Teachers' Retirement System
State of Montana

Actuarial Valuation
As of July 1, 2009

Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

September 30, 2009

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, prepared as of July 1, 2009.

The purpose of this report is to provide a summary of the funded status of the System as of July 1, 2009, to provide the Annual Required Contribution (ARC) and the accounting information under Governmental Accounting Standards Board Statements No. 25 and 27 (GASB 25 and 27). While not verifying the data at source, the actuary performed tests for consistency and reasonability. On the basis of this valuation, it is recommended that the Employer make contributions to the Retirement System at the rate of 14.07% of payroll for the fiscal year ending June 30, 2012, based on a 30-year amortization 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 and meet the parameters for the disclosures under GASB 25 and 27. Following this valuation, an experience study will be performed over the four year period beginning July 1, 2006 ending July 1, 2009. Any recommended changes as a result of the experience study, will be adopted for the July 1, 2010 valuation.

We have prepared the Schedule of Funding Progress and Trend Information shown in the financial section of the Comprehensive Annual Financial Report, and all supporting schedules including the Schedule of Active Member Valuation Data, the Solvency Test and the Analysis of Financial Experience shown in the actuarial section of the Comprehensive Annual Financial Report. All historical information that references a valuation date prior to July 1, 2009 was prepared by the previous actuarial firm.

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.

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.

In our opinion, System has operated on an actuarially sound basis in the past. In order for the System to continue to operate in an actuarial sound manner, contributions equal to the ARC are necessary for future fiscal years. Assuming that these contributions are made to the System, from year to year in the future at the rates recommended on the basis of the successive actuarial valuations, the continued sufficiency of the retirement fund to provide the benefits called for under the System may be safely anticipated.

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

Respectfully submit

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President

Todd Green, ASA
Principal and Senior 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)

VALUATION DATE	**July 1, 2009**	**July 1, 2008**
Active members		
Number		
Full-Time Members	12,673	12,694
Part-Time Members	5,783	5,598
Annual compensation	$ 683,235	$ 657,435
Retired members and beneficiaries		
Number	12,036	11,788
Annual allowances	$ 219,267	$ 208,985
Inactive Members		
Vested Terminated Members	1,640	1,649
Non-Vested Terminated Members	9,868	9,574
Assets		
Actuarial value	$ 2,762,194	$ 3,159,135
Market value	2,301,829	2,993,393
Unfunded accrued liability	$ 1,411,583	$ 794,600
Funded Ratio	66.18%	79.90%
CONTRIBUTIONS FOR FISCAL YEARS ENDING	**2012***	**2010 and 2011**
Total Normal Rate	10.69%	10.87%
Employee Contribution Rate	7.15%	7.15%
Employer Normal Rate	3.54%	3.72%
Employer Statutory Contribution Rate		
Normal Rate	3.54%	3.72%
UAL Rate	6.42%	6.24%
Total Rate	9.96%	9.96%
Amortization Period	Infinite	31.3
Required Increase in Statutory Contribution Rate	4.11%	0.17%
Employer ARC under GASB		
Normal Rate	3.54%	3.72%
UAL Rate	10.53%	6.41%
Total Rate	14.07%	10.13%
Amortization Period	30	30

* The July 1, 2009 valuation will determine the ARC for the fiscal years ending June 30, 2012. The July 1, 2010 valuation will determine the ARC for the fiscal year ending June 30, 2013.

As a result of this actuarial valuation of the benefits in effect under the Montana Teachers' Retirement System as of July 1, 2009, we find the current schedule of contributions (shown in the "History of Legislated Contributions" below) is not sufficient to amortize the Unfunded Actuarial Accrued Liability (UAAL) of the Retirement System. The net Funded Ratio is 66.18%. A 30-year amortization period is the maximum acceptable amortization period specified in Statements No. 25 and 27 of the Governmental Accounting Standards Board (GASB). Therefore, when measured by that standard, the System is not actuarially sound.

History of Legislated Contributions
(as a Percent of Pay)

	Members	Participating Employers	State General Fund	Total
Prior to July 1, 2007	7.15%	7.47%	0.11%	14.73%
July 1, 2007 to June 30, 2009	7.15%	7.47%	2.11%	16.73%
July 1, 2009 and after	7.15%	7.47%	2.49%	17.11%

Contribution Increases to Amortize UAAL Over 30 Years

A contribution increase of 4.11% of pay (17.11% to 21.22%) for the fiscal years ending June 30, 2012 is required to maintain the fund in an actuarial sound manner. The required increase will amortize the unfunded actuarial accrued liability (UAAL) over a 30 year period. The table below demonstrates the comparison ARC as recommended by the actuary and the current statutory contribution. It also shows the amount of additional contributions that will be necessary to maintain the System in an actuarial sound manner.

Valuation Date	Fiscal Year Ended for which ARC is Payable	ARC	Current Contribution	Expected Shortfall
July 1, 2008	June 30, 2010	10.13%	9.96%	$1,200,000
July 1, 2008	June 30, 2011	10.13%	9.96%	$1,300,000
July 1, 2009	June 30, 2012	14.07%	9.96%	$32,100,000

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, 2009 market value of assets is $460.4 million less than the actuarial value of assets due to a negative 20.80% market return in the year ended June 30, 2009. If the market value of assets was used, the amortization period would be infinite, and the net Funded Ratio would be 55.15%.

Based on market assets, a contribution increase of 7.54% of pay (17.11% to 24.65%) for the fiscal year ended June 30, 2012 is projected to maintain an amortization of the unfunded actuarial accrued liability over a 30 year period.

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 unfunded actuarial accrued liability 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 negative 20.80% net of investment and operating expenses. The actuarial assets earned negative 10.26% which is 18.01% less 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 following chart compares the annual returns for the past ten years.

Year	Market Return	Actuarial Return	Market Return over Assumption*	Actuarial Return over Assumption*
7/1/1999 to 6/30/2000	7.80%	12.80%	(0.20)%	4.80%
7/1/2000 to 6/30/2001	(5.09)%	9.19%	(13.09)%	1.19%
7/1/2001 to 6/30/2002	(7.26)%	3.83%	(15.26)%	(4.17)%
7/1/2002 to 6/30/2003	6.16%	1.60%	(1.84)%	(6.40)%
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)%

** 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). The chart above shows that the actuarial return on assets has under performed the assumption more than it has exceeded the assumption in the last ten years. These losses have led to the need for additional contributions.

