

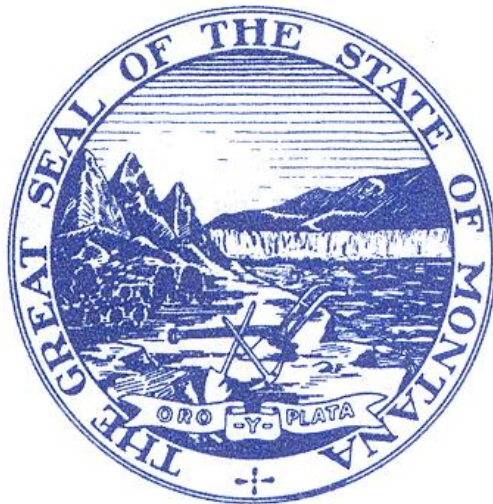


**Cavanaugh Macdonald**  
CONSULTING, LLC

*The experience and dedication you deserve*

**Teachers' Retirement System  
State of Montana**

**Actuarial Valuation  
As of July 1, 2013**





# Cavanaugh Macdonald

CONSULTING, LLC

*The experience and dedication you deserve*

September 27, 2013

Teachers' Retirement Board  
State of Montana  
1500 Sixth Avenue  
Helena, MT 59620-0139

Members of the Board:

In this report are submitted the results of the annual valuation of the assets and liabilities of the Teachers' Retirement System of Montana (TRS), prepared as of July 1, 2013.

The purpose of this report is to provide a summary of the funded status of the System as of July 1, 2013. While not verifying the data at source, the actuary performed tests for consistency and reasonability. The valuation indicates that the statutory contribution rate is sufficient to amortize the unfunded accrued liability within a 20 year period.

The promised benefits of the System are included in the actuarially calculated contribution rates which are developed using the Entry Age Normal cost method. Four-year market related value of assets is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded accrued liability that is being amortized by regular annual contributions as a level percentage of payroll, on the assumption that payroll will increase by 4.50% annually. The assumptions recommended by the actuary and adopted by the Board are in the aggregate reasonably related to the experience under the Fund and to reasonable expectations of anticipated experience under the Fund.

This is to certify that the independent consulting actuary is a member of the American Academy of Actuaries and has experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

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September 27, 2013  
Teachers' Retirement Board  
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Future actuarial results may differ significantly from the current results 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 or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

The Table of Contents, which immediately follows, outlines the material contained in the report.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'Edward Macdonald', written in a cursive style.

Edward A. Macdonald, ASA, FCA, MAAA  
President

A handwritten signature in blue ink, appearing to read 'Todd B. Green', written in a cursive style.

Todd B. Green, ASA, FCA, MAAA  
Principal and Consulting Actuary

EAM:TBG/kc



**Teachers' Retirement System  
State of Montana**

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**Section I**  
**Summary of Findings**

For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized below:

(Dollar amounts in thousands)

<b>VALUATION DATE</b>	<b>July 1, 2013</b>	<b>July 1, 2012</b>
Active members		
Number		
Full-Time Members	12,229	12,202
Part-Time Members	6,020	6,170
Annual valuation compensation	\$ 742,609	\$ 735,587
Retired members and beneficiaries		
Number	13,868	13,363
Annual allowances	\$ 284,333	\$ 267,851
Inactive Members		
Vested Terminated Members	1,566	1,566
Non-Vested Terminated Members	11,710	11,172
Assets		
Actuarial value	\$ 3,067,878	\$ 2,852,007
Market value	3,185,064	2,932,202
Actuarial Accrued Liability (AAL)	\$ 4,592,658	\$ 4,814,726
Unfunded Actuarial Accrued Liability	\$ 1,524,780	\$ 1,962,719
Funded Ratio	66.80%	59.24%
Market Value Rate of Return	12.94%	2.21%
<b>Annual Cost</b>		
Total Normal Rate	9.20%	9.65%
Employee Contribution Rate	<u>8.15%</u>	<u>7.15%</u>
Employer Normal Rate	1.05%	2.50%
Employer Statutory Contribution Rate		
Normal Rate	1.05%	2.50%
UAAL Rate	<u>9.91%</u>	<u>7.46%</u>
Total Rate	10.96%	9.96%
Amortization Period	20 Years	Infinite



As a result of this actuarial valuation of the benefits in effect under the Montana Teachers' Retirement System as of July 1, 2013, the statutory employer contributions are sufficient to amortize the Unfunded Actuarial Accrued Liability (UAAL) of the Retirement System within 20 years. The Funded Ratio is 66.80%.

The table below shows a history of the legislated contribution rates as a percent of pay. In addition to these contributions the System will receive cash contributions from two sources. The first is \$25 million on an annual basis from the State. The second is a one-time contribution payable to the System by the trustees of school districts maintaining a retirement fund. The one-time contribution to the Retirement System shall be the amount earmarked as an operating reserve in excess of 20% of the adopted retirement fund budget for the fiscal year 2013. This amount has been estimated to be \$14.7 million payable on October 1, 2013.

Finally, employers are now required to contribution 9.85% of total compensation of re-employed retirees who are employed in TRS covered positions.

History of Legislated Contributions  
(as a Percent of Pay)

**School District and Other Employers**

	<u>Members</u>	<u>Employers</u>	<u>General fund</u>	<u>Total employee &amp; employer</u>
Prior to July 1, 2007	7.15%	7.47%	0.11%	14.73%
July 1, 2007 to June 30, 2009	7.15%	7.47%	2.39%	16.73%
July 1, 2009 to June 30, 2013	7.15%	7.47%	2.49%	17.11%
July 1, 2013 to June 30, 2014	8.15%	8.47%	2.49%	19.11%
July 1, 2014 to June 30, 2015	8.15%	8.57%	2.49%	19.21%
July 1, 2015 to June 30, 2016	8.15%	8.67%	2.49%	19.31%
July 1, 2016 to June 30, 2017	8.15%	8.77%	2.49%	19.41%
July 1, 2017 to June 30, 2018	8.15%	8.87%	2.49%	19.51%
July 1, 2018 to June 30, 2019	8.15%	8.97%	2.49%	19.61%
July 1, 2019 to June 30, 2020	8.15%	9.07%	2.49%	19.71%
July 1, 2020 to June 30, 2021	8.15%	9.17%	2.49%	19.81%
July 1, 2021 to June 30, 2022	8.15%	9.27%	2.49%	19.91%
July 1, 2022 to June 30, 2023	8.15%	9.37%	2.49%	20.01%
July 1, 2023 to June 30, 2024	8.15%	9.47%	2.49%	20.11%

**State and University Employers**

	<u>Members</u>	<u>Employers</u>	<u>General fund</u>	<u>Total employee &amp; employer</u>
Prior to July 1, 2007	7.15%	7.47%	0.11%	14.73%
July 1, 2007 to June 30, 2009	7.15%	9.47%	0.11%	16.73%
July 1, 2009 to June 30, 2013	7.15%	9.85%	0.11%	17.11%
July 1, 2013 to June 30, 2014	8.15%	10.85%	0.11%	19.11%
July 1, 2014 to June 30, 2015	8.15%	10.95%	0.11%	19.21%
July 1, 2015 to June 30, 2016	8.15%	11.05%	0.11%	19.31%
July 1, 2016 to June 30, 2017	8.15%	11.15%	0.11%	19.41%
July 1, 2017 to June 30, 2018	8.15%	11.25%	0.11%	19.51%
July 1, 2018 to June 30, 2019	8.15%	11.35%	0.11%	19.61%
July 1, 2019 to June 30, 2020	8.15%	11.45%	0.11%	19.71%
July 1, 2020 to June 30, 2021	8.15%	11.55%	0.11%	19.81%
July 1, 2021 to June 30, 2022	8.15%	11.65%	0.11%	19.91%
July 1, 2022 to June 30, 2023	8.15%	11.75%	0.11%	20.01%
July 1, 2023 to June 30, 2024	8.15%	11.85%	0.11%	20.11%



### Calculations based on the Market Value of Assets

MCA 19-20-201 requires this report to show how market performance is affecting the actuarial funding of the Retirement System. The July 1, 2013 market value of assets is \$117.2 million more than the actuarial value of assets. This is due to the smoothing of investment gains and losses over a four year period. If the market value of assets was used, the amortization period would be 18 years, and the Funded Ratio would be 69.35%.

### Additional Details

MCA 19-20-604 states that the contribution from the State General Fund will be reduced by 0.11% when the amortization period of the System’s UAAL is 10 years or less according to the System’s latest actuarial valuation.

The actuarial costs are calculated using the entry age actuarial cost method. This is the method used by most public plans. It is designed to provide a stable contribution rate as a percent of member pay. This actuarial valuation measures the adequacy of the contribution rates set in Montana State Law.

### Investment Experience

The market assets earned 12.94% net of investment and operating expenses. As a result of prior years unrecognized gains, the actuarial assets earned 11.99% which is 4.24% greater than the actuarial assumption of 7.75%. The return on the actuarial assets differs from the return on market assets because the actuarial value of assets spreads gains and losses over four years. The chart below page shows the annual returns for the past ten years.

Year	Market Return	Actuarial Return	Market Return over Assumption*	Actuarial Return over Assumption*
7/1/2003 to 6/30/2004	13.31%	2.12%	5.31%	(5.88)%
7/1/2004 to 6/30/2005	8.04%	2.71%	0.29%	(5.04)%
7/1/2005 to 6/30/2006	8.91%	8.46%	1.16%	0.71%
7/1/2006 to 6/30/2007	17.64%	10.22%	9.89%	2.47%
7/1/2007 to 6/30/2008	(4.88)%	7.18%	(12.63)%	(0.57)%
7/1/2008 to 6/30/2009	(20.80)%	(10.26)%	(28.55)%	(18.01)%
7/1/2009 to 6/30/2010	12.87%	9.78%	5.12%	2.03%
7/1/2010 to 6/30/2011	21.67%	(0.13)%	13.92%	(7.88)%
7/1/2011 to 6/30/2012	2.21%	3.21%	(5.54)%	(4.54)%
7/1/2012 to 6/30/2013	12.94%	11.99%	5.19%	4.24%

\* The actuarial assumption was 8.0% through 6/30/2004 and 7.75% thereafter.

Asset gains or losses result when the return on the actuarial value of assets differs from the actuarial investment return assumption of 7.75% (8.0% before July 1, 2004).

On a market value basis the System earned (\$161.8) million less than anticipated by the 7.75% assumption in the year ended June 30, 2012 and \$149.1 million more than anticipated by the 7.75% assumption in the year ended June 30, 2013. The net result as of July 1, 2013 is that the market value of assets is \$117.2 million more than the actuarial value of assets. This \$117.2 million in unrecognized asset gains will either offset any future investment losses or if there are none, reduce the amortization period of the UAAL in future valuations.





## **Recent Contribution Increases**

As shown in the “History of Legislated Contributions” at the beginning of this section, the employer contributions from the General Fund have increased to 2.49% of pay as of July 1, 2009. The supplemental contribution to ensure university member benefits are funded by university employers was increased from 4.04% to 4.72% of Optional Retirement Plan (ORP) member pay at July 1, 2007. The valuation that determined the 4.72% contribution rate of ORP member pay was based on the valuation completed as of July 1, 2006. The most recent ORP valuation completed as of July 1, 2012 indicated an increase is needed in the supplemental contribution rate from 4.72% to 9.04% of ORP member compensation rate.

Employers and members are required to make supplemental contributions if the funded ratio of the System is less than 90%. Since the funded ratio is currently 66.80%, Tier One Members are required to contribute an additional 1% of compensation. The individual employers are required to contribute an additional 1% of compensation beginning July 1, 2013. The employer contribution shall increase by 0.1% each year following July 1, 2013 until the total employer supplemental contribution is equal to 2% of compensation. Finally, beginning July 1, 2013, the State will contribute \$25 million annually.

In addition to the increases mention above, the System will receive a one-time contribution payable to the System by the trustees of school districts maintaining a retirement fund. The one-time contribution to the Retirement System shall be the amount earmarked as an operating reserve in excess of 20% of the adopted retirement fund budget for the fiscal year 2013. This amount has been estimated to be \$14.7 million payable on October 1, 2013.

