

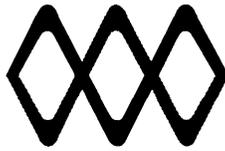
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Teachers Retirement Association Fund
ACTUARIAL VALUATION REPORT

July 1, 1998



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December 7, 1998

Legislative Commission on
Pensions and Retirement
55 State Office Building
St. Paul, Minnesota 55155

RE: Teachers Retirement Association Fund

Commission Members:

Pursuant to the terms of our Actuarial Services Contract, we have performed an actuarial valuation of the Fund as of July 1, 1998.

The results of our calculations are set forth in the following report, as are the actuarial assumptions upon which our calculations have been made. We have relied on the basic employee data and asset figures as submitted by the Teachers Retirement Association.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with the requirements of Section 356.215, Minnesota Statutes, and the requirements of the Standards for Actuarial Work, adopted by the Commission.

Respectfully submitted,

MILLIMAN & ROBERTSON, INC.

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Teachers Retirement Association Fund

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Teachers Retirement Association Fund

Report Highlights

(dollars in thousands)

	07/01/97 Valuation	07/01/98 Valuation
A. CONTRIBUTIONS (Table 11)		
1. Statutory Contributions - Chapter 354 % of Payroll	11.64%	10.00% *
2. Required Contributions - Chapter 356 % of Payroll	9.85%	9.82%
3. Sufficiency (Deficiency): (A.1. - A.2.)	1.79%	0.18% *
B. FUNDING RATIOS		
1. Accrued Benefit Funding Ratio		
a. Current Assets (Table 1)	\$11,103,759	\$12,727,546
b. Current Benefit Obligations (Table 8)	\$10,262,081	\$11,332,467
c. Funding Ratio: (a/b)	108.20%	112.31%
2. Accrued Liability Funding Ratio		
a. Current Assets (Table 1)	\$11,103,759	\$12,727,546
b. Actuarial Accrued Liability (Table 9)	\$10,963,637	\$12,046,312
c. Funding Ratio: (a/b)	101.28%	105.66%
3. Projected Benefit Funding Ratio (Table 8)		
a. Current and Expected Future Assets	\$14,067,718	\$15,134,315
b. Current and Expected Future Benefit Obligations	\$13,231,366	\$14,382,569
c. Funding Ratio: (a/b)	106.32%	105.23%
C. PLAN PARTICIPANTS		
1. Active Members		
a. Number (Table 3)	68,554	68,247
b. Projected Annual Earnings	\$2,475,599	\$2,569,368
c. Average Annual Earnings (Actual \$)	\$36,112	\$37,648
d. Average Age	43.1	43.1
e. Average Service	12.6	12.5
2. Others		
a. Service Retirements (Table 4)	23,678	25,088
b. Survivors (Table 5)	1,578	1,686
c. Disability Retirements (Table 6)	425	454
d. Deferred Retirements (Table 7)	6,356	6,924
e. Terminated Other Non-vested (Table 7)	16,653	16,827
f. Total	48,690	50,979

* Decrease in statutory contributions by 1.64% has decreased the sufficiency by a like amount.

Teachers Retirement Association Fund

Commentary

Purpose

The purpose of this valuation is to determine the financial status of the Plan. In order to achieve this purpose, an actuarial valuation is made at the beginning of each fiscal year as required by Section 356.215 of Minnesota Statutes.

Report Highlights

The financial status of the Plan can be measured by three different funding ratios:

- The Accrued Benefit Funding Ratio is a measure of current funding status and, when viewed over a period of years, presents a view of the funding progress. It is based upon benefits which have been earned by service to the valuation date. This year's ratio is 112.31%. The corresponding ratio for the prior year was 108.20%
- The Accrued Liability Funding Ratio is also a measure of funding status and funding progress. It is based on the actuarial cost method that has historically been used by the State. For 1998 the ratio is 105.66%, which is an increase from the 1997 value of 101.28%.
- The Projected Benefit Funding Ratio is a measure of the adequacy or deficiency in the contribution level. This year's ratio of 105.23% verifies that the current statutory contributions are sufficient.

Asset Information (Tables 1 and 2)

Minnesota Statutes require that the asset value used for actuarial purposes recognize only a third of the unrealized gains and losses. This requirement exists because market values

(which include all unrealized gain and losses) are typically volatile and can produce erratic changes in the contribution requirements from year to year.

The calculation of the Actuarial Value of Assets is shown in Table 1 on lines E1 to E6. It combines the cost value of the Assets Available for benefits and one-third of the difference between the market value and cost value of those assets.

The term “Actuarial Value of Assets” is used to indicate that the value was determined for use in this actuarial valuation. Since Minnesota Statutes refer to this value as “Current Assets”, the latter phrase will be used in the remainder of this report.

This Plan participates in the Minnesota Post Retirement Investment Fund (i.e., MPRIF). After the MPRIF liability has been calculated for each participating Plan, the State Board of Investments, (i.e., SBI) will determine each Plan’s portion of the excess earnings for the January benefit increase as well as the Plan’s allocated market share of MPRIF.

Actuarial Balance Sheet (Table 8)

An actuarial balance sheet provides a method for evaluating current and future levels of funding.

The Current Benefit Obligation used to measure current funding levels is calculated as follows:

- For Active Members – Salary and service are projected to retirement to determine benefits for each member and the ratio of credited service to total service establishes the portion of the projected benefit to be used in calculating the current funding level.

- For Non-Active Members – The discounted value of benefits, including augmentation in cases where benefits have not commenced.

Actuarial Cost Method (Table 9)

The approach used by the State of Minnesota to determine contribution sufficiency is the Entry Age Normal Actuarial Cost Method. The primary characteristic of this method is that it allocates costs as a level percentage of payroll.

A comparison of this actuarial method (Table 9) to the actuarial balance sheet (Table 8) illustrates the two techniques for allocating liabilities of active Members to past and future. As noted in the prior section, the balance sheet allocates benefits and corresponding liabilities, on the basis of service. The method used in Table 9 allocates liabilities so that the cost each year will be a constant percentage of payroll. Both approaches, however, calculate the value of all future benefits the same way (see line F of Table 8 and line A6, column 1, of Table 9).

An Unfunded Actuarial Accrued Liability is computed under the Entry Age Normal Actuarial Cost Method by comparing the liabilities allocated to past service (Actuarial Accrued Liability) to the Current Assets. This amount, line B3, is funded over the remaining years to the amortization date by a series of payments that remain a constant percentage of payroll each year.

Source of Actuarial Gains and Losses (Table 10)

The assumptions used in making the calculations using the Entry Age Normal Actuarial Cost Method are based on long-term expectations. Each year the actual experience will deviate from the long-term expectations. For a detailed analysis of the major components, refer to Table 10.

Contribution Sufficiency (Table 11)

This report determines the adequacy of Statutory Contributions by comparing the Statutory Contributions to the Required Contributions.

The Required Contributions, set forth in Chapter 356, consist of:

- Normal costs based on the Entry Age Normal Actuarial Cost Method.
- A Supplemental Contribution for amortizing any Unfunded Actuarial Accrued Liability.
- An Allowance for Expenses.

Table 11 shows the Plan has a contribution sufficiency since the Statutory Contribution Rate is 10.00% compared to the Required Contribution Rate of 9.82%.

Changes in Actuarial Assumptions

There were no changes in actuarial assumptions since the last valuation.

Changes in Plan Provisions

There were no changes in the plan provisions which affected plan costs for the current valuation.

Statutory contribution rates for employers are reduced from last year reflecting the removal of any supplemental contribution requirement.