On a market value basis the System earned $401.5 million less than anticipated by the 7.75% assumption in the year ended June 30, 2008 and $843.7 million less than anticipated by the 7.75% assumption in the year ended June 30, 2009. The net result as of July 1, 2009 is that the market value of assets is $460.4 million less than the actuarial value of assets. This $460.4 million in unrecognized asset losses, if not offset by future gains, will cause the contributions needed to amortize the UAAL in future valuations to increase even further. Therefore, to stay financially sound in the future, the System will need either (1) future gains such as asset returns over the new 7.75% assumption, or (2) an increase in contribution rates.

Recent Contribution Increases

As shown in the "History of Legislated Contributions" at the beginning of this section the employer contributions from the General Fund has 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. These additional contributions helped bring the amortization period of the System's Unfunded Actuarial Accrued Liability (UAAL) under 30 years at July 1, 2007. Unfortunately poor asset performance for the two years ended June 30, 2009 now require contribution rate increase to maintain actuarial soundness and an amortization period within 30 years.

Amortization Period Changes

The July 1, 2008 actuarial valuation calculated a 31.3 year amortization period for the Unfunded Actuarial Accrued Liability. If there were no assumption changes, or experience gains and losses, the amortization period would have been expected to decrease by 1.0 year to 30.3 at July 1, 2009. The experience gains and losses (primarily asset losses) from the year ending June 30, 2009 increased the amortization period. The resulting amortization period at July 1, 2009 is infinite.

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: "Whenever the amortization period of the unfunded liabilities for two consecutive valuations are projected to exceed 30 years based on the market value of assets, or the funded ratio is less than 85%, and the Board cannot reasonably anticipate that the amortization period would decline or the funded ratio improve without an increase in funding sources, it is the obligation of the Board to recommend to the legislature that funding be increased and/or liabilities be reduced."

   b) Analysis: The amortization period at July 1, 2009 is infinite based on actuarial assets and infinite based on market assets. Assuming experience follows the actuarial assumptions, the amortization period is projected to remain above 30 years based on both measures for some time to come. The net funded ratio is currently 66.18%. Therefore, the guidance in the Board's Funding and Benefits Policy indicates the Board should "recommend to the legislature that funding be increased and/or liabilities be reduced."

2) Ultimate Goal

   a) The Funding and Benefits Policy states: "It is the ultimate goal of the TRB to eliminate the current Unfunded Actuarial Accrued Liability and to establish a Stabilization Reserve equal to at least 10% of the Actuarial Accrued Liability. Once the system has achieved this goal, any surplus funds that become available may be applied toward the cost of benefit enhancements and/or contribution reductions, provided, sufficient reserves are retained to reasonably allow for adverse experience and the contribution rates remain at least 1 percent above the normal cost."

b) Analysis: This goal is currently a long way off. This is represented by infinite amortization periods using both actuarial and market assets. Discipline will be required by all parties concerned to reach this goal, and will have to include contribution increases to maintain the amortization period within 30 years.

3) Benefit Enhancements

a) The Funding and Benefits Policy states: "Proposed benefit enhancements must include additional funding sufficient to cover any increase in the normal cost and to amortize any increase in unfunded liabilities over a period not to exceed 25 years. In addition, as of the most recent actuarial valuation, the funded ratio must be 85% or greater before the Board will support legislation to enhance benefits."

b) Analysis: Since the net funded ratio at July 1, 2009 of 66.18% is below 85% the Board's Funding and Benefits policy does not currently support enhanced benefits, even if funding of increased unfunded liabilities over 25 years is included.

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 affected by the various assumptions. We have amortized changes in the Unfunded Actuarial Accrued Liability (UAAL) over 25 years for the purpose of these illustrations.

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

Impact of Assuming 0.5% Lower Investment Return	
	Funded Ratio
Current Assumption 7.75%	66.18%
Lower Assumption 7.25%	62.62%
Change	-3.56%
	Implied Contribution Increase / (Decrease)
Normal Cost Rate	1.28%
25 year amortization of UAAL	1.89%
Total	3.17%
Impact of Assuming 0.5% Higher Investment Return	
	Funded Ratio
Current Assumption 7.75%	66.18%
Higher Assumption 8.25%	69.82%
Change	3.64%
	Implied Contribution Increase / (Decrease)
Normal Cost Rate	-1.11%
25 year amortization of UAAL	-1.92%
Total	-3.03%

Retirement – The age when members are expected to retire is another key actuarial assumption. This is particularly true for systems that have early provisions for unreduced retirement such as TRS' provision for full retirement after 25 years of service at any age. If members retire earlier than anticipated by the actuarial assumptions the System's funding may suffer. The illustration below represents the cost of benefits if all members retired as soon as they were eligible for a full benefit at 25 years of service or at age 60.

Impact of Assuming All Members Retiring at the Earlier of 25 Years of Service or Age 60	
	Funded Ratio
Current Assumption	66.18%
100% Retirement at 25/60	61.43%
Change	-4.75%
	Implied Contribution Increase / (Decrease)
Normal Cost Rate	1.03%
25 year amortization of UAAL	3.69%
Total	4.72%

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 Unfunded Actuarial Accrued Liability 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

Active member demographic experience was examined in the prior actuaries experience study dated April 29, 2008. The Retirement Board adopted the recommendations presented in the report. There were no assumption changes since the July 1, 2008 valuation.

The next experience study is currently planned to take place after the July 1, 2009 valuation and be a comprehensive experience study examining all methods and assumptions. Recommended changes will be used for the first time in the July 1, 2010 valuation.

Benefit Changes

No benefit changes are reflected in this valuation.

Contribution Changes

The contribution rate changes are documented at the beginning of this summary.

Method Changes

No changes in methods as reflected in this valuation.

Impact of Changes

The following table summarizes how experience has changed the Unfunded Actuarial Accrued Liability (UAAL) since the July 1, 2008 Actuarial Valuation. Further detail can be found in Table 19.

Changes in the Unfunded Actuarial Accrued Liability (UAAL)

(In millions)

July 1, 2008 Valuation UAAL funded by TRS contributions	$	794.6
Expected Decrease	$	3.9
Transition Increase		35.2
Total Expected Increase	$	39.1
Expected July 1, 2009 UAAL	$	833.7
Experience Loss on Actuarial Liabilities	$	16.0
Experience Loss on Actuarial Assets		561.9
Total Experience Loss	$	577.9
July 1, 2009 Valuation UAAL funded by TRS contributions	$	1,411.6

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Summary

- The System's market value investment return of -20.80% for the year ended June 30, 2009 is 28.55% less than the actuarial assumption of 7.75%. This represents an asset loss of $843.7 million due to investment return less 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, 2009, the market value of assets was $2,301.8 million. As of July 1, 2009 the preliminary actuarial value of assets was $3,067.7 million. Since the preliminary actuarial value of assets exceeded 120% of the market value, the actuarial value was determined to be 120% of the market value of assets. Since the initial loss the July 1, 2009 market value of assets is $460.4 million less than the actuarial value of assets. This $460.4 million loss will be recognized in future actuarial valuations unless it is offset by returns larger than the 7.75% assumption.

