

Appendix A: Actuarial Procedures and Methods

Valuation of Assets

The actuarial asset valuation method spreads asset gains and losses over four years. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of four years.

Investment Earnings

The annual rate of investment earnings of the assets of the System is assumed to be 7.30% per year net of investment and administrative expenses, compounded annually.

Interest on Member Contributions

Interest on member contributions is assumed to accrue at the most recent actual rate granted, or a rate of 0.22% per annum, compounded annually.

Future Salaries

The rates of annual salary increase assumed for the purpose of the valuation are illustrated in Table B-2. In addition to increases in salary due to merit and longevity, this scale includes an assumed 3.50% annual rate of increase in the general wage level of the membership.

Service Retirement

Table B-3 shows the annual assumed rates of retirement for actives members meeting the service retirement eligibilities.

Disablement

The rates of disablement used in this valuation are illustrated in Table B-4.

Mortality

The mortality rates used in this valuation are described in Table B-1.

Other Terminations of Employment

The rates of assumed future withdrawal from active service for reasons other than death, disability or retirement are shown for representative ages in Table B-5.

Probability of Marriage & Dependent Children

If death occurs in active status, all members are assumed to have an eligible surviving spouse with no dependent children.

Records with no Birth Date

New records with no birth date are assumed to be 37 years old. Records that are not new and have no birth date used the same birth date as the prior year's valuation.



Appendix A: Actuarial Procedures and Methods

Active Records with a Salary Less than \$1,000

These members are included in the active headcounts, however the pay of these members is not included in the Valuation Projected Salaries summarized in Appendix D. The liability for these members is their accumulated member contributions payable on the valuation date.



Table B-1

Summary of Valuation Assumptions

I. Economic assumptions	
A. General wage increases	3.50%
B. Investment return	7.30%
C. Price inflation assumption	2.75%
D. Payroll growth	3.25%
E. Growth in membership	0.00%
F. Interest on member accounts	0.22%
II. Demographic assumptions	
A. Individual salary increase due to promotion and longevity	Table B-2
B. Retirement	Table B-3
C. Disablement	Table B-4
D. Mortality among Active Participants	
PUB-2010 General Amount Weighted Employee Mortality projected to 2021 for males and females. Projected generationally using MP-2021.	
E. Mortality among Disabled pensioners	
PUB-2010 General Amount Weighted Disabled Retiree mortality table set forward 1 year for both males and females.	
F. Mortality among Contingent Survivor pensioners	
PUB-2010 General Amount Weighted Contingent Survivor Mortality projected to 2021 with ages set forward 1 year for males and females. Projected generationally using MP-2021.	
G. Mortality among Healthy pensioners	
PUB-2010 General Amount Weighted Healthy Retiree Mortality Table projected to 2021, with ages set forward one year and adjusted 104% for males and 103% for females. Projected generationally using MP-2021.	
H. Other terminations of employment	Table B-5



Table B-2
Future Salaries

	(a)	(b)	(1+(a))*(1+(b))
Years of Service	Individual Merit & Longevity	General Wage Increase	Total Salary Increase
1	4.80%	3.50%	8.47%
2	3.80	3.50	7.43
3	2.80	3.50	6.40
4	2.00	3.50	5.57
5	1.40	3.50	4.95
6	0.80	3.50	4.33
7	0.40	3.50	3.91
8	0.00	3.50	3.50
8 & Up	0.00	3.50	3.50



Appendix B: Summary of Valuation Assumptions

Table B-3
Retirement
Annual Rates

<u>Age</u>	<u>Less than 30 Years of Service</u>	<u>30 Years or more of Service and age 60 with 25 Years of Service</u>
Less than 45		10.0%
45		10.0
46		10.0
47		10.0
48		10.0
49		10.0
50	4.5%	15.8
51	4.5	15.8
52	4.5	15.8
53	4.5	15.8
54	4.5	15.8
55	5.5	15.8
56	6.0	15.8
57	6.0	15.8
58	6.0	15.8
59	7.0	15.8
60	9.0	15.8
61	9.0	15.8
62	15.0	22.0
63	15.0	22.0
64	15.0	22.0
65	30.0	35.0
66	30.0	35.0
67	25.0	35.0
68	25.0	30.0
69	25.0	30.0
70 & Over	100.0	100.0



Appendix B: Summary of Valuation Assumptions

Table B-4
Disablement
Annual Rates

Age	All Members
22	0.00%
27	0.04
32	0.04
37	0.04
42	0.16
47	0.40
52	0.71
57	1.00
60	1.44
62	0.00

All disabilities are assumed to be permanent and without recovery.