The increased member and employer contributions along with the reduction in the GABA were necessary in order to reduce the amortization period below 30 years.

Finally, each employer will contribute 9.85% of total compensation paid to all re-employed TRS retirees retired employed in a TRS reportable position.

## **Amortization Period Changes**

The July 1, 2012 actuarial valuation calculated an infinite amortization period for the UAAL. The resulting amortization period at July 1, 2013 is 20 years. The decrease in the amortization period is primarily due to the provisions of HB 377 which provided for increased contributions from the members, employers and the State and a reduction in the GABA for current and future retirees until certain funding criteria are met.

## **Funding and Benefits Policy**

The Teachers’ Retirement System has adopted a Funding and Benefits Policy to provide general guidelines to help ensure decisions are made based on sound, consistent, and thoroughly examined criteria. The Funding and Benefits Policy includes guidance on the following topics:

### **1) Additional Funding**

#### **a) The Funding and Benefits Policy states:**

- “1. If the amortization period is greater than 30 years, the actuary will recommend the single contribution rate increase that can reasonably expect to fully amortize the UAAL over a closed 30-year period effective July 1, following the next regular legislative session.





2. If the amortization period is less than 30 years, but greater than 0, and it is projected to continue to decline over the remainder of the closed period, the actuary will not recommend a change in the statutory contribution rates.
  3. IF the amortization period is less than 30 years, but has increased over prior valuations and is projected to continue to grow, the actuary will recommend a contribution rate increase that is reasonably expected to reverse the recent trend and reestablish a closed amortization period equal to that of the last valuation.”
- 2) Analysis: The amortization period as of July 1, 2013 is 20 years based on actuarial assets and 18 years based on market assets. Assuming experience follows the actuarial assumptions, the amortization period is projected to decline. Therefore additional funding is not necessary at this time.
- 3) Ultimate Goal
- a) The Funding and Benefits Policy states: “It is the desire of the Board to fully fund the System. However, until the System becomes fully funded, any unfunded will be amortized over a closed period of no more than 30 years and funded as a level percent of pay. At such time as the System becomes fully funded and has as stabilization reserve of at least 10% of the actuarial accrued liability, the allowed amortization period for any subsequent unfunded liabilities will be reduced to a closed period of not greater than 20 years.”
  - b) Analysis: The amortization period on an actuarial value of asset basis is 20 years and is anticipated to decline. This is within the parameters of ultimate goal of the Retirement System.
- 4) Benefit Enhancements
- a) The Funding and Benefits Policy states: “Any recommendation for a benefit enhancement must include recommendations for necessary additional funding or other benefit reduction to cover any increase in normal cost arising from the recommended enhancement and to amortize any increase in the unfunded actuarial accrued liabilities arising from the recommended enhancement over a period not to exceed 25 years.
- The Board will determine its position with respect to supporting or opposing legislation, on a case-by-case basis, and will apply this policy, actuarial funding standards, and other industry-standard information and resources if finds persuasive, as decision guides. The Board may not support legislation to enhance benefits if the funded ratio is less than 85%, and the amortization period is greater than 20 years.”
- b) Analysis: Since the funded ratio at July 1, 2013 of 66.80% is below 80% the Board’s Funding and Benefits policy does not currently support enhanced benefits.

### **Sensitivity to Future Experience**

The valuation results are projections based on the actuarial assumptions. Actual experience will differ from these assumptions, either increasing or decreasing the ultimate cost. The following illustrations provide simple analyses on how the costs are sensitive to changes in the assumed rate of return and changes to the GABA.



Investment Return – The investment return assumption generally has the largest impact on the funding of the System.

<u>Impact of Assuming 0.5% Lower Investment Return</u>	
	<u>Funded Ratio</u>
Current Assumption 7.75%	66.80%
Lower Assumption 7.25%	<u>63.49%</u>
Change	(3.31)%
	<u>Amortization Period Increase / (Decrease)</u>
Current Assumption 7.75%	20 Years
Lower Assumption 7.25%	<u>25 Years</u>
Increase	5 Years
<u>Impact of Assuming 1.0% Lower Investment Return</u>	
	<u>Funded Ratio</u>
Current Assumption 7.75%	66.80%
Lower Assumption 6.75%	<u>60.25%</u>
Change	(6.55)%
	<u>Amortization Period Increase / (Decrease)</u>
Current Assumption 7.75%	20 Years
Lower Assumption 6.75%	<u>33 Years</u>
Increase	13 Years
<u>Impact of Assuming 1.5% Lower Investment Return</u>	
	<u>Funded Ratio</u>
Current Assumption 7.75%	66.80%
Lower Assumption 6.25%	<u>57.08%</u>
Change	(9.72)%
	<u>Amortization Period Increase / (Decrease)</u>
Current Assumption 7.75%	20 Years
Lower Assumption 6.25%	<u>44 Years</u>
Increase	24 Years



## Invalidation of GABA

During the 2013 Legislative session, HB 377 was passed which changed the GABA provision of TRS. The previous GABA provision provided an annual 1.50% increase on January 1<sup>st</sup> of each year to retirees and beneficiaries in receipt of pension benefits once the retiree had been retired for at least 36 months. The new GABA provision limits the annual increase to 0.5% if the funded ratio of the System is less than 90%. If this provision of HB 377 is determined to be a contractual violation the results of the July 1, 2013 would change. The table below compares the results of the July 1, 2013 annual valuation under the GABA provision of HB 377 to the GABA provisions in place prior to January 1, 2013.

Dollar amounts in thousands		
	New GABA Provision	Prior GABA Provisions
<b>VALUATION DATE</b>	<b>July 1, 2013</b>	<b>July 1, 2013</b>
Actuarial Accrued Liability (AAL)	\$ 4,592,658	\$4,963,778
Actuarial value of Assets	\$ 3,067,878	\$3,067,878
Unfunded Actuarial Accrued Liability	\$ 1,524,780	\$1,895,900
Funded Ratio	66.80%	61.81%
<b>Annual Cost</b>		
Total Normal Rate	9.20%	9.62%
Employee Contribution Rate	<u>8.15%</u>	<u>8.15%</u>
Employer Normal Rate	1.05%	1.47%
Employer Statutory Contribution Rate		
Normal Rate	1.05%	1.47%
UAAL Rate	<u>9.91%</u>	<u>9.49%</u>
Total Rate	10.96%	10.96%
Amortization Period	20 Years	29 Years

The future funding status of the System will be determined by the System's experience. The System's actual asset returns and retirement rates, as well as member longevity, salary increases, withdrawal rates, disability rates and future legislation will all impact the funding status of the System. The entry age normal cost method and four year smoothing of asset gains and losses will help to provide a more orderly funding of the System's liabilities, but will not change the actual experience. The amortization period of the UAAL is not likely to decrease by the expected 1.0 year with each passing actuarial valuation. Instead, the amortization period is expected to decrease more or less than 1.0 years each year, reflecting gains and losses due to experience different than the actuarial assumptions.

### **Assumption Changes**

There have been no assumption changes since the previous valuation.



## Benefit Changes

During the 2013 Legislative Session, HB 377 was passed which had a significant impact on the valuation results as of July 1, 2013. HB 377 provides additional revenue and creates a two tier benefit structure. A Tier One Member is a person who first became a member before July 1, 2013 and has not withdrawn their member's account balance. A Tier Two Member is a person who first becomes a member on or after July 1, 2013 or after withdrawing their member's account balance, becomes a member again on or after July 1, 2013.

The GABA for Tier 1 members has also been modified as follows:

- If the most recent actuarial valuation of the System shows that the funded ratio is less than 90%, then the maximum increase that can be granted is 0.50%.
- If the funded ratio is at least 90% and the increase is not projected to cause the System's funded ratio to be less than 85%, an increase can be granted that is greater than 0.50% but not more than 1.50%.

The second tier benefit structure for members hired on or after July 1, 2013 is summarized below.

- (1) **Final Average Compensation:** average of earned compensation paid in five consecutive years of full-time service that yields the highest average
- (2) **Service Retirement:** Eligible to receive a service retirement benefit if the member has been credited with at least five full years of creditable service and has attained the age of 60; or has been credited with 30 or more years of full-time or part-time creditable service and has attained age 55
- (3) **Early Retirement:** Eligible to receive an early retirement allowance if a member is not eligible for service retirement but has at least five years of creditable service and attained age 55
- (4) **Professional Retirement Option:** if the member has been credited with 30 or more years of service and has attained the age of 60 they are eligible for an enhanced allowance equal to 1.85% of average final compensation times all service at retirement . Otherwise, the multiplier used to calculate the retirement allowance will be equal to 1.67%
- (5) **Annual Contribution:** 8.15% of member's earned compensation
- (6) **Supplemental Contribution Rate:** On or after July 1, 2023, the TRS Board may require a supplemental contribution up to 0.5% if the following three conditions are met:
  - a. The average funded ratio of the System based on the last three annual actuarial valuations is equal to or less than 80%; and
  - b. The period necessary to amortize all liabilities of the System based on the latest annual actuarial valuation is greater than 20 years; and
  - c. A State or employer contribution rate increase or a flat dollar contribution to the Retirement System Trust fund has been enacted that is equivalent to or greater than the supplemental contribution rate imposed by the TRS Board.
- (7) **Disability Retirement:** A member will not be eligible for a disability retirement if the member is or will be eligible for a service retirement on the date of termination
- (8) **Guaranteed Annual Benefit Adjustment (GABA):**
  - a. If the most recent actuarial valuation shows that Retirement System liabilities are at least 90% funded and the provision of the increase is not projected to cause the System's liabilities to be less than 85% funded, the GABA may increase from the 0.5% floor up to 1.5%, as set by the Board.



## Contribution Changes

Since the previous valuation the passage of HB 377 during the 2013 legislative session increased revenue from the members, employers and the State as follows:

- Annual State contribution equal to \$25 million paid to the System in monthly installments.
- One-time contribution payable to the Retirement System by the trustees of a school district maintaining a retirement fund. The one-time contribution to the Retirement System shall be the amount earmarked as an operating reserve in excess of 20% of the adopted retirement fund budget for the fiscal year 2013. This amount has been estimated to be \$14.7 million payable October 1, 2013.
- 1% supplemental employer contribution. This will increase the current employer rates:
  - School Districts contributions will increase from 7.47% to 8.47%
  - The Montana University System and State Agencies will increase from 9.85% to 10.85%.
  - The supplemental employer contribution will increase by 0.1% each fiscal year for fiscal year 2014 thru fiscal year 2024. Fiscal years beginning after June 30, 2024 the total supplemental employer contribution will be equal to 2%.
- Members hired prior to July 1, 2013 (Tier 1) under HB 377 are required to contribute a supplemental contribution equal to an additional 1% of the member's earned compensation.

In addition HB 34 was passed which requires each employer to contribute 9.85% of total compensation paid to all re-employed TRS retirees employed in a TRS reportable position to the System.

## Method Changes

Since the previous valuation, there have been no methodology changes.

## Impact of Changes

The following table summarizes how experience has changed the UAAL since the July 1, 2012 Actuarial Valuation. Further detail can be found in Table 11.