- The amortization period of the Unfunded Actuarial Accrued Liability is Infinite. The guidance in the Board's Funding and Benefits Policy indicates the Board should "recommend to the legislature that funding be increased and/or liabilities be reduced." The Policy's ultimate goal is to increase the current net funded ratio of 66.18% 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.

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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, 2009. 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.

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Table 1

Statement of Fiduciary Net Assets

	TOTAL TRS 2009	TOTAL TRS 2008
ASSETS		
Cash/Cash Equivalents-Short Term		
Investment Pool (Note A)	$ 27,551,832	$ 34,385,181
Receivables:		
Accounts Receivable	14,319,630	19,361,764
Interest Receivable	4,840,668	7,292,299
Due from Primary Government	3,493,376	3,327,119
Total Receivables	$ 22,653,674	$ 29,981,182
Investments, at fair value (Note A):		
Mortgages	$ 20,491,720	$ 27,120,606
Investment Pools	2,222,979,817	2,893,544,962
Other Investments	8,357,337	8,351,432
Securities Lending Collateral (Note A)	210,084,770	180,987,059
Total Investments	$ 2,461,913,644	$ 3,110,004,059
Assets Used in Plan Operations:		
Land and Buildings	$ 193,844	$ 193,844
Less: Accumulated Depreciation	(147,409)	(143,645)
Equipment	63,662	63,662
Less: Accumulated Depreciation	(53,076)	(48,999)
Prepaid Expenses	-	647
Intangible Assets, net of amortization (Note D)	215,843	252,351
Total Other Assets	$ 272,864	$ 317,860
TOTAL ASSETS	$ 2,512,392,014	$ 3,174,688,282
LIABILITIES		
Accounts Payable	$ 185,080	$ 83,835
Due to Primary Government	18,610	18,603
Acountability for Advances	3,841	-
Securities Lending Liability (Note A)	210,084,770	180,987,059
Compensated Absences (Note A)	174,174	158,675
OPEB Implicit Rate Subsidy	96,974	47,478
TOTAL LIABILITIES	$ 210,563,449	$ 181,295,650
NET ASSETS HELD IN TRUST FOR PENSION BENEFITS	$ 2,301,828,565	$ 2,993,392,632

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Table 2

Statement of Changes in Fiduciary Net Assets

	TOTAL TRS 2009	TOTAL TRS 2008
ADDITIONS		
Contributions:		
Employer	$ 66,850,644	$ 67,930,235
Plan Member	57,256,365	59,560,549
Other	14,147,324	13,492,375
Total Contributions	$ 138,254,333	$ 140,983,159
Misc Income	$ 15,421	$ 15,654
Investment Income:		
Net Appreciation/(Depreciation) in Fair Value of Investments	$ (671,716,604)	$ (236,359,446)
Investment Earnings	70,040,815	96,731,693
Security Lending Income (Note A)	4,318,004	9,544,163
Investment Income/(Loss)	$ (597,357,785)	$ (130,083,590)
Less: Investment Expense	13,562,768	15,425,847
Less: Security Lending Expense (Note A)	1,897,208	7,802,791
Net Investment Income/(Loss)	$ (612,817,761)	$ (153,312,228)
Total Additions	$ (474,548,007)	$ (12,313,415)
DEDUCTIONS		
Benefit Payments	$ 209,942,663	$ 196,060,216
Withdrawals	5,170,028	5,694,601
Administrative Expense (Note D)	1,853,873	1,750,765
OPEB Expenses	49,496	47,478
Total Deductions	$ 217,016,060	$ 203,553,060
NET INCREASE (DECREASE) IN PLAN NET ASSETS	$ (691,564,067)	$ (215,866,475)
NET ASSETS HELD IN TRUST FOR PENSION BENEFITS BEGINNING OF YEAR	$ 2,993,392,632	$ 3,209,259,107
END OF YEAR	$ 2,301,828,565	$ 2,993,392,632

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Table 3

Determination of Actuarial Value of Assets

Valuation Date July 1:	2008	2009	2010	2011	2012
A. Actuarial Value Beginning of Year	$ 3,006,232,625	$ 3,159,134,766			
B. Market Value End of Year	2,993,392,632	2,301,828,565			
C. Market Value of Beginning of Year	3,209,259,107	2,993,392,632			
D. Cash Flow					
D1. Contributions	140,983,159	138,254,333			
D2. Benefit Payments	(201,754,817)	(215,112,691)			
D3. Net	$ (60,771,658)	$ (76,858,358)			
E. Investment Income					
E1. Market Total: B. - C. - D3.	$ (155,094,817)	$ (614,705,709)			
E2. Assumed Rate	7.75%	7.75%			
E3. Amount for Immediate Recognintion	246,362,679	229,009,668			
E4. Amount for Phased-in Recognition	(401,457,496)	(843,715,377)			
F. Phased-In Recognition of Investment Income					
F1. Current Year: 0.25 * E4.	$ (100,364,374)	$ (210,928,844)	$ -	$ -	$ -
F2. First Prior Year	67,675,494	(100,364,374)	(210,928,844)	-	-
F3. Second Prior Year	-	67,675,494	(100,364,374)	(210,928,844)	-
F4. Third Prior Year	-	-	67,675,494	(100,364,374)	(210,928,844)
F5. Total Recognized Investment Gain	$ (32,688,880)	$ (243,617,724)	$ (243,617,724)	$ (311,293,218)	$ (210,928,844)
G. Preliminary Actuarial Value End of Year A. + D3. + E3. + F5.	$ 3,159,134,766	$ 3,067,668,352			
H. Corridor					
H1. 80% of Market Value	$ 2,394,714,106	$ 1,841,462,852			
H2. 120% of Market Value	3,592,071,158	2,762,194,278			
I. Actuarial Value End of Year G. Not Less than H1. or Not Greater than H2	$ 3,159,134,766	$ 2,762,194,278			
J. Difference Between Market & Actuarial Values	$ (165,742,134)	$ (460,365,713)			

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Table 4

Historical Investment Returns*

Fiscal Year Ending	Market Returns	Actuarial Returns	Actuarial Return Over 8.00% Assumption
June 30, 1995	15.7%	8.9%	0.9%
June 30, 1996	12.4%	10.4%	2.4%
June 30, 1997	19.4%	14.9%	6.9%
June 30, 1998	16.6%	16.0%	8.0%
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)%

Fiscal Year Ending	Market Returns	Actuarial Returns	Actuarial Return Over 7.75% Assumption
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)%
15 Year Average	6.0%	7.2%	(0.8)%

