June 2004

Experience Study
1998 - 2003

Minnesota State Retirement System
State Patrol Retirement Fund

MERCER
Human Resource Consulting

Contents

Introduction

This report presents the results of an analysis of the experience of the Minnesota State Retirement System State Patrol Retirement Fund over the five-year period from July 1, 1998 to June 30, 2003.

This report is divided into three sections. The first section describes the plan participants included in the study, the actuarial methods employed and the current actuarial assumptions used to perform the annual valuation. The second section details the results of the study separately for each assumption. The final section summarizes the results and presents conclusions to the Board.

It is our opinion that this report is, to the best of our knowledge, complete and accurate. The actuarial methods are applied on an objective basis and are appropriate for the purpose at hand. Therefore, the information contained in this report fully and fairly discloses the experience of the Minnesota State Retirement System State Patrol Retirement Fund over the period July 1, 1998 to June 30, 2003.

The undersigned are available to provide further information or answer any questions with respect to this report. The undersigned credentialed actuary meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report. In addition, the undersigned credentialed actuary meets the definition of "approved actuary" in Minnesota Statutes, Section 356.215.

_____   Date ___4/4/2004___

Stephen T. McElhaney, FSA

_____   Date ___6/4/2004___

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Basis of Study

This section:

- Describes the sources of membership data used in the study.

- Describes the actuarial methods employed in the study.

- Summarizes the current set of actuarial assumptions used in the annual valuation of the Fund.

Plan Participants

The individuals included in this study were members of the Minnesota State Retirement System State Patrol Retirement Fund during the period from July 1, 1998 through June 30, 2003.

Census information gathered for the last five actuarial valuations formed the basis for this study. This census information and the current actuarial assumptions described beginning on page 5 were used to determine the expected number of terminations, deaths, withdrawals, disabilities and retirements during the period under consideration.

The actual terminations, deaths, disabilities, withdrawals and retirements were accumulated on an annual basis from records used in each actuarial valuation. The records include specific information received from the Minnesota State Retirement System office in the preparation of each actuarial valuation. This information was reviewed for accuracy and consistency.

Actuarial Methodology

For any retirement system, actuarial assumptions employed are intended to be reasonable estimates of future expected events that could affect the amount and timing of benefits and the assets accumulated. These assumptions, along with an actuarial cost method, the employee census data and the provisions outlined in the statutes are used to determine the overall funding requirements for the Plan. The true cost to the Plan over time will be the actual benefit payments and expenses required by the statutes for the participant group covered under the Plan, less the investment return realized on trust assets. To the extent the actual experience deviates from the assumptions, experience gains and losses will occur. These gains (losses) then serve to reduce (increase) future contribution levels. The actuarial assumptions should be reasonable and should be reviewed periodically to insure that they remain appropriate. The actuarial cost method used to determine contributions, however, automatically adjusts over time for differences between what is assumed and the true experience under the Plan.

Decrements

For the withdrawal, mortality, disability and retirement studies, the following procedure was used. Based upon the current rates of decrement described on pages 5-7 and the census information previously described, expected numbers of withdrawals, deaths, disabilities and retirements were determined for each age and then accumulated into five-year age groupings, (except for retirement, which was analyzed at distinct ages). The expected occurrences were then compared to the actual number of occurrences over the period under investigation.

Salary Increases

For the salary increase study, fiscal year pay for each year from July 1, 1998 through June 30, 2002 was used. For each participant who was active on two consecutive valuation dates, with at least two years of service, we calculated the salary increase as a percentage of the prior year's pay. These actual salary increases were then compared to the expected salary increases over the period of investigation, in five-year age and service groupings.

For purposes of comparing actual salary increases to assumed salary increases, we excluded all individuals whose pay increased or decreased 20% or more. While this was a relatively small group, their salary increases distorted the experience of the overall group of continuing active participants.