### Changes in the Unfunded Actuarial Accrued Liability (UAAL)

(In millions)

July 1, 2012 Valuation UAAL	\$ 1,962.7
Expected Increase	<u>68.2</u>
Expected July 1, 2013 UAAL	\$ 2,030.9
Experience Gain on Actuarial Liabilities	\$ (16.8)
Experience Gain on Actuarial Assets	(118.2)
Plan Amendments (HB 377)	<u>(371.1)</u>
Total Gain	<u>\$ (506.1)</u>
July 1, 2013 Valuation UAAL	\$ 1,524.8



## Teachers' Retirement System State of Montana

### Summary

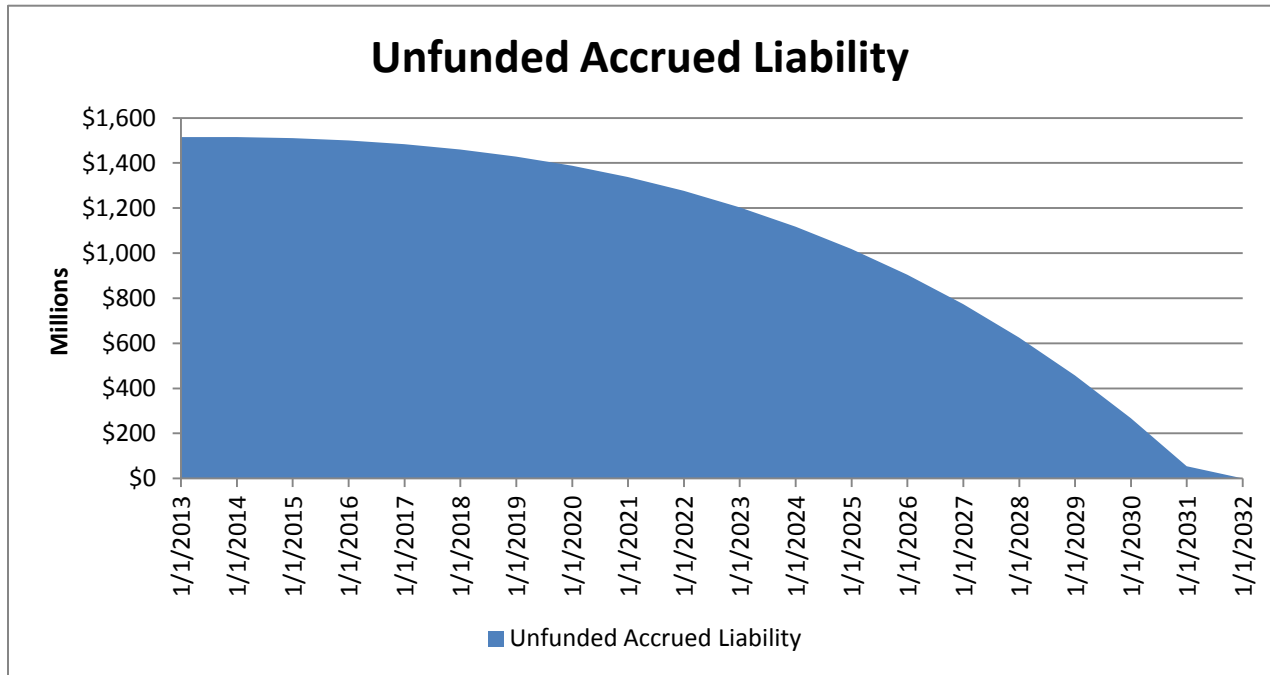
- \* The System's actuarial value investment return of 11.99% for the year ended June 30, 2013 is 4.24% more than the actuarial assumption of 7.75%. This represents an asset gain of \$118.2 million due to investment return greater than anticipated. The actuarial value of assets is not allowed to be greater than 120% or less than 80% of the market value of assets. As of July 1, 2013, the market value of assets was \$3,185.1 million. As of July 1, 2013 the preliminary actuarial value of assets was \$3,067.9 million. Since the preliminary actuarial value is within the corridor no adjustment is required to the preliminary actuarial value of assets. The July 1, 2013 market value of assets is \$117.2 million more than the actuarial value of assets. This \$117.2 million gain will be recognized in future actuarial valuations unless it is offset by returns less than the 7.75% assumption.
- \* As of July 1, 2013 the amortization period of the UAAL is 20 years. Prior to this valuation the funding period was infinite. During the 2013 legislative session, HB 377 was passed which provided increased funding of the Retirement System along with a temporary reduction in the GABA until certain funding parameters are met. This action complied with the Board's current Funding and Benefits Policy. The Policy's ultimate goal is to increase the current net funded ratio of 66.80% above 110% to encourage stable contribution rates.
- \* The funding of the retirement system will be impacted by future experience which will sometimes be more favorable than the actuarial assumptions and sometimes less favorable. In particular, investment returns larger and smaller than the 7.75% assumption are expected to have significant impacts on the System's funding progress. In the long term, the favorable experience is needed to offset the less favorable experience. This is the reason for using an actuarial value of assets that smoothes gains and losses over four years.



## Teachers' Retirement System State of Montana

### Projected Progress toward 100% Funding

The table below shows the projected progress toward reaching 100%. When the System is 100% funded the Unfunded Actuarial Accrued Liability will be fully amortized. This is scheduled to occur within 20 years. The ultimate goal of the TRS System is to become at least 100% funded and to establish a reserve equal to 10% of the Systems Actuarial Accrued Liability.







# Teachers' Retirement System State of Montana

## Section 2

### Assets

In many respects, an actuarial valuation can be regarded as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is July 1, 2013. On that date, the assets available for the payment of benefits are appraised. These assets are compared with the actuarial liabilities. The actuarial process thus leads to a method of determining what contributions by members and their employers are needed to strike a balance.

The asset valuation method being used is a four-year smoothing method. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of four years. The actuarial value of assets is not allowed to be greater than 120% or less than 80% of the market value of assets.

Table 1 lists the assets held and their market value for the past two years. Table 2 summarizes the fund's activity during the past two years. Table 3 summarizes the determination of the actuarial value of assets. Table 4 summarizes historical asset returns for the last 15 years including the amount recognized by the actuarial asset valuation method which was greater or lesser than the actuarial investment return assumption.



**Teachers' Retirement System  
State of Montana**

**Table 1**

**Statement of Fiduciary Net Assets**

	<u>TOTAL TRS 2013</u>	<u>TOTAL TRS 2012</u>
<b>ASSETS</b>		
Cash/Cash Equivalents-Short Term		
Investment Pool	\$ 49,311,573	\$ 34,990,630
Receivables:		
Accounts Receivable	19,291,577	18,239,103
Interest Receivable	3,590,714	3,943,728
Total Receivables	<u>\$ 22,882,291</u>	<u>\$ 22,182,831</u>
Investments, at fair value:		
Investment Pools	3,112,815,628	2,875,013,588
Other Investments	527,645	452,251
Securities Lending Collateral	141,343,948	130,643,155
Total Investments	<u>\$ 3,254,687,221</u>	<u>\$ 3,006,108,994</u>
Assets Used in Plan Operations:		
Land and Buildings	\$ 193,844	\$ 193,844
Less: Accumulated Depreciation	(150,545)	(150,545)
Equipment	142,697	142,697
Less: Accumulated Depreciation	(110,110)	(91,521)
Prepaid Expenses	1,200	-
Intangible Assets, net of amortization	-	13,603
Total Other Assets	<u>\$ 77,086</u>	<u>\$ 108,078</u>
<b>TOTAL ASSETS</b>	<u>\$ 3,326,958,172</u>	<u>\$ 3,063,390,533</u>
<b>LIABILITIES</b>		
Accounts Payable	\$ 59,617	\$ 126,636
Securities Lending Liability	141,343,948	130,643,155
Compensated Absences	202,791	178,869
OPEB Implicit Rate Subsidy	287,409	239,397
<b>TOTAL LIABILITIES</b>	<u>\$ 141,893,765</u>	<u>\$ 131,188,057</u>
<b>NET ASSETS HELD IN TRUST FOR PENSION BENEFITS</b>	<u>\$ 3,185,064,406</u>	<u>\$ 2,932,202,476</u>



Teachers' Retirement System  
State of Montana

Table 2

Statement of Changes in Fiduciary Net Assets

	<b>TOTAL TRS 2013</b>	<b>TOTAL TRS 2012</b>
<b>ADDITIONS</b>		
Contributions:		
Employer	\$ 74,113,191	\$ 72,422,404
Plan Member	62,849,685	62,745,441
Other	17,521,347	16,843,766
Total Contributions	<u>\$ 154,484,223</u>	<u>\$ 152,011,611</u>
Misc Income	\$ 7,956	\$ 9,689
Investment Income:		
Net Appreciation/(Depreciation) in Fair Value of Investments	\$ 251,267,246	\$ (8,013,031)
Investment Earnings	136,721,675	89,331,577
Security Lending Income	881,395	1,177,164
Investment Income/(Loss)	<u>\$ 388,870,317</u>	<u>\$ 82,495,710</u>
Less: Investment Expense	14,930,082	15,891,193
Less: Security Lending Expense	218,700	263,225
Net Investment Income/(Loss)	<u>\$ 373,721,534</u>	<u>\$ 66,341,292</u>
Total Additions	<u>\$ 528,213,713</u>	<u>\$ 218,362,592</u>
<b>DEDUCTIONS</b>		
Benefit Payments	\$ 268,250,231	\$ 251,410,455
Withdrawals	5,119,358	5,294,856
Administrative Expense	1,934,182	1,829,800
OPEB Expenses	48,012	46,055
Total Deductions	<u>\$ 275,351,783</u>	<u>\$ 258,581,166</u>
<b>NET INCREASE (DECREASE) IN PLAN NET ASSETS</b>	<u>\$ 252,861,930</u>	<u>\$ (40,218,574)</u>
<b>NET ASSETS HELD IN TRUST FOR PENSION BENEFITS BEGINNING OF YEAR</b>	\$ 2,932,202,476	\$ 2,972,419,220
<b>ADJUSTMENT</b>		\$ 1,830
<b>END OF YEAR</b>	<u>\$ 3,185,064,406</u>	<u>\$ 2,932,202,476</u>

**Teachers' Retirement System  
State of Montana  
Table 3**



**Determination of Actuarial Value of Assets**

Valuation Date July 1:	2012	2013	2014	2015	2016
A. Actuarial Value Beginning of Year	\$ 2,866,483,194	\$ 2,852,006,805			
B. Market Value End of Year	2,932,202,476	3,185,064,406			
C. Market Value of Beginning of Year	2,972,419,220	2,932,202,476			
D. Cash Flow					
D1. Contributions	152,011,611	154,484,223			
D2. Benefit Payments	<u>(256,705,311)</u>	<u>(273,369,589)</u>			
D3. Net	\$ (104,693,700)	\$ (118,885,366)			
E. Investment Income					
E1. Market Total: B. - C. - D3.	\$ 64,476,956	\$ 371,747,296			
E2. Assumed Rate	7.75%	7.75%			
E3. Amount for Immediate Recognition	226,305,609	222,638,884			
E4. Amount for Phased-in Recognition	(161,828,653)	149,108,412			
F. Phased-In Recognition of Investment Income					
F1. Current Year: 0.25 * E4.	\$ (40,457,163)	\$ 37,277,103	\$ -	\$ -	\$ -
F2. First Prior Year	86,269,457	(40,457,163)	37,277,103	-	-
F3. Second Prior Year	29,028,252	86,269,457	(40,457,163)	37,277,103	-
F4. Third Prior Year	<u>(210,928,844)</u>	<u>29,028,252</u>	<u>86,269,457</u>	<u>(40,457,163)</u>	<u>37,277,103</u>
F5. Total Recognized Investment Gain	\$ (136,088,298)	\$ 112,117,649	\$ 83,089,397	\$ (3,180,060)	\$ 37,277,103
G. Preliminary Actuarial Value End of Year A. + D3. + E3. + F5.	\$ 2,852,006,805	\$ 3,067,877,972			
H. Corridor					
H1. 80% of Market Value	\$ 2,345,761,981	\$ 2,548,051,525			
H2. 120% of Market Value	3,518,642,971	3,822,077,287			
I. Actuarial Value End of Year G. Not Less than H1. or Not Greater than H2.	\$ 2,852,006,805	\$ 3,067,877,972			
J. Difference Between Market & Actuarial Values	\$ 80,195,671	\$ 117,186,434			



**Teachers' Retirement System  
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**Table 4**

**Historical Investment Returns\***

<b>Fiscal Year Ending</b>	<b>Market Returns</b>	<b>Actuarial Returns</b>	<b>Actuarial Return Over 8.00% Assumption</b>
June 30, 1999	11.9%	12.3%	4.3%
June 30, 2000	7.8%	12.8%	4.8%
June 30, 2001	(5.1)%	9.2%	1.2%
June 30, 2002	(7.3)%	3.8%	(4.2)%
June 30, 2003	6.2%	1.6%	(6.4)%
June 30, 2004	13.3%	2.1%	(5.9)%
<b>Fiscal Year Ending</b>	<b>Market Returns</b>	<b>Actuarial Returns</b>	<b>Actuarial Return Over 7.75% Assumption</b>
June 30, 2005	8.0%	2.7%	(5.0)%
June 30, 2006	8.9%	8.5%	0.7%
June 30, 2007	17.6%	10.2%	2.5%
June 30, 2008	(4.9)%	7.2%	(0.6)%
June 30, 2009	(20.8)%	(10.3)%	(18.0)%
June 30, 2010	12.9%	9.8%	2.0%
June 30, 2011	21.7%	(0.1)%	(7.9)%
June 30, 2012	2.2%	3.2%	(4.6)%
June 30, 2013	12.9%	12.0%	4.3%
15 Year Average	5.1%	5.5%	(2.4)%

