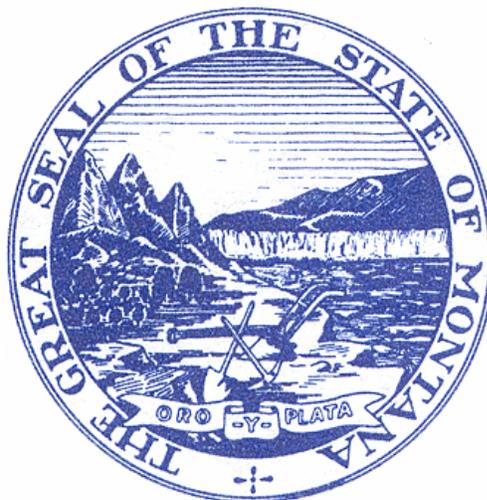# Teachers' Retirement System
State of Montana

ACTUARIAL VALUATION
(As of July 1, 2007)

Prepared by:

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Fellow, Society of Actuaries
Member, American Academy of Actuaries

Craig J. Glyde
Enrolled Actuary

October 1, 2007

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

Dear Members of the Board:

As requested, we have made an actuarial valuation of the Teachers' Retirement System of the State of Montana. The major findings of the valuation are contained in this report. They are summarized in Section 1. This report reflects the benefit provisions and contribution rates in effect as of July 1, 2007.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the System's staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. In our examination of these data, we have found them to be reasonably consistent and comparable with data used for other purposes. Since the valuation results are dependent on the integrity of the data supplied, the results can be expected to differ if the underlying data is incomplete or missing. It should be noted that if any data or other information is inaccurate or incomplete, our calculations may need to be revised.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Actuarial Standards of Practice promulgated by the Actuarial Standards Board and the applicable Guides to Professional Conduct, amplifying Opinions, and supporting Recommendations of the American Academy of Actuaries.

We further certify that all costs, liabilities, rates of interest, and other factors for the System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting the System. We further certify that, in our opinion, each actuarial assumption used is reasonably related to the experience of the Plan and to reasonable expectations which, in combination, represent our best estimate of anticipated experience under the System.

Nevertheless, the emerging costs will vary from those presented in this report to the extent actual experience differs from that projected by the actuarial assumptions. The Board of Trustees has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix A.

Actuarial computations presented in this report are for purposes of determining the recommended funding amounts for the System. The computations prepared for this purpose may differ as disclosed in our report. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements and goals. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

Milliman's work product was prepared exclusively for the System for a specific and limited purpose. It is a complex, technical analysis that assumes a high level of knowledge concerning the System's operations, and uses the System's data, which Milliman has not audited. It is not for the use or benefit of any third party for any purpose. Any third party recipient of Milliman's work product who desires professional guidance should not rely upon Milliman's work product, but should engage qualified professionals for advice appropriate to its own specific needs.

We would like to express our appreciation to Mr. David L. Senn, Executive Director of the System, and to members of his staff, who gave substantial assistance in supplying the data on which this report is based.

I, Mark C. Olleman, am a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

We respectfully submit the following report, and we look forward to discussing it with you.

Respectfully submitted,

Mark C. Olleman, FSA, EA, MAAA
Consulting Actuary
Joint Board Enrollment # 05-05636

Craig J. Glyde, EA
Associate Actuary
Joint Board Enrollment # 05-07186

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Teachers' Retirement System
State of Montana

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Teachers' Retirement System
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Section 1

Summary of Findings

As a result of this actuarial valuation of the benefits in effect under the Montana Teachers' Retirement System as of July 1, 2007, we find the current schedule of contributions (shown below) to amortize the Unfunded Actuarial Accrued Liability of the Retirement System over 28.6 years. 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 actuarially sound.

The System's net Funded Ratio increased from 76.1% at July 1, 2006 to 79.6% at July 1, 2007. The improvements in the System's funding are primarily due to additional contributions and favorable investment returns.

	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%

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.

Funding has been Strengthened with Additional Contributions

As shown above the employer contributions from the General Fund have been increased prospectively. An additional one-time contribution of $50 million was also made in the first half of 2007. Finally, 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. These factors, in combination with superior investment returns for the past year, are responsible for bringing the amortization period of the System's Unfunded Actuarial Accrued Liability under 30 years.

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Investment Experience

The market assets earned 17.64% net of investment and operating expenses. The actuarial assets earned 10.22% which is 2.47% above 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 seven years.

Year	Market Return	Actuarial Return	Actuarial Return over Assumption*
7/1/2000 to 6/30/2001	(5.09)%	9.19%	1.19%
7/1/2001 to 6/30/2002	(7.26)%	3.83%	(4.17)%
7/1/2002 to 6/30/2003	6.16%	1.60%	(6.40)%
7/1/2003 to 6/30/2004	13.31%	2.12%	(5.88)%
7/1/2004 to 6/30/2005	8.04%	2.71%	(5.04)%
7/1/2005 to 6/30/2006	8.91%	8.46%	0.71%
7/1/2006 to 6/30/2007	17.64%	10.22%	2.47%

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). Although the actuarial return on assets has outperformed the assumption in the past two years, 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 seven years. These losses led to the need for additional contributions.

The July 1, 2006 actuarial valuation set actuarial assets equal to market value. At their May 2007 meeting the Retirement Board adopted an actuarial asset method with gains and losses after July 1, 2006 smoothed over a four year period. Due to the superior returns in the year ended June 30, 2007, the System has not yet recognized $203 million in market value gains. This will help to stabilize funding if the Trust's investment return is less than the actuarial assumption for a short period.

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."

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b) Analysis: Although the funded ratio at July 1, 2007 is below 85% on an Actuarial Value of Assets basis, the net funded ratio has improved from 76.1% to 79.6% over the last year and the System's amortization period of 28.6 years is less than 30. In addition, the July 1, 2007 Market Value of Assets includes $203 million of unrecognized gains that were not included in the Actuarial Value of Assets. Therefore, assuming experience follows the actuarial assumptions, the Board can reasonably anticipate that the amortization period will decline and the funded ratio will improve without an increase in funding sources.

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: The funding of the TRS is moving in this direction, but it is still projected to be a long way off. This is represented by an amortization period of the Unfunded Actuarial Accrued Liability of 28.6 years using actuarial assets and 18.3 years using market assets. Discipline will be required by all parties concerned to reach this goal.

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, 2007 of 79.6% 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.