Table B-5

**Other Terminations of Employment
Among Members Not Eligible to Retire
Annual Rates**

<u>Years of Service</u>	<u>All Members</u>
0	35.0%
1	27.0
2	18.0
3	14.0
4	11.0
5	11.0
6	10.0
7	9.0
8	8.0
9	7.0
10	6.0
11	6.0
12	5.0
13	5.0
14	4.5
15 & Over	3.0

Family Composition

Female spouses are assumed to be three years younger than males. 100% of non-retired employees are assumed married for both male and female employees. Actual marital characteristics are used for retirees.

Vested Benefits for Termination Members

Vested benefits for members who terminated during years ending June 30, 2009 and later were estimated based upon compensation and service information in the census data. For members who terminated prior to June 30, 2008, vested benefits valued were the same as had been calculated by the prior actuary for the June 30, 2008 actuarial valuation.



Appendix C: Summary of Benefit Provisions

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|--|---|
| Service credit | <ul style="list-style-type: none">• Service credit is used to determine the amount of a member's retirement benefit.• One month of service credit is earned for each month where the member is paid for 160 hours. This includes certain transferred and purchased service. |
| Membership service | <ul style="list-style-type: none">• Membership service is used to determine eligibility for vesting, retirement or other benefits.• One month of membership service is earned for any month member contributions are made, regardless of the number of hours worked.• Eligible members in all systems may purchase service that counts toward membership service.• Additionally, eligible active and inactive Sheriffs' Retirement System (SRS) members may purchase 1 for 5 (additional) service that will count as membership service. |
| Contributions | <ul style="list-style-type: none">• Member contributions are made through an "employer pick-up" arrangement which results in deferral of taxes on the contributions. |
| Compensation | <ul style="list-style-type: none">• Compensation generally means all remuneration paid, excluding certain allowances, benefits, and lump sum payments. Compensation is specifically defined in law and differs amongst the systems.• Bonuses paid on or after July 1, 2013 to any member will not be treated as compensation for retirement purposes. No member or employer contributions will be paid on bonuses. |
| Withdrawal of employee contributions | <ul style="list-style-type: none">• A member is eligible for a withdrawal of their contributions when they terminate service and are either not eligible for or have not taken a retirement benefit.• The member receives the accumulated member contributions, which consists of member contributions and regular interest.• Upon receipt of a refund of accumulated contributions a member's vested right to a monthly benefit is forfeited. |
| Member contributions interest credited (regular interest) | <ul style="list-style-type: none">• Interest is credited to member accounts at the rates determined by the Board.• The current interest rate credited to member accounts is 0.22%. |
| Refunds | <ul style="list-style-type: none">• Terminating members eligible to retire may, in lieu of receiving a monthly retirement benefit, refund their accumulated contributions in a lump sum.• Terminating members with accumulated contributions between \$200 and \$1,000 who wish to rollover their refund must do so within 90 days of termination of service.• Trusts, estates, and charitable organizations listed as beneficiaries are entitled to receive only a lump sum payment. |



Appendix C: Summary of Benefit Provisions

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| Lump-sum payouts | <ul style="list-style-type: none">• Effective July 1, 2017, lump sum payouts in all systems are limited to the member's accumulated contributions rather than the present value of the member's benefit. |
| Type of Plan | <ul style="list-style-type: none">• Multiple-employer cost sharing |
| Membership eligibility | <ul style="list-style-type: none">• Employees of the State and local governments that have contracted for PERS coverage.• Certain employees of the university system and school districts, not covered by a separate retirement system governed by Title 19 of the Montana Code Annotated. |
| Member contributions | <ul style="list-style-type: none">• 7.9% of member's compensation.• Temporary 1% increase for all members effective July 1, 2011.• Reduced to 6.9% when amortization period drops below 25 years and remains below 25 years following the termination of the temporary 1% increase and the additional employer contribution rate. |
| Employer contributions | <ul style="list-style-type: none">• 8.97% of each member's compensation for state and university. Reduced when amortization period drops below 25 years and remains below 25 years following the termination of the additional employer contribution rate and the member's temporary 1% increase.• 8.87% of each member's compensation for local governments• 8.6% of each member's compensation for school districts• Contribution going into the PERS Defined Benefit Plan is reduced by 0.04% of compensation paid into the Educational Fund.• Employers who hire PERS retirees who work less than 960 hours in the calendar year in a PERS-covered position, but do not become active members, contribute the employer's contribution rate on the working retiree's compensation. |
| State contributions | <ul style="list-style-type: none">• 0.1% of compensation from the State for local governments• 0.37% of compensation from State for School Districts• Contributions are also made to the system from the State General Fund through a statutory appropriation. |
| Compensation period used in benefit calculation | <ul style="list-style-type: none">• HAC = Highest Average Compensation• Hired prior to July 1, 2011: HAC is average of the highest 36 consecutive months (or shorter period of total service) of compensation paid by member.• Hired on or after July 1, 2011: HAC is average of the highest 60 consecutive months (or shorter period of total service) of compensation paid to member.• Hired on or after July 1, 2013: 110% annual cap on compensation considered as part of a member's HAC. |