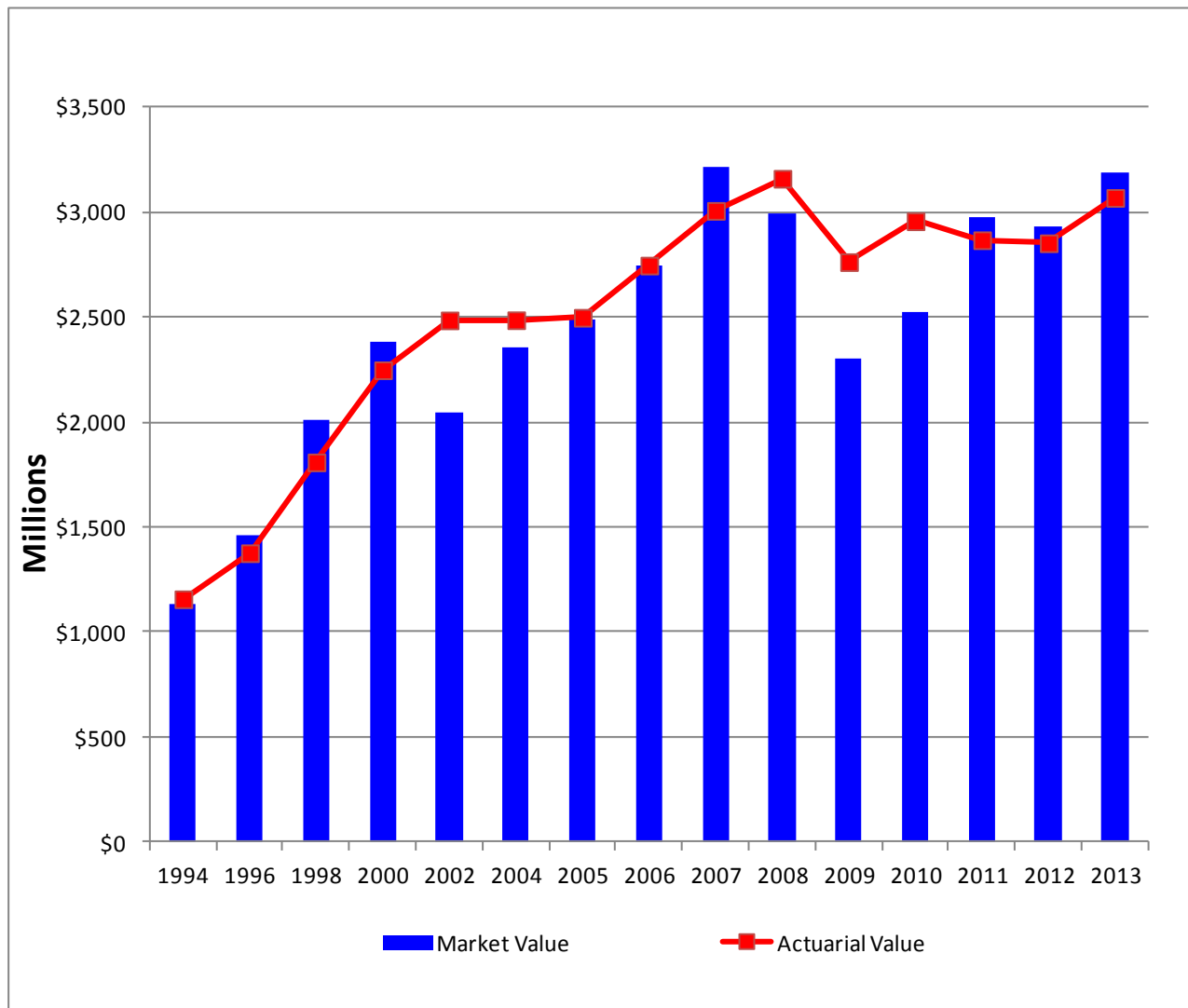
\* Returns reflect all investment returns, including investment income and realized and unrealized investment gains and losses, and are net of investment expenses and administrative expenses paid by the System.



### Teachers' Retirement System State of Montana

Table 5

#### Market Value of Assets vs. Actuarial Value of Assets





## **Teachers' Retirement System State of Montana**

### **Section 3**

#### **Actuarial Present Value of Future Benefits**

In the previous section, an actuarial valuation was related to an inventory process, and an analysis was given of the inventory of assets of the System as of the valuation date. In this section, the discussion will focus on the commitments of the System, which will be referred to as its actuarial liabilities.

Table 6 contains an analysis of the actuarial present value of all future benefits for contributing members, for former contributing members, and for beneficiaries. The analysis is given by type of benefit.

The actuarial liabilities summarized in Table 6 include the actuarial present value of all future benefits expected to be paid with respect to each member covered as of the valuation date. For an active member, this value includes a measure of both benefits already earned and future benefits to be earned. Thus, for all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and, if an optional benefit is chosen, for the lives of their surviving beneficiaries.

The actuarial valuation does not recognize liabilities for employees who become members and participate in the System after the valuation date.





**Teachers' Retirement System  
State of Montana**

**Table 6**

**Actuarial Present Value of Future Benefits  
for Contributing Members, Former Contributing  
Members, and Beneficiaries**

(All amounts are actuarial present values in millions)

	<u>July 1, 2013</u> <b>Total</b>	<u>July 1, 2012</u> <b>Total</b>
<b>A. Active Members</b>		
Service Retirement	\$ 2,127.4	\$ 2,303.9
Disability Retirement	12.9	13.7
Survivors' Benefits	49.0	52.9
Vested Retirement	29.3	30.6
Refund of Member Contributions	45.5	29.5
<b>Total</b>	<b>\$ 2,264.1</b>	<b>\$ 2,430.6</b>
<b>B. Inactive Members and Annuitants</b>		
Service Retirement	\$ 2,646.2	\$ 2,710.8
Disability Retirement	20.2	21.7
Beneficiaries*	162.3	166.5
Vested Terminated Members	51.9	54.5
Refund of Member Contributions	19.2	18.2
<b>Total</b>	<b>\$ 2,899.8</b>	<b>\$ 2,971.7</b>
<b>C. Grand Total</b>	<b>\$ 5,163.9</b>	<b>\$ 5,402.3</b>

\* Includes survivors of active and retired members and children's benefits



## **Teachers' Retirement System State of Montana**

### **Section 4**

#### **Employer Contributions**

In the previous two sections, attention has been focused on the assets and the present value of all future benefits of the System. A comparison of Tables 3 and 6 indicates that there is a shortfall in current actuarial assets to meet the present value of all future benefits for current members and beneficiaries.

In an active system, there will always be a difference between the assets and the present value of all future benefits. An actuarial valuation sets a schedule of future contributions that will deal with this funding in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. For this valuation, the entry age actuarial cost method has been used. A description of the entry age actuarial cost method is provided in Appendix A. Under this method, or essentially any actuarial cost method, the contributions required to meet the difference between current assets and the present value of all future benefits are allocated each year between two elements:

A normal cost amount, which ideally is relatively stable as a percentage of salary over the years;

and an amount which is used to amortize the UAAL.

The two items described above, normal cost and UAAL, are the keys to understanding the actuarial cost method. Let us first discuss the normal cost.

The normal cost is the theoretical contribution rate, which will meet the ongoing costs of a group of average new employees. Suppose that a group of new employees were covered under a separate fund from which all benefits and to which all contributions and associated investment return were to be paid. Under the entry age actuarial cost method, the normal cost contribution rate is that level percentage of pay which would be exactly right to maintain this fund on a stable basis. If experience were to follow the actuarial assumptions exactly, the fund would be completely liquidated with the last payment to the last survivor of the group.

We have determined the normal cost rates separately by type of benefit under the System. These are summarized in Table 7. In Table 7 we also provide a summary of the member and employer statutory contributions and ARC under GASB.

The term "fully funded" is often applied to a system where contributions for everyone at the normal cost rate will fully pay for the benefits of existing as well as new employees. Often, systems are not fully funded, either because of benefit improvements in the past that have not been completely paid for or actuarial deficiencies that have occurred because experience has not been as anticipated. Under these circumstances, a UAAL exists.



Table 8 shows how the UAAL was derived for the System. Lines A and B show, respectively, the total present value of future benefits and the portion of the future liability that is expected to be paid from future normal cost contributions, both employer and employee. Line C shows the actuarial accrued liability. Line D shows the amount of assets available for benefits. Line E shows the UAAL.

The amortization of the UAAL assumes university supplemental contributions are made as a percent of pay for members of the Optional Retirement Plan (ORP) until June 30, 2033. Under Section 19-20-621, periodic separate valuations are to be performed to measure the liabilities of benefits to be paid under the Teachers' Retirement System (TRS) for Montana University System (MUS) members. The MUS valuations calculate contribution rates that finance the university member benefits with university contributions and reflect actual experience including investment returns. Therefore the university supplemental contribution rate has varied from time to time. Recently it has varied as follows:

<b>Supplemental University Contribution Rate</b>	<b>Fiscal Years Ending</b>
2.81%	June 30, 1998
3.12%	June 30, 1999
3.42%	June 30, 2000
3.73%	June 30, 2001
4.04%	June 30, 2002 to June 30, 2007
4.72%	June 30, 2008 to June 30, 2033

The value of future supplemental university contributions included in the July 1, 2013 TRS valuation is \$153.1 million based on a 4.72% contribution rate until July 1, 2033.

The UAAL at any date after establishment of a system is affected by any actuarial gains or losses arising when the actual experience of the system varies from the experience anticipated by the actuarial assumptions used in the valuations. To the extent actual experience as it develops differs from the assumptions used, so also will the actual emerging costs differ from the estimated costs. The impact of these differences in actual experience from the assumptions is included in Section 1, the Summary of Findings.



**Teachers' Retirement System  
State of Montana**

**Table 7**

**Normal Cost Contribution Rates  
As Percentages of Salary**

	<u>July 1, 2013 Total</u>	<u>July 1, 2012 Total</u>
Service retirement	7.17%	7.73%
Disability retirement	0.08%	0.08%
Survivors' benefits	0.24%	0.26%
Vested retirement	0.40%	0.43%
Refund of member contributions	<u>1.31%</u>	<u>1.15%</u>
Total Normal Rate	<u><u>9.20%</u></u>	<u><u>9.65%</u></u>
Employee Normal Rate	8.15%	7.15%
Employer Normal Rate	1.05%	2.50%



**Teachers' Retirement System  
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**Table 8**

**Unfunded Actuarial Accrued Liability  
(Dollar amounts in millions)**

	<b>July 1, 2013</b>	<b>July 1, 2012</b>
A. Actuarial present value of all future benefits for present and former members and their survivors (Table 6)	\$ 5,163.9	\$ 5,402.3
B. Less actuarial present value of total future normal costs for present members	<u>571.2</u>	<u>587.6</u>
C. Actuarial accrued liability	\$ 4,592.7	\$ 4,814.7
D. Less assets available for benefits	<u>3,067.9</u>	<u>2,852.0</u>
E. Unfunded actuarial accrued liability	\$ 1,524.8	\$ 1,962.7



## **Teachers' Retirement System State of Montana**

### **Section 5**

#### **Cash Flows**

The fundamental equation for funding a retirement system is that benefits and administrative expenses must be provided for by contributions (past and future) and investment income. When a retirement system matures, benefits and administrative expenses often exceed contributions. In this case we say the system has a “negative cash flow.” Mature systems are characterized by negative cash flows and large pools of assets. This is natural. Actuarial funding is designed to accumulate large pools of assets which will in turn provide investment income and finance negative cash flows when systems mature. If the fund is looked at as a whole, investment income is usually larger than the difference between contributions and benefit payments. The retirement system’s investment strategy should maximize potential returns at a prudent level of risk while providing for needed cash flows.

