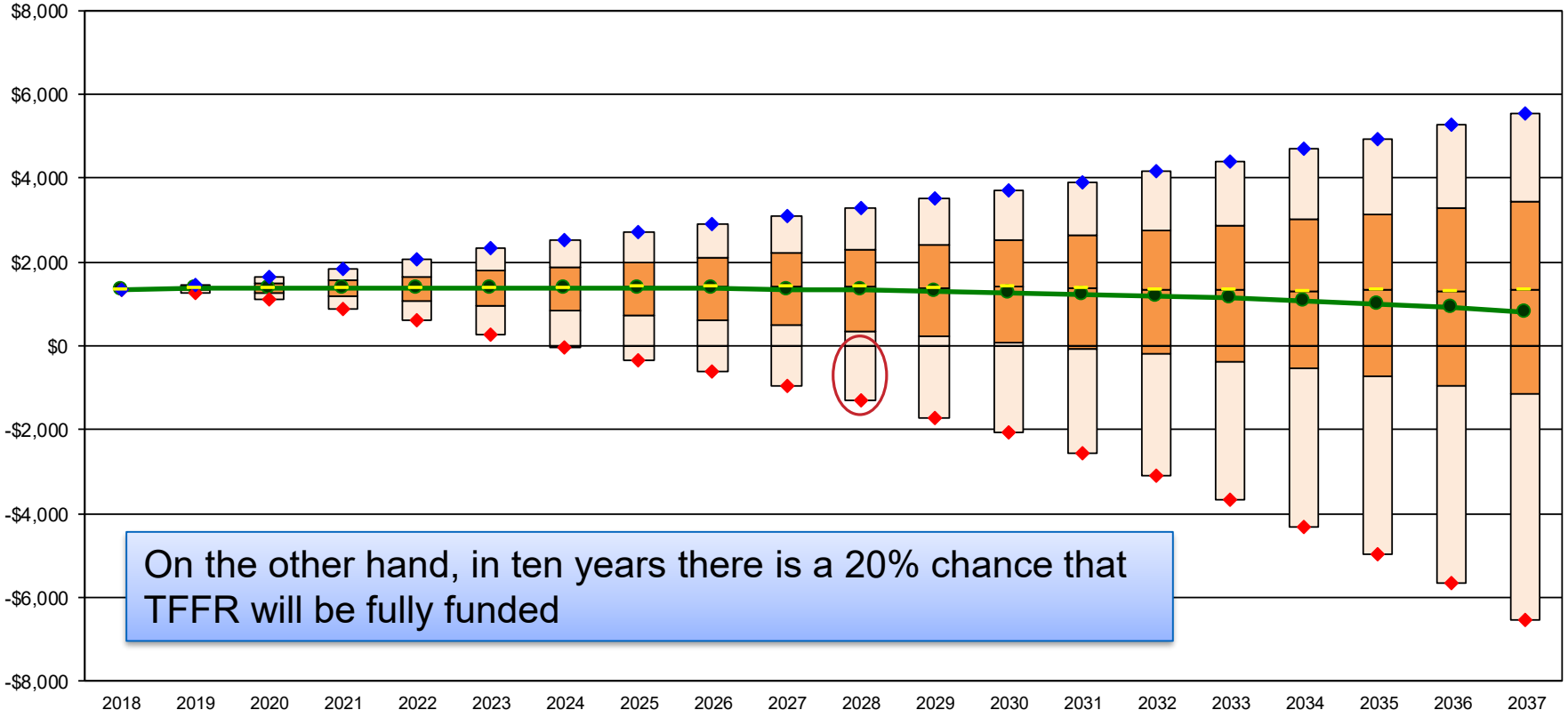
* Compared to the benchmark funding policy amortization, which has 25 years remaining as of 2018

Unfunded Liability – Baseline

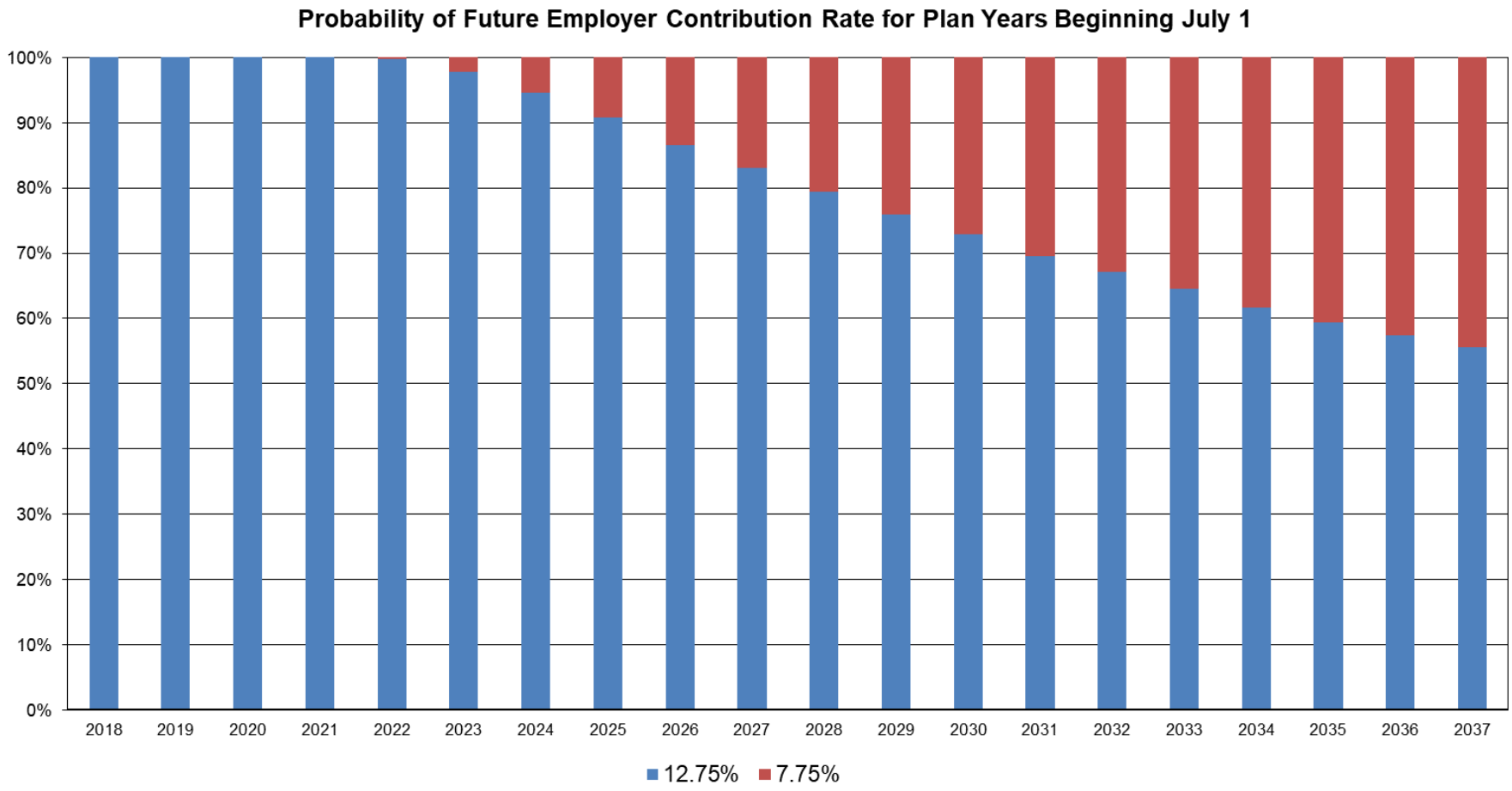
Projected Unfunded Actuarial Accrued Liability (AVA basis) for Plan Years Beginning July 1



	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
95th	1,337	1,470	1,665	1,850	2,069	2,325	2,523	2,711	2,901	3,102	3,299	3,518	3,708	3,914	4,174	4,404	4,698	4,946	5,262	5,566
75th	1,337	1,413	1,490	1,556	1,660	1,782	1,894	1,986	2,089	2,207	2,298	2,410	2,526	2,627	2,752	2,877	3,007	3,152	3,291	3,459
50th	1,337	1,376	1,389	1,371	1,372	1,370	1,395	1,406	1,411	1,412	1,418	1,393	1,399	1,374	1,354	1,336	1,316	1,328	1,315	1,341
25th	1,337	1,335	1,282	1,180	1,074	960	846	731	608	491	361	213	87	(66)	(193)	(378)	(536)	(712)	(952)	(1,165)
5th	1,337	1,281	1,124	886	612	279	(32)	(338)	(601)	(953)	(1,285)	(1,727)	(2,082)	(2,566)	(3,093)	(3,689)	(4,314)	(4,985)	(5,655)	(6,556)
	1,337	1,377	1,392	1,374	1,374	1,377	1,376	1,372	1,363	1,349	1,330	1,304	1,272	1,233	1,187	1,132	1,069	996	912	818

Baseline deterministic projection using current 7.75% investment return assumption

Employer Contribution Rate – Baseline



When TFFR is fully funded, the employer contribution rate will sunset back to 7.75%

Probability Detail – Baseline

	Probability in 10 Years	Probability in 20 Years
Funded Ratio		
Less than 50%	13.8%	20.5%
Less than 60%	27.7%	29.3%
Less than 70%	43.6%	38.2%
More than 80%	42.0%	53.1%
More than 90%	28.8%	43.9%
More than 100%	18.6%	35.7%
Effective Amortization Period		
Infinite in any year	12.4%	27.5%
More than 30 in any year	38.8%	51.9%
More than 15 years	50.9%	n/a
More than 5 years	n/a	57.6%

Probability Detail – Alternative Assumed Return Assumptions

	Probability in 10 Years		Probability in 20 Years	
	7.50%	7.25%	7.50%	7.25%
Funded Ratio				
Less than 50%	15.9%	17.8%	21.1%	22.2%
Less than 60%	30.8%	33.6%	30.6%	31.7%
Less than 70%	46.3%	50.3%	39.3%	40.6%
More than 80%	38.3%	35.1%	51.6%	50.2%
More than 90%	25.9%	23.0%	42.5%	41.2%
More than 100%	16.5%	14.2%	34.6%	33.6%
Effective Amortization Period				
Infinite in any year	16.3%	21.5%	31.4%	36.0%
More than 30 in any year	58.9%	99.1%*	67.1%	99.3%*
More than 15 years	56.2%	62.0%	n/a	
More than 5 years	n/a		59.5%	61.3%

* Baseline effective period would increase to 36 years in 2019 using a 7.25% return assumption

Probability Detail – Additional Scenarios

	Probability in 10 years:		
	Less Than 70% Funded	More Than 80% Funded	Funding Period >15
Baseline	43.6%	42.0%	50.9%
1% per year growth in actives	42.0%	43.3%	46.2%
Accelerated retirements	44.3%	41.3%	51.6%
Increase life expectancy 1 year	45.6%	39.1%	54.2%
Contribution rate lower by 2%	49.9%	36.1%	62.3%

Baseline	43.6%	42.0%	50.9%
0% actual return in 2019	54.2%	30.7%	61.8%
7.50% assumed return	46.3%	38.3%	56.2%
7.25% assumed return	50.3%	35.1%	62.0%

Observations and Discussion

Key observations

- The investment return risk has the largest potential impact to TFFR
- The current 7.75% return assumption is below the 50th percentile return
  - A decrease in this assumption to 7.50% or 7.25% materially changes the landscape of the TFFR funded percentage projections
- Based on the TFFR funding policy the following chart shows the ideal funding progress:

Valuation Date	Funding Period	Funded %
July 1, 2019	25 years	65.5%
July 1, 2029	15 years	In the 80s
July 1, 2039	5 years	In the 90s

- The probability that TFFR's funded percentage in 10 years will be less than 70% is approximately 44%
  - Said another way, there is a 40% chance that the funded percentage will not improve over the next 10 years (based on the current assumed return)
- If discussion of contribution rate decreases were to surface, this would present significant risk to TFFR

Plan Funding Policy vs. Plan Management Policy

A funding policy sets actuarially sound contribution rates

- A funding policy serves as a benchmark, which can be compared to the fixed employer contribution rates
- Actuarially determined contribution is equal to Normal Cost plus 25 year amortization of Unfunded Accrued Liability (as of 7/1/2018)
  - Amortization targets 100% funding in 25 years
  - TFFR's amortization method is 30 year closed period that began on July 1, 2013

A plan management policy monitors ongoing plan health

- Identify and establish objective criteria to evaluate health of TFFR
- Illustrates market volatility and contribution inadequacy risks through stochastic modeling
- Allows Board to evaluate future funded ratio based on probabilities
- Serves as advance warning tool

A plan management policy is a more robust way to evaluate the ongoing health and sustainability of TFFR

Using the Plan Management Policy

- Recalculate Policy Score as part of the annual valuation or other frequency
- Policy Score provides context for likelihood of future positive or negative events
  - For example, if funded ratio is projected to be at an unacceptable level with a high likelihood, the Board can explore ways to address this
- Policy Score can be part of the actuarial analysis of proposed legislation
  - Does the Policy Score improve, stay the same, or worsen?
  - Should the Policy Score be a factor when analyzing the effect of a benefit improvement?

