Agenda

ND Teachers' Fund for Retirement
Board Meeting

Thursday, October 22, 2015
1:00 pm

Peace Garden Room
State Capitol, Bismarck, ND

1. Call to Order and Approval of Agenda - Pres. Gessner (Board Action) 5 min
2. Approval of Minutes of September 24, 2015 Meeting – Pres. Gessner (Board Action) 5 min
3. 2015 Valuation Report – Kim Nicholl, Segal (Board Action) 60 min
4. Asset Liability Study – Fay Kopp (Board Action) 15 min
5. Actuarial Audit – Fay Kopp (Board Action) 15 min
6. Legislative Update – Fay Kopp (Information) 15 min
7. Annual TFFR Program Audit Report – Terra Miller Bowley (Board Action) 15 min
8. Board Education: Investment Performance Measurement Reports – Dave Hunter (Information) 15 min
9. Trustee Education - NCTR Conference Report – Kim Franz, Mel Olson, Mike Burton (Information) 15 min
10. Other Business
11. Adjournment

Next Board Meeting: January 21, 2016

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

NORTH DAKOTA TEACHERS' FUND FOR RETIREMENT
MINUTES OF THE
SEPTEMBER 24, 2015, BOARD MEETING

BOARD MEMBERS PRESENT:	Mike Gessner, President Kirsten Baesler, State Superintendent Mike Burton, Trustee Kim Franz, Trustee Rob Lech, Trustee Mel Olson, Trustee Kelly Schmidt, State Treasurer
STAFF PRESENT:	Terra Miller Bowley, Audit Services Supervisor Eric Chin, Investment Analyst Connie Flanagan, Fiscal & Invest Op Mgr David Hunter, ED/CIO Fay Kopp, Deputy ED/CRO Rich Nagel, Information Systems Supervisor Darlene Roppel, Retirement Assistant Darren Schulz, Deputy CIO Shelly Schumacher, Retirement Program Manager
OTHERS PRESENT:	Julia Moriarty, Callan Janilyn Murtha, Attorney General's Office Nancy Peterson, NDU-Retired Gordie Weightman, Callan

CALL TO ORDER:
Mr. Mike Gessner, President of the Teachers' Fund for Retirement (TFFR) Board of Trustees, called the board meeting to order at 1:00 p.m. on Thursday, September 24, 2015, in the Ft. Union Room at the State Capitol in Bismarck, ND.

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

APPROVAL OF AGENDA:
The Board considered the meeting agenda. President Gessner requested agenda item #9, ESPB Community Expert Rules, be moved to follow agenda item #2, Approval of Minutes.

MRS. FRANZ MOVED AND MR. OLSON SECONDED TO APPROVE THE REVISED AGENDA.

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

MINUTES:
The board considered the minutes of the TFFR board meetings held July 23 and July 24, 2015.

MR. OLSON MOVED AND MR. LECH SECONDED TO APPROVE THE MINUTES OF THE TFFR BOARD MEETINGS HELD JULY 23 AND JULY 24, 2015.

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

ESPB COMMUNITY EXPERT RULES:
Mrs. Kopp commented on the emergency Education Standards and Practices Board (ESPB) community expert rules that were signed by the Governor and in effect for the 2015-16 school year. The rules allow the hiring of non-licensed community experts to fill certain vacant teaching positions if approved by ESPB. These individuals will not be eligible to participate in the TFFR pension plan because they do not have a teaching license. State Superintendent Baesler responded to questions on the rules and process. Board discussion followed.

ASSET LIABILITY STUDY:
Mrs. Kopp introduced Callan Associates representatives, Ms. Julia Moriarty, Senior Vice President, Capital Markets Research, and Gordie Weightman, Vice President, Fund Sponsor Consulting. They presented information on the Asset Liability study that Callan will be conducting including the asset-liability study process, capital market expectations, liabilities, risk tolerance, asset classes currently employed, additional asset classes to consider, and study timeline and decisions. The study is meant to set a long term strategic asset allocation. The board will make a recommendation on the active member population growth rate projection in October. Results of the study will be delivered to the TFFR Board at the January 21, 2016 board meeting.

The presentation is on file at the Retirement and Investment Office (RIO).

TREASURER SCHMIDT MOVED AND MR. LECH SECONDED TO INCLUDE IN THE STUDY THE FUND'S CURRENT ASSET CLASSES WHICH INCLUDES DOMESTIC EQUITY, DOMESTIC FIXED INCOME, INTERNATIONAL EQUITY, INTERNATIONAL FIXED INCOME, REAL ESTATE, WORLD EQUITY, PRIVATE EQUITY, TIMBER, INFRASTRUCTURE, OPPORTUNISTIC, CASH AND EQUIVALENTS, AND TO EXCLUDE HEDGE FUNDS AND CURRENCY.

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

Supt. Baesler left at 2:20 p.m.

The board recessed at 2:45 p.m. and reconvened at 2:55 p.m.

ANNUAL TFFR INVESTMENT REPORT:

Mr. Hunter presented the annual TFFR investment report including asset allocation, investment performance, expenses, and capital markets for the fiscal year ending June 30, 2015. The net investment return for the fiscal year ending 6/30/15 was 3.52%, 5-year average was 10.94%, and 30-year average was 8.37%. During the last 5 years, asset allocation and active management generated approximately $890 million and $85 million of TFFR overall investment income, respectively. TFFR's investment returns have consistently ranked in the second quartile of the Callan Public Fund data base over the last 1-, 3-, and 5-year periods. Board discussion followed.

All reports given throughout the meeting are on file at RIO.

MR. BURTON MOVED AND MRS. FRANZ SECONDED TO ACCEPT THE 2015 ANNUAL INVESTMENT REPORT.

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

ANNUAL RIO BUDGET AND EXPENSE REPORT:

Mrs. Flanagan reviewed the annual RIO budget and expense report. RIO came in under budget for the 2013-15 biennium. Ms. Flanagan discussed continuing appropriations such as investment expenses, member benefit and refund payments, and actuarial, auditing, and legal consulting fees. She also reviewed appropriated expenditures such as salaries and operating expenses. Board discussion followed.

MR. OLSON MOVED AND MR. LECH SECONDED TO ACCEPT THE 2015 ANNUAL BUDGET AND EXPENSE REPORT.

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

SIB CUSTOMER SATISFACTION SURVEY:

President Gessner presented a summary of the individual TFFR board member responses to the State Investment Board (SIB) customer satisfaction survey. Board discussion followed.

MR. BURTON MOVED AND TREASURER SCHMIDT SECONDED TO SUBMIT THE ANNUAL CUSTOMER SATISFACTION SURVEY RESPONSE TO THE SIB.

AYES: MR. BURTON, MRS. FRANZ, MR. OLSON, TREASURER SCHMIDT, MR. LECH, AND PRESIDENT GESSNER.
NAYS: NONE
MOTION CARRIED.

ABSENT: SUPT. BAESLER

IRS COMPLIANCE REVIEW AND IRS DETERMINATION LETTER:

Mrs. Kopp reviewed the Internal Revenue Service (IRS) compliance and determination letter process. The program to request a determination letter every five years is being discontinued. This is the last year that a determination letter can be requested. The application fee is $2,500. Ms. Melanie Walker, benefits consultant with Segal, has conducted an Internal Revenue Code (IRC) compliance review and has determined that the TFFR governing plan provisions substantially comply with written plan requirements for qualified pension plans under IRC section 401(a). She also offered some suggested language relating to the HEART Act which is included in proposed administrative rule changes. Ms. Walker is currently preparing the application forms and necessary information to apply for the IRS determination letter later this year.

TREASURER SCHMIDT MOVED AND MR. OLSON SECONDED TO APPROVE SUBMISSION OF TFFR PLAN FOR IRS DETERMINATION LETTER AND ASSOCIATED COSTS.

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

PROPOSED ADMINISTRATIVE RULES:

Mrs. Kopp reviewed proposed administrative rule changes. Rule changes are needed to define certain terms for administrative clarification, update language to maintain compliance with federal IRC requirements (HEART Act) and to reflect the recent revised actuarial assumptions and factors. The timeline was also reviewed.

MR. OLSON MOVED AND MR. LECH SECONDED TO SUBMIT THE PROPOSED ADMINISTRATIVE RULES TO THE LEGISLATIVE COUNCIL AND DISTRIBUTE FOR PUBLIC COMMENT, SUBJECT TO ACTUARY AND LEGAL COUNSEL FINAL REVIEW AND INCORPORATION OF ANY NONSUBSTANTIVE CHANGES.

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

EXPERIENCE STUDY IMPLEMENTATION:

Mrs. Schumacher updated the board on the status of changes needed to implement the revised actuarial assumptions approved by the TFFR Board as a result of the 5-year actuarial experience study. This includes updating the ND Administrative Code with new actuarial factors, and incorporating revised interest rate and mortality assumptions into the CPAS pension administration computer system and plan calculations. The programming work should begin in October. Additionally, staff has incorporated the revised interest rate assumption into late employer reporting and prior fiscal year corrections as of July 1, 2015. Changes have been communicated to members and employers via the employer and member newsletters which contained articles on the Experience Study assumption changes.

ACTUARIAL AUDIT:
Mrs. Kopp reviewed a suggested amendment to Board Policy B-9, Trust Fund Evaluation/Monitoring. The board had requested information on the frequency of actuarial audits. Mrs. Kopp indicated that the Government Finance Officers Association (GFOA) recommends that actuarial audits be conducted at least every five years, and it appears that most public plans are following this practice.

MR. OLSON MOVED AND MRS. FRANZ SECONDED TO ADD THE SENTENCE: "IF THERE IS A CHANGE IN ACTUARIES, A FULL REPLICATION OF THE PREVIOUS ACTUARIAL VALUATION SHOULD BE CONDUCTED AND WILL SERVE AS AN ACTUARIAL AUDIT" TO BULLET #2 IN BOARD POLICY B-9, AS PROPOSED.

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

SIB GOVERNANCE PRESENTATION:
Mr. Hunter commented on the SIB Governance presentation by Mr. Keith Ambachtsheer on July 24, 2015. The board also provided their feedback.

Treasurer Schmidt left at 4:25 p.m.

ANNUAL TECHNOLOGY REPORT:
Mr. Nagel, Information Systems Supervisor, reported on the current activities and future initiatives for the Information Technology department of RIO. The Data Processing Coordinator III position has been vacant twice in the last 18 months and is still vacant. Some projects have been put on hold to ensure that the critical items with highest priority are being completed first. In addition to updating the board on staffing issues, Mr. Nagel also commented on 2015 legislation, member web services, network allocations, records retention, disaster recovery, and IT security. Mr. Nagel reviewed the security incident that occurred on a state ITD server this summer that affected 950 TFFR members, and actions taken by RIO and ITD. Board discussion followed.

MR. LECH MOVED AND MR. BURTON SECONDED TO ACCEPT THE ANNUAL TECHNOLOGY REPORT.

AYES: MR. BURTON, MR. LECH, MRS. FRANZ, MR. OLSON, AND PRESIDENT GESSNER.
NAYS: NONE
MOTION CARRIED.

ABSENT: SUPT. BAESLER AND TREASURER SCHMIDT

CONSENT AGENDA:

MR. LECH MOVED AND MRS. FRANZ SECONDED TO APPROVE THE CONSENT AGENDA WHICH INCLUDES TWO DISABILITIES, 2015-6D AND 2015-7D, AND TWO QUALIFIED DOMESTIC RELATIONS ORDERS (QDRO), 2015-04 AND 2015-05.

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

OTHER BUSINESS:

Mrs. Kopp stated the first meeting of the interim Employee Benefits Programs Committee (EBPC) will be held October 27, 2015. TFFR's actuary, Segal, will present the 2015 Actuarial Valuation report to the committee.

Mrs. Kopp will be presenting to the North Dakota Council of Educational Leaders (NDCEL) and North Dakota School Board Association (NDSBA) at their annual conventions in October.

The next regular board meeting will be held October 22, 2015, 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 4:40 p.m.

Respectfully Submitted:

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

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Darlene Roppel
Reporting Secretary

MEMORANDUM

TO: TFFR Board
FROM: Fay Kopp
DATE: October 15, 2015
SUBJ: 2015 Valuation Report and Funding Policy

TFFR's actuarial consultant, Kim Nicholl, Senior Vice President with Segal Company, will be at the October TFFR Board meeting to present the **2015 valuation report** (attached). Future funding projections will be provided at the meeting.

As you can see, TFFR's:

- **Funded ratio** decreased slightly from 61.8% to **61.6%** as of July 1, 2015.
- **Actuarially determined contribution (ADC)** increased from 11.57% to **13.04%** this year. This rate is greater than the 12.75% employer rate currently required by law so there is a **small contribution deficiency of (0.29)%** of payroll.
- **Unfunded actuarial accrued liability (UAAL)** increased from $1.2 billion to **$1.3 billion**.

These results are primarily driven by changes to the actuarial assumptions that were adopted by the Board as part of the 2015 Experience Study and became effective July 1, 2015. The assumption changes increased plan costs by about $171 million.

GASB 67 information at the plan level is also part of the 2015 valuation report. TFFR's:

- **Net Plan Liability (NPL)** (which is very similar to the plan's UAAL on a market basis) increased from $1.05 billion to **$1.3 billion** as of June 30, 2015.
- **Plan Net Position** as a percentage of total pension liability (on a market basis) decreased from 66.6% to **62.1%.**

A separate GASB 68 report which also includes employer allocations and pension amounts will be completed in the next month or so.

I have also included the Board's **Actuarial Funding Policy Statement** which Segal originally assisted the Board in developing. Segal has reviewed this policy and finds that it is still appropriate.

Please review this important 2015 funding and financial information and plan to discuss 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, 2015

October 22, 2015

Presented By:

Kim Nicholl, FSA, MAAA, EA
Senior 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 22, 2015 meeting of the Board of Trustees. This document should not be shared, copied or quoted, in whole or in part, without the consent of Segal Consulting, except to the extent otherwise required by law. Except where otherwise specifically noted, the actuarial calculations and projections were completed under the supervision of Matthew A. Strom, FSA, MAAA, Enrolled Actuary.

Discussion Topics – Valuation and Projections

Segal Consulting

- Overview of Valuation Process
- Summary of Valuation Highlights
- Membership and Demographics
- Valuation Results and Projections

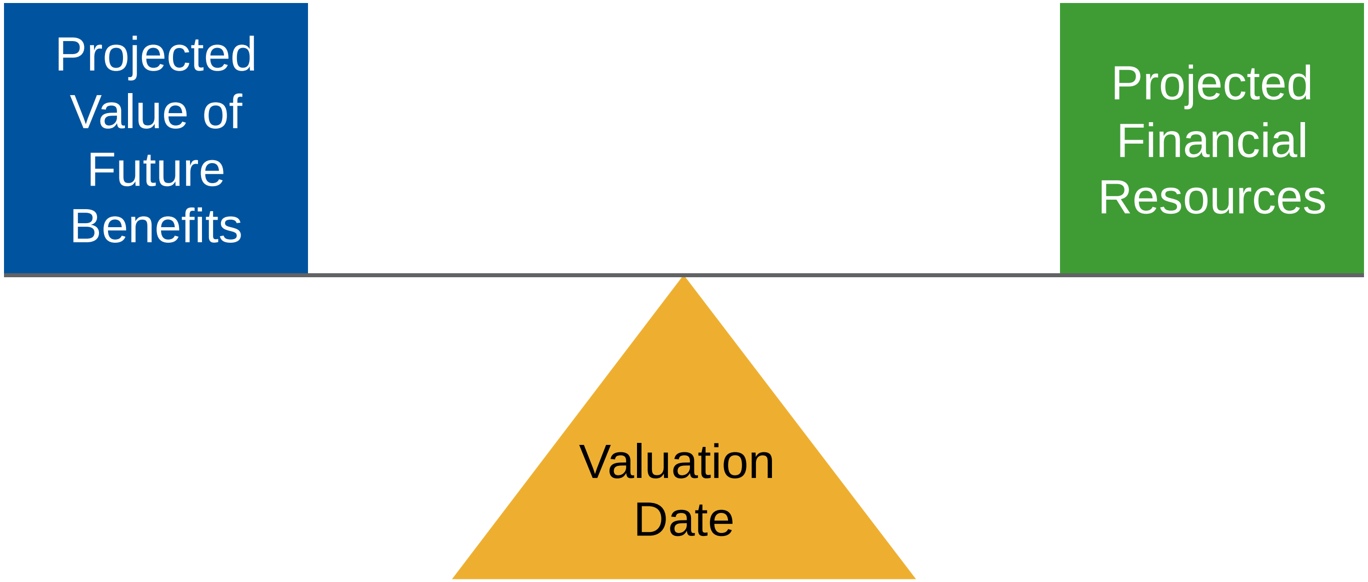
Purposes of the Actuarial Valuation

- Report the Fund's actuarial assets
- Calculate the Fund's liabilities
- Determine the Actuarially Determined Contribution (ADC) for fiscal year 2016, based upon the funding policy
  - Compare to the statutory employer contribution
- Determine the effective amortization period
- Provide information for annual financial statements
- Identify emerging trends

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
- Apply assumptions about:
  - Economic (investment return, inflation, salary raises)
  - People or 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

Benefits = Contributions + Investment Return - Expenses

Actuarially Determined Contribution vs. Effective Amortization Period

- The Actuarially Determined Contribution (ADC) is based upon the Fund's funding policy
  - Equal to the normal cost plus amortization of the unfunded actuarial accrued liability (UAAL)
  - The funding policy components include:
    - Cost method, which is entry age normal
    - Asset valuation method, which includes a five-year smoothing period with a 20% corridor
    - Amortization period, which is a closed 28 year period as of July 1, 2015, as a level percentage of payroll
- The effective amortization period is the number of years that the UAAL is expected to be amortized based upon the fixed member and employer contribution rates
  - The effective amortization period is compared to the remaining amortization period to assess the progress toward amortizing the UAAL
- The employer contribution rate is compared to the ADC
  - Measure of the adequacy of the employer (and member) contribution rates

Segal recently reviewed the TFFR funding policy and finds it to continue to be appropriate.

Actuarial Assumptions

Two types:

Demographic	Economic
• Retirement • Disability • Death in active service • Withdrawal • Death after retirement	• Inflation • Interest rate (return on assets) • Salary increases • Payroll growth

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.

Economic Assumptions

➢ Interest rate

- 7.75%, net of investment expenses

➢ Salary increase rates

- Based on service
- Ranges from 14.50% for new members to 4.25% for members with 25 or more years of service

➢ Payroll growth

- 3.25%

➢ Administrative Expenses

- Explicit administrative expense assumption, equal to prior year administrative expenses plus inflation

Many assumptions were changed as a result of the five year experience study.

Actuarial Methods

➢ Asset valuation method (actuarial value of assets)

- Smoothing of investment gains or losses
- TFFR uses a five-year smoothing method
  - Investment returns above or below the expected return are recognized over five years
- 20% market value corridor is applied (e.g., actuarial value must fall within 80% to 120% of market value)

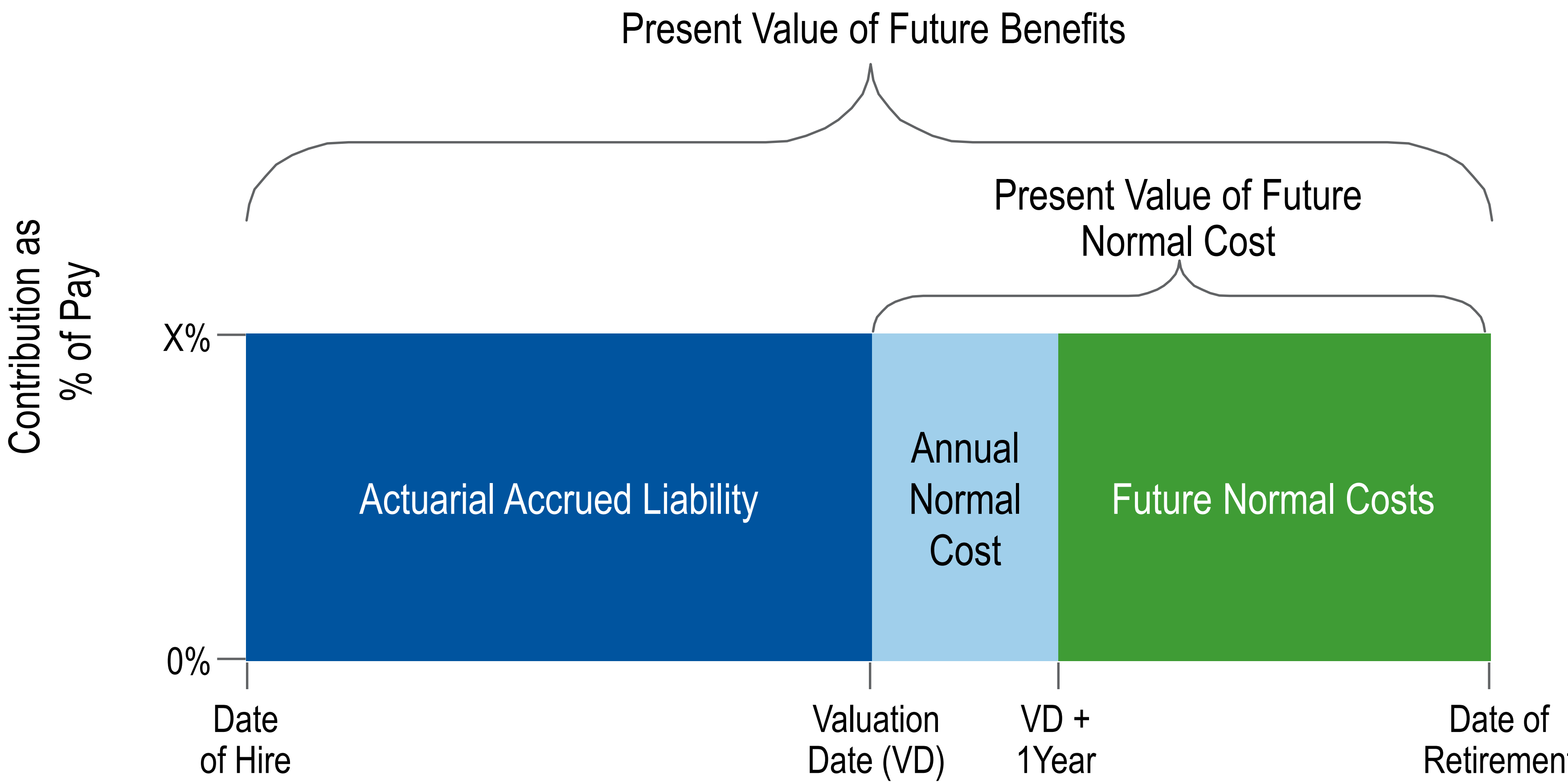
➢ Cost method

- Allocation of liability between past service and future service
  - TFFR uses the entry age normal cost method
    - » Spreads cost of member's retirement benefit over expected career as a level % of salary
    - » Most public sector retirement systems use the entry age normal cost method

➢ Amortization method

- 30-year "closed" period to pay off unfunded actuarial accrued liability, effective with the July 1, 2013, actuarial valuation
  - 28 years remaining as of July 1, 2015
- Based on level percentage of payroll

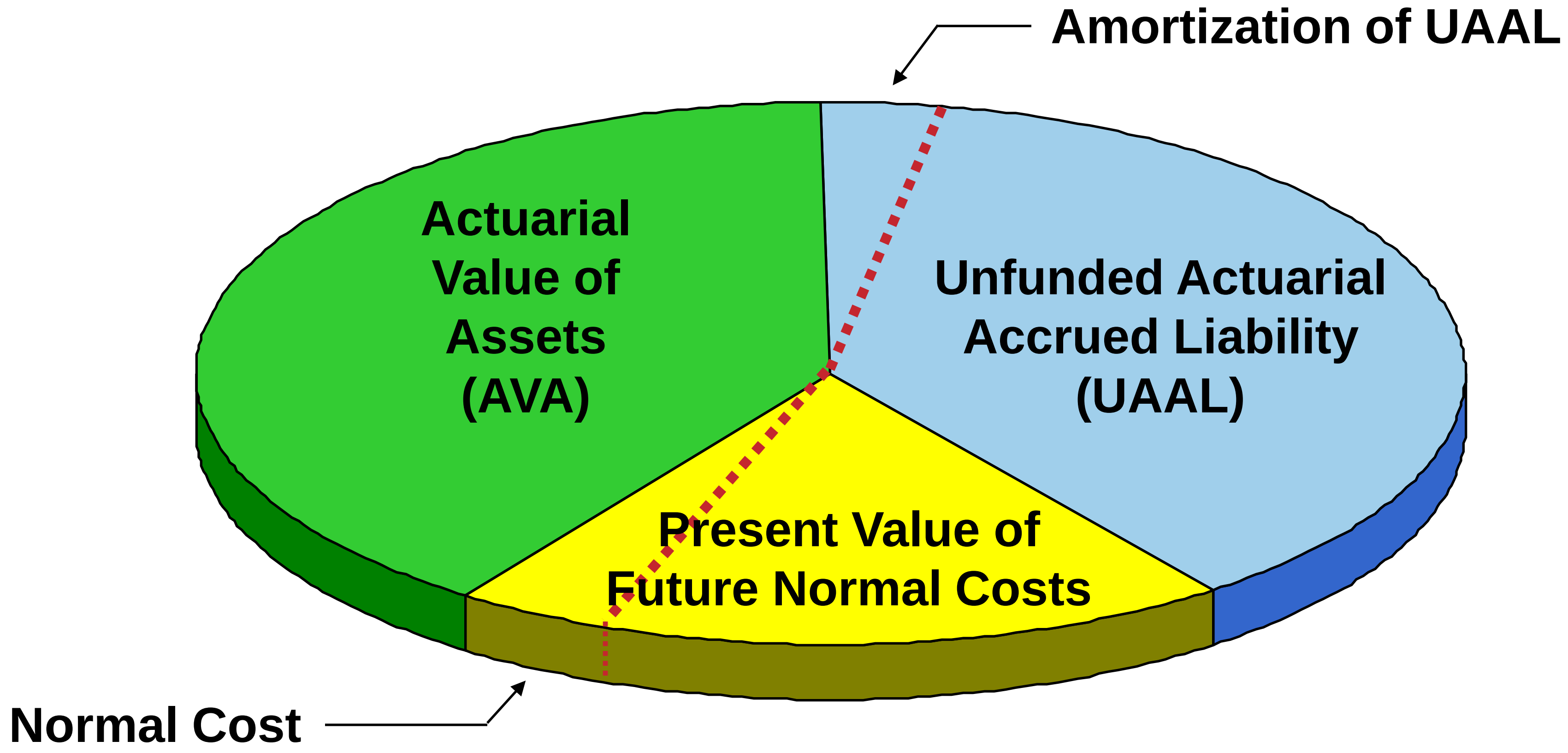
Funding Process



Actuarial Accrued Liability - Assets = Unfunded Actuarial Accrued Liability

Actuarially Determined Contribution

Present Value of Future Benefits



Summary of Valuation Highlights

- Valuation reflects assumption changes adopted as a result of the five year experience study completed earlier this year:
  - Investment return assumption lowered from 8.00% to 7.75%
  - Inflation assumption lowered from 3.00% to 2.75%
  - Individual salary increases lowered by 0.25% due to lower inflation assumption
  - An explicit administrative expense assumption added to the normal cost, equal to prior year administrative expenses plus inflation
  - Rates of turnover and retirement were changed to better reflect anticipated future experience
  - Mortality assumption updated to the “RP-2014” mortality tables with generational improvement
- The assumption changes impacted the 7/1/2015 valuation results as follows:
  - Accrued liability increased by $171 million
  - Funded ratio decreased by 3.2%
  - Effective amortization period increased by 8 years

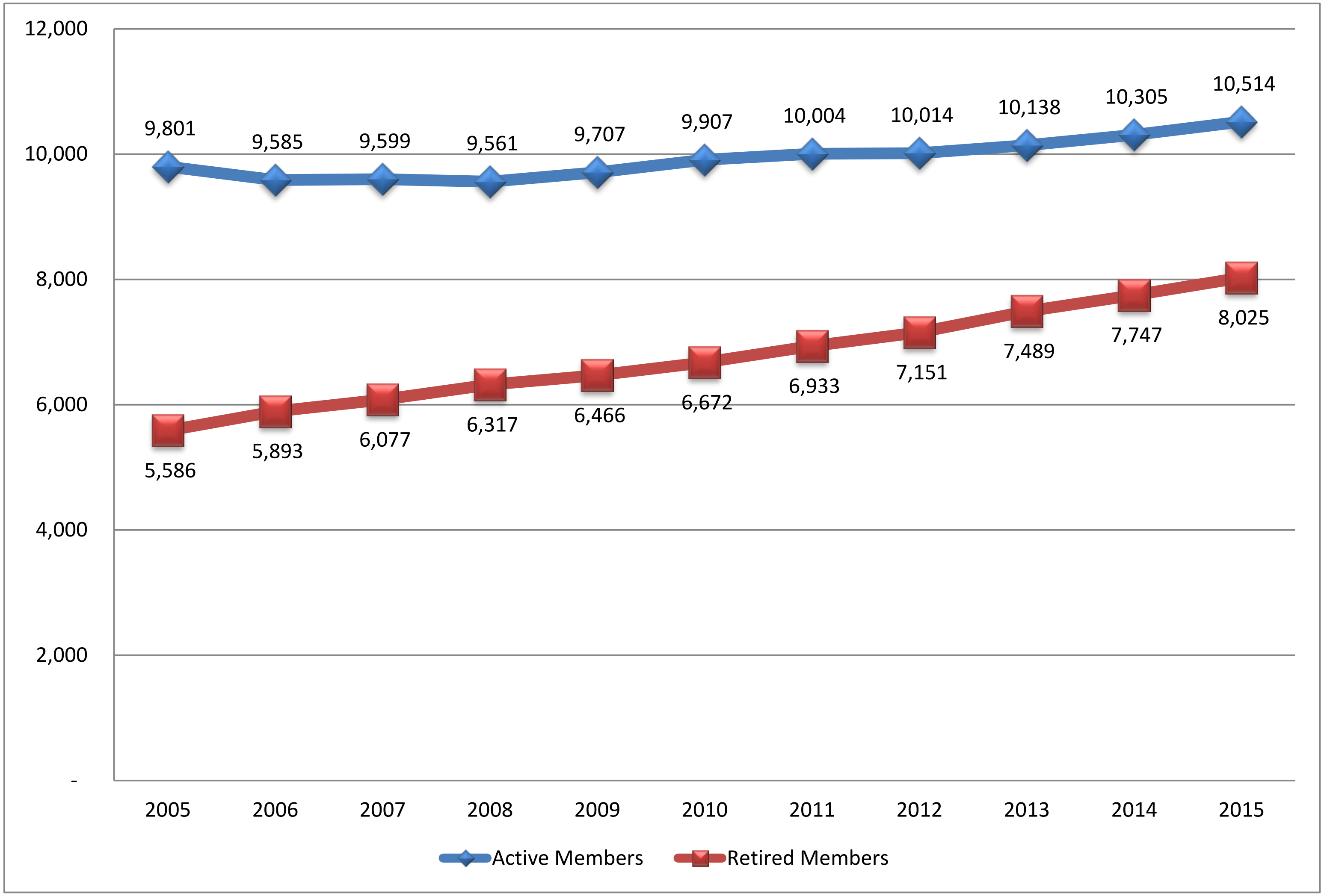
Summary of Valuation Highlights (continued)

- Market value of assets returned 3.5% for year ending 6/30/15 (Segal calculation)
  - Gradual recognition of deferred gains resulted in 10.7% return on actuarial value of assets
- Net impact on funded ratio was a decrease from 61.8% (as of 7/1/2014) to 61.6% (as of 7/1/2015)
- Effective amortization period increased from 24 years (as of 7/1/2014) to 29 years (as of 7/1/2015)
- Net impact on actuarially determined contribution (ADC) was an increase from 11.57 % of payroll (FY15) to 13.04% of payroll (FY16)
  - Based on the employer contribution rate of 12.75% for FY16, the contribution deficiency is 0.29% of payroll
- Net Pension Liability increased from $1.05 billion as of 6/30/2014, to $1.31 billion as of 6/30/2015

Membership

	2015	2014	Change
Active			
• Number	10,514	10,305	+2.0%
• Payroll (annualized)	$589.8 mil	$557.2 mil	+5.8%
• Average Age	42.5 years	42.9 years	-0.4 years
• Average Service	12.4 years	12.8 years	-0.4 years
Retirees and Beneficiaries			
• Number	8,025	7,747	+3.6%
• Total Annual Benefits	$177.4 mil	$165.8 mil	+7.0%
• Average Monthly Benefit	$1,842	$1,783	+3.3%

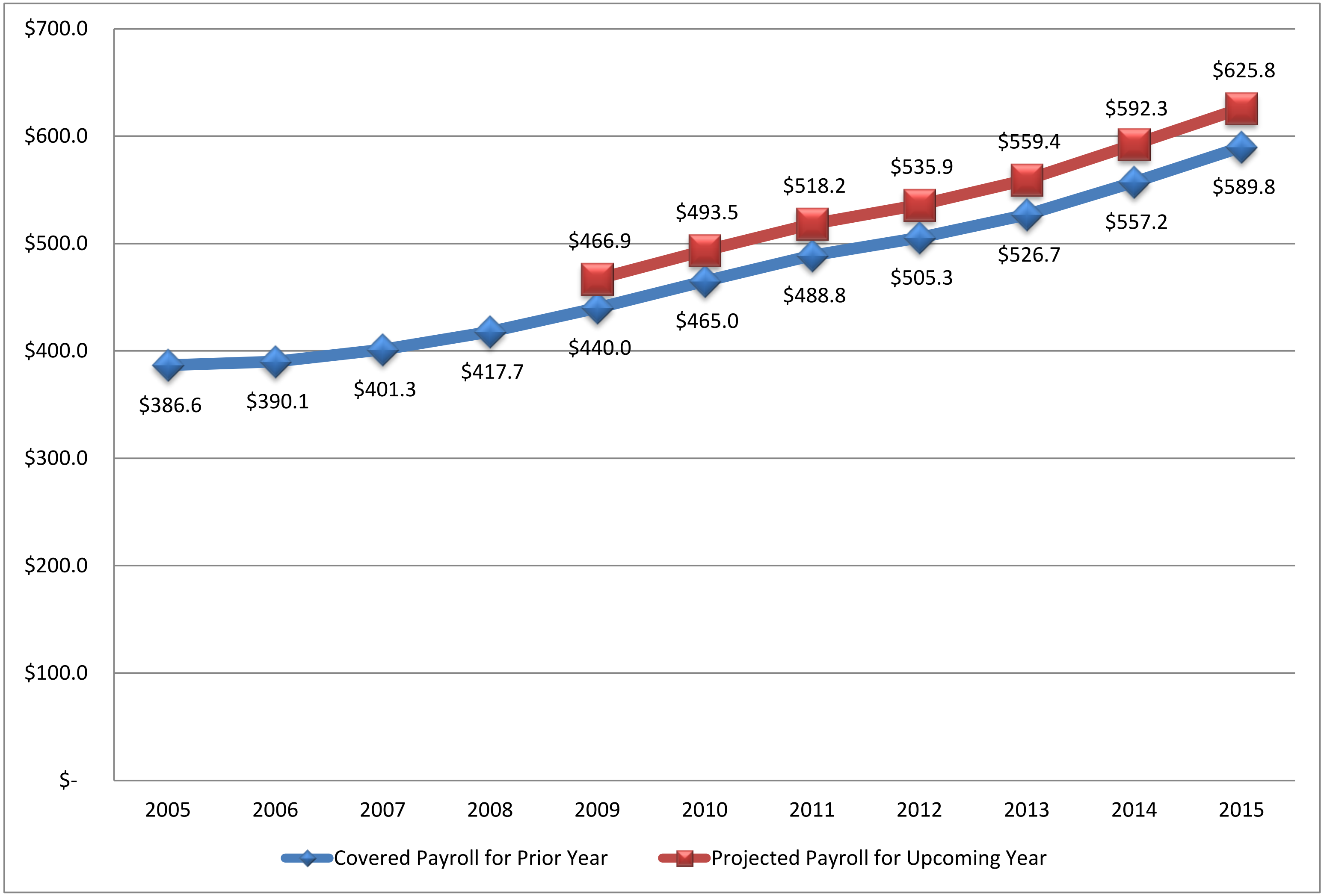
Active and Retired Membership



Since 2005, number of retirees and beneficiaries has increased 3.7% per year on average.