Actuarial Assumptions

Economic	
Investment Return	Pre-Retirement: 8.5%
	Post-Retirement: 6.0%
Salary Increases	Annual increases according to table on next page.
Benefit Increases after Retirement	Payment of earnings on retired reserves in excess of 6% accounted for by using a 6% post-retirement assumption.
Other	
Mortality	Pre-Retirement:
	Male: 1983 Group Annuity Mortality for males set back 1 year
	Female: 1983 Group Annuity Mortality for females
	Post-Retirement:
	Male: 1983 Group Annuity Mortality for males set forward 2 years
	Female: 1983 Group Annuity Mortality for females set forward 2 years
	Post-Disability: Combined Annuity Mortality
Withdrawal	Refer to Tables on following pages
Expenses	Prior year expenses expressed as a percentage of prior year payroll
Disability	Refer to Tables on following pages
Retirement	Refer to Tables on following pages
Percentage Married at Retirement	100%
Age Difference	Males are assumed to be three years older than female spouses
Family	Members are assumed to have two children whose ages are dependent upon the Member's age. Assumed first child is born at Member's age 28 and second child is born at Member's age 31.
Benefit Election	Married Males
	25% elect 50% J&S
	25% elect 100% J&S
	Married Females
	5% elect 50% J&S
	5% elect 100% J&S

Actuarial Assumptions *(continued)*

TABLE OF SAMPLE SALARY INCREASES

<u>Age</u>	<u>Increase</u>
20	7.75%
25	7.00%
30	7.00%
35	7.00%
40	6.50%
45	5.75%
50	5.50%
55+	5.25%

TABLE OF SAMPLE DISABILITY RATES

<u>Age</u>	<u>Males and Females</u>
20	.04%
25	.06%
30	.08%
35	.11%
40	.18%
45	.29%
50	.50%
55	.88%
60	1.41%
63+	0.0%

Actuarial Assumptions *(continued)*

TABLE OF SAMPLE WITHDRAWAL RATES

Attained Age	Males and Females
20	2.20%
25	1.70%
30	1.20%
35	.70%
40	.60%
45	.60%
50+	0%

TABLE OF RETIREMENT RATES

Attained Age	Males and Females
50-53	2%
54	20%
55	60%
56-61	20%
62-64	50%
65	100%

Results of Study

This section presents the following results of the study:

- Withdrawal

- Retirement

- Disability

- Active Mortality

- Retiree and Beneficiary Mortality

- Disability Retiree Mortality

- Salary Increases

- Investment Return

Withdrawal

Basis of Analysis

The withdrawal rates specify the assumed probability that a given employee will leave employment within the following year for reasons other than retirement, death or disability. For most employers, these probabilities are much higher for employees at younger ages with relatively few years of service and decline quickly as service and age increases.

The Minnesota State Retirement System State Patrol Retirement Fund uses age-related termination rates that trend downward as age increases.

Historical Data

During the five years from 1998 through 2003, the actual number of withdrawals was lower than expected (35 actual versus 51 expected). For members with less than 3 years of service, the actual number of withdrawals was higher than assumed, (17 actual versus 8 expected). However, for members with 3 or more years of service, actual withdrawals were just 42% of expected (18 actual versus 43 expected).

Withdrawal *(continued)*

1998-2003 Terminations

	Less than 3 years			3+ years			Total		
Age	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	5	1.09	459%	0	1.07	0%	5	2.16	232%
25-29	5	3.70	135%	1	7.18	14%	6	10.88	55%
30-34	3	2.04	147%	4	9.76	41%	7	11.80	59%
35-39	1	0.71	140%	3	8.26	36%	4	8.98	45%
40-44	2	0.33	603%	5	9.30	54%	7	9.63	73%
45-49	1	0.15	667%	4	7.78	51%	5	7.93	63%
50+	0	0.00	N/A	1	0.00	N/A	1	0.00	N/A
	17	8.02	212%	18	43.35	42%	35	51.38	68%

Withdrawal *(continued)*

2002-2003 Terminations

Age	Actual	Expected	Actual/Expected
20-24	1	0.23	443%
25-29	2	2.03	99%
30-34	1	2.49	40%
35-39	1	1.77	56%
40-44	2	1.90	105%
45-49	1	1.72	58%
50+	0	0.00	N/A
Total	8	10.14	81%

2001-2002 Terminations

Age	Actual	Expected	Actual/Expected
20-24	2	0.41	494%
25-29	0	2.37	0%
30-34	2	2.55	78%
35-39	2	1.79	112%
40-44	0	1.94	0%
45-49	0	1.66	0%
50+	0	0.00	N/A
Total	6	10.72	59%

