

Agenda

ND Teachers' Fund for Retirement Board Meeting

Thursday, October 27, 2016
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 22, 2016 Meeting – Pres. Gessner (Board Action) 5 min
3. 2016 Valuation Report – Kim Nicholl and Matt Strom, Segal (Board Action) 60 min
4. Actuarial Audit Report Response – Kim Nicholl and Matt Strom, Segal (Information) 10 min
5. National Public Pension Issues – Kim Nicholl and Matt Strom, Segal (Information) 10 min
6. Board Education: ND Education Demographics – Jerry Coleman, DPI (Information) 30 min
7. Investment Update – Dave Hunter (Information) 10 min
8. Legislative Update – Fay Kopp (Information) 10 min
9. Board Policies – Fay Kopp (Board Action) 15 min
10. Annual TFFR Program Audit Report – Terra Miller Bowley (Board Action) 10 min
11. Trustee Education Reports (Information) 10 min
NCTR Conference – Mel Olson, Toni Gumeringer
Callan College – Mike Burton
12. Other Business
13. Adjournment

Next Board Meeting: January 26, 2017

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 22, 2016, BOARD MEETING**

BOARD MEMBERS PRESENT: Mike Gessner, President
Kirsten Baesler, State Superintendent
Mike Burton, Trustee
Toni Gumeringer, Trustee
Rob Lech, Trustee
Mel Olson, Trustee
Kelly Schmidt, State Treasurer

STAFF PRESENT: Connie Flanagan, Fiscal & Invest Op Mgr
David Hunter, ED/CIO
Fay Kopp, Deputy ED/CRO
Terra Miller Bowley, Audit Services Supervisor
Rich Nagel, Information Systems Supervisor
Darlene Roppel, Retirement Assistant
Shelly Schumacher, Retirement Program Manager

OTHERS PRESENT: Erica Cermak, NDRTA
Jon Martinson, NDSBA
Janilyn Murtha, Attorney General's Office
Becky Pitkin, ESPB
Dan Sipes, Deputy CIO, NDITD

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 22, 2016, in the Peace Garden Room at the State Capitol in Bismarck, ND.

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

APPROVAL OF AGENDA:

The Board considered the meeting agenda.

MR. OLSON MOVED AND MR. LECH SECONDED TO APPROVE THE AGENDA AS PRESENTED.

AYES: TREASURER SCHMIDT, MR. BURTON, MR. LECH, MRS. GUMERINGER, MR. OLSON, AND PRESIDENT GESSNER

NAYS: NONE

MOTION CARRIED.

ABSENT: SUPT. BAESLER

MINUTES:

The board considered the minutes of the regular TFFR board meeting held July 21, 2016, and the special board meeting held July 22, 2016.

MRS. GUMERINGER MOVED AND MR. BURTON SECONDED TO APPROVE THE MINUTES OF THE REGULAR TFFR BOARD MEETING HELD JULY 21, 2016, AND THE SPECIAL TFFR BOARD MEETING HELD JULY 22, 2016.

AYES: MR. LECH, MR. OLSON, TREASURER SCHMIDT, MR. BURTON, MRS. GUMERINGER, AND PRESIDENT GESSNER

NAYS: NONE

MOTION CARRIED.

ABSENT: SUPT. BAESLER

Supt. Baesler arrived at 1:13 p.m.

BOARD EDUCATION:

Mrs. Kopp introduced Mr. Sipes, Deputy Chief Information Officer with the state of North Dakota Information Technology Department (NDITD). Mr. Sipes presented information on the current state of cybersecurity, cybersecurity principles and ND cybersecurity initiatives. Cybersecurity is the number one priority of the NDITD. Mr. Sipes explained that effective security encompasses the following cybersecurity principles: identify, protect, detect, respond and recover. Mr. Sipes commented on the cyberattack which occurred last year affecting WSI and TFFR member information, the work of the Governor's Cybersecurity Task Force, and the State Auditor Specialized Security Audit.

Mrs. Kopp thanked Mr. Sipes for the excellent service ITD provides to the Retirement and Investment Office (RIO).

ANNUAL RIO TECHNOLOGY REPORT:

Mr. Nagel, Information Systems Supervisor, presented the annual technology report. With the hiring of Mr. Len Wall in February 2016, the IT department is fully staffed. The member online application is about 90% complete and will be deployed soon. RIO is currently in the beginning stages of researching cyber insurance and has budgeted for it in the next biennium. Current and future IT initiatives were also reviewed.

Mrs. Kopp thanked Mr. Nagel for a job well done.

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

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

NAYS: NONE

MOTION CARRIED.

TFFR MEMBER AND EMPLOYER ONLINE DEMO:

Mrs. Schumacher and Mr. Nagel gave a demonstration of the current TFFR employer web services and the member web services that will be available soon. Active and retired members will have access to their member account information, such as member account value, salary and service history, monthly pension benefit details, and annual statements. Seventy-eight percent of employers are reporting online, which comprises 95% of membership. Treasurer Schmidt requested that a report on the timeline for transition from paper to online reports be added to the Ends report given each year to the board.

2015-16 RE-EMPLOYED RETIREE REPORT:

Mrs. Schumacher reviewed the 2015-16 TFFR Re-employed Retiree Report. The total number of re-employed retirees was 325 out of a total of 8,249 retirees (4%). Retirees were hired in 139 of the 214 school districts. Total salaries earned by re-employed retirees were \$8.66 million or about \$26,000 per retiree. All areas are now considered critical shortage by the Education Standards and Practices Board (ESPB). After discussion,

TREASURER SCHMIDT MOVED AND MR. OLSON SECONDED TO ACCEPT THE 2015-16 RE-EMPLOYED RETIREE REPORT.

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

NAYS: NONE

MOTION CARRIED.

RETIREE SUBSTITUTE TEACHING:

Mrs. Kopp reported on the meeting held with stakeholder groups to discuss TFFR's interpretation of contracted in-staff subbing, particularly as it pertains to re-employed retirees. The stakeholder groups were generally in agreement that no changes should be made that will negatively impact the plan or require legislative changes at this time. Ms. Miller-Bowley reviewed findings related to in-staff subbing by re-employed retirees in employer compliance audits.

Mrs. Kopp outlined options for board consideration. After discussion, the Board directed Mrs. Kopp to continue the current practice and to draft a board policy to clarify the current practice which, for both active members and re-employed retirees, TFFR uses the calendar dates indicated on the teacher's contract to determine the length of the teacher's contract period for in-staff subbing.

MR. BURTON MOVED AND MRS. GUMERINGER SECONDED TO ACCEPT THE RETIREE SUBSTITUTE TEACHING REPORT.

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

NAYS: NONE

MOTION CARRIED.

The meeting recessed at 3:08 p.m. and reconvened at 3:20 p.m.

ANNUAL TFFR INVESTMENT REPORT:

Mr. Hunter presented the annual TFFR investment report including investment performance, asset allocation, and investment returns, for the fiscal year ending June 30, 2016. The net investment return for the fiscal year ending 6/30/16 was 0.28%. The 5-year average was 6.32% and 30-year average was 7.73%. During the last 5 years, asset allocation and active management generated over \$515 million and \$45 million of TFFR's net investment income, respectively. TFFR's investment returns have consistently ranked in the second quartile of the Callan Public Fund database over the last five years. Risk has declined from over 115% to approximately 105% on a rolling 3- and 5-year basis. Mr. Hunter explained TFFR's net investment position declined by \$18 million last year as benefit payments exceeded contributions by \$24 million, while net investment earnings were only \$8 million (after investment expenses). Mr. Hunter reported that TFFR's fees declined from 63 bps to 52 bps in the last year due to various fee reductions which have been realized from strong asset growth in North Dakota. He also gave an update on economic and capital markets. After board discussion,

TREASURER SCHMIDT MOVED AND MR. LECH SECONDED TO ACCEPT THE ANNUAL TFFR INVESTMENT REPORT.

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

NAYS: NONE

MOTION CARRIED.

ANNUAL RIO BUDGET AND EXPENSE REPORT:

Mrs. Flanagan reviewed the annual RIO budget and expense report for the fiscal year ending June 30, 2016. She explained continuing appropriations and budgeted expenditures. With 50% of the biennium remaining, more than 50% of the budget is available. Mrs. Flanagan explained the budget request for the 2017-2019 biennium that was submitted to the Office of Management and Budget (OMB). RIO is a special fund agency and therefore, does not receive any general funds. The budget request includes over 9% decrease in operating expenses. An additional \$75,000 was requested in an optional package request for cyber risk insurance.

After board discussion,

MR. OLSON MOVED AND MR. BURTON SECONDED TO ACCEPT THE ANNUAL RIO BUDGET AND EXPENSE REPORT.

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

LEGISLATIVE UPDATE:

Mrs. Kopp updated the board on the meetings of the Legislative Council Employee Benefits Programs Committee (EBPC). Segal will present the 2016 actuarial valuation report at the October 26, 2016, meeting. To date, there are no TFFR related bills submitted for interim study. Mrs. Kopp was asked to comment on the actuarial audit that was conducted by Cavanaugh Macdonald at the next meeting.

BOARD POLICIES:

Mrs. Kopp brought five draft board policy changes to the board for consideration as discussed at the July 21, 2016 board meeting.

Board Policy B-2: Goals-update terms used to describe the TFFR outreach programs.

TREASURER SCHMIDT MOVED AND MR. OLSON SECONDED TO ADOPT THE AMENDMENTS TO B-2 "GOALS".

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

Board Policy B-6: Membership Data and Contributions-update language and incorporate an Audit Committee change.

TREASURER SCHMIDT MOVED AND MRS. GUMERINGER SECONDED TO ADOPT THE AMENDMENTS TO B-6 "MEMBERSHIP DATA AND CONTRIBUTIONS".

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

Board Policy B-7: Member Services-update terms and services.

TREASURER SCHMIDT MOVED AND MR. LECH SECONDED TO ADOPT THE AMENDMENTS AND REMOVE "GREATER" FROM #11 OF B-7 "MEMBER SERVICES".

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

Board Policy C-8: Employer Reporting Errors-update and clarify language.

MR. LECH MOVED AND MR. BURTON SECONDED TO ADOPT THE AMENDMENTS TO C-8 "EMPLOYER REPORTING ERRORS".

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

NAYS: NONE

MOTION CARRIED.

Board Policy C-9: Employer Reports-update and clarify language.

TREASURER SCHMIDT MOVED AND SUPT. BAESLER SECONDED TO ADOPT THE AMENDMENTS TO C-9 "EMPLOYER REPORTS".

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

NAYS: NONE

MOTION CARRIED.

Mrs. Kopp reviewed the proposed new policies, C-21 "Board Appeals" and C-22 "Board Communications". At the board's request, the new policies will be added to the next board meeting agenda for second reading and final approval. This will give members and the public additional time to comment on new board policies.

The Board also directed Mrs. Kopp to develop a board policy for the next board meeting that outlines the steps in adopting new policies.

Supt. Baesler left meeting at 4:35 p.m.

SIB AND TFFR CUSTOMER SATISFACTION SURVEYS:

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

MR. OLSON MOVED AND MR. BURTON SECONDED TO SUBMIT THE ANNUAL CUSTOMER SATISFACTION SURVEY RESPONSE AS PRESENTED TO THE SIB.

AYES: MRS. GUMERINGER, MR. BURTON, MR. LECH, MR. OLSON, TREASURER SCHMIDT, AND PRESIDENT GESSNER.

NAYS: NONE

MOTION CARRIED.

ABSENT: SUPT. BAESLER

Mrs. Kopp commented on the TFFR customer satisfaction survey received from North Dakota Council of Educational Leaders (NDCEL).

IN MEMORIAM BOARD RESOLUTION:

Mrs. Kopp requested the adoption of a memorial resolution for Mr. Scott Engmann, a former Executive Director of RIO, who passed away last year. The resolution will also be sent to the National Council on Teacher Retirement (NCTR).

**Resolution in Memoriam
Scott R. Engmann**

WHEREAS, Mr. Scott Engmann, retired Executive Director of the ND Teachers' Fund for Retirement (NDTFFR) and ND Retirement and Investment Office (NDRIO), passed away on February 18, 2015; and

WHEREAS, Mr. Engmann dedicated a professional career which spanned over 30 years to the state of North Dakota by serving 18 years as NDTFFR/NDRIO Executive Director until his retirement in 1999, as well as other ND administrative and teaching positions; and

WHEREAS, Mr. Engmann served as President, Executive Committee member, active participant and cherished friend of the National Council on Teacher Retirement (NCTR);

WHEREAS, Mr. Engmann was a zealous defender of pension security and earned a reputation as a strong advocate for defined benefit plans, cost efficient pension administration, and high-quality customer service; and

WHEREAS, Mr. Engmann provided steadfast leadership on pension issues, and supported efforts to improve member benefits, prudently invest trust fund assets, and safeguard the financial integrity of the fund; and

WHEREAS, Mr. Engmann distinguished himself as an outstanding pension administrator whose invaluable knowledge, experience, integrity, and compassion served fund members; now, therefore, be it

RESOLVED, that the NDTFFR Board, with a deep sense of loss, fondly remembers Mr. Scott Engmann for his tireless efforts to protect and enhance retirement security of teachers and public employees, and be it further

RESOLVED, that the Board extends its sympathy to Scott's daughters, Cassie Kress and Janelle Kisow, and their families; and be it further

RESOLVED, that a copy of this Resolution be presented to Mr. Scott Engmann's family, and submitted to the National Council on Teacher Retirement on behalf of the many lives he has so positively touched.

MR. LECH MOVED AND MR. OLSON SECONDED TO APPROVE THE RESOLUTION IN MEMORIAM OF SCOTT ENGMANN.

AYES: MR. OLSON, MR. LECH, MRS. GUMERINGER, TREASURER SCHMIDT, MR. BURTON, AND PRESIDENT GESSNER.

NAYS: NONE

MOTION CARRIED.

ABSENT: SUPT. BAESLER

CONSENT AGENDA:

TREASURER SCHMIDT MOVED AND MR. LECH SECONDED TO APPROVE THE CONSENT AGENDA WHICH CONSISTED OF QDRO # 2016-05.

AYES: MR. BURTON, MRS. GUMERINGER, MR. OLSON, TREASURER SCHMIDT, MR. LECH, AND PRESIDENT GESSNER.

NAYS: NONE

MOTION CARRIED.

ABSENT: SUPT. BAESLER

OTHER BUSINESS:

The next regular board meeting will be held October 27, 2016, in the Peace Garden Room at the State Capitol.

All presentations and reports from this meeting are on file at RIO.

ADJOURNMENT:

With no further business to come before the Board, President Gessner adjourned the meeting at 4:45 p.m.

Respectfully Submitted:

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

Darlene Roppel
Reporting Secretary

MEMORANDUM

TO: TFFR Board
FROM: Fay Kopp
DATE: October 20, 2016
SUBJ: 2016 Actuarial Valuation Report

Kim Nicholl and Matt Strom, Segal Consultants, will be at the October board meeting to present the recently completed 2016 actuarial valuation of the NDTFFR plan (attached).

As you can see, TFFR's:

- **Funded ratio** (based on actuarial value of assets or AVA) increased slightly from 61.6% to **62.1%** as of July 1, 2016.
- **Actuarially determined contribution (ADC)** increased from 13.04% to **13.22%** this year. This rate is greater than the 12.75% statutory employer rate, so there is a **small contribution deficiency of (0.47)%** of payroll.
- **Net unrecognized investment loss of \$105 million** from previous years that has not yet been recognized in the AVA because of the 5-year smoothing. As these losses are recognized over the next 4 years, the funded ratio is expected to decline, assuming the plan earns 7.75% in the future.
- **Unfunded actuarial accrued liability (UAAL)** increased from \$1.32 billion to **\$1.36 billion**.

GASB 67 information at the plan level is also part of the 2016 valuation report. TFFR's:

- **Net Plan Liability (NPL)** (which is very similar to the plan's UAAL on a market basis) increased from \$1.31 billion to **\$1.47 billion** as of June 30, 2016.
- **Plan Net Position** as a percentage of total pension liability (based on market value of assets) decreased from 62.1% to **59.2%**.

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

Please review this important 2016 funding and financial information and plan to discuss at the meeting.

Attachment



North Dakota Teachers' Fund for Retirement

Actuarial Valuation as of July 1, 2016

October 27, 2016

Presented By:

*Kim Nicholl, FSA, MAAA, EA
Senior Vice President*

*Matt Strom, FSA, MAAA, EA
Vice President*

This document has been prepared by Segal Consulting for the benefit of the Board of Trustees of the North Dakota Teachers' Fund for Retirement and is not complete without the presentation provided at the October 27, 2016 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**
- **Valuation Results and Projections**
- **Actuarial Audit and Update on Public Sector Topics**

Purposes of the Actuarial Valuation

- Report the Fund's actuarial assets
- Calculate the Fund's liabilities
- Determine the funding policy Actuarially Determined Contribution (ADC) for fiscal year 2017 and compare to the statutory employer contribution
- Determine the effective amortization period
- Explore the reasons why the current valuation differs from the prior valuation
- Provide information for annual financial statements

The Valuation Process

Input

Member Data
Asset Information
Benefit Provisions
Actuarial Assumptions
Funding Methodology



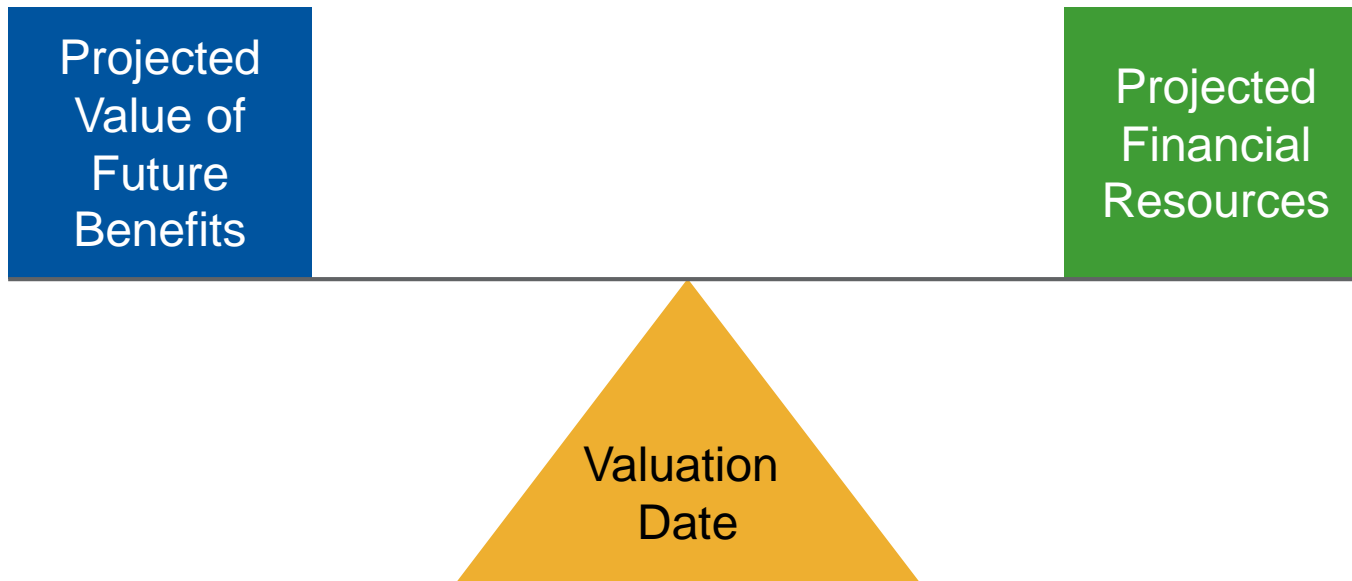
Results

Actuarial Value of Assets
Normal Cost and Actuarial Liability
Unfunded Liability and Funded Ratio
Funding Period
Actuarially Determined Employer
Contribution
Accounting Results

How is an Actuarial Valuation Performed?

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

Actuarial Balance



Over the life of a pension system,

$\text{Benefits} + \text{Expenses} = \text{Contributions} + \text{Investment Return}$

$\text{Contributions} = \text{Benefits} + \text{Expenses} - \text{Investment Return}$

Actuarially Determined Contribution vs. Funding Period

Actuarially Determined Contribution (ADC)

- Equal to the normal cost plus amortization of the unfunded actuarial accrued liability (UAAL)
- The funding policy components:
 - Entry age cost method
 - Asset valuation method – five-year smoothing period with a 20% corridor
 - Amortization period – closed 30 year period beginning July 1, 2013, as a level percentage of payroll (27 years as of July 1, 2016)

Funding Period

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

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

Actuarial Assumptions

Two types:

Demographic

- Retirement
- Disability
- Death in active service
- Withdrawal
- Death after retirement

Economic

- Inflation – 2.75%
- Investment return – 7.75%
- Salary increases – 14.50% for new members to 4.25% for members with 25+ years
- Payroll growth – 3.25%

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

Actuarial Methods

Asset Valuation Method (Actuarial Assets)

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

Cost Method

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

Amortization Method

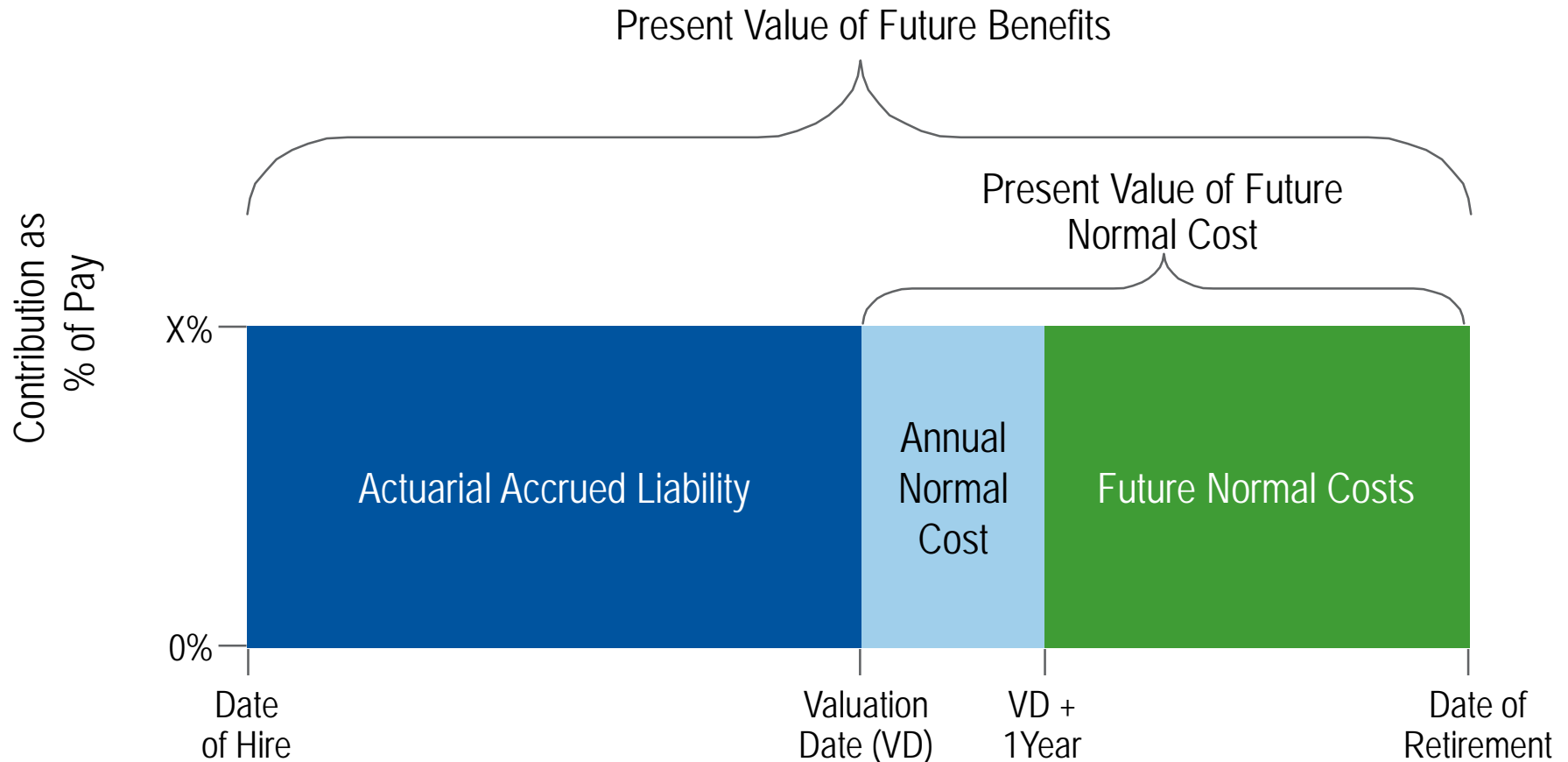
- Relies on two inputs:
 - Number of years to amortize the UAL
 - Level dollar or level percentage of payroll approach
- TFFR's amortization method:
 - 30-year closed period that began July 1, 2013
 - 27 years remaining
 - Level percentage of payroll

Entry Age Normal Cost Method

Allocates Cost Between Past and Future service

- **Normal Cost:** Cost of annual benefit accrual as a level percent of salary
- **Actuarial Accrued Liability:** Represents accumulated value of past normal costs (or difference between total cost and future normal costs)
- **Unfunded Actuarial Accrued Liability:** Actuarial accrued liability minus actuarial value of assets
- **Actuarially Determined Employer Contribution:**
 - Normal cost (net of member contributions) plus
 - Amortization payment of unfunded accrued liability over a 27-year closed period as a percent of payroll
 - 30-year closed period began July 1, 2013

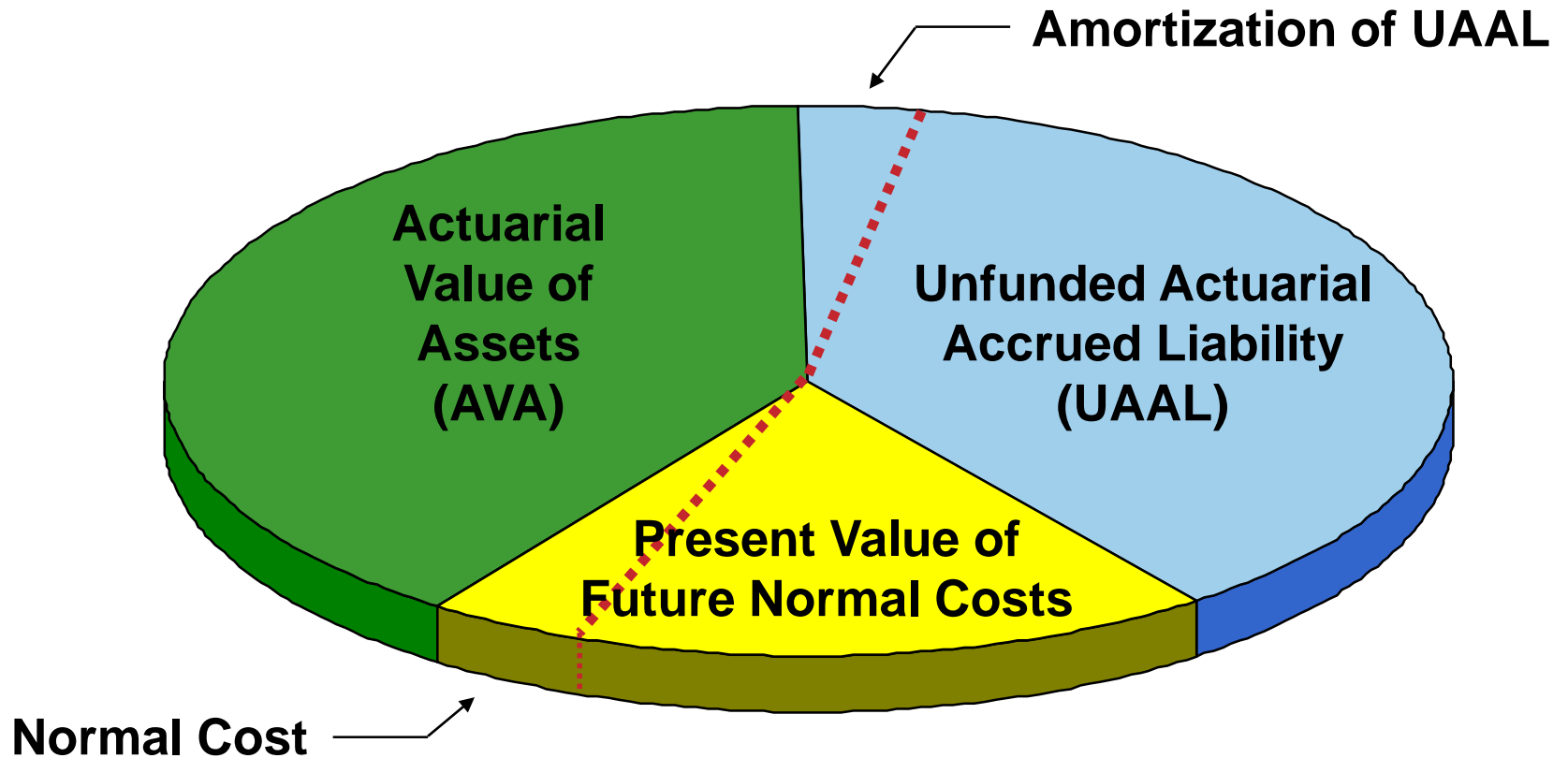
Funding Process



$$\text{Actuarial Accrued Liability} - \text{Assets} = \text{Unfunded Actuarial Accrued Liability}$$

