

**TENNESSEE CONSOLIDATED
RETIREMENT SYSTEM
EXPERIENCE STUDY**

JULY 1, 2004 - JUNE 30, 2008



Bryan, Pendleton, Swats & McAllister, LLC
A Wells Fargo Company

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September 25, 2009

The Honorable David H. Lillard, Jr., Chairman
Board of Trustees
Tennessee Consolidated Retirement System
Nashville, Tennessee 37219

Dear Mr. Lillard:

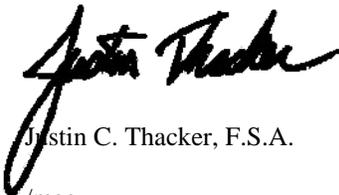
Submitted herewith are the results of an experience study of the Tennessee Consolidated Retirement System prepared for the four year period ending June 30, 2008, pursuant to the provisions of TCA Section 8-34-503(b). Also included are recommendations with respect to the actuarial assumptions of the plan for use with valuations occurring after this study date.

We trust that this report will be helpful in formulation of policy with respect to the operation and financing of the System. We very much appreciate the opportunity to serve the Board of Trustees, and will be pleased to supplement this report in any way, as you request.

The staff of the Tennessee Consolidated Retirement System has been extremely helpful and cooperative in developing the information required for this study. Their cooperation has been greatly appreciated, and is hereby acknowledged.

The study summarized in this report has been performed utilizing generally accepted actuarial principles and, where applicable, applying actuarial standards of practice. The undersigned is an actuary at BPS&M, member of the American Academy of Actuaries, and has met the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions herein.

Respectfully submitted,



Justin C. Thacker, F.S.A.

/mec

Enclosures

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Summary of Report	1
Introduction.....	1
Demographic Assumptions	3
Effect of Actuarial Assumptions on Plan Costs.....	3
General Approach.....	4
Post-Retirement Mortality.....	8
Pre-Retirement Mortality.....	17
Disability.....	25
Turnover.....	33
Spread of Retirement Ages.....	53
Summary of Demographic Assumptions.....	61
Economic Assumptions	62
Inflation.....	62
Cost of Living Adjustment for TCRS Retirees.....	63
Interest Rates.....	64
Salary Scale.....	66
Social Security Increases.....	68
Economic Assumption Summary.....	68
Other Groups	69

Introduction

"At least once in each six (6) year period, the actuary shall make an actuarial investigation into the mortality, service and compensation experience of the members and beneficiaries of the retirement system, and taking into account the results of such investigation, the board of trustees shall adopt for the retirement system such mortality, service, and other tables as shall be deemed necessary."

Tennessee Code Annotated, Section 8-34-503(b)

Since the Tennessee Consolidated Retirement System was established effective July 1, 1972, an actuarial experience study has been conducted periodically in accordance with the statute cited above. Each study has covered a four year reporting period, in compliance with the statutory requirement prior to amendment in 1992 to permit a six year rather than four year span. The current study examines the four year period ending June 30, 2008.

The initial four year period ended June 30, 1976. The experience study performed as of that date reached some definite conclusions and identified other probable trends. However, there were shortcomings to the data collected for the study because the records on which the study drew had been established, necessarily, to support the ongoing administration of the System. Steps were taken at that time to begin accumulating more elaborate information so that studies performed as of June 30, 1980 and later produced more comprehensive results. The data collection process continues to be refined to take advantage of the additional processing power made available by advances in technology. Information that was not previously available is now gathered allowing more elaborate analysis of results.

TCA 8-34-503(b) provides that the periodic actuarial investigation shall cover the "mortality, service and compensation experience" of the System. Within this framework, the various factors relating to the System's experience can be categorized, as follows:

- A. Demographic Assumptions
 - 1. Post-retirement Mortality
 - 2. Pre-retirement Mortality
 - 3. Rates of Disability
 - 4. Turnover (i.e., withdrawal from the System)
 - 5. Spreads of Retirement Age

- B. Economic Assumptions
 - 1. Rate of Investment Return
 - 2. Changes in Compensation for Continuing Employees
 - 3. Increases in Social Security Taxable Wage Base
 - 4. Cost of Living Adjustments

Each of the factors is discussed separately in the following sections of this report.

As input for the study, census data was obtained for the fiscal years beginning July 1, 2004, 2005, 2006, and 2007. For each year, the employee population established as of the beginning of the fiscal year was traced through the end of the fiscal year. For these years, records had been provided by TCRS indicating whether each individual was still a member of the System as of the end of the fiscal year or, if he was no longer a member, the cause of his withdrawal (retirement, disability, death, etc.).

Salaries were reported for each employee who was an active participant as of the beginning of each fiscal year. For each individual who remained an active employee as of the end of a fiscal year, salaries were compared to full year salaries reported in the previous fiscal year in order to determine compensation increase rates.

In studying each "decrement" (that is, each reason for which individuals could have withdrawn from the System), a comparison of "actual" to "expected" terminations was made. The number of "actual" withdrawals for each cause was tabulated from the records maintained by the System. The "expected" terminations for each cause were determined by applying the rates of decrement recommended with the 2004 experience study to the exposure (that is, the number of individuals active as of the beginning of each fiscal year). By comparing the ratio of actual terminations to expected terminations for each cause, the validity of the actuarial tables was tested.

Results for the four separate years included in the review period have been combined in order to increase the sample size and smooth out random variations.

Each of the studies investigated several groups separately, because it was felt that they might have significantly different experience. The groups were defined as follows:

1. Teachers
2. General State Employees
3. Employees of Political Subdivisions
4. "Group II" Members (Firemen, Police, Wildlife Officers, and Highway Patrol)
5. "Group III" Members (County officials and Public Service Commissioners)
6. UT-TIAA with Guarantees
7. Local Teachers in Closed Systems
8. "Aged" Teachers and State Employees (retired lives only)

In practice, "Group II" and "Group III" were small, closed groups which were not large enough to generate credible experience, and "UT-TIAA", local teachers, and "aged" retirees exhibited experience quite similar to the larger group of teachers. Therefore, primary attention was paid to the first three groups—Teachers, general State employees and employees of Political Subdivisions. The results shown for Teachers include not only contributory ("K-12") teachers, but UT-TIAA members and local teachers, as well as "aged" retirees. "Non-Contributory" teachers (higher education) are included with general State employees, since they are combined with them for purposes of determining contribution rates.

Each of the sections in the Demographic Assumptions portion of the report deals with a particular rate of decrement or other assumption, in the order previously listed. For each assumption, the "ratios of actual to expected" based on the current tables are illustrated and discussed. A recommendation is then made concerning each assumption. The Board may choose to adopt the recommendations for use with valuations occurring after this study date and with any actuarial calculations required prior to subsequent changes in the assumptions.

Effect of Actuarial Assumptions on Plan Costs

It is important to realize that actuarial assumptions do not determine the ultimate cost of a pension plan. Actual experience (benefits paid plus the expenses of plan operation, less interest earned on plan assets) ultimately determines the amount which the plan sponsor must contribute. What the actuarial assumptions do, in combination with the actuarial funding method, is determine the incidence of the plan's ultimate cost over a period of years --- how much the plan's sponsor must contribute to the plan each year.

For example, if a very "conservative" set of assumptions is used as the basis for a valuation (low interest earnings, high salary increases, low turnover, low mortality rates), the initial cost of the plan will be high, but the required contribution rates will in all likelihood decrease gradually in later years. If, on the other hand, a plan starts out using a very "liberal" or "optimistic" set of assumptions (high interest earnings, low salary increases, high turnover, high mortality rates), the initial cost of the plan may be quite low, but plan costs will gradually increase in future years.

For most employers, a fairly level plan contribution as a percentage of covered payroll is a desirable goal. Therefore, plan sponsors usually try to choose assumptions that they feel are generally reasonable. In the absence of unusual events, a reasonable set of actuarial assumptions can be expected to develop a reasonably level series of annual contributions.

The purpose of the experience study is to review the existing set of actuarial assumptions and identify any trends in participant behavior or economic situations that are deemed to be long-term in nature. Any changes to the assumptions would be expected to have an impact on the future level of required contributions to the plan.

General Approach

The portion of the study concerning active participants was based on the active life data associated with fiscal years beginning in 2004 through 2007. For each plan year, a record was established for each person who was an active participant in the plan as of the beginning of the year. Those records were tracked through the end of each fiscal year to determine the employment status at that time. A similar process was used to develop records concerning mortality among retired lives to determine whether the participant was still living at the end of the respective fiscal years.

These records served as the basis for the experience study. For most of the actuarial assumptions, the study took the form of determining ratios of "actual" results to the "expected" results obtained by applying the current tables to the participating lives. The table on the next page shows an example of the way in which "actual" terminations were compared to "expected" terminations and a ratio of "actual to expected" was obtained.

In order to obtain this table, each record was treated as a "unit of exposure" -- that is, the participant with which it is associated entered the year and was "exposed" to the contingency being measured. The member either terminated participation for this reason during the year or did not. In either event, it counted as a unit of exposure, so the exposure figure for the proper age and sex was increased by one. If the person actually terminated participation for this reason, the "actual" column was also increased by one for that age and sex; if the person was still employed at the end of the year, or if he terminated for some other reason, no entry was made to the "actual" column. An "expected" figure was calculated by multiplying the one unit of exposure by the probability of termination included in the turnover table currently being utilized in the valuation. For example, if for a particular age and sex the current table assumes that 15% of the participants will terminate employment during the next year, a factor of .15 was added to the "expected" column for the appropriate age and sex.

After all of the records were processed through the program, ratios of actual to expected were calculated. For example, over the four years of observation, 8,397 males between the ages of 36 and 40 began a year of employment. Of those 8,397 people, 555 terminated their employment before the end of the year. On the other hand, the turnover table currently being utilized assumes that approximately 3.33% of males in this age bracket will terminate their employment, so the "expected" figure was 280. Thus, actual terminations in this category were greater than the "expected" terminations --- the ratio of actual to expected was 198%.

DEMOGRAPHIC ASSUMPTIONS

		General State Ultimate Withdrawal Unweighted				
		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	4	0	1	0.00	
	21-25	1,253	236	188	125.62	
	26-30	4,582	581	497	116.82	
	31-35	6,770	604	437	138.29	
	36-40	8,397	555	280	198.20	
	41-45	11,051	523	235	222.92	
	46-50	13,183	462	250	184.93	
	51-55	12,510	464	259	179.19	
	56-60	4,824	240	167	143.72	
	61-65	162	20	6	313.73	
	66-70	37	8	0	n/a	
	71-75	7	1	0	n/a	
	TOTAL		62,780	3,694	2,319	159.26
	<u>FEMALE</u>	16-20	4	1	1	135.14
21-25		1,546	279	254	109.92	
26-30		7,465	926	953	97.16	
31-35		10,021	927	832	111.39	
36-40		11,783	829	543	152.69	
41-45		17,138	774	459	168.64	
46-50		20,601	816	453	180.30	
51-55		18,434	779	527	147.91	
56-60		6,423	321	274	117.07	
61-65		103	18	5	391.30	
66-70		14	2	0	n/a	
71-75		9	4	0	n/a	
TOTAL			93,541	5,676	4,300	132.01
<u>TOTAL</u>		16-20	8	1	1	69.09
	21-25	2,799	515	442	116.60	
	26-30	12,047	1,507	1,450	103.90	
	31-35	16,791	1,531	1,269	120.65	
	36-40	20,180	1,384	823	168.17	
	41-45	28,189	1,297	694	187.00	
	46-50	33,784	1,278	702	181.95	
	51-55	30,944	1,243	786	158.22	
	56-60	11,247	561	441	127.16	
	61-65	265	38	11	346.24	
	66-70	51	10	0	n/a	
	71-75	16	5	0	n/a	
	TOTAL		156,321	9,370	6,619	141.56

This example provides a simplified illustration of the methodology used in succeeding sections of the report. Actual comparisons made herein are conducted on the basis described above but have been modified by “weighting” in order to enhance the effectiveness of the results. The weighting process gives recognition to the fact that some participants, due to associated larger liabilities, have a greater impact on valuation results than others. For instance, a senior official who has completed a significant number of years of service and receives a high salary will have a substantially larger actuarial liability than a short service lower paid employee of the same age. The impact on the plan of service retirement of the senior official is a more significant event than retirement of the lower paid employee of the same age. Therefore, the “number” of participants used to develop exposure, actual and expected numbers has been weighted by multiplying the number by the actuarial liability for that participant. Actuarial assumptions recommended with the 2004 experience study are used in determining liability weightings. For instance, an employee with a liability of \$10,000 for whom the probability of termination was 10% would result in exposure and expected amounts for a particular year of 1 and 0.10 respectively on an unweighted basis and 10,000 and 1,000 respectively on a weighted basis. If the participant died during the year, the "actual" weighted entry for the year would be 10,000.

The charts presented herein have been developed recognizing liability weightings. Weighted results have been reduced proportionately to maintain exposure amounts within a reasonable range.

The table on the following page shows the results of the earlier table after data for participants have been weighted by liability amount. After weighting, the actual to expected ratio for the group of Consolidated State male employees between 36 and 40 years of age is reduced from 198.20% to 119.72%. The reduction suggests that higher paid employees with relatively more seniority are less inclined to terminate employment than lower paid employees with shorter periods of service. This result is expected and is further confirmed by comparing the overall actual to expected ratio between the two tables. The overall ratio declines from 141.56% to 101.11%. The process of correlating rates of termination, death, etc. to liability weightings ensures that actuarial assumptions are developed in the same manner they are applied. Both the development of the rates in the experience study and their application in the valuation process are with respect to liability amounts.

DEMOGRAPHIC ASSUMPTIONS

		General State Ultimate Withdrawal Weighted				
		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	14	0	2	0.00	
	21-25	11,167	1,840	1,652	111.40	
	26-30	85,920	8,662	9,075	95.46	
	31-35	232,705	14,025	14,614	95.97	
	36-40	476,790	18,565	15,507	119.72	
	41-45	898,351	23,611	18,930	124.73	
	46-50	1,332,567	22,621	25,252	89.58	
	51-55	1,265,885	31,084	26,136	118.93	
	56-60	474,753	18,400	16,451	111.85	
	61-65	13,152	367	550	66.80	
	66-70	665	204	0	n/a	
	71-75	23	0	0	n/a	
	TOTAL		4,791,991	139,379	128,168	108.75
	<u>FEMALE</u>	16-20	11	3	2	148.93
21-25		11,938	1,948	1,941	100.34	
26-30		126,712	13,037	15,809	82.47	
31-35		308,484	20,581	25,051	82.16	
36-40		594,709	27,401	26,701	102.62	
41-45		1,310,877	32,193	34,672	92.85	
46-50		1,910,632	41,109	42,003	97.87	
51-55		1,714,832	50,528	49,027	103.06	
56-60		584,947	25,157	24,910	100.99	
61-65		2,126	764	98	783.12	
66-70		199	82	0	n/a	
71-75		95	53	0	n/a	
TOTAL			6,565,561	212,856	220,213	96.66
<u>TOTAL</u>		16-20	25	3	5	68.58
	21-25	23,105	3,788	3,593	105.42	
	26-30	212,632	21,700	24,883	87.21	
	31-35	541,188	34,606	39,665	87.25	
	36-40	1,071,499	45,966	42,207	108.91	
	41-45	2,209,229	55,804	53,602	104.11	
	46-50	3,243,198	63,731	67,256	94.76	
	51-55	2,980,717	81,613	75,163	108.58	
	56-60	1,059,700	43,556	41,361	105.31	
	61-65	15,277	1,131	647	174.77	
	66-70	864	285	0	n/a	
	71-75	117	53	0	n/a	
	TOTAL		11,357,552	352,235	348,381	101.11

In each of the following sections, the appropriateness of the current assumptions is discussed, and tables are included which compare actual results during the past four years to the "expected" results obtained by applying the current tables to the exposure. A recommendation is then made, and a second group of tables illustrates the relationship between "actual" and "expected" based on any proposed new tables.

Post-Retirement Mortality

Pension costs are quite sensitive to changes in post-retirement mortality assumptions. Therefore, it is important that mortality tables used in the actuarial valuation adequately reflect post-retirement mortality experience. Mortality rates have been studied based on two major groups of employees, a) the Teachers group consisting of Teachers and Group III members and b) the group consisting of State employees, Political Subdivision employees and Group II members.