Withdrawal *(continued)*

2000-2001 Terminations

Age	Actual	Expected	Actual/Expected
20-24	0	0.53	0%
25-29	1	2.35	43%
30-34	2	2.47	81%
35-39	0	1.78	0%
40-44	2	1.97	102%
45-49	2	1.62	123%
50+	0	0.00	N/A
Total	7	10.72	65%

1999-2000 Terminations

Age	Actual	Expected	Actual/Expected
20-24	2	0.54	373%
25-29	1	2.33	43%
30-34	2	2.23	90%
35-39	0	1.92	0%
40-44	1	1.92	52%
45-49	0	1.51	0%
50+	1	0.00	N/A
Total	7	10.45	67%

Withdrawal (continued)

1998-1999 Terminations

Age	Actual	Expected	Actual/Expected
20-24	0	0.46	0%
25-29	2	1.80	111%
30-34	0	2.05	0%
35-39	1	1.71	58%
40-44	2	1.90	105%
45-49	2	1.43	140%
50+	0	0.00	N/A
Total	7	9.35	75%

Retirement

Basis of Analysis

The retirement rates specify the assumed probability that a given employee will retire within the following year. For most plans, these probabilities are higher for older employees or employees with more years of service. Accordingly, retirement rates will usually vary by age or service. In addition, probabilities of retirement are usually higher if employees are eligible to receive full unreduced benefits prior to normal retirement age. Currently, the Minnesota State Retirement System State Patrol Retirement Fund uses retirement rates that vary by age.

Historical Data

During the five years from 1998 through 2003, the actual number of retirements was higher than expected (179 actual versus 148 expected).

Retirement

1998-2003 Retirements

Age	Actual	Expected	Actual/ Expected	Expected Percent	Actual Percent
50	4	2.71	148%	2%	3%
51	12	2.68	448%	2%	9%
52	11	2.54	433%	2%	9%
53	9	2.53	356%	2%	7%
54	15	26.47	57%	20%	11%
55	85	84.09	101%	60%	61%
56	21	7.33	287%	20%	57%
57	1	3.36	30%	20%	6%
58	1	3.70	27%	20%	5%
59	3	3.07	98%	20%	20%
60	10	3.35	299%	20%	60%
61	4	1.30	308%	20%	62%
62	1	1.35	74%	50%	37%
63	1	0.79	127%	50%	64%
64	0	0.00	N/A	50%	N/A
65	0	0.00	N/A	100%	N/A
66	0	0.27	0%	100%	0%
67	0	1.00	0%	100%	0%
68	1	1.23	81%	100%	81%
69	0	0.00	N/A	100%	N/A
70 +	0	0.00	N/A	100%	N/A
Total	179	147.77	121%		

Retirement *(continued)*

2002-2003 Retirements

Age	Actual	Expected	Actual/ Expected	Expected Percent	Actual Percent
50	2	0.62	320%	2%	6%
51	1	0.51	195%	2%	4%
52	2	0.42	480%	2%	10%
53	0	0.33	0%	2%	0%
54	1	4.87	21%	20%	4%
55	11	13.97	79%	60%	47%
56	6	1.72	348%	20%	70%
57	0	0.34	0%	20%	0%
58	0	0.84	0%	20%	0%
59	1	0.74	135%	20%	27%
60	0	0.34	0%	20%	0%
61	0	0.06	0%	20%	0%
62	0	0.57	0%	50%	0%
63	0	0.29	0%	50%	0%
64	0	0.00	N/A	50%	N/A
65	0	0.00	N/A	100%	N/A
66	0	0.00	N/A	100%	N/A
67	0	0.00	N/A	100%	N/A
68	0	0.00	N/A	100%	N/A
69	0	0.00	N/A	100%	N/A
70 +	0	0.00	N/A	100%	N/A
Total	24	25.62	94%		

Retirement *(continued)*

2001-2002 Retirements

Age	Actual	Expected	Actual/ Expected	Expected Percent	Actual Percent
50	1	0.56	178%	2%	4%
51	2	0.46	430%	2%	9%
52	3	0.41	738%	2%	15%
53	2	0.53	376%	2%	8%
54	2	4.39	46%	20%	9%
55	16	17.09	94%	60%	56%
56	2	0.76	265%	20%	53%
57	0	0.84	0%	20%	0%
58	0	0.73	0%	20%	0%
59	1	0.54	184%	20%	37%
60	1	0.26	385%	20%	77%
61	0	0.23	0%	20%	0%
62	0	0.29	0%	50%	0%
63	0	0.00	N/A	50%	N/A
64	0	0.00	N/A	50%	N/A
65	0	0.00	N/A	100%	N/A
66	0	0.00	N/A	100%	N/A
67	0	0.00	N/A	100%	N/A
68	0	0.00	N/A	100%	N/A
69	0	0.00	N/A	100%	N/A
70 +	0	0.00	N/A	100%	N/A
Total	30	27.09	111%		