Appendix C: Summary of Benefit Provisions

Service retirement eligibility

Members hired **prior to** July 1, 2011:

- Age 60, 5 years membership service
- Age 65, regardless of membership service
- Any age, 30 years membership service

Members hired **on or after** July 1, 2011:

- Age 65, 5 years of membership service
- Age 70, regardless of service

Service retirement benefit formula

Members hired **prior to** July 1, 2011:

- Less than 25 years of membership service:
1.785% of HAC x years of service credit
- 25 years or more of membership service:
2% of HAC x years of service credit
- **OR**, if greater than either of the above:
the actuarial equivalent of 2 times the member's regular contributions and interest plus the actuarial equivalent of any additional contributions and interest.

Members hired **on or after** July 1, 2011:

- Less than 10 years of membership service:
1.5% of HAC x years of service credit
- Between 10 and 30 years of membership service:
1.785% of HAC x years of service credit
- 30 years or more of membership service:
2% of HAC x years of service credit
- **OR**, if greater than any of the above:
the actuarial equivalent of 2 times the member's regular contributions and interest plus the actuarial equivalent of any additional contributions and interest.

Second retirement benefit

Members who retire **before January 1, 2016, return to PERS-covered employment, and accumulate less than 2 years of additional service credit receive:**

- A refund of the member's contributions plus regular interest;
- No service credit for second employment;
- The same benefit amount starting the month following termination; **and**
- The member's Guaranteed Annual Benefit Adjustment (GABA) increasing again in January immediately following the member's second retirement.

Members who retire **before January 1, 2016 and return to PERS-covered employment for at least 2 years of additional service credit receive:**

- A re-calculated retirement benefit based on provisions in effect after member's initial retirement; **and**
- GABA on member's re-calculated benefit starting in January after receiving the re-calculated benefit for 12 months.



Appendix C: Summary of Benefit Provisions

Members who retire **on or after January 1, 2016, return to PERS service, and accumulate less than 5 years of additional service credit receive:**

- A refund of a member's contributions plus regular interest;
- No service credit for second employment;
- The same benefit amount starting the month following termination; **and**
- The member's GABA increasing again in January immediately following the member's second retirement.

Members who retire **on or after January 1, 2016, return to PERS service, and accumulate 5 or more years of additional service credit receive:**

- The same retirement benefit paid immediately prior to member's return to service;
- A second retirement benefit for member's second period of service based on laws in effect upon the member's rehire date; **and**
- The member's GABA on both benefits starting in January after receiving the original and new benefit for 12 months.

Early retirement eligibility

Members hired **prior to** July 1, 2011:

- Age 50 with 5 years of membership service; or
- Any age under age 60 with 25 years of membership service

Members hired **on or after** July 1, 2011:

- Age 55 with 5 years of membership service.

Early retirement benefit formula

Members hired **prior to** July 1, 2011 **and**

- who retire **prior to** October 1, 2011

The actuarial equivalent of the accrued portion of the service retirement benefit that would have been payable to the member commencing at age 60 or upon completion of 30 years of membership service. The service retirement benefit is reduced by a factor resulting from multiplying 0.5% (for first five years from service retirement eligibility) and 0.3% (for six to 10 years from service retirement eligibility) by the number of months by which the retirement date precedes the date at which the member would have attained age 60 or completed 30 years of membership service.

- who retire **on or after** October 1, 2011

The actuarial equivalent of the accrued portion of the service retirement benefit that would have been payable to the member commencing at age 60 or upon completion of 30 years of membership service. The service retirement benefit must be reduced using actuarially equivalent factors based on the most recent valuation.



Appendix C: Summary of Benefit Provisions

Disability eligibility and benefit formula

Members hired **on or after** July 1, 2011:

The actuarial equivalent of the accrued portion of the service retirement benefit that would have been payable to the member commencing at age 65. The service retirement benefit must be reduced using actuarially equivalent factors based on the most recent valuation.