In this context, "conservative" tables are tables with low assumed rates of mortality—it is assumed that retirees will continue to live for comparatively long periods of time. Translated into ratios of actual to expected deaths among retirees, a mortality table is "conservative" if ratios of actual to expected are above 100%. If ratios are below 100%, fewer retirees are dying than expected. Since they are living longer than expected, they will receive more benefits from the plan than expected, so more money will have to go into the fund than has been anticipated.

The 1976, 1980, and 1984 studies all showed that retirees, especially teachers, were living longer than expected—that is, the post-retirement mortality tables then in use were not sufficiently conservative. Differences between actual and expected deaths were so great that some question remained as to whether the improvements in mortality were permanent or were due partially to statistical fluctuations. Therefore, the Board adopted an "intermediate" approach. About one-half of the apparent improvement in mortality was recognized in the new tables adopted after the 1980 study, with the understanding that further action could be taken if subsequent studies indicated permanent and/or continuing improvement. In 1984, the full continued improvement in mortality was recognized by adoption of the 1983 Group Annuity Mortality Tables as the basis for expected deaths among teachers and the 1975 Group Annuity Mortality Tables (somewhat less conservative) as the basis for expected deaths among other retirees.

Experience from 1984 to 1988 indicated that the tables adopted as a result of the 1984 study had provided an accurate picture of expected deaths among retirees, and this pattern continued during the period ending in 1992. For the four year period ending in 1996, the ratio of actual to expected mortality declined below 100% among service retirees. As a result of the 1996 study, the male Teachers mortality table was modified to a more conservative basis, while other groups were left unchanged since the ratios were generally above 95%.

Mortality experience in the 2000 study showed continued improvement among both major groups. Overall ratios for both groups declined by almost 4% from 1996 to 2000, with the majority of mortality improvement recognized among males. As a result of the 2000 study, mortality tables were modified for both major groups in order to bring actual to expected ratios back up to 100%. In addition, the new mortality tables were based on actual TCRS mortality experience. Historically, mortality rates had been created by adjusting standard tables by a uniform percentage to fit the overall pattern of the TCRS groups. This change was made to better reflect actual TCRS mortality experience below age 65, which was not consistent with standard mortality tables.

Experience in the 2004 study showed continued mortality improvement in the group consisting of State employees, Political Subdivision employees and Group II members. The ratio of actual to expected mortality for this group declined from 100% to 91% since the 2000 study, with males experiencing more mortality improvement than females. Experience of the Teachers group (consisting of Teachers and Group III members) resulted in a reasonably conservative ratio of 103%. As a result of the 2004 study, mortality tables were modified for both major groups in order to bring actual to expected ratios back to 100%.

Experience in the current study shows continued mortality improvement among all groups (mortality improvements in the prior study were mostly related to only the group consisting of State employees, Political Subdivision employees and Group II members - not the Teachers group). The ratio of actual to expected mortality for both of the main groups declined from 100% to just below 90% since the 2004 study, with both males and females experiencing consistent mortality improvement during the period.

Mortality experience following disability retirements was also investigated. The number of death claims among disabled retirees is not large enough to be fully credible statistically—disability retirees amount to only 5% of TCRS retirees. The results of the study indicate that actual mortality among both males and females is higher than expected. Results for disability mortality continue to be very inconsistent between study periods, suggesting further that experience in this area is less than fully credible.

The tables on the next three pages set out actual deaths, expected deaths, and ratios of actual to expected during the last four years. Actual and expected deaths are weighted by liability amounts to improve accuracy. Expected deaths are based on the tables used in the 2007 valuation. The first two pages show results for service retirees and the third for disability retirees.

DEMOGRAPHIC ASSUMPTIONS

All Teacher Groups Post-Retirement Mortality Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>
<u>MALE</u>	36-40	19,417	0	11	0.00
	41-45	6,773	0	9	0.00
	46-50	13,151	0	34	0.00
	51-55	365,924	1,890	1,566	120.72
	56-60	1,842,052	9,932	9,718	102.21
	61-65	2,277,760	19,630	18,858	104.09
	66-70	1,910,022	27,672	28,939	95.62
	71-75	1,515,444	36,960	41,512	89.03
	76-80	892,472	36,536	44,378	82.33
	81-85	405,879	27,257	30,997	87.93
	86-90	135,032	18,255	19,665	92.83
	91-95	28,567	6,758	6,462	104.58
	TOTAL	9,412,492	184,890	202,149	91.46
	<u>FEMALE</u>	36-40	22,991	0	10
41-45		12,805	204	11	1,800.08
46-50		31,525	426	47	908.63
51-55		984,780	2,823	2,344	120.45
56-60		3,705,100	15,752	14,275	110.34
61-65		4,419,131	25,646	28,206	90.92
66-70		3,585,752	30,917	39,003	79.27
71-75		2,434,265	37,217	43,392	85.77
76-80		1,615,345	42,539	52,536	80.97
81-85		784,032	37,420	47,189	79.30
86-90		399,903	38,622	41,954	92.06
91-95		192,678	34,942	36,985	94.48
TOTAL		18,188,309	266,509	305,952	87.11
<u>TOTAL</u>		36-40	42,408	0	20
	41-45	19,578	204	21	989.53
	46-50	44,676	426	81	526.43
	51-55	1,350,704	4,714	3,910	120.56
	56-60	5,547,152	25,684	23,993	107.05
	61-65	6,696,891	45,275	47,064	96.20
	66-70	5,495,774	58,588	67,943	86.23
	71-75	3,949,709	74,177	84,904	87.37
	76-80	2,507,818	79,076	96,914	81.59
	81-85	1,189,911	64,676	78,186	82.72
	86-90	534,936	56,877	61,619	92.31
	91-95	221,245	41,700	43,447	95.98
	TOTAL	27,600,802	451,399	508,101	88.84

DEMOGRAPHIC ASSUMPTIONS

Consolidated State, Polisubs & Group II Post-Retirement Mortality Old Assumptions

		<i>Exposure</i>	<i>Actual</i>	<i>Expected</i>	<i>Act/Exp</i>
<u>MALE</u>	36-40	23,994	0	27	0.00
	41-45	5,387	47	12	408.20
	46-50	40,249	52	145	35.75
	51-55	457,587	4,921	2,679	183.67
	56-60	1,622,663	14,314	14,832	96.51
	61-65	2,616,275	31,481	38,740	81.26
	66-70	2,861,096	50,368	61,302	82.16
	71-75	2,045,244	60,506	70,777	85.49
	76-80	1,027,624	53,694	59,688	89.96
	81-85	468,513	37,537	42,979	87.34
	86-90	124,602	16,864	16,554	101.87
	91-95	25,906	6,334	5,324	118.97
	TOTAL	11,319,139	276,118	313,060	88.20
<u>FEMALE</u>	36-40	37,568	0	24	0.00
	41-45	23,117	0	27	0.00
	46-50	93,277	287	162	177.32
	51-55	512,002	1,648	1,445	114.02
	56-60	1,375,589	9,362	7,572	123.65
	61-65	2,316,237	19,291	20,507	94.07
	66-70	2,435,590	27,989	31,871	87.82
	71-75	1,734,553	28,265	36,269	77.93
	76-80	1,058,969	36,958	38,334	96.41
	81-85	518,657	28,621	30,071	95.18
	86-90	180,227	17,858	19,185	93.09
	91-95	44,305	8,350	8,374	99.71
	TOTAL	10,330,091	178,630	193,841	92.15
<u>TOTAL</u>	36-40	61,561	0	51	0.00
	41-45	28,504	47	39	121.53
	46-50	133,526	339	307	110.43
	51-55	969,590	6,569	4,124	159.27
	56-60	2,998,252	23,676	22,404	105.68
	61-65	4,932,512	50,771	59,248	85.69
	66-70	5,296,686	78,357	93,173	84.10
	71-75	3,779,797	88,771	107,046	82.93
	76-80	2,086,593	90,652	98,021	92.48
	81-85	987,170	66,159	73,050	90.57
	86-90	304,828	34,722	35,739	97.15
	91-95	70,211	14,685	13,699	107.20
	TOTAL	21,649,230	454,748	506,901	89.71

DEMOGRAPHIC ASSUMPTIONS

All Retirees Post-Disability Mortality Old Assumptions

		<i>Exposure</i>	<i>Actual</i>	<i>Expected</i>	<i>Act/Exp</i>
<u>MALE</u>	36-40	9,207	158	195	81.06
	41-45	26,149	1,133	623	181.78
	46-50	65,486	2,547	1,735	146.84
	51-55	121,682	5,155	3,824	134.81
	56-60	156,618	6,054	5,808	104.23
	61-65	103,961	4,912	4,436	110.73
	66-70	45,517	4,079	2,244	181.80
	71-75	19,027	1,836	1,125	163.14
	76-80	11,813	898	903	99.38
	81-85	7,490	1,287	813	158.16
	86-90	4,346	195	628	31.02
	91-95	291	50	67	75.23
	TOTAL		571,587	28,303	22,401
<u>FEMALE</u>	36-40	11,595	595	247	240.87
	41-45	36,874	800	880	90.85
	46-50	87,019	2,792	2,306	121.10
	51-55	169,869	6,999	5,323	131.49
	56-60	216,550	8,011	8,017	99.93
	61-65	140,696	4,248	6,004	70.76
	66-70	61,317	2,847	3,019	94.30
	71-75	28,403	1,280	1,695	75.51
	76-80	16,094	993	1,226	81.00
	81-85	6,314	585	662	88.40
	86-90	3,019	413	454	90.92
	91-95	878	190	201	94.40
	TOTAL		778,627	29,753	30,033
<u>TOTAL</u>	36-40	20,802	753	442	170.37
	41-45	63,023	1,933	1,503	128.55
	46-50	152,504	5,340	4,040	132.15
	51-55	291,551	12,154	9,147	132.88
	56-60	373,168	14,065	13,825	101.73
	61-65	244,657	9,160	10,439	87.75
	66-70	106,834	6,926	5,263	131.61
	71-75	47,430	3,116	2,820	110.48
	76-80	27,906	1,891	2,130	88.80
	81-85	13,804	1,872	1,475	126.86
	86-90	7,365	607	1,081	56.16
	91-95	1,168	240	268	89.63
	TOTAL		1,350,214	58,056	52,434

Recommendation: Results for the tables applied to both of the main groups (State employees/Political Subdivisions and Teachers) have again reached the lower end of the acceptable range due to improvements in mortality. New tables are recommended for both groups to fit the mortality experience from the study period. Adopting the new tables would produce actual to expected ratios of 100% for both groups based on the experience data observed from 2004 to 2008.

A more conservative approach for post-retirement mortality should also be considered. Since mortality improvement has been documented throughout recent studies, anticipating future improvements in mortality would be prudent. This can be accomplished by using a generational mortality table that reduces the expected probabilities of mortality for all future years. This approach assumes that mortality improvements will continue indefinitely and is not yet widely used. Another approach is to create a mortality table that would produce actual to expected ratios greater than 100%. Mortality tables with ratios between 100% and 105% would be a reasonable approach in the short-term, while continuing to monitor mortality improvements in the future.

For the disability assumption, the difference in results from the prior period suggests that a change is warranted. A modified table is recommended based on a blend of current experience and the prior assumption since the experience in this area is less than fully credible.

DEMOGRAPHIC ASSUMPTIONS

All Teacher Groups Post-Retirement Mortality Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>
<u>MALE</u>	36-40	19,417	0	11	0.00
	41-45	6,773	0	9	0.00
	46-50	13,151	0	35	0.00
	51-55	365,924	1,890	1,808	104.54
	56-60	1,842,052	9,932	10,093	98.41
	61-65	2,277,760	19,630	19,330	101.55
	66-70	1,910,022	27,672	27,610	100.22
	71-75	1,515,444	36,960	36,840	100.33
	76-80	892,472	36,536	37,116	98.44
	81-85	405,879	27,257	27,113	100.53
	86-90	135,032	18,255	18,287	99.83
	91-95	28,567	6,758	6,630	101.92
	TOTAL	9,412,492	184,890	184,883	100.00
	<u>FEMALE</u>	36-40	22,991	0	10
41-45		12,805	204	14	1,504.26
46-50		31,525	426	56	758.54
51-55		984,780	2,823	2,759	102.34
56-60		3,705,100	15,752	15,383	102.40
61-65		4,419,131	25,646	25,645	100.00
66-70		3,585,752	30,917	31,667	97.63
71-75		2,434,265	37,217	36,536	101.86
76-80		1,615,345	42,539	42,629	99.79
81-85		784,032	37,420	38,148	98.09
86-90		399,903	38,622	37,950	101.77
91-95		192,678	34,942	35,706	97.86
TOTAL		18,188,309	266,509	266,503	100.00
<u>TOTAL</u>		36-40	42,408	0	21
	41-45	19,578	204	23	893.69
	46-50	44,676	426	92	465.61
	51-55	1,350,704	4,714	4,567	103.21
	56-60	5,547,152	25,684	25,475	100.82
	61-65	6,696,891	45,275	44,976	100.67
	66-70	5,495,774	58,588	59,277	98.84
	71-75	3,949,709	74,177	73,376	101.09
	76-80	2,507,818	79,076	79,745	99.16
	81-85	1,189,911	64,676	65,261	99.11
	86-90	534,936	56,877	56,237	101.14
	91-95	221,245	41,700	42,336	98.50
	TOTAL	27,600,802	451,399	451,386	100.00

DEMOGRAPHIC ASSUMPTIONS

Consolidated State, Polisubs and Group II Post-Retirement Mortality Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>
<u>MALE</u>	36-40	23,994	0	28	0.00
	41-45	5,387	47	12	403.54
	46-50	40,249	52	147	35.34
	51-55	457,587	4,921	2,690	182.92
	56-60	1,622,663	14,314	14,146	101.18
	61-65	2,616,275	31,481	32,393	97.18
	66-70	2,861,096	50,368	51,152	98.47
	71-75	2,045,244	60,506	61,307	98.69
	76-80	1,027,624	53,694	53,794	99.82
	81-85	468,513	37,537	38,669	97.07
	86-90	124,602	16,864	16,382	102.94
	91-95	25,906	6,334	5,386	117.60
	TOTAL	11,319,139	276,118	276,105	100.01
	<u>FEMALE</u>	36-40	37,568	0	26
41-45		23,117	0	32	0.00
46-50		93,277	287	186	154.25
51-55		512,002	1,648	1,690	97.48
56-60		1,375,589	9,362	7,827	119.61
61-65		2,316,237	19,291	19,315	99.87
66-70		2,435,590	27,989	28,039	99.82
71-75		1,734,553	28,265	29,776	94.93
76-80		1,058,969	36,958	36,353	101.67
81-85		518,657	28,621	28,847	99.22
86-90		180,227	17,858	18,183	98.21
91-95		44,305	8,350	8,348	100.02
TOTAL		10,330,091	178,630	178,623	100.00
<u>TOTAL</u>		36-40	61,561	0	54
	41-45	28,504	47	43	109.62
	46-50	133,526	339	333	101.84
	51-55	969,590	6,569	4,381	149.95
	56-60	2,998,252	23,676	21,974	107.75
	61-65	4,932,512	50,771	51,709	98.19
	66-70	5,296,686	78,357	79,190	98.95
	71-75	3,779,797	88,771	91,083	97.46
	76-80	2,086,593	90,652	90,146	100.56
	81-85	987,170	66,159	67,516	97.99
	86-90	304,828	34,722	34,565	100.45
	91-95	70,211	14,685	13,735	106.92
	TOTAL	21,649,230	454,748	454,728	100.00

DEMOGRAPHIC ASSUMPTIONS

All Retirees Post-Disability Mortality Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	36-40	9,207	158	223	70.89	
	41-45	26,149	1,133	744	152.32	
	46-50	65,486	2,547	2,066	123.27	
	51-55	121,682	5,155	4,283	120.35	
	56-60	156,618	6,054	6,106	99.15	
	61-65	103,961	4,912	4,522	108.62	
	66-70	45,517	4,079	2,287	178.40	
	71-75	19,027	1,836	1,168	157.17	
	76-80	11,813	898	954	94.15	
	81-85	7,490	1,287	857	150.15	
	86-90	4,346	195	652	29.88	
	91-95	291	50	67	75.26	
	TOTAL		571,587	28,303	23,928	118.29
	<u>FEMALE</u>	36-40	11,595	595	285	208.40
41-45		36,874	800	1,050	76.13	
46-50		87,019	2,792	2,747	101.66	
51-55		169,869	6,999	5,970	117.25	
56-60		216,550	8,011	8,433	95.00	
61-65		140,696	4,248	6,120	69.41	
66-70		61,317	2,847	3,076	92.55	
71-75		28,403	1,280	1,760	72.69	
76-80		16,094	993	1,294	76.74	
81-85		6,314	585	698	83.82	
86-90		3,019	413	470	87.83	
91-95		878	190	201	94.37	
TOTAL			778,627	29,753	32,105	92.67
<u>TOTAL</u>		36-40	20,802	753	508	148.10
	41-45	63,023	1,933	1,794	107.72	
	46-50	152,504	5,340	4,813	110.94	
	51-55	291,551	12,154	10,253	118.54	
	56-60	373,168	14,065	14,539	96.74	
	61-65	244,657	9,160	10,642	86.07	
	66-70	106,834	6,926	5,363	129.16	
	71-75	47,430	3,116	2,929	106.39	
	76-80	27,906	1,891	2,248	84.13	
	81-85	13,804	1,872	1,555	120.37	
	86-90	7,365	607	1,122	54.16	
	91-95	1,168	240	268	89.61	
	TOTAL		1,350,214	58,056	56,033	103.61

Pre-Retirement Mortality

Pension costs are not particularly sensitive to changes in pre-retirement mortality rates, because the mortality rates at active ages are quite low. Nevertheless, it is desirable to utilize rates which reasonably reflect actuarial experience if possible.

