
Merced County Employees' Retirement Association

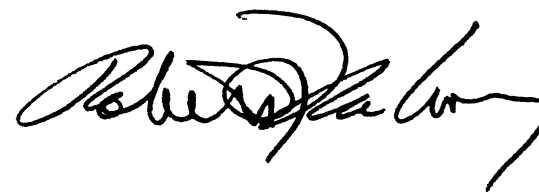
Actuarial Experience Study
July 1, 2007 through
June 30, 2010



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Executive Summary

Purpose

The purpose of this Actuarial Experience Study is to review the actuarial experience of the Merced County Employees' Retirement Association (the Plan) during the period from July 1, 2007 through June 30, 2010.

The Plan's demographic experience – observed rates of retirement, withdrawal, termination, disability, and death – was compared with the experience expected under the actuarial assumptions adopted to determine Plan actuarial liabilities and cost, and revised assumptions are recommended as appropriate. Other demographic assumptions – such as commencement ages for deferred vested members and terminal pay assumptions – are also studied.

In addition, the Plan's economic assumptions were reviewed. The economic assumptions include the assumed rates of inflation, COLA increases, investment return, and active payroll growth.

The purpose of this Summary is to give the reader a quick summary of the major conclusions that have been reached. Details are presented in later sections of this Report.

Prior Experience Studies

The most recent Experience Study for the Plan was conducted by Buck Consultants in 2008, covering the period from July 1, 2004 through June 30, 2007. Based on that study, rates of service retirement, withdrawal, and termination were modified.

Retirement Rates

Over the past three years, actual rates of retirement among General Service and Safety members have been greater than predicted by the current assumptions, particularly among those with at least 20 years of service. Therefore, new sets of retirement rates are proposed for the General and Safety members, with higher rates for those with more service.

The proposed rates would have predicted fewer retirements than actually occurred over the past three years. Since the elevated number of retirements in the recent experience may be a temporary effect of current economic conditions, we have been cautious in assuming these rates will persist.

The proposed rates are the same for males and females, as there do not appear to be significant differences in retirement patterns among male and female members.

Withdrawal Rates

Withdrawal rates measure the frequency with which members terminate employment and withdraw their member contributions.

Overall, the number of withdrawals among General and Safety members were reasonably close to the number expected. However, the rates of withdrawal were much higher for those early in their career, and significantly lower or nonexistent for those with more service. This pattern is not explicitly reflected in the current age-based assumptions.

Accordingly, new service-based withdrawal assumptions are proposed, with rates that decrease as the amount of service increases. The proposed rates retain close agreement with both the total number of withdrawals and with the number of withdrawals at each age; the new rates dramatically increase the agreement with the actual experience by level of service.

Vested Termination Rates

Overall, vested terminations among General and Safety members were below the number expected. For the General members, the actual number of terminations was higher than expected for females and lower than expected for males.

New General and Safety termination rates have been proposed. The proposed General assumptions use separate rates for males and females, with rates depending on service. The proposed combined male and female Safety rates also depend on service.

Based on observed rates of transfer to a reciprocating employer, the proposed General rates reflect an assumption that all members taking a deferred benefit with less than five years of service will transfer to a reciprocal employer, while only 25% of those with five or more years of service at the time of termination will do the same.

For the Safety members, all those who take a deferred benefit with less than five years of service are assumed to transfer to a reciprocal employer, and 50% of those terminate with five or more years of service will do the same.

For both General and Safety, the proposed withdrawal and vested termination rates assume that no terminations or withdrawals will occur once a member is eligible for a service retirement benefit.

Non-Duty Disability Rates

Among General and Safety members, the rates of non-duty disability observed during this study were lower than anticipated by the current assumptions. However, non-duty disability experience was extremely limited; therefore no revisions to the rates have been proposed.

At the time of the next experience study, the experience of the following three years can be combined with that from the current period to form the basis for more reliable conclusions.

Duty Disability Rates

The rates of duty disability were below those expected during the current period. As with the non-duty disabilities, the amount of experience was limited.

However, the experience compiled by Buck during the prior study also reflected lower than expected duty disabilities. Therefore a 50% reduction in the duty-disability rates is proposed for General and Safety members.

Other Demographic Assumptions

An increase in the assumed benefit commencement age for deferred vested Safety members and a slight reduction in the

assumed age for deferred vested General members has been proposed, to better reflect actual member behavior during the course of the current experience study.

No changes to the terminal (Ventura) pay load or the family composition assumptions – the percentage of members electing a surviving spouse or partner at retirement and the number of members assumed to have an eligible survivor in the case of a death during active service – are proposed.

Longevity and Promotion Pay Increases

The current actuarial assumption is that the pay of all active members will increase by 4.50% per year due to inflation. For General members, pay is expected to increase for individual members by an additional 0.5% to 6.5% for merit, longevity and promotion, depending on the age of the member. Similarly for Safety members, pay is expected to increase by an additional 0.5% to 2.0% for merit, longevity and promotion, depending on the age of the members.

An analysis of the average pay of active members reveals that wage increases are more closely tied to service, rather than age. Therefore new assumptions are proposed for General and Safety members, which reflect higher rates of increases in the first few years of the member's career and more limited increase in later years.

Mortality Rates

The number of deaths among service retired members and their survivors was slightly greater than expected under the current

assumptions in this Study, which is desirable, given expected continued mortality improvement in the future.

A recent study by the Society of Actuaries discovered that members with higher benefit amounts have lower rates of death than members with lower benefits. When the MCERA experience was examined using a similar methodology, the analysis indicated that the male rates should be more conservative than they are currently, with lower assumed rates of death.

Therefore, we have proposed the use of the RP 2000 mortality tables, with a two year setback for male members (and no adjustment for females). The same rates are proposed for General and Safety members, as the amount of data for Safety members is extremely limited and there does not appear to be a significant difference in mortality experience between these groups.

The new assumptions proposed for post-retirement mortality would have also done a reasonable job of predicting the mortality experience for the active membership; therefore the same rates will be used for pre- and post-retirement mortality.

We have proposed the use of the RP 2000 mortality tables for disabled members; with an additional age adjustment to bring the expectations more in line with actual experience.

Economic Assumptions

The current inflation assumption of 4.50% is high, based on the opinions of experts and information which can be discerned from the investment markets. Accordingly, we propose a reduction in the inflation assumption from 4.50% to 3.50%. We also propose

that the payroll growth assumption be reduced to 3.50%, reflecting no expected growth in wages above the level of inflation.

We propose a reduction in the effective assumed rate of return on assets (net of administrative and investment expenses) from 8.16% to 7.50%. This represents a slight increase in the real return assumption (the level of expected investment return above inflation), from 3.66% to 4.00%.