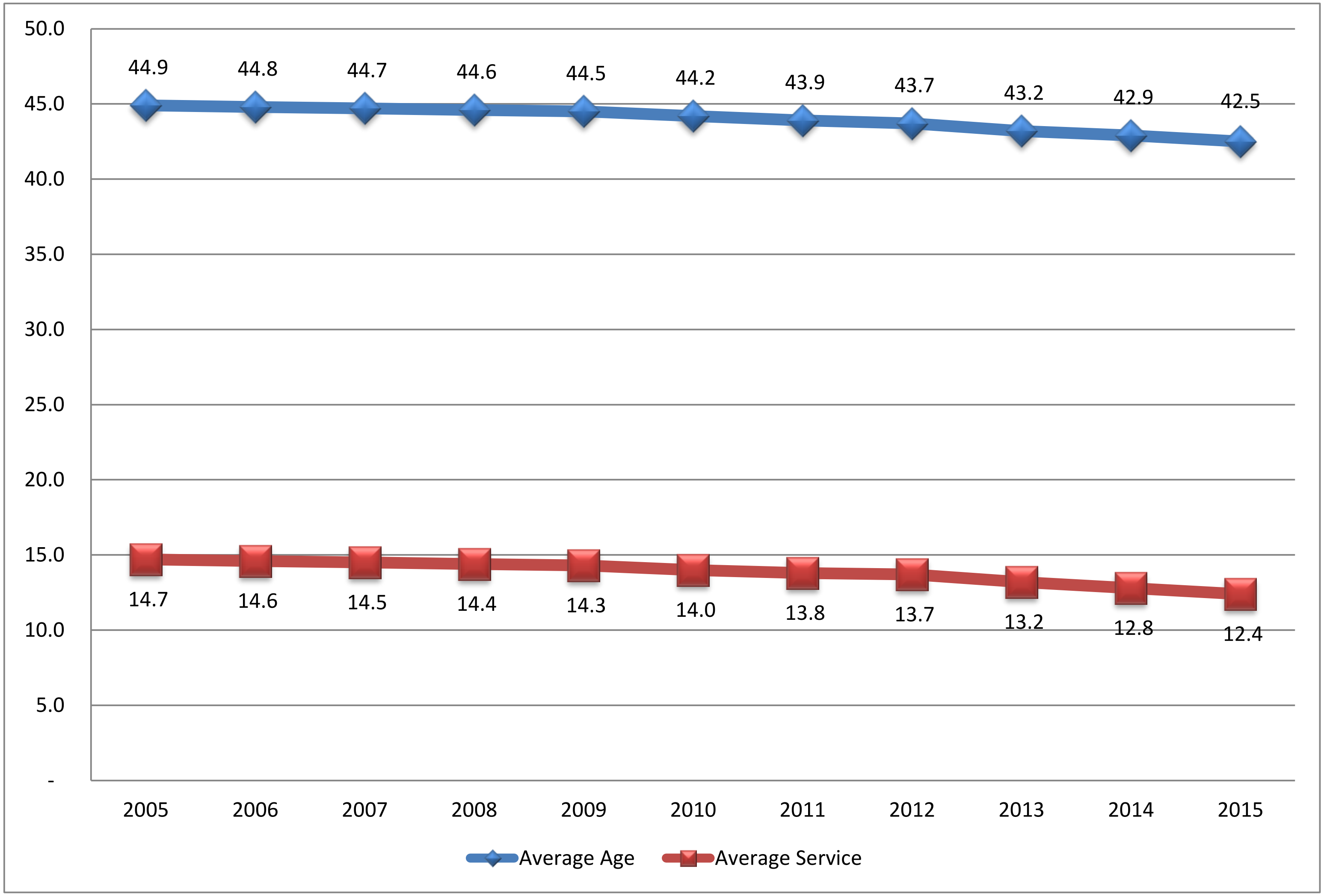
Active Payroll

$ Millions

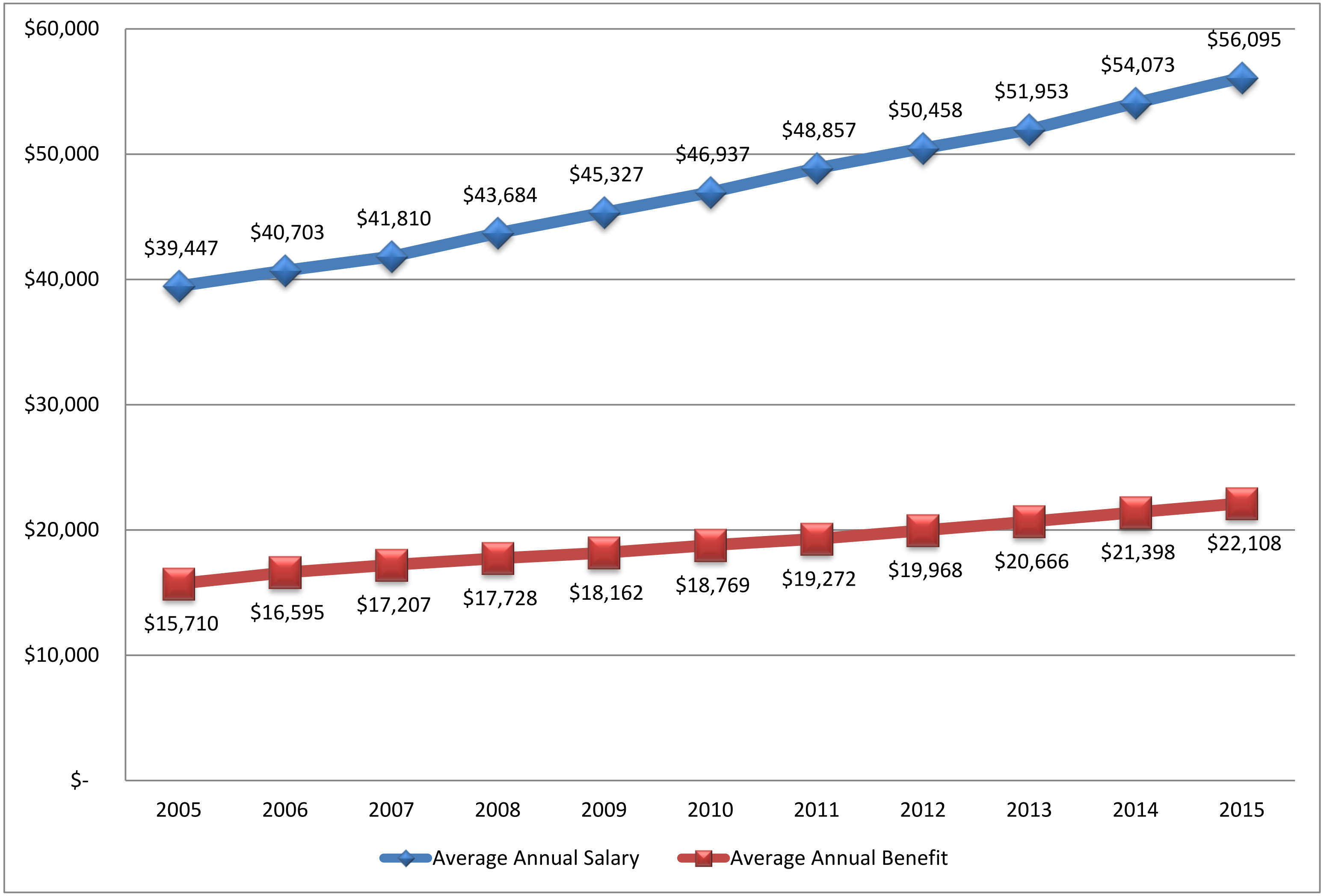


Since 2005, active payroll has increased, on average, 4.3% per year.

Average Age and Service of Active Members



Average Salary and Average Benefit



Since 2005, average salary has increased, on average, 3.6% per year. Average annual benefit has also increased by 3.5% per year.

Assets

- The market value of assets increased from $2.09 billion (as of 6/30/2014) to $2.14 billion (as of 6/30/2015)
  - Segal determined the investment return was 3.5%, net of investment expenses
- The actuarial value of assets – which smoothes investment gains and losses over five years – increased from $1.94 billion (as of 6/30/2014) to $2.13 billion (as of 6/30/2015)
  - Return of 10.7%, net of investment expenses
  - Actuarial value is 99.2% of market value
  - There is a total of $17 million of deferred net investment gains that will be recognized in future years
- The average annual return on <u>market</u> assets
  - 10-year average is 5.9%
  - 20-year average is 7.1%
  - 30-year average is 8.2%
- The average annual return on <u>actuarial</u> assets
  - 10-year average is 6.0%
  - 20-year average is 7.0%
  - 30-year average is 7.5%

Market Value of Assets ($ in millions)

Fiscal Year Ending June 30, 2015	
Beginning of Year	$2,090*
Contributions:	
• Employer	78
• Member	72
• Service Purchases and Other	2
• Total	152
Benefits and Refunds	(172)
Administrative Expenses	(2)
Investment Income (net)	74
End of Year	$2,142
Rate of Return	3.5%

** Restated due to GASB 68 implementation*

Actuarial Value of Assets ($ in millions)

1. Market Value of Assets as of June 30, 2014	$2,090*
2. Cash Flow Items for FYE June 30, 2015	(22)
3. Expected Return	167
4. Expected Market Value of Assets (1) + (2) + (3)	$2,235
5. Actual Market Value of Assets on June 30, 2015	**2,142**
6. Excess/(Shortfall) for FYE June 30, 2015 (5) – (4)	(93)
Excess/(Shortfall) Returns:	

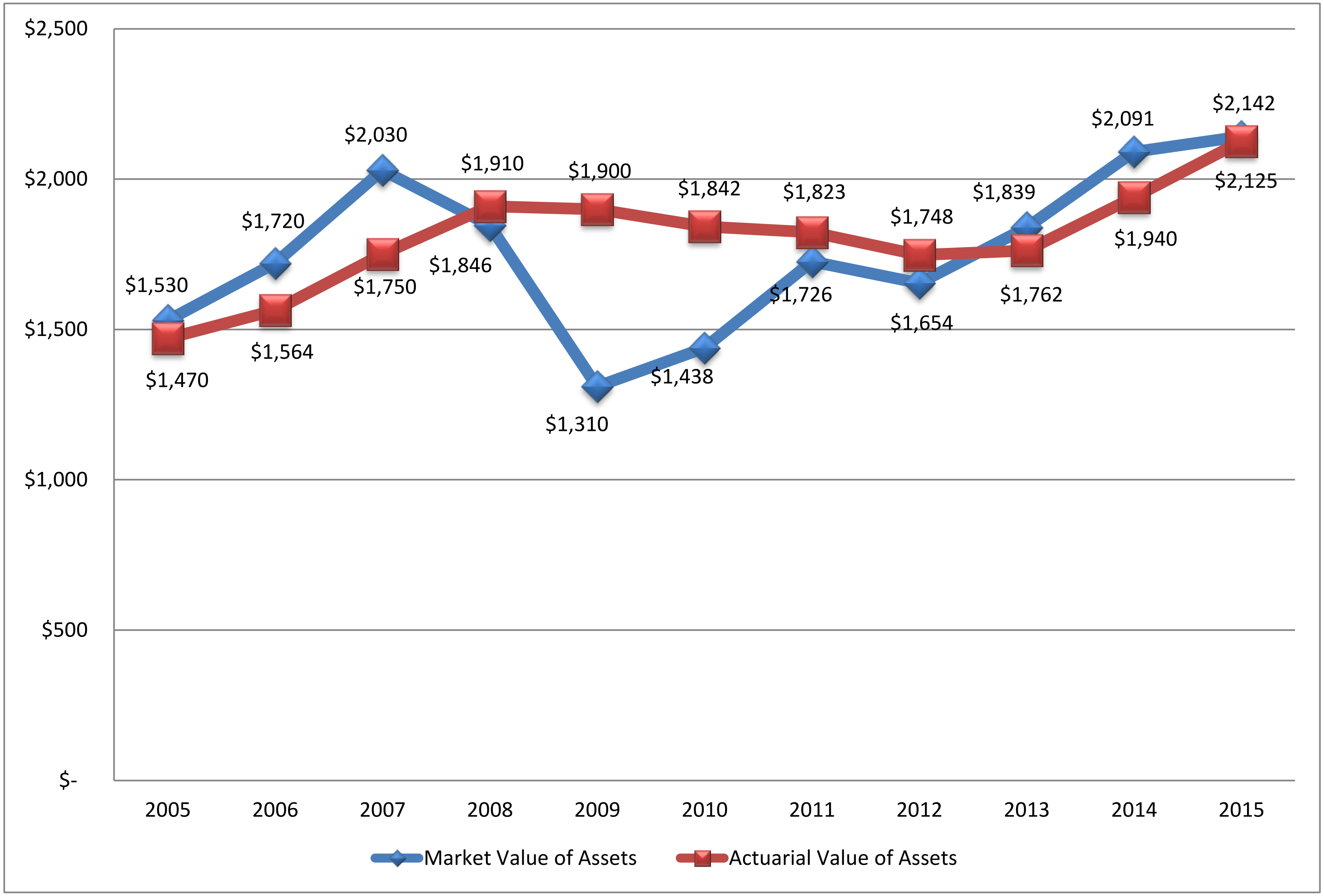
Year	Initial Amount	Deferral %	Unrecognized Amount
2015	($93)	80%	($74)
2014	147	60%	88
2013	87	40%	35
2012	(159)	20%	(32)
2011	220	0%	0
7. Total			**$17**

8. Actuarial Value of Assets as of June 30, 2015 (5) - (7)	**$2,125**
9. Actuarial Value of Assets as a % of Market Value of Assets	99.2%

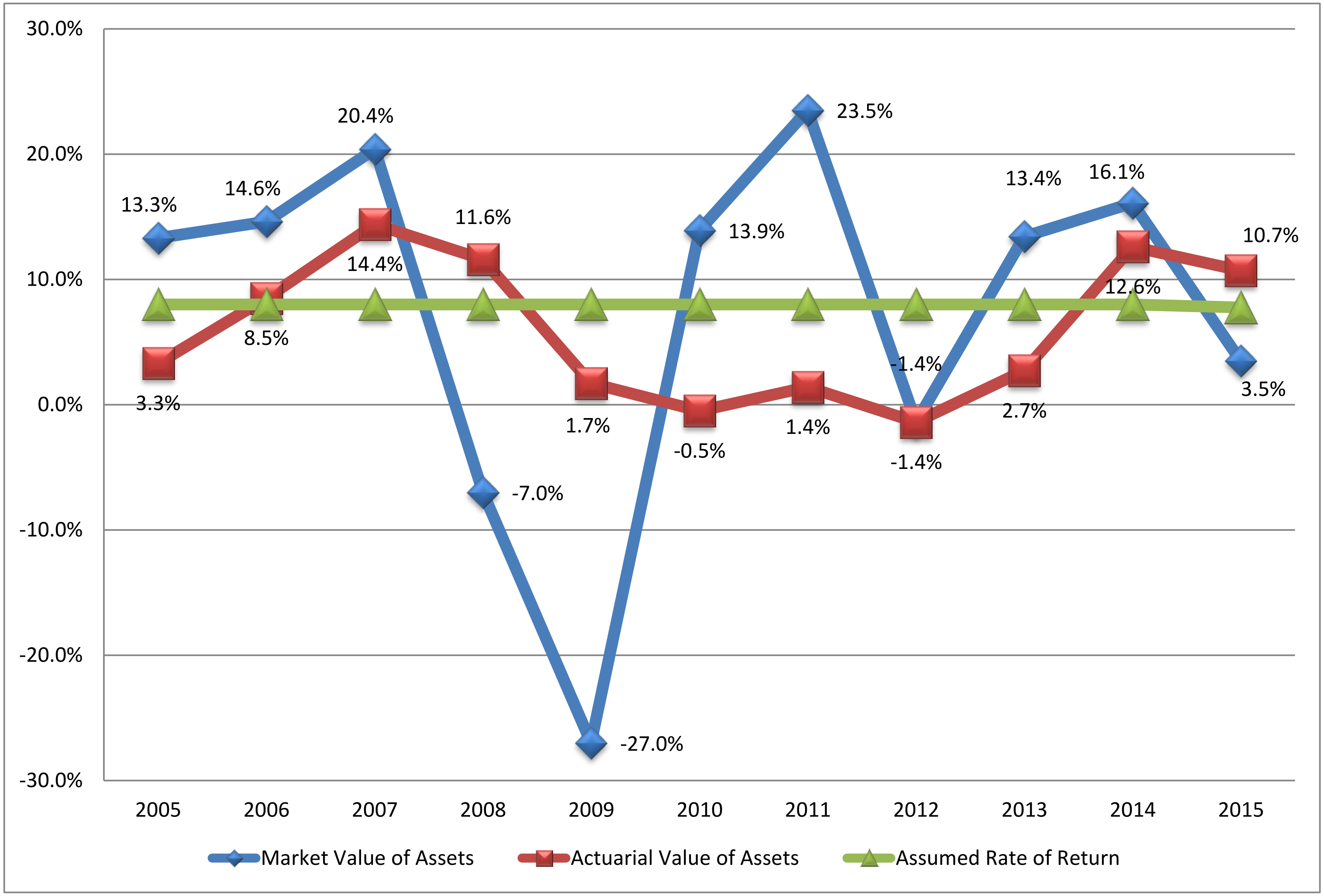
** Restated due to GASB 68 implementation*

Market and Actuarial Values of Assets

$ Millions

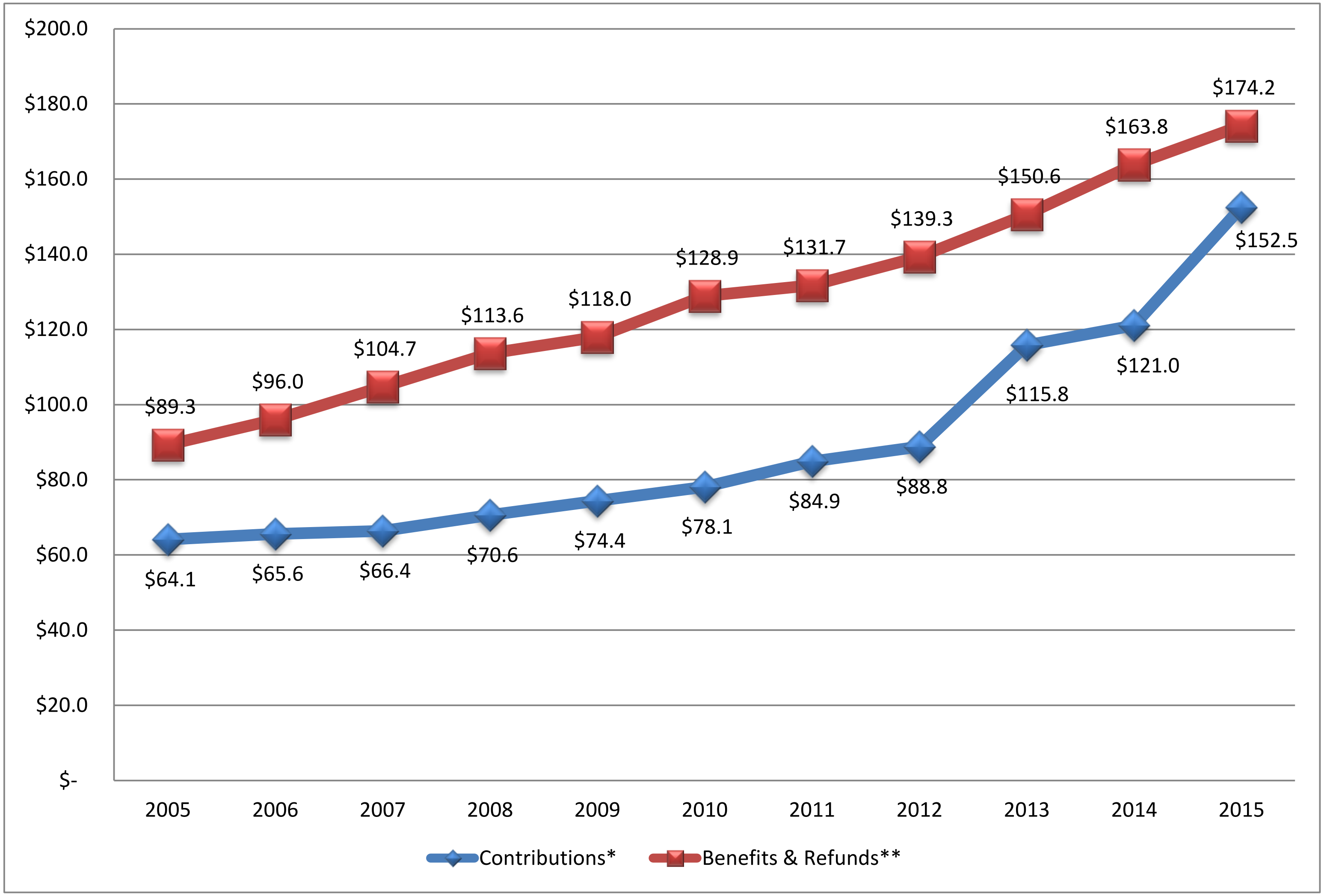


Asset Returns



Contributions vs. Benefits and Refunds

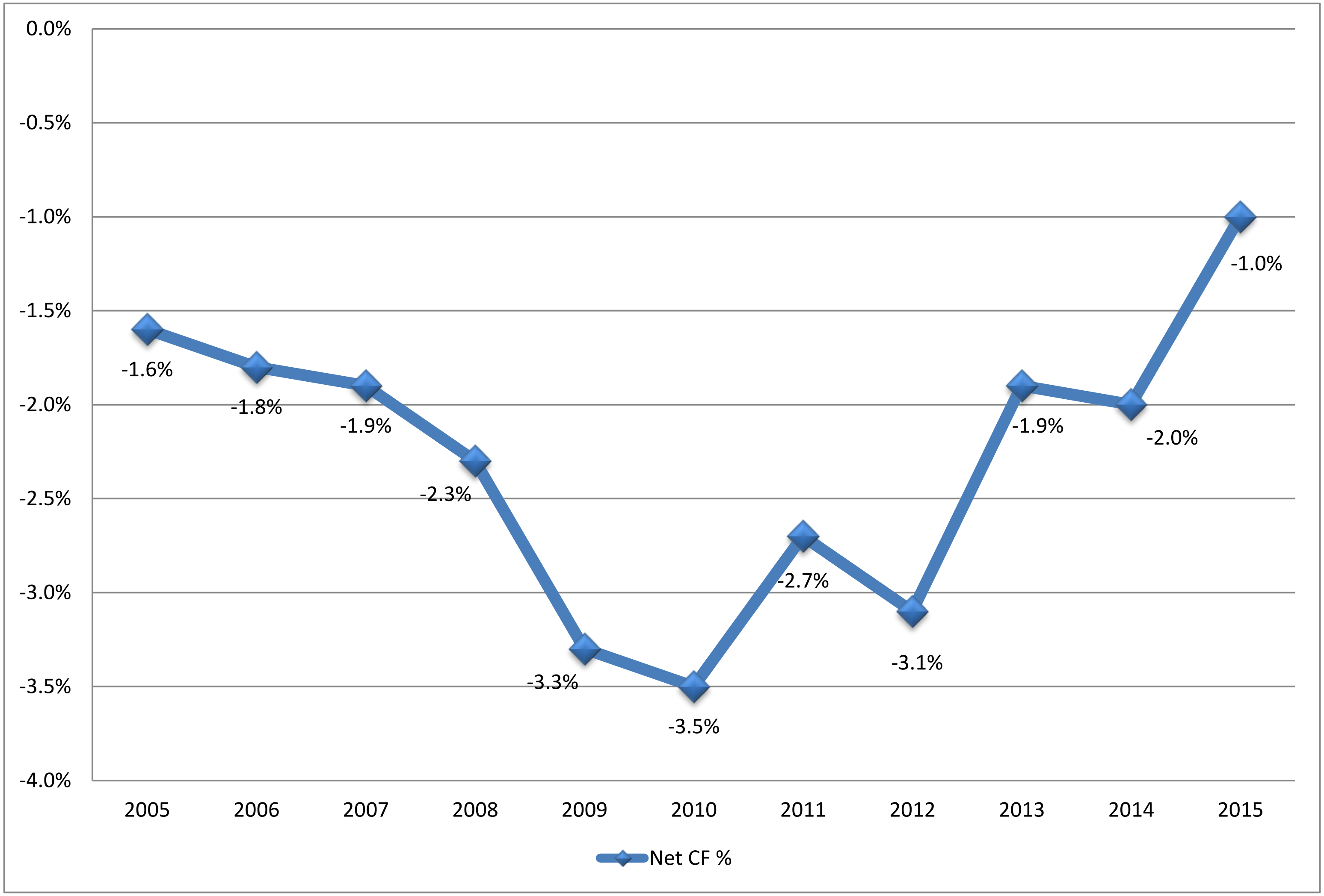
$ Millions



* Includes member and employer contributions, service purchases, and other

** Includes administrative expenses

Net Cash Flow as a % of Market Value



Valuation Results ($ in millions)

	July 1, 2015		July 1, 2014
	Before Changes*	After Changes	
Actuarial Accrued Liability:			
• Active Members	$1,416	$1,490	$1,398
• Inactive Members	83	85	79
• Retirees and Beneficiaries	1,779	1,875	1,662
Total	**$3,278**	**$3,450**	**$3,139**
Actuarial Assets	2,125	2,125	1,940
Unfunded Accrued Liability	$1,153	$1,325	$1,198
Funded Ratio	64.8%	61.6%	61.8%
Effective Amortization Period**	21 years	29 years	24 years

** Prior to reflecting the assumption changes that were adopted effective July 1, 2015.*
*** Based on actuarial accrued liability, normal cost rate, and payroll as of the valuation date and that all actuarial assumptions are realized as expected.*

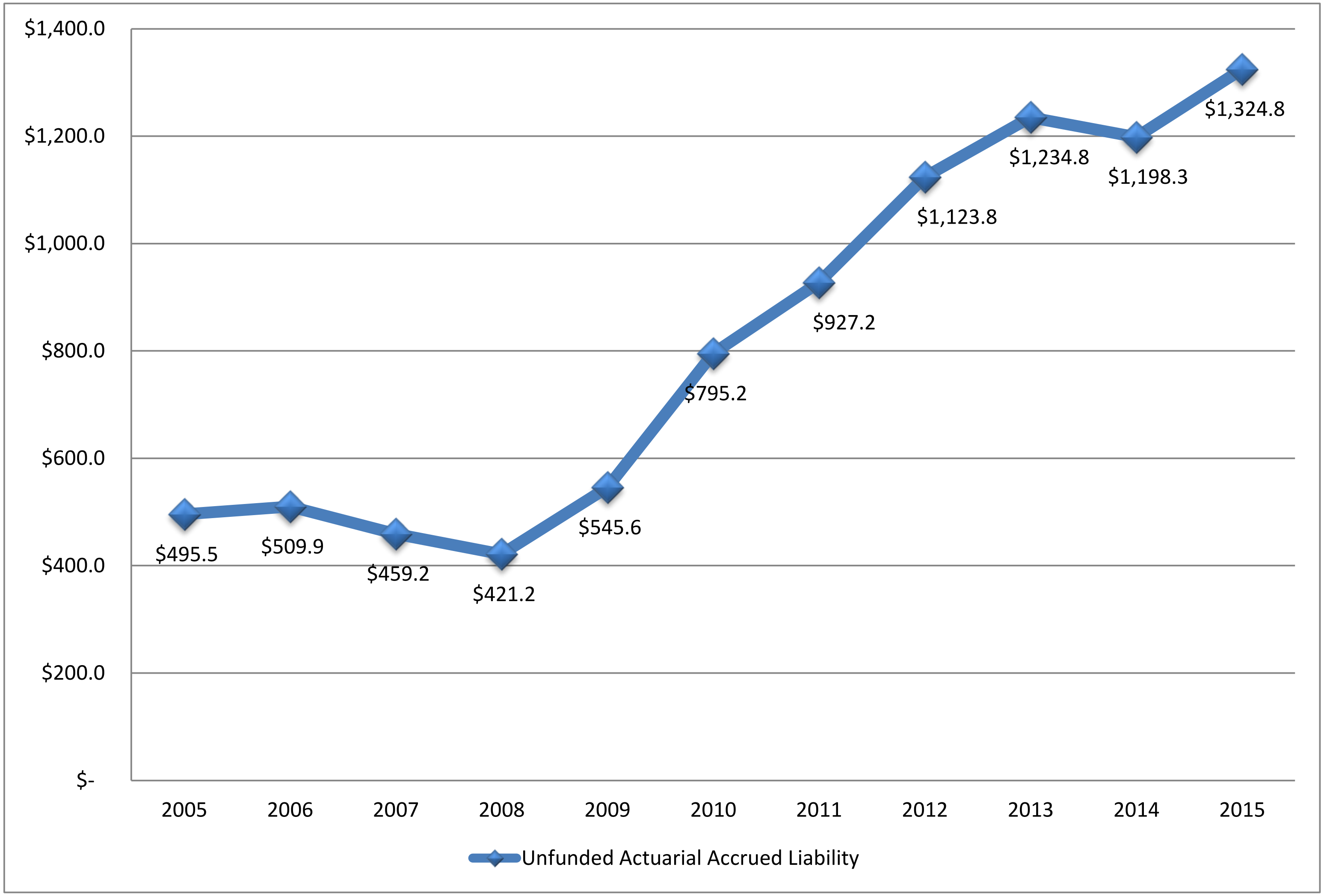
Actuarially Determined Contribution

	July 1, 2015		July 1, 2014
	Before Changes*	After Changes	
Normal Cost Rate**	10.70%	11.63%	10.63%
Member Rate	11.75%	11.75%	11.75%
Employer Normal Cost Rate	-1.05%	-0.12%	-1.12%
Amortization of UAAL	11.73%	13.16%	12.69%
Actuarially Determined Contribution	10.68%	13.04%	11.57%
Employer Rate	12.75%	12.75%	12.75%
Contribution Sufficiency/(Deficiency)	2.07%	(0.29%)	1.18%