TABLE 1

Teachers Retirement Association Fund

Statement of Plan Net Assets*(dollars in thousands)*

JULY 1, 1998

	<u>Market Value</u>	<u>Cost Value</u>
A. ASSETS IN TRUST		
1. Cash, Equivalents, Short-term Securities	\$78,602	\$78,602
2. Fixed Income	1,750,748	1,733,587
3. Equity	5,766,088	4,774,823
4. Real Estate	306,444	242,618
5. Equity in MPRIF	5,570,230	5,570,230
6. Invested Securities Lending Collateral	1,484,023	1,484,023
7. Other	1,085	1,085
Subtotal	<u>\$14,957,220</u>	<u>\$13,884,968</u>
B. ASSETS RECEIVABLE	23,243	23,243
C. LIABILITIES		
1. Invested Securities Lending Collateral	(1,484,023)	(1,484,023)
2. Other	(54,059)	(54,059)
Subtotal	<u>(1,538,082)</u>	<u>(1,538,082)</u>
D. NET ASSETS HELD IN TRUST FOR PENSION BENEFITS		
1. MPRIF Reserves	5,570,230	5,570,230
2. Member Reserves	1,303,006	1,303,006
3. Other Non-MPRIF Reserves	6,569,145	5,496,893
4. Total Assets Available for Benefits	<u>\$13,442,381</u>	<u>\$12,370,129</u>
<hr/>		
E. DETERMINATION OF ACTUARIAL VALUE OF ASSETS		
1. Cost Value of Assets Available for Benefits (D4)		\$12,370,129
2. Market Value (D4)	\$13,442,381	
3. Cost Value (D4)	<u>12,370,129</u>	
4. Market Over Cost: (E2-E3)	\$1,072,252	
5. One-third of Market Over Cost: (E4)/3		357,417
6. Actuarial Value of Assets (E1+E5) (Same as "Current Assets")		<u>\$12,727,546</u>

TABLE 2

Teachers Retirement Association Fund

Statement of Change In Plan Net Assets
(dollars in thousands)

YEAR ENDING JUNE 30, 1998

	<u>Market Value</u>	<u>Cost Value</u>
A. ASSETS AVAILABLE AT BEGINNING OF PERIOD	\$11,503,009	\$10,904,134
B. ADDITIONS		
1. Member Contributions	\$124,096	\$124,096
2. Employer Contributions	151,323	151,323
3. Contributions From Other Sources	0	0
4. MPRIF Income	730,940	730,940
5. Net Investment Income		
a. Interest and Dividends	839,585	839,585
b. Net Realized Gain (Loss)	175,732	175,732
c. Net Change in Unrealized Gain (Loss)	473,377	0
d. Investment Expenses	<u>(10,827)</u>	<u>(10,827)</u>
Net Subtotal	1,477,867	1,004,490
6. Other	1,330	1,330
7. Total Additions	<u>\$2,485,556</u>	<u>\$2,012,179</u>
C. OPERATING EXPENSES		
1. Service Retirements paid from MPRIF	\$514,701	\$514,701
2. Service Retirements paid from plan assets	2,307	2,307
2. Disability Benefits	7,815	7,815
3. Survivor Benefits	9,028	9,028
4. Refunds	5,689	5,689
6. Administrative Expenses	5,417	5,417
7. Other	<u>1,227</u>	<u>1,227</u>
8. Total Disbursements	<u>\$546,184</u>	<u>\$546,184</u>
D. OTHER CHANGES IN RESERVES	0	0
E. ASSETS AVAILABLE AT END OF PERIOD	<u>\$13,442,381</u>	<u>\$12,370,129</u>

TABLE 3

TEACHERS RETIREMENT ASSOCIATION FUND
ACTIVE MEMBERS AS OF JUNE 30, 1998

Age	Years of Service								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	1,523	158	1	0	0	0	0	0	1,682
25-29	1,705	5,786	556	0	0	0	0	0	8,047
30-34	935	2,640	3,750	281	0	0	0	0	7,606
35-39	827	1,493	2,317	2,509	198	0	0	0	7,344
40-44	743	1,830	1,519	1,625	2,437	589	0	0	8,743
45-49	804	1,709	1,701	1,751	1,808	3,814	1,088	1	12,676
50-54	443	1,070	1,129	1,245	1,245	1,811	4,835	699	12,477
55-59	198	557	480	529	716	865	1,918	2,135	7,398
60-64	148	179	162	186	175	260	411	366	1,887
65+	99	98	33	30	17	26	37	47	387
ALL	7,425	15,520	11,648	8,156	6,596	7,365	8,289	3,248	68,247

AVERAGE ANNUAL EARNINGS

Age	Years of Service								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	18,290	25,950	1,862	0	0	0	0	0	19,000
25-29	16,002	25,177	32,289	0	0	0	0	0	23,724
30-34	14,869	25,410	32,819	37,988	0	0	0	0	28,232
35-39	14,313	24,225	32,638	40,262	42,789	0	0	0	31,743
40-44	12,874	23,023	33,214	40,412	43,867	47,616	0	0	34,630
45-49	12,156	22,002	32,846	40,491	44,555	47,831	48,837	46,198	38,680
50-54	12,019	21,329	32,150	40,817	44,288	49,023	50,561	51,617	43,257
55-59	10,658	15,890	27,673	39,265	44,617	48,640	52,967	53,166	45,166
60-64	8,535	10,923	22,707	32,746	41,819	49,213	54,783	55,484	40,236
65+	6,186	10,765	20,565	34,672	44,573	46,078	55,713	53,972	25,685
ALL	14,751	23,675	32,358	40,091	44,132	48,245	51,124	53,103	35,510

PRIOR FISCAL YEAR EARNINGS (IN MILLIONS) BY YEARS OF SERVICE

Age	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	ALL
All	110	367	377	327	291	355	424	173	2,424

TEACHERS RETIREMENT ASSOCIATION FUND

SERVICE RETIREMENTS AS OF JUNE 30, 1998

<u>Age</u>	<u>YEARS RETIRED</u>							<u>ALL</u>
	<u><1</u>	<u>1-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25+</u>	
<50	0	0	0	0	0	0	0	0
50-54	13	14	0	0	0	0	0	27
55-59	970	1,212	27	0	0	0	0	2,209
60-64	763	3,137	1,602	17	0	0	0	5,519
65-69	202	1,671	2,793	1,020	4	0	0	5,690
70-74	18	225	1,508	1,987	445	1	0	4,184
75-79	2	17	227	1,485	1,058	172	2	2,963
80-84	0	2	17	177	1,283	611	75	2,165
85+	0	0	1	5	60	1,408	857	2,331
ALL	1,968	6,278	6,175	4,691	2,850	2,192	934	25,088

AVERAGE ANNUAL BENEFIT

<u>Age</u>	<u>YEARS RETIRED</u>							<u>ALL</u>
	<u><1</u>	<u>1-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25+</u>	
<50	0	14,715	0	0	0	0	0	0
50-54	22,715	20,223	8,885	0	0	0	0	21,423
55-59	27,343	24,802	20,423	24,782	0	0	0	25,864
60-64	25,279	28,968	28,429	20,749	0	0	0	28,276
65-69	20,585	20,995	23,352	20,117	19,234	0	0	21,979
70-74	15,632	19,547	19,953	23,248	15,227	18,946	0	20,975
75-79	2,346	11,096	19,171	20,630	19,717	11,198	17,583	19,575
80-84	0	1,096	9,372	17,756	19,510	16,503	6,405	17,968
85+	0	0	929	5,035	16,478	15,676	8,654	13,086
ALL	25,686	25,627	23,631	21,503	18,854	15,557	8,493	22,082

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS RETIRED

<u>Age</u>	<u><1</u>	<u>1-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25+</u>	<u>ALL</u>
All	50,550	160,886	145,921	100,871	53,734	34,101	7,933	553,993

TEACHERS RETIREMENT ASSOCIATION FUND

SURVIVORS AS OF JUNE 30, 1998

<u>Age</u>	<u>YEARS SINCE DEATH</u>							<u>ALL</u>
	<u><1</u>	<u>1-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25+</u>	
<50	4	55	9	3	1	0	0	72
50-54	8	45	8	2	0	0	0	63
55-59	17	72	29	3	2	2	1	126
60-64	28	104	69	16	5	2	1	225
65-69	16	116	96	47	21	4	5	305
70-74	30	108	110	73	14	5	5	345
75-79	14	115	81	55	28	14	7	314
80-84	7	37	42	26	17	10	12	151
85+	3	21	13	13	18	8	9	85
ALL	127	673	457	238	106	45	40	1,686