NORTH DAKOTA RETIREMENT AND INVESTMENT OFFICE
Teachers' Fund for Retirement
State Investment Board

Segal Consulting

North Dakota Teachers' Fund for Retirement

Risk Assessment/Plan Management Policy – Phase 2

July 25, 2019

Presented By:

Kim Nicholl, FSA, MAAA, EA
Senior Vice President and Actuary

Matt Strom, FSA, MAAA, EA
Senior Vice President and Actuary

This document has been prepared by Segal Consulting for the benefit of the Board of Trustees of the North Dakota Teachers' Fund for Retirement and is not complete without the presentation provided at the July 25, 2019 meeting of the Board of Trustees.

Project Phases

- Project consists of two phases:
- Phase 1 – initial risk assessment and stochastic modeling
  - Baseline liabilities, normal costs, and benefit payments projected using an open group forecast
  - Combination of stochastic and deterministic projections to evaluate the financial health of TFFR
- **Phase 2 – develop Plan Management Policy**
  - **Identify Policy metrics and establish "ideal" and "problematic" conditions**
  - **Construct a scoring system with the idea of meeting TFFR's long-term funding goals**
  - **Discuss and fine-tune Policy and scoring system**

Plan Funding Policy vs. Plan Management Policy

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  - Should the Policy Score be a factor when analyzing the effect of a benefit improvement?

Stochastic Results – Output Modeled

Output

- **Portfolio investment return**
- **Funded percentage**
- Effective amortization period
- Unfunded actuarial accrued liability
- Employer contribution rate

Liabilities

- **Assumed rate of return of 7.75%**
  - Liabilities are discounted at 7.75%

Stochastic Modeling of Investment Return

- Modeling of future simulated return trials is based on:
  - The Horizon Survey of Capital Market Assumptions (2018 Edition)
    - This survey compiles and averages the capital market assumptions of 35 investment consultants
  - TFFR's target asset allocation, shown below:

	Asset Class	Target Allocation
Fixed/Alternative	US Core	17%
	Real Estate	10%
	High Yield	7%
	Commodities/Timber	2%
	Infrastructure	5%
	Cash	1%
Equity	US Large Cap	25%
	US Small Cap	7%
	International Developed	16%
	Emerging Markets	4%
	Private Equity	6%

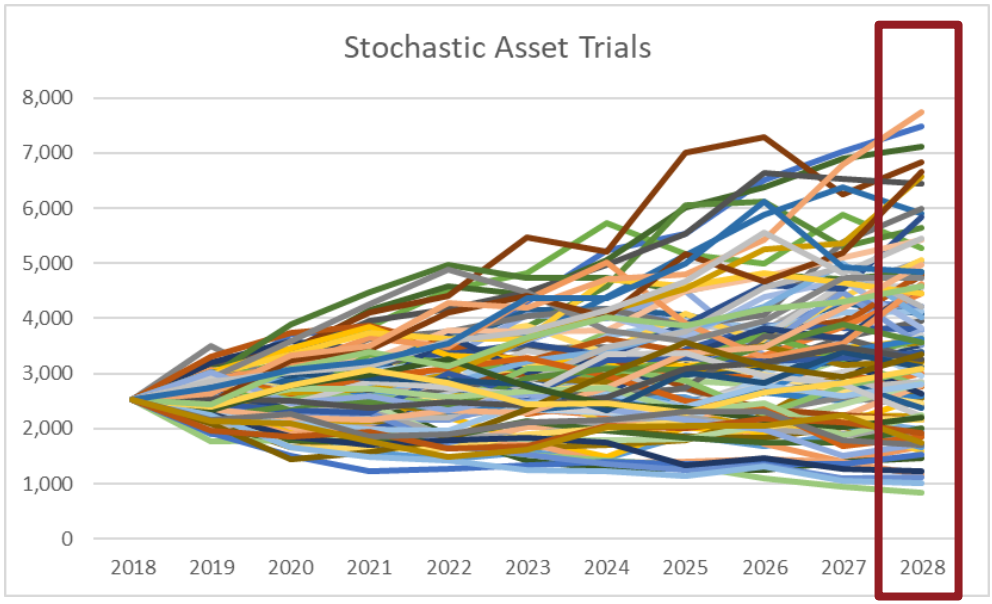
Capital Market Assumptions

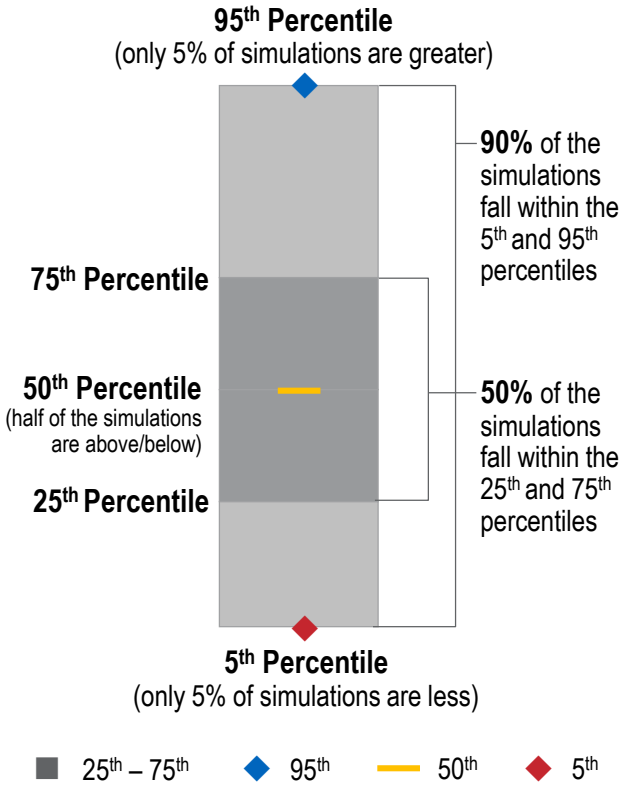
	Asset Class	Expected Return*/ Standard Deviation		Target Allocation	Weighted Return
Fixed/Alternative	US Core	4.6%	5.7%	17%	0.79%
	Real Estate	7.7%	13.9%	10%	0.77%
	High Yield	6.4%	10.2%	7%	0.45%
	Commodities/Timber	6.5%	17.6%	2%	0.13%
	Infrastructure	8.2%	14.7%	5%	0.41%
	Cash	3.1%	2.7%	1%	0.03%
Equity	US Large Cap	8.7%	16.4%	25%	2.18%
	US Small Cap	10.1%	20.2%	7%	0.71%
	International Developed	9.5%	18.7%	16%	1.51%
	Emerging Markets	11.9%	24.9%	4%	0.48%
	Private Equity	12.2%	22.2%	6%	0.73%
	Total			**100%**	**8.19%**
	Adjustment to Geometric				(0.64%)
	Total Long-term Return				**7.55%**

* Based on 20-year arithmetic assumptions and reflects long-term inflation of 2.48%

Summarizing Stochastic Results

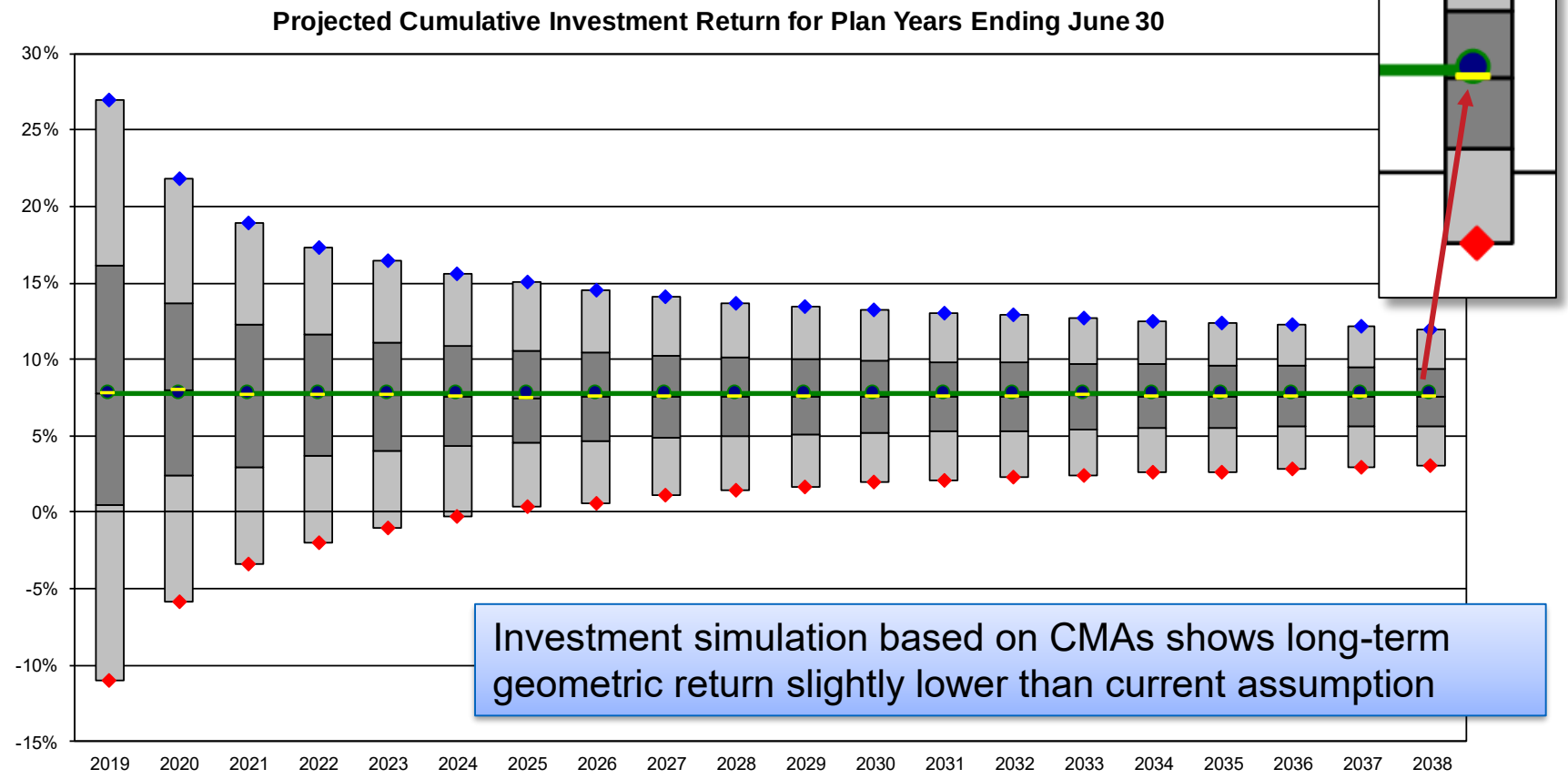
- The individual trials are grouped into percentiles and summarized as a range