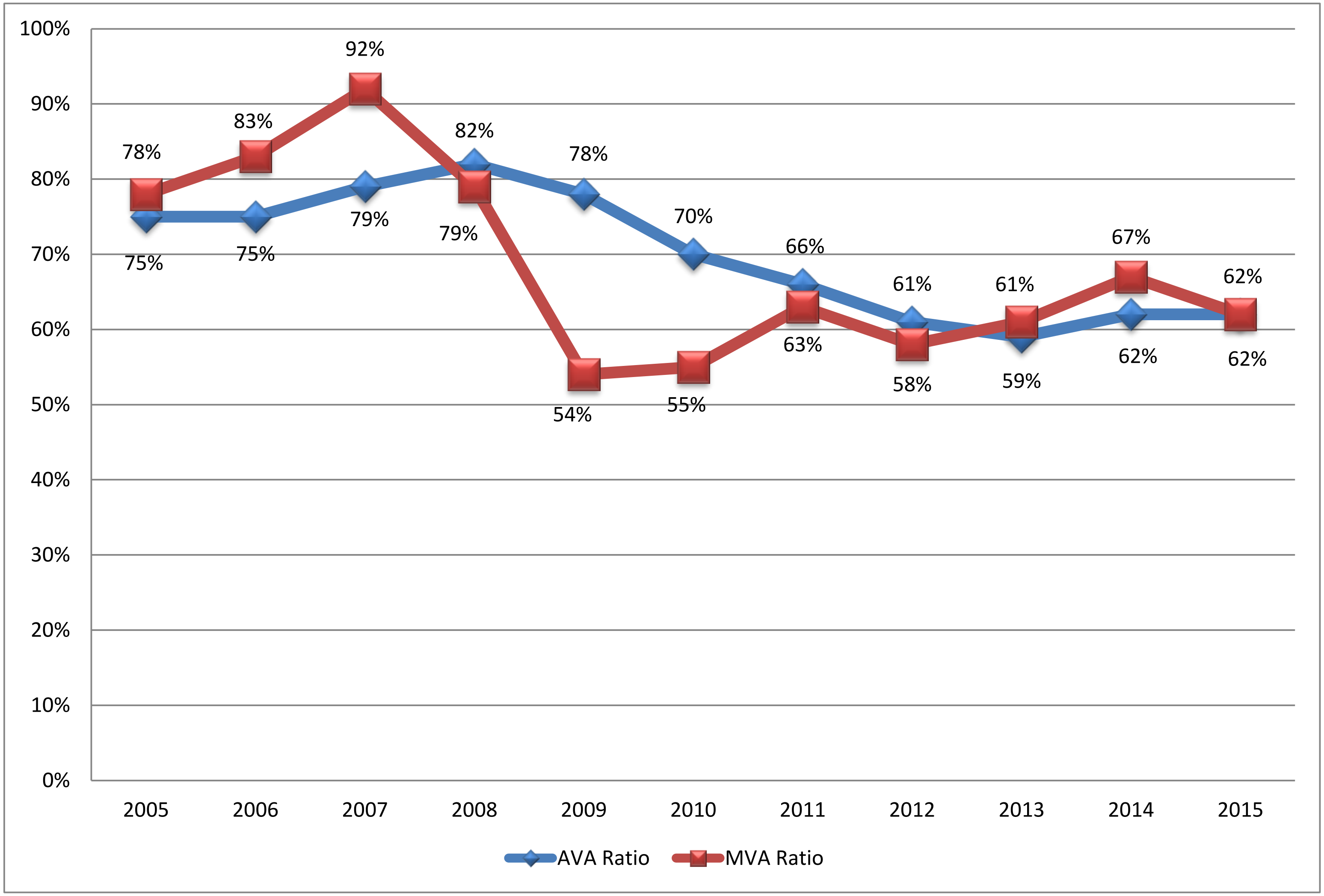
* *Prior to reflecting the assumption changes that were adopted effective July 1, 2015.*
** *Includes administrative expenses of $1,976,285 for 2015*

Unfunded Actuarial Accrued Liability

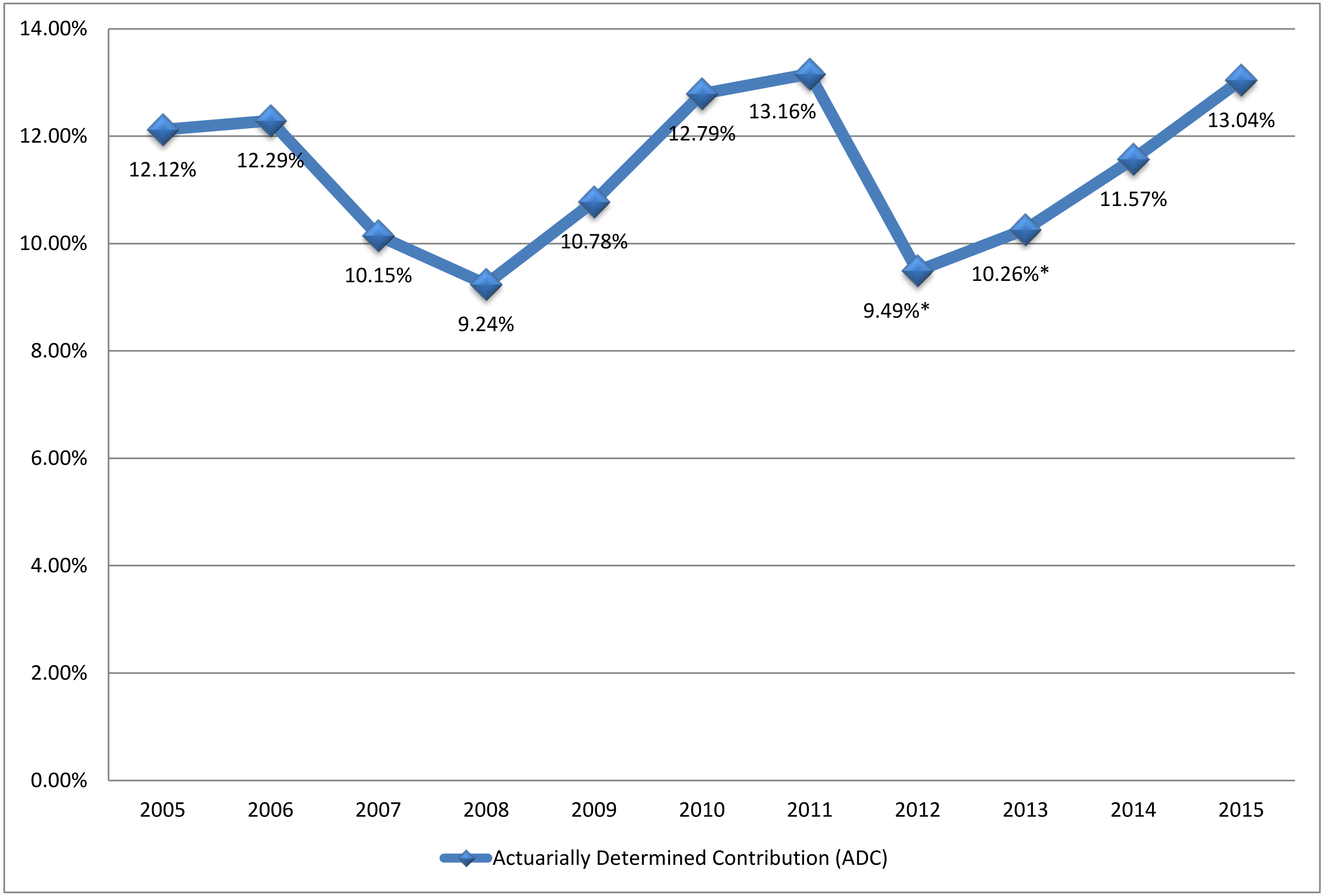
$ Millions



Funded Ratios



Actuarially Determined Contribution (ADC)



- Prior to 2013, the calculation of the ADC was based on a 30-year open level percentage of payroll amortization.
- Beginning in 2013, the amortization period is 30-year closed.

* Reflects the actuarial present value of contribution increases effective July 1, 2014.

Accounting Information – GASB 67 and 68

- Prior slides provided information on the funding of TFFR
- Next four slides provide information on the accounting requirements for TFFR and its employers
- Governmental Accounting Standards Board (GASB) adopted new accounting standards
  - GASB 67 provides for accounting with respect to plans and was effective for TFFR as of June 30, 2014
  - GASB 68 provides for financial reporting by employers and is effective for TFFR participating employers as of June 30, 2015

Net Pension Liability

- Net pension liability (NPL) is required to be reported in the Fund's financial statements and on each employer's balance sheet
  - Total pension liability (TPL) minus market value of assets
- Total pension liability based on:
  - Projected Value of Benefits (akin to Actuarial Accrued Liability)
  - Blended discount rate
    - Determined using projections of contributions and benefit payments
    - TFFR's discount rate is 7.75%
  - Entry age actuarial cost method

Employers' Reporting

- Employers are required to recognize and disclose their proportionate share of the collective pension amounts for all benefits provided by the Fund, which include:
  - Net pension liability
  - Deferred outflows of resources
  - Deferred inflows of resources
  - Pension expense
- Each employer must report its proportionate share of the net pension liability (NPL) in its financial statements
- TFFR uses covered payroll of active members as its basis for allocating the collective NPL
- GASB 68 information will be shown in a separate report

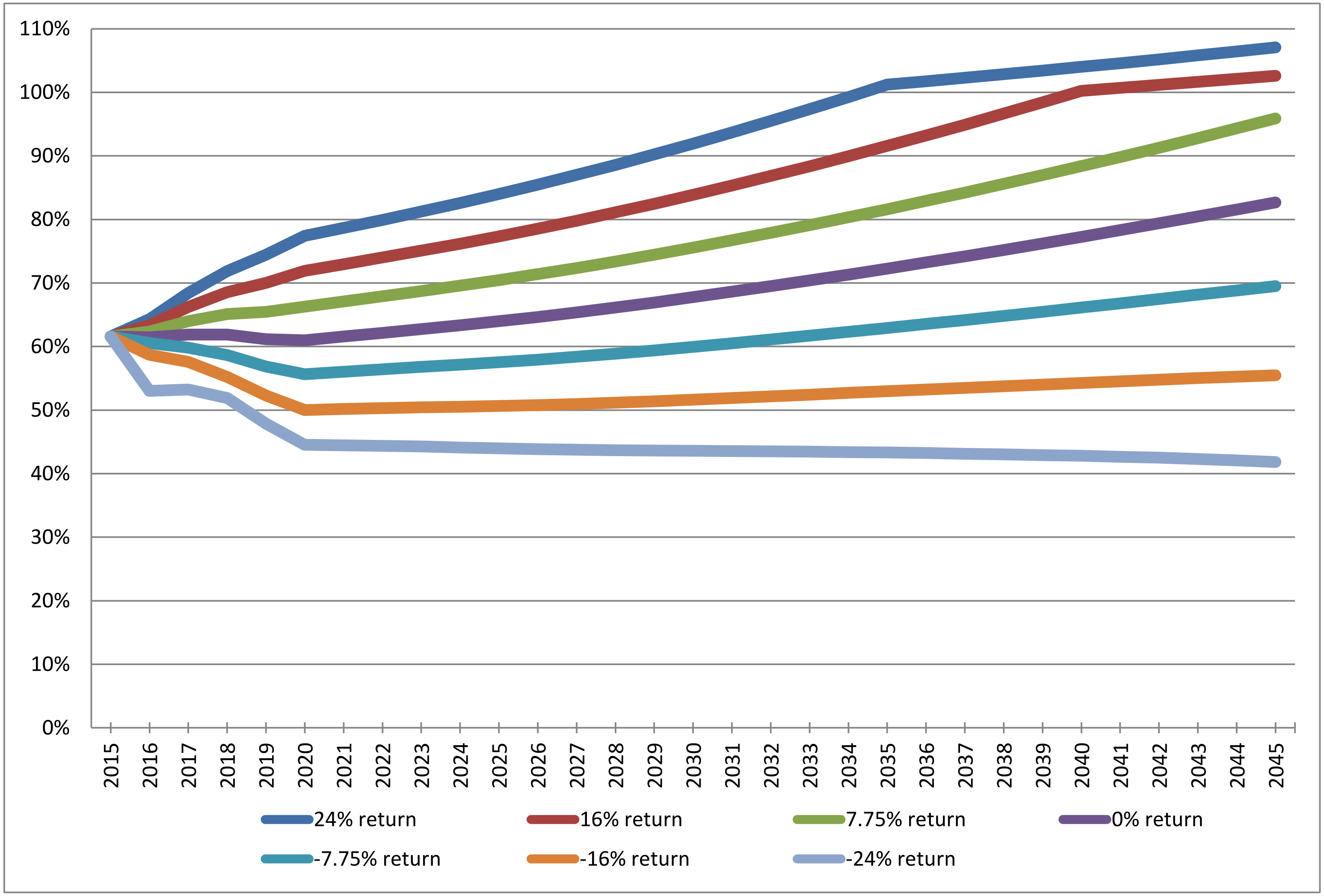
Net Pension Liability

	June 30, 2015	June 30, 2014
Discount Rate	7.75%	8.00%
Total Pension Liability (TPL)	$3,449,775,982	$3,138,799,773
Plan Fiduciary Net Position (PFNP)	2,141,920,800	2,090,977,056
Net Pension Liability (NPL)	1,307,855,182	1,047,822,717
PFNP as a Percentage of TPL	62.1%	66.6%
Sensitivity to Changes in Discount rate		
• 1% Decrease	$1,728,392,470	$1,414,755,083
• Current Discount Rate	1,307,855,182	1,047,822,717
• 1% Increase	957,135,967	739,221,908

Projections

- Projections of estimated funded ratios for 30 years
  - Based on FY16 investment return scenarios ranging from -24% to +24%
  - Assumes Fund earns 7.75% per year in FY17 and each year thereafter
  - Additional projections assuming Fund earns 6.75% or 8.75% per year every year
  - All other experience is assumed to emerge as expected
- Includes statutory contribution rates
  - Member rate is 11.75% for FY15 and thereafter
  - Employer rate is 12.75% for FY15 and thereafter
  - Increases “sunset” back to 7.75% once the funded ratio reaches 100% (based on actuarial assets)

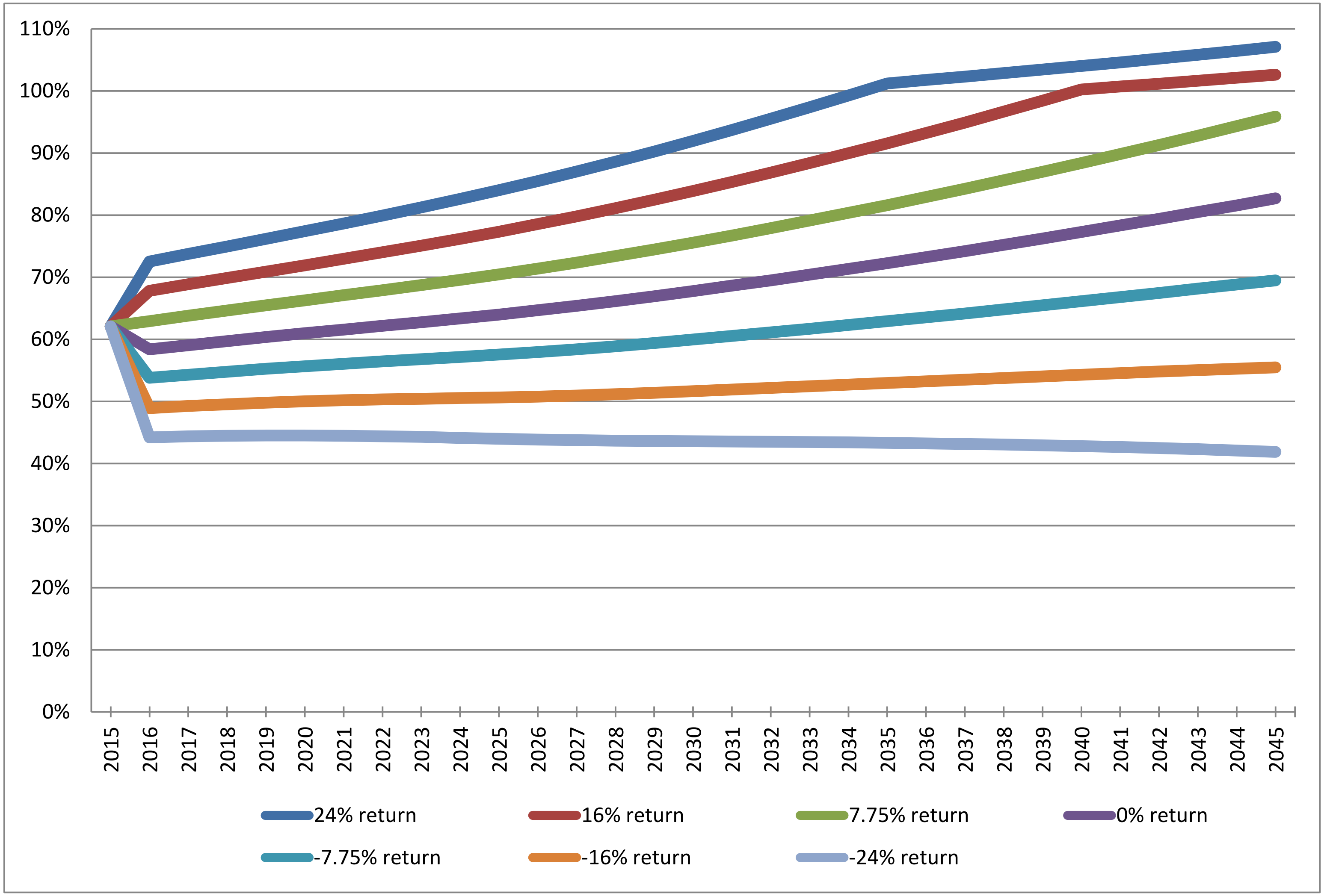
Projected Funded Ratios (AVA Basis)



Projected Funded Ratios (AVA Basis)

Valuation Year	24% for FY2016	16% for FY2016	7.75% for FY2016	0.00% for FY2016	-7.75% for FY2016	-16% for FY2016	-24% for FY2016
2015	62%	62%	62%	62%	62%	62%	62%
2016	64%	63%	62%	61%	61%	59%	53%
2017	68%	66%	64%	62%	60%	58%	53%
2018	72%	69%	65%	62%	59%	55%	52%
2019	74%	70%	65%	61%	57%	52%	48%
2020	77%	72%	66%	61%	56%	50%	45%
2025	84%	77%	70%	64%	58%	51%	44%
2030	92%	84%	76%	68%	60%	52%	44%
2035	101%	92%	82%	72%	63%	53%	43%
2040	104%	100%	88%	77%	66%	54%	43%
2045	107%	103%	96%	83%	69%	55%	42%

Projected Funded Ratios (MVA Basis)



Projected Funded Ratios (MVA Basis)

Valuation Year	24% for FY2016	16% for FY2016	7.75% for FY2016	0.00% for FY2016	-7.75% for FY2016	-16% for FY2016	-24% for FY2016
2015	62%	62%	62%	62%	62%	62%	62%
2016	73%	68%	63%	58%	54%	49%	44%
2017	74%	69%	64%	59%	54%	49%	44%
2018	75%	70%	65%	60%	55%	50%	45%
2019	76%	71%	65%	60%	55%	50%	45%
2020	77%	72%	66%	61%	56%	50%	45%
2025	84%	77%	70%	64%	58%	51%	44%
2030	92%	84%	76%	68%	60%	52%	44%
2035	101%	92%	82%	72%	63%	53%	43%
2040	104%	100%	88%	77%	66%	54%	43%
2045	107%	103%	96%	83%	69%	55%	42%

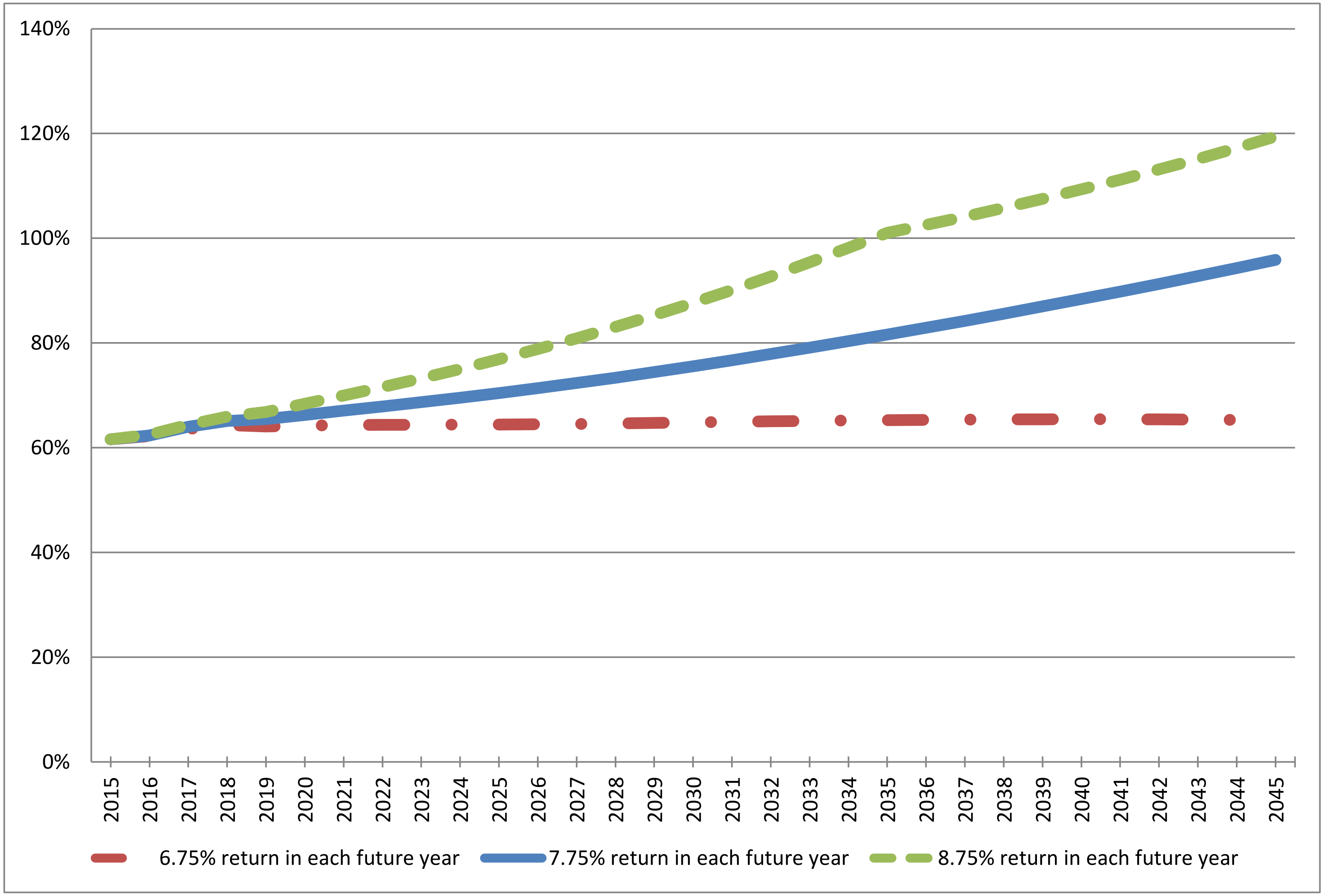
Projected Margin (AVA Basis)

Valuation Year	24% for FY2016	16% for FY2016	7.75% for FY2016	0.00% for FY2016	-7.75% for FY2016	-16% for FY2016	-24% for FY2016
2015	-0.29%	-0.29%	-0.29%	-0.29%	-0.29%	-0.29%	-0.29%
2016	0.22%	-0.11%	-0.46%	-0.78%	-1.10%	-1.75%	-3.75%
2017	1.31%	0.52%	-0.29%	-1.05%	-1.82%	-2.63%	-4.21%
2018	2.24%	0.99%	-0.29%	-1.50%	-2.70%	-3.99%	-5.23%
2019	2.90%	1.19%	-0.57%	-2.22%	-3.88%	-5.64%	-7.34%
2020	3.73%	1.56%	-0.69%	-2.80%	-4.90%	-7.15%	-9.32%
2025	5.10%	1.96%	-1.28%	-4.32%	-7.36%	-10.60%	-13.73%
2030	7.73%	2.89%	-2.11%	-6.80%	-11.49%	-16.48%	-21.32%
2035	3.93%	6.02%	-1.59%	-8.74%	-15.90%	-23.51%	-30.89%
2040	4.93%	3.47%	3.04%	-5.91%	-14.86%	-24.39%	-33.63%
2045	6.20%	4.37%	8.75%	-2.53%	-13.81%	-25.82%	-37.47%

* 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

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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: 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. 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 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) 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 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 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) as defined by GASB.

Net Pension Liability: 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 which is used to determine the Amortization Payment but which does not change over time. If the initial period is set at 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount, or 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: The actuarial accrued liability based on the blended discount rate as described in GASB 67/68.

Unfunded Actuarial Accrued Liability: 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.

Questions?

SEGAL

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North Dakota Teachers' Fund for Retirement

Actuarial Valuation and Review as of July 1, 2015

Segal Consulting

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October 16, 2015

Board of Trustees
North Dakota Teachers' Fund for Retirement
1930 Burnt Boat Drive P.O. Box 7100
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, 2015.

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 North Dakota Century 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 28 years beginning July 1, 2015, 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 (28 years remaining as of July 1, 2015). For this calculation, payroll is assumed to increase 3.25% per year. As of July 1, 2015, the ADC is 13.04%, compared to 11.57% last year. This is greater than the 12.75% rate currently required by law.

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) decreased from last year. The funded ratio at July 1, 2014, was 61.8%, while it is 61.6% as of July 1, 2015. Based on the market value of assets rather than the actuarial value of assets, the funded ratio decreased to 62.1%, compared to 66.6% last year.

The increase in ADC and decrease in funded ratio are primarily driven by changes to the actuarial assumptions that were adopted by the Board and effective July 1, 2015. A summary of the changes is shown in Section 1 of this report.

The Plan has a net asset gain of $17 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 gain is due to market gains during FY 2013 and FY 2014 offset by market losses in FY 2012 and FY 2015. As these gains are recognized over the next four years, the funded ratio is expected to improve, 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 assumptions as approved by the Board are reasonably related to the experience of and the expectation for the Plan.

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, 2015, by the staff of the Retirement and Investment Office (RIO). 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 RIO staff. That assistance is gratefully acknowledged.

Sincerely,

Segal Consulting, a member of the Segal Group, Inc.

By: Kim Nicholl

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

Matthew A. Strom

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

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SECTION 1

VALUATION SUMMARY

SECTION 2

VALUATION RESULTS

SECTION 3

SUPPLEMENTAL INFORMATION

SECTION 4

REPORTING INFORMATION

Segal Consulting

Significant Issues in the Valuation Year

1. Effective with the July 1, 2015, actuarial valuation, the Trustees adopted several assumption changes, including the following:
   - Investment return assumption lowered from 8.00% to 7.75%.
   - Inflation assumption lowered from 3.00% to 2.75%.
   - Total salary scale rates lowered by 0.25% due to lower inflation.
   - Added an explicit administrative expense assumption, equal to prior year administrative expenses plus inflation.
   - Rates of turnover and retirement were changed to better reflect anticipated future experience.
   - Updated the mortality assumption to the “RP-2014” mortality tables with generational improvement.

   The net impact of the assumption changes was an increase in the actuarial accrued liability of $171.3 million, an increase in the actuarially determined contribution of 2.36%, and an increase in the funding period of 8 years.

2. The employer statutory contribution rate for the fiscal year beginning July 1, 2015, under the North Dakota Century Code is equal to 12.75% of payroll for employers. Compared to the actuarially determined contribution of 13.04% of payroll, the contribution deficiency is 0.29% of payroll as of July 1, 2015.

3. The funded ratio based on the actuarial value of assets over the actuarial accrued liability as of July 1, 2015, is 61.6%, compared to 61.8% as of July 1, 2014. This ratio is a measure of funding status and its history is a measure of funding progress.

4. For the year ended June 30, 2015, Segal has determined that the asset return on a market value basis was 3.5%. After gradual recognition of investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 10.7%. This represents an experience gain when compared to the prior assumed rate of 8.0%. As of June 30, 2015, the actuarial value of assets ($2.125 billion) represented 99.2% of the market value ($2.142 billion).

5. The portion of deferred investment gains and losses recognized during the calculation of the July 1, 2015, actuarial value of assets contributed to a gain of $51.9 million. The demographic and liability experience resulted in a $3.6 million loss.

6. As mentioned above, the current method used to determine the actuarial value of assets yields an amount that is 99.2% of the market value of assets as of June 30, 2015. 99.2% 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.

7. 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.

8. The Net Pension Liability (NPL) is equal to the difference between the TPL and the Plan's Fiduciary Net Position. The Plan's Fiduciary Net Position is equal to the market value of assets and therefore, the NPL measure is very similar to the Unfunded Actuarial Accrued Liability on a market value basis. The NPL increased from $1,047,822,717 as of June 30, 2014, to $1,307,855,182 as of June 30, 2015.

9. The Fund's cash flow (contributions minus benefit payments, refunds, and expenses) as a percentage of the market value of assets is -1.0% as of June 30, 2015, compared to -2.0% as of June 30, 2014. The increase in net cash flow is primarily due to the increase in contribution rates that were effective July 1, 2014.