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

Impact of Assuming 0.5% Lower Investment Return	
	<u>Funded Ratio</u>
Current Assumption 7.75%	79.6%
Lower Assumption 7.25%	<u>75.3%</u>
Change	-4.3%
	<u>Implied Contribution Increase / (Decrease)</u>
Normal Cost Rate	1.18%
25 year amortization of UAAL	<u>1.76</u>
Total	2.94%

Impact of Assuming 0.5% Higher Investment Return	
	<u>Funded Ratio</u>
Current Assumption 7.75%	79.6%
Higher Assumption 8.25%	<u>84.1%</u>
Change	4.5%
	<u>Implied Contribution Increase / (Decrease)</u>
Normal Cost Rate	-1.02%
25 year amortization of UAAL	<u>-1.76</u>
Total	-2.78%

<u>Mortality</u> – Calculations of the Retirement System's liability depend on accurate predictions of how long members will live. The current assumption assumes mortality remains static at projected 2008 levels. The example below shows the impact of projecting continued mortality improvement to the end of the members' lives. This is sometimes called "generational mortality" because younger members are expected to live longer.

Impact of Assuming Generational Mortality	
	<u>Funded Ratio</u>
Current Assumption	79.6%
Generational Mortality	<u>78.1%</u>
Change	-1.5%
	<u>Implied Contribution Increase / (Decrease)</u>
Normal Cost Rate	0.24%
25 year amortization of UAAL	<u>0.77</u>
Total	1.01%

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	79.6%
100% Retirement at 25/60	75.1%
Change	-4.5%
	Implied Contribution Increase / (Decrease)
Normal Cost Rate	0.99%
25 year amortization of UAAL	2.46
Total	3.45%

The future funding status of the System will be determined by the System's experience. The System's actual asset returns, member longevity, retirement rates, as well as 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 will reflect gains and losses due to experience different than the actuarial assumptions.

Assumption Changes

No assumptions were changed for this valuation. The last assumptions updated were the mortality assumptions in the July 1, 2006 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

The Retirement Board adopted a four year smoothing of market value gains and losses to be used as the actuarial value of assets for this report at their May 2007 meeting.

Impact of Changes

The following table summarizes how experience has changed the Unfunded Actuarial Accrued Liability (UAAL) since the July 1, 2006 Actuarial Valuation. Further detail can be found in Table 12.

Changes in the Unfunded Actuarial Accrued Liability (UAAL)
(In millions)

July 1, 2006 Valuation UAAL funded by TRS contributions		$863.1
Expected Increase without Assumption or Supplemental Contribution Change	38.7	
New Assumptions	0.0	
0.68% Supplemental Contribution Increase	(22.1)	
Total Expected Increase		16.6
Expected July 1, 2007 UAAL		$879.7
Experience Loss on Actuarial Liabilities	6.9	
Experience (Gain) on Actuarial Assets	(67.7)	
Total Experience Gain		(60.8)
July 1, 2007 UAAL before $50 million contribution		818.9
Additional $50 million contribution		($50.0)
July 1, 2007 Valuation UAAL funded by TRS contributions		$768.9

Summary

- The additional contributions committed to TRS since the prior valuation in combination with favorable asset returns have reduced the amortization of the Unfunded Actuarial Accrued Liability to 28.6 years and increased the net Funded Ratio from 76.1% to 79.6%.

- The Retirement Board's Funding and Benefits Policy suggests no changes should be made in contributions or benefits. The Policy's ultimate goal is to increase the current net funded ratio of 79.6% 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 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.

The table on the following page summarizes the key valuation results.

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Summary of Key Valuation Results

		2007 Valuation	2006 Valuation	Percentage Change
1.	**Total Membership**			
	A. Active Members (Annual Pay $1,000 or more)	17,628	17,555	0.4%
	B. Active Members (Annual Pay under $1,000)	548	544	0.7%
	C. Vested Terminated Members	1,671	1,684	-0.8%
	D. Non-vested Terminated Members	8,963	8,542	4.9%
	E. Retired Members and Beneficiaries	11,356	11,019	3.1%
	F. Total Membership	40,166	39,344	2.1%
2.	**Annual Salaries**			
	A. Annual Total *($Thousands)*	$ 629,501	$ 606,989	3.7%
	B. Annual Average per Active Member	$ 35,710	$ 34,576	3.3%
3.	**Average Annual Allowance Payable**			
	A. Service Retirement	$ 18,249	$ 17,452	4.6%
	B. Disability Retirement	$ 9,339	$ 9,049	3.2%
	C. Survivors & Beneficiaries	$ 10,236	$ 9,877	3.6%
	D. All Payees	$ 17,192	$ 16,436	4.6%
4.	**Actuarial Accrued Liability *($Millions)***			
	A. Active Members	$ 1,684.0	$ 1,627.0	3.5%
	B. Inactive Members	73.4	72.8	0.8%
	C. Retired Members and Beneficiaries	2,171.1	2,033.8	6.8%
	D. Total AAL	$ 3,928.5	$ 3,733.6	5.2%
	E. Less Present Value of Future University Supplemental Contributions	153.4	124.7	23.0%
	F. AAL Funded by TRS Contributions	$3,775.1	$ 3,608.9	4.6%
5.	**Value of System Assets *($Millions)***			
	A. Fair Value	$ 3,209.3	$ 2,745.8	16.9%
	B. Smoothing Unrecognized Loss / (Reserve)	(203.1)	0.0	
	C Actuarial Value	3,006.2	2,745.8	9.5%
	D. Ratio of Actuarial Value to Fair Value	93.7%	100.0%	
6.	**Funded Status *($Millions)***			
	A. UAAL Funded by TRS Contributions	$ 768.9	$ 863.1	-10.9%
	B. Funded Ratio *(5C ÷ 4D)*	76.5%	73.5%	
	C. Net Funded Ratio *(5C ÷ 4F)*	79.6%	76.1%	
7.	**Contribution Rates *(percent of salaries)***			
	A. Statutory Funding Rate*	17.11%	14.73%	13.6%
	B. Normal Cost Rate	10.40%	10.37%	0.3%
	C. Available for Amortization of UAAL *(7A – 7B)*	6.71%	4.36%	45.2%
	D. Period to Amortize	28.6	Does not amortize	

* Statutory funding rate increases from 16.73% to 17.11% at July 1, 2009.

Teachers' Retirement System
State of Montana

Section 2

Scope of the Report

This report presents the actuarial valuation of the Montana Teachers' Retirement System as of July 1, 2007.

A summary of the findings resulting from this valuation is presented in the previous section. Section 3 describes the assets of the System. Sections 4 and 5 describe how the obligations of the System are to be met under the actuarial cost method in use.

