



111 SW Fifth Avenue
Suite 3700
Portland, OR 97204
USA

Tel +1 503 227 0634
Fax +1 503 227 7956

milliman.com

March 18, 2008

Teachers' Retirement Board
CalSTRS

Re: 2007 Actuarial Experience Analysis

Dear Members of the Board:

The actuarial valuations as of June 30, 2007, will become the cornerstone for analyzing the funding status of the System's Defined Benefit (DB) Program, Defined Benefit Supplement (DBS) Program, the Cash Balance Benefit (CBB) Program and the Medicare Premium Payment (MPP) Program. Additional actuarial information will be developed for disclosing employer liabilities on financial statements, and for analyzing the fiscal impact of proposed future legislation.

We are pleased to submit this report of our investigation of the experience of CalSTRS through June 30, 2007. The results of this investigation are the basis for recommended changes in a number of actuarial assumptions for the three actuarial valuations to be performed as of June 30, 2007.

The purpose of this report is to communicate the results of our review of the actuarial methods and the economic and demographic assumptions. Several of our recommendations represent changes from the prior methods or assumptions and are designed to better anticipate the emerging experience of the System. We have provided financial information showing the estimated impact of the recommended assumptions on the June 30, 2006 actuarial valuation. We believe the recommended assumptions provide our best estimate of anticipated experience affecting CalSTRS. Nevertheless, the emerging costs will vary from those presented in this report to the extent that actual experience differs from that projected by the actuarial assumptions.

In preparing this report, we relied without audit on information (some oral and some in writing) supplied by the CalSTRS staff. This information includes, but is not limited to, statutory provisions, membership data, and financial information. In our examination, after discussion with CalSTRS and certain adjustments, we have found the data to be reasonably consistent and comparable with data used for other purposes. Since the experience study 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 determinations might 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 (ASB) and the applicable Guides to Professional Conduct, amplifying Opinions, and supporting Recommendations of the American Academy of Actuaries.

We further certify that the assumptions developed in this report satisfy ASB Standards of Practice, in particular, No. 27 (Selection of Economic Assumptions for Measuring Pension Obligations) and No. 35 (Selection of Demographic and Other Non-economic Assumptions for Measuring Pension Obligations).


Milliman has been engaged by CalSTRS as an independent actuary. Any distribution of this report must be in its entirety, including this cover letter, unless prior written consent is obtained from Milliman. Milliman's work product was prepared exclusively for CalSTRS for a specific and limited purpose. It is a complex, technical analysis that assumes a high level of knowledge concerning CalSTRS operations, and uses the CalSTRS 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 acknowledge the help in the preparation of the data for this investigation given by the CalSTRS staff. We look forward to our discussions and the opportunity to respond to your questions and comments at your next meeting.


I, Mark Johnson, 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.

I, Nick Collier, am a member of the American Academy of Actuaries and an Associate of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,



Mark O. Johnson, FSA, MAAA
Consulting Actuary



Nick J. Collier, ASA, EA, MAAA
Consulting Actuary

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

TABLE OF CONTENTS

	Page
Section 1	Summary of Key Recommendations 1
Section 2	Introduction 4
Section 3	Actuarial Methods 10
Section 4	Economic Assumptions 15
Section 5	Demographic Assumptions 34
Section 6	Estimated Impact of Recommendations 56



This work product was prepared solely for CalSTRS. It may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Section 1

Summary of Key Recommendations

Actuarial Methods

The key methods are the actuarial cost method and the asset smoothing method. We reviewed these methods and concluded they are still appropriate. We are not making any recommendations for changes at this time.

- The funded status of the DB Program is measured by the Entry Age Actuarial Cost Method. The funded status is measured by the Traditional Unit Credit Cost Method for both the DBS and CBB Programs. The MPP Program is evaluated on a pay-as-you-go basis.
- The DB Program is valued using an asset smoothing method. The Method is the Cumulative Expected Value Method with One-Third Recognition of Gains and Losses. The DBS and CBB Programs use Fair Value of Assets and the MPP Program uses an allocated value of the DB Program Fair Market Value.

Economic Assumptions

The two major economic assumptions are net investment return and wage growth and each is affected by the underlying assumed rate of inflation. We are not recommending any changes to these assumptions for the DB Program.

We are recommending that the expected return for the DBS and CBB Programs be lowered from 8.00% to 7.75% because the portfolios of those Programs are not invested in the full spectrum of instruments available in the DB Program portfolio, and are therefore more conservative. This change will only impact the determination of Additional Earnings and Additional Annuity Credits for the DBS and CBB Programs under certain circumstances.

	<u>Current</u>	<u>Recommendations</u>	
		<u>DB</u>	<u>DBS & CBB</u>
Consumer Price Inflation	3.25%	3.25%	3.25%
Net Real Rate of Return	<u>4.75</u>	<u>4.75</u>	<u>4.50</u>
Investment Return	8.00%	8.00%	<u>7.75%</u>
Consumer Price Inflation	3.25%	3.25%	3.25%
Net Real Rate of Return	<u>1.00</u>	<u>1.00</u>	<u>1.00</u>
Wage Growth	4.25%	4.25%	4.25%

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Economic assumptions specific to the MPP Program will be developed in conjunction with the actuarial valuation. Due to the changing healthcare market, it is not prudent to set all of the assumptions in advance for this program.

Demographic Assumptions

The demographic assumptions reviewed in this study pertain to the DB, DBS, CBB and MPP Programs. There are some additional demographic assumptions for the MPP Program which will be developed in conjunction with the actuarial valuation.

The most significant change from a financial perspective is our recommendation to strengthen the mortality assumptions. The assumption was last changed in 1999 and, due to continued improvements in life expectancies, we recommend another update.

We are also recommending modest changes to the service retirement rates, termination rates, refund rates and disability rates. Our recommendations also include changes to several supplemental assumptions. The major assumptions are outlined below.

Based on the Experience of the DB Program	Recommended Revisions
Mortality	
Healthy Retired Members	yes
Beneficiaries	yes
Active Members	yes
Disabled Members (including pre-72)	yes
Service Retirement	
Retirement from Active Membership	yes
Retirement from Vested Membership	no
Disability	
Coverage A	no
Coverage B	yes
Other Terminations of Membership	
Withdrawal	yes
Probability of Refund	yes
Merit Scale Salary Adjustments	no

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Estimated Impact on the Valuations

DB Program: The long-term cost of the DB Program is expected to increase by about 1.461% of salaries. Of this total, 1.287% is due to the strengthened mortality assumptions.

DBS and CBB Programs: The lowering of the investment return assumption from 8.00% to 7.75% may have an impact in certain years on the decision to distribute Additional Earnings Credits and Additional Annuity Credits.

SBMA and MPP Programs: Distributions to individual members of the SBMA and MPP Programs are expected to be paid over a longer period due to the strengthened mortality assumptions.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Section 2

Introduction

Purpose of the Study

The primary purpose of an actuarial valuation is to analyze the sufficiency of future contributions from members, employers and the State, to meet the current and future obligations of each program. By using the actuarial methods and assumptions adopted by the Retirement Board, the actuarial valuations will provide the best estimate of the long-term financing of the programs.

The purpose of this study is to recommend a set of actuarial methods and assumptions for the 2007 actuarial valuations. We expect these methods and assumptions to be used until the next Experience Analysis is completed. These methods and assumptions have been developed in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the applicable Standards of Practice adopted by the Actuarial Standards Board of the American Academy of Actuaries.

Scope of the Study

Actuarial valuations utilize various methods and procedures and two different types of assumptions. Economic assumptions are related to the general economy and its impact on CalSTRS, while demographic assumptions are based on the emergence of the specific experience of CalSTRS members.

All of the methods and assumptions that will be used in the 2007 and later actuarial valuations have been reviewed in this Study. The remainder of this report is organized in the following manner:

- Section 3 Actuarial Methods
- Section 4 Economic Assumptions
- Section 5 Demographic Assumptions
- Section 6 Estimated Impact of Recommendations

Funding and Valuation Principles

Just as certain investment choices have an associated "investment risk," choices in actuarial assumptions have an associated "actuarial risk." Our responsibility is to consider the impact our work will have on both the current and future funding status of CalSTRS.

Determining the adequacy of the current contribution rates is dependent on the assumptions we use to project the future benefit payments and then to discount the value of future

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

benefits to determine the present values. Thus, it is important that the Board understand the sensitivity of the actuarial calculations to the underlying assumptions.

- If actual experience shows that the assumptions overestimated the true cost of the plan, decisions for change may be inappropriately made based on the current higher costs levels. This may also result in an overstatement of costs today and the longer term impact will not be realized until many years in the future when costs may need to be lowered due to the current overstatement.
- If actual experience shows that the assumptions underestimated the true cost of the plan, decisions for change may be inappropriately made based on the lower current costs levels. This may result in an unexpected need to increase costs in the future and may lead to budgeting difficulties.
- The valuation only presents the costs as of one date. Further analysis illustrating the potential volatility of the cost results may be needed to fully appreciate the “actuarial risk” associated with actuarial assumptions.

The actuarial assumptions do not directly impact the true cost of the plan benefits; however, they do impact how the financing and pre-funding of those retirement benefits take place before the true costs can be determined.

Since the actuarial assumption is for the long term, it is expected that in the near term there will be years in which the actual investment return will exceed the actuarial assumption, and there will be years when the actual experience will not meet the assumed rate. It is the expected long-term rate that is used to project and finance the retirement benefits.

Using a more conservative (i.e., lower) investment return assumption gives a greater assurance of having actuarial experience gains in the future, whereas using a more aggressive (i.e., higher) investment return assumption implies a willingness to assume a greater “actuarial risk” of future experience losses. Using a wage inflation that is too low is similar to using an investment return that is too high.

The question that needs to be asked in the public sector is: How great an actuarial risk is the Board willing to accept in the actuarial assumptions? If actuarial experience gains materialize in the future, CalSTRS' funded status will be better than expected. If actuarial experience losses materialize, what legal or other restrictions are applicable?

The actuarial assumptions are usually divided into two groups: economic and demographic. The economic assumptions must not only reflect CalSTRS' actual experience but also give even greater consideration to the long-term expectation of future economic growth for the nation, as well as the global economy. By long term, we are looking at time periods of from 20 to 40, possibly to 60, years – a much longer time frame than investment managers or economists will likely be discussing.

The non-economic, or demographic assumptions, are based on CalSTRS' actual experience, adjusted to reflect trends and historical experience. Thus, the economic assumptions are much more subjective than the demographic assumptions, and the demographic assumptions are much more dependent on the results of the experience studies.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Overview

This report presents the results of an investigation of the recent actuarial experience of CalSTRS. We will refer to this investigation as an experience analysis.

Throughout this report, we refer to "expected" and "proposed" actuarial assumptions. The "expected" assumptions are those used for our actuarial valuation of CalSTRS as of June 30, 2006. They may also be referred to as the "current" assumptions. These assumptions and methods were adopted by the Board based on Milliman's 2003 Experience Analysis. The "proposed" or "recommended" assumptions are those we recommend for use in the valuation as of June 30, 2007 and for subsequent valuations until further changes are made.

The choice of economic assumptions (investment return, general wage growth and payroll increase) is discussed in Section 4 of this report. These assumptions are generally chosen on the basis of the actuary's expectations as to the effect of future economic conditions on the operation of CalSTRS. However, the setting of these assumptions is much more subjective than in setting and recommending the demographic assumptions.

Section 5 of this report will show the results of our study of demographic assumptions. The Board will most likely rely on our analysis of these assumptions as they are much more deterministic than the economic assumptions. The exhibits are detailed comparisons between actual and expected terminations on both the current and proposed bases.

For each type of assumption, graphs show the actual, the expected and proposed rates, usually by some combination of gender, years of service and age. The exhibits also show the total numbers of actual and expected terminations. Ratios larger than 100% on the current basis indicate that the rates may need to be raised; ratios smaller than 100% indicate that rates may need to be lowered.

For each exhibit, the actual decrement rates are shown as bar graphs on either a quinquennial-age basis, a years-of-service basis, or, in the case of retirement rates, on an age-by-age basis. The current rates – the "expected" rates – used in the June 30, 2006 actuarial valuation, are shown as well as the new proposed assumptions as line graphs. Therefore, the assumption changes we are proposing are illustrated by the difference between the two lines in each exhibit. Note that in cases where no change is being proposed, only the expected rate line is shown.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Our Philosophy

Similar to an actuarial valuation, the calculation of actual and expected experience is a fairly mechanical process. From one actuary to another, you would expect to see very little difference. However, the setting of assumptions is a different story, as it is more art than science. In this report, we recommend new assumptions. To help you understand our thought process, here is a brief summary of our philosophy:

- **Don't overreact:** When we see significant changes in experience, we generally do not adjust our rates to reflect the entire difference. We will generally recommend rates somewhere between the old rates and the new experience. If the experience during the next study shows the same result, we will probably recognize this trend at that point. On the other hand, if the experience returns closer to its prior level, we will not have overreacted, minimizing volatility of the funded status.
- **Anticipate Trends:** If there is an identified trend that is expected to continue, we believe it should be recognized. An example of this is the retiree mortality assumption. It is an established trend that people are continuing to live longer; therefore, we prefer to build in a margin to future increases in life expectancies.
- **Simplify:** In this report we describe what factor affects each assumption. In general, we attempt to identify which factors are significant and eliminate the ones that do not materially improve accuracy.