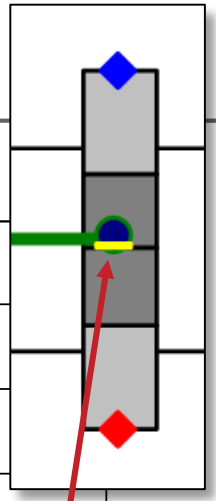




- The median is represented by the yellow line at the center of the distribution
- The dark gray shaded rectangle represents 50% of all outcomes around the median
- The large, light gray rectangle (inclusive of the dark gray area) represents 90% of all outcomes around the median
- Other percentile results/probabilities are calculated as well

Investment Return



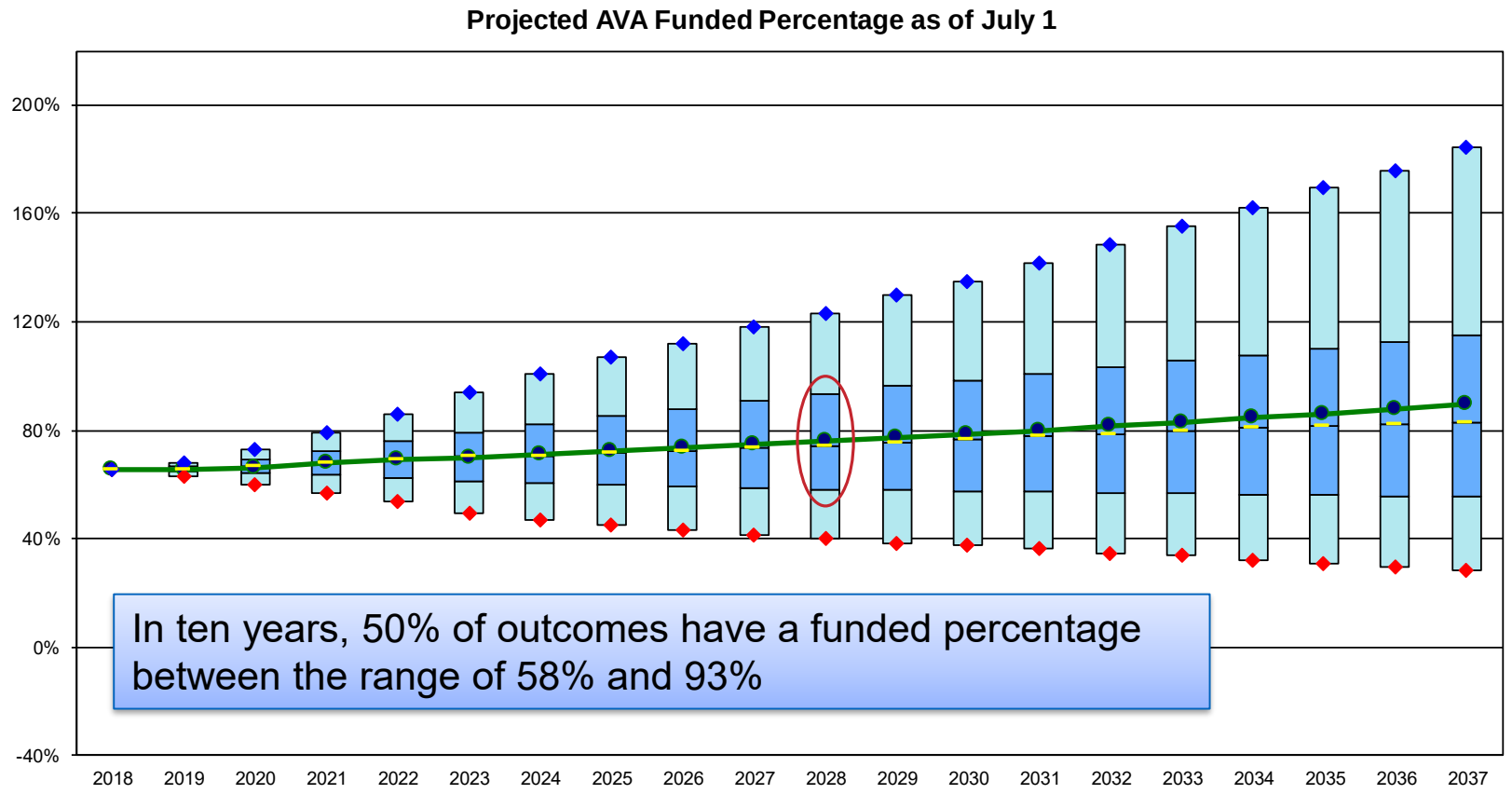


Investment simulation based on CMAs shows long-term geometric return slightly lower than current assumption

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
95th	27.0%	21.8%	18.9%	17.3%	16.4%	15.6%	15.0%	14.5%	14.1%	13.7%	13.5%	13.2%	13.0%	12.9%	12.7%	12.5%	12.4%	12.3%	12.1%	12.0%
75th	16.1%	13.7%	12.3%	11.6%	11.1%	10.9%	10.6%	10.4%	10.2%	10.1%	10.0%	9.9%	9.8%	9.8%	9.7%	9.7%	9.6%	9.5%	9.5%	9.4%
50th	7.8%	8.0%	7.7%	7.6%	7.6%	7.5%	7.5%	7.5%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%
25th	0.5%	2.4%	3.0%	3.7%	4.0%	4.3%	4.6%	4.7%	4.9%	5.0%	5.1%	5.2%	5.3%	5.4%	5.5%	5.5%	5.5%	5.6%	5.7%	5.7%
5th	-11.0%	-5.9%	-3.4%	-2.0%	-1.0%	-0.3%	0.3%	0.6%	1.1%	1.4%	1.7%	1.9%	2.1%	2.3%	2.4%	2.6%	2.7%	2.8%	3.0%	3.0%
	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%

Current investment return assumption

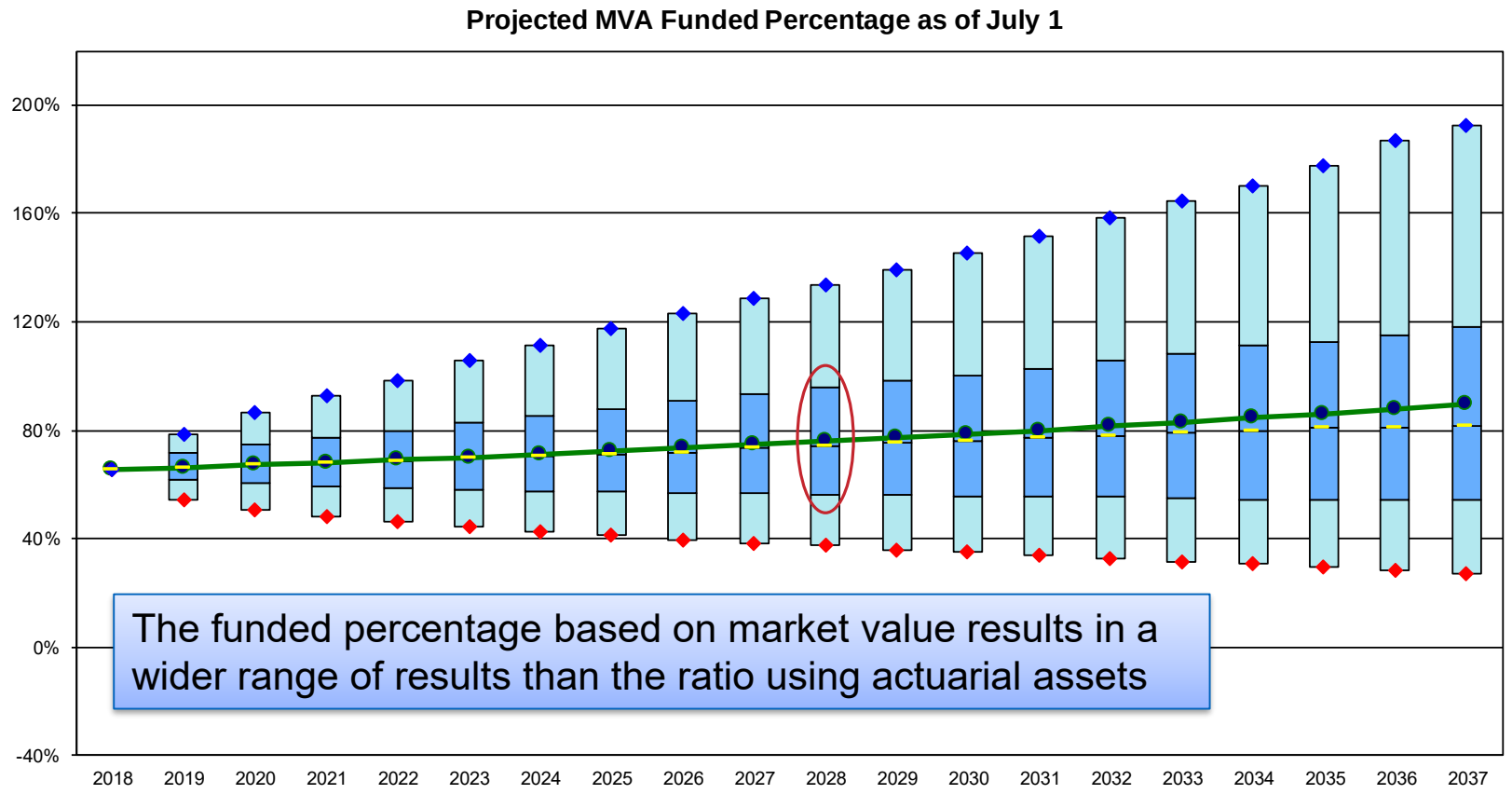
AVA Funded Percentage – Baseline



	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
95th	65%	68%	73%	79%	86%	94%	101%	107%	112%	118%	123%	130%	135%	142%	148%	155%	162%	169%	176%	185%
75th	65%	67%	69%	73%	76%	79%	82%	85%	88%	91%	93%	96%	99%	101%	103%	106%	108%	110%	113%	115%
50th	65%	66%	67%	68%	69%	70%	71%	72%	72%	73%	74%	76%	76%	78%	79%	80%	81%	82%	82%	83%
25th	65%	65%	64%	64%	63%	61%	60%	60%	59%	58%	58%	58%	57%	57%	57%	57%	56%	56%	56%	55%
5th	65%	63%	60%	57%	54%	50%	47%	45%	43%	42%	40%	38%	38%	37%	35%	34%	32%	31%	29%	28%
	65%	66%	66%	68%	69%	70%	71%	72%	73%	75%	76%	77%	79%	80%	81%	83%	85%	86%	88%	89%

Baseline deterministic projection using current 7.75% investment return assumption

MVA Funded Percentage – Baseline



	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
95th	66%	78%	86%	93%	99%	106%	111%	117%	123%	129%	133%	139%	146%	152%	159%	165%	170%	178%	187%	193%
75th	66%	72%	75%	77%	80%	83%	86%	88%	91%	93%	96%	98%	100%	103%	106%	108%	111%	113%	115%	118%
50th	66%	66%	68%	68%	69%	70%	70%	71%	72%	73%	74%	75%	76%	77%	78%	79%	80%	81%	81%	82%
25th	66%	62%	60%	59%	59%	58%	58%	57%	57%	57%	56%	56%	56%	56%	56%	55%	54%	54%	55%	54%
5th	66%	55%	51%	48%	46%	44%	43%	41%	39%	38%	37%	36%	35%	34%	33%	31%	31%	30%	28%	27%
	66%	66%	67%	68%	69%	70%	71%	72%	73%	75%	76%	77%	79%	80%	81%	83%	85%	86%	88%	89%

Baseline deterministic projection using current 7.75% investment return assumption

Metrics for Management Policy Scoring System

Current funded ratio

- The Fund's current funded ratio is one of the most visible metrics
- A high current funded ratio should be recognized in the scoring

Downside funded ratio in 10 years (2030)

- In the short-term, the Fund should avoid an "undesirable" funded ratio with relatively high probability

Target funded ratio in 20 years (2040)

- Over a longer term, the Fund should be on the path to achieving its goals with reasonable probability

Improvement in funded ratio over a 10-year period

- Regardless of where the Fund sits "today", it should seek an increasing funded ratio over time

Ability to recover from/withstand a market downturn

- In situations where the financial markets experience a downturn, the scoring should recognize when the funded ratio improves relative to the impact after the downturn

For purposes of the Policy scoring, we believe the funded ratio using the market value of assets is the appropriate measure.

