NDTFFR Board Meeting Agenda

Thursday, October 26, 2017
1:00 pm
Peace Garden Room
State Capitol, Bismarck, ND

1. **Call to Order and Approval of Agenda** - Pres. Gessner (Board Action)

2. **Approval of Minutes of September 21, 2017 Meeting** - Pres. Gessner (Board Action) 5 min.

3. **2017 Valuation Report** – Kim Nicholl and Matt Strom, Segal (Board Action) 60 min.

4. **Board Education: Governmental Pension Plan Actuarial Issues** – Kim Nicholl and Matt Strom, Segal (Information) 15 min.

5. **TFFR Legislative Update** – Fay Kopp (Information) 10 min.

6. **RIO Agency Update** – Dave Hunter (Information) 10 min.

7. **2016-17 Re-employed Retiree Report –** Shelly Schumacher (Information) 15 min.

8. **Quarterly Audit Service Update** – Terra Miller Bowley (Information) 10 min.

9. **Trustee Education Report –** Mel Olson (Information) 10 min.

10. **Board Policy C-7: Employer Payment Plan Models, 1st Reading**
    Fay Kopp (Board Action) 10 min.

11. **LEA President Contract Release Time** - Fay Kopp and Jan Murtha (Board Action) – 30 min.
    *Executive Session possible for attorney consultation and to discuss confidential member information pursuant to NDCC 44-04-19.1, 44-04-19.2 and 15-39.1-30.

12. **Other Business**

13. **Adjournment**

Next Board Meeting: January 25, 2018

Any person who requires an auxiliary aid or service should contact the Retirement and Investment Office at 701-328-9885 at least three (3) days before the scheduled meeting.

NORTH DAKOTA TEACHERS' FUND FOR RETIREMENT
MINUTES OF THE
SEPTEMBER 21, 2017, BOARD MEETING

BOARD MEMBERS PRESENT:	Mike Gessner, President Rob Lech, Vice President Mike Burton, Trustee Toni Gumeringer, Trustee Mel Olson, Trustee Kelly Schmidt, State Treasurer
ABSENT:	Kirsten Baesler, State Superintendent
STAFF PRESENT:	Terra Miller Bowley, Audit Services Supvr Connie Flanagan, Fiscal & Invt Ops Mgr Bonnie Heit, Admin Svs Supvr David Hunter, ED/CIO Fay Kopp, Deputy ED/CRO Rich Nagel, IT Supvr Shelly Schumacher, Retirement Program Mgr
OTHERS PRESENT:	Thomas Harkless, Wells Fargo Kathy Kindschi, NDU-Retired Janilyn Murtha, Attorney General's Office

CALL TO ORDER:

Mr. Mike Gessner, President of the Teachers' Fund for Retirement (TFFR) Board of Trustees, called the meeting to order at 1:00 p.m. on Thursday, September 21, 2017, in the Peace Garden Room, State Capitol, Bismarck, ND.

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

ACCEPTANCE OF AGENDA:

The Board considered the agenda for the September 21, 2017 meeting.

Discussion was held on tabling Agenda Item 8, LEA President Contract Release time. After discussion,

IT WAS MOVED BY MR. BURTON AND SECONDED BY MRS. GUMERINGER AND CARRIED BY A ROLL CALL VOTE TO REVISE THE AGENDA BY TABLING AGENDA ITEM 8, LEA PRESIDENT CONTRACT RELEASE TIME, UNTIL THE NEXT MEETING.

AYES: MRS. GUMERINGER, MR. LECH, MR. BURTON, MR. OLSON, AND PRESIDENT GESSNER
NAYS: TREASURER SCHMIDT
MOTION CARRIED.
ABSENT: SUPT. BAESLER

MINUTES:

The Board considered the minutes of the July 27, 2017 and July 28, 2017, meetings.

IT WAS MOVED BY MR. OLSON AND SECONDED BY MR. LECH AND CARRIED BY A ROLL CALL VOTE TO ACCEPT THE JULY 27, 2017, AND JULY 28, 2017, MINUTES AS DISTRIBUTED.

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

INVESTMENT REPORT:

Mr. Hunter presented TFFR's annual investment report for the fiscal year ended June 30, 2017. TFFR earned a net return of 12.9% versus a policy benchmark of less than 12%. TFFR earned a net return of 9.1% for the 5 years ended June 30, 2017, which exceeded the policy benchmark of 8.3% by over 0.65%. During the last 5 years, asset allocation and active management generated over $800 million (93%) and $60 million (7%) of TFFR's net investment income, respectively. TFFR's investment returns were ranked in the 26th percentile for the 5-years ended June 30, 2017, based on Callan's Public Fund Sponsor Database. Mr. Hunter also commented on managers on the SIB Watch List.

Mr. Hunter also recommended changes to the TFFR Investment Policy Statement. The State Investment Board (SIB) recently approved structural changes to eliminate agency Mortgage Backed Securities and International Debt strategies. The changes are expected to materially improve risk-adjusted returns within the Pension Trust largely due to the elimination of International Fixed Income and low expected returns and high-expected volatility. In order to implement the changes, TFFR's asset allocation within Fixed Income should be revised to reduce Investment Grade to 16% (from 19%) while increasing Non-Investment Grade to 7% (from 4%). The total allocation to Fixed Income will remain constant at 23%.

IT WAS MOVED BY TREASURER SCHMIDT AND SECONDED BY MR. OLSON AND CARRIED BY A ROLL CALL VOTE TO ACCEPT STAFF RECOMMENDATION AND REVISE THE TEACHERS' FUND FOR RETIREMENT INVESTMENT POLICY STATEMENT.

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

IT WAS MOVED BY MRS. GUMERINGER AND SECONDED BY MR. BURTON AND CARRIED BY A ROLL CALL VOTE TO ACCEPT THE ANNUAL INVESTMENT REPORT FOR THE PERIOD ENDING JUNE 30, 2017.

AYES: MR. BURTON, MR. LECH, MRS. GUMERINGER, MR. OLSON, TREASURER SCHMIDT, PRESIDENT GESSNER
NAYS: NONE
MOTION CARRIED
ABSENT: SUPT. BAESLER

BUDGET/EXPENSE REPORT:

Ms. Flanagan reviewed the Retirement and Investment Office's budget and expenses for the fiscal year ended June 30, 2017. She explained continuing appropriations(i.e. investment expenses, member benefit and refund payments, and consulting expenses) and budgeted expenditures (i.e. salaries and benefits, operating expenses, and contingency funds). Ms. Flanagan also presented RIO's 2017-19 budget approved by the Legislature.

IT WAS MOVED BY TREASURER SCHMIDT AND SECONDED BY MR. BURTON AND CARRIED BY A ROLL CALL VOTE TO ACCEPT THE ANNUAL BUDGET AND EXPENSE REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 2017.

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

TECHNOLOGY REPORT:

Mr. Nagel highlighted Information Technology projects, which occurred during the period of July 1, 2016 - June 30, 2017, as well as future initiatives. He commented on the technology aspects of the office move, software upgrades, web services, IT security, records retention and purging, and office equipment.

IT WAS MOVED BY MR. OLSON AND SECONDED BY TREASURER SCHMIDT AND CARRIED BY A ROLL CALL VOTE TO ACCEPT THE ANNUAL INFORMATION TECHNOLOGY REPORT.

AYES: MR. LECH, TREASURER SCHMIDT, MR. BURTON, MRS. GUEMERINGER, MR. OLSON, AND PRESIDENT GESSNER
NAYS: NONE
MOTION CARRIED
ABSENT: SUPT. BAESLER

The Board recessed at 2:07 p.m. and reconvened at 2:16 p.m.

COMMUNICATIONS UPDATE:

Ms. Kopp reviewed methods retirement services staff is looking into to enhance and expand the use of electronic communication methods. Due to budget constraints and the ability to provide information electronically, staff is in the process of transitioning away from traditional mailing and distribution methods to more cost effective electronic methods. Examples include completion of TFFR Member Online, updating RIO website, expanding TFFR webcast library, and distributing active member newsletters and outreach program materials electronically. This transition will evolve over time as RIO balances limited staff, budget, and resources.

LEGISLATIVE UPDATE:

Ms. Kopp reviewed the upcoming schedule, agenda items, and membership of the Employee Benefits Programs Committee.

EMPLOYER PAYMENT PLAN:

Ms. Kopp reviewed the TFFR Employer Payment Plan Models and explained how payment of member contributions on a tax deferred basis can be made by the employer through salary reduction or salary supplement.

Effective July 1, 2003, TFFR Board Policy C-7, Employer Payment Plan Models, was amended to eliminate Model 3 which is the model that allows employers to pay a fixed dollar amount of the member contributions using a combination of salary supplement and salary reduction. Employers using Model 3 were allowed to continue as a closed group, but Model 3 is no longer available to other employers. The reason for eliminating Model 3 was due to the small number of employers who utilize the model, the complexity of the model, and resulting reporting errors to TFFR. The number of Model 3 employers, to date, has slowly decreased to three.

After discussion,

IT WAS MOVED BY TREASURER SCHMIDT AND SECONDED BY MR. OLSON AND CARRIED BY A ROLL CALL VOTE TO DIRECT STAFF TO DRAFT A POLICY WHICH WOULD COMPLETELY ELIMINATE MODEL 3 (PARTIAL) EFFECTIVE JULY 1, 2019.

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

Mrs. Kopp and Mrs. Murtha will draft amendments to policy C-7. The draft policy will be presented to the Board for first reading in October.

SIB CUSTOMER SATISFACTION SURVEY:

Mr. Gessner distributed compiled responses to the SIB Customer Satisfaction Survey for the period of July 1, 2016 – June 30, 2017, by the TFFR Board. The purpose of the survey is to determine how well the SIB, through the staff of RIO, is meeting the expectations of its clients. On a scale of 4.00 points, the Board rated the SIB 3.5 – 3.67 for all rating factors.

IT WAS MOVED BY MR. LECH AND SECONDED BY MR. OLSON AND CARRIED BY A ROLL CALL VOTE TO ACCEPT THE RESULTS OF THE SIB CUSTOMER SATISFACTION SURVEY.

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

EDUCATION:

Ms. Schumacher provided an educational segment on Disability Retirement Benefits describing eligibility requirements, benefit calculation, application and approval process, and recertification requirements. For the period of 1998 – 2017, the TFFR Board has approved 149 disabilities, or about 7 each year.

CONSENT AGENDA:

The Consent Agenda contained Disability Application 2017-5D.

IT WAS MOVED BY TREASURER SCHMIDT AND SECONDED BY MR. OLSON AND CARRIED BY A ROLL CALL VOTE TO ACCEPT STAFF RECOMMENDATION AND APPROVE THE CONSENT AGENDA.

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

OTHER BUSINESS:

The Board was provided a number of readings in their meeting materials to reference. The readings included publications from the National Association of State Retirement Administrators, Center for Retirement Research, AON Hewitt, and National Conference on Public Employee Retirement Systems.

The next regularly scheduled board meeting will be held October 26, 2017, in the Peace Garden Room at the State Capitol.

ADJOURNMENT:

With no further business to come before the Board, President Gessner adjourned the meeting at 3:19 p.m.

Respectfully Submitted:

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Mr. Mike Gessner, President
Teachers' Fund for Retirement Board

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Bonnie Heit
Reporting Secretary

MEMORANDUM

TO: **TFFR Board**

FROM: **Fay Kopp**

DATE: **October 19, 2017**

SUBJ: **2017 Actuarial Valuation Report**

Kim Nicholl and Matt Strom, Segal Consultants, will be at the October board meeting to present the recently completed 2017 actuarial valuation of the NDTFFR plan (attached).

A few highlights from the 2017 valuation report:

- **Funded ratio** (based on actuarial value of assets or AVA) increased slightly from 62.1% to **63.7%** as of July 1, 2017.
- **Net unrecognized investment loss of $19 million** from previous years that has not yet been recognized in the AVA because of the 5-year smoothing.
- **Actuarially determined contribution (ADC)** decreased from 13.22% to **12.99%** this year. This rate is greater than the 12.75% statutory employer rate, so there is a **small contribution deficiency of (0.24)%** of payroll.
- **Unfunded actuarial accrued liability (UAAL)** decreased from $1.36 billion to **$1.35 billion**.

GASB 67 information at the plan level is also part of the 2017 valuation report:

- **Net Plan Liability (NPL)** (which is very similar to the plan's UAAL on a market basis) decreased from $1.47 billion to **$1.37 billion** as of June 30, 2017.
- **Plan Net Position** as a percentage of total pension liability (based on market value of assets) increased from 59.2% to **63.2%.**

A separate GASB 68 report is in the process of being completed which includes employer allocations and pension amounts. This report will be delivered to the Board at the January 2018 meeting.

Please review this important 2017 funding and financial information and plan to discuss any questions with Segal at the meeting.

Attachment

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, 2017

October 26, 2017

Presented By:

Kim Nicholl, FSA, MAAA, EA
Senior Vice President

Matt Strom, FSA, MAAA, EA
Vice President

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 26, 2017 meeting of the Board of Trustees.

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Discussion Topics – Valuation and Projections

Segal Consulting

- Overview of Valuation Process
- Summary of Valuation Highlights
- Valuation Results and Projections
- Update on Public Sector Topics

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 2018 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

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

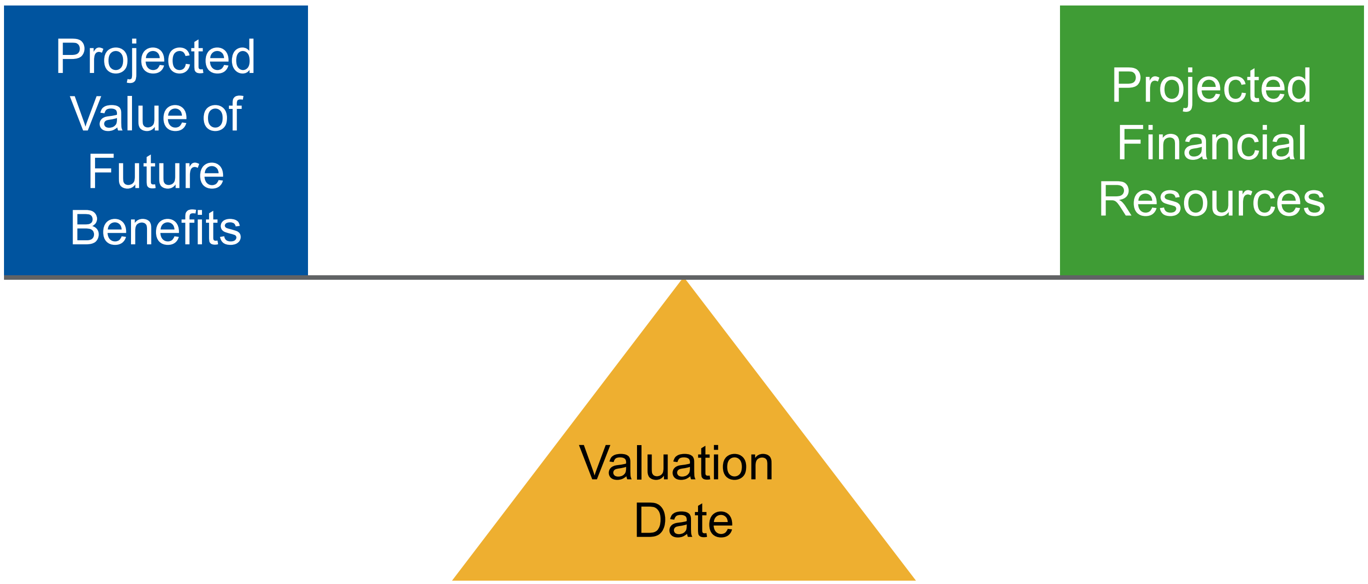
Actuarially Determined Employer Contribution

Accounting Results

How is an Actuarial Valuation Performed?

- Gather data as of the valuation date
  - Participant data
  - Financial data
- Project a benefit for each member, for each possible benefit
- Utilize actuarial assumptions
  - Economic (investment return, inflation, salary raises)
  - Demographic (death, disability, retirement, turnover)
- Apply assumptions to benefits to determine a total liability and assign liabilities to service
- Apply the funding policy to determine the actuarially determined contribution (ADC)
  - Based on actuarial cost method and asset valuation method

Actuarial Balance



Over the life of a pension system,

Benefits + Expenses = Contributions + Investment 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:
  - Entry age cost method
  - Asset valuation 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

Amortization Method

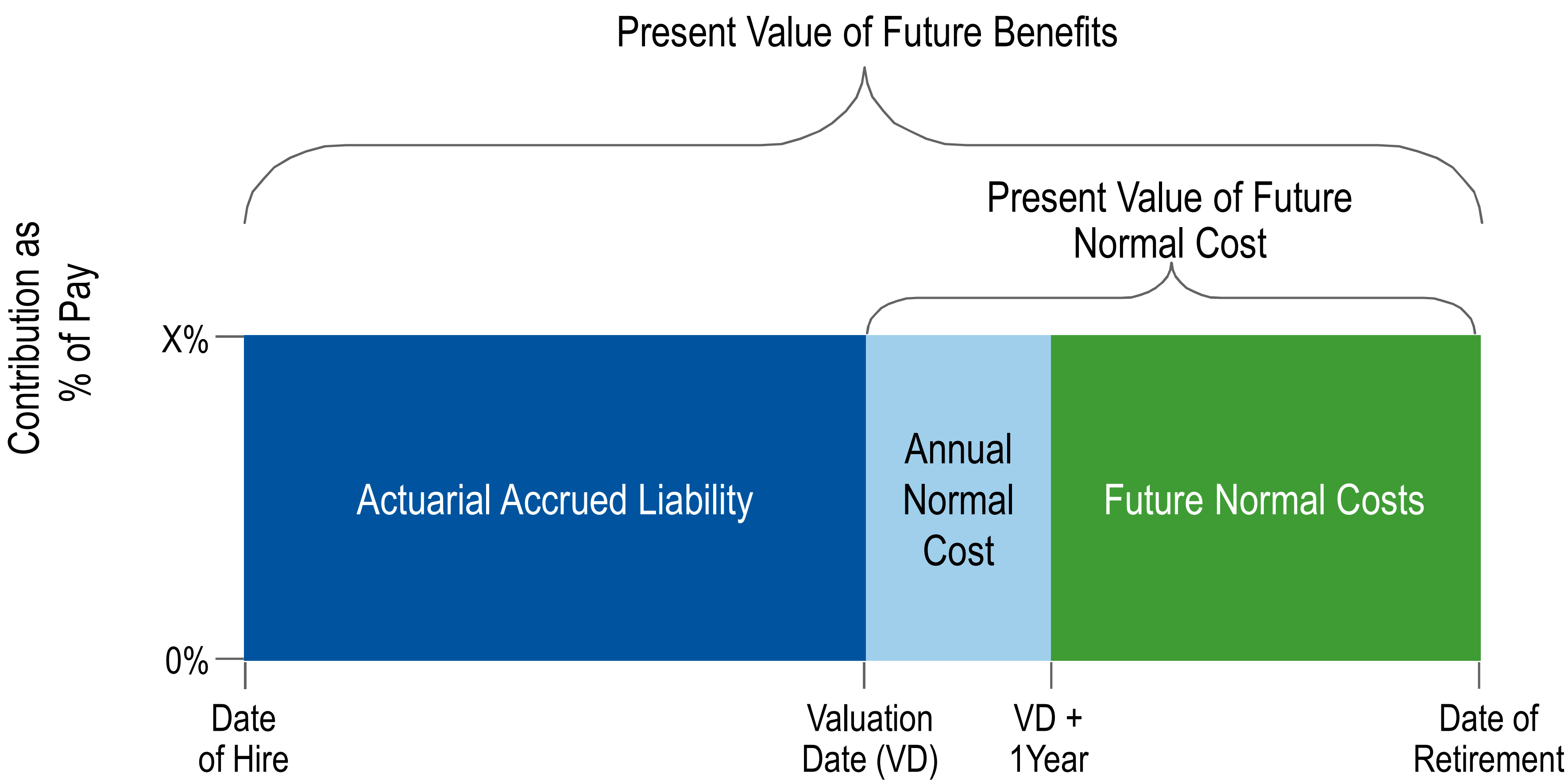
- Relies on two inputs:
  - Number of years to amortize the UAL
  - Level dollar or level percentage of payroll approach
- TFFR's amortization method:
  - 30-year closed period that began July 1, 2013
  - 26 years remaining
  - Level percentage of payroll

Entry Age Normal Cost Method

Allocates cost between past and future service

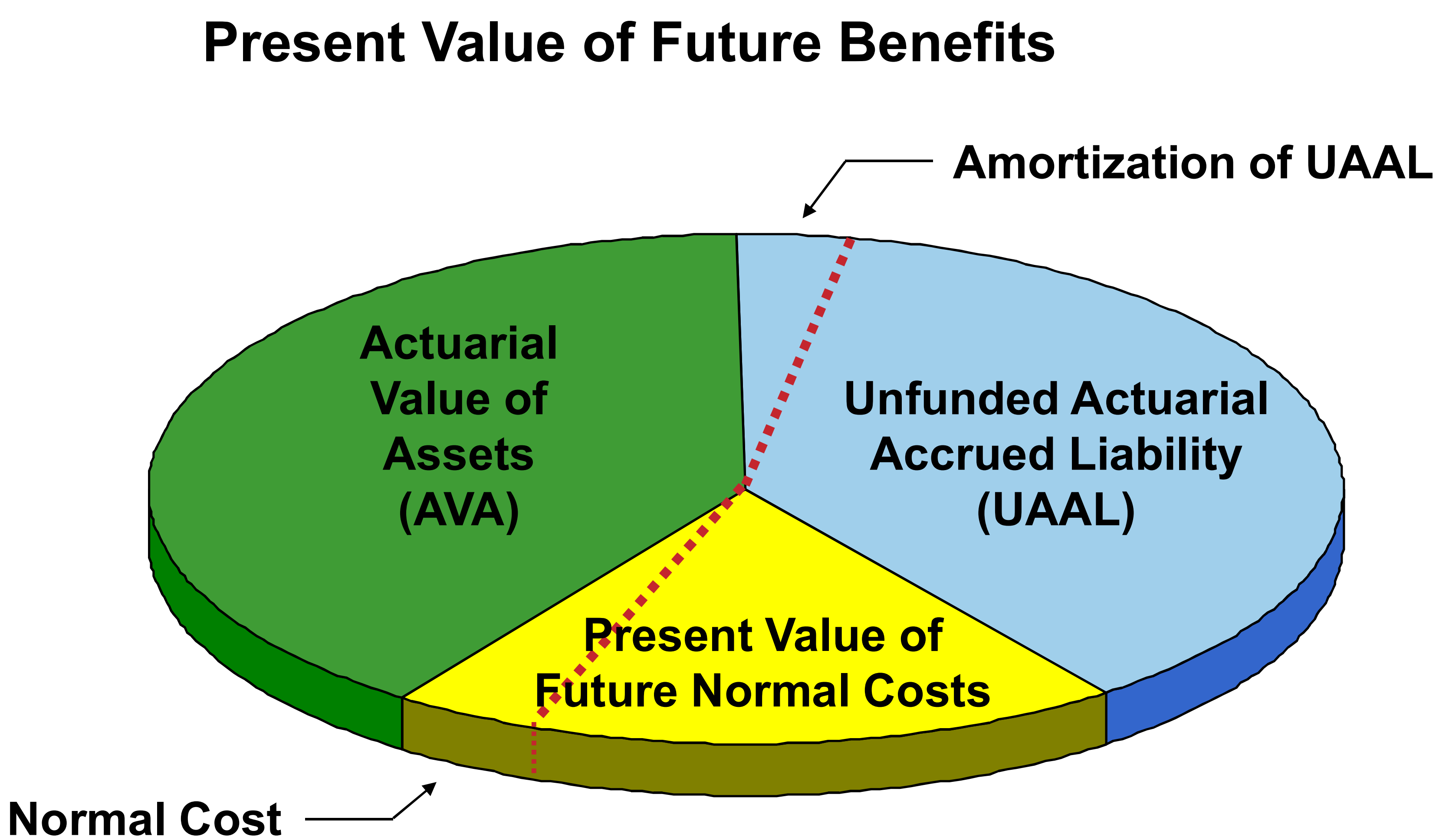
- **Normal Cost:** Cost of annual benefit accrual as a level percent of salary
- **Actuarial Accrued Liability:** Represents accumulated value of past normal costs (or difference between total cost and future normal costs)
- **Unfunded Actuarial Accrued Liability:** Actuarial accrued liability minus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

Funding Process



Actuarial Accrued Liability - Assets = Unfunded Actuarial Accrued Liability

Actuarially Determined Contribution



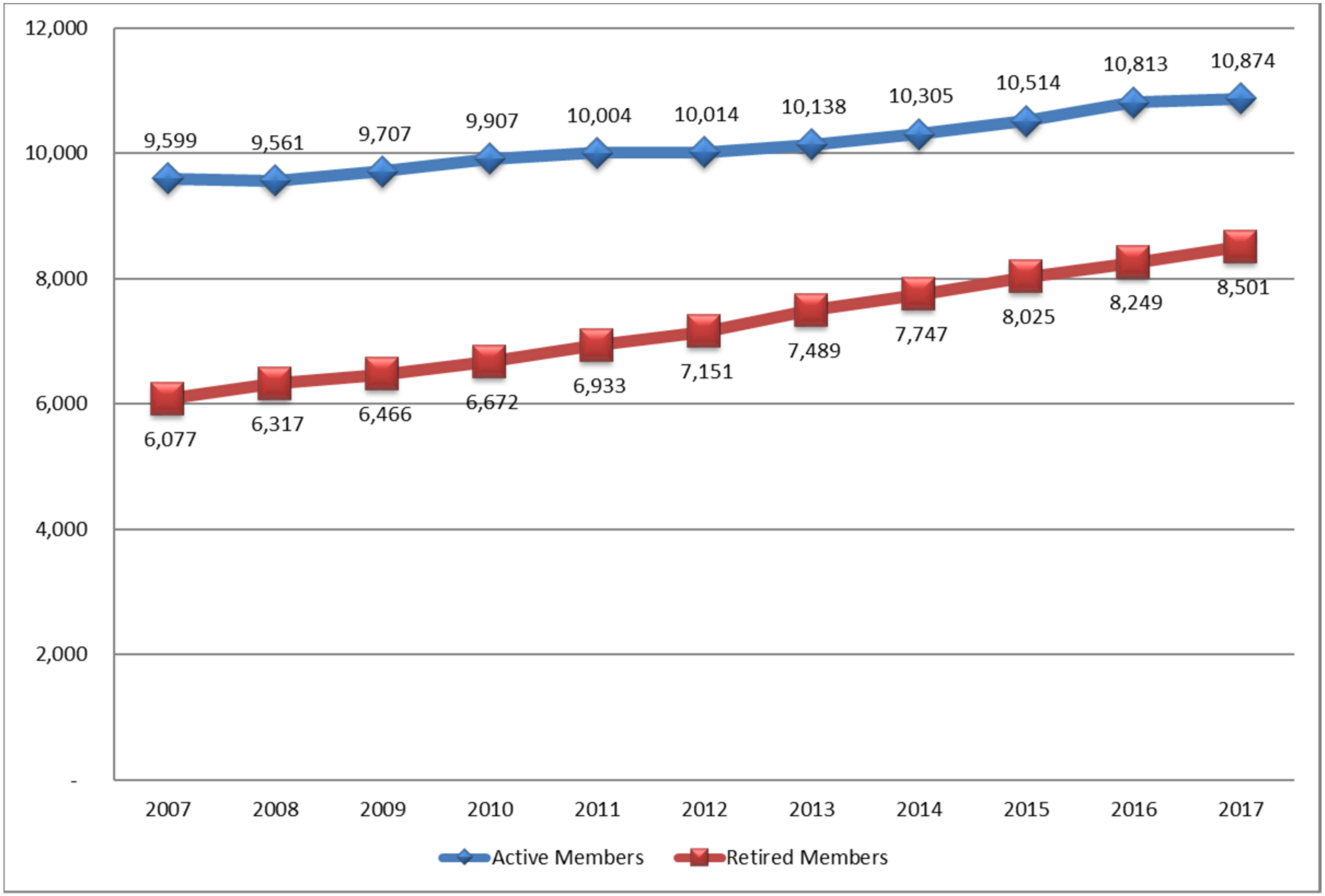
Summary of Valuation Highlights

- Market value of assets returned 12.6% for year ending 6/30/17 (Segal calculation)
  - Gradual recognition of deferred losses resulted in 8.2% return on actuarial value of assets
- Net impact on funded ratio was an increase from 62.1% (as of 7/1/16) to 63.7% (as of 7/1/16)
- Effective amortization period decreased from 29 years to 27 years
- Net impact on actuarially determined contribution (ADC) was a decrease from 13.22% of payroll to 12.99% of payroll
  - Based on the employer contribution rate of 12.75%, the contribution deficiency has decreased from 0.47% of payroll to 0.24% of payroll
- GASB Net Pension Liability decreased from $1.47 billion as of 6/30/16, to $1.37 billion as of 6/30/17

Membership

	2017	2016	Change
Active			
• Number	10,874	10,813	+0.6%
• Payroll (annualized)	$650.1 mil	$627.0 mil	+3.7%
• Average Age	42.1 years	42.3 years	- 0.2 years
• Average Service	11.9 years	12.1 years	- 0.2 years
Retirees and Beneficiaries			
• Number	8,501	8,249	+3.1%
• Total Annual Benefits	$198.9 mil	$187.2 mil	+6.3%
• Average Monthly Benefit	$1,950	$1,891	+3.1%

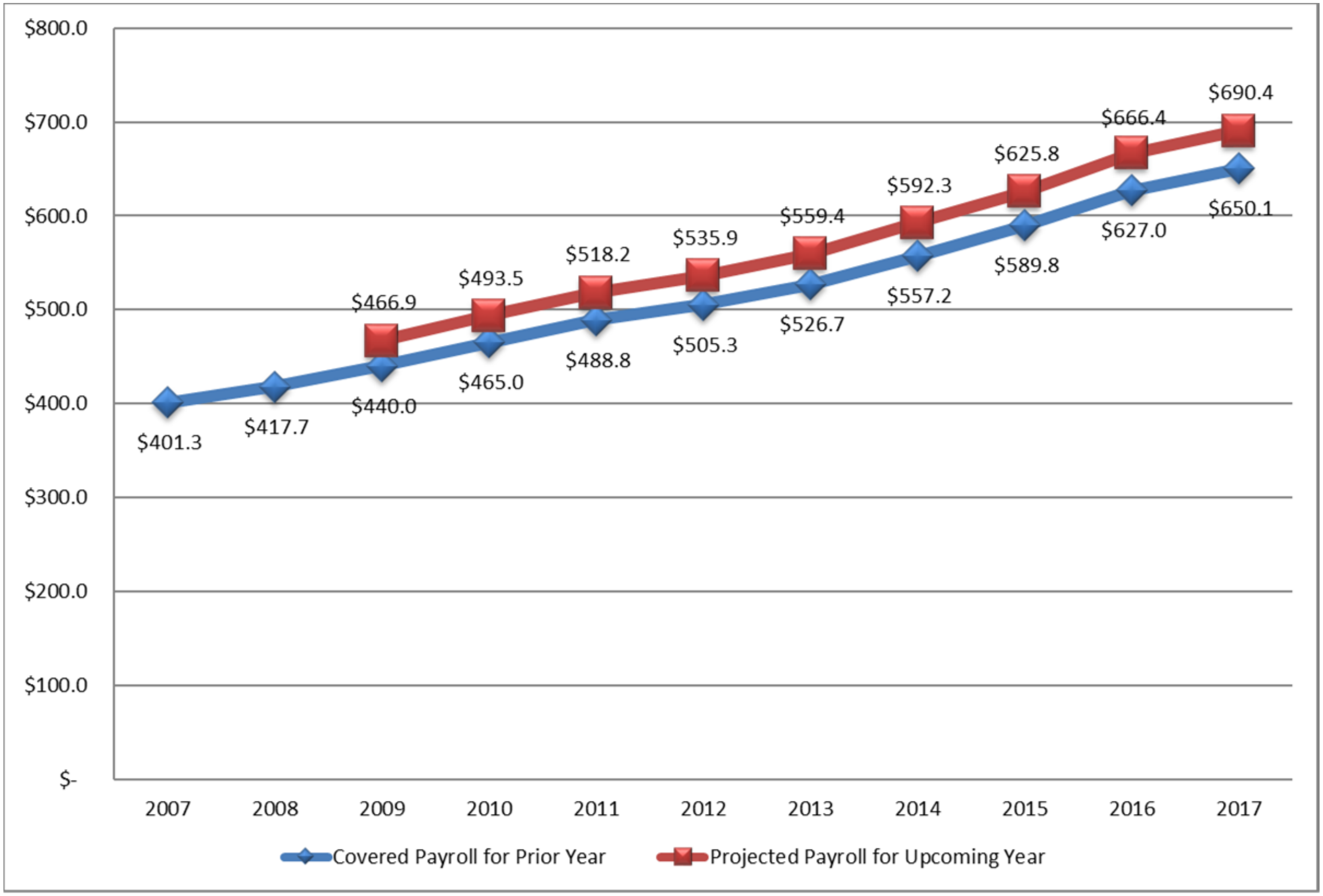
Active and Retired Membership



Since 2007, number of retirees and beneficiaries has increased 3.4% per year on average.

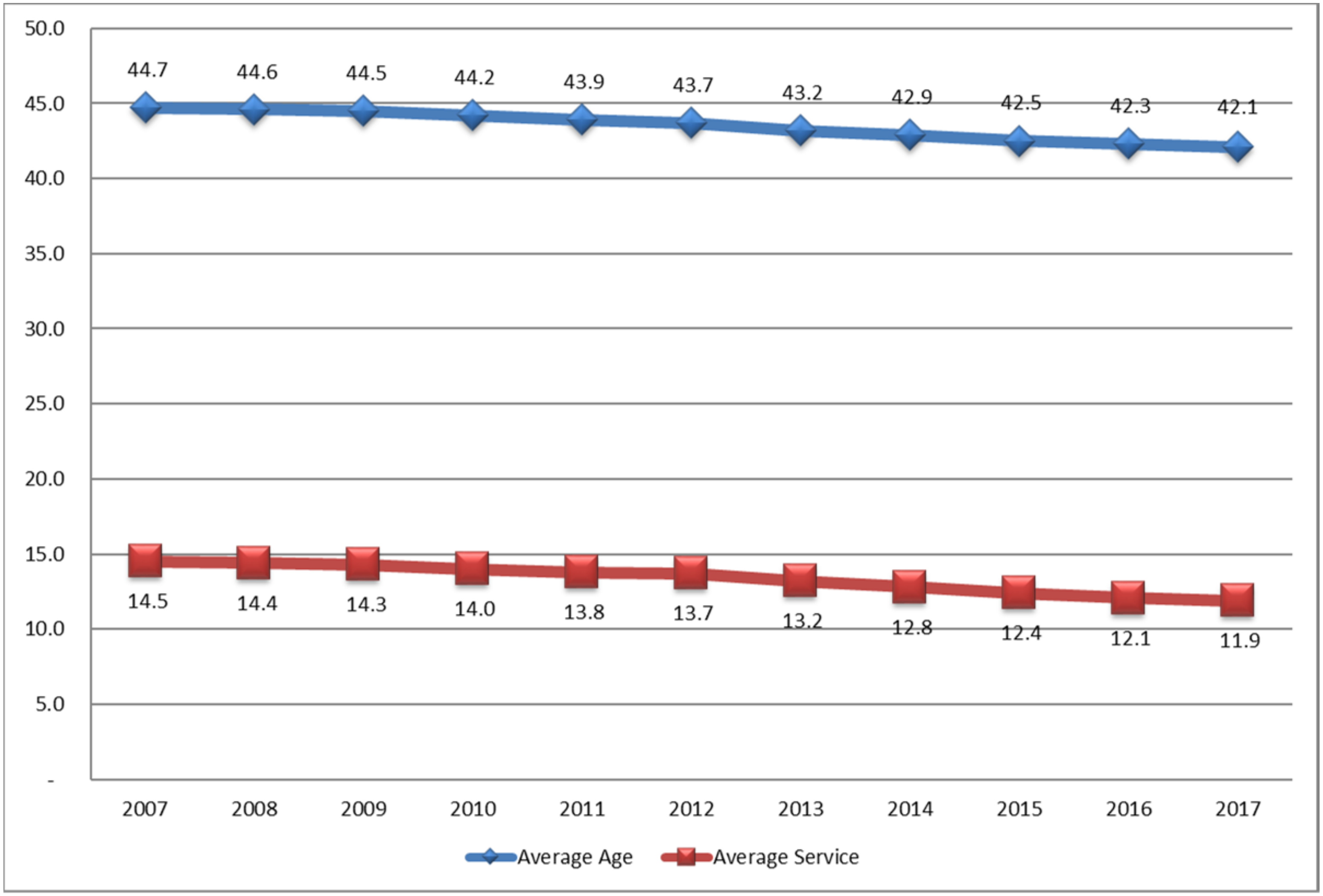
Active Payroll

$ Millions

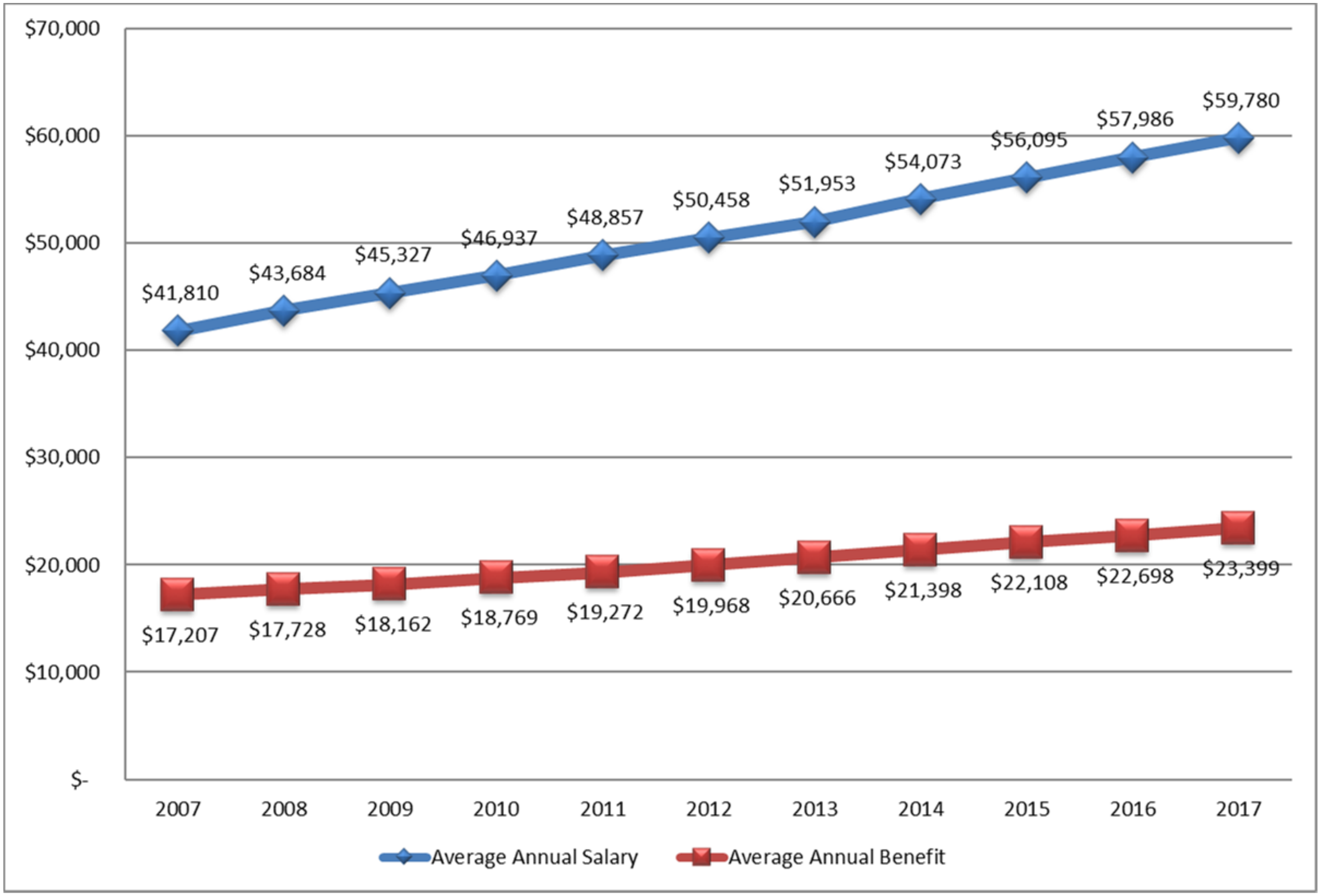


Since 2007, active payroll has increased, on average, 4.9% per year.

Average Age and Service of Active Members



Average Salary and Average Benefit



Since 2007, average salary has increased, on average, 3.6% per year. Average annual benefit has increased by 3.3% per year.