Summary of Key Valuation Results

	2015		2014
Demographic Data for Plan Year Beginning July 1:			
Number of retirees and beneficiaries		8,025	7,747
Number of inactive vested members		1,607	1,509
Number of inactive non-vested members		660	661
Number of active members		10,514	10,305
Total payroll supplied by System, annualized		$589,783,780	$557,222,917
Statutory Contributions (% of Payroll) for Plan Year Beginning July 1:	Before Changes*	After Changes	
Member	11.75%	11.75%	11.75%
Employer	12.75%	12.75%	12.75%
Actuarially determined contribution rate for year beginning July 1	10.68%	13.04%	11.57%
Margin/(deficit)	2.07%	-0.29%	1.18%
Assets:			
Market value		$2,141,920,800	$2,090,977,056**
Actuarial value		2,125,017,451	1,940,473,504
Return on market value as determined by Segal		3.5%	16.1%
Return on actuarial value		10.7%	12.6%
Ratio of actuarial value to market value		99.2%	92.8%
Net cash flow % relative to market value		-1.0%	-2.0%
Actuarial Information:	Before Changes*	After Changes	
Normal cost %	10.70%	11.63%	10.63%
Normal cost	$67,087,882	$72,798,417	$62,980,534
Actuarial accrued liability	3,278,451,335	3,449,775,982	3,138,799,773
Unfunded actuarial accrued liability	1,153,433,884	1,324,758,531	1,198,326,269
Funded ratio	64.8%	61.6%	61.8%
Effective amortization period	21 years	29 years	24 years
GASB Information:			
Discount rate		7.75%	8.00%
Total pension liability		$3,449,775,982	$3,138,799,773
Plan fiduciary net position		2,141,920,800	2,090,977,056
Net pension liability		1,307,855,182	1,047,822,717
Plan fiduciary net position as a percentage of total pension liability		62.1%	66.6%

* *Certain information is shown prior to reflecting the assumption changes that were adopted effective July 1, 2015.*

** *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.*

Summary of Key Valuation Results (continued)

	2015	2014
Gains/(Losses):		
Asset experience	$51,873,093	$80,084,128
Liability experience	-3,623,699	-8,882,399
Benefit changes	0	0
Assumption/method changes	-171,324,647	0
Total gain/(loss)	-$123,075,253	$71,201,729

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 the 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, 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. 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 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.
- If 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.
- The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.

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.

A. MEMBER DATA

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

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

A historical perspective of how the participant population has changed over the past ten valuations can be seen in this chart.

CHART 1

Member Population: 2006 – 2015

Year Ended June 30	Active Members	Inactive Vested Members	Inactive Non-vested Members	Retirees and Beneficiaries	Ratio of Actives to Retirees and Beneficiaries
2006	9,585	1,409	143	5,893	1.63
2007	9,599	1,439	142	6,077	1.58
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

Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 10,514 active members with an average age of 42.5 and 12.4 average years of service. The 10,305 active members in the prior valuation had an average age of 42.9 and 12.8 average years of service.

Inactive Members

In this year's valuation, there were 1,607 participants with a vested right to a deferred or immediate vested benefit.

In addition, there were 660 participants entitled to a return of their employee contributions.

These graphs show a distribution of active members by age and by years of service.

CHART 2

Distribution of Active Members by Age as of June 30, 2015

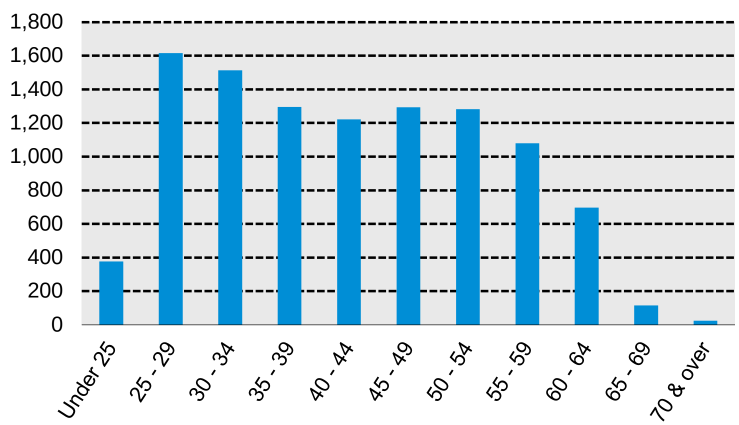
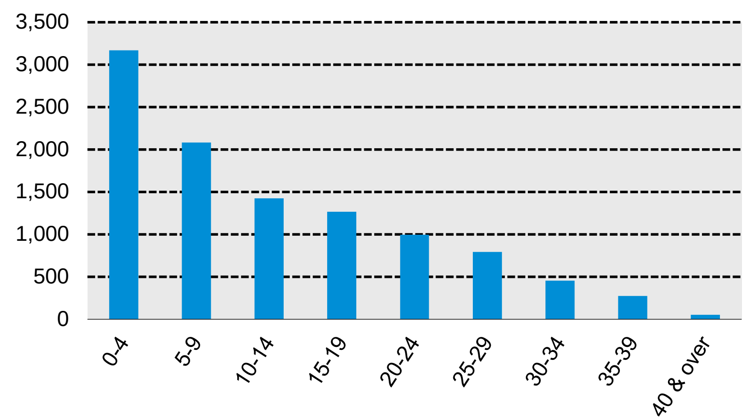


CHART 3

Distribution of Active Members by Years of Service as of June 30, 2015

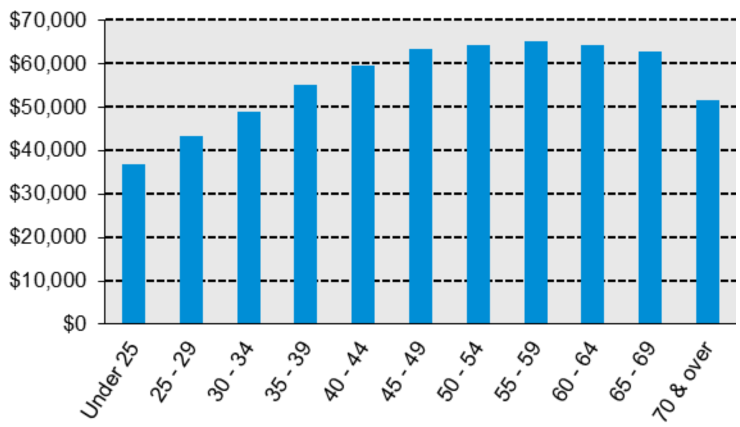


Distribution of Active Members by Age and Average Compensation

In this year's valuation, there were 10,514 active members with an average compensation of $56,095. The 10,305 active members in the prior valuation had an average compensation of $54,073.

CHART 4

Distribution of Active Members by Age and Average Compensation as of June 30, 2015



Retirees and Beneficiaries
As of July 1, 2015, 7,378 retirees and 647 beneficiaries were receiving total monthly benefits of $14,784,843. For comparison, in the previous valuation, there were 7,120 retirees and 627 beneficiaries receiving monthly benefits of $13,814,311.

These graphs show a distribution of the current retirees and beneficiaries based on their monthly amount and age, by type of pension.

CHART 5

Distribution of Retirees and Beneficiaries by Type and by Monthly Amount as of July 1, 2015

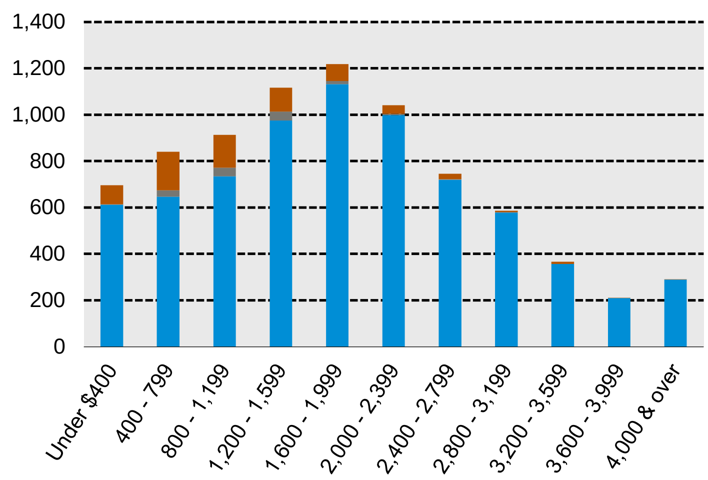
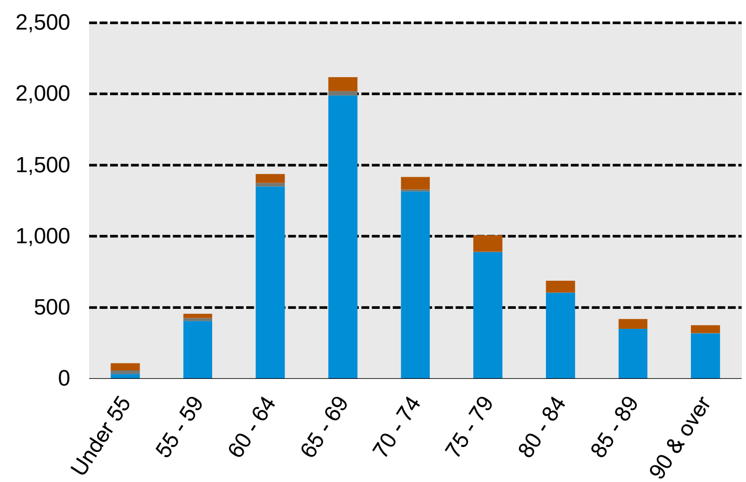


CHART 6

Distribution of Retirees and Beneficiaries by Type and by Age as of July 1, 2015



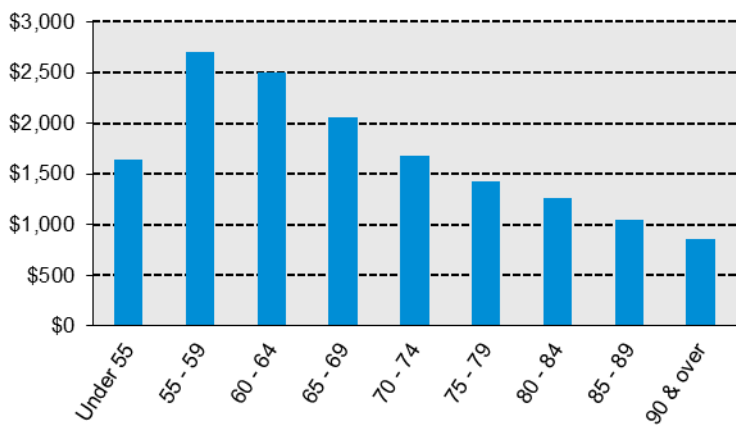
■ Beneficiary
■ Disabled Retiree
■ Retiree

Distribution of Retirees and Beneficiaries by Age and Average Monthly Benefit Amount

As of July 1, 2015, the average monthly benefit amount among 7,378 retirees and 647 beneficiaries was $1,842. In the previous valuation, the average monthly benefit amount among 7,120 retirees and 627 beneficiaries was $1,783.

CHART 7

Distribution of Retirees and Beneficiaries by Age and Average Monthly Amount as of July 1, 2015



B. FINANCIAL INFORMATION

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

The chart shows the determination of the actuarial value of assets as of the valuation date and the value from the prior year.

CHART 8

Determination of Actuarial Value of Assets for Years Ended June 30, 2015, and June 30, 2014

			2015		2014	
1.	Market value of assets available for benefits			$2,141,920,800		$2,090,977,056*
2.	Calculation of unrecognized return**	Original Amount***	% Not Recognized		% Not Recognized	
	(a) Year ended June 30, 2015	-$93,205,396	80%	-$74,564,316		
	(b) Year ended June 30, 2014	147,144,380	60%	88,286,628	80%	$117,715,504
	(c) Year ended June 30, 2013	87,575,593	40%	35,030,237	60%	52,545,356
	(d) Year ended June 30, 2012	-159,245,999	20%	-31,849,200	40%	-63,698,400
	(e) Year ended June 30, 2011	219,705,461		0	20%	43,941,092
	(f) Total unrecognized return			$16,903,349		$150,503,552
3.	Actuarial value of assets (Current Assets): (1) – (2f)			$2,125,017,451		$1,940,473,504
4.	Actuarial value as a percent of market value: (3) ÷ (1)			99.2%		92.8%

* *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.*

** *Recognition at 20% per year over 5 years*

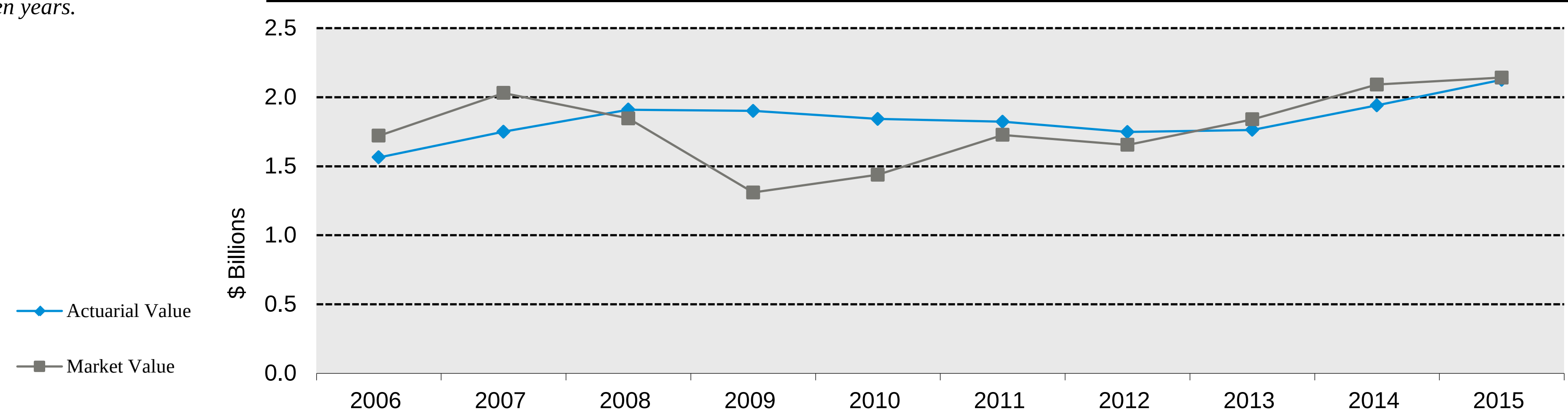
****Total return minus expected return on market value*

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 TFFR'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.

This chart shows the change in the actuarial value of assets versus the market value over the past ten years.

CHART 9

Actuarial Value of Assets vs. Market Value of Assets as of June 30, 2006 – 2015



Investment Rate of Return

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 TFFR's investment policy. The assumed rate of return on the actuarial value of assets for the year ended June 30, 2015, was 8.00%. The actual rate of return on an actuarial basis for the Plan Year ended June 30, 2015, was 10.69%.

Since the actual return for the year was greater than the assumed return, TFFR experienced an actuarial gain during the year ended June 30, 2015, with regard to its investments.

This chart shows the gain/(loss) due to investment experience.

CHART 10

Actuarial Value Investment Experience for Year Ended June 30, 2015

1.	Actual return	$206,243,011
2.	Average value of assets	1,929,623,972
3.	Actual rate of return: (1) ÷ (2)	10.69%
4.	Assumed rate of return	8.00%
5.	Expected return: (2) x (4)	$154,369,918
6.	Actuarial gain/(loss): (1) – (5)	$51,873,093

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 market value investment return for the last thirty years, including five-year, ten-year, fifteen-year, twenty-year and thirty-year averages.

Chart 11
Investment Return

Year Ended June 30	Market Value	Actuarial Value	Year Ended June 30	Market Value	Actuarial Value
1986	19.3%	11.8%	2001	-7.6%	8.6%
1987	9.2%	12.3%	2002	-8.6%	3.0%
1988	5.0%	7.3%	2003	2.1%	0.6%
1989	14.3%	8.6%	2004	18.9%	1.9%
1990	6.7%	7.7%	2005	13.3%	3.3%
1991	7.5%	5.8%	2006	14.6%	8.5%
1992	12.4%	6.5%	2007	20.4%	14.4%
1993	14.7%	8.1%	2008	-7.0%	11.6%
1994	1.2%	7.0%	2009	-27.0%	1.7%
1995	13.6%	9.1%	2010	13.9%	-0.5%
1996	15.6%	11.3%	2011	23.5%*	1.4%
1997	18.5%	12.6%	2012	-1.4%*	-1.4%
1998	13.2%	12.6%	2013	13.4%*	2.7%
1999	11.5%	13.5%	2014	16.1%*	12.6%
2000	11.6%	13.3%	2015	3.5%*	10.7%

Average Rates of Return	Market Value	Actuarial Value
Last 5 years:	10.3%	5.2%
Last 10 years:	5.9%	6.0%
Last 15 years:	4.9%	5.2%
Last 20 years:	7.1%	7.0%
Last 30 years:	8.2%	7.5%

** As determined by Segal.*

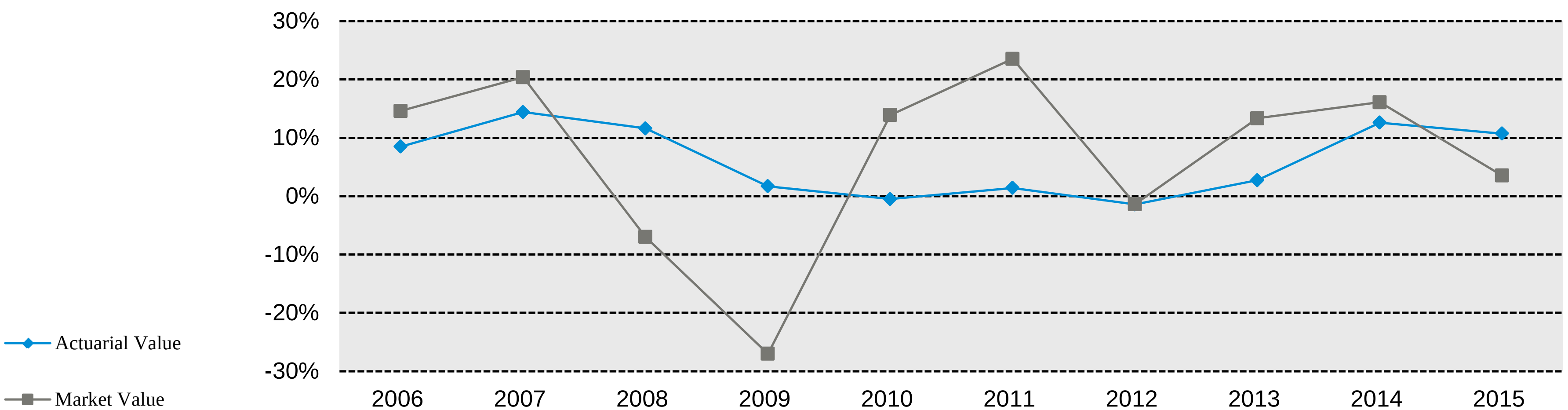
Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

Administrative Expenses
Administrative expenses for the year ended June 30, 2015, totaled $1,923,392. An explicit administrative expense assumption was added effective July 1, 2015.

This chart illustrates how this leveling effect has actually worked over the years 2006 - 2015.

CHART 12

Market and Actuarial Rates of Return for Years Ended June 30, 2006 - 2015



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.

Chart 13

History of Cash Flow

Year Ending June 30,	Contributions[1]	Disbursements or Expenditures: Benefit Payments	Refunds	Administrative Expenses	Total	Net Cash Flow for the Year[2]	Market Value of Assets	Net Cash Flow as Percent of Market Value
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2006	$65,577,828	($91,818,092)	($2,697,308)	($1,484,591)	($95,999,991)	($30,422,163)	$1,720,324,948	-1.8%
2007	66,362,099	(99,737,905)	(3,328,931)	(1,592,060)	(104,658,896)	(38,296,797)	2,029,777,412	-1.9%
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%

[1] Column (2) includes employee and employer contributions, as well as any purchased service credits during the year.
[2] Column (7) = Column (2) + Column (6).

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, but are not limited to:

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

The net loss from this other experience for the year ended June 30, 2015, amounted to $3,623,699, which is less than 0.1% of the actuarial accrued liability.

A brief summary of demographic gain/(loss) experience of TFFR for the year ended June 30, 2015 is shown in the chart below.

The chart shows elements of the experience gain/(loss) for the most recent year.

CHART 14

Experience Due to Changes in Demographics for Year Ended June 30, 2015

1.	Turnover	-$2,127,811
2.	Retirement	5,122,743
3.	Deaths among retired members and beneficiaries	-2,775,408
4.	Salary/service increase for continuing actives	1,456,967
5.	New entrants	-6,908,339
6.	Miscellaneous	1,608,149
7.	Total	-$3,623,699

C. DEVELOPMENT OF EMPLOYER COSTS

The amount of actuarially determined contribution is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability. This total amount is then divided by the projected payroll for active members to determine the actuarially determined contribution of 13.04% of payroll.

Effective July 1, 2013, the amortization period was set to 30 years, but declines by one year in each subsequent valuation. As of July 1, 2015, the amortization period has 28 years remaining.

The chart compares this valuation's recommended contribution with the prior valuation.

CHART 15

Actuarially Determined Contribution

	Year Beginning July 1			
	2015		2014	
	Amount	% of Compensation	Amount	% of Compensation
1. Total normal contribution rate, adjusted for timing*	$72,798,417**	11.63%	$62,980,534	10.63%
2. Less: member contribution rate	73,528,490	-11.75%	69,591,661	-11.75%
3. Employer normal contribution rate, adjusted for timing*	-$730,073	-0.12%	-6,611,127	-1.12%
4. Actuarial accrued liability	3,449,775,982		3,138,799,773	
5. Actuarial value of assets	2,125,017,451		1,940,473,504	
6. Unfunded actuarial accrued liability: (4) - (5)	1,324,758,531		1,198,326,269	
7. Payment on unfunded actuarial accrued liability, adjusted for timing*	82,360,453	13.16%	75,149,970	12.69%
8. Actuarially determined contribution (3) + (7)	$81,630,380	13.04%	$68,538,843	11.57%
9. Total payroll supplied by System, annualized	$589,783,780		$557,222,917	
10. Projected annual payroll for fiscal year beginning July 1	$625,774,379		$592,269,452	

* *Contributions are assumed to be paid at the middle of every month*

** *Includes administrative expenses of $1,976,285*

The actuarially determined contribution as of July 1, 2015, is based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. It includes all changes affecting future costs, adopted benefit changes, actuarial gains and losses, and changes in the actuarial assumptions.

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.

The chart reconciles the actuarially determined contribution from the prior valuation to the amount determined in this valuation.

CHART 16

Reconciliation of Actuarially Determined Contribution from July 1, 2014 to July 1, 2015

		July 1, 2015		July 1, 2014
1. Prior valuation		11.57%		10.26%
2. Increases/(decreases) due to:				
a. Change in amortization period (decrease from 30 years to 29 years remaining as of July 1, 2014 and decrease from 29 years to 28 years remaining as of July 1, 2015)	0.00%		0.00%	
b. Change in covered payroll and normal cost	-0.23%		-0.27%	
c. Employer contributions received at 12.75% rather than 11.57% for FY2015 and 10.75% rather than 10.26% for FY 2014	-0.15%		-0.05%	
d. Liability experience	0.04%		0.25%	
e. Investment experience	-0.53%		-0.62%	
f. Legislative changes	0.00%		0.00%	
g. Change in actuarial assumptions	2.34%		0.00%	
h. Adjustment to remove present value of increased employer statutory contributions from amortization payment	0.00%		2.00%	
i. Total		1.47%		1.31%
3. Current valuation (1. + 2.i.)		13.04%		11.57%
4. Statutory employer contribution rate		12.75%		12.75%
5. Margin available [contribution sufficiency/(deficiency)] (4. – 3.)		-0.29%		1.18%

D. ADDITIONAL INFORMATION

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. Chart 17 below presents a graphical representation of this information for TFFR.

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.

Chart 18 shows the funded ratio calculated using both the actuarial value of assets and the market value of assets.

The details regarding the calculations of these values may be found in Section 4.

CHART 17
Actuarially Determined Versus Actual Employer Contributions, Years Ended June 30

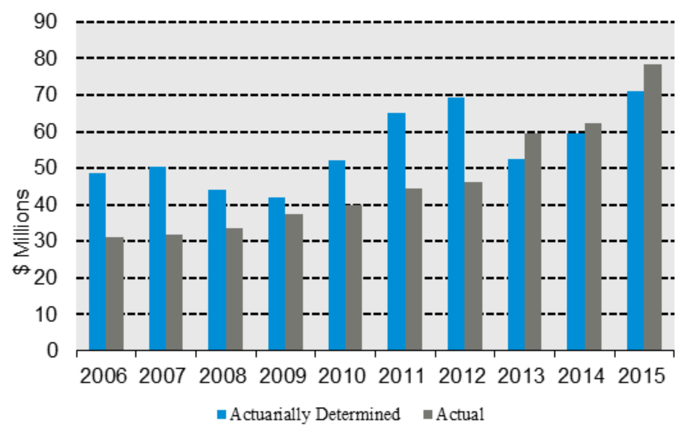
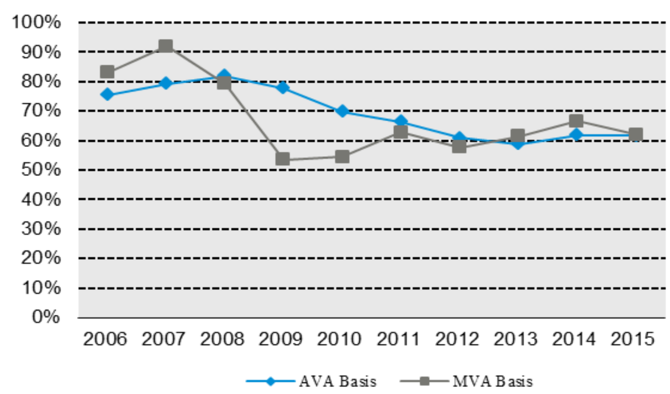


CHART 18
Funded Ratio, Years Ended June 30



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 summarizes certain active member data, and the age/service distribution of active members among tiers is shown in Exhibit C. Exhibit D-1 and Exhibit D-2 show the distribution of retirees by option and by benefit amount. Exhibit E shows a reconciliation of the member data from last year’s valuation to this year’s valuation.

The number of active members increased by 2.0% since last year, from 10,305 to 10,514. 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 5.8% since last year. For all comparative purposes, payroll is the amount supplied by the RIO staff (i.e., the 2014-2015 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, 2015. Pay is assumed to change only at the beginning of a school/fiscal year.

Average pay increased by 3.7%, from $54,073 to $56,095. This includes the impact of replacing more highly paid members who retire with new teachers. The average increase in salary for the 9,450 continuing members (members active in both this valuation and the preceding valuation) was 6.5%.

The average age of active members decreased from 42.9 years to 42.5 years, and their average service decreased from 12.8 years to 12.4 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

	July 1, 2015	July 1, 2014
Plan Eligibility		
a. Tier 1 Grandfathered	2,869	3,240
b. Tier 1 Non-grandfathered	3,312	3,395
c. Tier 2	4,333	3,670
d. Total	10,514	10,305
Benefit Eligibility		
a. Non-Vested	3,145	2,899
b. Vested	5,494	5,428
c. Early Retirement	888	938
d. Normal Retirement	987	1,040
e. Total	10,514	10,305

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, 1,875 members were eligible for either reduced or unreduced retirement, a decrease over last year’s figure of 1,978.

EXHIBIT A
Member Data

Member Data	July 1, 2015	July 1, 2014
1. Active members		
a. Males	2,670	2,656
b. Females	7,844	7,649
c. Total members	10,514	10,305
d. Total payroll supplied by System, annualized	$589,783,780	$557,222,917
e. Average salary	$56,095	$54,073
f. Average age	42.5	42.9
g. Average service	12.4	12.8
h. Total contributions with interest	$737,479,504	$698,157,822
i. Average contribution with interest	$70,143	$67,749
2. Vested inactive members		
a. Number	1,607	1,509
b. Total annual deferred benefits	$10,722,390	$10,207,883
c. Average annual deferred benefit	$6,672	$6,765
d. Average age	49.3	49.6
3. Non-vested inactive members		
a. Number	660	661
b. Employee contributions with interest due	$3,659,588	$3,084,613
c. Average refund due	$5,545	$4,667
d. Average age	37.5	38.3
4. Service retirees		
a. Number	7,250	6,991
b. Total annual benefits	$166,577,429	$155,409,403
c. Average annual benefit	$22,976	$22,230
d. Average age	71.0	70.9
5. Disabled retirees		
a. Number	128	129
b. Total annual benefits	$1,869,981	$1,886,877
c. Average annual benefit	$14,609	$14,627
d. Average age	62.0	61.3
6. Beneficiaries		
a. Number	647	627
b. Total annual benefits	$8,970,707	$8,475,439
c. Average annual benefit	$13,865	$13,517
d. Average age	73.8	73.6

EXHIBIT B
Historical Summary of Active Member Data

	Active Members		Total Payroll Supplied by System, Annualized		Average Salary			
Year Ending June 30,	Number	Percent Increase/ (Decrease)	Amount in $ Millions	Percent Increase/ (Decrease)	$ Amount	Percent Increase/ (Decrease)	Average Age	Average Service
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1996	9,797	1.4%	$281.2	4.7%	$28,708	3.3%	42.9	13.6
1997	10,010	2.2%	294.1	4.6%	29,382	2.3%	43.4	14.0
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

EXHIBIT C

Members in Active Service as of June 30, 2015
By Age, Years of 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	376	376	- -	- -	- -	- -	- -	- -	- -	- -
	$36,722	$36,722	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	1,615	1,274	340	1	- -	- -	- -	- -	- -	- -
	43,385	42,230	$47,702	$47,732	- -	- -	- -	- -	- -	- -
30 - 34	1,513	495	806	212	- -	- -	- -	- -	- -	- -
	48,945	43,038	50,736	55,923	- -	- -	- -	- -	- -	- -
35 - 39	1,296	305	343	501	147	- -	- -	- -	- -	- -
	54,966	46,358	53,345	59,065	$62,634	- -	- -	- -	- -	- -
40 - 44	1,221	220	214	225	451	109	2	- -	- -	- -
	59,554	47,648	55,872	61,091	64,880	$65,039	$90,516	- -	- -	- -
45 - 49	1,293	142	152	169	272	411	141	6	- -	- -
	63,263	50,476	53,893	59,756	64,345	68,155	73,063	$87,517	- -	- -
50 - 54	1,283	159	99	130	156	200	385	153	1	- -
	64,245	50,041	55,254	57,366	64,175	68,382	70,382	69,849	$70,805	- -
55 - 59	1,079	106	72	100	126	172	176	210	117	- -
	65,185	52,830	53,213	60,203	65,355	66,978	69,128	70,566	69,592	- -
60 - 64	697	61	42	74	93	91	77	74	148	37
	64,257	53,101	50,072	59,596	60,101	68,097	66,571	69,252	69,795	$72,122
65 - 69	116	22	10	13	20	12	12	8	5	14
	62,652	58,096	51,341	62,073	59,219	54,689	68,935	74,021	71,023	75,287
70 & over	25	9	4	1	1	2	- -	3	2	3
	51,639	38,191	55,049	35,270	52,145	66,499	- -	62,800	64,987	62,759
Total	10,514	3,169	2,082	1,426	1,266	997	793	454	273	54
	$56,095	$43,900	$51,727	$58,955	$64,014	$67,486	$70,239	$70,344	$69,699	$72,423

EXHIBIT D-1

Schedule of Annuitants by Type of Benefit as of July 1, 2015

Type of Benefits/ Form of Payment	Number	Annual Benefits Amount	Average Monthly Benefits
Service:			
Straight Life	3,096	$61,145,845	$1,646
100% J&S	2,733	73,592,337	2,244
50% J&S	576	15,011,348	2,172
5 Years C&L	19	274,660	1,205
10 Years C&L	171	3,231,536	1,575
20 Years C&L	96	2,224,335	1,931
Level	559	11,097,368	1,654
Subtotal:	7,250	$166,577,429	$1,915
Disability:			
Straight Life	105	$1,573,577	$1,249
100% J&S	12	156,394	1,086
50% J&S	8	108,333	1,128
5 years C&L	1	6,254	521
10 Years C&L	0	0	0
20 Years C&L	2	25,423	1,059
Level	0	0	0
Subtotal:	128	$1,869,981	$1,217
Beneficiaries:			
Straight Life	631	$8,774,320	$1,159
5 Years Certain Only	2	42,878	1,787
10 Years Certain Only	9	70,362	652
20 Years Certain Only	5	83,147	1,386
Subtotal:	647	$8,970,707	$1,155
Total:	8,025	$177,418,117	$1,842