Using the Plan Management Policy

- As currently constructed, the Policy Score will range from 0-14
  - A higher score equates to better overall Fund health
- Recalculate Policy Score as part of the annual valuation or other frequency
- Policy Score provides context for likelihood of future positive or negative events
  - For example, if funded ratio is projected to be at an unacceptable level with a high likelihood, the Board can explore ways to address this
- Policy Score can be part of the actuarial analysis of proposed legislation
  - Does the Policy Score improve, stay the same, or worsen?
  - Allow a benefit improvement as long as Policy Score does not decrease?

Policy Scoring System – Draft

Criteria 1

Based on current year funded ratio

- If current ratio is 90% or higher: **+3**
- If current ratio is between 80% to 90%: **+2**
- If current ratio is between 70% to 80%: **+1**
- If current ratio is less than 70%: **+0**

Criteria 2

Downside funded ratio in 2030 (about 10 years from now)

- Under 65% funded ratio with less than 20% probability: **+3**
- Under 65% funded ratio with less than 30% probability: **+2**
- Under 65% funded ratio with less than 40% probability: **+1**
- Under 65% funded ratio with more than 40% probability: **+0**

Criteria 3

Target funded ratio in 2040 (about 20 years from now)

- 85% or higher with more than 50% probability: **+4**
- Between 80% and 85% with more than 50% probability: **+3**
- Between 75% and 80% with more than 50% probability: **+2**
- Between 70% and 75% with more than 50% probability: **+1**
- Not more than 70% with more than 50% probability: **+0**

Criteria 4

Improvement over 10 years

- Funded ratio improves by +5% over 10 years with 66% probability: **+2**
- Funded ratio improves by +5% over 10 years with 50% probability: **+1**
- Ratio does not improve by +5% over 10 years with 50% probability: **+0**

Criteria 5

Ability to recover from market downturn*

- Funded ratio after downturn improves by +5% over 10 years with 50% probability: **+2**
- Funded ratio after downturn improves by +5% over 10 years with 33% probability: **+1**
- Ratio after downturn does not improve by +5% over 10 years with 33% probability: **+0**

* “Market downturn” defined as a two-year compound average return of -10% or worse

Policy Scoring System – Draft *(continued)*

- Total summary score can range from 0 to 14
  - Metrics focus on funded ratio measures
    - Effective amortization period considered, but likely redundant
    - Outside metrics such as economic cycle considered, but held out
- Summary "health" can be summed up as follows:
  - **Green** (score of 11 to 14) to indicate *"objectives being met or likely to be met"*
  - **Yellow** (score of 7 to 10) to indicate *"objectives may be met over longer period"*
  - **Orange** (score of 4 to 6) to indicate *"closely monitor"*
  - **Red** (score of 0 to 3) to indicate *"changes should be considered"*

Policy Scoring System – Draft *(continued)*

Criteria 1

Current year funded ratio is 66%

- If current ratio is 90% or higher: **+3**
- If current ratio is between 80% to 90%: **+2**
- If current ratio is between 70% to 80%: **+1**
- If current ratio is less than 70%: **+0**

+0

Criteria 2

37% probability of funded ratio <65% in 2030

- Under 65% funded ratio with less than 20% probability: **+3**
- Under 65% funded ratio with less than 30% probability: **+2**
- Under 65% funded ratio with less than 40% probability: **+1**
- Under 65% funded ratio with more than 40% probability: **+0**

+1

Criteria 3

53% probability of funded ratio >80% in 2040

- 85% or higher with more than 50% probability: **+4** (49% probability)
- Between 80% and 85% with more than 50% probability: **+3** (53% probability)
- Between 75% and 80% with more than 50% probability: **+2** (57% probability)
- Between 70% and 75% with more than 50% probability: **+1** (61% probability)
- Not more than 70% with more than 50% probability: **+0**

+3

Criteria 4

55% probability of improvement over 10 years

- Funded ratio improves by +5% over 10 years with 66% probability: **+2**
- Funded ratio improves by +5% over 10 years with 50% probability: **+1**
- Ratio does not improve by +5% over 10 years with 50% probability: **+0**

+1

Criteria 5

40% probability of recovering from market downturn*

- Funded ratio after downturn improves by +5% over 10 years with 50% probability: **+2**
- Funded ratio after downturn improves by +5% over 10 years with 33% probability: **+1**
- Ratio after downturn does not improve by +5% over 10 years with 33% probability: **+0**

+1

+6

* 845 scenarios contain -10% average over 2 years (in the first 10 years), 339 of which "recover"

Policy Scoring System – Draft *(continued)*

- To address the "all or nothing" aspect of scoring, the point system could be set up such that partial points are awarded
  - Half points for partially meeting criteria
  - For example, Criteria 1 would change from this:
    - If current ratio is 90% or higher: **+3**
    - If current ratio is between 80% and 90%: **+2**
    - If current ratio is between 70% and 80%: **+1**
    - If current ratio is less than 70%: **+0**
  - To, effectively, this:
    - If current ratio is 90% or higher: **+3**
    - *If current ratio is between 85% and 90%:* ***+2.5*** ←
    - If current ratio is between 80% and 85%: **+2**
    - *If current ratio is between 75% and 80%:* ***+1.5*** ←
    - If current ratio is between 70% and 75%: **+1**
    - *If current ratio is between 65% and 70%:* ***+0.5*** ←
    - If current ratio is less than 65%: **+0**

Calculating the Summary Score

Criteria 1

Current year funded ratio is 66%

- If current ratio is 90% or higher: **+3**
- If current ratio is between 80% to 90%: **+2**
- If current ratio is between 70% to 80%: **+1**
- If current ratio is less than 70%: **+0**

+0.5

Criteria 2

37% probability of funded ratio <65% in 2030

- Under 65% funded ratio with less than 20% probability: **+3**
- Under 65% funded ratio with less than 30% probability: **+2**
- Under 65% funded ratio with less than 40% probability: **+1**
- Under 65% funded ratio with more than 40% probability: **+0**

+1

Criteria 3

53% probability of funded ratio >80% in 2040

- 85% or higher with more than 50% probability: **+4** (49% probability)
- Between 80% and 85% with more than 50% probability: **+3** (53% probability)
- Between 75% and 80% with more than 50% probability: **+2** (57% probability)
- Between 70% and 75% with more than 50% probability: **+1** (61% probability)
- Not more than 70% with more than 50% probability: **+0**

+3

Criteria 4

55% probability of improvement over 10 years

- Funded ratio improves by +5% over 10 years with 66% probability: **+2**
- Funded ratio improves by +5% over 10 years with 50% probability: **+1**
- Ratio does not improve by +5% over 10 years with 50% probability: **+0**

+1

Criteria 5

40% probability of recovering from market downturn*

- Funded ratio after downturn improves by +5% over 10 years with 50% probability: **+2**
- Funded ratio after downturn improves by +5% over 10 years with 33% probability: **+1**
- Ratio after downturn does not improve by +5% over 10 years with 33% probability: **+0**

+1

+6.5

* 845 scenarios contain -10% average over 2 years (in the first 10 years), 339 of which “recover”

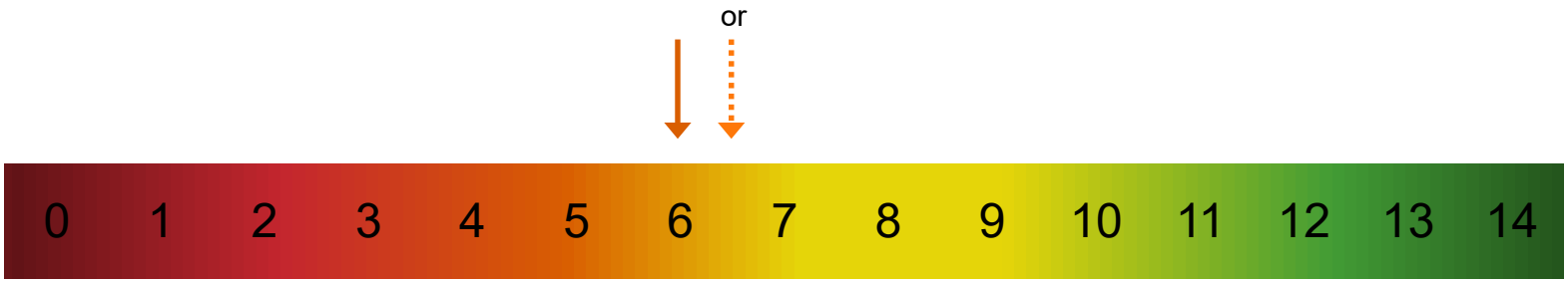
Calculating the Summary Score *(continued)*

- Composite summary score equal to **6** (or 6.5 with partial points)

Assessment:

Summary score of 11 to 14:	**Objectives being met or likely to be met**
Summary score of 7 or 10:	**Objectives may be met over longer period**
Summary score of 4 to 6:	**Closely monitor**
Summary score of 0 to 3:	**Changes should be considered**

Based on a summary score of 6 (or 6.5**): Orange (**or Orange/Yellow**)**



or

Summary Score at Alternative Discount Rates

7.50% - Grey
7.25% - Purple

Criteria 1	**Current year funded ratio is 64%/62%** • If current ratio is 90% or higher: **+3** • If current ratio is between 80% to 90%: **+2** • If current ratio is between 70% to 80%: **+1** • If current ratio is less than 70%: **+0**	**+0/+0**
Criteria 2	**39%/41% probability of funded ratio <65% in 2030** • Under 65% funded ratio with less than 20% probability: **+3** • Under 65% funded ratio with less than 30% probability: **+2** • Under 65% funded ratio with less than 40% probability: **+1** • Under 65% funded ratio with more than 40% probability: **+0**	**+1/+0.5**
Criteria 3	**52%/51% probability of funded ratio >80% in 2040** • 85% or higher with more than 50% probability: **+4** (48%/47% probability) • Between 80% and 85% with more than 50% probability: **+3** (52%/51% probability) • Between 75% and 80% with more than 50% probability: **+2** (56%/55% probability) • Between 70% and 75% with more than 50% probability: **+1** (60%/59% probability) • Not more than 70% with more than 50% probability: **+0**	**+3/+3**
Criteria 4	**52%/50% probability of improvement over 10 years** • Funded ratio improves by +5% over 10 years with 66% probability: **+2** • Funded ratio improves by +5% over 10 years with 50% probability: **+1** • Ratio does not improve by +5% over 10 years with 50% probability: **+0**	**+1/+1**
Criteria 5	**42%/41% probability of recovering from market downturn*** • Funded ratio after downturn improves by +5% over 10 years with 50% probability: **+2** • Funded ratio after downturn improves by +5% over 10 years with 33% probability: **+1** • Ratio after downturn does not improve by +5% over 10 years with 33% probability: **+0**	**+1/+1**
		+6/+5.5

* 845 scenarios contain -10% average over 2 years (in the first 10 years), 354 (348) of which “recover”

North Dakota Teachers' Fund For Retirement

MEMORANDUM

TO: **TFFR Board**
FROM: **Fay Kopp**
DATE: **October 17, 2019**
SUBJ: **Legislative Update**

The Legislative Employee Benefits Programs Committee (LEBPC) is meeting on October 23, 2019 (agenda).