Historically, pre-retirement mortality rates for Teachers have been very low—lower than expected under any mortality table in general use. The Board recognized this experience in 1996 by basing expected results for Teachers on 60% of the 1983 Group Annuity Mortality Table. The full 1983 Group Annuity Mortality Table continued to be used for Consolidated State and Political Subdivision employees. In 2000, tables were adopted for Teachers that were approximately 85% of the previous variant of the 1983 Group Annuity Mortality Table. The 1994 Group Annuity Mortality Table was adopted for Consolidated State and Political Subdivision employees. As a result of the 2004 study, all groups began using a variant of the 1994 Group Annuity Mortality Table (60% for Teachers and 65% for Consolidated State and Political Subdivision employees).

Since TCRS became non-contributory for most State employees, records do not support a study of pre-retirement mortality among non-contributory groups. Previously, when a Member's employment terminated, a claim had to be made for the return of his contributions, and that claim indicated the reason for the termination. Now no such claim needs to be filed. As a result, TCRS records do not indicate the reason for the termination; the Member is simply no longer active. The same problem relates partially to Political Subdivisions, since some of them are contributory and some are not.

The table on the next page shows the results for active Teachers, and the tables on the following pages show results for Consolidated State and Political Subdivision employees. The latter two probably do not adequately reflect results, since deaths appear to be understated for non-contributory groups. The limited amount of pre-retirement deaths also limits the credibility of this experience.

Teachers
Pre-Retirement Mortality
Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	32	0	0	n/a	
	21-25	8,523	0	4	0.00	
	26-30	121,879	11	60	17.90	
	31-35	333,457	0	181	0.00	
	36-40	480,606	181	296	61.04	
	41-45	638,213	39	566	6.86	
	46-50	1,076,705	1,778	1,522	116.86	
	51-55	1,955,117	3,778	4,630	81.59	
	56-60	2,027,953	6,071	8,206	73.99	
	61-65	750,779	4,106	5,182	79.23	
	66-70	142,313	696	1,748	39.81	
	71-75	27,095	0	524	0.00	
	TOTAL		7,562,675	16,659	22,919	72.69
	<u>FEMALE</u>	16-20	73	0	0	n/a
21-25		50,794	5	10	51.12	
26-30		499,351	55	105	52.14	
31-35		1,186,368	56	330	16.90	
36-40		1,719,270	523	673	77.71	
41-45		2,312,249	894	1,317	67.87	
46-50		4,343,376	3,323	3,493	95.13	
51-55		7,210,826	8,555	8,999	95.06	
56-60		6,366,759	11,273	13,653	82.57	
61-65		2,025,976	4,909	8,106	60.55	
66-70		334,720	939	2,386	39.37	
71-75		67,662	580	752	77.13	
TOTAL			26,117,425	31,111	39,824	78.12
<u>TOTAL</u>		16-20	105	0	0	n/a
	21-25	59,317	5	13	37.26	
	26-30	621,230	65	165	39.62	
	31-35	1,519,825	56	511	10.90	
	36-40	2,199,876	704	969	72.62	
	41-45	2,950,463	933	1,884	49.53	
	46-50	5,420,081	5,101	5,015	101.72	
	51-55	9,165,944	12,332	13,629	90.48	
	56-60	8,394,712	17,344	21,859	79.35	
	61-65	2,776,755	9,015	13,289	67.84	
	66-70	477,033	1,635	4,133	39.56	
	71-75	94,757	580	1,276	45.46	
	TOTAL		33,680,099	47,770	62,743	76.14

**General State
Pre-Retirement Mortality
Old Assumptions**

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	537	0	0	n/a	
	21-25	17,202	9	7	121.69	
	26-30	97,386	0	52	0.00	
	31-35	243,326	46	144	31.97	
	36-40	487,052	237	329	72.07	
	41-45	908,831	872	878	99.34	
	46-50	1,542,730	3,199	2,332	137.18	
	51-55	2,277,564	5,263	5,819	90.45	
	56-60	2,509,247	8,713	11,118	78.37	
	61-65	1,533,863	7,307	11,989	60.95	
	66-70	550,210	4,874	7,349	66.33	
	71-75	154,543	2,756	3,238	85.09	
	TOTAL	10,322,490	33,277	43,256	76.93	
	<u>FEMALE</u>	16-20	400	0	0	n/a
		21-25	20,123	0	4	0.00
26-30		143,308	0	33	0.00	
31-35		325,231	0	98	0.00	
36-40		610,497	144	264	54.73	
41-45		1,327,095	131	823	15.93	
46-50		2,290,903	1,485	1,977	75.13	
51-55		2,882,171	2,702	3,865	69.91	
56-60		2,553,034	3,162	6,033	52.41	
61-65		1,230,556	3,463	5,482	63.17	
66-70		374,771	1,312	2,946	44.52	
71-75		84,787	343	1,042	32.92	
TOTAL		11,842,877	12,742	22,565	56.47	
<u>TOTAL</u>		16-20	937	0	0	n/a
		21-25	37,325	9	12	78.70
	26-30	240,693	0	85	0.00	
	31-35	568,558	46	241	19.00	
	36-40	1,097,549	381	593	64.35	
	41-45	2,235,926	1,003	1,701	58.99	
	46-50	3,833,633	4,684	4,309	108.71	
	51-55	5,159,735	7,965	9,683	82.25	
	56-60	5,062,281	11,875	17,150	69.24	
	61-65	2,764,419	10,770	17,471	61.65	
	66-70	924,981	6,186	10,295	60.09	
	71-75	239,330	3,098	4,280	72.39	
	TOTAL	22,165,367	46,019	65,820	69.92	

**Political Subdivisions
Pre-Retirement Mortality
Old Assumptions**

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>
<u>MALE</u>	16-20	902	3	0	n/a
	21-25	34,850	4	15	27.48
	26-30	156,443	121	83	145.30
	31-35	376,941	195	222	87.69
	36-40	610,918	152	410	37.13
	41-45	887,751	1,051	852	123.46
	46-50	1,136,093	1,821	1,704	106.86
	51-55	1,321,026	4,964	3,325	149.30
	56-60	1,132,453	6,667	4,994	133.50
	61-65	600,010	3,605	4,624	77.97
	66-70	175,905	1,882	2,372	79.34
	71-75	63,326	1,134	1,342	84.50
	TOTAL	6,496,618	21,600	19,943	108.31
	<u>FEMALE</u>	16-20	298	1	0
21-25		14,626	0	3	0.00
26-30		80,840	0	18	0.00
31-35		206,248	32	63	51.47
36-40		410,127	142	176	80.36
41-45		723,833	530	447	118.44
46-50		1,109,002	720	952	75.64
51-55		1,317,268	1,306	1,767	73.94
56-60		1,225,884	1,886	2,913	64.74
61-65		702,734	1,634	3,155	51.80
66-70		217,732	713	1,718	41.51
71-75		69,498	524	863	60.72
TOTAL		6,078,089	7,488	12,075	62.01
<u>TOTAL</u>		16-20	1,201	4	0
	21-25	49,476	4	18	22.97
	26-30	237,282	121	102	119.12
	31-35	583,189	227	285	79.74
	36-40	1,021,045	294	586	50.12
	41-45	1,611,584	1,581	1,299	121.73
	46-50	2,245,094	2,542	2,657	95.67
	51-55	2,638,293	6,271	5,092	123.15
	56-60	2,358,336	8,553	7,907	108.17
	61-65	1,302,744	5,239	7,778	67.35
	66-70	393,637	2,595	4,090	63.45
	71-75	132,824	1,658	2,205	75.19
	TOTAL	12,574,707	29,088	32,018	90.85

Recommendation: It is recommended that future expectations of pre-retirement mortality for all groups be based on a variant of the RP-2000 Mortality Table for Employees (male and female) in order to base the assumption on an updated table.

For Teachers, it is proposed to use 60% of the RP-2000 Mortality Table for Employees (male and female), while the recommendation for Consolidated State and Political Subdivision employees is to use 80% of the RP-2000 Mortality Table for Employees (male and female). While the mortality rates are below standard tables, the resulting tables do reasonably predict the liabilities the System will incur in the future.

Teachers
Pre-Retirement Mortality
Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	32	0	0	n/a	
	21-25	8,523	0	2	0.00	
	26-30	121,879	11	30	35.88	
	31-35	333,457	0	131	0.00	
	36-40	480,606	181	278	65.05	
	41-45	638,213	39	508	7.65	
	46-50	1,076,705	1,778	1,233	144.26	
	51-55	1,955,117	3,778	3,128	120.78	
	56-60	2,027,953	6,071	4,853	125.10	
	61-65	750,779	4,106	2,752	149.21	
	66-70	142,313	696	753	92.34	
	71-75	27,095	0	474	0.00	
	TOTAL		7,562,675	16,659	14,141	117.81
	<u>FEMALE</u>	16-20	73	0	0	n/a
21-25		50,794	5	6	78.41	
26-30		499,351	55	73	75.13	
31-35		1,186,368	56	287	19.39	
36-40		1,719,270	523	625	83.68	
41-45		2,312,249	894	1,331	67.18	
46-50		4,343,376	3,323	3,842	86.49	
51-55		7,210,826	8,555	9,385	91.15	
56-60		6,366,759	11,273	12,426	90.72	
61-65		2,025,976	4,909	5,830	84.20	
66-70		334,720	939	1,343	69.95	
71-75		67,662	580	873	66.48	
TOTAL			26,117,425	31,111	36,021	86.37
<u>TOTAL</u>		16-20	105	0	0	n/a
	21-25	59,317	5	8	59.89	
	26-30	621,230	65	103	63.64	
	31-35	1,519,825	56	418	13.33	
	36-40	2,199,876	704	903	77.95	
	41-45	2,950,463	933	1,839	50.74	
	46-50	5,420,081	5,101	5,075	100.52	
	51-55	9,165,944	12,332	12,513	98.56	
	56-60	8,394,712	17,344	17,279	100.38	
	61-65	2,776,755	9,015	8,582	105.04	
	66-70	477,033	1,635	2,096	77.99	
	71-75	94,757	580	1,346	43.08	
	TOTAL		33,680,099	47,770	50,162	95.23

**General State
Pre-Retirement Mortality
Recommended Assumptions**

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>
<u>MALE</u>	16-20	537	0	0	n/a
	21-25	17,202	9	5	176.86
	26-30	97,386	0	32	0.00
	31-35	243,326	46	128	35.89
	36-40	487,052	237	380	62.32
	41-45	908,831	872	969	90.04
	46-50	1,542,730	3,199	2,334	137.06
	51-55	2,277,564	5,263	4,845	108.64
	56-60	2,509,247	8,713	8,077	107.87
	61-65	1,533,863	7,307	7,734	94.48
	66-70	550,210	4,874	3,891	125.26
	71-75	154,543	2,756	3,605	76.44
	TOTAL	10,322,490	33,277	32,001	103.99
<u>FEMALE</u>	16-20	400	0	0	n/a
	21-25	20,123	0	3	0.00
	26-30	143,308	0	28	0.00
	31-35	325,231	0	105	0.00
	36-40	610,497	144	301	47.92
	41-45	1,327,095	131	1,027	12.77
	46-50	2,290,903	1,485	2,678	55.46
	51-55	2,882,171	2,702	4,966	54.41
	56-60	2,553,034	3,162	6,716	47.08
	61-65	1,230,556	3,463	4,797	72.19
	66-70	374,771	1,312	2,026	64.74
	71-75	84,787	343	1,487	23.06
	TOTAL	11,842,877	12,742	24,133	52.80
<u>TOTAL</u>	16-20	937	0	0	n/a
	21-25	37,325	9	8	108.14
	26-30	240,693	0	60	0.00
	31-35	568,558	46	233	19.70
	36-40	1,097,549	381	682	55.96
	41-45	2,235,926	1,003	1,996	50.29
	46-50	3,833,633	4,684	5,012	93.46
	51-55	5,159,735	7,965	9,810	81.19
	56-60	5,062,281	11,875	14,793	80.27
	61-65	2,764,419	10,770	12,531	85.95
	66-70	924,981	6,186	5,917	104.54
	71-75	239,330	3,098	5,092	60.85
	TOTAL	22,165,367	46,019	56,134	81.98

**Political Subdivisions
Pre-Retirement Mortality
Recommended Assumptions**

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>
<u>MALE</u>	16-20	902	3	0	n/a
	21-25	34,850	4	10	39.93
	26-30	156,443	121	51	236.97
	31-35	376,941	195	198	98.56
	36-40	610,918	152	474	32.12
	41-45	887,751	1,051	940	111.83
	46-50	1,136,093	1,821	1,710	106.53
	51-55	1,321,026	4,964	2,783	178.40
	56-60	1,132,453	6,667	3,632	183.60
	61-65	600,010	3,605	2,995	120.37
	66-70	175,905	1,882	1,250	150.49
	71-75	63,326	1,134	1,497	75.74
	TOTAL	6,496,618	21,600	15,540	139.00
<u>FEMALE</u>	16-20	298	1	0	n/a
	21-25	14,626	0	2	0.00
	26-30	80,840	0	16	0.00
	31-35	206,248	32	67	47.76
	36-40	410,127	142	201	70.35
	41-45	723,833	530	557	95.09
	46-50	1,109,002	720	1,290	55.82
	51-55	1,317,268	1,306	2,270	57.54
	56-60	1,225,884	1,886	3,236	58.27
	61-65	702,734	1,634	2,752	59.38
	66-70	217,732	713	1,180	60.46
	71-75	69,498	524	1,232	42.54
	TOTAL	6,078,089	7,488	12,803	58.48
<u>TOTAL</u>	16-20	1,201	4	0	n/a
	21-25	49,476	4	13	32.53
	26-30	237,282	121	67	181.46
	31-35	583,189	227	265	85.65
	36-40	1,021,045	294	675	43.52
	41-45	1,611,584	1,581	1,497	105.60
	46-50	2,245,094	2,542	3,000	84.72
	51-55	2,638,293	6,271	5,053	124.11
	56-60	2,358,336	8,553	6,867	124.54
	61-65	1,302,744	5,239	5,747	91.16
	66-70	393,637	2,595	2,430	106.78
	71-75	132,824	1,658	2,729	60.75
	TOTAL	12,574,707	29,088	28,343	102.63

Disability

As is the case with pre-retirement mortality rates, the incidence of disability is so low that overall pension costs are not very sensitive to changes in disability rates.

Disability ratios among Teachers decreased from 98% of expected in 2004 to 78% in 2008. Disability ratios among State employees decreased from 100% of expected to 83%. Political Subdivision employees also experienced a decrease in disability ratios from 96% to 72%.