Retirement *(continued)*

2000-2001 Retirements

Age	Actual	Expected	Actual/ Expected	Expected Percent	Actual Percent
50	0	0.47	0%	2%	0%
51	3	0.46	650%	2%	13%
52	2	0.57	350%	2%	7%
53	2	0.48	419%	2%	8%
54	1	5.20	19%	20%	4%
55	18	16.20	111%	60%	67%
56	5	1.84	272%	20%	55%
57	0	0.73	0%	20%	0%
58	0	0.54	0%	20%	0%
59	1	0.56	179%	20%	36%
60	2	0.86	231%	20%	46%
61	1	0.31	318%	20%	65%
62	0	0.00	N/A	50%	N/A
63	0	0.00	N/A	50%	N/A
64	0	0.00	N/A	50%	N/A
65	0	0.00	N/A	100%	N/A
66	0	0.00	N/A	100%	N/A
67	0	0.00	N/A	100%	N/A
68	0	0.00	N/A	100%	N/A
69	0	0.00	N/A	100%	N/A
70 +	0	0.00	N/A	100%	N/A
Total	35	28.22	124%		

Retirement *(continued)*

1999-2000 Retirements

Age	Actual	Expected	Actual/ Expected	Expected Percent	Actual Percent
50	1	0.46	218%	2%	4%
51	4	0.62	630%	2%	13%
52	3	0.55	549%	2%	11%
53	3	0.58	517%	2%	10%
54	4	5.54	72%	20%	14%
55	15	17.09	88%	60%	53%
56	1	0.97	104%	20%	21%
57	1	0.75	133%	20%	27%
58	1	0.62	162%	20%	33%
59	0	0.98	0%	20%	0%
60	1	0.41	244%	20%	49%
61	2	0.40	500%	20%	100%
62	0	0.00	N/A	50%	N/A
63	0	0.00	N/A	50%	N/A
64	0	0.00	N/A	50%	N/A
65	0	0.00	N/A	100%	N/A
66	0	0.00	N/A	100%	N/A
67	0	0.27	0%	100%	0%
68	0	0.23	0%	100%	0%
69	0	0.00	N/A	100%	N/A
70 +	0	0.00	N/A	100%	N/A
Total	36	29.47	122%		

Retirement *(continued)*

1998-1999 Retirements

Age	Actual	Expected	Actual/ Expected	Expected Percent	Actual Percent
50	0	0.59	0%	2%	0%
51	2	0.60	331%	2%	7%
52	1	0.60	167%	2%	3%
53	2	0.61	329%	2%	7%
54	7	6.47	108%	20%	22%
55	25	19.73	127%	60%	76%
56	7	2.05	342%	20%	68%
57	0	0.70	0%	20%	0%
58	0	0.98	0%	20%	0%
59	0	0.24	0%	20%	0%
60	6	1.47	408%	20%	82%
61	1	0.30	333%	20%	67%
62	1	0.50	200%	50%	100%
63	1	0.50	200%	50%	100%
64	0	0.00	N/A	50%	N/A
65	0	0.00	N/A	100%	N/A
66	0	0.27	0%	100%	0%
67	0	0.73	0%	100%	0%
68	1	1.00	100%	100%	100%
69	0	0.00	N/A	100%	N/A
70 +	0	0.00	N/A	100%	N/A
Total	54	37.34	145%		

Disability

Basis of Analysis

The disability rates specify the assumed probability that a given employee will become disabled within the following year. The Minnesota State Retirement System State Patrol Retirement Fund currently uses an age-related disability table.

Historical Data

During the five years from 1998 through 2003, there were fewer disabilities than expected (9 actual versus 12 expected).

Because the sample group is small, results for the five-year period are shown in the aggregate.