Actuarial Standard of Practice No. 27

The Actuarial Standards Board has adopted Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*. This standard provides guidance to actuaries giving advice on selecting economic assumptions for measuring obligations under defined benefit plans. In 2007, the Governmental Accounting Standards Board (GASB) adopted Statement 50 but mostly for issues relating to the disclosure of financial results. There were no significant changes regarding this discussion of actuarial assumptions.

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. These estimates are based on a mixture of past experience, future expectations, and professional judgment. 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.

Recognizing that there is not one "right answer", the standard calls for the actuary to develop a best estimate range for each economic assumption, and then recommend a specific point within that range. Each economic assumption should individually satisfy this standard.

After completing the selection process, the actuary should review the set of economic assumptions for consistency. This may require the actuary to use the same inflation component in each of the economic assumptions selected. However, if a change occurs in

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

one assumption, the actuary needs to consider if the change would modify other economic assumptions as well.

An actuary's best-estimate range with respect to a particular measurement of pension obligations may change from time to time due to changing conditions or emerging plan experiences. The actuary may change assumptions frequently in certain situations, even if the best-estimate range has not changed materially, and less frequently in other situations. Even if assumptions are not changed, the actuary needs to be satisfied that each of the economic assumptions selected for a particular measurement complies with the Actuarial Standard of Practice No. 27.

This report will address the relevant types of economic assumptions used in the actuarial valuation to determine the obligations of CalSTRS. In our opinion, the proposed economic assumptions have been developed in accordance with ASOP No. 27.

Actuarial Standard of Practice No. 35: Selection of Demographic Assumptions

Actuarial Standard of Practice No. 35 (ASOP 35) governs the selection of demographic and other non-economic assumptions for measuring pension obligations. ASOP 35 states that the actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations, and select assumptions based upon application of that professional judgment. The actuary should select reasonable demographic assumptions in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

ASOP 35 Steps: The actuary should follow the following steps in selecting the demographic assumptions:

1. Identify the types of assumptions. Types of demographic assumptions include but are not limited to retirement, mortality, termination of employment, disability, election of optional forms of payment, administrative expenses, family composition, and treatment of missing or incomplete data. The actuary should consider the purpose and nature of the measurement, the materiality of each assumption, and the characteristics of the covered group in determining which types of assumptions should be incorporated into the actuarial model.
2. Consider the relevant assumption universe. The relevant assumption universe includes experience studies or published tables based on the experience of other representative populations, the experience of the plan sponsor, the effects of plan design, and general trends.
3. Consider the assumption format. The assumption format includes whether assumptions are based on parameters such as gender, age, service or calendar year. The actuary should consider the impact the format may have on the results, the availability of relevant information, the potential to model anticipated plan experience, and the size of the covered population.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

4. Select the Specific Assumptions. In selecting an assumption the actuary should consider the potential impact of future plan design as well as the factors listed above.
5. Evaluate the Reasonableness of the Selected Assumption. The assumption should be expected to appropriately model the contingency being measured. The assumption should not be anticipated to produce significant actuarial gains or losses.

ASOP 35 General Considerations and Application: Each individual demographic assumption should satisfy the criteria of ASOP 35. In selecting demographic assumptions the actuary should also consider the internal consistency between the assumptions, materiality, cost effectiveness, and the combined effect of all assumptions. At each measurement date the actuary should consider whether the selected assumptions continue to be reasonable, but the actuary is not required to do a complete assumption study at each measurement date. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP 35.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Section 3

Actuarial Methods

This section describes the actuarial cost method and the asset valuation method that are used to process the data, and predict the funding requirements of each Program.

Actuarial Cost Methods	
DB Program	Entry Age
DBS Program	Traditional Unit Credit
CBB Program	Traditional Unit Credit
MPP Program	Pay-As-You-Go
Asset Valuation Methods	
DB Program	Cumulative Expected Value with One-Third Recognition of Gains and Losses
DBS Program	Fair Market Value
CBB Program	Fair Market Value
MPP Program	Fair Market Value

We are not recommending any changes to the methods that are currently in place. The following sections provide a brief explanation of each of the methods.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Actuarial Cost Methods

DB Program: The accruing costs of all benefits are measured by the Entry Age Actuarial Cost Method. The actuarial present value of projected benefits for each individual member included in the 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 Obligation. The excess of the Actuarial Obligation over the Actuarial Value of Assets is called the Unfunded Actuarial Obligation. If the Actuarial Value of Assets exceeds the Actuarial Obligation, the difference is called the Actuarial Surplus.

The ages at entry of future active members are assumed to average the same as the entry ages of the present active members they replace. If the number of active members should increase (or decrease), it is further assumed that the average entry age of the larger (or smaller) group will be the same, from an actuarial standpoint, as that of the present active group. Under these assumptions, the Normal Cost Rate will not vary with the termination of the present active membership, or with an expansion or contraction of the active membership.

The Entry Age Actuarial Cost Method is the most widely used method to measure the accruing costs of large public employee retirement systems.

DBS and CBB Programs: The Traditional Unit Credit Actuarial Cost Method is used to analyze the funding status of these programs. Under this method, the projected benefits of each individual member are allocated by a consistent formula to valuation years. The actuarial present value of future projected benefits allocated to the current year is called the Normal Cost. The actuarial present value of future projected benefits allocated to periods prior to the valuation year is called the Actuarial Obligation.

When the Traditional Unit Credit Actuarial Cost Method is applied to the DBS and CBB Programs, these calculations are able to be simplified. In this case, the Actuarial Obligation is equal to the accumulated account balances and the Normal Cost is equal to the total annual contribution.

MPP Program: The obligations are funded on a pay-as-you-go basis.

Recommendation: We believe the aforementioned actuarial cost methods are reasonable and recommend they be retained. An independent audit of our work by Gabriel, Roeder, Smith & Company (GRS) in 2005 affirmed the use of these methods as reasonable, except for the MPP Program which they did not review.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Asset Valuation Methods

The audited financial statements as of June 30 are created each year. We receive a special report providing the information for each of the three Programs. The financial statements reflect the fair value of assets, sometimes referred to as the market value, or fair market value.

DB Program: The valuation of assets for an actuarial valuation of a defined benefit pension plan may be thought of in a different light than the value of assets for a retirement system's financial statement. The purpose in a financial statement disclosure is to make a representation of the current value of the assets on a fair value basis. Because the underlying calculations in the actuarial valuation are long-term in nature, and one of the goals of the actuarial valuation process is to measure the funding stability of the DB Program, it can be advantageous to smooth out short-term fluctuations in the fair value of assets.

Like the majority of large public retirement systems, the DB Program uses an asset smoothing method to determine the Actuarial Value of Assets. The assets are valued using a method that delays recognition of investment gains or losses. The expected actuarial value is the prior year's actuarial value increased with net cash flow of funds, and all increased with interest during the past year at the expected investment return assumption. One-third of the difference between the expected actuarial value of assets and the Fair Market Value of assets is added to the expected actuarial value of assets to arrive at the Actuarial Value of Assets.

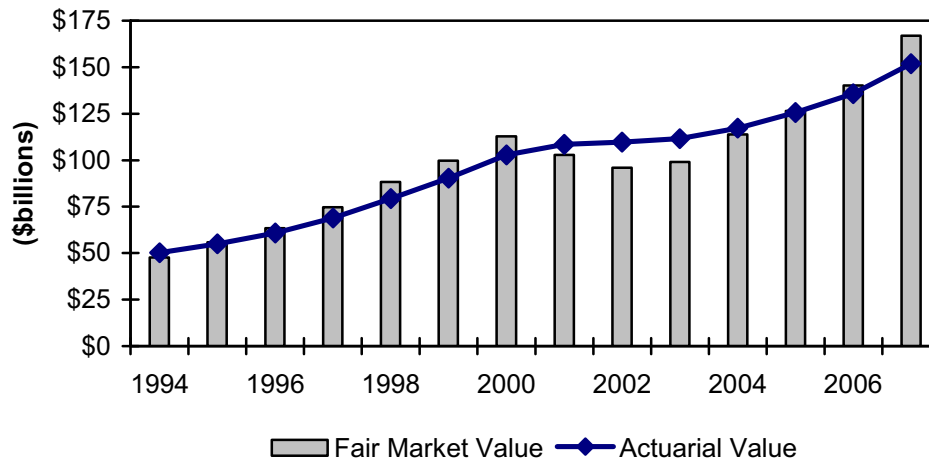
The following table includes the derivation of the Actuarial Value of Assets as of June 30, 2006 and 2007 for the DB Program.

<i>(\$Millions)</i>	June, 2006	June, 2007
Actuarial Value at Beginning of Year	\$ 125,665	\$ 135,832
Contributions	4,739	4,943
Benefits and Expenses	(6,726)	(7,260)
Expected Return at 8%	<u>9,974</u>	<u>10,774</u>
Expected Actuarial Value End of Year (A)	\$ 133,652	\$ 144,289
Fair Market Value	<u>140,192</u>	<u>166,903</u>
Difference between Fair Market Value and Expected Actuarial Value	\$ 6,540	\$ 22,614
Recognition Factor	One-third	One-third
Recognized Gain or Loss (B)	\$ 2,180	\$ 7,538
Actuarial Value at End of Year (A) + (B) <i>(Expected Value plus Recognized Gain or Loss)</i>	\$ 135,832	\$ 151,827
<i>Ratio of Actuarial Value of Assets to Fair Market Value of Assets</i>	97%	91%
Estimated Net Rate of Return on AVA	9.7%	13.6%

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

The following chart shows a history of the Actuarial Value of Assets compared to the Fair Market Value of Assets. You can see that, after relatively poor investment years, the Actuarial Value of Assets is once again less than the Fair Market Value because not all of the recent gains are recognized.

(\$Millions) June 30	Fair Market Value of Assets	Estimated Annual Return	Actuarial Value of Assets	Ratio of Actuarial to Market
1994	\$ 47,631	0.3%	\$ 50,203	105%
1995	55,862	16.9	55,047	99
1996	63,455	13.3	60,876	96
1997	74,778	17.3	68,966	92
1998	88,198	17.3	79,381	90
1999	99,780	13.4	90,265	90
2000	112,771	12.7	102,790	91
2001	102,915	(9.1)	108,571	105
2002	96,028	(6.1)	109,755	114
2003	99,031	3.8	111,604	113
2004	113,815	16.6	117,206	103
2005	126,447	12.3	125,665	99
2006	140,192	12.5	135,832	97
2007	166,903	20.9	151,827	91



This current asset smoothing method was adopted for the 1999 actuarial valuation and is effective for the investment experience beginning in July of 1993. Prior to the 1999 actuarial valuation, the recognition factor was one-fourth instead of one-third.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Smoothing Periods: The GRS audit stated that the current asset smoothing method is quite reasonable. However, we are aware that the general range for smoothing periods is three to five years, and a few systems smooth over even longer periods. Therefore, in the following table we are illustrating the impact of using four-year or five-year smoothing instead of the current three-year smoothing.

<i>(\$Millions)</i>		Ratio of Actuarial to Market Values		
June 30	<i>Estimated Return</i>	Current 3-Year	Alternative 4-Year	Alternative 5-Year
Recognition Factor		33%	25%	20%
1994	0.3%	105%	106%	106%
1995	16.9	99	99	99
1996	13.3	96	96	96
1997	17.3	92	91	90
1998	17.3	90	88	87
1999	13.4	90	88	86
2000	12.7	91	88	86
2001	(9.1)	105	104	102
2002	(6.1)	114	114	114
2003	3.8	113	114	115
2004	16.6	103	105	105
2005	12.3	99	100	101
2006	12.5	97	97	97
2007	20.9	91	90	90

Even over the volatile investment period since 1993, the difference between 20%, 25% and 33% Recognition Factors is not particularly significant. Subsequent to periods of good returns, more smoothing will produce lower Actuarial Values (see 2000 above) and after periods of poor returns, more smoothing will produce higher Actuarial Values (see 2003).

Recommendation for DB Program: We recommend the current method be continued.