We propose a revised rate of expected COLA growth (2.7%), which is derived from simulations of the future level of inflation and is below the 3% COLA cap.

Summary of Experience and Impact on Plan Costs

In the table shown on the following page, we present a summary of experience, the new proposed assumptions where applicable, and the impact of the proposed assumption changes on the overall current Plan cost as a percentage of payroll.

Should all of the recommendations in this Report be adopted, an increase in the total current actuarial cost of approximately 6.8% of pay will result. The employee contributions will also be recomputed as a result of the revised assumptions, and may offset some of the increased cost for the employer.

These assumptions will not determine the ultimate level of employer contributions; instead, the required contributions will depend on the *actual* demographic and financial experience of the Plan. The goal of an experience study is to make our best

estimate of future conditions so that the Plan costs computed by the actuary will be as stable and predictable as possible.

Organization of Report

The first section of the Report deals with decrements among active members and also includes consideration of the merit component of pay increases and other demographic assumptions.

The second section of the Report deals with mortality among active and inactive members.

The third section of the Report concerns economic assumptions.

A final section presents methodological details.

The report has been prepared in accordance with generally accepted actuarial methods and procedures. EFI will be happy to answer any questions from MCERA Board or staff regarding its methodology or conclusions.

Assumption	Experience	Recommendation	Impact on Plan Cost (as a % of payroll)
Service Retirement	More retirements than expected, especially at higher service levels. Little difference between General male and female members	Implement new rates, with higher rates at higher service levels. Combined sex rates for General and Safety.	+ 0.9%
Withdrawal	Fewer withdrawals at high levels of service than expected.	Implement new service-based rates, which decrease as service increases.	+ 1.5%
Termination	Experience varies by group and gender.	Implement new service-based rates, with separate rates for General males and females and Safety members.	<0.1%
Non-Duty Disability	Fewer than expected non-duty disabilities, but very little experience.	No change recommended. Combine experience in next study for more credible data.	0.0%
Duty Disability	Fewer than expected duty disabilities. Also true in prior study.	Reduce duty disability rates by 50%.	- 0.5%
Mortality	Fewer deaths than expected for males, especially when measured on benefit-weighted basis.	Propose use of RP-2000 tables, with age adjustments for male retirees and disabled members. Use same rates for General and Safety.	+ 1.1%
Vested Deferral Age	Average age at commencement higher than expected for Safety, lower for General	Adjust assumed commencement ages to reflect experience.	+ 0.1%
Longevity and Promotion Pay Increases	General and Safety promotion / longevity pay increases tied more to service than age.	Propose new service-based rates, with higher increases early in career.	<0.1%
Terminal (Ventura) Pay Load	Recent retirements reflect increase in pay at retirement close to current assumption.	No change recommended.	0.0%
Family Composition	Current assumptions reasonably reflect experience.	No change recommended.	0.0%
Economic Assumptions	Current inflation assumption (4.5%) and COLA growth (3.0%) are high. Return assumption (8.16%) is optimistic.	Reduce inflation and pay growth assumption to 3.5%. Reduce return assumption to 7.5%. Reduce COLA growth assumption to 2.7%	+ 3.8%
		Total Change	+ 6.8%

Active Decrements: Service Retirement (General)

Current Assumption

Summary of Experience versus Current Assumptions (Ages 50-70)

	Eligible Exposure	Actual Retirements	Expected Retirements	Actual to Expected Ratio
Males	468	73	55.9	130.6%
Females	820	118	94.6	124.7%
Combined	1,288	191	150.5	126.9%

	Actual Average Age	Expected Average Age
Males	59.1	59.4
Females	58.5	58.4
Combined	58.7	58.8

- General members are currently eligible to retire at age 50 (age 55 for Tier 2) with 10 years of membership (though only five years of benefit service is necessary) or at any age with 30 or more years of Eligibility Service.
- We excluded the exposures and decrements for those above age 70 from this analysis, as all members over age 70 are assumed to retire immediately.
- There were about 27% more retirements than expected. In addition, there were significant more retirements than expected among members with more than twenty years of service, and fewer for those with less than twenty years of service.
- Having fewer retirements than expected, especially for the members with higher levels of service, will generally result in an understatement of liabilities and future demographic losses.
- The rates of retirement were similar for male and female members.

Recommendation

Summary of Experience versus Proposed Assumptions (Ages 50-70)

	Eligible Exposure	Actual Retirements	Expected Retirements	Actual to Expected Ratio
Males	468	73	69.5	104.9%
Females	820	118	103.3	114.3%
Combined	1,288	191	172.8	110.5%

	Actual Average Age	Expected Average Age
Males	59.1	59.1
Females	58.5	58.5
Combined	58.7	58.7

- We have proposed new unisex retirement rates, which reflect higher rates of retirement for members with more service. The rates are not applied for Tier 2 before age 55 with less than 30 years of service.
- Experience emerging at CalPERS indicates that retirement rates in California have been fluctuating significantly from year to year. Current economic conditions may be playing a role in this.

Therefore, while we have proposed an increase in the expected number of retirements, we have not proposed as much of an increase as far as recent experience may indicate (the actual to expected ratio is still greater than 100%). We recommend moving in the direction of higher retirement rates, but waiting to gather more data as part of the next experience study before making more significant changes to the assumed rates.
- Charts 1 and 2 show the comparison of the actual and assumed number of retirements for the current and proposed assumptions for various age and service ranges.

General Retirement Rates – Current Assumption

Gender:		
Age	Male	Female
50	6.2%	6.5%
51	4.1%	4.4%
52	4.1%	3.8%
53	6.0%	3.9%
54	3.4%	3.7%
55	7.5%	13.5%
56	7.9%	13.7%
57	16.5%	13.8%
58	8.6%	14.0%
59	18.0%	14.0%
60	16.0%	16.0%
61	16.0%	12.9%
62	34.5%	35.0%
63	18.1%	20.0%
64	22.1%	20.0%
65	25.6%	40.0%
66	25.0%	45.0%
67	40.0%	50.0%
68	70.0%	60.0%
69	80.0%	80.0%
70+	100.0%	100.0%