** 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.*

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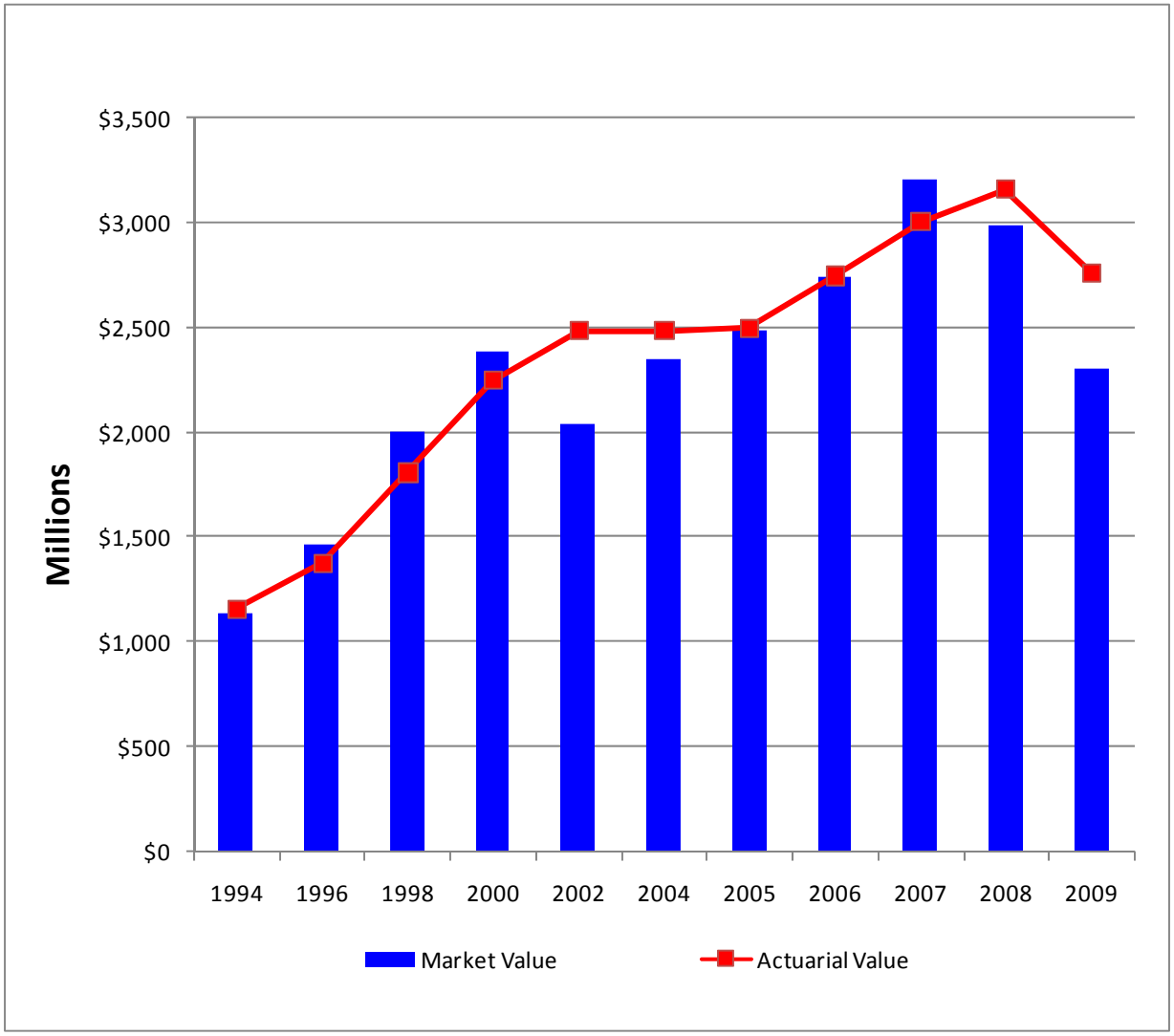
Table 5

Market Value of Assets vs. Actuarial Value of Assets



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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.

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Table 6

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

(All amounts are actuarial present values in millions)

	July 1, 2009 Total	July 1, 2008 Total
A. Active Members		
Service Retirement	$ 2,330.4	$ 2,187.6
Disability Retirement	16.6	15.8
Survivors' Benefits	52.7	47.4
Vested Retirement	27.9	26.0
Refund of Member Contributions	27.9	27.5
Total	$ 2,455.5	$ 2,304.3
B. Inactive Members and Annuitants		
Service Retirement	$ 2,256.4	$ 2,161.3
Disability Retirement	19.8	18.8
Beneficiaries*	139.6	132.9
Vested Terminated Members	56.6	58.1
Refund of Member Contributions	16.1	15.6
Total	$ 2,488.4	$ 2,386.7
C. Grand Total	$ 4,943.9	$ 4,691.0

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

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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 is 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 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 favorable 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 E shows the amount of assets available for benefits. Line F 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:

Supplemental University Contribution Rate	Fiscal Years Ending
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, 2009 TRS valuation is $157.2 million based on a 4.72% contribution rate until July 1, 2033.

In Table 9 we show the projected payroll basis for the amortization of the UAAL.

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.

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Table 7

Normal Cost Contribution Rates
As Percentages of Salary

	July 1, 2009 Total	July 1, 2008 Total
Service retirement	8.74%	8.85%
Disability retirement	0.11%	0.11%
Survivors' benefits	0.29%	0.26%
Vested retirement	0.44%	0.45%
Refund of member contributions	1.11%	1.20%
Total Normal Rate	10.69%	10.87%
Employee Normal Rate	7.15%	7.15%
Employer Normal Rate	3.54%	3.72%

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Table 8

Unfunded Actuarial Accrued Liability
(Dollar amounts in millions)

	July 1, 2009	July 1, 2008
A. Actuarial present value of all future benefits for present and former members and their survivors (Table 6)	$ 4,943.9	$ 4,691.0
B. Less actuarial present value of total future normal costs for present members	612.9	580.2
C. Actuarial accrued liability	$ 4,331.0	$ 4,110.8
D. Less present value of future university supplemental contributions*	157.2	$ 157.1
E. Less assets available for benefits	2,762.2	3,159.1
F. Unfunded actuarial accrued liability	$ 1,411.6	$ 794.6

* *Paid by contributions to TRS made as a percentage of the salaries of the participants in the Optional Retirement Plan (ORP) to fund Montana University System member benefits. The percentage of salary will be a level 4.72% for the Fiscal Years through 2033.*

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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 negative cash flow for the year ended June 30, 2009. The System's total cash flow including benefits payments, administrative expenses and investment earnings was $(691.5) million. Of the $(691.5) million, $(612.8) million was due to investment returns.