DBS and CBB Programs: The assets are valued at Fair Market Value and the Gain and Loss Reserve acts as a smoothing technique. We recommend this method be continued.

MPP Program: For funding purposes, the assets are valued as the allocated value of the DB Program Fair Market Value of Assets. This figure is derived by taking the prior year value and increasing with earnings and decreasing by benefit payments during the year. We recommend this method be continued.

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

**Section 4
Economic Assumptions**

Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, provides guidance to actuaries giving advice on selecting economic assumptions for measuring obligations under defined benefit plans. 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. These estimates are based on a mixture of past experience, future expectations, and professional judgment. 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.

Recognizing that there is not one “right answer”, the standard calls for the actuary to develop a best estimate range for each economic assumption, and then recommend a specific point within a range the actuary considers reasonable. The best estimate range may be broader than what the actuary considers a reasonable range. 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 with the changes in bold print.

	Current	Recommendations	
		DB	DBS & CBB
Consumer Price Inflation	3.25%	3.25%	3.25%
Net Real Rate of Return	<u>4.75</u>	<u>4.75</u>	4.50
Investment Return	8.00%	8.00%	7.75%
Interest on Member Accounts	6.00%	6.00%	7.75%
Consumer Price Inflation	3.25%	3.25%	3.25%
Net Real Rate of Return	<u>1.00</u>	<u>1.00</u>	<u>1.00</u>
Wage Growth	4.25%	4.25%	4.25%

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Consumer Price Inflation

Use in the Valuation: When we refer to inflation in this report, we are referring to price inflation. The future price inflation assumption has an indirect impact on the results of the actuarial valuation through the development of the assumptions for investment returns and wage growth. It will also have an impact on the predicted sustainability of the Supplemental Benefit Maintenance Account (SBMA).

The long-term relationship between inflation and investment return has long been recognized by economists. The basic principle is that the investors demand a “real return” which is the excess of actual investment returns over inflation. If inflation rates are expected to be high, investors will demand expected investment returns that are also expected to be high enough to exceed inflation, while lower inflation rates will result in lower demanded expected investment returns, at least in the long run.

The current assumption for inflation is 3.25% per year.

Historical Perspective: We have used certain published economic statistics that have been accumulated on a monthly basis over the last 75 years. The data for inflation is based on the Consumer Price Index, US City Average, All Urban Consumers (CPI). The data for periods ending in June of each year is documented in Exhibit 4-1 at the end of this section.

Although economic activities in general and inflation in particular, do not lend themselves to prediction on the basis of historical analysis, historical patterns and long-term trends are a factor to be considered in developing the inflation assumption.

There are numerous ways to review this data, with significantly differing results. The tables below show the compounded annual inflation rate for various ten-year periods and for longer periods ended in June of 2007. CCPI refers to the California CPI.

Period	CPI	CCPI
1997-2007	2.66%	3.11%
1987-1997	3.51	3.24
1977-1987	6.46	6.93
1967-1977	6.19	6.10
1957-1967	1.71	1.96

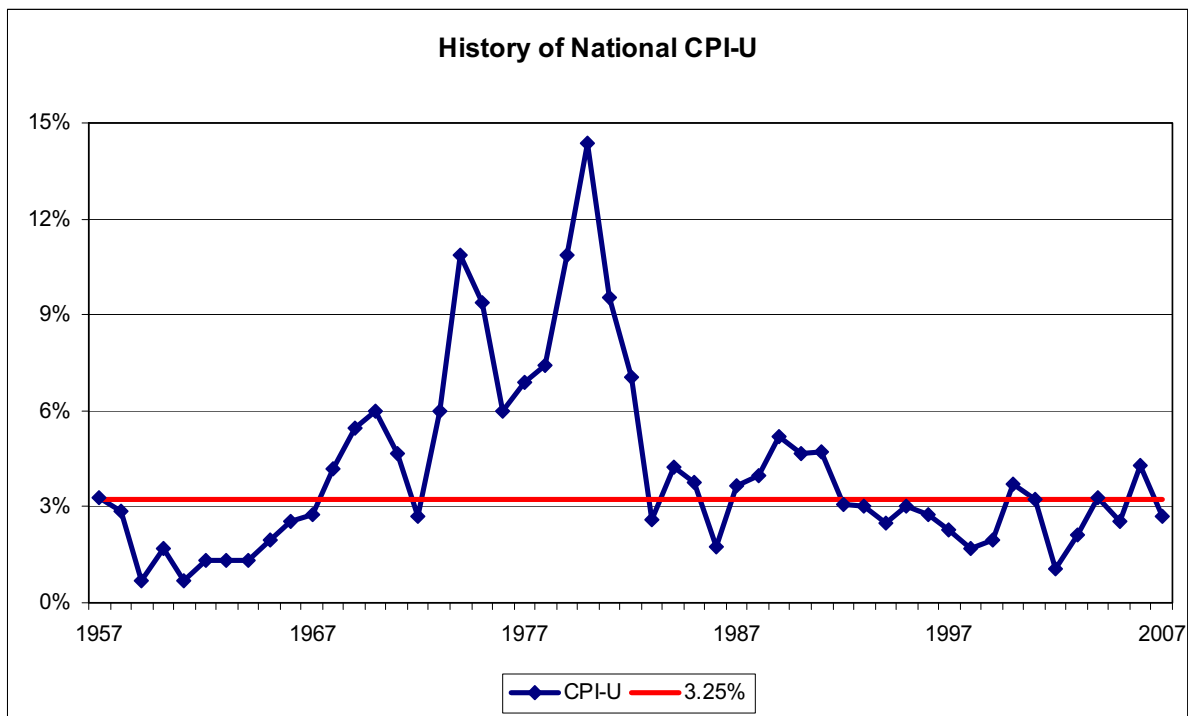
Period	CPI	CCPI
1997-2007	2.66%	3.11%
1987-2007	3.08	3.18
1977-2007	4.20	4.41
1967-2007	4.69	4.83
1957-2007	4.09	4.25
75 Years	3.71%	

The following chart shows the 25th, 50th, and 75th percentile of the national CPI over 25, 50, and 75 year periods.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

National CPI			
	25 Years	50 Years	75 Years
25 th Percentile	2.49%	2.35%	1.82%
50 th Percentile - Median	3.04%	3.17%	3.00%
75 th Percentile	3.76%	5.05%	4.93%

The following graph shows the historical national CPI increases (June to June) compared to the current assumption of 3.25% per year. Note that the actual CPI increases have been in a relatively narrow range over the last 25 years.



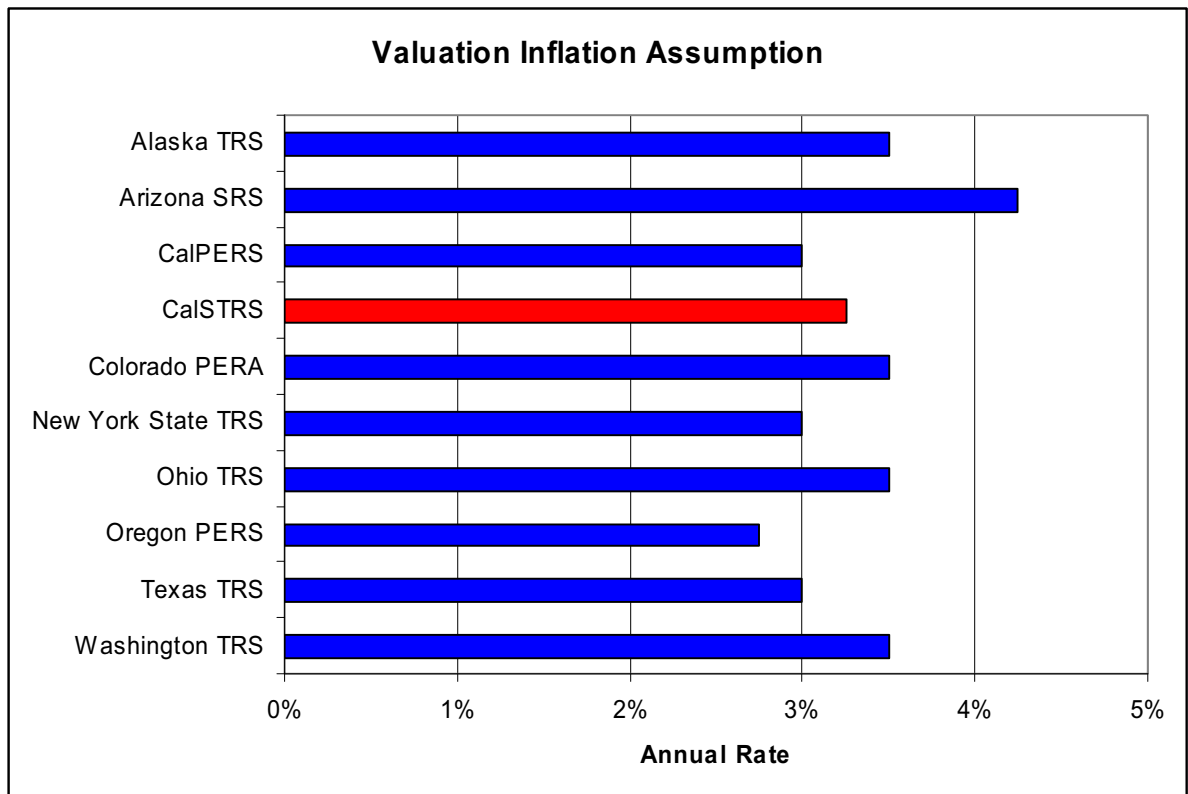
It is interesting, but not critical in the global sense of the economy, to look at inflation rates in the State of California. There have been variances from the national CPI over short periods; however, the average increases over longer periods of time, particularly the last 20 years, are very close. The CCPI history is included in Exhibit 4-2.

Forecasts of Inflation: We recognize that most investment consultants set their own capital market assumptions with an inflation assumption less than our current assumption. For example, both PCA (for CalSTRS) and Milliman's investment practice are currently using 2.50% as the inflation component. However, investment consultants are rarely looking at a time horizon more than five or ten years, let alone the generations that we are using in a pension valuation.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Many economists forecast inflation lower than the current assumption of 3.25%, but generally look at shorter periods than appropriate for a pension valuation. To find an economic forecast with a long enough time frame to suit our purpose, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the 2007 Trustees Report, the projected average annual increase in the CPI over the next 30 years under the intermediate cost assumptions was 2.80%. The reasonable range was stated as 1.80% to 3.80%.

Peer Group Comparison: Actuarial inflation assumptions have been declining in recent years due to the pattern of inflation previously shown. The following chart shows the latest inflation assumptions for a group of ten large teacher systems, including a number in the West. Of these ten systems, only one has an assumption greater than 3.5% and only one has an assumption less than 3.0%. CalSTRS is in the main stream for the inflation assumption.



CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Recommendation: We recommend retention of the long-term assumed inflation rate of 3.25% per year, which will be used to build the net investment return and wage growth assumptions.

- We agree with the Social Security projections that a range between 1.80% and 3.80% is reasonable for an actuarial valuation of a retirement system.
- We do not believe the difference between the national CPI and the California CPI will be statistically significant for predicting future wage growth for California's teachers or future investment returns.
- Although inflation has generally been less than 3.25% in the recent past, there have been years (such as 2001 and 2006) when this has not been the case.

We believe that the current assumption of 3.25% per year is reasonable.

Consumer Price Inflation	
Current Assumption	3.25%
Best Estimate Range	1.80% - 3.80%
Recommended Assumption	3.25%

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Investment Return

Use in the Valuation: The investment return assumption is one of the primary determinants in the calculation of the expected cost of the System's benefits, providing a discount of the future benefit payments reflecting the time value of money. This assumption has a direct impact on the calculation of the Actuarial Obligation, Normal Costs, and the factors for optional benefits. Due to different asset allocation policies, the assumption is studied separately for the DBS and CBB Programs.

The current investment return assumption for all programs is 8.00% per year, net of all administrative and investment-related expenses.

Historical Perspective: One of the inherent problems with analyzing historical data is that the results can look significantly different depending on the time frame used if the year-to-year results tend to vary widely. The asset allocation also has a critical role in returns, so results achieved under other allocations are not meaningful. Furthermore, the approach we used to predict inflation does not necessarily reflect current expectations for the capital markets. Even though history provides a valuable perspective for setting this assumption, we prefer to concentrate on a prospective approach.

Projection Model using Capital Market Assumptions: We have projected the best-estimate range for the investment return assumption based upon a model developed by Milliman's investment practice. This model is used to provide the range of assumptions appropriate for compliance with Actuarial Standard of Practice No. 27, "Selection of Economic Assumptions for Measuring Pension Obligations." The Standard defines the Best-Estimate Range as "the narrowest range within which the actuary reasonably anticipates that the actual results, compounded over the measurement period, are more likely than not to fall."