AVERAGE ANNUAL BENEFIT

<u>Age</u>	<u>YEARS SINCE DEATH</u>							<u>ALL</u>
	<u><1</u>	<u>1-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25+</u>	
<50	10,875	14,668	7,333	9,712	3,302	0	0	13,176
50-54	16,391	19,841	6,103	1,660	0	0	0	17,081
55-59	17,884	16,754	13,493	13,840	10,415	12,813	4,654	15,827
60-64	19,195	21,112	16,341	17,668	14,380	6,470	10,919	18,840
65-69	23,043	20,320	16,472	15,130	18,440	19,544	5,759	18,074
70-74	18,447	17,870	19,698	19,343	23,140	18,492	8,139	18,897
75-79	23,709	18,152	17,292	16,417	22,566	16,852	4,635	17,909
80-84	24,309	15,605	17,808	19,038	21,533	19,528	8,150	17,547
85+	7,971	14,471	16,750	12,581	10,288	10,767	11,016	12,701
ALL	19,403	18,362	16,954	16,980	18,777	16,145	7,861	17,582

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS SINCE DEATH

<u>Age</u>	<u><1</u>	<u>1-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25+</u>	<u>ALL</u>
All	2,464	12,358	7,748	4,041	1,990	727	314	29,643

TEACHERS RETIREMENT ASSOCIATION FUND

DISABILITY RETIREMENTS AS OF JUNE 30, 1998

Age	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	7	45	15	1	0	0	0	68
50-54	7	52	17	8	3	0	0	87
55-59	6	85	36	10	7	2	0	146
60-64	4	50	46	25	6	4	1	136
65-69	0	9	4	2	1	1	0	17
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	24	241	118	46	17	7	1	454

AVERAGE ANNUAL BENEFIT

Age	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	12,116	12,826	7,607	3,023	0	0	0	11,458
50-54	19,498	18,750	12,277	10,256	25,717	0	0	17,004
55-59	18,932	20,199	14,849	12,511	16,924	4,681	0	17,932
60-64	18,103	18,951	24,201	15,499	11,688	11,346	8,767	19,448
65-69	0	22,877	23,286	10,252	16,646	7,597	0	20,223
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	16,971	18,351	17,490	13,438	16,612	8,906	8,767	17,324

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS DISABLED

Age	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
All	407	4,423	2,064	618	282	62	9	7,865

TABLE 7

Teachers Retirement Association Fund

Reconciliation Of Members

	Actives	Terminated	
		Deferred Retirement	Other Non-Vested
A. ON JUNE 30, 1997	68,554	6,356	16,653
B. ADDITIONS	6,721	1,031	3,912
C. DELETIONS			
1. Service Retirement	(1,687)	(422)	0
2. Disability	(7)	0	0
3. Death	(33)	(41)	0
4. Terminated - Deferred	(4,554)	0	0
5. Terminated - Refund	(492)	0	(820)
6. Terminated - Other Non-Vested	0	0	(1,426)
7. Returned as Active	0	0	(1,343)
8. Transferred to Other Fund	0	0	0
D. DATA ADJUSTMENTS	(255)	0	(149)
Vested	52,644		
Non-Vested	15,603		
E. TOTAL ON JUNE 30, 1998	68,247	6,924	16,827
		Recipients	
	Retirement Annuitants	Disabled	Survivors
A. ON JUNE 30, 1997	23,678	425	1,578
B. ADDITIONS	1,972	80	194
C. DELETIONS			
1. Service Retirement	0	(20)	0
2. Death	(561)	(21)	(35)
3. Annuity Expired	(1)	0	(50)
4. Returned as Active	0	(6)	0
D. DATA ADJUSTMENTS	0	(4)	(1)
E. TOTAL ON JUNE 30, 1998	25,088	454	1,686

TABLE 8

Teachers Retirement Association Fund

Actuarial Balance Sheet*(dollars in thousands)*

JULY 1, 1998

A. CURRENT ASSETS (TABLE 1, E6)				\$12,727,546
B. EXPECTED FUTURE ASSETS				
1. Present Value of Expected Future Statutory Supplemental Contributions (See Table 11)				\$70,513
2. Present Value of Future Normal Costs				2,336,257
3. Total Expected Future Assets				<u>\$2,406,770</u>
C. TOTAL CURRENT AND EXPECTED FUTURE ASSETS				<u>\$15,134,316</u>
D. CURRENT BENEFIT OBLIGATIONS	<u>Non-Vested</u>	<u>Vested</u>		<u>Total</u>
1. Benefit Recipients				
a. Retirement Annuities		\$5,362,431		\$5,362,431
b. Disability Benefits		92,839		92,839
c. Surviving Spouse and Child Benefits		228,556		228,556
2. Deferred Retirements with Future Augmentation		352,333		352,333
3. Former Members without Vested Rights		49,425		49,425
4. Active Members				
a. Retirement Annuities	12,686	4,818,667		4,831,353
b. Disability Benefits	180,075	0		180,075
c. Survivor's Benefits	60,858	0		60,858
d. Deferred Retirements	1,401	81,306		82,707
e. Refund Liability Due to Death or Withdrawal	0	91,890		91,890
5. Total Current Benefit Obligations	<u>\$255,020</u>	<u>\$11,077,447</u>		<u>\$11,332,467</u>
E. EXPECTED FUTURE BENEFIT OBLIGATIONS				<u>\$3,050,102</u>
F. TOTAL CURRENT AND EXPECTED FUTURE BENEFIT OBLIGATIONS				<u>\$14,382,569</u>
G. CURRENT UNFUNDED ACTUARIAL LIABILITY (D5-A)				(\$1,395,079)
H. CURRENT AND FUTURE UNFUNDED ACTUARIAL LIABILITY (F-C)				(\$751,747)

TABLE 9

Teachers Retirement Association Fund

**Determination Of Unfunded Actuarial Accrued Liability (UAAL)
And Supplemental Contribution Rate**
(dollars in thousands)

JULY 1, 1998

	Actuarial Present Value of Projected Benefits <u>(1)</u>	Actuarial Present Value of Future Normal Costs <u>(2)</u>	Actuarial Accrued Liability <u>(3)=(1)-(2)</u>
A. DETERMINATION OF ACTUARIAL ACCRUED LIABILITY (AAL)			
1. Active Members			
a. Retirement Annuities	\$7,614,338	\$1,875,809	\$5,738,529
b. Disability Benefits	297,353	119,165	178,188
c. Survivor's Benefit	95,509	35,470	60,039
d. Deferred Retirements	149,926	74,379	75,547
e. Refunds Due to Death or Withdrawal	139,859	231,434	(91,575)
f. Total	<u>\$8,296,985</u>	<u>\$2,336,257</u>	<u>\$5,960,728</u>
2. Deferred Retirements With Future Augmentation	352,333		352,333
3. Former Members Without Vested Rights	49,425		49,425
4. Annuitants in MPRIF	5,570,230		5,570,230
5. Recipients Not in MPRIF	<u>113,596</u>		<u>113,596</u>
6. Total	<u>\$14,382,569</u>	<u>\$2,336,257</u>	<u>\$12,046,312</u>
B. DETERMINATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL)			
1. AAL (A6)			\$12,046,312
2. Current Assets (Table 1, E6)			<u>12,727,546</u>
3. UAAL (B1-B2)			<u>(\$681,234)</u>
C. DETERMINATION OF SUPPLEMENTAL CONTRIBUTION RATE			
1. Present Value of Future Payrolls Through the Amortization Date of July 1, 2020			\$39,174,114
2. Supplemental Contribution Rate (B3/C1)			0.00%

Teachers Retirement Association Fund

Changes In Unfunded Actuarial Accrued Liability (UAAL)
(dollars in thousands)

YEAR ENDING JUNE 30, 1998

A. UAAL AT BEGINNING OF YEAR	(\$140,122)
B. CHANGE DUE TO INTEREST REQUIREMENTS AND CURRENT RATE OF FUNDING	
1. Normal Cost and Expenses	\$243,611
2. Contribution	(275,418)
3. Interest on A, B1 and B2	<u>(13,262)</u>
4. Total (B1+B2+B3)	<u>(\$45,069)</u>
C. EXPECTED UAAL AT END OF YEAR (A+B4)	(\$185,191)
D. INCREASE (DECREASE) DUE TO ACTUARIAL LOSSES (GAINS) BECAUSE OF EXPERIENCE DEVIATIONS FROM EXPECTED	
1. Salary Increases	(\$74,652)
2. Investment Return	(638,249)
3. MPRIF Mortality	10,260
4. Mortality of Other Benefit Recipients	1,058
5. Other Items	<u>205,540 *</u>
6. Total	<u>(\$496,043)</u>
E. UAAL AT END OF YEAR BEFORE PLAN AMENDMENTS AND CHANGES IN ACTUARIAL ASSUMPTION (C+D6)	(\$681,234)
F. CHANGE IN ACTUARIAL ACCRUED LIABILITY DUE TO PLAN AMENDMENTS	0
G. CHANGE IN ACTUARIAL ACCRUED LIABILITY DUE TO CHANGES IN ACTUARIAL ASSUMPTIONS	<u>0</u>
H. UAAL AT END OF YEAR (E+F+G)	<u><u>(\$681,234)</u></u>

* Differences in the amounts recognized as employee contributions and the methodology in calculating benefit values for vested and non-vested inactive members are estimated to account for 60-70% of this other loss item.