Table 9 shows the System had a positive cash flow for the year ended June 30, 2013. The System’s total cash flow including benefits payments, administrative expenses and investment earnings was \$252.9 million. Of the \$252.9 million, \$373.7 million was due to investment returns. The System is projected to have a positive cash flow in all future years.

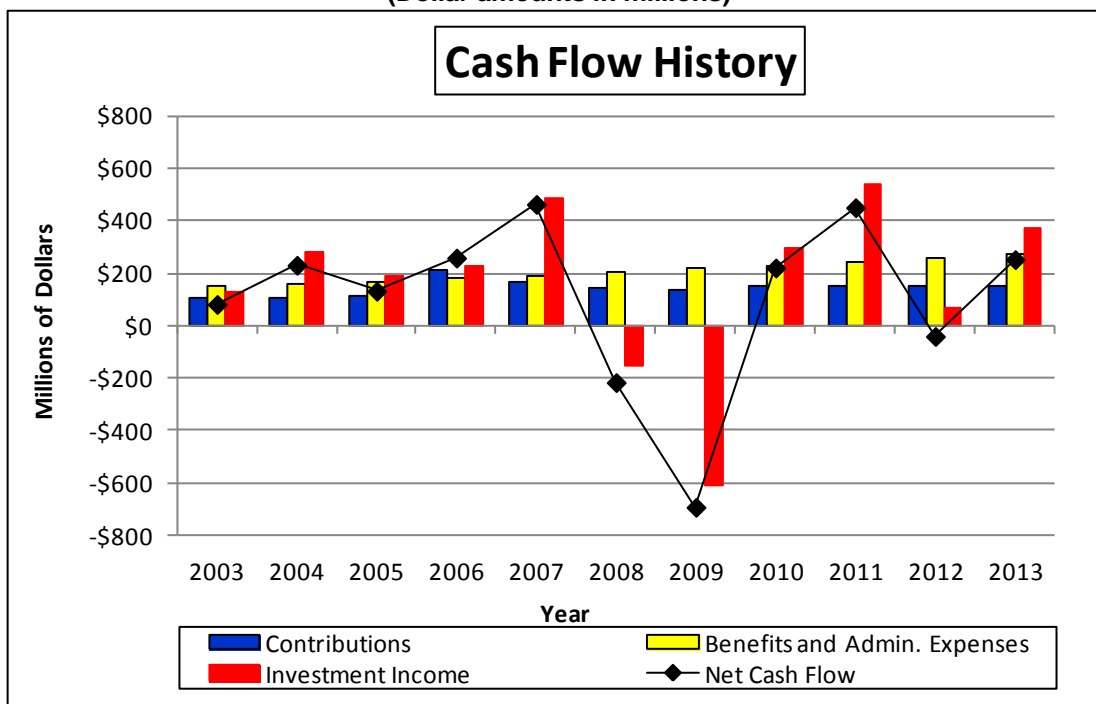
As long as the System had a positive cash flow, there was no need to plan where the funds would come from to pay benefits since benefits could be paid by incoming contributions. A negative cash flow, as defined above, requires planning what funds will be used to pay the difference between benefits and contributions. We are providing these projections to aid in developing the investment strategy for the System’s assets.



## Teachers' Retirement System State of Montana

Table 9

### Cash Flow History (Dollar amounts in millions)



<b>Historical Cash Flows</b>				
Year	Benefits &			Net Cash
Ended	Contributions	Administrative	Investment	Flow
<u>June 30</u>	<u>Expenses</u>	<u>Income</u>	<u>Flow</u>	
2003	\$ 104.3	\$ 148.6	\$ 126.2	\$ 81.9
2004	107.9	158.5	281.8	231.2
2005	110.7	167.1	188.7	132.3
2006	212.3 *	178.4	224.8	258.7
2007	169.2 **	190.4	484.5	463.3
2008	141.0	203.6	(153.3)	(215.9)
2009	138.3	217.0	(612.8)	(691.5)
2010	152.3	226.3	295.0	221.0
2011	153.3	241.4	539.0	450.9
2012	152.0	258.6	66.3	(40.2)
2013	154.5	275.4	373.7	252.9

\* Reflects \$100 million transfer to TRS

\*\* Reflects \$50 million transfer to TRS

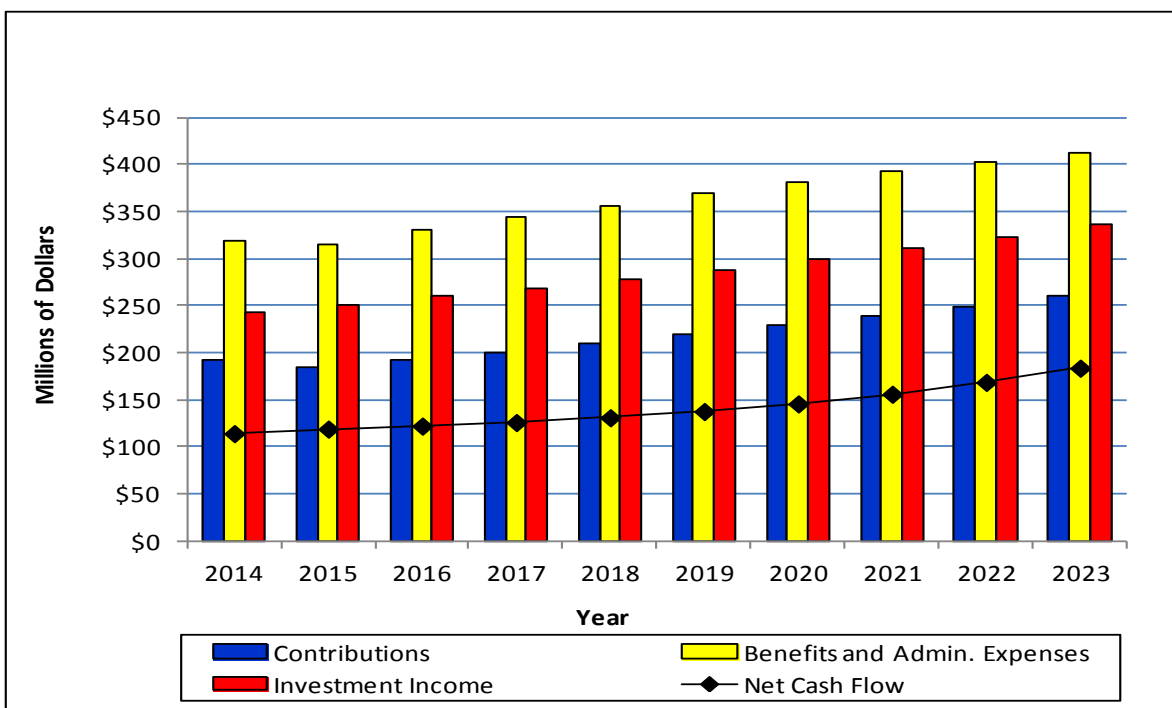




## Teachers' Retirement System State of Montana

**Table 10**

### Cash Flow Projections (Dollar amounts in millions)



<b>Projected Cash Flows</b>				
Year Ended <u>June 30</u>	<u>Contributions</u>	Benefits & Administrative <u>Expenses</u>	Assumed Investment <u>Income</u>	Net Cash <u>Flow</u>
2014	\$ 191.4	\$ 319.5	\$ 242.3	\$ 114.2
2015	184.3	315.9	250.6	119.0
2016	192.3	329.7	259.6	122.2
2017	200.7	343.5	268.8	126.0
2018	209.4	356.7	278.4	131.1
2019	218.7	369.5	288.5	137.7
2020	228.3	381.5	299.0	145.8
2021	238.5	392.7	310.3	156.1
2022	249.2	402.9	322.4	168.7
2023	260.4	412.2	335.6	183.8



**Teachers' Retirement System  
State of Montana**

**Section 6**

**Actuarial Gains or Losses**

An analysis of actuarial gains or losses is performed in conjunction with all regularly scheduled valuations.

The results of our analysis of the financial experience of the System in the three most recent regular actuarial valuations are presented in Table 11. Each gain or loss shown represents our estimate of how much the given type of experience caused the Unfunded Actuarial Accrued Liability or Funding Reserve to change in the period since the previous actuarial valuation.

Gains and losses shown due to demographic sources are approximate. Demographic experience is analyzed in greater detail in our periodic assumption studies.

Non-recurring gains and losses result from changes in the actuarial assumptions and benefit improvements.



**Teachers' Retirement System  
State of Montana**

**Table 11**

**Analysis of Actuarial Gains or Losses\***  
(Dollar amounts in millions)

	<b>UAAL (Gain)/Loss</b>		
	<b>June 30, 2013</b>	<b>June 30, 2012</b>	<b>June 30, 2011</b>
<b>Investment Income</b>			
Investment income was (greater) less than expected based on actuarial value of assets.	\$ (118.2)	\$ 128.0	\$ 229.8
<b>Pay Increases</b>			
Pay increases were (less) greater than expected.	(38.2)	(58.2)	(36.7)
<b>Age &amp; Service Retirements</b>			
Members retired at (older) younger ages or with (less) greater final average pay than expected	19.3	19.8	19.0
<b>Disability Retirements</b>			
Disability claims were (less) greater than expected	0.3	0.4	0.2
<b>Death-in-Service Benefits</b>			
Survivor claims were (less) greater than expected	(0.4)	(0.1)	(0.5)
<b>Withdrawal From Employment</b>			
(More) less reserves were released by withdrawals than expected	4.1	6.7	5.4
<b>Death After Retirement</b>			
Retirees (died younger) lived longer than expected	2.3	4.6	2.6
<b>Data Adjustments and Benefit Payment Timing</b>			
Service purchases, data corrections, etc.	(4.4)	10.2	(10.9)
<b>Other</b>			
Miscellaneous (gains) and losses	0.1	0.5	5.8
<b>Total (Gain) or Loss During Period From Financial Experience</b>	<b>\$ (135.1)</b>	<b>\$ 111.9</b>	<b>\$ 214.7</b>
<b>Non-Recurring Items.</b>			
Changes in actuarial assumptions and methods			
Changes in benefits caused a (gain) loss	(371.1)		(6.7)
<b>Composite (Gain) Loss During Period</b>	<b>\$ (506.2)</b>	<b>\$ 111.9</b>	<b>\$ 208.0</b>

\* Effects related to gains are shown in parentheses. Numerical results are expressed as a (decrease) increase in the Unfunded Actuarial Accrued Liability (UAAL). Gains decrease the UAAL and losses increase the UAAL.



## **Teachers' Retirement System State of Montana**

### **Appendix A**

#### **Actuarial Procedures and Assumptions**

Retirement, disablement and termination of employment assumptions reflect the five-year experience study for the period ending 2009 adopted by the Board on May 13, 2010.

The current asset valuation method was adopted for the July 1, 2007 valuation.

Tables A-3 through A-6 give rates of decrement for service retirement, disablement, mortality, and other terminations of employment.

#### **Actuarial Cost Method**

The actuarial valuation was prepared using the entry age actuarial cost method. Under this method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit. The portion of this actuarial present value allocated to a valuation year is called the normal cost. The normal cost was first calculated for each individual member. The normal cost rate is defined to equal the total of the individual normal costs, divided by the total pay rate.

The portion of this actuarial present value not provided for at a valuation date by the sum of (a) the actuarial value of the assets and (b) the actuarial present value of future normal costs is called the UAAL. The UAAL is amortized as a level percentage of the projected salaries of present and future members of the System.

#### **Records and Data**

The data used in the valuation consist of financial information; records of age, sex, service, salary, contribution rates, and account balances of contributing members; and records of age, sex, and amount of benefit for retired members and beneficiaries. All of the data were supplied by the System and are accepted for valuation purposes without audit.



### **Replacement of Terminated Members**

The ages at entry and distribution by sex of future members are assumed to average the same as those of the present members they replace. If the number of active members should increase, it is further assumed that the average entry age of the larger group will be the same, from an actuarial standpoint, as that of the present group. Under these assumptions, the normal cost rates for active members will not vary with the termination of present members.