By assuming the portfolio is re-balanced annually and that annual returns are lognormally distributed and independent from year to year, we can develop expected percentiles for the long-term distribution of annualized returns.

Using properties of the lognormal distribution, we calculate the 25th and 75th percentiles of the long-term total return distribution. This becomes our best-estimate range because 50% of the outcomes are expected to fall within this range and it is centered about the mean.

Capital market assumptions were combined with an asset allocation to generate expected real rates of returns (total return less assumed inflation) which were then added to the current inflation assumption of 3.25%. The real rate of return is subject to significant year-to-year volatility as measured by the standard deviation. Volatility over time will generally lower the mean real rate of return but diversification by asset class will reduce the volatility and narrow the range of expected total returns for the entire portfolio.

As inputs to our model we have utilized the current CalSTRS capital market assumptions which are documented in Exhibit 4-3. The asset allocation for the three Programs is shown below.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Allocation by Asset Class	DB Program	DBS & CBB Programs
US Equities	41%	50%
Intr'l Equities	21	25
Core Fixed Income	20	25
Private Equity	8	0
Real Estate	10	0
Cash Equivalents	0	0
Total Portfolio	100%	100%

The capital market assumptions were combined with the Board's asset allocation policy to generate expected returns. The expected real rate of return of the DB Program portfolio allocated according to current policy is 5.78% for one year, 9.03% including an assumed inflation rate of 3.25%. However, the return is subject to significant year-to-year volatility as evidenced by the standard deviation. Volatility over time will lower the mean rate of return, but diversification by asset class narrows the range of expected returns. The model provides a guide to see if it is reasonable to expect this return to compound over longer periods of time. The results are summarized below, showing expected real rates of return up to 30 years.

Horizon in Years	Mean	Std Dev	Percentile Results for Real Rate of Return – DB Program				
			5th	25 th	50th	75th	95th
1	5.8%	13.9%	-15.4%	-4.0%	4.9%	14.5%	30.0%
5	5.1	6.1	-4.7	0.8	4.9	9.1	15.5
10	5.0	4.3	-2.0	2.0	4.9	7.8	12.3
20	4.9	3.0	-0.0	2.8	4.9	7.0	10.0
30	4.9	2.5	0.9	3.2	4.9	6.6	9.1

For one year, the mean real return is 5.8%, but due to the volatility associated with the asset allocation, the range of probable outcomes is quite large. For example, for one year there is a 5% chance the real rate of return will be less than -15.4% and a 5% chance it will be greater than 30.0%. As the time horizon lengthens, the range of cumulative average results narrows.

Over a thirty-year time horizon, there is a 25% chance the real rate of return will be less than 3.2% and a 25% chance the return will be greater than 6.6% (bold numbers on the bottom line in the table above). Therefore, we can say the real rate of return is just as likely to be within the range from 3.2% to 6.6% as not. The median real return over thirty years is expected to be 4.9%.

For a slightly different perspective, we utilized the current capital market assumptions produced by Milliman's investment practice. In this case, the range of results was 3.5% at the 25th percentile to 6.6% at the 75th percentile with a median real return of 5.0%. These results are similar at the median and top, and slightly higher at the bottom end.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

The DBS and CBB Programs have a slightly different asset allocation policy than the DB Program because they are not invested in the full spectrum of instruments available in the DB Program portfolio. Using the CalSTRS capital market assumptions, we generated a slightly lower expected real rate of return for these programs. The range at the 30-year horizon is from 3.0% at the 25th percentile to 6.2% at the 75th percentile, and the median is 4.6% (about 0.3% lower than the DB Program).

Administrative and Investment-Related Expenses: The investment return is assumed to be net of all administrative and investment-related expenses. The following table below shows the ratio of expenses to the CalSTRS Plan assets over the last five years. The expense ratio is calculated as the total expense divided by the ending asset balance at fair market value.

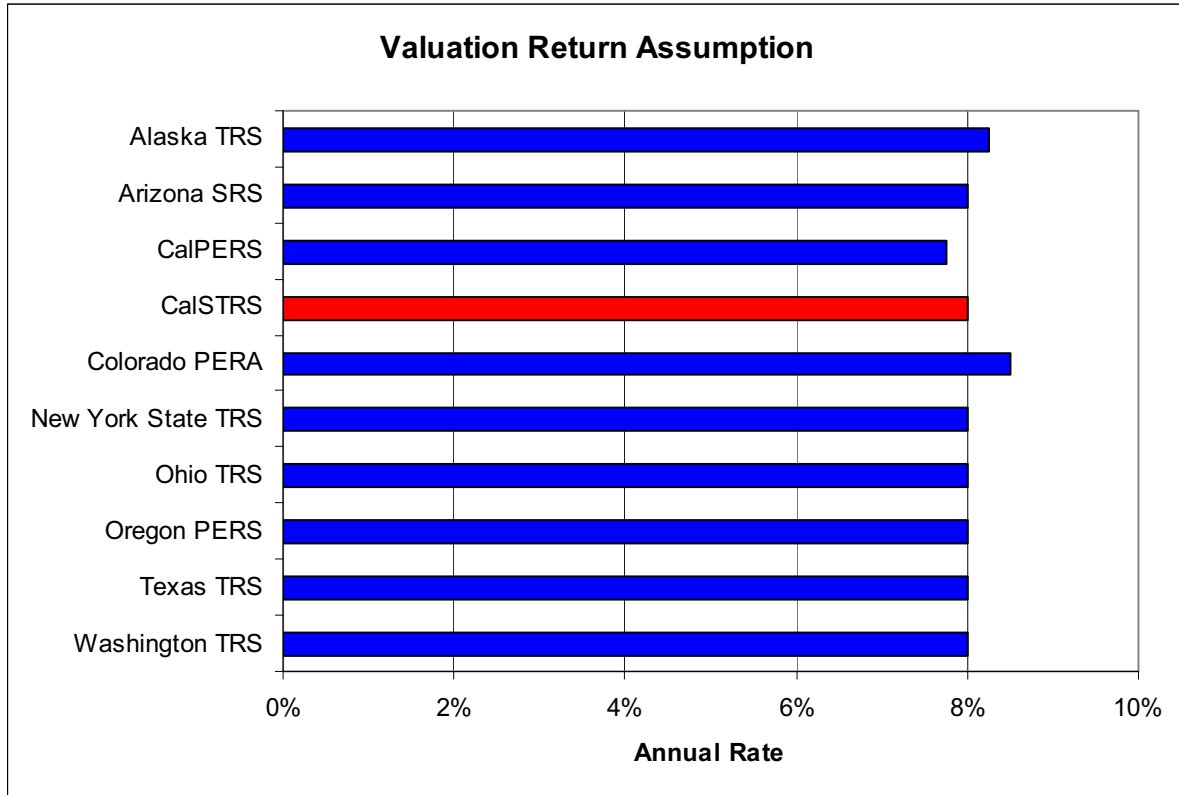
(\$million)	CalSTRS Plan Assets	Administrative		Investment		Expense Ratio
		Expense	Ratio	Expense	Ratio	
2003	\$ 100,372	\$ 73	0.072%	\$ 81	0.080%	0.152%
2004	116,061	95	0.082	83	0.071	0.153
2005	129,524	95	0.073	100	0.077	0.150
2006	144,212	96	0.066	113	0.078	0.144
2007	177,378	106	0.060	146	0.083	0.143

The expenses for the Securities Lending Program are shown with other investment related expenses in the System's financial statements. Since this expense is not related to the income from the invested assets, we have excluded these costs. Based on this data, it appears the investment expenses represent about 0.15% of the CalSTRS Plan assets. The expense ratios, measured in this way, have decreased recently due to the increase in the fair value of assets.

This assumption does not have a direct impact on the actuarial valuation results, but it does provide a measure of gross return on investments that will be needed to meet the actuarial assumption used for the valuation. For example, if the investment return assumption is set equal to 8.00%, then CalSTRS would need to earn a gross return on its assets of about 8.15% in order to meet the 8.00% for funding purposes.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Peer Group Comparison: Actuarial return assumptions have remained steady in recent years even though there has been significant volatility in the markets. This is likely because actuaries view this assumption as very long term in nature. The following chart shows the latest return assumptions for the same peer group we looked at previously. Of these ten systems, seven are using 8%. CalSTRS is in the main stream for the return assumption.



Recommendations: Based on the ASOP No. 27 guidelines, we conclude that the best estimate range is the expected real rates of return between the 25th and 75th percentile projected out 30 years, plus the assumed inflation rate, less administrative and investment-related expenses.

Components of Return	Percentile Results					
	DB Program			DBS and CBB Programs		
	25th	50th	75th	25th	50th	75th
Real Rate of Return	3.21%	4.88%	6.58%	2.96%	4.59%	6.24%
Assumed Inflation	3.25	3.25	3.25	3.25	3.25	3.25
Expenses	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
Net Investment Return	6.31%	7.98%	9.68%	6.06%	7.69%	9.34%

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

There is a slightly less than 50% chance that the net return will be 8% or more over a 30-year period. A net return of 8% is at the 54th percentile for the DBS and CBB Programs. Due to the different asset allocation and resulting expected returns, we are recommending that the assumed earnings rate on these Programs be set at 0.25% less than that for the DB Program.

We recommend the following long-term net investment return assumptions.

	Investment Return	
	DB Program	DBS and CBB Programs
Current Assumption	8.00%	8.00%
Best Estimate Range	6.31% - 9.68%	6.06% - 9.34%
Recommended Assumption	8.00%	7.75%

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Interest on Member Accounts

Use in the Valuation: This assumption is used to predict the level of future member account balances. In the DB Program, the account balance may be refunded upon termination of membership. In the DBS and CBB Programs, all benefits are dependent on the level of the account balance.

The current assumption is 6.00% per year for the DB Program and 8.00% per year for the DBS and CBB Programs.

DB Program: The Board's policy is to credit interest to member accounts in an amount to be calculated annually based on the rate paid on two-year Treasury notes for the previous twelve months. The rate can go no higher than the actuarial assumed investment return, nor lower than a current passbook rate.

In light of this policy, the actuarial assumption in the valuation has been set equal to the assumed increase in the Consumer Price Index plus a margin to reflect the yield in excess of inflation on two-year Treasuries. The following table shows the average excess yield of two-year Treasuries over inflation for the last ten years.

	CPI	2-Yr Treas.	Excess
1998	1.7%	5.1%	3.4%
1999	2.0	5.4	3.4
2000	3.7	5.7	2.0
2001	3.2	6.0	3.8
2002	1.1	3.5	2.4
2003	2.1	2.4	0.3
2004	3.3	1.7	(1.6)
2005	2.5	2.6	0.1
2006	4.3	4.0	(0.3)
2007	2.7	5.0	2.3

As you can see, the relationship during the four-year period from 2003 through 2006 was inconsistent with other years in the period. Excluding those years, the average excess of the 2-year Treasury rate over the CPI was 2.9%. We are recommending that the assumption remain at 6.00% which is 2.75% above the recommended inflation assumption.

DBS and CBB Programs: The Board's policy is to credit interest to member accounts based on the statutory minimum rate for the year, plus a portion of the returns in excess of the statutory minimum. The Board has the authority to establish a reserve for short-term fluctuations in the actual returns from year to year so that the minimum credit can be allocated from current invested assets. Nevertheless, the long-term intention is to allocate all of the investment earnings to the member accounts. Therefore, the assumed long-term credit to member accounts should be 7.75% per year, the same as the recommended investment return assumption for these Programs.

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Recommendations: Our recommended assumptions are shown in the following table.

Interest on Member Accounts		
	DB Program	DBS and CBB Programs
Current Assumption	6.00%	8.00%
Recommended Assumption	6.00%	7.75%

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Wage Growth

Use in the Valuation: Estimates of future salaries are based on two types of assumptions. Rates of increase in the general wage level of the membership are directly related to inflation, while individual salaries due to promotion and longevity occur even in the absence of inflation. The promotion and longevity assumptions, referred to as the merit scale, will be reviewed with the other demographic assumptions.

The current wage growth assumption is 1.00% above the inflation assumption, or 4.25%.

Historical Perspective: We have used statistics from the Social Security Administration on the National Average Wage back to 1951. For years prior to 1951, we studied the Total Private Nonagricultural Wages as published in *Historical Statistics of the U.S., Colonial Times to 1970*. The data for each year is documented in Exhibit 4-4.

There are numerous ways to review this data. For consistency with our observations of other indices, the table below shows the compounded annual rates of wage growth for various ten-year periods, and for longer periods ended in June of 2006. National wage data for 2007 is not yet available.