Actuarially Determined Contribution

Present Value of Future Benefits



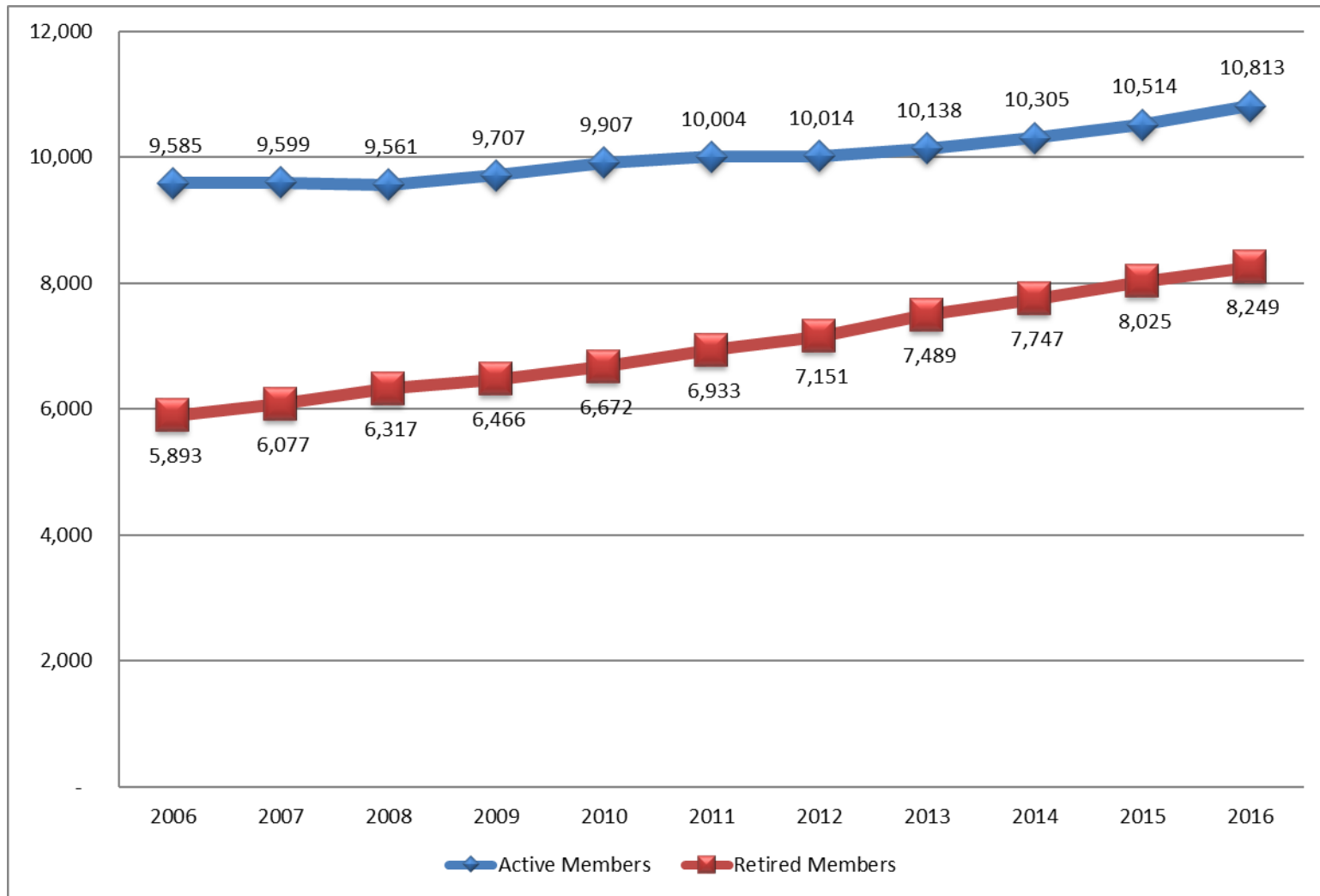
Summary of Valuation Highlights

- Market value of assets returned 0.39% for year ending 6/30/16 (Segal calculation)
 - Gradual recognition of deferred gains resulted in 6.16% return on actuarial value of assets
- Net impact on funded ratio was an increase from 61.6% (as of 7/1/15) to 62.1% (as of 7/1/16)
- Effective amortization period remained unchanged at 29 years
- Net impact on actuarially determined contribution (ADC) was an increase from 13.04 % of payroll (FY15) to 13.22% of payroll (FY16)
 - Based on the employer contribution rate of 12.75% for FY15, the contribution deficiency has increased from 0.29% of payroll to 0.47% of payroll
- GASB Net Pension Liability increased from \$1.31 billion as of 6/30/15, to \$1.47 billion as of 6/30/16

Membership

	2016	2015	Change
Active			
• Number	10,813	10,514	+2.8%
• Payroll (annualized)	\$627.0 mil	\$589.8 mil	+6.3%
• Average Age	42.3 years	42.5 years	- 0.2 years
• Average Service	12.1 years	12.4 years	- 0.3 years
Retirees and Beneficiaries			
• Number	8,249	8,025	+2.8%
• Total Annual Benefits	\$187.2 mil	\$177.4 mil	+5.5%
• Average Monthly Benefit	\$1,891	\$1,842	+2.7%

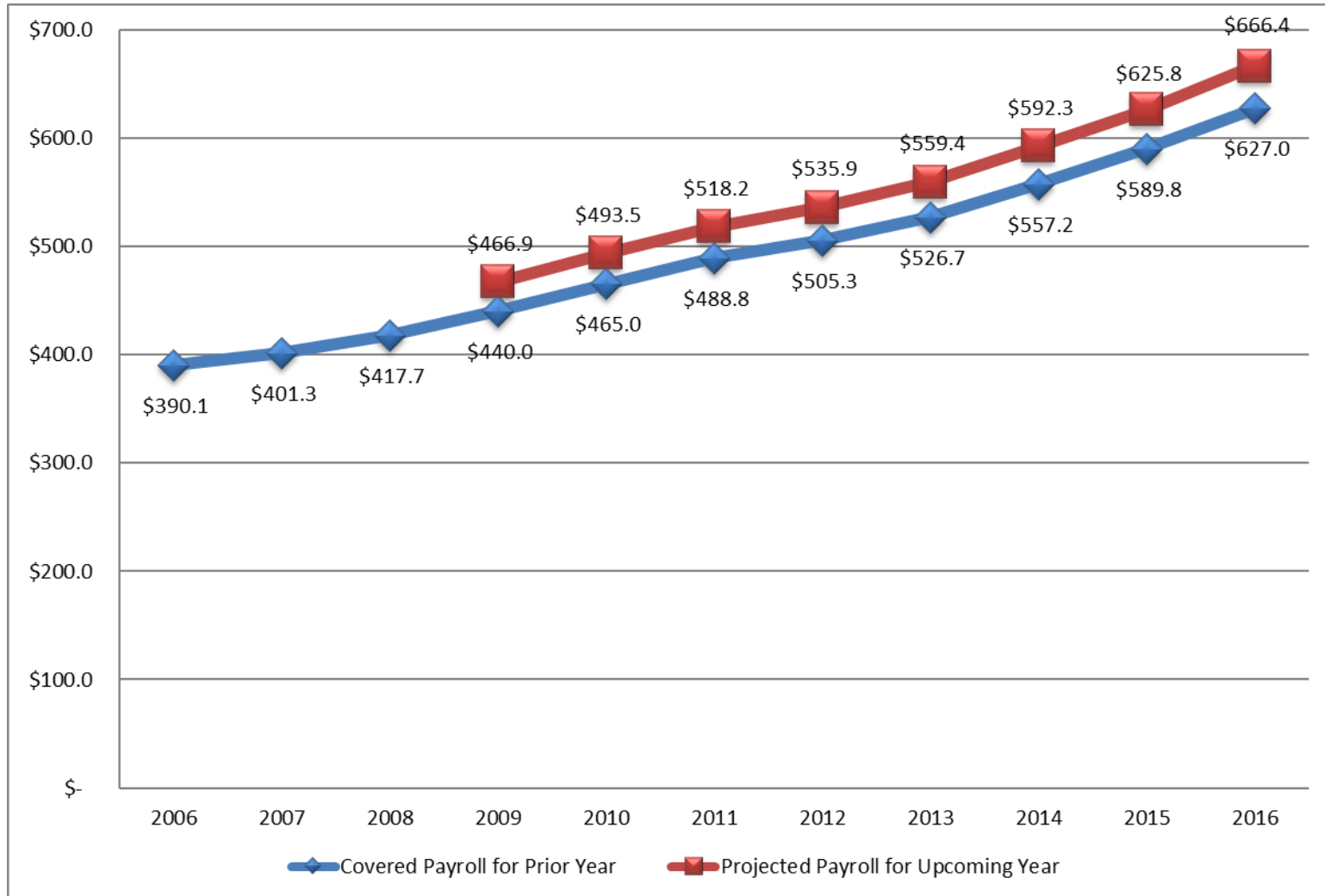
Active and Retired Membership



Since 2006, number of retirees and beneficiaries has increased 3.4% per year on average.

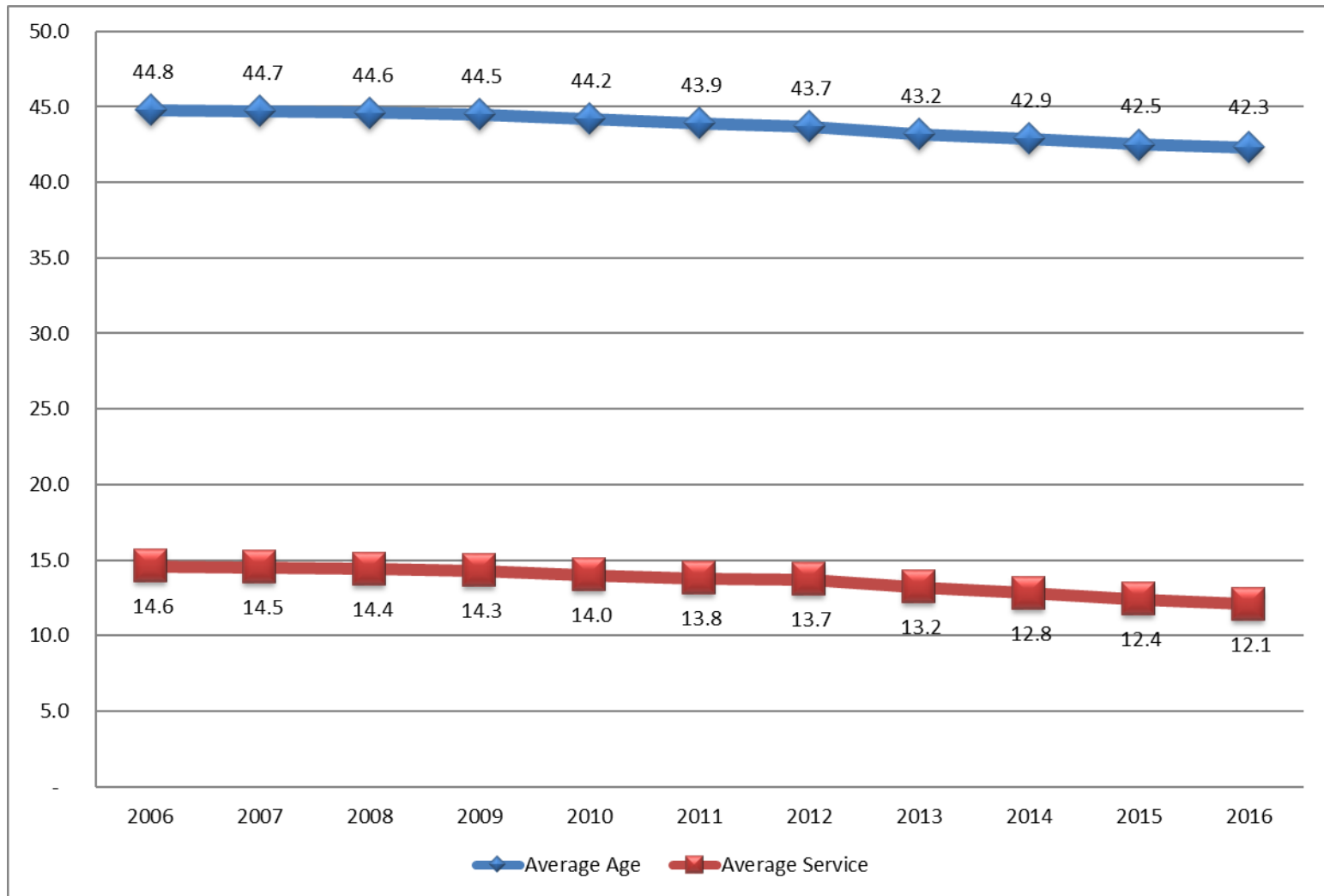
Active Payroll

\$ Millions

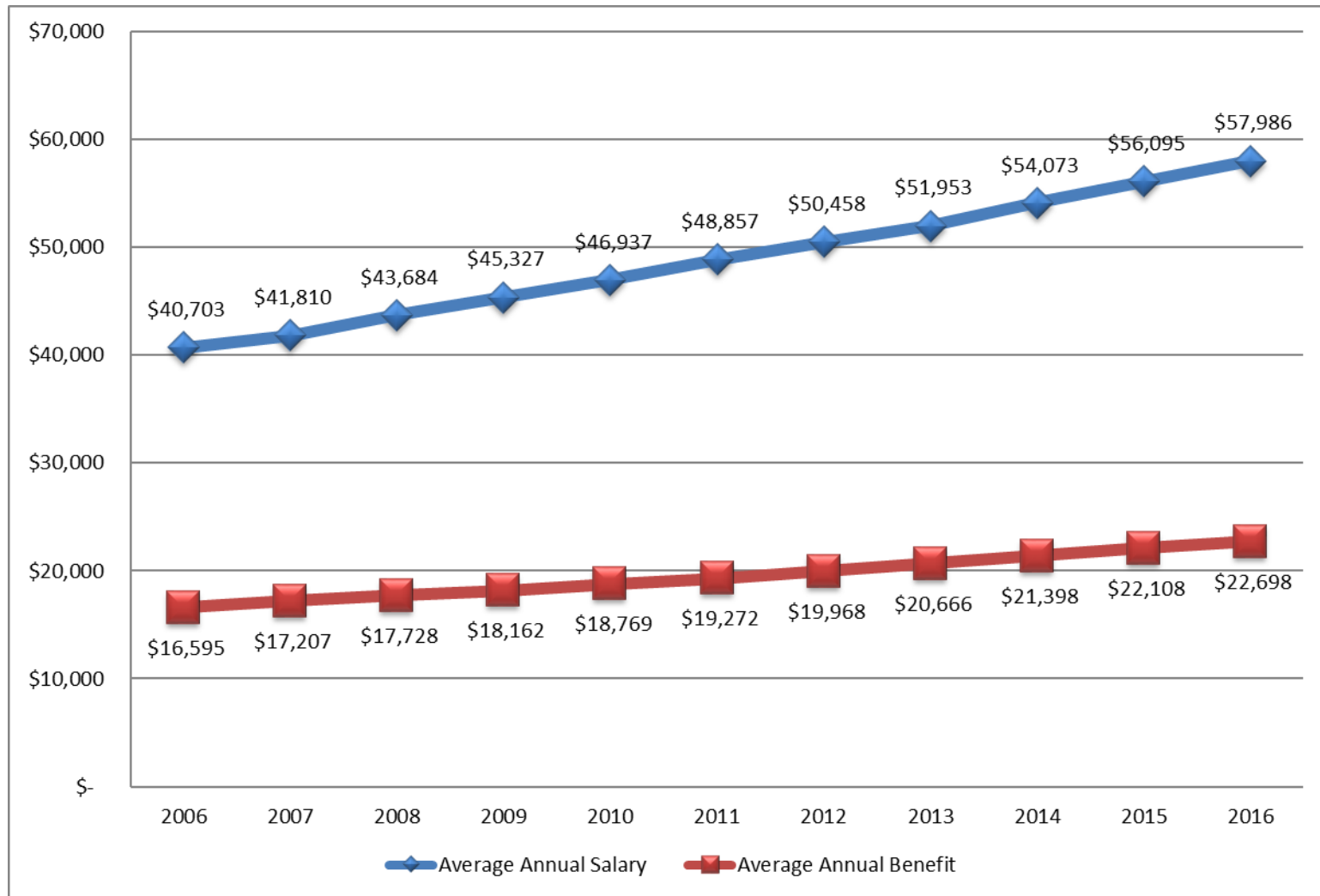


Since 2006, active payroll has increased, on average, 4.9% per year.

Average Age and Service of Active Members



Average Salary and Average Benefit



Since 2006, average salary has increased, on average, 3.6% per year. Average annual benefit has increased by 3.2% per year.

Assets

- The market value of assets decreased from \$2.14 billion (as of 6/30/15) to \$2.12 billion (as of 6/30/16)
 - Segal determined the investment return was 0.39%, net of investment expenses
- The actuarial value of assets increased from \$2.13 billion (as of 6/30/15) to \$2.23 billion (as of 6/30/16)
 - Investment return of 6.16%, net of investment expenses
 - Actuarial value is 104.9% of market
 - There is a total of \$105 million of deferred net investment losses that will be recognized in future years
- The average annual return on market assets
 - 10-year average is 4.5%
 - 20-year average is 6.4%
- The average annual return on actuarial assets
 - 10-year average is 5.8%
 - 20-year average is 6.7%

Market Value of Assets (\$ in millions)

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

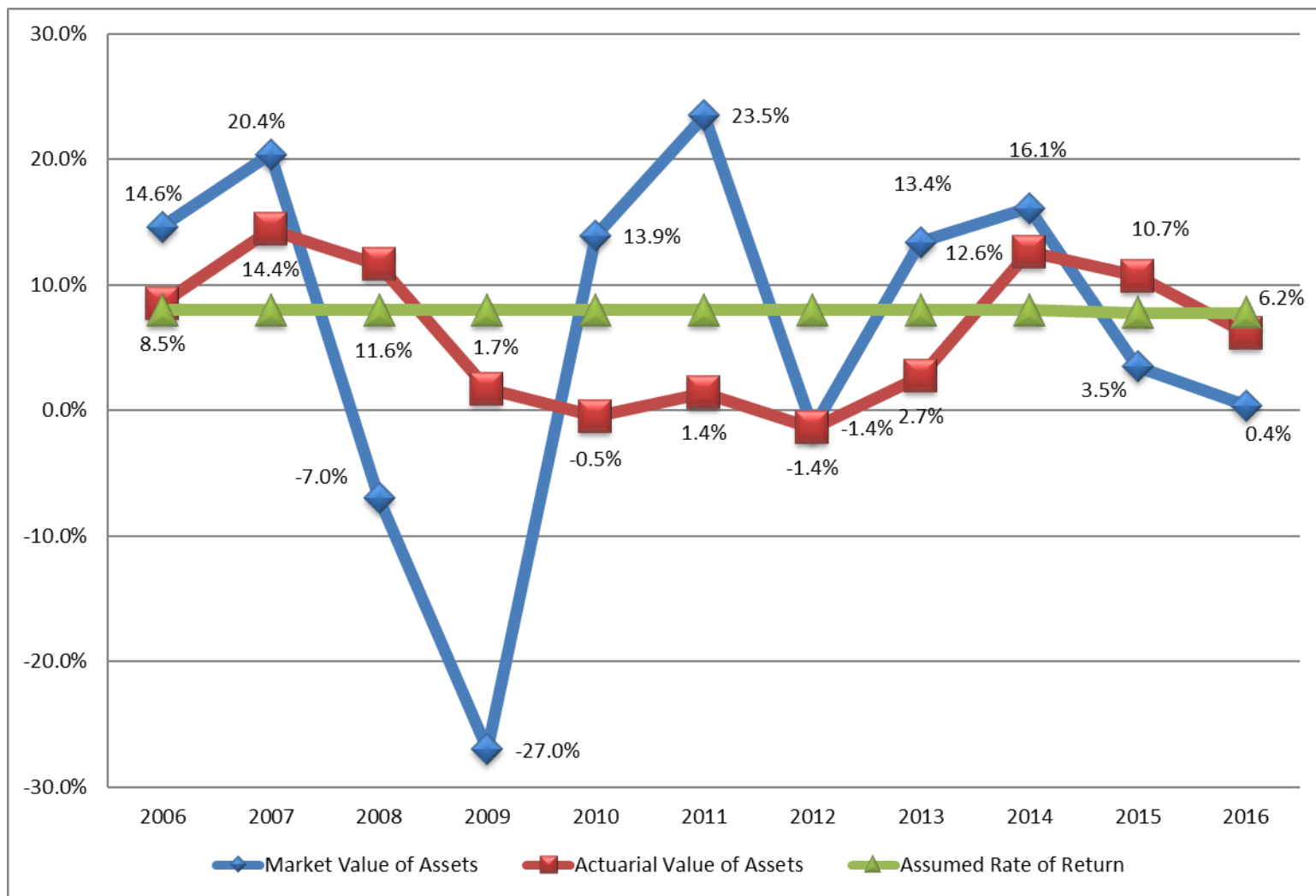
Actuarial Value of Assets (\$ in millions)

1. Market Value of Assets as of June 30, 2015	\$2,142
2. Cash Flow Items for FYE June 30, 2016	(26)
3. Expected Return	<u>165</u>
4. Expected Market Value of Assets (1) + (2) + (3)	\$2,281
5. Actual Market Value of Assets on June 30, 2016	2,124
6. Excess/(Shortfall) for FYE June 30, 2016 (5) – (4)	(157)
Excess/(Shortfall) Returns:	

Year	Initial Amount	Deferral %	Unrecognized Amount
2016	(\$157)	80%	(\$125)
2015	(93)	60%	(56)
2014	147	40%	59
2013	87	20%	17
2012	(159)	0%	<u>0</u>
7. Total			(\$105)

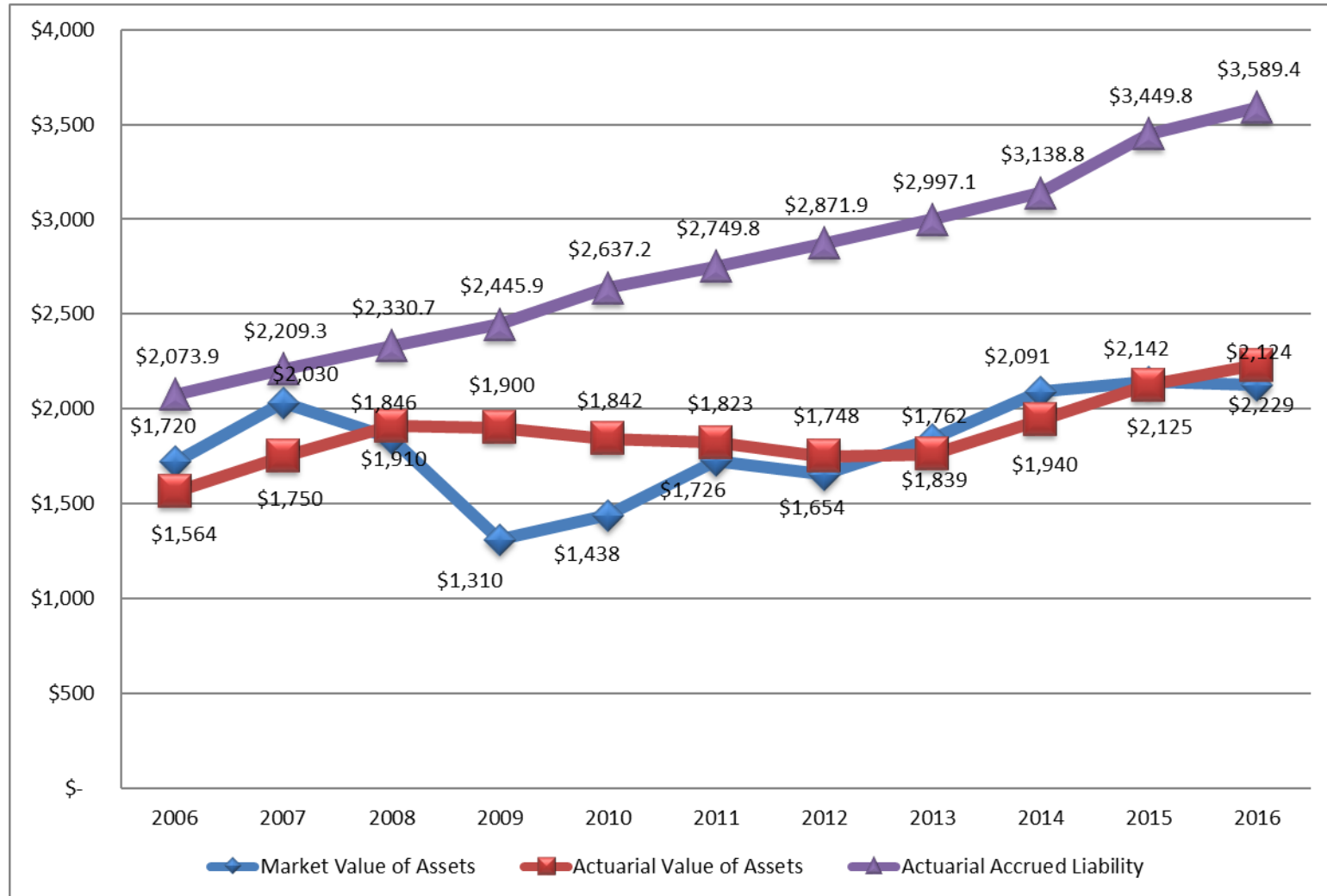
8. Actuarial Value of Assets as of June 30, 2016 (5) - (7)	\$2,229
9. Actuarial Value of Assets as a % of Market Value of Assets	104.9%

Asset Returns



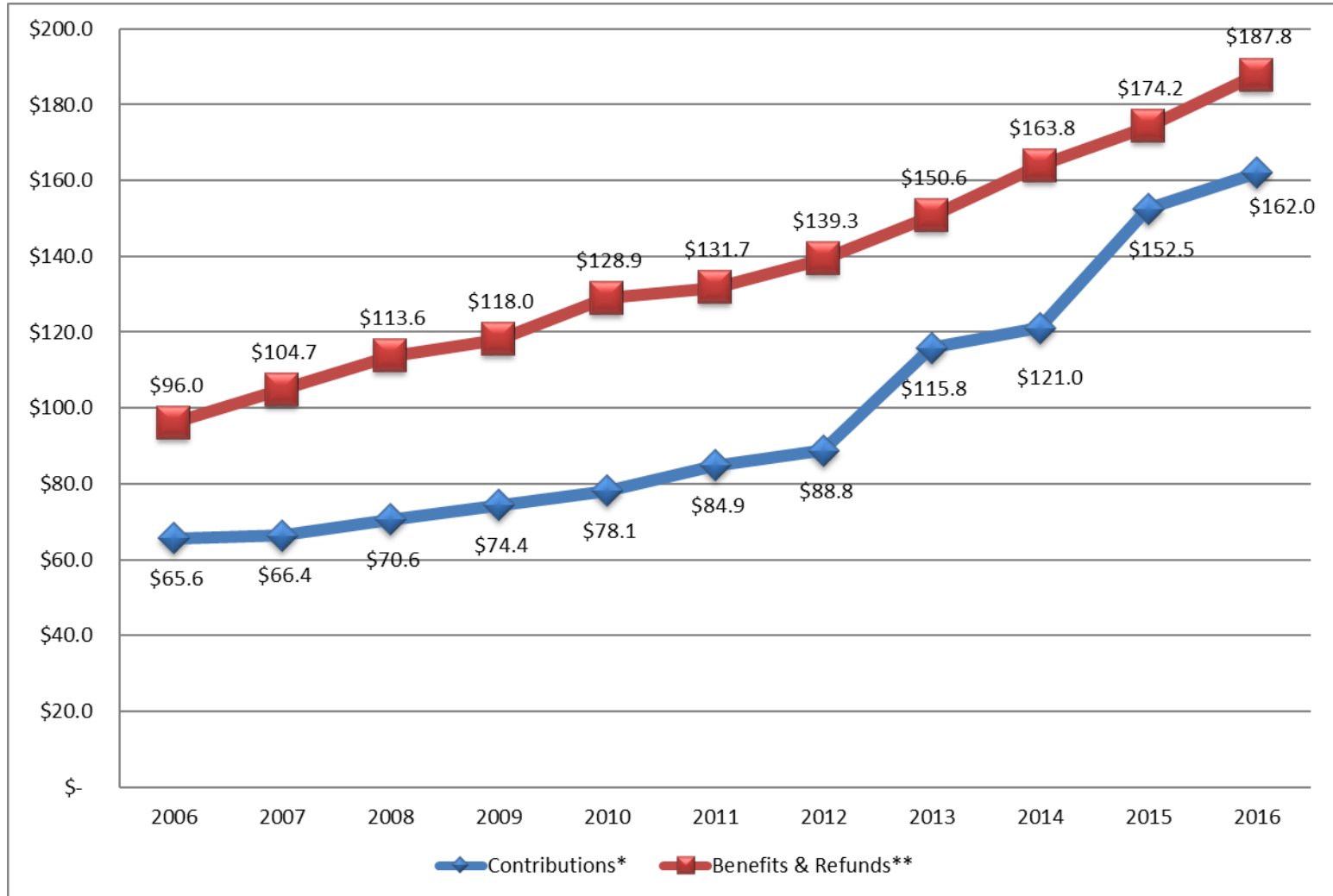
Market and Actuarial Values of Assets Compared to Actuarial Accrued Liability