The Committee will receive an overview of the TFFR program (Fay), RIO/SIB investment program (Dave), and the 2019 TFFR actuarial valuation report (Segal).

We will provide you with an update at the Board meeting on October 24.

BOARD INFORMATION AND DISCUSSION.

Confidential materials will be sent separately to Board members.

MEMORANDUM

TO: **TFFR Board**
FROM: **Shelly Schumacher**
DATE: **October 4, 2019**
SUBJ: **Employer Reporting Reviews**

Background

The Internal Audit (IA) division of the Retirement and Investment Office (RIO) reviews the required TFFR reports and payments that are made by school districts and other TFFR participating employers as provided for in NDCC 15-39.1. The review is designed to check the accuracy of retirement salaries, contributions, and service credit reported by employers. In the past, completed employer compliance audits were forwarded to Retirement Services to review the Schedule of Changes to Member Salary, Contributions, and Service and determine if additional years needed review and corrections. Retirement Services would make the corrections, draft member correction letters, and create the invoice or refund. IA would issue the official report to the Employer containing the errors, corrections, and recommendations.

In 2019, IA implemented new audit procedures to the employer reporting review process. Under the new procedures, IA conducts the employer reporting review, creates the Schedules of Changes, and issues a report containing findings, exceptions, and recommendations. This report is now issued to Retirement Services who is responsible for creating and issuing an official Employer Reporting Review report documenting errors, corrections, and recommendations to the Employer (see new process overview below). All communications and follow-up related to the employer reporting review are now handled by Retirement Services (primarily Retirement Program Manager and Employer Services Coordinator).

New Process Overview – Retirement Services

1) Retirement Services conducts a comprehensive review of IA report, Schedule of Changes to Salaries and Contributions, and other supporting documents on TFFR Employer Reporting Reviews and r determines if additional years will be reviewed.

2) After analysis of the IA report and documentation is completed, Retirement Services provides a written response to findings and recommendations to IA.

3) Retirement Services calls Employer/Business Manager to discuss findings, recommendations, and future actions.

4) Retirement Services creates the official TFFR Employer Reporting Review report and employer correspondence.

5) Retirement Services makes member account corrections, prepares employer invoice or refund, and prepares member account correction letters.

6) In order to improve transparency and increase communication with school boards, administrators, and business managers regarding employer reporting practices, Retirement Services e-mails Employer Reporting Review Report to Superintendent, School Board President, and Business Manager.

7) TFFR requests that the Employer Reporting Review be put on the next School Board meeting agenda.

8) Employer either accepts or rejects the report. If accepted, Superintendent and Governing Body President sign an acknowledgement letter and provide an explanation of how the employer will comply with findings and recommendations. If rejected, employer files an appeal with the TFFR Board.

9) Once the employer acknowledgement letter is received, Retirement Services sends member correction letters.

10) TFFR Employer Reporting Review reports are then presented to the TFFR Board for approval.

BOARD ACTION REQUESTED.

Board Motion to approve the Warwick and New England Employer Reporting Reviews.
Note: In the future, we plan to include Board approval of Employer Reporting Reviews on the Consent Agenda.

Attached: Employer Review Reports, Employer Letter, Employer Acknowledgement

North Dakota Teachers' Fund For Retirement

TFFR Employer Reporting Review Report
Issued July 22, 2019

Warwick School District
July 1, 2016 – June 30, 2017

Background

Employers play a vital role in the successful operation of the Teachers' Fund for Retirement (TFFR) program for North Dakota educators. Employers must enroll eligible teachers and administrators for TFFR membership, report service hours, report and remit member and employer retirement contributions based on TFFR eligible retirement salary, complete necessary forms, distribute retirement information, and provide other information needed for TFFR to accurately and efficiently process retirement, refund, disability, and death benefits.

The Internal Audit (IA) division of the Retirement and Investment Office (RIO) has developed a program to review the required TFFR reports and payments that are made by school districts and other participating employers as provided for in NDCC 15-39.1. This program is in conjunction with and in addition to the audit performed by RIO's external auditors.

The program is designed to test the accuracy of retirement salaries and contributions reported by TFFR participating employers to determine compliance with the definition of salary as it appears in NDCC 15-39.1-04(10). The employer's master contract, employer payment plan, salary schedule, extra-curricular payment schedules, individual teacher contracts, and other pertinent documents are used in the examination. Other reporting procedures reviewed include the calculation of service hours and eligibility for TFFR membership.

Upon completion, TFFR Employer Reporting Review reports are filed with TFFR Management who is responsible for issuing any errors, corrections, or recommendations to the Employer. Reports are also filed with the TFFR Board and the Audit Committee of the State Investment Board (SIB). TFFR Employer Reporting Review reports are subject to ND open records and open meetings laws (except for confidential member information contained in report schedules) and are available on the public website with other TFFR and SIB Audit Committee meeting materials.

Scope of Warwick School District Review

In the Warwick audit report dated April 22, 2016, the retirement salaries for fiscal years 2013/14 through 2014/15 reported by the Warwick School District were found to be not in compliance with the definition of salary as it appears in NDCC 15-39.1-04 (10). Six findings were noted in the report and a not in compliance review was scheduled for fiscal year 2016/17 to ensure that errors were corrected. The following information was reviewed.

- Phase I – Review of the Warwick Employer Audit dated April 22, 2016, review of reporting history after the timeframe of the audit, select a sample of six members for the review of salary/service hours/eligibility for 2016/17, and request information from the employer.

- Phase II – Complete review of information requested from the employer to determine that salary reported was eligible, members were eligible, service hours were accurate, and that reporting errors found in the audit dated April 22, 2016 had been corrected by the employer.

- Phase III – Warwick Business Manager notified TFFR that 2016/17 and 2017/18 salary errors occurred. The 2016/17 errors were forwarded to Internal Audit to be included in the review.

The 2016/17 TFFR Employer Reporting Review for Warwick was conducted under new procedures of the Audit Work Plan instituted in 2019. Internal Audit started the Warwick review on February 28, 2019 and submitted a report to TFFR Management on May 23, 2019. After review and consideration of the report, TFFR is now issuing the Warwick School District this final TFFR Employer Reporting Review report which includes errors, corrections, and recommendations.

Results Summary

The Warwick School District has corrected the TFFR employer reporting errors noted in the audit report dated April 22, 2016, with the exception of four errors described below. TFFR will correct the member accounts resulting in a shortage of TFFR contributions. Details regarding the member accounts, and an invoice for the contributions plus interest totaling $1,409.99 will be sent to the Warwick Business Manager.

Errors, Corrections and Recommendations

After reviewing the information for fiscal year 2016/17, TFFR has determined that the Warwick School District corrected the following reporting errors from the 2016 audit report:

- Written agreements were issued for summer salary – see Error 1
- Hours for retired members who returned to teach were monitored
- Eligible salary was reported
- Ineligible busing was not reported
- Salary was reported in the correct fiscal year – see Error 2
- Service hours were correctly reported – see Error 3

There were four employer errors noted during the recent Warwick reporting review:

Error 1: Warwick hired a member for fiscal year 2017/18. The member participated in District education in June of 2017 which was reported to TFFR in June of 2017. Since the member did not have a written agreement for the 2016/17 fiscal year, the professional development/ education salary and contributions paid should not have been reported to TFFR.

Correction/Recommendation:
TFFR will correct the salaries and contributions for the Warwick TFFR members included on the Schedule for Changes in Salaries and Contributions. In addition, TFFR will correct service hours for the member that should not have been reported to TFFR in FY 17.

Error 2: On the 2015/16 Employer Summary report, there was one month reported for two teachers who were no longer employed at Warwick (both teachers were not contracted with the District in 2015/16). Due to summer salary errors that occurred in the 2016 audit, a request for documentation for the July 2015 salary reported for the two members was made. The Business Manager stated that she was new to her position in July of 2015 and could not find documentation on why the salary was paid and reported to TFFR.

Recommendation:
Warwick should maintain proper documentation and detailed pay code descriptions for all salary payments, including summer salary, made to teachers in order to determine whether the payments are eligible retirement salary that should be reported to TFFR.

Error 3: Warwick monitored hours for retired members who returned to teach in 2016/17. The Business Manager received calendars from the retired teachers that showed the days and hours worked. However, the actual hours reported for two retired teachers were not accurate. Accounts were not corrected because the hours reported did not exceed the maximum allowable hours.

Recommendation*:*
Warwick should accurately report actual hours worked for retired members based on documentation maintained by the school district.

Error 4: During the Presumptive Retirement Process in 2018, TFFR found that Warwick had a programming error for deductions in the 2017/18 fiscal year. An insurance deduction occurred before the TFFR contribution was calculated which resulted in a salary shortage. The Warwick Business Manager provided TFFR with errors found in 2016/17 and 2017/18 fiscal years in October of 2018 to include with the scheduled TFFR Employer Reporting Review. Seven accounts were forwarded, and corrections were made from a spreadsheet generated by the Warwick Business Manager.

Correction/Recommendation:
Warwick should fix payroll deduction error to ensure deductions are properly handled. TFFR will correct the salaries and contributions for the Warwick members included on the Schedule for Changes in Salaries and Contributions.

Report Distribution:

Larry Thiele, Warwick School Board President
Dean Dauphinais, Warwick Superintendent
Theresa Brien, Warwick Business Manager
TFFR Board
03029/840

North Dakota Retirement & Investment Office
Teachers' Fund for Retirement
State Investment Board

3442 East Century Avenue | P.O. Box 7100 | Bismarck, ND 58507-7100
Telephone: 701-328-9885 | Toll Free: 800-952-2970| Fax: 701-328-9897

July 22, 2019

Larry Thiele, School Board President
Dean Dauphinais, Superintendent
Theresa Brien, Business Manager
Warwick School District
210 4th Avenue
Warwick, ND 58381

Via email

SUBJECT: TFFR Employer Reporting Review Report

Dear Warwick School District:

The Internal Audit (IA) division of the Retirement and Investment Office (RIO) recently completed a review of the required employer reports and payments to the Teachers' Fund for Retirement (TFFR) made by Warwick School District for the 2016-17 school year. Here is the TFFR Employer Reporting Review report summarizing the findings, corrections, and recommendations from the Warwick review conducted in 2019 (attached) which was completed as a follow up to the review conducted in 2016 (also attached). Schedules which detail the member accounts reviewed and the required corrections will be provided to the Warwick Business Manager separately.

In order to improve transparency and increase communication with school boards, administrators, and business managers regarding employer reporting practices, TFFR has implemented new procedures regarding these reviews. Please respond to the TFFR Employer Reporting Review report within 30 days as outlined below.

- Review TFFR Employer Reporting Review report and contact TFFR with any questions.
- Add TFFR Employer Reporting Review report to next regular School Board meeting agenda.
- School Board should take action to either Accept or Reject TFFR Employer Reporting Review report within 30 days of the report date.
  - If accepted, Superintendent and School Board President should sign and return an acknowledgement letter (sample attached), and provide a written explanation describing how the Employer will comply with findings, corrections, and/or recommendations.
- If rejected, Superintendent and School Board President should sign and return an acknowledgement letter, and provide a written explanation describing any areas of disagreement or reasons for rejection which will be considered.
- Follow up with TFFR and School District staff as needed.