Decade	Wage Growth	CPI Incr.	Real Wages	Period	Wage Growth	CPI Incr.	Real Wages
1996-2006	4.08%	2.62%	1.46%	1996-2006	4.08%	2.62%	1.46%
1986-1996	4.11	3.65	0.46	1986-2006	4.09	3.13	0.96
1976-1986	6.50	6.78	(0.28)	1976-2006	4.89	4.34	0.56
1966-1976	6.45	5.77	0.68	1966-2006	5.28	4.69	0.59
1956-1966	3.41	1.76	1.64	1956-2006	4.90	4.10	0.80
				75 Years	4.88	3.52	1.35

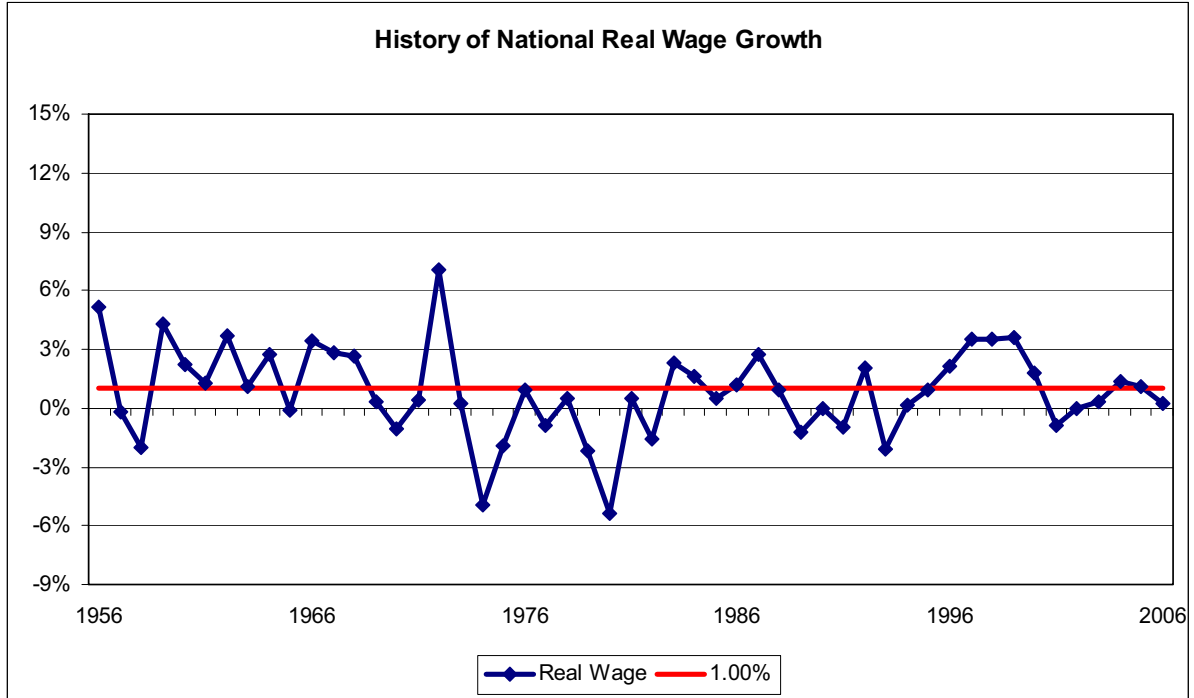
The excess of wage growth over price inflation represents the increase in the standard of living, also called productivity, or real wage growth.

There has been debate on the issue of whether public sector employees will receive, over the long term, the same rewards for productivity as employees in the private sector, where productivity is more readily measurable. To our knowledge, no definitive research has been completed on this topic. Nevertheless, it is our opinion that public sector employees must be rewarded, even if there is a time lag, with the same productivity increases as those participating in the remainder of the economy.

We also looked at the average CalSTRS Earnable Salary in excess of the California CPI over the last 30 years. These averages are not as reliable as the national statistics, since they include the influence of a change in the number of members from one point to another.

The following graph plots the historical real wage growth represented by the aforementioned indices against the current actuarial assumption of 1.00%.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS



Forecasts of Future Wages: Wage inflation has been projected by the Office of the Chief Actuary of the Social Security Administration. In the 2007 Trustees Report, the long-term annual increase in the National Average Wage is estimated to be 1.1% higher than the Social Security intermediate inflation assumption of 2.8% per year. The range of the assumed real wage growth in the 2007 Trustees Report was from 0.6% to 1.6% per year.

Recommendation: Based on our judgment, we believe that a range between 0.25% and 1.75% is reasonable for the assumed increase in real wages. We recommend that the long-term assumed wage inflation rate remain the same at 1.00% above the assumed inflation rate, or 4.25% per year.

Wage Growth			
Current Assumption	4.25%		
Best Estimate Range			
Real Growth Rate	0.25%	-	1.75%
Recommended Assumption			
Real Growth Rate	1.00%		
Assumed Rate of Inflation	<u>3.25</u>		
Total Wage Growth Rate	4.25%		

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Index of Exhibits

- Exhibit 4-1** **Consumer Price Index**
US City Average, All Urban Consumers
Reported by US Department of Labor, Bureau of Labor Statistics
- Exhibit 4-2** **California Consumer Price Index**
City Average, All Urban Consumers
Reported by California Department of Finance
- Exhibit 4-3** **Capital Market Assumptions**
Adopted by the Teachers' Retirement Board
- Exhibit 4-4** **Wage Index**
1951 – 2006 National Average Wage
Reported by the Social Security Administration
- 1928 – 1950 Total Private Nonagricultural Wages
Historical Statistics of the U.S., Colonial Times to 1970
Reported by the Society of Actuaries

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Exhibit 4-1

US Consumer Price Index

June of:	Index	Increase	June of:	Index	Increase
1932	13.6				
1933	12.7	(6.6)%	1973	44.2	6.0%
1934	13.4	5.5	1974	49.0	10.9
1935	13.7	2.2	1975	53.6	9.4
1936	13.8	0.7	1976	56.8	6.0
1937	14.4	4.3	1977	60.7	6.9
1938	14.1	(2.1)	1978	65.2	7.4
1939	13.8	(2.1)	1979	72.3	10.9
1940	14.1	2.2	1980	82.7	14.4
1941	14.7	4.3	1981	90.6	9.6
1942	16.3	10.9	1982	97.0	7.1
1943	17.5	7.4	1983	99.5	2.6
1944	17.6	0.6	1984	103.7	4.2
1945	18.1	2.8	1985	107.6	3.8
1946	18.7	3.3	1986	109.5	1.8
1947	22.0	17.6	1987	113.5	3.7
1948	24.1	9.5	1988	118.0	4.0
1949	23.9	(0.8)	1989	124.1	5.2
1950	23.8	(0.4)	1990	129.9	4.7
1951	25.9	8.8	1991	136.0	4.7
1952	26.5	2.3	1992	140.2	3.1
1953	26.8	1.1	1993	144.4	3.0
1954	26.9	0.4	1994	148.0	2.5
1955	26.7	(0.7)	1995	152.5	3.0
1956	27.2	1.9	1996	156.7	2.8
1957	28.1	3.3	1997	160.3	2.3
1958	28.9	2.8	1998	163.0	1.7
1959	29.1	0.7	1999	166.2	2.0
1960	29.6	1.7	2000	172.4	3.7
1961	29.8	0.7	2001	178.0	3.2
1962	30.2	1.3	2002	179.9	1.1
1963	30.6	1.3	2003	183.7	2.1
1964	31.0	1.3	2004	189.7	3.3
1965	31.6	1.9	2005	194.5	2.5
1966	32.4	2.5	2006	202.9	4.3
1967	33.3	2.8	2007	208.4	2.7
1968	34.7	4.2			
1969	36.6	5.5			
1970	38.8	6.0			
1971	40.6	4.6			
1972	41.7	2.7			

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Exhibit 4-2

California Consumer Price Index

June of:	Index	Increase	June of:	Index	Increase
1957	27.1				
1958	28.1	3.7%	1983	99.1	0.6
1959	28.5	1.4	1984	103.6	4.5
1960	29.1	2.1	1985	108.4	4.6
1961	29.5	1.4	1986	112.2	3.5
1962	30.0	1.7	1987	116.3	3.7
1963	30.2	0.7	1988	121.7	4.6
1964	30.8	2.0	1989	128.2	5.3
1965	31.6	2.6	1990	134.3	4.8
1966	32.1	1.6	1991	140.1	4.3
1967	32.9	2.5	1992	145.2	3.6
1968	34.3	4.3	1993	148.9	2.5
1969	36.0	5.0	1994	150.7	1.2
1970	37.9	5.3	1995	154.2	2.3
1971	39.4	4.0	1996	156.6	1.6
1972	40.5	2.8	1997	160.0	2.2
1973	42.7	5.4	1998	163.6	2.3
1974	47.1	10.3	1999	167.8	2.6
1975	52.0	10.4	2000	174.0	3.7
1976	55.2	6.2	2001	183.2	5.3
1977	59.5	7.8	2002	185.9	1.5
1978	64.6	8.6	2003	189.9	2.2
1979	71.0	9.9	2004	195.8	3.1
1980	83.3	17.3	2005	201.3	2.8
1981	90.1	8.2	2006	210.9	4.8
1982	98.5	9.3	2007	217.4	3.1

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Exhibit 4-3

**Capital Market Assumptions
Provided by CalSTRS**

Asset Class	Expected Annual Return *	Standard Deviation
US Equities	9.00%	18.5%
International Equities	9.00	19.0
Core Fixed Income	4.75	6.5
Alternative Investments	12.50	35.0
Real Estate	7.50	13.5
Cash Equivalents	3.50	2.0

* Includes inflation of 2.5% per year.

Asset Class	Cross Correlation Matrix					
	US Equities	Int'l Equities	Core Fixed	Alt. Invest.	Real Estate	Cash
US Equities	1.00					
Int'l Equities	0.70	1.00				
Core Fixed	0.25	0.10	1.00			
Alt. Invest.	0.65	0.60	0.10	1.00		
Real Estate	0.50	0.40	0.50	0.15	1.00	
Cash	0.10	0.00	0.40	0.10	0.30	1.00

The capital market assumptions were combined with the Board's asset allocation policy to generate expected returns over a thirty-year period. The model assumes that investment returns are lognormally distributed and is based on mathematical formulas from *The Long-Term Expected Rate of Return: Setting It Right* by Olivier de la Grandville as published in the Financial Analysts Journal, Nov/Dec 1998.

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Exhibit 4-4

Wage Index

June of:	Index	Increase	June of:	Index	Increase
1931	\$ 1,086.09				
1932	954.02	(12.2)%	1972	\$ 7,133.80	9.8%
1933	892.58	(6.4)	1973	7,580.16	6.3
1934	929.34	4.1	1974	8,030.76	5.9
1935	968.53	4.2	1975	8,630.92	7.5
1936	1,008.20	4.1	1976	9,226.48	6.9
1937	1,071.58	6.3	1977	9,779.44	6.0
1938	1,047.39	(2.3)	1978	10,556.03	7.9
1939	1,076.41	2.8	1979	11,479.46	8.7
1940	1,106.41	2.8	1980	12,513.46	9.0
1941	1,228.81	11.1	1981	13,773.10	10.1
1942	1,455.70	18.5	1982	14,531.34	5.5
1943	1,661.79	14.2	1983	15,239.24	4.9
1944	1,796.28	8.1	1984	16,135.07	5.9
1945	1,865.46	3.9	1985	16,822.51	4.3
1946	2,009.14	7.7	1986	17,321.82	3.0
1947	2,205.08	9.8	1987	18,426.51	6.4
1948	2,370.53	7.5	1988	19,334.04	4.9
1949	2,430.52	2.5	1989	20,099.55	4.0
1950	2,570.33	5.8	1990	21,027.98	4.6
1951	2,799.16	8.9	1991	21,811.60	3.7
1952	2,973.32	6.2	1992	22,935.42	5.2
1953	3,139.44	5.6	1993	23,132.67	0.9
1954	3,155.64	0.5	1994	23,753.53	2.7
1955	3,301.44	4.6	1995	24,705.66	4.0
1956	3,532.36	7.0	1996	25,913.90	4.9
1957	3,641.72	3.1	1997	27,426.00	5.8
1958	3,673.80	0.9	1998	28,861.44	5.2
1959	3,855.80	5.0	1999	30,469.84	5.6
1960	4,007.12	3.9	2000	32,154.82	5.5
1961	4,086.76	2.0	2001	32,921.92	2.4
1962	4,291.40	5.0	2002	33,252.09	1.0
1963	4,396.64	2.5	2003	34,064.95	2.4
1964	4,576.32	4.1	2004	35,648.55	4.6
1965	4,658.72	1.8	2005	36,952.94	3.7
1966	4,938.36	6.0	2006	38,651.41	4.6
1967	5,213.44	5.6	2007	not available	
1968	5,571.76	6.9			
1969	5,893.76	5.8			
1970	6,186.24	5.0			
1971	6,497.08	5.0			

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Section 5

Demographic Assumptions

Actuarial Standard of Practice (ASOP) No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*, provides guidance to actuaries giving advice on selecting demographic assumptions for defined benefit plans. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP No. 35.