EXHIBIT D-2

Schedule of Annuitants by Monthly Benefit as of July 1, 2015

Monthly Benefit Amount	Number of Members	Female	Male	Average Service
Under $200	231	170	61	6.34
200 - 399	465	354	111	12.02
400 - 599	449	351	98	17.08
600 - 799	392	289	103	20.91
800 - 999	402	291	111	23.17
1,000 - 1,199	511	383	128	26.23
1,200 - 1,399	527	359	168	27.91
1,400 - 1,599	590	387	203	29.23
1,600 - 1,799	619	411	208	29.29
1,800 - 1,999	599	397	202	30.37
2,000 - 2,199	557	378	179	30.23
2,200 - 2,399	484	308	176	31.06
2,400 - 2,599	398	260	138	32.19
2,600 - 2,799	347	222	125	32.64
2,800 - 2,999	309	183	126	33.28
3,000 - 3,199	277	186	91	33.81
3,200 - 3,399	210	125	85	34.76
3,400 - 3,599	156	88	68	34.09
3,600 - 3,799	132	73	59	35.51
3,800 - 3,999	79	42	37	35.56
4,000 & over	291	131	160	36.55
Total:	8,025	5,388	2,637	27.46

EXHIBIT E

Reconciliation of Member Data by Status

	Active Members	Vested Terminated Members	Non-Vested Terminated Members	Service Retirees	Disabled Retirees	Beneficiaries	Total
A. Number as of July 1, 2014	10,305	1,509	661	6,991	129	627	20,222
B. Additions and new hires	960	0	0	0	0	0	960
C. Participant movement							
1. Retirement	-350	-63	-2	415	0	0	0
2. Disability	-5	0	0	0	5	0	0
3. Died with beneficiary	-4	-1	0	-34	-2	41	0
4. Died without beneficiary	-4	-4	0	-122	-3	-23	-156
5. Terminated vested	-176	176	0	0	0	0	0
6. Terminated non-vested	-151	0	152	0	0	0	1***
7. Refunds	-162	-31	-27	0	0	0	-220
8. Rehired as active	104	-59	-44	0	-1	0	0
9. Expired benefits	0	0	0	0	0	0	0
10. New alternate payee	0	0	0	0	0	2	2
11. Data corrections	-3*	80**	-80**	0	0	0	-3
D. Number as of July 1, 2015	10,514	1,607	660	7,250	128	647	20,806

**Removed from database after being reported to TFFR in error*
***Participants reported as vested due to reciprocity*
****Includes 1 member who was hired and terminated in the same year*

EXHIBIT F

Statement of Change in Plan Net Assets for Year Ended June 30, 2015

	As of June 30	
	2015	**2014**
A. Assets available at beginning of year	$2,090,415,057*	$1,839,583,960
B. Revenue for the year		
1. Contributions		
a. Employee contributions	$72,268,451	$56,554,767
b. Employer contributions	78,422,098	62,355,146
c. Purchased service credit	1,600,739	2,034,289
d. Interest, penalties and other	172,474	47,766
e. Total	$152,463,762	$120,991,968
2. Income		
a. Interest, dividends, and other income	$40,486,496	$36,744,024
b. Investment expenses	-6,916,830	-7,257,140
c. Net	$33,569,666	$29,486,884
3. Net realized and unrealized gains/(losses)	39,635,140	264,759,565
4. Total revenue: (1e) + (2c) + (3)	$225,668,568	$415,238,417
C. Expenditures for the year		
1. Benefits and refunds		
a. Refunds	$3,889,671	$3,908,921
b. Regular annuity benefits	167,792,430	157,529,892
c. Partial lump-sum benefits paid	557,332	820,463
d. Total	$172,239,433	$162,259,276
2. Administrative and miscellaneous expenses	1,923,392	1,586,045
3. Total expenditures	$174,162,825	$163,845,321
D. Increase/(decrease) in net assets: (B4 – C3)	$51,505,743	$251,393,096
E. Value of assets at end of year: (A + D)	$2,141,920,800	$2,090,977,056

** The market value of assets as of June 30, 2014 was restated due to GASB 68 implementation.*

EXHIBIT G

Statement of Plan Net Assets (Assets at Market or Fair Value)

	As of June 30	
	2015	**2014**
1. Cash and cash equivalents (operating cash)	$18,964,788	$17,012,740
2. Receivables:		
a. Member and employer contributions	$23,591,127	$16,233,852
b. Investment income	8,574,358	7,457,808
c. Miscellaneous receivables	20,646	4,362
d. Total receivables	$32,186,131	$23,696,022
3. Investments		
a. Invested cash	$29,631,182	$20,045,640
b. Domestic equities	461,830,284	457,923,675
c. International equities	652,582,263	631,143,702
d. Domestic fixed income	379,036,997	374,882,829
e. International fixed income	101,138,757	103,794,657
f. Real assets	389,351,436	369,078,739
g. Private equity	81,662,078	97,357,862
h. Total investments	$2,095,232,997	$2,054,227,104
4. Total assets: (1) + (2d) + (3h)	$2,146,383,916	$2,094,935,866
5. Deferred outflows of resources related to pensions	$76,002	$0
6. Liabilities		
a. Accounts payable	$3,244,085	$3,320,810
b. Accrued expenses	1,193,136	631,740
c. Due to other state agencies	8,722	6,260
d. Total liabilities	$4,445,943	$3,958,810
7. Deferred inflows related to pensions	$93,175	$0
8. Total market value of assets available for benefits: (4) + (5) – (6d) – (7)	$2,141,920,800	$2,090,977,056*

** 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 G (continued)

Statement of Plan Net Assets (Assets at Market or Fair Value)

	As of June 30	
	2015	**2014**
9. Asset allocation (investments)		
a. Invested cash	1.4%	1.0%
b. Domestic equities	22.0%	22.3%
c. International equities	31.2%	30.7%
d. Domestic fixed income	18.1%	18.2%
e. International fixed income	4.8%	5.1%
f. Real estate	18.6%	18.0%
g. Private equity	3.9%	4.7%
h. Total investments	100.0%	100.0%

EXHIBIT H

Development of Unfunded Actuarial Accrued Liability

	Year Ending June 30			
	2015		2014	
1. Unfunded actuarial accrued liability at beginning of year		$1,198,326,269		$1,234,817,443
2. Normal cost at beginning of year		60,617,900		56,751,722
3. Total contributions		152,463,762		120,991,968
4. Interest on:				
(a) Unfunded actuarial accrued liability and normal cost	$100,715,534		$103,325,533	
(b) Total contributions	5,512,663		4,374,732	
(c) Total interest: (4a) – (4b)		$95,202,871		$98,950,801
5. Expected unfunded actuarial accrued liability: (1) + (2) – (3) + (4c)		$1,201,683,278		$1,269,527,998
6. Changes due to (gain)/loss from:				
(a) Investments	-$51,873,093		-$80,084,128	
(b) Demographics	3,623,699		8,882,399	
(c) Total changes due to (gain)/loss: (6a) + (6b)		-48,249,394		-71,201,729
7. Change due to plan amendments		0		0
8. Change in actuarial cost method		0		0
9. Change in actuarial assumptions		171,324,647		0
10. Unfunded actuarial accrued liability at end of year: (5) + (6c) + (7) + (8) + (9)		$1,324,758,531		$1,198,326,269

EXHIBIT I

Definitions 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 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 (ADC).
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., TFFR'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:

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, termination of employment, 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 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 Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).

Actuarial Value of Assets: 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 GASB. 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 on 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) 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.
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 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) as defined by GASB.
Net Pension Liability:	The Net Pension Liability is equal to Total Pension Liability minus 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 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 which 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 is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount, or 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: The actuarial accrued liability based on the blended discount rate as described in GASB 67/68.

Unfunded Actuarial Accrued Liability: 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.

EXHIBIT I

Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1.	Pensioners as of the valuation date (including 647 beneficiaries in pay status)		8,025
2.	Members inactive during year ended June 30, 2015, with vested rights		1,607
3.	Members active during the year ended June 30, 2015		10,514
	Fully vested	7,369	
	Not vested	3,145	
4.	Other non-vested inactive members as of June 30, 2015		660

EXHIBIT I (continued)

Summary of Actuarial Valuation Results

	Actuarial Present Value of Projected Benefits	Actuarial Present Value of Future Normal Costs	Actuarial Accrued Liability
A. Determination of Actuarial Accrued Liability			
1. Active members			
a. Retirement benefits	$2,028,241,599	$573,370,250	$1,454,871,349
b. Disability benefits	31,049,978	13,474,478	17,575,500
c. Death benefits	34,140,296	14,146,740	19,993,556
d. Withdrawal benefits	132,841,893	135,374,468	-2,532,575
e. Total	$2,226,273,766	$736,365,936	$1,489,907,830
2. Inactive vested members	81,539,292	--	81,539,292
3. Inactive non-vested members	3,659,588	--	3,659,588
4. Retirees and beneficiaries	1,874,669,272	--	1,874,669,272
5. Total	$4,186,141,918	$736,365,936	$3,449,775,982
B. Determination of Unfunded Actuarial Accrued Liability			
1. Actuarial accrued liability			$3,449,775,982
2. Actuarial value of assets			2,125,017,451
3. Unfunded actuarial accrued liability: (1) – (2)			$1,324,758,531

EXHIBIT II

Actuarial Balance Sheet

	July 1, 2015	July 1, 2014
A. Assets		
1. Current Assets		
a. Market Value	$2,141,920,800	$2,090,977,056*
b. Adjustment for actuarial value	-16,903,349	-150,503,552
c. Actuarial value of assets	$2,125,017,451	$1,940,473,504
2. Actuarial present value of future contributions		
a. Member contributions	$799,757,682	$721,502,103
b. Employer normal costs	-63,391,746	-104,201,830
c. Unfunded actuarial accrued liability	1,324,758,531	1,198,326,269
d. Total	$2,061,124,467	$1,815,626,542
3. Total (lc + 2d)	$4,186,141,918	$3,756,100,046
B. Liabilities (Present Value of Projected Benefits)		
1. Retirees and beneficiaries	$1,874,669,272	$1,661,646,220
2. Inactive members	85,198,880	78,991,412
3. Active members	2,226,273,766	2,015,462,414
4. Total	$4,186,141,918	$3,756,100,046

** 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 III

Comparison of Employer Contribution to Actuarially Determined Contribution

	Actuarially Determined Contribution (ADC)[1]		Actual Employer Contribution[2]		Percentage of ADC Contributed
Fiscal Year	% of Payroll[3]	Amount[4]	% of Payroll	Amount	[(5)/(3)]
(1)	(2)	(3)	(4)	(5)	(6)
2006	12.12%	$48,747,189	7.75%	$31,170,851	63.9%
2007	12.29%	50,532,462	7.75%	31,865,466	63.1%
2008	10.15%	44,114,585	7.75%	33,683,550	76.4%
2009	9.24%	41,986,174	8.25%	37,487,655	89.3%
2010	10.78%	52,053,217	8.25%	39,836,646	76.5%
2011	12.79%	65,112,696	8.75%	44,545,433	68.4%
2012	13.16%	69,373,794	8.75%	46,126,193	66.5%
2013	9.49%[5]	52,396,153	10.75%	59,352,860	113.3%
2014	10.26%	59,513,485	10.75%	62,355,146	104.8%
2015	11.57%	71,167,632	12.75%	78,422,098	110.2%

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 ADC for each fiscal year is based on the actuarial valuation as of the beginning of the year. Therefore, the FY 2015 ADC is based on the July 1, 2014 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.

4 The dollar amount of the FY2014 and FY2015 ADC 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.

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

EXHIBIT IV

Schedule of Employer Contributions

Fiscal Year	Actuarially Determined Contributions	Contributions in Relation to the Actuarially Determined Contributions	Contribution Deficiency (Excess)	Actual 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%

EXHIBIT V

Schedule of Funding Progress

Valuation Date	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded/ Accrued Liability (UAAL) (3) – (2)	Funded Ratio (2) / (3)	Total Payroll Supplied by System, Annualized	UAAL as a % of Compensation (4) / (6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
07/01/2006	1,564,000,000	2,073,900,000	509,900,000	75.4%	390,100,000	130.7%
07/01/2007	1,750,100,000	2,209,300,000	459,200,000	79.2%	401,300,000	114.4%
07/01/2008	1,909,500,000	2,330,600,000	421,200,000	81.9%	417,700,000	100.8%
07/01/2009	1,900,327,834	2,445,896,710	545,568,876	77.7%	439,986,705	124.0%
07/01/2010	1,841,960,220	2,637,165,045	795,204,825	69.8%	465,007,110	171.0%
07/01/2011	1,822,598,871	2,749,751,755	927,152,884	66.3%	488,764,292	189.7%
07/01/2012	1,748,080,771	2,871,870,286	1,123,789,515	60.9%	505,285,069	222.4%
07/01/2013	1,762,321,644	2,997,139,087	1,234,817,443	58.8%	526,698,342	234.4%
07/01/2014	1,940,473,504	3,138,799,773	1,198,326,269	61.8%	557,222,917	215.1%
07/01/2015	2,125,017,451	3,449,775,982	1,324,758,531	61.6%	589,783,780	224.6%

Note: Numbers for 7/1/2006 – 7/1/2008 valuation dates are rounded

Exhibit VI

Determination of Contribution Sufficiency

	July 1, 2015	
A. Statutory Contributions	**Percent of Payroll**	**Dollar Amount**
1. Member contributions	11.75%	$73,528,490
2. Employer contributions	12.75%	79,786,233
3. Total	24.50%	$153,314,723
B. Actuarially Determined Contribution	**Percent of Payroll**	**Dollar Amount**
1. Gross normal cost:		
(a) Retirement	8.61%	$53,893,070
(b) Disability	0.19%	1,190,483
(c) Death	0.21%	1,299,900
(d) Deferred termination benefit and refunds	1.89%	11,855,987
(e) Total normal cost as of July 1	10.90%	68,239,440
2. Gross normal cost including administrative expenses and adjusted for timing	11.63%	72,798,417*
3. Less member contribution rate	11.75%	73,528,490
4. Employer normal cost rate: (2) – (3)	-0.12%	-730,073
5. Unfunded actuarial accrued liability rate, adjusted for timing	13.16%	82,360,453
6. Total: (4) + (5)	13.04%	81,630,380
C. Contribution Sufficiency / (Deficiency): (A.2) – (B.6)	-0.29%	-$1,844,147
Projected annual payroll for fiscal year beginning on the valuation date		625,774,379

** Includes administrative expenses of $1,976,285*

EXHIBIT VII

Solvency Test

	July 1, 2015	July 1, 2014
1. Actuarial accrued liability (AAL)		
a. Active member contributions	$737,479,504	$698,157,822
b. Retirees and beneficiaries	1,874,669,272	1,661,646,220
c. Active and inactive members (employer financed)	837,627,206	778,995,731
d. Total	$3,449,775,982	$3,138,799,773
2. Actuarial value of assets	2,125,017,451	1,940,473,504
3. Cumulative portion of AAL covered		
a. Active member contribution	100.0%	100.0%
b. Retirees and beneficiaries	74.0%	74.8%
c. Active and inactive members (employer financed)	0.0%	0.0%

EXHIBIT VIII

Net Pension Liability

	June 30, 2015	June 30, 2014
The components of the net pension liability were as follows:		
Total pension liability	$3,449,775,982	$3,138,799,773
Plan fiduciary net position	(2,141,920,800)	(2,090,977,056)
Net pension liability	$1,307,855,182	$1,047,822,717
Plan fiduciary net position as a percentage of the total pension liability	62.1%	66.6%

The net pension liability was measured as of June 30, 2015, and is determined based on the total pension liability from the July 1, 2015, 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, 2015.

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of July 1, 2015, 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 investment expenses
Cost-of-living adjustments	None

For active members, mortality rates were based on the RP-2014 Employee Mortality Table, projected generationally using Scale MP-2014. For inactive members and 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, 2015 funding actuarial valuation.

The long-term expected investment rate of return assumption 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 Fund's target asset allocation are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Global Equities	57%	7.53%
Global Fixed Income	22%	1.28%
Global Real Assets	20%	5.38%
Cash Equivalents	1%	0.00%
Total	100%	

Discount rate: The discount rate used to measure the total pension liability was 7.75% as of June 30, 2015 (8.00% as of June 30, 2014). The projection of cash flows used to determine the discount rate assumes that member and employer contributions will be made at rates equal to those based on this July 1, 2015, 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 for current plan members as of June 30, 2015. 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, 2015.

Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability as of June 30, 2015, and June 30, 2014, calculated using the discount rate of 7.75% for 2015 (8.00% for 2014), as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.75%/7.00%) or 1-percentage-point higher (8.75%/9.00%) than the current rate:

	1% Decrease	Current Discount Rate	1% Increase
Net pension liability as of June 30, 2014	$1,414,755,083	$1,047,822,717	$739,221,908
Net pension liability as of June 30, 2015	$1,728,392,470	$1,307,855,182	$957,135,967

EXHIBIT IX

Schedules of Changes in Net Pension Liability

	2015	2014
Total pension liability		
Service cost	$60,617,900	$56,751,722
Interest	249,063,837	237,820,894
Change of benefit terms	0	0
Differences between expected and actual experience	2,209,258	9,347,346
Changes of assumptions	171,324,647*	0
Benefit payments, including refunds of employee contributions	(172,239,433)	(162,259,276)
Net change in total pension liability	$310,976,209	$141,660,686
Total pension liability – beginning	3,138,799,773	2,997,139,087
Total pension liability – ending (a)	$3,449,775,982	$3,138,799,773
Plan fiduciary net position		
Contributions – employer	$78,422,098	$62,355,146
Contributions – member	72,268,451	56,554,767
Contributions – purchased service credit	1,600,739	2,034,289
Contributions – other	172,474	47,766
Net investment income	73,204,806	294,246,449
Benefit payments, including refunds of employee contributions	(172,239,433)	(162,259,276)
Administrative expense	(1,923,392)	(1,586,045)
Net change in plan fiduciary net position	$51,505,743	$251,393,096
Plan fiduciary net position – beginning	2,090,415,057**	1,839,583,960
Plan fiduciary net position – ending (b)	$2,141,920,800	$2,090,977,056
Net pension liability – ending (a) – (b)	$1,307,855,182	$1,047,822,717
Plan fiduciary net position as a percentage of the total pension liability	62.1%	66.6%
Actual covered employee payroll	$615,104,860	$580,053,235
Plan net pension liability as percentage of covered employee payroll	212.6%	180.6%

* *Increase in net pension liability due to changes in assumptions resulted primarily from a decrease in the investment return assumption and an updated mortality improvement scale.*

** *Restated due to GASB implementation.*

EXHIBIT X
Summary of Assumptions and Methods

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:

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 were then adjusted to future years using the 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)

*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.

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

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 of Service	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, 2015, to reflect that their benefit is not finalized as of the valuation date.

Annual Administrative Expenses:	Administrative expenses of $1,976,285 (actual expenses for the previous year, increased with inflation) are expected to be paid monthly for the year beginning July 1, 2015.
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 XI
Summary of Plan Provisions

Effective Date:	July 1, 1971
Plan Year:	Twelve-month period ending June 30^{th}
Administration:	The Teachers' Fund for Retirement (TFFR) is administered 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 North Dakota 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 contributions 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:	The 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, will 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 will 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 XII

Summary of Plan Changes

1991 Legislative Session:

1. Benefit multiplier increased from 1.275% to 1.39% for all future retirees.
2. Provide a post-retirement benefit increase 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 North Dakota 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 session.

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 North Dakota 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.

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Policy Type: TFFR Ends

Policy Title: Actuarial Funding Policy Statement

Introduction

The purpose of this Actuarial Funding Policy is to record the funding objectives and policy set by the Board of Trustees (Board) for the North Dakota Teachers' Fund for Retirement (TFFR). Effective with the July 1, 2013 actuarial valuation, the Board establishes this Actuarial Funding Policy to help ensure the systematic funding of future benefit payments for members of TFFR. The contributions made to TFFR are set by statute. These statutory contributions will be compared to the contributions determined under the funding policy in order to assess the appropriateness of the statutory contributions. Based upon this comparison, the Board will decide what action to take, if any. The employer contribution determined under the funding policy is called the actuarially determined employer contribution (ADEC). In addition, this document records certain guidelines established by the Board to assist in administering TFFR in a consistent and efficient manner.

This Actuarial Funding Policy supersedes any previous Actuarial Funding Policies and may be modified as the Board deems necessary.

Goals of Actuarial Funding Policy

1. To achieve long-term full funding of the cost of benefits provided by TFFR;

2. To seek reasonable and equitable allocation of the cost of benefits over time;

3. To maintain a policy that is both transparent and accountable to the stakeholders of TFFR, including plan participants, employers, and residents of the State of North Dakota.

Actuarially Determined Employer Contribution and Funding Policy Components

TFFR's actuarially determined employer contribution is comprised of the Normal Cost and an amortization of the Unfunded Actuarial Accrued Liability (UAAL). The Normal Cost and the amortization of the UAAL are determined by the following three components of this funding policy:

I. Actuarial Cost Method: the techniques to allocate the cost/liability of retirement benefits to a given period;

II. Asset Smoothing Method: the techniques that spread the recognition of investment gains or losses over a period of time for the purposes of determining the Actuarial Value of Assets used in the actuarial valuation process; and

III. Amortization Policy: the decisions on how, in terms of duration and pattern, to reduce the difference between the Actuarial Accrued Liability and the Actuarial Value of Assets in a systematic manner.

Policy Type: Policy Ends

Policy Title: Actuarial Funding Policy Statement

I. Actuarial Cost Method:

The Entry Age Normal method shall be applied to the projected benefits in determining the Normal Cost and the Actuarial Accrued Liability. The Normal Cost shall be determined as a level percentage of pay on an individual basis for each active member.

II. Asset Smoothing Method:

The investment gains or losses of each valuation period, as a result of comparing the actual market return to the expected market return, shall be recognized in level amounts over 5 years in calculating the Actuarial Value of Assets. Deferred investment gains or losses cannot exceed 20% of the Market Value of Assets (i.e., the Actuarial Value of Assets cannot be more than 120%, nor less than 80%, of the Market Value of Assets as of any valuation date).

III. Amortization Policy:

- The UAAL, (i.e., the difference between the Actuarial Accrued Liability and the Actuarial Value of Assets), as of July 1, 2013, shall be amortized over a “closed” 30-year period. In other words, the UAAL as of July 1, 2014 shall be amortized over 29 years, the UAAL as of July 1, 2015 shall be amortized over 28 years, etc.

- Beginning with the July 1, 2024 valuation, the Board shall have the discretion to continue the “closed” amortization period, or instead to amortize the UAAL over another period, not to exceed 20 years.

- Any new UAAL as a result of change in actuarial assumptions or methods will be amortized over a period equal to the amortization period of the UAAL. The Board shall have the discretion to amortize the new UAAL as a result of change in actuarial assumptions or methods over a period of 20 years.

- Unless an alternative amortization period is recommended by the Actuary and accepted by the Board based on the results of an actuarial analysis, the increase in UAAL as a result of any plan amendments will be amortized over a period not to exceed 20 years.
- In a situation where the amortization of the UAAL has more than one component, a single equivalent amortization period will be determined by the Actuary.
- UAAL shall be amortized as a level percentage of payroll so that the amortization amount in each year during the amortization period shall be expected to be a level percentage of covered payroll, taking into consideration the current assumption for general payroll increase.

- If an overfunding exists (i.e., the UAAL becomes negative so that there is a surplus), such surplus and any subsequent surpluses will be amortized over an “open” amortization period of 30 years. Any subsequent UAAL will be amortized over 20 years as the first of a new series of closed period UAAL amortization.

Actuarial Assumptions Guidelines

The actuarial assumptions directly affect only the timing of contributions; the ultimate contribution level is determined by the benefits and the expenses actually paid offset by actual investment returns. To the extent that actual experience deviates from the assumptions, experience gains and losses will occur. These gains (or losses) then serve to reduce (or increase) the future contribution requirements.

Actuarial assumptions are generally grouped into two major categories:

- Demographic assumptions – including rates of termination, retirement, disability, mortality, etc.
- Economic assumptions – including investment return, salary increase, payroll growth, inflation, etc.

The actuarial assumptions are described in detail in the actuarial valuation report. They represent the Board's best estimate of anticipated experience under TFFR and are intended to be long term in nature. Therefore, in developing the actuarial assumptions, the Board considers not only past experience but also trends, external forces and future expectations.

Actuarial experience studies are completed every five years or at the Board's direction.

Glossary of Funding Policy Terms

- **Present Value of Benefits (PVB) or total cost**: the "value" at a particular point in time of all projected future benefit payments for current plan members. The "future benefit payments" and the "value" of those payments are determined using actuarial assumptions as to future events. Examples of these assumptions are estimates of retirement patterns, salary increases, investment returns, etc. Another way to think of the PVB is that if the plan has assets equal to the PVB and all actuarial assumptions are met, then no future contributions would be needed to provide all future service benefits for all current members, including future service and salary increases for current active members.

- **Actuarial Cost Method:** allocates a portion of the total cost (PVB) to each year of service, both past service and future service.

- **Normal Cost:** the cost allocated under the Actuarial Cost Method to each year of active member service.

- **Entry Age Normal Actuarial Cost Method:** A funding method that calculates the Normal Cost as a level percentage of pay or level dollar amount over the working lifetime of the plan's members.

- **Actuarial Accrued Liability (AAL)**: the value at a particular point in time of all past Normal Costs. This is the amount of assets the plan would have today if the current plan provisions, actuarial assumptions and participant data had always been in effect, contributions equal to the Normal Cost had been made and all actuarial assumptions came true.

- **Market Value of Assets (MVA):** the fair value of assets of the plan as reported in the plan's audited financial statements.

- **Actuarial Value of Assets (AVA):** the market value of assets less the deferred investment gains or losses not yet recognized by the asset smoothing method.

- **Unfunded Actuarial Accrued Liability (UAAL):** the portion of the AAL that is not currently covered by the AVA. It is the positive difference between the AAL and the AVA.

- **Surplus:** the positive difference, if any, between the AVA and the AAL.

- **Actuarial Value Funded Ratio:** the ratio of the AVA to the AAL.

- **Market Value Funded Ratio:** the ratio of the MVA to the AAL.

- **Actuarial Gains and Losses:** changes in UAAL or surplus due to actual experience different from what is assumed in the actuarial valuation. For example, if during a given year the assets earn more than the investment return assumption, the amount of earnings above the assumption will cause an unexpected reduction in UAAL, or "actuarial gain" as of the next valuation. These include contribution gains and losses that result from actual contributions made being greater or less than the level determined under the policy.

- **Valuation Date:** July 1 of every year.

TFFR Board Adopted: March 21, 2013

MEMORANDUM

TO: **TFFR Board**

FROM: **Fay Kopp**

DATE: **October 15, 2015**

SUBJ: **Asset Liability Study**

At the September meeting, Callan Associates reviewed the process they will use to conduct TFFR's Asset Liability Study and solicited board input on study variables.

In building the liability model, projections need to be made relating to active population since there is an expectation that the active member population will grow as the need for additional teachers and schools rises to meet a growing student population.

Callan recommends modeling **two** active population projections:

1) **Base-case projection**: Active population remains constant (0% growth).

2) **Alternative projection**: Active population grows by a certain amount each year – Should the growth rate be 1%, 2%, or more? Should the growth rate remain constant for the entire projection period or should it trend back to 0% over some period?

I recently met with Jerry Coleman, DPI Director of School Finance, to discuss this issue. DPI continues to project growth in student population based on increased resident births, in-migration statistics, and a strong ND economy. Although oil activity has slowed and may reduce projected student numbers, all indicators still point toward growth. DPI estimates around 2000-3000 (2-3%) more students each year for the next 3 years (which is as far as DPI projections run). It is unknown how the projected student growth will translate into the number of teachers/licensed staff needed in the future. Some school districts have and will continue to absorb the new students, and others will need to hire more teachers, add classrooms, and build schools to accommodate the growth. Additionally, there are still some areas of the state that are seeing declines in student numbers which will offset some of the growth.

ND Census Newsletter

1) TFFR Active Membership Growth - Past 10 years

Year	Active TFFR	Inc/(Dec)	%	
2006	9,585	(216)	(2.2)	
2007	9,599	14	0.1	
2008	9,561	(38)	(0.4)	
2009	9,707	146	1.5	
2010	9,907	200	2.1	
2011	10,004	97	1.0	
2012	10,014	10	0.1	
2013	10,138	124	1.2	
2014	10,305	167	1.6	
2015	10,514	209	2.0	
3 yr avg		167	1.6%	Total 500
5 yr avg		121	1.2%	607
10 yr avg		71	0.7%	713

2) DPI Student Enrollment Growth – Past 10 years

Year	K-12 Students	Inc/(Dec)	%	
2006	97,120	(2,242)	(2.3)	
2007	95,600	(1,520)	(1.6)	
2008	94,056	(1544)	(1.6)	
2009	93,406	(650)	(0.7)	
2010	93,715	309	0.3	
2011	94,729	1,014	1.1	
2012	95,778	1,049	1.1	
2013	99,192	3,414	3.6	
2014	101,656	2,464	2.5	
2015	104,278	2,622	2.6	
3 yr avg		2,833	2.9%	Total 8,500
5 yr avg		2,113	2.2%	10,563
10 yr avg		492	0.5%	4,916

3) Ratio of Active TFFR members to K-12 Students – Past 10 years

Year	K-12 Students	Active TFFR	Ratio Students/ Active TFFR
2006	97,120	9,585	10.1
2007	95,600	9,599	10.0
2008	94,052	9,561	9.8
2009	93,406	9,707	9.6
2010	93,715	9,907	9.5
2011	94,729	10,004	9.5
2012	95,778	10,014	9.6
2013	99,192	10,138	9.8
2014	101,656	10,305	9.9
2015	104,278	10,514	9.9
3 yr avg			9.9
5 yr avg			9.7
10 yr avg			9.8

Using a ratio of 10 students for every 1 active TFFR member, if there is an increase of 2,000-3,000 students in each of the next 5 years, it would equate to 200-300 more TFFR members each year or approximately 2 - 3% active population growth.

4) Projected Active TFFR Member Growth – Next 5 years

Year	0%	1%	2%	3%
2016	0	105	210	315
2017	0	106	214	325
2018	0	107	219	335
2019	0	108	223	345
2020	0	109	228	355
5 yr increase	0	535	1,094	1,675
Total proj active	10,514	11,049	11,608	12,189

As noted earlier, Callan will model two active population projections. They will model a base-line projection reflecting a constant active population (0%). For the second projection, it appears either a 1% or 2% active member increase for the next 5 years would be reasonable estimates. While 1% growth is more conservative and closer to past 3-5 year history, 2% growth provides a greater range in order to analyze the potential impact on the plan.

Please review this information, and plan to discuss and provide board direction on the second projection.

North Dakota LEGENDARY

North Dakota Census Office

Growing ND by the Numbers

INSIDE THIS ISSUE:

July 2015

Migration Gain

From April 2010 through June 30, 2014, North Dakota was estimated to have gained 48,867 additional residents due to migration. Data from the same duration of time one decade earlier shows the state "lost" an estimated 14,719 residents due to migration to other states.

Source: Pop Est Program: annual 2004 and 2014 components of change data

North Dakota Has Fastest Percent Growth, 2010-14

Since the beginning of the decade, oil development has had a significant impact on North Dakota. North Dakota has grown at a rate higher than any other state adding nearly 10 percent, or about 67,000 new residents, to its estimated population from the 2010 Decennial Census to July 2014. Texas comes in second in the percentage ranking followed by Colorado, Utah, Florida and Arizona. Due to North Dakota's relative small size, the addition of 67,000 more residents has a higher percentage impact than other states. Texas, for example grew at 7.2 percent, adding an estimated 1,811,000 individuals.

North Dakota's recent growth has been fueled by in-migration, a reversal of decades of out-migration from the state.

The state's largest gain so far was from 2011 to 2012 with an estimated 22,152 additional residents, 3.3 percent in one year. This was up from 1.9 percent from the Census in 2010 to

continued on page 2

North Dakota County Population Change

Since 2010, 37 of the North Dakota's 53 counties, led by those in the Bakken region and urban areas, are estimated to have had an increase in population. This is a major change from 1980 to 1990 and 1990 to 2000, when only 6 counties grew each decade and from 2000 to 2010 when 11 counties saw growth.

Of the 53 counties in the state, 38 are estimated to have experienced a net growth due to migration. Only 31 counties have gained as a result of natural growth or more births than deaths.

Source: Pop Est Program File PEPTCOMT 2014

Giving Birth to New North Dakotans

Migration into North Dakota has had a significant impact on the number of infants in the state, as many of those who have moved here are younger adults of child-bearing ages often having children after they arrive in the state. In 2003, when the state had an estimated population of 638,817, there were 7,976 live births. In 2013, the state population had grown to an estimated 723,857, an increase of 13 percent. However, live births increased to 10,591 by 2013, an increase of 25 percent and almost double the change in the states overall population.