In addition, the Employer has the right to appeal to the TFFR Board. Should you decide to do so, please notify me in writing at the administrative office within 30 days of the report date.

TFFR Employer Reporting Review reports are subject to ND open records and open meetings laws (except for confidential member information contained in schedules sent to the Business Manager only). This report will also be filed with the TFFR Board, and the Audit Committee of the State Investment Board (SIB). As such, the report will be available on our public website with other TFFR and SIB Audit Committee meeting materials.

The findings, corrections, and recommendations contained in the 2019 report are based on state statutes and rules in effect during the time period under review. Legislative and rule changes may have occurred after that time period. Therefore, any changes to negotiated agreements, salary schedules, or special payments should be discussed with TFFR in advance to confirm whether amounts should be reported as eligible TFFR salary and subject to member and employer contributions.

On behalf of the TFFR Board, I would like to thank the staff of the Warwick School District for your cooperation and assistance throughout the TFFR review process. We greatly appreciate your efforts to ensure timely and accurate TFFR reporting for ND teachers and administrators.

If you have any questions, please contact Shelly Schumacher, Retirement Program Manager, or me.

Sincerely,

Fay Kopp

Fay Kopp, CRA
TFFR Chief Retirement Officer –
RIO Deputy Executive Director

Attachments: 2019 TFFR Employer Review; 2016 Employer Review; Employer Acknowledgement

03029/840

C: Shelly Schumacher, Retirement Program Manager
Tami Volkert, Employer Services Coordinator

EMPLOYER ACKNOWLEDGEMENT

OF TFFR EMPLOYER REPORTING REVIEW REPORT

At the (district name) Warwick School Board meeting on (meeting date) 8/27/19, the School Board reviewed the TFFR Employer Reporting Review report (report date) 7/22/19. By motion, the Board voted to:

X **ACCEPT** the TFFR Employer Reporting Review Report.
The school district agrees with and will comply with the findings, corrections, and/or recommendations in the report. School district must describe what steps will be taken to ensure the same errors will not occur in the future. Please be specific. Use additional pages if needed.

Errors have been fixed with AFLAC deductible
Business Manager taking steps to ensure correct
payrolls are recorded to TFFR.

___ **REJECT** the TFFR Employer Reporting Review Report.
The school district disagrees with the findings, corrections, and/or recommendations in the report. School district must describe areas of disagreement or reasons for rejection. Please be specific. Use additional pages if needed.

Note: The Employer has the right to appeal the TFFR Employer Reporting Review Report to the TFFR Board. Notification must be made to the Chief Retirement Officer within 30 days of the report date. Please contact administrative office for more information.

SIGNATURES:

Doug Thiele
School Board President

8/27/19
Date

Superintendent

8/27/19
Date

Please return Employer Acknowledgement letter to TFFR within 30 days to the following address:
ND Retirement and Investment Office - Teachers' Fund for Retirement
3442 East Century Avenue, P.O. Box 7100 – Bismarck, ND 58507-7100
Email: rio@nd.gov – Fax: 701.328.9897 - Phone 701.328.9885 or 800.952.2970

03029 /840

North Dakota Teachers' Fund For Retirement

TFFR Employer Reporting Review Report
Issued September 5, 2019

New England School District
July 1, 2015 – June 30, 2017

Background

Employers play a vital role in the successful operation of the Teachers' Fund for Retirement (TFFR) program for North Dakota educators. Employers must enroll eligible teachers and administrators for TFFR membership, report service hours, report and remit member and employer retirement contributions based on TFFR eligible retirement salary, complete necessary forms, distribute retirement information, and provide other information needed for TFFR to accurately and efficiently process retirement, refund, disability, and death benefits.

The Internal Audit (IA) division of the Retirement and Investment Office (RIO) has developed a program to review the required TFFR reports and payments that are made by school districts and other TFFR participating employers as provided for in NDCC 15-39.1. In particular, the program is designed to check the accuracy of retirement salaries, contributions, and service credit reported by employers. This program is in conjunction with and in addition to the audit performed by RIO's external auditors.

Upon completion, TFFR Employer Reporting Review reports are filed with TFFR Management who is responsible for issuing any errors, corrections, or recommendations to the Employer. Reports are also filed with the TFFR Board and the Audit Committee of the State Investment Board (SIB). TFFR Employer Reporting Review reports are subject to ND open records and open meetings laws (except for confidential member information contained in report schedules) and are available on the public website with other TFFR and SIB Audit Committee meeting materials.

New England School District Review

Internal Audit conducted a TFFR Employer Reporting Review of the New England School District to test the accuracy of retirement salaries, contributions, and service credit reported by the district. The employer's master contracts, employer payment plan, salary schedules, extra-curricular payment schedules, individual teacher contracts, and payroll records were used in the review. Other reporting procedures reviewed during the review process included the calculation of service hours and eligibility for TFFR membership.

- Phase I – Reviewed the district's reporting history, selected a sample of members for the salary review, requested information from the Employer.

- Phase II – Completed the review of information received from the Employer to determine whether salary reported was eligible, members were eligible, and service hours were accurate.

Based on this review, TFFR is now issuing the New England School District this final TFFR Employer Reporting Review report which includes errors, corrections, and recommendations.

Results Summary

There were three Employer errors identified in the New England review (see below). As a result of these three Employer errors, there are two member accounts requiring corrections. TFFR will correct the member accounts resulting in a net overpayment of TFFR contributions. Details regarding the member account corrections and a refund for the overpaid contributions totaling $185.28 will be sent to the New England Business Manager.

Errors, Corrections and Recommendations

Error 1: The Employer reported incorrect retirement salaries for three members. Two of the three member accounts had material errors that are recommended for correction. The following errors were found: in-staff subbing was not reported for one member, contract salary was reported incorrectly for one member, and athletic supervision of students was not reported for one member (not corrected).

Correction/Recommendation:
Retirement Services will correct the salaries and contributions for the two New England TFFR members included on the Schedule for Changes in Salaries and Contributions. The New England Business Manager should also review the athletic supervision and in-staff subbing pay codes to confirm that these are correctly coded to be included in eligible TFFR reportable salary.

Error 2: The Employer did not report all in-staff subbing hours for one member who did not earn a full year of service credit in 2015/16.

Correction/Recommendation:
Retirement Services will correct the service hours for one New England TFFR member included on the Service Hours Correction Worksheet.

Error 3: State law allows retirees who are receiving TFFR retirement benefits to return to covered employment under certain limitations. If the retirees exceed the limitations, TFFR must discontinue payment of retirement benefits. The District is required to report actual hours worked by retirees who have returned to covered employment to TFFR.

Actual service hours were not reported to TFFR for three retired teachers who returned to covered employment. The Employer did not have established procedures for actively monitoring service hours. They relied on the honor system. Since the service hours reported did not exceed maximum allowable hours, TFFR did not correct hours.

Recommendation:
Retirement Services recommends that New England School District establish procedures to actively monitor service hours and correctly report actual service hours for reemployed retirees.

Report Distribution:
Constance Jalbert, New England School Board President
Kelly Koppinger, New England Superintendent
Tamara Volk, New England Business Manager
TFFR Board
21009/840

North Dakota Retirement & Investment Office
Teachers' Fund for Retirement
State Investment Board

3442 East Century Avenue | P.O. Box 7100 | Bismarck, ND 58507-7100
Telephone: 701-328-9885 | Toll Free: 800-952-2970| Fax: 701-328-9897

September 5, 2019

Constance Jalbert, School Board President
Kelly Koppinger, Superintendent
Tamara Volk, Business Manager
New England School District
PO Box 307
New England ND 58647-0307

Via email

SUBJECT: TFFR Employer Reporting Review Report

Dear New England School District:

The Internal Audit (IA) division of the Retirement and Investment Office (RIO) recently completed a review of the required employer reports and payments to the Teachers' Fund for Retirement (TFFR) made by New England School District for the 2015-17 school years. Here is the TFFR Employer Reporting Review report summarizing the findings, corrections, and recommendations from the New England review conducted in 2019 (attached).

Schedules which detail the member accounts reviewed and the required corrections will be provided to the New England Business Manager separately.

In order to improve transparency and increase communication with school boards, administrators, and business managers regarding employer reporting practices, TFFR has implemented new procedures regarding these reviews. Please respond to the TFFR Employer Reporting Review report within 30 days as outlined below.

- Review TFFR Employer Reporting Review report and contact TFFR with any questions.
- Add TFFR Employer Reporting Review report to next regular School Board meeting agenda.
- School Board should take action to either Accept or Reject TFFR Employer Reporting Review report within 30 days of the report date.
  - If accepted, Superintendent and School Board President should sign and return an acknowledgement letter (sample attached), and provide a written explanation describing how the Employer will comply with findings, corrections, and/or recommendations.
- If rejected, Superintendent and School Board President should sign and return an acknowledgement letter, and provide a written explanation describing any areas of disagreement or reasons for rejection which will be considered.
- Follow up with TFFR and School District staff as needed.

In addition, the Employer has the right to appeal to the TFFR Board. Should you decide to do so, please notify me in writing at the administrative office within 30 days of the report date.

TFFR Employer Reporting Review reports are subject to ND open records and open meetings laws (except for confidential member information contained in schedules sent to the Business Manager only). This report will also be filed with the TFFR Board, and the Audit Committee of the State Investment Board (SIB). As such, the report will be available on our public website with other TFFR and SIB Audit Committee meeting materials.

The findings, corrections, and recommendations contained in the 2019 report are based on state statutes and rules in effect during the time period under review. Legislative and rule changes may have occurred after that time period. Therefore, any changes to negotiated agreements, salary schedules, or special payments should be discussed with TFFR in advance to confirm whether amounts should be reported as eligible TFFR salary and subject to member and employer contributions.

On behalf of the TFFR Board, I would like to thank the staff of the New England School District for your cooperation and assistance throughout the TFFR review process. We greatly appreciate your efforts to ensure timely and accurate TFFR reporting for ND teachers and administrators.

If you have any questions, please contact Shelly Schumacher, Retirement Program Manager, or me.

Sincerely,

Fay Kopp

Fay Kopp, CRA
TFFR Chief Retirement Officer –
RIO Deputy Executive Director

Attachments: 2019 TFFR Employer Review; Employer Acknowledgement

21009/840

C: Shelly Schumacher, Retirement Program Manager
Tami Volkert, Employer Services Coordinator

EMPLOYER ACKNOWLEDGEMENT

OF TFFR EMPLOYER REPORTING REVIEW REPORT

At the (district name) New England Public School School Board meeting on (meeting date) 9-16-2019, the School Board reviewed the TFFR Employer Reporting Review report (report date) 9-5-2019. By motion, the Board voted to:

X **ACCEPT** the TFFR Employer Reporting Review Report.
The school district agrees with and will comply with the findings, corrections, and/or recommendations in the report. School district must describe what steps will be taken to ensure the same errors will not occur in the future. Please be specific. Use additional pages if needed.

- All subbing hours with contracted employers will be reported to TFFR.
- Absence days will be deducted from salary only not cash option.

___ **REJECT** the TFFR Employer Reporting Review Report.
The school district disagrees with the findings, corrections, and/or recommendations in the report. School district must describe areas of disagreement or reasons for rejection. Please be specific. Use additional pages if needed.

Note: The Employer has the right to appeal the TFFR Employer Reporting Review Report to the TFFR Board. Notification must be made to the Chief Retirement Officer within 30 days of the report date. Please contact administrative office for more information.