The purpose of a study of demographic experience is to compare what happened to the membership during the study period (July 1, 2003 through June 30, 2007) with what was expected to happen based on the assumptions used in the most recent Actuarial Valuation. Studies of demographic experience involve several steps.

- First, the number of members changing membership status, called decrements, during the study are tabulated by entry age, attained age, duration or sex, or a combination of these.
- Next, the number of members expected to change status is calculated by multiplying certain membership statistics, called the exposure, by the expected rates of decrement.
- Then, the number of actual decrements are compared with the number of expected decrements. The comparison is called the actual to expected ratio (A/E Ratio).

If the actual experience differs significantly from the overall expected results, or if the pattern of actual decrements, or rates of decrement, by age, sex, or duration does not follow the expected pattern, new assumptions are considered. Recommended revisions normally are not an exact representation of the experience during the observation period. Judgment is required to predict future experience from past trends and current evidence, including a determination of the amount of weight to assign to the most recent experience.

Revised rates of decrement are tested by using them to recalculate the expected number of decrements during the study period, and the results are shown as revised A/E Ratios.

The remainder of this section presents the results of the demographic study. We have prepared tables that show a comparison of the actual and expected decrements and the overall ratio of actual to expected results under the current assumptions. If a change is being proposed, the revised A/E Ratios are shown as well.

Salary adjustments, other than the economic assumption for wage inflation, are treated as demographic assumptions. However, a different method of investigation is needed for salaries than is used for the decrements. These adjustments have been analyzed with historical data as described later in this section.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

The following list shows the major demographic assumptions we reviewed, all of which are based on the experience of the CalSTRS membership.

Based on the Experience of the DB Program	Recommended Revisions
Mortality	
Healthy Retired Members	yes
Beneficiaries	yes
Active Members	yes
Disabled Members (including pre-72)	yes
Service Retirement	
Retirement from Active Membership	yes
Retirement from Vested Membership	no
Disability	
Coverage A	no
Coverage B	yes
Other Terminations of Membership	
Withdrawal	yes
Probability of Refund	yes
Merit Scale Salary Adjustments	no

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Mortality

Healthy Retired Members: Mortality has been improving in this country throughout the century with dramatic improvements at pre-retirement ages. Mortality has also been improving at the retired ages and recent experience studies have shown this to be true in the DB Program. If the actual to expected ratio (A/E) is greater than 100%, we have predicted fewer deaths, and therefore have built in some margin for future mortality improvements.

This assumption applies to the retired members only. The mortality was last changed in the 1999 study to the 1994 Group Annuity Mortality Table, published by the Society of Actuaries. The 1994 GAM is a set of two sex-distinct tables. The previous change was in 1988. It is prudent to have a margin of between 5% and 10% to anticipate future improvements in mortality.

Mortality of Healthy Retired Members				
	Number of Deaths (2003-07)		Actual / Expected Ratios	
	Actual Number	Expected Number	2007 Study	2003 Study
Male	7,595	8,234	92%	100%
Female	<u>11,833</u>	<u>11,881</u>	<u>100</u>	<u>107</u>
Total	19,428	20,115	97%	104%

We observed a continuing decline in the A/E Ratios over the last eight years and are recommending a change at this time. In addition to the raw data shown above, we studied mortality at each age, including a breakdown by large or small benefit amounts. Our recommendation is a modification of the RP2000 Combined Mortality Table, published by the Society of Actuaries.

Current Assumption:	Male	1994 GAM (-3) to age 77, then graduated to 1994 GAM at age 92
	Female	1994 GAM (-2) to age 77, then graduated to 1994 GAM at age 87
Recommendation:	Male	Male RP2000 (-5) to age 70, then graduated to Male RP2000 (-2) at age 95
	Female	Female RP2000 (-5) to age 75, then graduated to Female RP2000 (-1) at age 90

We also recommend that the assumed mortality table used after retirement for currently active members continue to be set back an additional two years from the table used for current retirees to allow for future mortality improvements. This reflects the belief that present active members will experience even lower mortality than those now retired. This is the current assumption and does not represent a change.

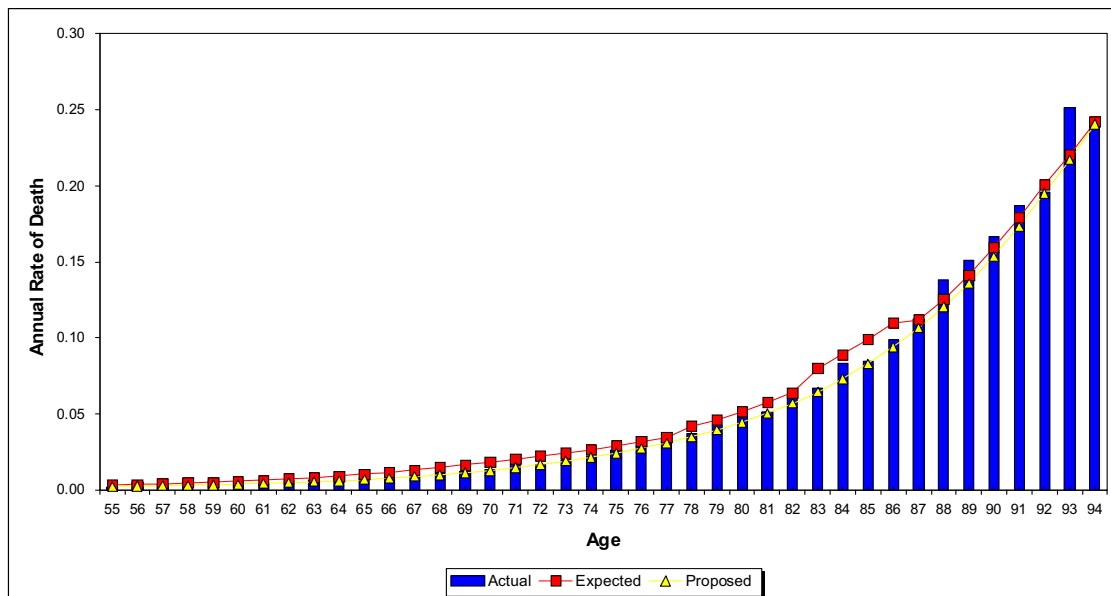
CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

The following table shows the results of the 2003-07 experience as if we had used the recommended mortality assumptions.

Recommended Mortality of Healthy Retired Members				
	<u>Number of Deaths (2003-07)</u>		<u>Actual / Expected Ratios</u>	
	Actual Number	Proposed Number	Revised Set	Current Set
Male	7,595	6,976	109%	92%
Female	<u>11,833</u>	<u>11,040</u>	<u>107</u>	<u>100</u>
Total	19,428	18,016	108%	97%

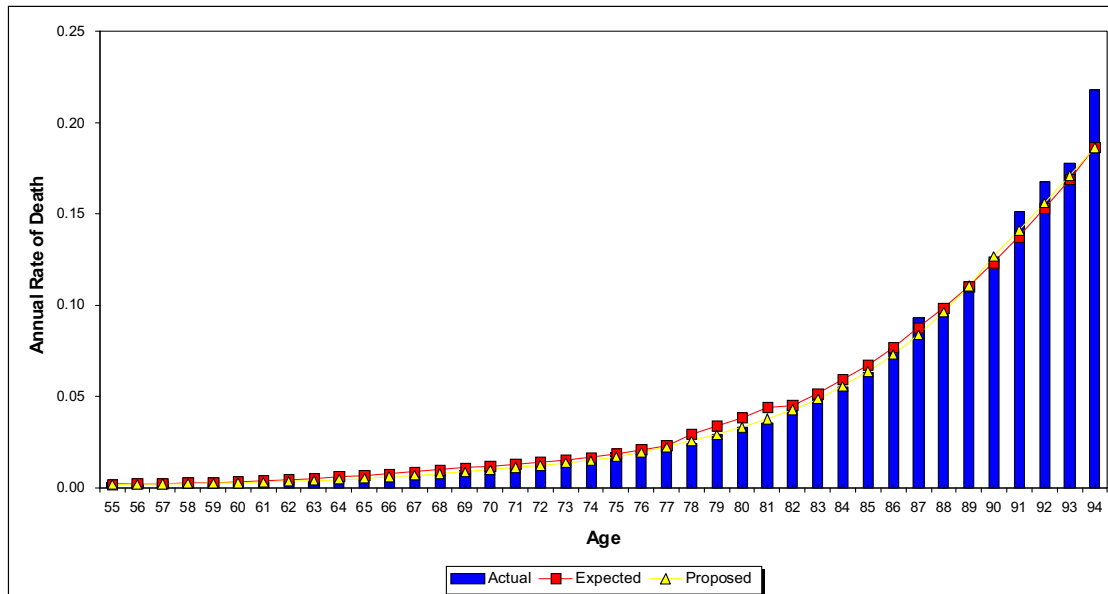
The following graphs illustrate the current and proposed retiree mortality rates at ages 55 through 94 compared to the actual death rates.

**Mortality Rates
Healthy Male Retirees
(July 1, 2003 through June 30, 2007)**



CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Mortality Rates Healthy Female Retirees (July 1, 2003 through June 30, 2007)



The mortality experience for retired members electing different survivorship options is critical for the determination of the option factors, but has little impact on the actuarial valuation. The mortality experience by option elected will be studied later in conjunction with a review of the actuarial equivalency factors.

Because it is so difficult to understand the impact of changing annual death rates, we have put together a table of life expectancies from age 60 and age 70 for comparison.

	Age	Life Expectancy (Years)		
		Current	Proposed	Change
Male	60	23.6	25.1	1.5
	70	15.5	16.5	1.0
Female	60	26.5	27.3	0.8
	70	17.9	18.4	0.5

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Beneficiaries: This assumption applies to the surviving beneficiaries of members who have elected a joint and survivor annuity. The reported deaths are only for those beneficiaries who died while receiving an allowance, that is, after the death of the member. There is not complete data on the mortality experience of beneficiaries prior to the death of the member, because there is no requirement that the death be reported to the System. The mortality of beneficiaries prior to the death of the member is more critical to the development of the option factors than to the results of the valuation.

Mortality of Beneficiaries				
	<u>Number of Deaths (2003-07)</u>		<u>Actual / Expected Ratios</u>	
	Actual Number	Expected Number	2007 Study	2003 Study
Male	617	696	89%	109%
Female	<u>1,904</u>	<u>1,842</u>	<u>103</u>	<u>111</u>
Total	2,521	2,538	99%	110%

Just like the member mortality, we observed a continuing decline in the A/E Ratios over the last eight years and are recommending a change at this time. In addition to the raw data shown above, we studied mortality at each age. Our recommendation to use the same mortality tables recommended for the healthy retired groups.

Current Assumption:

Male	1994 GAM (-1) to age 77, then graduated to 1994 GAM at age 92
Female	1994 GAM (-2) to age 77, then graduated to 1994 GAM at age 87

Recommendation:

Male	Male RP2000 (-5) to age 70, then graduated to Male RP2000 (-2) at age 95
Female	Female RP2000 (-5) to age 75, then graduated to Female RP2000 (-1) at age 90

The following table shows the results of the 2003-07 experience as if we had used the recommended mortality assumptions.

Recommended Mortality of Beneficiaries				
	<u>Number of Deaths (2003-07)</u>		<u>Actual / Expected Ratios</u>	
	Actual Number	Proposed Number	Revised Set	Current Set
Male	617	605	102%	89%
Female	<u>1,904</u>	<u>1,743</u>	<u>109</u>	<u>103</u>
Total	2,521	2,348	107%	99%

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Active Members: The recent trend of improving mortality is especially evident with the active members' experience. The assumption was changed in 1988 and 1999. If the A/E Ratio is under 100%, that means we are overvaluing the death benefits. However, this also means we may be undervaluing the retirement benefit.

Mortality of Active Members				
	Number of Deaths (2003-07)		Actual / Expected Ratios	
	Actual Number	Expected Number	2007 Study	2003 Study
Male	836	1,115	75%	77%
Female	<u>1,086</u>	<u>1,399</u>	<u>78</u>	<u>85</u>
Total	1,922	2,514	76%	82%

The trend of fewer active deaths may be due to the fact that the population is aging rapidly and the mortality rates at the older end of the active member spectrum are too high. Even though the financial impact of this assumption is very small, we are recommending a revision so that the active member mortality continues to be set two years behind the retired member mortality. Since we are recommending a change to the retired mortality assumption, this means the active member mortality assumption will change as well.