Assets

- The market value of assets increased from $2.12 billion (as of 6/30/16) to $2.36 billion (as of 6/30/17)
  - Segal determined the investment return was 12.64%, net of investment expenses
- The actuarial value of assets increased from $2.23 billion (as of 6/30/16) to $2.38 billion (as of 6/30/17)
  - Investment return of 8.18%, net of investment expenses
  - Actuarial value is 100.8% of market
  - There is a total of $19 million of deferred net investment losses that will be recognized in future years
- The average annual return on <u>market</u> assets
  - 10-year average is 3.8%
  - 20-year average is 6.1%
  - 30-year average is 7.7%
- The average annual return on <u>actuarial</u> assets
  - 10-year average is 5.2%
  - 20-year average is 6.5%
  - 30-year average is 7.1%

Market Value of Assets ($ in millions)

	Fiscal Year Ending June 30, 2017	Fiscal Year Ending June 30, 2016
Beginning of Year	$2,124	$2,142
Contributions:		
• Employer	86	83
• Member	79	76
• Service Purchases	3	3
• Total	168	162
Benefits and Refunds	(199)	(186)
Investment Income (net)	267	6
End of Year	$2,360	$2,124
Rate of Return	12.64%	0.39%

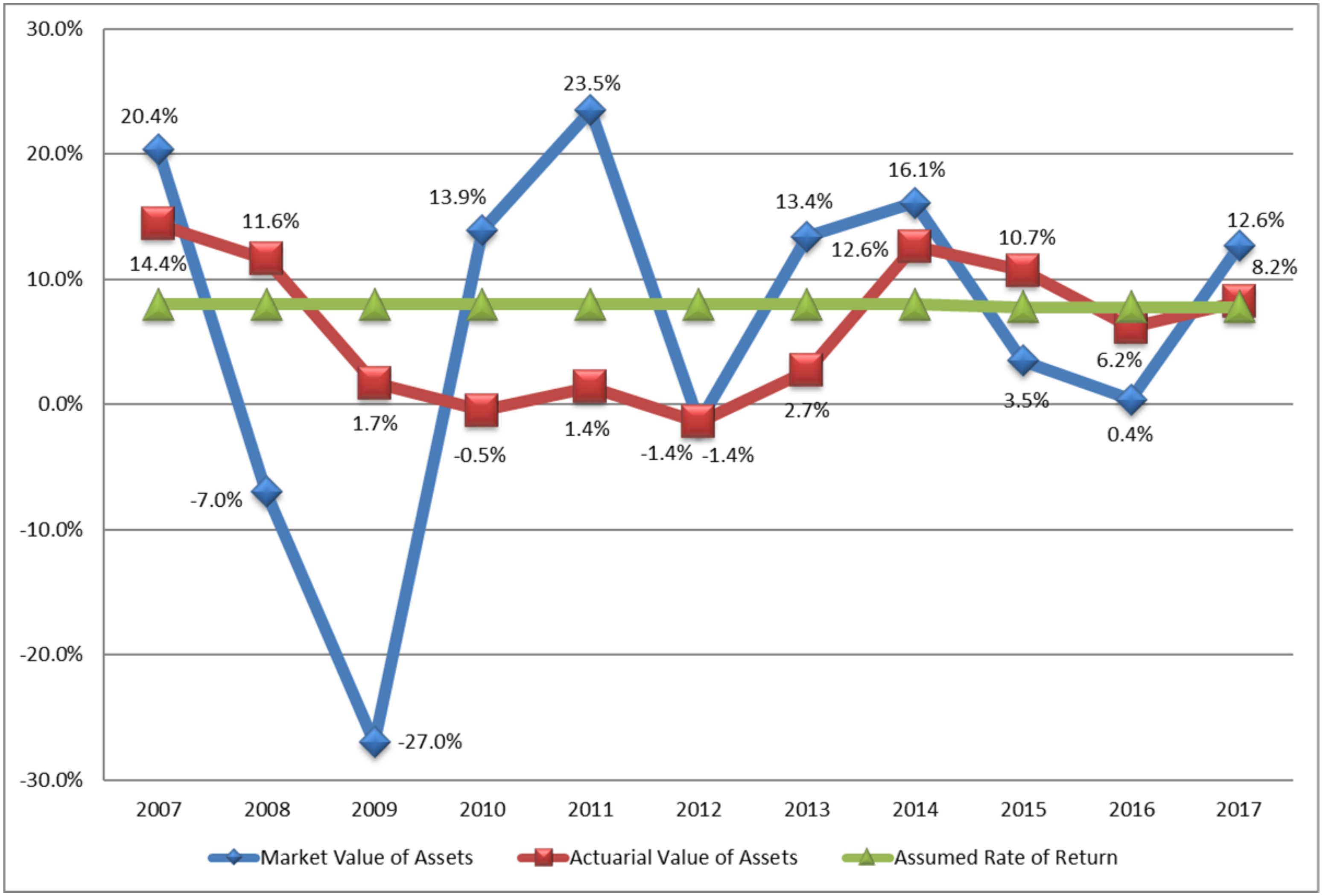
Actuarial Value of Assets ($ in millions)

1. Market Value of Assets as of June 30, 2016	$2,124
2. Cash Flow Items for FYE June 30, 2017	(30)
3. Expected Return	163
4. Expected Market Value of Assets (1) + (2) + (3)	$2,257
5. Actual Market Value of Assets on June 30, 2017	**2,360**
6. Excess/(Shortfall) for FYE June 30, 2017 (5) – (4)	103
Excess/(Shortfall) Returns:	

Year	Initial Amount	Deferral %	Unrecognized Amount
2017	$103	80%	$83
2016	(157)	60%	(94)
2015	(93)	40%	(37)
2014	147	20%	29
2013	87	0%	0
7. Total			**($19)**

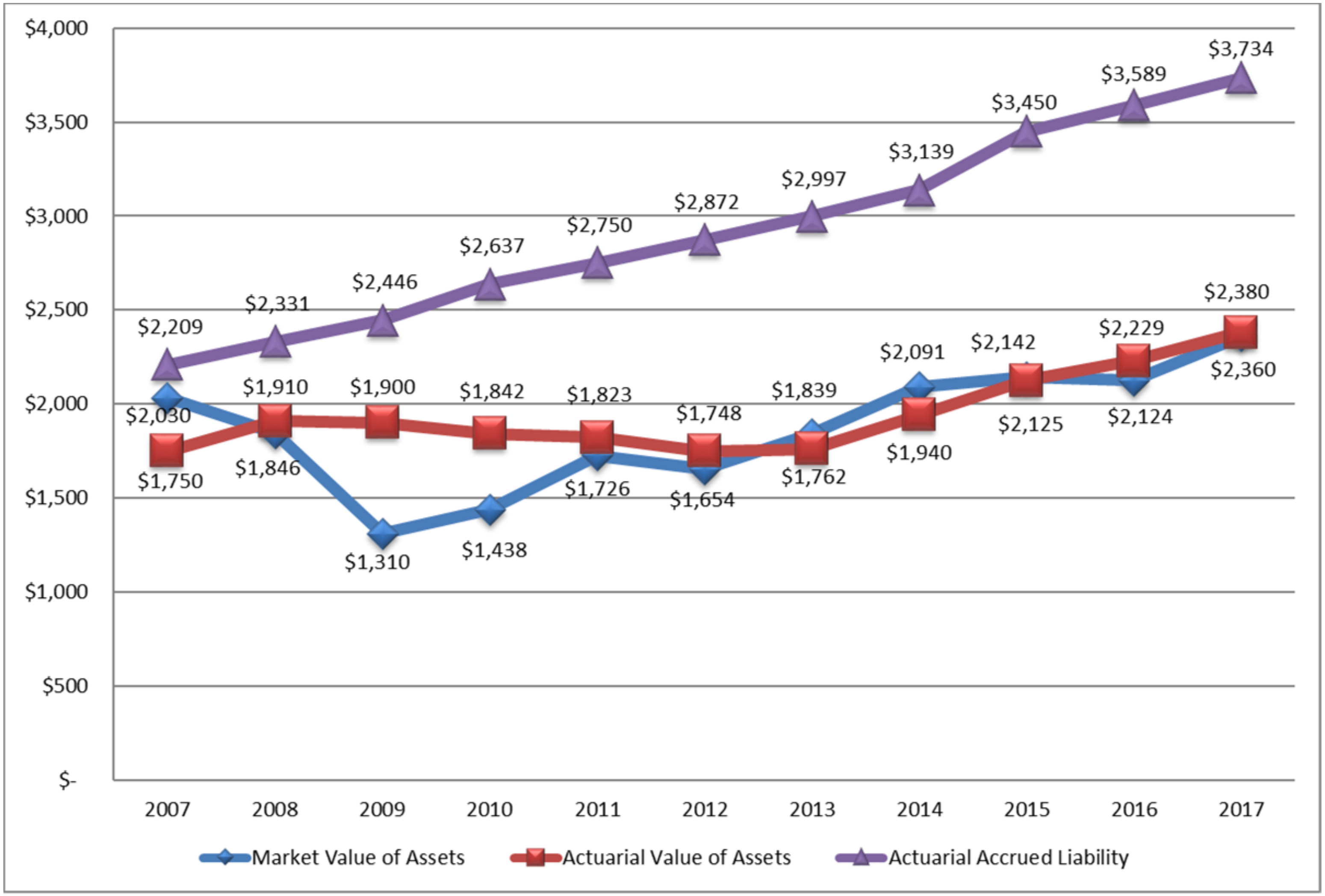
8. Actuarial Value of Assets as of June 30, 2017 (5) - (7)	**$2,380**
Actuarial Value of Assets as a % of Market Value of Assets	100.8%

Asset Returns



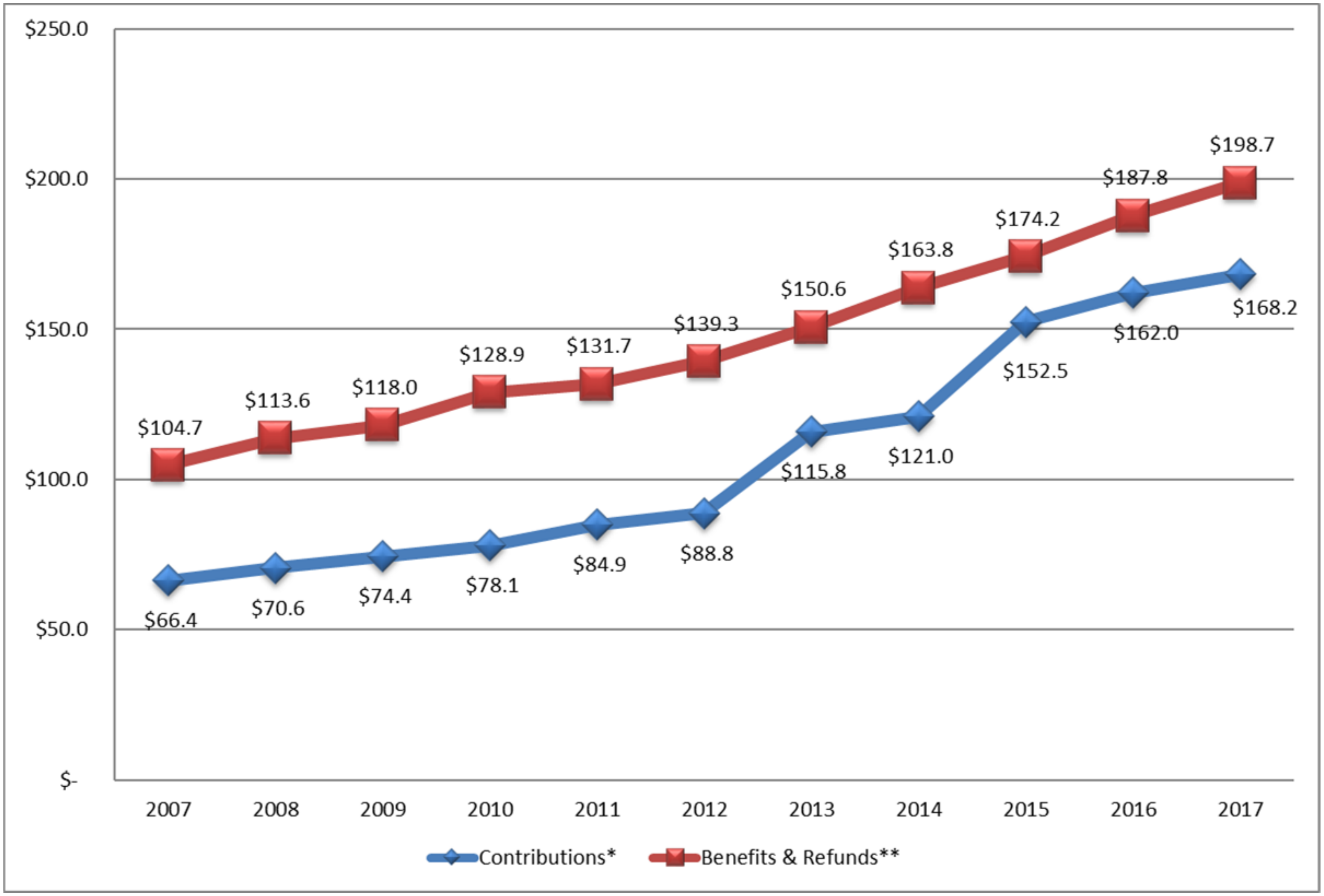
Market and Actuarial Values of Assets Compared to Actuarial Accrued Liability

$ Millions



Contributions vs. Benefits and Refunds

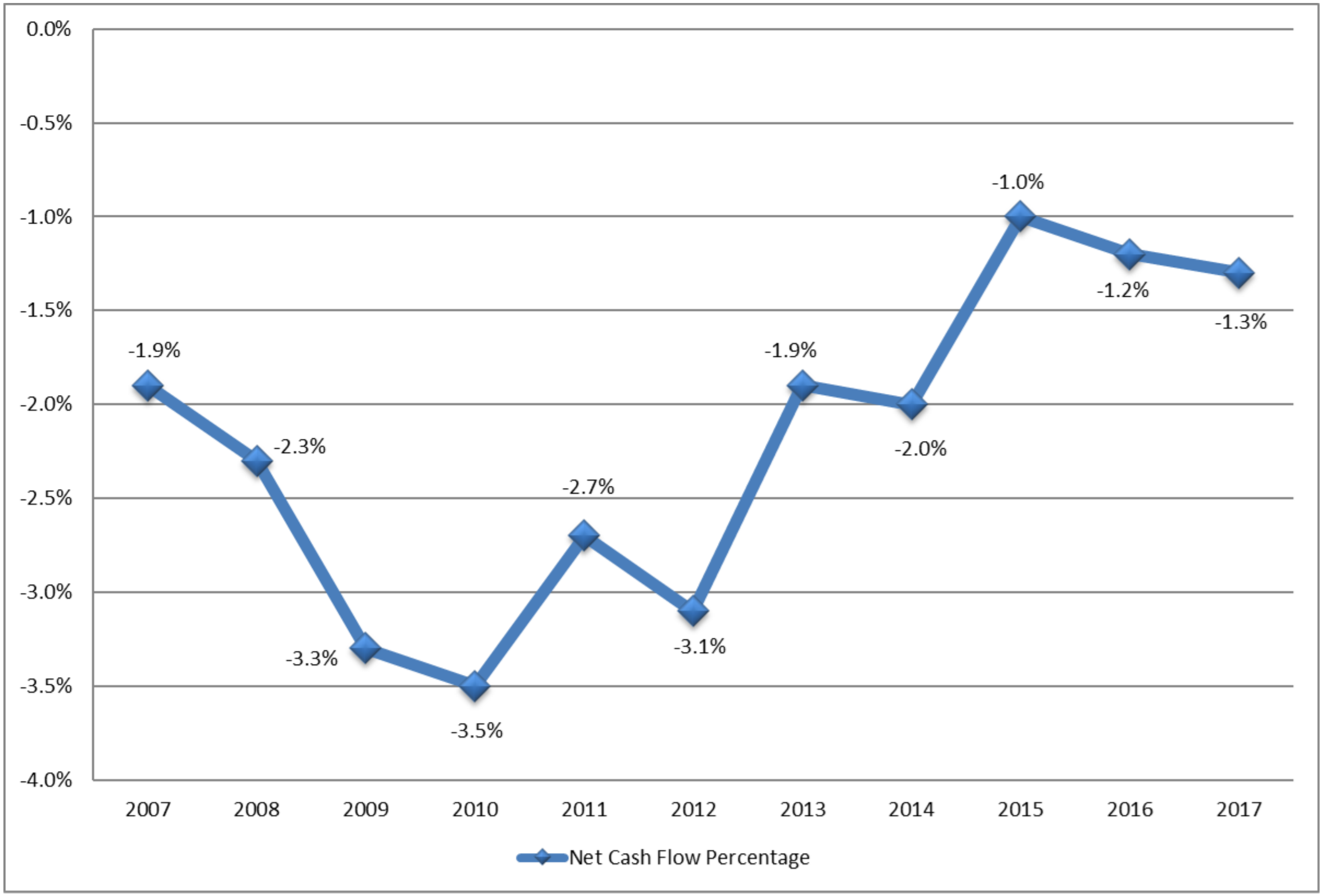
$ Millions



* Includes member and employer contributions, and service purchases

** Includes administrative expenses

Net Cash Flow as a % of Market Value



Valuation Results ($ in millions)

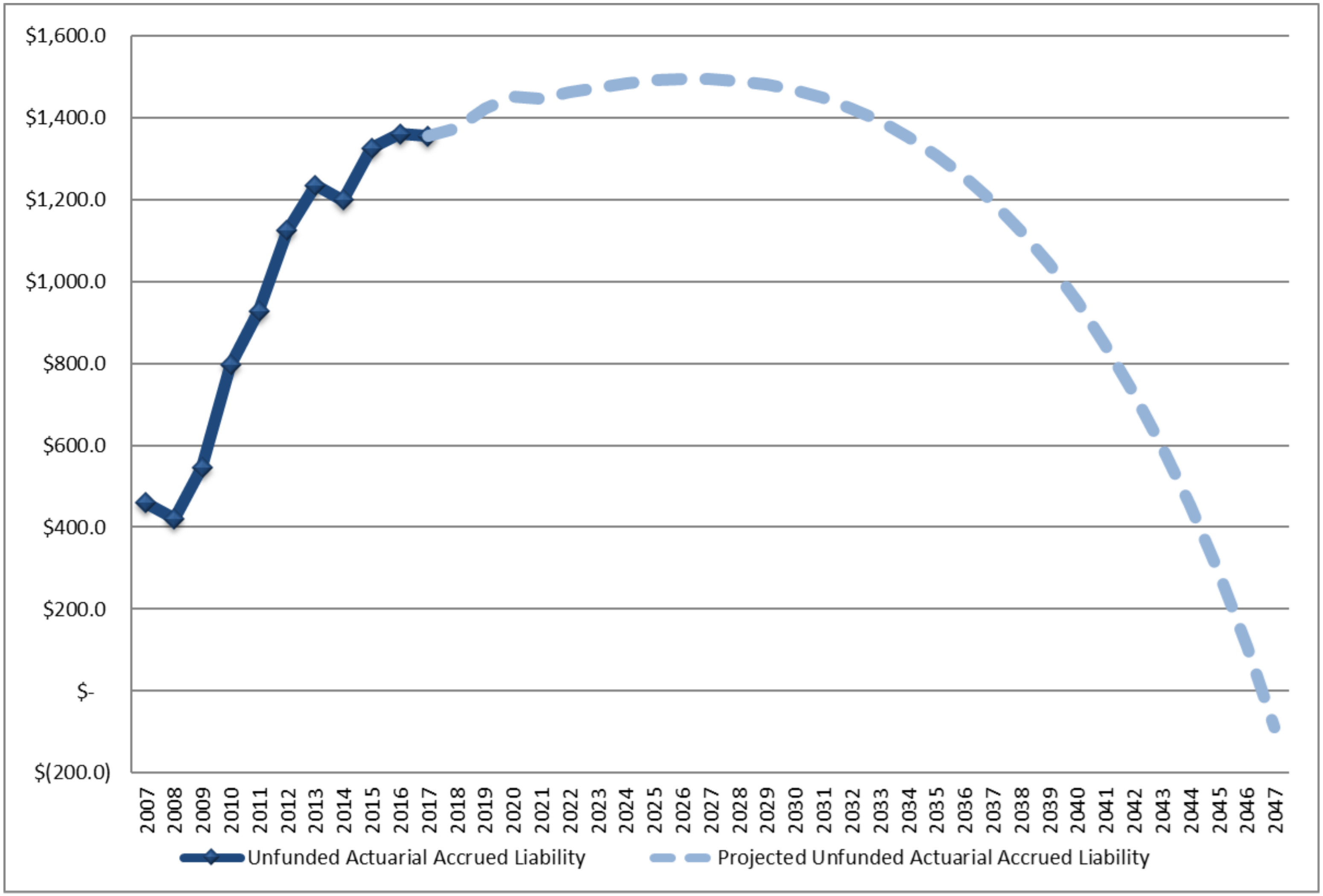
	July 1, 2017	July 1, 2016
Actuarial Accrued Liability:		
• Active Members	$1,545	$1,523
• Inactive Members	96	90
• Retirees and Beneficiaries	2,093	1,976
Total	**$3,734**	**$3,589**
Actuarial Assets	2,380	2,229
Unfunded Accrued Liability	$1,354	$1,360
Funded Ratio	63.7%	62.1%

Actuarially Determined Contribution

	For the Year Beginning	
	July 1, 2017	July 1, 2016
Normal Cost Rate	12.06%	12.04%
Member Rate	11.75%	11.75%
Employer Normal Cost Rate	0.31%	0.29%
Amortization of UAAL	12.69%	12.93%
Actuarially Determined Contribution	12.99%	13.22%
Statutory Employer Rate	12.75%	12.75%
Contribution Sufficiency/(Deficiency)	(0.24%)	(0.47%)

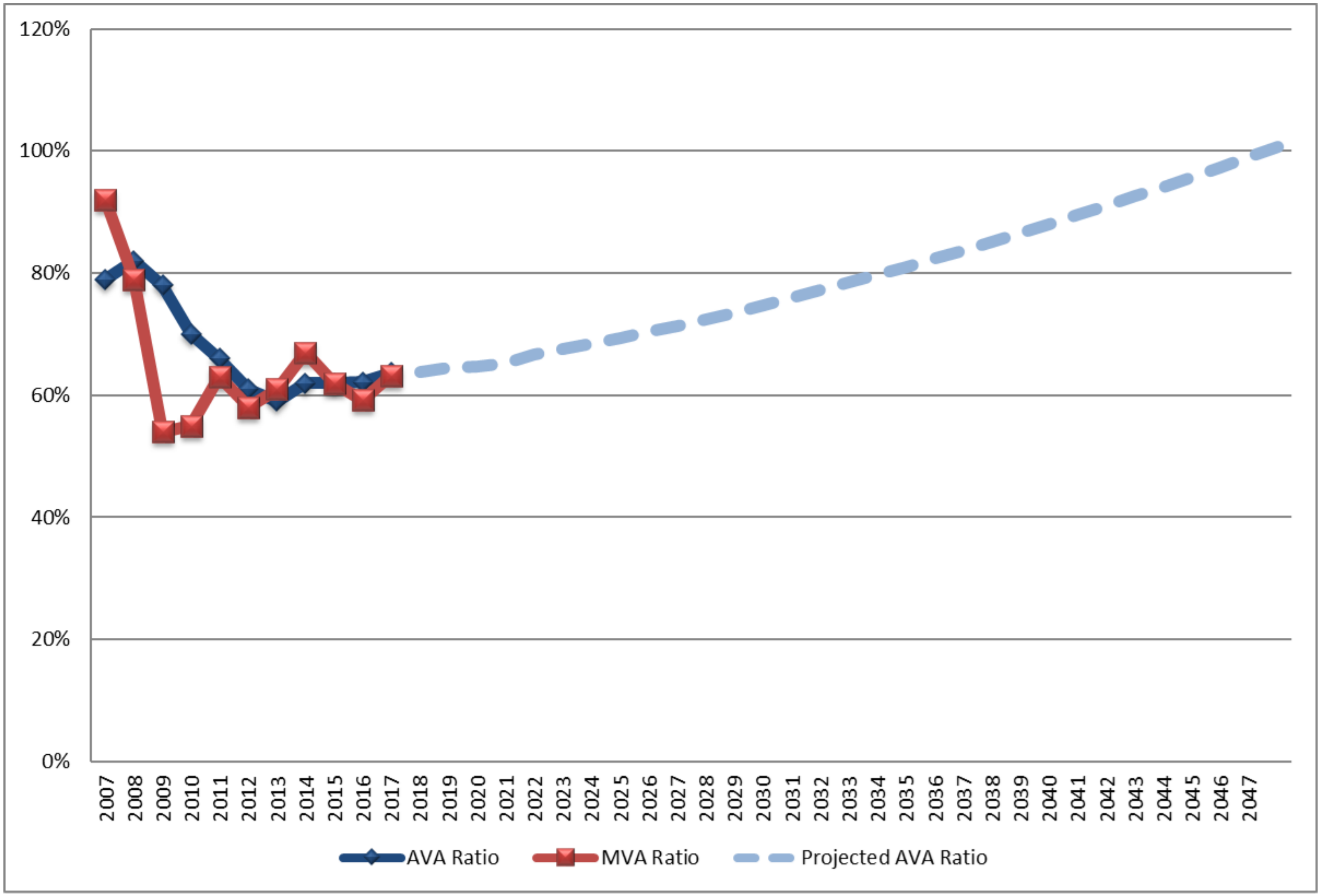
Unfunded Actuarial Accrued Liability

$ Millions



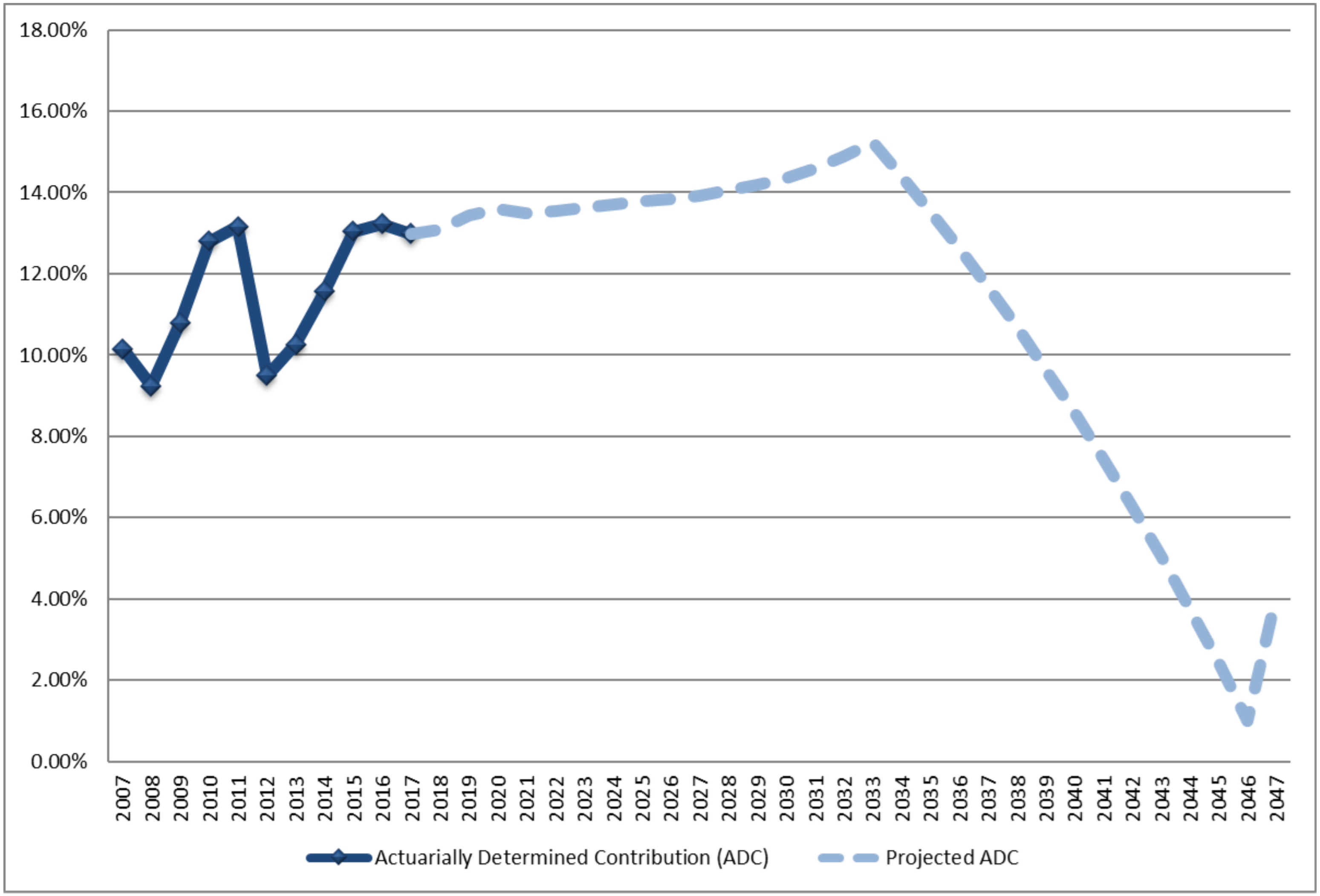
Projection based on all assumptions, including 7.75% investment return, realized as expected

Funded Ratio



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

Actuarially Determined Contribution (ADC)



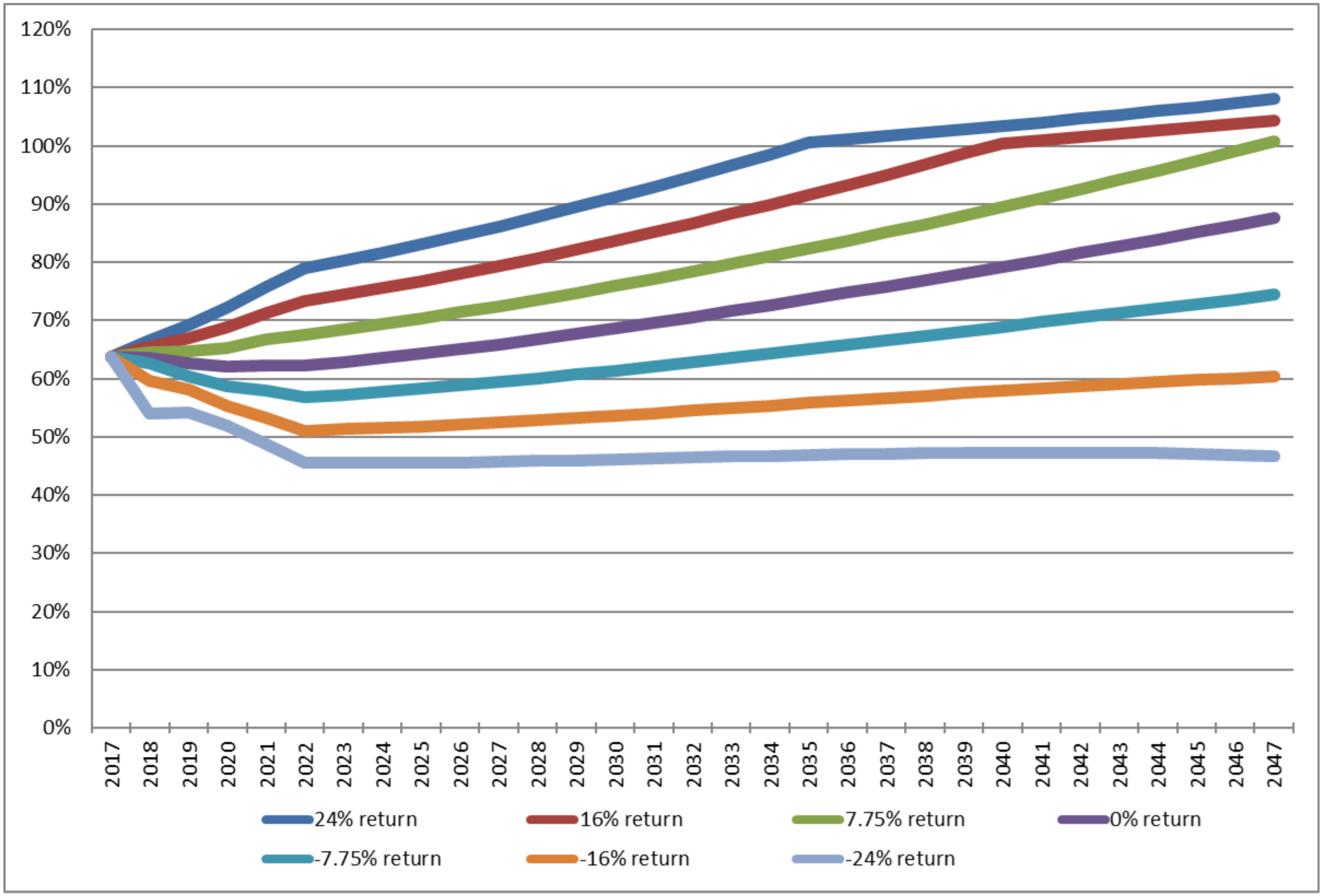
- For 2007 - 2013, the calculation of the ADC was based on a 30-year open level percentage of payroll amortization.
- Beginning in 2013, the period is 30-year closed. In 2033, when the remaining period reaches 10 years, it is assumed to operate as 10-year open
- 2012 and 2013 reflect the actuarial present 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 FY18 investment return scenarios ranging from -24% to +24%
  - Assumes Fund earns 7.75% per year in FY19 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)

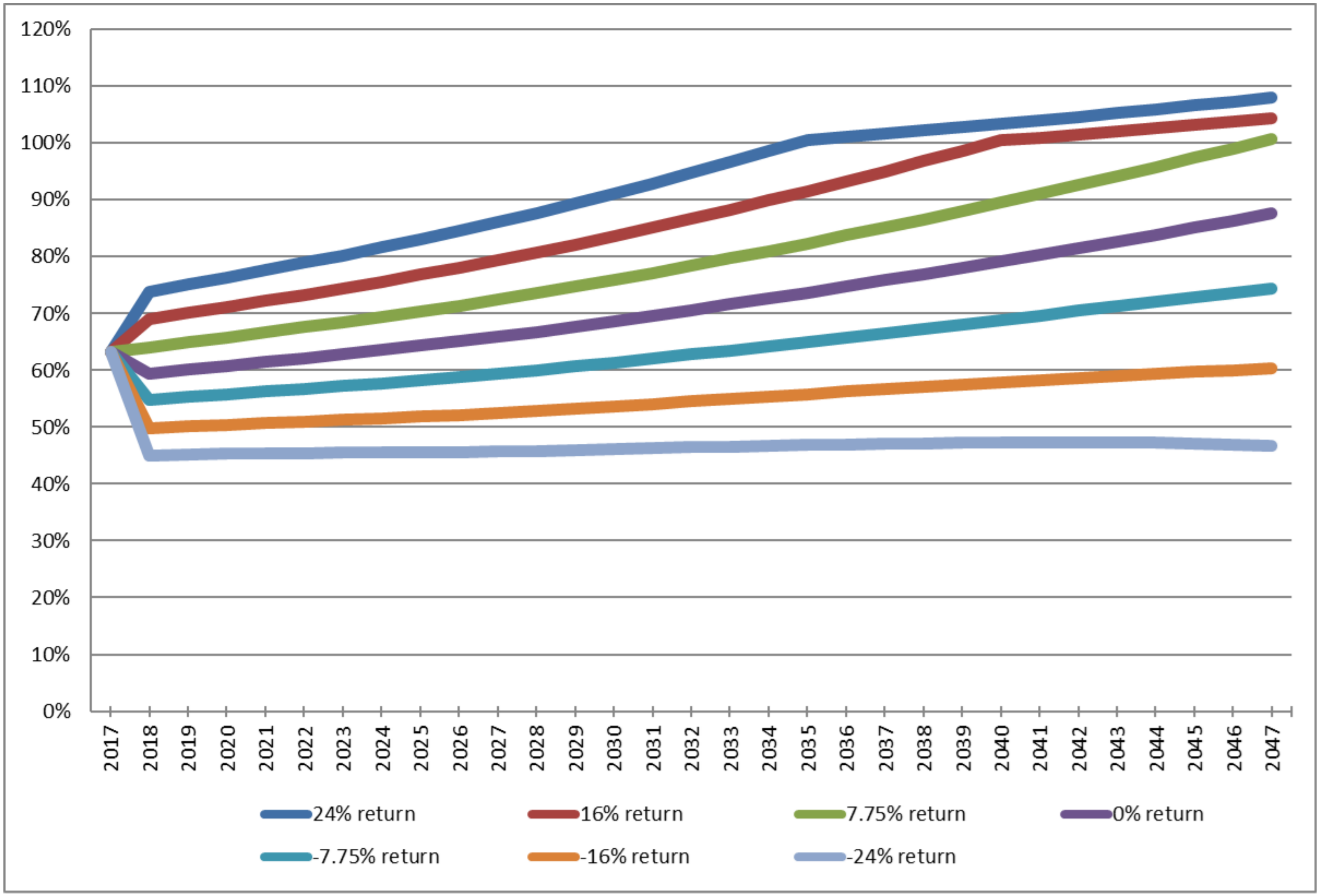
Projected Funded Ratios (AVA Basis)



Projected Funded Ratios (AVA Basis)

Valuation Year	24% for FY2018	16% for FY2018	7.75% for FY2018	0% for FY2018	-7.75% for FY2018	-16% for FY2018	-24% for FY2018
2017	64%	64%	64%	64%	64%	64%	64%
2018	67%	66%	65%	64%	63%	60%	54%
2019	69%	67%	65%	63%	60%	58%	54%
2020	72%	69%	65%	62%	59%	55%	52%
2021	76%	71%	67%	62%	58%	53%	49%
2022	79%	73%	68%	62%	57%	51%	45%
2027	86%	79%	72%	66%	59%	52%	46%
2032	95%	87%	78%	71%	63%	55%	46%
2037	102%	95%	85%	76%	67%	57%	47%
2042	105%	102%	93%	82%	70%	59%	47%
2047	108%	104%	101%	88%	74%	60%	47%

Projected Funded Ratios (MVA Basis)



Projected Funded Ratios (MVA Basis)

Valuation Year	24% for FY2018	16% for FY2018	7.75% for FY2018	0% for FY2018	-7.75% for FY2018	-16% for FY2018	-24% for FY2018
2017	63%	63%	63%	63%	63%	63%	63%
2018	74%	69%	64%	59%	55%	50%	45%
2019	75%	70%	65%	60%	55%	50%	45%
2020	76%	71%	66%	61%	56%	50%	45%
2021	78%	72%	67%	61%	56%	51%	45%
2022	79%	73%	68%	62%	57%	51%	45%
2027	86%	79%	72%	66%	59%	52%	46%
2032	95%	87%	78%	71%	63%	55%	46%
2037	102%	95%	85%	76%	67%	57%	47%
2042	105%	102%	93%	82%	70%	59%	47%
2047	108%	104%	101%	88%	74%	60%	47%

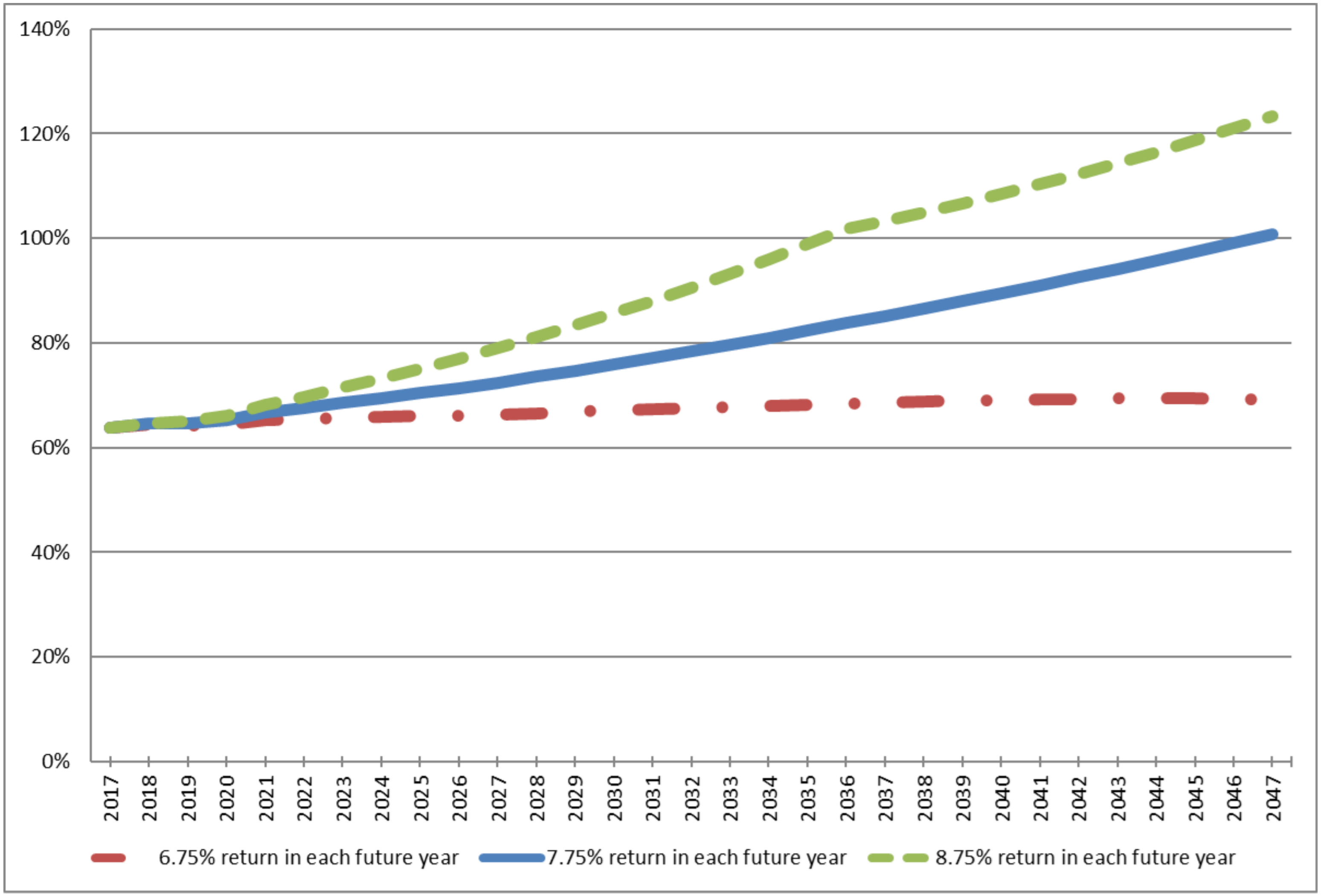
Projected Margin (AVA Basis)