General Retirement Rates – Proposed Assumption

Service:			
Age	10 – 19 Years	20 – 29 Years	30+ Years
50	2.5%	5.0%	7.5%
51	2.5%	5.0%	7.5%
52	5.0%	10.0%	15.0%
53	5.0%	10.0%	15.0%
54	5.0%	10.0%	15.0%
55	9.0%	18.0%	27.0%
56	7.5%	15.0%	22.5%
57	7.5%	15.0%	22.5%
58	7.5%	15.0%	22.5%
59	7.5%	15.0%	22.5%
60	25.0%	25.0%	37.5%
61	25.0%	25.0%	37.5%
62	25.0%	25.0%	37.5%
63	25.0%	25.0%	37.5%
64	25.0%	25.0%	37.5%
65	40.0%	40.0%	40.0%
66	45.0%	45.0%	45.0%
67	50.0%	50.0%	50.0%
68	60.0%	60.0%	60.0%
69	80.0%	80.0%	80.0%
70+	100.0%	100.0%	100.0%

Chart A-1: MCERA General Comparison of Actual and Expected Retirements

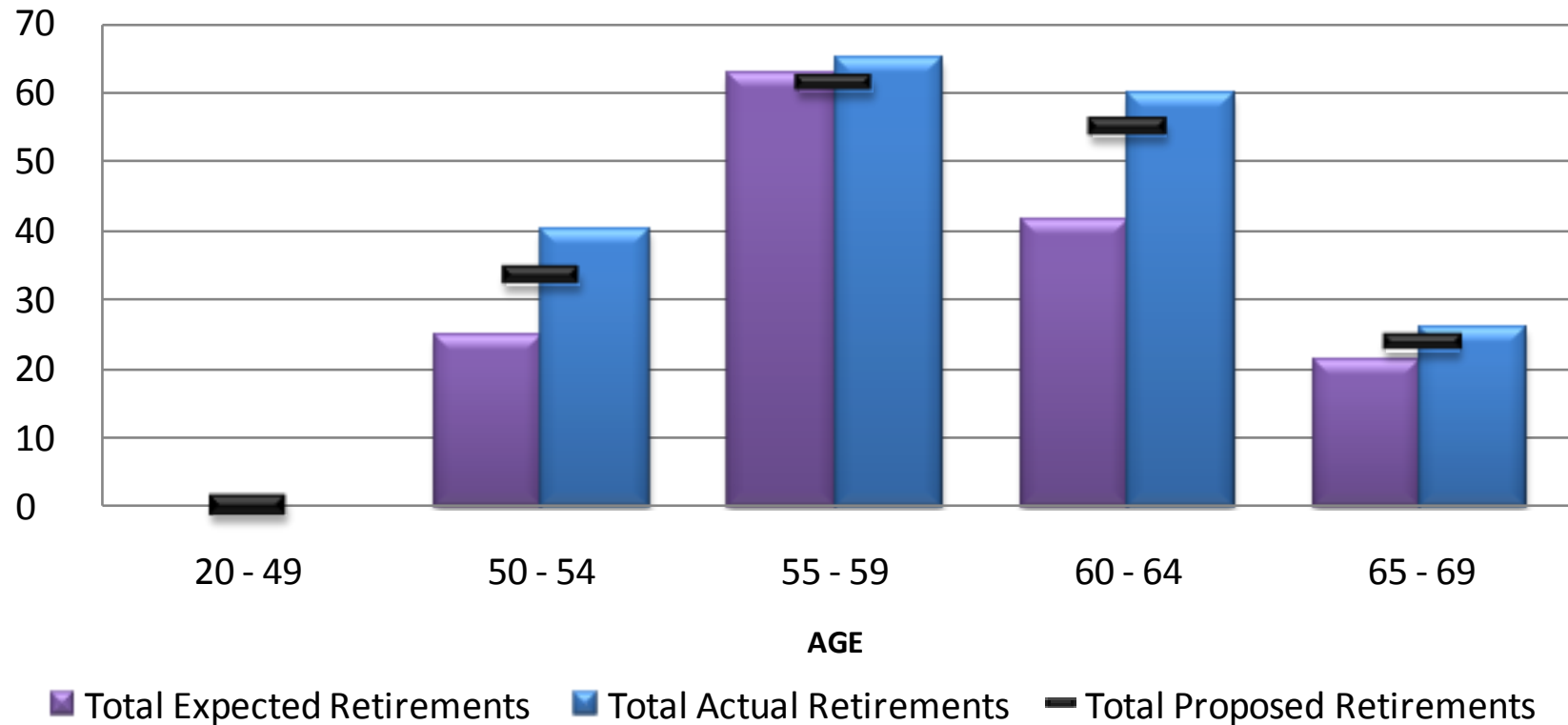


Chart 1: Comparison of Expected, Actual and Proposed Number of Retirements by Age for Male and Female General Service Members
In this chart, we note that the proposed number of retirements is closer to the actual number at each age group.