The actuarial procedures and assumptions used in this valuation are described in Appendix A. The current benefit structure, as determined by the provisions of the governing law on July 1, 2007, is summarized in Appendix B. Schedules of valuation data classifying the data used in the valuation by various categories of contributing members, former contributing members, and beneficiaries make up Appendix C. Appendix D provides a brief summary of the System's recent experience. Comparative statistics are presented on the System's membership and contribution rates. Appendix E is a glossary of actuarial terms used in this report.

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Section 3

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, 2007. 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 four-year smoothing method was adopted by the Board effective for the July 1, 2007 valuation. The actuarial value of assets was set equal to the market value of assets in the July 1, 2006 valuation.

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 shows when asset gains or losses will be recognized in the actuarial value of assets. Table 5 summarizes historical asset returns since July 1, 1994 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
June 30, 2007 and June 30, 2006

	Total TRS 2007	Total TRS 2006
ASSETS		
Cash/Cash Equivalents-Short Term		
Investment Pool (Note A)	$ 88,419,440	$ 71,802,925
Receivables:		
Accounts Receivable	15,159,435	15,236,623
Interest Receivable	6,214,473	5,556,602
Due from Primary Government	170,489	249,859
Total Receivables	$ 21,544,397	$ 21,043,084
Investments, at fair value (Note A):		
Mortgages	$ 31,399,861	$ 36,712,095
Investment Pools	3,059,618,387	2,607,713,723
Other Investments	8,236,796	8,056,730
Securities Lending Collateral (Note A)	157,024,527	51,930,374
Total Investments	$ 3,256,279,571	$ 2,704,412,922
Assets Used in Plan Operations:		
Land and Buildings	$ 193,844	$ 193,844
Less: Accumulated Depreciation	(139,880)	(136,118)
Equipment	147,087	147,087
Less: Accumulated Depreciation	(131,200)	(129,561)
Prepaid Expense	9,812	4,452
Intangible Assets, net of amortization (Note D)	246,113	607,086
Total Other Assets	$ 325,776	$ 686,790
TOTAL ASSETS	$ 3,366,569,184	$ 2,797,945,721
LIABILITIES		
Accounts Payable	$ 110,922	$ 88,974
Due to Primary Government	34,740	29,446
Securities Lending Liability (Note A)	157,024,527	51,930,374
Compensated Absences (Note A)	139,888	125,880
TOTAL LIABILITIES	$ 157,310,077	$ 52,174,674
NET ASSETS HELD IN TRUST FOR PENSION BENEFITS	$ 3,209,259,107	$ 2,745,771,047

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Table 2

Statement of Changes in Fiduciary Net Assets
Fiscal Year Ended June 30, 2007 and 2006

		Total TRS 2007		Total TRS 2006
ADDITIONS				
Contributions:				
Employer	$	61,935,701	$	58,268,941
Plan Member		56,500,655		53,292,921
Other		720,266		693,226
Total Contributions	$	119,156,622	$	112,255,088
Misc Income	$	15,633	$	3,968
Payment from Primary Government		50,000,000		100,000,000
Investment Income:				
Net Appreciation/(Depreciation) in Fair Value of Investments	$	354,302,356	$	153,737,011
Investment Earnings		137,540,095		74,818,519
Security Lending Income (Note A)		5,815,626		3,918,769
Investment Income/(Loss)	$	497,658,077	$	232,474,299
Less: Investment Expense		7,616,254		3,859,788
Less: Security Lending Expense (Note A)		5,509,847		3,827,250
Net Investment Income/(Loss)	$	484,531,976	$	224,787,261
Total Additions	$	653,704,231	$	437,046,317
DEDUCTIONS				
Benefit Payments	$	182,826,747	$	171,956,507
Withdrawals		5,594,541		4,876,148
Administrative Expense (Note D)		1,434,103		1,579,155
Loss on Intangible Asset		501,575		0
Transfer out		205		0
Total Deductions	$	190,357,171	$	178,411,810
NET INCREASE (DECREASE) IN PLAN NET ASSETS	$	463,347,060	$	258,634,507
NET ASSETS HELD IN TRUST FOR PENSION BENEFITS				
BEGINNING OF YEAR		2,745,771,047		2,487,136,540
Prior Period Adjustment		141,000		0
END OF YEAR	$	3,209,259,107	$	2,745,771,047

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Table 3

Determination of Actuarial Value of Assets
July 1, 2007

Determination of Recognized Investment Gains and Losses - Four-Year Smoothing

A.	Expected investment return – Year Ended 6/30/2007	$ 212,050,750
B.	Actual investment return – Year Ended 6/30/2007	$ 482,752,726
C.	Gains/(losses) – 2007 [B-A]	$ 270,701,976
D.	Gains/(losses) – 2006	N/A
E.	Gains/(losses) – 2005	N/A
F.	Gains/(losses) – 2004	N/A
G.	Gains/(losses) recognized at July 1, 2007* [¼ C + ¼ D + ¼ E + ¼ F]	$ 67,675,494

Determination of Actuarial Assets

Actuarial value of assets July 1, 2006		$ 2,745,771,047
Contributions less benefits	$ (19,264,666)	
Expected investment return	212,050,750	
Recognized investment gains/(losses)	67,675,494	260,461,578
Actuarial value of assets July 1, 2007		**3,006,232,625**
Unrecognized Gain / (Loss)		203,026,482
Market Value of Assets July 1, 2007 (Actuarial Value + Unrecognized Gain / (Loss))		$ 3,209,259,107

* Includes rounding adjustment.

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Table 4

Schedule of Investment Gain/(Loss) Recognition (in Millions)

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Year Ending 06/30	Market Value Investment Gain/(Loss) Over Expected	Investment Gain/(Loss) Recognized in Past Years*			Investment Gain/(Loss) Recognized in Current Year	Investment Gain/(Loss) to be Recognized in Future Years		
		2004	2005	2006	2007	2008	2009	2010
2004	$0.0	$0.0	$0.0	$0.0	$0.0			
2005	$0.0		$0.0	$0.0	$0.0	$0.0		
2006	$0.0			$0.0	$0.0	$0.0	$0.0	
2007	$270.7				$67.7	$67.7	$67.7	$67.7
2008	$0.0					$0.0	$0.0	$0.0
2009	$0.0						$0.0	$0.0
2010	$0.0							$0.0

Total Gain/(Loss) Recognized at Each Valuation Date

Recognized				Scheduled to be Recognized**		
$0.0	$0.0	$0.0	$67.7	$67.7	$67.7	$67.7

Unrecognized Gain/(Loss) Remaining

$203.0	$135.4	$67.7	$0.0

* The current actuarial asset method was adopted for the July 1, 2007 actuarial valuation. Gains and losses recognized by prior methods are not shown in this exhibit.