Valuation Year	24% for FY2018	16% for FY2018	7.75% for FY2018	0% for FY2018	-7.75% for FY2018	-16% for FY2018	-24% for FY2018
2017	-0.24%	-0.24%	-0.24%	-0.24%	-0.24%	-0.24%	-0.24%
2018	0.36%	0.02%	-0.34%	-0.68%	-1.02%	-2.09%	-4.17%
2019	0.99%	0.17%	-0.68%	-1.48%	-2.28%	-3.13%	-4.60%
2020	1.80%	0.50%	-0.85%	-2.11%	-3.38%	-4.72%	-6.03%
2021	2.92%	1.12%	-0.73%	-2.46%	-4.20%	-6.05%	-7.85%
2022	3.87%	1.57%	-0.79%	-3.02%	-5.24%	-7.61%	-9.90%
2027	5.68%	2.30%	-1.18%	-4.45%	-7.72%	-11.21%	-14.58%
2032	9.08%	3.56%	-2.14%	-7.48%	-12.83%	-18.53%	-24.05%
2037	4.11%	8.78%	1.07%	-6.16%	-13.40%	-21.10%	-28.57%
2042	5.31%	4.07%	6.47%	-2.67%	-11.81%	-21.55%	-30.98%
2047	6.82%	5.24%	3.72%	1.58%	-10.05%	-22.43%	-34.43%

* 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 Funded Ratios (AVA Basis) Actual Returns +1% or -1% of Assumed



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

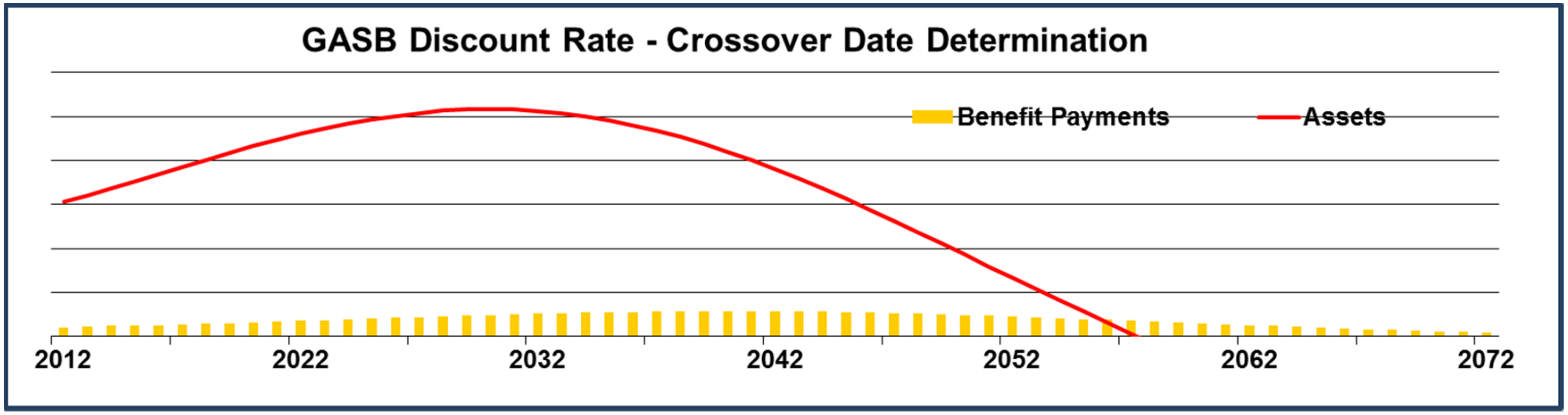
Valuation Year	6.75% Return in Each Future Year	7.75% Return in Each Future Year	8.75% Return in Each Future Year
2017	64%	64%	64%
2018	64%	65%	65%
2019	64%	65%	65%
2020	65%	65%	66%
2021	65%	67%	68%
2022	65%	68%	70%
2027	66%	72%	79%
2032	68%	78%	91%
2037	69%	85%	103%
2042	69%	93%	112%
2047	69%	101%	123%

GASB Discount Rate

- Determined annually based on a projection of benefit payments and assets
  - Benefit payments 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 30-year AA/Aa tax-exempt municipal bond index is used (3.58%)
    - 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, 2017, TFFR does not have a crossover date

Net Pension Liability ($ in millions)

Collective TFFR	June 30, 2017	June 30, 2016
Total Pension Liability at 7.75%	$3,734	$3,589
Fiduciary Net Plan Position (i.e., MVA)	2,360	2,124
Net Pension Liability (NPL)	1,374	1,465
Sensitivity to changes in discount rate		
• 1% decrease (6.75%)	$1,826	$1,900
• Current discount rate (7.75%)	1,374	1,465
• 1% increase (8.75%)	997	1,103

Reconciliation of Collective Net Pension Liability

($ in millions)	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
Balance as of June 30, 2016	$3,589	$2,124	$1,465
Changes for the year			
Service cost	75		75
Interest	277		277
Difference between expected and actual experience	(10)		(10)
Contributions – employer		86	(86)
Contributions – member		79	(79)
Contributions – purchased service credit and other		3	(3)
Net investment income		267	(267)
Benefit payments and refunds of contributions	(197)	(197)	0
Administrative expense		(2)	2
Changes of assumptions	-		-
Change of benefit terms	-		-
Net changes	145	236	(91)
Balance as of June 30, 2017	$3,734	$2,360	$1,374

Collective Pension Expense ($ in millions)

	Year ending June 30, 2017	Year ending June 30, 2016
Service cost	$75	$68
Interest on the total pension liability	276	265
Projected earning on plan investments	(163)	(165)
Contributions – member	(79)	(76)
Contributions – purchased service credit and other	(3)	(3)
Administrative expense	2	2
Current year of recognition of:		
• Change of assumptions	24	24
• Difference between expected and actual experience	(1)	0
• Difference between projected and actual earning on pension plan investments	0	20
• Change of benefit terms	0	0
Total pension expense	$132	$137

Numbers may not add due to rounding

Public Sector Topics In the News

- Actuarial Standards Board – New Standard is expected to be issued in draft format that will likely require:
  - Solvency liability would be disclosed with all funding valuations
    - Present value of accrued benefits discounted at U.S. Treasury Rates
  - Actuary should calculate and disclose a reasonable ADC
    - Normal cost based on each member's benefits
    - No perpetual negative amortization (where contribution is less than the normal cost plus interest on the UAAL)
  - Other suggested disclosures:
    - Assessment of when assets are expected to be depleted
    - Amortization period for fixed rate plans
    - Whether contribution is less than normal cost plus interest on the UAAL

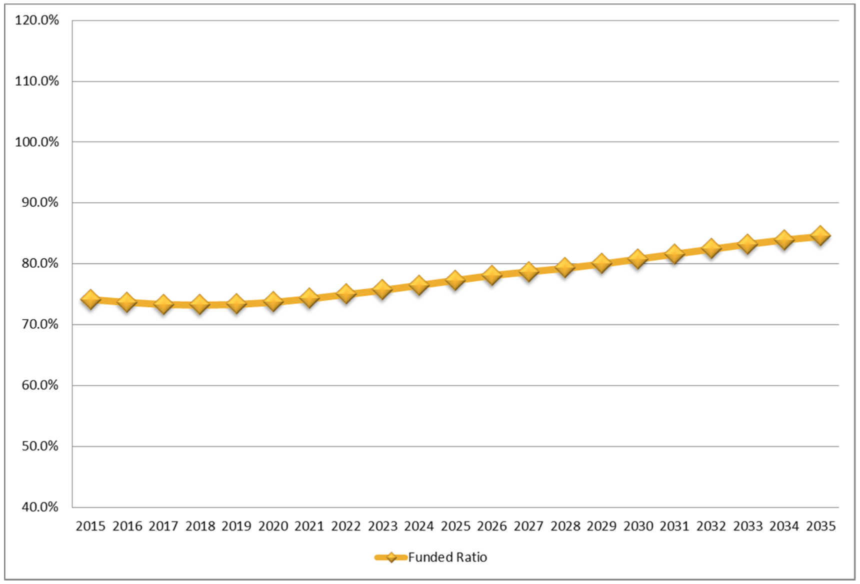
Public Sector Topics In the News (continued)

- Actuarial Standard of Practice on Assessment and Disclosure of Risk is expected this year:
  - Additional information will be required to be provided to intended users of the risks of future experience differing from the assumptions
  - Would apply when performing an actuarial funding valuation or a pricing valuation of a proposed change
  - Steps that actuary would need to take:
    - Identify the risks
    - Include an assessment of the risks identified
      - Scenario tests – impact of one possible event, several simultaneous events, or several sequential events
      - Sensitivity tests – impact of change in actuarial assumption or method
      - Stress test – impact of adverse changes in one or a few factors
      - Stochastic modeling
    - Actuary to recommend a more detailed assessment if actuary believes it would be beneficial to intended users

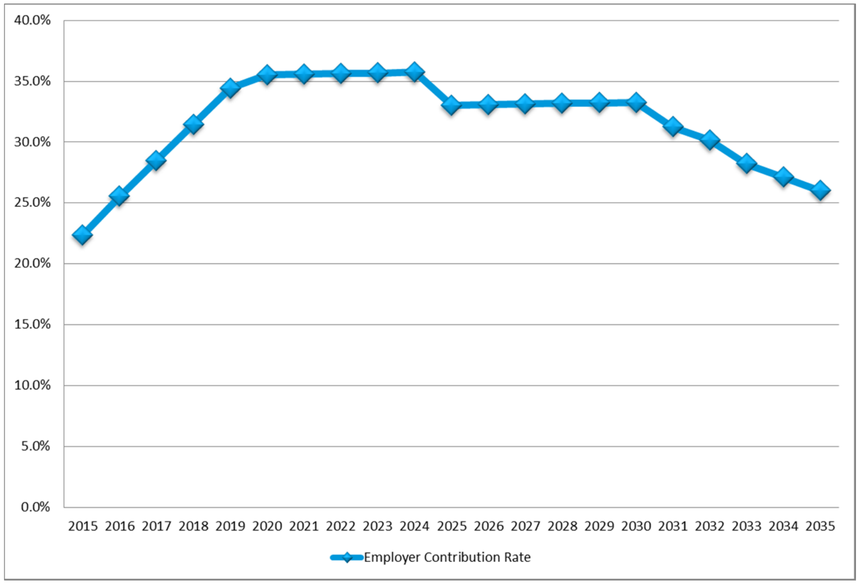
Deterministic Projections

- Projections provide a meaningful way to assess the long-term health of a pension plan
  - Not only provides information on what future funding measures might look like, but also their value relative to the current valuation date
- Deterministic projections are based on a defined set of inputs
  - "If this happens, then this is the result"
  - Useful for evaluating expected values for a given set of parameters
    - Quite often, inputs are based on all assumptions being met, with perhaps one or two deviations to demonstrate sensitivity

Funded Ratio (Sample)



Employer Contribution Rate (Sample)



Stochastic Projections

- Stochastic projections provide a view of expected outcomes with an element of probability attached
- Capital Market Assumptions (CMAs) are estimates for expected risk and return for a given set of asset classes, as well as the expected relationship between classes

Correlation Coefficients

Sample CMAs

Class	Expected Return	Risk/ Volatility	Core Fixed	Non-Core Fixed	US Equity	Non-US Equity	Emerging Equity	Real Estate
Core Fixed	2.6%	4.75%	1.00					
Non-Core Fixed	4.3%	14.25%	0.43	1.00				
US Equity	6.7%	19.00%	-0.07	0.64	1.00			
Non-US Equity	9.1%	24.00%	0.05	0.77	0.86	1.00		
Emerging Equity	11.2%	29.75%	0.09	0.77	0.76	0.92	1.00	
Real Estate	6.3%	18.75%	0.28	0.54	0.49	0.45	0.44	1.00

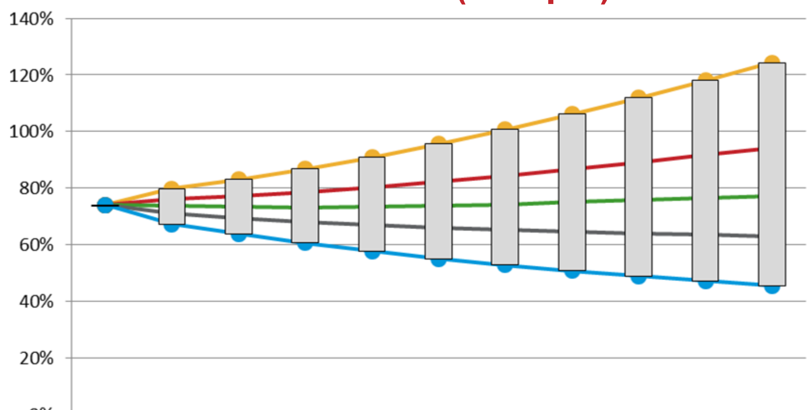
Stochastic Projections

- Portfolio investment returns are simulated using CMAs and the results of thousands of “trials” are tabulated into percentiles
  - **95th percentile**—5% chance of exceeding this value, 95% chance of falling below
  - **75th percentile**—25% chance of exceeding this value, 75% chance of falling below
  - **50th percentile (i.e., mean value)**—50/50 chance of exceeding or falling below this value
  - **25th percentile**—75% chance of exceeding this value, 25% chance of falling below
  - **5th percentile**—95% chance of exceeding this value, 5% chance of falling below
- Items can be modeled stochastically:
  - Expected investment return
  - Funded ratio
  - Actuarially determined contribution rate
  - Effective amortization period

Stochastic Projections

- Below are two graphs that show the funded ratio and employer contribution for a sample pension plan

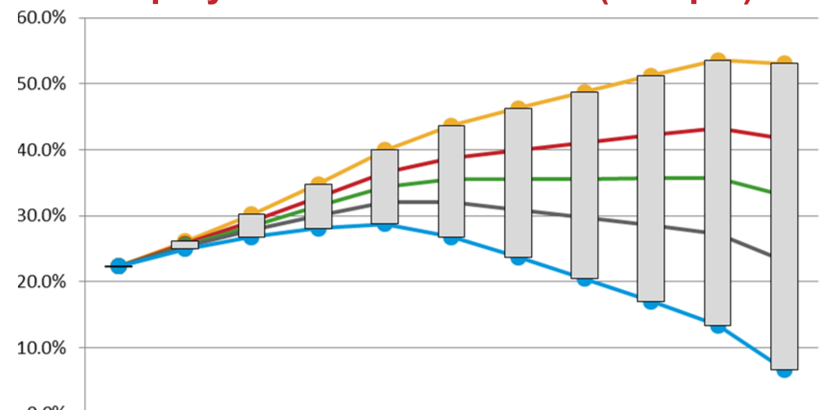
Funded Ratio (Sample)



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
95th	74%	80%	83%	87%	91%	96%	101%	106%	112%	118%	124%
75th	74%	76%	77%	79%	80%	82%	84%	87%	89%	92%	94%
50th	74%	74%	73%	73%	73%	74%	74%	75%	76%	76%	77%
25th	74%	71%	70%	68%	67%	66%	65%	65%	64%	64%	63%
5th	74%	67%	64%	61%	58%	55%	53%	51%	49%	47%	46%

95th 75th 50th 25th 5th

Employer Contribution Rate (Sample)



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
95th	22.4%	26.1%	30.2%	34.8%	39.9%	43.7%	46.3%	48.8%	51.2%	53.6%	53.0%
75th	22.4%	25.7%	29.1%	32.8%	36.6%	38.8%	39.9%	41.1%	42.2%	43.3%	41.6%
50th	22.4%	25.5%	28.5%	31.4%	34.4%	35.5%	35.6%	35.6%	35.7%	35.7%	33.0%
25th	22.4%	25.3%	27.8%	30.1%	32.1%	32.0%	30.9%	29.7%	28.5%	27.3%	23.2%
5th	22.4%	25.0%	26.8%	28.1%	28.7%	26.8%	23.7%	20.4%	17.0%	13.4%	6.7%

95th 75th 50th 25th 5th

- For example, the sample tables above illustrate that there is a 25% probability of being less than 63% funded by 2025 and the contribution rate exceeding 41.6%

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, 2017, 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.

Segal Consulting

North Dakota Teachers' Fund for Retirement

Actuarial Valuation and Review as of July 1, 2017

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 13, 2017

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, 2017.

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. Both are Fellows of the Society of Actuaries, Enrolled Actuaries, and Members of the American Academy of Actuaries, and both are experienced in performing valuations for large public retirement systems. They both 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 26 years beginning July 1, 2017, 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 (26 years remaining as of July 1, 2017). For this calculation, payroll is assumed to increase 3.25% per year. As of July 1, 2017, the ADC is 12.99%, compared to 13.22% last year. This is greater than the 12.75% rate currently required by law.

The decrease in ADC is primarily driven by an actuarial gain on assets and demographic experience emerging more favorably than assumed.

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, 2016, was 62.1%, while it is 63.7% as of July 1, 2017. Based on the market value of assets rather than the actuarial value of assets, the funded ratio increased to 63.2%, compared to 59.2% last year.

The Plan has a net investment loss of $19 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 2015 and FY 2016 offset by market gains in FY 2014 and FY 2017. As these losses are recognized over the next four years, the funded ratio is expected to slightly decline, assuming the plan earns 7.75% 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, 2017, 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
Vice President and Actuary

Table of Contents

North Dakota Teachers' Fund for Retirement Actuarial Valuation and Review as of July 1, 2017

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, 2017. 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, 2017 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, 2017, provided by the North Dakota Retirement and Investment Office;
- The assets of the Plan as of June 30, 2017, 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, 2017, under the North Dakota Century Code is equal to 12.75% of payroll for employers. Compared to the actuarially determined contribution of 12.99% of payroll, there is a contribution deficiency of 0.24% of payroll as of July 1, 2017. The actuarially determined contribution rate defined by the Plan's funding policy is based on a 26-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 27 years; only one year longer than the Plan's funding policy amortization period.
3. Actual employer contributions made during the fiscal year ending June 30, 2017 were $86,058,868, which is 97.7% of the actuarially determined contribution. In the prior fiscal year, actual contributions were $82,839,932, which is 97.8% 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, 2017, is 63.7%, compared to 62.1% as of July 1, 2016. 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, 2017, Segal has determined that the asset return on a market value basis was 12.6%. After gradual recognition of investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 8.2%. This represents an experience gain when compared to the assumed rate of 7.75%. As of June 30, 2017, the actuarial value of assets ($2.380 billion) represented 100.8% of the market value ($2.360 billion).
6. The portion of deferred investment gains and losses recognized during the calculation of the July 1, 2017, actuarial value of assets contributed to a gain of $9.5 million. The demographic and liability experience resulted in a $11.1 million gain.
7. As mentioned above, the current method used to determine the actuarial value of assets yields an amount that is 100.8% of the market value of assets as of June 30, 2017. 100.8% 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 decreased from $1,465,058,563 as of June 30, 2016, to $1,373,525,753 as of June 30, 2017.
10. The Fund's cash flow (contributions minus benefit payments, refunds, and expenses) as a percentage of the market value of assets is -1.3% as of June 30, 2017, compared to -1.2% as of June 30, 2016. 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.

Summary of Key Valuation Results

		2017	2016
Demographic data for plan year beginning July 1	• Number of retirees and beneficiaries	8,501	8,249
	• Number of inactive vested members	1,600	1,601
	• Number of inactive non-vested members contributions	878	779
	• Number of active members	10,874	10,813
	• Total payroll supplied by System, annualized	$650,052,674	$627,002,353
	• Average payroll supplied by System, annualized	$59,780	$57,986
Statutory contributions for fiscal year beginning July 1:	• Member rate	11.75%	11.75%
	• Employer rate	12.75%	12.75%
	• Actuarially determined contribution rate	12.99%	13.22%
	• Margin/(deficit)	-0.24%	-0.47%
Actuarial accrued liability for plan year beginning July 1:	• Retirees and beneficiaries	$2,092,923,830	$1,976,315,201
	• Inactive vested members	89,410,993	84,502,367
	• Inactive non-vested members	6,560,485	5,214,727
	• Active members	1,545,121,520	1,523,361,556
	• Total	$3,734,016,828	$3,589,393,851
	• Normal cost including administrative expenses for plan year beginning July 1	$83,230,495	$80,236,633
Assets for plan year beginning July 1:	• Market value of assets (MVA)	$2,360,491,075	$2,124,335,288
	• Actuarial value of assets (AVA)	2,379,811,205	2,229,292,988
	• Actuarial value of assets as a percentage of market value of assets	100.8%	104.9%
Funded status for plan year beginning July 1:	• Unfunded/(overfunded) actuarial accrued liability on market value of assets	$1,373,525,753	$1,465,058,563
	• Funded percentage on MVA basis	63.2%	59.2%
	• Unfunded/(overfunded) actuarial accrued liability on actuarial value of assets	$1,354,205,623	$1,360,100,863
	• Funded percentage on AVA basis	63.7%	62.1%
	• Effective amortization period	27 years	29 years
GASB information:	• Discount rate	7.75%	7.75%
	• Total pension liability	$3,734,016,828	$3,589,393,851
	• Plan fiduciary net position	2,360,491,075	2,124,335,288
	• Net pension liability	$1,373,525,753	$1,465,058,563
	• Plan fiduciary net position as a percentage of total pension liability	63.2%	59.2%
Gains/(losses):	• Asset experience	$9,464,023	-$33,588,108
	• Liability experience	11,371,394	-7,742,413
	• Administrative expenses	-275,066	133,635
	• Assumption/method changes	0	0
	• Total gain/(loss)	$20,560,351	-$41,196,887

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: 2008 –2017

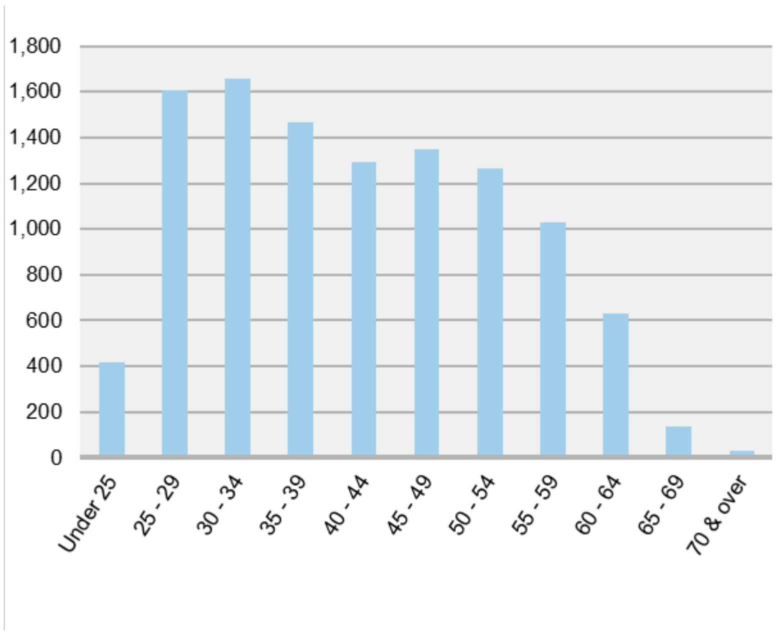
As of July 1	Active Members	Inactive Vested Members	Inactive Non-vested Members	Retirees and Beneficiaries	Ratio of Actives to Retirees and Beneficiaries
2008	9,561	1,459	229	6,317	1.51
2009	9,707	1,490	292	6,466	1.50
2010	9,907	1,472	331	6,672	1.48
2011	10,004	1,463	407	6,933	1.44
2012	10,014	1,483	468	7,151	1.40
2013	10,138	1,500	563	7,489	1.35
2014	10,305	1,509	661	7,747	1.33
2015	10,514	1,607	660	8,025	1.31
2016	10,813	1,601	779	8,249	1.31
2017	10,874	1,600	878	8,501	1.28

Active Members

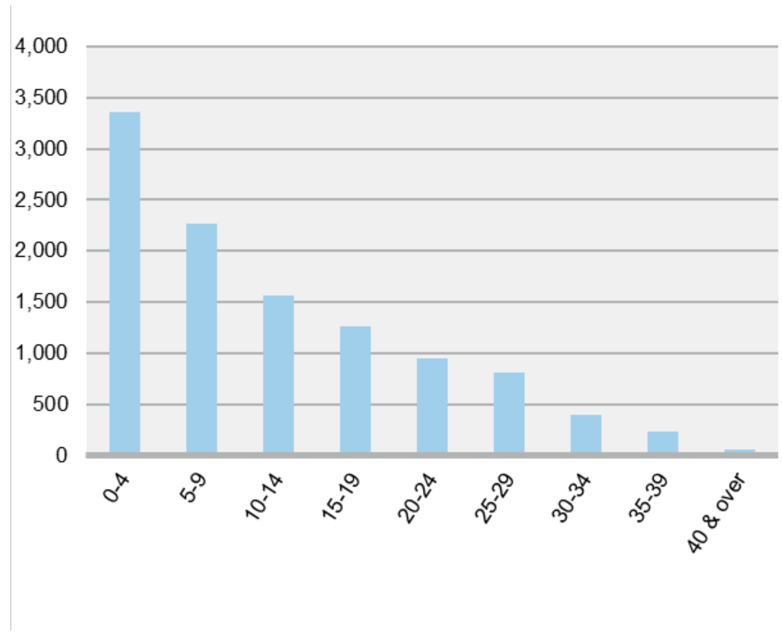
Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 10,874 active members with an average age of 42.1 and average years of service of 11.9 years. The 10,813 active members in the prior valuation had an average age of 42.3 and average service of 12.1 years.

Distribution of Active Participants as of July 1, 2017

ACTIVES BY AGE



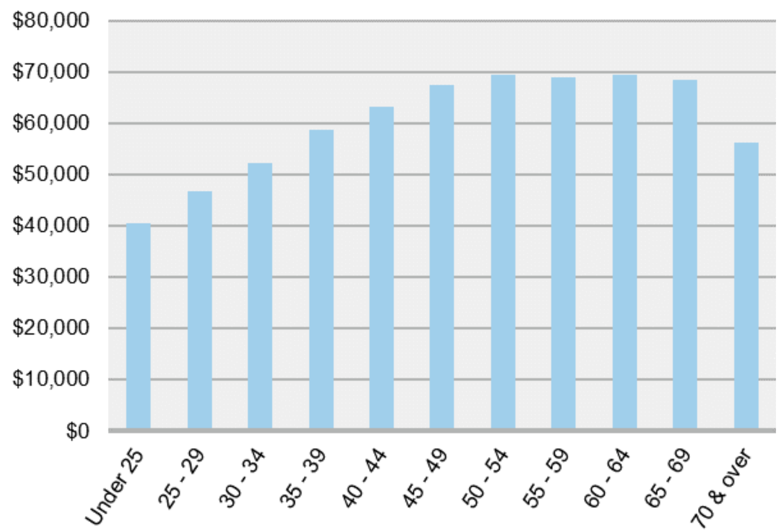
ACTIVES BY YEARS OF SERVICE



In this year's valuation, there were 10,874 active members with an average compensation of $59,780. The 10,813 active members in the prior valuation had an average compensation of $57,986.

Distribution of Active Participants as of July 1, 2017

ACTIVES BY AGE AND AVERAGE COMPENSATION



Inactive Members

In this year's valuation, there were 1,600 members with a vested right to a deferred or immediate vested benefit.

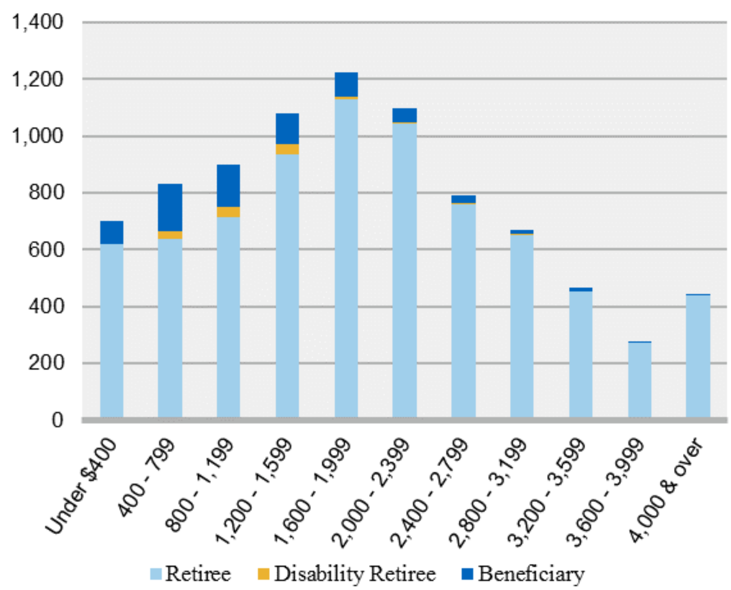
In addition, there were 878 non-vested members entitled to a return of their employee contributions.

Retirees and Beneficiaries

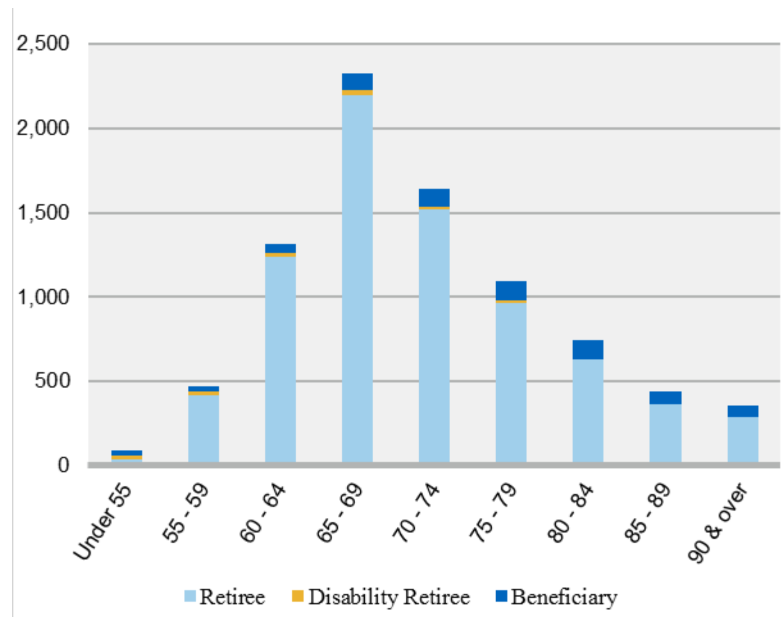
As of July 1, 2017, 7,792 retirees and 709 beneficiaries were receiving total monthly benefits of $16,576,096. For comparison, in the previous valuation, there were 7,563 retirees and 686 beneficiaries receiving monthly benefits of $15,602,746.

Distribution of Retirees and Beneficiaries as of July 1, 2017

RETIREES AND BENEFICIARIES BY TYPE AND MONTHLY AMOUNT



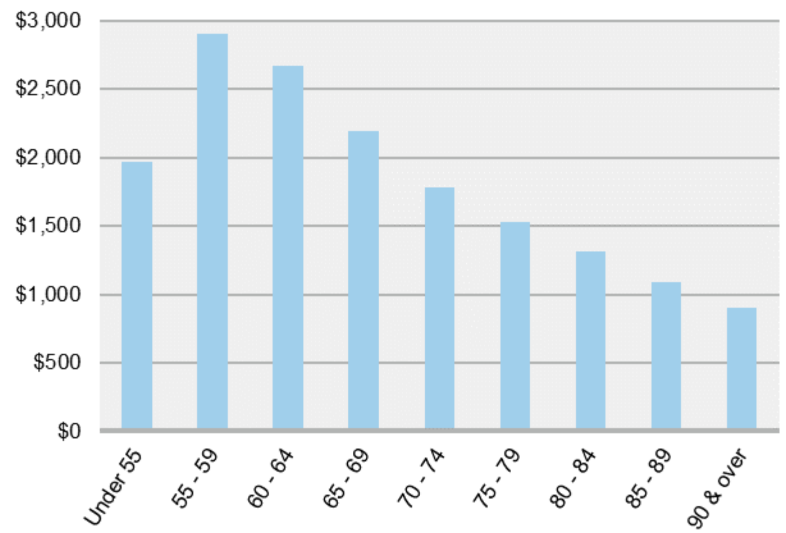
RETIREES AND BENEFICIARIES BY TYPE AND BY AGE



As of July 1, 2017, the average monthly benefit for retirees is $1,950, compared to $1,891 in the previous valuation. The average age for retirees is 71.7 in the current valuation, compared with 71.4 in the prior valuation.

Distribution of Retirees and Beneficiaries as of July 1, 2017

RETIREES AND BENEFICIARIES BY AGE AND AVERAGE MONTHLY AMOUNT



Historical Plan Population

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

ACTIVE MEMBER DATA STATISTICS: 1998 – 2017

	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
1998	9,896	-1.1%	298.4	1.5%	30,156	2.6%	43.5	14.0
1999	10,046	1.5%	314.6	5.4%	31,318	3.9%	44.0	14.4
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

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

SERVICE RETIREES DATA STATISTICS: 2008 – 2017

	Service Retirees		Average Annual Amount		
As of July 1	Number	Percent Change	$ Amount	Percent Change	Average Age
2008	5,695	3.8%	18,361	3.0%	70.8
2009	5,833	2.4%	18,806	2.4%	70.8
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

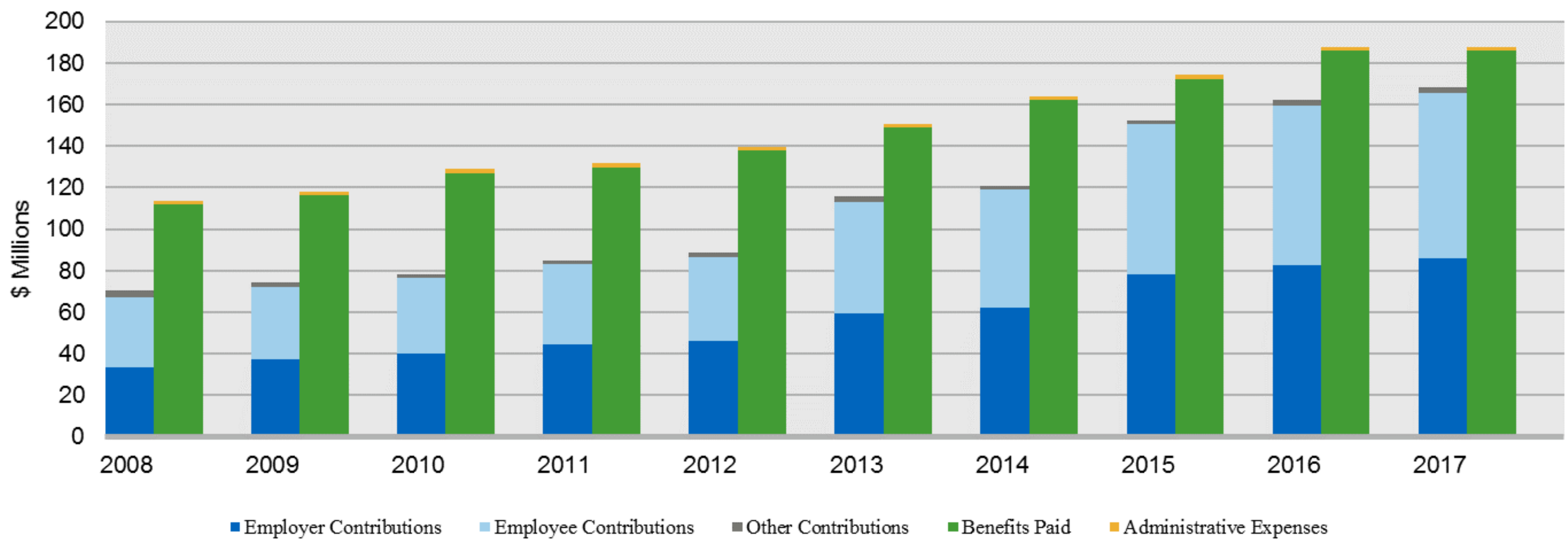
This table does not include disability retirees or beneficiaries.

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, 2008 – 2017



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. A characteristic of the asset valuation method is that, over time, it is more likely to produce an actuarial value of assets that is less than the market value of assets. The asset method provides a degree of conservatism to increase the likelihood that benefits are funded. 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, 2017, AND JUNE 30, 2016

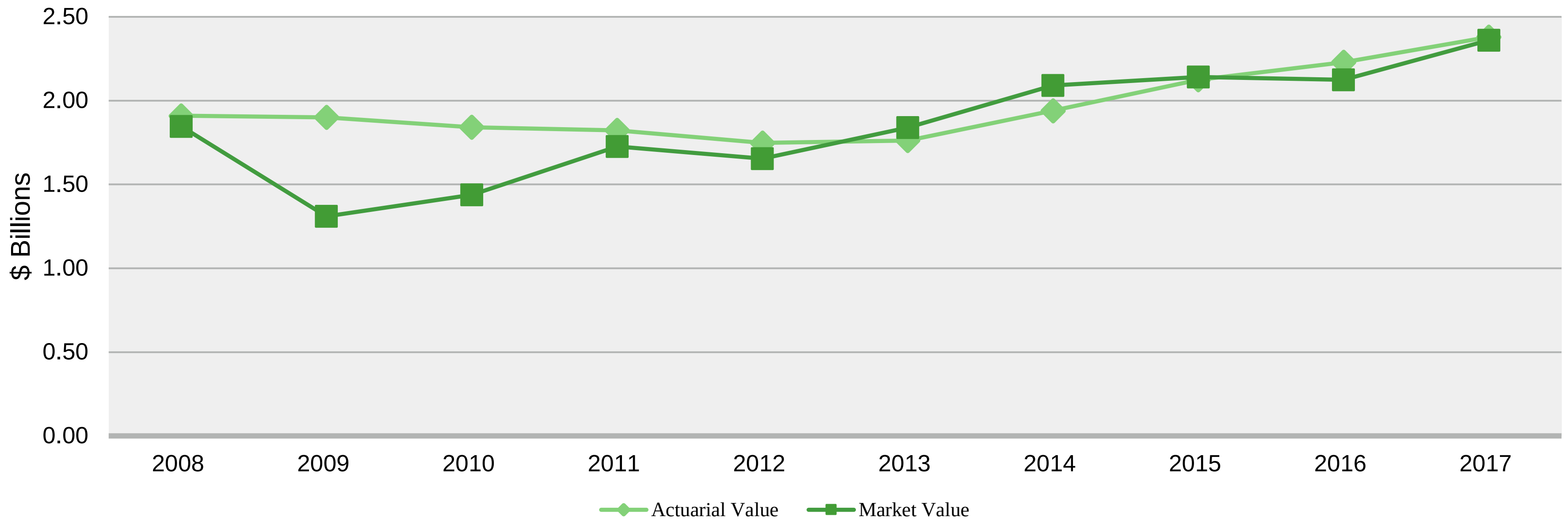
				2017		2016
1.	Market value of assets available for benefits			$2,360,491,075		$2,124,335,288
2.	Calculation of unrecognized return*	Original Amount**	% Not Recognized		% Not Recognized	
	a. Year ended June 30, 2017	$103,235,815	80%	$82,588,652		
	b. Year ended June 30, 2016	-156,759,166	60%	-94,055,500	80%	-$125,407,333
	c. Year ended June 30, 2015	-93,205,396	40%	-37,282,158	60%	-55,923,238
	d. Year ended June 30, 2014	147,144,380	20%	29,428,876	40%	58,857,751
	e. Year ended June 30, 2013	87,575,593		0	20%	17,515,119
	f. Total unrecognized return			-$19,230,130		-$104,957,700
3.	Actuarial value of assets (Current Assets): 1 – 2f			$2,379,811,205		$2,229,292,288
4.	Actuarial value as a percent of market value: 3 ÷ 1			100.8%		104.9%

* 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, 2008 – 2017



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 gain is $20,560,351, which includes $9,464,023 from investment gains and $11,096,328 in net gains from all other sources. The net experience variation from individual sources other than investments was 0.3% 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, 2017

1.	Net gain/(loss) from investments*	$9,464,023
2.	Net gain/(loss) from administrative expenses	-275,066
3.	Net gain/(loss) from liability and other experience	11,371,394
4.	Net experience gain/(loss): 1 + 2 + 3	$20,560,351

* 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 12.64% for the year ended June 30, 2017.