Chart A-2: MCERA General Comparison of Actual and Expected Retirements

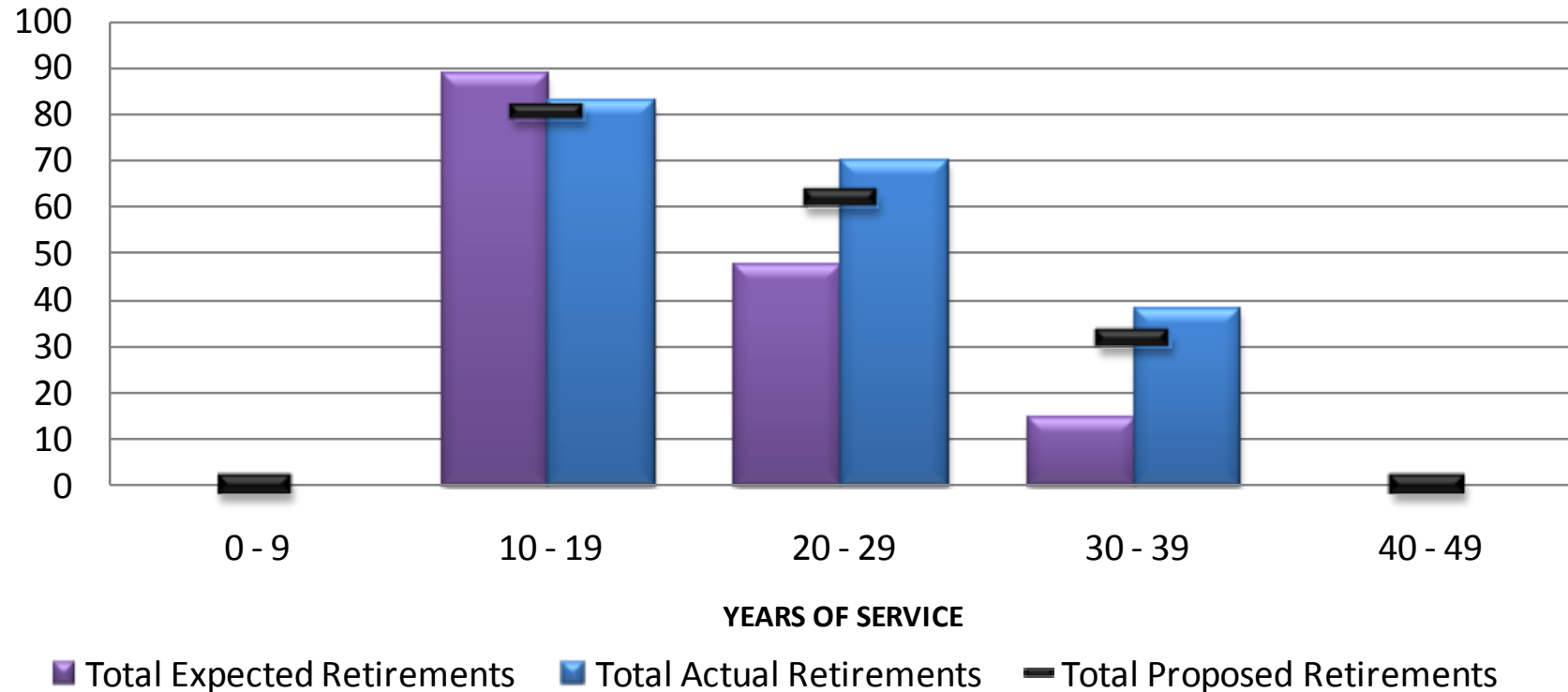


Chart 2: Comparison of Expected, Actual and Proposed Number of Retirements by Service for Male and Female General Service Members
In this chart, we note that the proposed number of retirements is closer to the actual number at each service group.

Service Retirement (Safety)

Current Assumption

Summary of Experience versus Current Assumptions (Ages 40-60)

	Eligible Exposure	Actual Retirements	Expected Retirements	Actual to Expected Ratio
Males	112	15	6.6	227.4%
Females	24	6	1.7	359.4%
Combined	136	21	8.3	254.1%

	Actual Average Age	Expected Average Age
Males	52.2	55.3
Females	53.8	55.2
Combined	52.7	55.3

- Safety members are currently eligible to retire at age 50 with 10 years of service or at any age with 20 or more years of service.
- There were over 150% more retirements than expected. In particular, far more females retired than expected, but the amount of female experience is small and subject to greater variation.
- As with the General members, the actual rates of retirement were higher for members with 20 or more years of service.
- We excluded the exposures and decrements for those above age 60 from this analysis, as most Safety members retire before this age.

Recommendation

Summary of Experience versus Proposed Assumptions (Ages 40-60)

	Eligible Exposure	Actual Retirements	Expected Retirements	Actual to Expected Ratio
Males	112	15	12.9	116.3%
Females	24	6	3.6	167.8%
Combined	136	21	16.5	127.5%

	Actual Average Age	Expected Average Age
Males	52.2	52.6
Females	53.8	52.8
Combined	52.7	52.6

- The proposed assumption reflect higher rates of retirement for those with at least 20 years of service between ages 50 and 59.
- We recommend retaining a single set of rates for both males and females due to the limited amount of female experience.
- As with the General members, we have recommended moving in the direction of higher retirement rates, but waiting to gather more data as part of the next experience study before making more significant changes to the rates.
- Expected average retirement age is in closer agreement with actual experience under the proposed assumptions.
- Chart 3 shows the current, actual and proposed retirement rates by age and Chart 4 show a comparison of the actual and assumed number of retirements for various service ranges.

Safety Retirement Rates – Current Assumption

Age	10-19 Years	20+ Years
40	0.0%	0.0%
41	0.0%	0.0%
42	0.0%	0.0%
43	0.0%	0.0%
44	0.0%	0.0%
45	0.0%	0.5%
46	0.0%	0.8%
47	0.0%	1.1%
48	0.0%	1.7%
49	0.0%	2.5%
50	4.5%	4.5%
51	3.0%	3.0%
52	3.0%	3.0%
53	3.8%	3.8%
54	3.8%	3.8%
55	25.0%	25.0%
56	12.5%	12.5%
57	12.5%	12.5%
58	15.0%	15.0%
59	30.0%	30.0%
60+	100.0%	100.0%

Safety Retirement Rates – Proposed Assumption

Age	10-19 Years	20+ Years
40	0.0%	2.5%
41	0.0%	2.5%
42	0.0%	2.5%
43	0.0%	2.5%
44	0.0%	2.5%
45	0.0%	5.0%
46	0.0%	5.0%
47	0.0%	5.0%
48	0.0%	5.0%
49	0.0%	5.0%
50	7.5%	25.0%
51	7.5%	25.0%
52	7.5%	25.0%
53	7.5%	25.0%
54	7.5%	25.0%
55	7.5%	25.0%
56	7.5%	25.0%
57	7.5%	25.0%
58	7.5%	25.0%
59	7.5%	25.0%
60+	100.0%	100.0%

Chart A-3: MCERA Safety Comparison of Actual, Current and Proposed Retirement Rates