- 5 years of membership service

If hired **on or before** February 24, 1991 **and** did not make a contrary election, the greater of:

- (90% of 1.785% of HAC) x service credit, or
- 25% of HAC

If hired **after** February 24, 1991 **and prior to** July 1, 2011, **or** hired **on or before** February 24, 1991 **and** so elected:

- Less than 25 years of membership service:
1.785% of HAC x service credit, or
- At least 25 years of membership service:
2% of HAC x service credit

If hired **on or after** July 1, 2011:

- Less than 10 years of membership:
1.5% of HAC x years of service credit
- Between 10 and 30 years of membership service:
1.785% of HAC x years of service credit
- 30 years or more of membership service:
2% of HAC x years of service credit

Survivor's benefit eligibility

Member's status at time of death:

- active;
 - receiving disability benefit for less than six months;
 - continuously disabled without receiving a disability benefit;
- or**
- inactive



Appendix C: Summary of Benefit Provisions

Death payment benefit formula

- Accumulated contributions + (monthly compensation x lesser of years of service credit **or** 6) + interest until benefit paid.
- However, a survivor of an inactive member who was inactive for more than 6 months will receive only accumulated contributions and interest from the date of death until payment.
- A survivor may elect to receive the payment as a non-increasing annuity that is the actuarial equivalent of the death payment amount.

Survivor benefit formula

Members hired **prior to** July 1, 2011:

- The survivorship benefit payable to a vested member's survivor is:
 - the actuarial equivalent of the member's accrued retirement benefit at the time of death; **or**,
- If the member dies **prior to** age 50 **or** 25 years of membership service:
 - the actuarial equivalent of the accrued portion of the early retirement benefit that would have been paid to the member at age 50.

Members hired **on or after** July 1, 2011:

- The survivorship benefit payable to an active vested member's survivor is:
 - the actuarial equivalent of the member's accrued retirement benefit at the time of death; **or**
- If the member dies **prior to** age 55:
 - the actuarial equivalent of the accrued portion of the early retirement benefit that would have been paid to the member at age 55.

Vesting eligibility and benefit

- 5 years of membership service
- Accrued normal retirement benefit, payable when eligible for retirement.
- In lieu of a pension, a member may receive a refund of accumulated contributions.
- Upon receipt of a refund of accumulated contributions, a member's vested right to a monthly benefit is forfeited.



Appendix C: Summary of Benefit Provisions

Retirement benefits - Form of payment

Option 1, the normal form of payment is a single life annuity with a refund of any remaining account balance to a designated beneficiary. Optional Benefits:

- Option 2, a life annuity and joint 100% survivor benefit,
- Option 3, a life annuity and joint 50% survivor benefit, and
- Option 4, a life annuity with a period certain.

If a retiring member selects Option 2 or 3 and the contingent annuitant predeceases or is divorced from the member, the retiree may, within 18 months of the death or divorce, choose to revert to the higher Option 1 benefit available at retirement or the retiree may select a different contingent annuitant and/or a different option.

Post retirement benefit increases

For retired members hired **before** July 1, 2013 who have been retired at least 12 months, a Guaranteed Annual Benefit Adjustment (GABA) will be made January 1 of each year equal to:

- 3% for members hired **before** July 1, 2007, and
- 1.5% for members hired **on or after** July 1, 2007 and **prior to** July 1, 2013.

For retired members who were hired **on or after** July 1, 2013 and who have been retired at least 12 months, a Guaranteed Annual Benefit Adjustment (GABA) will be made January 1 of each year equal to:

- A maximum of 1.5% for each year PERS is funded at or above 90%, subject to a 0.1% reduction for each 2% PERS is funded below 90%; or
- 0% whenever the amortization period for PERS is 40 years or more.

Changes since last valuation

None



Appendix D: Valuation Data

Valuation Data

This chart is presented for informational purposes only. The counts shown in the valuation line were used for preparation of the liabilities disclosed within this report. The counts disclosed for the Annual Financial Report and the Summary of Results (page 1) match the ACFR at the request of the Board. The differences between counts, if any, have no material effect upon the liability calculation.

	<u>Active</u>	<u>Disabled</u>	<u>Retirees and Beneficiaries</u>	<u>Terminated Vested Members</u>	<u>Terminated Non-Vested Members</u>	<u>Total</u>
Participant Counts Used for Valuation	28,496	599	24,528	4,776	23,009	81,408
Disabled Members having attained normal retirement age		(497)	497			-
Receiving Benefit Payments	9			11	11	31
Actively Working			1	1	19	21
Other Adjustments	3			2	71	76
Participant Counts shown in the Annual Financial Report	28,508	102	25,026	4,790	23,110	81,536



Appendix D: Valuation Data

Valuation Data

This valuation is based upon the membership of the System as of June 30, 2022. Membership data was supplied by the System and has been accepted for valuation purposes without audit. However, tests were performed to ensure that the data is sufficiently accurate for valuation purposes.

The salaries used in the tables and charts which follow are different than the salaries used for the Board Summary on page 1. The valuation projected salaries to be paid for the following fiscal year, whereas the Board Summary, salaries are applicable in the year ending on the valuation date.