\$ Millions



Contributions vs. Benefits and Refunds

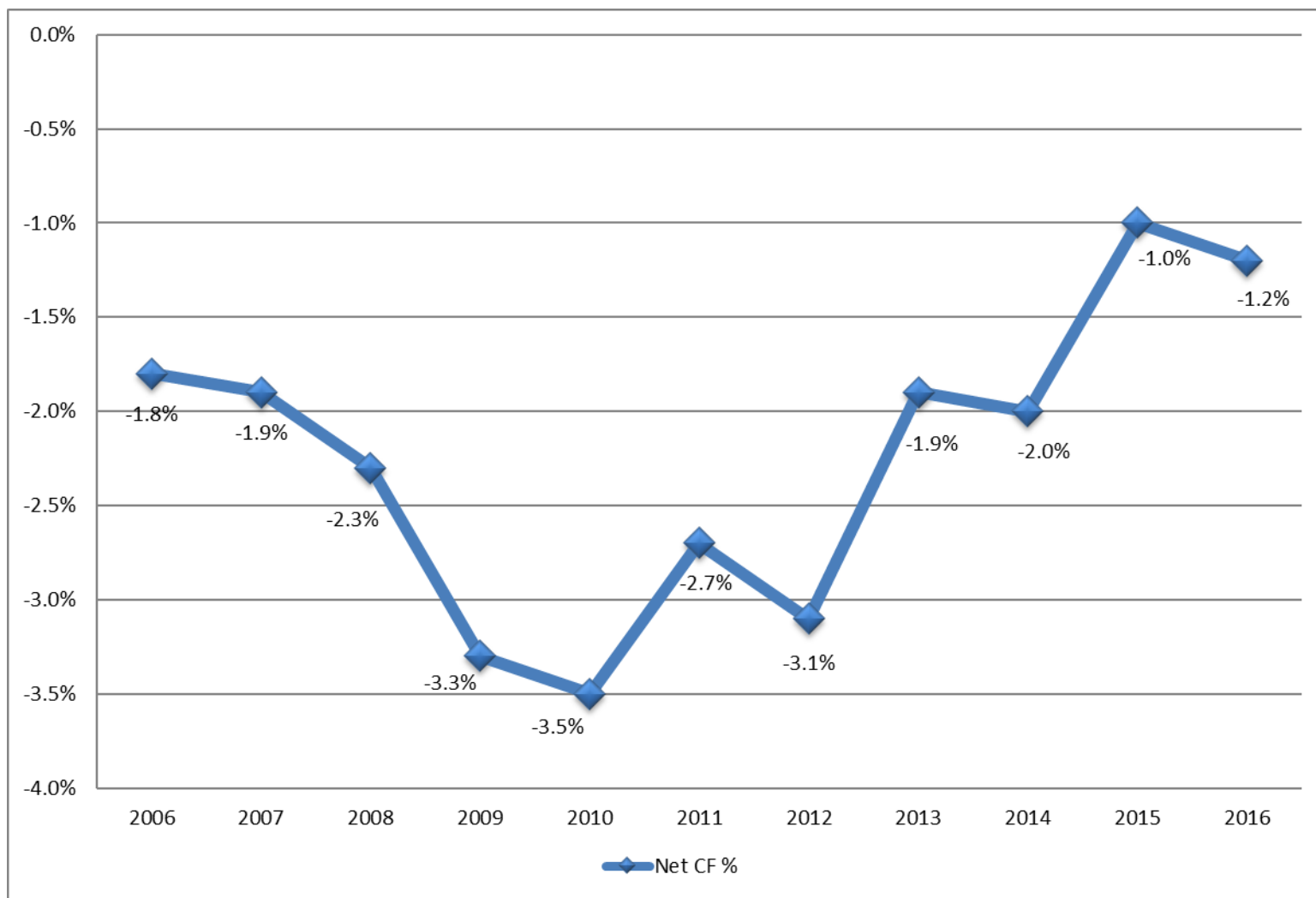
\$ Millions



* Includes member and employer contributions, and service purchases

** Includes administrative expenses

Net Cash Flow as a % of Market Value



Valuation Results (\$ in millions)

	July 1, 2016	July 1, 2015
Actuarial Accrued Liability:		
• Active Members	\$1,523	\$1,490
• Inactive Members	90	85
• Retirees and Beneficiaries	<u>1,976</u>	<u>1,875</u>
Total	\$3,589	\$3,450
Actuarial Assets	<u>2,229</u>	<u>2,125</u>
Unfunded Accrued Liability	\$1,360	\$1,325
Funded Ratio	62.1%	61.6%

Actuarially Determined Contribution

	For the Year Beginning	
	July 1, 2016	July 1, 2015
Normal Cost Rate	12.04%	11.63%
Member Rate	<u>11.75%</u>	<u>11.75%</u>
Employer Normal Cost Rate	0.29%	-0.12%
Amortization of UAAL	<u>12.93%</u>	<u>13.16%</u>
Actuarially Determined Contribution	13.22%	13.04%
Employer Rate	12.75%	12.75%
Contribution Sufficiency/(Deficiency)	(0.47%)	(0.29%)

Net Pension Liability (\$ in millions)

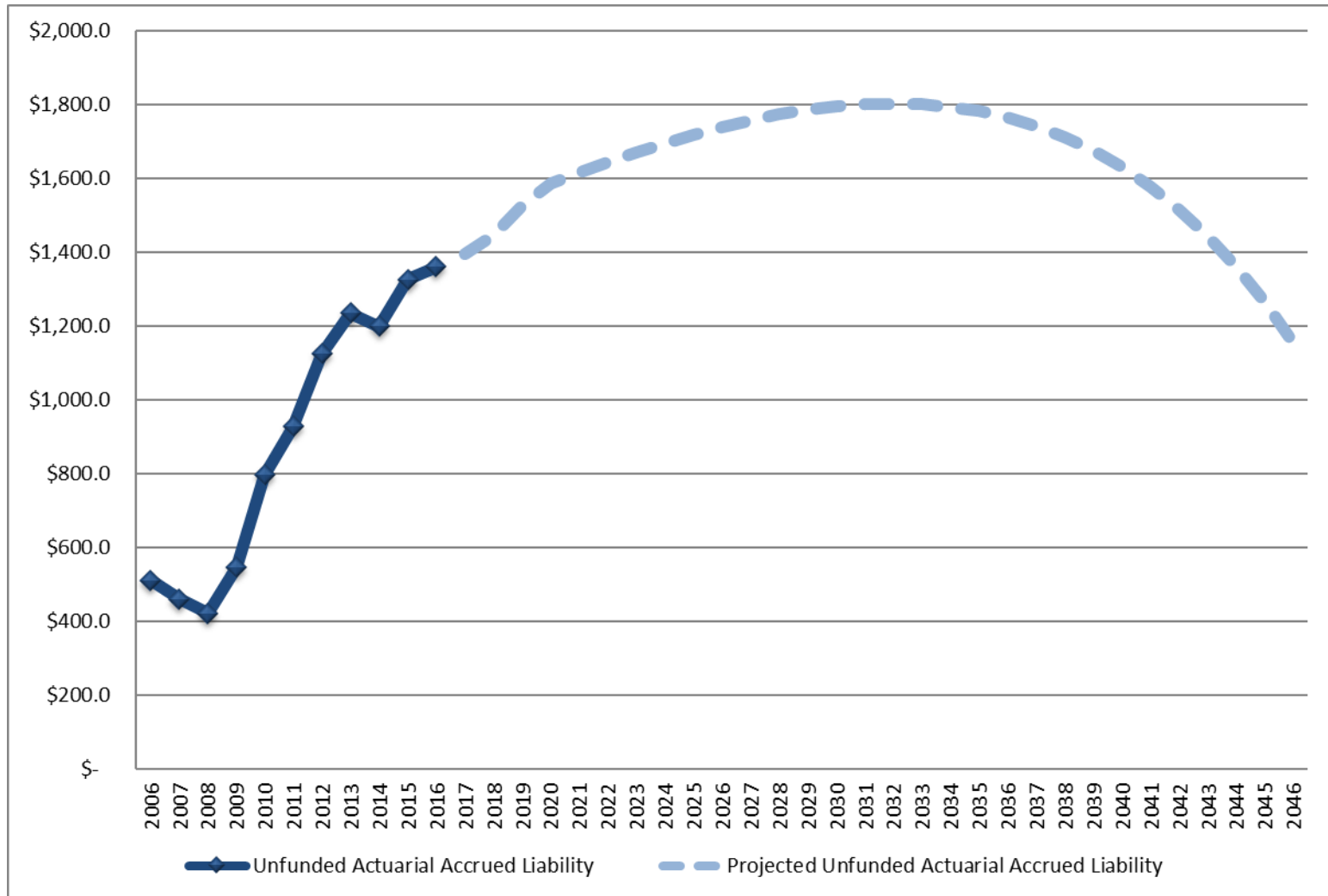
Collective TFFR	June 30, 2016	June 30, 2015
Total Pension Liability at 7.75%	\$3,589	\$3,450
Fiduciary Net Plan Position (i.e., MVA)	2,124	2,142
Net Pension Liability (NPL)	1,465	1,308
Sensitivity to changes in discount rate		
• 1% decrease (6.75%)	\$1,900	\$1,728
• Current discount rate (7.75%)	1,465	1,308
• 1% increase (8.75%)	1,103	957

Valuation Results – Comments

- The actuarial accrued liability increased from \$3.45 billion (as of 6/30/15) to \$3.59 billion (as of 6/30/16)
- The unfunded actuarial accrued liability (UAAL) increased from \$1.32 billion to \$1.36 billion
- The funded ratio on an AVA basis increased from 61.6% to 62.1%
 - On a market value basis, the funded ratio decreased from 62.1% to 59.2%
- The actuarially determined contribution (ADC) increased from 13.04% of payroll to 13.22% of payroll
 - This increase was primarily due actual investment experience less than expected
 - Results in a contribution deficiency of 0.47% when compared to 12.75% employer contribution
 - The effective amortization period is 29 years

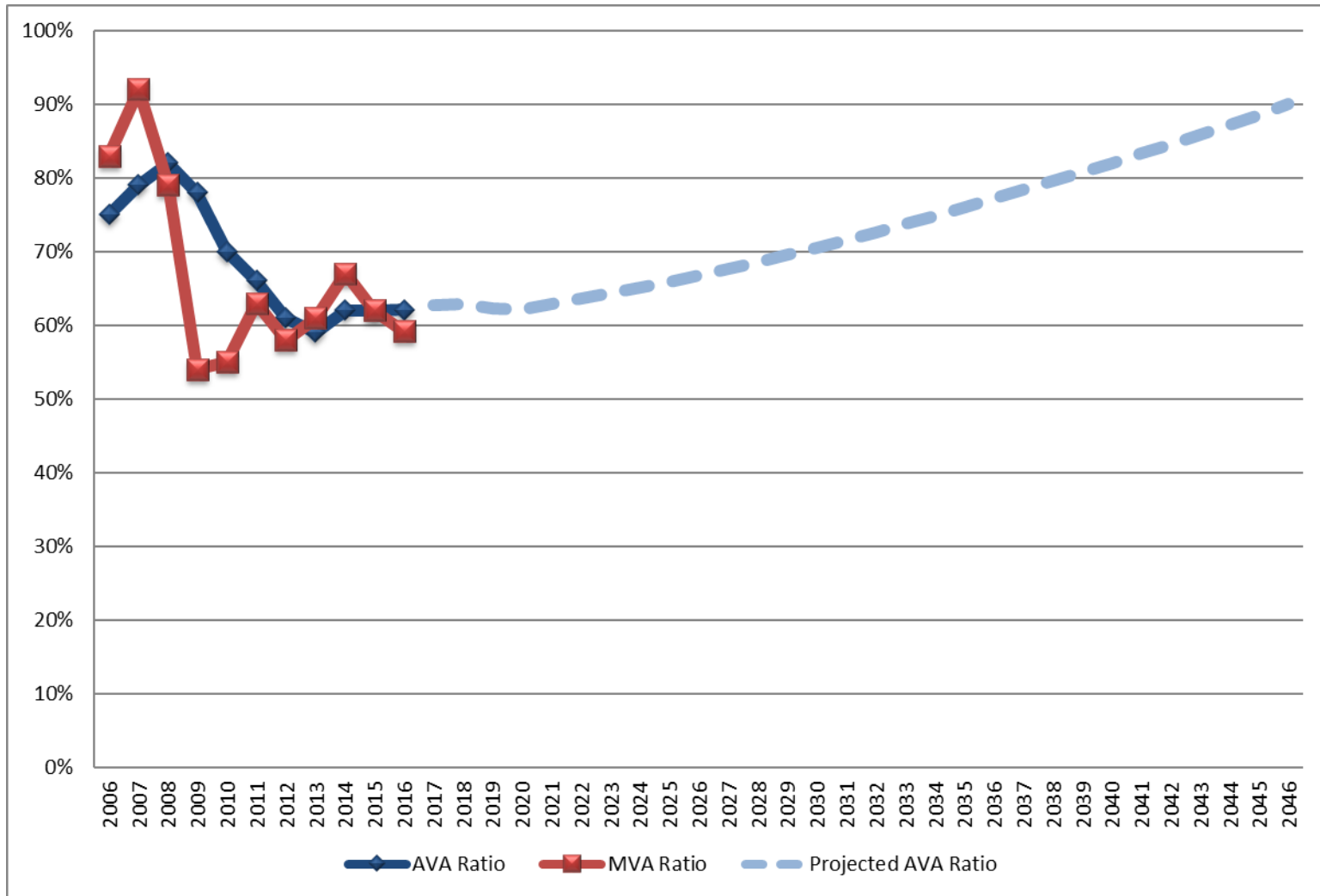
Unfunded Actuarial Accrued Liability

\$ Millions



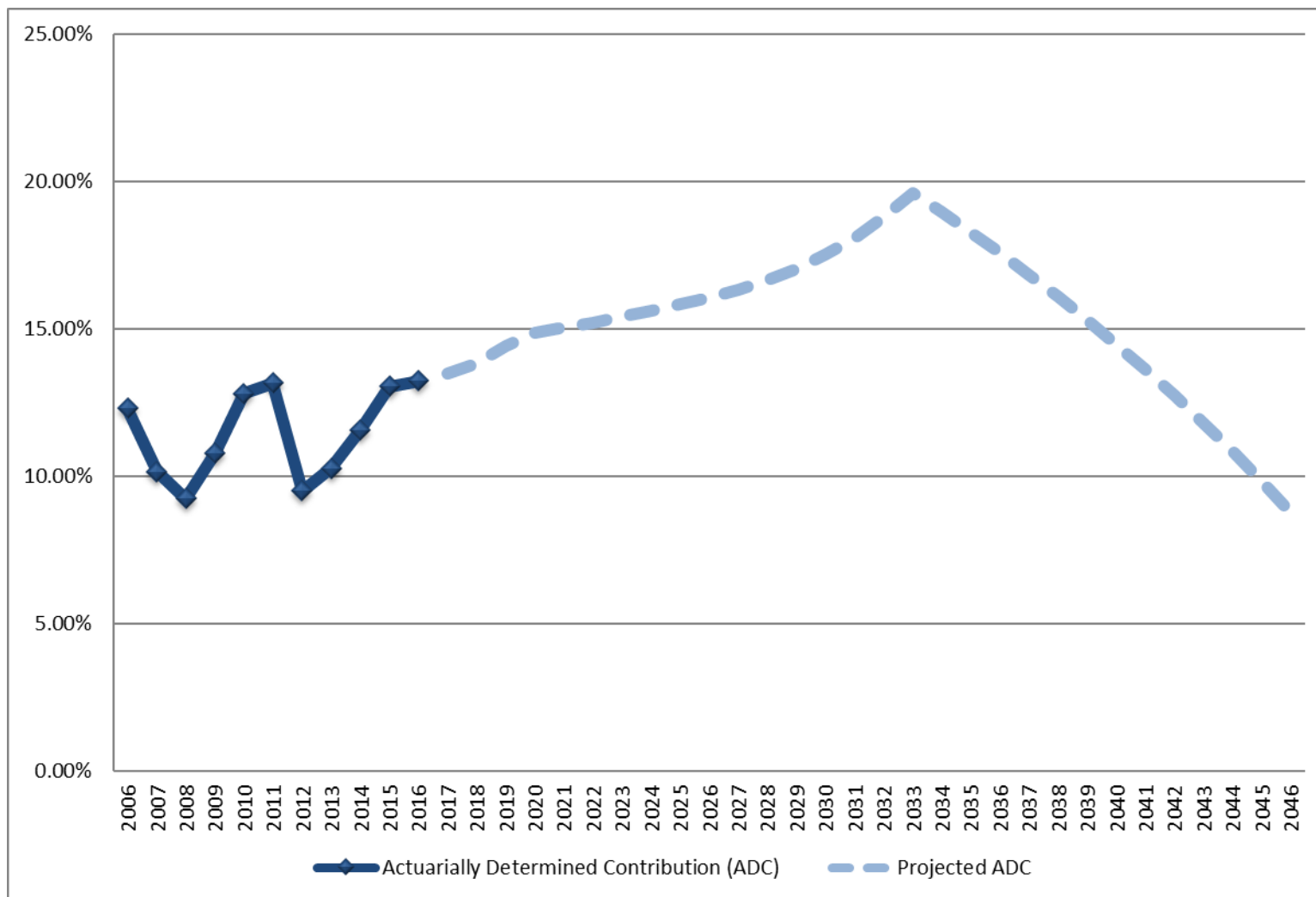
Projection based on all assumptions, including 7.75% investment return, realized as expected

Funded Ratios



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

Actuarially Determined Contribution (ADC)



- Prior to 2005, the ADC calculation was based on a 20-year open amortization period.
- From 2005 - 2012, the calculation of the ADC was based on a 30-year open level percentage of payroll amortization.
- Beginning in 2013, the period is 30-year closed. In 2033, when the remaining period reaches 10 years, it is assumed to operate as 10-year open
- * 2012 and 2013 reflect the actuarial present value of contribution increases effective July 1, 2014.

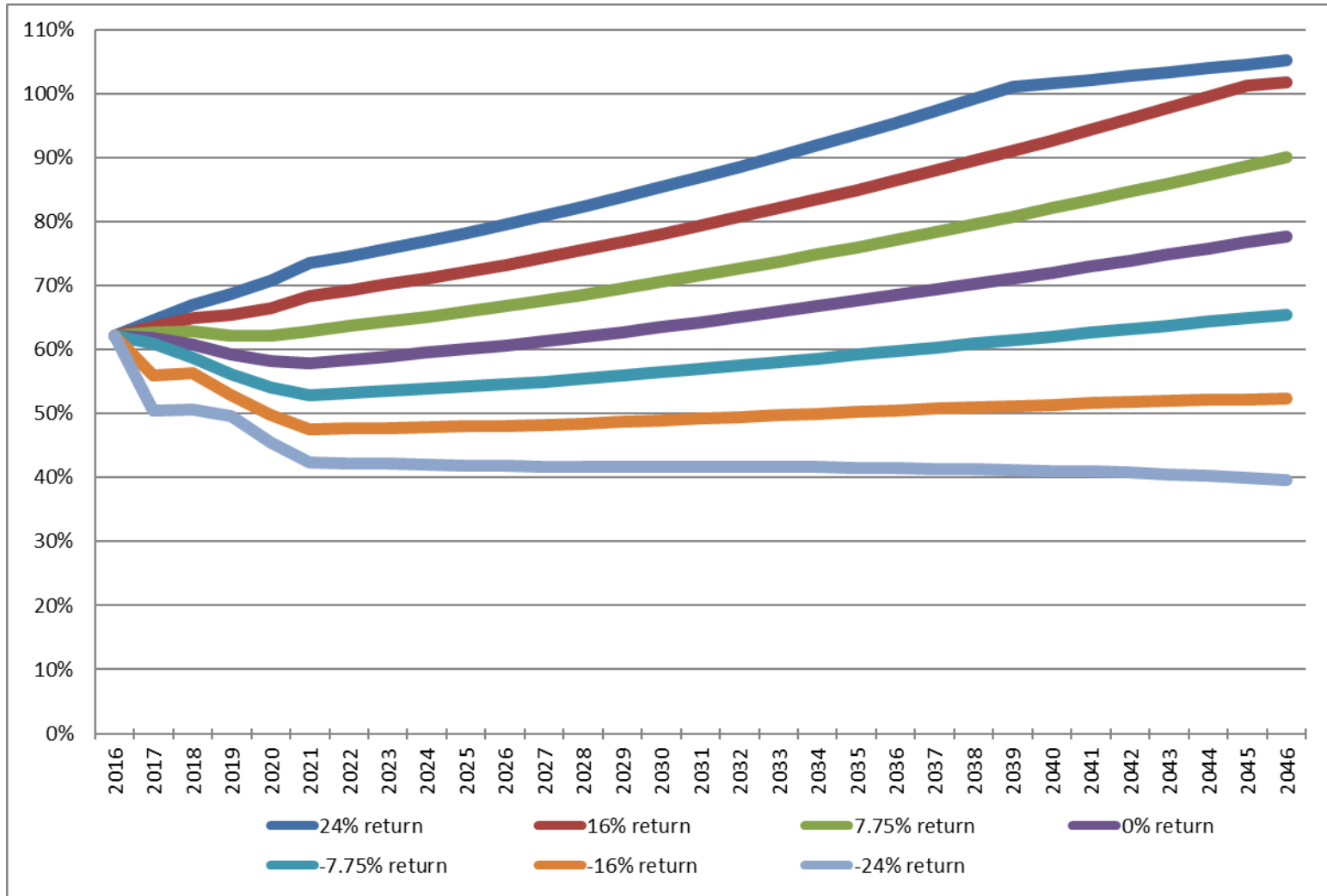
Projection based on all assumptions, including 7.75% investment return, realized as expected

Sensitivity Projections

- Projections of estimated funded ratios for 30 years
 - Based on 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
 - Administrative expenses increase by 2.75% each year
 - All other experience is assumed to emerge as expected

- Includes contribution rates from HB 1134
 - Member rate is 11.75% for FY16 and thereafter
 - Employer rate is 12.75% for FY16 and thereafter
 - Increases “sunset” back to 7.75% once the funded ratio reaches 100% (based on actuarial assets)

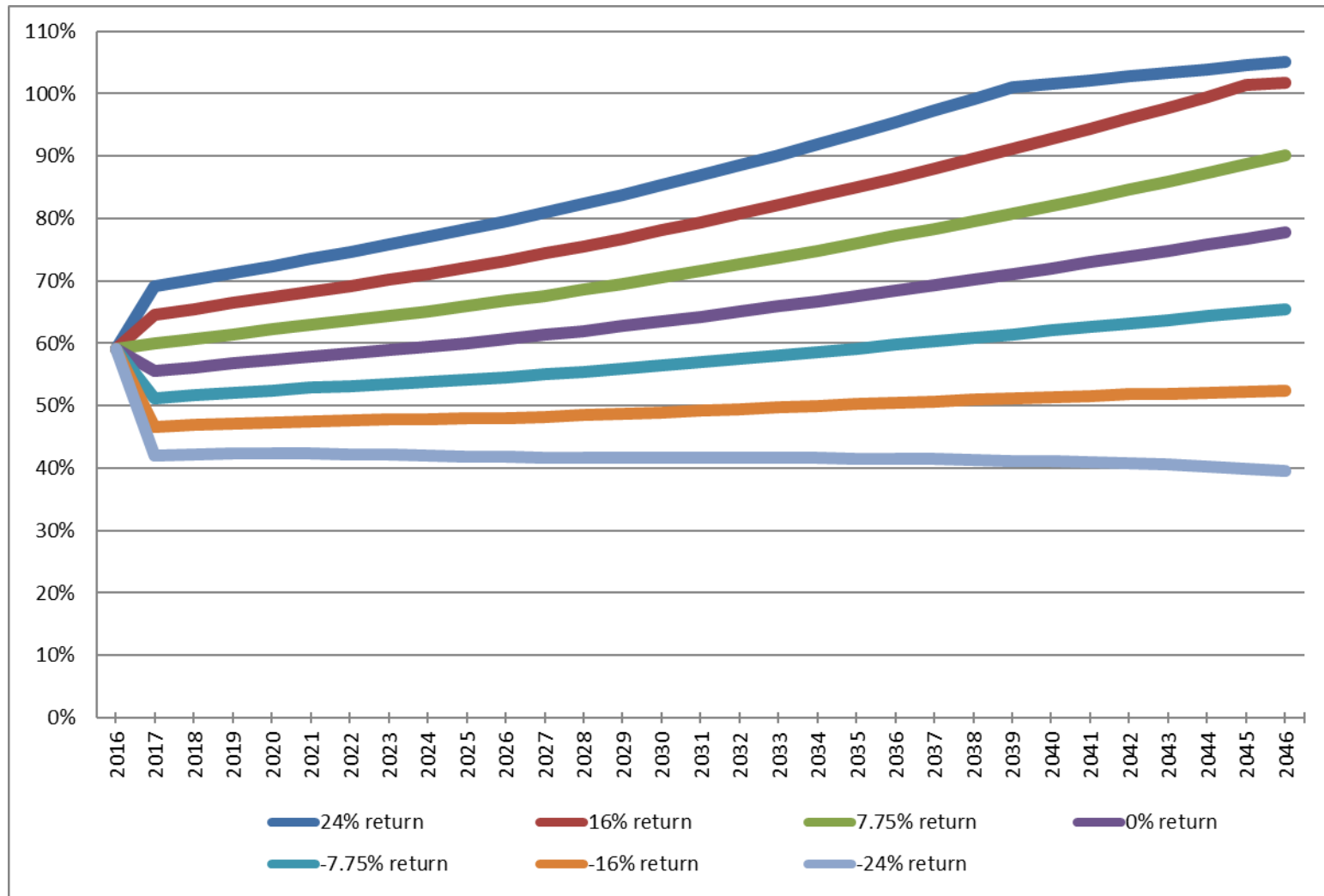
Projected Funded Ratios (AVA Basis)



Projected Funded Ratios (AVA Basis)

Valuation Year	24% for FY2017	16% for FY2017	7.75% for FY2017	0% for FY2017	-7.75% for FY2017	-16% for FY2017	-24% for FY2017
2016	62%	62%	62%	62%	62%	62%	62%
2017	64%	64%	63%	62%	61%	56%	51%
2018	67%	65%	63%	61%	59%	56%	51%
2019	69%	66%	62%	59%	56%	53%	50%
2020	71%	67%	62%	58%	54%	50%	46%
2021	73%	68%	63%	58%	53%	47%	42%
2026	80%	73%	67%	61%	55%	48%	42%
2031	87%	79%	72%	64%	57%	49%	42%
2036	95%	86%	77%	68%	60%	50%	41%
2041	102%	94%	83%	73%	63%	52%	41%
2046	105%	102%	90%	78%	65%	52%	40%

Projected Funded Ratios (MVA Basis)



Projected Funded Ratios (MVA Basis)

Valuation Year	24% for FY2017	16% for FY2017	7.75% for FY2017	0% for FY2017	-7.75% for FY2017	-16% for FY2017	-24% for FY2017
2016	59%	59%	59%	59%	59%	59%	59%
2017	69%	65%	60%	56%	51%	47%	42%
2018	70%	66%	61%	56%	52%	47%	42%
2019	71%	66%	61%	57%	52%	47%	42%
2020	72%	67%	62%	57%	52%	47%	42%
2021	73%	68%	63%	58%	53%	47%	42%
2026	80%	73%	67%	61%	55%	48%	42%
2031	87%	79%	72%	64%	57%	49%	42%
2036	95%	86%	77%	68%	60%	50%	41%
2041	102%	94%	83%	73%	63%	52%	41%
2046	105%	102%	90%	78%	65%	52%	40%