Table 10 shows that at the current statutory contribution rate and if the System's assets earn the assumed investment rate of return of 7.75%, the System has a temporary positive cash flow that will eventually become negative after reflecting benefit payments, contributions and investment earnings. This is due to the fact that the current statutory contribution is no longer adequate to fund the System in an actuarial sound manner.

Table 11 shows that if the ARC is contributed to the System as recommended by the Actuary and the System's assets earn the assumed rate of 7.75%, 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.

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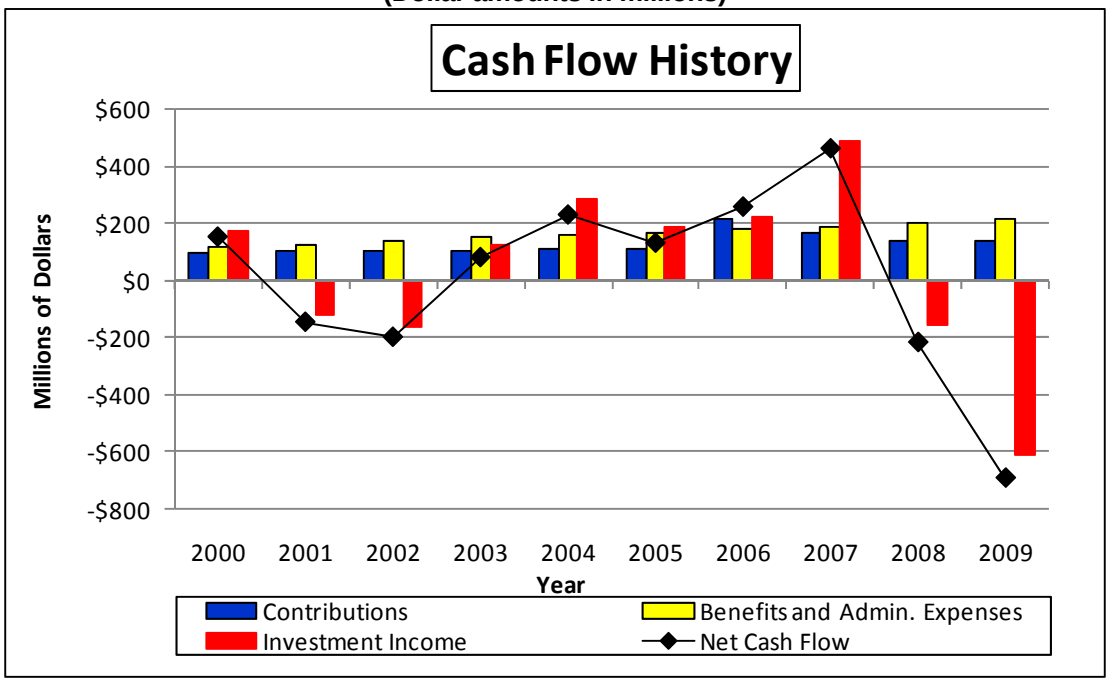
Table 9

Cash Flow History
(Dollar amounts in millions)



Historical Cash Flows

Year Ended June 30	Contributions		Benefits & Administrative Expenses	Investment Income	Net Cash Flow
2000	$ 94.1		$ 115.8	$ 175.2	$ 153.5
2001	99.9		126.0	(119.1)	(145.2)
2002	100.2		138.1	(159.6)	(197.5)
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)

** Reflects $100 million transfer to TRS*
*** Reflects $50 million transfer to TRS*

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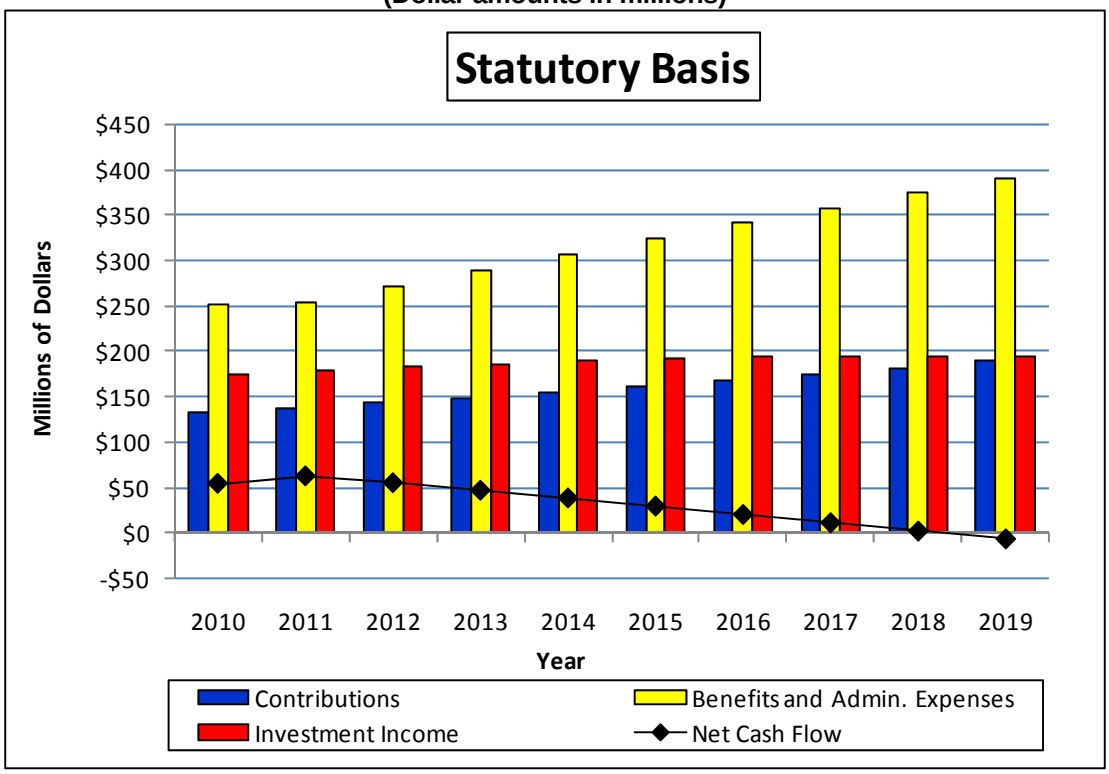
Table 10

Cash Flow Projections
(Dollar amounts in millions)



Year Ended June 30	Projected Cash Flows: Statutory Contributions	Benefits & Administrative Expenses	Assumed Investment Income	Net Cash Flow
2010	$ 132.4	$ 252.1	$ 173.8	$ 54.1
2011	137.4	253.2	178.1	62.3
2012	142.9	270.5	182.5	54.8
2013	148.6	288.3	186.2	46.5
2014	154.6	305.8	189.4	38.2
2015	160.9	323.5	191.9	29.3
2016	167.6	341.1	193.8	20.3
2017	174.6	358.4	194.9	11.2
2018	182.0	375.3	195.4	2.1
2019	189.7	391.3	195.3	(6.4)