Active Members	Number	Valuation Projected Salaries
Full-Time Members	20,650	\$ 1,210,945,231
Part-Time Members	7,846	\$ 136,479,516
Total Active Members	28,496	\$ 1,347,424,747

Table D-1 contains summaries of the data for contributing members. For full-time members, values shown in the tables are the numbers of members and their total and average annual salaries. For part-time members, only the numbers of members are shown.

Table D-2 presents distributions of the following:

- Members receiving service retirement benefits.
- Members receiving disability retirement benefits.
- Survivors of deceased retired members receiving benefits.
- Survivors of deceased active members.
- Terminated vested members.

Table D-3 is a reconciliation of membership data from June 30, 2021 to June 30, 2022.



Appendix D: Valuation Data

The following is a summary of retired members and beneficiaries currently receiving benefits. The chart reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 50 for an explanation of the number of annuitants used for valuation purposes.

Type of Annuitant	Number	Annual Benefits	Average Annual Benefits
Service Retirement	22,301	\$ 474,056,162	\$ 21,257
Survivors of Deceased Retired Members	1,682	27,906,690	16,591
Survivors of Deceased Active Members	545	7,122,419	13,069
Total Retirees and Beneficiaries	24,528	\$ 509,085,271	\$ 20,755
Disability Retirement	599	7,885,510	13,164
Total Annuitants	25,127	\$ 516,970,781	\$ 20,574

Terminated Members with Contributions Not Withdrawn	Number
Vested Terminated Members	4,776
Non-Vested Terminated Members	23,009
Total Terminated Members	27,785



**Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2022**

Number of Employees

Age	<u>Completed Years of Service</u>												Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+		
<25	336	163	71	62	5									637
25 to 29	386	277	214	359	200	3								1,439
30 to 34	341	277	200	418	660	115	6							2,017
35 to 39	298	242	216	383	700	407	107	3						2,356
40 to 44	231	204	162	310	651	430	324	100	2					2,414
45 to 49	225	142	177	288	538	361	347	258	61	3				2,400
50 to 54	224	165	131	271	547	421	363	315	230	64	1			2,732
55 to 59	162	142	122	248	574	449	377	385	279	160	44			2,942
60 to 64	85	90	76	202	503	392	375	368	242	200	97	38		2,668
65 to 69	29	23	19	68	165	133	95	104	71	54	26	31		818
70 and up	11	8	8	18	42	38	31	21	17	4	10	19		227
Totals	2,328	1,733	1,396	2,627	4,585	2,749	2,025	1,554	902	485	178	88		20,650



**Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2022**

Annual Salaries in Thousands

Age	Completed Years of Service												Totals	
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+		
<25	14,082	6,913	3,021	2,795	264									27,076
25 to 29	17,925	12,732	10,574	18,234	10,615	152								70,232
30 to 34	17,476	14,023	10,550	21,585	38,581	6,839	360							109,415
35 to 39	14,913	12,708	11,459	21,523	43,952	26,594	7,355	217						138,720
40 to 44	11,832	10,136	9,191	16,894	40,183	28,571	22,852	6,966	118					146,743
45 to 49	10,806	7,985	9,247	15,506	32,120	23,604	24,917	19,601	5,191	220				149,198
50 to 54	11,288	8,356	6,775	14,332	31,126	26,317	24,506	22,463	18,334	5,261	89			168,848
55 to 59	7,918	6,920	5,937	13,138	31,699	26,375	24,045	25,696	20,306	12,809	3,092			177,937
60 to 64	3,809	4,288	3,734	10,153	27,917	22,848	22,150	24,815	17,112	14,621	6,833	2,457		160,735
65 to 69	1,658	1,177	950	3,490	8,997	7,343	5,957	6,833	4,628	3,883	1,886	2,383		49,184
70 and up	503	383	402	875	2,047	2,226	1,756	1,259	1,104	268	630	1,406		12,858
Totals	112,210	85,621	71,840	138,526	267,502	170,868	133,897	107,850	66,794	37,062	12,530	6,246		1,210,945



**Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2022**

Average Annual Salary

Age	<u>Completed Years of Service</u>											Totals		
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39		40+	
<25	41,910	42,413	42,553	45,082	52,849									42,505
25 to 29	46,439	45,964	49,412	50,791	53,075	50,535								48,806
30 to 34	51,250	50,623	52,750	51,639	58,456	59,472	60,061							54,246
35 to 39	50,045	52,512	53,050	56,195	62,788	65,342	68,736	72,189						58,880
40 to 44	51,220	49,686	56,736	54,497	61,725	66,443	70,531	69,658	59,081					60,788
45 to 49	48,027	56,233	52,244	53,841	59,702	65,384	71,808	75,972	85,104	73,419				62,166
50 to 54	50,393	50,643	51,715	52,887	56,904	62,511	67,508	71,311	79,715	82,202	88,984			61,804
55 to 59	48,874	48,731	48,664	52,977	55,226	58,742	63,781	66,742	72,783	80,059	70,274			60,482
60 to 64	44,813	47,641	49,125	50,261	55,502	58,285	59,065	67,432	70,709	73,106	70,445	64,650		60,246
65 to 69	57,170	51,191	50,007	51,321	54,526	55,209	62,701	65,703	65,181	71,898	72,539	76,883		60,128
70 and up	45,683	47,852	50,203	48,598	48,739	58,576	56,632	59,971	64,955	66,907	63,028	73,996		56,642
Totals	48,200	49,406	51,461	52,731	58,343	62,157	66,122	69,401	74,051	76,416	70,396	70,977		58,641



**Table D-1:
Active Members Distribution of
Part-Time Employees
as of June 30, 2022**

Number of Employees

Age	Completed Years of Service											Totals		
	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39		40+	
<25	390	128	52	25	1									596
25 to 29	299	112	68	70	29									578
30 to 34	288	119	78	103	99	10								697
35 to 39	258	123	86	144	143	43	4							801
40 to 44	230	132	83	132	173	52	20	7						829
45 to 49	187	95	65	115	171	62	37	15	2					749
50 to 54	215	106	72	102	176	93	59	22	9	2				856
55 to 59	166	94	77	120	203	105	74	60	18	8	1			926
60 to 64	111	97	76	123	175	117	82	54	37	21	11	3		907
65 to 69	75	43	42	70	120	61	42	30	20	12	8	2		525
70 and up	55	30	33	50	83	44	25	23	17	10	7	5		382
Totals	2,274	1,079	732	1,054	1,373	587	343	211	103	53	27	10		7,846



Appendix D: Valuation Data

**Table D-2:
Distribution of Inactive Lives**

The charts reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 50 for an explanation of the number of annuitants used for valuation purposes.

Members Receiving Service Retirement Benefits as of June 30, 2022

<u>Age</u>	<u>Number of Persons</u>	<u>Annual Benefits in Thousands</u>	<u>Average Annual Benefits</u>
<50	5	\$ 194,539	\$ 38,908
50 to 54	136	4,170,860	30,668
55 to 59	549	16,070,745	29,273
60 to 64	2,582	60,593,385	23,468
65 to 69	5,549	124,536,266	22,443
70 to 74	5,596	123,033,089	21,986
75 to 79	3,827	78,279,188	20,454
80 to 84	2,251	40,154,745	17,839
85 to 89	1,166	18,515,251	15,879
90 and up	640	8,508,094	13,294
Totals	22,301	\$ 474,056,162	\$ 21,257

Members Receiving Disability Retirement Benefits as of June 30, 2022

<u>Age</u>	<u>Number of Persons</u>	<u>Annual Benefits in Thousands</u>	<u>Average Annual Benefits</u>
<50	14	\$ 116,991	\$ 8,356
50 to 54	23	346,226	15,053
55 to 59	61	870,913	14,277
60 to 64	101	1,585,587	15,699
65 to 69	126	1,643,577	13,044
70 to 74	125	1,603,236	12,826
75 to 79	77	922,242	11,977
80 to 84	46	491,804	10,691
85 to 89	16	164,058	10,254
90 and up	10	140,876	14,088
Totals	599	\$ 7,885,510	\$ 13,164



Table D-2: Distribution of Inactive Lives

The charts reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 50 for an explanation of the number of annuitants used for valuation purposes.

Survivors of Deceased Retired Members as of June 30, 2022

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	63	\$ 449,748	\$ 7,139
50 to 54	34	449,855	13,231
55 to 59	39	614,509	15,757
60 to 64	83	1,432,611	17,260
65 to 69	165	2,869,991	17,394
70 to 74	270	5,204,392	19,276
75 to 79	265	4,447,603	16,783
80 to 84	287	4,810,974	16,763
85 to 89	257	4,244,486	16,516
90 and up	219	3,382,521	15,445
Totals	1,682	\$ 27,906,690	\$ 16,591

Survivors of Deceased Active Members as of June 30, 2022

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	94	\$ 692,114	\$ 7,363
50 to 54	28	351,304	12,547
55 to 59	46	505,663	10,993
60 to 64	83	1,024,404	12,342
65 to 69	88	1,335,996	15,182
70 to 74	80	1,235,479	15,443
75 to 79	50	768,264	15,365
80 to 84	41	508,095	12,393
85 to 89	20	404,617	20,231
90 and up	15	296,483	19,766
Totals	545	\$ 7,122,419	\$ 13,069



**Table D-2:
Distribution of Inactive Lives**

The charts reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 50 for an explanation of the number of annuitants used for valuation purposes.