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 2017 plan year was 8.18%. Since the actual return for the year was greater than the assumed return, the Plan experienced an actuarial gain during the year ended June 30, 2017 with regard to its investments.

INVESTMENT EXPERIENCE

		Year Ended June 30, 2017		Year Ended June 30, 2016	
		Market Value	Actuarial Value	Market Value	Actuarial Value
1.	Value assets at the beginning of year	$2,124,335,288	$2,229,292,988	$2,141,920,800	$2,125,017,451
2.	Contributions during the fiscal year	168,157,111	168,157,111	161,995,828	161,995,828
3.	Benefits and expense during the fiscal year	198,689,975	198,689,975	-187,820,336	-187,820,336
4.	Value of assets at end of year	2,360,491,075	2,379,811,205	2,124,335,288	2,229,292,988
5.	Net investment income: 4 – 1 – 2 +3	$266,688,651	$181,051,081	$8,238,996	$130,100,044
6.	Average value of assets: 1 + [2 – 3] x ½	$2,109,068,856	$2,214,026,556	$2,129,008,546	$2,112,105,197
7.	Rate of return: 5 ÷ 6	12.64%	8.18%	0.39%	6.16%
8.	Assumed rate of return	7.75%	7.75%	7.75%	7.75%
9.	Expected investment income: 6 x 8	$163,452,836	$171,587,058	$164,998,162	$163,688,153
10.	Actuarial gain/(loss): 5 – 9	$103,235,815	$9,464,023	-$156,759,166	-$33,588,108

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: 1988 - 2017

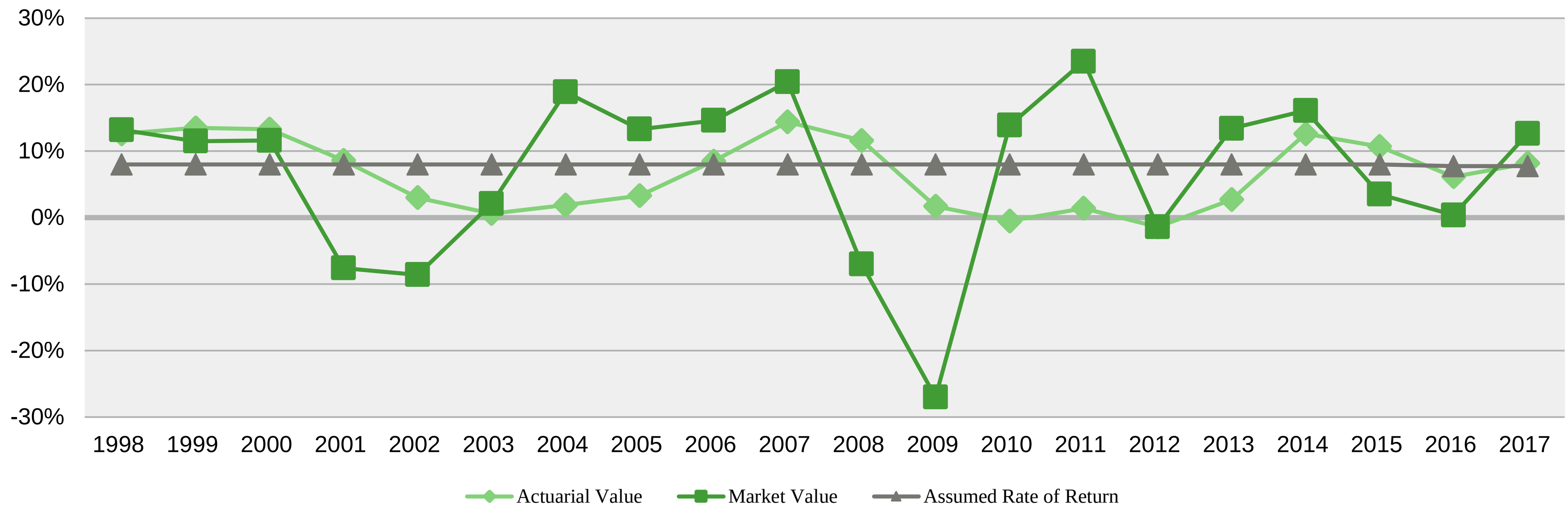
Year Ended June 30	Market Value	Actuarial Value	Year Ended June 30	Market Value	Actuarial Value	Year Ended June 30	Market Value	Actuarial Value
1988	5.0%	7.3%	1998	13.2%	12.6%	2008	-7.0%	11.6%
1989	14.3	8.6	1999	11.5	13.5	2009	-27.0	1.7
1990	6.7	7.7	2000	11.6	13.3	2010	13.9	-0.5
1991	7.5	5.8	2001	-7.6	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

	Market Value	Actuarial Value
Most recent five-year average return	9.0%	8.0%
Most recent ten-year average return	3.8%	5.2%
Most recent 15-year average return	7.0%	5.3%
Most recent 20-year average return	6.1%	6.5%
Most recent 30-year average return	7.7%	7.1%

Note: For 2011-2017, 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, 1998 - 2017



Administrative Expenses

Administrative expenses for the year ended June 30, 2017 totaled $2,173,431 compared to the assumption of $1,902,577. This resulted in a loss of $275,066 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, 2017 amounted to $11,371,394, which is 0.3% of the actuarial accrued liability.

EXPERIENCE DUE TO CHANGES IN DEMOGRAPHICS FOR YEAR ENDED JUNE 30, 2017

Turnover	-$2,012,594
Retirement	-1,502,862
Deaths among retired members and beneficiaries	9,358,428
Salary/service increase for continuing actives	9,408,089
New entrants	-4,865,404
Miscellaneous	985,737
Total gain/ (loss)	**$11,371,394**

D. Changes in the Actuarial Accrued Liability

The actuarial accrued liability as of July 1, 2017 is $3,734,016,828, an increase of $144,622,977, or 4.0%, 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: 2008 - 2017

		Disbursements or Expenditures						
Year Ended June 30	Contributions[1]	Benefit Payments	Refunds	Administrative Expenses	Total Disbursements	Net Cash Flow for the Year[2]	Market Value of Assets	Net Cash Flow as Percent of Market Value
2008	$70,573,389	($106,456,334)	($5,500,476)	($1,639,521)	($113,596,331)	($43,022,942)	$1,846,113,411	-2.3%
2009	74,380,980	(113,966,079)	(2,362,251)	(1,707,506)	(118,035,836)	(43,654,856)	1,309,716,730	-3.3%
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%

[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, 2017, AND JUNE 30, 2016

			2017		2016
1.	Unfunded/(overfunded) actuarial accrued liability at beginning of year		$1,360,100,863		$1,324,758,531
2.	Normal cost at beginning of year		77,315,074		70,147,697
3.	Total contributions		168,157,111		161,995,828
4.	Interest on:				
	a. Unfunded actuarial accrued liability and normal cost	$111,399,735		$108,105,233	
	b. Total contributions	5,892,587		5,676,683	
	c. Total interest: 4a – 4b		$117,292,322		$102,428,550
5.	Expected unfunded/(overfunded) actuarial accrued liability		$1,374,765,974		$1,335,338,949
6.	Changes due to (gain)/loss:				
	a. Investments	-$9,464,023		$33,588,108	
	b. Demographics	-11,096,328		7,608,779	
	c. Total changes due to (gain)/loss: 6a + 6b		(20,560,351)		41,196,887
7.	Changes due to plan amendments		0		0
8.	Changes in actuarial cost method		0		0
9.	Changes in actuarial assumptions		0		0
10.	Changes due to actuarial audit		0		-16,434,973
11.	Unfunded/(overfunded) actuarial accrued liability at end of year: 5 + 6c + 7 + 8 + 9 + 10		$1,354,205,623		$1,360,100,863

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 12.99% 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, 2017, there are 26 years remaining on this schedule. The employer contribution rate set by the TFFR is currently 12.75% of payroll. Since the actuarially determined contribution is 12.99% of payroll, there is a deficit of 0.24% of payroll. The calculated employer normal cost (including expenses) is 0.31% of payroll. The remaining 12.69% of payroll will amortize the unfunded actuarial accrued liability over a period of 26 years.

The contribution requirement as of July 1, 2017 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			
		2017		2016	
		Amount	% of Payroll	Amount	% of Payroll
1.	Total normal cost, adjusted for timing*	$83,230,495	12.06%	$80,236,633	12.04%
2.	Expected employee contributions	81,117,159	11.75%	78,305,065	11.75%
3.	Employer normal cost, adjusted for timing*: 1 - 2	$2,113,336	0.31%	$1,931,568	0.29%
4.	Actuarial accrued liability	3,734,016,828		3,589,393,851	
5.	Actuarial value of assets	2,379,811,205		2,229,292,988	
6.	Unfunded/(overfunded) actuarial accrued liability: 4 – 5	1,354,205,623		1,360,100,863	
7.	Payment on unfunded actuarial accrued liability, adjusted for timing*	87,579,901	12.69%	86,189,591	12.93%
8.	Total recommended contribution: 3 + 7	$89,693,237	12.99%	$88,121,159	13.22%
9.	Total payroll supplied by System, annualized	$650,052,674		$627,002,353	
10.	Projected annual payroll for fiscal year beginning July 1	$690,358,799		$666,426,087	

* 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, 2017		July 1, 2016
1.	Prior valuation		13.22%		13.04%
2.	Increases/(decreases) due to:				
	• Effect of change in amortization period (decrease from 28 years to 27 years remaining as of July 1, 2016 and decrease from 27 years to 26 years remaining as of July 1, 2017)	0.00%		0.00%	
	• Effect of change in covered payroll and normal cost	-0.03%		-0.39%	
	• Effect of contributions (more)/less than actuarially determined contribution: 12.75% rather than 13.04% for FY2016 and 12.75% rather than 13.22% for FY2017	-0.01%		-0.06%	
	• Effect of gains and losses on accrued liability	-0.10%		0.07%	
	• Effect of investment (gain)/loss	-0.09%		0.32%	
	• 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%		0.24%	
	Total change		-0.23%		0.18%
3.	Current valuation: 1 + 2		12.99%		13.22%
4.	Statutory employer contribution rate		12.75%		12.75%
5.	Margin available [contribution sufficiency/(deficiency)]: 4 – 3		-0.24%		-0.47%

* Change to valuation software as a result of the actuarial audit

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: 2008 – 2017

Fiscal Year Ended June 30	Actuarially Determined Employer Contribution (ADC)[1]		Actual Employer Contribution[2]		Percent Contributed
	Amount[3]	Percentage of Payroll[4]	Amount	Percentage of Payroll	
2008	$44,114,585	10.15%	$33,683,550	7.75%	76.4%
2009	41,986,174	9.24%	37,487,655	8.25%	89.3%
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%

[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.

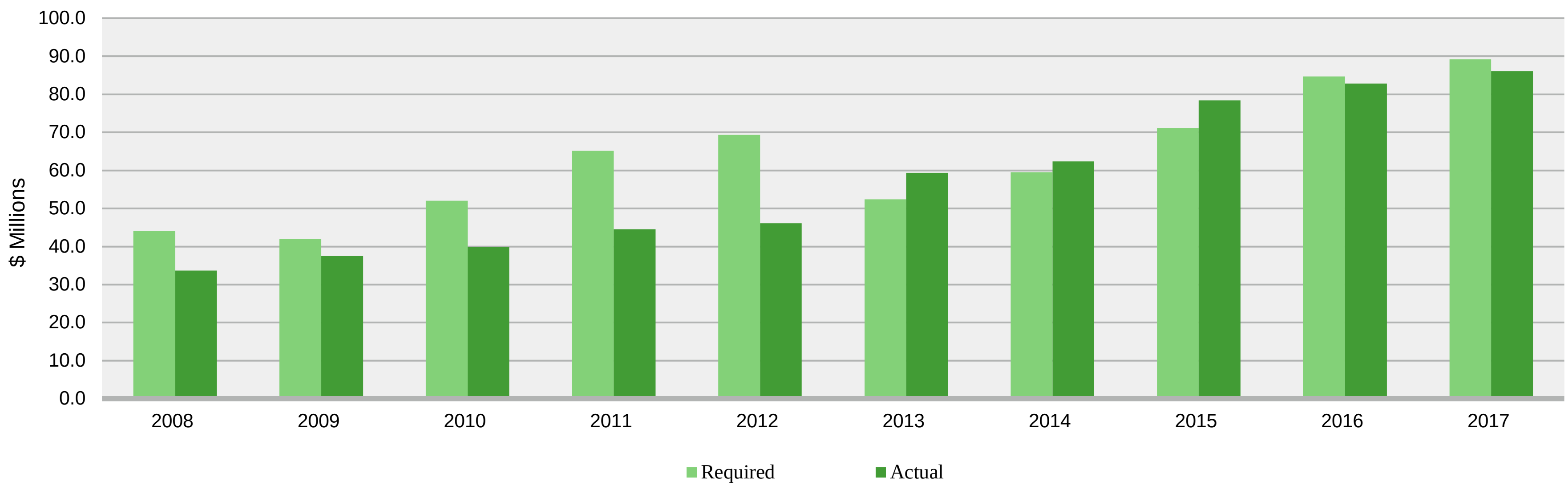
[3] The dollar amount of the ADC for FY 2014 through FY 2017 is based on actual payroll for the year and differs from the estimated dollar amount shown in the prior year's actuarial valuation report because of differences between estimated and actual payroll.

[4] The ADC for each fiscal year is based on the actuarial valuation as of the beginning of the year. Therefore, the FY 2017 ADC is based on the July 1, 2016 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

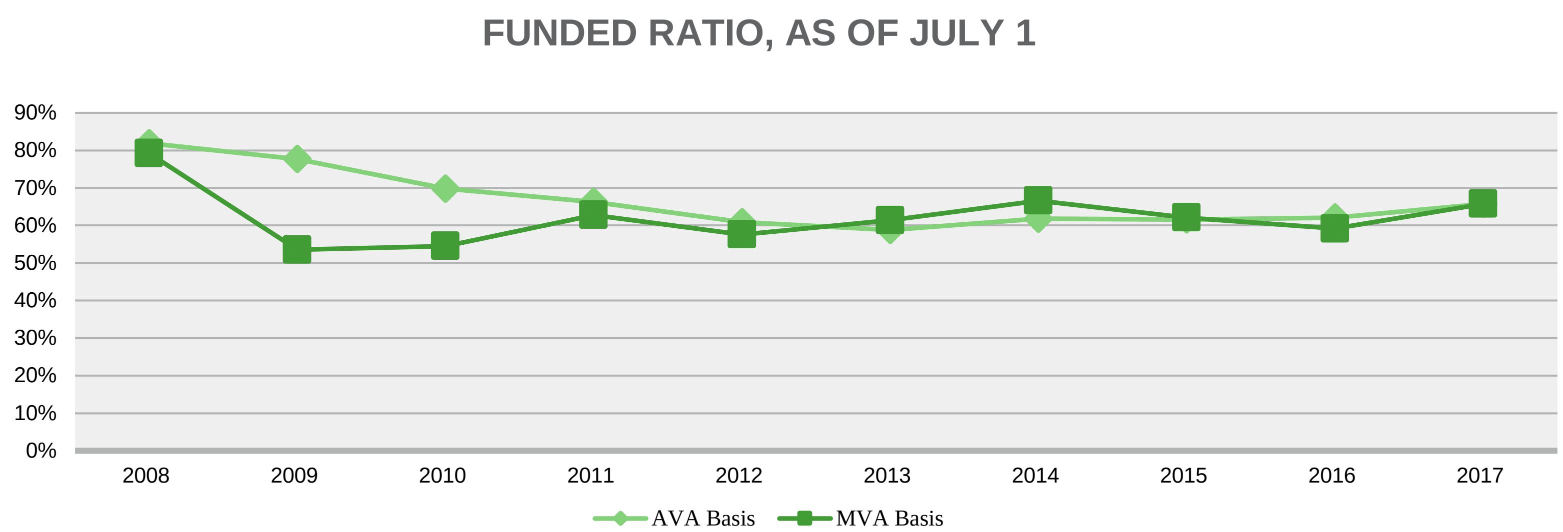
The other critical piece of information regarding TFFR's financial status is the funded ratio. This ratio compares the actuarial value of assets to the actuarial accrued liabilities of the Plan. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. 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
2008	1,909,500,000	2,330,600,000	421,200,000	81.9%	417,700,000	100.8%
2009	1,900,327,834	2,445,896,710	545,568,876	77.7%	439,986,705	124.0%
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%

Note: Numbers for 7/1/2008 valuation dates are rounded.

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

	2017	2016
Actuarial accrued liability (AAL)		
• Active member contributions	$839,076,681	$792,788,975
• Retirees and beneficiaries	2,092,923,830	1,976,315,201
• Active and inactive members (employer financed)	802,016,317	820,289,675
Total	$3,734,016,828	$3,589,393,851
Actuarial value of assets	$2,379,811,205	$2,229,292,988
Cumulative portion of AAL covered		
• Active member contributions	100.0%	100.0%
• Retirees and beneficiaries	73.6%	72.7%
• Active and inactive members (employer financed)	0.0%	0.0%

K. Summary of Actuarial Valuation Results

		July 1, 2017		July 1, 2016	
A.	**Determination of Actuarial Accrued Liability**				
1.	Active members				
	a. Retirement benefits	$2,168,649,742		$2,118,617,183	
	b. Disability benefits	34,821,841		33,023,457	
	c. Death benefits	37,339,571		35,998,781	
	d. Withdrawal benefits	152,460,825		141,479,143	
	e. Total		2,393,271,979		$2,329,118,564
2.	Inactive vested members		89,410,993		84,502,367
3.	Inactive non-vested members		6,560,485		5,214,727
4.	Retirees and beneficiaries		2,092,923,830		1,976,315,201
5.	**Actuarial Present Value of Projected Benefits:** 1e + 2 + 3 + 4		**$4,582,167,287**		**$4,395,150,859**
6.	Actuarial Present Value of Future Normal Costs, Active Members				
	a. Retirement benefits	$666,419,486		$636,231,737	
	b. Disability benefits	15,828,831		14,996,785	
	c. Death benefits	16,296,393		15,609,541	
	d. Withdrawal benefits	149,605,749		138,918,945	
	e. Total		**$848,150,459**		**$805,757,008**
7.	**Actuarial Accrued Liability:** 5 – 6e		**$3,734,016,828**		**$3,589,393,851**
B.	**Determination of Unfunded Actuarial Accrued Liability**				
1.	Actuarial accrued liability		$3,734,016,828		$3,589,393,851
2.	Actuarial value of assets		2,379,811,205		2,229,292,288
3.	Unfunded actuarial accrued liability: 1 – 2		$1,354,205,623		$1,360,100,863

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, 2017	July 1, 2016
Liabilities		
• Present value of benefits for retirees and beneficiaries	$2,092,923,830	$1,976,315,201
• Present value of benefits for inactive members	95,971,478	89,717,094
• Present value of benefits for active members	2,393,271,979	2,329,118,564
Total liabilities	**$4,582,167,287**	**$4,395,150,859**
Assets		
• Total valuation value of assets	$2,379,811,205	$2,229,292,288
• Present value of future contributions by members	906,244,234	859,717,173
• Present value of future employer contributions for:		
» Entry age normal costs	-58,093,775	-53,959,465
» Unfunded actuarial accrued liability	$1,354,205,623	$1,360,100,863
Total of current and future assets	**$4,582,167,287**	**$4,395,150,859**

M. Determination of Contribution Sufficiency

		July 1, 2017		July 1, 2016	
A.	**Statutory Contributions**	**%Payroll**	**$ Amount**	**% Payroll**	**$ Amount**
1.	Member contributions	11.75%	$81,117,159	11.75%	$78,305,065
2.	Employer contributions	12.75%	88,020,747	12.75%	84,969,326
3.	Total	24.50%	$169,137,906	24.50%	$163,274,391
B.	**Actuarially Determined Contribution**	**% Payroll**	**$ Amount**	**% Payroll**	**$ Amount**
1.	Normal cost				
	a. Retirement	8.99%	$62,129,851	9.06%	$60,354,225
	b. Disability	0.20%	1,389,983	0.20%	1,336,108
	c. Death	0.22%	1,491,791	0.22%	1,451,543
	d. Deferred termination benefit and refunds	1.89%	13,029,709	1.85%	12,334,187
	e. Total	11.30%	$78,041,335	11.33%	$75,476,063
	f. Normal cost, adjusted for timing	11.73%	80,990,337	11.75%	78,334,056
2.	Administrative expenses, adjusted for timing	0.32%	2,240,158	0.29%	1,902,577
3.	**Gross normal cost including administrative expenses, adjusted for timing:** 1f + 2	**12.05%**	**$83,230,495**	**12.04%**	**$80,236,633**
4.	Less member contribution rate	11.75%	81,117,159	11.75%	78,305,065
5.	Employer normal cost rate: 3– 4	0.30%	2,113,336	0.29%	1,931,568
6.	Unfunded actuarial accrued liability rate, adjusted for timing	12.69%	87,579,901	12.93%	86,189,591
7.	Total: 5 + 6	12.99%	89,693,237	13.22%	88,121,159
C.	**Contribution Sufficiency / (Deficiency): A2 – B7**	**-0.24%**	**-$1,672,490**	**-0.47%**	**-$3,151,833**
	Projected annual payroll for fiscal year beginning on the valuation date		$690,358,799		$666,426,087

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 0.6% since last year, from 10,813 to 10,874. 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 3.6% since last year. For all comparative purposes, payroll is the amount supplied by the RIO staff (i.e., the 2016-2017 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, 2017. Pay is assumed to change only at the beginning of a school/fiscal year.

Average pay increased by 3.1%, from $57,986 to $59,780. This includes the impact of replacing more highly paid members who retire with new teachers. The average increase in salary for the 9,945 continuing members (members active in both this valuation and the preceding valuation) was 7.1%.

The average age of active members decreased from 42.3 years to 42.1 years, and their average service decreased from 12.1 years to 11.9 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, 2017	July 1, 2016
Plan Eligibility:		
• Tier 1 Grandfathered	2,221	2,559
• Tier 1 Non-grandfathered	3,237	3,272
• Tier 2	5,416	4,982
• **Total**	**10,874**	**10,813**
Benefit Eligibility:		
• Non-Vested	3,331	3,380
• Vested	5,789	5,608
• Early Retirement	859	851
• Normal Retirement	895	974
• **Total**	**10,874**	**10,813**

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, 1,754 members were eligible for either reduced or unreduced retirement, a decrease over last year's figure of 1,825.

Exhibit A – Member Data

Category	July 1, 2017	July 1, 2016	Change From Prior Year
Active members:			
• Males	2,731	2,742	-0.40%
• Females	8,143	8,071	0.89%
• Total number	10,874	10,813	0.56%
• Total payroll supplied by System, annualized	$650,052,674	$627,002,353	3.68%
• Average salary	$59,780	$57,986	3.09%
• Average age	42.1	42.3	-0.2
• Average service	11.9	12.1	-0.2
• Total contributions with interest	$839,076,681	$792,788,975	5.84%
• Average contribution with interest	$77,164	$73,318	5.25%
Vested inactive members:			
• Number	1,600	1,601	-0.06%
• Total annual deferred benefits	$11,604,535	$11,131,831	4.25%
• Average annual deferred benefit	$7,253	$6,953	4.31%
• Average age	49.1	49.3	-0.2
Non-vested inactive members:			
• Number	878	779	12.71%
• Employee contributions with interest due	$5,040,170	$5,214,700	-3.35%
• Average refund due	$5,741	$6,702	-14.34%
• Average age	37.0	37.0	0.0
Service retirees:			
• Number	7,664	7,435	3.08%
• Total annual benefit	$186,635,145	$175,417,123	6.40%
• Average annual benefit	$24,352	$23,593	3.22%
• Average age	71.5	71.3	-0.2
Disabled retirees:			
• Number	128	128	0.00%
• Total annual benefit	$1,877,679	$1,885,987	-0.44%
• Average annual benefit	$14,669	$14,734	-0.44%
• Average age	63.4	62.7	0.7
Beneficiaries:			
• Number	709	686	3.35%
• Total annual benefit	$10,400,322	$9,929,829	4.74%
• Average annual benefit	$14,669	$14,475	1.34%
• Average age	75.4	72.9	2.5

Exhibit B – Members in Active Service as of July 1, 2017
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	416	416	0	0	0	0	0	0	0	0
	$40,383	$40,383	0	0	0	0	0	0	0	0
25 - 29	1,607	1,253	354	0	0	0	0	0	0	0
	46,799	45,587	$51,088	0	0	0	0	0	0	0
30 - 34	1,656	530	906	220	0	0	0	0	0	0
	52,121	46,914	53,968	$57,057	0	0	0	0	0	0
35 - 39	1,467	336	388	600	143	0	0	0	0	0
	58,672	49,501	57,582	62,713	$66,219	0	0	0	0	0
40 - 44	1,292	246	216	267	465	98	0	0	0	0
	63,207	50,159	58,389	64,666	69,259	$73,892	0	0	0	0
45 - 49	1,350	188	159	184	253	427	136	3	0	0
	67,343	52,611	60,217	64,982	70,221	72,998	$75,983	$73,633	0	0
50 - 54	1,262	162	80	122	165	197	398	137	1	0
	69,448	55,149	60,386	62,512	67,265	71,925	76,258	77,131	$65,873	0
55 - 59	1,028	127	90	82	130	131	185	189	94	0
	68,796	54,863	60,533	61,249	65,732	70,017	76,668	76,685	73,299	0
60 - 64	630	67	47	69	81	79	78	54	128	27
	69,424	54,873	61,772	65,256	64,557	72,899	73,949	75,254	76,212	$77,034
65 - 69	136	23	20	15	21	9	12	7	14	15
	68,374	60,028	59,414	59,000	73,363	66,344	68,622	75,906	72,891	88,797
70 & over	30	9	4	2	3	1	3	3	2	3
	56,199	39,558	51,496	42,907	61,214	81,502	83,012	67,298	73,814	58,153
Total	10,874	3,357	2,264	1,561	1,261	942	812	393	239	45
	$59,780	$47,352	$55,691	$62,476	$68,230	$72,389	$75,995	$76,535	$74,808	$79,696

Exhibit C-1 – Schedule of Annuitants by Type of Benefit as of July 1, 2017

Type of Benefits/Form of Payment	Number	Annual Benefits Amount	Average Monthly Benefits
Service:			
• Straight Life	2,960	$62,457,528	$1,758
• 100% J&S	3,195	89,157,980	2,325
• 50% J&S	666	18,021,369	2,255
• 5 Years C&L	18	267,235	1,237
• 10 Years C&L	172	3,491,174	1,691
• 20 Years C&L	113	2,670,989	1,970
• Level	540	10,568,870	1,631
Subtotal:	7,664	$186,635,145	$2,029
Disability:			
• Straight Life	102	$1,541,985	$1,260
• 100% J&S	18	234,011	1,083
• 50% J&S	6	85,766	1,191
• 5 Years C&L	1	6,254	521
• 10 Years C&L	0	0	0
• 20 Years C&L	1	9,663	805
• Level	0	0	0
Subtotal:	128	$1,877,679	$1,222
Beneficiaries:			
• Straight Life	667	$10,052,526	$1,256
• 10 Years Certain	4	28,081	585
• 20 Years Certain	12	124,389	864
• QDRO Alternate Payee	26	195,326	626
Subtotal:	709	$10,400,322	$1,222
Total:	**8,501**	**$198,913,146**	**$1,950**

Exhibit C-2 – Schedule of Annuitants by Monthly Benefit as of July 1, 2017

Monthly Benefit Amount	Number of Members	Female	Male	Average Service
Under $200	251	185	66	6.16
200 - 399	460	349	111	11.73
400 - 599	435	337	98	16.21
600 - 799	400	287	113	20.06
800 - 999	401	292	109	22.22
1,000 - 1,199	497	377	120	25.67
1,200 - 1,399	513	347	166	27.12
1,400 - 1,599	567	376	191	28.92
1,600 - 1,799	622	416	206	29.12
1,800 - 1,999	605	405	200	29.98
2,000 - 2,199	566	397	169	29.85
2,200 - 2,399	531	347	184	30.48
2,400 - 2,599	421	285	136	31.62
2,600 - 2,799	372	249	123	32.21
2,800 - 2,999	356	223	133	32.82
3,000 - 3,199	314	214	100	33.31
3,200 - 3,399	272	182	90	34.27
3,400 - 3,599	197	117	80	33.85
3,600 - 3,799	162	94	68	35.16
3,800 - 3,999	115	68	47	35.08
4,000 & over	444	226	218	36.65
Total:	**8,501**	**5,773**	**2,728**	**27.38**

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, 2016	**10,813**	**1,601**	**779**	**7,435**	**128**	**686**	**21,442**
• Additions and new members	835	0	0	0	0	0	825
• Retirements	-328	-63	0	391	0	0	0
• Disability	-1	-3	0	0	4	0	0
• Died with beneficiary	-3	0	0	-41	-1	48	3*
• Died without beneficiary	-5	-3	0	-121	-3	-23	-155
• Terminated vested	-153	153	0	0	0	0	0
• Terminated non-vested	-198	0	198	0	0	0	0
• Refunds	-179	-32	-58	0	0	0	-269
• Rehired as active	94	-53	-41	0	0	0	0
• Expired benefits	0	0	0	0	0	-6	-6
• New alternate payee	0	0	0	0	0	4	4
• Data adjustments	-1**	0	0	0	0	0	-1
Number as of July 1, 2017	**10,874**	**1,600**	**878**	**7,664**	**128**	**709**	**21,853**

* Due to multiple beneficiaries

** Removed from database after being reported to TFFR in error

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

	Year Ended June 30 , 2017		Year Ended June 30 , 2016	
Net assets at market value at the beginning of the year		$2,124,335,288		$2,141,920,800
Contribution:				
• Employee contributions	$79,309,153		$76,342,685	
• Employer contributions	86,058,868		82,839,932	
• Purchased service credit	2,553,200		2,768,245	
• Interest, penalties and other	235,890		44,966	
Total contribution income		*$168,157,111*		*$161,995,828*
Investment income:				
• Interest, dividends and other income	$50,718,890		$49,982,337	
• Securities lending income	229,936		304,571	
• Investment expenses	-6,011,791		-6,034,689	
• Securities lending income	-45,973		-60,907	
Net investment income		*$44,891,062*		*$44,191,312*
Net realized and unrealized gains/(losses)		221,797,589		-35,952,316
Total income available for benefits		**$434,845,762**		**$170,234,824**
Less benefit payments and expenses:				
• Regular annuity benefits	$190,029,141		$179,625,551	
• Partial lump-sum benefits paid	1,075,553		992,233	
• Refunds	5,411,850		5,350,896	
Total benefits and refunds	$196,516,544		$185,968,680	
• Administrative and miscellaneous expenses	$2,173,431		$1,851,656	
Total benefit payments and expenses		*$198,689,975*		*$187,820,336*
Change in reserve for future benefits		**$236,155,787**		**-$17,585,512**
Net assets at market value at the end of the year		**$2,360,491,075**		**$2,124,335,288**

Exhibit F – Summary Statement of Plan Assets

	June 30 , 2017		June 30 , 2016	
Cash and cash equivalents (operating cash)		$19,082,062		$19,747,422
Invested securities lending collateral		12,839,759		19,859,451
Total accounts receivable		35,281,492		35,020,845
Investments:				
• Equities	$1,275,571,112		$1,131,917,482	
• Fixed Income	521,927,872		479,086,760	
• Short-term	27,243,767		18,515,640	
• Real assets	407,547,460		369,771,496	
• Private equity	76,976,255		73,374,321	
Total investments at market value		$2,309,266,466		$2,072,665,699
Total assets		$2,376,469,779		$2,147,293,417
Deferred outflows of resources related to pensions		384,391		168,324
Total accounts payable		16,307,753		23,056,143
Deferred inflows related to pensions		55,342		70,310
Net assets at market value		**$2,360,491,075**		**$2,124,335,288**
Net assets at actuarial value		**$2,379,811,205**		**$2,229,292,288**

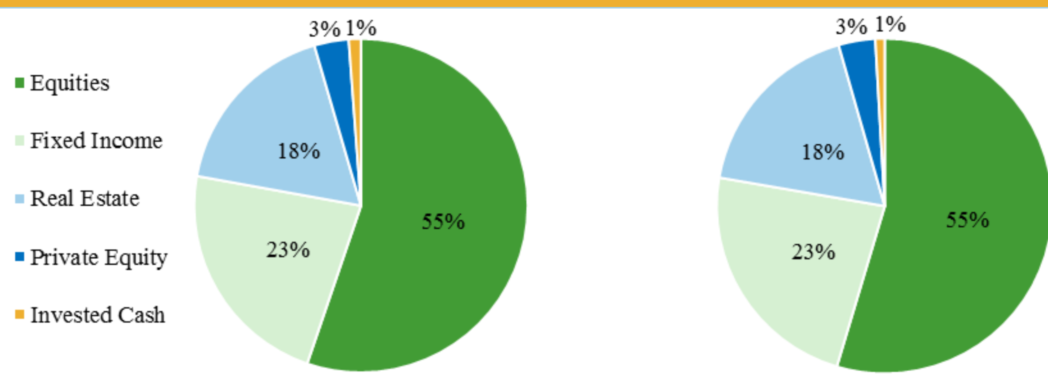


Exhibit G – Development of the Fund Through June 30, 2017

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
2008	$33,683,550	$33,237,677	$3,652,162	($140,641,059)	($1,639,521)	(111,956,810)	$1,846,113,411	$1,909,500,000	103.4%
2009	37,487,655	34,712,846	2,180,479	(492,741,825)	(1,707,506)	(116,328,330)	1,309,716,730	1,900,327,834	145.1%
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%

* On a market basis, net of investment fees; for 2008-2010 and 2015-2017, 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, 2017, to reflect that their benefits are not finalized as of the valuation date.
Annual Administrative Expenses:	Administrative expenses of $2,233,200 (actual expenses for the previous year, increased with inflation) are expected to be paid monthly for the year beginning July 1, 2017.
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.

Effective Date:	July 1, 1971
Plan Year:	July 1 through June 30
Administration:	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.
Type of Plan:	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.
Eligibility:	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.
Member Contributions:	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%.
Salary:	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.
Employer Contributions:	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.

Effective Date	Addition to 7.75% Base Rate	Employer Contribution Rate
July 1, 2008	0.50%	8.25%
July 1, 2010	1.00%	8.75%
July 1, 2012	3.00%	10.75%
July 1, 2014	5.00%	12.75%

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%.

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 (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.

Section 5: GASB Information

Exhibit 1 – Net Pension Liability

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

	July 1, 2017	July 1, 2016
Total pension liability	$3,734,016,828	$3,589,393,851
Plan fiduciary net position	(2,360,491,075)	(2,124,335,288)
Net pension liability	$1,373,525,753	$1,465,058,563
Plan fiduciary net position as a percentage of the total pension liability	63.2%	59.2%

The net pension liability was measured as of June 30, 2017, and is determined based on the total pension liability from the July 1, 2017, 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, 2017.

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of July 1, 2017, 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, 2017 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, 2017 are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return*
Global Equities	58%	6.7%
Global Fixed Income	23%	0.8%
Global Real Assets	18%	5.2%
Cash Equivalents	1%	0.0%
Total	100%	

* Geometric real rates of return are net of inflation.

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, 2017, is 3.58%, as published by the Board of Governors of the Federal Reserve System.

The discount rate used to measure the total pension liability was 7.75% as of June 30, 2017. 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, 2017, 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, 2017. 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, 2017.

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, 2015	$1,728,392,470	$1,307,855,182	$957,135,967
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

Exhibit 2 – Schedules of Changes in Net Pension Liability

	2017	2016
Total pension liability		
• Service cost	$75,476,063	$68,239,440
• Interest	276,412,402	265,439,909
• Change of benefit terms	0	0
• Differences between expected and actual experience	(10,748,944)	(8,092,800)
• Changes of assumptions	0	0
• Benefit payments, including refunds of employee contributions	(196,516,544)	(185,968,680)
Net change in total pension liability	**$144,622,977**	**$139,617,869**
Total pension liability – beginning	**3,589,393,851**	**3,449,775,982**
Total pension liability – ending (a)	**$3,734,016,828**	**$3,589,393,851**
Plan fiduciary net position		
• Contributions – employer	$86,058,868	$82,839,932
• Contributions – employee	79,309,153	76,342,685
• Contributions – purchased service credit	2,553,200	2,768,245
• Contributions – other	235,890	44,966
• Net investment income	266,688,651	8,238,996
• Benefit payments, including refunds of employee contributions	(196,516,544)	(185,968,680)
• Administrative expense	(2,173,431)	(1,851,656)
• Other	0	0
Net change in plan fiduciary net position	**236,155,787**	**($17,585,512)**
Plan fiduciary net position – beginning	**2,124,335,288**	**2,141,920,800**
Plan fiduciary net position – ending (b)	**$2,360,491,075**	**$2,124,335,288**
Net pension liability – ending (a) – (b)	**$1,373,525,753**	**$1,465,058,563**
Plan fiduciary net position as a percentage of the total pension liability	**63.2%**	**59.2%**
Covered employee payroll	**$674,971,342**	**$649,724,868**
Net pension liability as percentage of covered employee payroll	**203.5%**	**225.5%**

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-Employee Payroll	Contributions as a Percentage of Covered Employee 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%

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MEMORANDUM

TO: TFFR Board

FROM: Fay Kopp

DATE: October 19, 2017

SUBJ: Governmental Pension Plan Actuarial Issues

Kim Nicholl and Matt Strom, Segal Consultants, will provide comments related to potential new actuarial standards which could impact the NDTFFR plan and other governmental pension plans in the future.

MEMORANDUM

TO: TFFR Board

FROM: Fay Kopp

DATE: October 19, 2017

SUBJ: TFFR LEGISLATIVE UPDATE

The **Legislative Employee Benefits Programs Committee (LEBPC)** is scheduled to meet at 10 am on Thursday, October 26, 2017. Scheduled presentations for the morning are as follows:

RIO/SIB overview	Dave Hunter
TFFR overview	Fay Kopp
2017 valuation report	Kim Nicholl and Matt Strom, Segal

We will update the Board at the meeting that afternoon.

NORTH DAKOTA LEGISLATIVE MANAGEMENT

Tentative Agenda

EMPLOYEE BENEFITS PROGRAMS COMMITTEE

Thursday, October 26, 2017
Roughrider Room, State Capitol
Bismarck, North Dakota

10:00 a.m. Call to order
Roll call
Consideration of the minutes of the September 21, 2017, meeting
Comments by the Chairman

OVERVIEW OF THE RETIREMENT AND INVESTMENT OFFICE

10:05 a.m. Presentation by Mr. David J. Hunter, Executive Director and Chief Investment Officer, Retirement and Investment Office, of an overview of the Retirement and Investment Office, including State Investment Board investments for the Teachers' Fund for Retirement (TFFR) and the Public Employees Retirement System (PERS)

10:35 a.m. Presentation by Ms. Fay Kopp, Chief Retirement Officer, Teachers' Fund for Retirement, of an overview of TFFR

Committee discussion and directives

ACTUARIAL VALUATIONS OF THE TEACHERS' FUND FOR RETIREMENT AND THE PUBLIC EMPLOYEES RETIREMENT SYSTEM

11:00 a.m. Presentations by Ms. Kim Nicholl, Senior Vice President, and Mr. Matthew A. Strom, Vice President, The Segal Group, Inc., of:

- An overview of the TFFR valuation process
- The July 1, 2017, actuarial valuation of TFFR

Comments by interested persons

Committee discussion and directives

12:00 noon Luncheon recess

1:00 p.m. Presentation by Ms. Amelia Williams, Consultant, and Mr. Lance Weiss, Senior Consultant, Gabriel, Roeder, Smith & Company Holdings, Inc., of:

- An overview of the PERS valuation process
- The July 1, 2017, actuarial valuations of PERS, the Highway Patrolmen's retirement system, Job Service retirement system, and Retiree Health Insurance Credit Program

Comments by interested persons

Committee discussion and directives

2:30 p.m. Presentation by representatives of PERS providing followup comments from the September 21, 2017, meeting

3:00 p.m. Adjourn

Committee Members

Representatives: Mike Lefor (Chairman), Randy Boehning, Jason Dockter, Vernon Laning, Alisa Mitskog, Mark S. Owens, Roscoe Streyle

Senators: Brad Bekkedahl, Dick Dever, Karen K. Krebsbach, Oley Larsen, Gary A. Lee, Carolyn C. Nelson

Staff Contact: Jennifer S. N. Clark, Counsel

NDTFFR Overview

Legislative Management
Employee Benefits Programs Committee

October 26, 2017

Fay Kopp, Chief Retirement Officer – Deputy Executive Director
ND Teachers' Fund for Retirement (TFFR) - Retirement & Investment Office (RIO)

TFFR Plan

- TFFR is a defined benefit pension plan designed to provide lifetime retirement, disability, and death benefits for ND public school educators and certain state teachers. The plan is also an important feature in the recruitment and retention of high quality teachers.
- Governing laws: NDCC 15-39.1 and NDAC Title 82.
- Plan is funded by member (teacher) and employer (school district) contributions, and investment earnings.