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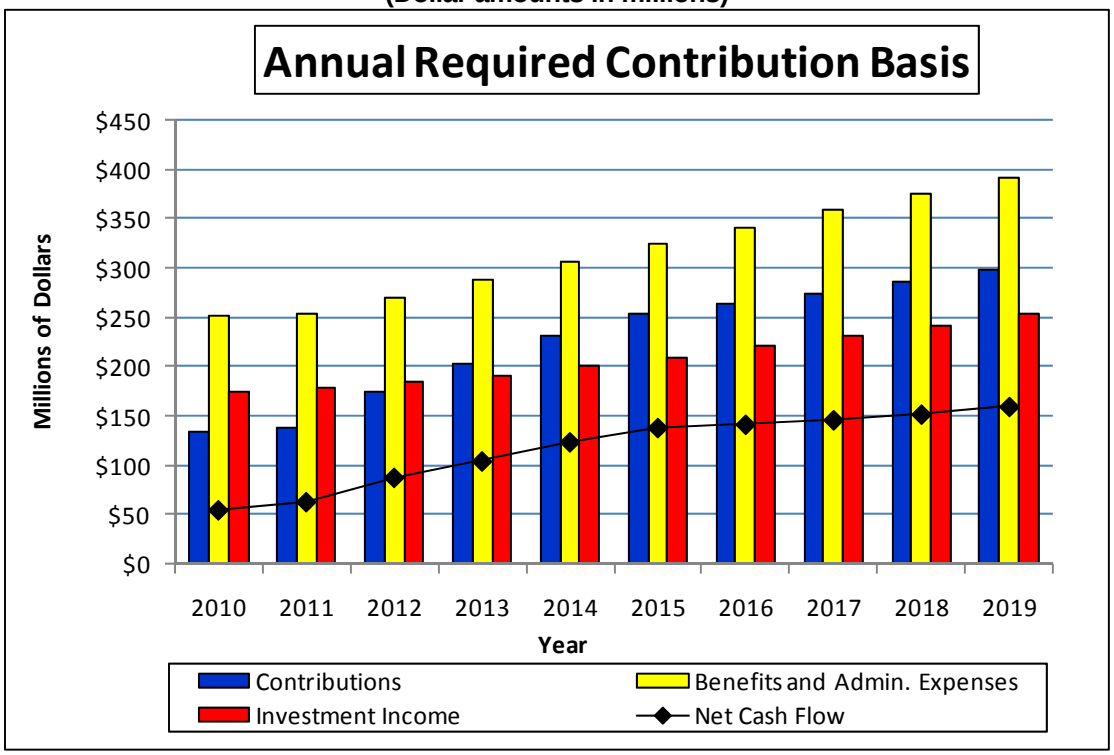
Table 11

Cash Flow Projections
(Dollar amounts in millions)



Year Ended June 30	Projected Cash Flows: Annual Required Contributions	Benefits & Administrative Expenses	Assumed Investment Income	Net Cash Flow
2010	$ 133.7	$ 252.1	$ 173.8	$ 55.4
2011	138.7	253.2	178.2	63.7
2012	174.9	270.5	183.9	88.3
2013	202.2	288.3	191.1	105.0
2014	230.5	305.8	199.7	124.3
2015	252.9	323.5	209.5	138.9
2016	263.3	341.1	220.0	142.3
2017	274.4	358.4	230.8	146.7
2018	285.9	375.3	241.9	152.5
2019	298.0	391.3	253.6	160.2

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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 14. 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.

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Table 12

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

	UAAL (Gain)/Loss		
	June 30, 2009	June 30, 2008	June 30, 2007
Investment Income			
Investment income was (greater) less than expected based on actuarial value of assets.	$ 561.9	$ 17.0	$ (67.7)
Pay Increases			
Pay increases were (less) greater than expected.	(4.4)	4.8	2.5
Age & Service Retirements			
Members retired at (older) younger ages or with (less) greater final average pay than expected	6.3	(1.0)	(0.9)
Disability Retirements			
Disability claims were (less) greater than expected	0.4	0.2	0.2
Death-in-Service Benefits			
Survivor claims were (less) greater than expected	(0.2)	0.3	(1.0)
Withdrawal From Employment			
(More) less reserves were released by withdrawals than expected	4.7	1.7	7.2
Death After Retirement			
Retirees (died younger) lived longer than expected	(2.8)	(6.3)	0.5
Other			
Miscellaneous (gains) and losses	12.0	2.5	(1.6)
Total (Gain) or Loss During Period From Financial Experience	$ 577.9	$ 19.2	$ (60.8)
Non-Recurring Items.			
Changes in actuarial assumptions caused a (gain) loss.	-	(10.6)	-
Changes in benefits caused a (gain) loss.	-	-	-
Composite (Gain) Loss During Period.	$ 577.9	$ 8.6	$ (60.8)

* *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.*

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Appendix A

Actuarial Procedures and Assumptions

Retirement, disablement and termination of employment assumptions have been updated to reflect the Retirement Board's actions at the May 8, 2008 Retirement Board Meeting. These actions reflect the recommended changes in the 2001-2007 Investigation of Active Member Demographic Experience report.

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

The current mortality assumptions were adopted for the July 1, 2006 valuation.

Economic assumptions were reviewed in the 2004 Investigation of Experience Study.

The next experience study will be performed after the July 1, 2009 valuation based on the prior valuations of July 1, 2006, July 1, 2007, July 1, 2008 and July 1, 2009. The assumptions adopted by the board based on the experience study will be first utilized in the July 1, 2010 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 9.96% of members' salaries. In accordance with MCA 19-20-604, 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.

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 must be increased by 1.5% 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 July 1, 2008. The rates for University Members were adopted July 1, 2008.

Disablement

The rates of disablement used in this valuation are illustrated in Table A-4. These rates were adopted July 1, 2008.

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 July 1, 2008.

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, but give no indication as to the number of hours worked. As done in the past, we imputed a "part-time percentage" by comparing the pay received with their annual equivalent full-time salary. Their accumulated service was divided by this percentage to reflect their full benefit. 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, 2009 was $173,082,817.

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.

