

MINNESOTA
PUBLIC EMPLOYEES RETIREMENT ASSOCIATION
(PERA)

ACTUARIAL ANALYSIS AND RECOMMENDATIONS

1948

Board of Trustees
Public Employees' Retirement Association
Court House
St. Paul, Minnesota

Gentlemen:

As requested by you, and in accordance with our agreement, I have made a study of the probable future results of the operation of the Association under the law as it existed before the amendments enacted in 1947 using certain basic assumptions.

In accordance with this agreement, we have made such a study, the results of which are appended hereto.

E. D. Brown, Jr., Actuary

PUBLIC EMPLOYEES' RETIREMENT ASSOCIATION
St. Paul, Minnesota

Report of Actuarial Investigation

At the request of the Board of Trustees of the Association, we have made an actuarial investigation of the present status of the Public Employees' Retirement Fund, and an estimate of the probable results of future operation of the Fund under the existing law, assuming that future operations will show the same results as the past experience of the Fund, with respect to number of retirements and amount of retirement annuities. This assumption was at the request of the Board and does not necessarily represent our opinion.

With the assistance and cooperation of the Secretary and the office staff of the Fund, the following data were collected for each active member of the Association:

Sex
Date of birth
Years of service credit
Amount of accumulated deductions

For each retired member:

Sex
Date of birth
Date of annuity
Amount of annuity
Amount of accumulated deductions at retirement
Years of service credit at retirement

Similar data were obtained for retired members who had died. Numerous tabulations were made from the data thus obtained, and exhaustive studies were made to reveal the present status of the Fund, and various projections were made into the future to estimate the future course of its experience. These data were obtained as of December 31, 1946, and any reference herein to present status relates to that date.

In arriving at the estimates contained in this report, it was necessary to make a number of basic assumptions. Membership in the Fund has increased substantially in each year since it was put into effect in 1931. We cannot assume, however, that this growth in membership will continue as there is a definite limit to the number of persons who could be covered under the Plan within the state. It is probable that there will be further increases in membership due to the entrance of new groups from time to time, but we do not believe it possible to make any reasonable assumption of the extent of such further increases in membership or the time at which such additional groups would come under the Fund. We have, therefore, assumed for the sake of this report that no additional units will be added, and we have assumed further that employment in the governmental units involved will remain at the present level. It is not likely that this assumption will be borne out with any degree of accuracy, but we do not believe that any divergences from this assumption will materially affect the conclusions which we have reached.

We have also assumed that the average rate of turn-over in employment will continue at about the same level as has been experienced by the Association since

its organization. There are many factors which may affect the rate of turn-over and which may materially from year to year, but we believe it reasonable to assume that on the average the rate of turn-over will not vary materially from the experience of the past 15 years. In making projections into the future on the assumption that employment remains at the present level, we have assumed that members who withdraw from service, die, or retire on an annuity will be replaced by new employees. We have assumed that these new employees will be distributed as to age and sex in the same pattern as the present employees covered under the Association at their original date of employment. We have used rates of withdrawal which follow the pattern of withdrawal from service over the past 15 years, and have applied death rates as derived from the Combined Annuitants Mortality Table which, after comparison with the experience of the Association, would appear to be the most appropriate table for such purpose. Where interest factors were necessary, we have assumed an average earning on the invested assets of the Fund of $2\frac{1}{2}\%$ per annum. This rate is somewhat less than has actually been earned by the Fund over its period of existence, but is somewhat greater than can be realized on conservative, sound investments at the present time. We believe that over a considerable period this assumption of $2\frac{1}{2}\%$ interest is reasonable and sound and a rate which the Association can be expected to maintain.

MEMBERSHIP

The data compiled show a total of 8,784 active members, and 279 retired members now drawing annuities. A distribution of the membership by age and sex is as follows:

ACTIVE MEMBERS

<u>MEN</u>			<u>WOMEN</u>		<u>TOTAL</u>	
<u>Age</u>	<u>Number</u>	<u>Accumulated Deductions</u>	<u>Number</u>	<u>Accumulated Deductions</u>	<u>Number</u>	<u>Accumulated Deductions</u>
13-17	8	\$ 257	29	\$ 481	37	\$ 738
18-22	63	2,188	592	31,353	655	33,541
23-27	228	16,756	477	47,978	705	64,734
28-32	395	58,804	372	67,343	767	126,147
33-37	558	150,329	342	86,734	900	237,063
38-42	567	209,004	324	93,904	891	302,908
43-47	679	325,572	349	117,076	1,028	442,648
48-52	804	431,099	324	123,286	1,128	554,386
53-57	792	458,553	282	99,198	1,074	557,751
58-62	617	395,097	201	88,016	818	483,113
63-67	399	248,665	112	46,867	511	295,532
68-72	164	113,738	21	11,555	185	125,293
73-77	55	42,012	5	2,535	60	44,547
78-82	23	21,892	1	128	24	22,020
83-87	1	969			1	969
TOTAL	5,353	\$2,474,935	3,431	\$ 816,455	8,784	\$3,291,390

RETIRED MEMBERS

<u>MEN</u>			<u>WOMEN</u>			<u>TOTAL</u>	
<u>Age</u>	<u>Number</u>	<u>Annual Annuity</u>	<u>Number</u>	<u>Annual Annuity</u>	<u>Number</u>	<u>Annual Annuity</u>	
58-62	2	\$ 2,007	2	\$ 1,528	4	\$ 3,535	
63-67	26	26,937	8	5,268	34	32,205	
68-72	78	80,420	20	15,488	98	95,908	
73-77	59	60,515	22	17,650	81	78,165	
78-82	36	31,552	6	5,149	42	36,701	
83-87	14	14,466	2	1,170	16	15,636	
88-92	4	3,248			4	3,248	
TOTAL	219	\$219,145	60	\$ 46,253	279	\$265,398	

ESTIMATES OF FUTURE EXPERIENCE

In projecting the experience of the Association into the future we have, as previously stated, assumed a constant level of employment and membership both as to number of members and distribution by sex at the same figure as at January 1, 1947. We have also assumed that salaries will remain constant with an average salary for men of \$2,200 annually, and for women of \$1,700 annually, which is approximately the salary average at January 1, 1947.

In projecting the experience relating to retiring members into the future, we have assumed that the same number of members will retire each year as shown by the average of the past experience of the Association. No annuities were granted under the provisions of the Act during the first five years of operation, so that the experience of the Fund up to June 30, 1946 represents ten years during which members had an opportunity to retire. The total number of retirements during this period was 350, or an average of 35 per year. We have, therefore, assumed a constant rate of 35 retirements each year in the future. We have also assumed that members will retire in the same age and service pattern as has been experienced by the Association in the past and that the annuities to which they will be entitled will also be at the same average rate as shown by past experience.

With respect to the members who may be expected to withdraw from service, die, or retire on annuity, we have computed the probable amount of refunds of accumulated deductions in the case of deaths and withdrawals, and the amount of accumulated deductions at retirement for the retired members. We have also computed the probable amount of accumulated deductions for members remaining in active service.

In order to cut down the number of calculations, our computations have been made on the basis of grouping the membership by attained age around a central age at five year intervals such as ages 20, 25, 30, etc. Also, projections into the future have been made at five year intervals. We believe that there is no substantial loss of accuracy in the computations made on this basis. These projections have been made for 45 years into the future, or until January 1, 1992. The following tables show the number of active members in service at the end of each five year period with the estimated accumulated deductions to their credit, the number of members withdrawing from service during each five year period with the amount of accumulated deductions refunded, and the estimated amounts withheld under the provisions of Sections 353.04 and 353.14. Also shown are the number of deaths of active members within each five year period, the estimated amount of refunds to the

heirs of such deceased members, and the amounts withheld under Sections 353.04 and 353.14. Also shown are the estimated number of members retiring on annuity during each five year period with the amount of accumulated deductions for such retired members at retirement. The number of new members entering the Association during each five year period is equal to the total of the members who withdrew from service, died, or retired on annuity during the period, thus continuing membership at a constant level. The rate of turnover has been rather high, and we have assumed that it will continue at the same average level as in the past.