### **Employer Contributions**

At the time of this valuation, the total employer contribution rate for normal costs and amortization of the UAAL was 10.96% of members' salaries. The employer contribution rate will increase by 0.10% each year beginning July 1, 2014 until the total employer contribution rate equals 11.96%.

### **Administrative and Investment Expenses**

The administrative and investment expenses of the System are assumed to be funded by investment earnings in excess of 7.75% per year.

### **Valuation of Assets - Actuarial Basis**

The actuarial asset valuation method spreads asset gains and losses over four years. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of four years. The gains and losses are measured starting with the year ended June 30, 2007. The actuarial value of assets is not allowed to be greater than 120% or less than 80% of the market assets. (Adopted effective July 1, 2007.)

### **Investment Earnings**

The annual rate of investment earnings of the assets of the System is assumed to be 7.75% per year, compounded annually. (Adopted effective July 1, 2004)

### **Interest on Member Contributions**

Interest on member contributions is assumed to accrue at a rate of 5% per annum, compounded annually. This assumption was set as of July 1, 2004.

### **Postretirement Benefit Increases**

On January 1 of each year, the retirement allowance payable is increased by 0.5% if the retiree has received benefits for at least 36 months prior to January 1 of the year in which the adjustment is to be made.



### **Future Salaries**

The rates of annual salary increase assumed for the purpose of the valuation are illustrated in Table A-2. In addition to increases in salary due to merit and longevity, this scale includes an assumed 4.5% annual rate of increase in the general wage level of the membership. The merit and longevity increases for the MUS members did not show a pattern of increasing or decreasing with service at the time of our most recent study. Therefore, the MUS members have a flat 1% merit and longevity assumption. The general wage increase assumption was adopted July 1, 2004 and the merit and longevity scales were adopted July 1, 2002.

Montana University System (MUS) members are assumed to have a 0.63% higher average final compensation to account for the larger than average annual compensation increases observed in the years immediately preceding retirement.

### **Service Retirement**

Table A-3 shows the annual assumed rates of retirement among members eligible for service retirement. Separate rates are used when a member is eligible for reduced benefits, for the first year a member is eligible for full benefits, and for the years following the first year a member is eligible for full benefits. The rates for General Members were adopted May 13, 2010. The rates for University Members were adopted May 13, 2010.

### **Disablement**

The rates of disablement used in this valuation are illustrated in Table A-4. These rates were adopted May 13, 2010.

### **Mortality**

The mortality rates used in this valuation are illustrated in Table A-5. A written description of each table used is included in Table A-1. These rates were adopted July 1, 2006.

### **Other Terminations of Employment**

The rates of assumed future withdrawal from active service for reasons other than death, disability or retirement are shown for representative ages in Table A-6. These rates were adopted May 13, 2010.

### **Benefits for Terminating Members**

Members terminating with less than five years of service are assumed to request an immediate withdrawal of their contributions with interest. Table A-7 shows the assumed probability of retaining membership in the System among members terminating with five or more years of service. These rates were adopted July 1, 2002.

We estimated the present value of future benefits for terminated vested members based on the greater of the present value of their deferred benefit at age 60 or their available contribution account.



### **Part-Time Employees**

The valuation data for active members identify part-time members. Part-time members earning less than \$1,000 during the last year were valued at their current member contribution balance.

### **Optional Retirement Program**

ORP payroll as of June 30, 2013 was \$198,324,794.

Effective for fiscal years after June 30, 2007 until June 30, 2033, the Optional Retirement Program contribution rate is 4.72%, pursuant to MCA 19-20-621.

### **Buybacks, Purchase of Service, and Military Service**

The active liabilities and normal cost (excluding liabilities and normal cost in respect of Return of Employee Contributions) were increased to 100.5% of their original value to fund this additional service based on a study of the System's experience for the five calendar years 1995 through 1999. Effective July 1, 2008.

### **Probability of Marriage**

If death occurs in active status, all members are assumed to have an eligible surviving spouse and two children. The spouse is assumed to be the same age as the member.

### **Records with no Birth Date**

New records with no birth date are assumed to be 25 years old. Records that are not new and have no birth date used the same birth date as the prior year's valuation.





## Teachers' Retirement System State of Montana

### Table A-1

### Summary of Valuation Assumptions

I. Economic assumptions		
A.	General wage increases* (Adopted July 1, 2004)	4.50%
B.	Investment return (Adopted July 1, 2004)	7.75%
C.	Price Inflation Assumption (Adopted July 1, 2004)	3.50%
D.	Growth in membership	0.00%
E.	Postretirement benefit increases (Starting three years after retirement)	0.50%
F.	Interest on member accounts (Adopted July 1, 2004)	5.00%
II. Demographic assumptions		
A.	Individual salary increase due to promotion and longevity (General Member assumptions adopted July 1, 2002) (University Member assumptions adopted July 1, 2000)	Table A-2
B.	Retirement (adopted May 13, 2010)	Table A-3
C.	Disablement (adopted May 13, 2010)	Table A-4
D.	Mortality among contributing members, service retired members, and beneficiaries  For Males: RP 2000 Combined Mortality Table for Males, set back three years, with mortality improvements projected by Scale AA to 2008 (adopted July 1, 2006).  For Females: RP 2000 Combined Mortality Table for Females, set back two years, with mortality improvements projected by Scale AA to 2008 (adopted July 1, 2006).	Table A-5
E.	Mortality among disabled members  For Males: RP 2000 Disabled Mortality Table for Males, set back three years, with mortality improvements projected by Scale AA to 2008 (adopted July 1, 2006).  For Females: RP 2000 Disabled Mortality Table for Females, set forward three years, with mortality improvements projected by Scale AA to 2008 (adopted July 1, 2006).	Table A-5
F.	Other terminations of employment (adopted May 13, 2010)	Table A-6
G.	Probability of retaining membership in the System upon vested termination (adopted July 1, 2002)	Table A-7

\* Montana University System (MUS) members are assumed to have a 0.63% higher average final compensation to account for the larger than average annual compensation increases observed in the years immediately preceding retirement.



**Teachers' Retirement System  
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**Table A-2**

**Future Salaries**

Years of Service	General Members			University Members		
	Individual Merit & Longevity	General Wage Increase	Total Salary Increase	Individual Merit & Longevity	General Wage Increase	Total Salary Increase
1	4.51%	4.50%	9.01%	1.00%	4.50%	5.50%
2	4.09	4.50	8.59	1.00	4.50	5.50
3	3.46	4.50	7.96	1.00	4.50	5.50
4	2.94	4.50	7.44	1.00	4.50	5.50
5	2.52	4.50	7.02	1.00	4.50	5.50
6	2.21	4.50	6.71	1.00	4.50	5.50
7	1.89	4.50	6.39	1.00	4.50	5.50
8	1.68	4.50	6.18	1.00	4.50	5.50
9	1.47	4.50	5.97	1.00	4.50	5.50
10	1.31	4.50	5.81	1.00	4.50	5.50
11	1.16	4.50	5.66	1.00	4.50	5.50
12	1.00	4.50	5.50	1.00	4.50	5.50
13	0.84	4.50	5.34	1.00	4.50	5.50
14	0.68	4.50	5.18	1.00	4.50	5.50
15	0.58	4.50	5.08	1.00	4.50	5.50
16	0.47	4.50	4.97	1.00	4.50	5.50
17	0.37	4.50	4.87	1.00	4.50	5.50
18	0.26	4.50	4.76	1.00	4.50	5.50
19	0.21	4.50	4.71	1.00	4.50	5.50
20	0.16	4.50	4.66	1.00	4.50	5.50
21	0.11	4.50	4.61	1.00	4.50	5.50
22 & Up	0.00	4.50	4.50	1.00	4.50	5.50



**Teachers' Retirement System  
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**Table A-3**

**Retirement  
Annual Rates**

Age	General Members			University Members		
	Eligible for Reduced Benefits	First Year Eligible for Full Benefits	Thereafter	Eligible for Reduced Benefits	First Year Eligible for Full Benefits	Thereafter
45		8.0%	5.5%		17.0%	8.0%
46		8.0	5.5		17.0	8.0
47		8.0	5.5		17.0	8.0
48		8.0	5.5		17.0	8.0
49	*	8.0	5.5	*	17.0	8.0
50	5.0%	8.0	5.5	7.0%	17.0	8.0
51	5.0	8.0	6.3	7.0	17.0	8.0
52	5.0	8.0	8.0	7.0	17.0	8.0
53	5.0	9.0	7.3	7.0	17.0	8.0
54	5.0	9.0	8.2	7.0	17.0	8.0
55	7.0	9.0	9.8	7.0	15.0	8.0
56	7.0	12.0	11.3	7.0	15.0	8.0
57	7.0	11.8	12.5	7.0	15.0	8.0
58	7.0	14.8	13.1	7.0	15.0	8.0
59	7.0	17.4	14.8	7.0	15.0	8.0
60	*	14.6	17.0	*	15.0	8.5
61		21.3	25.0		14.0	14.5
62		23.8	25.0		20.0	19.0
63		11.4	25.0		14.0	14.5
64		19.0	25.0		20.0	18.0
65		40.0	35.0		28.0	26.0
66		8.0	20.0		21.0	21.0
67		30.0	20.0		21.0	24.5
68		6.0	20.0		21.0	19.5
69		6.0	20.0		21.0	30.0
70		**	**		**	**

\* All benefits are unreduced after attaining age 60. Reduced benefits are not available before age 50.

\*\* Immediate retirement is assumed at age 70 or over.



**Teachers' Retirement System  
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**Table A-4**

**Disablement  
Annual Rates**

Age	All Members
25	.005%
30	.005
35	.008
40	.028
45	.044
50	.063
55	.084
60	.100



**Teachers' Retirement System  
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**Table A-5**

**Mortality  
Annual Rates**

Age	Contributing Members, Service Retired Members and Beneficiaries		Disabled Members	
	Men	Women	Men	Women
25	.03%	.02%	1.97%	.68%
30	.04	.02	2.17	.69
35	.05	.04	2.17	.67
40	.09	.05	2.17	.66
45	.11	.08	2.08	.85
50	.15	.12	2.23	1.31
55	.23	.20	2.69	1.89
60	.41	.38	3.32	2.43
65	.78	.73	3.99	3.19
70	1.45	1.29	4.90	4.33
75	2.42	2.17	6.15	6.01
80	4.22	3.55	8.30	8.30
85	7.55	5.91	11.43	11.86



**Teachers' Retirement System  
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**Table A-6**

**Other Terminations of Employment  
Among Members Not Eligible to Retire  
Annual Rates**

<u>Years of Service</u>	<u>All Members</u>
1	36.5%
2	20.5
3	14.6
4	10.5
5	8.5
6	7.0
7	6.4
8	5.8
9	5.4
10	5.0
11	4.3
12	3.9
13	3.5
14	3.2
15	2.9
16	2.6
17	2.3
18	2.0
19	1.9
20	1.8
21	1.7
22	1.6
23	1.5
24	1.5



**Teachers' Retirement System  
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**Table A-7**

**Probability of Retaining Membership in the System  
Upon Vested Termination**

<u>Age</u>	<u>Probability of Retaining Membership</u>
25	54%
30	54
35	58
40	58
45	60
50	70
55	75



**Teachers' Retirement System  
State of Montana**

**Appendix B**

**Summary of Benefit Provisions**

**Effective Date**

September 1, 1937.

**Vesting Period**

Five years. No benefits are payable unless the member has a vested right, except the return of employee contributions with interest.

**Tier One Member**

A person who became a member before July 1, 2013 and who has not withdrawn the member's account balance.

**Tier Two Member**

A person who became a member on or after July 1, 2013, or who after withdrawing the member's account balance, became a member again after July 1, 2013.

**Final Compensation**

Tier One Members

Average of highest three consecutive years of earned compensation.

Tier Two Members

Average of highest five consecutive years of earned compensation.

**Normal Form of Benefits**

Life only annuity. All benefits cease upon death; however, in no event will the member receive less than the amount of employee contributions with interest.





## Normal Retirement Benefits

### Tier One Members

Eligibility: 25 years of service or age 60 with five years of service.

Benefit: The retirement benefit is equal to 1/60 of final compensation for each year of service.

### Tier Two Members

Eligibility: Age 55 with 30 years of service or age 60 with five years of service.