TFFR Board of Trustees

- TFFR Board of Trustees is responsible for administering the TFFR benefits program. The Board has a fiduciary responsibility to the fund's beneficiaries.
- The Board consists of 5 active and retired members appointed by the Governor and 2 elected state officials.

Mike Gessner, President
Active Teacher - Minot

Toni Gumeringer, Trustee
Active Teacher - Bismarck

Rob Lech, Vice President
Active Administrator
Jamestown

TFFR Board of Trustees

Mel Olson, Trustee
Retired Member
Fargo

Kirsten Baesler
State Superintendent

Mike Burton, Trustee
Retired Member
Fargo

Kelly Schmidt
State Treasurer

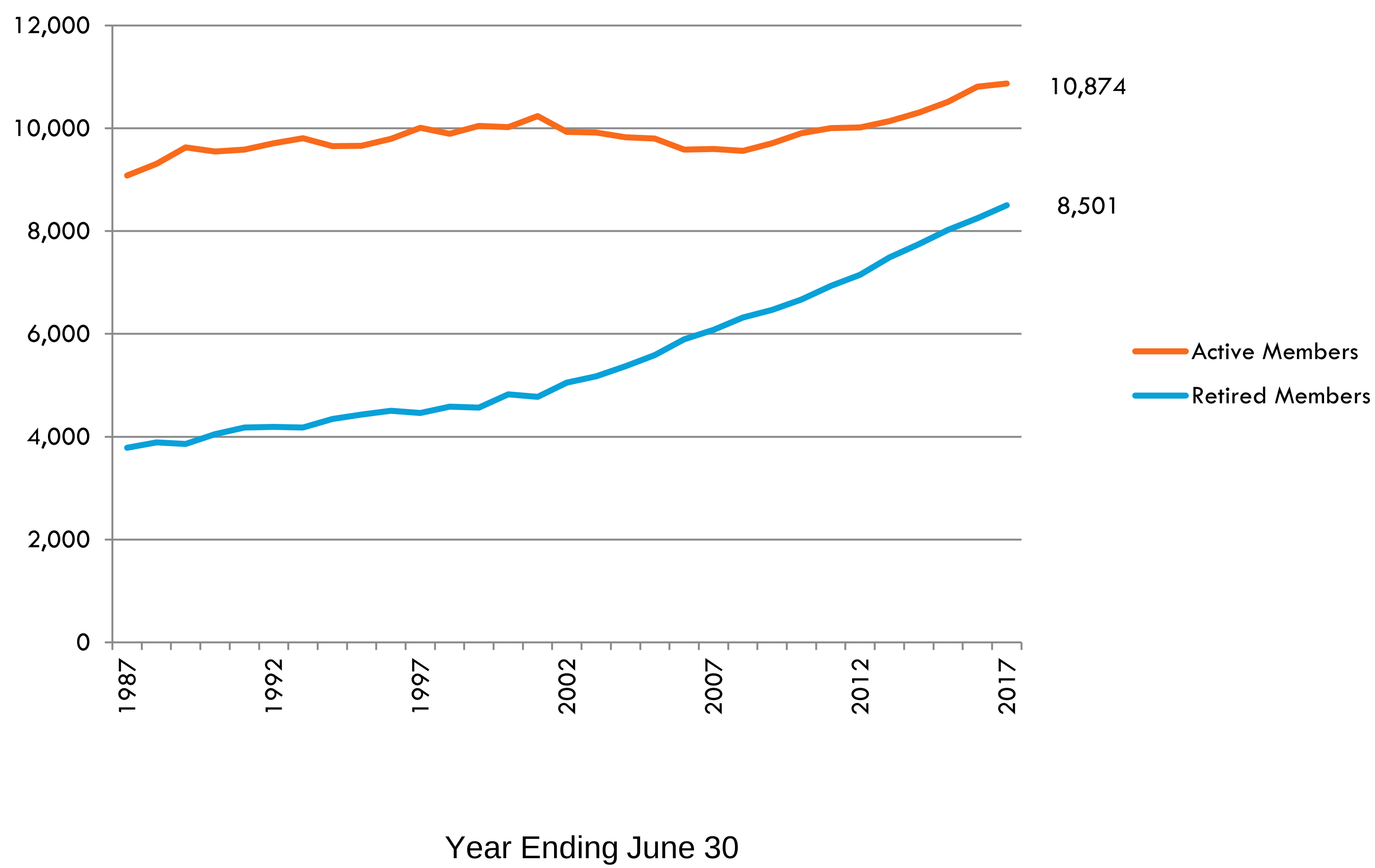
TFFR Board Mission

- The mission of TFFR, a trust fund, is to advocate for develop, and administer a comprehensive retirement program for all trust fund members within the resources available.

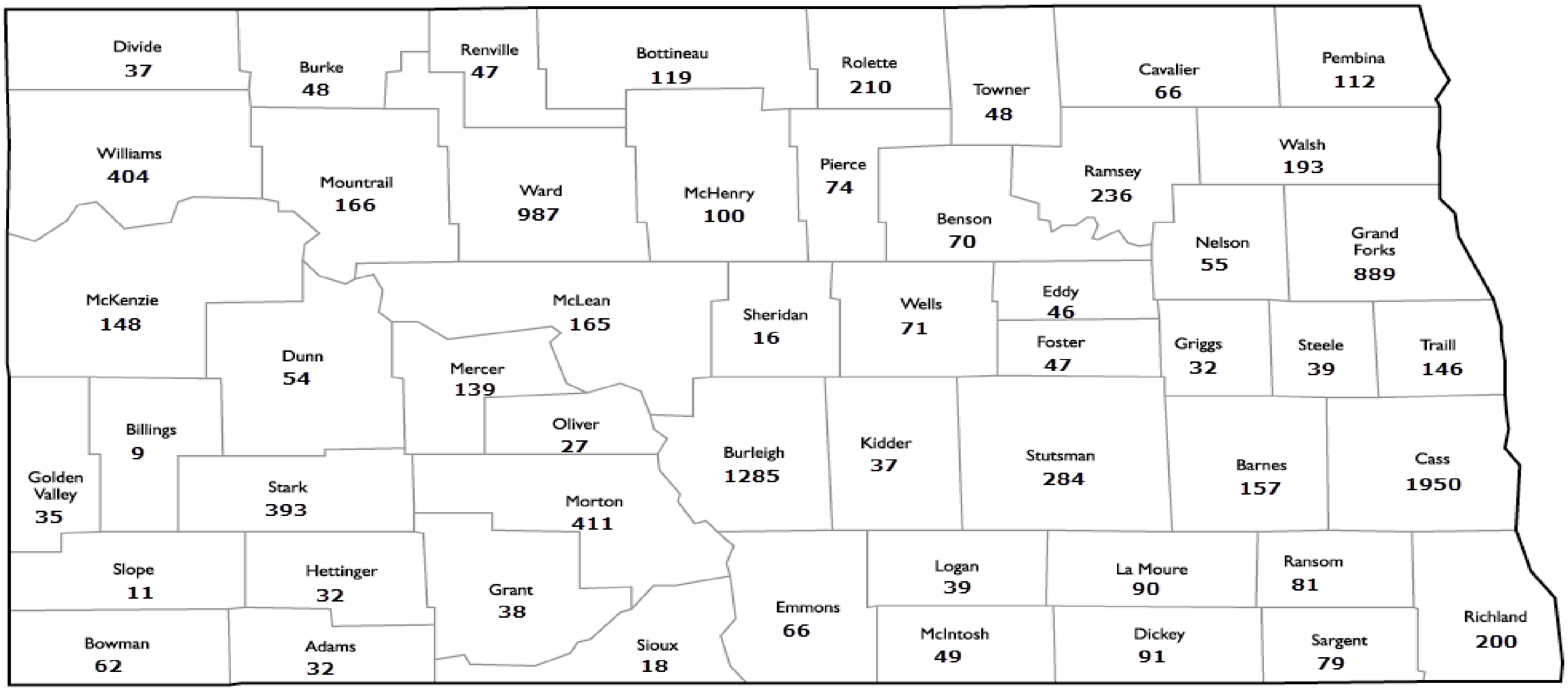
- The Board's #1 priority is to improve the TFFR plan's funding status to protect and sustain current and future benefits.

TFFR Background

Active and Retired TFFR Members 1987 - 2017



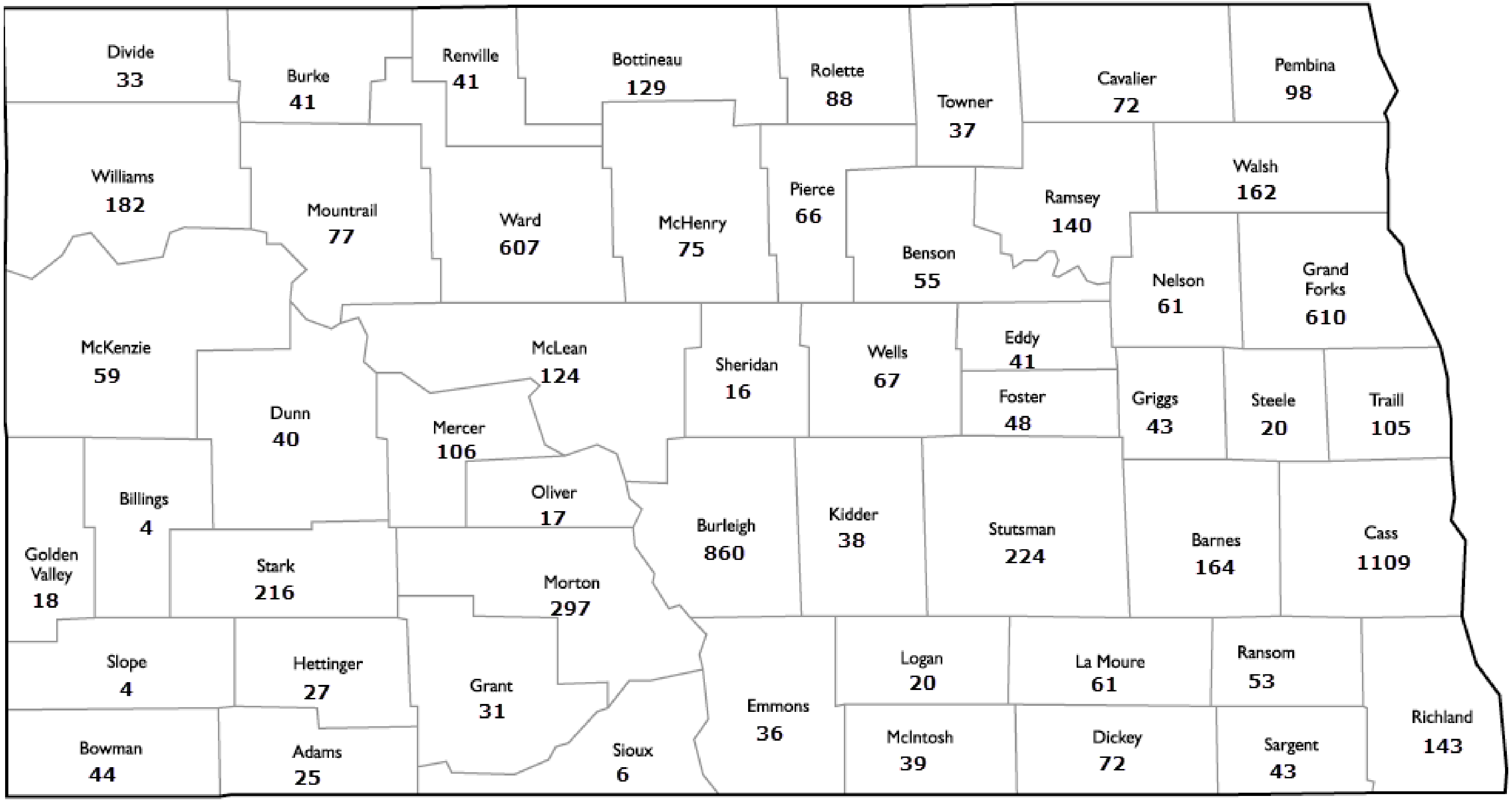
TFFR Active Members by County



In-State	10,240
Out-of-State	634
Total	10,874

July 1, 2017

TFFR Retired Members by County



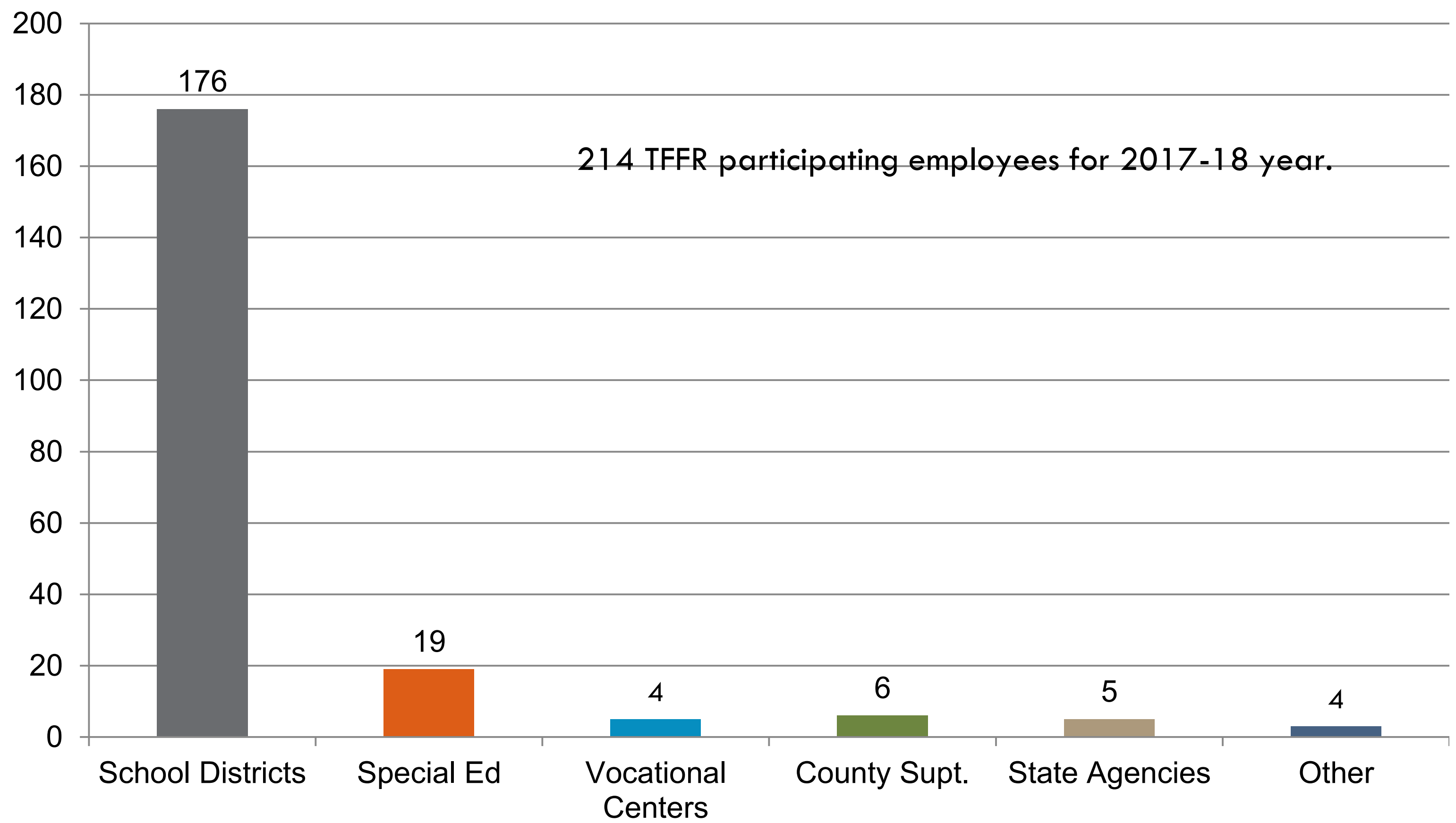
In-state	6,794
Out-of-state	1,707
Total	8,501

7.1.17

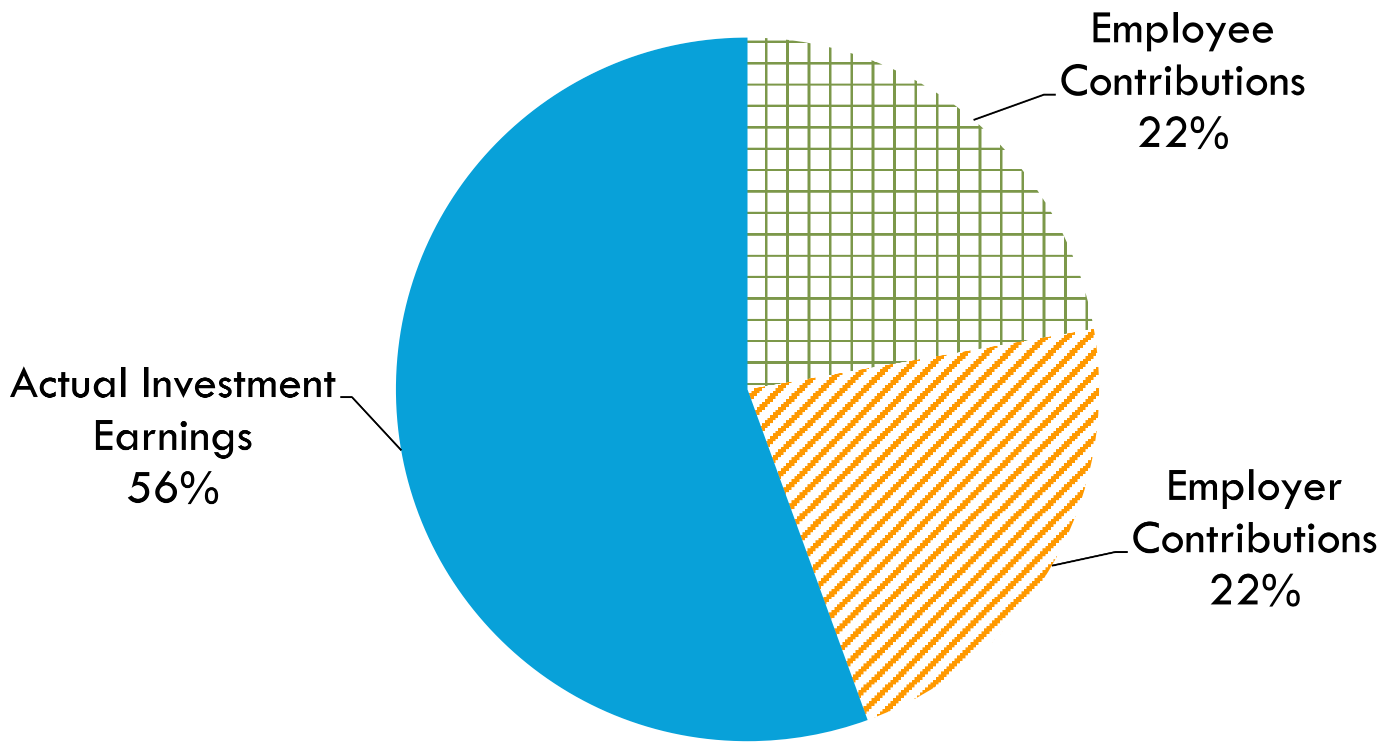
Average Monthly TFFR Benefits by County as of 7.1.17

COUNTY	RETIREE COUNT	AVERAGE BENEFIT	TOTAL BENEFITS
Adams	25	1,923	48,073
Barnes	164	2,196	360,092
Benson	55	2,111	116,115
Billings	4	1,479	5,917
Bottineau	129	1,696	218,817
Bowman	44	1,896	83,445
Burke	41	1,539	63,102
Burleigh	860	2,123	1,825,552
Cass	1,109	2,225	2,467,351
Cavalier	72	1,704	122,677
Dickey	72	1,921	138,330
Divide	33	1,903	62,812
Dunn	40	2,108	84,317
Eddy	41	1,987	81,476
Emmons	36	1,964	70,696
Foster	48	2,271	109,017
Golden Valley	18	1,838	33,080
Grand Forks	610	2,200	1,342,275
Grant	31	1,434	44,446
Griggs	43	1,909	82,091
Hettinger	27	1,871	50,522
Kidder	38	1,802	68,463
LaMoure	61	1,823	111,180
Logan	20	1,850	37,003
McHenry	75	1,950	146,248
McIntosh	39	1,734	67,609
McKenzie	59	2,024	119,442
McLean	124	1,840	228,177
Mercer	106	2,000	212,037
Morton	297	1,961	582,491
Mountrail	77	1,580	121,669
Nelson	61	1,827	111,455
Oliver	17	2,019	34,318
Pembina	98	2,165	212,164
Pierce	66	1,817	119,895
Ramsey	140	1,857	259,956
Ransom	53	1,734	91,894
Renville	41	1,874	76,823
Richland	143	2,191	313,334
Rolette	88	1,917	168,692
Sargent	43	1,594	68,549
Sheridan	16	1,620	25,926
Sioux	6	902	5,413
Slope	4	1,190	4,760
Stark	216	2,063	445,501
Steele	20	1,766	35,329
Stutsman	224	2,026	453,780
Towner	37	1,885	69,732
Traill	105	1,883	197,694
Walsh	162	1,938	314,008
Ward	607	2,096	1,272,409
Wells	67	1,864	124,892
Williams	182	2,102	382,534
Totals	**6,794**	**2,045**	**13,893,580**
Out of State	**1,707**	**1,571**	**2,682,530**
Grand Totals	**8,501**	**1,950**	**16,576,110**

TFFR Employers by Type



Sources of TFFR Revenue
FY 1988-2017



2017 Legislation

- **There were no legislative proposals approved in 2017 that directly affected TFFR plan active or retired members:**
  - No benefit increases for retirees
  - No benefit changes for actives
  - No contribution rate increases
  - No plan provision modifications

- Benefit and contribution changes were approved by the Legislature in 2011 to address TFFR funding improvement. Changes were phased in over time, and are outlined on the following slides.

TFFR Plan Benefits

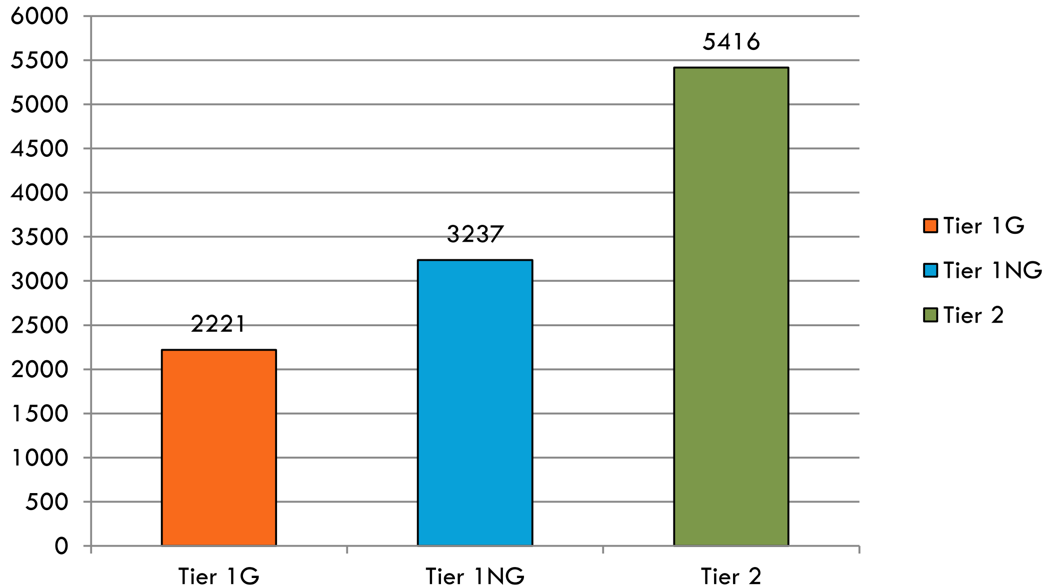
Membership

TFFR participation is mandatory for employees who are:

- Licensed by Education Standards and Practices Board (ESPB)
- Contracted with participating employer to provide teaching, supervisory, administrative, or extracurricular services
- Other members defined in state law

TFFR Membership Tiers

- **Tier 1- Members who have service credit prior to 7/1/08**
  - Grandfathered – Members who on 6/30/13 were within 10 years of retirement eligibility (age 55+ or Rule of 65+).
  - Non-grandfathered – Members who on 6/30/13 were more than 10 years away from retirement eligibility (less than Rule of 65).
- **Tier 2 – Members employed on or after 7/1/08**



Total Active Members 10,874 as of 6/30/17

Summary of TFFR Pension Benefits for Membership Tiers

	Tier 1 Grandfathered Member	Tier 1 Non-Grandfathered Member	Tier 2 Member
Vesting Period	3 years	3 years	5 years
Unreduced Retirement Eligibility			
Minimum Age	No	60	60
AND Rule	Rule of 85	Rule of 90	Rule of 90
OR Normal Retirement Age	65	65	65
Reduced Retirement Eligibility			
Minimum Age	55	55	55
Reduction Factor	6%	8%	8%
Retirement Formula Multiplier	2%	2%	2%
x Final average salary (high salaries of career)	3 year FAS	3 year FAS	5 year FAS
x Service Credit	Total Years	Total Years	Total Years
Disability Retirement	Yes	Yes	Yes
Retirement formula multiplier (2%) X FAS X total years			
Death/Survivor Benefits	Yes	Yes	Yes
Refund of account value or life annuity to survivor based on member's vesting status.			

Retirement Benefit Formula Example

- Teacher has 30 years of service credit and career high annual salaries of:

  $42,000

  44,000

  46,000

  48,000

  50,000

  - Tier 1 (FAS 3 years) SLA Benefit Calculation

    48,000 X 2% X 30 yrs = $28,800 (60% FAS)

  - Tier 2 (FAS 5 years) SLA Benefit Calculation

    46,000 X 2% X 30 yrs = $27,600 (60% FAS)

- Benefit Options: Single Life Annuity, 100% and 50% Joint and Survivor, 10 and 20 year Term Certain, Level Income with Social Security, and Partial Lump Sum Option.

Retirement Benefit Formula

Final Average Salary* X 2.0% X Service Credit =
Single Life Annuity Benefit Amount

What percent of Final Average Salary (FAS) will a TFFR member receive under the 2.0% multiplier at normal retirement age?

Years of Service	Percent of FAS*
5	10%
10	20%
15	30%
20	40%
25	50%
30	60%
35	70%
40	80%

*Tier 1 members FAS – high three salaries

*Tier 2 members FAS – high five salaries

Contribution Rates

RATES %	Employer	Member	Total	Increase
1997 – 2008	7.75%	7.75%	15.5%	--
7/1/08	8.25%	7.75%	16.0%	+0.5%
7/1/10	8.75%	7.75%	16.5%	+0.5%
7/1/12	10.75%	9.75%	20.5%	+4.0%
7/1/14	12.75%	11.75%	24.5%	+4.0%

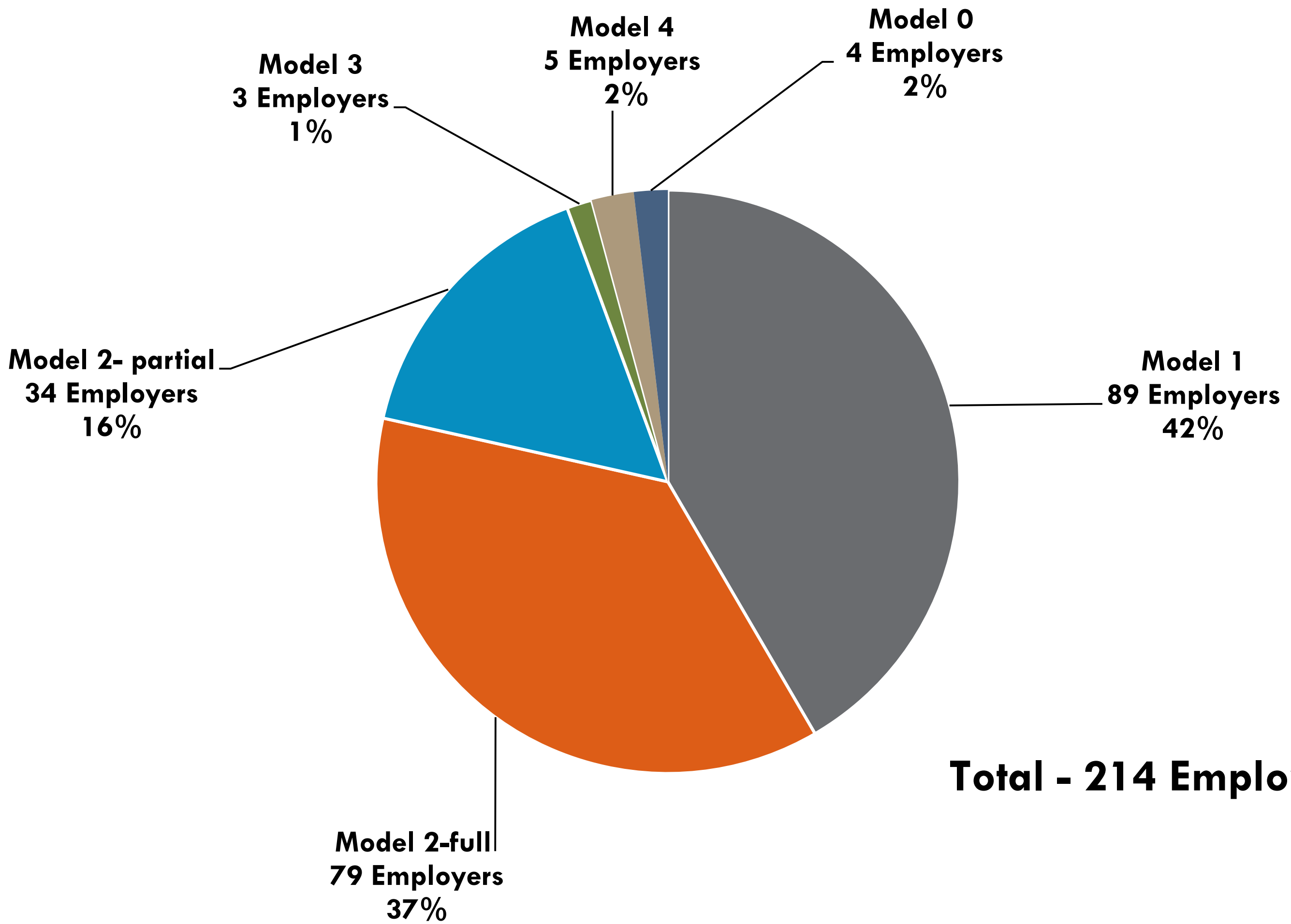
Note: 2011 legislation increased contribution rates to improve TFFR funding. Increased rates will be in effect until TFFR reaches 100% funded ratio, then rates will be reduced to 7.75% each.

TFFR Employer Payment Plan (EPP) Models

Payment of member contributions on a tax deferred basis can be made by the employer through a: (1) salary reduction or (2) salary supplement.

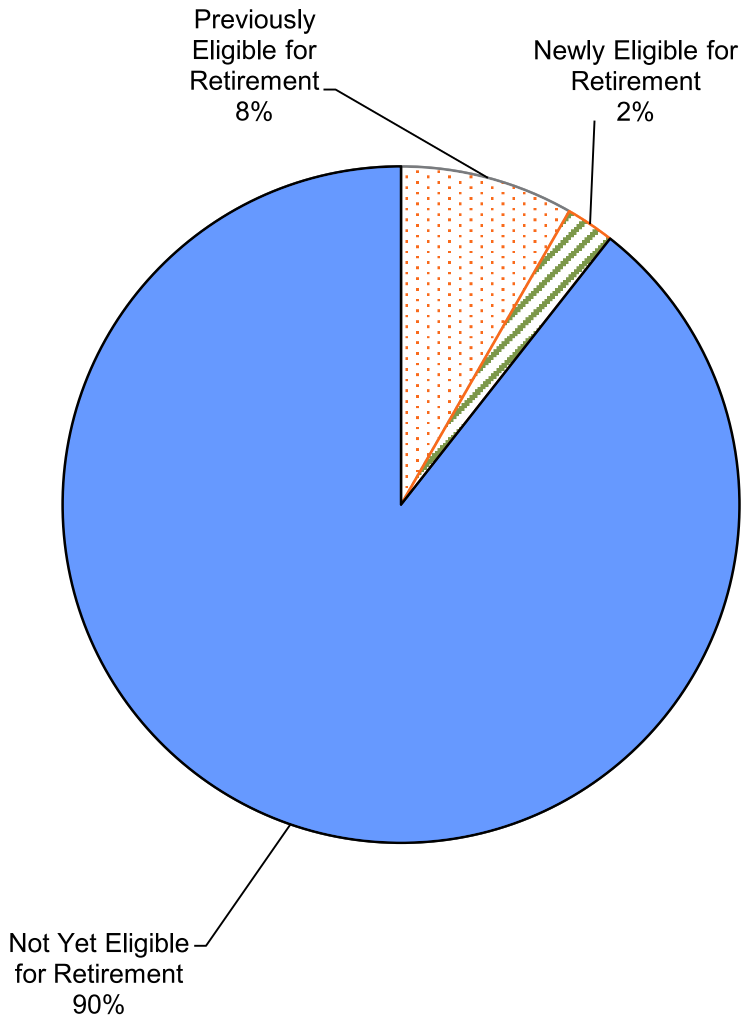
- **Model 1**: Member/employee contribution is paid by employee through a salary reduction and remitted by employer as tax deferred dollars.
- **Model 2 All:** Member/employee contribution is paid by employer as a salary supplement and remitted to TFFR as tax deferred dollars.
- **Model 2 partial %, Model 3 partial $, Model 4 state agencies:** A portion of the member/employee contribution is paid by employer as a salary supplement and remitted to TFFR as tax deferred dollars. The remaining employee contribution is paid by employee and remitted by employer as tax deferred dollars. Model 3 $ option is no longer available.
- **No Model**: Member/employee contribution is paid by employee and remitted by employer as taxed dollars.

TFFR Employer Models 2016-17



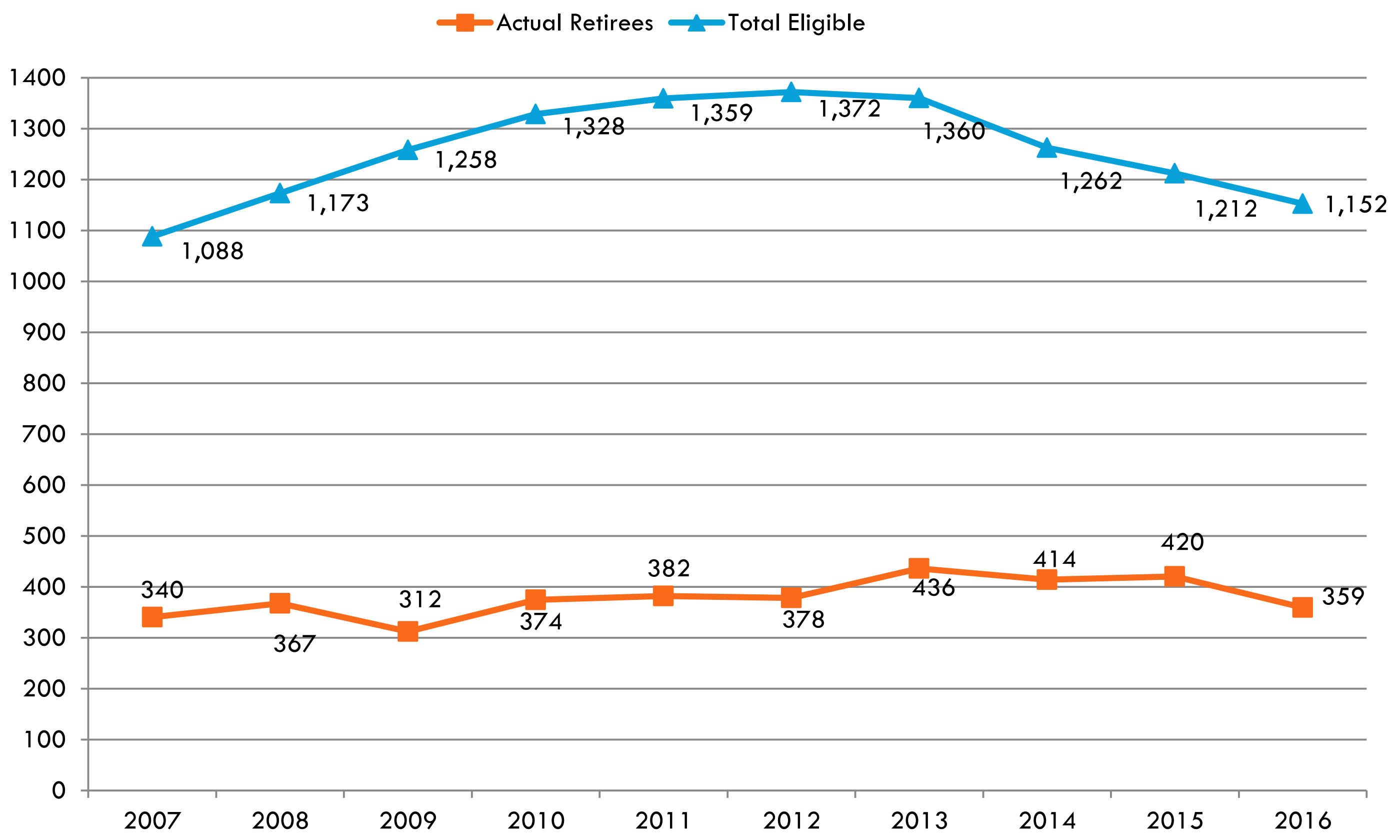
Total - 214 Employers

Active TFFR Members Eligible for Retirement



Previously Eligible	874
Newly Eligible in 2016/17	213
Not Eligible	9,893
Total	10,980

Actual New Retirees and Total Eligible
(as of 1/1/2017)



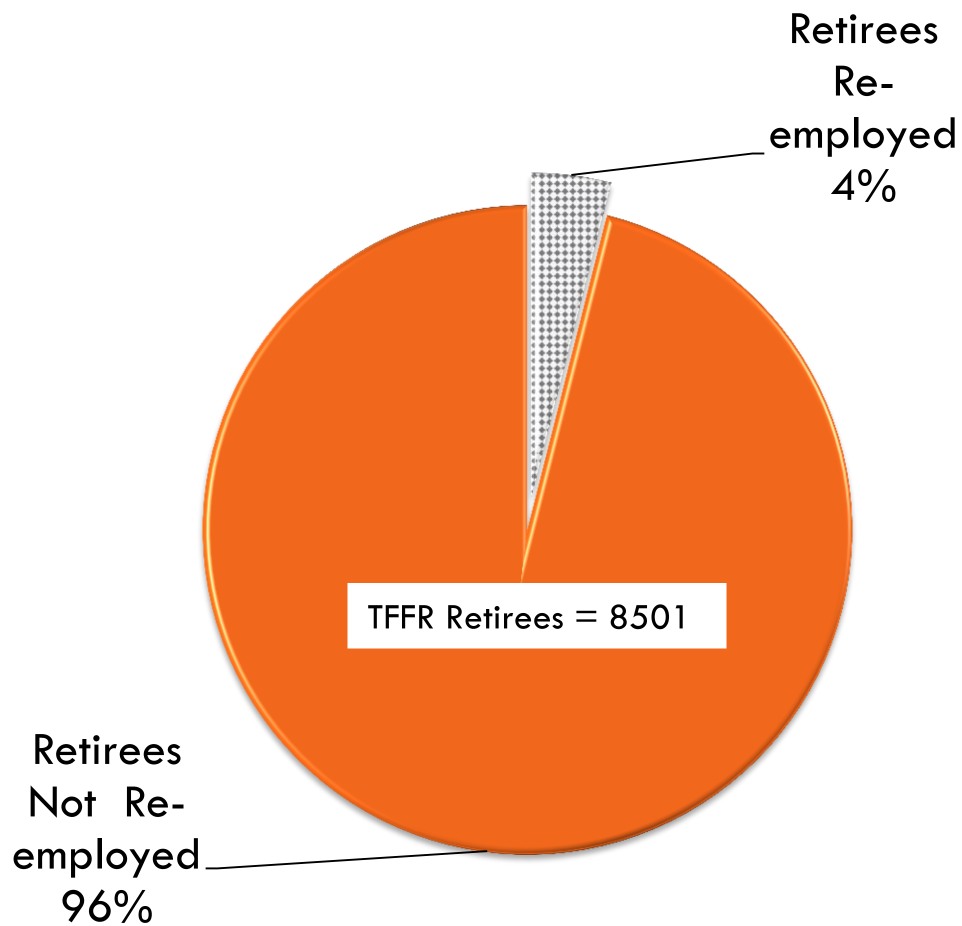
Based on ratios of 30% and 40% of actual retirements to eligible retirements, approximately 3,000 to 3,200 active members are projected to retire in the next 10 years, which averages about 310 per year.