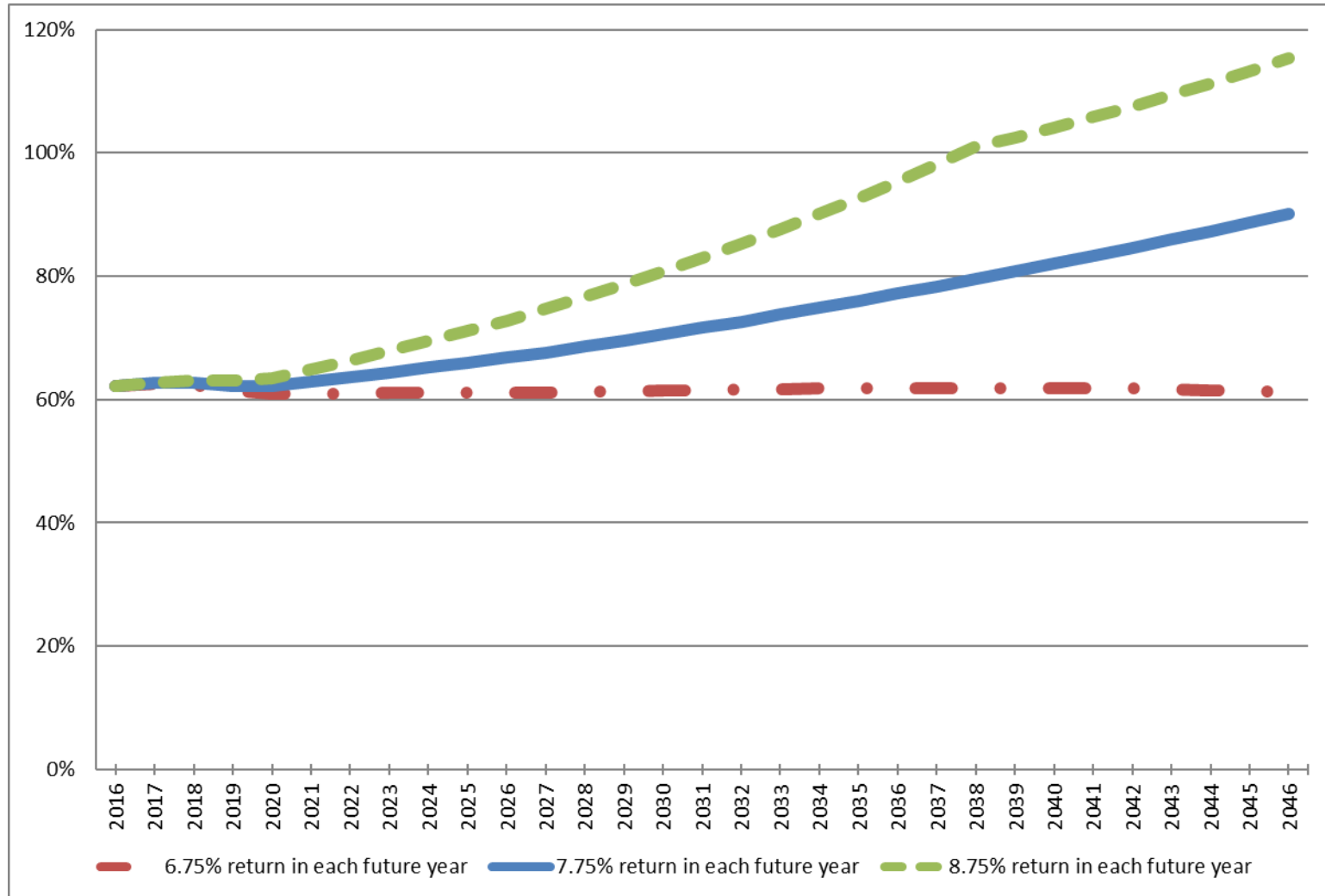
Projected Margin (AVA Basis)

Valuation Year	24% for FY2017	16% for FY2017	7.75% for FY2017	0% for FY2017	-7.75% for FY2017	-16% for FY2017	-24% for FY2017
2016	-0.47%	-0.47%	-0.47%	-0.47%	-0.47%	-0.47%	-0.47%
2017	-0.06%	-0.37%	-0.70%	-1.01%	-1.32%	-3.09%	-4.99%
2018	0.48%	-0.27%	-1.04%	-1.77%	-2.49%	-3.42%	-5.45%
2019	0.76%	-0.43%	-1.65%	-2.80%	-3.95%	-5.17%	-6.36%
2020	1.20%	-0.42%	-2.10%	-3.68%	-5.25%	-6.93%	-8.56%
2021	1.95%	-0.13%	-2.27%	-4.28%	-6.29%	-8.43%	-10.51%
2026	2.83%	-0.19%	-3.30%	-6.22%	-9.14%	-12.25%	-15.27%
2031	4.41%	-0.37%	-5.29%	-9.92%	-14.55%	-19.47%	-24.25%
2036	9.18%	2.31%	-4.77%	-11.43%	-18.09%	-25.18%	-32.05%
2041	4.33%	8.09%	-0.81%	-9.16%	-17.51%	-26.41%	-35.03%
2046	5.57%	4.19%	4.04%	-6.52%	-17.09%	-28.34%	-39.25%

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

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

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



Projected Funded Ratios (AVA Basis)

Actual Returns +1% or -1% of Assumed

Valuation Year	6.75% Return in Each Future Year	7.75% Return in Each Future Year	8.75% Return in Each Future Year
2016	62%	62%	62%
2017	63%	63%	63%
2018	62%	63%	63%
2019	61%	62%	63%
2020	61%	62%	64%
2021	61%	63%	65%
2026	61%	67%	73%
2031	62%	72%	83%
2036	62%	77%	95%
2041	62%	83%	106%
2046	61%	90%	115%

Actuarial Review of July 1, 2015 Valuation

- Cavanaugh Macdonald Consulting completed its review in July 2016
 - Concluded that Segal's work provides an appropriate assessment of the health and funding requirements of TFFR
 - Offered comments and suggestions for Segal to consider
- Actuarial assumptions
 - Certain suggestions will be implemented with the next experience study
 - Provide formal report in addition to presentation
 - Study retirement experience with results weighted by liability
 - Other minor suggestions will be considered
- Actuarial methods
 - Date of hire was adjusted for approximately 1,000 members who have a break in service
 - NO impact on total liability, but minimal difference in the allocation of the liability between past and future service
 - Liability for deferred vested death benefit was adjusted resulting in immaterial reduction of liability

Actuarial Review of July 1, 2015 Valuation (continued)

- Valuation report
 - Modified some language related to description of actuarial assumptions
 - Showed derivation of investment gain/loss on the market value of assets
 - Included source of high quality tax-exempt general obligation municipal bond rate for GASB discount rate determination

Segal is pleased that the actuarial review confirms that the calculations are accurate and the valuation is in compliance with Actuarial Standards of Practice.

Public Sector Topics In the News

- Society of Actuaries' mortality study for public sector plans
 - Preliminary results expected in late 2017
- Actuarial Standards Board – Pension Task Force Report issued in June and suggests potential changes for ASB to consider
 - Solvency liability would be disclosed with all funding valuations
 - Present value of accrued benefits discounted at U.S. Treasury Rates
 - Actuary should calculate and disclose a reasonable ADC
 - Normal cost based on each member's benefits
 - No perpetual negative amortization (where contribution is less than the normal cost plus interest on the UAAL)
 - Other suggested disclosures:
 - Assessment of when assets are expected to be depleted
 - Amortization period for fixed rate plans
 - Whether contribution is less than normal cost plus interest on the UAAL

Public Sector Topics In the News (continued)

- Actuarial Standards Board – Second Exposure Draft on Assessment and Disclosure of Risk
 - Intention is to provide additional information to intended users of the risks of future experience differing from the assumptions
 - Would apply when performing an actuarial funding valuation or a pricing valuation of a proposed change
 - Steps that actuary would need to take:
 - Identify the risks
 - Include an assessment of the risks identified
 - » Scenario tests – impact of one possible event, several simultaneous events, or several sequential events
 - » Sensitivity tests – impact of change in actuarial assumption or method
 - » Stochastic modeling
 - » Stress test – impact of adverse changes in one or a few factors
 - Recommend a more detailed assessment if actuary believes it would be beneficial to intended users

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.

Plan Fiduciary Net Position: Market value of assets.

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.

North Dakota Teachers' Fund for Retirement

Actuarial Valuation and Review
as of July 1, 2016

The logo for Segal Consulting is a large, dark blue, stylized arrow pointing to the right. The arrow has a white star-like symbol at its tip. The text "Segal Consulting" is written in white, sans-serif font across the middle of the arrow.

★ Segal Consulting



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October 19, 2016

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, 2016.

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

ACTUARIAL VALUATION

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

FINANCING OBJECTIVES

The member and employer contribution rates are established by statute. Member and employer rates are 11.75% and 12.75%, respectively. The 11.75% member contribution rate and 12.75% employer contribution rate will remain in effect until TFFR is 100% funded on an actuarial basis. At that point, the employer and member contribution rates will revert to 7.75%. The rates are intended to be sufficient to pay TFFR's normal cost and to amortize TFFR's unfunded actuarial accrued liability (UAAL) over a period of 27 years beginning July 1, 2016, 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 (27 years remaining as of July 1, 2016). For this calculation, payroll is assumed to increase 3.25% per year. As of July 1, 2016, the ADC is 13.22%, compared to 13.04% last year. This is greater than the 12.75% rate currently required by law.

The increase in ADC is primarily driven by the actuarial loss on assets.

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) increased from last year. The funded ratio at July 1, 2015, was 61.6%, while it is 62.1% as of July 1, 2016. Based on the market value of assets rather than the actuarial value of assets, the funded ratio decreased to 59.2%, compared to 62.1% last year.

The Plan has a net investment loss of \$105 million from previous years that has not yet been recognized in the actuarial value of assets because of the five-year smoothing. This unrecognized asset loss is due to market losses during FY 2015 and FY 2016 offset by market gains in FY 2013 and FY 2014. As these losses are recognized over the next four years, the funded ratio is expected to decline, assuming the plan earns 7.75% in the future.

REPORTING CONSEQUENCES

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

BENEFIT PROVISIONS

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

ASSUMPTIONS AND METHODS

Actuarial assumptions and methods are set by the Board of Trustees, based upon recommendations made by the Plan's actuary. On April 30, 2015, the Board adopted new assumptions, effective for the July 1, 2015 valuation. In our opinion, the 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

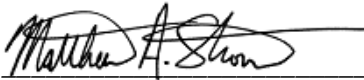
Member data for retired, active, and inactive participants was supplied as of July 1, 2016, by the staff of the Retirement Office. We have not subjected this data to any auditing procedures, but have examined the data for reasonableness and consistency with the prior year's data. Asset information was also supplied by the staff. That assistance is gratefully acknowledged.

Sincerely,

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

By: 

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



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

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SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

Significant Issues in the Valuation Year

1. Changes were made effective with the July 1, 2016, actuarial valuation as a result of the independent review that Cavanaugh Macdonald Consulting performed in 2016. The changes had a minimal impact on the valuation, as shown in the reconciliation of the unfunded actuarial accrued liability and are as follows:
 - The calculation of the death benefit liability for deferred vested members was modified.
 - Dates of hire were adjusted for members who had a break in service.Additional information is included in this actuarial valuation report.
2. The employer statutory contribution rate for the fiscal year beginning July 1, 2016, under the North Dakota Century Code is equal to 12.75% of payroll for employers. Compared to the actuarially determined contribution of 13.22% of payroll, the contribution deficiency is 0.47% of payroll as of July 1, 2016.
3. The funded ratio based on the actuarial value of assets over the actuarial accrued liability as of July 1, 2016, is 62.1%, compared to 61.6% as of July 1, 2015. This ratio is a measure of funding status and its history is a measure of funded progress.
4. For the year ended June 30, 2016, Segal has determined that the asset return on a market value basis was 0.4%. After gradual recognition of investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 6.2%. This represents an experience loss when compared to the assumed rate of 7.75%. As of June 30, 2016, the actuarial value of assets (\$2.229 billion) represented 104.9% of the market value (\$2.124 billion).
5. The portion of deferred investment gains and losses recognized during the calculation of the July 1, 2016, actuarial value of assets contributed to a loss of \$33.6 million. The demographic and liability experience resulted in a \$7.6 million loss.
6. As mentioned above, the current method used to determine the actuarial value of assets yields an amount that is 104.9% of the market value of assets as of June 30, 2016. 104.9% 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

SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

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 Fiduciary Net Position. The Plan 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 \$1,307,855,182 as of June 30, 2015, to \$1,465,058,563 as of June 30, 2016.
9. The Fund's cash flow (contributions minus benefit payments, refunds, and expenses) as a percentage of the market value of assets is -1.2% as of June 30, 2016, compared to -1.0% as of June 30, 2015. The decrease in net cash flow is primarily due to the asset loss. However, it is not unusual for a mature pension system to operate with minor negative cash flow as returns on investments generally exceed the net cash outflow and assets continue to rise.

SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

Summary of Key Valuation Results

	2016	2015
Demographic Data for Plan Year Beginning July 1:		
Number of retirees and beneficiaries	8,249	8,025
Number of inactive vested members	1,601	1,607
Number of inactive non-vested members	779	660
Number of active members	10,813	10,514
Total payroll supplied by System, annualized	\$627,002,353	\$589,783,780
Statutory Contributions (% of Payroll) for Plan Year Beginning July 1:		
Member	11.75%	11.75%
Employer	12.75%	12.75%
Actuarially determined contribution rate for year beginning July 1	13.22%	13.04%
Margin/(deficit)	-0.47%	-0.29%
Assets:		
Market value	\$2,124,335,288	\$2,141,920,800
Actuarial value	2,229,292,988	2,125,017,451
Return on market value as determined by Segal	0.4%	3.5%
Return on actuarial value	6.2%	10.7%
Ratio of actuarial value to market value	104.9%	99.2%
Net cash flow % relative to market value	-1.2%	-1.0%
Actuarial Information:		
Normal cost %	12.04%	11.63%
Normal cost	\$80,236,633	\$72,798,417
Actuarial accrued liability	3,589,393,851	3,449,775,982
Unfunded actuarial accrued liability	1,360,100,863	1,324,758,531
Funded ratio	62.1%	61.6%
Effective amortization period	29 years	29 years
GASB Information:		
Discount rate	7.75%	7.75%
Total pension liability	\$3,589,393,851	\$3,449,775,982
Plan fiduciary net position	2,124,335,288	2,141,920,800
Net pension liability	1,465,058,563	1,307,855,182
Plan fiduciary net position as a percentage of total pension liability	59.2%	62.1%

SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

Summary of Key Valuation Results (continued)

	2016	2015
Gains/(Losses):		
Asset experience	-\$33,588,108	\$51,873,093
Liability experience	-7,608,779	-3,623,699
Benefit changes	0	0
Assumption/method changes	<u>0</u>	<u>-171,324,647</u>
Total gain/(loss)	-\$41,196,887	-\$123,075,253

SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

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.

SECTION 1: Valuation Summary for the North Dakota Teachers' Fund for Retirement

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.

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

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: 2007 – 2016

Year Ended June 30	Active Members	Inactive Vested Members	Inactive Non-vested Members	Retirees and Beneficiaries	Ratio of Actives to Retirees and Beneficiaries
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
2016	10,813	1,601	779	8,249	1.31

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 10,813 active members with an average age of 42.3 and 12.1 average years of service. The 10,514 active members in the prior valuation had an average age of 42.5 and 12.4 average years of service.

Inactive Members

In this year's valuation, there were 1,601 participants with a vested right to a deferred or immediate vested benefit.

In addition, there were 779 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, 2016

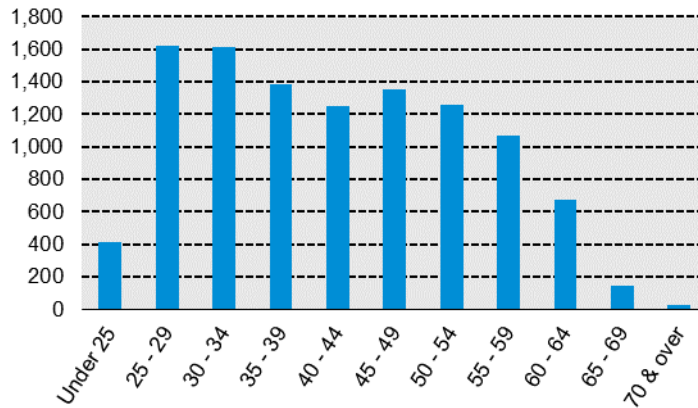
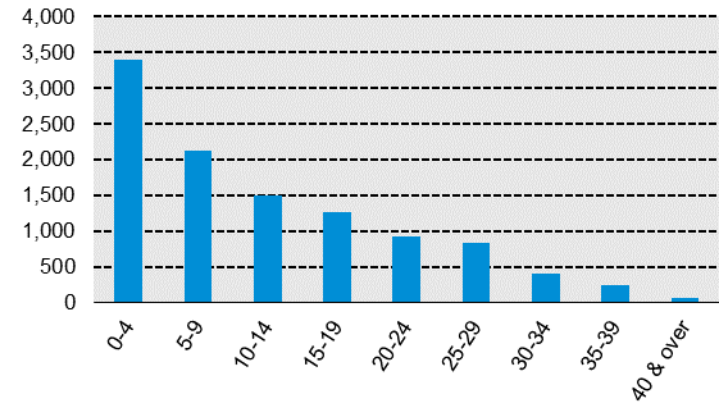


CHART 3
Distribution of Active Members by Years of Service as of June 30, 2016



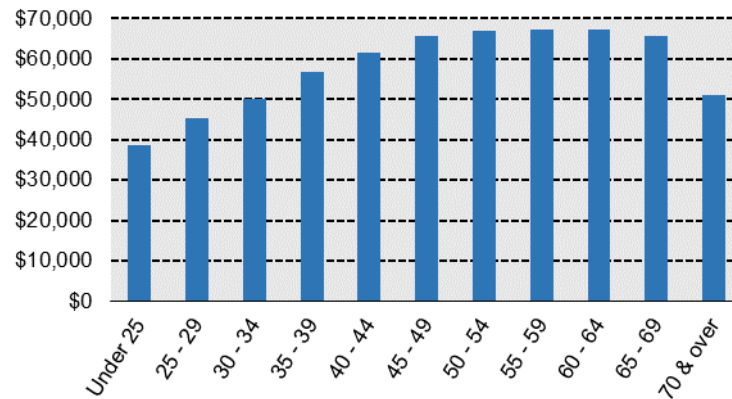
SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Distribution of Active Members by Age and Average Compensation

In this year's valuation, there were 10,813 active members with an average compensation of \$57,986. The 10,514 active members in the prior valuation had an average compensation of \$56,095.

CHART 4

Distribution of Active Members by Age and Average Compensation as of June 30, 2016



SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

Retirees and Beneficiaries

As of July 1, 2016, 7,563 retirees and 686 beneficiaries were receiving total monthly benefits of \$15,602,746. For comparison, in the previous valuation, there were 7,378 retirees and 647 beneficiaries receiving monthly benefits of \$14,784,843.

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, 2016

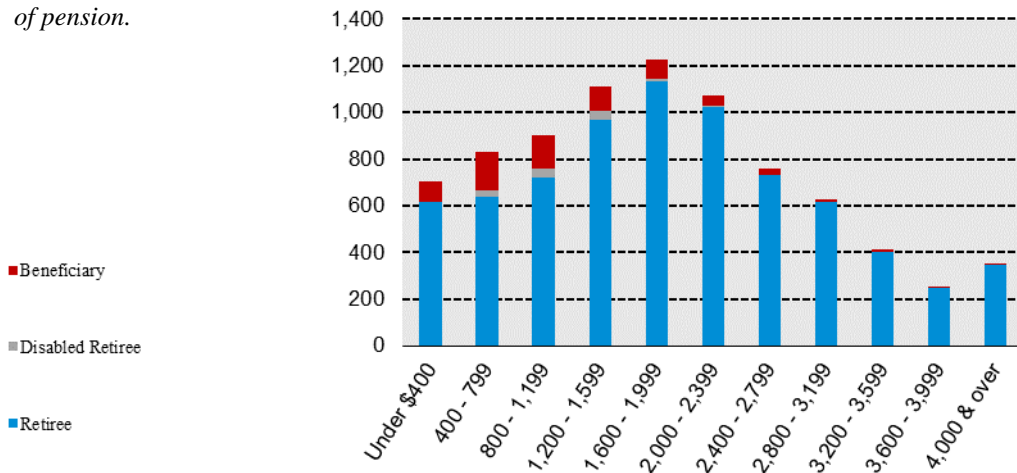
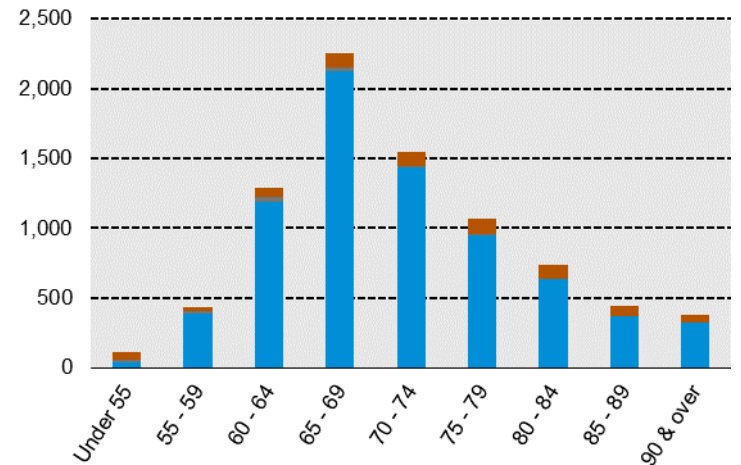


CHART 6
Distribution of Retirees and Beneficiaries by Type and by Age as of July 1, 2016



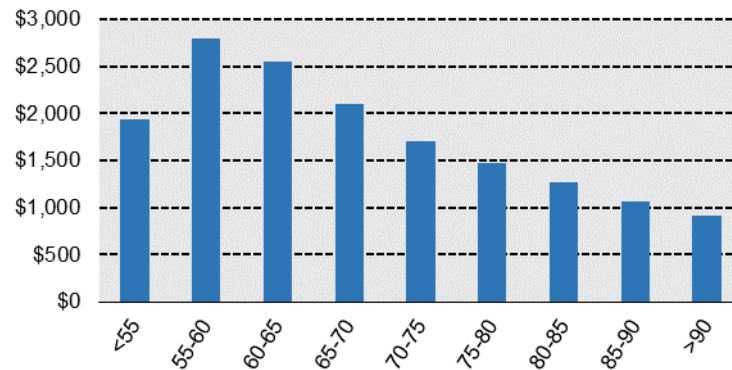
SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

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

As of July 1, 2016, the average monthly benefit amount among 7,563 retirees and 686 beneficiaries was \$1,891. In the previous valuation, the average monthly benefit amount among 7,378 retirees and 647 beneficiaries was \$1,842.

CHART 7

Distribution of Retirees and Beneficiaries by Age and Average Monthly Amount as of July 1, 2016



SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

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, 2016, and June 30, 2015

		2016		2015	
1.	Market value of assets available for benefits		\$2,124,335,288		\$2,141,920,800
2.	Calculation of unrecognized return*	<u>Original Amount**</u>	<u>% Not Recognized</u>	<u>% Not Recognized</u>	
(a)	Year ended June 30, 2016	-\$156,759,166	80% -\$125,407,333		
(b)	Year ended June 30, 2015	-93,205,396	60% -55,923,238	80%	-\$74,564,316
(c)	Year ended June 30, 2014	147,144,380	40% 58,857,751	60%	88,286,628
(d)	Year ended June 30, 2013	87,575,593	20% 17,515,119	40%	35,030,237
(e)	Year ended June 30, 2012	-159,245,999	0	20%	<u>-31,849,200</u>
(f)	Total unrecognized return		-\$104,957,700		\$16,903,349
3.	Actuarial value of assets (Current Assets): (1) – (2f)		<u>\$2,229,292,288</u>		<u>\$2,125,017,451</u>
4.	Actuarial value as a percent of market value: (3) ÷ (1)		<u>104.9%</u>		<u>99.2%</u>

* Recognition at 20% per year over 5 years

** Total return minus expected return on market value

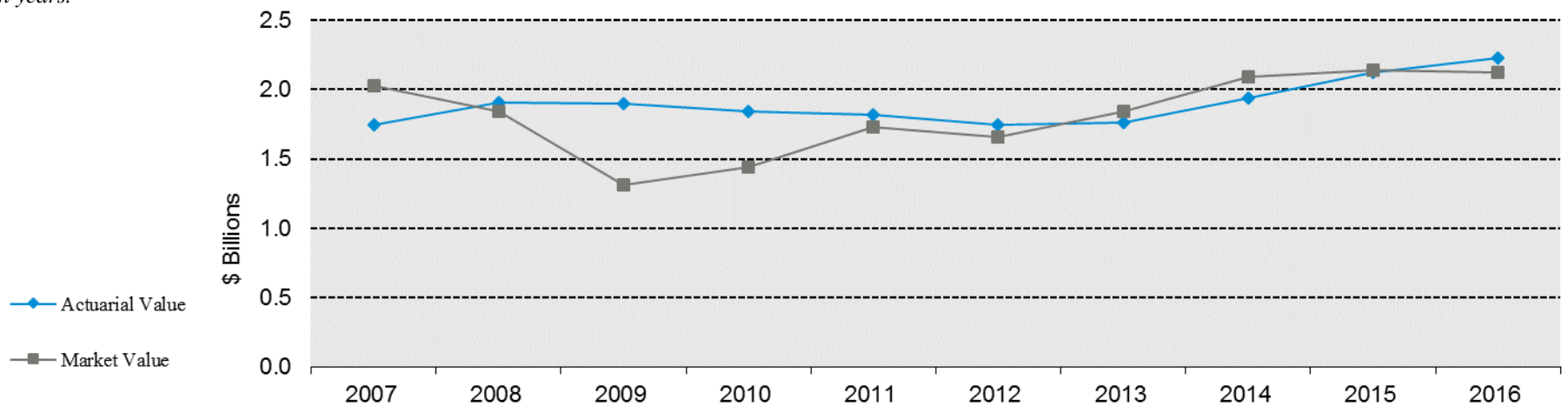
SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

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, 2007 – 2016



SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

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, 2016, was 7.75%. The actual rate of return on an actuarial basis for the Plan Year ended June 30, 2016, was 6.16%.

Since the actual return for the year was less than the assumed return, TFFR experienced an actuarial loss during the year ended June 30, 2016, with regard to its investments.

This chart shows the gain/(loss) due to investment experience on the market value and the actuarial value of assets.

CHART 10

Investment Experience for Year Ended June 30, 2016 – Market Value and Actuarial Value

	Market Value	Actuarial Value
1. Value assets as of June 30, 2015	\$2,141,920,800	\$2,125,017,451
2. Contributions during fiscal year ended June 30, 2016	161,995,828	161,995,828
3. Benefits and expenses during fiscal year ended June 30, 2016	-187,820,336	-187,820,336
4. Value of assets as of June 30, 2016	2,124,335,288	2,229,292,988
5. Total investment income (4) – (1) – (2) + (3)	8,238,996	130,100,044
6. Average value of assets (1) + [(2) + (3)] ÷ 2	2,129,008,546	2,112,105,197
7. Actual rate of return: (5) ÷ (6)	0.39%	6.16%
4. Assumed rate of return	7.75%	7.75%
5. Expected return: (2) x (4)	164,998,162	\$163,688,153
6. Actuarial gain/(loss): (1) – (5)	<u>-\$156,759,166</u>	<u>-\$33,588,108</u>

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

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
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%
2001	-7.6%	8.6%	2016	0.4%*	6.2%
Average Rates of Return					
		Last 5 years:	6.1%	6.2%	
		Last 10 years:	4.5%	5.8%	
		Last 15 years:	5.5%	5.0%	
		Last 20 years:	6.4%	6.7%	
		Last 30 years:	7.5%	7.3%	

* As determined by Segal.