** The total gain/(loss) actually recognized in each future year will include additional amortizations of future gains and/or losses.

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Table 5

Historical Investment Returns*

Fiscal Year Ending	Market Returns	Actuarial Return	Actuarial Return Over 8.0% 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 Return	Actuarial Return Over 7.75% Assumption
June 30, 2005	8.04	2.71	(5.04)
June 30, 2006	8.91	8.46	0.71
June 30, 2007	17.64	10.22	2.47

* *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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Section 4

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, 2007 Total	July 1, 2006 Total
A. Active members		
Service retirement	$ 2,031.8	$ 1,964.7
Disability retirement	24.6	23.8
Survivors' benefits	40.2	39.1
Vested Retirement	34.9	33.6
Refund of Member Contributions	34.0	32.8
Total	$ 2,165.5	$ 2,094.0
B. Inactive members and annuitants		
Service retirement	$ 2,029.2	$ 1,896.2
Disability retirement	18.7	18.5
Beneficiaries*	123.2	119.1
Vested terminated members	59.2	59.8
Nonvested terminated members	14.2	13.0
Total	$ 2,244.5	$ 2,106.6
C. Grand Total	$ 4,410.0	$ 4,200.6

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

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Section 5

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.

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.

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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: the portion of the present value of future benefits not provided by future normal cost contributions. Line D shows the amount of assets available for benefits. Line E shows the UAAL. Lines F and G show the impact of the present value of future scheduled university supplemental contributions (described below) on the UAAL.

As can be seen from this discussion, a key consideration in the adequacy of the funding of the System is how the UAAL is being amortized. Table 9 shows that the currently scheduled employer and member contribution rates are adequate to pay the total normal cost rate (10.40% of pay), and to pay additional amounts that will amortize (pay off) the UAAL over the next 28.6 years.

As was discussed in Section 3, effective on the valuation date, the asset valuation method being used is a four-year smoothing method. In Tables 8 and 9, we have developed the UAAL, and the amortization period over which current contribution rates will eliminate the UAAL, on both an Actuarial Value of Assets basis and a Market Value of Assets basis. The key difference is that, under a Market Value of Assets basis, all investment gains and losses would be immediately recognized as they arise.

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*

*   *House Bill No. 63 enacted legislation that provided for increased university supplemental contributions, effective July 1, 2007.*

The value of future supplemental university contributions included in the July 1, 2007 TRS valuation is $153.4 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.

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Table 7

Normal Cost Contribution Rates
As Percentages of Salary

	July 1, 2007 Total	July 1, 2006 Total
Service retirement	7.96%	7.94%
Disability retirement	0.17	0.16
Survivors' benefits	0.22	0.22
Vested retirement	0.63	0.63
Refund of member contributions	1.42	1.42
Total	10.40%	10.37%

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Table 8

Unfunded Actuarial Accrued Liability
(All dollar amounts in millions)

	July 1, 2007 (Actuarial Value of Assets Basis)*	July 1, 2006
A. Actuarial present value of all future benefits for present and former members and their survivors (Table 6)	$ 4,410.0	$ 4,200.6
B. Less actuarial present value of total future normal costs for present members	481.5	467.0
C. Actuarial accrued liability	$ 3,928.5	$ 3,733.6
D. Less assets available for benefits	3,006.2	2,745.8
E. Unfunded actuarial accrued liability	$ 922.3	$ 987.8
F. Less present value of future university supplemental contributions**	153.4	124.7
G. Unfunded actuarial accrued liability funded by TRS contributions	$ 768.9	$ 863.1

*   *The numbers above are based on the actuarial value of assets. If the $3,209.3 million market value of assets was used at July 1, 2007, then the unfunded actuarial accrued liability would be $719.2million and the unfunded actuarial accrued liability funded by TRS contributions would be $565.8 million. The information in this footnote is provided in accordance with MCA 19-20-201, to show how market performance is affecting the actuarial funding of the retirement system.*

**   *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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Table 9

Recommended Contribution Rates
As Percentages of Salary

		July 1, 2007 (Actuarial Value of Assets Basis)*	July 1, 2006
A.	Employer contribution rate**	9.96%	7.58%
B.	Member contribution rate	7.15	7.15
C.	Total contribution rate	17.11%	14.73%
D.	Less total normal cost rate (Table 7)	10.40	10.37
E.	Amount available to amortize unfunded actuarial accrued liability** (C – D)	6.71%	4.36%
F.	Amortization period from Valuation Date***	28.6	N/A

*   *The numbers above are based on the actuarial value of assets. Based on market assets the amortization period at July 1, 2007 would be 18.3 years. The information in this footnote is provided in accordance with MCA 19-20-201, to show how market performance is affecting the actuarial funding of the retirement system.*

** *The employer rate will increase from 9.58% to 9.96% at July 1, 2009. 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 unfunded actuarial accrued liability is 10 years or less according to the System's latest actuarial valuation. This is reflected in all relevant calculations in this report.*

*** *As of July 1, 2006, the unfunded actuarial accrued liability did not amortize over a reasonable period.*

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Table 10

Illustration of Projected TRS Contribution Rates
Reflecting 28.6 Year Amortization of UAAL

Investment Assumption:			7.75%					
General Wage Increases:			4.50%					
Contribution Increase effective July 1, 2009:			0.38%					