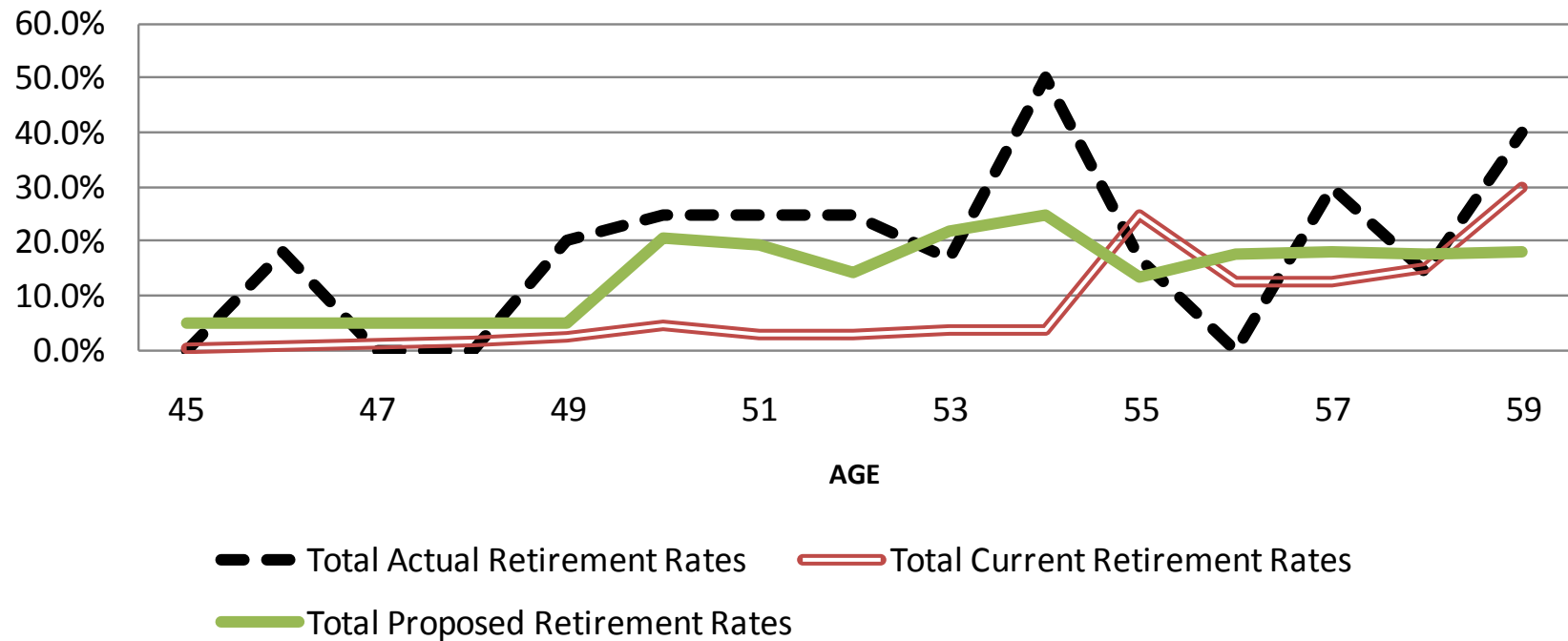


Chart 3: Comparison of Actual and Proposed Retirement Rates (weighted average) by Age, Male and Female Safety Members
 In this chart, we note that the proposed retirement rates are closer to the actual rates.

Chart A-4: MCERA Safety Comparison of Actual and Expected Retirements

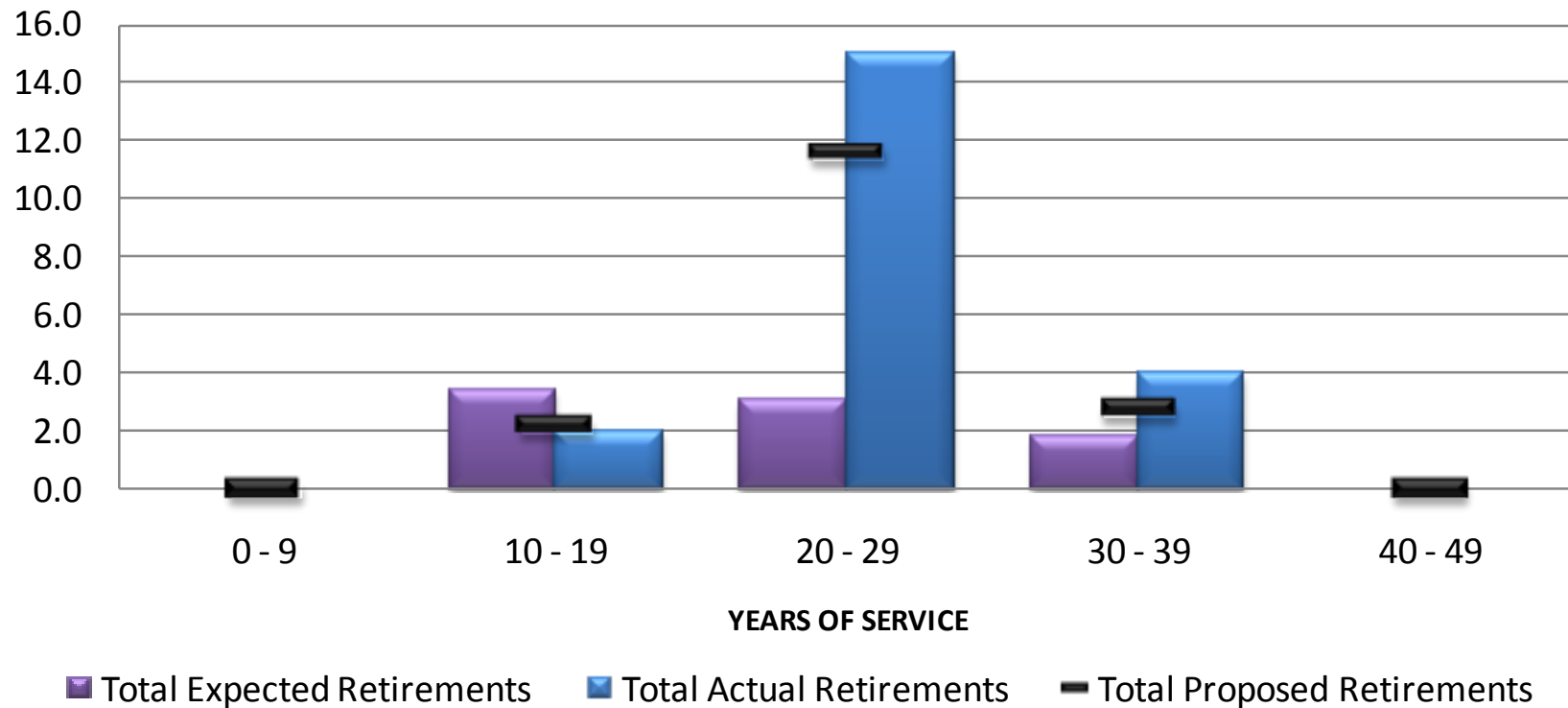


Chart 4: Comparison of Expected, Actual and Proposed Number of Retirements by Service for Male and Female Safety Members
 In this chart, we note that the proposed number of retirements is closer to the actual number at each service group.

Withdrawal (General)

Current Assumption

Summary of Experience versus Current Assumptions

	Eligible Exposure	Actual Withdrawals	Expected Withdrawals	Actual to Expected Ratio
Males	1,344	93	101.3	91.8%
Females	3,099	211	216.3	97.5%
Combined	4,443	304	317.6	95.7%

	Actual Average Age	Expected Average Age
Males	39.3	36.0
Females	38.0	35.0
Combined	38.4	35.3

- A withdrawal occurs when a member terminates employment and withdraws his or her member contributions.
- The current withdrawal rates are based on age, decreasing as the members gets older. However, in our experience withdrawal rates are much more strongly related to service, generally decreasing as service increases. This was true for MCERA over the study period.
- Even though the number of withdrawals was close to expected under the current assumptions, the use of age-based withdrawal rates will understate liabilities, since it is unlikely that members with high levels of service will withdraw their contributions, regardless of age.
- The rates of withdrawal were similar for male and female members.