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Table A-1

Summary of Valuation Assumptions
(July 1, 2009)

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)	1.50%
	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 July 1, 2008)	Table A-3
	C.	Disablement (adopted July 1, 2008)	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 July 1, 2008)	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.*

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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

	General Members			University Members		
Age	Eligible for Reduced Benefits	First Year Eligible for Full Benefits	Thereafter	Eligible for Reduced Benefits	First Year Eligible for Full Benefits	Thereafter
45		18.0%	7.0%		9.0%	5.0%
46		18.0	7.0		9.0	5.0
47		12.5	7.0		9.0	5.0
48		12.5	7.0		9.0	5.0
49	*	12.5	7.0	*	9.0	5.0
50	3.0%	12.5	7.0	1.9%	9.0	5.0
51	3.0	16.0	7.5	2.2	9.0	5.0
52	3.0	16.0	8.0	2.5	9.0	5.0
53	3.0	16.0	8.5	2.8	9.0	5.0
54	3.0	16.0	9.0	3.1	9.0	5.0
55	5.0	24.0	11.0	3.4	15.0	5.0
56	5.0	24.0	12.0	3.7	15.0	6.0
57	5.0	24.0	13.0	4.0	15.0	6.0
58	5.0	24.0	14.0	4.3	15.0	6.0
59	5.0	24.0	16.0	4.7	15.0	7.0
60	*	17.0	21.0	*	15.0	10.0
61		21.0	21.0		14.0	14.0
62		25.0	25.0		20.0	20.0
63		22.0	22.0		14.0	14.0
64		23.0	23.0		20.0	20.0
65		33.0	33.0		28.0	28.0
66		26.0	26.0		21.0	21.0
67		22.0	22.0		21.0	21.0
68		20.0	20.0		21.0	21.0
69		20.0	20.0		21.0	21.0
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	.010%
30	.010
35	.020
40	.030
45	.050
50	.080
55	.100
60	.120

Teachers' Retirement System
State of Montana

Table A-5

Mortality
Annual Rates

	Contributing Members, Service Retired Members and Beneficiaries		Disabled Members	
Age	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

Years of Service	All Members
1	36.0%
2	16.0
3	12.0
4	9.0
5	7.0
6	6.5
7	6.0
8	5.5
9	5.1
10	4.7
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
State of Montana

Table A-7

Probability of Retaining Membership in the System Upon Vested Termination

Age	Probability of Retaining Membership
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.
Final Compensation	Average of highest three 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	
Eligibility:	25 years of service or age 60 and five years of service.
Benefit:	The retirement benefit is equal to 1/60 of final compensation for each year of service.
Early Retirement Benefits	
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 reduced 1/2 of 1% for each of the first 60 months early and 3/10 of 1% for each of the next 60 months early.

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.
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	Member: 7.15% of compensation. Employer: 9.96% of compensation. 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.
Interest on Member Contributions	Interest on member contributions is currently being credited at a rate of 1.0% per annum.
Cost-of-Living Adjustments	On January 1 of each year, the retirement allowance payable must be increased by 1.5% 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.

Teachers' Retirement System
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Appendix C

Valuation Data

This valuation is based upon the membership of the System as of July 1, 2009. 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.

Active Members	Number	Annual Salaries in Millions
Full-Time Members	12,673	$ 613.1
Part-Time Members*	5,270	69.9
Total Contributing Members*	17,943	$ 683.0
Active Members with Annual Compensation less than $1,000	513	
Total Active Members	18,456	

** 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, 2008 to July 1, 2009.

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

Type of Annuitant	Number	Annual Benefits in Thousands	Average Annual Benefits
Service Retirement	10,471	$ 202,253	$ 19,316
Survivors of Deceased Retired Members	925	11,250	12,162
Total Service Retirement (including survivors	11,396	$ 213,502	$ 18,735
Disability Retirement	206	2,006	9,738
Survivors of Deceased Active Members	404	3,686	9,124
Child Beneficiaries	30	72	2,400
Total Annuitants	12,036	$ 219,266	$ 18,218

Terminated Members with Contributions Not Withdrawn	Number
Vested Terminated Members	1,640
Non-Vested Terminated Members	9,868
Total Terminated Members	11,508

Teachers' Retirement System
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Table C-1

Active Members Distribution of Full-Time Employees and Salaries

as of July 1, 2009

Number of Employees

	Completed Years of Service												
Age	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+	Totals
<25	16	108	43	6	-	-	-	-	-	-	-	-	173
25 to 29	25	209	266	422	182	-	-	-	-	-	-	-	1,104
30 to 34	23	122	132	263	650	141	-	-	-	-	-	-	1,331
35 to 39	10	80	104	165	381	560	126	-	-	-	-	-	1,426
40 to 44	6	62	52	98	286	330	510	122	-	-	-	-	1,466
45 to 49	5	59	52	98	256	285	395	426	177	-	-	-	1,753
50 to 54	3	31	43	95	216	252	339	390	501	167	-	-	2,037
55 to 59	-	24	24	41	160	215	295	341	405	425	169	-	2,099
60 to 64	5	11	17	27	72	101	141	157	175	161	181	30	1,078
65 to 69	1	2	4	2	10	15	13	25	23	20	22	21	158
70 and up	1	3	1	1	2	2	5	5	3	4	7	14	48
Totals	95	711	738	1,218	2,215	1,901	1,824	1,466	1,284	777	379	65	12,673

Teachers' Retirement System
State of Montana

Table C-1

Active Members Distribution of Full-Time Employees and Salaries

as of July 1, 2009

Annual Salaries in Thousands

	Completed Years of Service												
Age	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+	Totals
<25	178	3,186	1,318	213	-	-	-	-	-	-	-	-	4,895
25 to 29	347	6,389	8,455	13,993	6,567	-	-	-	-	-	-	-	35,750
30 to 34	334	3,992	4,530	9,337	25,803	6,317	-	-	-	-	-	-	50,313
35 to 39	129	3,024	3,860	6,121	16,167	26,793	6,703	-	-	-	-	-	62,796
40 to 44	106	2,278	1,855	3,850	12,350	15,721	27,554	7,060	-	-	-	-	70,774
45 to 49	101	2,160	1,846	3,723	10,855	13,664	21,498	24,055	9,940	-	-	-	87,842
50 to 54	53	1,189	1,743	3,854	9,429	11,861	18,546	22,103	29,336	9,828	-	-	107,943
55 to 59	-	911	969	1,662	7,255	10,585	15,480	19,421	23,835	26,098	10,225	-	116,441
60 to 64	71	515	696	1,125	3,324	5,154	7,571	9,162	11,326	10,951	11,850	1,910	63,655
65 to 69	8	68	152	61	542	808	588	1,446	1,433	1,428	1,517	1,455	9,505
70 and up	15	88	52	32	87	91	220	417	151	337	420	1,252	3,162
Totals	1,342	23,800	25,474	43,970	92,379	90,995	98,159	83,665	76,021	48,642	24,012	4,617	613,077