Fiscal Year Ending	TRS Payroll			Total TRS Contribution Rate	Normal Cost Rate	Amortization Rate	Amortization Payment	Amortization Payment Discounted to Valuation Date
	non-MUS	MUS	Total					
2008	610,269,756	36,607,862	646,877,618	16.73%	10.40%	6.33%	40,947,353	39,447,292
2009	637,731,895	33,694,071	671,425,966	16.73%	10.40%	6.33%	42,501,264	37,999,329
2010	666,429,830	30,753,148	697,182,978	17.11%	10.40%	6.71%	46,780,978	38,817,369
2011	696,419,173	27,776,257	724,195,430	17.11%	10.40%	6.71%	48,593,513	37,421,210
2012	727,758,035	25,118,298	752,876,333	17.11%	10.40%	6.71%	50,518,002	36,105,088
2013	760,507,147	22,417,427	782,924,574	17.11%	10.40%	6.71%	52,534,239	34,845,557
2014	794,729,969	19,912,839	814,642,808	17.11%	10.40%	6.71%	54,662,532	33,649,409
2015	830,492,817	17,498,719	847,991,536	17.11%	10.40%	6.71%	56,900,232	32,507,566
2016	867,864,994	15,357,637	883,222,631	17.11%	10.40%	6.71%	59,264,239	31,422,869
2017	906,918,919	13,295,038	920,213,957	17.11%	10.40%	6.71%	61,746,356	30,384,157
2018	947,730,270	11,330,394	959,060,664	17.11%	10.40%	6.71%	64,352,971	29,389,160
2019	990,378,132	9,614,864	999,992,996	17.11%	10.40%	6.71%	67,099,530	28,439,422
2020	1,034,945,148	8,107,621	1,043,052,769	17.11%	10.40%	6.71%	69,988,841	27,530,419
2021	1,081,517,680	6,876,306	1,088,393,986	17.11%	10.40%	6.71%	73,031,236	26,660,936
2022	1,130,185,975	5,853,965	1,136,039,940	17.11%	10.40%	6.71%	76,228,280	25,826,501
2023	1,181,044,344	4,901,983	1,185,946,327	17.11%	10.40%	6.71%	79,576,999	25,021,868
2024	1,234,191,340	4,114,815	1,238,306,155	17.11%	10.40%	6.71%	83,090,343	24,247,415
2025	1,289,729,950	3,451,266	1,293,181,216	17.11%	10.40%	6.71%	86,772,460	23,500,631
2026	1,347,767,798	2,850,289	1,350,618,087	17.11%	10.40%	6.71%	90,626,474	22,779,040
2027	1,408,417,349	2,382,169	1,410,799,518	17.00%	10.40%	6.60%	93,112,768	21,720,624
2028	1,471,796,129	1,924,157	1,473,720,286	17.00%	10.40%	6.60%	97,265,539	21,057,402
2029	1,538,026,955	1,610,018	1,539,636,973	17.00%	10.40%	6.60%	101,616,040	20,416,946
2030	1,607,238,168	1,322,841	1,608,561,009	17.00%	10.40%	6.60%	106,165,027	19,796,695
2031	1,679,563,886	1,055,418	1,680,619,304	17.00%	10.40%	6.60%	110,920,874	19,195,845
2032	1,755,144,261	882,925	1,756,027,186	17.00%	10.40%	6.60%	115,897,794	18,614,520
2033	1,834,125,752	737,606	1,834,863,358	17.00%	10.40%	6.60%	121,100,982	18,051,241
2034	1,916,661,411	577,107	1,917,238,518	17.00%	10.40%	6.60%	126,537,742	17,505,003
2035	2,002,911,175	458,952	2,003,370,127	17.00%	10.40%	6.60%	132,222,428	16,975,789
2036	2,093,042,178	346,967	2,093,389,145	17.00%	10.40%	6.60%	82,898,210	9,877,629

Present Value of Future Amortization Payments: 769,206,931

Section 6

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.

The chart on the following page and Table 11 show that in 1998 the System had a small negative cash flow. In the year ended June 30, 2007, the System's benefits and administrative expenses exceeded contributions by $21 million despite a one-time cash contribution of $50 million. At the current contribution rates, benefits and administrative expenses are projected to continue to exceed contributions in future years, and this deficit is projected to increase to $145 million for the year ending June 30, 2017.

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.

The projected contributions and administrative expenses are based on the actual amounts for the year ended June 30, 2007. Contributions are assumed to increase at the general wage increase assumption of 4.5%. Expenses are assumed to increase at the underlying inflation assumption of 3.5%. The future employer contribution rate is assumed to be 9.58% for fiscal years ending June 30, 2008 and June 30, 2009, increasing to 9.96% effective July 1, 2009.

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Cash Flow History

Millions of Dollars

Legend: Contributions | Benefits and Admin. Expenses | Net Cash Flow
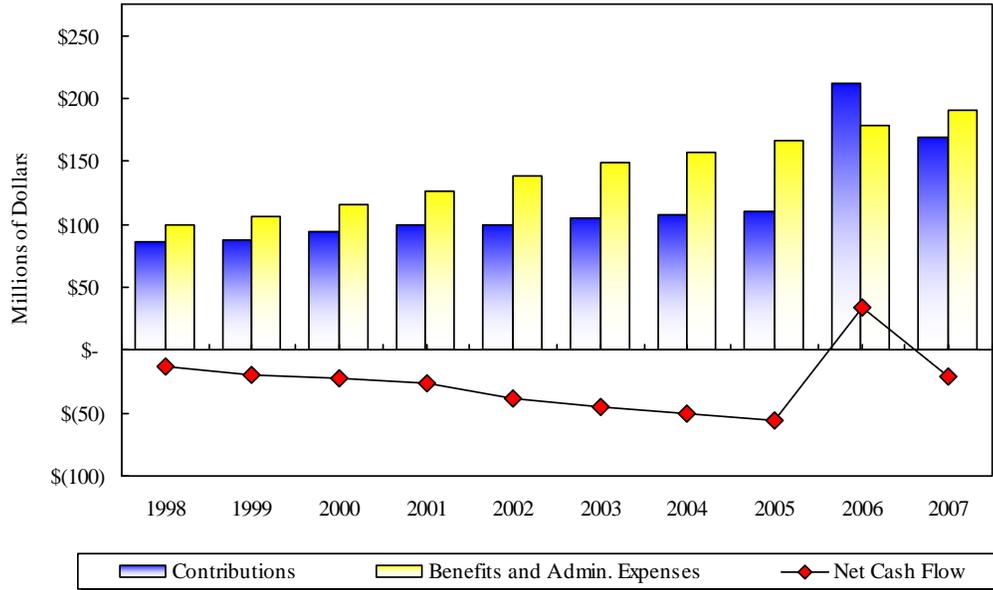
Cash Flow Projections