Recommendation

Summary of Experience versus Proposed Assumptions

	Eligible Exposure	Actual Withdrawals	Expected Withdrawals	Actual to Expected Ratio
Males	1,344	93	91.1	102.1%
Females	3,099	211	202.8	104.1%
Combined	4,443	304	293.9	103.5%

	Actual Average Age	Expected Average Age
Males	39.3	39.3
Females	38.0	37.5
Combined	38.4	38.2

- We propose the use of a new unisex set of service-based withdrawal rates.
- The proposed unisex assumptions maintain a close match between the total actual and expected number of withdrawals, for both males and females. In addition, there is much stronger agreement between actual and expected behavior at each age and level of service [see Charts 5 and 6].
- As part of the last actuarial valuation, EFI recommended that withdrawal rates not be applied once a member is eligible for a service retirement. During the period of the experience study, only two members withdrew their contributions who qualified for a service retirement, both of whom had less than 15 years of service. We recommend continuing to assume that no member will withdraw once eligible for a service retirement benefit.

General Withdrawal Rates – Current Assumption

Sample Ages	Male	Female
20	20.9%	17.2%
25	18.2%	16.1%
30	14.9%	12.7%
35	12.0%	9.4%
40	6.7%	5.2%
45	4.8%	4.6%
50	3.0%	3.3%
55	2.1%	2.3%
60	1.3%	1.0%
65	0.0%	0.0%

No withdrawals are assumed for participants who are eligible for retirement.

General Withdrawal Rates – Proposed Assumption

Service	Unisex, All Ages
0	33.0%
1	15.0%
2	10.0%
3 – 4	7.0%
5 - 6	3.0%
7 - 19	1.5%
20 - 29	0.5%
30 +	0.0%

No withdrawals are assumed for participants who are eligible for retirement.

Chart A-5: MCERA General Comparison of Actual, Current and Proposed Withdrawal Rates

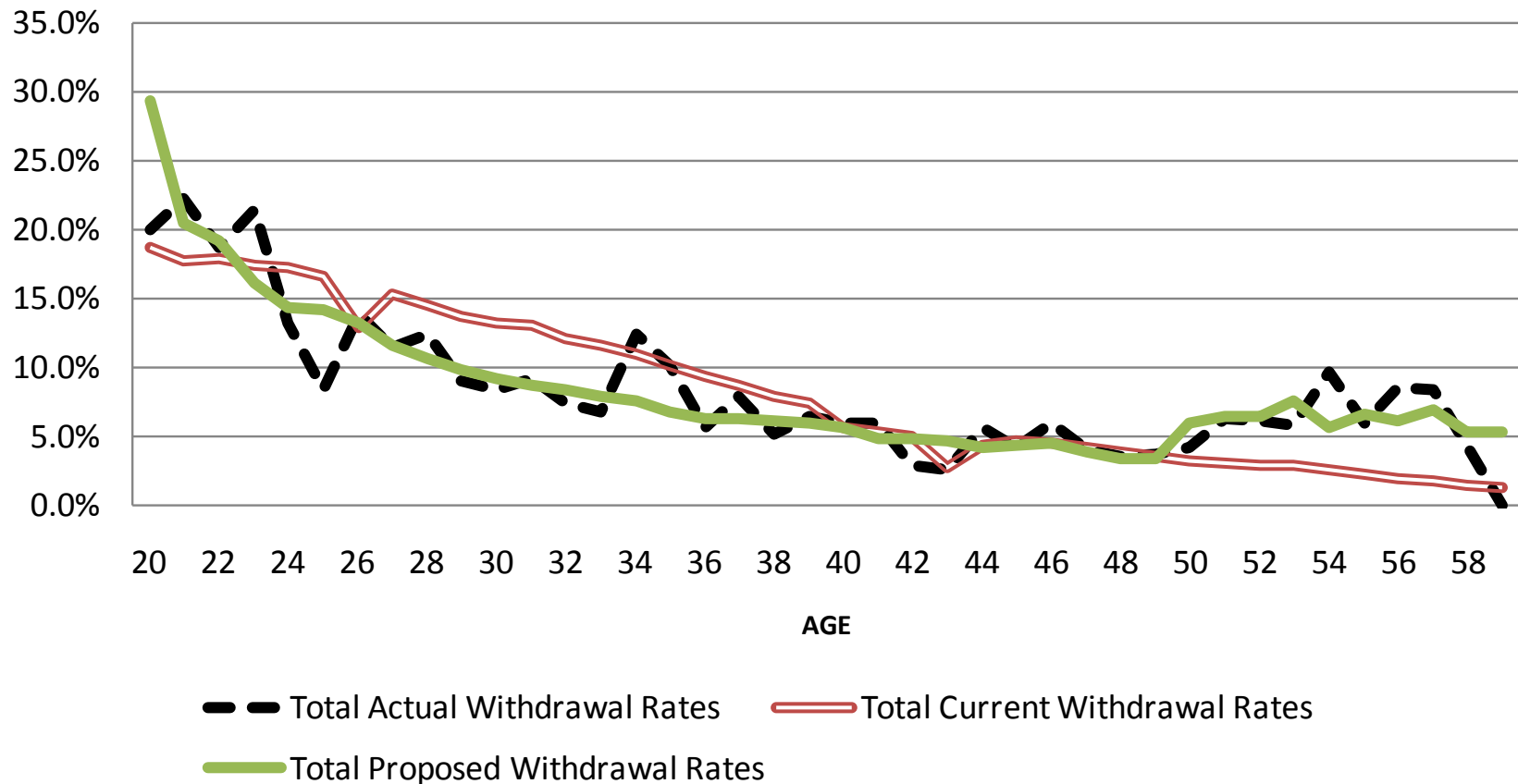


Chart 5: A comparison of the actual, current and proposed withdrawal rates (weighted by age) for male and female General members. We note that the proposed rates are closer to the actual rates, even though the proposed rates are based on service rather than age.