Source: Pop Est Program & ND Dept of Health Vital Statistics

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continued from page 1 – North Dakota Has Fastest Percent Growth, 2010-14

2011, and 2.4 percent from 2011 to 2012. The last year of data actually shows a reduction in growth for the state at 2.2 percent from 2013 to 2014.

Even though the number of unfilled jobs continued to increase between 2013 and 2014, and oilfield development continued to grow, the rate of growth of the state's population appeared to have leveled off. The likely explanation is cost of housing and other related expenses that appeared to soar in many of the fastest growing parts of the state.

New state residents tend to reflect the racial and ethnic make-up of the United States more than the resident population of North Dakota prior to 2010. The result is a more racially diverse population than previously experienced here. Areas of the state with the highest rates of migration are those that are seeing the most rapid diversification.

Source: Pop Est Program File NST-EST2014-04

Growing the Population through Migration

What is most unique about North Dakota's growth is the composition of our population change. While the state has had the highest percentage growth of any state, it has had near the lowest percentage of the growth coming from what is referred to as "natural increase." Natural increase is simply the count of births less deaths that occur in a given area. Our state had the third smallest number of births from April of 2010 to mid-2014 and the fourth smallest number of deaths of any state. About only a quarter of our growth since 2010 occurred in this category and only two states, Maine (which suffered a loss of population due to more deaths than births) and Florida had a smaller percentage of their growth occurring naturally than North Dakota.

Thirty seven of the 50 states have experienced a net gain in population due to migration since 2010. North Dakota's percentage gain has been the highest of any state. About three-fourths of the change in our state's population or about 49,000 of the 67,000 additional residents is attributed to migration into the state. Data suggests that about half of the state's migration originated from Minnesota followed by Texas, California and Florida.

In-migration also provides a dividend to the state's natural rate of growth as migrants into the state tend to be young adults of child bearing age. Evidence of this is the state's growing number of children under age 5. In 2003 there were estimated to be 37,534 residents under 5 years of age in the state. Ten years later in 2013, the number had grown to 48,767, an increase of nearly 30 percent.

Source: Pop Est Program File PEPAGESEX AND ST-ESTOOINT-ALLDATA-2003

MEMORANDUM

TO: **TFFR Board**

FROM: **Fay Kopp**

DATE: **October 15, 2015**

SUBJ: **Actuarial Audit**

Due diligence requires that pension plan fiduciaries exercise prudence in selecting actuarial consultants, and monitor the quality of their work. An actuarial audit is a valuable tool for monitoring the actuarial services performed on behalf of the pension plan.

An actuarial audit involves engaging the services of an outside actuary (reviewing actuary) to scrutinize the work of the plan's consulting actuary. Actuarial audits are helpful for several reasons:

1) They enhance the credibility of the actuarial valuation process by providing independent assurance that it was performed in accordance with actuarial standards of practice.
2) They increase public trust in how the pension plan is being governed.
3) They help plan fiduciaries to assess whether the pension plan is meeting its funding objectives.
4) They can lead to the remediation of errors that might otherwise go undiscovered.
5) They can provide recommendations for improving the actuarial valuation process, including how information is presented in the actuarial valuation report and in other communications.

Actuarial audits are not all the same. Various levels of actuarial audits are distinguished from one another by the types of services performed by the reviewing actuary. GFOA defines the various levels as follows:

1) In a level one, or "full-scope," actuarial audit, the reviewing actuary fully replicates the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the plan's consulting actuary. In addition, the reviewing actuary examines the consulting actuary's methods and assumptions for reasonableness and internal consistency.

2) In a level two actuarial audit, the reviewing actuary does not fully replicate the consulting actuary's valuation, but instead uses a sampling of the plan's participant data to test the results of the valuation. The reviewing actuary also examines the consulting actuary's methods and assumptions for reasonableness and internal consistency.

3) In a level three actuarial audit, the reviewing actuary examines the consulting actuary's methods and assumptions for reasonableness and internal consistency, but does not perform actuarial calculations.

In the past, NDTFFR has had a level one, or "full-scope" actuarial audit conducted. The Board utilized the RFP process, a proposal evaluation committee made up of 2-3 staff then reviewed the proposals and selected the finalists, and finally the TFFR board interviewed the top 2-3 candidates and selected the reviewing actuary.

- In 2006, the TFFR Board selected Buck Consultants to conduct a full scope actuarial audit of the 2005 valuation done by the plan's actuary at that time, GRS.

- In 2011, the Board changed actuaries from GRS to Segal, and a full replication of the 2010 actuarial valuation was conducted by Segal and served as an actuarial audit.

The Board should decide the process to be used for the actuarial audit of the 2015 actuarial valuation. If the Board wants to follow a similar process that has been used in the past, here is a proposed timeline to assist in the discussion. If desired, the Board could also participate on the proposal evaluation committee.

2015-16 Actuarial Audit
Proposed Timeline

October 22, 2015	*TFFR Board discusses process for selecting actuary to conduct actuarial audit of 2015 valuation, calculations, projections, assumptions, and methods.*
Nov-Dec	*Staff develops RFP and distribution list.*
January 2016	*Staff distributes RFP with assistance from state procurement.*
February	*Proposal evaluation committee (2-3 staff) reviews proposals, selects finalists, and schedules board presentations.*
March 17	*Board interviews top 2-3 candidates, and makes selection.*
April-June	*Actuarial audit conducted.*
July 21, 2016	*Board receives results of actuarial audit.*

MEMORANDUM

TO: TFFR Board

FROM: Fay Kopp

DATE: October 15, 2015

SUBJ: Legislative Update

Legislative Employee Benefits Programs Committee (LEBPC)

The LEBPC has scheduled its first meeting of the interim on October 27. Committee chair is Senator Karen Krebsbach.

As you can see from the Agenda (attached), Dave Hunter is scheduled to provide an overview of the SIB investment program. Fay Kopp will provide an overview of the TFFR plan. Matt Strom, Segal, will present education on the actuarial valuation process as well as the results of TFFR's 2015 valuation report and funding projections.

Attachment

NORTH DAKOTA LEGISLATIVE MANAGEMENT

Tentative Agenda

EMPLOYEE BENEFITS PROGRAMS COMMITTEE

Tuesday, October 27, 2015
Harvest Room, State Capitol
Bismarck, North Dakota

9:00 a.m. Call to order
Roll call
Comments by the Chairman
Review of the *Supplementary Rules of Operation and Procedure of the North Dakota Legislative Management*

9:05 a.m. Presentation by the Legislative Council staff of a background memorandum relating to the statutory duties and past procedures of the Employee Benefits Programs Committee

9:10 a.m. Comments by interested persons and committee discussion regarding general requirements for submission and review of legislative retirement insurance and retiree health insurance proposals

OVERVIEW OF RETIREMENT, INSURANCE, AND RETIREE HEALTH INSURANCE PROGRAMS

9:15 a.m. Presentation by Mr. Sparb Collins, Executive Director, Public Employees Retirement System, of an overview of the Public Employees Retirement System (PERS), including:

- Structure of the PERS Board
- Structure of the PERS office
- Retirement programs, including the PERS main system, Highway Patrolmen's retirement system, judges' retirement system, National Guard security police and firefighters' retirement system, law enforcement retirement systems, prior service retiree system, higher education system, defined contribution plan, and Job Service North Dakota retirement plan
- Retiree health insurance program
- Health insurance program
- Life insurance program
- Employee assistance program
- Deferred compensation program
- Dental, vision, and long-term care insurance programs
- Flexcomp program

10:15 a.m. Presentation by Mr. David J. Hunter, Executive Director and Chief Investment Officer, Retirement and Investment Office, of an overview of the state's investment program and the current investment climate

10:45 a.m. Presentation by Ms. Fay Kopp, Chief Retirement Officer, Teachers' Fund for Retirement, of an overview of the Teachers' Fund for Retirement (TFFR)

HUMAN RESOURCE MANAGEMENT SERVICES

11:25 a.m. Presentation by a representative of Human Resource Management Services, Office of Management and Budget, of a report required under North Dakota Century Code Section 54-06-31 on the implementation, progress, and bonuses provided by state agency programs to provide bonuses to recruit or retain employees in hard-to-fill positions

11:45 a.m. Presentation by a representative of Human Resource Management Services of biennial reports required under Sections 54-06-32, 54-06-33, and 54-06-34 summarizing reports of state agencies providing service awards to employees in the classified service, providing employer-paid costs of training or educational courses to employees in the classified services, and paying employee membership dues for professional organizations and membership dues for service clubs when required to do business or if the membership is primarily for the benefit of the state

12:00 noon Luncheon recess

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

1:00 p.m. Presentations by representatives of The Segal Group Inc. of:

- An overview of the TFFR and PERS valuation process
- The July 1, 2015, actuarial valuation of TFFR
- The July 1, 2015, actuarial valuations of the PERS main system, judges' retirement fund, National Guard retirement fund, Highway Patrolmen's retirement fund, and retiree health benefits fund

3:30 p.m. Comments by interested persons

4:00 p.m. Committee discussion and staff directives

4:30 p.m. Adjourn

Committee Members

Senators: Karen K. Krebsbach (Chairman), Dick Dever, Ralph Kilzer, Carolyn C. Nelson, Erin Oban, Nicole Poolman

Representatives: Pamela Anderson, Randy Boehning, Jason Dockter, Jessica Haak, Gary Kreidt, Vernon Laning, Kenton Onstad

Staff Contact: Alex J. Cronquist, Fiscal Analyst

RETIREMENT AND INVESTMENT OFFICE
AUDIT SERVICES
2014 – 2015 Year End Audit Activities Report
July 1, 2014 – June 30, 2015

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.

The SIB Audit Committee opted to postpone development of a detailed audit work program for Fiscal Year July 1, 2014 through June 30, 2015. The SIB Audit Committee did provide guidance related to audit activities and planning for Fiscal Year July 1, 2014 through June 30, 2015. 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.

Retirement Program Audit Activities

- **TFFR Compliance Audits and Not In Compliance (NIC) Reviews**

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(9). 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.

At the conclusion of the 2014-2015 fiscal year a total of thirty-one employers had been notified of either an upcoming TFFR Compliance Audit or NIC Review. Twenty-four employer audits were completed including twenty-two TFFR Compliance Audits and two NIC Reviews. Of the twenty-four employer audits completed twenty-two employers were found to be in compliance or generally in compliance while two employers were ultimately found not in compliance. Eight TFFR employer audits were in progress including seven TFFR Compliance Audits and one NIC Review. Seven TFFR Compliance Audits were pending but not yet started. As of June 30, 2015 twenty-two employers had yet to be audited in the third audit cycle.

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 a five year period.

- **TFFR File Maintenance Audits**

Audit Services tests changes made to TFFR member account data by RIO employees on a quarterly basis. Audit tables are generated and stored indicating any file maintenance changes made to member accounts. In fiscal year 2014-2015 four TFFR File Maintenance Audits were completed and no exceptions were noted.

- **Benefits Payments Audit**

A review of deaths, purchases of service, refunds, long outstanding checks, and long term annuitants was completed to determine that established policy and procedures were being followed by the staff of Retirement Services. The 2013-2014 Benefit Payments Audit was completed in August 2014 and no exceptions were noted. The 2014-2015 Benefit Payments Audit will commence in August 2015 with results being reported in the First Quarter Audit Activities Report in September 2015.

- **Annual Salary Verification Project**

The accurate reporting of salary and contributions to TFFR by participating employers is vital to the administration of retirement benefits. On an annual basis during the third quarter Audit Services will verify salaries and contributions reported to TFFR for the prior fiscal year for fifty randomly selected member accounts. The Annual Salary Verification Project was completed in January 2015 and ultimately five member accounts were corrected as a result of these efforts.

- **TFFR Benefit Payment Cost Efficiency Review**

Audit Services was asked to verify if retirement benefits are being paid at TFFR on a cost effective basis according to the *Ends* policy in the SIB Governance Manual which supports one of the RIO's overall missions which is to ensure that TFFR benefit recipients receive their retirement benefits in a cost effective and timely manner. This review was completed in June 2015. Audit Services found that retirement benefits are being paid at TFFR on a cost effective basis. RIO's overall mission of ensuring that TFFR benefit recipients receive their retirement benefits in a cost effective and timely manner is also being met.

Administrative and Investment Audit Activities

- **Annual Audit Planning**

Annual audit planning for fiscal year 2015-2016 was completed in April 2015. The audit plan for the upcoming fiscal year was presented to the SIB Audit Committee in May 2015 and approved.

- **External Audit Support**

Audit Services provides support to our external audit partners, CliftonLarsonAllen (CLA), prior to, during, and after the annual financial audit of the RIO. In fiscal year 2014-2015 Audit Services assisted by notifying thirteen employers of upcoming GASB 68 Census Data Audits. GASB 68 Census Data Audit fieldwork was completed by CLA auditors in late January 2015. Audit Services provided in office support to CLA field auditors. A total of 202 member accounts were reviewed and two member accounts required corrections. CLA also requested the Fiscal and Investment Operations Manager in cooperation with Audit Services contact thirty-three employers and request confirmation of TFFR contributions for the fiscal year ending June 30, 2014. Preparation for the upcoming annual financial audit of the RIO was completed in May 2015.

- **Executive Limitation Audit**

Audit Services completed the Executive Limitation Audit for the calendar year beginning January 1, 2014 and ending December 31, 2014. The purpose of the audit was to determine the Executive Director/CIO's level of compliance with SIB Governance Manual Executive Limitation polices (A-1 through A-11). Audit Services is sufficiently satisfied that the Executive Director/CIO is in compliance with the SIB Governance Manual Executive Limitation polices A-1 through A-11 for the calendar year ending December 31, 2014.

In conjunction with the Executive Limitation Audit, Audit Services facilitated two organization wide surveys of employees in December 2014 and January 2015. The purpose of the surveys was to provide employees the opportunity to evaluate the Executive Director/CIO as well as their immediate supervisors and other members of the management staff. Employees were also asked to generate ideas related to improving organizational communication, productivity, morale and/or efficiency.

- **Executive Limitation A-2 – Staff Relations**

The SIB Governance Manual Executive Limitation policy A-2 requires that staff upon termination of employment with the RIO be provided the opportunity to complete an employment questionnaire and exit interview with the Supervisor of Audit Services. During the fiscal year ended June 30, 2015 two employees voluntarily terminated their employment with the RIO. Exit interviews were conducted with both employees and a questionnaire was completed during the course of these interviews.

Professional Development Activities

Audit Services reinstated its membership with The Institute of Internal Auditors (IIA) in October 2014. Audit Services has since pursued networking and professional development opportunities via the IIA's local chapter, Central Nodak. A professional development plan was approved for the Supervisor of Audit Services in January 2015. The Supervisor of Audit Services will pursue a Certified Internal Auditor (CIA) professional designation.

Summary

Audit effort was directed to activities that are of greatest concern to the SIB Audit Committee, RIO Management, and our external audit partners. Audit Services will continue to work closely with the SIB Audit Committee, RIO Management, and our external audit partners to continue to improve overall efficiency, effectiveness, and economy of total audit activity.

North Dakota Retirement and Investment Office
Audit Services
TFFR COMPLIANCE AUDITS
July 1, 2014 through June 30, 2015

			EMPLOYERS	FISCAL YEARS	MEMBERS	REPORT DATE	EMPLOYER CONTRIB'S DR(CR)	MEMBER'S SALARIES ADJUSTED	MEMBER SERVICE CREDIT ADJUSTED	STATUS
	✔		**Audits completed (22)**				**In compliance**		**14**	
	✔		**NIC reviews completed (2)**				**Generally in compliance**		**8**	
							Not in compliance		**2**	
									24	
			Audits carried over from 2013/14 year (9)							
			NIC audits carried over from 2013/14 year (1)							
			Audit notifications sent 2014/15 (28)							
			NIC notifications sent 2014/15 (2)							
			Audits carried over to 2015/16 (14)							
			NIC audits moved to a date in the future (2)							
Carry forward from 2013/14										
1	✔	DT	Flasher	6/30/13, 12	22	9/10/2014	(1,897.64)	7	0	Generally in compliance Did not report eligible game supervision salary; reported ineligible cash for a fringe benefit-programming error; and did not have written agreements for summer salary.
2	✔	DT	Glen Ullin (GASB)	6/30/13, 12	24	6/11/2015	8,558.03	10	0	Not in compliance The District did not report eligible extra-curricular salary; reported ineligible salary; reported subbing without a written agreement; did not issue written agreements for summer salary; and did not have procedures for monitoring the hours for retired teachers who had returned to teach.
3	✔	DT	Grand Forks/ and fiscal agent for Red River Valley Education Cooperative	6/30/12, 11	789	9/10/2014	(2,637.36)	9	5	Generally in compliance Reported summer salary in the wrong fiscal year; did not report eligible salary- coaching and health committee; reported ineligible announcing salary; no written agreements for summer salary; and reported service hours incorrectly.
4	✔	TMB	Hazelton-Moffit (GASB)	6/30/13, 12	18	3/6/2015	(384.71)	1	1	Generally in compliance District did not report eligible in-staff subbing and contract salary; reported service hours incorrectly; and did not have written agreements for summer salary.
5	✔	DT	Lake Region Spec. Education	6/30/13, 12	29	10/10/2014	0.00	0	1	In compliance Reported service hours for part-time member incorrectly (isolated error).
6	✔	DT	Mohall/Lansford/Sherwood	6/30/13, 12	41	3/20/2015	0.00	0	0	In compliance Did not have the proper documentation to support salary and service hours reported for a retired member who had returned to teach.
7	✔	TMB	Nesson	6/30/13, 12	25	12/9/2014	615.24	1	1	Generally in compliance The District did not report accompanist salary; ineligible bus driver training was reported; service hours was incorrect; and there was no written agreement for summer salary.

North Dakota Retirement and Investment Office
Audit Services
TFFR COMPLIANCE AUDITS
July 1, 2014 through June 30, 2015

			EMPLOYERS	FISCAL YEARS	MEMBERS	REPORT DATE	EMPLOYER CONTRIB'S DR(CR)	MEMBER'S SALARIES ADJUSTED	MEMBER SERVICE CREDIT ADJUSTED	STATUS
	✔		**Audits completed (22)**				**In compliance**		**14**	
	✔		**NIC reviews completed (2)**				**Generally in compliance**		**8**	
							Not in compliance		**2**	
									24	
8	✔	DT	Oliver-Mercer Spec. Education	6/30/13, 12	19	12/8/2014	686.03	3	3	Generally in compliance Did not report eligible annual national certification bonus; reported immaterial amounts of extended school year salary in the wrong fiscal year; and reported service hours incorrectly for part-time members.
9	✔	DT	South Heart	6/30/13, 12	31	8/6/2014	1,636.13	6	0	Generally in compliance Reported ineligible meal reimbursement salary; and software programming error in reporting retirement salary.
			Notifications 2014/15							
10	✔	DT	Devils Lake/ and fiscal agent for Northeast Educational Cooperative	6/30/14, 13	173	3/5/2015	(10,758.62)	5	1	Generally in compliance The District reported ineligible Harmony House salary; did not issue written agreements for summer salary; and reported service hours incorrectly.
11	✔	TMB	Edmore	6/30/14, 13	16	1/26/2015	1,017.83	8	1	Generally in compliance The District did not report eligible in-staff subbing; reported salary without a written agreement; and reported service hours incorrectly.
12	✔	TMB	Kensal	6/30/14, 13	21	4/16/2015	0.00	0	0	In compliance Reported service hours incorrectly for one member-no correction.
13	✔	TMB	Lewis and Clark	6/30/14, 13	63	5/1/2015	0.00	0	0	In compliance No exceptions were noted.
14	✔	TMB	Mayville-Portland C-G	6/30/14, 13	49	12/30/2014	0.00	0	0	In compliance No exceptions noted.
15	✔	DT	Montpelior	6/30/14, 13	27	3/27/2015	0.00	1	0	In compliance The District reported salary in the wrong fiscal year.
16	✔	DT	Munich	6/30/2014, 13	18	4/1/2015	0.00	0	1	In compliance The District reported ineligible bus salary (isolated occurrence); also reported service hours wrong (isolated occurrence).

North Dakota Retirement and Investment Office
Audit Services
TFFR COMPLIANCE AUDITS
July 1, 2014 through June 30, 2015

			EMPLOYERS	FISCAL YEARS	MEMBERS	REPORT DATE	EMPLOYER CONTRIB'S DR(CR)	MEMBER'S SALARIES ADJUSTED	MEMBER SERVICE CREDIT ADJUSTED	STATUS
	✔		**Audits completed (22)**				**In compliance**		**14**	
	✔		**NIC reviews completed (2)**				**Generally in compliance**		**8**	
							Not in compliance		**2**	
									24	
17	✔	TMB	North Border	6/30/2014, 13	54	3/20/2015	0.00	0	1	In compliance The District did not have summer agreement for one teacher; addendums were not issued for contract changes; reported service hours incorrectly for one member.
18	✔	TMB	Page	6/30/2014, 13	13	2/2/2015	0.00	0	0	In compliance Did not report eligible book study salary.
19	✔	TMB	Selfridge	6/30/2014, 13	16	3/20/2015	0.00	0	0	In compliance District did not report in-staff subbing (isolated occurrence).
20	✔	DT	Sheyenne Valley Career and Tech.	6/30/2014, 13	11	6/2/2015	0.00	0	0	In compliance No exceptions noted.
21	✔	DT	South Prairie Elementary	6/30/2014, 13	25	5/13/2015	(83.30)	1	0	In compliance The District reported salary in the wrong fiscal year-isolated; reported bus and driving salary-isolated; and did not have written agreement for summer salary-isolated.
22	✔	TMB	Wolford	6/30/14, 13	11	1/23/2015	0.00	0	0	In compliance Reported ineligible subbing (isolated occurrence); and service hours error
				Totals	1,495		(3,248.37)	52	15	

Not in compliance reviews

		DT	Fort Yates	We will wait to complete a full-scale audit at the start of the 4th cycle.						
		TMB	Halliday (second check)	Supervisor of Internal audit talked with the Superintendent. The only error the District had not corrected was reporting in-staff subbing. The new Superintendent stated the District had eliminated this salary; therefore, no review was necessary.						
23	✔	DT	McClusky	6/20/2014	18	3/12/2015	0.00	0	0	In compliance The District had an isolated error in reporting subbing.
24	✔	DT	Williston	6/30/2013	217	1/29/2015	4,909.93	4	11	Not in compliance Summer salary reported in the wrong fiscal year; no written agreements for summer salary; ineligible member reported; incorrect salary reported due to programming error; and service hours for part-time members reported incorrectly.
					1,730		1,661.56	56	26	

Board Education

Investment Performance Measurement Reports

October 13, 2015

Dave Hunter, Executive Director/CIO

Darren Schulz, CFA, Deputy Chief Investment Officer

ND Retirement & Investment Office (RIO)

State Investment Board (SIB)

Investment Performance Reports – Overview

- **The following pages provide an overview of how to review "Performance Reports" for the TFFR pension plan.**
- **Performance reports are available on the RIO website on a monthly basis noting that monthly data is preliminary and subject to change.**
  http://www.nd.gov/rio/RIO_ref/report_list.asp?rType=performance&rFolder=TFFR&rName=Teachers' Fund For Retirement
- **Quarterly performance is available on the RIO website generally 45-to-50 days after each quarter.** http://www.nd.gov/rio/SIB/Publications/PerformanceReports/2015-06PerformanceReport.pdf
- **In general, RIO recommends the reader review the investment performance reporting using the following order (or hierarchy):**
  1. Total Fund Returns;
  2. Global Equity (57% target allocation);
  3. Global Fixed Income (22% target allocation);
  4. Global Real Assets (20% target allocation);
  5. Subsectors of the 3 major asset classes (e.g. Real Estate or Timber); and
  6. Investment Manager/Strategy (e.g. TIR – Teredo or TIR – Springbank).
- **Given the long-term investment horizon of the TFFR pension plan, there should be a greater emphasis placed on 5-year returns over shorter periods.**

Investment Performance Report – Total Fund Returns

Review "Total Fund" Performance (Short-Term) - Compare Net Returns for the Current Fiscal Year To Date (Column F, Row 1) to the Policy Benchmark (Column F, Row 2) to see if **Net Return of the Total Fund** (Column F, Row 3) **exceeded our Policy Benchmark Target** (based on the TFFR board approved asset allocation).

Column >	A	B	C	D	E	F	G	H	I	J	K	L
		June-15			Current Fiscal YTD		Prior Year FY14		3 Years Ended 6/30/2015		5 Years Ended 6/30/2015	
			Allocation									
Row		Market Value	Actual	Policy	Gross (5)	Net	Gross (5)	Net	Gross (5)	Net	Gross (5)	Net
1	**TOTAL FUND**	**2,103,807,352**	**100.0%**	**100.0%**	**3.86%**	**3.52%**	**16.90%**	**16.53%**	**11.43%**	**11.09%**	**11.38%**	**11.01%**
2	*POLICY TARGET BENCHMARK*				*2.16%*	***2.16%***	*15.74%*	*15.74%*	*9.80%*	*9.80%*	*9.97%*	***9.97%***
3	**TOTAL RELATIVE RETURN**				**1.70%**	**1.36%**	**1.17%**	**0.79%**	**1.64%**	**1.29%**	**1.41%**	**1.04%**

Review "Total Fund" Performance (Long-Term) - Compare Net Returns for the 5 Years Ended June 30, 2015 (Column L, Row 1) to the Policy Benchmark (Column L, Row 2) to see if **Net Return of the Total Fund** (Column L, Row 3) **exceeded the Policy Bench-mark Target** (based on the TFFR board approved asset allocation).

Summary: If the Total Relative Return is positive, (as highlighted in green) the SIB's core investment belief in "active management generating excess income over passive investing" is validated for the given reporting period.

NOTE: All SIB client specific monthly reporting is preliminary and subject to change noting it is unaudited data.

ND TEACHERS FUND FOR RETIREMENT
INVESTMENT PERFORMANCE REPORT AS OF JUNE 30, 2015

	June-15					Current Fiscal YTD		Prior Year FY14		3 Years Ended 6/30/2015		5 Years Ended 6/30/2015	
		Allocation		Quarter									
	Market Value	Actual	Policy	Gross [5]	Net	Gross [5]	Net	Gross [5]	Net	Gross [5]	Net	Gross [5]	Net
TOTAL FUND	**2,103,807,352**	**100.0%**	**100.0%**	**0.83%**	**0.78%**	**3.86%**	**3.52%**	**16.90%**	**16.53%**	**11.43%**	**11.09%**	**11.38%**	**11.01%**
POLICY TARGET BENCHMARK				*0.26%*	*0.26%*	*2.16%*	*2.16%*	*15.74%*	*15.74%*	*9.80%*	*9.80%*	*9.97%*	*9.97%*
ATTRIBUTION ANALYSIS													
Asset Allocation				**-0.04%**	**-0.04%**	**-0.05%**	**-0.05%**	**0.23%**	**0.23%**	**0.08%**	**0.08%**	**0.05%**	**0.05%**
Manager Selection				**0.61%**	**0.56%**	**1.75%**	**1.41%**	**0.93%**	**0.56%**	**1.56%**	**1.21%**	**1.36%**	**0.99%**
TOTAL RELATIVE RETURN				0.57%	0.52%	1.70%	1.36%	1.17%	0.79%	1.64%	1.29%	1.41%	1.04%
GLOBAL EQUITIES	***1,198,248,840***	***57.0%***	***57.0%***	***0.81%***	***0.77%***	***3.51%***	***3.17%***	***22.39%***	***21.97%***	***14.76%***	***14.38%***		
Benchmark				***0.17%***	***0.17%***	***1.55%***	***1.55%***	***22.03%***	***22.03%***	***13.53%***	***13.53%***		
Epoch (1)	144,434,304	6.9%	7.0%	0.21%	0.05%	8.58%	7.85%	18.24%	17.41%	15.77%	15.00%	14.20%	13.31%
LSV	188,899,108	9.0%	9.0%	1.29%	1.26%	1.94%	1.03%	27.77%	27.33%	N/A	N/A	N/A	N/A
Total Global Equities	**333,333,412**	**15.8%**	**16.0%**	**0.84%**	**0.75%**	**4.68%**	**3.84%**	**23.24%**	**22.64%**	**12.99%**	**12.57%**		
MSCI World				***0.31%***	***0.31%***	***1.43%***	***1.43%***	***24.05%***	***24.05%***	***14.27%***	***14.27%***		
Domestic - broad	***462,458,815***	***22.0%***	***21.5%***	***0.39%***	***0.37%***	***8.65%***	***8.47%***	***25.23%***	***24.86%***	***19.06%***	***18.77%***		
Benchmark				***0.20%***	***0.20%***	***7.26%***	***7.26%***	***25.02%***	***25.02%***	***17.81%***	***17.81%***		
Large Cap Domestic													
LA Capital	136,652,294	6.5%	6.6%	0.91%	0.86%	12.76%	12.52%	25.82%	25.56%	19.03%	18.79%	19.06%	18.84%
Russell 1000 Growth				***0.12%***	***0.12%***	***10.56%***	***10.56%***	***26.92%***	***26.92%***	***17.99%***	***17.99%***	***18.59%***	***18.59%***
LA Capital	88,504,777	4.2%	3.3%	-0.28%	-0.31%	8.26%	8.12%	24.42%	24.27%	17.89%	17.73%	17.86%	17.64%
Russell 1000				***0.11%***	***0.11%***	***7.37%***	***7.37%***	***25.36%***	***25.36%***	***17.73%***	***17.73%***	***17.58%***	***17.58%***
Northern Trust	54,205,987	2.6%	3.3%	-0.36%	-0.36%	6.26%	5.89%	26.83%	25.90%	18.57%	18.03%	18.27%	17.86%
Clifton	76,862,284	3.7%	3.3%	-0.01%	-0.01%	7.43%	7.41%	24.65%	24.65%	17.27%	17.26%	N/A	N/A
S&P 500				***0.28%***	***0.28%***	***7.42%***	***7.42%***	***24.61%***	***24.61%***	***17.31%***	***17.31%***	***17.34%***	***17.34%***
Total Large Cap Domestic	**356,225,342**	**16.9%**	**16.6%**	**0.22%**	**0.19%**	**9.48%**	**9.30%**	**25.21%**	**24.96%**	**19.06%**	**18.85%**	**17.97%**	**17.69%**
Russell 1000 (2)				***0.11%***	***0.11%***	***7.37%***	***7.37%***	***25.36%***	***25.36%***	***17.73%***	***17.73%***	***17.57%***	***17.57%***
Small Cap Domestic													
SEI	-	0.0%	0.0%	N/A	N/A	N/A	N/A	-90.87%	-90.87%	N/A	N/A	N/A	N/A
Callan (5)	52,557,829	2.5%	2.4%	0.88%	0.88%	3.98%	3.98%	25.27%	24.40%	18.49%	18.00%	17.77%	17.18%
Clifton	53,675,644	2.6%	2.4%	1.04%	1.04%	7.58%	7.17%	24.95%	24.29%	18.98%	18.44%	N/A	N/A
Total Small Cap Domestic	**106,233,472**	**5.0%**	**4.8%**	**0.96%**	**0.96%**	**5.77%**	**5.57%**	**25.13%**	**24.36%**	**18.85%**	**18.34%**	**18.02%**	**17.48%**
Russell 2000				***0.42%***	***0.42%***	***6.49%***	***6.49%***	***23.64%***	***23.64%***	***17.81%***	***17.81%***	***17.08%***	***17.08%***
International - broad	***320,794,475***	***15.2%***	***14.5%***	***2.23%***	***2.19%***	***-2.62%***	***-2.82%***	***23.73%***	***23.29%***	***12.35%***	***11.91%***		
Benchmark				***0.65%***	***0.65%***	***-4.34%***	***-4.34%***	***21.81%***	***21.81%***	***10.41%***	***10.41%***		
Developed International													
Capital Group	63,915,295	3.0%	3.5%	1.89%	1.80%	-1.78%	-2.20%	21.31%	20.79%	13.07%	12.59%	9.84%	9.33%
MSCI EAFE (3)				***0.62%***	***0.62%***	***-4.22%***	***-4.22%***	***23.57%***	***23.57%***	***11.97%***	***11.97%***	***8.38%***	***8.38%***
NTGI	115,231,023	0.0%	5.9%	0.64%	0.64%	-4.98%	-5.01%	N/A	N/A	N/A	N/A	N/A	N/A
MSCI World Ex US				***0.48%***	***0.48%***	***-5.28%***	***-5.28%***						
DFA (5)	36,995,983	1.8%	1.2%	5.19%	5.19%	-3.27%	-3.27%	36.64%	35.75%	18.18%	17.71%	13.39%	12.81%
Wellington	42,062,448	2.0%	1.2%	5.84%	5.63%	0.53%	-0.31%	29.23%	28.18%	17.91%	16.99%	15.88%	14.97%
S&P/Citigroup BMI EPAC < $2BN				***5.97%***	***5.97%***	***1.14%***	***1.14%***	***26.39%***	***26.39%***	***14.70%***	***14.70%***	***11.08%***	***11.08%***
Total Developed International	**258,204,749**	**12.3%**	**11.8%**	**2.41%**	**2.35%**	**-3.10%**	**-3.34%**	**26.29%**	**25.89%**	**13.96%**	**13.52%**	**10.66%**	**10.22%**
MSCI EAFE (3)				***0.62%***	***0.62%***	***-4.22%***	***-4.22%***	***23.57%***	***23.57%***	***11.97%***	***11.97%***	***8.38%***	***8.38%***
Emerging Markets													
JP Morgan	-	0.0%	0.0%	N/A	N/A	N/A	N/A	11.04%	9.86%	N/A	N/A	9.58%	8.73%
NTGI	-	0.0%	0.0%	N/A	N/A	N/A	N/A	14.40%	14.30%	N/A	N/A	N/A	N/A
Axiom	47,800,359	2.3%	2.1%	1.39%	1.39%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DFA (5)	14,789,367	0.7%	0.7%	1.97%	1.97%	-1.73%	-1.73%	16.64%	15.89%	7.76%	7.30%	6.78%	6.17%
Total Emerging Markets	**62,589,726**	**3.0%**	**2.8%**	**1.53%**	**1.53%**	**-0.86%**	**-0.88%**	**12.68%**	**12.12%**	**5.31%**	**4.89%**	**6.29%**	**5.75%**
MSCI Emerging Markets				***0.69%***	***0.69%***	***-5.13%***	***-5.13%***	***14.31%***	***14.31%***	***3.71%***	***3.71%***	***3.75%***	***3.75%***

NOTE: All SIB client specific monthly reporting is preliminary and subject to change noting it is unaudited data.