Millions of Dollars

Legend: Contributions | Benefits and Admin. Expenses | Net Cash Flow
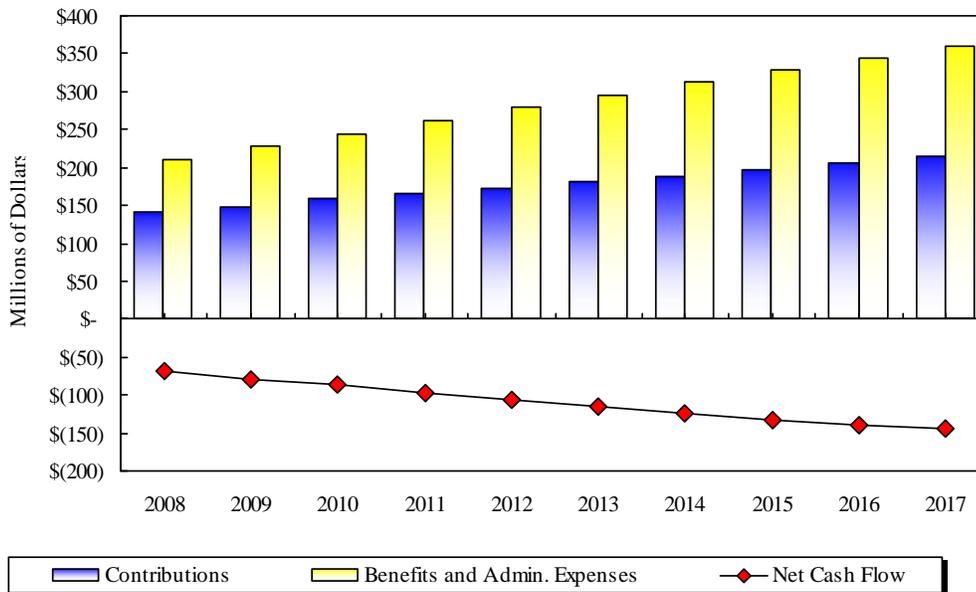
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Table 11

Cash Flow History and Projections

Year Ended June 30,	Historical Cash Flows*		
	Contributions	Benefits & Administrative Expenses	Net Cash Flow
1998	$ 87	$ 100	$ (13)
1999	88	107	(19)
2000	94	116	(22)
2001	100	126	(26)
2002	100	138	(38)
2003	104	149	(45)
2004	108	158	(50)
2005	111	167	(56)
2006	212 **	178	34
2007	169 ***	190	(21)

Year Ending June 30,	Projected Cash Flows*		
	Contributions	Benefits & Administrative Expenses	Net Cash Flow
2008	$ 142	$ 211	$ (69)
2009	148	228	(80)
2010	158	244	(86)
2011	165	262	(97)
2012	173	279	(106)
2013	180	296	(116)
2014	189	313	(124)
2015	197	329	(132)
2016	206	345	(139)
2017	215	360	(145)

*   *Millions of Dollars*

** *Reflects $100 million transfer to TRS*

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

Section 7

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 two most recent regular actuarial valuations are presented in Table 12. 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	
	2006 - 2007	2005 - 2006
Investment Income. Investment income was (greater) less than expected. Based on actuarial value of assets.	($67.7)	($17.9)
Pay Increases. Pay increases were (less) greater than expected.	2.5	(1.3)
Age & Service Retirements. Members retired at (older) younger ages or with (less) greater final average pay than expected.	(0.9)	(4.1)
Disability Retirements. Disability claims were (less) greater than expected.	0.2	0.3
Death-in-Service Benefits. Survivor claims were (less) greater than expected.	(1.0)	(0.2)
Withdrawal From Employment. (More) less reserves were released by withdrawals than expected.	7.2	6.5
Death After Retirement. Retirees (died younger) lived longer than expected.	0.5	(6.2)
Other. Miscellaneous (gains) and losses resulting from data adjustments.	(1.6)	17.6
Total (Gain) or Loss During Period From Financial Experience.	$(60.8)	$ (5.3)
Non-Recurring Items. Changes in actuarial assumptions caused a (gain) loss.	0.0	24.0
Changes in benefits caused a (gain) loss.	0.0	0.0
Composite (Gain) Loss During Period.	$(60.8)	$ 18.7

* *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

The actuarial assumptions used in this valuation have not been changed since the July 1, 2006 Actuarial Valuation. However, a new asset valuation method was adopted for the July 1, 2007 valuation. The Board most recently adopted new mortality assumptions at the May 19, 2006 Retirement Board Meeting. Active demographic assumptions were reviewed in the 2002 Investigation of Experience Study. Economic assumptions were reviewed in the 2004 Investigation of Experience Study.

Tables A-3 through A-6 give rates of decrement for service retirement, disablement, mortality, and other terminations of employment. These rates of decrement are referred to in actuarial literature as the absolute rate of decrement. Table A-7 shows the assumed probability of retaining membership in the System among members terminating with five or more years of service.

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 unfunded actuarial accrued liability (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.

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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 9.58% of members' salaries. The employer contribution rate will increase to 9.96% at July 1, 2009. 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. (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's most recent retirement effective date is at least 36 months prior to January 1 of the year in which the adjustment is to be made.

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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, 2002. The rates for University Members were adopted July 1, 2002.

Disablement

The rates of disablement used in this valuation are illustrated in Table A-4. The rates for General Members were adopted July 1, 2002. The rates for University Members were adopted July 1, 1996.

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, 2002.

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 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

The total contribution received for the fiscal year ending June 30, 2007 was $6,103,160. Based on a contribution rate of 4.04%, we assumed the total ORP payroll for the fiscal year to be $151,068,317 ($6,103,160 divided by 4.04%).

Effective for fiscal years after June 30, 2007 until June 30, 2033, the Optional Retirement Program contribution rate is 4.72%, as described in House Bill No. 63.

Buybacks, Purchase of Service, and Military Service

The active liabilities and normal cost 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, 2000.

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
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Table A-1

Summary of Valuation Assumptions
(July 1, 2007)

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, 2002)	Table A-3
C.	Disablement (adopted July 1, 2002) (General Member assumptions adopted July 1, 2002) (University Member assumptions adopted July 1, 1996)	Table A-4
D.	Mortality among contributing members, service retired members, and beneficiaries	Table A-5
	For Males: RP 2000 Combined Mortality Table for Males, set back 3 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 2 years, with mortality improvements projected by Scale AA to 2008 (adopted July 1, 2006).	
E.	Mortality among disabled members	Table A-5
	For Males: RP 2000 Disabled Mortality Table for Males, set back 3 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 3 years, with mortality improvements projected by Scale AA to 2008 (adopted July 1, 2006).	
F.	Other terminations of employment (adopted July 1, 2002)	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
State of Montana

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		18.0%	9.5%		5.0%	4.9%
46		18.0	9.5		5.0	4.9
47		12.5	9.5		5.0	4.9
48		12.5	9.5		5.0	4.9
49	*	12.5	9.5	*	5.0	4.9
50	4.0%	12.5	9.5	1.9%	8.0	4.9
51	4.0	16.0	9.5	2.2	8.0	4.9
52	4.5	16.0	9.5	2.5	8.0	6.0
53	4.5	16.0	9.5	2.8	8.0	6.0
54	5.0	16.0	9.5	3.1	12.0	6.0
55	5.5	22.0	14.0	3.4	15.0	6.0
56	6.0	22.0	14.0	3.7	15.0	6.0
57	6.5	22.0	14.0	4.0	15.0	7.0
58	6.5	22.0	15.0	4.3	15.0	7.0
59	7.0	22.0	18.0	4.7	15.0	9.0
60	*	22.0	22.0	*	19.0	10.0
61		22.0	22.0		19.0	14.0
62		27.0	27.0		24.0	24.0
63		22.0	22.0		14.0	14.0
64		25.0	25.0		20.0	20.0
65		35.0	35.0		33.0	33.0
66		30.0	30.0		23.0	23.0
67		24.0	24.0		23.0	23.0
68		22.0	22.0		23.0	23.0
69		22.0	22.0		23.0	23.0
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.