Chart A-6: MCERA General Comparison of Actual, Current and Proposed Withdrawal Rates

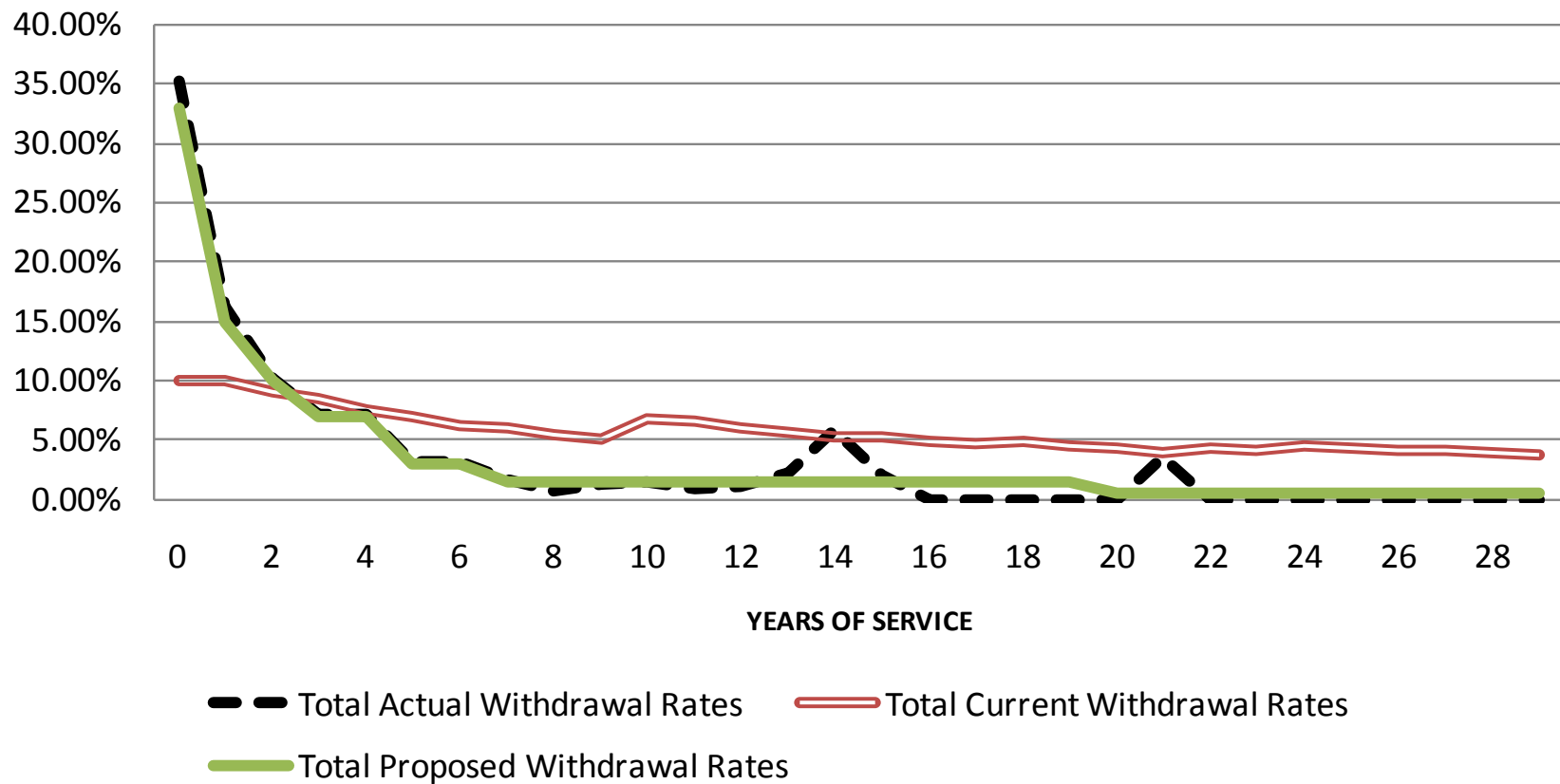


Chart 6: A comparison of the actual, current and proposed withdrawal rates (weighted by service) for male and female General members. We note that the proposed service-based rates are much closer to the actual rates than the current age-based rates.

Withdrawal (Safety)

Current Assumption

Summary of Experience versus Current Assumptions (Ages 20-59)

	Eligible Exposure	Actual Withdrawals	Expected Withdrawals	Actual to Expected Ratio
Males	601	33	34.7	95.0%
Females	246	14	15.7	89.1%
Combined	847	47	50.5	93.2%

	Actual Average Age	Expected Average Age
Males	31.3	30.0
Females	29.4	29.6
Combined	30.7	29.9

- Currently, a single table of age-based rates is used for males and females.
- Withdrawal rates should be related to service, decreasing as service increases, to a rate of 0% at 10 years of service.
- The number of actual withdrawals was lower than the number of members who were expected to withdraw their contributions, particularly among those with higher levels of service, resulting in actuarial losses.

Recommendation

Summary of Experience versus Proposed Assumptions (ages 20-59)

	Eligible Exposure	Actual Withdrawals	Expected Withdrawals	Actual to Expected Ratio
Males	601	33	34.2	96.5%
Females	246	14	14.2	98.9%
Combined	847	47	48.4	97.2%

	Actual Average Age	Expected Average Age
Males	31.3	29.7
Females	29.4	30.1
Combined	30.7	29.8

- A unisex set of service-based withdrawal rates is proposed, reflecting rates of withdrawal that decrease with service.
- No withdrawals are expected to occur after 10 years.
- Charts 7 and 8 demonstrate that there is still strong agreement between actual and expected behavior at each age and much stronger agreement under each level of service under the proposed service-based rates compared to the current age-based rates.

Safety Withdrawal Rates – Current Assumption

Sample Ages	Rate
20	13.0%
25	10.0%
30	7.8%
35	5.0%
40	2.5%
45	1.6%
50	0.9%

No withdrawals are assumed for participants who are eligible for retirement or are age 55 or older.

Safety Withdrawal Rates – Proposed Assumption

Service	All Ages
0	25.0%
1	12.5%
2 - 4	5.0%
5 - 7	2.5%
8 - 9	1.0%
10+	0.0%

No withdrawals are assumed for participants who are eligible for retirement.