Benefit: A member age 60 with at least 30 years of creditable service will receive a retirement allowance equal to 185/100 of final compensation for each year of service. Otherwise, the multiplier used to calculate the retirement allowance will equal 1/60 of final compensation for each year of service.

## Early Retirement Benefits

### Tier One Member

Eligibility: Five years of service and age 50.

Benefit: The retirement benefit is calculated in the same manner as described for normal retirement, but the benefit is actuarially reduced by the lesser of the number of years equal to the age of the participant at the early retirement subtracted from age 60 or the number of years of service at early retirement subtracted from 25 years of service.

### Tier Two Member

Eligibility: Five years of service and age 55.

Benefit: The retirement benefit is calculated in the same manner as described for normal retirement, but the benefit is actuarially reduced by the lesser of the number of years equal to the age of the participant at the early retirement subtracted from age 60 or the number of years of service at early retirement subtracted from 30 years of service.



#### Death Benefit

Eligibility: Five years of service.

Benefit: The death benefit is equal to 1/60 of final compensation for each year of service accrued at date of death, with an actuarial adjustment based on the relation of the member's age at death to the beneficiary's age. A monthly benefit of \$200 is paid to each child until age 18. In addition, a lump-sum benefit of \$500 is paid upon the death of an active or retired member.

#### Disability Benefit

Eligibility: Five years of service.

Benefit: The disability benefit is equal to 1/60 of final compensation for each year of service accrued at date of disability. The minimum benefit is 1/4 of the final compensation. A Tier Two Member is not eligible for a disability retirement if the member is or will be eligible for a service retirement on or before the member's date of determination.

#### Withdrawal Benefits

With less than five years of service, the accumulated employee contributions with interest are returned. With more than five years, the member may elect a refund of contributions with interest or leave the contributions and interest in the System and retain a vested right to retirement benefits.

#### Contributions

Tier One Member: 7.15% of compensation. Tier One members are required to contribute a Supplemental Contribution equal to an additional 1% of compensation. The Board may decrease the Supplemental Contribution if the average funded ratio of the System based on the last three actuarial valuations is equal to or greater than 90% and the period necessary to amortize the unfunded liabilities of the System based on the most recent actuarial valuation is less than 15 years. Following one or more decreases in the supplemental contribution the Board may increase the supplemental contribution to a rate not to exceed 1% if the average funded ratio of the System based on the last three annual actuarial valuations is equal to or less than 80% and the period necessary to amortize all liabilities of the System based on the most recent annual actuarial valuation is greater than 20 years.

Tier Two Member: 8.15% of compensation. The Board may require a Tier Two member to contribute a Supplemental Contribution if the average funded ratio of the System based



on the last three actuarial valuations is equal to or less than 80% and the period necessary to amortize the unfunded actuarial accrued liability is greater than 20 years and a State or employer contribution rate increase or a flat dollar contribution to the System has been enacted which is equivalent to or greater than the Supplemental Contribution Rate imposed by the Board. A single Tier Two Supplemental Contribution Rate increase cannot exceed 0.5% of compensation and in total cannot exceed 9.15% of compensation. The Board may decrease the Supplemental Contribution if the average funded ratio of the System based on the previous three annual actuarial valuations is equal to or greater than 90%; and the period necessary to amortize the unfunded actuarial accrued liability is less than 15 years.

Employer: 9.96% of compensation. Employers are required to contribute a supplemental contribution equal to 1% for fiscal year 2014 and increase by 0.1% each fiscal year through 2024. The Board may decrease the Employer Supplemental Contribution if the average funded ratio of the System based on the last three actuarial valuations is equal to or greater than 90% and the period necessary to amortize the unfunded actuarial accrued liability based on the most recent valuation is less than 15 years and the GABA has been increased to the maximum allowable. Following one or more decreases in the Supplemental Contribution Rate the Board may increase the Supplemental Contribution Rate to a rate not to exceed 1% if the average funded ratio of the System based on the last three actuarial valuations is equal to or less than 80% and the period necessary to amortize the unfunded actuarial accrued liability is greater than 20 years.

MCA 19-20-604 specifies that the employer contribution rate will be reduced by 0.11% when the amortization period of the System's UAAL is 10 years or less according to the System's latest actuarial valuation.

State Supplemental Contribution: \$25 million per year on an annual basis

Re-employed Retirees: Employers are required to contribute 9.85% of total compensation paid to re-employed retirees who are hired in a TRS covered position.

Interest on Member contributions

Effective July 1, 2010, the interest credited on member contributions is reduced from 1.0% to 0.25% per annum.



**Cost-of-Living Adjustments**

On January 1 of each year, if the retiree has received benefits for at least 36 months prior to January 1 of the year in which the adjustment is to be made, for Tier One Members, the retirement allowance will be increased by 0.5% if the funded ratio of the System is less than 90%. If the most recent actuarial valuation shows that the System is at least 90% funded and the provisions of the increase is not projected to cause the System's liabilities to be less than 85% funded, the increase can be an amount greater than 0.5% and no more than 1.5%, as set by the Board.

For Tier Two Members, the retirement allowance will be increased by an amount equal to or greater than 0.5% but no more than 1.5% if the most recent actuarial valuation shows the System to be at least 90% funded and the provisions of the increase is not projected to cause the funded to be less than 85%.



**Teachers' Retirement System  
State of Montana**

**Appendix C**

**Valuation Data**

This valuation is based upon the membership of the System as of July 1, 2013. Membership data were supplied by the System and accepted for valuation purposes without audit. However, tests were performed to ensure that the data are sufficiently accurate for valuation purposes.

<u>Active Members</u>	<u>Number</u>	<u>Annual Salaries in Millions</u>
Full-Time Members	12,229	\$ 628.8
Part-Time Members*	<u>5,387</u>	<u>73.4</u>
Total Contributing Members*	17,616	\$ 702.2
Active Members with Annual Compensation less than \$1,000	633	
Total Active Members	18,249	

\* Excludes part-time members with annual compensation less than \$1,000.

Table C-1 contains summaries of the data for contributing members. For full-time members, values shown in the tables are the numbers of members and their total and average annual salaries. For part-time members, only the numbers of members are shown.

Table C-2 presents distributions of the following:

- Members receiving service retirement benefits.
- Members receiving disability retirement benefits.
- Survivors of deceased retired members receiving benefits.
- Survivors of deceased active members.
- Child beneficiaries.
- Terminated vested members.

Table C-3 is a reconciliation of membership data from July 1, 2012 to July 1, 2013.



The following is a summary of retired members and beneficiaries currently receiving benefits:

<u>Type of Annuitant</u>	<u>Number</u>	<u>Annual Benefits in Thousands</u>	<u>Average Annual Benefits</u>
Service Retirement	12,138	\$ 262,848	\$ 21,655
Survivors of Deceased Retired Members	<u>1,068</u>	<u>14,871</u>	<u>13,924</u>
Total Service Retirement (including survivors)	13,206	\$ 277,719	\$ 21,030
Disability Retirement	203	2,201	10,840
Survivors of Deceased Active Members	429	4,342	10,121
Child Beneficiaries	<u>30</u>	<u>72</u>	<u>2,400</u>
Total Annuitants	13,868	\$ 284,333	\$ 20,503

<u>Terminated Members with Contributions Not Withdrawn</u>	<u>Number</u>
Vested Terminated Members	1,566
Non-Vested Terminated Members	<u>11,710</u>
Total Terminated Members	13,276



**Teachers' Retirement System  
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**Table C-1**

**Active Members Distribution of  
Full-Time Employees and Salaries  
as of July 1, 2013**

**Number of Employees**

Age	Completed Years of Service												Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+		
<25	16	139	40	3										198
25 to 29	44	268	206	361	225	1								1,105
30 to 34	13	126	85	258	786	136								1,404
35 to 39	11	70	66	161	484	581	110							1,483
40 to 44	14	65	47	99	351	386	541	118						1,621
45 to 49	8	47	38	67	234	273	329	495	97					1,588
50 to 54	5	39	24	45	223	228	260	373	385	134				1,716
55 to 59	5	31	26	35	131	211	226	294	324	360	92			1,735
60 to 64	2	14	16	16	65	112	119	181	161	173	177	34		1,070
65 to 69	2	6	1	5	12	20	38	39	38	32	24	42		259
70 and up				2	5	5	2	6	6	1	6	17		50
Totals	120	805	549	1,052	2,516	1,953	1,625	1,506	1,011	700	299	93		12,229



**Teachers' Retirement System  
State of Montana**

**Table C-1**

**Active Members Distribution of  
Full-Time Employees and Salaries  
as of July 1, 2013**

**Annual Salaries in Thousands**

Age	<u>Completed Years of Service</u>												Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+		
<25	450	4,312	1,292	98										6,151
25 to 29	1,109	8,833	7,007	12,865	8,829	30								38,672
30 to 34	368	4,461	3,161	9,983	33,907	6,535								58,415
35 to 39	310	2,613	2,613	6,640	22,180	29,934	6,357							70,648
40 to 44	440	2,624	1,840	4,075	16,320	20,261	31,664	7,031						84,256
45 to 49	180	1,904	1,596	2,946	10,520	14,111	18,973	30,814	6,034					87,078
50 to 54	218	1,753	997	2,121	10,108	11,875	14,544	22,996	23,793	8,303				96,710
55 to 59	154	1,268	1,125	1,634	6,091	10,960	12,661	18,052	20,249	23,121	6,055			101,370
60 to 64	50	808	722	821	3,160	5,847	6,815	10,543	10,343	11,278	11,982	2,209		64,577
65 to 69	117	274	76	258	757	1,094	2,153	2,420	2,493	2,316	2,276	3,188		17,423
70 and up				164	276	269	99	329	423	109	474	1,389		3,531
Totals	3,396	28,851	20,430	41,605	112,149	100,916	93,266	92,185	63,334	45,127	20,787	6,786		628,832





**Teachers' Retirement System  
State of Montana**

**Table C-1**

**Active Members Distribution of  
Full-Time Employees and Salaries  
as of July 1, 2013**

**Average Annual Salary**

Age	Completed Years of Service												Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+		
<25	28,116	31,019	32,308	32,512										31,067
25 to 29	25,197	32,958	34,015	35,636	39,240	29,989								34,997
30 to 34	28,331	35,402	37,191	38,694	43,138	48,053								41,606
35 to 39	28,207	37,332	39,590	41,243	45,827	51,522	57,789							47,639
40 to 44	31,445	40,370	39,147	41,165	46,495	52,490	58,529	59,588						51,978
45 to 49	22,445	40,518	41,999	43,966	44,959	51,687	57,669	62,251	62,205					54,835
50 to 54	43,697	44,961	41,548	47,138	45,329	52,085	55,939	61,652	61,800	61,960				56,358
55 to 59	30,749	40,918	43,275	46,679	46,496	51,942	56,024	61,401	62,497	64,226	65,815			58,427
60 to 64	24,978	57,715	45,123	51,326	48,619	52,208	57,265	58,246	64,241	65,189	67,692	64,972		60,352
65 to 69	58,685	45,700	75,844	51,625	63,094	54,695	56,668	62,049	65,612	72,370	94,838	75,910		67,271
70 and up				82,118	55,184	53,736	49,344	54,840	70,435	108,997	79,022	81,693		70,622
Totals	28,304	35,840	37,212	39,548	44,574	51,672	57,395	61,212	62,645	64,466	69,521	72,968		51,421



**Teachers' Retirement System  
State of Montana**

**Table C-1**

**Active Members Distribution of  
Part-Time Employees  
as of July 1, 2013**

**Number of Employees**

Age	<u>Completed Years of Service</u>												Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+		
<25	147	76	13	9	3	1								249
25 to 29	221	157	75	59	48	8	3							571
30 to 34	95	99	61	56	79	34	9	5	3	2				443
35 to 39	101	111	64	68	84	49	20	11	7	2			2	519
40 to 44	101	86	66	113	147	60	28	14	6	2	2		6	631
45 to 49	56	43	58	76	187	103	47	16	6	10	3		7	612
50 to 54	53	64	59	97	178	159	73	40	17	4	6		7	757
55 to 59	49	60	41	68	175	141	101	60	16	15	6		17	749
60 to 64	37	43	19	60	106	97	82	56	21	17	2		8	548
65 to 69	14	17	15	27	55	32	20	15	7	5	3		2	212
70 and up	6	7	6	13	22	20	15	2	3	1			1	96
Totals	880	763	477	646	1,084	704	398	219	86	58	22		50	5,387