Teachers Retirement Association Fund

Determination Of Contribution Sufficiency*(dollars in thousands)*

JULY 1, 1998

	Percent of Payroll	Dollar Amount
A. STATUTORY CONTRIBUTIONS - CHAPTER 354		
1. Employee Contributions	5.00%	\$128,538
2. Employer Contributions	5.00%	128,538
3. Total	<u>10.00%</u>	<u>\$257,076</u>
 B. REQUIRED CONTRIBUTIONS - CHAPTER 356		
1. Normal Cost		
a. Retirement Benefits	7.78%	\$199,869
b. Disability benefits	0.47%	12,099
c. Survivors	0.15%	3,759
d. Deferred Retirement Benefits	0.23%	5,979
e. Refunds Due to Death or Withdrawal	0.97%	24,808
f. Total	<u>9.60%</u>	<u>\$246,514</u>
2. Supplemental Contribution Amortization by July 1, 2020 of UAAL	0.00%	0
3. Allowance for Expenses	<u>0.22%</u>	<u>5,653</u>
4. Total	<u>9.82%</u>	<u>\$252,167</u>
C. CONTRIBUTION SUFFICIENCY (DEFICIENCY) [A3-B4]	0.18%	\$4,909

Note: Projected Annual Payroll for Fiscal Year Beginning on JULY 1, 1998 is \$2,569,368.

Teachers Retirement Association Fund

Summary of Actuarial Assumptions and Methods

<i>Interest:</i>	Pre-Retirement: 8.5% per annum Post-Retirement: 8.5% per annum
<i>Benefit Increases After Retirement:</i>	Payment of earnings on retired reserves in excess of 6% accounted for by 6% post-retirement assumptions.
<i>Salary Increases:</i>	Reported salary for prior fiscal year, with new hires annualized, increased according to the table below to current fiscal year and annually for each future year.
<i>Mortality:</i>	<p>Pre-Retirement:</p> <p>Male - 1983 Group Annuity Mortality Table for males set back eight years.</p> <p>Female - 1983 Group Annuity Mortality Table for females set back four years.</p> <p>Post-Retirement:</p> <p>Male - Same as above except set back four years.</p> <p>Female - Same as above except set back two years.</p> <p>Post-Disability:</p> <p>Male - 1977 Railroad Retirement Board Mortality for Disabled Annuitants up to retirement age.</p> <p>Female - 1977 Railroad Retirement Board Mortality for Disabled Annuitants up to retirement age.</p> <p>Revert to post-retirement assumption at retirement.</p>
<i>Retirement Age:</i>	Age 62 or if over age 62, one year from valuation date. In addition, 45% of Basic Members and 30% of Coordinated Members are assumed to retire each year that they are eligible for the Rule of 90.

TABLE 12
(Continued)

Separation: Select and ultimate rates were based on plan experience as of June 30, 1989. Ultimate rates after the third year are shown in rate table. Select rates are as follows:

	<u>First Year</u>	<u>Second Year</u>	<u>Third Year</u>
Less than 35	.3	.15	.1
35-44	.25	.125	.08
45-60	.3	.15	.1

Disability: Rates as shown in table.

Expenses: Prior year expenses expressed as percentage of prior year payroll.

Return of Contributions: All employees withdrawing after becoming eligible for a deferred benefit were assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.

Family Composition: 85% of male Members and 65% of female Members are assumed to be married. Female is three years younger than male. Assume Members have no children.

Social Security: N/A

Special Consideration: Married Members assumed to elect subsidized joint and survivor form of annuity as follows:

Males - 15% elect 50% J&S option
0% elect 75% J&S option
50% elect 100% J&S option

Females - 10% elect 50% J&S option
0% elect 75% J&S option
10% elect 100% J&S option

Actuarial Cost Method: Entry Age Normal Actuarial Cost Method with normal costs expressed as a level percentage of earnings. Under this method, Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.

Asset Valuation Method: Cost Value plus one-third Unrealized Gains or Losses.

*Payment on the
Unfunded Actuarial
Accrued Liability:*

A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 5% per annum.

TABLE 12
(Continued)

Teachers Retirement Association Fund

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

Separations Expressed as the Number of Occurrences Per 10,000:

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>		<u>Salary Increases</u>
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
20	3	1	600	600	4	4	0	0	7.25%
21	3	2	600	600	4	4	0	0	7.25
22	3	2	600	600	4	4	0	0	7.25
23	3	2	600	600	5	5	0	0	7.20
24	3	2	600	600	5	5	0	0	7.15
25	3	2	600	600	5	5	0	0	7.10
26	4	2	600	600	5	5	0	0	7.05
27	4	2	600	600	5	5	0	0	7.00
28	4	2	600	600	5	5	0	0	7.00
29	4	3	580	580	5	5	0	0	7.00
30	4	3	565	565	6	6	0	0	7.00
31	4	3	540	540	6	6	0	0	7.00
32	4	3	520	520	6	6	0	0	7.00
33	5	3	500	500	6	6	0	0	7.00
34	5	3	480	480	6	6	0	0	7.00
35	5	4	440	440	6	6	0	0	7.00
36	5	4	370	370	7	7	0	0	7.00
37	6	4	330	330	7	7	0	0	7.00
38	6	4	280	280	8	8	0	0	6.90
39	6	5	240	240	8	8	0	0	6.80
40	7	5	210	210	8	8	0	0	6.70
41	7	5	195	195	9	9	0	0	6.60
42	8	6	185	185	9	9	0	0	6.50
43	9	6	175	175	10	10	0	0	6.35
44	9	7	160	160	10	10	0	0	6.20
45	10	7	145	145	11	11	0	0	6.05
46	10	8	130	130	12	12	0	0	5.90
47	11	8	115	115	13	13	0	0	5.75
48	12	9	100	100	14	14	0	0	5.70
49	14	10	85	85	16	16	0	0	5.65

TABLE 12
(Continued)

Teachers Retirement Association Fund

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

Separations Expressed as the Number of Occurrences Per 10,000:

<u>Age</u>	<u>Preretirement Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>		<u>Salary Increases</u>
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
50	15	11	70	70	17	17	0	0	5.60%
51	17	12	55	55	19	19	0	0	5.55
52	19	14	40	40	22	22	0	0	5.50
53	22	15	25	25	26	26	0	0	5.45
54	25	16	10	10	30	30	0	0	5.40
55	28	18	0	0	36	36	0	0	5.35
56	31	19	0	0	41	41	0	0	5.30
57	35	21	0	0	47	47	0	0	5.25
58	39	23	0	0	52	52	0	0	5.25
59	43	25	0	0	58	58	0	0	5.25
60	48	28	0	0	63	63	0	0	5.25
61	52	31	0	0	69	69	0	0	5.25
62	57	34	0	0	0	0	10,000	10,000	5.25
63	61	38	0	0	0	0	0	0	5.25
64	66	42	0	0	0	0	0	0	5.25
65	71	47	0	0	0	0	0	0	5.25
66	77	52	0	0	0	0	0	0	5.25
67	84	58	0	0	0	0	0	0	5.25
68	92	64	0	0	0	0	0	0	5.25
69	101	71	0	0	0	0	0	0	5.25

TABLE 14

Teachers Retirement Association Fund

SCHEDULE OF FUNDING PROGRESS

(dollars in thousands)