Investment Performance Report – Global Equities

Review "Global Equities" Performance (Short-Term) - Compare Net Returns for the Current Fiscal Year To Date (Column F, Row 4) to the Policy Benchmark (Column F, Row 5) to see if the **Net Return of Global Equities exceeded our Benchmark (e.g. 3.17% minus 1.55% = 1.62%).**

Column >	A	B	C	D	E	F	G	H	I	J	K	L
		June-15			Current Fiscal YTD		Prior Year FY14		3 Years Ended 6/30/2015		5 Years Ended 6/30/2015	
			Allocation									
Row		Market Value	Actual	Policy	Gross [5]	Net	Gross [5]	Net	Gross [5]	Net	Gross [5]	Net
1	**TOTAL FUND**	**2,103,807,352**	**100.0%**	**100.0%**	**3.86%**	**3.52%**	**16.90%**	**16.53%**	**11.43%**	**11.09%**	**11.38%**	**11.01%**
2	*POLICY TARGET BENCHMARK*				*2.16%*	***2.16%***	*15.74%*	*15.74%*	*9.80%*	*9.80%*	*9.97%*	***9.97%***
3	**TOTAL RELATIVE RETURN**				**1.70%**	**1.36%**	**1.17%**	**0.79%**	**1.64%**	**1.29%**	**1.41%**	**1.04%**
4	***GLOBAL EQUITIES***	***1,198,248,840***	***57.0%***	***57.0%***	***3.51%***	***3.17%***	***22.39%***	***21.97%***	***14.76%***	***14.38%***		
5	***Benchmark***			***52.0%***	***1.55%***	***1.55%***	***22.03%***	***22.03%***	***13.53%***	***13.53%***		

Review "Global Equities" Performance (Medium-Term) - Compare Net Returns for the 3 Years Ended June 30, 2015 (Column J, Row 4) to the Policy Benchmark (Column L, Row 5) to see if the **Net Return of Global Equities exceeded the Benchmark (e.g. 14.38% less 13.53% = 0.85%). Global Equity active management created 0.85% of Excess Return for the 3-years ended June 30, 2015, while Actual and Target asset allocations were consistent at 57.0% (Columns C and D, Row 4).**

NOTE: All SIB client specific monthly reporting is preliminary and subject to change noting it is unaudited data.

Investment Performance Report – Global Fixed Income

Global Fixed Income Performance (Short-Term) - Compare Net Returns for the Current FYTD (Column F, Row 6) to the Policy Benchmark (Column F, Row 7) to see if **Net Return of Fixed Income > Benchmark (e.g. 0.30% minus -2.22% = 2.52%).**

Column >	A	B	C	D	E	F	G	H	I	J	K	L
		June-15			Current Fiscal YTD		Prior Year FY14		3 Years Ended 6/30/2015		5 Years Ended 6/30/2015	
			Allocation									
Row		Market Value	Actual	Policy	Gross (5)	Net	Gross (5)	Net	Gross (5)	Net	Gross (5)	Net
1	TOTAL FUND	2,103,807,352	100.0%	100.0%	3.86%	3.52%	16.90%	16.53%	11.43%	11.09%	11.38%	11.01%
2	*POLICY TARGET BENCHMARK*				*2.16%*	***2.16%***	*15.74%*	*15.74%*	*9.80%*	*9.80%*	*9.97%*	***9.97%***
3	TOTAL RELATIVE RETURN				1.70%	1.36%	1.17%	0.79%	1.64%	1.29%	1.41%	1.04%
4	*GLOBAL EQUITIES*	*1,198,248,840*	*57.0%*	*57.0%*	*3.51%*	*3.17%*	*22.39%*	*21.97%*	*14.76%*	*14.38%*		
5	*Benchmark*			*52.0%*	*1.55%*	*1.55%*	*22.03%*	*22.03%*	*13.53%*	*13.53%*		
	Global Equity Detail Collapsed											
6	*GLOBAL FIXED INCOME*	*484,399,254*	*23.0%*	*22.0%*	*0.56%*	*0.30%*	*8.04%*	*7.80%*	*4.80%*	*4.56%*		
7	*Benchmark*				*-2.22%*	*-2.22%*	*7.16%*	*7.16%*	*1.89%*	*1.89%*		

Global Fixed Income (Medium Term) - Compare Net Returns for the 3 Years Ended June 30, 2015 (Column J, Row 6) to the Benchmark (Column L, Row 7). **Active management created 2.55% of Excess Return within Global Fixed Income for the 3-years ended June 30, 2015 (e.g. 4.56% less 1.89% = 2.67%), while Actual and Target asset allocations were within 1% (Columns C and D, Row 6).**

NOTE: All SIB client specific monthly reporting is preliminary and subject to change noting it is unaudited data.

Investment Performance Report – Global Real Assets

Column >	A	B	C	D	F	H	J	L
		June-15			Current	Prior	3 Years	5 Years
	NOTE:		Allocation		FY 15	FY 14	6/30/15	6/30/15
Row	Gross Return columns are hidden.	Market Value	Actual	Policy	Net	Net	Net	Net
10	***GLOBAL REAL ASSETS***	***391,531,027***	***18.6%***	***20.0%***	***9.11%***	***11.00%***	***9.33%***	
11	***Benchmark***				***8.78%***	***8.55%***	***8.47%***	
	Global Real Estate							
13	INVESCO - Core	84,131,631			15.97%	10.48%	13.07%	14.50%
14	INVESCO - Fund II (5)	8,272,376			6.23%	14.49%	14.50%	24.83%
15	INVESCO - Fund III (5)	14,794,492			18.70%	18.28%	17.92%	N/A
16	INVESCO - Fund IV (6)	10,879,401			N/A	N/A	N/A	N/A
17	INVESCO - Asia Real Estate Fund	4,954,617			16.19%	15.25%	8.12%	3.24%
19	J.P. Morgan Strategic & Special Fu	76,525,028			13.64%	14.04%	13.78%	14.67%
20	J.P. Morgan Alternative Property Fu	163,336			-33.28%	4.18%	-7.16%	1.30%
21	J.P. Morgan Greater Europe Fund (	11,650,750			16.90%	66.58%	0.01%	N/A
22	J.P. Morgan Greater China Propert	4,550,524			16.74%	70.53%	23.88%	16.34%
23	**Total Global Real Estate**	**215,922,154**	**10.3%**	**10.0%**	**15.25%**	**16.24%**	**13.99%**	**15.52%**
24	***NCREIF TOTAL INDEX***				***12.98%***	***11.21%***	***11.63%***	***12.72%***
	Timber	45.8160%						
25	TIR - Teredo	27,899,514	1.3%		15.52%	6.64%	9.18%	6.18%
26	TIR - Springbank	53,377,730	2.5%		-1.98%	0.22%	-1.41%	-2.17%
27	**Total Timber (5)**	**81,277,245**	**3.9%**	**5.0%**	**3.95%**	**2.62%**	**2.37%**	
28	***NCREIF Timberland Index***				***10.02%***	***9.94%***	***9.77%***	***6.10%***
	Infrastructure							
29	JP Morgan (Asian) (5)	13,860,194	0.7%		-2.58%	3.71%	7.80%	4.26%
30	JP Morgan (IIF)	62,108,361	3.0%		0.23%	8.81%	6.12%	5.44%
31	Grosvenor (formerly Credit Suisse)	17,670,025	0.8%		5.37%	12.90%	9.19%	N/A
32	Grosvenor CIS II (6)	693,048	0.0%		N/A	N/A	N/A	
33	**Total Infrastructure**	**94,331,628**	**4.5%**	**5.0%**	**0.72%**	**8.83%**	**6.95%**	
34	***CPI***				***-0.38%***	***2.05%***	***1.13%***	

Performance Notes:

Global Real Asset returns have exceeded performance benchmarks for the 1-year and 3-year periods ended June 30, 2015.

1-Year Actual Net Return of 9.11% (Column F, Row 10) **versus Benchmark of 8.78%** (Column F, Row 11).

3-Years Actual Net Return of 9.33% (Column J, Row 10) **versus Benchmark of 8.47%** (Column J, Row 11).

Timber has materially under-performed the Benchmark in recent years (Columns F, H, J and L, Rows 27 and 28).

1-Year (3.95% versus 10.02%)
3-Yrs. (2.37% versus 9.77%).

Note: Global Real Asset allocations are within 1% to 2% of target levels noting that this asset class does not lend itself to precise quarterly rebalancing due to these investments being significantly less liquid than public equity and public debt investments.

NDRIO Investment Performance Summary - Quarterly

ND RETIREMENT AND INVESTMENT OFFICE
ND STATE INVESTMENT BOARD
INVESTMENT PERFORMANCE SUMMARY
AS OF JUNE 30, 2015

		Investment Performance (net of fees)																
		Quarter Ended					Fiscal Years ended June 30					Periods ended 6/30/15 (annualized)						
Fund Name	Market Values as of 6/30/15	9/30/14	12/31/14	3/31/15	6/30/15	FYTD 2015	2014	2013	2012	2011	2010	3 Years	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
Pension Trust Fund																		
Teachers' Fund for Retirement (TFFR)	2,103,807,352	-1.14%	1.55%	2.31%	0.78%	3.52%	16.53%	13.57%	-1.12%	24.05%	13.87%	11.06%	10.94%	5.87%	4.99%	7.23%	7.80%	8.37%
Public Employees Retirement System (PERS)	2,422,579,596	-1.11%	1.57%	2.31%	0.75%	3.53%	16.38%	13.44%	-0.12%	21.27%	13.67%	10.98%	10.61%	5.98%	5.54%	7.65%	8.01%	8.68%
City of Bismarck Employees Pension	81,745,818	-0.91%	1.71%	2.29%	0.58%	3.69%	14.56%	12.41%	1.57%	20.32%	12.74%	10.12%	10.29%	6.00%	5.65%	7.52%	8.38%	*
City of Bismarck Police Pension	35,889,943	-1.09%	1.66%	2.30%	0.68%	3.56%	15.27%	13.03%	1.31%	21.10%	13.30%	10.50%	10.61%	6.01%	5.48%	7.40%	8.25%	*
Job Service of North Dakota Pension	96,392,560	-0.69%	2.14%	2.43%	-0.57%	3.30%	13.54%	11.71%	3.09%	16.39%	13.63%	9.42%	9.47%	6.16%	5.52%	8.47%	*	*
City of Fargo Employees Pension	1,461	0.01%	0.02%	0.02%	0.02%	0.06%	8.42%	13.90%	0.97%	21.58%	14.82%	7.31%	8.69%	*	*	*	*	*
City of Grand Forks Employees Pension	59,232,374	-0.95%	1.89%	2.21%	0.38%	3.53%	16.33%	14.01%	1.09%	21.64%	13.91%	11.15%	11.04%	*	*	*	*	*
Grand Forks Park District	6,035,137	-0.39%	2.15%	2.43%	0.00%	4.22%	16.44%	14.43%	0.86%	20.98%	*	11.57%	11.12%	*	*	*	*	*
Subtotal Pension Trust Fund	4,805,684,242																	
Insurance Trust Fund																		
Workforce Safety & Insurance (WSI)	1,762,659,137	-0.43%	1.85%	2.36%	-0.52%	3.26%	11.71%	8.31%	6.17%	13.23%	11.94%	7.71%	8.48%	5.65%	5.43%	7.08%	7.62%	*
State Fire and Tornado Fund	23,416,231	-0.89%	2.19%	2.47%	-0.60%	3.16%	12.78%	10.59%	4.93%	14.52%	14.52%	8.76%	9.11%	6.14%	5.49%	6.62%	6.91%	*
State Bonding Fund	3,180,024	0.08%	0.84%	1.22%	-0.88%	1.25%	4.06%	2.96%	5.31%	5.01%	8.63%	2.75%	3.71%	2.25%	3.04%	4.77%	5.46%	*
Petroleum Tank Release Compensation Fund	7,162,837	0.07%	0.76%	1.11%	-0.80%	1.13%	3.68%	2.47%	4.84%	4.97%	7.79%	2.42%	3.41%	2.06%	2.70%	4.71%	*	*
Insurance Regulatory Trust Fund	2,636,660	-0.86%	1.56%	1.87%	-0.52%	2.04%	9.88%	8.49%	2.82%	11.61%	10.29%	6.75%	6.90%	5.06%	4.69%	6.06%	6.01%	*
State Risk Management Fund	6,849,216	-0.29%	2.96%	2.36%	-0.96%	4.08%	12.29%	10.19%	7.63%	14.36%	16.02%	8.80%	9.65%	6.37%	5.57%	*	*	*
State Risk Management Workers Comp Fund	6,224,541	-0.39%	3.34%	2.46%	-0.86%	4.57%	13.68%	11.61%	7.40%	16.23%	16.40%	9.88%	10.62%	6.64%	*	*	*	*
Cultural Endowment Fund	383,050	-1.11%	3.43%	2.86%	0.02%	5.22%	16.94%	15.58%	4.65%	21.33%	14.89%	12.46%	12.55%	6.75%	*	*	*	*
Budget Stabilization Fund	574,011,150	0.11%	0.44%	0.93%	0.38%	1.86%	1.94%	1.87%	2.03%	3.73%	7.38%	1.89%	2.29%	*	*	*	*	*
ND Association of Counties (NDACo) Fund	3,833,499	-0.82%	1.89%	2.36%	-0.65%	2.77%	11.61%	9.46%	1.69%	17.73%	15.34%	7.88%	8.49%	5.09%	4.61%	*	*	*
Bismarck Deferred Sick Leave Account	872,178	-0.81%	2.02%	2.54%	-0.77%	2.95%	12.32%	9.83%	5.69%	13.80%	15.30%	8.29%	8.84%	6.19%	5.76%	*	*	*
City of Fargo FargoDome Permanent Fund	41,007,046	-1.65%	2.61%	2.72%	-0.28%	3.38%	16.34%	13.46%	3.14%	19.16%	16.78%	10.92%	10.89%	6.41%	*	*	*	*
State Board of Medical Examiners Fund	2,174,702	-0.58%	1.19%	1.75%	0.32%	2.70%	*	*	*	*	*	*	*	*	*	*	*	*
PERS Group Insurance Account	39,653,686	0.00%	0.00%	0.00%	0.00%	0.01%	0.06%	0.27%	0.24%	0.31%	0.36%	0.11%	0.18%	1.55%	1.92%	*	*	*
Subtotal Insurance Trust Fund	2,474,063,958																	
Legacy Fund	3,328,631,302	-1.77%	2.07%	2.81%	0.22%	3.31%	6.64%	1.15%	*	*	*	3.69%	*	*	*	*	*	*
PERS Retiree Insurance Credit Fund	97,671,059	-1.12%	2.51%	2.16%	-0.47%	3.06%	16.53%	14.80%	2.62%	21.65%	16.86%	11.30%	11.47%	6.11%	4.75%	7.27%	7.53%	*
Total Assets Under SIB Management	10,706,050,561																	

* These funds do not have the specified periods of history under SIB management.

Note: Asset allocation largely drives investment performance. Each fund has a unique allocation that takes into consideration return objectives, risk tolerance, liquidity constraints, and unique circumstances. Such considerations must be taken into account when comparing investment returns. **All figures are preliminary and subject to revision.**

http://www.nd.gov/rio/SIB/Publications/PerformanceReports/2015-06PerformanceReport.pdf

TFFR Investment Ends – June 30, 2015

SIB clients should receive investment returns consistent with their written investment policies and market variables. This "End" is evaluated based on comparison of each client's (a) actual net rate of return, (b) standard deviation and (c) risk adjusted excess return, to the client's policy benchmark over a minimum period of 5 years.

	1 Yr Ended 6/30/2015	3 Yrs Ended 6/30/2015	5 Yrs Ended 6/30/2015	Risk 5 Yrs Ended 6/30/2015	Risk Adj Excess Return 5 Yrs Ended 6/30/2015
TEACHERS' FUND FOR RETIREMENT (TFFR)					
Total Fund Return - Net	**3.52%**	**11.06%**	**10.94%**	7.9%	**0.57%**
Policy Benchmark Return	2.16%	9.78%	9.97%	7.6%	
EXCESS RETURN	**1.36%**	**1.28%**	**0.97%**	**104%**	

Net Return: TFFR's net investment rate of return for the 5-year period ended June 30, 2015 was **10.94%** versus a policy benchmark of **9.97%** resulting in an **Excess Return of 0.97% (or 97 bps)**.

Risk: TFFR's standard deviation for the 5-year period ended March 31, 2015 was 7.9% versus a policy benchmark of 7.6% resulting in a **portfolio risk ratio of 104%**. This is within TFFR's stated risk tolerance which indicates this ratio should **not exceed 115%**.

The Risk-Adjusted Excess Return of TFFR's portfolio (net of fees and expenses) was **0.57%** for the 5-year period ended June 30, 2015, thereby exceeding the stated policy benchmark.

TFFR Long Term Results Meet or Exceed Expectations

ND RETIREMENT AND INVESTMENT OFFICE
ND STATE INVESTMENT BOARD
INVESTMENT PERFORMANCE SUMMARY
AS OF JUNE 30, 2015

Investment Performance (net of fees)

		Fiscal Years ended June 30					Periods ended 6/30/15 (annualized)				
Fund Name	FYTD 2015	2014	2013	2012	2011	2010	3 Years	5 Years	10 Years	20 Years	30 Years
TFFR	3.52%	16.53%	13.57%	-1.12%	24.05%	13.87%	**11.06%**	**10.94%**	5.87%	7.23%	**8.37%**

Note: Asset allocation largely drives investment performance. Each fund has a unique allocation that takes into consideration return objectives, risk tolerance, liquidity constraints, and unique circumstances. Such considerations must be taken into account when comparing investment returns. **All figures are preliminary and subject to revision.**

The TFFR Pension Plan is a Long Term Investor

Net investment returns for the TFFR Pension Plan continue to exceed 8% over the past 3-, 5- and 30-year periods despite disappointing conditions in the international equity and debt markets which declined by over 4% and 13%, respectively, during the most recent fiscal year end.

ND STATE INVESTMENT BOARD MEETING

Friday, October 23, 2015, 8:30 a.m.
State Capitol, Peace Garden Room
Bismarck, ND

I. APPROVAL OF AGENDA

II. APPROVAL OF MINUTES (September 25, 2015)

III. INVESTMENTS

A. PIMCO Capital Markets Update - Mr. Crescenzi, Ms. King, Ms. Wu (to follow) (45 min)
B. Board Education: Monthly Performance Reports - Mr. Hunter (enclosed) (20 min)
C. Board Education: Fiduciary Duty & Staff Conferences (enclosed) - Mr. Hunter (15 min)
D. Litigation Update: WGI Trading - Ms. Flanagan (enclosed) (10 min)

========================== Break from 10:00 to 10:15 a.m. ===========================

E. Litigation Update: Pending - Ms. Murtha (15 min) **(Board Action)**
F. Litigation Monitoring: Policy Proposal - Mr. Hunter (15 min) **(Board Action)**

IV. GOVERNANCE

A. SIB Client Survey - Mr. Hunter (enclosed) (10 min) **(Board Acceptance)**
B. SIB Audit Comm Fiscal Year End Report - Ms. Miller Bowley (enclosed) (10 min) **(Board Acceptance)**
C. Annual Goals and Investment Plan Update - Mr. Hunter (enclosed) (10 min) **(Board Acceptance)**

V. QUARTERLY MONITORING - 9/30/15 (enclosed). (Board Acceptance) (15 min)

A. Executive Limitations/Staff Relations - Mr. Hunter
B. Budget/Financial Conditions - Ms. Flanagan
C. Investment Program - Mr. Schulz
D. Retirement Program - Ms. Kopp
E. Watch List - Mr. Schulz (to follow)

VI. OTHER

SIB Audit Committee meeting - November 19, 2015, 3:00 p.m. - Peace Garden, State Capitol
SIB meeting - November 20, 2015, 8:30 a.m. - Peace Garden, State Capitol

VII. ADJOURNMENT.

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

NORTH DAKOTA STATE INVESTMENT BOARD
MINUTES OF THE
SEPTEMBER 25, 2015, BOARD MEETING

MEMBERS PRESENT:	Drew Wrigley, Lt. Governor, Chair Mike Sandal, Vice Chair Jeff Engleson, Deputy Land Commissioner Mike Gessner, TFFR Board Adam Hamm, Insurance Commissioner (TLCF) Rob Lech, TFFR Board Mel Olson, TFFR Board Kelly Schmidt, State Treasurer Yvonne Smith, PERS Board Cindy Ternes, WSI designee Tom Trenbeath, PERS Board
STAFF PRESENT:	Eric Chin, Investment Analyst Connie Flanagan, Fiscal & Invt Op Mgr Bonnie Heit, Assist to the SIB David Hunter, ED/CIO Fay Kopp, Dep ED/CRA Terra Miller Bowley, Supvr Audit Services Cody Schmidt, Compliance Officer Darren Schulz, Dep CIO Susan Walcker, Invt Acct
GUESTS PRESENT:	Jeff Diehl, Adams Street Partners Levi Erdmann, Land Dept. Miguel Gonzalo, Adams Street Partners Jan Murtha, Attorney General's Office

CALL TO ORDER:

Lt. Governor Wrigley called the State Investment Board (SIB) meeting to order at 8:30 a.m. on Friday, September 25, 2015, at the State Capitol, Ft. Union Room, Bismarck, ND.

AGENDA:

IT WAS MOVED BY MR. SANDAL AND SECONDED BY MS. TERNES AND CARRIED ON A VOICE VOTE TO ACCEPT THE AGENDA FOR THE SEPTEMBER 25, 2015, MEETING AS DISTRIBUTED.

AYES: TREASURER SCHMIDT, MR. GESSNER, COMMISSIONER HAMM, MS. TERNES, MR. ENGLESON, MS. SMITH, MR. LECH, MR. SANDAL, MR. TRENBEATH, MR. OLSON, AND LT. GOVERNOR WRIGLEY
NAYS: NONE
MOTION CARRIED

MINUTES:

IT WAS MOVED BY MR. LECH AND SECONDED BY MR. GESSNER AND CARRIED ON A VOICE VOTE TO APPROVE THE AUGUST 28, 2015, MINUTES AS DISTRIBUTED.

AYES: MS. SMITH, MR. SANDAL, MR. OLSON, MR. GESSNER, MR. LECH, MR. TRENBEATH, MS. TERNES, COMMISSIONER HAMM, MR. ENGLESON, TREASURER SCHMIDT, AND LT. GOVERNOR WRIGLEY
NAYS: NONE

MOTION CARRIED

INVESTMENTS:

Investment Fees/Expenses – Mr. Hunter reviewed investment management fees and expenses for fiscal years 2013, 2014, and 2015. Investment management fees and expenses as a percent of average assets under management declined from 0.65% in fiscal year 2013 to 0.51% in fiscal 2014 to 0.47% in fiscal 2015.

The decline of 14 basis points in fiscal 2014 and 3 basis points in fiscal 2015 realized annual incremental savings of approximately $17 million based on $10 billion of average assets under management.

Staff also expects additional savings will be realized in timber management incentive fees, Novarca investment management fee reviews, and securities lending.

IT WAS MOVED BY MR. GESSNER AND SECONDED BY MR. LECH AND CARRIED ON A VOICE VOTE TO ACCEPT THE INVESTMENT FEES/EXPENSES REPORT FOR FISCAL YEARS ENDING JUNE 30, 2013, 2014, and 2015.

AYES: MR. TRENBEATH, TREASURER SCHMIDT, MR. OLSON, MR. ENGLESON, MR. LECH, MR. SANDAL, COMMISSIONER HAMM, MR. GESSNER, MS. SMITH, MS. TERNES, AND LT. GOVERNOR WRIGLEY
NAYS: NONE
MOTION CARRIED

Novarca Fee Review – Since February 17, 2015, Novarca's initial overview of the SIB portfolio showed fees already at or among the lowest offered by its managers. Novarca's initial review included the following managers: LSV Asset Management, Epoch Investment Partners, Capital Guardian Trust Company, Wellington Trust Company, and the private equity portfolios. LSV Asset Management's review has been completed and annual savings of $228,000 or 7 basis points was realized to better align with best in market for the international equity strategy. Epoch Investment Partners review has also been completed and findings show the SIB had best terms for the size of the international equity mandate. An analysis of transaction costs revealed less than efficient trading on a low turnover portfolio realizing market size of the strategy prohibits additional agile executions. Staff will continue to monitor transaction costs.

Lt. Governor Wrigley thanked staff for all of their efforts in managing the process to realize savings for the Pension Trust and Insurance Trust.

Private Equity Update – The Pension Trust's private equity portfolio currently has $540 million in commitments and returns need to be enhanced by promoting the development of strategic partnerships to leverage a "best ideas" approach while increasing pricing leverage. The Adams Street Partnerships have generally performed in line with expectations while the non-Adams Street Partnerships have not.

Asset and Performance Overview – Mr. Hunter updated the SIB on the status of the portfolios they manage on behalf of their clients as of June 30, 2015. Assets under management grew by approximately 14 percent or $1.3 billion. The SIB's client assets, based on unaudited valuations, currently exceed $10.7 billion. The Pension Trust posted a net return of 3.5 percent with gains of $164 million. The Insurance Trust generated a net return of 2.3 percent with gains of $58 million.

The Legacy Fund's net return was 3.3 percent and assets increased by $1.1 billion.
Adams Street Partners – Adams Street representatives provided an overview of the firm, history and overview of private markets, and status of the portfolios they currently manage on behalf of the SIB.

Adams Street Partners also reviewed a new fund in which they are currently accepting commitments.

The Board recessed at 10:07 a.m. and reconvened at 10:22 a.m.

Private Equity Recommendation – Staff recommends up to a $30 million commitment to the new Adams Street 2015 Global Fund and secondly to engage Callan to perform a private equity manager search subject to successful contract negotiations. Staff noted that the SIB clients within the $4.8 billion Pension Trust currently have a 5 percent (or $240 million) target allocation to private equity versus an actual allocation of approximately $180 million. Staff has reviewed the recommendation with Callan who confirms staff's recommendation to rebuild the client's private equity allocation using Adams Street Partners and one or two other strategic partners.

IT WAS MOVED BY MR. GESSNER AND SECONDED BY MR. SANDAL AND CARRIED ON A ROLL CALL VOTE TO ACCEPT STAFF RECOMMENDATION TO ENHANCE PRIVATE EQUITY.

AYES: MR. ENGLESON, TREASURER SCHMIDT, MR. SANDAL, COMMISSIONER HAMM, MR. OLSON, MS. TERNES, MR. GESSNER, MR. TRENBEATH, MR. LECH, MS. SMITH, AND LT. GOVERNOR WRIGLEY
NAYS: NONE
MOTION CARRIED

BOARD EDUCATION: – Mr. Hunter reviewed educational opportunities, which board members have attended.

The board requested educational opportunities that staff have attended.

MONITORING REPORTS:

Ms. Flanagan reviewed the following compliance reports for Fiscal Year 2015 from the SIB investment managers; Exceptions to Investment Guidelines, Certification of Compliance with Investment Guidelines, Audit and Internal Control (SSAE 16) reports, and Form ADV Part 1, 2A, and 2B.

The Board requested a generic version of an ADV form.

IT WAS MOVED BY TREASURER SCHMIDT AND SECONDED BY MR. LECH AND CARRIED ON A VOICE VOTE TO ACCEPT THE MONITORING REPORTS.

AYES: MR. GESSNER, MR. ENGLESON, MS. SMITH, MS. TERNES, TREASURER SCHMIDT, MR. LECH, COMMISSIONER HAMM, MR. OLSON, MR. TRENBEATH, MR. SANDAL, AND LT. GOVERNOR WRIGLEY
NAYS: NONE
MOTION CARRIED

The board also received the final 2013-15 biennium budget report for their reference.

Mr. Hunter also provided a staff update. Efforts are still ongoing to fill the Data Processing Coordinator position, which has been vacant since May 29, 2015. In the interim, suggestions made by the board were to possibly outsource some of the duties or look into the State Government Student Internship Program.

IT WAS MOVED BY TREASURER SCHMIDT AND SECONDED BY MR. SANDAL AND CARRIED ON A VOICE VOTE TO ACCEPT THE 2013-15 BUDGET REPORT AND STAFF REPORT.

AYES: MR. OLSON, MR.TRENBEATH, MR. ENGLESON, MR. GESSNER, COMMISSIONER HAMM, MS. SMITH, MR. SANDAL, TREASURER SCHMIDT, MS. TERNES, MR. LECH, AND LT. GOVERNOR WRIGLEY
NAYS: NONE
MOTION CARRIED

OTHER:

The next scheduled SIB Audit Committee meeting is September 25, 2015, at 1:00 p.m. in the Ft. Union Room.

The next scheduled SIB meeting is October 23, 2015, at 8:30 a.m. in the Peace Garden Room.

ADJOURNMENT:

With no further business to come before the SIB, Lt. Governor Wrigley adjourned the meeting at 11:01 a.m.

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Lt. Governor Wrigley, Chair
State Investment Board

____
Bonnie Heit
Assistant to the Board

MEMORANDUM

TO: **TFFR Board**

FROM: **Fay Kopp**

DATE: **October 15, 2015**

SUBJ: **Trustee Education/NCTR Conference 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.

At its annual conferences and workshops, NCTR provides world-class speakers, leaders, and experts to provide pension and investment education and share insights. Unparalleled networking opportunities are available with pension trustees, administrators, and industry professionals from all over the country.

In July, Mike Burton attended the NCTR Trustee Workshop. In October, Kim Franz, Mel Olson, and Fay Kopp attended the NCTR Annual Conference. Trustees can provide a brief update on the education they received.