ACTIVE MEMBERS

<u>Date</u>	<u>Number</u>	<u>Accumulated Deductions</u>
1947	8784	\$ 3,291,390
1952	8784	4,971,494
1957	8784	5,740,206
1962	8784	6,111,645
1967	8784	6,290,219
1972	8784	6,369,700
1977	8784	6,433,544
1982	8784	6,476,324
1987	8784	6,516,811
1992	8784	6,544,604

WITHDRAWALS FROM SERVICE IN 5 YR. PERIOD

<u>Period</u>	<u>Number</u>	<u>Amount Refund</u>	<u>Amount Withheld</u>
1947-52	3006	\$ 1,192,008	\$ 35,898
1952-57	3098	1,583,512	48,732
1957-62	3078	1,621,183	41,461
1962-67	3073	1,633,638	40,594
1967-72	3102	1,663,665	42,249
1972-77	3146	1,698,777	44,296
1977-82	3189	1,730,638	46,017
1982-87	3217	1,757,029	47,933
1987-92	3228	1,761,487	49,614

DIED IN SERVICE IN 5 YR. PERIOD

<u>Period</u>	<u>Number</u>	<u>Amount Refund</u>	<u>Amount Withheld</u>
1947-52	480	\$ 347,554	\$ 17,912
1952-57	562	542,352	34,153
1957-62	648	647,047	43,721
1962-67	721	924,192	62,467
1967-72	767	1,018,100	69,321
1972-77	779	1,043,478	72,424
1977-82	765	1,029,269	72,361
1982-87	740	1,004,062	71,210
1987-92	720	976,133	69,286

RETIRED ON ANNUITY IN 5 YR. PERIOD

Period	Number	Accumulated Deduction at Retirement
1947-52	175	\$ 183,603
1952-57	175	216,788
1957-62	175	260,509
1962-67	175	299,714
1967-72	175	315,271
1972-77	175	321,444
1977-82	175	324,058
1982-87	175	325,901
1987-92	175	327,089

In the projection of the experience on annuitants, we have assumed the same pattern of retirement as has been experienced by the Association, which means the same distribution by age at retirement. The experience of the Association shows a concentration of retirement around ages 65 and 70, with the average age at retirement near 70 years. This average is materially higher than is usually found under retirement plans for public employees. The reason for the lower average age at retirement generally is chiefly due to the fact that retirement is permissible at earlier ages and that many plans contain a compulsory age at retirement, which condition is not found in your Association. The following tables show the estimated number of persons on retirement and the annual amount of annuity payable at five year intervals from 1947 to 1992, the estimated number of annuitants who will die in each five year period and the amount of annuity payable to them, and the estimated number of new annuities granted in each five year period with the annual amount of annuity granted. The amounts shown in these tables are based on the assumption that full annuities would be paid with no reduction as provided in Section 353.14. This Section provides that the total amount available for distribution in annuity payments during any one month shall in no event exceed the total amount received from salary deductions and assessments in lieu thereof during the preceding month, and that where the total of annuities in force exceeds such amount, all annuities payable shall be proportionately reduced. These calculations indicate a substantial increase in the amount of annuities in force over the next 15 years, increasing slightly thereafter, but remaining fairly constant at a level of about \$438,000 annually.

ESTIMATED NUMBER AND ANNUAL AMOUNT OF ANNUITIES IN FORCE AT 5 YEAR INTERVALS

Year	Number	Amount
1947	279	\$ 265,398
1952	361	345,041
1957	414	393,559
1962	443	417,648
1967	460	429,624
1972	463	434,846
1977	472	437,280
1982	475	438,385
1987	476	438,964
1992	476	439,248

ESTIMATED DEATHS OF ANNUITANTS AND NEW ANNUITIES
GRANTED SHOWING NUMBER OF PERSONS AND AMOUNT
OF ANNUITY IN 5 YEAR PERIODS

<u>Period</u>	<u>Deaths</u>		<u>New Annuitants</u>	
	Number	Amount	Number	Amount
1947-52	93	\$ 88,209	175	\$ 167,852
1952-57	123	117,936	175	166,454
1957-62	145	139,310	175	163,399
1962-67	159	151,324	175	163,300
1967-72	166	157,449	175	162,671
1972-77	171	160,230	175	162,664
1977-82	173	161,552	175	162,657
1982-87	174	162,110	175	162,689
1987-92	175	162,407	175	162,691

FINANCIAL RESULTS OF FUTURE OPERATION

In order to obtain an estimate of the financial results of the operation of the Retirement Fund in the future, we have estimated the assets of the Retirement Fund at January 1, 1947 based on the assets at June 30, 1946 with a normal increase for the six months period, and have estimated member deposits to be received, interest earnings and, from the previous calculations, disbursements for refunds to employees who withdraw from service and die, annuity payments, and expense of operation. We have made this projection on the basis of five year intervals and the results of this projection are shown in the following table. Member deposits are estimated on the basis of 4% of the assumed average salary for men and women and are assumed to remain constant, since the level of membership is assumed to remain constant. Interest is computed on average balance of assets at the rate of 2½% per annum. The amount of disbursements in refunds to members withdrawing from service or dying are as calculated in the preceding tables. Annuity payments are computed on the basis of the initial amount of annuities in force at the beginning of each five year period with an increase each year of an amount sufficient to increase the total to the amount in force estimated at the end of the five year period.