Actuarial Valuation Date	Actuarial Value of Assets (A)	Actuarial Accrued Liability (AAL) (B)	Unfunded AAL (UAAL) (B - A)	Funded Ratio (A)/(B)	Actual Covered Payroll (Previous FY) (C)	UAAL as % of Covered Payroll (B - A) / (C)
07/01/91	5,614,924	7,213,720	1,598,796	77.84%	1,943,375	82.27%
07/01/92	6,324,733	7,662,522	1,337,789	82.54%	1,989,624	67.24%
07/01/93	7,045,937	8,266,059	1,220,122	85.24%	2,065,881	59.06%
07/01/94	7,611,936	9,115,266	1,503,330	83.51%	2,150,300	69.91%
07/01/95	8,348,124	9,717,623	1,369,499	85.91%	2,204,693	62.12%
07/01/96	9,541,221	10,366,168	824,947	92.04%	2,268,390	36.37%
07/01/97	11,103,759	10,963,637	(140,122)	101.28%	2,359,011	-5.94%
07/01/98	12,727,546	12,046,312	(681,234)	105.66%	2,422,957	-28.12%

TABLE 15

Teachers Retirement Association Fund
SCHEDULE OF EMPLOYER CONTRIBUTIONS
(dollars in thousands)

Year Ended June 30	Actuarially Required Contribution Rate (A)	Actual Covered Payroll (B)	Actual Member Contributions (C)	Annual Required Contribution [(A) x (B)] - (C)	Actual Employer Contribution*	Percentage Contributed
1991	13.11%	1,943,375	89,313	165,463	159,439	96.36%
1992	13.04%	1,989,624	91,506	167,941	162,370	96.68%
1993	13.13%	2,065,881	94,709	176,541	168,071	95.20%
1994	12.75%	2,150,300	100,803	173,360	171,855	99.13%
1995	14.73%	2,204,693	143,536	181,215	179,672	99.15%
1996	14.30%	2,268,390	148,051	176,329	184,495	104.63%
1997	12.78%	2,359,011	154,161	147,321	191,670	130.10%
1998	9.55% **	2,422,957	124,096	107,296	151,323	141.03%

* Includes contributions from other sources (if applicable).

** Actuarially Required Contribution Rate calculated according to parameters of GASB 25 using a 30-year amortization of the negative unfunded accrued liability

TABLE 3A
BASIC

TEACHERS RETIREMENT ASSOCIATION FUND
ACTIVE MEMBERS AS OF JUNE 30, 1998

Age	Years of Service								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	0	0	0	0	0	0	0	0	0
40-44	0	0	0	0	0	0	0	0	0
45-49	0	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0	0
55-59	0	0	0	0	0	0	2	3	5
60-64	0	0	0	0	0	0	0	18	18
65+	0	0	0	0	0	0	0	9	9
ALL	0	0	0	0	0	0	2	30	32

AVERAGE ANNUAL EARNINGS

Age	Years of Service								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	0	0	0	0	0	0	0	0	0
40-44	0	0	0	0	0	0	0	0	0
45-49	0	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0	0
55-59	0	0	0	0	0	0	59,232	61,959	60,868
60-64	0	0	0	0	0	0	0	51,348	51,348
65+	0	0	0	0	0	0	0	47,149	47,149
ALL	0	0	0	0	0	0	59,232	51,149	51,654

PRIOR FISCAL YEAR EARNINGS (IN THOUSANDS) BY YEARS OF SERVICE

Age	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	ALL
All	0	0	0	0	0	0	119	1,535	1,653

TEACHERS RETIREMENT ASSOCIATION FUND

SERVICE RETIREMENTS AS OF JUNE 30, 1998

Age	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0
55-59	2	8	0	0	0	0	0	10
60-64	20	157	316	11	0	0	0	504
65-69	16	96	444	384	2	0	0	942
70-74	1	17	166	605	195	0	0	984
75-79	0	1	31	346	379	96	2	855
80-84	0	0	3	36	377	299	54	769
85+	0	0	0	0	17	449	338	804
ALL	39	279	960	1,382	970	844	394	4,868

AVERAGE ANNUAL BENEFIT

Age	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0
55-59	42,369	27,373	0	0	0	0	0	30,372
60-64	34,975	42,814	43,320	21,000	0	0	0	42,344
65-69	36,393	33,213	40,326	34,454	28,429	0	0	37,115
70-74	33,961	33,375	34,525	37,633	23,836	0	0	34,297
75-79	0	6,406	27,951	32,310	28,315	14,650	17,583	28,334
80-84	0	0	1,427	29,049	28,936	19,758	7,044	23,728
85+	0	0	0	0	24,616	21,379	11,480	17,286
ALL	35,910	38,362	39,787	35,061	27,591	20,039	10,903	30,141

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS RETIRED

Age	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
All	1,401	10,703	38,196	48,454	26,763	16,913	4,296	146,726

TEACHERS RETIREMENT ASSOCIATION FUND

SURVIVORS AS OF JUNE 30, 1998

Age	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	1	0	0	1	1	0	0	3
50-54	0	0	0	0	0	0	0	0
55-59	1	1	1	1	1	2	1	8
60-64	6	14	9	5	4	1	1	40
65-69	6	30	21	12	14	3	5	91
70-74	7	19	33	20	7	2	5	93
75-79	4	27	15	12	9	8	6	81
80-84	0	9	11	6	7	2	9	44
85+	0	6	6	4	4	2	4	26
ALL	25	106	96	61	47	20	31	386

AVERAGE ANNUAL BENEFIT

Age	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	23,895	0	0	19,851	3,302	0	0	15,683
50-54	0	0	0	0	0	0	0	0
55-59	53,975	46,409	22,461	25,572	17,557	12,813	4,654	24,532
60-64	26,461	32,437	24,200	30,489	17,623	10,788	10,919	26,883
65-69	31,079	31,392	27,773	22,459	22,607	17,612	5,759	26,144
70-74	21,487	31,882	28,410	23,123	26,518	15,970	8,139	25,962
75-79	23,604	26,457	29,821	29,447	30,618	20,411	4,314	25,607
80-84	0	22,209	20,466	42,338	29,392	24,042	7,882	22,814
85+	0	16,471	17,616	10,602	17,519	13,244	10,964	14,898
ALL	26,717	28,878	26,450	25,896	24,359	17,952	7,282	24,812

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS SINCE DEATH

Age	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
All	668	3,061	2,539	1,580	1,145	359	226	9,577

TEACHERS RETIREMENT ASSOCIATION FUND

DISABILITY RETIREMENTS AS OF JUNE 30, 1998

Age	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0
55-59	0	1	0	0	0	0	0	1
60-64	0	3	5	1	0	0	0	9
65-69	0	0	0	0	0	0	0	0
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	0	4	5	1	0	0	0	10

AVERAGE ANNUAL BENEFIT

Age	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0
55-59	0	53,720	0	0	0	0	0	53,720
60-64	0	7,695	61,757	70,806	26,960	19,307	0	44,742
65-69	0	0	0	0	0	0	0	0
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	0	19,201	61,757	70,806	0	0	0	45,640

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS DISABLED

Age	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
All	0	77	309	71	0	0	0	456

TABLE 11A
Basic

Teachers Retirement Association Fund

Determination Of Contribution Sufficiency
(dollars in thousands)

JULY 1, 1998

	<u>Percent of Payroll</u>	<u>Dollar Amount</u>
A. STATUTORY CONTRIBUTIONS - CHAPTER 354		
1. Employee Contributions	9.00%	\$157
2. Employer Contributions	9.00%	157
3. Total	<u>18.00%</u>	<u>\$314</u>
 B. REQUIRED CONTRIBUTIONS - CHAPTER 356		
1. Normal Cost		
a. Retirement Benefits	12.65%	\$220
b. Disability benefits	0.75%	13
c. Survivors	0.34%	6
d. Deferred Retirement Benefits	0.00%	0
e. Refunds Due to Death or Withdrawal	<u>2.41%</u>	<u>42</u>
f. Total	<u>16.15%</u>	<u>\$281</u>

Note: Projected Annual Payroll for Fiscal Year Beginning on JULY 1, 1998 is \$1,740.

Teachers Retirement Association Fund

Summary of Plan Provisions

GENERAL

Eligibility: A public school or MNSCU teacher who is not covered by the Social Security Act, **except** for teachers employed by Minneapolis, St. Paul or Duluth public schools or by the University of Minnesota.

No MNSCU teacher is a Member if that person elected coverage under Chapter 354B.