Reading: NASRA Issue Brief
GRS Perspectives

TFFR Board Calendar and Education Plan 2015-16

<u>JULY 23, 2015 – 10 am</u>
Election of Officers
Asset Liability Study Presentations
Annual TFFR Program Review
Annual Customer Satisfaction Reports
Qtrly Audit Services Update (3/30)
Qtrly Investment Update (3/30)

<u>SEPTEMBER 24, 2015 – 1 pm</u>
IRS Compliance Review Results
Asset Liability Study
Administrative Rules
Annual Investment Report (6/30)
Annual Budget and Expense Report
Annual Technology Report

<u>OCTOBER 22, 2015 – 1 pm</u>
2015 Actuarial Valuation Report – Segal
2015 GASB Report - Segal
Asset Liability Study
Actuarial Audit Planning
Annual TFFR Program Audit Report (6/30)
Education: Investment Reports

<u>JANUARY 21, 2016 – 1 pm</u>
2017 Legislative Planning
Asset Liability Study Report
Administrative Rules
Annual Retirement Trends Report
Annual Retirement Statistics Report
Qtrly Audit Services Update (9/30)
Qtrly Investment Update (9/30)
GASB Update
Education: Fiduciary Duties/Ethics

<u>MARCH 17, 2016 – 1 pm</u>
2017 Legislative Planning
Actuarial Audit Presentations
Annual Pension Plan Comparisons
Qtrly Audit Services Update (12/30)
Qtrly Investment Update (12/30)
Education: Disability & QDROs

<u>APRIL 21, 2016 – 1 pm</u>
2016-17 Board Calendar and Educ Plan
Education: Open Records/Open Meeting

Note: Agenda items or education topics may be rearranged if needed.

10/01/15

NASRA Issue Brief:
State Hybrid Retirement Plans

September 2015

Although hybrid plans have been in place in public sector retirement systems for decades, this plan design has received increased attention in recent years. This new focus occurs as states find that closing their traditional pension plan to future (and, in some cases, existing) employees could increase—rather than reduce—costs,[1] and that providing only a 401(k)-type plan does not meet important retirement security, human resource, or fiscal objectives. While most states have chosen to retain their defined benefit (DB) plan by modifying required employer and employee contributions, restructuring benefits, or both,[2] some have looked to so-called "hybrid" plans that combine elements of traditional pensions and individual account plans.

Many defined benefit plans in the public sector already contain hybrid plan elements, which shift some risk from the employer to plan participants. Hybrid plan elements commonly incorporated into traditional public sector defined benefit plans include employee contributions or benefits that are linked to the plan's investment performance or actuarial condition. The use of these hybrid plan elements are discussed in NASRA Issue Brief: Shared Risk in Public Retirement Plans.

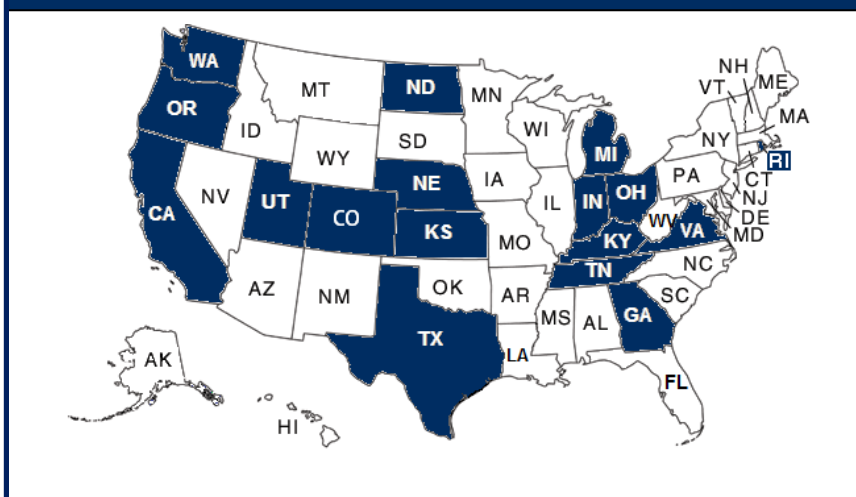
Although a hybrid retirement plan may take one of many forms, this brief examines two broad types in use in the public sector. The first is a cash balance plan, which marries elements of traditional pensions with individual accounts into a single plan (see Table 1). The second type combines a traditional DB plan, usually with a lower level of benefit accrual, with an individual defined contribution (DC) retirement savings account, referred to in this brief as a "DB+DC plan" (see Table 2). Despite variability among these plans, most contain the core features known to promote retirement security: mandatory participation, shared financing between employers and employees, pooled assets invested by professionals, targeted income replacement with survivor and disability protection, and a benefit that cannot be outlived.

Mandatory Participation

In the private sector, just one-half of the workforce participates in an employer-sponsored retirement plan, widely recognized as a major factor contributing to a lack of retirement security. By contrast, for nearly all employees of state and local government, retirement plan participation is mandatory.[3]

Employee participation remains mandatory in state hybrid plans. One partial exception is the Georgia Employees' Retirement System (ERS), which administers a hybrid plan for many of its members. Participation in the DB component of the plan is mandatory, and participants may elect to not participate in the DC component (although the vast majority have not exercised this election).

Figure 1: States that administer CB or DB+DC plans as a mandatory or optional primary retirement benefit for groups of general, public safety or K-12 educational employees



Most public employees also have access to a supplemental, voluntary individual retirement savings plan, such as a 401(k), 403(b) or 457 plan. In addition to mandatory participation in the primary plan, some public employers automatically enroll new hires in supplemental retirement savings plans, and participants may opt-out of these plans.

Shared Financing among Employers and Employees

Nearly all traditional pensions in the public sector require employees to contribute toward the cost of their retirement benefit,[4] and in the wake of the 2008-09 market decline and the Great Recession, many states have increased employees' required contributions.[5]

Hybrid plans also typically employ a shared financing approach to retirement benefits. State cash balance plans, which feature annual accruals on employee accounts (cash balances), are funded with mandatory contributions from both employees and employers.

DB+DC plans vary regarding which plan component and how much employees and employers are required to contribute. As examples, for the hybrid plans in Indiana, Ohio, Oregon, and Washington, the employer finances the entirety of the DB component, and the DC component is funded by mandatory employee contributions (ranging from 3 percent to 15 percent of salary). The Michigan Public Schools hybrid plan requires employees to contribute to the DB component on a graduated scale based on pay, and employers finance the remainder; employees are also required to make a mandatory two-percent-of-salary contribution to the DC component, which employers match at a 50 percent rate.

The Georgia ERS hybrid requires employees to contribute 1.25 percent of salary to the DB component, with the remainder financed by the employer. Employees are automatically enrolled in the DC component at 1 percent or 5 percent of salary, depending on date of hire, and may opt out or contribute more. Employers match the first 1 percent of salary and one-half of the next 4 percent of salary voluntarily contributed by the employee to the DC plan.

The Utah retirement system requires employers to contribute 10 percent of salary (12 percent for public safety) toward the DB plan's cost.[6] If the cost is less than the employer's contribution, the difference goes into employees' individual 401(k) savings account. If the cost of the DB plan exceeds the employer's contribution rate, employees must contribute the difference to the DB plan. In either instance, employees may elect to make additional contributions to the 401(k) plan. (Employers in Utah must also contribute to the Utah Retirement System to amortize the unfunded pension liability.)

North Dakota PEP

North Dakota offers most of its workers an optional hybrid retirement plan designed to provide greater portability.

Known as "PEP"—Portability Enhancement Program—North Dakota PERS participants can vest in the employer's portion of the defined benefit plan by participating in a supplemental deferred compensation account, funding a benefit that is more portable than the traditional defined benefit plan and similar to a defined contribution plan.

Pooled Assets

Retirement assets that are pooled and invested by professionals offer important advantages over individual, self-directed accounts. Combined portfolios have a longer investment horizon, which allows them to be more diversified and to sustain greater market volatility. In addition, the professional asset management and lower administrative and investment costs in pooled arrangements result in higher investment returns.

As with traditional pension plan assets, cash balance plan assets are pooled, invested by professionals, and guarantee annual returns to plan participants. Likewise, DB+DC plans pool assets in the DB component; the manner in which DC plan assets are managed varies. Most plans provide a range of risk-based investment options: some are retail mutual funds and others are maintained by the retirement system and available only to plan participants. Assets in the Oregon DC component, for example, are pooled and invested in a fund similar to the DB plan fund; participants do not have a choice regarding how their DC plan assets are managed. Similarly, Washington State provides an option for employees to invest their DC assets in a fund that emulates the DB plan fund.

Required Lifetime Benefit Payouts

A core objective of retirement plans is to provide lifetime income insurance. A major threat to lifetime income is known as longevity risk, which is the danger of exhausting assets before death. Ensuring lifetime income can be accomplished in part by pooling longevity risk, i.e., distributing that risk among many plan participants. The alternative is an arrangement, embodied in defined contribution plans, in which longevity risk is borne by individuals.

Most public sector plans require some or all of the pension benefit to be paid in the form of an annuity – installments over one's retired lifetime – rather than allowing benefits to be distributed in a lump sum. This not only better ensures participants will not exhaust retirement assets, but it also reduces costs by allowing retirement assets to be invested as part of the trust over a longer period, and by funding for average longevity rather than the maximum longevity.

As examples, the two statewide cash balance plans in Texas require participant accounts to be paid in the form of a lifetime benefit; county and district employees may elect to receive 100% of their benefit as a partial lump sum upon retirement. The Nebraska cash balance plan gives employees the option of receiving a lifetime benefit payout on any portion of their account balance, and to receive any portion of their retirement benefit as a lump sum.

DB+DC plans normally require the DB portion of the plan to be paid in the form of a lifetime annuity. The DC portion, however, usually may be paid out in various forms including a lifetime benefit, a lump sum or partial lump sum of the account balance, or installments over a certain term (e.g., 5, 10, 15 or 20 years).

Targeted Income Replacement with Social Security, Disability & Survivor Benefits

Pension plans typically are designed to replace a targeted portion of income in retirement, a feature not provided in retirement plans with individual accounts. Approximately 25 percent of state and local government employees do not participate in Social Security.[7] While most public sector retirement plan designs seek to replace a targeted percentage of income, they often also reflect the presence or absence of income from Social Security.

Benefits that provide income insurance in the event of death or disability are an important feature among public sector employers, particularly for jobs that involve hazardous conditions. Most public sector retirement plans—whether traditional or hybrid—include survivor and disability benefits, which is a cost-effective method for sponsoring these benefits.

Conclusion

Nearly every state has made changes in recent years to the retirement plans.[8] While DB plans remain the prevailing model, cash balance and DB+DC plans have been in place for many years in some states, and are new in others. The diversity in public sector plan design reflects the fact that a one-size-fits-all solution does not meet key retirement plan objectives, including the ability of public employers and to manage their workforce, to provide an assured source of adequate retirement income for workers. Like defined benefit plans, cash balance and DB+DC plans in the public sector vary from one jurisdiction to the next, and no single design will address the cost and risk factors of every state or local government.

A vital factor in evaluating a retirement plan is the extent to which it contains the core elements known to best meet human resource and retirement policy objectives of state and local governments: mandatory participation, shared financing, pooled investments, targeted income replacement with disability and survivor protections, and lifetime benefit payouts. These features are a proven means of delivering income security in retirement, retaining qualified workers who perform essential public services, and providing an important source of economic stability to every city, town, and state across the country.[9]

The fact that many pension plans sponsored by state and local governments already contain elements of hybrid plans illustrates the important fact that switching to a new hybrid plan design is not necessary to take advantage of hybrid plan design elements.

Most public retirement systems seek to provide a benefit that meets these objectives while balancing risk between employees and employer units. The information in the tables below illustrates the degree to which states are using various cash balance and DB+DC designs to achieve these objectives.

See Also

National Association of State Retirement Administrators, Resolution 2010-01: *Guiding Principles for Retirement Security and Plan Sustainability*, http://www.nasra.org/resolutions#RESOLUTION 2010-01

National Association of State Retirement Administrators Issue Brief: Shared-Risk in Public Retirement Plans, http://www.nasra.org/sharedriskbrief

National Conference of State Legislators, State Defined Contribution and Hybrid Pension Plans, http://www.ncsl.org/Portals/1/Documents/employ/StateDC-%20HybridRetirementPlans2010.pdf

National Institute on Retirement Security, *Still a Better Bang for the Buck: The Economic Efficiencies of Pensions*, 2014, http://www.nirsonline.org/index.php?option=com_content&task=view&id=871&Itemid=48

National Institute on Retirement Security, *Decisions, Decisions: Retirement Plan Choices for Public Employees and Employers*, 2011, http://www.nirsonline.org/storage/nirs/documents/Decisions%20Decisions/final_decisions_decisions_report.pdf

National Institute on Retirement Security, *Look Before You Leap: The Unintended Consequences of Pension Freezes*, 2008, http://www.nirsonline.org/index.php?option=com_content&task=view&id=173&Itemid=49

U.S. Department of Labor, Bureau of Labor Statistics, *National Compensation Survey: Employee Benefits in States and Local Government in the U.S.*, March 2015, http://www.bls.gov/news.release/ebs2.t01.htm

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[1] NASRA, "Costs of Switching from a DB to a DC Plan," http://www.nasra.org/plandesignchange

[2] NASRA, "Selected Approved Changes to State Public Pensions to Restore or Preserve Plan Sustainability," http://www.nasra.org/files/Compiled%20Resources/nasrasustainabilitychanges.pdf

[3] U.S. Department of Labor, Bureau of Labor Statistics, Retirement Benefits: Access, Participation and Take-Up Rates, July 2015, http://www.bls.gov/news.release/ebs2.t01.htm

[4] Public Fund Survey, www.publicfundsurvey.org

[5] NASRA, "Selected Approved Changes to State Public Pensions to Restore or Preserve Plan Sustainability," ibid.

[6] Employers are also required to contribute an actuarially determined rate each year to amortize the DB plan unfunded liability

[7] U.S. Government Accountability Office, "Social Security: Issues Regarding the Coverage of Public Employees," 2007, http://finance.senate.gov/imo/media/doc/1110607testmn1.pdf

[8] National Conference of State Legislatures, "State Retirement Legislation," http://www.ncsl.org/documents/employ/Basic-Presentation-July2012.pdf and NASRA, "Selected Approved Changes," supra

[9] National Institute on Retirement Security, *Pensionomics: Measuring the Economic Impact of State & Local Pension Plans,* 2014, http://www.nirsonline.org/index.php?option=content&task=view&id=861

Table 1: Overview of Cash Balance Hybrid Plans						
	Year plan approved	**Employee groups affected**	**Contributions**	**Rate of return applied to cash balances**	**Benefit payment options**	**Info online**
CA State Teachers	1995 for the Cash Balance Benefit Program, 2000 for the Defined Benefit Supplement	The Cash Balance Benefit Program is optional for part-time and adjunct educational workers; the Defined Benefit Supplement is a cash balance plan provided to full-time educators	EEs in the Cash Balance Benefit Program typically pay approximately 4% of earnings, depending on local bargaining agreements; Defined Benefit Supplement EEs contributed 2% from 2001-2010 Beginning in 2011, ER and EE contributions to the Defined Benefit Supplement are 8% each on compensation in excess of one-year of service credit ER must contribute at least 4% for Cash Balance Benefit participants and the combined EE/ER rate must be at least 8%	Guaranteed minimum interest rate is based on 30-year U.S. Treasury bonds for the period from March to February immediately prior to the plan year (3% for plan year 2013-14)	Lump-sum and/or monthly lifetime annuity or period certain monthly annuity	http://www.calstrs.com/sites/main/files/file-attachments/basics_cash_balance_plan.pdf
KS PERS	2012	Mandatory for EEs of state and local government, including education employees, hired after 1/1/15	EEs contribute 6% ER contributes between 3-6% depending on how long the member has been employed	Members are guaranteed an annual rate of return of 4% on their accounts	Retiring participants may annuitize their cash balance and may elect to take up to 30 percent as a lump sum. Participants may also elect to use a portion of their balance to fund an auto-COLA	http://www.kpers.org
KY RS	2013	Mandatory for new state and local EEs, judges, and legislators who become members on or after January 1, 2014	EEs contribute 5%; public safety EEs contribute 8% State contributes 4%; 7.5% for public safety EEs	Employee accounts are guaranteed 4% annual return; accounts also receive 75% of all returns above 4%	Member may choose annuity payments, a payment option calculated as the actuarial equivalent of the life annuity, or a refund of the accumulated account balance	https://kyret.ky.gov/employees/tierthree/Pages/default.aspx

* EE = employee; ER = employer

	Year plan approved	Employee groups affected	Contributions	Rate of return applied to cash balances	Benefit payment options	Info online
NE County and State	2002	Mandatory for county and state EEs* hired after 2002 and those hired previously who elected to switch from the DC plan	State EEs contribute 4.8%, county EEs contribute 4.5% State contributes 156% of EE rate; counties contribute 150% of EE rate	Based on the federal mid-term rate plus 1.5%: When the mid-term rate falls below 3.5%, EEs receive a 5% minimum credit rate When favorable returns combine with an actuarial surplus, the governing board may approve a dividend payment to EE accounts	Retiring participants may annuitize any portion of their cash balance and take a lump sum of any remainder. Members electing an annuity may also elect to take a reduced benefit with an automatic annual COLA	www.npers.ne.gov
TX County and District	1967	Mandatory for EEs of 600+ counties and special districts that have elected to participate in the TCDRS	EEs pay 4%, 5%, 6%, or 7% depending on ER election ERs pay normal cost plus amount to amortize the unfunded liability within a 20-year closed period	7% (set by statute): Used to reduce ERs' Members' accounts receive an annual interest credit of 7% as specified by statute	Lifetime annuity based on EE final savings account balance, less any EE-elected partial lump-sum payment, plus ER matching	http://www.tcdrs.org/TCDRS Publications/GuidetoMemberBenefits.pdf
TX Municipal	1947	Mandatory for EEs of 800+ cities that have elected to participate in the TMRS	EEs pay 5%, 6%, or 7%, depending on ER* election ER pays 100%, 150%, or 200% of EE rate, also depending on ER election, and adjusted based on unfunded liability	5% (set by statute): The TMRS Board determines the allocation of any excess amounts; the board is authorized to distribute such amounts a) to reduce cities' unfunded liabilities; b) to EEs' individual accounts, and/or c) to a reserve to help offset future investment losses	Annuity with or without a partial lump sum, depending on EE election	http://www.tmrs.com/down/pubs/TMRS_Facts_2014.pdf

Table 2: Basic Hybrid Plan Facts			
	Year plan approved	**Info online**	**Employee groups affected**
Colorado Fire & Police Pension Plan	2004	www.fppaco.org (see "Benefits" in left column	Firefighters and police officers employed by participating departments that elect coverage under this plan
Georgia Employees' Retirement System	2008	www.ers.ga.gov	Mandatory for new hires since 2009; optional for those hired before 2009 (EE* may opt-out of DC component within 90 days)
Indiana Public Retirement System	1955	http://www.in.gov/inprs/files/WhitePaper-UnderstandingINPRS.pdf	Mandatory except for EE hired after 2011 who may elect a DC plan only
Michigan Public Schools Retirement System	2010	http://www.mipensionplus.org/publicschools/yourplan.html	Mandatory for all new hires after 6/30/10
Ohio Public Employees' Retirement System	2002	http://www.opers.org	Optional for new hires and non-vested workers since 12/31/02
State Teachers' Retirement System of Ohio	2001	http://www.strsoh.org	Optional for new hires and non-vested workers since 2001
Oregon Public Employees' Retirement System	2003	http://www.oregon.gov/pers/Pages/about_us.aspx	Mandatory for all EEs (existing and new) since 2004
Rhode Island Employees' Retirement System	2011	https://d10k7k7mywg42z.cloudfront.net/assets/4f2feb51dabe9d2cb600fa49/final_rirsaguide_january2012.pdf	Mandatory for existing members of ERS with fewer than 20 years of service as of 6/30/12, as well as new hires (except judges and some public safety members)
Tennessee Consolidated Retirement System	2013	http://treasury.tn.gov/tcrs/PDFs/HybridPlanSummarySheet.pdf	Mandatory for new state and higher education employees and teachers hired as of 7/1/14; optional for local government entities
Utah Retirement System	2010	https://www.urs.org/mango/pdf/urs/Miscellaneous/tier2Compare.pdf	Mandatory for new hires as of 7/1/11; all EEs may elect DC-only plan
Virginia Retirement System	2012	http://www.varetirement.org/hybridemployer.html	Mandatory for most state and local employees, educational employees, and judges, hired as of 1/1/14 – excluding state police and other law enforcement officers
Washington Department of Retirement Systems	1996	http://www.icmarc.org/washingtonstate/plan-3-overview.html	Optional for most employee groups

Table 3: DB and DC Component Features							
	DB benefit formula (having met age/service requirements)	**DB plan contributions**	**Employer DC plan contributions**	**Employee DC plan contributions**	**DC plan investment options**	**Default DC plan investment options**	**DC plan withdrawal options**
Colorado Fire & Police Pension Plan	1.5% x years of service x highest average salary = annual benefit	The board of directors of FPPA annually determines the DB/DC split of the contributions to the plan.	Any excess amount not needed to fund the DB plan is contributed to the Money Purchase Plan.	Any excess not needed to fund the DB plan is contributed to the Money Purchase plan.	19 options, including a broad range of fixed income and equity funds, 11 target date funds, and a brokerage window	Age appropriate Target Date Fund	Lump sum, monthly periodic payments, monthly lifetime benefit, annuity from outside provider
GA Employees' RS	1% x years of service x final average salary = annual benefit	EE contributes 1.25% and ER contributes the remainder of the annual actuarially determined contribution rate	100% ER match on EE's 1st 1% of salary and 50% match on next 4% of salary for a maximum ER contribution of 3%	EEs hired before 7/1/14 auto enroll at 1% of salary contribution; EEs hired as of 7/1/14 auto enroll at 5% of salary; EEs may vary contribution rate up or down; participants may opt-out of the DC plan within 90 days of their date of hire	16 options ranging from conservative to aggressive, plus 5 lifecycle funds	Lifecycle funds based on age	Rollover, annuity, lump sum, partial lump sum, installments
Indiana Public RS	1.1% x years of service x final average salary = annual benefit	ER funds the DB benefit	None	3% of salary	7 options ranging from conservative to aggressive, and 10 target date funds, all administered by the retirement system	The Guaranteed Fund, which earns a fixed rate established annually by the Board	Annuity, rollover, partial lump sum and annuity, deferral until age 70½
Michigan Public Schools RS	1.5% x years of service x final average salary = annual benefit	EE contributes on a graduated scale based on pay; ER contributes remainder	ER contributes 1% of salary	2% of salary	Choice of active and passive investment options, target date funds, and a brokerage window	Target Retirement Fund that matches the year the participant will be eligible to retire	Lump sum, consolidation from other plans, direct rollover to an IRA, periodic distribution
Ohio Public Employees' RS	1% x up to 30 years of service x final average salary + 1.25% x years in excess of 30 x final average salary = annual benefit	ER funds the DB benefit	None	10% of salary	16 OPERS-sponsored funds including core and target date funds, plus a brokerage window	Target Date Fund closest to the year the participant turns 65	Annuity, including partial lump sum option plan; deferral until age 70½
Ohio State Teachers' RS	1% x years of service x final average salary = annual benefit	ER funds the DB benefit	None	10% of salary	8 STRS Ohio-sponsored options ranging from conservative to aggressive plus a guaranteed return option and target date funds	Earliest target date fund	Annuity including partial lump sum, lump sum or rollover

	DB benefit formula (having met age/service requirements)	DB plan contributions	Employer DC plan contributions	Employee DC plan contributions	DC plan investment options	Default DC plan investment options	DC plan withdrawal options
Oregon PERS	Varies depending upon date of hire and which of 3 DB plans EE is enrolled in	ER funds the DB benefit	Optional	6% of salary	All DC plan contributions are invested in a single, pooled fund that mirrors the DB plan fund	DB plan fund	DB plan fund
Rhode Island ERS	1% x years of service x final average salary = annual benefit	State EEs and teachers contribute 3.75% to the DB plan; municipal EEs contribute 1 or 2% based on COLA choice; municipal police and fire contribute 7 or 8% based on COLA election.	ER contributes between 1-1.5% for EEs covered by Social Security, and between 3-3.5% for non-covered EEs, depending on their years of service as of 6/30/12	State and local EEs and teachers contribute 5% to the DC plan; 3% for municipal police and fire EEs not covered by Social Security	12 target date funds and 10 funds ranging from conservative to aggressive	Age appropriate Target Retirement Fund	Age appropriate Target Retirement Fund
Tennessee Consolidated RS	1% x years of service x final average salary (maximum annual pension benefit of $80k, indexed by CPI)	EE contributes 5% to the DB plan ER contributes 4%	ER contributes 5% to the DC plan	EEs contribute 2%, with opt-out feature	11 target date funds and 15 options ranging from conservative to aggressive	Age appropriate Target Date portfolio	Age appropriate Target Date portfolio
Utah RS	1.5% x years of service x final average salary = annual benefit For public safety: 2% x years of service x final average salary = annual benefit	ER pays up to 10% of pay, 12% for public safety.	ER contributes 10% (12% for public safety); if DB cost is more, EE must pay but if less, the difference is applied to EE's DC account	EE contributions optional	12 risk-based options	Age-appropriate target date fund	Age-appropriate target date fund
Virginia RS	1% x years of service x final average salary = annual benefit	EE contributes 4% to the DB plan; ER contributes an actuarially determined amount to fund the DB benefit (less employer DC contributions)	Mandatory ER contributions of 1% - increases with EE contributions up to 3.5% maximum	EEs may contribute up to 5% to the DC plan (1% minimum)	11 options ranging from conservative to aggressive, plus 10 target date funds.	Target Date Funds based on the participant's age at enrollment	Target Date Funds based on the participant's age at enrollment
Washington Department of RS	1% x years of service x final average salary = annual benefit	ER funds the DB benefit	None	5% to 15% of salary depending on EE	Either the total allocation portfolio, which mirrors DB plan fund, or 7 self-directed funds ranging from conservative to aggressive, plus target date funds	Target Date Funds based on the participant's age at enrollment	Lump sum, direct rollover, scheduled payments, personalized payment schedule, and annuity purchase

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Understanding the Impact of Negative Cash Flow on a Public Pension Plan

Lance Weiss, EA, FCA, MAAA

Public-sector pension plans are designed to provide public employees with a pension upon their retirement. But where does the money come from to make the pension payments? Very simply stated, the goal is for employees and their employers to make periodic contributions to a pension fund, which together with investment returns on the invested contributions, will be sufficient to pay all promised benefits upon the members' retirement. This concept is illustrated by the following basic public pension plan financing equation:

B + E = I + C

where:
B = Benefits Paid
E = Administrative Expenses
I = Investment Return on Plan Assets
C = Contributions

In this equation, the benefits paid are determined by negotiated and/or legislated plan provisions. Administrative expenses are generally determined by system policies. Investment return is determined by investment policies (including liquidity issues). Contributions are generally shared by employees and their employer, with the amount of employee and employer contributions generally set by statute, plan document, or other contract.

Annual employee and employer contributions represent a systematic means of pre-funding the system's costs. The benefit of pre-funding is that investment return on the pre-funded plan assets reduces the employer's long-term contributions.

Retirement plans that have been in operation for a number of years generally have contributions coming in and benefits being paid out each year. The net (non-investment) cash flow is the difference between the contributions and benefits and expenses. These cash flows will vary for each plan since all plans have different demographics and maturities.

Using the same basic public pension plan financing equation, net (non-investment) cash flow is determined by:

Net Cash Flow = C - B - E

where:
C = Contributions
B = Benefits Paid
E = Administrative Expenses

Consequently, if C – B – E is negative, the plan has a negative cash flow and if C – B – E is positive, the plan has a positive cash flow. Younger plans tend to have positive cash flows, whereas more mature plans may have negative cash flows. There is nothing necessarily wrong with a plan having negative cash flows. In fact, it is expected that all plans will have negative cash flows over time, which is considered the normal cycle of a pension plan.

Further, when assessing the impact of cash flow on a pension plan, it is important to remember why a pension plan has assets - **to pay benefits**. Although a plan has negative cash flow, it does not necessarily imply it is in trouble. In fact, some would say that the primary purpose of pre-funding is so the investment return can pay a significant portion of the benefit payments.

Understanding the Impact of Negative Cash Flow on a Public Pension Plan

For example, a mature plan with a one-to-one ratio of actives to retirees that is well funded may have negative cash flow, but be actuarially sound. On the other hand, a poorly funded plan that has negative cash flow may be indicative of a plan that is in need of significant (and potentially unaffordable) increases in annual employer contributions.

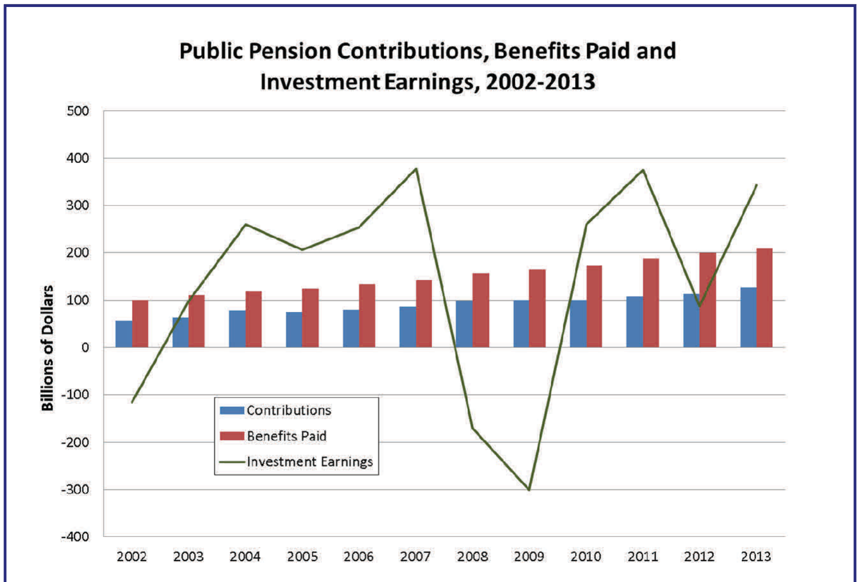
One potential warning sign for mature plans is if the amount of negative cash flow as a percentage of the plan assets starts to get excessive. For example, if the funded ratio of a plan is significantly below 100%, then negative cash flows now represent a much larger percentage of the assets. This can be an indicator that the plan may need to have a more aggressive funding policy.

A plan in a negative cash flow situation that does not have enough liquidity to make all the required benefit payments may be forced to change its investment portfolio to one comprised of a larger percentage of short-term (cash generating) investments. Such a change in investment policy may result in the plan's actuary recommending a reduction in the investment return assumption. The direct result will be a significant increase in the annual contribution requirement of the plan which, in turn, will reduce the amount of the negative cash flow.

As more and more baby boomers retire, the negative cash flow problem could potentially worsen. For example, according to an analysis by the Center for State & Local Government Excellence of the Current Population Survey, 50% of the U.S. public-sector workforce is age 45 or older.[1] This suggests that a large portion of the public-sector workforce will be eligible for retirement within 10 years.

In fact, it is typical for mature plans to experience negative cash flow. The chart below, reproduced from the 2015 Public Fund Survey, plots the combined revenues and expenditures of 100 large public retirement systems. The green line reflects investment gains and losses, which vacillate as investment markets fluctuate. The blue bars indicate total contributions from employees and employers and the red bars show benefit payments.

As this chart indicates, benefit payments exceeded contributions each year during the period from 2002 through 2013 for the plans included in the survey. The good news is that investment earnings were available in most years to offset the negative cash flows.



Source: NASRA, Public Fund Survey, Summary of Findings, January 2015.

In summary, negative (non-investment) cash flow is not, by itself, an indication of financial or actuarial distress for a public pension plan.

However, a larger (i.e., more negative) cash flow may require the system's assets to be managed more conservatively, with a larger allocation to more liquid assets in order to meet current benefit payroll requirements. This is likely to result in the plan's actuary recommending a reduction in the investment return assumption and a significant increase in the annual contribution requirement of the plan.

[1] Joshua Franzel, Retirement Security: The Evolving Social Contract, Center for State & Local Government Excellence (SLGE), June 9, 2015. Presentation at the SLGE Retirement Security Summit.

About the Author

Lance Weiss, EA, FCA, MAAA is a Senior Consultant with more than 30 years of actuarial and retirement consulting experience.

During his career, Lance has worked with large public-sector entities and private corporations, coordinating retirement benefits with other elements of total compensation programs.

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