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

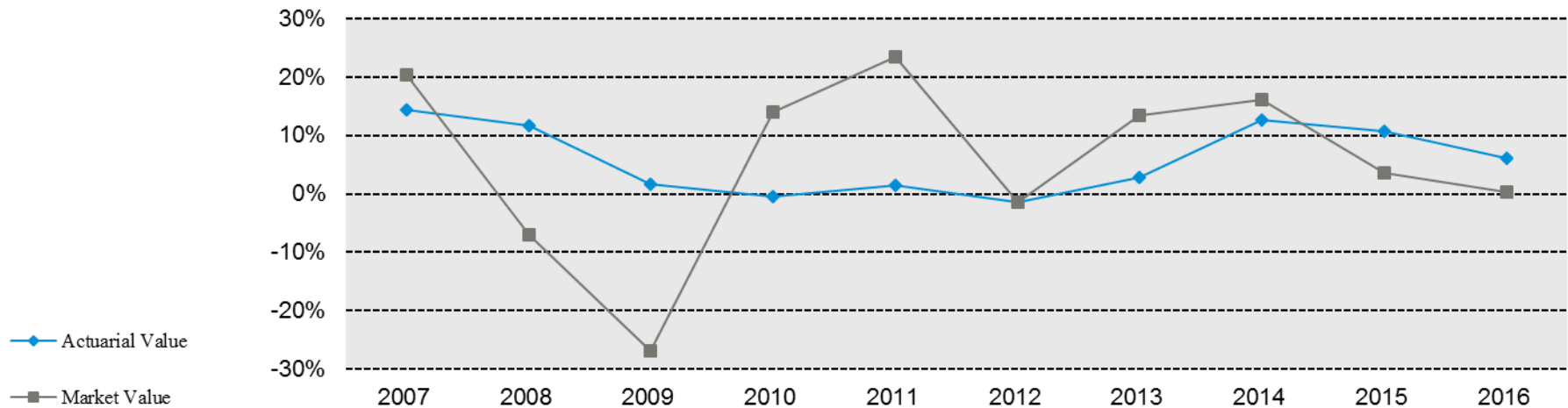
Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

Administrative Expenses

Administrative expenses for the year ended June 30, 2016, totaled \$1,851,656. An explicit administrative expense assumption was added effective July 1, 2015.

This chart illustrates how this leveling effect has actually worked over the years 2007 - 2016.

CHART 12
Market and Actuarial Rates of Return for Years Ended June 30, 2007 - 2016



SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

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,	Disbursements or Expenditures					Net Cash Flow for the Year ²	Market Value of Assets	Net Cash Flow as Percent of Market Value
	Contributions ¹	Benefit Payments	Refunds	Administrative Expenses	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
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%
2016	161,995,828	(180,617,784)	(5,350,896)	(1,851,656)	(187,820,336)	(25,824,508)	2,124,335,288	-1.2%

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).

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

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, 2016, amounted to \$7,608,779, which is less than 0.2% of the actuarial accrued liability.

A brief summary of demographic gain/(loss) experience of TFFR for the year ended June 30, 2016, 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, 2016

1.	Turnover	-\$2,923,056
2.	Retirement	56,645
3.	Deaths among retired members and beneficiaries	-44,215
4.	Salary/service increase for continuing actives	536,090
5.	New entrants	-6,978,001
6.	Miscellaneous	<u>1,743,758</u>
7.	Total	-\$7,608,779

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

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 13.22% 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, 2016, the amortization period has 27 years remaining.

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

CHART 15
Actuarially Determined Contribution

	Year Beginning July 1			
	2016		2015	
	Amount	% of Compensation	Amount	% of Compensation
1. Total normal contribution rate, adjusted for timing*	\$80,236,633	12.04%	\$72,798,417	11.63%
2. Less: member contribution rate	<u>78,305,065</u>	<u>-11.75%</u>	<u>73,528,490</u>	<u>-11.75%</u>
3. Employer normal contribution rate, adjusted for timing*	\$1,931,568	0.29%	-\$730,073	-0.12%
4. Actuarial accrued liability	3,589,393,851		3,449,775,982	
5. Actuarial value of assets	2,229,292,988		2,125,017,451	
6. Unfunded actuarial accrued liability: (4) - (5)	1,360,100,863		1,324,758,531	
7. Payment on unfunded actuarial accrued liability, adjusted for timing*	86,189,591	12.93%	82,360,453	13.16%
8. Actuarially determined contribution (3) + (7)	<u>\$88,121,159</u>	<u>13.22%</u>	<u>\$81,630,380</u>	<u>13.04%</u>
9. Total payroll supplied by System, annualized	\$627,002,353		\$589,783,780	
10. Projected annual payroll for fiscal year beginning July 1	\$666,426,087		\$625,774,379	

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

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

The actuarially determined contribution as of July 1, 2016, 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, 2015 to July 1, 2016

	July 1, 2016	July 1, 2015
1. Prior valuation	13.04%	11.57%
2. Increases/(decreases) due to:		
a. Change in amortization period (decrease from 29 years to 28 years remaining as of July 1, 2015 and decrease from 28 years to 27 years remaining as of July 1, 2016)	0.00%	0.00%
b. Change in covered payroll and normal cost	-0.39%	-0.23%
c. Employer contributions received at 12.75% rather than 13.04% for FY2016 and 12.75% rather than 11.57% for FY2015	-0.06%	-0.15%
d. Liability experience	0.07%	0.04%
e. Investment experience	0.32%	-0.53%
f. Legislative changes	0.00%	0.00%
g. Change in actuarial assumptions	0.00%	2.34%
h. Change to valuation software as a result of the actuarial audit	0.24%	0.00%
i. Total	<u>0.18%</u>	<u>1.47%</u>
3. Current valuation (1. + 2.i.)	13.22%	13.04%
4. Statutory employer contribution rate	12.75%	12.75%
5. Margin available [contribution sufficiency/(deficiency)] (4. – 3.)	<u>-0.47%</u>	<u>-0.29%</u>

SECTION 2: Valuation Results for the North Dakota Teachers' Fund for Retirement

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

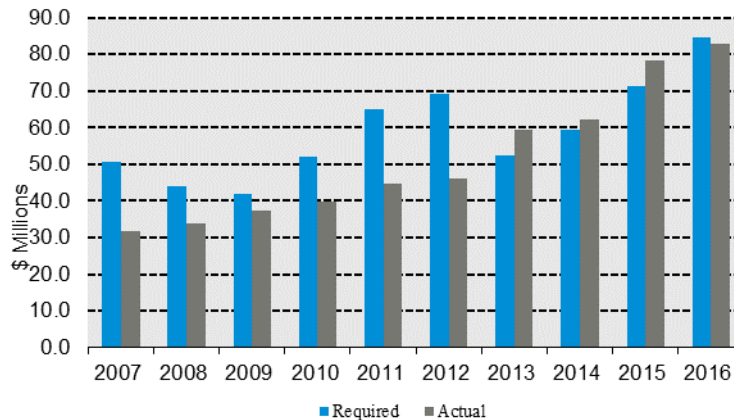
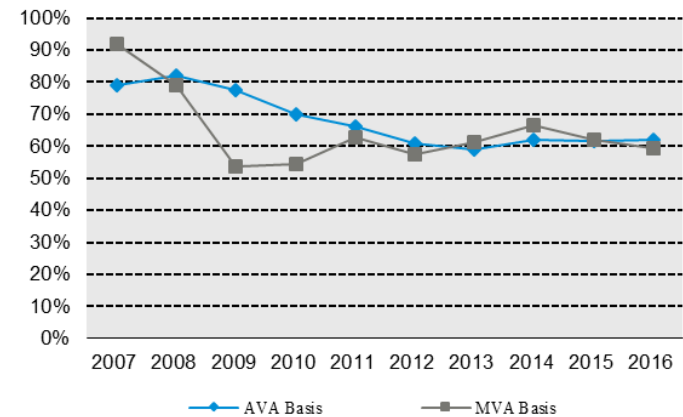


CHART 18
Funded Ratio, Years Ended June 30



SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

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 2.8% since last year, from 10,514 to 10,813. 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 6.3% since last year. For all comparative purposes, payroll is the amount supplied by the RIO staff (i.e., the 2015-2016 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, 2016. Pay is assumed to change only at the beginning of a school/fiscal year.

Average pay increased by 3.4%, from \$56,095 to \$57,986. This includes the impact of replacing more highly paid members who retire with new teachers. The average increase in salary for the 9,661 continuing members (members active in both this valuation and the preceding valuation) was 6.0%.

The average age of active members decreased from 42.5 years to 42.3 years, and their average service decreased from 12.4 years to 12.1 years.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

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, 2016	July 1, 2015
1. Plan Eligibility		
a. Tier 1 Grandfathered	2,559	2,869
b. Tier 1 Non-grandfathered	3,272	3,312
c. Tier 2	<u>4,982</u>	<u>4,333</u>
d. Total	10,813	10,514
2. Benefit Eligibility		
a. Non-Vested	3,380	3,145
b. Vested	5,608	5,494
c. Early Retirement	851	888
d. Normal Retirement	<u>974</u>	<u>987</u>
e. Total	10,813	10,514

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, 1,825 members were eligible for either reduced or unreduced retirement, a decrease over last year's figure of 1,875.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT A Member Data	July 1, 2016	July 1, 2015
1. Active members		
a. Males	2,742	2,670
b. Females	8,071	7,844
c. Total members	10,813	10,514
d. Total payroll supplied by System, annualized	\$627,002,353	\$589,783,780
e. Average salary	\$57,986	\$56,095
f. Average age	42.3	42.5
g. Average service	12.1	12.4
h. Total contributions with interest	\$792,788,975	\$737,479,504
i. Average contribution with interest	\$73,318	\$70,143
2. Vested inactive members		
a. Number	1,601	1,607
b. Total annual deferred benefits	\$11,131,831	\$10,722,390
c. Average annual deferred benefit	\$6,953	\$6,672
d. Average age	49.3	49.3
3. Non-vested inactive members		
a. Number	779	660
b. Employee contributions with interest due	\$5,214.7	\$3,659,588
c. Average refund due	\$6,702	\$5,545
d. Average age	37.0	37.5
4. Service retirees		
a. Number	7,435	7,250
b. Total annual benefits	\$175,417,123	\$166,577,429
c. Average annual benefit	\$23,593	\$22,976
d. Average age	71.3	71.0
5. Disabled retirees		
a. Number	128	128
b. Total annual benefits	\$1,885,987	\$1,869,981
c. Average annual benefit	\$14,734	\$14,609
d. Average age	62.7	62.0
6. Beneficiaries		
a. Number	686	647
b. Total annual benefits	\$9,929,829	\$8,970,707
c. Average annual benefit	\$14,475	\$13,865
d. Average age	72.9	73.8

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT B

Historical Summary of Active Member Data

Year Ending June 30,	<u>Active Members</u>		<u>Total Payroll Supplied by System, Annualized</u>		<u>Average Salary</u>		Average Age	Average Service
	Number	Percent Increase/ (Decrease)	Amount in \$ Millions	Percent Increase/ (Decrease)	\$ Amount	Percent Increase/ (Decrease)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
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
2016	10,813	2.8%	627.0	6.3%	57,986	3.4%	42.3	12.1

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT C

**Members in Active Service as of June 30, 2016
By Age, Years of Service, and Average Compensation**

Age	Years of Credited Service									
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	411	411	--	--	--	--	--	--	--	--
	38,535	38,535	--	--	--	--	--	--	--	--
25 - 29	1,621	1,285	336	--	--	--	--	--	--	--
	45,205	44,030	49,699	--	--	--	--	--	--	--
30 - 34	1,616	545	865	206	--	--	--	--	--	--
	50,185	44,938	51,989	56,494	--	--	--	--	--	--
35 - 39	1,382	340	348	552	142	--	--	--	--	--
	56,728	47,932	55,479	60,830	64,909	--	--	--	--	--
40 - 44	1,249	228	210	249	458	103	1	--	--	--
	61,402	49,482	57,248	62,698	66,762	69,301	59,863	--	--	--
45 - 49	1,357	184	153	181	292	398	146	3	--	--
	65,668	52,803	56,837	64,118	67,662	70,432	76,102	64,788	--	--
50 - 54	1,259	161	92	130	155	185	408	127	1	--
	66,925	53,501	59,260	59,864	64,604	71,057	73,472	72,398	80,435	--
55 - 59	1,068	128	81	95	123	144	188	198	111	--
	67,244	54,221	56,218	60,336	67,981	69,713	71,465	75,141	70,965	--
60 - 64	678	74	38	68	77	87	86	65	137	46
	67,241	52,353	55,310	61,660	62,746	70,455	69,741	74,326	73,173	78,387
65-70	145	28	11	13	24	13	17	10	9	20
	65,823	64,539	54,873	53,256	61,659	59,646	72,528	80,161	69,474	76,311
70 & over	27	12	4	1	2	1	--	3	1	3
	51,034	38,795	57,439	39,640	59,001	72,975	--	65,992	78,003	58,674
Total	10,813	3,396	2,138	1,495	1,273	931	846	406	259	69
	57,986	45,908	53,618	60,784	66,266	70,174	73,065	74,132	72,144	76,928

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT D-1

Schedule of Annuitants by Type of Benefit as of July 1, 2016

Type of Benefits/ Form of Payment	Number	Annual Benefits Amount	Average Monthly Benefits
Service:			
Straight Life	2,917	\$59,292,259	\$1,694
100% J&S	3,035	82,538,546	2,266
50% J&S	644	16,890,793	2,186
5 Years C&L	19	274,660	1,205
10 Years C&L	175	3,398,376	1,618
20 Years C&L	100	2,296,394	1,914
Level	<u>545</u>	<u>10,726,095</u>	<u>1,640</u>
Subtotal:	7,435	\$175,417,123	\$1,966
Disability:			
Straight Life	105	\$1,573,577	\$1,261
100% J&S	14	176,960	1,053
50% J&S	7	104,057	1,239
5 years C&L	1	6,254	521
10 Years C&L	0	0	0
20 Years C&L	1	9,663	805
Level	<u>0</u>	<u>0</u>	<u>0</u>
Subtotal:	128	\$1,885,987	\$1,228
Beneficiaries:			
Straight Life	662	\$9,692,053	\$1,220
5 Years Certain Only	3	8,505	236
10 Years Certain Only	11	92,606	702
20 Years Certain Only	<u>10</u>	<u>136,664</u>	<u>1,139</u>
Subtotal:	686	\$9,929,828	\$1,206
Total:	8,249	\$187,232,938	\$1,891

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

**EXHIBIT D-2
Schedule of Annuitants by Monthly Benefit as of July 1, 2016**

Monthly Benefit Amount	Number of Members	Female	Male	Average Service
Under \$200	241	179	62	6.27
200 - 399	461	348	113	11.88
400 - 599	445	348	97	16.64
600 - 799	387	281	106	20.45
800 - 999	398	292	106	22.61
1,000 - 1,199	506	380	126	25.86
1,200 - 1,399	528	359	169	27.55
1,400 - 1,599	583	379	204	29.13
1,600 - 1,799	619	414	205	29.25
1,800 - 1,999	608	407	201	30.12
2,000 - 2,199	557	381	176	30.09
2,200 - 2,399	514	335	179	30.67
2,400 - 2,599	406	269	137	32.00
2,600 - 2,799	356	232	124	32.53
2,800 - 2,999	336	210	126	33.02
3,000 - 3,199	292	202	90	33.48
3,200 - 3,399	239	155	84	34.49
3,400 - 3,599	175	102	73	33.99
3,600 - 3,799	144	78	66	35.41
3,800 - 3,999	105	62	43	35.26
4,000 & over	<u>349</u>	<u>168</u>	<u>181</u>	<u>36.54</u>
Total:	8,249	5,581	2,668	27.41

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

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, 2015	10,514	1,607	660	7,250	128	647	20,806
B. Additions and new hires	1,032	0	8	0	0	0	1,040
C. Participant movement							
1. Retirement	-296	-57	0	354	-1	0	0
2. Disability	-3	-2	0	0	5	0	0
3. Died with beneficiary	-3	0	0	-58	-2	67	4**
4. Died without beneficiary	-4	-1	-1	-111	-1	-24	-142
5. Terminated vested	-164	164	0	0	0	0	0
6. Terminated non-vested	-205	0	205	0	0	0	0
7. Refunds	-176	-37	-47	0	0	0	-260
8. Rehired as active	120	-73	-46	0	-1	0	0
9. Expired benefits	0	0	0	0	0	-5	-5
10. New alternate payee	0	0	0	0	0	1	1
11. Data corrections	<u>-2*</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>-2</u>
D. Number as of July 1, 2016	10,813	1,601	779	7,435	128	686	21,442

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

***Due to multiple beneficiaries*

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT F

Statement of Change in Plan Net Assets for Year Ended June 30, 2016

	As of June 30	
	2016	2015
A. Assets available at beginning of year	\$2,141,920,800	\$2,090,415,057*
B. Revenue for the year		
1. Contributions		
a. Employee contributions	\$76,342,685	\$72,268,451
b. Employer contributions	82,839,932	78,422,098
c. Purchased service credit	2,768,245	1,600,739
d. Interest, penalties and other	<u>44,966</u>	<u>172,474</u>
e. Total	\$161,995,828	\$152,463,762
2. Income		
a. Interest, dividends, and other income	\$49,982,337	\$40,486,496
b. Securities lending income	304,571	0
c. Investment expenses	-6,034,689	-6,916,830
d. Security lending expenses	<u>-60,907</u>	<u>0</u>
e. Net	\$44,191,312	\$33,569,666
3. Net realized and unrealized gains/(losses)	<u>-35,952,316</u>	<u>39,635,140</u>
4. Total revenue: (1e) + (2c) + (3)	\$170,234,824	\$225,668,568
C. Expenditures for the year		
1. Benefits and refunds		
a. Refunds	\$5,350,896	\$3,889,671
b. Regular annuity benefits	179,625,551	167,792,430
c. Partial lump-sum benefits paid	<u>992,233</u>	<u>557,332</u>
d. Total	\$185,968,680	\$172,239,433
2. Administrative and miscellaneous expenses	<u>1,851,656</u>	<u>1,923,392</u>
3. Total expenditures	\$187,820,336	\$174,162,825
D. Increase/(decrease) in net assets: (B4 – C3)	-\$17,585,512	\$51,505,743
E. Value of assets at end of year: (A + D)	<u>\$2,124,335,288</u>	<u>\$2,141,920,800</u>

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

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT G

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

	As of June 30	
	2016	2015
1. Cash and cash equivalents (operating cash)	\$19,747,422	\$18,964,788
2. Invested securities lending collateral	19,859,451	0
3. Receivables:		
a. Member and employer contributions	\$25,494,939	\$23,591,127
b. Investment income	9,517,943	8,574,358
c. Miscellaneous receivables	<u>7,963</u>	<u>20,646</u>
d. Total receivables	\$35,020,845	\$32,186,131
4. Investments		
a. Invested cash	\$18,515,640	\$29,631,182
b. Domestic equities	477,387,621	461,830,284
c. International equities	654,529,861	652,582,263
d. Domestic fixed income	358,183,152	379,036,997
e. International fixed income	120,903,608	101,138,757
f. Real assets	369,771,496	389,351,436
g. Private equity	<u>73,374,321</u>	<u>81,662,078</u>
h. Total investments	\$2,072,665,699	\$2,095,232,997
5. Total assets: (1) + (2) + (3d) + (4h)	\$2,147,293,417	\$2,146,383,916
6. Deferred outflows of resources related to pensions	\$168,324	\$76,002
7. Liabilities		
a. Securities lending collateral	\$19,859,451	\$0
b. Accounts payable	128,532	151,094
c. Accrued expenses	1,354,756	1,193,136
d. Investment expenses payable	<u>1,713,404</u>	<u>3,101,713</u>
e. Total liabilities	\$23,056,143	\$4,445,943
8. Deferred inflows related to pensions	\$70,310	\$93,175
9. Total market value of assets available for benefits: (5) + (6) – (7e) – (8)	\$2,124,335,288	\$2,141,920,800

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT G (continued)

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

	As of June 30	
	2016	2015
10. Asset allocation (investments)		
a. Invested cash	0.9%	1.4%
b. Domestic equities	23.0%	22.0%
c. International equities	31.6%	31.2%
d. Domestic fixed income	17.3%	18.1%
e. International fixed income	5.8%	4.8%
f. Real estate	17.9%	18.6%
g. Private equity	<u>3.5%</u>	<u>3.9%</u>
h. Total investments	100.0%	100.0%

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT H

Development of Unfunded Actuarial Accrued Liability

	Year Ending June 30	
	2016	2015
1. Unfunded actuarial accrued liability at beginning of year	\$1,324,758,531	\$1,198,326,269
2. Normal cost at beginning of year	70,147,697	60,617,900
3. Total contributions	161,995,828	152,463,762
4. Interest on:		
(a) Unfunded actuarial accrued liability and normal cost	\$108,105,233	\$100,715,534
(b) Total contributions	<u>5,676,683</u>	<u>5,512,663</u>
(c) Total interest: (4a) – (4b)	<u>\$102,428,550</u>	<u>\$95,202,871</u>
5. Expected unfunded actuarial accrued liability: (1) + (2) – (3) + (4c)	\$1,335,338,949	\$1,201,683,278
6. Changes due to (gain)/loss from:		
(a) Investments	\$33,588,108	-\$51,873,093
(b) Demographics	7,608,779	3,623,699
(c) Total changes due to (gain)/loss: (6a) + (6b)	41,196,887	-48,249,394
7. Change due to plan amendments	0	0
8. Change in actuarial cost method	0	0
9. Change in actuarial assumptions	0	171,324,647
10. Change due to actuarial audit	-16,434,973	N/A
11. Unfunded actuarial accrued liability at end of year: (5) + (6c) + (7) + (8) + (9) + (10)	<u>\$1,360,100,863</u>	<u>\$1,324,758,531</u>

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

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.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

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):	<p>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:</p> <ol style="list-style-type: none">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, andDiscounted according to an assumed rate (or rates) of return to reflect the time value of money.
Actuarial Present Value of Future Plan Benefits:	<p>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.</p>
Actuarial Valuation:	<p>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).</p>
Actuarial Value of Assets:	<p>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.</p>

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

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:	<p>The estimates on which the cost of the Fund is calculated including:</p> <ul style="list-style-type: none">(a) <u>Investment return</u> - the rate of investment yield that the Fund will earn over the long-term future;(b) <u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates;(c) <u>Retirement rates</u> - the rate or probability of retirement at a given age;(d) <u>Turnover rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;(e) <u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

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.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for Retirement

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.

SECTION 3: Supplemental Information for the North Dakota Teachers' Fund for 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.

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

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 686 beneficiaries in pay status)		8,249
2. Members inactive during year ended June 30, 2016, with vested rights		1,601
3. Members active during the year ended June 30, 2016		10,813
Fully vested	7,433	
Not vested	3,380	
4. Other non-vested inactive members as of June 30, 2016		779

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

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	\$2,118,617,183	\$636,231,737	\$1,482,385,446
b. Disability benefits	33,023,457	14,996,785	18,026,672
c. Death benefits	35,998,781	15,609,541	20,389,240
d. Withdrawal benefits	<u>141,479,143</u>	<u>138,918,945</u>	<u>2,560,198</u>
e. Total	\$2,329,118,564	\$805,757,008	\$1,523,361,556
2. Inactive vested members	84,502,367	--	84,502,367
3. Inactive non-vested members	5,214,727	--	5,214,727
4. Retirees and beneficiaries	<u>1,976,315,201</u>	--	<u>1,976,315,201</u>
5. Total	\$4,395,150,859	\$805,757,008	\$3,589,393,851
B. Determination of Unfunded Actuarial Accrued Liability			
1. Actuarial accrued liability			\$3,589,393,851
2. Actuarial value of assets			<u>2,229,292,288</u>
3. Unfunded actuarial accrued liability: (1) – (2)			\$1,360,100,863

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT II

Actuarial Balance Sheet

	July 1, 2016	July 1, 2015
A. Assets		
1. Current Assets		
a. Market Value	\$2,124,335,288	\$2,141,920,800
b. Adjustment for actuarial value	<u>104,957,700</u>	<u>-16,903,349</u>
c. Actuarial value of assets	\$2,229,292,288	\$2,125,017,451
2. Actuarial present value of future contributions		
a. Member contributions	\$859,717,173	\$799,757,682
b. Employer normal costs	-53,959,465	-63,391,746
c. Unfunded actuarial accrued liability	<u>\$1,360,100,863</u>	<u>1,324,758,531</u>
d. Total	\$2,165,858,571	\$2,061,124,467
3. Total (1c + 2d)	<u>\$4,395,150,859</u>	<u>\$4,186,141,918</u>
B. Liabilities (Present Value of Projected Benefits)		
1. Retirees and beneficiaries	\$1,976,315,201	\$1,874,669,272
2. Inactive members	89,717,094	85,198,880
3. Active members	<u>2,329,118,564</u>	<u>2,226,273,766</u>
4. Total	<u>\$4,395,150,859</u>	<u>\$4,186,141,918</u>

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT III

Comparison of Employer Contribution to Actuarially Determined Contribution

Fiscal Year	Actuarially Determined Contribution (ADC) ¹		Actual Employer Contribution ²		Percentage of ADC Contributed
	% of Payroll ³	Amount ⁴	% of Payroll	Amount	[(5)/(3)]
(1)	(2)	(3)	(4)	(5)	(6)
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%
2016	13.04%	84,724,122	12.75%	82,839,932	97.8%

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 2016 ADC is based on the July 1, 2015 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 ADC for FY2014 through FY 2016 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.

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

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%
2016	84,724,122	82,839,932	1,884,190	649,724,868	12.75%

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

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)
07/01/2007	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%
07/01/2016	2,229,292,988	3,589,393,851	1,360,100,863	62.1%	627,002,353	216.9%

Note: Numbers for 7/1/2007 – 7/1/2008 valuation dates are rounded

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

Exhibit VI

Determination of Contribution Sufficiency

	July 1, 2016	
	Percent of Payroll	Dollar Amount
A. Statutory Contributions		
1. Member contributions	11.75%	\$78,305,065
2. Employer contributions	<u>12.75%</u>	<u>84,969,326</u>
3. Total	<u>24.50%</u>	<u>\$163,274,391</u>
B. Actuarially Determined Contribution		
1. Gross normal cost:		
(a) Retirement	9.06%	\$60,354,225
(b) Disability	0.20%	1,336,108
(c) Death	0.22%	1,451,543
(d) Deferred termination benefit and refunds	<u>1.85%</u>	<u>12,334,187</u>
(e) Total normal cost as of July 1	<u>11.33%</u>	<u>75,476,063</u>
2. Gross normal cost including administrative expenses and adjusted for timing	12.04%	80,236,633*
3. Less member contribution rate	11.75%	78,305,065
4. Employer normal cost rate: (2) – (3)	0.29%	1,931,568
5. Unfunded actuarial accrued liability rate, adjusted for timing	12.75%	86,189,591
6. Total: (4) + (5)	<u>13.22%</u>	<u>88,121,159</u>
C. Contribution Sufficiency / (Deficiency): (A.2) – (B.6)	-0.47%	-\$3,151,833
Projected annual payroll for fiscal year beginning on the valuation date		\$666,426,087

* Includes expected administrative expenses of \$1,902,577

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT VII
Solvency Test

	July 1, 2016	July 1, 2015
1. Actuarial accrued liability (AAL)		
a. Active member contributions	\$792,788,975	\$737,479,504
b. Retirees and beneficiaries	1,976,315,201	1,874,669,272
c. Active and inactive members (employer financed)	<u>820,289,675</u>	<u>837,627,206</u>
d. Total	\$3,589,393,851	\$3,449,775,982
2. Actuarial value of assets	2,229,292,988	2,125,017,451
3. Cumulative portion of AAL covered		
a. Active member contribution	100.0%	100.0%
b. Retirees and beneficiaries	51.4%	74.0%
c. Active and inactive members (employer financed)	0.0%	0.0%

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT VIII

Net Pension Liability

	June 30, 2016	June 30, 2015
The components of the net pension liability were as follows:		
Total pension liability	\$3,589,393,851	\$3,449,775,982
Plan fiduciary net position	<u>(2,124,335,288)</u>	<u>(2,141,920,800)</u>
Net pension liability	\$1,465,058,563	\$1,307,855,182
Plan fiduciary net position as a percentage of the total pension liability	59.2%	62.1%

The net pension liability was measured as of June 30, 2016, and is determined based on the total pension liability from the July 1, 2016, 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, 2016.

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of July 1, 2016, 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 and inactive members, mortality rates were based on the RP-2014 Employee Mortality Table, projected generationally using Scale MP-2014. For healthy retirees, mortality rates were based on the RP-2014 Healthy Annuitant Mortality Table set back one year, multiplied by 50% for ages under 75 and grading up to 100% by age 80, projected generationally using Scale MP-2014. For disabled retirees, mortality rates were based on the RP-2014 Disabled Mortality Table set forward four years.

The actuarial assumptions used were based on the results of an experience study dated April 30, 2015. They are the same as the assumptions used in the July 1, 2016 funding actuarial valuation.

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

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	58%	7.30%
Global Fixed Income	23%	0.88%
Global Real Assets	18%	5.32%
Cash Equivalents	<u>1%</u>	0.00%
Total	100%	

Discount rate: The long-term expected rate of return on pension plan investments is 7.75%. The high quality tax-exempt general obligation municipal bond rate (20-Bond GO Index) as of the closest date prior to the valuation date of June 30, 2016, is 2.85%, as published by the Board of Governors of the Federal Reserve System.

The discount rate used to measure the total pension liability was 7.75% as of June 30, 2016. 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, 2016, 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, 2016. 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, 2016.