Contributions:

Member: 9.0% of salary.

Employer: 9.0% of salary.

Allowable Service: A day of credit is earned if five hours are taught that day. A year is earned if 170 days of service are credited. Credit may also be provided for certain leaves if contributions are paid into the fund.

Salary: Compensation used for contribution purposes excluding lump-sum annual or sick leave payments, severance payments, any payments made in lieu of employer paid fringe benefits or expenses, and employer contributions to a Section 457 deferred compensation plan.

Average Salary: Average of the five highest successive years of salary. Average Salary is based on all Allowable Service if less than five years.

RETIREMENT

Normal Retirement:

Eligibility: Age 65 and three years of Allowable Service. Age 62 and 30 years of Allowable Service. Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service.

Early Retirement Eligibility:

Eligibility: Age 55 and three years of Allowable Service. Any age with 30 years of Allowable Service. Rule of 90: Age plus Allowable Service totals 90.

Retirement Amount: The greater of 2.2% of Average Salary for each of the first 10 years of Allowable Service and 2.7% of Average Salary for each subsequent year with reduction of 0.25% for each month the Member is under age 65 at time of retirement or under age 62 if 30 years of Allowable Service. No reduction if age plus years of Allowable Service totals 90;

OR

2.7% of Average Salary for each year of Allowable Service assuming augmentation to age 65 at 3% per year and actuarial reduction for each month the Member is under age 65.

Form of Payment: Life annuity.
Actuarially equivalent options are:
50%, 75% or 100% joint and survivor with bounce back feature without additional reduction.
15 year certain and life.
Guaranteed refund.

Benefit Increases: Benefits may be increased each January 1 depending on the investment performance of the Minnesota Post Retirement Investment Fund (MPRIF). A Member who has been receiving a benefit for at least 12 full months as of June 30 will receive a full increase. Members receiving benefits for at least one full month but less than 12 full months will receive a partial pro rata increase.

TABLE 13A
BASIC
(Continued)

Members retired under laws in effect before July 1, 1973 receive an additional lump-sum payment from TRA each year. In 1989, this lump-sum payment was the greater of \$25 times each full year of Allowable Service or the difference between \$400 times each full year of Allowable Service and the sum of the benefits paid from any Minnesota public pension plan plus cash payments from the Social Security Administration for the preceding fiscal year July 1, 1988 through June 30, 1989. In each following year, the lump-sum payment increases by the same percentage increase that is applied to regular annuities paid from MPRIF.

Members who terminate service after June 30, 1997 and whose benefits commence during the period July 2, 1997 through July 1, 2002 shall receive a percentage of the July 1, 1997 permanent increase as follows:

July 2, 1997 - July 1, 1998	50%
July 2, 1998 - July 1, 1999	40%
July 2, 1999 - July 1, 2000	30%
July 2, 2000 - July 1, 2001	20%
July 2, 2001 - July 1, 2002	10%

DISABILITY

Disability Benefit:

Eligibility: Total and permanent disability before normal retirement age with three years of Allowable Service.

Amount: Normal Retirement Benefit based on Allowable Service and Average Salary at disability without reduction for commencement before normal retirement age unless an optional annuity plan is selected. Supplemental benefit of \$25 per month.

A Member who became disabled before July 1, 1997 whose benefit does not commence until after June 30, 1997 shall receive an actuarially equivalent increase to reflect the change from 5% to 6% in the post-retirement interest assumption.

TABLE 13A
BASIC
(Continued)

Payments stop at normal retirement age or the five year anniversary of the effective date of the disability benefit, whichever is later. Payments stop earlier if disability ceases or death occurs. Benefits may be reduced on resumption of partial employment. If death occurs before retirement status, the surviving spouse and dependent children are eligible for survivor benefits.

Form of Payment: Same as for retirement.

Benefit Increases: Adjusted by TRA to provide same increase as MPRIF.

Members who become disabled after June 30, 1997 and whose benefits commence during the period July 1, 1997 through July 1, 2002 shall receive a percentage of the July 1, 1997 permanent increase as follows:

July 2, 1997 - July 1, 1998	50%
July 2, 1998 - July 1, 1999	40%
July 2, 1999 - July 1, 2000	30%
July 2, 2000 - July 1, 2001	20%
July 2, 2001 - July 1, 2002	10%

Retirement After Disability:

Eligibility: Normal retirement age or the five year anniversary of the effective date of the disability benefit, whichever is later.

Amount: Any optional annuity continues. Otherwise, the larger of the disability benefit paid before normal retirement age or the normal retirement benefit available at normal retirement age, or an actuarially equivalent optional annuity.

Benefit Increases: Same as for retirement.

DEATH

Surviving Spouse Benefit:

<i>Eligibility:</i>	Active Member with 18 months of Allowable Service or Member receiving a disability benefit.
<i>Amount:</i>	50% of salary for the last full fiscal year preceding death. Maximum family benefit is \$1,000 per month. Benefits paid until spouse's death.
	Surviving spouse optional annuity or refund of contributions may be elected in lieu of this benefit.

Surviving Dependent Child Benefit:

<i>Eligibility:</i>	Active Member with 18 months of Allowable Service or Member receiving a disability benefit.
<i>Amount:</i>	10% of salary for the last full fiscal year preceding death. Family benefit minimum (including spouse's benefit) of 50% of salary and maximum \$1,000 per month. Benefits paid until child marries, dies, or attains age 18 (age 22 if full-time student.)

Surviving Spouse Optional Annuity:

<i>Eligibility:</i>	Member or former Member with three years of Allowable Service who dies before retirement or disability benefits commence.
<i>Amount:</i>	Survivor's payment of the 100% joint and survivor benefit or an actuarial equivalent term certain annuity. If commencement is prior to age 65 (age 62 if 30 years of service), the benefit is reduced same as early retirement with half the applicable reduction factor used from age 55 to the actual commencement age. If no surviving spouse, then an actuarial equivalent dependent child benefit is paid to age 20 or for five years if longer.

TABLE 13A
BASIC
(Continued)

A survivor of a Member who terminated service before July 1, 1997 whose benefit does not commence until after June 30, 1997 shall receive an actuarially equivalent increase to reflect the change from 5% to 6% in the post-retirement interest assumption.

Benefit Increases: Adjusted by TRA to provide same increase as MPRIF except surviving spouse optional annuity benefit increases which are paid from MPRIF.

Survivors of Members who terminate service and die after June 30, 1997 and whose benefits commence during the period July 2, 1997 through July 1, 2002 shall receive a percentage of the July 1, 1997 permanent increase as follows:

July 2, 1997 - July 1, 1998	50%
July 2, 1998 - July 1, 1999	40%
July 2, 1999 - July 1, 2000	30%
July 2, 2000 - July 1, 2001	20%
July 2, 2001 - July 1, 2002	10%

Refund of Contributions:

Eligibility: Member dies before receiving any retirement benefits and survivor benefits are not elected.

Amount: The excess of the Member's contributions over any disability benefits paid plus 5% interest compounded annually if death occurred before May 16, 1989 and 6% interest compounded annually if death occurred on or after May 16, 1989.

TERMINATION

Refund of Contributions:

Eligibility: Thirty days following termination of teaching service.

Amount: Member's contributions with 5% interest compounded annually if termination occurred before May 16, 1989 and 6% interest compounded annually if termination occurred on or

TABLE 13A
BASIC
(Continued)

after May 16, 1989. A deferred annuity may be elected in lieu of a refund.

Deferred Benefit:

Eligibility: Vested at date of termination. Current requirement is three years of Allowable Service.

Amount: Benefit computed under law in effect at termination and increased by the following percentage compounded annually: 0% before 7/1/71; 5% from 7/1/71 to 1/1/81; and 3% thereafter until January 1 of the year following attainment of age 55 and 5% thereafter until the annuity begins. Amount is payable as a normal or early retirement.

A Member who terminated service before July 1, 1997 whose benefit does not commence until after June 30, 1997 shall receive an actuarially equivalent increase to reflect the change from 5% to 6% in the post-retirement interest assumption.