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Teachers' Retirement System
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Table A-4

Disablement
Annual Rates

Age	General Members	University Members
25	.010%	.003%
30	.010	.006
35	.020	.012
40	.040	.021
45	.080	.036
50	.130	.055
55	.180	.083
60	.260	.126

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Teachers' Retirement System
State of Montana

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
State of Montana

Table A-6

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

Years of Service	General Members	University Members
1	30.0%	33.0%
2	16.0	17.0
3	11.0	13.0
4	9.0	11.0
5	8.0	9.0
6	7.7	8.3
7	7.3	7.7
8	7.0	7.0
9	6.6	6.6
10	6.2	6.2
11	5.8	5.8
12	5.4	5.4
13	5.0	5.0
14	4.6	4.6
15	4.2	4.2
16	3.8	3.8
17	3.4	3.4
18 and up	3.0	3.0

Teachers' Retirement System
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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

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Appendix B

Summary of Benefit Provisions

Effective Date   September 1, 1937.

Vesting Period   5 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 3 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 5 years of service.

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

Early Retirement Benefits

    Eligibility: 5 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.

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Death Benefit

    Eligibility: 5 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: 5 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 5 years of service, the accumulated employee contributions with interest are returned. With more than 5 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: 9.58% of compensation, 9.96% starting July 1, 2009.

                              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 5.0% 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's most recent retirement effective date is at least 36 months prior to January 1 of the year in which the adjustment is to be made.

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Appendix C

Valuation Data

This valuation is based upon the membership of the System as of July 1, 2007. 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.

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.

Active Members	Number	Annual Salaries in Millions
Full-Time Members	12,634	$ 568.4
Part-Time Members*	4,994	61.1
Total Contributing Members*	17,628	$ 629.5
Active Members with Annual Compensation less than $1,000	548	
Total Active Members	18,176	

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

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, 2006 to July 1, 2007.

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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	9,881	$ 180,321	$ 18,249
Survivors of Deceased Retired Members	843	9,479	11,245
Total Service Retirement (including survivors)	10,724	189,800	17,699
Disability Retirement	203	1,896	9,339
Survivors of Deceased Active Members	404	3,481	8,615
Child Beneficiaries	25	60	2,400
Total Annuitants	11,356	$ 195,237	$ 17,192

Terminated Members with Contributions Not Withdrawn	Number
Vested Terminated Members	1,671
Non-Vested Terminated Members	8,963
Total Terminated Members	10,634

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State of Montana

Table C-1

Active Members Distribution of
Full-Time Employees and Salaries
as of July 1, 2007

Number of Employees

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	15	72	14	-	1	-	-	-	-	-	-	-	102
25 to 29	32	273	269	324	122	-	-	-	-	-	-	-	1,020
30 to 34	19	119	108	213	693	81	-	-	-	-	-	-	1,233
35 to 39	19	78	75	128	441	527	97	-	-	-	-	-	1,365
40 to 44	11	56	56	119	281	366	473	91	-	-	-	-	1,453
45 to 49	12	54	57	98	274	292	364	507	122	-	-	-	1,780
50 to 54	6	51	48	71	259	323	366	446	543	135	-	-	2,248
55 to 59	8	35	25	64	154	222	368	361	409	497	108	1	2,252
60 to 64	6	10	11	23	74	78	125	157	142	169	159	13	967
65 to 69	1	6	2	2	13	13	23	30	16	23	26	22	177
70 and up	1	-	1	1	3	5	2	2	4	6	3	9	37
Totals	130	754	666	1,043	2,315	1,907	1,818	1,594	1,236	830	296	45	12,634

Completed Years of Service

Teachers' Retirement System
State of Montana

Table C-1

Active Members Distribution of
Full-Time Employees and Salaries
as of July 1, 2007

Annual Salaries in Thousands

Age	0	1	2	3 to 4	5 to 9	Completed Years of Service 10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	205	1,932	400	-	33	-	-	-	-	-	-	-	2,570
25 to 29	380	7,730	7,629	9,940	4,005	-	-	-	-	-	-	-	29,684
30 to 34	334	3,538	3,360	7,070	25,330	3,344	-	-	-	-	-	-	42,976
35 to 39	331	2,396	2,379	4,658	16,816	23,280	4,490	-	-	-	-	-	54,350
40 to 44	168	1,855	1,820	4,284	10,646	16,641	23,743	4,595	-	-	-	-	63,752
45 to 49	173	1,791	1,861	3,671	10,493	13,086	18,214	26,467	6,523	-	-	-	82,279
50 to 54	58	1,835	1,767	2,546	10,481	14,894	18,648	23,498	30,011	7,608	-	-	111,346
55 to 59	80	1,144	918	2,619	6,087	9,836	17,944	19,293	23,071	28,253	6,123	56	115,424
60 to 64	65	354	417	1,000	3,381	3,521	6,413	8,819	8,327	10,899	9,417	846	53,459
65 to 69	17	223	55	63	571	653	1,155	1,654	1,009	1,474	1,778	1,515	10,167
70 and up	6	-	18	57	113	190	289	121	295	364	222	669	2,344
Totals	1,817	22,798	20,624	35,908	87,956	85,445	90,896	84,447	69,236	48,598	17,540	3,086	568,351

Teachers' Retirement System
State of Montana

Table C-1

Active Members Distribution of
Full-Time Employees and Salaries
as of July 1, 2007