Disability *(continued)*

1998-2003 Disabilities

Age	Actual	Expected	Actual/Expected
20 - 24	0	0.03	0%
25 - 29	0	0.26	0%
30 - 34	0	0.55	0%
35 - 39	1	0.98	102%
40 - 44	1	1.76	57%
45 - 49	2	2.64	76%
50 - 54	3	4.00	75%
55 - 59	2	1.51	133%
60 - 64	0	0.21	0%
65 +	0	0.00	N/A
	9	11.94	75%

Active Mortality

Basis of Analysis

The active mortality rates specify the assumed probability that a given employee will die in the following year. Currently, the Minnesota State Retirement System State Patrol Retirement Fund uses the 1983 Group Annuity Table with a one year set back for males and with no set back for females.

Historical Data

During the five years from 1998 though 2003, the number of actual deaths was less than expected. Unfortunately, this small sampling does not represent enough data to make a reasonable analysis of mortality rates. Using standard mortality tables usually represents the best estimate for future experience over the long term.

Because the sample group is small, results for the five-year period are shown in the aggregate.

Active Mortality *(continued)*

1998-2003 Active Mortality

		Male			Female	
Age	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	0	.02	0%	0	.00	N/A
25-29	0	.17	0%	0	.01	0%
30-34	1	.33	300%	0	.03	0%
35-39	1	.58	172%	0	.05	0%
40-44	1	1.01	99%	0	.06	0%
45-49	0	1.69	0%	0	.05	0%
50-54	1	2.60	38%	0	.04	0%
55-59	1	.90	112%	0	.02	0%
60-64	0	.13	0%	0	.00	N/A
65+	1	.04	2,348%	0	.00	N/A
Total	6	7.47	80%	0	.26	0%

Retiree and Beneficiary Mortality

Basis of Analysis

The post-retirement mortality rates specify the assumed probability that a given retiree or beneficiary will die in the following year. Currently, the Minnesota State Retirement State Patrol Retirement Fund uses the 1983 Group Annuity Mortality Table set forward two years for post-retirement mortality for both males and females.

Historical Data

During the five years from 1998 through 2003, actual deaths were consistently less than the expected number. The experience was similar for males and females.

Retiree and Beneficiary Mortality *(continued)*

1998-2003 Retiree and Beneficiary Mortality

| Age | Male | | | Female | | |
	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	2	0.00	N/A	0	0.00	N/A
25-29	0	0.00	N/A	1	0.00	N/A
30-34	0	0.00	N/A	0	0.00	N/A
35-39	0	0.00	N/A	0	0.00	N/A
40-44	0	0.00	N/A	0	0.01	0%
45-49	0	0.00	N/A	0	0.02	0%
50-54	0	0.63	0%	0	0.06	0%
55-59	2	5.08	39%	1	0.21	473%
60-64	3	6.96	43%	0	0.24	0%
65-69	6	9.89	61%	1	0.94	106%
70-74	14	19.33	72%	1	2.79	36%
75-79	18	24.29	74%	1	4.27	23%
80-84	14	22.36	63%	3	8.06	37%
85-89	7	10.85	65%	7	9.43	74%
90-94	3	5.01	60%	11	7.52	146%
95-99	0	0.32	0%	3	4.57	66%
100+	0	0.00	N/A	1	1.19	84%
Total	69	104.72	66%	30	39.31	76%

Retiree and Beneficiary Mortality (continued)

2002-2003 Retiree and Beneficiary Mortality

		Male			Female	
Age	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	0	0.00	N/A	0	0.00	N/A
25-29	0	0.00	N/A	0	0.00	N/A
30-34	0	0.00	N/A	0	0.00	N/A
35-39	0	0.00	N/A	0	0.00	N/A
40-44	0	0.00	N/A	0	0.00	N/A
45-49	0	0.00	N/A	0	0.00	N/A
50-54	0	0.17	0%	0	0.01	0%
55-59	0	1.11	0%	0	0.06	0%
60-64	0	1.62	0%	0	0.06	0%
65-69	1	2.04	49%	0	0.15	0%
70-74	1	3.45	29%	0	0.62	0%
75-79	5	5.60	89%	0	0.87	0%
80-84	3	4.54	66%	2	1.70	118%
85-89	5	3.76	133%	0	1.67	0%
90-94	0	1.03	0%	2	1.21	166%
95-99	0	0.27	0%	1	1.35	74%
100+	0	0.00	N/A	0	0.00	N/A
Total	15	23.59	64%	5	7.70	65%