**Teachers' Retirement System  
State of Montana**

**Table C-2**

**Distribution of Inactive Lives**

**Members Receiving Service Retirement Benefits as of July 1, 2013**

<u>Age</u>	<u>Number of Persons</u>	<u>Annual Benefits in Thousands</u>	<u>Average Annual Benefits</u>
<50	14	\$ 371	\$ 26,502
50 to 54	200	4,746	23,729
55 to 59	769	18,650	24,253
60 to 64	2,552	59,413	23,281
65 to 69	3,099	72,205	23,299
70 to 74	2,217	49,382	22,274
75 to 79	1,413	29,055	20,563
80 to 84	969	17,542	18,103
85 to 89	527	7,452	14,141
90 and up	378	4,030	10,663
Totals	12,138	\$ 262,848	\$ 21,655

**Members Receiving Disability Retirement Benefits as of July 1, 2013**

<u>Age</u>	<u>Number of Persons</u>	<u>Annual Benefits in Thousands</u>	<u>Average Annual Benefits</u>
<50	13	\$ 167	\$ 12,876
50 to 54	11	141	12,845
55 to 59	28	314	11,217
60 to 64	48	555	11,569
65 to 69	43	448	10,418
70 to 74	24	236	9,821
75 to 79	16	162	10,094
80 to 84	11	103	9,388
85 to 89	5	38	7,564
90 and up	4	36	9,033
Totals	203	\$ 2,201	\$ 10,840



**Teachers' Retirement System  
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**Table C-2**

**Distribution of Inactive Lives**

**Survivors of Deceased Retired Members as of July 1, 2013**

<u>Age</u>	<u>Number of Persons</u>	<u>Annual Benefits in Thousands</u>	<u>Average Annual Benefits</u>
<50	48	\$ 437	\$ 9,096
50 to 54	18	162	9,019
55 to 59	47	568	12,091
60 to 64	76	959	12,622
65 to 69	137	2,147	15,675
70 to 74	163	2,808	17,224
75 to 79	169	2,678	15,845
80 to 84	158	2,190	13,861
85 to 89	151	1,868	12,373
90 and up	101	1,053	10,428
Totals	1,068	\$ 14,871	\$ 13,924

**Survivors of Deceased Active Members as of July 1, 2013**

<u>Age</u>	<u>Number of Persons</u>	<u>Annual Benefits in Thousands</u>	<u>Average Annual Benefits</u>
<50	76	\$ 555	\$ 7,306
50 to 54	33	197	5,966
55 to 59	49	496	10,113
60 to 64	61	783	12,839
65 to 69	67	721	10,757
70 to 74	44	608	13,818
75 to 79	31	287	9,274
80 to 84	35	408	11,650
85 to 89	18	204	11,342
90 and up	15	83	5,545
Totals	429	\$ 4,342	\$ 10,121



**Teachers' Retirement System  
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**Table C-2**

**Distribution of Inactive Lives**

**Terminated Vested Members as of July 1, 2013  
Number of Persons**

<u>Age</u>	<u>Number</u>
<25	
25 to 29	7
30 to 34	95
35 to 39	152
40 to 44	191
45 to 49	238
50 to 54	320
55 to 59	379
60 to 64	159
65 to 69	24
70 and above	<u>1</u>
Total	1,566

**Child Beneficiaries as of July 1, 2013  
Number of Persons**

<u>Age</u>	<u>Number</u>
<5	2
5 to 6	-
7 to 8	1
9 to 10	3
11 to 12	4
13 to 14	7
15 to 16	11
17 to 18	<u>2</u>
Total	30



**Teachers' Retirement System  
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**Table C-3**

**Data Reconciliation**

	<u>Active Contributing Members*</u>	<u>Terminated Vested Members</u>	<u>Service Retired Members</u>	<u>Disabled Members</u>	<u>Survivors and Beneficiaries</u>
<b>July 1, 2012 Valuation</b>	17,736	1,566	11,675	203	1,485
Refunds and Non-Vested Terminations	(1,089)	(76)			
Change to Annual Pay Under \$1,000	13	8			
Vested Terminations	(239)	239	95	1	
Service Retirements	(636)	(95)	636		
Disability Retirements	(7)	(1)		7	
Deaths with Beneficiary	(11)	(2)	(80)	(4)	97
Deaths without Beneficiary			(185)	(4)	(56)
New Entrants	1,451				
Rehires	390	(64)	(5)		
Other	8	(9)	2		2
<b>July 1, 2013 Valuation</b>	17,616	1,566	12,138	203	1,528

\* Excludes active members with annual compensation less than \$1,000



**Teachers' Retirement System  
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**Appendix D**

**Comparative Schedules**

This section contains tables that summarize the experience of the System shown in present and past valuation reports.

Table D-1 shows a summary of the active members covered as of the various valuation dates.

Table D-2 shows a summary of the retired and inactive members as of the various valuation dates.

Table D-3 summarizes the contribution rates determined by each annual actuarial valuation.



**Teachers' Retirement System  
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**Table D-1**

**Active Membership Data**

Valuation Date (July 1)	Full-Time Members	Part-Time Members**	Total Contributing Members**	Part-Time Members Annual Compensation less than \$1,000	Annual Full-Time Salaries in Thousands	Average Full-Time Annual Salary	Average Age**	Average Years of Service**	Average Hire Age**
1987	13,105	1,955	15,060	*	\$340,481	\$25,981	*	*	*
1989	12,546	2,541	15,087	*	339,866	27,090	*	*	*
1992	13,502	3,141	16,643	*	401,092	29,706	42.4	11.6	30.8
1994	14,938	2,637	17,575	377	416,968	27,914	42.5	11.0	31.5
1996	13,251	5,444	18,695	1,295	424,085	32,004	43.3	11.6	31.7
1998	13,545	4,647	18,192	776	459,191	33,901	44.0	12.1	31.9
2000	13,289	4,245	17,534	886	477,160	35,906	44.5	12.2	32.3
2002	12,796	4,650	17,446	723	486,204	37,997	45.0	12.2	32.8
2004	12,601	5,013	17,614	637	510,808	40,537	45.6	12.2	33.4
2005	12,523	5,019	17,542	697	523,909	41,836	45.8	12.4	33.4
2006	12,715	4,840	17,555	544	549,268	43,198	46.0	12.5	33.5
2007	12,634	4,994	17,628	548	568,351	44,986	46.2	12.5	33.7
2008	12,694	5,077	17,771	521	592,514	46,677	46.1	12.3	33.8
2009	12,673	5,270	17,943	513	613,077	48,377	46.2	12.4	33.8
2010	12,711	5,642	18,353	600	630,444	49,598	45.9	12.2	33.8
2011	12,506	5,400	17,906	578	633,005	50,616	46.2	12.4	33.8
2012	12,202	5,534	17,736	636	622,140	50,987	46.0	12.4	33.6
2013	12,229	5,387	17,616	633	628,832	51,421	45.8	12.2	33.6

\* Not available.

\*\* Excludes part-time active members with annual compensation less than \$1,000.





**Teachers' Retirement System  
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**Table D-2**

**Retired and Inactive Membership Data**

Valuation Date (July 1)	Number	All Annuitants					Terminated Members	
		Annual Benefits in Thousands	Average Annual Benefit	Average Current Age	Average Age at Retirement	Average Service at Retirement	Number Vested Terminated	Number Non-Vested Terminated
1987	6,036	\$ 43,236	\$ 7,163	*	*	*	*	*
1989	6,330	49,546	7,827	*	*	*	*	*
1992	6,927	63,483	9,165	*	*	*	*	*
1994	7,530	78,183	10,383	*	*	*	1,105	5,722
1996	7,896	87,351	11,063	*	*	*	1,152	6,479
1998	8,362	99,040	11,844	69.6	57.3	*	1,190	8,158
2000	9,021	117,227	12,995	69.3	57.0	*	1,256	9,308
2002	9,768	139,131	14,244	69.1	56.8	*	1,485	8,231
2004	10,375	159,776	15,400	69.1	56.7	*	1,620	7,861
2005	10,664	170,129	15,954	69.3	56.7	*	1,649	8,569
2006	11,019	181,114	16,436	69.3	56.5	*	1,684	8,542
2007	11,356	195,237	17,192	69.3	56.6	*	1,671	8,963
2008	11,788	208,985	17,729	69.4	56.7	*	1,649	9,574
2009	12,036	219,267	18,218	69.7	57.5	25.5	1,640	9,868
2010	12,440	234,048	18,814	69.9	57.6	25.5	1,553	10,304
2011	12,899	250,500	19,420	70.0	57.8	25.5	1,580	10,727
2012	13,363	267,851	20,044	70.2	57.9	25.5	1,566	11,172
2013	13,868	284,333	20,503	70.4	58.0	25.5	1,566	11,710

\* Not available.



**Teachers' Retirement System  
State of Montana**

**Table D-3**

**Contribution Rates**

Valuation Date (July 1)	Contribution Rates			Normal Cost Rate	UAAL Rate*
	Employee	Employer	Total		
1992	7.044%	7.459%	14.503%	9.876%	4.627%
1994	7.044	7.470	14.514	9.494	5.020
1996	7.044	7.470	14.514	9.328	5.186
1998	7.044	7.470	14.514	8.880	5.634
2000	7.15	7.58**	14.73	9.71	5.02
2002	7.15	7.58	14.73	10.33	4.40
2004	7.15	7.58	14.73	10.34	4.39
2005	7.15	7.58	14.73	10.35	4.38
2006	7.15	7.58	14.73	10.37	4.36
2007	7.15	9.58	16.73	10.40	6.33
2008	7.15	9.58	16.73	10.87	5.86
2009	7.15	9.96	17.11	10.69	6.42
2010	7.15	9.96	17.11	9.74	7.37
2011	7.15	9.96	17.11	9.64	7.47
2012	7.15	9.96	17.11	9.64	7.47
2013	8.15^	10.96^	19.11^	9.20	9.91

\* The UAAL rate is the amount available to amortize the UAAL. It is equal to the total contribution rate, minus the normal cost rate.

\*\* The 1999 Legislation which passed the 1.5% GABA, also added a 0.11% state general fund contribution.

^ HB 377 Legislation increased the employee and employer contribution rates each by 1%.



## **Teachers' Retirement System State of Montana**

### **Appendix E**

#### **Glossary**

The following definitions are largely excerpts from a list adopted in 1981 by the major actuarial organizations in the United States. In some cases the definitions have been modified for specific applicability to the Montana Teachers' Retirement System. Defined terms are capitalized throughout this Appendix.

#### **Accrued Benefit**

The amount of an individual's benefit (whether or not vested) as of a specific date, determined in accordance with the terms of a pension plan and based on compensation and service to that date.

#### **Actuarial Accrued Liability**

That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of pension plan benefits and expenses which is not provided for by future Normal Costs.

#### **Actuarial Assumptions**

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disablement, and retirement; changes in compensation, rates of investment earnings, and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; and other relevant items.

#### **Actuarial Cost Method**

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Accrued Liability.

#### **Actuarial Gain (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, as determined in accordance with a particular Actuarial Cost Method.



## **Appendix E (continued)**

### **Actuarial Present Value**

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.

### **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 pension plan.

### **Actuarial Value of Assets**

The value of cash, investments and other property belonging to a pension plan, as used by the actuary for the purpose of an Actuarial Valuation.

### **Actuarially Equivalent**

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

### **Amortization Payment**

That portion of the pension plan contribution which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

### **Entry Age Actuarial Cost Method**

A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a valuation date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability.

### **Market Value of Assets**

The fair value of cash, investments and other property belonging to a pension plan that could be acquired by exchanging them on the open market.

### **Normal Cost**

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.



## **Appendix E (continued)**

### **Projected Benefits**

Those pension plan benefit amounts which are 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 and past and anticipated future compensation and service credits.

### **Unaccrued Benefit**

The excess of an individual's Projected Benefits over the Accrued Benefits as of a specified date.

### **Unfunded Actuarial Accrued Liability**

The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.