



# Cavanaugh Macdonald

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May 1, 2014

Mr. Shawn Graham  
Executive Director  
Teachers Retirement System  
State of Montana  
1500 Sixth Avenue  
Helena, MT 59620-0139

Dear Mr. Graham:

Enclosed are 15 copies of the "Montana Teachers' Retirement System Experience Study for the Five-Year Period Ending July 1, 2013".

Let us know if there are any questions concerning this report.

Sincerely,

Edward A. Macdonald ASA, FCA, MAAA  
President

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

EAM:TBG/jnw

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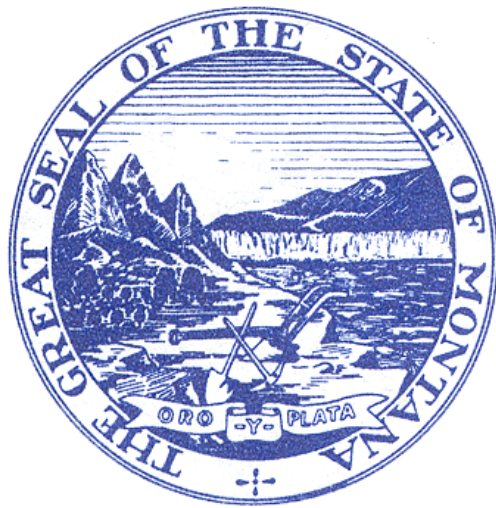
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**Experience Study**

**For the Five-Year Period**

**Ending July 1, 2013**





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May 1, 2014

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

Dear Members of the Board:

We are pleased to submit the results of a study of the economic and demographic experience for the Montana Teachers' Retirement System. The purpose of this investigation is to assess the reasonability of the actuarial assumptions for the System. This investigation covers the five-year period from July 1, 2008 to July 1, 2013. As a result of the investigation, it is recommended that revised assumptions be adopted by the Board for future use.

The experience study includes all active full-time members, retired members and beneficiaries of deceased members. The mortality experience was studied separately for males and females. Incidences of withdrawal, disability, retirement and compensation increases were investigated without regard to gender. Retirement experience and compensation increases were investigated separately for university and non-university members.

This report shows comparisons between the actual and expected cases of separation from active service, actual and expected number of deaths, and actual and expected salary increases. Tables and graphs are used to show the actual decrement rates, the expected decrement rates and, where applicable, the proposed decrement rates.

The recommended decrement tables are shown in Appendix D of this report. In the actuary's judgment, the recommended rates are suitable for use until further experience indicates that modifications are needed.

Actuarial assumptions are used to measure and budget future costs. Changing assumptions will not change the actual cost of future benefits. Once the assumptions have been adopted, the actuarial valuation measures the adequacy of the contributions rates set in Montana State Law.

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The experience study was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

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

Edward A. Macdonald ASA, FCA, MAAA  
President

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

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

EAM:TBG\jnw



## Summary of Results

The following summarizes the findings and recommendations with regard to the assumptions utilized by the Montana Teachers' Retirement System. Explanations for the recommendations are found in the sections that follow.

### **Recommended Economic Assumption Changes**

The table below lists the three economic assumptions used in the actuarial valuation and their current and proposed rates. We recommend reducing the assumed rates of price inflation and real wage growth.

Item	Current	Proposed
Price Inflation	3.50%	3.25%
Investment Return	7.75%	7.75%
Real Wage Growth	1.00%	0.75%

### **Recommended Demographic Assumption Changes**

The table below lists the demographic assumptions that we recommend be changed based on the experience of the last five years.

Assumption Change
Update pre and post retirement mortality rates

### **Recommended Method Changes**

#### **Payroll Growth Assumption**

In keeping with the real wage growth change, we recommend that the payroll growth assumption for amortization as a level percent of pay be reduced from 4.50% to 4.00%.

#### **Administrative Expense Load**

We have recommended an investment return assumption that is net of investment expenses only, therefore the normal cost rate must be loaded for administrative expenses. The administrative expense load is equal to the prior year's administrative expenses adjusted for non-recurring items as a percentage of payroll plus an additional amount for GASB Statements 67 & 68 reporting fees.

**Financial Impact**

The following table highlights the impact of the recommended changes noted on the previous page on the unfunded accrued liability (UAL) and funded status for the System as of July 1, 2013.

(\$ Thousands)

	<b>Before Change</b>	<b>Reduced GABA After Change</b>	<b>Full GABA After Change</b>
UAL	\$1,524,780	\$1,565,438	\$1,944,206
Funded Status	66.80%	66.21%	61.21%



**Economic Assumptions**

There are three economic assumptions used in performing the actuarial valuation for the Montana Teachers’ Retirement System. The assumptions are:

- Price Inflation
- Investment Return
- Wage Inflation

The Actuarial Standards Board has issued Actuarial Standard of Practice (ASOP) No. 27, “*Selection of Economic Assumptions for Measuring Pension Obligations*”, which provides guidance to actuaries in selecting economic assumptions for measuring obligations under defined benefit plans. As noted in ASOP No. 27, because no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes based on a mixture of past experience and future expectations. These estimates therefore are best stated as a range utilizing the actuary’s professional judgment. In setting the range and the single point within that range to use, the actuary should consider a number of factors, including the purpose and nature of the measurement, and appropriate recent and long-term historical economic data. However, the standard explicitly advises the actuary not to give undue weight to recent experience.

Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular valuation, each economic assumption should be consistent with every other economic assumption over the measurement period.

In our opinion, the economic assumptions recommended in this report have been developed in accordance with ASOP No. 27. The following table shows our recommendations followed by explanations of each assumption.

Item	Current	Proposed
Price Inflation	3.50%	3.25%
Real Rate of Return	<u>4.25</u>	<u>4.50</u>
Investment Return	7.75%	7.75%
Price Inflation	3.50%	3.25%
Real Wage Growth	<u>1.00</u>	<u>0.75</u>
Wage Inflation	4.50%	4.00%





### Price Inflation

**Background:** As seen in the table on the previous page, assumed price inflation is used as a component for both the investment return assumption and the wage inflation assumption. The latter two assumptions will be discussed in detail in the following sections.

It is important that the price inflation assumption be consistently applied throughout the economic assumptions utilized in an actuarial valuation. This is called for in ASOP No. 27.

The current price inflation assumption is 3.50% per year.

**Past Experience:** The Consumer Price Index, US City Average, All Urban Consumers, CPI (U), has been used as the basis for reviewing historical levels of price inflation. The level of that index in June of each of the last 50 years is provided in Appendix A.

In analyzing this data, average rates of inflation have been determined by measuring the compound growth rate of the CPI (U) over various time periods. The results are as follows:

Period	Average Annual Rate of Inflation
2003 – 2013	2.43%
1993 – 2013	2.43%
1983 – 2013	2.88%
1973 – 2013	4.25%
1963 – 2013	4.15%
1953 – 2013	3.67%
1926 – 2013	2.99%

Over shorter historic periods, the average annual rate of increase in the CPI-U has been below 3.00%. The years of high inflation occurring from 1973 to 1982 has a significant impact on the averages over periods which include these rates. We should add that since 1926, the average annual rate of inflation was 2.99%.

The graph below shows the annual increases in the CPI (U) over a 50 year period.

























































