2001-2002 Retiree and Beneficiary Mortality

		Male			Female	
Age	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	1	0.00	N/A	0	0.00	N/A
25-29	0	0.00	N/A	0	0.00	N/A
30-34	0	0.00	N/A	0	0.00	N/A
35-39	0	0.00	N/A	0	0.00	N/A
40-44	0	0.00	N/A	0	0.00	N/A
45-49	0	0.00	N/A	0	0.00	N/A
50-54	0	0.17	0%	0	0.01	0%
55-59	1	1.12	90%	1	0.05	1,931%
60-64	0	1.49	0%	0	0.04	0%
65-69	2	2.01	99%	1	0.20	499%
70-74	1	3.56	28%	1	0.62	163%
75-79	2	5.11	39%	1	0.80	126%
80-84	3	4.69	64%	1	1.69	59%
85-89	1	2.86	35%	3	1.93	156%
90-94	0	0.85	0%	6	1.78	337%
95-99	0	0.06	0%	0	1.10	0%
100+	0	0.00	N/A	1	0.58	171%
Total	11	21.92	50%	15	8.80	170%

Retiree and Beneficiary Mortality *(continued)*

2000-2001 Retiree and Beneficiary Mortality

| | | Male | | | Female | |
| | | | Actual/ | | | Actual/ |
Age	Actual	Expected	Expected	Actual	Expected	Expected
20-24	1	0.00	N/A	0	0.00	N/A
25-29	0	0.00	N/A	0	0.00	N/A
30-34	0	0.00	N/A	0	0.00	N/A
35-39	0	0.00	N/A	0	0.00	N/A
40-44	0	0.00	N/A	0	0.00	N/A
45-49	0	0.00	N/A	0	0.00	N/A
50-54	0	0.13	0%	0	0.01	0%
55-59	1	1.05	95%	0	0.04	0%
60-64	2	1.38	145%	0	0.04	0%
65-69	0	1.95	0%	0	0.21	0%
70-74	4	3.89	103%	0	0.59	0%
75-79	5	4.78	105%	0	0.89	0%
80-84	2	4.66	43%	0	1.43	0%
85-89	1	2.01	50%	2	2.33	86%
90-94	1	1.09	91%	1	1.48	68%
95-99	0	0.00	N/A	1	0.79	127%
100+	0	0.00	N/A	0	0.38	0%
Total	17	20.94	81%	4	8.19	49%

1999-2000 Retiree and Beneficiary Mortality

| | | Male | | | Female | |
| | | | Actual/ | | | Actual/ |
Age	Actual	Expected	Expected	Actual	Expected	Expected
20-24	0	0.00	N/A	0	0.00	N/A
25-29	0	0.00	N/A	0	0.00	N/A
30-34	0	0.00	N/A	0	0.00	N/A
35-39	0	0.00	N/A	0	0.00	N/A
40-44	0	0.00	N/A	0	0.00	N/A
45-49	0	0.00	N/A	0	0.00	N/A
50-54	0	0.10	0%	0	0.01	0%
55-59	0	0.94	0%	0	0.03	0%
60-64	0	1.27	0%	0	0.05	0%
65-69	1	1.88	53%	0	0.19	0%
70-74	5	4.25	118%	0	0.53	0%
75-79	2	4.52	44%	0	0.88	0%
80-84	3	4.33	69%	0	1.62	0%
85-89	0	1.21	0%	1	1.89	53%
90-94	1	1.15	87%	1	1.53	65%
95-99	0	0.00	N/A	0	0.56	0%
100+	0	0.00	N/A	0	0.23	0%
Total	12	19.65	61%	2	7.52	27%

Retiree and Beneficiary Mortality *(continued)*

1998-1999 Retiree and Beneficiary Mortality

	Male			Female		
Age	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	0	0.00	N/A	0	0.00	N/A
25-29	0	0.00	N/A	1	0.00	N/A
30-34	0	0.00	N/A	0	0.00	N/A
35-39	0	0.00	N/A	0	0.00	N/A
40-44	0	0.00	N/A	0	0.00	N/A
45-49	0	0.00	N/A	0	0.00	N/A
50-54	0	0.07	0%	0	0.02	0%
55-59	0	0.86	0%	0	0.02	0%
60-64	1	1.20	84%	0	0.04	0%
65-69	2	2.01	100%	0	0.19	0%
70-74	3	4.19	72%	0	0.44	0%
75-79	4	4.28	93%	0	0.83	0%
80-84	3	4.13	73%	0	1.62	0%
85-89	0	1.01	0%	1	1.63	62%
90-94	1	0.89	113%	1	1.52	66%
95-99	0	0.00	N/A	1	0.77	130%
100+	0	0.00	N/A	0	0.00	N/A
Total	14	18.64	75%	4	7.08	56%