**Teachers
Ordinary Disability
Old Assumptions**

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	32	0	0	n/a	
	21-25	8,523	0	1	0.00	
	26-30	121,879	0	10	0.00	
	31-35	333,457	0	50	0.00	
	36-40	480,606	124	267	46.29	
	41-45	638,213	105	766	13.65	
	46-50	1,076,705	1,741	1,945	89.51	
	51-55	1,955,117	2,461	3,980	61.84	
	56-60	2,027,953	2,419	2,844	85.08	
	61-65	750,779	770	0	n/a	
	66-70	142,313	3	0	n/a	
	71-75	27,095	0	0	n/a	
	TOTAL		7,562,675	7,623	9,863	77.29
	<u>FEMALE</u>	16-20	73	0	0	n/a
21-25		50,794	0	4	0.00	
26-30		499,351	0	41	0.00	
31-35		1,186,368	291	178	163.39	
36-40		1,719,270	546	955	57.13	
41-45		2,312,249	2,570	2,789	92.14	
46-50		4,343,376	8,045	7,840	102.62	
51-55		7,210,826	9,668	14,680	65.86	
56-60		6,366,759	6,880	9,124	75.40	
61-65		2,025,976	0	0	n/a	
66-70		334,720	0	0	n/a	
71-75		67,662	0	0	n/a	
TOTAL			26,117,425	27,999	35,612	78.62
<u>TOTAL</u>		16-20	105	0	0	n/a
	21-25	59,317	0	5	0.00	
	26-30	621,230	0	52	0.00	
	31-35	1,519,825	291	228	127.51	
	36-40	2,199,876	669	1,222	54.76	
	41-45	2,950,463	2,674	3,555	75.23	
	46-50	5,420,081	9,786	9,785	100.02	
	51-55	9,165,944	12,129	18,660	65.00	
	56-60	8,394,712	9,299	11,968	77.70	
	61-65	2,776,755	770	0	n/a	
	66-70	477,033	3	0	n/a	
	71-75	94,757	0	0	n/a	
	TOTAL		33,680,099	35,622	45,474	78.33

**General State
Ordinary Disability
Old Assumptions**

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>
<u>MALE</u>	16-20	537	0	0	n/a
	21-25	17,202	0	14	0.00
	26-30	97,386	0	84	0.00
	31-35	243,326	133	306	43.31
	36-40	487,052	561	835	67.14
	41-45	908,831	1,523	1,978	76.99
	46-50	1,542,730	3,865	3,951	97.83
	51-55	2,277,564	6,861	6,500	105.55
	56-60	2,509,247	4,825	5,955	81.03
	61-65	1,533,863	1,525	0	n/a
	66-70	550,210	75	0	n/a
	71-75	154,543	0	0	n/a
	TOTAL	10,322,490	19,367	19,623	98.70
<u>FEMALE</u>	16-20	400	0	0	n/a
	21-25	20,123	0	8	0.00
	26-30	143,308	0	62	0.00
	31-35	325,231	92	199	46.50
	36-40	610,497	697	837	83.28
	41-45	1,327,095	2,208	3,230	68.36
	46-50	2,290,903	4,926	7,650	64.40
	51-55	2,882,171	10,454	11,993	87.17
	56-60	2,553,034	5,067	9,498	53.35
	61-65	1,230,556	618	0	n/a
	66-70	374,771	143	0	n/a
	71-75	84,787	477	0	n/a
	TOTAL	11,842,877	24,683	33,476	73.73
<u>TOTAL</u>	16-20	937	0	1	0.00
	21-25	37,325	0	22	0.00
	26-30	240,693	0	146	0.00
	31-35	568,558	225	505	44.57
	36-40	1,097,549	1,258	1,672	75.22
	41-45	2,235,926	3,731	5,208	71.64
	46-50	3,833,633	8,791	11,601	75.78
	51-55	5,159,735	17,315	18,493	93.63
	56-60	5,062,281	9,892	15,452	64.01
	61-65	2,764,419	2,143	0	n/a
	66-70	924,981	218	0	n/a
	71-75	239,330	477	0	n/a
	TOTAL	22,165,367	44,050	53,099	82.96

**Political Subdivisions
Ordinary Disability
Old Assumptions**

		<i>Exposure</i>	<i>Actual</i>	<i>Expected</i>	<i>Act/Exp</i>
<u>MALE</u>	16-20	902	0	0	n/a
	21-25	34,850	0	14	0.00
	26-30	156,443	26	63	40.96
	31-35	376,941	134	151	88.73
	36-40	610,918	406	414	98.12
	41-45	887,751	1,083	1,755	61.73
	46-50	1,136,093	2,256	4,316	52.26
	51-55	1,321,026	6,055	6,852	88.36
	56-60	1,132,453	4,152	5,139	80.79
	61-65	600,010	169	0	n/a
	66-70	175,905	0	0	n/a
	71-75	63,326	0	0	n/a
	TOTAL	6,496,618	14,281	18,704	76.35
<u>FEMALE</u>	16-20	298	0	0	n/a
	21-25	14,626	0	6	0.00
	26-30	80,840	0	32	0.00
	31-35	206,248	0	82	0.00
	36-40	410,127	140	282	49.72
	41-45	723,833	367	1,453	25.29
	46-50	1,109,002	2,841	4,220	67.32
	51-55	1,317,268	4,674	6,842	68.31
	56-60	1,225,884	4,482	5,500	81.48
	61-65	702,734	0	0	n/a
	66-70	217,732	0	0	n/a
	71-75	69,498	0	0	n/a
	TOTAL	6,078,089	12,504	18,417	67.89
<u>TOTAL</u>	16-20	1,201	0	0	n/a
	21-25	49,476	0	20	0.00
	26-30	237,282	26	95	27.01
	31-35	583,189	134	233	57.35
	36-40	1,021,045	546	696	78.51
	41-45	1,611,584	1,451	3,208	45.23
	46-50	2,245,094	5,096	8,536	59.71
	51-55	2,638,293	10,729	13,694	78.35
	56-60	2,358,336	8,634	10,640	81.15
	61-65	1,302,744	169	0	n/a
	66-70	393,637	0	0	n/a
	71-75	132,824	0	0	n/a
	TOTAL	12,574,707	26,785	37,122	72.15

Recommendation: The incidence of disability among all groups should be improved by the adoption of revised tables. The proposed tables are based on a blend of current experience and the prior assumption since the experience in this area is less than fully credible.

Teachers
Ordinary Disability
Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	32	0	0	n/a	
	21-25	8,523	0	1	0.00	
	26-30	121,879	0	10	0.00	
	31-35	333,457	0	57	0.00	
	36-40	480,606	124	306	40.44	
	41-45	638,213	105	741	14.12	
	46-50	1,076,705	1,741	1,727	100.79	
	51-55	1,955,117	2,461	3,395	72.49	
	56-60	2,027,953	2,419	2,558	94.58	
	61-65	750,779	770	0	n/a	
	66-70	142,313	3	0	n/a	
	71-75	27,095	0	0	n/a	
	TOTAL		7,562,675	7,623	8,795	86.67
	<u>FEMALE</u>	16-20	73	0	0	n/a
21-25		50,794	0	4	0.00	
26-30		499,351	0	41	0.00	
31-35		1,186,368	291	202	143.85	
36-40		1,719,270	546	1,094	49.89	
41-45		2,312,249	2,570	2,695	95.35	
46-50		4,343,376	8,045	6,964	115.53	
51-55		7,210,826	9,668	12,525	77.18	
56-60		6,366,759	6,880	8,188	84.03	
61-65		2,025,976	0	0	n/a	
66-70		334,720	0	0	n/a	
71-75		67,662	0	0	n/a	
TOTAL			26,117,425	27,999	31,714	88.29
<u>TOTAL</u>		16-20	105	0	0	n/a
	21-25	59,317	0	5	0.00	
	26-30	621,230	0	52	0.00	
	31-35	1,519,825	291	259	112.25	
	36-40	2,199,876	669	1,399	47.83	
	41-45	2,950,463	2,674	3,436	77.83	
	46-50	5,420,081	9,786	8,691	112.60	
	51-55	9,165,944	12,129	15,921	76.18	
	56-60	8,394,712	9,299	10,746	86.54	
	61-65	2,776,755	770	0	n/a	
	66-70	477,033	3	0	n/a	
	71-75	94,757	0	0	n/a	
	TOTAL		33,680,099	35,622	40,509	87.94

**General State
Ordinary Disability
Recommended Assumptions**

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	537	0	0	n/a	
	21-25	17,202	0	11	0.00	
	26-30	97,386	0	67	0.00	
	31-35	243,326	133	228	58.23	
	36-40	487,052	561	696	80.59	
	41-45	908,831	1,523	1,773	85.90	
	46-50	1,542,730	3,865	3,980	97.10	
	51-55	2,277,564	6,861	6,292	109.04	
	56-60	2,509,247	4,825	5,254	91.83	
	61-65	1,533,863	1,525	0	n/a	
	66-70	550,210	75	0	n/a	
	71-75	154,543	0	0	n/a	
	TOTAL		10,322,490	19,367	18,301	105.83
	<u>FEMALE</u>	16-20	400	0	0	n/a
21-25		20,123	0	6	0.00	
26-30		143,308	0	45	0.00	
31-35		325,231	92	170	54.32	
36-40		610,497	697	675	103.29	
41-45		1,327,095	2,208	2,689	82.11	
46-50		2,290,903	4,926	6,743	73.06	
51-55		2,882,171	10,454	10,523	99.35	
56-60		2,553,034	5,067	7,680	65.98	
61-65		1,230,556	618	0	n/a	
66-70		374,771	143	0	n/a	
71-75		84,787	477	0	n/a	
TOTAL			11,842,877	24,683	28,531	86.51
<u>TOTAL</u>		16-20	937	0	0	n/a
	21-25	37,325	0	17	0.00	
	26-30	240,693	0	112	0.00	
	31-35	568,558	225	398	56.55	
	36-40	1,097,549	1,258	1,371	91.77	
	41-45	2,235,926	3,731	4,462	83.61	
	46-50	3,833,633	8,791	10,724	81.98	
	51-55	5,159,735	17,315	16,815	102.97	
	56-60	5,062,281	9,892	12,934	76.48	
	61-65	2,764,419	2,143	0	n/a	
	66-70	924,981	218	0	n/a	
	71-75	239,330	477	0	n/a	
	TOTAL		22,165,367	44,050	46,832	94.06

**Political Subdivisions
Ordinary Disability
Recommended Assumptions**

		<i>Exposure</i>	<i>Actual</i>	<i>Expected</i>	<i>Act/Exp</i>
<u>MALE</u>	16-20	902	0	0	n/a
	21-25	34,850	0	11	0.00
	26-30	156,443	26	50	51.06
	31-35	376,941	134	121	110.24
	36-40	610,918	406	353	114.92
	41-45	887,751	1,083	1,318	82.20
	46-50	1,136,093	2,256	3,478	64.85
	51-55	1,321,026	6,055	6,049	100.10
	56-60	1,132,453	4,152	4,643	89.44
	61-65	600,010	169	0	n/a
	66-70	175,905	0	0	n/a
	71-75	63,326	0	0	n/a
	TOTAL	6,496,618	14,281	16,024	89.12
<u>FEMALE</u>	16-20	298	0	0	n/a
	21-25	14,626	0	5	0.00
	26-30	80,840	0	26	0.00
	31-35	206,248	0	66	0.00
	36-40	410,127	140	241	58.28
	41-45	723,833	367	1,090	33.70
	46-50	1,109,002	2,841	3,401	83.52
	51-55	1,317,268	4,674	6,042	77.35
	56-60	1,225,884	4,482	4,969	90.20
	61-65	702,734	0	0	n/a
	66-70	217,732	0	0	n/a
	71-75	69,498	0	0	n/a
	TOTAL	6,078,089	12,504	15,840	78.94
<u>TOTAL</u>	16-20	1,201	0	0	n/a
	21-25	49,476	0	16	0.00
	26-30	237,282	26	76	33.66
	31-35	583,189	134	188	71.23
	36-40	1,021,045	546	594	91.98
	41-45	1,611,584	1,451	2,408	60.24
	46-50	2,245,094	5,096	6,879	74.08
	51-55	2,638,293	10,729	12,092	88.73
	56-60	2,358,336	8,634	9,611	89.83
	61-65	1,302,744	169	0	n/a
	66-70	393,637	0	0	n/a
	71-75	132,824	0	0	n/a
	TOTAL	12,574,707	26,785	31,865	84.06

Turnover

Nine pages of tables are included to illustrate ratios of actual to expected turnover. A "two-year select and ultimate" approach has been used. That is, separate rates are examined for the first year of participation, the second year of participation, and an aggregate rate (by age and sex) is utilized thereafter. The "ultimate" tables are more important than the "first-year" and "second-year" tables because the "ultimate" tables apply throughout most of an individual's career.

It should be noted that ratios in excess of 100% are "conservative" with respect to turnover. If turnover is higher than expected, fewer employees will remain until retirement, so fewer benefits will be paid. However, turnover tends to fluctuate with the general condition of the economy, so substantial fluctuations should be expected between high-growth periods (jobs are plentiful, and turnover is high) and low-growth periods (options are limited, and turnover is low).

First-Year: The tables on the following three pages show first-year turnover rates for the three broad categories of employees. The first year ratio for Teachers, State and Political Subdivision employees are 114%, 91% and 107% respectively.

Second-Year: Ratios for the second year for Teachers, State and Political Subdivision groups were respectively 108%, 90% and 113% following a pattern that is similar to that of first year ratios.

Ultimate: Ratios for ultimate termination for Teachers, State and Political Subdivisions are 98%, 101% and 113% respectively. Even though the State group's ratio was 101%, there was still some degree of variability among males and females.

DEMOGRAPHIC ASSUMPTIONS

Teachers 1st Year Withdrawal Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	0	0	0	n/a	
	21-25	922	152	166	91.77	
	26-30	1,489	269	268	100.22	
	31-35	896	228	161	141.38	
	36-40	810	120	146	82.42	
	41-45	670	106	121	87.51	
	46-50	860	194	155	125.43	
	51-55	485	84	87	95.98	
	56-60	709	303	128	237.54	
	61-65	274	115	45	258.58	
	66-70	62	49	0	n/a	
	71-75	21	18	0	n/a	
	TOTAL		7,200	1,638	1,276	128.38
	<u>FEMALE</u>	16-20	5	0	1	0.00
21-25		4,425	712	797	89.45	
26-30		4,641	874	835	104.61	
31-35		3,170	601	571	105.33	
36-40		2,679	432	482	89.56	
41-45		2,547	413	458	90.19	
46-50		1,972	438	355	123.30	
51-55		1,531	336	276	121.75	
56-60		998	281	180	156.20	
61-65		378	215	64	334.43	
66-70		82	67	0	n/a	
71-75		8	6	0	n/a	
TOTAL			22,437	4,374	4,019	108.85
<u>TOTAL</u>		16-20	5	0	1	0.00
	21-25	5,348	865	963	89.85	
	26-30	6,130	1,143	1,103	103.55	
	31-35	4,066	829	732	113.27	
	36-40	3,490	552	628	87.90	
	41-45	3,217	519	579	89.63	
	46-50	2,831	632	510	123.95	
	51-55	2,016	419	363	115.55	
	56-60	1,707	584	307	189.97	
	61-65	652	330	109	303.35	
	66-70	144	117	0	n/a	
	71-75	29	24	0	n/a	
	TOTAL		29,636	6,012	5,295	113.56

DEMOGRAPHIC ASSUMPTIONS

General State 1st Year Withdrawal Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	373	110	124	88.15	
	21-25	2,370	619	648	95.48	
	26-30	3,520	718	883	81.34	
	31-35	3,322	605	766	78.93	
	36-40	3,212	571	679	84.05	
	41-45	3,129	472	603	78.17	
	46-50	2,989	350	515	67.98	
	51-55	3,287	344	542	63.41	
	56-60	2,922	340	482	70.49	
	61-65	1,224	378	202	187.09	
	66-70	418	134	69	n/a	
	71-75	43	13	4	n/a	
	TOTAL		26,808	4,652	5,517	84.31
	<u>FEMALE</u>	16-20	250	89	83	106.97
21-25		3,260	842	881	95.60	
26-30		5,106	1,220	1,282	95.22	
31-35		5,119	1,111	1,182	94.06	
36-40		4,498	825	954	86.48	
41-45		4,824	766	927	82.58	
46-50		4,961	765	858	89.13	
51-55		3,860	545	637	85.63	
56-60		2,914	512	481	106.53	
61-65		975	359	161	223.07	
66-70		277	110	46	n/a	
71-75		31	13	3	n/a	
TOTAL			36,075	7,159	7,495	95.51
<u>TOTAL</u>		16-20	623	198	207	95.69
	21-25	5,630	1,461	1,529	95.55	
	26-30	8,626	1,938	2,164	89.56	
	31-35	8,441	1,716	1,948	88.11	
	36-40	7,710	1,396	1,633	85.47	
	41-45	7,954	1,237	1,531	80.84	
	46-50	7,950	1,115	1,374	81.19	
	51-55	7,146	889	1,179	75.41	
	56-60	5,836	852	963	88.49	
	61-65	2,199	737	363	203.04	
	66-70	695	244	115	n/a	
	71-75	74	27	7	n/a	
	TOTAL		62,883	11,811	13,012	90.77