Recommended Mortality of Active Members				
	Number of Deaths (2003-07)		Actual / Expected Ratios	
	Actual Number	Proposed Number	Revised Set	Current Set
Male	836	782	107%	75%
Female	<u>1,086</u>	<u>1,162</u>	<u>93</u>	<u>78</u>
Total	1,922	1,944	99%	76%

Current Assumption: Male Two-year setback from retired mortality
Female Two-year setback from retired mortality

Recommendation: Male Two-year setback from recommended retired mortality
Female Two-year setback from recommended retired mortality

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Disabled Members: Members may terminate from disabled status by returning to active membership, by recovering to inactive status, or by death. The current and proposed valuation method does not call for a prediction of a return to active status. Instead, those members are assumed to remain disabled for life, and recoveries to active status are treated in the normal course of an actuarial valuation as demographic gains and losses. Thus we are assuming, for purposes of the valuation, that the only terminations from disabled status are due to the death of the disabled member.

The rates of mortality during the first three years of disability are higher than normal mortality rates. Therefore, special rates are in effect for the first three years of disability, regardless of the age of the disabilitant. The recent experience shows that the select period is still statistically significant.

Mortality of Disabled Members – First Three Years					
	Year	<u>Terminations (2003-07)</u>		<u>Actual / Expected Ratios</u>	
		Actual Rate	Expected Rate	2007 Study	2003 Study
Male	1	3.6%	11.4%	32%	37%
	2	5.6%	7.7%	73	35
	3	3.0%	6.2%	<u>48</u>	<u>63</u>
Number of Males		78	164	48%	42%
Female	1	3.2%	6.0%	53%	65%
	2	2.8%	3.8%	74	118
	3	2.0%	3.0%	<u>67</u>	<u>123</u>
Number of Females		156	249	63%	93%
Total Number		234	413	57%	72%

During this period, we had more members remain in disability status than we anticipated. Even though the total number of members in this category is very small, and the financial impact is therefore relatively small, we are recommending revisions at this time because this is a trend that has continued from the prior study.

The next table shows our recommended revisions to the mortality rates during the first three years of disablement. These rates are still significantly higher than the normal mortality rates.

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Recommended Mortality of Disabled Members – First Three Years					
	Year	Terminations (2003-07)		Actual / Expected Ratios	
		Actual Rate	Proposed Rate	Revised Set	Current Set
Male	1	3.6%	6.0%	60%	32%
	2	5.6%	4.8%	118	73
	3	3.0%	3.5%	<u>86</u>	<u>48</u>
Number of Males		78	92	85%	48%
Female	1	3.2%	3.5%	91%	53%
	2	2.8%	3.0%	93	74
	3	2.0%	2.5%	<u>80</u>	<u>67</u>
Number of Females		156	174	90%	63%
Total Number		234	266	88%	57%

The next table shows the opposite experience for disabled members after the third year of disability, excluding those who returned to active membership.

Mortality of Disabled Members After Third Year				
	Number of Deaths (2003-07)		Actual / Expected Ratios	
	Actual Number	Expected Number	2007 Study	2003 Study
Male	271	249	109%	118%
Female	<u>528</u>	<u>440</u>	<u>120</u>	<u>125</u>
Total	<u>799</u>	<u>689</u>	116%	122%

The A/E Ratio for males is currently very reasonable. However, the mortality experience of female disabled members is worse than expected (i.e., females are not living as long as expected). We are recommending new disabled mortality rates using a more modern table (RP2000). The new rates predict slightly more deaths from females. There was very little change with the male rates.

Recommended Mortality of Disabled Members After Third Year				
	Number of Deaths (2003-07)		Actual / Expected Ratios	
	Actual Number	Proposed Number	Revised Set	Current Set
Male	271	248	109%	109%
Female	<u>528</u>	<u>487</u>	<u>108</u>	<u>120</u>
Total	<u>799</u>	<u>735</u>	109%	116%

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Current Assumption:	Male	1994 GAM (+2) with a minimum rate of 2.5%
	Female	1994 GAM (+1) with a minimum rate of 2.2% First three years use special rates as shown
Recommendation:	Male	RP2000 (+2) with a minimum rate of 2.5%
	Female	RP2000 (+2) with a minimum rate of 2.0% First three years use special rates as shown

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Service Retirement

Retirements from Active Membership Status: The following table shows the actual number of retirements and the expected number based on the retirement assumptions in the last valuation. Due to the different benefit provisions, we looked separately at members who retired with and without 30 years of service.

Retirement from Active Membership (under age 70)					
		Number Retired (2003-07)		Actual / Expected Ratios	
Years		Actual Number	Expected Number	2007 Study	2003 Study
Male	Under 30	4,839	4,429	109%	98%
	30 & Up	<u>8,697</u>	<u>6,857</u>	<u>127</u>	<u>119</u>
Number of Males		13,536	11,286	120%	112%
Female	Under 30	14,907	14,995	99%	95%
	30 & Up	<u>13,075</u>	<u>10,245</u>	<u>128</u>	<u>115</u>
Number of Females		27,982	25,240	111%	104%
Total	Under 30	19,746	19,424	102%	96%
	30 & Up	<u>21,772</u>	<u>17,102</u>	<u>127</u>	<u>117</u>
Total Number		41,518	36,526	114%	107%

The experience shows there were about 14% more retirements in the observation period than expected. When the data is separated between those with and without 30 years of service at retirement, it is clear the assumed retired rates need to be revised.

We are recommending that the assumed retirement rates for members with over 30 years of service be increased. The experience continues to reflect the incentive to stay long enough to obtain the Longevity Bonus after 30, 31, or 32 years of service.

This year we also looked at retirement experience just after 25 years since members become eligible for the 1-year final compensation at this point.

We are recommending that the assumed retirement rates for members with less than 30 years of service be decreased, except if service is equal to or greater than 25 but less than 28 years. For service equal to or greater than 25 but less than 28 years, we recommend the assumed retirement rates be increased by 45%. For example, the assumed retirement rate for a female member at age 60 with less than 30 years of service is 9.0% per year. If the member has 25 years of service, the assumed retirement rate would be 13.05% (9.0% x 1.45). The increase in retirement rates for members with service greater than 25 but less than 28 years of service offsets the decrease in retirement rates shown for all ages with less than 30 years of service.

The following table shows revised results based on the recommendation.

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Recommended Retirement from Active Membership					
		Number Retired (2003-07)		Actual / Expected Ratios	
Years		Actual Number	Proposed Number	Revised Set	Current Set
Male	Under 30	4,839	4,695	103%	109%
	30 & Up	<u>8,697</u>	<u>7,839</u>	<u>111</u>	<u>127</u>
Number of Males		13,536	12,534	108%	120%
Female	Under 30	14,907	14,995	99%	99%
	30 & Up	<u>13,075</u>	<u>11,520</u>	<u>113</u>	<u>128</u>
Number of Females		27,982	26,515	106%	111%
Total	Under 30	19,746	19,690	100%	102%
	30 & Up	<u>21,772</u>	<u>19,359</u>	<u>112</u>	<u>127</u>
Total Number		41,518	39,049	106%	114%

The following table shows the expected and recommended probabilities of retirement.

Age	Male Retirement Rates				Female Retirement Rates			
	Current Rates		Proposed Rates		Current Rates		Proposed Rates	
	Under 30	30 & Up	Under 30 *	30 & Up	Under 30	30 & Up	Under 30 *	30 & Up
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
50	0.0%	1.5%	0.0%	1.5%	0.0%	1.5%	0.0%	2.5%
51	0.0	1.5	0.0	1.5	0.0	1.5	0.0	2.5
52	0.0	1.5	0.0	1.5	0.0	1.5	0.0	2.5
53	0.0	2.0	0.0	2.0	0.0	1.5	0.0	2.5
54	0.0	2.0	0.0	2.0	0.0	2.0	0.0	3.0
55	3.0	6.0	2.7	8.0	5.0	8.0	4.5	9.0
56	2.0	6.0	1.8	8.0	3.5	8.0	3.2	9.0
57	2.0	8.0	1.8	10.0	3.5	10.0	3.2	11.0
58	3.0	12.0	2.7	14.0	4.5	15.0	4.1	16.0
59	5.0	16.0	4.5	18.0	6.0	18.0	5.4	19.0
60	7.0	25.0	6.3	27.0	10.0	30.0	9.0	31.0
61	7.0	40.0	6.3	43.0	10.0	35.0	9.0	40.0
62	9.0	35.0	10.8	38.0	12.0	32.0	10.8	37.0
63	13.0	27.0	11.7	30.0	18.0	30.0	16.2	35.0
64	12.0	27.0	10.8	30.0	15.0	27.0	13.5	32.0
65	14.0	27.0	13.5	30.0	16.0	27.0	14.4	32.0
66	10.0	27.0	10.8	30.0	15.0	27.0	13.5	32.0
67	10.0	27.0	10.8	30.0	15.0	27.0	13.5	32.0
68	10.0	27.0	10.8	30.0	15.0	27.0	13.5	32.0
69	10.0	27.0	10.8	30.0	15.0	27.0	13.5	32.0
70	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* If service is equal to or greater 25 but less than 28 years, the assumed retirement rates shown above in columns (C) and (G) are increased by 45%.

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

Current Assumption:	Male	As shown in Column (A) and (B) above
	Female	As shown in Column (E) and (F) above
Recommendation:	Male	As shown in Columns (C) and (D) above, Column (C) adjusted between 25 and 28 years
	Female	As shown in Columns (G) and (H) above Column (G) adjusted between 25 and 28 years

1990 Benefit Structure: A valuation must be made to determine if the cost of the 1990 benefit structure falls within certain parameters. For this purpose, we recommend leaving the retirement rates as they were in 1990.

Retirement from Vested Terminated Membership Status: We currently assume that all vested terminated members retire at age 60. The average age of retirement for the observation period was 59.5 years of age. We recommend no change in this assumption.

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Disablement

Due to the enactment of new disability provisions in 1992, we have been using higher rates of disablement for Coverage B members since the 1993 Actuarial Valuation. A summary of our current findings and recommended changes is shown in the following chart.

Disablement of Active Members				
	Number of Disabilities (2003-07)		Actual / Expected Ratios	
	Actual Number	Expected Number	2007 Study	2003 Study
Coverage A				
Male	205	224	92%	87%
Female	<u>535</u>	<u>567</u>	<u>94</u>	<u>110</u>
Total	740	791	94%	103%
Coverage B				
Male	343	440	78%	73%
Female	<u>990</u>	<u>1,137</u>	<u>87</u>	<u>83</u>
Total	1,333	1,577	85%	81%

We lowered the rates of disability for Coverage A members as a result of the 1995 study, and the number of Coverage A disabilities in this study continues to be close to the number assumed. Therefore, we are not recommending any changes in the rates of disability for Coverage A members. It should be noted that since no new members may elect Coverage A, the group of potential Coverage A disabled members is declining. Currently, less than 25% of active members are enrolled in Coverage A and this ratio will continue to decline.

There were fewer Coverage B disabilities in this observation period than we assumed. We expected higher disability rates for Coverage B because of the greater benefits and the added incentive for members to apply for a disability. We lowered the disability rates as a result of the 2003 study and it is clear that another adjustment is warranted. The initial anti-selection during the 1992 election process has quite likely disappeared. That is, some members who perceived they were in less than average health, or were contemplating filing for disability, would have been more apt to elect Coverage B thus lowering the overall health of Coverage B members when compared to the Coverage A members.

Because the Coverage B disability benefit is not directly proportional to service, we expected, and have seen, higher rates of disability for members who entered the System at later ages. We have three sets of Coverage B disability rates; one for those who enter prior to age 40 (originally assumed to be the same rates as for Coverage A members), one for those who enter the System between the ages of 40 and 44, and one for those who enter the System at or after age 45. The experience for members hired at age 40 or older is tracking fairly well. We are only recommending reductions to the rates for those who enter the System under age 40.

The revised results are shown below based on our recommended changes for Coverage B.

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Recommended Disablement of Active Members				
	Number of Disabilities (2003-07)		Actual / Expected Ratios	
	Actual Number	Proposed Number	Revised Set	Current Set
Coverage B				
Male	343	405	85%	78%
Female	<u>990</u>	<u>1,095</u>	<u>90</u>	<u>87</u>
Total	1,333	1,500	89%	85%

- Current Assumption:**
- Coverage A Special rates by age only
 - Coverage B Special rates by entry age group
- Recommendation:**
- Coverage A No change
 - Coverage B Reduce rates of disability by approximately 15% for males and 7% for females, on average

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Terminations from Active Membership

Actual and expected numbers of terminated members under the current and recommended assumption are shown in the following table. These figures represent all members who terminated active membership, whether or not they elected a refund.