PROJECTION OF FINANCIAL STATUS

IN NEXT 5 YEARS AFTER DATE

<u>Date</u>	<u>Assets at Date</u>	<u>Income</u>	
		<u>Member Deposits</u>	<u>Interest</u>
1-1-47	3,223,280	3,521,860	456,109
1-1-52	4,105,411	3,521,860	510,987
1-1-57	4,120,153	3,521,860	489,988
1-1-62	3,777,798	3,521,860	419,513
1-1-67	2,979,149	3,521,860	303,240
1-1-72	1,893,920	3,521,860	155,267
1-1-77	579,550		

Disbursements

<u>Date</u>	<u>Withdrawals</u>	<u>Deaths in Service</u>	<u>Annuities</u>	<u>Expense</u>
1-1-47	1,192,008	347,554	1,486,276	70,000
1-1-52	1,583,512	542,352	1,822,241	70,000
1-1-57	1,621,183	647,047	2,015,973	70,000
1-1-62	1,633,638	924,192	2,112,192	70,000
1-1-67	1,663,665	1,018,100	2,158,564	70,000
1-1-72	1,698,777	1,043,478	2,179,242	70,000
1-1-77				

This table reveals that, under the assumptions made, the assets of the Fund would increase, after payment of amounts due on withdrawal from service and death, annuity payments, and expenses, for a period of about ten years, since income from member deposits and interest would exceed disbursements. Thereafter disbursements would exceed income each year, resulting in a net decrease in assets each year. According to the table, the balance of assets at January 1, 1977, 30 years hence, would be \$579,550. This amount, plus income from member deposits and interest, would be sufficient to meet the estimated disbursements for the year 1977, but would fall \$3,793 short of meeting the requirements for 1978. In other words, our estimates show that continued operation on the basis assumed herein would entirely exhaust the resources of the Fund in about 32 years, and that no funds would then be held representing deposits of active members, nor would funds be available for payment of refunds to members who withdraw or die, for payment of annuities to retired members, or to provide annuities for members retiring thereafter.

(Begin portion of report excluded from report sent to membership:)

The increase in the number and amount of annuities estimated in the future is due to the fact that the estimated number of members retiring is greater than the estimated number of deaths of retired members.

At the outset we stated that the assumption that future operations would show the same results as to number of members retired and amount of annuities as the past experience of the Fund does not necessarily represent our opinion. In order for any member to receive the maximum annuity, full contributions must be made for at least 20 years; consequently, no member will be able to retire on the maximum annuity without contributing additional amounts above the normal required contributions, prior to the year 1951. It appears obvious to assume that many members would be unable or unwilling to make the additional payments necessary to retire on the full annuity and have, therefore, continued in service until such time as their normal contributions will entitle them to the full annuity. It is likely, therefore, that there will be a very substantial increase in the number of members retiring on annuity beginning about 1951. Furthermore, there have been salary increases in most jobs, and it does not appear likely that the average amount of annuity will remain at its present level. A considerable increase in the average amount appears certain.

The result of a larger number of retirements and a higher average amount of annuity would be a more rapid depletion of the assets of the Fund.

It is obvious from the results shown in the Projection of the Financial Status that the sources of revenue for maintaining the Retirement Fund are not adequate to meet the estimated disbursements even under the assumptions which have been used in the preparation of this report. Continued operation of the Fund on the present basis can only result in the eventual dissipation of its funds. It is necessary that steps be taken to provide additional sources of revenue or that substantial adjustments be made to place the Fund on a sound basis.