Members who terminate service after June 30, 1997 and whose benefits commence during the period July 2, 1997 through July 1, 2002 shall receive a percentage of the July 1, 1997 permanent increase as follows:

July 2, 1997 - July 1, 1998	50%
July 2, 1998 - July 1, 1999	40%
July 2, 1999 - July 1, 2000	30%
July 2, 2000 - July 1, 2001	20%
July 2, 2001 - July 1, 2002	10%

SUMMARY OF SIGNIFICANT CHANGES

No significant changes recognized for this valuation.

**TABLE 3B
COORDINATED**

**TEACHERS RETIREMENT ASSOCIATION FUND
ACTIVE MEMBERS AS OF JUNE 30, 1998**

Age	Years of Service								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	1,523	158	1	0	0	0	0	0	1,682
25-29	1,705	5,786	556	0	0	0	0	0	8,047
30-34	935	2,640	3,750	281	0	0	0	0	7,606
35-39	827	1,493	2,317	2,509	198	0	0	0	7,344
40-44	743	1,830	1,519	1,625	2,437	589	0	0	8,743
45-49	804	1,709	1,701	1,751	1,808	3,814	1,088	1	12,676
50-54	443	1,070	1,129	1,245	1,245	1,811	4,835	699	12,477
55-59	198	557	480	529	716	865	1,916	2,132	7,393
60-64	148	179	162	186	175	260	411	348	1,869
65+	99	98	33	30	17	26	37	38	378
ALL	7,425	15,520	11,648	8,156	6,596	7,365	8,287	3,218	68,215

AVERAGE ANNUAL EARNINGS

Age	Years of Service								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	18,290	25,950	1,862	0	0	0	0	0	19,000
25-29	16,002	25,177	32,289	0	0	0	0	0	23,724
30-34	14,869	25,410	32,819	37,988	0	0	0	0	28,232
35-39	14,313	24,225	32,638	40,262	42,789	0	0	0	31,743
40-44	12,874	23,023	33,214	40,412	43,867	47,616	0	0	34,630
45-49	12,156	22,002	32,846	40,491	44,555	47,831	48,837	46,198	38,680
50-54	12,019	21,329	32,150	40,817	44,288	49,023	50,561	51,617	43,257
55-59	10,658	15,890	27,673	39,265	44,617	48,640	52,959	53,153	45,154
60-64	8,535	10,923	22,707	32,746	41,819	49,213	54,783	55,702	40,129
65+	6,186	10,765	20,565	34,672	44,573	46,078	55,713	55,593	25,174
ALL	14,751	23,675	32,358	40,091	44,132	48,245	51,122	53,122	35,503

PRIOR FISCAL YEAR EARNINGS (IN MILLIONS) BY YEARS OF SERVICE

Age	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	ALL
All	110	367	377	327	291	355	424	171	2,422

TEACHERS RETIREMENT ASSOCIATION FUND

SERVICE RETIREMENTS AS OF JUNE 30, 1998

Age	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	13	14	0	0	0	0	0	27
55-59	968	1,204	27	0	0	0	0	2,199
60-64	743	2,980	1,286	6	0	0	0	5,015
65-69	186	1,575	2,349	636	2	0	0	4,748
70-74	17	208	1,342	1,382	250	1	0	3,200
75-79	2	16	196	1,139	679	76	0	2,108
80-84	0	2	14	141	906	312	21	1,396
85+	0	0	1	5	43	959	519	1,527
ALL	1,929	5,999	5,215	3,309	1,880	1,348	540	20,220

AVERAGE ANNUAL BENEFIT

Age	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	14,715	0	0	0	0	0	0
50-54	22,715	20,223	8,885	0	0	0	0	21,423
55-59	27,312	24,785	20,423	24,782	0	0	0	25,844
60-64	25,018	28,238	24,770	20,288	0	0	0	26,863
65-69	19,225	20,251	20,143	11,460	10,039	0	0	18,976
70-74	14,554	18,417	18,151	16,951	8,512	18,946	0	16,878
75-79	2,346	11,389	17,782	17,082	14,917	6,837	0	16,023
80-84	0	1,096	11,075	14,873	15,588	13,385	4,759	14,794
85+	0	0	929	5,035	13,260	13,006	6,814	10,875
ALL	25,479	25,035	20,656	15,840	14,346	12,750	6,734	20,142

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS RETIRED

Age	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
All	49,149	150,185	107,721	52,415	26,971	17,187	3,636	407,271

TEACHERS RETIREMENT ASSOCIATION FUND

SURVIVORS AS OF JUNE 30, 1998

Age	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	3	55	9	2	0	0	0	69
50-54	8	45	8	2	0	0	0	63
55-59	16	71	28	2	1	0	0	118
60-64	22	90	60	11	1	1	0	185
65-69	10	86	75	35	7	1	0	214
70-74	23	89	77	53	7	3	0	252
75-79	10	88	66	43	19	6	1	233
80-84	7	28	31	20	10	8	3	107
85+	3	15	7	9	14	6	5	59
ALL	102	567	361	177	59	25	9	1,300

AVERAGE ANNUAL BENEFIT

Age	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	6,535	14,668	7,333	4,642	0	0	0	13,067
50-54	16,391	19,841	6,103	1,660	0	0	0	17,081
55-59	15,628	16,336	13,173	7,975	3,273	0	0	15,237
60-64	17,213	19,350	15,162	11,841	1,408	2,151	0	17,101
65-69	18,222	16,457	13,308	12,617	10,106	25,340	0	14,642
70-74	17,522	14,879	15,964	17,917	19,762	20,173	0	16,289
75-79	23,751	15,605	14,445	12,781	18,752	12,107	6,560	15,232
80-84	24,309	13,482	16,865	12,048	16,031	18,399	8,956	15,381
85+	7,971	13,671	16,009	13,460	8,222	9,942	11,058	11,733
ALL	17,610	16,396	14,429	13,908	14,330	14,700	9,857	15,434

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS SINCE DEATH

Age	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
All	1,796	9,297	5,209	2,462	846	368	89	20,064

TEACHERS RETIREMENT ASSOCIATION FUND

DISABILITY RETIREMENTS AS OF JUNE 30, 1998

<u>Age</u>	<u>YEARS DISABLED</u>							<u>ALL</u>
	<u><1</u>	<u>1-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25+</u>	
<50	7	45	15	1	0	0	0	68
50-54	7	52	17	8	3	0	0	87
55-59	6	84	36	10	7	2	0	145
60-64	4	47	41	24	6	4	1	127
65-69	0	9	4	2	1	1	0	17
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	24	237	113	45	17	7	1	444

AVERAGE ANNUAL BENEFIT

<u>Age</u>	<u>YEARS DISABLED</u>							<u>ALL</u>
	<u><1</u>	<u>1-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25+</u>	
<50	12,116	12,826	7,607	3,023	0	0	0	11,458
50-54	19,498	18,750	12,277	10,256	25,717	0	0	17,004
55-59	18,932	19,800	14,849	12,511	16,924	4,681	0	17,685
60-64	18,103	19,670	19,621	13,194	7,194	6,519	8,767	17,292
65-69	0	22,877	23,286	10,252	16,646	7,597	0	20,223
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	16,971	18,336	15,531	12,163	15,026	6,148	8,767	16,583

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS DISABLED

<u>Age</u>	<u><1</u>	<u>1-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25+</u>	<u>ALL</u>
All	407	4,346	1,755	547	255	43	9	7,363

Teachers Retirement Association Fund

Determination Of Contribution Sufficiency
(dollars in thousands)

JULY 1, 1998

	<u>Percent of Payroll</u>	<u>Dollar Amount</u>
A. STATUTORY CONTRIBUTIONS - CHAPTER 354		
1. Employee Contributions	5.00%	\$128,381
2. Employer Contributions	5.00%	128,381
3. Total	<u>10.00%</u>	<u>\$256,762</u>
 B. REQUIRED CONTRIBUTIONS - CHAPTER 356		
1. Normal Cost		
a. Retirement Benefits	7.78%	\$199,648
b. Disability benefits	0.47%	12,086
c. Survivors	0.15%	3,752
d. Deferred Retirement Benefits	0.23%	5,979
e. Refunds Due to Death or Withdrawal	<u>0.96%</u>	<u>24,766</u>
f. Total	<u>9.59%</u>	<u>\$246,231</u>

Note: Projected Annual Payroll for Fiscal Year Beginning on JULY 1, 1998 is \$2,567,628.