TFFR Retiree Re-employment

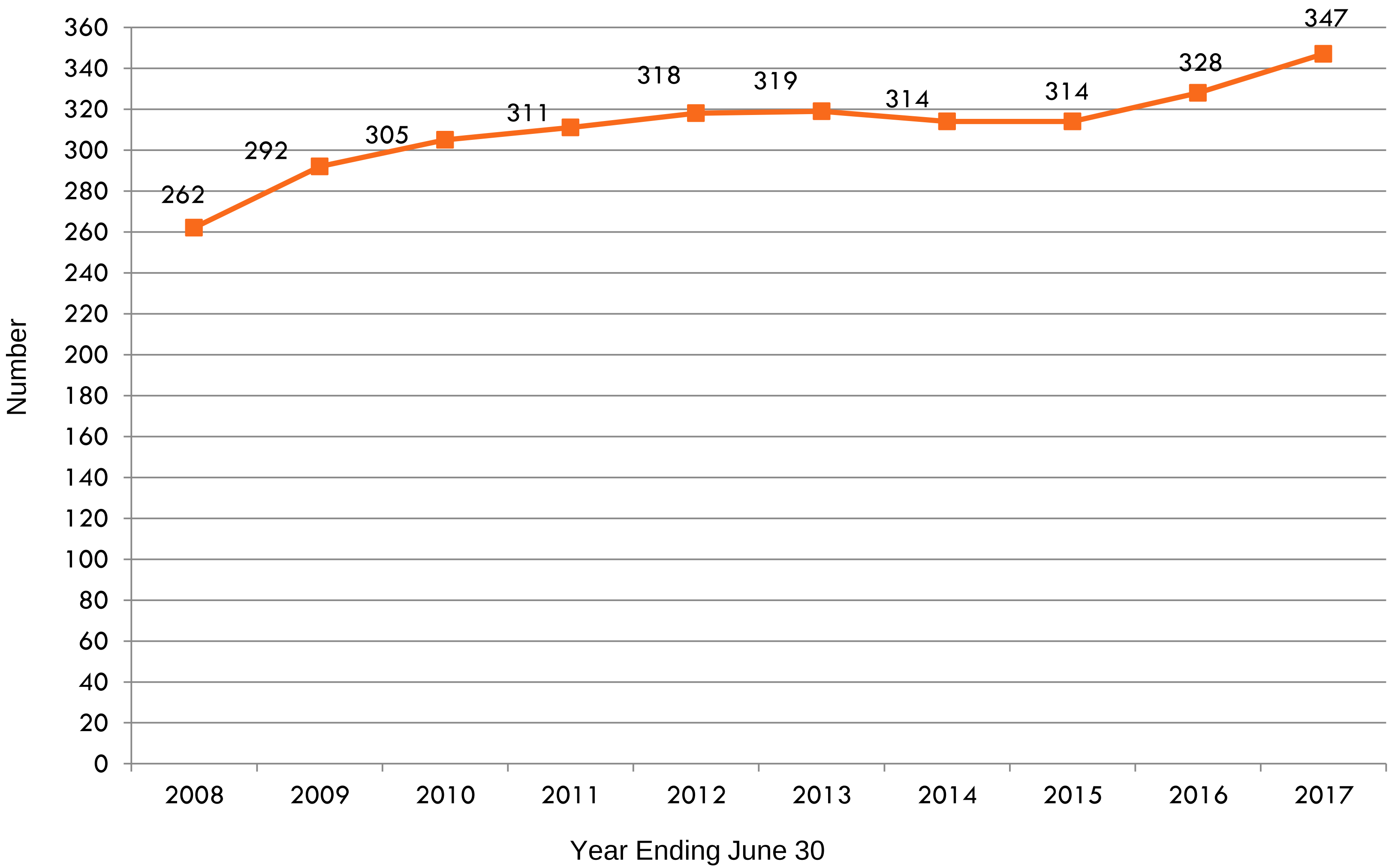
- **General Rule**
  - Retirees may return to covered employment after 30 day waiting period.
  - Employment is limited to a maximum number of hours in a fiscal year based on length of work arrangement.
    - 9 mo. 700 hours 11 mo. 900 hours
    - 10 mo. 800 hours 12 mo. 1,000 hours
  - Retiree continues receiving monthly TFFR retirement benefit, but benefit does not increase as result of returning to employment and payment of TFFR contributions.
  - Both retiree and employer contributions must be paid on retiree salary under the same employer payment plan model as active members.
- **Exceptions to General Rule**
  - Critical Shortage Areas – determined by Education Standards and Practices Board (ESPB).
  - Benefit Suspension and Benefit Recalculation
- **Note**: TFFR retiree re-employment limits do not apply to: 1)non contracted substitute teaching; 2) teaching in ND colleges, ND private schools, or out-of-state schools and colleges; or 3) employment outside of education.

TFFR Retiree Re-Employment 2016-17

Total number of Re-employed Retirees:		**347**
Superintendents	18	
Administrators	27	
Teachers	302	
General Rule	301	
Critical Shortage Area	46	
Suspend and Recalculate	0	
Average Age	63	
Average Salary	$26,800	
Total Salaries	$9,315,000	
No. Employers w/retirees	140	



TFFR Retiree Re-Employment



TFFR Investments

TFFR Investment Program

- Asset allocation and investment policy is determined by TFFR Board, with assistance from SIB Chief Investment Officer, investment consultant, and RIO staff.
- State Investment Board implements TFFR investment program.
- Asset Liability Study was conducted by SIB's investment consultant, Callan Associates, in 2015 with minor changes to asset allocation approved.
- **See October 26, 2017 presentation by David Hunter, SIB Chief Investment Officer.**

TFFR Funding

Retirement Funding Equation

C + I = B + E

- Contributions + Investments = Benefits + Expenses
- Not just for today, but for the long term.

Annual Actuarial Valuation

- Actuarial valuation is conducted by actuary each year. Purpose is to:
  - Determine the adequacy of the current employer contribution rate
  - Describe the current financial condition of TFFR
  - Analyze changes in TFFR's financial condition.
- Annual valuation report is presented to TFFR Board and Legislative Employee Benefits Programs Committee each year.
- **See October 26, 2017 presentation of TFFR's 2017 valuation results by Segal Consulting.**

Actuarial Experience Study

- An Experience Study is conducted by actuary every 5 years to compare actual plan experience to assumed plan experience, determine trends, and make recommendations.
  - Economic assumptions include inflation, salary increase, payroll growth, and investment returns.
  - Demographic assumptions include termination, disability, retirement, and mortality rates.
- Goal is to improve appropriateness and reliability of actuarial valuations.
- Experience Study was conducted in 2015 (for 2009-2014). Changes include: reduced investment return assumption from 8% to 7.75%, adopted new mortality tables to reflect longer life expectancies, and other minor adjustments to salary increase, turnover, and retirement rates.
- Segal Consultants reported results of Experience Study to TFFR Board and Legislative Employee Benefits Programs Committee.

Actuarial Audit

- Actuarial audit is an evaluation by an independent actuary, other than the one who performs the plan's actuarial valuation.
- Purpose is to express an opinion on the reasonableness or accuracy of the actuarial valuation results, assumptions, cost methods, contribution rates and related calculations.
- TFFR Board policy requires an actuarial audit to be conducted every 5 years.
- TFFR Board selected Cavanaugh-Macdonald Consulting in 2016 to conduct the actuarial audit of current actuary, Segal Consulting.
- Results of actuarial audit were very positive, with only minor recommendations.
- Report was delivered to TFFR Board and Legislative Employee Benefits Programs Committee.

TFFR Information

TFFR website: www.nd.gov/rio

- TFFR Board meeting schedule, members, and meeting minutes
- Legislation
  - Links to ND Legislative website, bill drafts, actuarial analysis, testimony
- Investments
  - Asset allocation, investment performance, investment guidelines
- GASB Information
  - GASB 68 Overview, Q & A, GASB 68 report and audited schedules, disclosure template
- Presentations
  - Presentations made to member and employer
- Publications and Reports
  - Newsletters, handbook, brochures
  - Actuarial, financial, and audit reports
- Contact Information
  - Phone: 701-328-9885 or 1-800-952-2970
  - Email: fkopp@nd.gov

North Dakota Teachers' Fund For Retirement

Summary

36

- The TFFR Board, State Investment Board, and RIO staff will continue to prudently manage and invest trust fund assets to ensure the TFFR retirement plan is financially sustainable for past, present and future ND educators.

- We are committed to:
  - Administering an accurate, prompt, and efficient pension benefits program.
  - Delivering high quality, friendly service to members and employers.

TFFR RE-EMPLOYED RETIREE REPORT
2016-17

Total number of Re-employed Retirees:	**347**
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Teachers	302
General Rule	301
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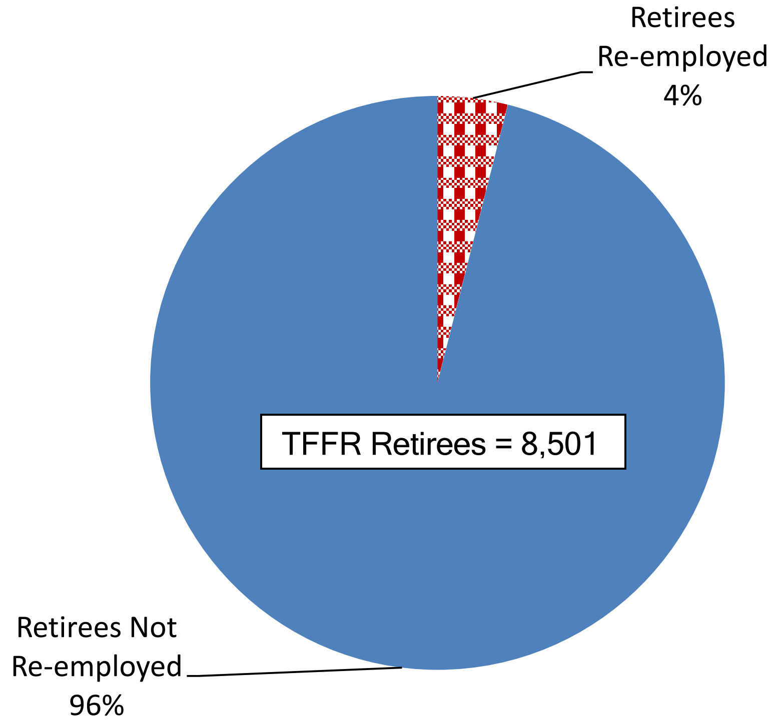
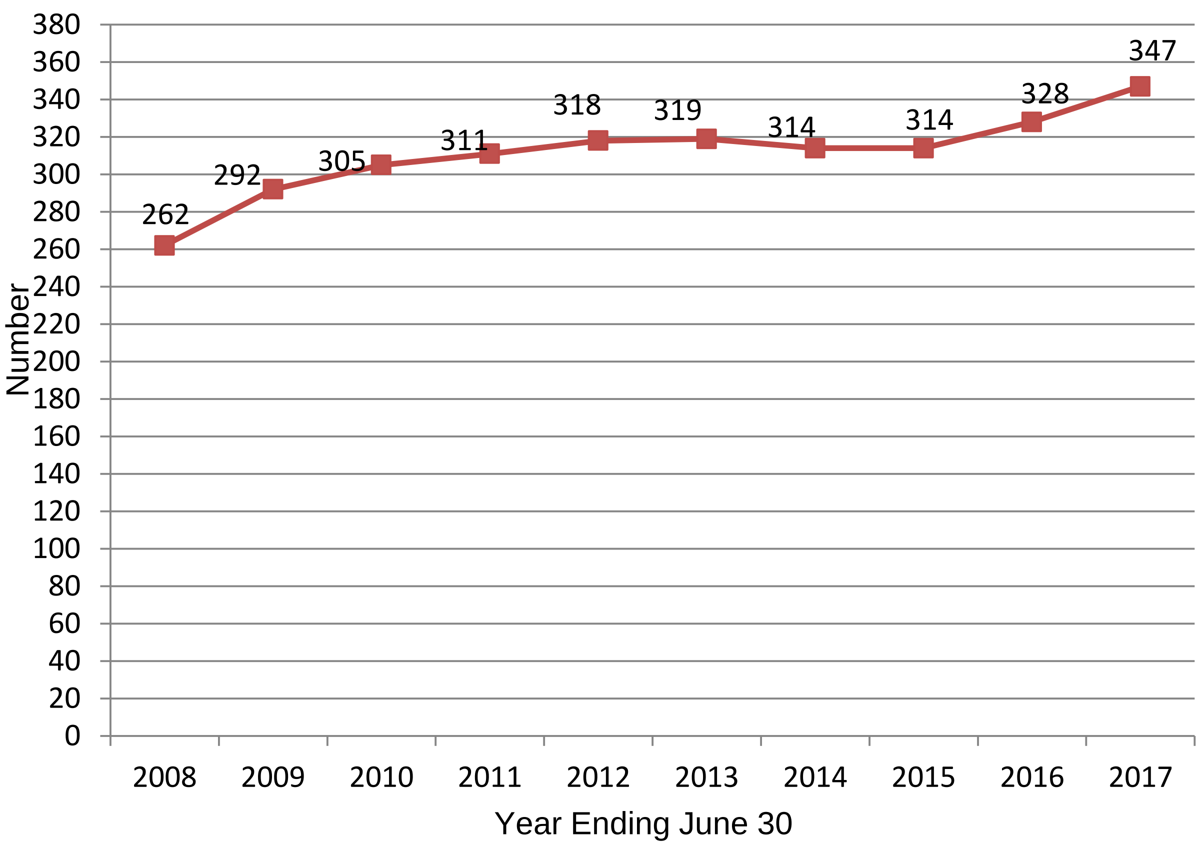
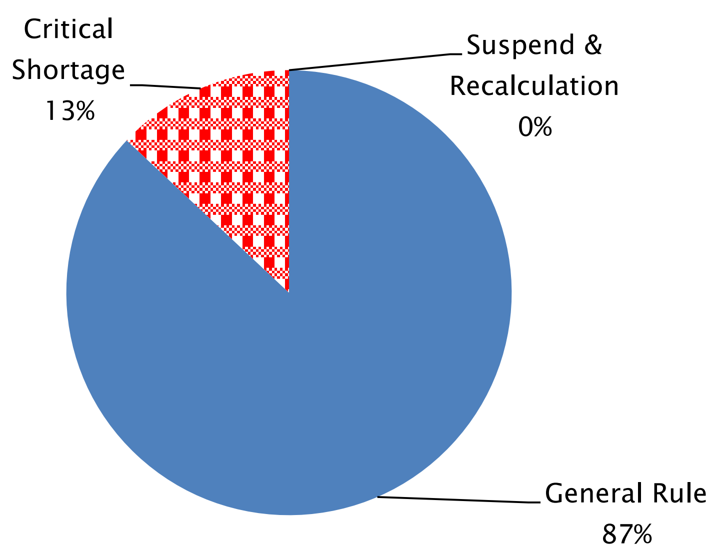
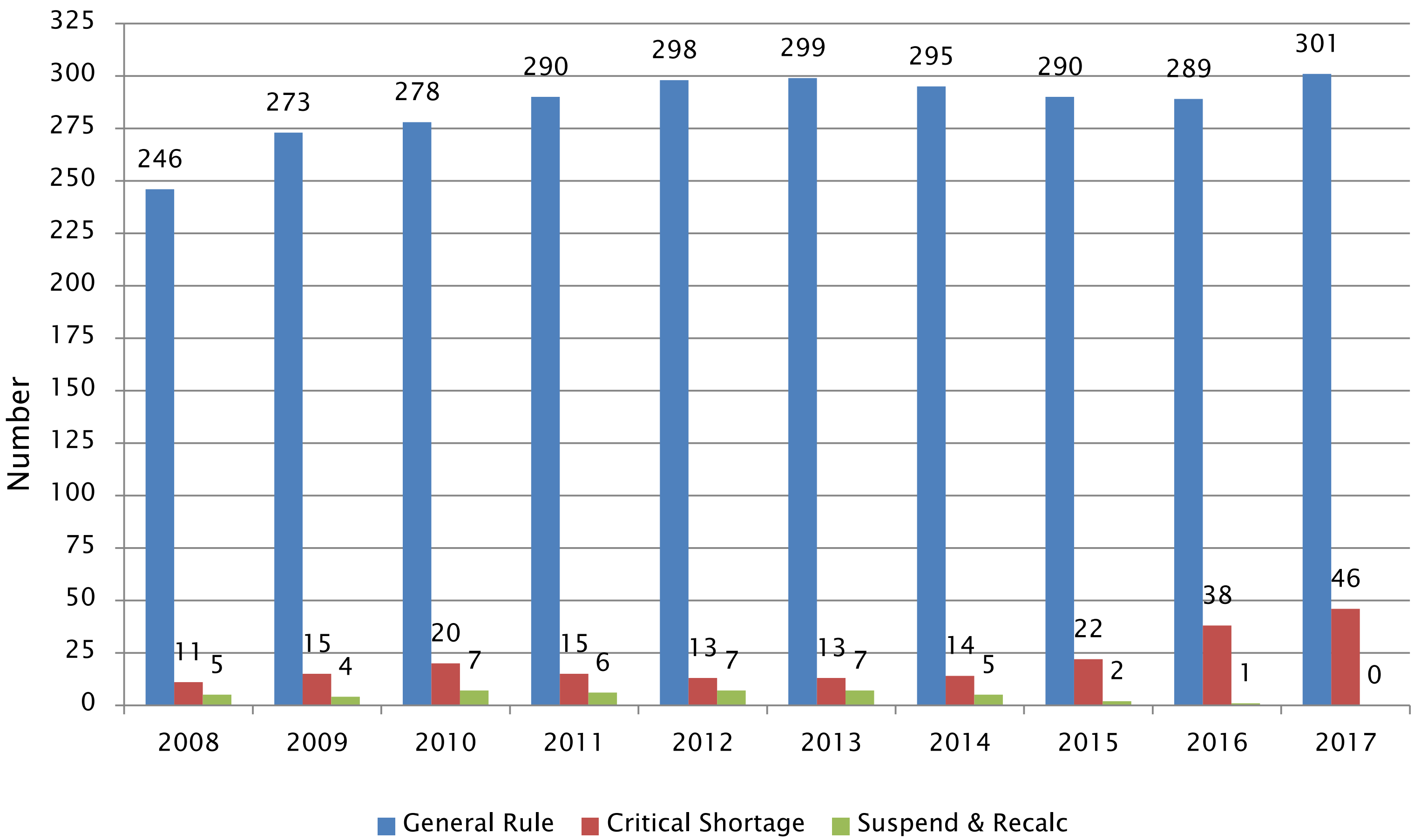


TFFR RE-EMPLOYED RETIREES
10 YRS. ENDING 6-30-17



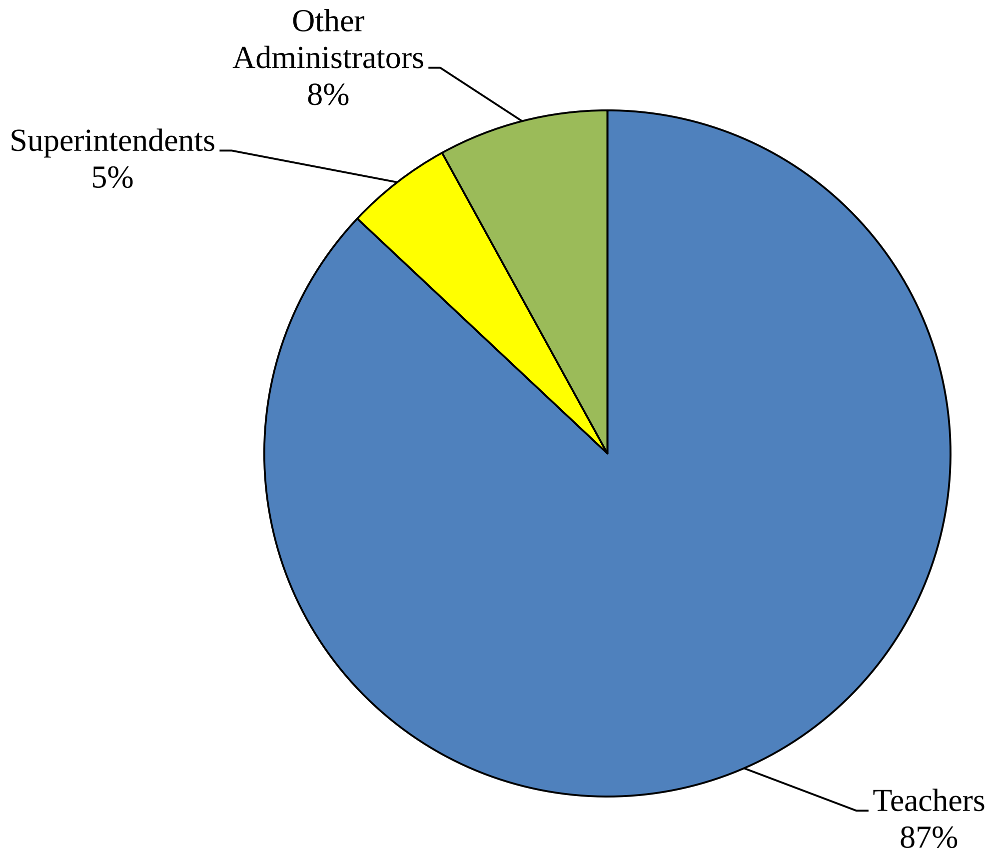
TFFR RE-EMPLOYED RETIREES BY OPTION
2016-17

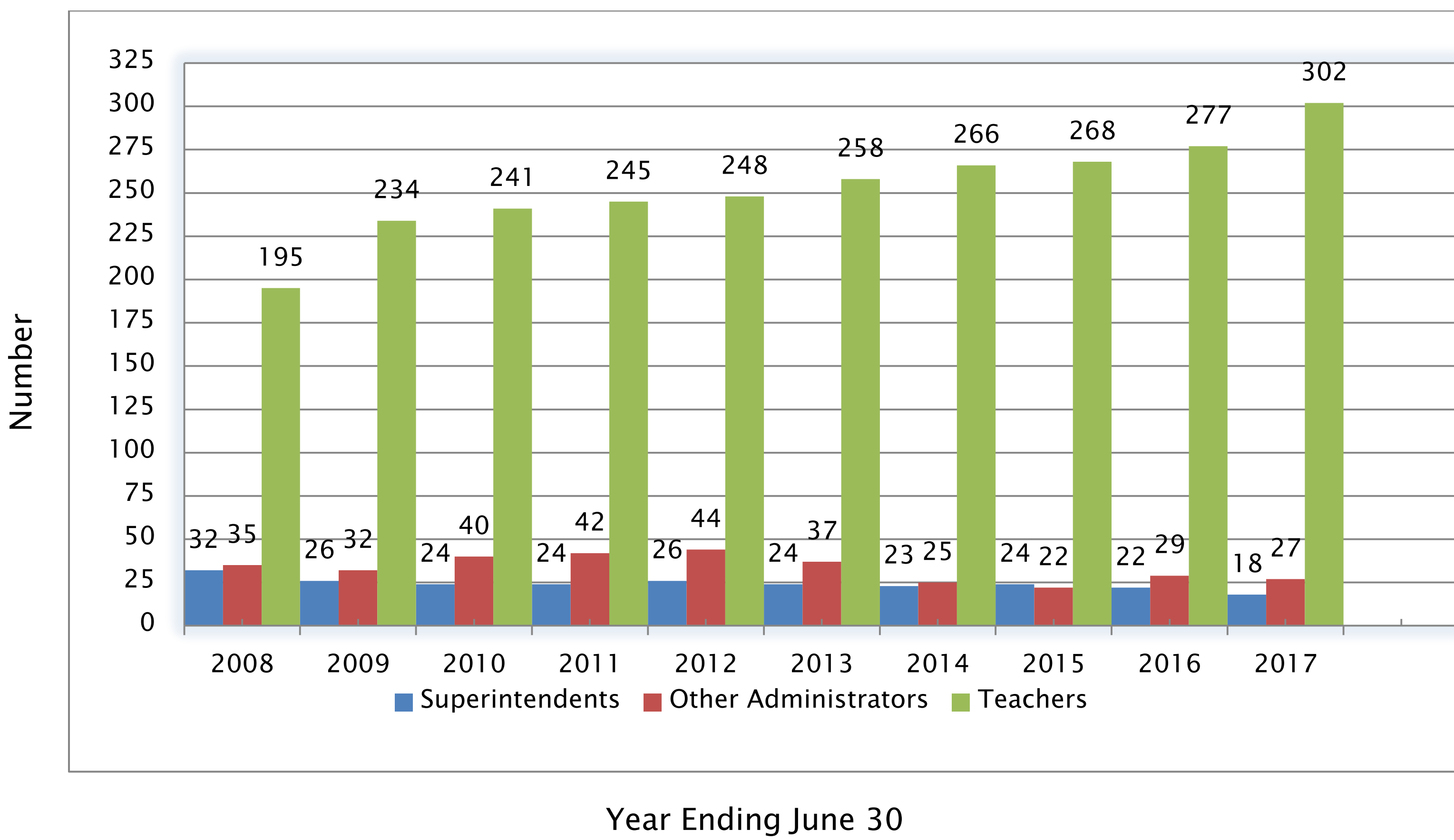




Year Ending June 30

TFFR RE-EMPLOYED RETIREES BY JOB TYPE
2016-17





TFFR RE-EMPLOYED RETIREES
BY SUBJECT/POSITION
2016-17

Subject or Position	Re-employed Retirees Full Time CSA/SR	Part Time Gen Rule	Total
Art	0	4	4
Business	3	10	13
Counseling	2	8	10
Elementary Ed	10	15	25
English/Reading	5	12	17
Extra-Curricular		36	36
FACS	1	9	10
Foreign Language		4	4
Health/Phy Ed	1	5	6
Library/Media	0	6	6
Math	2	8	10
Mentors, Strategists, Prof. Dev.	0	22	22
Music	3	9	12
Science	5	11	16
Social Studies/History	1	7	8
*Special Ed/Title/LD/Speech	7	43	50
Summer School/Driver's Ed		15	15
Tech Coordination/Tech Ed	1	8	9
Voc Ed/Adult Ed		21	21
Other Teachers	1	7	8
Total Retired Teachers	42	260	302
Superintendent	2	16	18
Principal/Asst Supt	2	11	13
Director/Coordinator	_	14	14
Total Retired Administrators	4	41	45
Total Re-Employed Retirees	**46**	**+ 301**	**= 347**

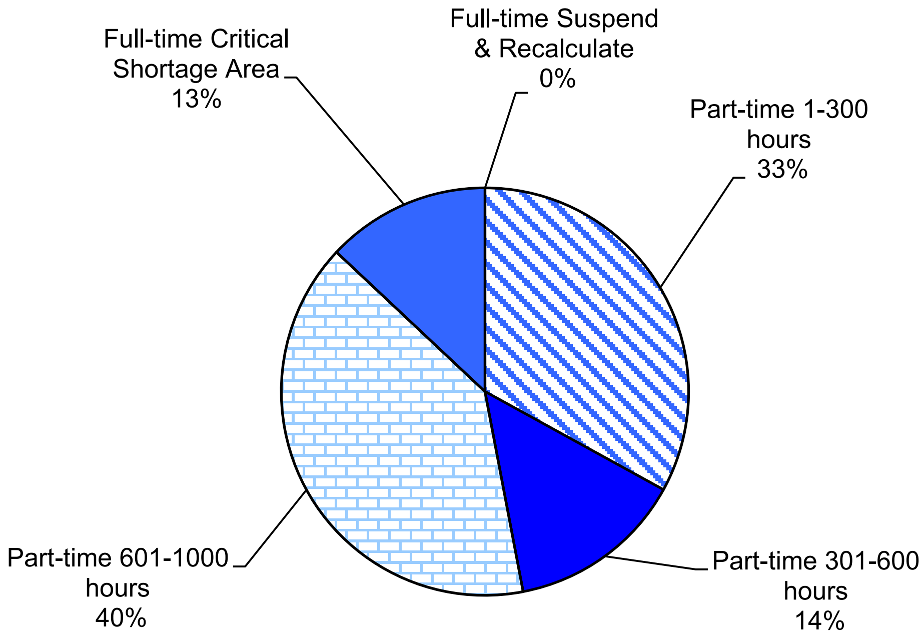
(7 teaching in 2 school districts)

*Special Ed:

LD	4
Speech Path/Ther	8
Spec Ed	21
Title	14
Vision Impair	3

CSA = Critical Shortage Area
SR = Suspend & Recalc

TFFR RE-EMPLOYED RETIREES BY HOURS CONTRACTED
2016-17



Hours Contracted	Re-employed Retirees	
Part Time – General Rule	**Number**	**Percent**
1 – 300 hours	112	33
301 – 600 hours	49	14
601 – 1000 hours	140	40
Full Time		
Critical Shortage Area	46	13
Suspend & Recalculate	0	0
Total Re-employed Retirees	**347**	**100%**
(7 teaching in 2 districts)		

TFFR RE-EMPLOYED RETIREES
BY EMPLOYER
2016-2017

School Districts	#	School Districts	#	School Districts	#
Alexander		Glenburn	3	Midkota	4
Anamoose		Goodrich	3	Midway	3
Apple Creek Elementary		Grafton	1	Milnor	1
Ashley	1	Grand Forks	20	Minnewauken	3
Bakker Elementary		Grenora		Minot	13
Barnes County North	1	Griggs County Central	2	Minto	
Beach	3	Halliday	1	Mohall-Lansford-Sherwood	
Belcourt	2	Hankinson		Montpelier	
Belfield	2	Harvey	1	Mott-Regent	2
Beulah	2	Hatton Eielson	2	Mt. Pleasant	1
Billings County School	3	Hazelton-Moffit		Munich	3
Bismarck	15	Hazen	2	Napoleon	2
Bottineau	5	Hebron	2	Naughton Rural	1
Bowbells		Hettinger	1	Nedrose	2
Bowman		Hillsboro	1	Nesson	
Burke Central	1	Hope	1	New Elementary	
Carrington	1	Horse Creek Elementary		New England	4
Cavalier	2	Jamestown	3	New Rockford-Sheyenne	
Center-Stanton		Kenmare		New Salem-Almont	2
Central Cass	1	Kensal	2	New Town	3
Central Elementary	1	Kidder County School Dist.	2	Newburg United	1
Central Valley	1	Killdeer	2	North Border School	6
Dakota Prairie		Kindred		North Sargent	
Devils Lake	1	Kulm		North Star-Cando	3
Dickinson		Lakota	2	Northern Cass	
Divide County	1	LaMoure	1	Northwood	3
Drake		Langdon	1	Oakes	1
Drayton	3	Larimore	2	Oberon Elementary	1
Dunseith	1	Leeds		Page	1
Earl Elementary		Lewis and Clark	2	Park River	3
Edgeley		Lidgerwood	1	Parshall	2
Edmore	1	Linton	1	Pingree-Buchanan	1
Eight Mile		Lisbon	1	Powers Lake	3
Elgin/New Leipzig	1	Litchville-Marion	1	Richardton-Taylor	2
Ellendale		Little Heart Elementary		Richland	
Emerado Elementary		Lone Tree Elementary		Rolette	3
Enderlin Area School		Maddock	1	Roosevelt-Carson	
Fairmount	1	Mandan	7	Rugby	
Fargo	17	Mandaree		Sargent Central	
Fessenden-Bowdon	3	Manning Elementary		Sawyer	1
Finley-Sharon	1	Manvel Elementary	2	Scranton	
Flasher		Maple Valley	3	Selfridge	2
Fordville Lankin	2	Mapleton Elementary		Solen-Canonball	1
Fort Ransom Elementary	1	Marmarth Elementary	1	South Heart	2
Fort Totten	5	Max	1	South Prairie Elementary	1
Fort Yates	2	Mayville-Portland CG	1	St. John's School	5
Gackle-Streeter	1	McClusky		St. Thomas	4
Garrison	1	McKenzie County School Dist		Stanley	
Glen Ullin		Medina			
		Menoken Elementary			

School Districts (cont)	#
Starkweather	
Sterling Elementary	2
Strasburg	1
Surrey	2
Sweet Briar Elementary	
TGU	2
Thompson	
Tioga	
Turtle Lake-Mercer	2
Twin Buttes Elementary	1
Underwood	1
United	
Valley-Edinburg	5
Valley City	1
Velva	3
Wahpeton	1
Warwick	2
Washburn	4
West Fargo	22
Westhope	1
White Shield	3
Williston	3
Wilton	
Wing	
Wishek	1
Wolford	4
Wyndmere	1
Yellowstone	
Zeeland	1

County Superintendents	
Logan County	
McKenzie County	
Morton County	1
Nelson County	
Slope County	
Ward County	

Special Education Units	
Burleigh County Special Ed	2
East Central Special Ed	6
GST Educational	1
James River Special Ed	
Lake Region Special Ed	
Lonetree Special Ed	1
Northern Plains Special Ed	
Oliver-Mercer Special Ed	1
Peace Garden Special Ed	1
Pembina Special Ed	
Rural Cass County Special Ed	1
Sheyenne Valley Special Ed	1
Souris Valley Special Ed	
South Central Prairie Sp Ed	1
South Valley Special Ed	
Southwest Special Ed	
Upper Valley Special Ed	2
West River Student Services	3
Wil-Mac Special Ed	4

Vocational Centers	
N Central Area Career & Tech	
N Valley Career & Tech Ctr	
Roughrider Area Career/Tech	1
SE Region Career & Tech Ctr	2
Sheyenne Valley Area Voc Ctr	

State Agencies & Institutions	
ND Center for Distance Ed	4
ND Dept of Public Instruction	
ND School for the Blind	3
ND School for the Deaf	1
ND Youth Correctional Center	1

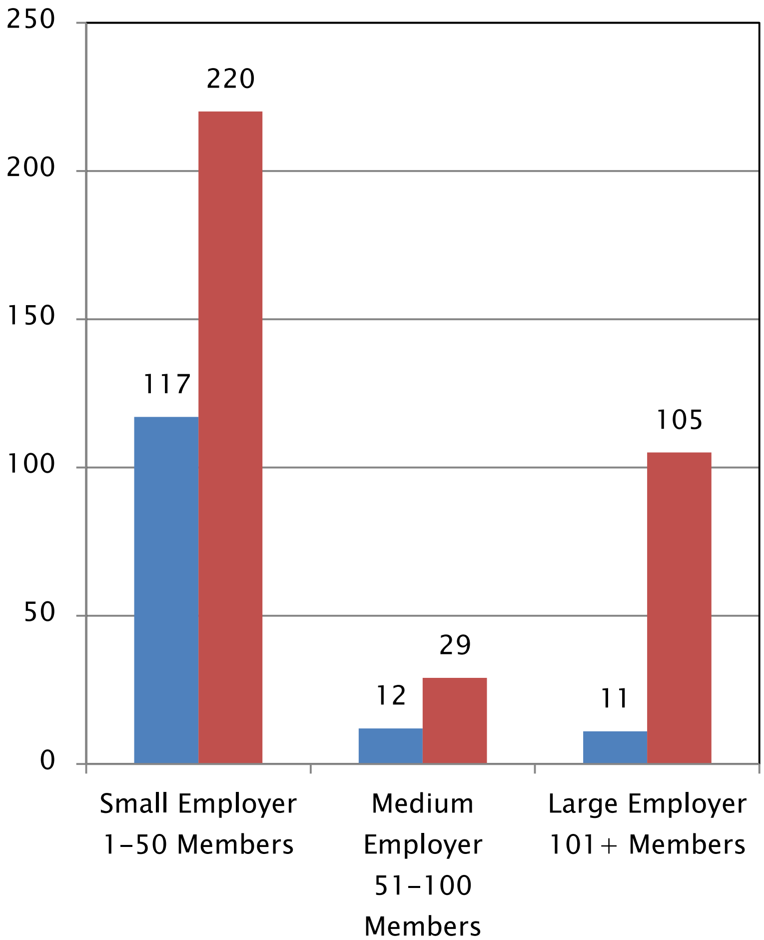
Other	
Great NW Education Co-op	1
ND United	
Rough Rider Ed Services	
South East Education Co-op	3

Total TFFR Participating Employers	**215**

140 Employers Employing TFFR Retirees (65%)

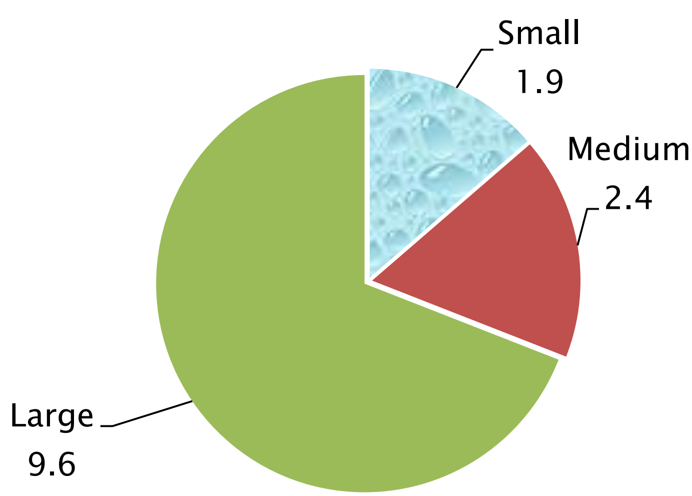
347 TFFR Retirees Employed (7 retirees working in 2 school districts)

TFFR RE-EMPLOYED RETIREES BY EMPLOYER SIZE
2016-17



Empl Size	All Empl.	Empl w/ Re-empl Retirees	
Small	184	117	64%
Medium	18	12	67%
Large	13	11	85%
Total	215	140	65%

Employer Size	Re-empl Retirees	
Small	220	62%
Medium	29	8%
Large	105	30%
Total	354	100%



347 Retirees employed by 140 employers
(7 retirees working in 2 districts)

Average All = 2.5 retirees/employer

RETIREMENT AND INVESTMENT OFFICE
AUDIT SERVICES
2017-2018 1st Quarter Audit Activities Report
July 1, 2017 – September 30, 2017

The audit objective of Audit Services is twofold: first, to provide comprehensive, practical audit coverage of the Retirement and Investment Office (RIO) programs; second, to assist RIO management and the State Investment Board (SIB) by conducting special reviews or audits.

Audit coverage is based on the July 1, 2017 through June 30, 2018 work plan approved by the SIB Audit Committee. The audit activities undertaken are consistent with the Audit Services charter and goals, and the goals of RIO. To the extent possible, our audits are being carried out in accordance with the International Standards for the Professional Practice of Internal Auditing. Audit effort is being directed to the needs of RIO and the concerns of management and the SIB Audit Committee.

<u>Retirement Program Audit Activities</u>

- **TFFR Employer Audit Program**

We examine employer reporting to the Teachers' Fund for Retirement (TFFR) to determine whether retirement salaries and contributions reported for members of TFFR are in compliance with the definition of salary as it appears in NDCC 15-39.1-04(10). Other reporting procedures reviewed during the audit process are calculation of service hours and eligibility for TFFR membership. A written report is issued after each audit examination is completed. The TFFR Employer Audit Program includes Compliance Audits, Not in Compliance (NIC) Reviews, and Special Audits requested by Retirement Services.

Status of TFFR Employer Audits as of September 30, 2017:

- Two (2) employer audits had been completed.
- One (1) employer audit was pending corrections by Retirement Services.
- Five (5) employer audits were in progress.
- Five (5) employer audits were pending but not yet started.
- One (1) employer was notified of an upcoming audit.

This is an area that requires special emphasis due to the level of risk identified through previous audit results. Our long-range plans include auditing each employer over an eight year period.

- **Benefit Payments Audit**

A review of deaths, long outstanding checks, and long term annuitants is completed on an annual basis to verify that established policies and procedures are being followed by the staff of Retirement Services. The 2016-2017 Benefit Payments Audit was in progress at the end of the first quarter with a final report expected to be issued early October.

- **TFFR File Maintenance Audit**

A review of changes made to TFFR member account data by Retirement and Investment Office employees is reviewed on a quarterly basis. The TFFR File Maintenance Audit for the third quarter of 2017 was completed on August 1st. The TFFR File Maintenance Audit for the fourth quarter of 2017 was in progress at the end of the first quarter with a final report expected to be issued early October.

<u>Administrative and Investment Audit Activities</u>

- **Executive Limitation Audit**

Each year the SIB conducts a customer satisfaction survey. The purpose of this annual survey is to determine how well the SIB, through the staff of the RIO, is meeting the expectations of its clients. This survey is part of the SIB's ongoing effort to be more responsive to the needs of their clients and to continually improve the services that are provided. Audit Services facilitated the survey in July and August 2017 and results were provided to the SIB at their October 27, 2017 meeting.

- **External Audit Support**

Audit Services provided support to our external audit partners, CliftonLarsonAllen (CLA), during the GASB 68 Census Data Audits. Audit Services notified seventeen employers of an upcoming GASB 68 Census Data Audit in July 2017. CLA anticipated that GASB 68 Census Data Audit work would conclude in mid-October.

Professional Development/CE/General Education

Audit Services continued its participation with the Institute of Internal Auditors (IIA) Central NoDak Chapter by attending the September monthly meeting. Speaker Tony Aukland from the State and Local Intelligence Center (Cyber) discussed cyber security issues impacting organizations and individuals.