DEMOGRAPHIC ASSUMPTIONS

Political Subdivisions 1st Year Withdrawal Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	513	128	133	96.41	
	21-25	3,764	815	875	93.19	
	26-30	3,907	710	855	83.04	
	31-35	3,674	682	762	89.43	
	36-40	3,229	551	635	86.78	
	41-45	3,179	574	590	97.30	
	46-50	2,792	467	486	96.01	
	51-55	2,306	376	379	99.23	
	56-60	1,759	395	287	137.66	
	61-65	883	230	120	191.10	
	66-70	400	150	0	n/a	
	71-75	73	18	0	n/a	
	TOTAL		26,479	5,096	5,122	99.48
	<u>FEMALE</u>	16-20	194	61	50	122.60
		21-25	2,412	727	556	130.58
26-30		3,530	917	772	118.67	
31-35		4,082	936	846	110.54	
36-40		4,982	1,016	979	103.74	
41-45		4,723	917	875	104.76	
46-50		4,365	828	761	108.75	
51-55		3,169	565	521	108.35	
56-60		1,955	350	319	109.84	
61-65		708	222	103	214.73	
66-70		150	46	0	n/a	
71-75		53	18	0	n/a	
TOTAL			30,323	6,602	5,784	114.13
<u>TOTAL</u>		16-20	706	189	183	103.58
		21-25	6,176	1,542	1,431	107.73
	26-30	7,437	1,627	1,628	99.95	
	31-35	7,756	1,617	1,609	100.54	
	36-40	8,211	1,567	1,615	97.07	
	41-45	7,902	1,490	1,465	101.76	
	46-50	7,157	1,295	1,247	103.78	
	51-55	5,476	941	901	104.51	
	56-60	3,714	745	606	123.02	
	61-65	1,591	452	224	202.01	
	66-70	551	196	0	n/a	
	71-75	126	35	0	n/a	
	TOTAL		56,802	11,698	10,907	107.25

DEMOGRAPHIC ASSUMPTIONS

Teachers 2nd Year Withdrawal Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	7	0	1	0.00	
	21-25	3,636	439	491	89.45	
	26-30	7,846	1,117	1,059	105.45	
	31-35	4,270	516	576	89.60	
	36-40	4,183	642	565	113.72	
	41-45	2,999	448	405	110.69	
	46-50	2,908	423	393	107.63	
	51-55	2,926	539	395	136.35	
	56-60	2,364	759	319	237.92	
	61-65	932	431	112	385.53	
	66-70	155	124	0	n/a	
	71-75	19	13	0	n/a	
	TOTAL		32,246	5,451	4,316	126.32
	<u>FEMALE</u>	16-20	21	0	3	0.00
21-25		19,981	2,019	2,697	74.86	
26-30		25,920	3,727	3,499	106.52	
31-35		15,552	2,258	2,099	107.55	
36-40		13,013	1,278	1,757	72.76	
41-45		11,118	1,320	1,501	87.97	
46-50		9,596	1,126	1,295	86.92	
51-55		7,028	1,048	949	110.49	
56-60		5,063	1,524	684	222.98	
61-65		1,166	470	152	308.89	
66-70		343	206	0	n/a	
71-75		29	12	0	n/a	
TOTAL			108,830	14,989	14,636	102.41
<u>TOTAL</u>		16-20	28	0	4	0.00
	21-25	23,617	2,458	3,188	77.11	
	26-30	33,765	4,844	4,558	106.27	
	31-35	19,821	2,774	2,676	103.68	
	36-40	17,196	1,920	2,321	82.72	
	41-45	14,117	1,768	1,906	92.80	
	46-50	12,505	1,549	1,688	91.73	
	51-55	9,955	1,587	1,344	118.10	
	56-60	7,427	2,283	1,003	227.74	
	61-65	2,098	901	264	341.37	
	66-70	498	330	0	n/a	
	71-75	48	25	0	n/a	
	TOTAL		141,076	20,441	18,952	107.85

DEMOGRAPHIC ASSUMPTIONS

General State 2nd Year Withdrawal Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	149	45	41	109.80	
	21-25	3,665	802	892	89.90	
	26-30	7,946	1,433	1,690	84.82	
	31-35	7,300	1,225	1,332	91.97	
	36-40	7,051	936	1,123	83.36	
	41-45	7,026	879	995	88.29	
	46-50	6,870	593	897	66.04	
	51-55	6,417	569	799	71.16	
	56-60	5,429	721	664	108.53	
	61-65	2,939	661	359	184.26	
	66-70	725	346	88	n/a	
	71-75	73	46	8	n/a	
	TOTAL		55,589	8,255	8,888	92.87
	<u>FEMALE</u>	16-20	139	32	38	85.77
21-25		4,925	1,055	1,184	89.08	
26-30		11,490	2,075	2,445	84.87	
31-35		11,628	1,568	2,120	73.98	
36-40		11,290	1,465	1,801	81.32	
41-45		11,393	1,422	1,614	88.09	
46-50		11,450	1,268	1,496	84.78	
51-55		9,052	789	1,128	69.98	
56-60		5,597	784	685	114.49	
61-65		1,969	493	241	205.15	
66-70		576	234	70	n/a	
71-75		93	69	9	n/a	
TOTAL			79,603	11,255	12,830	87.72
<u>TOTAL</u>		16-20	288	77	78	98.22
	21-25	8,590	1,857	2,076	89.44	
	26-30	19,436	3,508	4,134	84.85	
	31-35	18,928	2,793	3,451	80.92	
	36-40	18,341	2,401	2,924	82.11	
	41-45	18,419	2,300	2,609	88.16	
	46-50	18,320	1,861	2,393	77.76	
	51-55	15,469	1,358	1,927	70.47	
	56-60	11,026	1,505	1,349	111.55	
	61-65	4,909	1,155	599	192.64	
	66-70	1,301	580	159	n/a	
	71-75	165	115	17	n/a	
	TOTAL		135,192	19,510	21,718	89.83

DEMOGRAPHIC ASSUMPTIONS

Political Subdivisions 2nd Year Withdrawal Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	329	50	71	69.71	
	21-25	6,601	1,121	1,262	88.80	
	26-30	8,687	1,402	1,542	90.91	
	31-35	8,272	1,389	1,365	101.81	
	36-40	7,524	1,162	1,150	101.05	
	41-45	7,165	1,152	1,004	114.82	
	46-50	6,323	919	806	113.92	
	51-55	5,785	659	675	97.66	
	56-60	4,104	716	472	151.60	
	61-65	2,194	524	226	231.59	
	66-70	768	152	0	n/a	
	71-75	188	53	0	n/a	
	TOTAL		57,941	9,299	8,574	108.45
	<u>FEMALE</u>	16-20	101	42	22	194.43
21-25		3,398	863	644	133.99	
26-30		7,114	1,474	1,263	116.73	
31-35		9,810	1,727	1,612	107.10	
36-40		11,173	1,787	1,703	104.94	
41-45		11,547	1,565	1,617	96.78	
46-50		10,766	1,909	1,375	138.80	
51-55		7,728	1,006	901	111.70	
56-60		5,395	809	620	130.44	
61-65		1,802	329	189	174.03	
66-70		411	109	0	n/a	
71-75		63	26	0	n/a	
TOTAL			69,306	11,647	9,947	117.09
<u>TOTAL</u>		16-20	430	92	93	98.84
	21-25	9,999	1,984	1,907	104.07	
	26-30	15,801	2,876	2,805	102.54	
	31-35	18,082	3,116	2,977	104.68	
	36-40	18,697	2,949	2,853	103.37	
	41-45	18,711	2,717	2,621	103.69	
	46-50	17,089	2,828	2,182	129.61	
	51-55	13,512	1,665	1,576	105.69	
	56-60	9,500	1,525	1,092	139.58	
	61-65	3,996	853	415	205.40	
	66-70	1,179	261	0	n/a	
	71-75	251	78	0	n/a	
	TOTAL		127,247	20,945	18,520	113.09

DEMOGRAPHIC ASSUMPTIONS

Teachers Ultimate Withdrawal Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	25	0	2	0.00	
	21-25	3,965	371	336	110.44	
	26-30	112,544	6,988	7,660	91.22	
	31-35	328,291	14,003	15,376	91.07	
	36-40	475,613	12,216	13,305	91.82	
	41-45	634,326	12,440	10,019	124.17	
	46-50	1,006,756	15,848	15,376	103.07	
	51-55	809,220	20,193	20,891	96.66	
	56-60	242,761	10,382	10,020	103.62	
	61-65	586	159	28	558.78	
	66-70	188	117	0	n/a	
	71-75	14	0	0	n/a	
	TOTAL		3,614,288	92,717	93,012	99.68
	<u>FEMALE</u>	16-20	47	9	5	181.67
21-25		26,388	2,877	2,632	109.32	
26-30		468,791	40,166	39,385	101.98	
31-35		1,167,646	62,445	69,847	89.40	
36-40		1,703,577	50,415	61,342	82.19	
41-45		2,298,585	36,169	39,993	90.44	
46-50		4,009,894	52,946	51,153	103.50	
51-55		3,475,171	97,464	89,750	108.60	
56-60		1,257,010	59,983	59,283	101.18	
61-65		1,172	327	48	687.01	
66-70		263	157	0	n/a	
71-75		29	29	0	n/a	
TOTAL			14,408,574	402,987	413,438	97.47
<u>TOTAL</u>		16-20	72	9	7	122.04
	21-25	30,352	3,248	2,968	109.45	
	26-30	581,335	47,154	47,045	100.23	
	31-35	1,495,938	76,448	85,223	89.70	
	36-40	2,179,190	62,631	74,647	83.90	
	41-45	2,932,911	48,609	50,011	97.20	
	46-50	5,016,650	68,794	66,529	103.40	
	51-55	4,284,391	117,657	110,640	106.34	
	56-60	1,499,771	70,365	69,303	101.53	
	61-65	1,758	486	76	639.11	
	66-70	451	274	0	n/a	
	71-75	43	29	0	n/a	
	TOTAL		18,022,862	495,704	506,450	97.88

DEMOGRAPHIC ASSUMPTIONS

General State Ultimate Withdrawal Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	14	0	2	0.00	
	21-25	11,167	1,840	1,652	111.40	
	26-30	85,920	8,662	9,075	95.46	
	31-35	232,705	14,025	14,614	95.97	
	36-40	476,790	18,565	15,507	119.72	
	41-45	898,351	23,611	18,930	124.73	
	46-50	1,332,567	22,621	25,252	89.58	
	51-55	1,265,885	31,084	26,136	118.93	
	56-60	474,753	18,400	16,451	111.85	
	61-65	13,152	367	550	66.80	
	66-70	665	204	0	n/a	
	71-75	23	0	0	n/a	
	TOTAL		4,791,991	139,379	128,168	108.75
	<u>FEMALE</u>	16-20	11	3	2	148.93
21-25		11,938	1,948	1,941	100.34	
26-30		126,712	13,037	15,809	82.47	
31-35		308,484	20,581	25,051	82.16	
36-40		594,709	27,401	26,701	102.62	
41-45		1,310,877	32,193	34,672	92.85	
46-50		1,910,632	41,109	42,003	97.87	
51-55		1,714,832	50,528	49,027	103.06	
56-60		584,947	25,157	24,910	100.99	
61-65		2,126	764	98	783.12	
66-70		199	82	0	n/a	
71-75		95	53	0	n/a	
TOTAL			6,565,561	212,856	220,213	96.66
<u>TOTAL</u>		16-20	25	3	5	68.58
	21-25	23,105	3,788	3,593	105.42	
	26-30	212,632	21,700	24,883	87.21	
	31-35	541,188	34,606	39,665	87.25	
	36-40	1,071,499	45,966	42,207	108.91	
	41-45	2,209,229	55,804	53,602	104.11	
	46-50	3,243,198	63,731	67,256	94.76	
	51-55	2,980,717	81,613	75,163	108.58	
	56-60	1,059,700	43,556	41,361	105.31	
	61-65	15,277	1,131	647	174.77	
	66-70	864	285	0	n/a	
	71-75	117	53	0	n/a	
	TOTAL		11,357,552	352,235	348,381	101.11

DEMOGRAPHIC ASSUMPTIONS

Political Subdivisions Ultimate Withdrawal Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	60	3	8	30.84	
	21-25	24,485	2,721	2,618	103.93	
	26-30	143,849	11,879	11,408	104.12	
	31-35	364,995	23,322	19,672	118.55	
	36-40	600,165	25,965	21,999	118.03	
	41-45	877,116	28,464	24,006	118.57	
	46-50	989,175	27,618	25,975	106.33	
	51-55	905,687	27,130	28,458	95.33	
	56-60	305,384	14,508	11,509	126.06	
	61-65	1,464	304	53	573.59	
	66-70	521	137	0	n/a	
	71-75	133	36	0	n/a	
	TOTAL		4,213,034	162,086	145,707	111.24
	<u>FEMALE</u>	16-20	4	4	1	490.69
21-25		8,816	1,276	1,431	89.22	
26-30		70,196	9,020	8,574	105.19	
31-35		192,356	17,386	15,982	108.78	
36-40		393,972	26,276	22,260	118.04	
41-45		707,564	34,441	29,370	117.27	
46-50		1,011,424	41,615	36,971	112.56	
51-55		1,078,615	46,158	40,159	114.94	
56-60		410,620	20,897	17,807	117.35	
61-65		1,394	183	57	322.93	
66-70		394	106	0	n/a	
71-75		75	25	0	n/a	
TOTAL			3,875,431	197,386	172,612	114.35
<u>TOTAL</u>		16-20	65	7	9	73.33
	21-25	33,302	3,997	4,049	98.73	
	26-30	214,045	20,898	19,983	104.58	
	31-35	557,351	40,708	35,655	114.17	
	36-40	994,136	52,241	44,259	118.04	
	41-45	1,584,680	62,906	53,376	117.85	
	46-50	2,000,599	69,233	62,946	109.99	
	51-55	1,984,302	73,288	68,617	106.81	
	56-60	716,004	35,405	29,316	120.77	
	61-65	2,858	486	110	444.20	
	66-70	915	242	0	n/a	
	71-75	208	60	0	n/a	
	TOTAL		8,088,465	359,472	318,319	112.93

Recommendation: Adjustments are recommended for the first and second year withdrawal rates for all groups in order to develop ratios closer to 100%. Where variability was noted from prior study periods, the modified table is based on a blend of current experience and the prior assumption.

Changes in ultimate turnover rates for all three groups are also recommended for both males and females. Recommended tables improve total ratios for ultimate turnover for both males and females to approximately 100% for the Teachers and State groups. These two groups have shown consistent experience over the last two study periods and only required small modifications as a result of the current study.

The old ultimate turnover assumption for the Political Subdivision group produced results in excess of 100% (more turnover than expected). However, the results from the 2004 study indicated that the Political Subdivision group experienced less turnover than expected (less than 100%). Since there has been variability in this result over recent study periods, the recommended table is based on a blend of current experience and the prior assumption for the Political Subdivision group.