Disability Retiree Mortality

Basis of Analysis

The post-disability mortality rates specify the assumed probability that a given disability retiree will die in the following year. Currently, the Minnesota State Retirement System State Retirement Fund uses the Combined Annuity Mortality table for post-disability mortality.

Historical Data

During the five years from 1998 through 2003, the actual number of disability retiree deaths was less than expected (2 actual versus 4 expected). As with the active mortality, not enough data exists to perform a meaningful analysis.

Because the sample group is small, results for the five-year period are shown in the aggregate.

Disability Retiree Mortality *(continued)*

1998-2003 Disability Retiree Mortality

Age	Actual	Expected	Actual/ Expected
20-24	0	0.00	N/A
25-29	0	0.00	N/A
30-34	0	0.00	N/A
35-39	0	0.01	0%
40-44	0	0.02	0%
45-49	0	0.20	0%
50-54	0	0.20	0%
55-59	1	0.53	189%
60-64	0	0.35	0%
65-69	1	0.46	217%
70-74	0	0.78	0%
75-79	0	0.96	0%
80-84	0	0.08	0%
85-89	0	0.00	N/A
90-94	0	0.00	N/A
95-99	0	0.00	N/A
100+	0	0.00	N/A
Total	2	3.59	56%

Salary Scale

Basis of Analysis

Salary increases are derived from three sources:

- Inflation
- General productivity
- Merit and promotion increases

For any given year, the correlation of salary increases with inflation is seldom perfect. However, over several years, especially with consistent inflation during those years, salary increases usually show a fairly clear inflation component, normally with a slight lag between inflation and salary growth. Merit and promotion increases are usually inversely correlated with age. That is, average salary increases are usually higher as a percentage for younger employees in most groups.

Currently, for the State Patrol Retirement Fund, an age-related salary increase assumption with rates ranging from 7.75% at age 20 to 5.25% at ages 55 and higher is used.

Historical Data

We reviewed the salary data by both age and service. The first table on the next page shows, by five-year age groups, the average salary increase over the entire study period and the average salary increase for each year in the study period. As expected, higher increases occur at the younger ages. Actual salary increases were less than assumed during the 5-year period for members over age 30, and were more than assumed for members less than age 30.

The second table shows the salary experience by service groups. Generally, salary increases decreased as service increased, and stabilized after 10 years of service.

For the salary analysis, we excluded members whose pay increased or decreased 20% or more. While this was a relatively small group, their salary increases distorted the experience of the overall group of continuing active participants.

Salary Scale by Age

	Average Salary Increases										
Years	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total
1998-1999	17.2%	11.8%	6.8%	5.9%	5.5%	3.4%	3.9%	0.4%	4.1%	0.4%	5.0%
1999-2000	14.1%	10.1%	9.6%	8.2%	8.0%	8.5%	8.0%	7.7%	8.0%	N/A	8.5%
2000-2001	4.2%	2.7%	1.2%	0.2%	0.8%	0.3%	0.3%	1.3%	3.6%	N/A	0.8%
2001-2002	10.1%	3.6%	2.5%	1.8%	1.1%	0.7%	1.4%	(0.3%)	(5.9%)	N/A	1.6%
2002-2003	13.2%	13.5%	11.8%	12.7%	12.0%	11.3%	10.2%	11.5%	9.5%	N/A	11.8%
All Years	11.7%	8.2%	6.3%	5.7%	5.4%	4.8%	4.7%	4.0%	3.7%	0.4%	5.5%
Expected	7.3%	7.0%	7.0%	6.8%	6.2%	5.6%	5.4%	5.3%	5.3%	5.3%	
Difference	4.4%	1.2%	(0.7%)	(1.1%)	(0.8%)	(0.8%)	(0.7%)	(1.3%)	(1.6%)	(4.9%)	