**Terminated Vested Members as of June 30, 2022
Number of Persons**

<u>Age</u>	<u>Number</u>
<25	2
25 to 29	59
30 to 34	255
35 to 39	501
40 to 44	580
45 to 49	586
50 to 54	752
55 to 59	909
60 to 64	719
65 to 69	323
70 and above	90
Total	4,776



**Table D-3:
Data Reconciliation**

The following table shows a reconciliation of the participants used in the previous valuation to this valuation. This chart reflects the counts used for valuation purposes as a result of data processing.

	<u>Active Members</u>	<u>Terminated Vested Members</u>	<u>Service Retired Members</u>	<u>Disabled Members</u>	<u>Survivors and Beneficiaries</u>
June 30, 2021 Valuation	29,012	4,372	21,570	640	2,193
Refunds and Non-Vested Terminations	(2,083)	(2)	(14)		
Vested Terminations	(974)	983			
Service Retirements	(1,068)	(319)	1,390		
Disability Retirements	(3)	(1)		4	
Deaths	(20)	(8)	(574)	(42)	(5)
New Entrants	4,170				182
Rehires	626	(153)	(5)		
Benefits Suspended / Expired	(852)	(101)	(85)	(3)	(143)
Transfer to DC Plan	(312)				
Other		5	19		
June 30, 2022 Valuation	28,496	4,776	22,301	599	2,227



Appendix E: Comparative Schedules

Comparative Schedules

This section contains tables that summarize the experience of the System shown in present and past valuation reports.

Table E-1 shows a summary of the active members covered as of the various valuation dates.

Table E-2 shows a summary of the retired and inactive members as of the various valuation dates.

Table E-3 summarizes the contribution rates determined by each annual actuarial valuation.



**Table E-1:
Active Membership Data**

<u>Valuation Date June 30,</u>	<u>Actives</u>	<u>Annual Salaries in Thousands</u>	<u>Average Annual Salary</u>	<u>Average Age</u>	<u>Average Years of Service</u>	<u>Average Hire Age</u>
2022	28,508	1,349,883	47,351	47.3	8.7	38.6
2021	29,028	1,361,590	46,906	47.5	8.9	38.6
2020	29,039	1,280,557	44,098	47.7	9.1	38.6
2019	28,908	1,247,344	43,149	47.9	9.3	38.6
2018	28,646	1,230,105	42,942	48.3	9.8	38.5
2017	29,395	1,232,067	41,914	48.1	9.5	38.5
2016	28,390	1,185,646	41,763	48.3	9.3	39.0
2015	28,237	1,156,855	40,696	48.7	9.6	39.1
2014	28,229	1,129,939	39,709			
2013	28,401	1,098,341	38,673			
2012	28,548	1,078,710	37,786			



Table E-2:
Members in Receipt of Annuities and Inactive Membership Data

Table with 9 columns: Valuation Date, Number, Annual Benefits in Thousands, Average Annual Benefit, Average Current Age, Average Age at Retirement, Average Service at Retirement, Number Vested Terminated, Number Non-Vested Terminated. Rows represent years from 2012 to 2022.



Table E-3:
Contribution Rates

Valuation Date June 30,	Contribution Rates****			Normal Cost Rate**	UAAL Rate***
	Employee	Employer*	Total		
2022	7.90 %	9.07 %	16.97 %	9.76 %	7.21 %
2021	7.90	8.97	16.87	10.04	6.83
2020	7.90	8.87	16.77	10.13	6.64
2019	7.90	8.77	16.67	10.43	6.24
2018	7.90	8.67	16.57	10.57	6.00
2017	7.90	8.57	16.47	10.16	6.31
2016	7.90	8.47	16.37	11.65	4.72
2015	7.90	8.37	16.27	11.49	4.78
2014	7.90	8.27	16.17	11.94	4.23
2013	7.90	8.17	16.07	10.94	5.13
2012*****	7.01	7.17	14.18	11.84	2.34

* Does not include State Statutory Appropriation.

** Includes DB Educational Fund contribution. Includes Administrative expenses for the 2014 through 2021 Valuation Dates.

*** The UAAL rate is the amount available to amortize the UAAL. It is equal to the total contribution rate, minus the normal cost rate.

**** The rates shown are for the fiscal year following the valuation date.

***** Employees hired prior to July 1, 2011 contributed 6.9%. Employees hired on or after July 1, 2011 contributed 7.90%.