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability as of June 30, 2016, and June 30, 2015, calculated using the discount rate of 7.75%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.75%) or 1-percentage-point higher (8.75%) than the current rate:

	1% Decrease	Current Discount Rate	1% Increase
Net pension liability as of June 30, 2015	\$1,728,392,470	\$1,307,855,182	\$957,135,967
Net pension liability as of June 30, 2016	\$1,900,291,033	\$1,465,058,563	\$1,102,551,032

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

EXHIBIT IX

Schedules of Changes in Net Pension Liability

	2016	2015
Total pension liability		
Service cost	\$68,239,440	\$60,617,900
Interest	265,439,909	249,063,837
Change of benefit terms	0	0
Differences between expected and actual experience	(8,092,800)	2,209,258
Changes of assumptions	0	171,324,647*
Benefit payments, including refunds of employee contributions	<u>(185,968,680)</u>	<u>(172,239,433)</u>
Net change in total pension liability	\$139,617,869	\$310,976,209
Total pension liability – beginning	<u>3,449,775,982</u>	<u>3,138,799,773</u>
Total pension liability – ending (a)	<u>\$3,589,393,851</u>	<u>\$3,449,775,982</u>
Plan fiduciary net position		
Contributions – employer	\$82,839,932	\$78,422,098
Contributions – member	76,342,685	72,268,451
Contributions – purchased service credit	2,768,245	1,600,739
Contributions – other	44,966	172,474
Net investment income	8,238,996	73,204,806
Benefit payments, including refunds of employee contributions	(185,968,680)	(172,239,433)
Administrative expense	<u>(1,851,656)</u>	<u>(1,923,392)</u>
Net change in plan fiduciary net position	(\$17,585,512)	\$51,505,743
Plan fiduciary net position – beginning	<u>2,141,920,800</u>	<u>2,090,415,057**</u>
Plan fiduciary net position – ending (b)	\$2,124,335,288	\$2,141,920,800
Net pension liability – ending (a) – (b)	<u>\$1,465,058,563</u>	<u>\$1,307,855,182</u>
Plan fiduciary net position as a percentage of the total pension liability	59.2%	62.1%
Actual covered employee payroll	\$649,724,868	\$615,104,860
Plan net pension liability as percentage of covered employee payroll	225.5%	212.6%

* 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.

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**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.

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

Retirement Rates:

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

Age	Unreduced Retirement *		Reduced Retirement
	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.

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

Disability Rates:

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

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

Termination Rates:

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

Years from Hire	Male	Female
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

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

Salary Increase Rates:

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

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

Payroll Growth Rate:

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

Percent Married:

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

Percent Electing a Deferred Termination Benefit:

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

Loading Factor for New Retirees:

The liability includes a 3% load for members who retired during the year ended June 30, 2016, to reflect that their benefit is not finalized as of the valuation date.

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

Annual Administrative Expenses:	Administrative expenses of \$1,902,577 (actual expenses for the previous year, increased with inflation) are expected to be paid monthly for the year beginning July 1, 2016.
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.

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

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 the State participate in TFFR. This includes teachers, supervisors, principals, administrators, etc. Non-certified employees such as teacher's aides, janitors, secretaries, drivers, etc. are not allowed to participate in TFFR. Eligible employees become members at their date of employment.
Member Contributions:	All active members contribute 11.75% of their salary per year. The employer may "pick up" the member's 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.

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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.

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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.

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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.

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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

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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.

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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.

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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.

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3. Employer service purchase authorized.
4. Active members of the Department of Public Instruction are permitted to make a one-time irrevocable election to transfer to the State Public Employees Retirement System in FY 2004. Both assets and liabilities for all TFFR service will be transferred for electing employees. Transferred assets will be based on the actuarial present value of the member's accrued TFFR benefit, or the member's contribution account balance if larger.

2005 Legislative Session:

There were no material changes made during the 2005 legislative 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 State Public Employees Retirement System in FY 2008. Both assets and liabilities for all TFFR service will be transferred for electing employees. Transferred assets will be the actuarial present value of the member's accrued TFFR benefit, or the member's contribution account balance, if larger.

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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).

SECTION 4: Reporting Information for the North Dakota Teachers' Fund for Retirement

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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MEMORANDUM

TO: TFFR Board
FROM: Fay Kopp
DATE: October 20, 2016
SUBJ: Actuarial Audit Report Response

Kim Nicholl and Matt Strom, Segal Consultants, will review their response to the Actuarial Audit conducted by Cavanaugh Macdonald Consulting earlier this year. Attached is a copy of Segal's July 14, 2016 letter which provides their initial comments relating to the actuarial review.

Attachment



101 North Wacker Drive Suite 500 Chicago, IL 60606-1724
T 312.984.8500 www.segalco.com

July 14, 2016

Ms. Fay Kopp
Deputy Executive Director
ND Retirement and Investment Office
1930 Burnt Boat Drive
Bismarck, ND 58507-7100

Re: **Comments Related to Actuarial Review of Segal Work for TFFR**

Dear Fay:

Earlier in 2016, the North Dakota Teachers' Fund for Retirement (TFFR) Board of Trustees retained Cavanaugh Macdonald Consulting, LLC (CMC) to perform an independent review of our July 1, 2015, actuarial valuation. As part of this process, CMC also reviewed projection results prepared in conjunction with the valuation, as well as the most recent experience study dated April 30, 2015.

CMC has completed their review and we have received a copy of their report dated July 13, 2016. The Executive Summary states: "While we offer up a number of different ideas, we believe that Segal's work provides appropriate assessment of the health and funding requirements of the NDTFFR." We are pleased that the auditor was able to validate our work. CMC has made a number of comments and suggestions related to their review. They are not indicative of any type of substantive error or omission in the work product and we will consider those suggestions very carefully during the coming actuarial work cycle.

Following are the comments and suggestions raised by CMC in their report (paraphrased, where appropriate), as well as our responses.

Section 2. Actuarial Assumptions

- 1. We would encourage Segal to explicitly outline their philosophy [related to recommending changes in demographic assumptions] in their [experience study] report so as to help the readers understand the rationale behind their recommendations.** We will consider providing this type of description in our next experience study report.

2. **We recommend that when Segal prepares the next experience study, they produce a complete formal report as well as the presentation.** This approach was discussed with TFFR staff at the conclusion of the prior experience study and we will prepare a “formal” report format as part of our next experience study.
3. **[W]e believe that [Segal] should change their description of the basis [i.e., that rates of salary increase are based on duration from initial system entry date rather than years of completed service] to more accurately reflect the nature of the rates developed.** We will add this clarification in our next experience study report.
4. **[Related to the salary scale assumption], while we are comfortable with the recommendation to retain the merit scale, we urge the inclusion of additional analysis in the report the next time an experience study is performed.** This additional analysis will be included in our next experience study report.
5. **[Related to the analysis of pension spiking], we would suggest an analysis to determine what portion of individuals had large increases in the final averaging period to see what issues may be arising.** We will consider including this additional analysis related to our review of possible pension spiking as part of the next experience study.
6. **We also believe that it could have been valuable to study the [retirement] experience with results weighted in proportion to salary or approximate liability. [...we] would suggest that this type of analysis at least be considered in the next experience study.** We will plan to study weighted retirement experience as part of the next experience study.
7. **While [the assumption related to the load applied to new retirees to reflect a possible benefit adjustment] is reasonable, we believe it should be reviewed in each experience study, especially as the transition of the membership from Tier 1 to Tier 2 with their different definitions of final average pay.** We will plan to study the load applied to new retirees as part of the next experience study.

Section 3. Actuarial Methods

1. **In our review of Segal’s work, we find that their application of some of the technical details of the entry age normal cost method are nonstandard in our experience, and note that this may lead to some distortion of the results.** CMC indicates that each member’s “entry age” should be the hypothetical date equal to attained age on the valuation date, less years of service credit. We appreciate this comment and understand the issues raised by CMC. However, TFFR covers employees that have earned for a few years less than 1 year of service or took a refund of contributions in the past. By revising their entry age to equal attained age less years of service, we believe we would be misstating the entry age normal cost method for these individuals. We will review the methodology in connection with the upcoming valuation cycle to determine if a

compromise solution is available, and if the additional time and expense of modifying the valuation software is worth it relative to the materiality of the change.

2. **[Because Segal’s valuation software bases entry age on original date of hire,] the duration based salary increases and termination rates being used are [X] years further along [relative to the more common approach of setting entry age equal to attained age less years of service.] [As a result, members with breaks in service are] expected to have lower future salaries, but also a lower likelihood of terminating employment in the future.** While we understand the point that CMC is making, we believe there is an argument to be made that the salary scale and decrements should operate on the basis of the earlier “actual” hire age instead of the “artificial” entry age based on attained age less years of service.
3. **We believe [a UAAL amortization method using layers of bases] is something that NDTFFR may wish to consider at some point, but because the current period is still relatively long, there is no urgent need to act.** The approach described by CMC is something we discussed with the TFFR Board in 2013 when developing the current funding policy. Ultimately, Segal, the TFFR Board, and TFFR staff settled on an approach that involved using a closed-period amortization of UAAL for simplicity, with the understanding that the approach would be revisited in the future.

Section 5. Actuarial Valuation Results Review

1. **[With respect to the calculation of the liability for deferred vested members,] because electing a refund of member contributions would eliminate the obligation for the pre-commencement death benefit, it would be more appropriate to first add the present value of the death benefit to the present value of the deferred benefit and compare that to the member’s account balance with interest.** We agree with this comment and will work with our valuation software engineering team to develop programming code to handle this.
2. **[For the calculation of the normal cost rate,] Segal divides the normal cost by the total pay rate at the start of the coming year. However, the normal cost is developed considering only pay expected to be paid, so there is a mismatch in the calculation of the normal cost rate.** This approach is standard across Segal public sector actuaries and we have seen it used by other public sector actuaries as well. We believe this boils down to a difference in methodology among various actuaries and agree that the difference is minor, particularly since the fixed contribution rate to TFFR is set by statute.
3. **[Regarding retrospective projections used in the entry age calculations, we] do not often see a reflection of historical benefits reflected in the normal cost calculation. We believe the present value of benefits appropriately reflect actual history, and only propose changing the normal cost rate along with the corresponding impact on actuarial accrued liability. We wish to emphasize that our proposal is to value the current provisions that are applicable to each member, not the provisions applicable to new members.** As CMC points out in their report, there is no clear guidance on the

precise way to implement the entry age actuarial cost method with respect to funding a plan (or determining an Actuarially Determined Contribution, or ADC). The GASB 67 and 68 statements do, however, provide guidance and our interpretation of the language in GASB Statement 67, paragraph 46(e) is that each member's normal cost should be determined based on the benefits that were earned during their career. Following the CMC approach for purposes of the ADC calculation would require the use of two sets of actuarial liability numbers, one for funding and the other for accounting, which we believe would result in confusion.

4. **We note that Segal applies a timing adjustment to the normal cost rate to reflect the timing of contributions. In our calculations, the mid-year adjustment is effectively included in the rate by the valuation software, and so we would not have an adjustment for that. We encourage Segal to review their valuation software to confirm that this timing adjustment is indeed needed.** Segal's proprietary actuarial valuation software determines present values, liabilities and normal cost as of the beginning of the year on the valuation date. Therefore, we confirm that the timing adjustment as shown in our valuation report is appropriate.
5. **In some cases, Segal has apparently reflected additional information regarding [middle of the year] timing, but has not clearly explained the timing.** We will review these areas of the valuation report and clarify when necessary.

Section 6. Valuation Report Review

1. **In our review of the report, we found it to be substantially in compliance with the applicable ASOPs. We identified three items as areas where some clarification or enhancement.** We will review these items and incorporate into our valuation report as necessary.
2. **[Because] the salary increase and termination assumptions are based on duration from entry date rather than simply completed years of service, the description of how those rates are used in Section 4, Exhibit X should be modified.** We will review the language in Section 4, Exhibit X of our report to make sure that our descriptions are not misleading related to the application of the salary increase and termination rates.
3. **The asset gain or loss to be recognized (see page 6, item 2a) is not otherwise developed in the report. We were able to independently calculate the amount and concur with its accuracy, but we think the derivation of this amount could be useful in helping readers better understand this method.** We will review this section of our report and determine where this calculation can be added.

Section 7. GASB Reporting Review

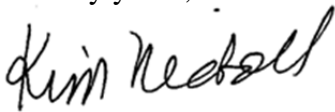
1. **We would suggest Segal include a source or derivation of [the high quality tax-exempt general obligation municipal bond rate] for completeness.** We will include the source of this rate in our report.

2. **In the notes to Exhibit 4 [of the GASB report] ... [w]e believe it would be more appropriate to display the assumptions used for the July 1, 2014 valuation since that valuation developed the actuarial contribution shown in the Schedule for the 2015 fiscal year.** In future reports, we will show all relevant assumptions as suggested and footnote when changes have occurred.

We are very pleased with the results of the audit, and, in particular, we are pleased that the auditor has successfully validated both our July 1, 2015, actuarial valuation and the 2015 experience study. We certainly appreciate the thorough work, professional demeanor, and helpful suggestions and recommendations that the auditors have made. We will continue to review them throughout the production of the July 1, 2016, actuarial valuation process and the experience study to be completed in 2020, and will implement those that seem to be in the best interest of TFFR .

Please contact us if you have any questions or comments.

Sincerely yours,



Kim M. Nicholl, FSA, EA, FCA
Senior Vice President & Actuary



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

MEMORANDUM

TO: TFFR Board
FROM: Fay Kopp
DATE: October 20, 2016
SUBJ: National Public Pension Issues

Kim Nicholl and Matt Strom, Segal Consultants, will provide comments related to national public pension issues which could impact the NDTFFR plan and other public pension plans in the future.

MEMORANDUM

TO: TFFR Board
FROM: Fay Kopp
DATE: October 20, 2016
SUBJ: Board Education: ND Education Demographics

Jerry Coleman, Director of School Finance and Organization with DPI, will be at the October TFFR Board meeting to present information on past, present, and projected future teacher and student demographic changes in ND. As he has done in the past, Jerry has been asked to provide any information or insights with regard to potential active membership population changes, salary increases, and payroll growth that could potentially impact the TFFR plan in the future.

ND Teachers' Fund for Retirement Board Meeting

October 27, 2016

Presentation by Adam Tescher – Assistant Director
School Finance and Organization
Department of Public Instruction

ND K-12 Education Demographics

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DEPARTMENT OF PUBLIC INSTRUCTION
Kirsten Baesler, State Superintendent
600 East Boulevard Avenue Dept. 201
Bismarck, North Dakota 58505-0440

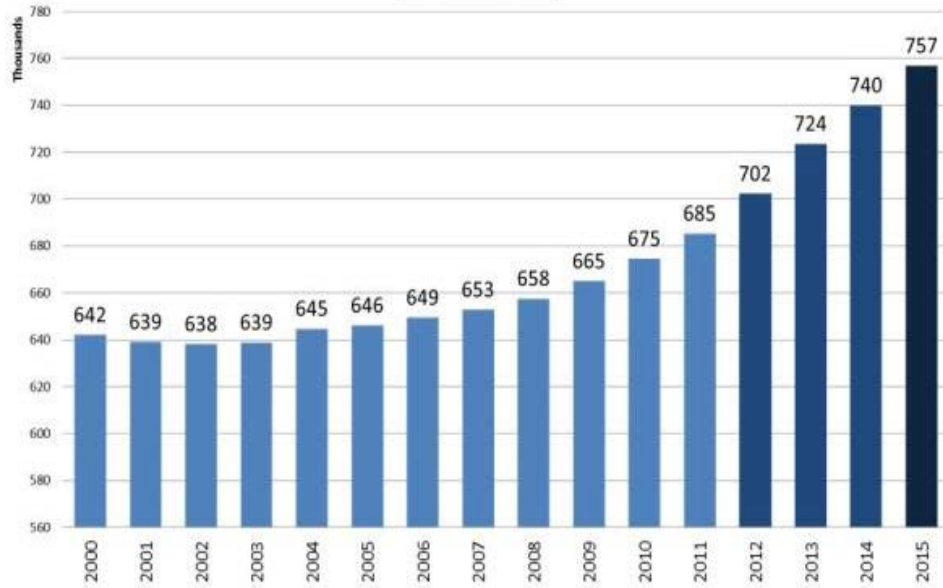
ND K-12 2015-16 Statistics

	Public Districts	Non-Public	State Institutions (est)	BIE	Sp Ed Units	Vo Ed Centers	Total
LEAs	179	43	4	5	31	13	275
Schools	373	53	4	6	0	0	436
K-12 Enrollment	106,070	6,594	82	1,590	0	0	114,336
Licensed Staff	10,358	622	73	233	415	90	11,791
Non-licensed Staff	6,316	512	75	176	231	50	7,360
Graduates	6,683	343	32	32	0	0	7,090

ND Population Historical Overview

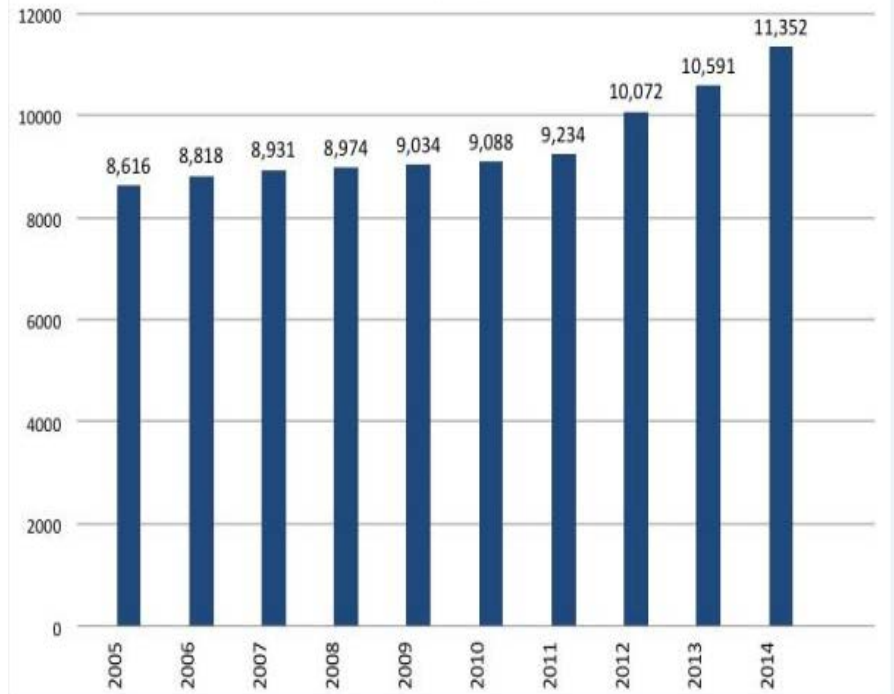
1870	2,405
1880	36,909
1890	190,983
1900	319,146
1910	577,056
1920	646,872
1930	680,845
1940	641,935
1950	619,636
1960	632,446
1970	617,761
1980	652,717
1990	638,800
2000	642,200
2010	672,591
2015 est.	756,000

**North Dakota
Estimate Annual Population
Since 2000
(In Thousands)**

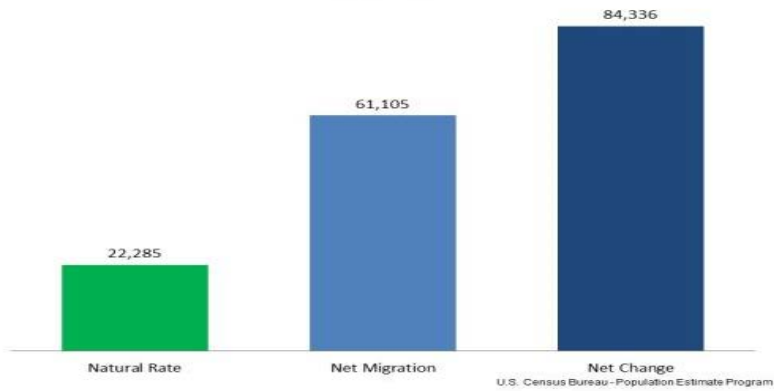


U.S. Census Bureau – Population Estimate Program

**North Dakota
Birth Per Year
2005 - 2014**



**North Dakota
Components of Change
2010 - 2015**

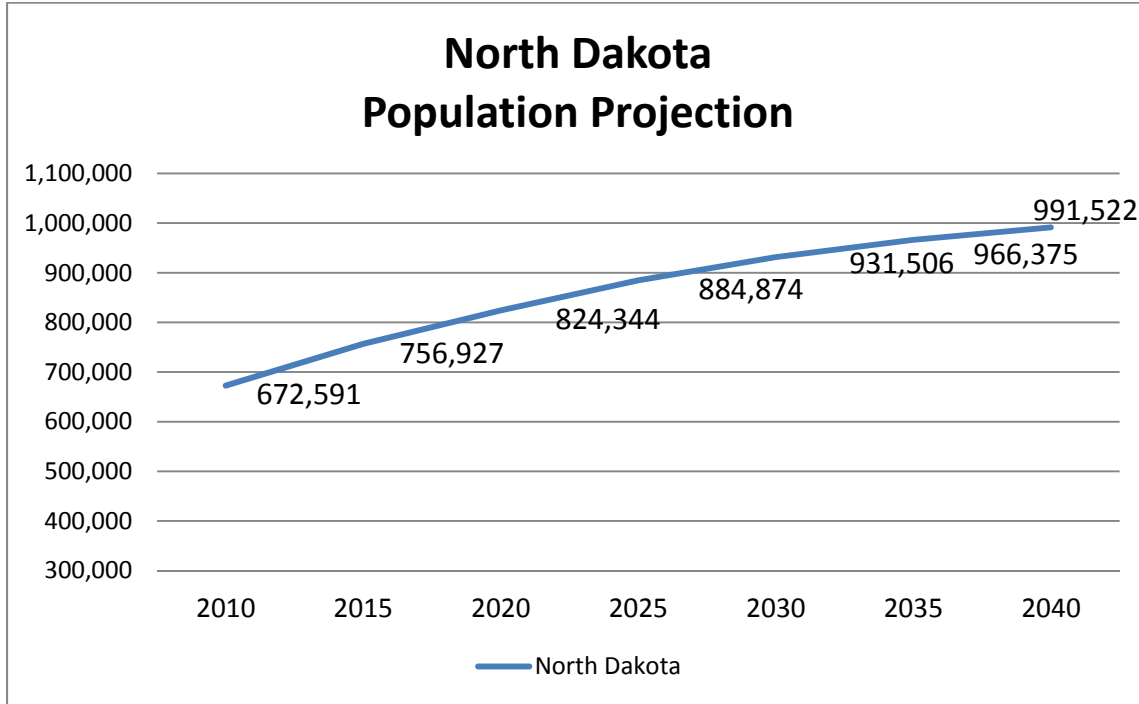


U.S. Census Bureau - Population Estimate Program

source: [North Dakota Census Office](#)

EXPECTED MIGRATION SCENARIO

The population of the state is expected to grow continuously from now to 2040, but begin to slow after 2030.

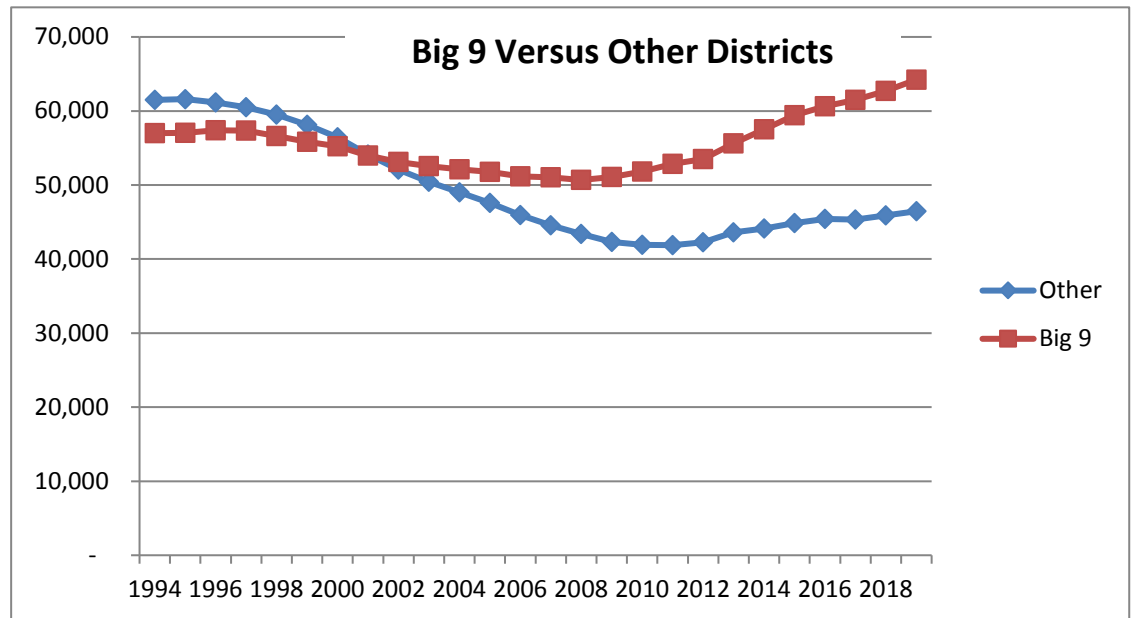
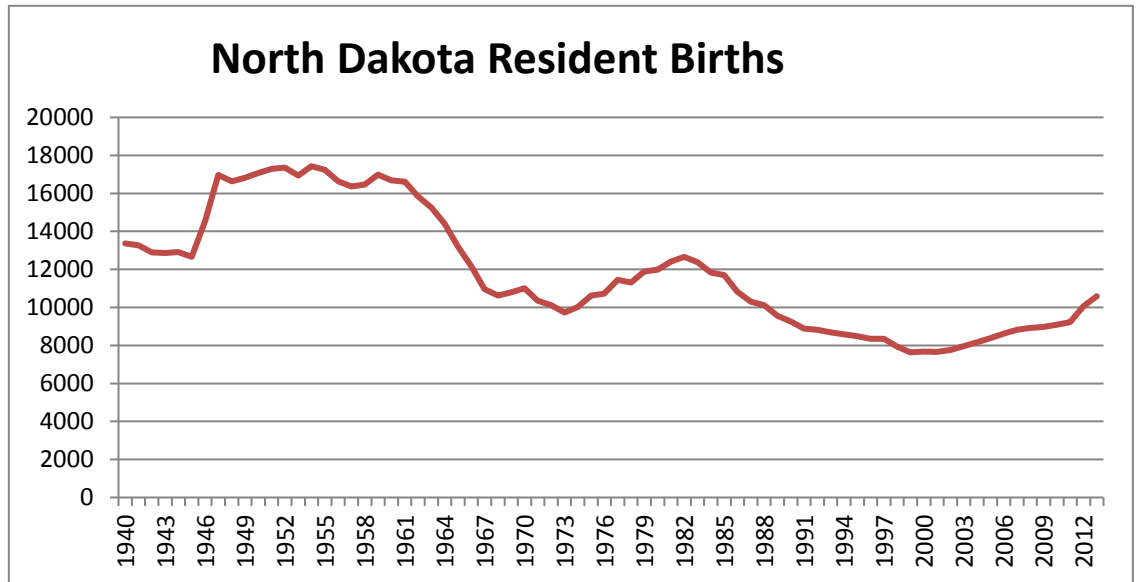


COMPONENTS OF CHANGE

Population change is generally counted in two ways: natural growth (births minus deaths) and net migration. There is a high level of interaction between these two components as the age groups most likely to migrate are those of, or near, child bearing ages and young children. Increased migration into the state has resulted in a significant increase in childbirths within the past few years. Under our expected migration scenario, this component is expected to continue to be a factor in the state's population growth between now and 2025. Afterwards, natural growth is expected to surpass migration as the primary driver in the growth of the state's population. Natural growth is expected to reach its highest level of contribution to the state's population increase during the timeframe from 2026 and 2030 and slowly taper off afterwards, but remain positive.

North Dakota Public K-12 Enrollment

School Year	Other	Big 9	Grand Total
1994	61,515	56,997	118,512
1995	61,604	57,045	118,649
1996	61,158	57,407	118,565
1997	60,484	57,332	117,816
1998	59,504	56,599	116,103
1999	58,111	55,818	113,929
2000	56,460	55,245	111,705
2001	54,120	53,974	108,094
2002	52,082	53,135	105,217
2003	50,444	52,569	103,013
2004	49,000	52,137	101,137
2005	47,568	51,756	99,324
2006	45,958	51,162	97,120
2007	44,560	51,040	95,600
2008	43,379	50,678	94,057
2009	42,306	51,100	93,406
2010	41,914	51,801	93,715
2011	41,878	52,851	94,729
2012	42,274	53,504	95,778
2013	43,590	55,602	99,192
2014	44,116	57,540	101,656
2015	44,839	59,439	104,278
2016	45,423	60,647	106,070
2017	45,344	61,498	106,842
2018	45,901	62,694	108,595
2019	46,449	64,234	110,683



Big 9 - Fargo, Bismarck, Grand Forks, West Fargo, Minot, Mandan, Dickinson, Williston, Jamestown (enr. over 2,000).