Salary Scale by Service

	Average Salary Increases								
Years	<2	3	4	5-9	10-14	15-19	20-24	25-29	30+
1998-1999	14.0%	6.4%	13.7%	5.7%	4.3%	4.4%	3.2%	4.0%	3.3%
1999-2000	12.8%	9.5%	10.4%	9.2%	7.3%	7.3%	8.3%	8.5%	5.7%
2000-2001	3.8%	2.6%	0.9%	2.0%	(0.9%)	0.1%	0.0%	0.6%	1.3%
2001-2002	4.9%	2.9%	3.4%	2.3%	0.3%	1.0%	0.3%	2.2%	(0.9%)
2002-2003	14.5%	12.3%	12.4%	13.1%	11.8%	11.4%	10.9%	8.4%	8.6%
All Years	9.9%	6.7%	8.0%	6.4%	4.5%	4.8%	4.4%	4.7%	3.5%
Expected	7.0%	7.0%	7.0%	7.0%	6.5%	6.3%	5.6%	5.4%	5.3%
Difference	2.9%	(0.3%)	1.0%	(0.6%)	(2.0%)	(1.5%)	(1.2%)	(0.7%)	(1.8%)

Investment Return

Basis of Analysis

The investment return assumption for funding is set to reflect long-term asset performance. It is based upon anticipated earnings on funds needed to provide all projected future benefits for current members, including future contributions.

Consistency and reasonableness between the investment return and salary scale assumption are important to produce valid costs. The inflation component of each assumption should be consistent. The investment return assumption consists of the inflation component and a real rate of return.

Currently, the Minnesota State Retirement System State Patrol Retirement Fund uses an 8.50% investment return assumption.

Historical Data and Analysis

Returns in excess of the 8.50% target were achieved in fiscal years ending June 30, 1999 and 2000, but fell short in the following three years. The average return over the 5-year period was just over 1%.

To evaluate the investment return assumptions, we must consider forecasted inflation as well as forecasted real rates of return on assets. Mercer investment consultants forecast these values on a regular basis reflecting the latest thinking on the economy and the outlook for capital markets.

Using Mercer investment assumptions and model for calculating portfolio returns and the target asset allocation on the next page, we feel the plan can substantiate an investment return between 5.5% and 9.25% with the expected return about 7.45%. Mercer's best practice is to choose the most appropriate assumption that falls between the 25th and 75th percentile. Choosing a rate too close to the edge of the range can result in the need to change the assumption too frequently, causing volatility in pension contribution results. The current 8.5% investment return assumption is at the 65th percentile.

Percentile	Active Fund	MPRIF	Total
25th	5.58%	5.63%	5.60%
50th	7.37%	7.52%	7.45%
75th	9.17%	9.42%	9.30%

On the following page, the target asset allocations for the active and post funds are shown.

Investment Return *(continued)*

Target Asset Allocations

	Active Fund	MPRIF
Domestic Stocks	45%	50%
International Stocks	15%	15%
Bonds	24%	27%
Alternative Assets*	15%	5%
Cash	1%	3%
	100%	100%

* Alternative assets include real estate, venture capital, and resource (oil, gas, etc.) funds.

Summary of Observations

The following summarizes the results of the experience study covering the period from
July 1, 1998 through June 30, 2003 and indicates where assumption changes will be considered:

Withdrawal

Actual withdrawals were 68% of expected, although for members with more than three years of experience,
actual withdrawals were only 42% of expected while actual withdrawals were 212% of expected for members
with less than three years of service. The rates should be adjusted to better reflect actual experience.

Retirement

Current retirement rates underestimated the number of retirements and did not properly anticipate the number
of early retirements. Rates should be updated to reflect early retirement benefit improvements and actual
experience.

Disability

The actual number of disability retirements was less than assumed. The current rates reasonably reflect actual
experience.

Active and Disability Retiree Mortality

The sample group is not large enough to perform a meaningful analysis. Standard mortality tables represent
the most likely probabilities.

Retiree and Beneficiary Mortality

Actual deaths were consistently less than expected. Mortality rates should be updated to reflect actual
experience.

Salary Scale and Investment Return

Actual salary increases were lower than expected for members over age 30, and were greater than expected
for members under age 30. Rates should be adjusted to better fit actual experience.

The current investment return assumption of 8.50% falls within a reasonable range. However, it would be
appropriate to jointly review the economic assumptions, particularly the inflation component.

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