SIGNATURES:

[signature] School Board President — 9-16-19 Date

Kelly Kopp Superintendent — 9-16-19 Date

Please return Employer Acknowledgement letter to TFFR within 30 days to the following address:
ND Retirement and Investment Office - Teachers' Fund for Retirement
3442 East Century Avenue, P.O. Box 7100 – Bismarck, ND 58507-7100
Email: rio@nd.gov ~ Fax: 701.328.9897 - Phone 701.328.9885 or 800.952.2970

21009 /840

North Dakota Teachers' Fund For Retirement

MEMORANDUM

TO: **TFFR Board**
FROM: **Fay Kopp and Rich Nagel**
DATE: **October 17, 2019**
SUBJ: **Pension Administration System Modernization Project Update**

Initial planning discussions on the TFFR Pension Administration System (PAS) Modernization project are underway. Several meetings have been held with TFFR/RIO, PERS, NDIT, and the Governor's Office to discuss the IT project process, project resources, project charter, and collaboration with PERS on shared software.

Attached is a memo dated October 8, 2019 in response to a request by the Governor's Office regarding the TFFR PAS Modernization Project.

Key points:

- The Board and Staff are keenly focused on the Board's fiduciary responsibilities to TFFR members, retirees, and beneficiaries, and the importance of making the most prudent decision for TFFR without regard to other State or outside interests.

- TFFR intends to follow all state procurement guidelines to ensure a fair and competitive bidding process is used, and to identify the best solution for TFFR at the best price considering licensing, implementation, and support/ maintenance costs over the long term.

Staff is beginning to work on developing the Project Charter, which is required for all large IT projects. The Charter will be presented to the TFFR Board for approval at a later date.

BOARD INFORMATION AND DISCUSSION.

North Dakota Retirement & Investment Office
Teachers' Fund for Retirement
State Investment Board

3442 East Century Avenue | P.O. Box 7100 | Bismarck, ND 58507-7100
Telephone: 701-328-9885 | Toll Free: 800-952-2970| Fax: 701-328-9897

MEMORANDUM

TO: **Jodi Uecker, Chief Operating Officer, Governor's Office**

FROM: **Fay Kopp, Chief Retirement Officer, Teachers' Fund for Retirement**
Dave Hunter, Executive Director, Retirement and Investment Office

DATE: **October 8, 2019**

SUBJECT: **TFFR Pension Administration System Modernization Project**

The 2019 Legislature approved spending of up to $9 million of TFFR special trust funds to upgrade or replace TFFR's current pension administration software (PAS). We understand the Governor's Office has some questions regarding this project and is interested in TFFR and PERS potentially sharing pension administration software in the future.

Attached is a brief summary of issues discussed at the TFFR pension administration system project planning meeting on September 20, 2019. Attendees at that meeting included:

Governor's Office:	Jodi Uecker, Danelle Hopkins
ND IT:	Shawn Riley, Justin Data, Kristine Vollmer
TFFR/RIO:	Fay Kopp, Dave Hunter, Rich Nagel
PERS:	Scott Miller, Derrick Hohbein

This documentation is intended to provide the Governor's Office with some background information about TFFR and PERS Board fiduciary duties, and other issues that impact the TFFR Board's responsibility to independently select the best vendor solution at the best price for this important TFFR pension administration system modernization project.

We appreciate the support of the Governor's Office and ND IT as we focus on making a well informed and prudent decision on the best web-based pension software solution for the TFFR program by remaining keenly focused on our fiduciary responsibilities.

Please contact us if you have any questions. We would be happy to schedule another meeting with you to discuss this TFFR project.

Thank you.

TFFR Pension Administration System Modernization Project
Potential Sharing of Pension Administration Software with PERS

A) Teachers' Fund for Retirement

TFFR Governance Structure

ND Teachers' Fund for Retirement (TFFR) is governed by a 7-member Board of Trustees who are responsible for administration of the TFFR retirement program.

- The TFFR Board is comprised of 7 trustees consisting of Rob Lech, President (active administrator); Toni Gumeringer (active teacher); Cody Mickelson (active teacher); Mike Burton (retired member); Mel Olson (retired member); State Treasurer Kelly Schmidt; and State Superintendent Kirsten Baesler. Three TFFR members are selected to also serve on the State Investment Board (SIB).

- TFFR members include approximately 22,500 active, inactive and retired teachers and administrators from 214 school districts and other participating TFFR employers.

- The Retirement and Investment Office (RIO) is the state agency responsible for administering both the TFFR retirement and the State Investment Board (SIB) investment programs.

- Dave Hunter is the Executive Director-Chief Investment officer for NDRIO/SIB and Fay Kopp is the Deputy Executive Director-Chief Retirement Officer for NDRIO/TFFR.

TFFR Pension Administration Software (PAS)

- In October 2005, TFFR moved from the State's mainframe system to a client-server based system provided by CPAS (utilizing state RFP process, CPAS was selected by TFFR Board). Project implementation cost was about $2 million at that time. While the client-server based software was a great improvement over the mainframe, after 14 years of operation, the functionality and technical architecture has become outdated and needs to be upgraded or replaced with a new PAS.

- During 2017-19, TFFR studied whether to upgrade to a web-based version of CPAS software (sole source), or replace with a web-based system from a different vendor. Product demonstrations of web-based products from current state PAS vendors were conducted. Discussions were held with ND IT, State Procurement, PERS, and an outside IT pension consultant to identify project risks, benefits, and estimated costs. RIO was

advised that because of the size and potential cost of this project, it should not be sole sourced to RIO's current vendor, but that the state's procurement and RFP process should drive the vendor selection.

- This large IT project was included as part of RIO's IT plan submitted to ND IT, budget strategy session with the Governor, SITAC review, and RIO's optional budget request for 2019-21.

- The 2019 Legislature approved up to $9 million of TFFR special trust funds to modernize TFFR's PAS with a new web-based system in the 2019-21 biennium. Preliminary planning for the project began with meetings with ND IT and PERS on August 21, 2019 and ND IT, PERS, and the Governor's Office on September 20, 2019.

- Note: The TFFR PAS project includes plans to re-engineer business processes and adopt modern best practices in pension administration. This includes enhanced member and employer self-service; straight-through-processing to automate enrollment, termination, retirement processing, calculations, communications, forms, and distribution; digital communications; and many other functional, customer service and security improvements.

B) **Public Employees Retirement System**

PERS Governance Structure

ND Public Employees Retirement System (PERS) is governed by a 9-member Board of Trustees who administer 6 different ND retirement systems including Public Employees, Judges, Highway Patrol, National Guard, Law Enforcement, and Job Service, as well as the Uniform Group Insurance Program, 457 Deferred Compensation Plan, Retiree Health Insurance Credit Program, and Flexible Compensation program.

- The PERS Board is comprised of Mark Dosch, Chairman; Casey Goodhouse (active member); Adam Miller (active member); Kim Wassim (active member); Yvonne Smith (retired member); Mylynn Tufte (State Health Officer); Troy Seibel (Attorney General appointee); Senator John Grabinger; and Rep. Jason Dockter. Three PERS members are selected to also serve on the State Investment Board (SIB).

- PERS retirement membership includes approximately 48,500 active, inactive and retired state, and certain city, county, university system, and nonteaching school employees from 447 participating PERS employers. The deferred compensation plan includes approximately 13,500 members from 247 participating employers. The insurance programs include Dental (~25,000 covered lives over 116 employers), EAP (~14,500 members over 114 employers), Health (~60,000 lives over 238 employers) and Vision

(~27,000 covered lives over 116 employers). The PERS office also administers the state flex plan (~2,800 members deferring over $5.5 million dollars of salary a year) as well as the Retiree Health Insurance Credit program (covering ~28,000 active and retired members).

- Scott Miller is the Executive Director for NDPERS.

PERS Pension Administration Software (PAS)

- In October 2010, PERS moved from the State's mainframe system to a web-based system provided by Sagitec (utilizing state RFP process, Sagitec was selected by PERS Board). Significant customizations to the base software were required to administer the various retirement, insurance, and other benefit programs provided by PERS. Project implementation was just under $10 million at that time. Additional customizations and changes to the PAS are made on a monthly basis.

- In 2015, PERS completed a redesign of the PERS employer portal. The 2019 Legislature approved funding of $190,000 to allow PERS to upgrade both their member and employer portals. Additional funding will be requested in the future to upgrade PERS internal application as well as converting PERS business process module in the PAS. These future potential upgrades, which would put PERS in line with the most sophisticated PAS that are available, are expected to total under $1 million.

- PERS does not plan to replace its current PAS now or in the foreseeable future.

C) Collaboration between TFFR and PERS to potentially share PAS software in the future

1) The TFFR Board and PERS Board each have Fiduciary Responsibilities to the participants of their respective retirement plans.

- Both the TFFR Board and the PERS Board are fiduciaries. As fiduciaries, trustees must act solely in the best interest of the members, retirees, and beneficiaries of their respective retirement systems for the exclusive purpose of providing benefits and paying reasonable expenses of administering the various TFFR and PERS programs. Trust fund assets may be used for no other purpose under federal tax law. No other State or outside interests may come before that of the members of each separate retirement system. The fiduciary duty is the highest standard of law, and is at the forefront of all decisions made independently by both the TFFR and the PERS Boards.

- Any requirement that either TFFR or PERS utilize a pension software vendor that may not be able to provide the necessary functionality for either system at the most reasonable cost would be in violation of TFFR or PERS fiduciary responsibilities. Each Board must make its vendor selection independent of the other Board, State or any other outside interests.

- Legislative approval to spend up to $9 million on the TFFR PAS project are not general funds, but are special trust funds owned by the participants of the TFFR. Only the TFFR Board can independently authorize payment of reasonable expenses for administering the TFFR plan.

2) The TFFR and PERS retirement programs are governed and administered by different and separate boards and agencies.

- TFFR and PERS pension programs are governed by two separate boards (TFFR and PERS) and administered by two separate state agencies (RIO and PERS), so processes and procedures require different and separate customizations and implementations.

- TFFR has used CPAS software since 2005 which is a client-server based PAS. TFFR plans to move to a modern web-based software (either current CPAS vendor or some other vendor). TFFR has legislative approval to do so, and may spend up to $9 million of TFFR special trust funds, subject to final approval by the TFFR Board.

  Note: CPAS has a modern web-based PAS which could provide a more secure, updated solution to administer the TFFR program. If a system upgrade by TFFR's current pension software vendor is selected, the cost could be less than the $9 million project cost estimate for a system replacement by a different vendor. Upgrades by a current vendor to a newer software version typically cost less, have a shorter timeline, require less staff training, and carry less risk than a complete system replacement utilizing a new vendor. However, that will be determined through the RFP and vendor selection process.

- PERS has used Sagitec software since 2010 which is a web-based PAS. Significant customization was required due to the many pension, insurance, and other benefit programs. PERS software is currently behind two releases, and PERS plans to request legislative approval to bring their PAS up to date in the next biennium, but at an estimated cost of under $1 million. PERS does not intend to replace their PAS system for a long time, but plans to keep the system updated as budget permits. (Note: once TFFR implements a new web-based solution, the PAS system would also be updated as budget permits in order to stay current and keep overall costs low.)

As noted, Sagitec is another leading PAS vendor who would be invited to bid on the TFFR PAS project. If there are operational efficiencies and cost savings that could be realized by having both TFFR and PERS contract with Sagitec, that should be identified and quantified in the Sagitec proposal for evaluation by TFFR.

- While TFFR and PERS perform similar pension administration functions, TFFR and PERS members are different, and most employers are different. And although the pension administration functions are somewhat similar, PERS administers many other programs – both insurance and retirement-related – that differ significantly from TFFR, and for which TFFR has no use. Even if the same software vendor was utilized by both TFFR and PERS, each system requires different structures, configuration, and deployment. To replace both systems with one vendor would cost significantly more than the $9 million TFFR has been given the authority to spend, and that option is not being suggested by either TFFR or PERS.