NORTH DAKOTA RETIREMENT AND INVESTMENT OFFICE
AUDIT SERVICES DIVISION
FISCAL YEAR 2017 -2018

	FY 2018 1st QTR	FY 2018 2nd QTR	FY 2018 3rd QTR	FY 2018 4th QTR	FY 2018 TOTAL
Audit Activities					
Retirement Program Audits:					
TFFR Employer Audit Program					380
Anamoose Public School District	32				32
Fort Totten Public School District	22				22
Fort Yates Public School District	97				97
Gackle-Streeter Public School District	20				20
Glenburn Public School District	18				18
Kindred Public School District	20				20
ND School for the Blind	21				21
Tioga Public School District	60				60
Audit Peer Reviews/TFFR Meeting(s)/Audit Planning/Audit Notifications/Intern	91				91
Benefit Payments Audit	162				162
TFFR File Maintenance Audit(s)	47				47
Annual Salary Verification Project	2				2
Audit Continuous Improvement Project - Employer Audit Program - Census Data Audit File	11				11
Agency Administrative and Investment Audits:					
Executive Limitation Audit	9				9
RIO External Auditor Assistance	14				14
Administrative Activities					
Administrative - Staff Mtgs, Time Reports, Email, Records Retention, General Reporting	166				166
Audit Committee/SIB/TFFR Attendance and Preparation	43				43
Professional Development/CE/General Education	10				10
Annual Leave, Sick Leave, and Holidays	198				198
Quarterly Total:	**1041**	**0.00**	**0.00**	**0.00**	**1041**

Total Hours for 2017-2018	4,176
D. Thorsen Total Hours 2017-2018	2,088
T. Miller Bowley Hours 2017-2018	2,088

MEMORANDUM

TO: TFFR Board

FROM: Fay Kopp

DATE: October 19, 2017

SUBJ: Trustee Education Report

TFFR belongs to the National Council on Teacher Retirement (NCTR) which is an independent association dedicated to safeguarding the integrity of public retirement systems to which teachers belong and to promoting the rights and benefits of all present and future members of the systems. NCTR provides excellent pension and investment education and unparalleled networking opportunities with pension trustees, administrators, and industry professionals from all over the country.

TFFR Board trustee Mel Olson attended the Annual NCTR Annual Conference in October 2017, and will present a brief Conference Report to the Board.

MEMORANDUM

TO: TFFR Board
FROM: Fay Kopp
Date: October 19, 2017
RE: TFFR Employer Payment Plan - Model 3

TFFR Board Policy C-7, Employer Payment Plan Models, was amended effective July 1, 2003 to eliminate Model 3. At that time, employers using Model 3 were allowed to continue as a closed group, but Model 3 was no longer available to other employers. The reason for eliminating Model 3 was due to the small number of employers who utilized the model, the complexity of the model (particularly with part time employees and re-employed retirees who must be prorated, etc.), and resulting reporting errors to TFFR (and potentially to the IRS).

Staff has discussed TFFR reporting problems with Model 3 employers, and over time, the number of Model 3 employers has slowly decreased. Currently, there are three small employers remaining under Model 3, paying member contribution amounts ranging from $1,000 to $3,500 per full time TFFR member per year.

At the September 2017 meeting, the TFFR Board considered possible elimination of Employer Payment Plan Model 3. (See September 14, 2017 Memo to Board for background information.) The Board directed staff to draft an amended policy which would entirely eliminate Model 3 and no longer allow any employers to report under this model effective July 1, 2019 (draft policy attached). For clarification purposes, the draft policy also describes all acceptable models which have been allowed by the plan for many years.

If the amended TFFR Board policy is approved to eliminate Model 3, it would require the three remaining Model 3 employers to convert to Model 1, Model 2, or no model as part of their next negotiated agreement. If employers do not comply and continue reporting under Model 3, they would be in violation of NDCC 15-39.1-23. Consequently, they could be charged a $250 penalty for each report not properly filed and TFFR could request DPI to suspend foundation aid payments for failing to file required TFFR reports.

Upon approval of the amended board policy, TFFR staff would take the following steps:

1) Contact the 3 employers who are currently under Model 3 (verbally and in writing) to notify them of the policy change, time frame in which the employers will need to stop using Model 3, and potential consequences for failing to file required reports.
2) Inform all TFFR participating employers of the policy change in the “Briefly” Employer Newsletter.
3) Monitor current Model 3 employers, and assist them in making necessary model changes prior to July 1, 2019.

4) If employers do not comply and continue reporting July 2019 reports (due August 15, 2019) under Model 3, under NDCC 15-39.1.23, they could be charged a $250 penalty for each monthly report not properly filed, and TFFR could request DPI to suspend foundation aid payments until required reports (under approved models) are filed with the Fund.

Legal Review

As previously noted, Jan Murtha, TFFR Legal Counsel, has reviewed the current policy, and proposed changes to the current policy, and agrees that the Board has the authority to eliminate Model 3 as an option for employers currently using that Model and that the proposed timeframe for implementing this change (i.e. effective July 1, 2019) provides reasonable notice. Jan noted that the proposed implementation of penalties for noncompliance under NDCC 15-39.1-23 is available to TFFR for enforcement of this change.

Board action requested

Approve first reading of TFFR Board Policy C-7, Employer Payment Plan Models. (Please note, if first reading is approved, staff plans to email draft policy to current Model 3 employers.)

BOARD INFORMATION AND DISCUSSION.

MEMORANDUM

TO: TFFR Board
FROM: Fay Kopp
Date: September 14, 2017
RE: TFFR Employer Payment Plan - Model 3

Employer Payment Plan Model Background

By statute, all TFFR participating employers are required to pay 12.75% and TFFR members are required to pay 11.75% of eligible salary to the TFFR retirement plan. Member contributions are deducted from the member's salary unless employers and members decide, through the contract negotiations process, that the employer will pay all or a portion of the member contributions as a salary supplement. TFFR Employer Payment Models are described in the TFFR Employer Guide, pages 13-23 and summarized below.

TFFR Employer Payment Plan (EPP) Models

Payment of member contributions on a tax deferred basis can be made by the employer through (1) salary reduction, or (2) salary supplement.

- No Model: Member/employee contribution is paid by employee and remitted by employer as taxed dollars.

- Model 1: Member/employee contribution is paid by employee through a salary reduction and remitted by employer as tax deferred dollars.

- Model 2 All: Member/employee contribution is paid by employer as a salary supplement and remitted to TFFR as tax deferred dollars.

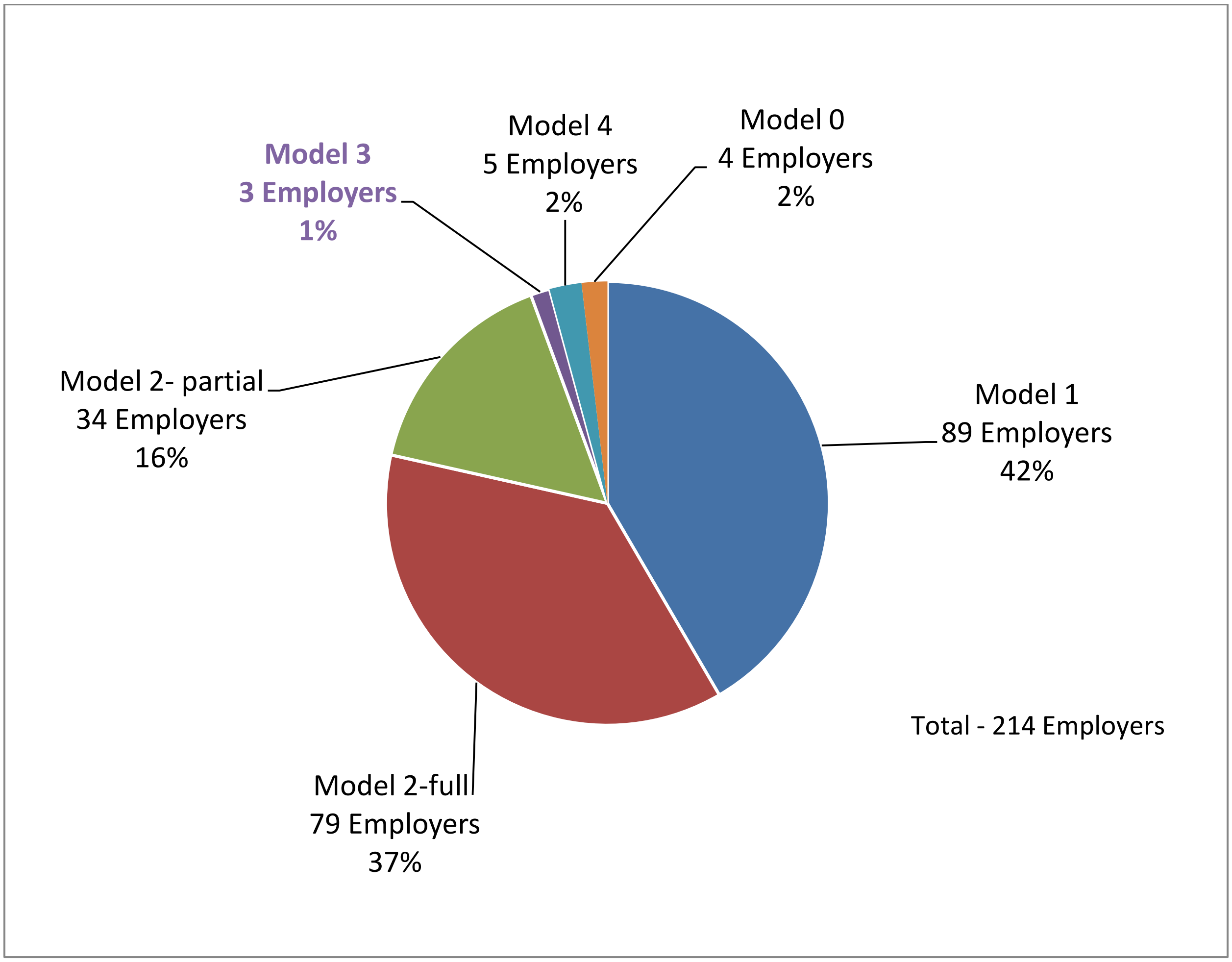
- Model 2 Partial (%): A fixed percentage of the member/employee contribution is paid by employer as a salary supplement and remitted to TFFR as tax deferred dollars. The remaining employee contribution is paid by employee and remitted by employer as tax deferred dollars.

- Model 3 Partial ($): A fixed dollar amount of the member/employee contribution is paid by employer as a salary supplement and remitted to TFFR as tax deferred dollars. The remaining employee contribution is paid by employee and remitted by employer as tax deferred dollars. Model 3 option is no longer available for use by employers after 7/1/03, though employers using Model 3 at that time were allowed to continue.

- Model 4: Includes state agencies only.

Of the 214 TFFR participating employers, here is a breakdown of model usage for the 2017-18 school year.

TFFR Employer Models
2017-18



Model 3 ($ partial)

Model 3 ($ partial) allows employers to pay a fixed dollar amount of the member contributions using a combination of a salary supplement and a salary reduction. See TFFR Employer Guide, page 20, for description of Model 3.

Example: *TFFR member is paid $50,000 base contract salary. Through contract negotiations, the employer agrees to pay $2,000 of member contributions as a salary supplement, so $2,000 is included as retirement salary (Model 3). The employer pays $2,000 of member contributions, and the remaining member contributions are deducted from the member's pay. All member contributions are tax deferred.*

TFFR retirement salary	***50,000 + 2,000 =***	***52,000***
• *Employer contributions:*	*52,000 X 12.75% =*	*6,630*
• *Member contributions:*	*52,000 X 11.75% =*	*6,110*

Portion of member contribs paid by employer: 2,000
Portion of member contribs paid by member: 6,110 - 2,000 = 4,110

Effective July 1, 2003, TFFR Board Policy C-7, Employer Payment Plan Models, was amended to eliminate Model 3. Employers using Model 3 were allowed to continue as a closed group, but Model 3 is no longer available to other employers. The reason for eliminating Model 3 was due to the small number of employers who utilize the model, the complexity of the model (particularly with part time employees and re-employed retirees who must be prorated, etc.), and resulting reporting errors to TFFR (and potentially to the IRS).

Staff has discussed TFFR reporting problems with Model 3 employers, and over time, the number of Model 3 employers has slowly decreased. Currently, there are three small employers remaining under Model 3, paying member contribution amounts ranging from $1,000 to $3,500 per full time employee per year.

Board Policy C-7 – Employer Payment Plan Models

Staff continues to be concerned with the difficulty employers experience in accurately reporting Model 3, and the resulting TFFR reporting errors. Therefore, we recommend TFFR Board Policy C-7 be amended to entirely eliminate Model 3 and no longer allow any employers to report under this model effective July 1, 2019. This would require the three remaining Model 3 employers to convert to Model 0, Model 1, or Model 2 as part of their next negotiated agreement. If employers do not comply and continue reporting under Model 3, they would be in violation of NDCC 15-39.1-23. Consequently, they would be charged a $250 penalty for each report not properly filed and would be subject to suspension of DPI foundation aid payments for failing to file required reports.

Legal Review

Jan Murtha, TFFR Legal Counsel, has reviewed the current policy, and proposed changes to the current policy, and agrees that the Board has the authority to eliminate Model 3 as an option for employers currently using that Model and that the proposed timeframe for implementing this change (ie effective July 1, 2019) provides reasonable notice. Jan noted that NDCC 15-29.1-23 requires employers to file reports as required by the Board and provides a penalty for employers that fail to do so; further NDAC 82-04-01-02(8)(c) specifically requires employers to file a new plan if the Board changes the models.

BOARD INFORMATION AND DISCUSSION.

Policy Type: TFFR Program
Policy Title: Employer Payment Plan Models

The TFFR B~~b~~oard has developed models relating to employer payment of member contributions as provided for in NDCC 15-39.1-09 and NDAC 82-04-01. The models are outlined in employer instructions prepared by the fund. Special provisions apply to state agencies and institutions, and employers that have not adopted a model.

Employers must select the employer payment plan model under which they will pay member ~~assessments~~contributions on a form provided by the administrative office. The model selected by the employer can only be changed once each year at the beginning of the fiscal year.

The following employer payment plan models are available to participating employers:

- Model 1: Member contributions are paid by the member through a salary reduction and remitted to TFFR by the employer as tax deferred contributions.

- Model 2 All: Member contributions are paid by the employer as a salary supplement and remitted to TFFR as tax deferred contributions.

- Model 2 Partial (%): A fixed percentage (1% minimum) of the member contributions are paid by the employer as a salary supplement and remitted to TFFR as tax deferred contributions. The remaining member contributions are paid by the member and remitted by the employer as tax deferred contributions.

- Model 3 Partial ($): A fixed dollar amount of the member contributions are paid by the employer as a salary supplement and remitted to TFFR as tax deferred contributions. The remaining member contributions are paid by the member and remitted by the employer as tax deferred contributions. Effective July 1, 2003, employers may no longer select Model 3. Any employers currently paying member contributions under this model may continue as a closed group, but Model 3 will no longer be available to other employers. Effective July 1, 2019, Model 3 will be eliminated, and no employers will be allowed to utilize this model.

- Model 4 State Agencies: Four Percent (4%) of the member contributions (or the % of member contributions the State agrees to pay) are paid by the State as a salary supplement and remitted to TFFR as tax deferred contributions. The remaining member contributions are paid by the member and remitted by the employer as tax deferred contributions.~~Effective July 1, 2007, the portion of member contributions deducted from the member's salary can be made on a tax deferred basis for state agencies and institutions (Model 4).~~

~~Effective July 1, 2012, the portion of member contributions deducted from the member's salary can be made on a tax deferred basis under all models (Model 1, 2, 3, 4).~~

Employers who do not select one of the above models must report member contributions paid by the member and remitted by the employer as taxed contributions. Payment of member contributions cannot be made on a tax deferred basis unless one of the above approved models is selected in writing.

TFFR Board Adopted: July 16, 1998.
Amended: March 13, 2003; March 15, 2007; September 22, 2011.

MEMORANDUM

TO: TFFR Board

FROM: Fay Kopp

DATE: October 19, 2017

SUBJECT: LEA President Contract Release Time

At the April and July 2017 meetings, the TFFR Board discussed salary payments made by TFFR employers to Local Education Association (LEA) presidents who are granted contract release time to perform their association duties. See April 24, 2017 memo from Fay Kopp and April 18, 2017 legal analysis from Jan Murtha for background information.

To give all board members an opportunity to participate in this discussion, the TFFR Board has tabled this topic, and it is scheduled to be discussed at the October 2017 meeting.

Additionally, Jan Murtha will be available to comment on the legal risks, strengths, and weaknesses of actions and policy implications that may be taken by the Board regarding this issue.

If the Board wishes to receive such attorney consultation or discuss confidential member information, the discussion should be held in Executive Session.

BOARD ACTION REQUESTED.

MEMORANDUM

TO: **TFFR Board**

FROM: **Fay Kopp**

DATE: **April 24, 2017**

SUBJ: **Eligible Salary Discussion**
LEA President Duties

At the January 26, 2017 TFFR Board meeting, the Board briefly discussed whether certain salary payments made by TFFR employers to TFFR members who are LEA (local education association) presidents and granted "contract release time" to perform association duties are eligible retirement salary for TFFR purposes as defined in NDCC 15-39.1-04(10). See Attachment 1 for applicable state statutes and administrative rules.

TFFR staff has become aware of two school districts in which the school district contracts and pays a TFFR member their full contract salary, and the LEA reimburses the school district for the 40% contract release time (partial leave of absence) granted to the LEA president to perform association duties. Currently, all of the teacher's contracted salary is being reported as eligible salary for TFFR purposes.

Please note that in the school districts under question, this has been a long-standing practice for over 25 years and is included in the negotiated agreements. This is not a salary spiking issue, but a question of whether payment for the LEA president duties (which is reimbursed by the LEA) constitutes eligible retirement salary under TFFR statutes.

Example:

LEA president holds a regular full time teaching contract for $50,000 with the school district, and is granted 40% contract release time each day to conduct LEA president duties. The LEA president would teach 60% of the time each day and conduct LEA president duties 40% of the time each day.

30,000	*60% school district duties - paid by school district*
<u>20,000</u>	*40% LEA president duties - paid by school district, but reimbursed by LEA*
50,000	*100% contract salary reported to TFFR - used in determining member and employer contribution amounts, and calculating TFFR pension benefit.*

RIO staff has gathered information from the school districts regarding this issue, and has had some initial discussions with ND United leaders as well as those LEA presidents who could potentially be affected.

Jan Murtha, TFFR's legal counsel from the Attorney General's Office, has reviewed this information and provided her legal analysis. See attached memo dated April 18, 2017.

Staff is asking the TFFR Board to consider, under the statutory authority granted in state law, if contract release pay for the performance of LEA president duties constitutes eligible salary for TFFR reporting purposes as defined in NDCC 15-39.1-04(10).

Some factors the Board may wish to consider:

- Whether LEA president duties are teaching, supervisory, administrative or extracurricular duties performed for the school district or other TFFR participating employer if the funding source for payment of those duties is the LEA.

- Whether state TFFR pension benefits should be based (in part) on salary earned for LEA president duties.

- Whether LEA president contract release time, which is a special type of paid leave, should be treated differently from other paid leave like sick, personal, funeral, professional leave, etc.

- Potential impact on current or future LEA presidents who could be affected by this eligible salary determination.

- Other criteria as set forth in NDAC 82-04-02-01.

It should also be noted that while there may only be a couple school districts that currently grant "contract release time" for LEA presidents and are reimbursed for the LEA president's salary, there are also some school districts that provide employer paid "association leave" to their teachers. For example, as referenced in a negotiated agreement, the school district may provide to the LEA, without loss of pay to individuals, up to 15 days for association activities during a school year. For TFFR purposes, this employer paid association leave has been treated like other paid, used leave for employees (i.e. sick, personal, funeral, professional leave, etc.) and is being appropriately reported as eligible salary for TFFR reporting purposes. In some cases, the LEA reimburses the school district for all or a portion of the substitute teacher's pay, while in other school districts, the LEA does not.

Please review this information, and plan to discuss at the meeting.

BOARD INFORMATION AND DISCUSSION.

Attachments

NDCC 15-39.1-04 (10) **Attachment 1**

"Salary" means a member's earnings in eligible employment under this chapter for teaching, supervisory, administrative, and extracurricular services during a plan year reported as salary on the member's federal income tax withholding statements plus any salary reduction or salary deferral amounts under 26 U.S.C. 125, 132(f), 401(k), 403(b), 414(h), or 457, as amended. "Salary" includes amounts paid to members for performance of duties, unless amounts are conditioned on or made in anticipation of an individual member's retirement or termination. The annual salary of each member taken into account in determining benefit accruals and contributions may not exceed the annual compensation limits established under 26 U.S.C. 401(a)(17)(B), as amended, as adjusted for increases in the cost of living in accordance with 26 U.S.C. 401(a)(17)(B), as amended. A salary maximum is not applicable to members whose participation began before July 1, 1996.

"Salary" does not include:

a. Fringe benefits or side, nonwage, benefits that accompany or are in addition to a member's employment, including insurance programs, annuities, transportation allowances, housing allowances, meals, lodging, or expense allowances, or other benefits provided by employer.

b. Insurance programs, including medical, dental, vision, disability, life, long-term care, workforce safety and insurance, or other insurance premiums or benefits.

c. Payments for unused sick leave, personal leave, vacation leave, or other unused leave.

d. Early retirement incentive pay, severance pay, or other payments conditioned on or made in anticipation of retirement or termination.

e. Teacher's aide pay, referee pay, bus driver pay, or janitorial pay.

f. Amounts received by a member in lieu of previously employer-provided benefits or payments that are made on an individual selection basis.

g. Signing bonuses as defined under section 15.1-09-33.1.

h. Other benefits or payments not defined in this section which the board determines to be ineligible teachers' fund for retirement salary.

NDCC 15-39.1-04 (12)

"Teacher" means:

a. **All persons licensed by the education standards and practices board who are contractually employed in teaching, supervisory, administrative, or extracurricular services by a state institution, multidistrict special education unit, area career and technology center, regional education association, school board, or other governing body of a school district of this state,** including superintendents, assistant superintendents, business managers, principals, assistant principals, and special teachers. For purposes of this subdivision, "teacher" includes persons contractually employed by one of the above employers to provide teaching, supervisory, administrative, or extracurricular services to a separate state institution, state agency, multidistrict special education unit, area career and technology center, regional education association, school board, or other governing body of a school district of this state under a third-party contract.

b. The superintendent of public instruction, assistant superintendents of public instruction, county superintendents, assistant superintendents, supervisors of instruction, the professional staff of the department of career and technical education, the professional staff of the center for distance education, **the executive director and professional staff of the North Dakota education association who are members of the fund on July 1, 1995,** the professional staff of an interim school district, and the professional staff of the North Dakota high school activities association who are members of the fund on July 1, 1995.

c. The executive director and professional staff of the North Dakota council of school administrators who are members of the fund on July 1, 1995, and licensed staff of teachers centers, but only if the person was previously a member of and has credits in the fund.

d. Employees of institutions under the control and administration of the state board of higher education who are members of the fund on July 16, 1989.

NDCC 15-39.1-24. Purchase of additional credit.

6. A teacher who is elected president of a professional educational organization recognized by the board and who serves in a full-time capacity in lieu of teaching may purchase service credit for the time spent serving as president. As an alternative to purchasing service credit under this subsection, a teacher and the governmental body employing the teacher may enter into an agreement under which payment for service credit for the time spent as president of the professional educational organization is made pursuant to section 15-39.1-09. The agreement must provide that contributions made pursuant to section 15-39.1-09 are calculated based on the teacher's annual salary as president.

NDAC 82-02-01-01 Definitions.

3. Administrative – means to manage, direct, or superintend a program, service, or school district or other participating employer.

10. Extracurricular – means outside of the regular curriculum of a school district or other participating employer which includes advising, directing, monitoring, or coaching athletics, music, drama, journalism, and other supplemental programs.

18. Supervisory – means to have general oversight or authority over students or teachers, or both, of a school district or other participating employer.

19. Teaching – means to impart knowledge or skills to students or teachers, or both, by means or oral or written lessons, instructions, and information.

NDAC 82-04-02-01 Criteria for eligible salary determinations.

The teachers' fund for retirement board will consider the following criteria and documentation to determine whether benefits or payments made to a teachers' fund for retirement member is eligible retirement salary as authorized in subsection 9 of North Dakota Century Code section 15-39.1-04:

1. Written authorization made in advance of payment. Examples include:

   a. Master contract or negotiated agreement.
   b. Individual employment contract.
   c. Written agreement between employee and employer.
   d. Minutes of school board or participating employer.
   e. Policy of school board or participating employer.
   f. Other information the board deems relevant.

2. Written documentation describing payment details, including:

   a. Duration of payment or whether payment is recurring or nonrecurring in future years.
   b. Frequency and date of payment.
   c. Relation of payment to base or contract salary.
   d. Reason or intent of payment.
   e. Description of duties or services to be performed.
   f. Description of employees who are eligible for payment.
   g. Amount of payment expressed as either a fixed dollar amount or percentage of known contract amount (not fixed percent of unknown amount).
   h. Funding source for payment.

3. Other pertinent information the board deems relevant. Examples include:

   a. Employee salary history.
   b. Retirement eligibility.
   c. Other information the board deems relevant.

MEMORANDUM

TO: Fay Kopp, Teachers' Fund For Retirement

FROM: Janilyn K. Murtha, Assistant Attorney General

RE: LEA President Contract Release Pay

DATE: April 18, 2017

You have asked me whether salary payments made by a TFFR participating employer to a licensed TFFR member is eligible salary for TFFR purposes if the payments include contract release pay to perform local education association (LEA) president duties and the TFFR employer is substantially or completely reimbursed by the LEA for the contract release time. In furtherance of your request you have provided for review various documents describing employment arrangements under which a LEA president is granted a partial leave of absence for contract release time each day during the school year to perform these duties. You have indicated that the teacher is paid their full contract salary for the school year by the employer, including for the contract release time, and the employer is substantially or completely reimbursed for this contract release time by the LEA. You have also indicated that TFFR employers are currently reporting the full contract salary as eligible salary but that the Board has not formally reviewed this issue.

From our discussion and the documentation provided this contract release and reimbursement arrangement appears to be a form of contractually negotiated leave limited to the performance of LEA president duties. At this time there does not appear to be a clear prohibition in law against used LEA president contract release time being afforded the same treatment as other types of used contractually negotiated leave such as leave for illness, vacation or funeral related use. It is my understanding that payment received by teachers for vacation, personal, illness leave etc. is generally treated as eligible salary for TFFR reporting purposes and note that N.D.C.C. § 15-39.1-04(10)(c), specifically excludes *unused* leave, supporting the conclusion that *used* leave is otherwise included.

While pay for contract release time for this purpose is not specifically included in the list of ineligible salary under N.D.C.C. § 15-39.1-04(10), the Board retains the discretion to determine what constitutes eligible salary for TFFR reporting purposes under N.D.C.C. § 15-39.1-04(10)(h). Pursuant to this authority the Board has the discretion to include or exclude contract release pay for the performance of LEA president duties as eligible salary. The Board could take such action as a matter of policy which would be applicable to all members or on an individual basis taking into consideration the unique facts and circumstances of each member. N.D.A.C. § 82-04-02-01 does set forth the criteria the Board may use to make eligible salary determinations for individual members; this criteria could also be used for consideration in establishing policy.

In summary I believe it is appropriate for the Board to review whether contract release pay for the performance of LEA president duties constitutes eligible salary pursuant to N.D.C.C. § 15-39.1-04(10)(h). Please let me know if you have any questions or if I can be of further assistance.

NDTFFR UPDATE

ND Retired Teachers Convention – Fargo

September 26, 2017

Fay Kopp, Chief Retirement Officer – Deputy Executive Director

ND Teachers' Fund for Retirement (TFFR)

ND Retirement & Investment Office (RIO)

2017 Host: Fabulous Fargo!

TFFR Board of Trustees

- TFFR Board of Trustees is responsible for administering the TFFR benefits program. The Board has a fiduciary responsibility to the fund's beneficiaries.
- The Board's #1 priority is to improve the plan's funding status to protect and sustain current and future benefits.
- The Board consists of 5 active and retired members appointed by the Governor and 2 elected state officials.

Mike Gessner, President
Active Teacher - Minot

Toni Gumeringer, Trustee
Active Teacher - Bismarck

Rob Lech, Vice President
Active Administrator
Jamestown

TFFR Board of Trustees

Mel Olson, Trustee
Retired Member
Fargo

Kirsten Baesler
State Superintendent

Mike Burton, Trustee
Retired Member
Fargo

Kelly Schmidt
State Treasurer

State Investment Board (SIB)

TFFR investment program is implemented by State Investment Board.

State Officials	Pension Representatives
Lt. Governor Brent Sanford, Chairman	Mike Gessner (TFFR)
State Treasurer Kelly Schmidt	Rob Lech (TFFR)
State Insurance Comm. Jon Godfread	Mel Olson (TFFR)
State Land Comm. Lance Gaebe	Adam Miller (PERS)
Workforce Safety & Insurance Cindy Ternes	Troy Seibel (PERS)
	Yvonne Smith (PERS)

TFFR Updates

2017 Legislation

- **There were no 2017 legislative proposals that would directly affect TFFR plan active or retired members:**
  - No benefit increases for retirees
  - No benefit changes for actives
  - No contribution rate increases
  - No plan provision modifications
  - No board member selection changes
- **RIO agency budget for 2017-19 was decreased by -1.4% from the current 2015-17 base level budget.**

Office Move

- Effective July 1, 2017, the Retirement and Investment Office (RIO), which is the agency that administers the TFFR plan, moved to a **NEW** location.
  - 3442 East Century Avenue - Bismarck
- No change in P.O. Box mailing address
- No change in office phone numbers
- Improvements include:
  - Better accessibility for visitors
  - Increased security of TFFR data and staff
  - Improved physical environment

Member Communication Methods

- Current member communication methods will continue.
  - Phone, mail, email, personal appointments, outreach programs, website
  - Retirees can continue to call, write, or visit us in person.
- TFFR is developing new methods to expand the use of electronic communications.
  - **TFFR Member Online:** Retirees will soon be able to access TFFR account information and benefit details on this SECURE internet application. Members will be notified when this option becomes available. To log on, you will need your Person ID number which can be found at the top of your Retiree Annual Statement which is mailed to you each December.
  - **TFFR Website:** Plans to update website in the next year to modernize website, make it more user friendly, and add new features and additional information.
    - Six new TFFR webcasts are currently available on website.

Distribution of Member Information

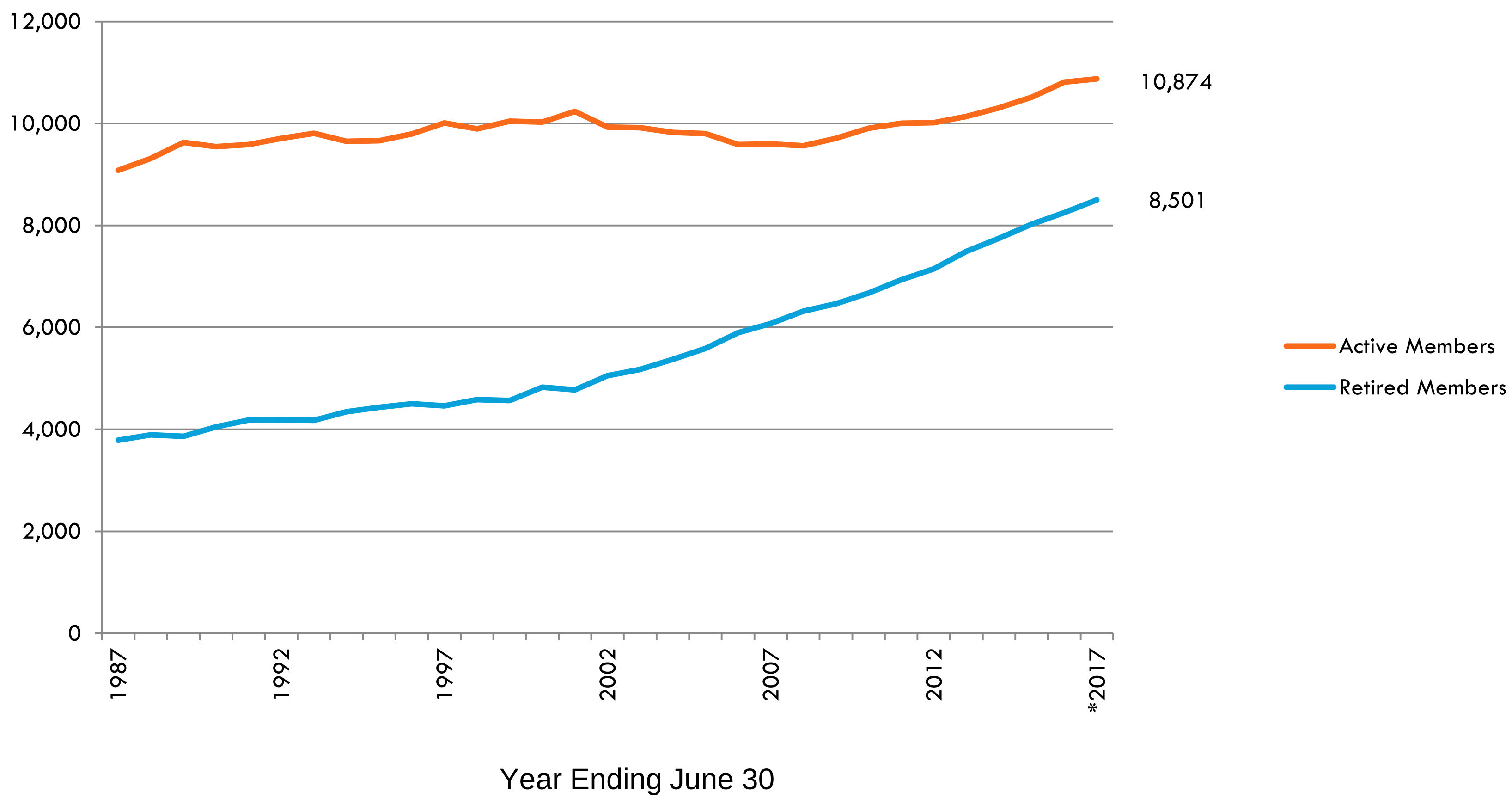
- Due to budget constraints and the ability to provide information electronically, we are in the process of transitioning away from traditional mailing and distribution methods to more cost effective electronic methods.
- In general, less information will be printed and mailed; more information will be available on TFFR Member Online, TFFR website, or sent electronically. This will primarily affect active members.
- **At this time, there will be no change to retiree mailings**.
  - Retirees will continue to receive all TFFR information including member newsletters, account change notices, annual statements, 1099s, etc. mailed to their home address.
  - In the future, if retirees sign up for Member Online, you will be able to begin receiving newsletters and other member communications electronically.

TFFR Background

Membership Fast Facts – July 1, 2017

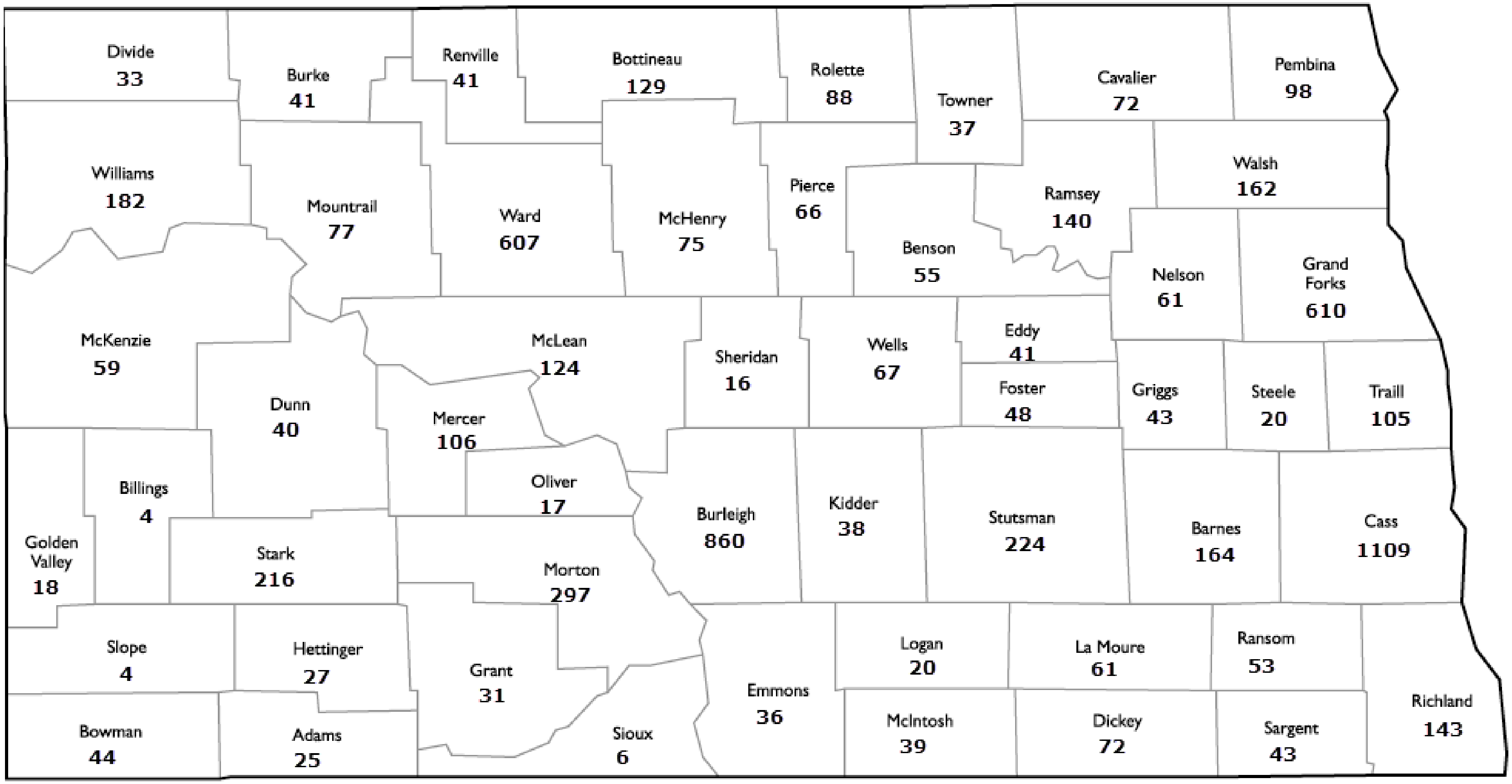
	Active	Retired
Membership Count	10,874	8,501
Avg. Annual Salary/Benefit	$59,393	$23,399
Avg. Service Credit	11.9 yrs.	27.4 yrs.
Avg. Current Age	42.2 yrs.	71.3 yrs.