Termination from Active Membership Status					
		Number of Members Terminated (2003-07)		Actual / Expected Ratios	
Years		Actual Number	Expected Number	2007 Study	2003 Study
Male	Under 30	7,654	7,022	109%	99%
	30-34	3,039	2,543	120	100
	35-39	2,080	1,712	121	103
	40-44	1,802	1,349	134	104
	45 & Up	<u>2,953</u>	<u>2,541</u>	<u>116</u>	<u>101</u>
Subtotal Males		17,528	15,167	116%	101%
Female	Under 30	23,030	22,128	104%	101%
	30-34	5,267	4,674	113	104
	35-39	3,463	3,117	111	96
	40-44	3,148	2,718	116	95
	45 & Up	<u>4,094</u>	<u>3,275</u>	<u>125</u>	<u>108</u>
Subtotal Females		39,002	35,912	109%	101%
Total Number		56,530	51,079	111%	101%

The rates of termination have been reduced in each of the last three studies, but now we recommend only some fine tuning. The overall experience indicated that termination rates were about 11% higher than expected during the observation period. However, when we studied the experience by years of service, actual rates of termination for female members with more than 10 years of service were lower than expected and we are recommending some adjustment. For most entry ages for members with less than 4 years of service, we are recommending slightly higher rates. We are recommending only minor changes between 3 and 10 years of service.

The revised results are shown below based on our recommended changes.

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Recommended Termination from Active Membership					
	Years	Number of Members Terminated (2003-07)		Actual / Expected Ratios	
		Actual Number	Proposed Number	Revised Set	Current Set
Male	Under 30	7,654	7,217	106%	109%
	30-34	3,039	2,734	111	120
	35-39	2,080	1,817	114	121
	40-44	1,802	1,441	125	134
	45 & Up	<u>2,953</u>	<u>2,690</u>	<u>110</u>	<u>116</u>
Subtotal Males		17,528	15,899	110%	116%
Female	Under 30	23,030	22,298	103%	104%
	30-34	5,267	4,895	108	113
	35-39	3,463	3,361	103	111
	40-44	3,148	2,795	113	116
	45 & Up	<u>4,094</u>	<u>3,388</u>	<u>121</u>	<u>125</u>
Subtotal Females		39,002	36,737	106%	109%
Total Number		56,530	52,636	107%	111%

The following tables show the recommended revisions to the assumed rates of termination by entry age and duration.

Duration	Annual Rate of Termination (by Entry Age and Duration)							
	Current Assumed Rates				Proposed Assumed Rates			
	27	32	37	42	27	32	37	42
Male								
1	12.5%	12.5%	12.5%	12.5%	12.5%	13.0%	13.0%	13.0%
2	7.7	7.7	7.7	7.7	7.7	9.0	9.0	9.0
3	5.4	5.4	5.4	5.4	6.0	6.5	6.5	6.5
4	4.4	4.4	4.4	4.4	4.8	5.0	5.0	5.0
5	3.0	3.0	3.0	3.0	3.6	3.0	3.0	3.0
10	2.0	2.0	2.0	2.4	2.0	2.0	2.0	2.0
15	1.1	1.1	1.2		1.1	1.1	1.1	
20	0.6	0.6			0.6	0.6		
25	0.5				0.5			

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Duration	Annual Rate of Termination (by Entry Age and Duration)							
	Current Assumed Rates				Proposed Assumed Rates			
	27	32	37	42	27	32	37	42
Female								
1	10.0%	10.0%	10.0%	10.0%	11.0%	11.0%	11.0%	10.5%
2	7.2	7.2	7.2	7.2	8.5	8.5	7.5	7.0
3	6.3	5.8	5.3	4.9	7.0	6.5	6.0	5.5
4	5.8	5.4	4.9	3.9	6.0	5.5	4.5	4.0
5	5.8	4.2	2.9	2.5	5.3	4.5	3.8	3.3
10	2.0	1.7	1.4	1.6	1.8	1.6	1.3	1.3
15	0.9	1.0	0.9		0.9	0.9	0.9	
20	0.7	0.9			0.5	0.5		
25	0.6				0.4			

Current Assumption: Rates as illustrated in the left half of the tables above

Recommendation: Rates as illustrated in the right half of the tables above

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Probability of Refund at Termination

Actual and expected numbers of refunds for terminated members under the current and recommended assumption are shown in the following table. The study only covers members with 5 years of service. We assume all terminating members with less than 5 years of service receive a refund immediately.

Refunds for Terminating Active Members					
		Number of Refunds (2003-07)		Actual / Expected Ratios	
	Years	Actual Number	Expected Number	2007 Study	2003 Study
Male	5-9	1,687	1,763	96%	110%
	10 & Up	<u>395</u>	<u>480</u>	<u>82</u>	<u>109</u>
Subtotal Males		2,082	2,243	93%	110%
Female	5-90	3,403	3,710	92%	108%
	10 & Up	<u>814</u>	<u>937</u>	<u>87</u>	<u>99</u>
Subtotal Females		4,217	4,647	91%	106%
Total Number		6,299	6,890	91%	107%

We recommend revising the assumed probabilities of refund, but not to the full extent of the experience in the observation period.

Recommended Refunds for Terminating Active Members					
		Number of Refunds (2003-07)		Actual / Expected Ratios	
	Years	Actual Number	Proposed Number	Revised Set	Current Set
Male	5-9	1,687	1,712	99%	96%
	10 & Up	<u>395</u>	<u>425</u>	<u>93</u>	<u>82</u>
Subtotal Males		2,082	2,137	97%	93%
Females	5-9	3,403	3,619	94%	92%
	10 & Up	<u>814</u>	<u>837</u>	<u>97</u>	<u>87</u>
Subtotal Females		4,217	4,456	95%	91%
Total Number		6,299	6,593	96%	91%

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Probability of Terminating Member Electing a Refund (by Entry Age)								
	Current Assumed Rates				Recommended Rates			
	27	32	37	42	27	32	37	42
Male								
Under 5	100%	100%	100%	100%	100%	100%	100%	100%
10	50	42	45	45	46	38	36	36
15	42	36	30		38	31	21	
20	36	27			31	15		
25	27				15			
Female								
Under 5	100%	100%	100%	100%	100%	100%	100%	100%
10	35	36	36	35	32	32	32	29
15	30	30	30		24	24	24	
20	20	20			14	14		
25	10				10			

Current Assumption: Rates as illustrated in the left half of the table above

Recommendation: Rates as illustrated in the right half of the table above

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

Merit Salary Increases

Annual increases in salaries, exclusive of the observed ultimate annual wage growth during the four-year period (2.78% per year), are shown at several entry ages and durations.

Yr.	Annual Increase in Salaries Due to Merit (by Entry Age)							
	Current Increases				Actual Experience			
	27	32	37	42	27	32	37	42
1	5.3%	5.1%	4.8%	4.8%	5.1%	5.0%	4.8%	4.8%
5	4.8	4.5	3.8	3.8	4.1	3.9	3.5	3.4
10	3.0	2.7	2.3	2.2	3.0	2.7	2.6	2.5
15	1.5	1.4	1.1	1.1	1.8	1.4	1.3	1.4
20	1.1	1.1	0.8	0.8	1.3	1.2	1.1	0.8
25	0.9	0.8	0.5	0.5	1.0	0.9	1.0	0.1
30	0.7	0.6	0.5		1.0	0.9	1.0	
35	0.7	0.6			1.4	0.9		
40	0.6				0.8			

The current merit wage scale was changed in 1999 and adjustments do not appear to be necessary at this time.

Current Assumption: Rates as illustrated in the left half of the table above

Recommendation: No changes

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM

2007 ACTUARIAL EXPERIENCE ANALYSIS

Supplemental Assumptions

We are recommending revisions to the following assumptions:

Unused Sick Leave: We studied the unused sick leave service for those members who retired during the study period. We found that this service was generally proportional to credited service. On average, new retirees had 0.54 years of unused sick leave service and 26.3 years of credited service (including unused sick leave service).

Our recommendation is to revise the assumed sick leave service from 0.67 years of Credited Service to 2.1% of total years of Credited Service.

Optional Forms: Option 8 was valued as a 65% joint and survivor annuity and will be valued with actual data in the future.

Number of Children: We studied the number of children for surviving spouses and disability retirements. Based on this analysis, we are recommending that married members are assumed to have the following number of children.

<u>Member's Gender</u>	<u>Actual # of Children</u>	<u>Current Assumption</u>	<u>Revised Assumption</u>
Male	0.76	0.53	0.75
Female	0.48	0.23	0.50

Assumed Offsets: We studied the benefit offset amounts for surviving spouses and disability retirements. Based on this analysis, we are recommending the following benefit offsets:

	<u>Coverage A</u>		<u>Coverage B</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
Current Set				
Death	9.1%	5.8%	0.0%	0.0%
Disability	5.3%	2.3%	2.7%	2.9%
Revised Set *				
Death	8.0%	4.0%	0.0%	0.0%
Disability	2.5%	4.0%	2.2%	3.0%

* Offsets are assumed to cease at age 60.

**CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM
2007 ACTUARIAL EXPERIENCE ANALYSIS**

**Section 6
Estimated Impact of Recommendations**

DB Program

We have recalculated the results of the 2006 Actuarial Valuation of the Defined Benefit Program using a sampling technique. The 2007 actuarial valuation will be the first application of the revised assumptions.

The impact of adopting all of our recommendations is shown in the following table. We used a 30-year amortization period for the Unfunded Actuarial Obligation

	(\$Millions)	Contributions as a Percent of Salaries		
	Actuarial Obligation	Normal Cost	Unfunded Obligation	Total 30-Yr Rate
2006 Valuation	\$ 150,872	16.820%	4.168%	20.988%
Expected 30-Year Level Rate				<u>17.656</u>
Estimated Revenue Needed				3.332%
Impact of Revised Assumptions				
Mortality	\$ 3,908	0.457%	0.830%	1.287%
Service Retirement	(32)	0.058	(0.007)	0.051
Disability	58	0.038	0.012	0.050
Terminations & Refunds	303	0.037	0.064	0.101
Other	<u>(109)</u>	<u>(0.005)</u>	<u>(0.023)</u>	<u>(0.028)</u>
Total Change	\$ 4,128	0.585%	0.876%	1.461%
Revised 2006 Valuation	\$ 155,000	17.405%	5.044%	22.449%
Expected 30-Year Level Rate				<u>17.656</u>
Estimated Revenue Needed				4.793%

The impact shown above does not include any demographic or economic experience gains or losses since June 30, 2006.

Table 15 in the 2006 DB Program actuarial valuation showed a Normal Cost Rate of 16.820% of Earned Salaries compared to expected revenue over the 30 years of 17.656% of Earned Salaries. This left only 0.836% of Earned Salaries available to amortize the Unfunded Actuarial Obligation and it was not sufficient. The estimated increase in the Normal Cost Rate by 0.585% of Earned Salaries shown above will further hinder the prospect of amortizing the DB Program's Unfunded Actuarial Obligation.

DBS and CBB Programs

CALIFORNIA STATE TEACHERS' RETIREMENT SYSTEM 2007 ACTUARIAL EXPERIENCE ANALYSIS

The only recommended change that will impact the Defined Benefit Supplement Program or the Cash Balance Benefit Program is the revision to the assumed investment return from 8.00% to 7.75% per year.

The Board established a Policy on June 9, 2006 that was effective for the Additional Earnings Credit and Additional Annuity Credit decisions beginning in 2006. The Board's Policy calls for a two-step determination of the allocation.

The first step allocates the excess of the Actuarial Surplus over twice the Minimum Interest Rate in the year after the valuation date up to the difference between the expected long-term rate of return and the Minimum Interest Rate for the prior year. In certain circumstances, the Additional Earnings Credit and Additional Annuity Credit may be less in the future by 0.25% due to the reduction in the assumed earnings rate.

MPP Program

The actuarial valuation results of the Medicare Premium Payment Program will also be impacted by the recommendation to strengthen the mortality assumptions. Longer expected payment of Part B premiums will have a somewhat greater impact on the MPP Program than the DB Program because the medical trend assumption (increasing expected future premiums) is greater than the 2% simple post-retirement adjustment (increasing future retirement benefits).

SBMA

The Supplemental Benefit Maintenance Account distributes certain benefits to members based on the increase in purchasing power since their date of retirement. The recommended strengthening of the mortality assumptions will increase the expected distributions from the SBMA due to longer life expectancies.