3) State law requires TFFR to utilize the State's procurement process for the PAS upgrade/replacement project.

- Because this is a large IT project, state law requires TFFR to utilize the state's procurement and RFP process in making its consultant and software vendor selections. This will ensure a fair and equitable bidding process for current state vendors of pension software (both CPAS and Sagitec) as well as other vendors who may be interested in providing a modern web-based solution for TFFR.

- Contracting with an outside IT consultant with proven experience in state pension system implementations will assist TFFR re-engineer business processes and help determine the best PAS at the best price for TFFR considering licensing, implementation, and support/maintenance costs over the long term.

- TFFR plans to utilize the state procurement and RFP process, and will evaluate all PAS proposals independently, with the TFFR Board giving final approval of consultant and vendor solution selection.

- It is unknown at this time what vendor solution will be the best financial and operational decision for TFFR. It could be TFFR's current PAS vendor (CPAS), PERS' current PAS vendor (Sagitec), or some other PAS vendor with proven experience in state pension system implementations. This decision will be based on the proposals submitted to TFFR considering the PAS vendor's understanding of the project, methodology, management plan, experience and qualifications, and cost of licensing, implementation, and support/maintenance costs over the long term.

- There is the possibility that TFFR could decide to use the same PAS vendor as PERS is currently using, but that cannot be determined until the procurement and selection process is completed. Again, this will be based on the proposals submitted to TFFR, reviewed by the selection committee, and approved by the TFFR Board. The decision must be independent of what is in the best interests of PERS, the State, or any other outside interests.

4) Other Options for a Shared System

In order to utilize trust fund assets for reasonable administrative expenses, the TFFR and PERS Boards must independently determine that the expenditure is in the best interests of the participants of each trust fund. Should some other source of funding become available in the future (for example, general funds) to pay for a shared TFFR and PERS pension administration system, the TFFR and PERS Boards could each independently make the decision to select the vendor and implement the solution if it is determined to be in the best interests of plan participants.

5) Around the Country

Statewide teacher and state employee retirement plans are governed and administered based on unique characteristics of each state and each participant group.

- In reviewing the list of statewide retirement plans in the most recent 2018 Public Fund Survey, there are 29 states where teacher and public employee retirement plans are governed/administered by one entity. There are 21 states where teacher and public employee retirement systems are governed/administered by separate entities, similar to the NDTFFR plan being governed by the TFFR Board and the NDPERS plan being governed by PERS Board (as well as Judges, Highway Patrol, etc.).

- According to the 2019 Public Retirement Information Systems Management (PRISM) listing of statewide pension systems and pension software utilized, of those pension systems that are governed by two separate boards, we found none who utilized the same PAS vendor. (Note: this is not an all-inclusive list, but is the most recent compiled data available.) For example, the Montana Teacher Retirement System (TRS) uses M-trust custom built software, and the Montana Public Employees Retirement Association (PERA) uses Sagitec. The Minnesota TRS uses custom built software, and Minnesota PERA uses Delphi. This is similar to NDTFFR using CPAS, and NDPERS using Sagitec.

- Having two separate boards and agencies govern and administer teacher and state employee retirement plans is not uncommon. There is no data suggesting current ND governance structures is causing either plan to operate less efficiently or at a higher cost. Further evaluation of all potential costs and implications related to governance structures would be needed in order to make a determination.

6) TFFR and PERS have a strong history of working together on common pension issues.

Over the years, TFFR and PERS have collaborated and shared resources on many pension administration issues when it was determined to be beneficial to each system and in the best interests of plan participants.

For example, the TFFR and PERS Boards and staff shared legal advice from outside tax counsel on U.S. Supreme Court decisions affecting state pension plans. TFFR and PERS also hired a consultant to assist us in jointly implementing new governmental accounting standards (GASB 67 and 68) in order to provide consistency across ND pension systems and participating employers of each plan.

C: Jodi Uecker, Danelle Hopkins – Governor's Office
Shawn Riley, Justin Data, Kristine Vollmer – ND IT
Fay Kopp, Dave Hunter, Rich Nagel – NDRIO
Scott Miller, Derrick Hohbein – NDPERS

North Dakota Teachers' Fund For Retirement

MEMORANDUM

TO: **TFFR Board**
FROM: **Fay Kopp and Cody Mickelson**
DATE: **October 17, 2019**
SUBJ: **Governance & Policy Review (GPR) Committee Update**

The TFFR Governance and Policy Review Committee has not met since their September 17, 2019 meeting.

As a recap, the Committee has had initial discussions on the first draft of a revised TFFR Board Governance Policy Manual (Sections A-J).

Fay and Cody plan to prepare another draft which will include Committee member feedback and suggestions. Fay will also schedule a meeting with TFFR's legal counsel, Anders Odegaard, to discuss governance related questions, and ensure proper legal review of potential changes and additions to Board governance policies and by-laws.

The Committee plans to meet in November or early December for another review of changes made to Sections A-J, and an initial review of Sections K-U.

We appreciate the Board's patience as we strive to balance this important TFFR Board project with other TFFR program priorities.

BOARD INFORMATION AND DISCUSSION.

North Dakota Teachers' Fund For Retirement

MEMORANDUM

TO: **TFFR Board**
FROM: **Fay Kopp**
DATE: **October 17, 2019**
SUBJ: **Trustee Educational Conference Reports**

NCTR, NEA, Callan, and other organizations provide excellent pension and investment education and networking opportunities with pension trustees, administrators, and industry professionals from all over the country.

To help trustees fulfill their fiduciary responsibilities in managing the trust fund, TFFR Board members have attended a number pension and investment related educational conferences in 2019.

• Cody Mickelson	NCTR Trustee Workshop	07/19	Berkeley, CA
• Toni Gumeringer	NEA Pension Forum (NDU pd)	07/19	Houston, TX
	NCTR Annual Conference	10/19	Nashville, TN
• Mike Burton	NCTR Annual Conference	10/19	Nashville, TN
• Mel Olson	NCTR Annual Conference	10/19	Nashville, TN

Board members should plan to share conference information with other trustees.

BOARD INFORMATION AND DISCUSSION.

North Dakota Teachers' Fund For Retirement

MEMORANDUM

TO: **TFFR Board**
FROM: **Fay Kopp**
DATE: **October 17, 2019**
SUBJ: **Board Retreat Planning**

As discussed at the July Board meeting, we have tentatively scheduled a TFFR Board Retreat to follow the 1 pm TFFR Board Business Meeting on January 23, 2020 at the Radisson Inn in Bismarck.

Tentative plans:

- Board Business Meeting
- Board Retreat Session A
- Dinner
- Board Retreat Session B

Pres. Lech and Fay will develop board retreat agenda items, but would also appreciate input from trustees on topics of interest to ensure the retreat includes relevant and valuable topics for discussion.

Room reservations will be made at the Radisson for out of town board members (Rob, Mike, Mel, and Cody). The State Investment Board is scheduled to meet on January 24, 2020.

BOARD INFORMATION AND DISCUSSION.

Informational

TO: **TFFR Board**

FROM: **Dave Hunter**

DATE: **October 16, 2019**

SUBJECT: **TFFR Chief Retirement Officer Succession Update**

On September 26, 2019, TFFR's Chief Retirement Officer and RIO's Deputy Executive Director Fay Kopp announced her intent to retire from RIO effective on March 31, 2020. RIO was deeply saddened by this announcement noting that Fay has been an outstanding talent having worked at RIO for 32 years including 20 years as TFFR's Chief Retirement Officer. Fay has been a truly inspirational leader for our agency for a very long time and she will be incredibly difficult to replace.

During the past month, RIO's management team and TFFR leadership has met to discuss the best ways to position the agency for continued future success. We have also consulted with HRMS. In order to identify any retirement leaders who may be interested in pursuing the opportunity to become TFFR's next Chief Retirement Officer and RIO's next Deputy Executive Director, RIO intends to post for this position internally (within RIO) in the upcoming weeks and seek to provide a further update to the TFFR board and SIB in November.

TFFR BOARD MEMO
Thursday, October 24, 2019

RE: TFFR Vision Statement and Core Values

FROM: Rob Lech, TFFR Board President

BOARD FOCUS: Action

At the September 26, 2019 meeting of the Teachers' Fund for Retirement (TFFR) Board, a vision development activity was conducted by board members and executive staff to create a new vision statement for TFFR. 3 groups created vision statements and a survey was created to rank and provide feedback. A total of 11 board members and TFFR staff provided input through the online survey.

Vision Statements

Vision Statement #1: The vision of TFFR is to safeguard and sustain the financial stability of the retirement fund by adhering to the principles of good governance, transparency, and accountability.

Vision Statement #2: TFFR's vision is to be a trusted leader in the administration of a financially sound retirement program for ND educators by providing exceptional customer service, professional plan management and operational effectiveness.

Vision Statement #3: To exceed expectations of providing lifetime retirement to ND educators using sound, trusted, and ethical fund management.

Feedback and Recommendations

Based on feedback from the survey, Vision Statements #1 and #2 were the preferred vision statements for 10 of 11 respondents, but there was not a substantial difference between the compiled rankings of these two statements. Based on the specific feedback, I am proposing the consideration of three options: 1) Approval of Vision Statement #1, 2) Approval of Vision Statement #2, or an amalgamated version of Vision Statements #1 and #2 below.

> Vision Statement #4: TFFR's vision is to be a trusted leader in the administration of a financially sound retirement program for ND educators by providing exceptional customer service, professional plan management and operational effectiveness and by adhering to the principles of good governance, transparency, and accountability.

The board will consider these options at the board meeting and will welcome further edits to all versions to reach a final vison statement prior to final approval.

Core Value Selection

With the determination of what TFFR is (mission) and what TFFR strives to be (vision), there remains the values, skills and attributes that build the organizational foundation of TFFR at all levels. This is done through the establishment of core values. This is a fairly straight-forward exercise that includes a ranking of key areas that each board member and staff member finds to be crucial to the success of TFFR. These can be communicated a few different ways. It may be as simple as listing the values, a listing and definition of the values, or a narrative defining how these values work together.

The first step of the process is to get feedback on which values, skills, and attributes are considered non-negotiable at TFFR. To begin this process, I have created a survey with a vast selection of values, skills, and attributes to be ranked. You will be asked to review the list and rank only the Top 5 as it relates to the success of TFFR.

The board should review and complete the exercise at the board meeting and TFFR staff will be sent the survey to be completed by November 1, 2019.

https://www.surveymonkey.com/r/TFFRVALUES

Recommended Action:
Approval or Revision of TFFR Vision Statement and Complete TFFR Value Survey during the October 24, 2019 Meeting

North Dakota Teachers' Fund For Retirement

NDTFFR Board Reading
October 2019

- Update on the Funded Status of State and Local Pension Plans. Center for State & Local Government Excellence (CSLGE), October 2019.

- Employee Contributions to Public Pension Plans. National Association of State Retirement Administrators (NASRA), September 2019.

- Investment Update: How Do Public Plans Value Their Assets? Center for Retirement Research at Boston College (CRR), September 2019.

- Financial Asset Inequality and Its Implications for Retirement Security. National Institute on Retirement Security (NIRS), September 2019.

- Proactive Pension Management: An Elected Official's Guide to Variable Benefit and Contribution Arrangements. Center for State & Local Government Excellence (CSLGE) and AARP, September 2019.

- Teacher Pension Plans and their Effect on Recruitment. The Hunt Institute based on study done by Bellwether Education Partners, June 2019 (forwarded by Treasurer Schmidt).