Average Annual Salary

Age	0	1	2	3 to 4	5 to 9	Completed Years of Service 10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	13,643	26,838	28,538	-	33,137	-	-	-	-	-	-	-	25,193
25 to 29	11,863	28,317	28,359	30,680	32,828	-	-	-	-	-	-	-	29,102
30 to 34	17,595	29,731	31,113	33,194	36,551	41,284	-	-	-	-	-	-	34,855
35 to 39	17,431	30,721	31,715	36,391	38,131	44,175	46,290	-	-	-	-	-	39,817
40 to 44	15,312	33,126	32,502	35,996	37,885	45,468	50,197	50,499	-	-	-	-	43,876
45 to 49	14,399	33,165	32,648	37,457	38,296	44,816	50,038	52,203	53,468	-	-	-	46,224
50 to 54	9,649	35,988	36,814	35,866	40,468	46,113	50,952	52,686	55,269	56,354	-	-	49,532
55 to 59	9,986	32,698	36,715	40,914	39,524	44,306	48,760	53,444	56,409	56,847	56,695	56,463	51,254
60 to 64	10,784	35,353	37,945	43,459	45,685	45,143	51,306	56,174	58,641	64,490	59,225	65,068	55,282
65 to 69	16,785	37,172	27,482	31,388	43,954	50,221	50,203	55,140	63,060	64,108	68,386	68,863	57,442
70 and up	5,535	-	17,700	57,366	37,552	37,975	144,399	60,453	73,848	60,720	74,013	74,351	63,345
Totals	13,968	30,238	30,965	34,427	37,994	44,806	49,998	52,979	56,017	58,552	59,256	68,589	44,986

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State of Montana

Table C-1

Active Members Distribution of
Part-Time Employees
as of July 1, 2007

Number of Employees

Age	0	1	2	3 to 4	5 to 9	Completed Years of Service 10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	104	26	5	2	-	-	-	-	-	-	-	-	137
25 to 29	139	105	54	45	35	-	-	-	-	-	-	-	378
30 to 34	109	78	49	55	71	30	-	-	-	-	-	-	392
35 to 39	107	98	73	62	90	57	33	-	-	-	-	-	520
40 to 44	127	107	81	119	141	49	42	24	-	-	-	-	690
45 to 49	104	97	67	120	249	106	37	37	18	-	-	-	835
50 to 54	71	91	68	126	206	140	62	27	21	8	-	-	820
55 to 59	56	53	49	87	158	111	76	41	18	21	6	-	676
60 to 64	32	30	25	50	74	52	59	11	11	6	3	1	354
65 to 69	19	11	4	23	29	13	10	8	5	1	-	1	124
70 and up	2	9	4	9	23	10	2	5	2	-	-	2	68
Totals	870	705	479	698	1,076	568	321	153	75	36	9	4	4,994

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Teachers' Retirement System
State of Montana

Table C-2

Distribution of Inactive Lives

Members Receiving Service Retirement Benefits as of July 1, 2007

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	25	$ 507	$ 20,295
50 to 54	303	5,928	19,565
55 to 59	1,133	23,385	20,640
60 to 64	2,115	44,260	20,927
65 to 69	2,049	41,912	20,455
70 to 74	1,502	28,056	18,679
75 to 79	1,106	17,963	16,242
80 to 84	735	9,735	13,244
85 to 89	512	5,416	10,579
90 and up	401	3,157	7,873
Total	9,881	180,321	18,249

Members Receiving Disability Retirement Benefits as of July 1, 2007

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	11	$ 108	$ 9,851
50 to 54	14	132	9,395
55 to 59	45	438	9,725
60 to 64	38	391	10,298
65 to 69	27	255	9,428
70 to 74	20	198	9,891
75 to 79	23	203	8,815
80 to 84	12	89	7,421
85 to 89	10	65	6,530
90 and up	3	17	5,817
Total	203	1,896	9,339

Teachers' Retirement System
State of Montana

Table C-2

Distribution of Inactive Lives

Survivors of Deceased Retired Members as of July 1, 2007

Age	Number of Persons	Annual Benefits in Thousands		Average Annual Benefits
<50	28	$	202	$	7,226
50 to 54	25		250		9,980
55 to 59	48		552		11,502
60 to 64	77		932		12,101
65 to 69	93		1,245		13,384
70 to 74	117		1,608		13,748
75 to 79	106		1,378		12,997
80 to 84	142		1,515		10,670
85 to 89	133		1,156		8,695
90 and up	74		641		8,665
Total	843		9,479		11,245

Survivors of Deceased Active Members as of July 1, 2007

Age	Number of Persons	Annual Benefits in Thousands		Average Annual Benefits
<50	79	$	424	$	5,369
50 to 54	36		256		7,116
55 to 59	46		426		9,262
60 to 64	63		618		9,805
65 to 69	41		519		12,669
70 to 74	35		278		7,953
75 to 79	40		443		11,081
80 to 84	31		332		10,711
85 to 89	24		135		5,609
90 and up	9		49		5,413
Total	404		3,481		8,615

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State of Montana

Table C-2

Distribution of Inactive Lives

Terminated Vested Members as of July 1, 2007
Number of Persons

Age	Number
<25	-
25 to 29	6
30 to 34	83
35 to 39	156
40 to 44	195
45 to 49	281
50 to 54	357
55 to 69	412
60 to 64	140
65 to 69	39
70 & above	2
Total	1,671

Child Beneficiaries as of July 1, 2007
Number of Persons

Age	Number
<5	-
5 to 6	1
7 to 8	2
9 to 10	5
11 to 12	4
13 to 14	5
15 to 16	8
17 to 18	-
Total	25

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Table C-3

Data Reconciliation

	Active Contributing Members *	Vested Terminated Members	Service Retired Members	Disabled Members	Survivors and Beneficiaries
July 1, 2006 Valuation	17,555	1,684	9,564	205	1,250
Refunds and NonVested Terminations	(1,102)	(88)	-	-	-
Change to Annual Pay under $1,000	(111)	(7)	-	-	-
Vested Terminations	(216)	216	-	-	-
Service Retirements	(506)	(61)	567	-	-
Disability Retirements	(6)	(3)	-	9	-
Deaths with Beneficiary	(8)	(2)	(62)	(3)	75
Deaths without Beneficiary	(7)	(2)	(191)	(8)	(52)
New Entrants	1,445	-	-	-	-
Rehires	584	(77)	(14)	-	-
Other	-	11	17	-	(1)
July 1, 2007 Valuation	17,628	1,671	9,881	203	1,272

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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.

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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

*   *Not available.*

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

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Table D-2

Retired and Inactive Membership Data

Valuation Date (July 1)	All Annuitants					Terminated Members	
	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

*   *Not available.*

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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%

*   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.
*** This rate increases to 9.96% at July 1, 2009.

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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.

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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.

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