Although the Association does not set up a separate fund for the payment of retirement benefits, it is obvious that the only sources of revenue for the payment of benefits are the contributions of the members who remain in service to retirement, the amounts withheld from the accumulated contributions of those members who withdraw from service or die before retirement, and the interest earnings on the invested funds. In order for the Fund to be on a sound basis, the accumulation of member deposits made by retiring members plus their share of the interest earnings of the Fund and their share of the amounts withheld from members withdrawing from service or who die before retirement should be sufficient to provide the promised benefit. If this is not sufficient to do so, the only manner in which benefits may be paid is to make up the difference out of the accumulated deposits of the active members of the Association. Obviously such a process cannot be long continued as any amounts taken away from active member deposits to pay retirement benefits will not be available to pay the retirement benefits of such active members when they reach retirement age, nor will they be available in the case of termination of service or death before retirement to pay the refunds provided in the Act to such members. A continual increase in membership would serve to delay the exhaustion of the Fund, but the same principle will hold true so long as the income of the Fund is not adequate to provide the promised benefits.

It is out of the question to presume that the members themselves would be willing or even able to make contributions to the Fund on an adequate basis. It would appear necessary, therefore, that some outside source of revenue be found to make up any deficiencies in members' contributions or, in the alternative, that benefits be reduced by 50% to 60% in order that the Fund may be placed on an adequate basis.

Reduction of benefits is a very undesirable method of achieving adequacy, particularly since the scale of benefits now payable is hardly adequate to meet the needs of the retiring employees. Something of the sort will be necessary, however, unless additional sources of revenue can be found.

In practically every retirement system for public employeesⁱⁿ the United States, a substantial portion of the cost is borne by the employer who is the state, the city, or other political sub-division as the case may be. In my opinion, it is impossible to provide a retirement system with adequate benefits on a sound basis without contribution by the employer, or at least a substantial amount of revenue from sources other than member contributions.

It would appear most desirable that an attempt be made to secure legislation amending the law to provide for contributions to the Fund by the various political sub-divisions whose employees are covered by the Retirement Fund, that the cost be shared by the employer and employee, and that the present scale of benefits be continued.

In any event, the Association is now faced with an increasingly insolvent condition and eventual bankruptcy unless proper steps are taken to place the Retirement Fund on an adequate basis. We do not believe it feasible to increase the contributions of the employees to a level which would be adequate to provide

the benefits now promised, nor do we favor reducing the benefits to the extent which would be necessary to make the present contributions adequate. The most desirable solution, in my opinion, is to make provision for regular contributions by the political sub-divisions or by the State, or both, which would provide sufficient amounts to finance the portion of benefits not provided by the contributions of members, and that the responsibility for maintaining the adequacy of the System should be an obligation of the political sub-divisions or the State, or both. This conclusion is obvious when we consider that any deficiencies which arise may be made up from only three sources: (1) from retired members by reduction of their annuities, (2) from active members by additional contributions, or (3) from the employer. The first of these is obviously undesirable as it reduces the income of the retired member which he has been led to expect will continue at the level on which it was granted, and which is none too adequate at best at a time when he is unable to supplement his income by his own effort. The second alternative also is unsound as it provides for contributions from which the member can never expect to receive any benefit. It seems clear, therefore, that the responsibility, if any, should be an obligation of the employer.

We have made no reference in this report to the existing actuarial deficiencies of the Retirement Fund since this was not a part of the request of the Board in authorizing this study. It is obvious that deficiency exists since the assets held by the Association at the end of the last fiscal year on June 30, 1946 were only \$57,000 more than the total of the member deposits. In addition to this liability, a true actuarial valuation would disclose an additional liability for the future payment of benefits under annuities already granted, as well as a contingent liability equal to the difference between the present value of expected benefit payments to active members and the actual deposits to their credit. Since it has been shown that the present rates of contributions are inadequate to provide the promised benefits, this contingent liability would be very substantial and, in addition, the actual liability for annuities already granted would require additional assets of nearly \$2,000,000.

(End portion of report excluded from report sent to membership.)

This report represents the condensation of a very considerable amount of calculation and attempts to outline your present situation and future prospects as concisely as possible without including the great mass of detail required before arriving at these conclusions.

Respectfully submitted,

E. D. Brown, Jr.
Consulting Actuary

Chicago, Illinois

June 30, 1948

This is a true and exact copy of the complete report submitted to Public Employees Retirement Association.

This reproduction is made possible by the donations of PERA members to the Minnesota Retirement Study Association.