DEMOGRAPHIC ASSUMPTIONS

Teachers 1st Year Withdrawal Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>
<u>MALE</u>	16-20	0	0	0	n/a
	21-25	922	152	166	91.77
	26-30	1,489	269	268	100.22
	31-35	896	228	161	141.38
	36-40	810	120	146	82.42
	41-45	670	106	122	86.89
	46-50	860	194	164	118.32
	51-55	485	84	101	82.69
	56-60	709	303	168	179.86
	61-65	274	115	76	152.43
	66-70	62	49	17	n/a
	71-75	21	18	1	n/a
	TOTAL	7,200	1,638	1,391	117.79
<u>FEMALE</u>	16-20	5	0	1	0.00
	21-25	4,425	712	797	89.45
	26-30	4,641	874	835	104.61
	31-35	3,170	601	571	105.33
	36-40	2,679	432	482	89.56
	41-45	2,547	413	462	89.58
	46-50	1,972	438	376	116.36
	51-55	1,531	336	323	104.01
	56-60	998	281	237	118.42
	61-65	378	215	103	208.98
	66-70	82	67	23	n/a
	71-75	8	6	0	n/a
	TOTAL	22,437	4,374	4,209	103.93
<u>TOTAL</u>	16-20	5	0	1	0.00
	21-25	5,348	865	963	89.85
	26-30	6,130	1,143	1,103	103.55
	31-35	4,066	829	732	113.27
	36-40	3,490	552	628	87.90
	41-45	3,217	519	583	89.02
	46-50	2,831	632	540	116.96
	51-55	2,016	419	424	98.91
	56-60	1,707	584	405	143.95
	61-65	652	330	178	185.01
	66-70	144	117	40	n/a
	71-75	29	24	1	n/a
	TOTAL	29,636	6,012	5,600	107.37

DEMOGRAPHIC ASSUMPTIONS

General State 1st Year Withdrawal Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	373	110	114	96.02	
	21-25	2,370	619	621	99.68	
	26-30	3,520	718	842	85.26	
	31-35	3,322	605	718	84.20	
	36-40	3,212	571	625	91.30	
	41-45	3,129	472	544	86.70	
	46-50	2,989	350	460	76.16	
	51-55	3,287	344	491	69.96	
	56-60	2,922	340	484	70.16	
	61-65	1,224	378	249	151.88	
	66-70	418	134	110	121.39	
	71-75	43	13	6	232.32	
	TOTAL		26,808	4,652	5,265	88.37
	<u>FEMALE</u>	16-20	250	89	76	116.55
		21-25	3,260	842	847	99.41
26-30		5,106	1,220	1,223	99.77	
31-35		5,119	1,111	1,108	100.33	
36-40		4,498	825	879	93.86	
41-45		4,824	766	835	91.66	
46-50		4,961	765	766	99.86	
51-55		3,860	545	576	94.61	
56-60		2,914	512	478	107.11	
61-65		975	359	203	177.04	
66-70		277	110	73	150.35	
71-75		31	13	5	258.00	
TOTAL			36,075	7,159	7,071	101.24
<u>TOTAL</u>		16-20	623	198	190	104.25
		21-25	5,630	1,461	1,468	99.52
	26-30	8,626	1,938	2,065	93.85	
	31-35	8,441	1,716	1,826	93.98	
	36-40	7,710	1,396	1,504	92.80	
	41-45	7,954	1,237	1,379	89.71	
	46-50	7,950	1,115	1,226	90.97	
	51-55	7,146	889	1,068	83.27	
	56-60	5,836	852	963	88.52	
	61-65	2,199	737	451	163.18	
	66-70	695	244	183	132.92	
	71-75	74	27	11	244.62	
	TOTAL		62,883	11,811	12,335	95.75

DEMOGRAPHIC ASSUMPTIONS

Political Subdivisions 1st Year Withdrawal Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	513	128	136	94.08	
	21-25	3,764	815	899	90.66	
	26-30	3,907	710	871	81.56	
	31-35	3,674	682	777	87.79	
	36-40	3,229	551	641	86.05	
	41-45	3,179	574	581	98.71	
	46-50	2,792	467	479	97.53	
	51-55	2,306	376	394	95.63	
	56-60	1,759	395	334	118.17	
	61-65	883	230	207	111.45	
	66-70	400	150	105	n/a	
	71-75	73	18	6	n/a	
	TOTAL		26,479	5,096	5,429	93.87
	<u>FEMALE</u>	16-20	194	61	51	119.62
21-25		2,412	727	572	127.14	
26-30		3,530	917	786	116.56	
31-35		4,082	936	862	108.52	
36-40		4,982	1,016	988	102.90	
41-45		4,723	917	862	106.31	
46-50		4,365	828	749	110.52	
51-55		3,169	565	541	104.37	
56-60		1,955	350	368	95.24	
61-65		708	222	163	135.94	
66-70		150	46	40	n/a	
71-75		53	18	8	n/a	
TOTAL			30,323	6,602	5,990	110.21
<u>TOTAL</u>		16-20	706	189	187	101.08
	21-25	6,176	1,542	1,470	104.84	
	26-30	7,437	1,627	1,657	98.17	
	31-35	7,756	1,617	1,639	98.70	
	36-40	8,211	1,567	1,628	96.27	
	41-45	7,902	1,490	1,443	103.25	
	46-50	7,157	1,295	1,228	105.46	
	51-55	5,476	941	935	100.69	
	56-60	3,714	745	702	106.16	
	61-65	1,591	452	370	122.26	
	66-70	551	196	145	n/a	
	71-75	126	35	15	n/a	
	TOTAL		56,802	11,698	11,419	102.44

DEMOGRAPHIC ASSUMPTIONS

Teachers 2nd Year Withdrawal Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	7	0	1	0.00	
	21-25	3,636	439	491	89.45	
	26-30	7,846	1,117	1,059	105.45	
	31-35	4,270	516	576	89.60	
	36-40	4,183	642	565	113.72	
	41-45	2,999	448	405	110.69	
	46-50	2,908	423	399	105.98	
	51-55	2,926	539	456	118.23	
	56-60	2,364	759	454	167.41	
	61-65	932	431	218	198.08	
	66-70	155	124	36	n/a	
	71-75	19	13	0	n/a	
	TOTAL		32,246	5,451	4,659	117.01
	<u>FEMALE</u>	16-20	21	0	3	0.00
21-25		19,981	2,019	2,697	74.86	
26-30		25,920	3,727	3,499	106.52	
31-35		15,552	2,258	2,099	107.55	
36-40		13,013	1,278	1,757	72.76	
41-45		11,118	1,320	1,501	87.97	
46-50		9,596	1,126	1,316	85.54	
51-55		7,028	1,048	1,091	96.06	
56-60		5,063	1,524	965	157.89	
61-65		1,166	470	272	172.73	
66-70		343	206	81	n/a	
71-75		29	12	0	n/a	
TOTAL			108,830	14,989	15,282	98.08
<u>TOTAL</u>		16-20	28	0	4	0.00
	21-25	23,617	2,458	3,188	77.11	
	26-30	33,765	4,844	4,558	106.27	
	31-35	19,821	2,774	2,676	103.68	
	36-40	17,196	1,920	2,321	82.72	
	41-45	14,117	1,768	1,906	92.80	
	46-50	12,505	1,549	1,715	90.29	
	51-55	9,955	1,587	1,547	102.59	
	56-60	7,427	2,283	1,419	160.93	
	61-65	2,098	901	490	184.00	
	66-70	498	330	117	n/a	
	71-75	48	25	0	n/a	
	TOTAL		141,076	20,441	19,941	102.50

DEMOGRAPHIC ASSUMPTIONS

General State 2nd Year Withdrawal Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	149	45	37	121.07	
	21-25	3,665	802	814	98.53	
	26-30	7,946	1,433	1,562	91.76	
	31-35	7,300	1,225	1,243	98.54	
	36-40	7,051	936	1,038	90.18	
	41-45	7,026	879	891	98.58	
	46-50	6,870	593	782	75.80	
	51-55	6,417	569	722	78.80	
	56-60	5,429	721	704	102.47	
	61-65	2,939	661	505	131.01	
	66-70	725	346	161	214.89	
	71-75	73	46	14	322.33	
	TOTAL		55,589	8,255	8,472	97.44
	<u>FEMALE</u>	16-20	139	32	34	94.57
21-25		4,925	1,055	1,081	97.54	
26-30		11,490	2,075	2,260	91.81	
31-35		11,628	1,568	1,978	79.26	
36-40		11,290	1,465	1,666	87.95	
41-45		11,393	1,422	1,445	98.37	
46-50		11,450	1,268	1,304	97.31	
51-55		9,052	789	1,016	77.71	
56-60		5,597	784	719	109.12	
61-65		1,969	493	337	146.56	
66-70		576	234	128	182.67	
71-75		93	69	16	428.35	
TOTAL			79,603	11,255	11,983	93.92
<u>TOTAL</u>		16-20	288	77	71	108.30
	21-25	8,590	1,857	1,895	97.97	
	26-30	19,436	3,508	3,822	91.79	
	31-35	18,928	2,793	3,221	86.70	
	36-40	18,341	2,401	2,703	88.81	
	41-45	18,419	2,300	2,337	98.45	
	46-50	18,320	1,861	2,085	89.25	
	51-55	15,469	1,358	1,737	78.16	
	56-60	11,026	1,505	1,422	105.83	
	61-65	4,909	1,155	842	137.23	
	66-70	1,301	580	289	200.62	
	71-75	165	115	30	378.76	
	TOTAL		135,192	19,510	20,455	95.38

DEMOGRAPHIC ASSUMPTIONS

Political Subdivisions 2nd Year Withdrawal Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	329	50	72	69.21	
	21-25	6,601	1,121	1,305	85.87	
	26-30	8,687	1,402	1,578	88.83	
	31-35	8,272	1,389	1,436	96.74	
	36-40	7,524	1,162	1,232	94.37	
	41-45	7,165	1,152	1,059	108.84	
	46-50	6,323	919	848	108.33	
	51-55	5,785	659	745	88.48	
	56-60	4,104	716	574	124.75	
	61-65	2,194	524	366	143.42	
	66-70	768	152	162	n/a	
	71-75	188	53	15	n/a	
	TOTAL		57,941	9,299	9,391	99.01
	<u>FEMALE</u>	16-20	101	42	22	192.89
21-25		3,398	863	667	129.44	
26-30		7,114	1,474	1,292	114.04	
31-35		9,810	1,727	1,699	101.65	
36-40		11,173	1,787	1,824	97.95	
41-45		11,547	1,565	1,706	91.76	
46-50		10,766	1,909	1,446	132.05	
51-55		7,728	1,006	995	101.16	
56-60		5,395	809	747	108.31	
61-65		1,802	329	302	109.00	
66-70		411	109	87	n/a	
71-75		63	26	5	n/a	
TOTAL			69,306	11,647	10,791	107.93
<u>TOTAL</u>		16-20	430	92	94	98.12
	21-25	9,999	1,984	1,972	100.60	
	26-30	15,801	2,876	2,871	100.18	
	31-35	18,082	3,116	3,135	99.40	
	36-40	18,697	2,949	3,056	96.51	
	41-45	18,711	2,717	2,764	98.30	
	46-50	17,089	2,828	2,294	123.28	
	51-55	13,512	1,665	1,739	95.73	
	56-60	9,500	1,525	1,321	115.45	
	61-65	3,996	853	667	127.85	
	66-70	1,179	261	249	n/a	
	71-75	251	78	20	n/a	
	TOTAL		127,247	20,945	20,182	103.78

DEMOGRAPHIC ASSUMPTIONS

Teachers Ultimate Withdrawal Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	25	0	3	0.00	
	21-25	3,965	371	339	109.30	
	26-30	112,544	6,988	7,506	93.09	
	31-35	328,291	14,003	14,443	96.95	
	36-40	475,613	12,216	12,186	100.25	
	41-45	634,326	12,440	9,992	124.50	
	46-50	1,006,756	15,848	17,298	91.62	
	51-55	809,220	20,193	20,997	96.17	
	56-60	242,761	10,382	9,045	114.78	
	61-65	586	159	28	558.78	
	66-70	188	117	0	n/a	
	71-75	14	0	0	n/a	
	TOTAL		3,614,288	92,717	91,837	100.96
	<u>FEMALE</u>	16-20	47	9	5	181.67
21-25		26,388	2,877	2,654	108.42	
26-30		468,791	40,166	39,167	102.55	
31-35		1,167,646	62,445	65,899	94.76	
36-40		1,703,577	50,415	53,064	95.01	
41-45		2,298,585	36,169	32,403	111.62	
46-50		4,009,894	52,946	52,110	101.60	
51-55		3,475,171	97,464	96,910	100.57	
56-60		1,257,010	59,983	59,553	100.72	
61-65		1,172	327	48	687.01	
66-70		263	157	0	n/a	
71-75		29	29	0	n/a	
TOTAL			14,408,574	402,987	401,811	100.29
<u>TOTAL</u>		16-20	72	9	7	120.74
	21-25	30,352	3,248	2,993	108.52	
	26-30	581,335	47,154	46,673	101.03	
	31-35	1,495,938	76,448	80,342	95.15	
	36-40	2,179,190	62,631	65,250	95.99	
	41-45	2,932,911	48,609	42,395	114.66	
	46-50	5,016,650	68,794	69,408	99.11	
	51-55	4,284,391	117,657	117,906	99.79	
	56-60	1,499,771	70,365	68,598	102.58	
	61-65	1,758	486	76	639.11	
	66-70	451	274	0	n/a	
	71-75	43	29	0	n/a	
	TOTAL		18,022,862	495,704	493,648	100.42

DEMOGRAPHIC ASSUMPTIONS

General State Ultimate Withdrawal Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	14	0	2	0.00	
	21-25	11,167	1,840	1,730	106.35	
	26-30	85,920	8,662	9,472	91.45	
	31-35	232,705	14,025	15,304	91.64	
	36-40	476,790	18,565	16,044	115.71	
	41-45	898,351	23,611	17,595	134.19	
	46-50	1,332,567	22,621	26,592	85.07	
	51-55	1,265,885	31,084	29,862	104.09	
	56-60	474,753	18,400	16,451	111.85	
	61-65	13,152	367	550	66.80	
	66-70	665	204	0	n/a	
	71-75	23	0	0	n/a	
	TOTAL		4,791,991	139,379	133,601	104.32
	<u>FEMALE</u>	16-20	11	3	2	150.40
21-25		11,938	1,948	1,843	105.68	
26-30		126,712	13,037	14,763	88.31	
31-35		308,484	20,581	23,498	87.59	
36-40		594,709	27,401	25,756	106.39	
41-45		1,310,877	32,193	33,460	96.21	
46-50		1,910,632	41,109	42,284	97.22	
51-55		1,714,832	50,528	49,876	101.31	
56-60		584,947	25,157	22,569	111.46	
61-65		2,126	764	102	749.59	
66-70		199	82	0	n/a	
71-75		95	53	0	n/a	
TOTAL			6,565,561	212,856	214,153	99.39
<u>TOTAL</u>		16-20	25	3	5	68.75
	21-25	23,105	3,788	3,573	106.00	
	26-30	212,632	21,700	24,235	89.54	
	31-35	541,188	34,606	38,801	89.19	
	36-40	1,071,499	45,966	41,800	109.97	
	41-45	2,209,229	55,804	51,055	109.30	
	46-50	3,243,198	63,731	68,876	92.53	
	51-55	2,980,717	81,613	79,738	102.35	
	56-60	1,059,700	43,556	39,020	111.63	
	61-65	15,277	1,131	652	173.60	
	66-70	864	285	0	n/a	
	71-75	117	53	0	n/a	
	TOTAL		11,357,552	352,235	347,754	101.29

DEMOGRAPHIC ASSUMPTIONS

Political Subdivisions Ultimate Withdrawal Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	60	3	8	30.57	
	21-25	24,485	2,721	2,691	101.09	
	26-30	143,849	11,879	11,765	100.97	
	31-35	364,995	23,322	21,346	109.26	
	36-40	600,165	25,965	23,996	108.20	
	41-45	877,116	28,464	26,043	109.30	
	46-50	989,175	27,618	26,936	102.53	
	51-55	905,687	27,130	28,764	94.32	
	56-60	305,384	14,508	12,331	117.65	
	61-65	1,464	304	58	520.60	
	66-70	521	137	0	n/a	
	71-75	133	36	0	n/a	
	TOTAL		4,213,034	162,086	153,940	105.29
	<u>FEMALE</u>	16-20	4	4	1	509.94
21-25		8,816	1,276	1,387	92.04	
26-30		70,196	9,020	8,624	104.59	
31-35		192,356	17,386	16,772	103.66	
36-40		393,972	26,276	24,254	108.34	
41-45		707,564	34,441	32,015	107.58	
46-50		1,011,424	41,615	39,126	106.36	
51-55		1,078,615	46,158	43,149	106.97	
56-60		410,620	20,897	19,384	107.80	
61-65		1,394	183	63	289.81	
66-70		394	106	0	n/a	
71-75		75	25	0	n/a	
TOTAL			3,875,431	197,386	184,774	106.83
<u>TOTAL</u>		16-20	65	7	9	73.00
	21-25	33,302	3,997	4,078	98.02	
	26-30	214,045	20,898	20,388	102.50	
	31-35	557,351	40,708	38,118	106.79	
	36-40	994,136	52,241	48,250	108.27	
	41-45	1,584,680	62,906	58,057	108.35	
	46-50	2,000,599	69,233	66,062	104.80	
	51-55	1,984,302	73,288	71,913	101.91	
	56-60	716,004	35,405	31,716	111.63	
	61-65	2,858	486	121	400.81	
	66-70	915	242	0	n/a	
	71-75	208	60	0	n/a	
	TOTAL		8,088,465	359,472	338,713	106.13

Spread of Retirement Ages

Spreads of actual retirement ages have been obtained separately for males and females within each category. Comparisons were also made between the age at which each individual became eligible for full retirement benefits and the age at which he actually retired.