Appendix F: Financial Statement Information

The information presented in the required supplementary schedules was determined as part of the actuarial valuation as of June 30, 2022. Additional information as of the latest actuarial valuation follows.

Valuation date	June 30, 2022
Actuarial cost method	Entry Age Normal
Amortization method	Open
Remaining amortization period	30 Years
Asset valuation method	Four-year smoothed market
Actuarial assumptions:	
Investment rate of return*	7.30%
General wage growth*	3.50%
Merit salary increases	0.0% - 6.3%
*Includes inflation	2.75%



Appendix F: Financial Statement Information

Gain and Loss in Accrued Liability During Years Ended June 30 Resulting from Differences Between Assumed Experience and Actual Experience						
Type of Activity	Gain or (Loss) for Year Ending June 30, (expressed in thousands)					
	2017	2018	2019	2020	2021	2022
Investment Income on Actuarial Value of Assets	\$ (17,159)	\$ 52,272	\$ (33,325)	\$ (31,116)	\$ 186,339	\$ 32,812
Combined Liability Experience	(153,660)	(134,065)	34,010	(26,718)	(59,716)	37,112
(Loss)/Gain During Year from Financial Experience	\$ (170,819)	\$ (81,793)	\$ 685	\$ (57,834)	\$ 126,623	\$ 69,924
Non-Recurring Items	(365,869)	0	0	0	0	(296,431)
Composite Gain or (Loss) During Year	\$ (536,688)	\$ (81,793)	\$ 685	\$ (57,834)	\$ 126,623	\$ (226,507)

Schedule of Funding Progress (expressed in thousands)						
Valuation Date June 30,	Actuarial Value of Assets	Actuarial Liability (AAL)	Funded Ratio	Unfunded AAL (UAAL)	Covered Payroll	UAAL as a Percentage of Covered Payroll
2022	\$ 6,770,814	\$ 9,026,784	75%	\$ 2,255,971	\$ 1,349,883	167%
2021	6,514,976	8,534,629	76%	2,019,652	1,361,590	148%
2020	6,099,398	8,234,003	74%	2,134,605	1,280,557	167%
2019	5,903,191	7,957,038	74%	2,053,847	1,247,344	165%
2018	5,705,236	7,730,084	74%	2,024,848	1,230,105	165%
2017	5,514,027	7,578,385	73%	2,064,358	1,232,067	168%



Appendix F: Financial Statement Information

Solvency Test Aggregate Accrued Liabilities for (expressed in thousands)							
Valuation Date June 30,	Active Member Contributions (1)	Retirees & Beneficiaries (2)	Active Member Employer Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Accrued Liability Covered by Reported Assets		
					(1)	(2)	(3)
2022	\$ 916,114	\$ 5,967,163	\$ 2,143,507	\$ 6,770,814	100%	98%	0%
2021	928,430	5,548,658	2,057,541	6,514,976	100%	100%	2%
2020	924,143	5,289,852	2,020,008	6,099,398	100%	98%	0%
2019	898,554	5,028,352	2,030,132	5,903,191	100%	100%	0%
2018	876,608	4,718,929	2,134,547	5,705,236	100%	100%	5%
2017	882,835	4,423,430	2,272,120	5,514,027	100%	100%	9%



Appendix G: Glossary

The following definitions are largely excerpts from a list adopted in 1981 by the major actuarial organizations in the United States. In some cases the definitions have been modified for specific applicability to the Public Employees' Retirement System. Defined terms are capitalized throughout this Appendix.

Accrued Benefit

The amount of an individual's benefit (whether or not vested) as of a specific date, determined in accordance with the terms of a pension plan and based on compensation and service to that date.

Actuarial Accrued Liability

That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of pension plan benefits and expenses which is not provided for by future Normal Costs.

Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disablement, and retirement; changes in compensation, rates of investment earnings, and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; and other relevant items.

Actuarial Cost Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Accrued Liability.

Actuarial Gain (Loss)

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

Actuarial Present Value

The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions.

Actuarial Valuation

The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

Actuarial Value of Assets

The value of cash, investments and other property belonging to a pension plan, as used by the actuary for the purpose of an Actuarial Valuation.

Actuarially Equivalent

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.



Appendix G: Glossary

Amortization Payment

That portion of the pension plan contribution which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Entry Age Actuarial Cost Method

A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a valuation date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability.

Market Value of Assets

The fair value of cash, investments and other property belonging to a pension plan that could be acquired by exchanging them on the open market.

Normal Cost

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.

Projected Benefits

Those pension plan benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits.

Unaccrued Benefit

The excess of an individual's Projected Benefits over the Accrued Benefits as of a specified date.

Unfunded Actuarial Accrued Liability

The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.