Teachers' Retirement System
State of Montana

Table C-1

Active Members Distribution of Full-Time Employees and Salaries

as of July 1, 2009

Average Annual Salary

	Completed Years of Service												
Age	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+	Totals
<25	11,110	29,504	30,642	35,462	-	-	-	-	-	-	-	-	28,292
25 to 29	13,887	30,569	31,784	33,158	36,081	-	-	-	-	-	-	-	32,382
30 to 34	14,532	32,723	34,316	35,502	39,698	44,799	-	-	-	-	-	-	37,801
35 to 39	12,901	37,796	37,113	37,096	42,434	47,845	53,196	-	-	-	-	-	44,037
40 to 44	17,715	36,742	35,666	39,286	43,183	47,640	54,027	57,869	-	-	-	-	48,277
45 to 49	20,158	36,610	35,505	37,986	42,403	47,944	54,424	56,468	56,158	-	-	-	50,109
50 to 54	17,760	38,361	40,528	40,573	43,652	47,068	54,708	56,675	58,555	58,851	-	-	52,991
55 to 59	-	37,946	40,365	40,542	45,343	49,234	52,475	56,952	58,853	61,407	60,506	-	55,474
60 to 64	14,127	46,860	40,916	41,678	46,161	51,033	53,694	58,358	64,719	68,019	65,469	63,676	59,049
65 to 69	7,917	33,878	38,079	30,379	54,173	53,877	45,225	57,841	62,305	71,412	68,938	69,275	60,160
70 and up	15,201	29,197	51,850	31,805	43,653	45,388	43,966	83,496	50,307	84,153	60,063	89,432	65,872
Totals	14,129	33,474	34,517	36,100	41,706	12,631	53,815	57,070	59,207	62,602	63,357	71,033	48,377

Teachers' Retirement System
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Table C-1

Active Members Distribution of Part-Time Employees

as of July 1, 2009

Number of Employees

	Completed Years of Service												
Age	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+	Totals
<25	153	53	14	7	-	-	-	-	-	-	-	-	227
25 to 29	198	101	60	39	28	4	1	-	-	-	-	-	431
30 to 34	107	97	53	57	76	29	11	5	-	-	2	-	437
35 to 39	112	106	62	91	90	44	24	10	3	1	1	-	544
40 to 44	78	85	73	107	146	46	35	14	8	3	2	4	601
45 to 49	103	113	84	129	215	99	47	18	7	6	2	5	828
50 to 54	73	79	66	99	218	150	70	30	9	8	2	9	813
55 to 59	51	65	51	79	173	139	108	47	17	8	3	13	754
60 to 64	24	45	30	48	84	53	65	23	12	8	5	4	401
65 to 69	22	14	13	19	41	20	16	8	3	3	-	1	160
70 and up	10	6	5	6	24	9	7	2	-	4	-	1	74
Totals	931	764	511	681	1,095	593	384	157	59	41	17	37	5,270

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Table C-2

Distribution of Inactive Lives

Members Receiving Service Retirement Benefits as of July 1, 2009

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	34	$ 792	$ 23,304
50 to 54	280	5,643	20,152
55 to 59	1,101	23,808	21,624
60 to 64	2,332	50,478	21,646
65 to 69	2,326	49,378	21,229
70 to 74	1,592	31,276	19,646
75 to 79	1,179	20,874	17,705
80 to 84	746	10,780	14,450
85 to 89	510	6,023	11,810
90 and up	371	3,201	8,628
Totals	10,471	$ 202,253	$ 19,316

Members Receiving Disability Retirement Benefits as of July 1, 2009

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	15	$ 148	$ 9,867
50 to 54	14	144	10,273
55 to 59	34	319	9,378
60 to 64	46	511	11,100
65 to 69	29	273	9,419
70 to 74	25	263	10,504
75 to 79	15	124	8,265
80 to 84	17	150	8,814
85 to 89	5	34	6,720
90 and up	6	42	6,917
Totals	206	$ 2,006	$ 9,738

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State of Montana

Table C-2

Distribution of Inactive Lives

Survivors of Deceased Retired Members as of July 1, 2009

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	37	$ 237	$ 6,414
50 to 54	27	262	9,721
55 to 59	47	532	11,325
60 to 64	85	1,104	12,993
65 to 69	124	1,841	14,850
70 to 74	136	2,042	15,015
75 to 79	115	1,515	13,233
80 to 84	140	1,640	11,718
85 to 89	134	1,341	10,005
90 and up	80	734	9,173
Totals	925	$ 11,250	$ 12,162

Survivors of Deceased Active Members as of July 1, 2009

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	105	$ 533	$ 5,078
50 to 54	36	256	7,111
55 to 59	52	485	9,335
60 to 64	57	602	10,564
65 to 69	47	568	12,075
70 to 74	40	377	9,436
75 to 79	35	357	10,205
80 to 84	29	319	11,007
85 to 89	24	218	9,081
90 and up	9	43	4,728
Totals	434	$ 3,758	$ 8,661

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Table C-2

Distribution of Inactive Lives

Terminated Vested Members as of July 1, 2009
Number of Persons

Age	Number
<25	-
25 to 29	9
30 to 34	83
35 to 39	171
40 to 44	196
45 to 49	258
50 to 54	364
55 to 59	413
60 to 64	117
65 to 69	26
70 and above	3
Total	1,640

Child Beneficiaries as of July 1, 2009
Number of Persons

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

Teachers' Retirement System
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Table C-3

Data Reconciliation

	Active Contributing Members*	Terminated Vested Members	Service Retired Members	Disabled Members	Survivors and Beneficiaries
July 1, 2008 Valuation	17,771	1,649	10,257	203	1,328
Refunds and Non-Vested Terminations	(1,167)	(67)			
Change to Annual Pay Under $1,000	5	3			
Vested Terminations	(234)	234			
Service Retirements	(383)	(81)	464		
Disability Retirements	(6)	(3)		9	
Deaths with Beneficiary	(7)	(1)	(69)		93
Deaths without Beneficiary			(167)	(6)	(61)
New Entrants	1,376				
Rehires	607	(94)	(14)		
Other	(19)				(1)
July 1, 2009 Valuation	17,943	1,640	10,471	206	1,359

* Full-time members only

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
State of Montana

Table D-1

Active Membership Data

Valuation Date (July 1)	Active Members: 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

* *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

	All Annuitants					Terminated Members	
Valuation Date (July 1)	Number	Annual Benefits in Thousands	Average Annual Benefit	Average Current Age	Average Age 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	1,640	9,868

* *Not available.*

Teachers' Retirement System
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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%

* *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.*

Teachers' Retirement System
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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 Teachers' Retirement System 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.

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.

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.