These rates reflect the way in which they are applied. Retirement rates apply to ages that are calculated as the "age nearest birthday" on a valuation date (June 30), and anticipate all retirements before the next June 30. Thus, anyone who attains age 64 during 2007 (i.e., was born in 1943) will be treated as being age 64 in the 2007 valuation. Any member in this group who retires before June 30, 2008 will be thought of, for valuation purposes, as retiring at age 64, even though (for example, a teacher who retires at the end of the 2007-2008 school year) he may already have attained age 65 when he retires. The effect of this approach is to divide between age 64 and age 65 retirements which actually occur shortly after the participants' 65th birthdays, rather than assigning them all to age 65.

As a result of the 2000 study, retirement arrays for each major group were modified to reflect liability weighted patterns. Prior to age 60, retirement rates upon first attaining the service retirement age were increased by 10% for all groups. On and after age 60, retirement rates for participants who have completed at least fifteen years of service were increased by 10%, 5% and 5% for Teachers, State and Political Subdivision employees.

For the 2000 to 2004 study period, the actual to expected ratios for service retirements declined considerably for each major group (all groups had ratios at or near 80%). These results suggested a significant decline in the number of retirements from the results of the 2000 study. Since the observed shift in retirement experience was significant, it was difficult to predict whether the data represented a permanent shift in retirement patterns or only a temporary change due to other factors. The 2004 study recommended that only a portion of the decline in service retirements be reflected in the modified retirement arrays. Retirement patterns from the 1996 to 2000 study period were blended with the results from the 2000 to 2004 study period to produce modified retirement arrays. The expectation was to monitor results over the next study period and adjust again in 2008 if the shift in service retirement was observed again.

The 2004 study also modified the special adjustments for retirement rates. Prior to age 60, retirement rates upon first attaining the service retirement age were increased by 12.5% for Teachers and 10% for State and Political Subdivision employees. On and after age 60, retirement rates for participants who have completed at least fifteen years of service were increased by 8% for Teachers and 4% for State and Political Subdivision employees.

The current analysis continues to suggest that adding an incremental percentage to retirement rates upon attaining the service retirement age prior to age 60 is appropriate. It also supports applying a greater probability of retirement on and after age 60 if the period of employment has been substantial. The extent of the additional retirement probability following attainment of age 60 varies among groups as well as by age.

For the 2004 to 2008 study period, the trend for employees to delay retirement continued for all groups. These results suggest that a continued reduction in retirement rates would be prudent since the pattern has now been consistently observed over two study periods.

DEMOGRAPHIC ASSUMPTIONS

Teachers Service Retirement Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>
<u>MALE</u>	16-20	0	0	0	n/a
	21-25	0	0	0	n/a
	26-30	0	0	0	n/a
	31-35	0	0	0	n/a
	36-40	0	0	0	n/a
	41-45	0	0	0	n/a
	46-50	2,463	0	227	0.00
	51-55	698,235	93,491	92,636	100.92
	56-60	1,442,223	223,678	233,742	95.69
	61-65	745,785	202,651	230,741	87.83
	66-70	141,415	31,260	61,137	51.13
	71-75	27,003	5,613	27,003	20.79
	TOTAL	3,057,122	556,693	645,486	86.24
	<u>FEMALE</u>	16-20	0	0	0
21-25		0	0	0	n/a
26-30		0	0	0	n/a
31-35		0	0	0	n/a
36-40		0	0	0	n/a
41-45		0	0	0	n/a
46-50		5,226	847	907	93.34
51-55		2,270,372	307,860	299,411	102.82
56-60		3,544,487	612,912	592,109	103.51
61-65		2,016,132	620,028	625,026	99.20
66-70		333,034	110,605	140,911	78.49
71-75		67,374	17,083	67,374	25.35
TOTAL		8,236,625	1,669,334	1,725,737	96.73
<u>TOTAL</u>		16-20	0	0	0
	21-25	0	0	0	n/a
	26-30	0	0	0	n/a
	31-35	0	0	0	n/a
	36-40	0	0	0	n/a
	41-45	0	0	0	n/a
	46-50	7,689	847	1,134	74.63
	51-55	2,968,607	401,351	392,047	102.37
	56-60	4,986,709	836,590	825,850	101.30
	61-65	2,761,917	822,679	855,767	96.13
	66-70	474,449	141,865	202,048	70.21
	71-75	94,377	22,696	94,377	24.05
	TOTAL	11,293,747	2,226,028	2,371,223	93.88

DEMOGRAPHIC ASSUMPTIONS

General State Service Retirement Old Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	0	0	0	n/a	
	21-25	0	0	0	n/a	
	26-30	0	0	0	n/a	
	31-35	0	0	0	n/a	
	36-40	0	0	0	n/a	
	41-45	0	0	0	n/a	
	46-50	59,929	3,968	5,536	71.68	
	51-55	587,718	46,276	56,575	81.80	
	56-60	1,450,694	128,290	153,661	83.49	
	61-65	1,492,748	233,797	320,473	72.95	
	66-70	545,779	90,876	115,903	78.41	
	71-75	153,696	26,396	50,368	52.41	
	TOTAL		4,290,565	529,603	702,516	75.39
	<u>FEMALE</u>	16-20	0	0	0	n/a
21-25		0	0	0	n/a	
26-30		0	0	0	n/a	
31-35		0	0	0	n/a	
36-40		0	0	0	n/a	
41-45		0	0	0	n/a	
46-50		120,133	12,456	10,974	113.51	
51-55		734,707	67,402	72,132	93.44	
56-60		1,223,590	115,147	130,885	87.98	
61-65		1,213,107	191,637	253,711	75.53	
66-70		372,100	67,205	78,774	85.31	
71-75		84,236	12,731	27,786	45.82	
TOTAL			3,747,872	466,579	574,263	81.25
<u>TOTAL</u>		16-20	0	0	0	n/a
	21-25	0	0	0	n/a	
	26-30	0	0	0	n/a	
	31-35	0	0	0	n/a	
	36-40	0	0	0	n/a	
	41-45	0	0	0	n/a	
	46-50	180,063	16,424	16,510	99.48	
	51-55	1,322,425	113,678	128,708	88.32	
	56-60	2,674,284	243,437	284,546	85.55	
	61-65	2,705,855	425,434	574,184	74.09	
	66-70	917,879	158,081	194,677	81.20	
	71-75	237,931	39,127	78,154	50.06	
	TOTAL		8,038,437	996,182	1,276,779	78.02

DEMOGRAPHIC ASSUMPTIONS

Political Subdivisions Service Retirement Old Assumptions

		<i>Exposure</i>	<i>Actual</i>	<i>Expected</i>	<i>Act/Exp</i>
<u>MALE</u>	16-20	0	0	0	n/a
	21-25	0	0	0	n/a
	26-30	0	0	0	n/a
	31-35	0	0	0	n/a
	36-40	0	0	0	n/a
	41-45	0	0	0	n/a
	46-50	39,041	5,473	3,582	152.79
	51-55	247,100	27,291	23,952	113.94
	56-60	457,151	50,595	54,123	93.48
	61-65	585,021	117,059	131,209	89.22
	66-70	171,120	32,065	34,345	93.36
	71-75	61,745	12,978	19,672	65.97
	TOTAL	1,561,177	245,460	266,884	91.97
	<u>FEMALE</u>	16-20	0	0	0
21-25		0	0	0	n/a
26-30		0	0	0	n/a
31-35		0	0	0	n/a
36-40		0	0	0	n/a
41-45		0	0	0	n/a
46-50		26,495	3,071	2,385	128.74
51-55		145,529	14,486	13,778	105.14
56-60		357,203	43,484	43,194	100.67
61-65		689,573	125,696	155,769	80.69
66-70		214,686	44,898	43,800	102.51
71-75		68,844	15,093	21,788	69.27
TOTAL		1,502,331	246,728	280,715	87.89
<u>TOTAL</u>		16-20	0	0	0
	21-25	0	0	0	n/a
	26-30	0	0	0	n/a
	31-35	0	0	0	n/a
	36-40	0	0	0	n/a
	41-45	0	0	0	n/a
	46-50	65,536	8,544	5,967	143.17
	51-55	392,629	41,777	37,730	110.72
	56-60	814,354	94,080	97,317	96.67
	61-65	1,274,594	242,754	286,978	84.59
	66-70	385,806	76,963	78,145	98.49
	71-75	130,588	28,071	41,460	67.70
	TOTAL	3,063,508	492,188	547,599	89.88

Recommendation: Retirement arrays for each major group should be modified to reflect the continued change in the pattern of retirement first noticed in the 2004 study. Recommended tables produce actual to expected ratios near 100% for Teachers and Political Subdivisions.

It is believed that a number of State employees deferred retirement at the end of the 2004 to 2008 study period in order to take advantage of an incentive program being offered that was to be effective shortly after the end of the study period. The desired result was to reflect the full, continued change in retirement pattern for the State group similar to the recommendations for the Teacher and Political Subdivision groups. The impact of the anticipation of the incentive program was factored into the recommended results for the State group resulting in a revised ratio of only 94% (where it otherwise would have been recommended as 100%).

Prior to age 60, retirement rates upon first attaining the service retirement age should be increased by 12.5% for Teachers and 7.5% for State and Political Subdivision employees (changed from 12.5% for Teachers and 10% for State and Political Subdivision employees). On and after age 60, retirement rates for participants who have completed at least fifteen years of service should be increased by 8% for Teachers and 2% for State and Political Subdivision employees (changed from 8% for Teachers and 4% for State and Political Subdivision employees).

Rates in the revised tables should be applied only to participants who have satisfied the eligibility requirements for service retirement. The effect of the recommended changes is illustrated in the following tables.

DEMOGRAPHIC ASSUMPTIONS

Teachers
Service Retirement
Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>
<u>MALE</u>	16-20	0	0	0	n/a
	21-25	0	0	0	n/a
	26-30	0	0	0	n/a
	31-35	0	0	0	n/a
	36-40	0	0	0	n/a
	41-45	0	0	0	n/a
	46-50	2,463	0	227	0.00
	51-55	698,235	93,491	92,636	100.92
	56-60	1,442,223	223,678	225,105	99.37
	61-65	745,785	202,651	200,720	100.96
	66-70	141,415	31,260	33,241	94.04
	71-75	27,003	5,613	9,068	61.90
	TOTAL	3,057,122	556,693	560,998	99.23
	<u>FEMALE</u>	16-20	0	0	0
21-25		0	0	0	n/a
26-30		0	0	0	n/a
31-35		0	0	0	n/a
36-40		0	0	0	n/a
41-45		0	0	0	n/a
46-50		5,226	847	907	93.34
51-55		2,270,372	307,860	311,789	98.74
56-60		3,544,487	612,912	617,148	99.31
61-65		2,016,132	620,028	625,026	99.20
66-70		333,034	110,605	107,791	102.61
71-75		67,374	17,083	34,655	49.29
TOTAL		8,236,625	1,669,334	1,697,316	98.35
<u>TOTAL</u>		16-20	0	0	0
	21-25	0	0	0	n/a
	26-30	0	0	0	n/a
	31-35	0	0	0	n/a
	36-40	0	0	0	n/a
	41-45	0	0	0	n/a
	46-50	7,689	847	1,134	74.63
	51-55	2,968,607	401,351	404,426	99.24
	56-60	4,986,709	836,590	842,253	99.33
	61-65	2,761,917	822,679	825,746	99.63
	66-70	474,449	141,865	141,032	100.59
	71-75	94,377	22,696	43,723	51.91
	TOTAL	11,293,747	2,226,028	2,258,314	98.57

DEMOGRAPHIC ASSUMPTIONS

General State Service Retirement Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	0	0	0	n/a	
	21-25	0	0	0	n/a	
	26-30	0	0	0	n/a	
	31-35	0	0	0	n/a	
	36-40	0	0	0	n/a	
	41-45	0	0	0	n/a	
	46-50	59,929	3,968	4,378	90.63	
	51-55	587,718	46,276	47,953	96.50	
	56-60	1,450,694	128,290	132,295	96.97	
	61-65	1,492,748	233,797	244,382	95.67	
	66-70	545,779	90,876	94,791	95.87	
	71-75	153,696	26,396	40,941	64.47	
	TOTAL		4,290,565	529,603	564,740	93.78
	<u>FEMALE</u>	16-20	0	0	0	n/a
21-25		0	0	0	n/a	
26-30		0	0	0	n/a	
31-35		0	0	0	n/a	
36-40		0	0	0	n/a	
41-45		0	0	0	n/a	
46-50		120,133	12,456	9,621	129.47	
51-55		734,707	67,402	70,567	95.52	
56-60		1,223,590	115,147	118,414	97.24	
61-65		1,213,107	191,637	203,556	94.14	
66-70		372,100	67,205	70,085	95.89	
71-75		84,236	12,731	23,780	53.54	
TOTAL			3,747,872	466,579	496,023	94.06
<u>TOTAL</u>		16-20	0	0	0	n/a
	21-25	0	0	0	n/a	
	26-30	0	0	0	n/a	
	31-35	0	0	0	n/a	
	36-40	0	0	0	n/a	
	41-45	0	0	0	n/a	
	46-50	180,063	16,424	13,999	117.33	
	51-55	1,322,425	113,678	118,519	95.92	
	56-60	2,674,284	243,437	250,709	97.10	
	61-65	2,705,855	425,434	447,938	94.98	
	66-70	917,879	158,081	164,877	95.88	
	71-75	237,931	39,127	64,721	60.46	
	TOTAL		8,038,437	996,182	1,060,763	93.91

DEMOGRAPHIC ASSUMPTIONS

Political Subdivisions Service Retirement Recommended Assumptions

		<u>Exposure</u>	<u>Actual</u>	<u>Expected</u>	<u>Act/Exp</u>	
<u>MALE</u>	16-20	0	0	0	n/a	
	21-25	0	0	0	n/a	
	26-30	0	0	0	n/a	
	31-35	0	0	0	n/a	
	36-40	0	0	0	n/a	
	41-45	0	0	0	n/a	
	46-50	39,041	5,473	3,621	151.14	
	51-55	247,100	27,291	27,349	99.79	
	56-60	457,151	50,595	51,600	98.05	
	61-65	585,021	117,059	115,388	101.45	
	66-70	171,120	32,065	31,773	100.92	
	71-75	61,745	12,978	18,869	68.78	
	TOTAL		1,561,177	245,460	248,601	98.74
	<u>FEMALE</u>	16-20	0	0	0	n/a
21-25		0	0	0	n/a	
26-30		0	0	0	n/a	
31-35		0	0	0	n/a	
36-40		0	0	0	n/a	
41-45		0	0	0	n/a	
46-50		26,495	3,071	2,302	133.43	
51-55		145,529	14,486	14,448	100.26	
56-60		357,203	43,484	42,861	101.45	
61-65		689,573	125,696	124,179	101.22	
66-70		214,686	44,898	44,376	101.18	
71-75		68,844	15,093	21,370	70.63	
TOTAL			1,502,331	246,728	249,535	98.88
<u>TOTAL</u>		16-20	0	0	0	n/a
	21-25	0	0	0	n/a	
	26-30	0	0	0	n/a	
	31-35	0	0	0	n/a	
	36-40	0	0	0	n/a	
	41-45	0	0	0	n/a	
	46-50	65,536	8,544	5,922	144.26	
	51-55	392,629	41,777	41,797	99.95	
	56-60	814,354	94,080	94,461	99.60	
	61-65	1,274,594	242,754	239,567	101.33	
	66-70	385,806	76,963	76,149	101.07	
	71-75	130,588	28,071	40,239	69.76	
	TOTAL		3,063,508	492,188	498,136	98.81

Summary of Demographic Assumptions

Recommendations for modification of demographic assumptions utilized for each major group have been made herein. These changes relate to experience identified from the four year period ending June 30, 2008. It is recommended that the revised array of assumptions be adopted for the major groups of employees.

Various economic assumptions such as interest rates, probable future salary increases, and increases in the Social Security taxable wage base are all linked to general economic conditions (especially the rate of inflation), and therefore are interrelated. Economic assumptions are not so directly the province of the actuary as are the assumptions previously discussed. Nevertheless, assumptions concerning the future pattern of these items are more important in determining plan costs than any of the decrements previously discussed, and usually are included under the title "Actuarial Assumptions." Also, past performance can serve as a clue to future performance, even if only as a starting point for adjustments reflecting changed situations.