Prepared by School Finance, 10/2016

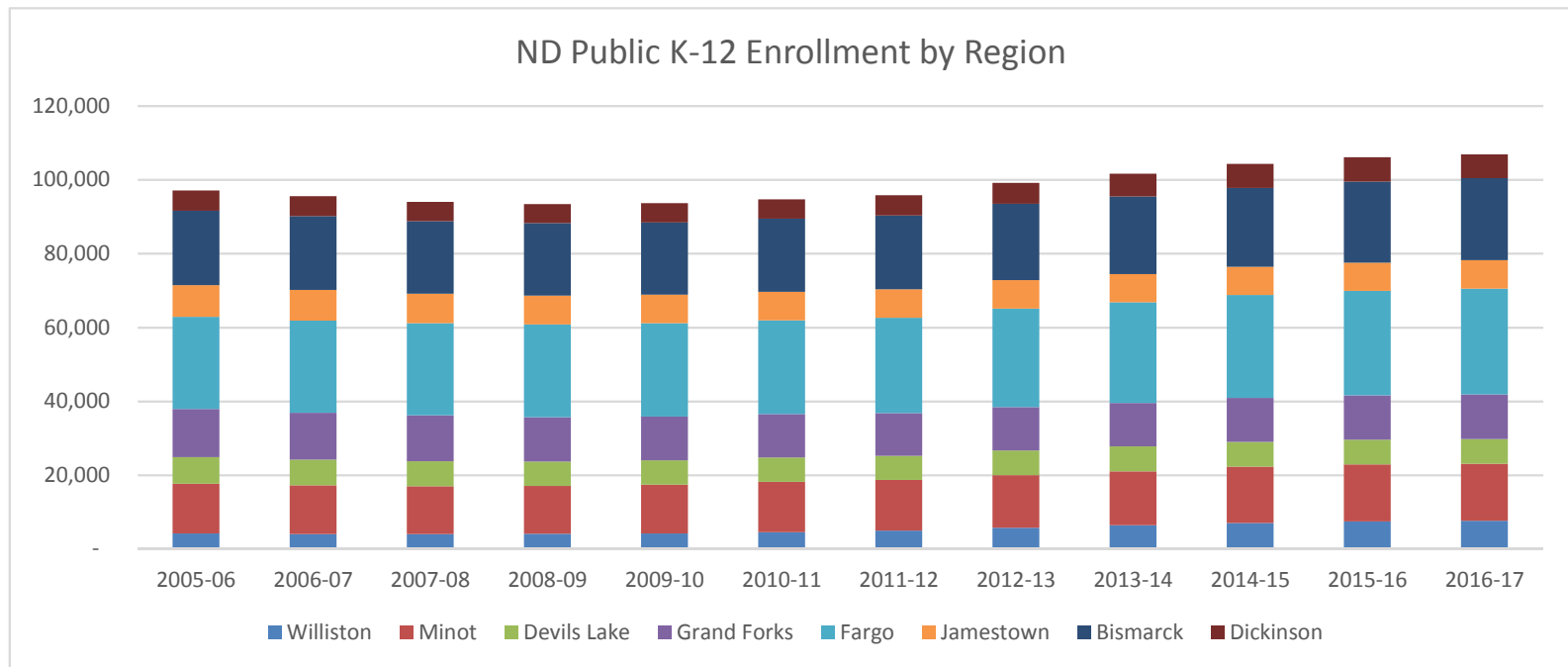
2018 and 2019 projected using 3 year cohort survival routine

2017 preliminary at October 15, 2016

ND Public K-12 Enrollment by Region
State planning regions

Preliminary estimate at 10/15/2016

Region Number	Region Name	Enrollment Totals by School Year (matches Educational Directory)											PRELIM		One Year Change		Change from 2009-10	
		2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	Students	Percent	Students	Percent	
1	Williston	4,209	4,056	4,061	4,123	4,236	4,583	5,013	5,721	6,457	7,052	7,502	7,664	162	2.1%	3,081	72.7%	
2	Minot	13,448	13,177	12,944	12,959	13,177	13,640	13,650	14,246	14,578	15,294	15,406	15,377	(29)	-0.2%	1,737	13.2%	
3	Devils Lake	7,200	6,982	6,765	6,621	6,627	6,612	6,572	6,714	6,719	6,672	6,716	6,768	52	0.8%	156	2.4%	
4	Grand Forks	13,023	12,666	12,420	11,963	11,849	11,691	11,579	11,755	11,781	11,864	11,940	12,020	80	0.7%	329	2.8%	
5	Fargo	25,027	25,012	24,964	25,126	25,257	25,400	25,837	26,673	27,262	27,889	28,348	28,719	371	1.3%	3,319	13.1%	
6	Jamestown	8,555	8,269	7,963	7,812	7,732	7,760	7,702	7,719	7,648	7,678	7,656	7,652	(4)	-0.1%	(108)	-1.4%	
7	Bismarck	20,119	19,982	19,686	19,647	19,586	19,815	19,975	20,634	21,066	21,367	21,927	22,218	291	1.3%	2,403	12.3%	
8	Dickinson	5,539	5,456	5,254	5,155	5,251	5,228	5,450	5,730	6,145	6,462	6,575	6,424	(151)	-2.4%	1,196	22.8%	
Total		97,120	95,600	94,057	93,406	93,715	94,729	95,778	99,192	101,656	104,278	106,070	106,842	772	0.7%	12,113	12.9%	
Change			(1,520)	(1,543)	(651)	309	1,014	1,049	3,414	2,464	2,622	1,792	772					



Public School Districts Enrollment by County, Past 12 Years

County Number	County Name	Enrollment Totals by School Year (matches Educational Directory)								PRELIM				One Year		Frontier	Oil Prod	Big 10
		2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	Students	Percent			
53	Williams	3,079	3,009	3,015	3,081	3,165	3,430	3,695	4,106	4,627	4,913	5,287	5,443	156	2.9%		x	
08	Burleigh	10,761	10,872	10,873	10,918	10,936	11,102	11,264	11,675	11,926	12,244	12,575	12,931	356	2.8%			x
09	Cass	18,851	18,991	19,066	19,403	19,751	19,974	20,434	21,295	21,912	22,562	23,090	23,537	447	1.9%			x
18	Grand Forks	9,183	8,996	8,797	8,500	8,458	8,415	8,342	8,506	8,587	8,720	8,818	8,908	90	1.0%			x
30	Morton	4,131	4,073	3,987	3,989	4,028	4,134	4,102	4,223	4,391	4,398	4,522	4,533	11	0.2%			x
40	Rolette	2,855	2,790	2,727	2,715	2,775	2,802	2,780	2,904	2,877	2,881	2,923	2,929	6	0.2%			x
51	Ward	8,713	8,607	8,398	8,435	8,673	9,090	8,992	9,428	9,708	10,119	10,155	10,117	(38)	-0.4%		x	x
39	Richland	2,570	2,487	2,423	2,337	2,260	2,282	2,287	2,250	2,251	2,234	2,228	2,213	(15)	-0.7%			x
47	Stutsman	2,831	2,724	2,645	2,617	2,607	2,555	2,575	2,558	2,548	2,591	2,613	2,592	(21)	-0.8%			x
45	Stark	3,318	3,295	3,199	3,160	3,228	3,272	3,404	3,562	3,897	4,209	4,265	4,210	(55)	-1.3%		x	x
14	Eddy	468	421	385	353	322	341	320	340	319	312	296	315	19	6.0%		x	
52	Wells	664	638	589	566	546	568	542	548	544	543	531	561	30	5.3%		x	
20	Griggs	462	415	407	392	377	375	365	370	368	376	385	406	21	5.2%		x	
48	Towner	353	322	297	301	281	271	265	261	272	269	273	286	13	4.5%		x	
22	Kidder	435	408	397	400	400	402	375	370	368	353	350	366	16	4.4%		x	
31	Mountrail	1,347	1,327	1,380	1,370	1,433	1,491	1,564	1,616	1,591	1,787	1,817	1,875	58	3.1%		x	
43	Sioux	436	399	360	350	384	397	413	421	424	438	469	480	11	2.3%		x	
02	Barnes	1,608	1,557	1,521	1,512	1,523	1,540	1,506	1,492	1,471	1,475	1,424	1,442	18	1.2%			
32	Nelson	524	490	494	462	468	443	449	443	455	439	414	419	5	1.2%		x	
36	Ramsey	1,985	1,922	1,861	1,800	1,832	1,791	1,743	1,759	1,764	1,748	1,772	1,790	18	1.0%			
10	Cavalier	580	555	521	479	458	437	442	428	435	438	472	476	4	0.8%		x	
26	McIntosh	457	430	391	374	381	390	379	377	384	374	359	361	2	0.6%		x	
29	Mercer	1,459	1,403	1,342	1,333	1,251	1,254	1,241	1,276	1,312	1,282	1,289	1,294	5	0.4%			x
05	Bottineau	902	857	816	852	785	765	761	795	820	861	844	847	3	0.4%		x	x
27	McKenzie	865	810	813	814	839	927	1,038	1,275	1,476	1,783	1,875	1,881	6	0.3%		x	x
34	Pembina	1,413	1,333	1,328	1,247	1,224	1,309	1,260	1,231	1,195	1,147	1,130	1,132	2	0.2%			
12	Divide	265	237	233	228	232	226	280	340	354	356	340	340	-	0.0%		x	x
44	Slope	13	16	16	15	21	19	15	16	23	22	21	21	-	0.0%		x	x
25	McHenry	1,006	962	904	875	862	853	857	909	954	953	969	965	(4)	-0.4%		x	x
23	LaMoure	671	658	647	613	625	630	631	650	653	643	644	641	(3)	-0.5%		x	
41	Sargent	804	799	759	740	708	671	664	649	638	615	608	605	(3)	-0.5%		x	
03	Benson	959	972	974	973	959	970	1,022	1,022	1,052	1,024	980	972	(8)	-0.8%		x	
49	Trail	1,507	1,454	1,437	1,396	1,331	1,311	1,274	1,329	1,315	1,329	1,302	1,289	(13)	-1.0%			
50	Walsh	1,903	1,847	1,801	1,754	1,699	1,524	1,528	1,575	1,544	1,558	1,578	1,561	(17)	-1.1%			
01	Adams	336	312	282	279	283	258	248	280	277	266	268	265	(3)	-1.1%		x	x
24	Logan	335	346	327	328	331	340	343	355	345	342	341	337	(4)	-1.2%		x	
38	Renville	623	577	578	575	572	577	604	596	601	607	630	615	(15)	-2.4%		x	x
28	McLean	1,518	1,497	1,454	1,436	1,433	1,410	1,484	1,582	1,546	1,600	1,623	1,576	(47)	-3.0%		x	x

Public School Districts Enrollment by County, Past 12 Years																		
County Number	County Name	Enrollment Totals by School Year (matches Educational Directory)								PRELIM				One Year		Frontier	Oil Prod	Big 10
		2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	Students	Percent			
16	Foster	647	616	583	573	529	518	539	543	520	520	517	502	(15)	-3.0%	x		
35	Pierce	594	574	625	610	613	612	603	583	573	604	613	595	(18)	-3.0%	x		
06	Bowman	590	605	587	559	551	525	548	595	612	593	604	585	(19)	-3.2%	x	x	
37	Ransom	989	990	994	972	947	920	945	929	955	963	952	918	(34)	-3.7%	x		
11	Dickey	880	885	853	837	813	844	822	826	815	814	842	810	(32)	-4.0%	x		
07	Burke	263	273	243	242	239	252	269	319	331	363	378	363	(15)	-4.1%	x	x	
21	Hettinger	418	411	386	360	373	379	409	421	424	451	468	449	(19)	-4.2%	x	x	
19	Grant	317	304	286	255	247	243	238	237	221	212	225	214	(11)	-5.1%	x		
15	Emmons	659	628	618	621	588	571	548	544	548	528	535	506	(29)	-5.7%	x		
13	Dunn	473	447	429	438	437	434	452	476	516	527	534	505	(29)	-5.7%	x	x	
42	Sheridan	138	143	132	137	123	106	100	106	103	104	115	108	(7)	-6.5%	x		
04	Billings	50	48	46	42	44	38	55	67	76	73	80	75	(5)	-6.7%	x	x	
33	Oliver	265	255	237	208	196	196	210	200	227	208	224	210	(14)	-6.7%	x		
17	Golden Valley	341	322	309	302	314	303	319	313	320	321	335	314	(21)	-6.7%	x	x	
46	Steele	306	291	285	278	260	242	233	221	191	186	168	157	(11)	-7.0%	x		
Total		97,120	95,600	94,057	93,406	93,715	94,729	95,778	99,192	101,656	104,278	106,070	106,842	772	0.7%	37	19	10

	One Year Change														Change from 2009-10	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Non Frontier Counties	76,167	75,360	74,420	74,197	74,741	75,785	76,427	79,169	81,325	83,410	84,971	85,921	950	1.1%	10,136	13.6%
¹ Frontier Counties	20,953	20,240	19,637	19,209	18,974	18,944	19,351	20,023	20,331	20,868	21,099	20,921	(178)	-0.9%	1,977	10.4%

¹Counties with less than seven persons per square mile (U.S. Census Bureau 2010).

	One Year Change														Change from 2009-10	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent
² Oil Producing Counties	25,579	25,015	24,430	24,396	24,735	25,503	26,235	27,972	29,465	31,086	31,782	31,740	(42)	-0.1%	6,237	25.2%
Non-Oil Producing Counties	71,541	70,585	69,627	69,010	68,980	69,226	69,543	71,220	72,191	73,192	74,288	75,102	814	1.1%	5,876	8.5%

²Members of ND Association of Oil & Gas Producing Counties.

	One Year Change														Change from 2009-10	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent
³ Largest 10 Counties	66,292	65,844	65,130	65,155	65,881	67,056	67,875	70,507	72,724	74,871	76,476	77,413	937	1.2%	10,357	15.7%
All Other Counties	30,828	29,756	28,927	28,251	27,834	27,673	27,903	28,685	28,932	29,407	29,594	29,429	(165)	-0.6%	1,756	6.3%

³Counties containing school districts with enrollment exceeding 2,000 students.

ND Public K-12 Enrollment Cohorts
Unduplicated Fall Enrollment Count

	School Year												---> projected	
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Kindergarten	6,578	6,648	6,729	7,214	7,470	7,445	8,236	8,575	8,822	9,033	8,925	8,814	9,078	9,270
Grade 1	6,907	6,704	6,827	6,744	7,147	7,478	7,517	8,366	8,605	8,901	9,051	8,720	8,744	8,992
Grade 2	6,916	6,747	6,511	6,748	6,725	7,195	7,487	7,707	8,401	8,642	8,871	8,840	8,613	8,636
Grade 3	6,913	6,907	6,787	6,541	6,839	6,914	7,225	7,723	7,853	8,417	8,663	8,760	8,802	8,579
Grade 4	7,014	6,929	6,931	6,812	6,547	6,972	7,025	7,379	7,817	7,989	8,433	8,666	8,775	8,818
Grade 5	7,077	7,001	6,983	6,962	6,904	6,675	7,023	7,291	7,531	7,953	7,984	8,452	8,682	8,790
Grade 6	7,299	7,130	7,036	7,074	7,089	7,140	6,884	7,338	7,462	7,809	8,096	8,121	8,658	8,859
Grade 7	7,877	7,465	7,289	7,218	7,249	7,367	7,320	7,254	7,585	7,661	7,948	8,196	8,264	8,810
Grade 8	7,987	7,868	7,467	7,360	7,301	7,297	7,421	7,496	7,335	7,638	7,694	7,924	8,203	8,283
Grade 9	8,461	8,262	8,045	7,670	7,572	7,578	7,462	7,796	7,776	7,672	7,931	7,983	8,214	8,513
Grade 10	8,235	8,174	8,002	7,855	7,683	7,682	7,517	7,515	7,707	7,678	7,607	7,769	7,896	8,128
Grade 11	7,992	7,961	7,802	7,620	7,563	7,415	7,354	7,414	7,414	7,458	7,434	7,258	7,472	7,593
Grade 12	7,864	7,804	7,643	7,588	7,626	7,563	7,308	7,338	7,348	7,427	7,433	7,339	7,194	7,412
Total	97,120	95,600	94,052	93,406	93,715	94,721	95,779	99,192	101,656	104,278	106,070	106,842	108,595	110,683
Change		(1,520)	(1,548)	(646)	309	1,006	1,058	3,413	2,464	2,622	1,792	772	1,753	2,088

ND Teacher Base Salary and FTE History

School Year	Licensed FTE			Average Salary			Enr/FTE	
	Admin fte	Other fte	Teacher fte	Admin	Other	Teacher	K-12 Enr	Ratio
2007	516	882	7,568	65,118	43,887	37,840	95,600	10.7
2008	511	875	7,609	67,120	45,725	39,137	94,057	10.5
2009	517	866	7,697	70,608	47,794	40,750	93,406	10.3
2010	521	902	7,829	73,156	48,923	41,977	93,715	10.1
2011	528	1,006	7,881	76,885	50,635	43,852	94,729	10.1
2012	535	1,017	7,911	80,268	51,711	45,072	95,778	10.1
2013	533	1,045	8,076	83,074	53,124	46,275	99,192	10.3
2014	552	1,039	8,192	86,115	54,245	47,231	101,656	10.4
2015	565	1,100	8,330	89,534	56,004	48,893	104,278	10.4
2016	577	1,145	8,474	92,826	57,842	50,455	106,070	10.4
2017	585	1,176	8,575	96,175	59,917	52,239	106,842	10.3

Licensed personnel (FTE)

- Teachers include classroom teachers, MR special education, SLD and ED, physical education, music, art, career and technology, Title I and any other type of teacher.
- Other licensed staff includes assistant directors, coordinators, counselors or counselor designates, county superintendents and assistant or deputy county superintendents, directors, instructional programmers, library media specialist, pupil personnel, school psychologist, speech pathologist and supervisors.
- Administrators include principals and assistant principals, superintendents and assistant or deputy superintendents.

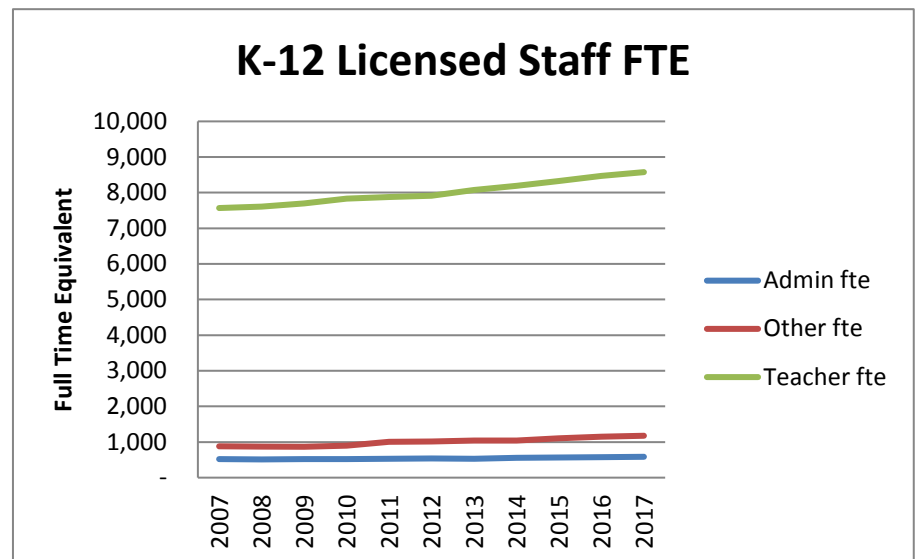
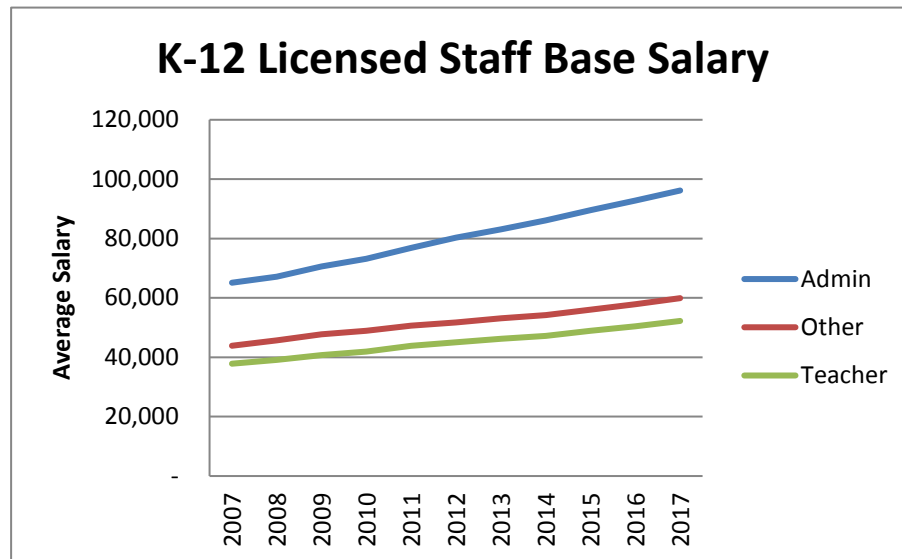




Table 211.60. Estimated average annual salary of teachers in public elementary and secondary schools, by state: Selected years, 1969-70 through 2014-15

State	Current dollars							Constant 2014-15 dollars ¹							Percent change, 1999-2000 to 2014-15
	1969-70	1979-80	1989-90	1999-2000	2009-10	2013-14	2014-15	1969-70	1979-80	1989-90	1999-2000	2009-10	2013-14	2014-15	
United States	\$8,626	\$15,970	\$31,367	\$41,807	\$55,202	\$56,610	\$57,379	\$54,046	\$48,687	\$58,467	\$58,448	\$60,281	\$57,022	\$57,379	-1.8
Alabama	6,818	13,060	24,828	36,689	47,571	48,720	49,497	42,718	39,815	46,278	51,293	51,948	49,075	49,497	-3.5
Alaska	10,560	27,210	43,153	46,462	59,672	65,891	66,755	66,163	82,954	80,436	64,956	65,162	66,371	66,755	2.8
Arizona	8,711	15,054	29,402	36,902	46,952	45,335	45,406	54,578	45,894	54,804	51,590	51,272	45,665	45,406	-12.0
Arkansas	6,307	12,299	22,352	33,386	46,700	47,319	48,017	39,516	37,495	41,663	46,675	50,997	47,664	48,017	2.9
California	10,315	18,020	37,998	47,680	68,203	71,396	72,535	64,628	54,937	70,827	66,659	74,478	71,916	72,535	8.8
Colorado	7,761	16,205	30,758	38,163	49,202	49,615	49,828	48,626	49,403	57,332	53,353	53,729	49,976	49,828	-6.6
Connecticut	9,262	16,229	40,461	51,780	64,350	70,583	71,709	58,030	49,476	75,418	72,391	70,271	71,097	71,709	-0.9
Delaware	9,015	16,148	33,377	44,435	57,080	59,305	59,195	56,483	49,230	62,213	62,122	62,332	59,737	59,195	-4.7
District of Columbia	10,285	22,190	38,402	47,076	64,548	73,162	75,490	64,440	67,649	71,580	65,814	70,487	73,695	75,490	14.7
Florida	8,412	14,149	28,803	36,722	46,708	47,780	48,992	52,705	43,135	53,688	51,339	51,006	48,128	48,992	-4.6
Georgia	7,276	13,853	28,006	41,023	53,112	52,924	53,382	45,587	42,233	52,202	57,352	57,999	53,309	53,382	-6.9
Hawaii	9,453	19,920	32,047	40,578	55,063	56,291	57,189	59,227	60,729	59,734	56,730	60,129	56,701	57,189	0.8
Idaho	6,890	13,611	23,861	35,547	46,283	44,465	45,218	43,169	41,495	44,476	49,696	50,541	44,789	45,218	-9.0
Illinois	9,569	17,601	32,794	46,486	62,077	60,124	61,083	59,954	53,659	61,127	64,989	67,789	60,562	61,083	-6.0
Indiana	8,833	15,599	30,902	41,850	49,986	50,289	50,502	55,343	47,556	57,600	58,508	54,585	50,655	50,502	-13.7
Iowa	8,355	15,203	26,747	35,678	49,626	52,032	52,862	52,348	46,349	49,855	49,879	54,192	52,411	52,862	6.0
Kansas	7,612	13,690	28,744	34,981	46,657	48,221	48,990	47,692	41,736	53,578	48,905	50,950	48,572	48,990	0.2
Kentucky	6,953	14,520	26,292	36,380	49,543	50,560	51,093	43,564	44,266	49,007	50,861	54,101	50,928	51,093	0.5
Louisiana	7,028	13,760	24,300	33,109	48,903	49,067	47,886	44,033	41,949	45,294	46,288	53,402	49,424	47,886	3.5
Maine	7,572	13,071	26,881	35,561	46,106	49,232	50,017	47,442	39,849	50,105	49,716	50,348	49,590	50,017	0.6
Maryland	9,383	17,558	36,319	44,048	63,971	64,546	64,845	58,789	53,528	67,697	61,581	69,857	65,016	64,845	5.3
Massachusetts	8,764	17,253	34,712	46,580	69,273	73,195	74,805	54,910	52,598	64,702	65,121	75,647	73,728	74,805	14.9
Michigan	9,826	19,663	37,072	49,044	57,958	62,166	62,778	61,564	59,946	69,101	68,565	63,291	62,619	62,778	-8.4
Minnesota	8,658	15,912	32,190	39,802	52,431	54,752	56,670	54,246	48,510	60,001	55,645	57,255	55,151	56,670	1.8
Mississippi	5,798	11,850	24,292	31,857	45,644	42,187	42,564	36,327	36,126	45,279	44,537	49,844	42,494	42,564	-4.4
Missouri	7,799	13,682	27,094	35,656	45,317	46,750	47,394	48,864	41,712	50,502	49,849	49,487	47,090	47,394	-4.9
Montana	7,606	14,537	25,081	32,121	45,759	49,893	50,999	47,655	44,318	46,750	44,906	49,969	50,256	50,999	13.6
Nebraska	7,375	13,516	25,522	33,237	46,227	49,539	50,318	46,208	41,206	47,572	46,467	50,480	49,900	50,318	8.3
Nevada	9,215	16,295	30,590	39,390	51,524	55,813	56,703	57,736	49,678	57,019	55,069	56,265	56,219	56,703	3.0
New Hampshire	7,771	13,017	28,986	37,734	51,443	57,057	58,554	48,689	39,684	54,029	52,754	56,176	57,472	58,554	11.0
New Jersey	9,130	17,161	35,676	52,015	65,130	68,238	69,038	57,203	52,318	66,499	72,719	71,123	68,735	69,038	-5.1
New Mexico	7,796	14,887	24,756	32,554	46,258	45,727	46,003	48,845	45,385	46,144	45,512	50,514	46,060	46,003	1.1
New York	10,336	19,812	38,925	51,020	71,633	76,409	77,628	64,759	60,400	72,555	71,328	78,224	76,965	77,628	8.8
North Carolina	7,494	14,117	27,883	39,404	46,850	44,990	47,783	46,953	43,038	51,973	55,088	51,161	45,318	47,783	-13.3
North Dakota	6,696	13,263	23,016	29,863	42,964	48,666	50,025	41,953	40,434	42,901	41,750	46,917	49,020	50,025	19.8
Ohio	8,300	15,269	31,218	41,436	55,958	55,913	56,172	52,003	46,550	58,189	57,929	61,107	56,320	56,172	-3.0
Oklahoma	6,882	13,107	23,070	31,298	47,691	44,549	44,628	43,119	39,959	43,002	43,756	52,079	44,873	44,628	2.0
Oregon	8,818	16,266	30,840	42,336	55,224	58,638	59,811	55,249	49,589	57,485	59,187	60,305	59,065	59,811	1.1
Pennsylvania	8,858	16,515	33,338	48,321	59,156	63,701	64,717	55,499	50,348	62,141	67,555	64,599	64,165	64,717	-4.2
Rhode Island	8,776	18,002	36,057	47,041	59,686	64,696	65,918	54,985	54,882	67,209	65,765	65,178	65,167	65,918	0.2
South Carolina	6,927	13,063	27,217	36,081	47,508	48,430	48,709	43,401	39,824	50,731	50,443	51,879	48,783	48,709	-3.4
South Dakota	6,403	12,348	21,300	29,071	38,837	40,023	40,661	40,118	37,645	39,702	40,642	42,410	40,314	40,661	#
Tennessee	7,050	13,972	27,052	36,328	46,290	47,742	48,503	44,171	42,596	50,424	50,788	50,549	48,090	48,503	-4.5
Texas	7,255	14,132	27,496	37,567	48,261	49,690	50,576	45,456	43,083	51,252	52,520	52,701	50,052	50,576	-3.7
Utah	7,644	14,909	23,686	34,946	45,885	45,695	45,848	47,893	45,452	44,150	48,856	50,107	46,028	45,848	-6.2
Vermont	7,968	12,484	29,012	37,758	49,084	55,958	57,642	49,923	38,059	54,077	52,787	53,600	56,365	57,642	9.2
Virginia	8,070	14,060	30,938	38,744	50,015	49,826	50,620	50,562	42,864	57,667	54,166	54,617	50,189	50,620	-6.5
Washington	9,225	18,820	30,457	41,043	53,003	52,969	53,714	57,799	57,376	56,771	57,380	57,880	53,355	53,714	-6.4
West Virginia	7,650	13,710	22,842	35,009	45,959	45,086	45,647	47,931	41,797	42,577	48,944	50,188	45,414	45,647	-7.9
Wisconsin	8,963	16,006	31,921	41,153	51,264	53,679	54,535	56,157	48,797	59,500	57,534	55,981	54,070	54,535	-5.2
Wyoming	8,232	16,012	28,141	34,127	55,861	56,583	57,715	51,577	48,815	52,454	47,711	61,001	56,995	57,715	21.0

#Rounds to zero.