Active and Retired TFFR Members 1987 - 2017



*Preliminary 2017 data

TFFR Retired Members by County



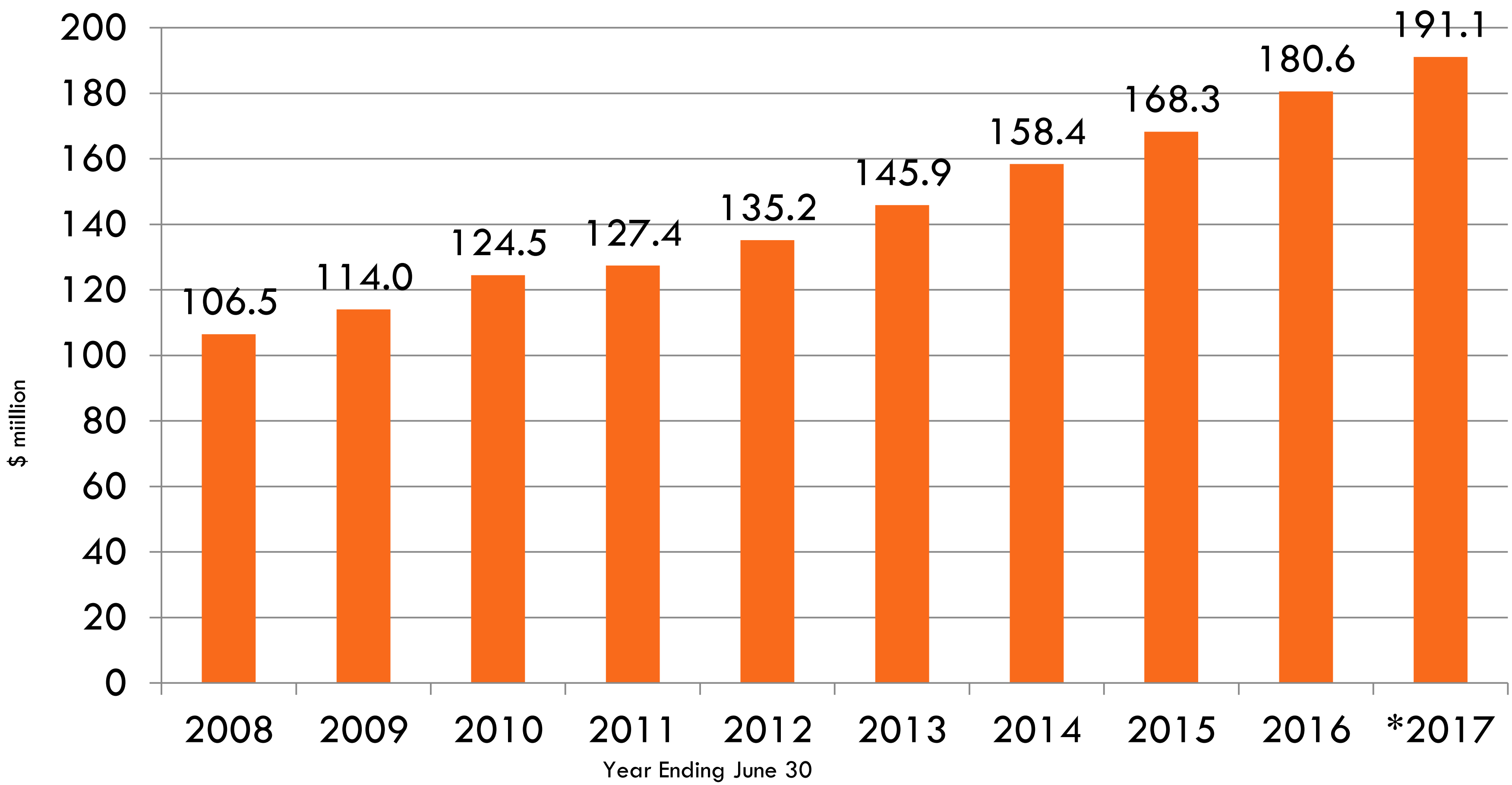
In-state	6,794
Out-of-state	1,707
Total	8,501

Average Monthly TFFR Benefits by County

(*preliminary 2017 data)

COUNTY	RETIREE COUNT	AVERAGE BENEFIT	TOTAL BENEFITS		COUNTY	RETIREE COUNT	AVERAGE BENEFIT	TOTAL BENEFITS
Adams	25	1,923	48,073		Mercer	106	2,000	212,037
Barnes	164	2,196	360,092		Morton	297	1,961	582,491
Benson	55	2,111	116,115		Mountrail	77	1,580	121,669
Billings	4	1,479	5,917		Nelson	61	1,827	111,455
Bottineau	129	1,696	218,817		Oliver	17	2,019	34,318
Bowman	44	1,896	83,445		Pembina	98	2,165	212,164
Burke	41	1,539	63,102		Pierce	66	1,817	119,895
Burleigh	860	2,123	1,825,552		Ramsey	140	1,857	259,956
Cass	1,109	2,225	2,467,351		Ransom	53	1,734	91,894
Cavalier	72	1,704	122,677		Renville	41	1,874	76,823
Dickey	72	1,921	138,330		Richland	143	2,191	313,334
Divide	33	1,903	62,812		Rolette	88	1,917	168,692
Dunn	40	2,108	84,317		Sargent	43	1,594	68,549
Eddy	41	1,987	81,476		Sheridan	16	1,620	25,926
Emmons	36	1,964	70,696		Sioux	6	902	5,413
Foster	48	2,271	109,017		Slope	4	1,190	4,760
Golden Valley	18	1,838	33,080		Stark	216	2,063	445,501
Grand Forks	610	2,200	1,342,275		Steele	20	1,766	35,329
Grant	31	1,434	44,446		Stutsman	224	2,026	453,780
Griggs	43	1,909	82,091		Towner	37	1,885	69,732
Hettinger	27	1,871	50,522		Traill	105	1,883	197,694
Kidder	38	1,802	68,463		Walsh	162	1,938	314,008
LaMoure	61	1,823	111,180		Ward	607	2,096	1,272,409
Logan	20	1,850	37,003		Wells	67	1,864	124,892
McHenry	75	1,950	146,248		Williams	182	2,102	382,534
McIntosh	39	1,734	67,609		**Totals**	**6,794**	**2,045**	**13,893,580**
McKenzie	59	2,024	119,442		**Out of State**	**1,707**	**1,571**	**2,682,530**
McLean	124	1,840	228,177		**Grand Totals**	**8,501**	**1,950**	**16,576,110**

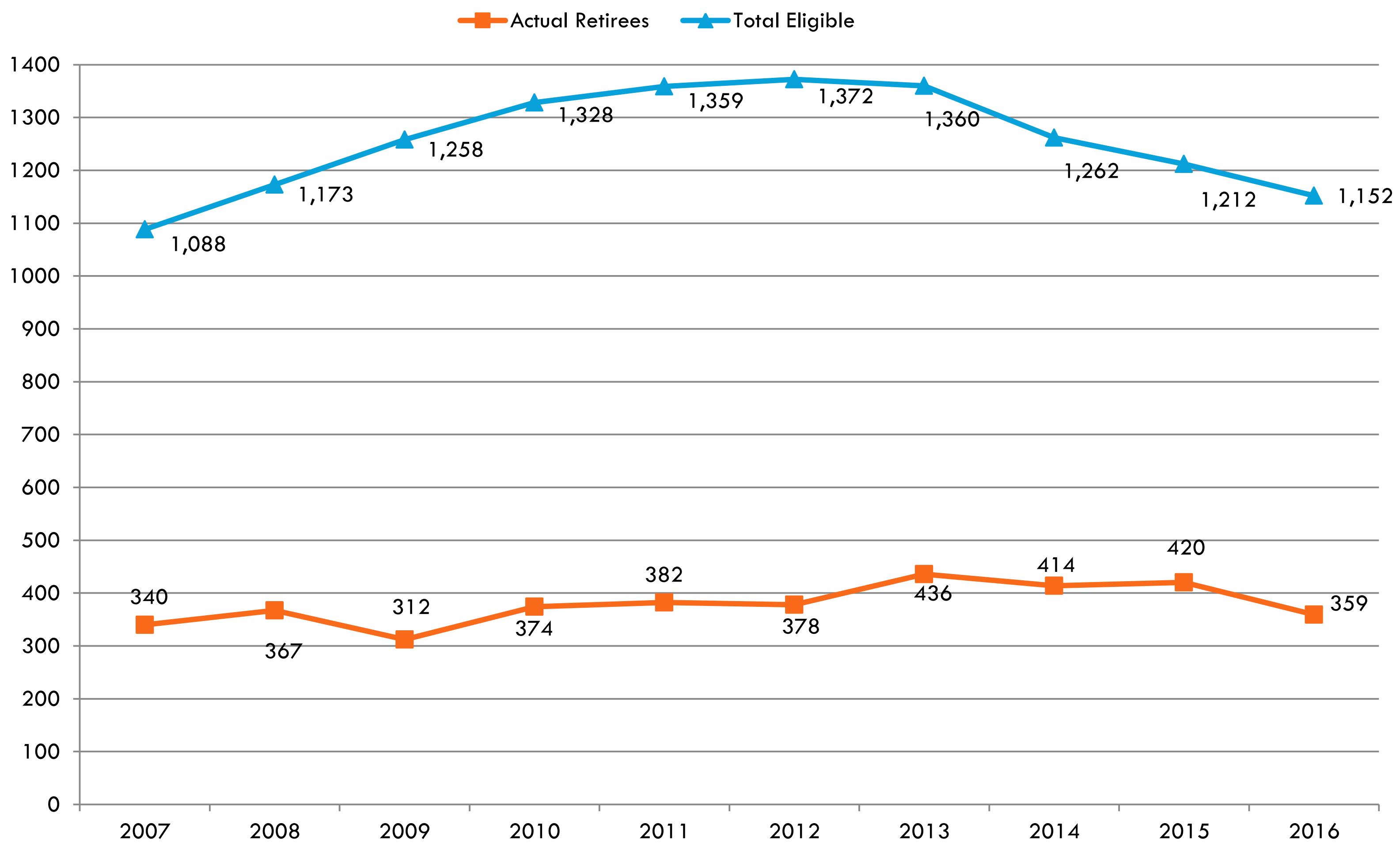
Annual TFFR Pension Benefits Paid



Year Ending June 30

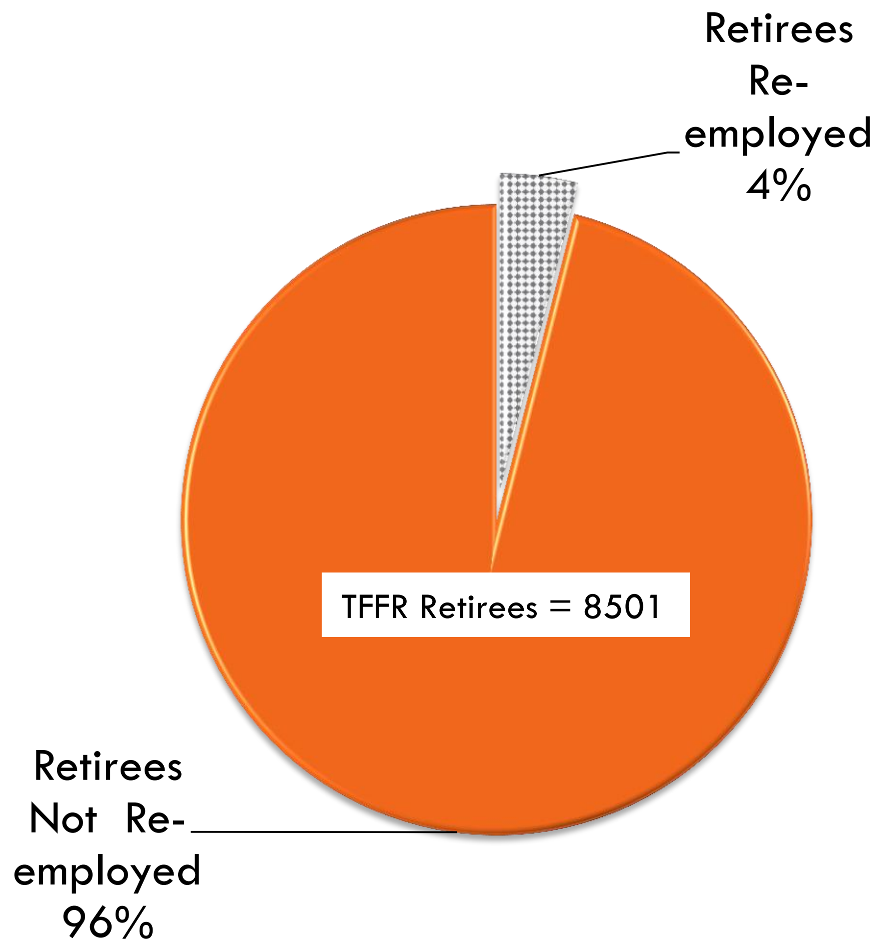
*Preliminary 2017 data

Actual New Retirees and Total Eligible
(as of 1/1/2017)



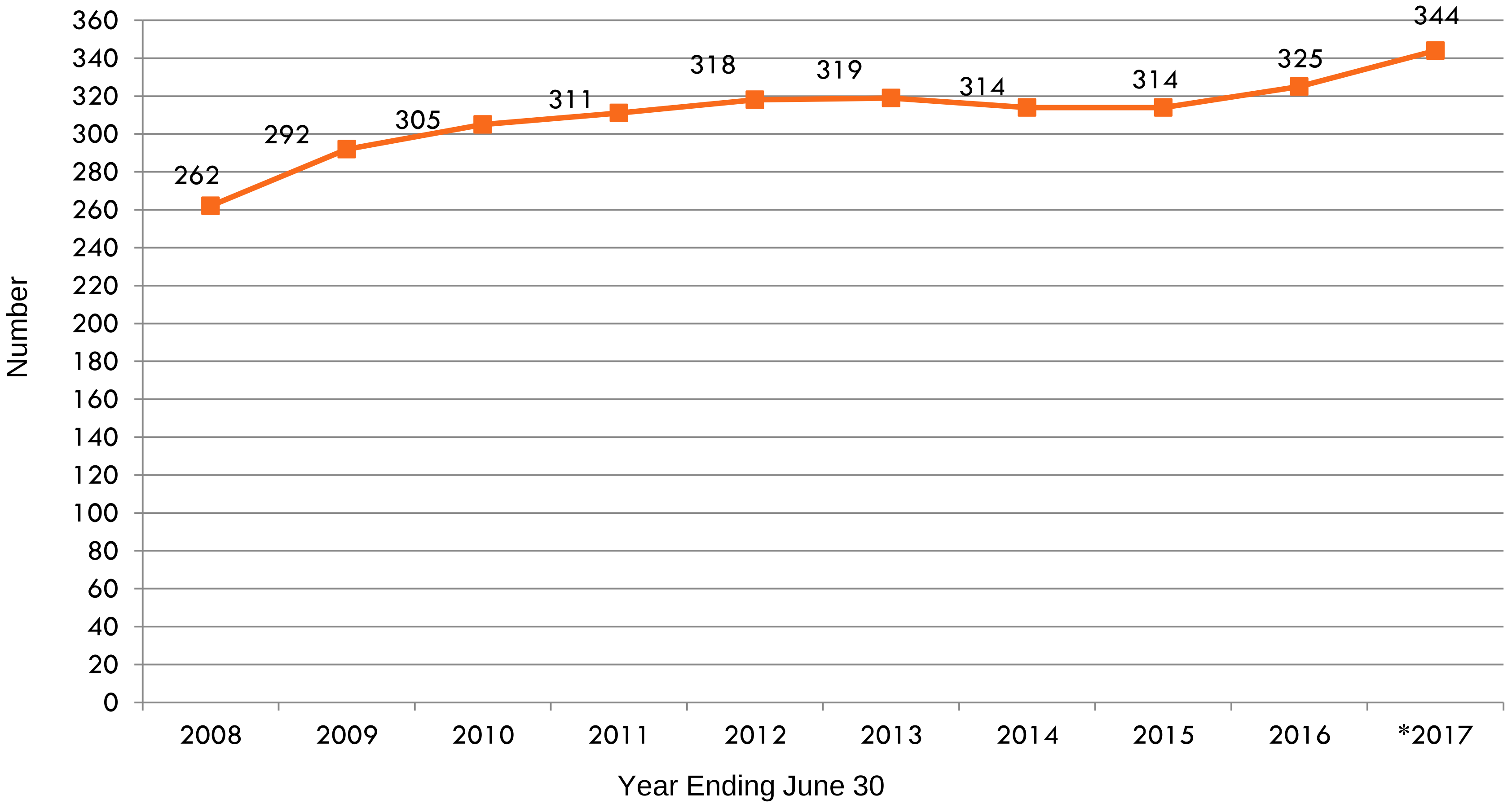
TFFR Retiree Re-Employment 2016-17

Total number of Re-employed Retirees:	**344**
Superintendents	21
Administrators	15
Teachers	308
General Rule	298
Critical Shortage Area	46
Suspend and Recalculate	0
Average Age	63
Average Salary	$25,000
Total Salaries	$8,731,000
No. Employers w/retirees	141



Preliminary 2017 data

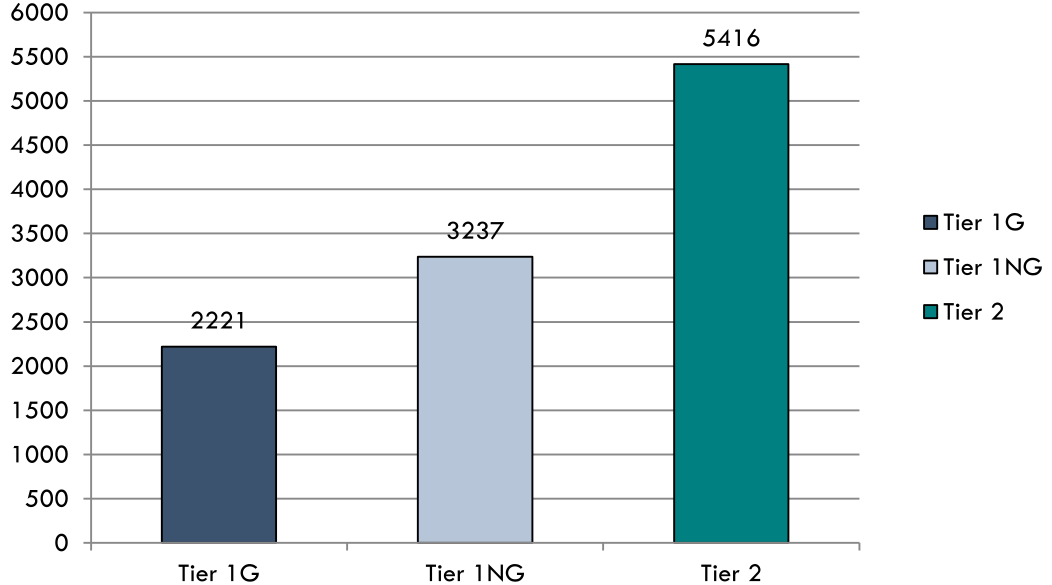
TFFR Retiree Re-Employment



*Preliminary 2017 data

TFFR Membership Tiers

- **Tier 1- Members who have service credit prior to 7/1/08**
  - Grandfathered – Members who on 6/30/13 were within 10 years of retirement eligibility (age 55+ or Rule of 65+)
  - Non-grandfathered – Members who on 6/30/13 were more than 10 years away from retirement eligibility (less than Rule of 65).
- **Tier 2 – Members employed on or after 7/1/08**



Total Active Members 10,874

Summary of TFFR Pension Benefits for Membership Tiers

	Tier 1 Grandfathered Member	Tier 1 Non-Grandfathered Member	Tier 2 Member
Vesting Period	3 years	3 years	5 years
Unreduced Retirement Eligibility			
Minimum Age	No	60	60
AND Rule	Rule of 85	Rule of 90	Rule of 90
OR Normal Retirement Age	65	65	65
Reduced Retirement Eligibility			
Minimum Age	55	55	55
Reduction Factor	6%	8%	8%
Retirement Formula Multiplier	2%	2%	2%
x Final average salary (high salaries of career)	3 year FAS	3 year FAS	5 year FAS
x Service Credit	Total Years	Total Years	Total Years
Disability Retirement	Yes	Yes	Yes
Retirement formula multiplier (2%) X FAS X total years			
Death/Survivor Benefits	Yes	Yes	Yes
Refund of account value or life annuity to survivor based on member's vesting status.			

Contribution Rates

RATES %	Employer	Member	Total	Increase
1997 – 2008	7.75%	7.75%	15.5%	--
7/1/08	8.25%	7.75%	16.0%	+0.5%
7/1/10	8.75%	7.75%	16.5%	+0.5%
7/1/12	10.75%	9.75%	20.5%	+4.0%
7/1/14	12.75%	11.75%	24.5%	+4.0%

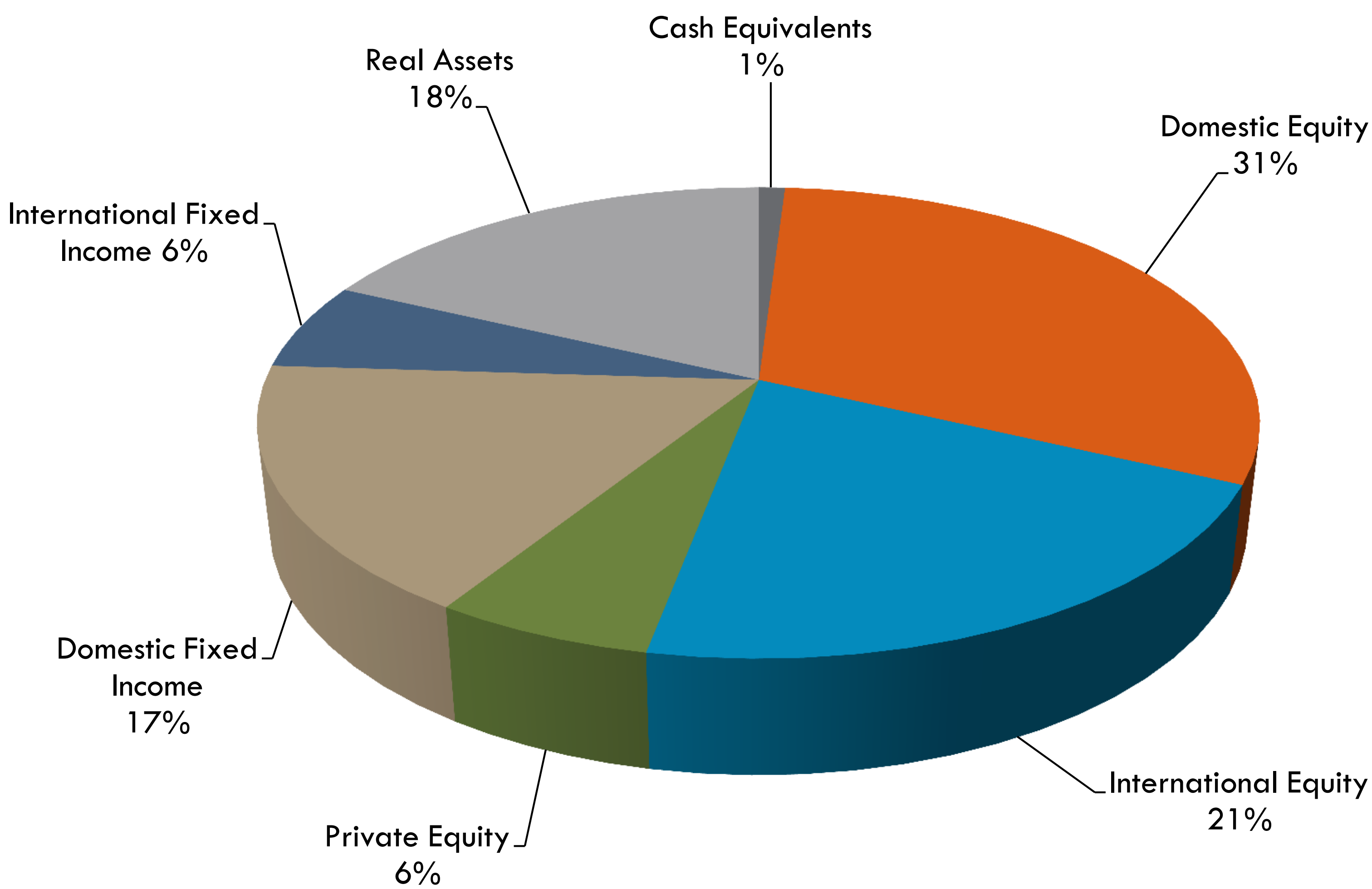
Note: Recent legislation increased contribution rates to improve TFFR funding. Increased rates will be in effect until TFFR reaches 100% funded ratio, then rates will be reduced to 7.75% each.

TFFR Investments

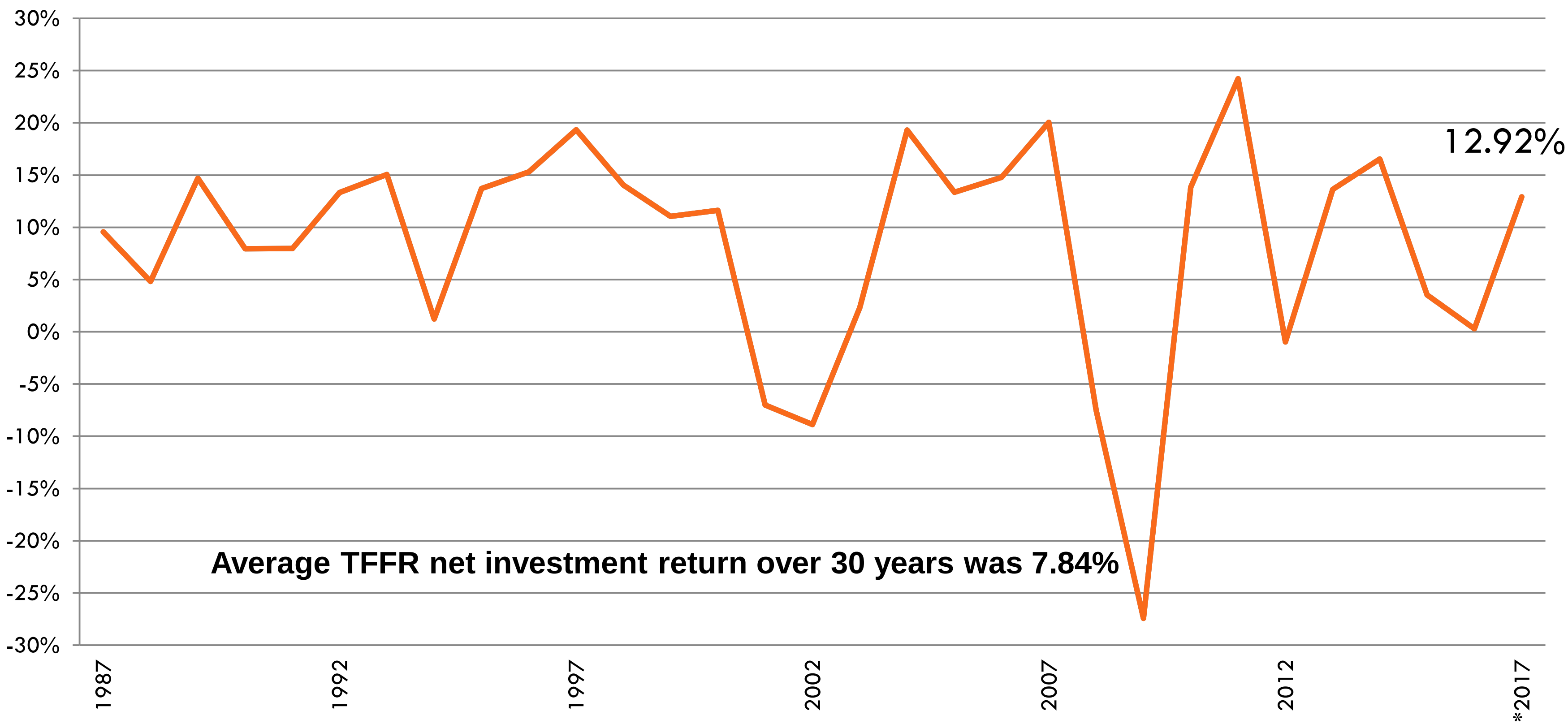
Asset Liability Study

- Asset allocation and investment policy is determined by TFFR Board, with assistance from SIB Chief Investment Officer.
- TFFR investment portfolio is divided into three basic categories:
  - Global Equity – domestic, international, and private
  - Global Fixed income – domestic, international
  - Global Real assets - timber, infrastructure, other
- TFFR Board recently worked with an investment consultant and completed a 5-year Asset Liability Study to evaluate the effectiveness of the current and alternative asset allocations on funding levels, and investment risk and return.
- The Board made some minor adjustments to TFFR's investment policy statement and asset allocation.
- TFFR's long term investment return assumption is 7.75%.

TFFR Asset Allocation
6-30-17



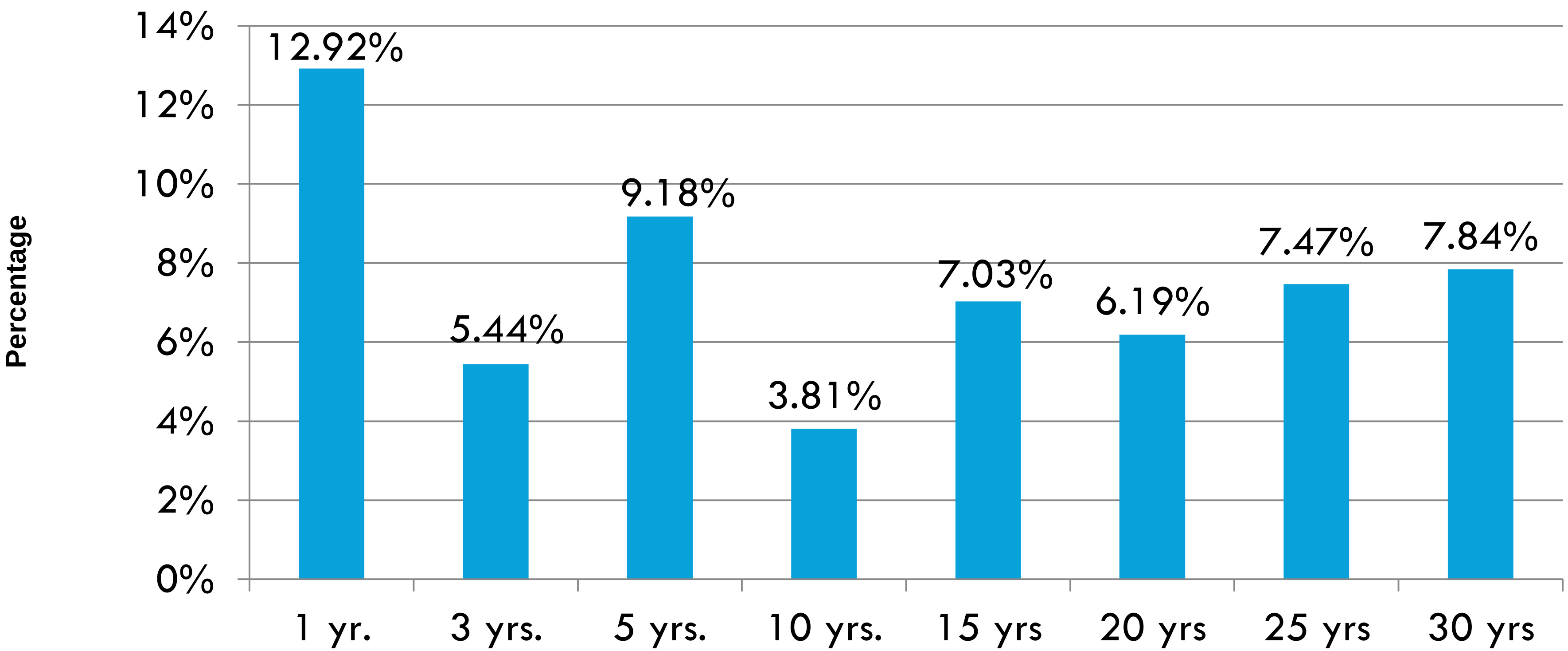
TFFR Net Investment Performance – Annual 1987-2017



Note: The investment returns shown were calculated by the SIB investment consultant. This calculation uses daily time-weighted cash flows in compliance with Global Investment Performance Standards (GIPS). These returns differ from the returns calculated by the actuary. The actuary calculation uses a very simplified approach with annual income and valuation data obtained by the actuary at the end of each fiscal year.

*Preliminary 2017 data

TFFR Net Investment Performance – Average Fiscal Year Ended June 30, 2017



Note: The investment returns shown were calculated by the SIB investment consultant. This calculation uses daily time-weighted cash flows in compliance with Global Investment Performance Standards (GIPS). These returns differ from the returns calculated by the actuary. The actuary calculation uses a very simplified approach with annual income and valuation data obtained by the actuary at the end of each fiscal year.

Preliminary 2017 data

Fair (Market) Value of TFFR Assets 1987 - 2017

*Preliminary 2017 data

29

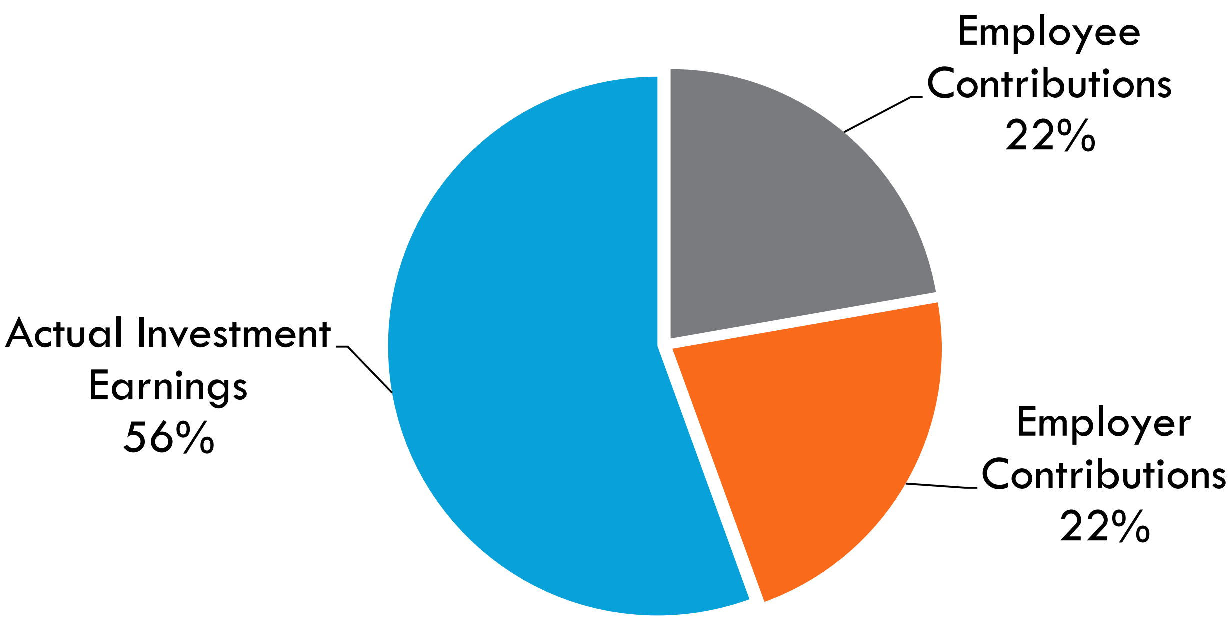
TFFR Funding

Retirement Funding Equation

$$C + I = B + E$$

- Contributions + Investments = Benefits + Expenses
- Not just for today, but for the long term.

Sources of TFFR Revenue FY 1990-2017

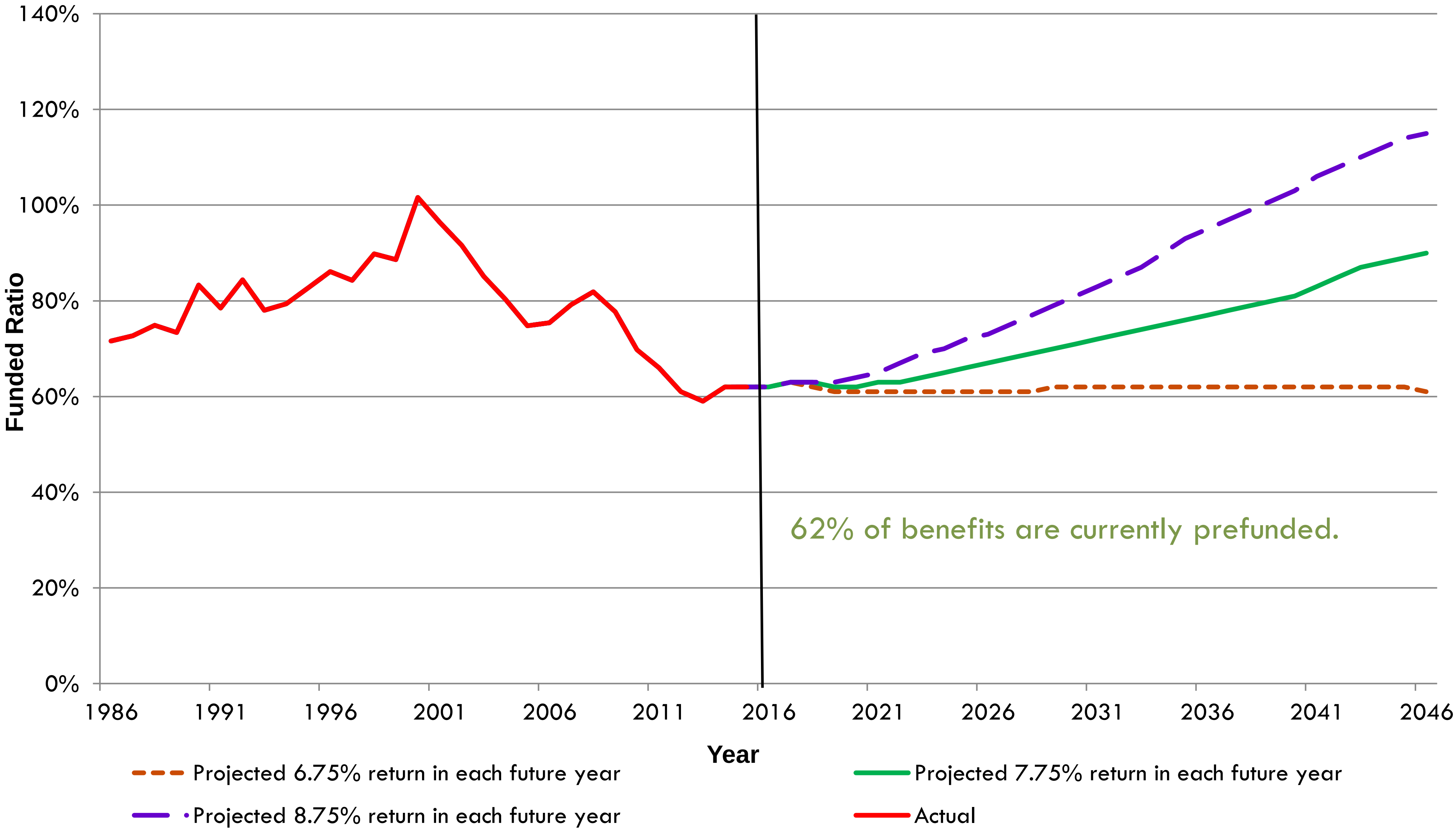


2016 Valuation Report Summary

Actuarial Accrued Liability	(AAL)	$3.59 billion
Actuarial Value of Assets	(AVA)	- 2.23 billion
Unfunded AAL	(UAAL)	$1.36 billion
AVA Funded Ratio		**62.1%**
Market Value of Assets (MVA)		$2.12 billion
MVA Funded Ratio		**59.2%**

2017 VALUATION IN PROCESS. RESULTS WILL BE PRESENTED TO TFFR BOARD IN OCTOBER 2017.

TFFR Funded Ratio (AVA)
Actual and Projected (based on 2016 valuation)



TFFR Funding Improvement Expected

- **Funding recovery is expected to occur gradually. Time is needed for the changes made to show positive funding results.**
  - Funding levels have remained relatively flat for the past few years. While that trend may continue in the next few years, over the long term, funding levels are projected to gradually improve.
  - Actuarial projections show it will likely take 20-30 years before TFFR reaches 80% - 100% funding levels, if the plan meets <u>all</u> actuarial assumptions.
  - If investment returns are greater than 7.75% over the long term and if TFFR reaches 100% funded level, employee and employer contribution rates will be reduced to 7.75% sooner than expected.
  - If investment returns are less than 7.75% over the long term, higher contribution rates will remain in effect, and funding progress will take longer.
- **Due to legislative action taken, TFFR's long term funding outlook is positive, and benefits are secure.**

Frequently Asked Questions

1) Is TFFR's funding situation improving?

- Funding recovery is expected to occur gradually over time, but it will be a long, slow process.
  - Funding levels have remained relatively flat for the past few years, although may slightly improve in 2017.
  - Actuarial projections show it will likely take 20-30 years before TFFR reaches 80% - 100% funding levels, if the plan meets all actuarial assumptions.
- A long term focus is important in financing pensions.

- **Good News: Due to legislative action taken, TFFR's long term funding outlook is positive, and benefits are secure for past, present, and future ND educators.**

2) Will retirees receive an increase in their TFFR annuity?

- Unfortunately, the TFFR trust fund cannot afford to increase retiree benefit payments as it would negatively impact the fund. TFFR does not anticipate being in a financial position to fund retiree benefit improvements due to a funding shortfall.
- The Board's highest priority is to ensure that adequate funds will be available to pay all promised benefits to current and future retirees.
- **Good news: Because TFFR is a defined benefit pension plan, current retiree benefits will be paid for life.**

3) Why is my check amount different than it was last month?

- Tax table changes (January), or if you changed tax withholding amount.
- Insurance premium changes (NDPERS)
- NDRTA or NDU-Retired annual dues (July)
- Benefit correction for new retirees
- Other

- **Good news: Anytime your monthly benefit amount changes, a TFFR notice is mailed to you explaining the reason for the change.**

TFFR Information

- TFFR website www.nd.gov/rio/tffr
  - Board members, meeting schedule, minutes, materials
  - Presentations to members, employers, other
  - Publications and Reports
    - Quarterly Newsletters
    - Member Handbook, Member Services Directory, Brochures
    - Actuarial, audit, financial, and investment reports
    - Forms
  - Legislation – Links to ND Legislative website, bill drafts, testimony
- Office Contact Information

  - Phone: 701-328-9885 or 1-800-952-2970
  - Email: fkopp@nd.gov
  - Address: 3442 East Century Ave., P.O. Box 7100, Bismarck, ND 58507

Summary

- The TFFR Board, State Investment Board, and RIO staff will continue to prudently manage and invest trust fund assets to ensure your TFFR retirement plan is financially sustainable for past, present and future ND educators.
- We pledge to you our steadfast commitment to:
  - Administering an accurate, prompt, and efficient pension benefits program.
  - Delivering high quality, friendly service to our members.
- We will do our best to serve you!

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

North Dakota Teachers' Fund For Retirement

NDTFFR Board Reading – October 2017

National Association of State Retirement Administrators (NASRA) Issue Brief: Employee Contributions to Public Pension Plans – September 2017

National Conference on Public Employee Retirement Systems (NCPERS): Public Pensions Are a Good Deal for Taxpayers – August 2017

National Institute on Retirement Security (NIRS): Revisiting the Three Rs of Teacher Retirement Systems: Recruitment, Retention, and Retirement – September 2017

National Institute on Retirement Security (NIRS): Decisions, Decisions: An Update on Retirement Plan Choices for Public Employees and Employers – August 2017

Center for Retirement Research (CRR): What's Happening to U.S. Mortality Rates? – September 2017