Economic assumptions are often determined based upon a component approach. Under this approach, the individual elements of each assumption are identified and combined to produce a total or composite amount. Each of these components contains inflation as a common item.

Inflation

Inflation is a common element in each of the economic assumptions made for the plan. Inflation is also a separate assumption that affects costs by determining cost of living adjustments that affect geometrically increased plan benefits following retirement.

There has been substantial fluctuation in historical rates of inflation. The table below presents rates of inflation that have occurred over various periods ending in 2008.

<i><u>Period</u></i>	<i><u>Period Length</u></i>	<i><u>Inflation</u></i>
2008-2008	1	0.1%
1994-2008	15	2.5%
1984-2008	25	3.0%
1979-2008	30	3.9%
1959-2008	50	4.0%
1949-2008	60	3.7%
1934-2008	75	3.8%
1929-2008	80	3.2%

Indicators of future inflation expectations include the opinion of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds, whose 2009 Annual Report discusses underlying actuarial assumption data. The report provides sets of low, intermediate and high cost actuarial assumptions. The ultimate annual inflation assumption documented in the report is assumed to be 1.8%, 2.8% and 3.8% for the low, intermediate and high cost assumptions, respectively.

Based upon the above historical information and expectation of future occurrences, the expected annual rate of inflation has been established at an intermediate annual rate of 3.0%. This expected annual rate of future inflation is unchanged from the current assumption being used by TCRS.

Cost of Living Adjustment for TCRS Retirees

TCRS provides an annual cost of living adjustment to retirees effective July 1 of each year based on the inflation measured in the previous calendar year. The method for determining the cost of living adjustment does not allow the adjustment to exceed 3.0% in any given year. The table below is the same as the one shown in the inflation section above that presents rates of inflation that have occurred over various periods ending in 2008, but this table contains an extra column to show the impact of applying the 3.0% limit over each period.

<u>Period</u>	<u>Period Length</u>	<u>Inflation</u>	<u>3.0% Limit Per Year</u>
2008-2008	1	0.1%	0.1%
1994-2008	15	2.5%	2.3%
1984-2008	25	3.0%	2.5%
1979-2008	30	3.9%	2.6%
1959-2008	50	4.0%	2.5%
1949-2008	60	3.7%	2.4%
1934-2008	75	3.8%	2.3%
1929-2008	80	3.2%	2.2%

The expected annual rate of inflation was established in the previous section at 3.0%. This assumption does not imply that inflation will be exactly 3.0% in each future year, but rather that inflation will average 3.0% in the future (some years greater and some years less). During periods when actual inflation is high, the TCRS cost of living adjustment will be limited to 3.0%. Therefore, the range of future TCRS cost of living adjustments will be between the actual rate of inflation during low inflationary periods and 3.0%.

Based upon the above historical information and the assumption that the long-term average expectation of future inflation has been established at 3.0%, the expected rate of the cost of living adjustment to TCRS retirees has been established at an annual rate of 2.5%. This expected annual rate of the cost of living adjustment is a decrease from the current assumption being used by TCRS of 3.0%.

Interest Rates

The long-term rate of return on investments is the most important single factor in determining the cost of a pension plan with a given set of benefits and participants. The investment experience of the TCRS trust fund has been studied on a "total return" basis by the TCRS investment staff. The following table shows the investment return for each individual year and separate average annualized rates of return for the period beginning with each fiscal year and ending June 30, 2008:

Fiscal Year	Rate of Return During Year	Average Annualized Rate of Return from Given Year through 2008
2007-2008	(1.2)%	(1.2)%
2006-2007	13.2	5.8
2005-2006	6.9	6.1
2004-2005	7.3	6.4
2003-2004	9.3	7.0
2002-2003	4.9	6.6
2001-2002	(1.9)	5.4
2000-2001	(1.6)	4.5
1999-2000	7.9	4.9
1998-1999	9.5	5.3
1997-1998	15.1	6.2
1996-1997	15.7	6.9
1995-1996	12.8	7.4
1994-1995	12.8	7.8
1993-1994	0.5	7.3

From the table above, it may be seen that the average annual total rate of return for the last fifteen years has been 7.3%, but that within that period there has been substantial fluctuation. The average annual total rate of return for the four years ending June 30, 2008 has been 6.4%, which is below the 7.5% assumed rate of return.

In accordance with investment policies established by the Board, TCRS investments emphasize bonds and other fixed income securities, but also include a substantial percentage of equity investments. On a "total return" basis, both kinds of investments are subject to wide fluctuations dependent upon market and economic conditions. The results shown in the table illustrate such fluctuations.

In order to arrive at contribution rates that are not unduly affected by these fluctuations, TCRS valuations assign a value to assets which is based on a "10-year moving average of market values". Over a short period, this approach may differ substantially from the year-by-year results shown above, but over longer periods the results should be similar and should reasonably replicate market value results. The smoothing process attempts to avoid the wide fluctuations shown in the table, tending also to smooth contribution rates.

Any analysis of expected returns should include both long-term historical returns and current expectations of the future investment climate. Generally, current expectations are useful for predicting short-term returns, while historical experience can be a better indicator of longer-term expected returns.

An expected long-term rate of return for the plan has been developed using a blend of future expectations of returns and long-term historical performance. The following chart reflects a weighted-average expected future return based on the investment policy adopted by the Board. The policy permits investments from various asset classes within a minimum and maximum allocation percentage, and also defines a target portfolio to determine the

basis for measuring investment performance of the fund. Since the investment manager will make decisions to periodically over or under weight a particular asset class, the basis used for estimating future returns is the target portfolio instead of the plan's actual asset allocation at any given point in time.

The two sources used in the forecast of expected future returns are as follows: (1) Expectations from 2009 Wells Fargo Capital Market Expectations and (2) historical rates of return by asset class as reported in Ibbotson's 2009 SBBI (Stocks, Bonds, Bills and Inflation) Yearbook. In considering what historical rates of return to consider, we extracted average returns for all historically available information (since 1926) and also considered average returns for the 15 year period ending in 2008. Since we do not believe there is one "correct" answer, but a range of possible results, we have considered different weighting factors below. In Scenario I, we assume the Wells Fargo Capital Market Expectations to be of greatest value and so weight that category 60% while weighting the other categories 20% each. In Scenario II, we assume all historical data to be the most meaningful and so weight that category 60% with the other two being 20%. When no historical data was available for certain asset classes, assumptions were made consistent with the level of risk presented within each class.

	(A) Allocation Percentage	(B) Wells Fargo	(C) SBBI Since 1926	(D) SBBI 15 Years	60/20/20 Expected Return	20/60/20 Expected Return
Domestic Stocks	35%	8.6%	9.6%	6.5%	2.93%	3.07%
International Stocks	15%	8.9%	11.7%	8.6%	1.41%	1.58%
Domestic Bonds	27%	5.3%	5.7%	6.2%	1.50%	1.55%
International Bonds	4%	5.6%	6.0%	6.5%	0.23%	0.24%
Inflation Indexed Bonds	8%	5.1%	5.5%	6.0%	0.43%	0.44%
Real Estate	7%	7.7%	10.1%	7.0%	0.56%	0.63%
Private Equity	3%	8.8%	9.9%	6.8%	0.26%	0.27%
Short-term securities	1%	3.5%	3.5%	3.5%	0.04%	0.04%
	100%				7.36%	7.82%

While there is no single "correct" assumption for the rate of investment return, the above range of 7.36% to 7.82% gives a reasonable range of outcomes that might be expected based on the plan's current funding policy. Based on this analysis, a rate of 7.5% would appear to be a reasonable assumption. Even if different weightings were applied to the various sources of data, 7.5% would still likely be in the range of reasonable outcomes.

The 7.5% interest assumption is representative of interest assumptions used by pension plans sponsored by large public employers. A 2009 Wilshire report indicates the average interest rate assumption used by 125 different state retirement systems is 8.0%. However, the average commitment to equity investments among other state retirement systems is higher than that of TCRS. Domestic and international equity (including real estate) allocations among state retirement plans average 68% compared to 57% for TCRS. The lower equity allocations for TCRS suggest that the use of a more conservative assumed investment return is appropriate.

Recommendation: The current rate of 7.5% presents a reasonable expectation of future investment returns when evaluated based upon the existing asset allocation targets and expected real rates of return. The rate is based upon an inflation rate of 3.0% which is consistent with the underlying inflation rate used in the establishment of other economic assumptions.

Salary Scale

In recent years, there has been a tendency away from uniform salary scales that do not vary by age to age graded scales. Age graded scales typically begin with higher increase rates for the younger ages where salary increases are highest and decline to lower levels for older participants where increases often approximate the cost of living. While direct comparisons may be accurately made among plans that use a uniform scale, comparisons between age graded scales are not as easily made. A 5% uniform scale will produce higher contribution rates than an age graded scale that begins at 7% and declines to 3%, for which the *average* is 5%, because the higher rates of the graded scale affect only the relatively smaller number of participants who are below the age midpoint.

After the 2000 experience study, salary assumptions were adopted to include an age-related feature for the first time. The new salary assumptions were further validated with the 2004 study where no changes were recommended. The greater accuracy achieved with age related tables offsets the small advantage of greater understandability afforded by uniform tables. Recommended tables are based upon an average real wage increase rate expectation of 0.5% coupled with anticipated inflation of 3.0%.

Under the current tables, salary increases decline from 9.5% at age 20 to 4.3% at age 60. Rates are assumed to decline very modestly thereafter to 4.2% ultimately. The average increase from age 20 to 60 is 6.17%. Although the average seems high, the table in aggregate is actually less conservative because the higher rates applicable to younger employees affect a relatively small group of employees for whom the expectation of reaching retirement and receiving benefit values are low. The graded salary scale replicates the effect of a uniform salary scale that increases annually at the rate of approximately 4.75%.

The tables on the next two pages show that average salaries have continued to increase reasonably close to the current salary scale assumption. The four-year averages for Teachers, State and Political Subdivisions were 4.66%, 6.22% and 5.05%, respectively. These rates are reasonably consistent with the 4.58%, 4.42% and 4.66% for the same groups measured during the 2000-2004 period.

The tables show that salary increases continue to vary significantly by age among all major groups. This result further supports the continued use of an age graded salary scale. There is also variability by year of examination. The average percentage increase for State employees for the four years commencing with July 1, 2004 are 8.61%, 3.19%, 7.66% and 5.66%. The differences measured by year suggest that averaging over a period of four years provides improved insight into historic salary changes. The somewhat larger increases for the State group experienced during the study period were believed to be due to compensation policies and adjustments that are not expected to continue in the future.

Recommendation: In order to evaluate the current salary scale assumption, the results of the following tables were averaged. It was also necessary to adjust the results based on the difference between the assumed inflation component built into the salary scale assumption and inflation that actually occurred during the study period. Inflation was assumed to be 3.0% annually, while actual inflation was 3.3% from the beginning of 2004 to the end of 2007.

Salary increase results for the current study period were consistent with expectations. As a result, no modification is proposed to the current salary scale assumption.

Teachers
Salary History - Individual Records
Weighted By Salary

	2004 No.	Percentage Increase in Average Salary				Average	Exp. Inc.	
		2004-05	2005-06	2006-07	2007-08			
TOTAL	16-20	0	0.00	-0.91	10.04	0.00	3.37	9.97
	21-25	246	6.33	5.73	6.91	7.19	6.55	8.75
	26-30	4,895	6.52	5.29	6.87	6.00	6.16	7.55
	31-35	7,093	6.46	5.33	6.36	6.09	6.06	6.80
	36-40	6,325	6.01	4.96	6.01	5.72	5.68	6.13
	41-45	6,457	5.68	4.13	5.37	4.85	5.00	5.47
	46-50	8,598	5.29	3.53	4.54	4.46	4.45	4.93
	51-55	10,215	4.87	3.01	4.02	3.88	3.94	4.58
	56-60	7,504	4.62	2.63	3.58	3.46	3.55	4.35
	61-65	1,814	4.38	2.51	3.36	3.14	3.29	4.23
	66-70	279	4.75	2.67	2.97	3.04	3.26	4.21
	71-75	64	3.63	0.96	2.83	3.24	2.77	4.20
	TOTAL	53,490	5.40	3.80	4.88	4.60	4.66	

General Employees
Salary History - Individual Records
Weighted By Salary

	2004 No.	Percentage Increase in Average Salary				Average	Exp. Inc.	
		2004-05	2005-06	2006-07	2007-08			
TOTAL	16-20	1	29.43	-6.06	6.30	12.53	6.63	9.97
	21-25	585	9.97	5.99	7.10	6.01	7.31	8.75
	26-30	2,404	9.87	7.23	8.78	6.51	7.98	7.55
	31-35	3,559	9.77	6.38	8.76	6.33	7.69	6.80
	36-40	4,373	8.99	5.27	8.39	6.27	7.16	6.13
	41-45	6,473	8.69	3.78	7.94	6.31	6.65	5.47
	46-50	8,410	8.70	2.83	7.91	5.90	6.29	4.93
	51-55	8,945	8.43	2.32	7.49	5.55	5.89	4.58
	56-60	7,519	8.31	2.02	7.21	5.27	5.63	4.35
	61-65	3,232	7.88	1.86	6.75	4.76	5.24	4.23
	66-70	1,107	7.33	1.25	6.06	4.49	4.73	4.21
	71-75	308	7.27	1.22	6.79	4.43	4.89	4.20
	TOTAL	46,916	8.61	3.19	7.66	5.66	6.22	

**Political Subdivisions
Salary History - Individual Records
Weighted By Salary**

		Percentage Increase in Average Salary						
	2004 No.	2004-05	2005-06	2006-07	2007-08	Average	Exp. Inc.	
TOTAL	16-20	0	9.45	8.59	22.23	11.51	9.97	
	21-25	703	8.83	7.28	7.56	7.78	8.75	
	26-30	2,605	7.86	6.33	7.00	6.86	7.55	
	31-35	4,637	6.88	5.65	6.35	6.14	6.80	
	36-40	6,193	6.40	4.95	5.92	5.60	6.13	
	41-45	8,276	5.76	4.71	5.59	5.22	5.47	
	46-50	9,042	5.58	4.37	5.08	4.84	4.93	
	51-55	8,473	5.38	3.99	5.09	4.65	4.58	
	56-60	7,056	4.83	3.97	4.77	4.35	4.35	
	61-65	3,602	4.43	3.72	4.64	4.18	4.23	
	66-70	1,304	4.01	4.03	4.50	4.06	4.21	
	71-75	541	4.39	3.44	4.21	3.92	4.20	
TOTAL	52,432	4.56	5.71	4.54	5.37	5.05		

Social Security Increases

Although the TCRS is not heavily integrated with Social Security, it is affected by changes in the Social Security taxable wage base because such changes affect the "Social Security Integration Level" of the TCRS. In general, the State's cost is lowered somewhat by assuming that the taxable wage base will increase. Since such increases are primarily due to inflation, an assumption concerning the wage base should parallel the interest assumption. An appropriate wage base escalation rate that relates consistently to the other economic assumptions can be determined by combining the expected real wage increase rate of 0.5% with anticipated inflation of 3.0% to produce a rate of 3.5%. This rate is consistent with the rate used in the 2007 actuarial valuation.

Economic Assumption Summary

Recommendation: The group of economic assumptions recommended above is based upon an integrated set of assumptions of which inflation is common to all. The approach taken in establishing assumptions results in coordination among the assumption elements.

The thrust of this study has been directed toward three major groups—Teachers, general State employees, and Political Subdivision employees. These three groups include the vast bulk of TCRS participants. Two other small groups ("UT-TIAA with guarantee" and "Local Teachers") are basically teacher groups, so it is recommended that the assumptions adopted for Teachers also be applied to them. The "Aged Teacher and State" retirees also are primarily former teachers, so they also should be covered by the assumptions used for Teachers.

"Group II" is a closed group that is not large enough to have credible experience with respect to mortality or disability. It is proposed that this group adopt the same mortality and disability assumptions as the Consolidated State group. Turnover appears to be roughly equal to the expected rates, but experience limits credibility. It is recommended that existing tables continue to be used for turnover.

"Group III" is a closed group that is also not large enough to generate credible experience. It is recommended that the mortality and disability rates adopted for Teachers be used also for "Group III." It is proposed that the retirement array adopted after the 2004 study be maintained without further changes for this group. The current schedule assumes rates of retirement for those who have met the service retirement eligibility requirements of 8% after age 50 increasing to 20% after age 65.