¹ Constant dollars based on the Consumer Price Index (CPI), prepared by the Bureau of Labor Statistics, U.S. Department of Labor, adjusted to a school-year basis. The CPI does not account for differences in inflation rates from state to state.

NOTE: Some data have been revised from previously published figures. Standard errors are not available for these estimates, which are based on state reports.

SOURCE: National Education Association, *Estimates of School Statistics*, 1969-70 through 2014-15. (This table was prepared September 2015.)

2016-17 Enrollment Observations

Enrollment in public schools declined by 25,000 students over a 15 year period ending 2010.

- Since 2010 enrollment has increased 13,127.
- The fall public K-12 enrollment for 2016-17 is estimated at 106,842.

School Districts declined by 70 over the same period.

- 178 districts ... 150 k-12; 26 elementary; 2 non-operating in 2016-17.
- 175 districts educate students.

The number of teachers remained relatively constant.

- Since 2010 licensed staff have increased 12%.
- Since 2010 enrollment has increased 14%.

More students are entering than exiting.

- Births reached a record low in 2001 and have been rising since then.
 - Births in 2001 were 7,664
 - Births in 2010 were 9,088
 - Births in 2013 were 10,591
 - Births in 2014 were 11,352
 - Births in 2015 were 11,265
- Grades K-4 average 8,760, Grades 4-12 average 7,880.
- Entering Kindergarten are 8,770, exiting seniors are 7,340.

Statewide projections show moderate enrollment increases over the next decade.

- We had been expecting enrollments to increase by 2,000-3,000 annually.
- We have adjusted that to 1,000 to 2,000 annually.

60% of ND students are served in ND's major cities where enrollments are expected to steadily increase.

- 64% of ND students are enrolled in 14 school districts with enrollment over 1,000.
- 58% of ND students are enrolled in 9 school districts with enrollment over 2,000.

Many small rural school districts will continue to experience declines.

- 95 districts lost an average of 14 students.
- 80 districts gained an average 25 students.

Impact from rapid oil development is real and unpredictable.

- The Minot, Williston and Dickinson regions showed no growth in students in 2016-17.
- Fargo and Bismarck regions increased grew at 1.4% over the previous year.

[North Dakota Census Office population projections](#) presented as of January 19, 2016:

- Since 2010 the state has gained an estimated 84,000 residents.
- On July 1, 2015 the state's population was estimated at 757,000.
- The state's population is estimated to be between 800,000 and 849,000 by 2020, a growth of 23% since 2010.
- A significant reversal of out-migration, an influx in the number of adults of childbearing age and corresponding increase in the number of child births has changed the make-up of the state's population the past few years.

**TFFR Pension Plan Returns
Preliminary Investment Update
As of September 30, 2016**

Overview:

Weak global equity returns during the past two fiscal years were largely responsible for generating disappointing investment results for the TFFR pension plan. This resulted in net returns of +3.5% in fiscal 2015 and **+0.3%** in fiscal 2016. The 3rd calendar quarter of 2015 was particularly disappointing noting that the plan posted a **-4.98%** net return (for the quarter ended 9/30/2015).

On a positive note, current fiscal year to date returns through 9/30/2016 are in line with long-term expectations. **Based on preliminary unaudited data which is subject to change, TFFR's estimated net return for the 1-year period ended September 30, 2016, is projected to approximate 8% as detailed below:**

TFFR Net Returns	– Quarter Ended 9/30/15	-4.98%	
	– Quarter Ended 12/31/15	+2.72%	
	– Quarter Ended 3/31/16	+1.31%	
	– Quarter Ended 6/30/16	+1.41%	
	– Fiscal Year Ended 6/30/16		<u>+0.3%</u> actual
	– Quarter Ended 12/31/15	+2.72% actual	
	– Quarter Ended 3/31/16	+1.31% actual	
	– Quarter Ended 6/30/16	+1.41% actual	
	– Quarter Ended 9/30/16	+2.25% estimate	
	– One-Year Period Ended 9/30/16		<u>+8%</u> estimate

TFFR Performance Report as of August 31, 2016:

	August 31, 2016 Market Value	Fiscal YTD Net
TOTAL FUND	\$2,142,281,032	3.0%
Equity	59%	4.5%
Fixed Income	23%	1.6%
Real Assets	18%	0.2%
Cash	0%	0.1%

In an attempt to be conservative, the quarter ended 9/30/16 net return was estimated at **+2.25%** noting actual returns were approximately **3%** through 8/31/16 (see table above) and September's monthly return was estimated to be positive (at less than ½ percent). **Please note the 9/30/16 estimates are based on preliminary data which is unaudited and subject to change.**

Data estimates refreshed as of October 17, 2016.

Appendix

Quarterly Public Market Returns as of September 30, 2016



SEPTEMBER 2016 — TAME MONTH, BETTER QUARTER

- Solid quarter in the U.S.; rock-solid quarter in emerging markets
- U.S. small caps led the way; U.S. minimum volatility took a breather
- Year to date panning out to be just fine; emerging and bonds more than fine
- Relative weakness year to date and in the trailing-12 months in developed markets ex U.S.

SELECTED INDICES - TOTAL RETURN (%)
9/30/16

S&P 500 Up 15.4% Last Year

	Month	3 Months	YTD	12 Months	
Dow Jones Industrials	-0.41	2.78	7.21	15.46	
S&P 500	0.02	3.85	7.84	15.43	— 1926 - 2015 AVG RETURN=10.0%
S&P 500 (equal weighted)	0.09	4.52	10.57	16.14	
S&P MidCap	-0.64	4.14	12.40	15.33	
S&P SmallCap	0.64	7.20	13.88	18.12	
S&P 500 Growth	0.40	4.76	6.38	14.74	
S&P 500 Value	-0.37	2.94	9.36	15.98	
S&P MidCap 400 Growth	-1.36	3.73	9.59	12.78	
S&P MidCap 400 Value	0.02	4.52	15.24	17.79	
S&P SmallCap 600 Growth	0.46	7.17	11.39	15.61	
S&P SmallCap 600 Value	0.83	7.23	16.62	20.94	
S&P US REIT	-1.80	-1.31	11.80	19.60	
Nasdaq Composite (price change)	1.89	9.69	6.08	14.97	

Russell 3000 Up 15% Last Year

Russell Top 200	0.03	3.84	6.96	15.23	
Russell 1000	0.08	4.03	7.92	14.93	
Russell 3000	0.16	4.40	8.18	14.96	←
Russell Midcap	0.20	4.52	10.26	14.25	
Russell SC Completeness	0.89	7.25	10.22	13.53	
Russell 2500	0.48	6.56	10.80	14.44	
Russell 2000	1.11	9.05	11.46	15.47	
Russell Microcap	2.94	11.25	9.38	13.47	
Russell Top 200 Growth	0.52	4.58	5.67	14.80	
Russell Top 200 Value	-0.49	3.05	8.39	15.71	
Russell 1000 Growth	0.37	4.58	6.00	13.76	
Russell 1000 Value	-0.21	3.48	10.00	16.20	
Russell 1000 Defensive	-0.77	0.60	7.72	15.03	
Russell 1000 Dynamic	0.91	7.55	7.84	14.53	
Russell 3000 Growth	0.45	4.92	6.12	13.64	
Russell 3000 Value	-0.13	3.87	10.40	16.38	
Russell Midcap Growth	-0.05	4.59	6.84	11.24	
Russell Midcap Value	0.42	4.45	13.72	17.26	
Russell SC Completeness Growth	1.18	8.27	6.85	10.71	
Russell SC Completeness Value	0.60	6.23	13.65	16.35	
Russell 2500 Growth	0.29	6.98	6.95	11.02	
Russell 2500 Value	0.66	6.18	14.51	17.68	
Russell 2000 Growth	1.44	9.22	7.48	12.12	
Russell 2000 Value	0.79	8.87	15.49	18.81	

ACWI Up 11.9% Last Year

MSCI USA Minimum Volatility	-0.65	-1.15	10.50	17.47	
MSCI All Country World Minimum Volatility	0.24	-0.28	10.65	16.31	
MSCI All Country World	0.61	5.30	6.60	11.96	←
MSCI All Country World ex USA	1.23	6.91	5.82	9.26	
MSCI World	0.53	4.87	5.55	11.36	
MSCI World ex USA	1.22	6.29	3.12	7.16	
MSCI World ex USA Growth	1.48	4.97	3.61	9.42	
MSCI World ex USA Value	0.95	7.69	2.64	4.87	
MSCI World Small Cap	1.49	7.24	9.70	14.34	
MSCI World ex USA Small Cap	2.81	8.00	7.26	13.50	
MSCI EAFE	1.23	6.43	1.73	6.52	

E.M. Up 16.7% Last Year

MSCI Pacific ex Japan	2.66	8.18	10.86	20.05	
MSCI Canada	1.10	4.85	20.63	14.47	
MSCI Emerging Markets	1.29	9.03	16.02	16.78	←
MSCI Emerging Markets Equal Weighted	0.39	6.81	14.00	14.11	
MSCI Emerging Markets IMI	1.29	8.83	15.02	16.19	
MSCI Emerging Markets Small Cap	1.31	7.60	9.08	12.65	
MSCI Emerging Markets Asia	1.33	10.51	12.99	16.90	
MSCI Emerging Markets EMEA	2.87	5.67	17.79	8.11	
MSCI Emerging Markets Latin America	-0.82	5.37	32.21	28.65	
Bloomberg Barclays US T-Bills (1-3 Month)	0.03	0.07	0.19	0.21	
Bloomberg Barclays US Agg Gov't-Treasury-Long	-1.61	-0.36	14.71	13.13	
Bloomberg Barclays US Agg Credit-Long	-1.06	2.26	16.50	15.73	
Bloomberg Barclays Municipal Bond	-0.50	-0.30	4.01	5.58	
Bloomberg Barclays US Aggregate	-0.06	0.46	5.80	5.19	←

Barclay Agg. Up 5% Last Year

Bloomberg Barclays US Agg Corporate High Yield	0.67	5.55	15.11	12.73	
Alerian MLP	1.85	1.07	15.94	12.74	

Comments: AJO (10/1/16)
Data: FactSet Research Systems (9/30/16)

MEMORANDUM

TO: TFFR Board
FROM: Fay Kopp
DATE: October 20, 2016
SUBJ: TFFR LEGISLATIVE UPDATE

- The **Legislative Audit and Fiscal Review Committee (LAFRC)** met on October 13, 2016. CliftonLarsonAllen presented TFFR Schedules of Employer Allocations and Pension Amounts by Employer as of June 30, 2015 (GASB 68 report).
- The **Legislative Employee Benefits Programs Committee (LEBPC)** is scheduled to meet on October 26, 2016. Segal will present the 2016 TFFR Actuarial Valuation Report. Fay will comment on the results of the 2015 actuarial audit conducted by Cavanaugh Macdonald Consulting.

As noted earlier, no TFFR related bills have been submitted for interim study.

**Legislative Employee Benefits Programs Committee
October 26, 2016**

**Fay Kopp, Chief Retirement Officer and Deputy Executive Director
ND Teachers' Fund for Retirement and ND Retirement & Investment Office**

**Staff Comments related to the Actuarial Audit
conducted by Cavanaugh Macdonald Consulting
for the NDTFFR Board**

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 a 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 enhance the credibility of the actuarial valuation process by providing independent assurance that work was performed in accordance with actuarial standards of practice. They increase public trust in how the pension plan is being governed and help plan fiduciaries assess whether the pension plan is meeting its funding objectives. Actuarial audits can lead to the remediation of errors that might otherwise go undiscovered and can provide recommendations for improving the actuarial valuation process and report.

NDTFFR Board policy requires an actuarial review or audit of TFFR's actuarial valuation be performed at least every five years by an independent actuary. After a formal RFP process in early 2016, the NDTFFR Board selected Cavanaugh Macdonald Consulting (CMC) to conduct an actuarial audit of the plan's current actuary, Segal Consulting. CMC reviewed the 2015 Valuation and Experience Study including actuarial assumptions, actuarial methods, participant data, valuation results, valuation report, funding projections, and GASB calculations. CMC conducted their work between April – July 2016, and issued their audit report to the TFFR Board on July 13, 2016.

The CMC audit report states: *“We generally find the actuarial valuation results to be reasonable and accurate based on the assumptions and methods used. The valuation was performed by qualified actuaries and was performed in accordance with the principles and practices prescribed by the Actuarial Standards Board.”*

The CMC audit report also noted: *“Because of the complexity of actuarial work, we would not expect to match Segal’s results exactly, nor would we necessarily expect our opinions regarding the selection of assumptions and methods to be the same as the opinions of Segal. While we offer up a number of different ideas, we believe that Segal’s work provides appropriate assessment of the health and funding requirements of the NDTFFR.”*

CMC did note a few issues where they believe there are opportunities for improvement. Segal reviewed the audit report, and provided comments related to the actuarial review in their July 14 letter. Segal has since considered and implemented those suggestions that seem to be in the best interest of TFFR in the July 1, 2016 actuarial valuation report.

The ND TFFR Board and RIO staff were very pleased with the results of the audit, and that the auditing actuary was able to successfully validate the actuarial work performed by Segal.

MEMORANDUM

TO: TFFR Board
FROM: Fay Kopp
DATE: October 20, 2016
SUBJ: TFFR BOARD POLICIES

The following draft policies are being submitted for TFFR Board consideration. Jan Murtha, TFFR legal counsel, has reviewed the draft policies, and her suggestions have been incorporated.

- 2nd Reading and Adoption (policies introduced at September 2016 meeting).

C-21 Board Appeals
C-22 Board Communications

- Introduction and 1st Reading:

C-23 Board Policy Introduction/Amendment/Passage
C-24 In-staff Subbing Contract Period

Attachments

New Policy–2nd reading

Policy Type: TFFR Program

Policy Title: Board Appeals

It is the policy of the TFFR Board of Trustees to allow any member, beneficiary, employer, or affected individual to appeal a determination made by the Chief Retirement Officer regarding TFFR eligibility, benefits, or other plan provisions with which the individual does not agree.

The affected individual must file a written request for board review within thirty days after notice of the determination of the Chief Retirement Officer has been mailed to the affected individual. If a request for board review is not filed within the thirty-day period, the decision of the Chief Retirement Officer is final. The request for board review must include the decision being appealed, the reason(s) the individual believes the decision should be reversed or modified, and any relevant documentation.

To review the matter, an appeal hearing will be scheduled as part of a regularly scheduled board meeting. A summary of the relevant facts and documentation will be presented. The affected individual and/or designee may attend and speak at the hearing. After review of the facts, documentation, and testimony, the Board will make its decision. The Board's decision will be communicated in writing to the affected individual within 30 days of the decision.

Any individual aggrieved by a decision of the Board may initiate a formal administrative action against the Board in accordance with ND Administrative Code Chapter 82-10 and ND Century Code Chapter 28-32.

TFFR Board Adopted: _____

New Policy–2nd Reading

Policy Type: TFFR Program

Policy Title: Board Communications

It is the policy of the TFFR Board of Trustees that the Board President and Chief Retirement Officer are authorized to represent the Board on retirement program issues and in announcing board positions and decisions, unless otherwise determined by the Board.

Board members may respond to general inquiries about the TFFR retirement program, however specific questions from members, beneficiaries, employers, and the public should be referred to the Chief Retirement Officer or the Retirement and Investment Office to provide more detailed information about the retirement program.

TFFR Board Adopted: _____

DRAFT

NEW POLICY – 1ST READING

Policy Type: TFFR Program

Polity Title: Board Policy Introduction/Amendment/Passage (Similar to SIB B-10)

New policies or policy amendments may be proposed by the Chief Retirement Officer or a Board member. All new policies or amendments must be submitted to the Board's legal counsel at the Attorney General's office for review prior to Board approval.

Upon request of the Chief Retirement Officer or a Board member, a new policy or amendment shall be placed on the Board's agenda for action as follows:

1. Introduction and first reading. A brief explanation or summary of the new policy or amendment shall be presented to the Board. Upon approval of introduction and first reading, the policy shall be placed on the agenda of the next scheduled meeting of the Board for second reading and adoption. When appropriate, the policy shall be distributed to interested parties.
2. Second reading and adoption. Interested parties and the public shall be allowed an opportunity to comment on the policy or amendment before final action by the Board. The policy shall take effect immediately following second reading and adoption by the Board, unless a different effective date is stated.
3. Amendments. Amendments may be proposed at any time before final adoption of the policy. Upon determination by the Board that adoption of an amendment constitutes a substantive change that significantly changes the meaning or effect of the policy, the Board shall continue consideration of second reading and adoption to the next meeting to permit further review and comment.

Emergency measures. Upon determination that an emergency or other circumstances calling for expeditious action exists, the Board may waive the requirement of a second reading and immediately approve the new policy or amendment following introduction and first reading.

TFFR Board Adopted: _____, 2016

NEW POLICY – 1ST READING

Policy Type: TFFR Program

Polity Title: In-staff Subbing Contract Period

It is the policy of the TFFR Board of Trustees that the following guidelines apply for the purpose of determining the contract period for in-staff subbing for active members and re-employed retirees as provided for in NDCC 15-39.1-04 (4) and (12), 15-39.1-19.1, 15-39.1-19.2, and NDAC 82-05-06-01.

- 1) In-staff subbing is defined as substitute teaching duties performed by a contracted teacher for the contracting TFFR participating employer.
- 2) If the active member or re-employed retiree has a contract or written agreement with the participating employer for full or part time work, TFFR will view the beginning and ending calendar dates indicated on the contract as the contract term to determine the contract period.
 - If substitute teaching duties are performed during the contract term, those duties are considered in-staff subbing, and retirement contributions are required to be paid on the substitute teaching pay. The in-staff subbing hours are reported as compensated hours for active members and are counted toward the annual hour limit for re-employed retirees (700 – 1000 hours depending upon length of contract).
 - If substitute teaching duties are performed before the beginning calendar date or after the ending calendar date of the contract term, those duties are not considered in-staff subbing, and no retirement contributions are required to be paid on the substitute teaching pay. The subbing hours are not reported as compensated hours for active members and are not counted toward the annual hour limit for re-employed retirees.
- 3) If the active member or re-employed retiree does not have a contract or written agreement with the participating employer, then no retirement contributions are required to be paid on the substitute teaching pay. The subbing hours are not reported as compensated hours for active members and are not counted toward the annual hour limit for re-employed retirees.

TFFR Board Adopted: _____, 2016

MEMORANDUM

TO: Teachers' Fund for Retirement (TFFR) Board

FROM: Terra Miller Bowley, Supervisor of Audit Services

DATE: October 27, 2016

SUBJECT: 2015-2016 Year End Audit Activities Report

Audit coverage was based on the July 1, 2015 through June 30, 2016 work plan approved by the SIB Audit Committee. The audit activities undertaken were consistent with the Audit Services charter and goals, and the goals of RIO. To the extent possible, our audits were carried out in accordance with the International Standards for the Professional Practice of Internal Auditing. Audit effort was directed towards the needs of RIO and the concerns of management and the SIB Audit Committee.

RETIREMENT PROGRAM AUDITS:

- **Teachers' Fund For Retirement (TFFR) Employer Audits**
 - **AUDIT PLAN REQUIREMENTS:** Complete a total of 35 TFFR Compliance Audits during the fiscal year. Complete Not in Compliance (NIC) Reviews as needed based on prior audit findings. Notify approximately 40 employers of upcoming TFFR Compliance Audit. Complete audit planning for the upcoming fiscal year in the fourth quarter.
 - **2015-2016 ACTUAL ACTIVITIES:**
 - A total of twenty two (22) TFFR employer audits were completed during fiscal year 2016. This included 21 TFFR Compliance Audits and 1 Not in Compliance (NIC) Review.
 - A total of nine (9) TFFR employer audits were in progress at the conclusion of fiscal year 2016. This included two (2) employers in the third audit cycle, Ft. Totten Public School District and White Shield Public School District, and seven (7) employers in the fourth audit cycle which was started on May 23, 2016.
 - A total of seven (7) TFFR employer audits were pending but not yet started at the conclusion of fiscal year 2016. All pending audits were in the fourth audit cycle.
 - Audit information was pending from three (3) employers who had been notified of an upcoming TFFR Compliance Audit. All employers notified were in the fourth audit cycle.
 - A total of twenty five (25) employers received audit notifications in fiscal year 2016.
 - Audit planning for fiscal year 2016-2017 was completed in the fourth quarter and presented to and approved by the SIB Audit Committee in May 2016.
- **Regional Education Associations (REA) Audits**
 - **AUDIT PLAN REQUIREMENTS:** Create and implement an audit program which addresses REAs. Complete compliance audits of two REAs.
 - **2015-2016 ACTUAL ACTIVITIES:**
 - Audits of two REAs were not completed in fiscal year 2016. Hours allocated to this particular task were reallocated to other higher priority audit activities.
- **Benefit Payments Audit**
 - **AUDIT PLAN REQUIREMENTS:** On an annual basis a review of deaths, long outstanding checks, purchases of service, and refunds is completed to determine that established policies and procedures are being followed by Retirement Services employees.
 - **2015-2016 ACTUAL ACTIVITIES:**
 - The Benefit Payment Audit was completed on September 3, 2015.

- **TFFR File Maintenance Audit**
 - **AUDIT PLAN REQUIREMENTS:** On a quarterly basis changes made to TFFR member account data by Retirement and Investment Office (RIO) employees is reviewed.
 - **2015-2016 ACTUAL ACTIVITIES:**
 - The TFFR File Maintenance Audit for the fourth quarter of 2015 was completed on September 8, 2015. The TFFR File Maintenance Audit for the first quarter of 2016 was completed on November 17, 2015. The TFFR File Maintenance Audit for the second quarter of 2016 was completed on May 13, 2016. The TFFR File Maintenance Audit for the third quarter of 2016 was completed on June 30, 2016.

- **Annual Salary Verification Project**
 - **AUDIT PLAN REQUIREMENTS:** On an annual basis during the third quarter Audit Services will verify salaries reported to TFFR for the prior fiscal year for 50 randomly selected member accounts.
 - **2015-2016 ACTUAL ACTIVITIES:**
 - The Annual Salary Verification Project for fiscal year 2015 was completed on March 16, 2016.

- **TFFR Cost Effective Benefit Payments/Benefit Recalculation**
 - **AUDIT PLAN REQUIREMENTS:** One of the missions of the RIO is to ensure that TFFR benefit recipients receive their retirement benefits in a cost effective and timely manner. On an annual basis Audit Services has been asked to verify that this mission is being achieved. As part of this overall process Audit Services will also verify the accuracy of benefit payments via the recalculation of benefits.
 - **2015-2016 ACTUAL ACTIVITIES:**
 - Start of the TFFR Cost Effective Benefit Payments/Benefit Recalculation Audit was delayed and the audit was not completed prior to the close of fiscal year 2016. The audit is currently in progress.

AGENCY ADMINISTRATIVE AND INVESTMENT AUDITS:

- **Executive Limitation Audit**
 - **AUDIT PLAN REQUIREMENTS:** On an annual basis the Executive Director/CIO's compliance with the State Investment Board (SIB) Governance Manual Executive Limitation Policies A-1 through A-11 is reviewed. The RIO conducts two employee opinion surveys on an annual basis. Audit Services also facilitates and compiles the results of the annual SIB Executive Review Committee survey administered to members of the SIB.
 - **2015-2016 ACTUAL ACTIVITIES:**
 - The Executive Limitation Audit for calendar year 2015 was completed on February 5, 2016. Two employee opinion surveys were administered in December 2015 and January 2016. The SIB Executive Review Committee survey was administered in March 2016.

- **Investment Performance Summary Review**
 - **AUDIT PLAN REQUIREMENTS:** Audit Services will review the reasonableness of the "Investment Performance Summary" table in RIO's CAFR for the last five fiscal years ended June 30, 2015 and annualized returns for the 3, 5, 10, and 20 years ended June 30, 2015.
 - **2015-2016 ACTUAL ACTIVITIES:**
 - The Investment Performance Summary Review was not completed in fiscal year 2016. Hours allocated to this particular task were reallocated to higher priority audit activities.

- **Schedule of Investment Fees Review & Investment Management Fees Review**
 - **AUDIT PLAN REQUIREMENTS:** Audit Services will review the reasonableness of the "Schedule of Investment Fees" in RIO's CAFR for the last six fiscal years ended June 30, 2015. Audit Services will also review the reasonableness of the five largest investment management fees and five largest incentive/investment performance fees for the fiscal year ended June 30, 2015.
 - **2015-2016 ACTUAL ACTIVITIES:**
 - Schedule of Investment Fees Review & Investment Management Fees Review were not completed in fiscal year 2016. Hours allocated to this particular task were reallocated to higher priority audit activities.

- **RIO External Auditor Assistance**
 - **AUDIT PLAN REQUIREMENTS:** Audit Services assists our external auditor, CliftonLarsonAllen, with a variety of tasks related to the annual financial audit of RIO and the GASB 68 census data audits.
 - **2015-2016 ACTUAL ACTIVITIES:**
 - Audit Services provided assistance to our external audit partners CliftonLarsonAllen during the financial audit of the RIO as well as the GASB 68 census data audits.

ADMINISTRATIVE ACTIVITIES (NON AUDIT RELATED):

- **Professional Development/CE/General Education**
 - **AUDIT PLAN REQUIREMENTS:** Audit Services is a member of the Institute of Internal Auditors (IIA) and attends monthly meetings along with bi-annual seminars. A member of Audit Services attends a national industry conference on an annual basis. The Supervisor of Audit Services is also pursuing a Certified Internal Auditor (CIA) professional designation which will require ongoing continuing education.
 - **2015-2016 ACUAL ACTIVITIES:**
 - Staff attended local IIA meetings, a risk management seminar, an auditing practices seminar, and various webinars. The Supervisor of Audit Services continued to pursue a Certified Internal Auditor (CIA) designation by successfully completing Part II of the CIA Exam in November 2015. The Supervisor of Audit Services also attended the IIA Central Regional Conference in May 2016.

- **Audit Services Procedure Manual**
 - **AUDIT PLAN REQUIREMENTS:** Creation of an Audit Services policy and procedure manual.
 - **2015-2016 ACUTAL ACTIVITIES:**
 - Procedures for the TFFR File Maintenance Audit were completed during fiscal year 2016.

- **Audit Services/Retirement Services Internship Program**
 - **AUDIT PLAN REQUIREMENTS:** Not included in Audit Services work plan approved for July 1, 2015 through June 30, 2016. Internship program initiated at the request of the Executive Director/CIO and SIB Audit Committee.
 - **2015-2016 ACUTAL ACTIVITIES:**
 - Supervisor of Audit Services and Retirement Program Manager were tasked with the creation of an internship program for the RIO. Internship work plan was submitted to HRMS for approval in March 2016. Qualifications and other job requirements were defined with the assistance of HRMS and the position was posted, interviews were conducted, and a candidate selected in April 2016. The intern arrived in our offices on May 16, 2016. The internship lasted a total of 14 weeks with time allocated between Audit Services and Retirement Services. The Supervisor of Audit Services and Retirement Program Manager were responsible for orientation, training, and ongoing support. The internship concluded on August 19, 2016.

MEMORANDUM

TO: TFFR Board
FROM: Fay Kopp
DATE: October 20, 2016
SUBJ: Trustee Education Reports

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

At its well renowned "Callan College," Callan Associates provides a foundation of investment knowledge for fund trustees and staff by providing investment theory, terminology, and practices as well as discussing fiduciary issues pertaining to fund management and oversight. In October, Mike Burton attended Callan College – Introduction to Investments.

Trustees may wish to report on pension and investment educational conferences they have recently attended.

READING:

[HTTP://CRR.BC.EDU/WP-CONTENT/UPLOADS/2016/10/SLP_51-1.PDF](http://crr.bc.edu/wp-content/uploads/2016/10/SLP_51-1.pdf)