Teachers Retirement Association Fund Coordinated

Summary of Plan Provisions

GENERAL

Eligibility: A public school or MNSCU teacher who is covered by the Social Security Act, except for teachers employed by Minneapolis, St. Paul or Duluth public schools or by the University of Minnesota.

No MNSCU teacher will become a new Member unless that person elects coverage under Chapter 354.

Contributions:

Member: 5.0% of salary.

Employer: 5.0% of salary.

Allowable Service: A day of credit is earned if five hours are taught that day. A year is earned if 170 days of service are credited. Credit may also be provided for certain leaves if contributions are paid into the fund.

Salary: Compensation used for contribution purposes excluding lump-sum annual or sick leave payments, severance payments, any payments made in lieu of employer paid fringe benefits or expenses, and employer contributions to a Section 457 deferred compensation plan.

Average Salary: Average of the five highest successive years of salary. Average Salary is based on all Allowable Service if less than five years.

RETIREMENT

Normal Retirement:

Eligibility:

First hired before July 1, 1989:

Age 65 and three years of Allowable Service. Age 62 and 30 years of Allowable Service. Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service.

First hired after June 30, 1989:

The greater of age 65 or the age eligible for full Social Security retirement benefits (but not to exceed age 66) and three years of Allowable Service. Proportionate Retirement Annuity is available at normal retirement age and one year of Allowable Service.

Early Retirement:

Eligibility:

First hired before July 1, 1989:

Age 55 and three years of Allowable Service.
Any age with 30 years of Allowable Service.
Rule of 90: Age plus Allowable Service totals 90.

First hired after June 30, 1989:

Age 55 with three years of Allowable Service.

Retirement Amount: First hired before July 1, 1989:

The greater of 1.2% of Average Salary for each of the first 10 years of Allowable Service and 1.7% of Average Salary for each subsequent year with reduction of 0.25% for each month the Member is under age 65 at time of retirement (age 62 if 30 years of Allowable Service). No reduction if age plus years of Allowable Service totals 90;

OR

1.7% of Average Salary for each year of Allowable Service assuming augmentation to age 65 at 3% per year and actuarial reduction for each month the Member is under age 65.

TABLE 13B
COORDINATED
(Continued)

First hired after June 30, 1989:

1.7% of Average Salary for each year of Allowable Service assuming augmentation to age eligible for full Social Security retirement benefits at 3% per year and actuarial reduction for each month the Member is under the full Social Security benefit retirement age but not to exceed age 66.

Form of Payment: Life annuity.

Actuarially equivalent options are:

50%, 75% or 100% joint and survivor with bounce back feature without additional reduction.

15 year certain and life.

Guaranteed refund.

Benefit Increases: Benefits may be increased each January 1 depending on the investment performance of the Minnesota Post Retirement Investment Fund (MPRIF). A Member who has been receiving a benefit for at least 12 full months as of the previous June 30 will receive a full increase. Members receiving benefits for at least one full month but less than 12 full months will receive a partial pro rata increase.

Members retired under laws in effect before July 1, 1973 receive an additional lump-sum payment from TRA each year. In 1989, this lump-sum payment was \$25 times each full year of Allowable Service. In each following year, the lump-sum payment increases by the same percentage increase that is applied to regular annuities paid from MPRIF.

Members who terminate service after June 30, 1997 and whose benefits commence during the period July 2, 1997 through July 1, 2002 shall receive a percentage of the July 1, 1997 permanent increase as follows:

July 2, 1997 - July 1, 1998	50%
July 2, 1998 - July 1, 1999	40%
July 2, 1999 - July 1, 2000	30%
July 2, 2000 - July 1, 2001	20%
July 2, 2001 - July 1, 2002	10%

DISABILITY

Disability Benefit:

Eligibility: Total and permanent disability before normal retirement age with three years of Allowable Service.

Amount: Normal Retirement Benefit based on Allowable Service and Average Salary at disability without reduction for commencement before normal retirement age unless an optional annuity plan is selected.

Payments stop at normal retirement age or the five year anniversary of the effective date of the disability benefit, whichever is later. Payments stop earlier if disability ceases or death occurs. Benefits may be reduced on resumption of partial employment.

A Member who became disabled before July 1, 1997 whose benefit does not commence until after June 30, 1997 shall receive an actuarially equivalent increase to reflect the change from 5% to 6% in the post-retirement interest assumption.

Form of Payment: Same as for retirement.

Benefit Increases: Adjusted by TRA to provide same increase as MPRIF.

Members who become disabled after June 30, 1997 and whose benefits commence during the period July 1, 1997 through July 1, 2002 shall receive a percentage of the July 1, 1997 permanent increase as follows:

July 2, 1997 - July 1, 1998	50%
July 2, 1998 - July 1, 1999	40%
July 2, 1999 - July 1, 2000	30%
July 2, 2000 - July 1, 2001	20%
July 2, 2001 - July 1, 2002	10%

Retirement After Disability:

- Eligibility:* Normal retirement age or the five year anniversary of the effective date of the disability benefit, whichever is later.
- Amount:* Any optional annuity continues. Otherwise, the larger of the disability benefit paid before normal retirement age or the normal retirement benefit available at normal retirement age, or an actuarially equivalent optional annuity.
- Benefit Increases:* Same as for retirement.

DEATH

Surviving Spouse Optional Annuity:

- Eligibility:* Member or former Member with three years of Allowable Service who dies before retirement benefits commence.
- Amount:* Survivor's payment of the 100% joint and survivor benefit or an actuarial equivalent term certain annuity. If commencement is prior to age 65 (age 62 if 30 years of service), the benefit is reduced same as early retirement with half the applicable reduction factor used from age 55 to the actual commencement age. If no surviving spouse, then an actuarial equivalent dependent child benefit is paid to age 20 or for five years if longer.
- A survivor of a Member who terminated service before July 1, 1997 whose benefit does not commence until after June 30, 1997 shall receive an actuarially equivalent increase to reflect the change from 5% to 6% in the post-retirement interest assumption.

TABLE 13B
COORDINATED
(Continued)

Benefit Increases: Same as for retirement.

Survivors of Members who terminate service and die after June 30, 1997 and whose benefits commence during the period July 2, 1997 through July 1, 2002 shall receive a percentage of the July 1, 1997 permanent increase as follows:

July 2, 1997 - July 1, 1998	50%
July 2, 1998 - July 1, 1999	40%
July 2, 1999 - July 1, 2000	30%
July 2, 2000 - July 1, 2001	20%
July 2, 2001 - July 1, 2002	10%

Refund of Contributions:

Eligibility: Member dies before receiving any retirement benefits and the surviving spouse optional annuity is not elected.

Amount: The excess of the Member's contributions over any disability benefits paid plus 5% interest compounded annually if death occurred before May 16, 1989 and 6% interest compounded annually if death occurred on or after May 16, 1989.

TERMINATION

Refund of Contributions:

Eligibility: Thirty days following termination of teaching service.

Amount: Member's contributions with 5% interest compounded annually if termination occurred before May 16, 1989 and 6% interest compounded annually if termination occurred on or after May 16, 1989. A deferred annuity may be elected in lieu of a refund.

TABLE 13B
COORDINATED
(Continued)

Deferred Benefit:

Eligibility: Vested at date of termination. Current requirement is three years of Allowable Service.

Amount: Benefit computed under law in effect at termination and increased by the following percentage compounded annually: 0% before 7/1/71; 5% from 7/1/71 to 1/1/81; and 3% thereafter until January 1 of the year following attainment of age 55 and 5% thereafter until the annuity begins. Amount is payable as a normal or early retirement.
A Member who terminated service before July 1, 1997 whose benefit does not commence until after June 30, 1997 shall receive an actuarially equivalent increase to reflect the change from 5% to 6% in the post-retirement interest assumption.

Members who terminate service after June 30, 1997 and whose benefits commence during the period July 2, 1997 through July 1, 2002 shall receive a percentage of the July 1, 1997 permanent increase as follows:

July 2, 1997 - July 1, 1998	50%
July 2, 1998 - July 1, 1999	40%
July 2, 1999 - July 1, 2000	30%
July 2, 2000 - July 1, 2001	20%
July 2, 2001 - July 1, 2002	10%

SUMMARY OF SIGNIFICANT CHANGES

No significant changes were recognized for this valuation.