Chart A-7: MCERA Safety Comparison of Actual, Current and Proposed Withdrawal Rates

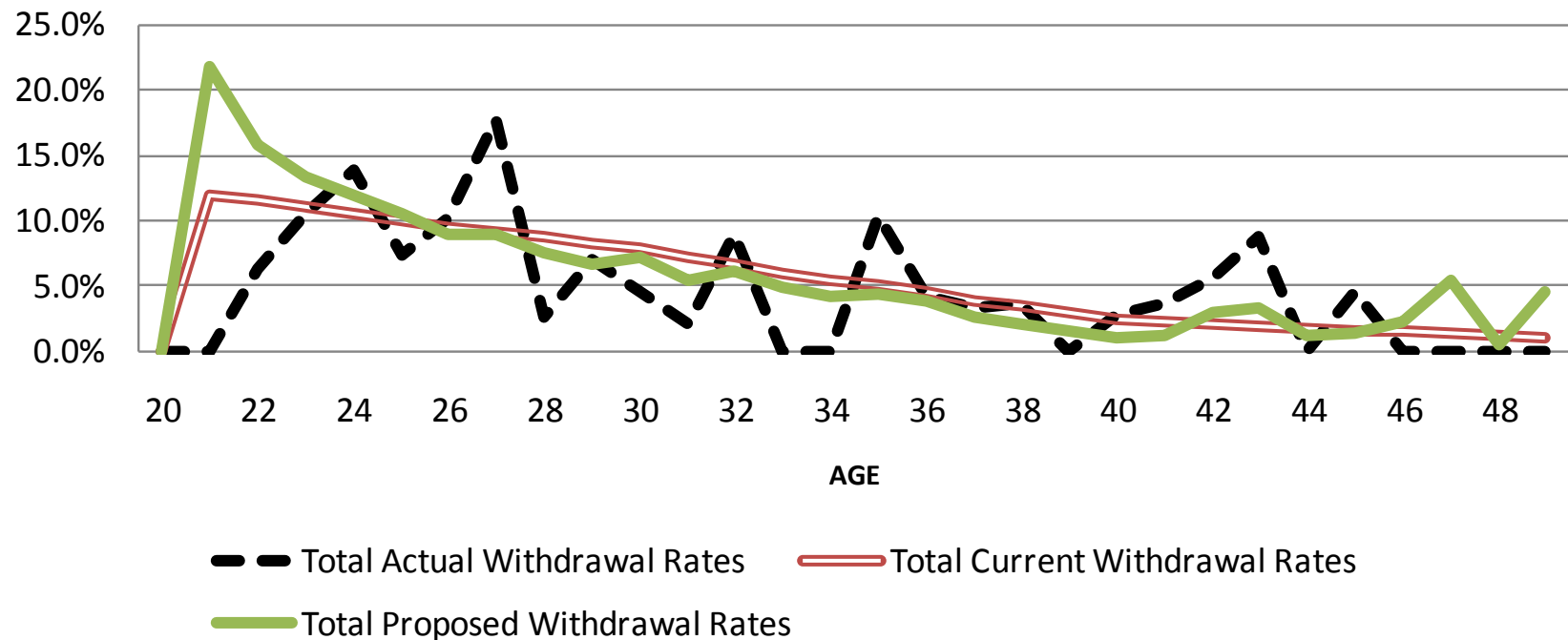


Chart 7: A comparison of the actual, current and proposed withdrawal rates (weighted by age) for male and female Safety members. We note that the proposed service-based rates are as close to the actual rates as the current age-based rates.

Chart A-8: MCERA Safety Comparison of Actual, Current and Proposed Withdrawal Rates

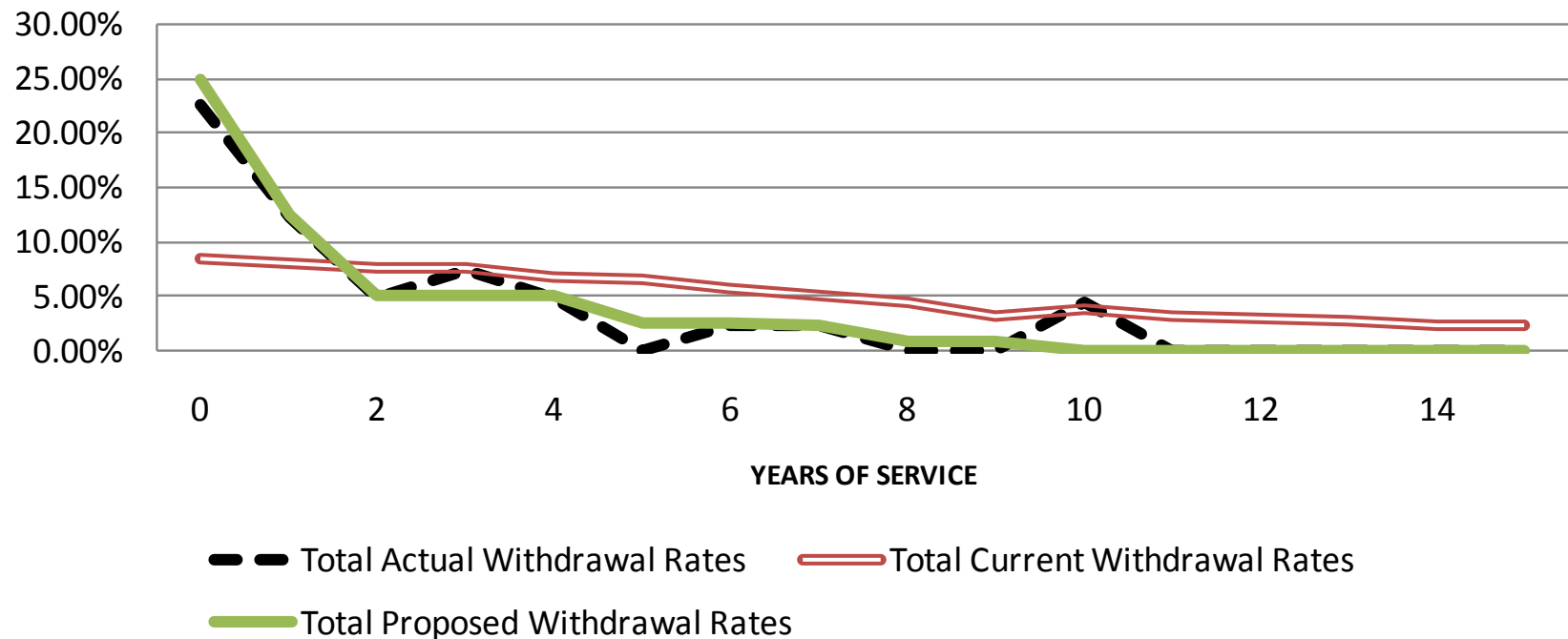


Chart 8: A comparison of the actual, current and proposed withdrawal rates (weighted by service) for male and female Safety members. We note that the proposed service-based rates are much closer to the actual rates than the current age-based rates.

Vested Termination (General)

Current Assumption

Summary of Experience versus Current Assumptions

	Eligible Exposure	Actual Terminations	Expected Terminations	Actual to Expected Ratio
Males	1,344	36	27.6	130.3%
Females	3,099	68	91.0	74.4%
Combined	4,443	104	118.6	87.7%

	Actual Average Age	Expected Average Age
Males	45.5	42.8
Females	46.1	40.5
Combined	45.9	41.0

- A vested termination occurs when a member terminates employment and leaves his or her member contributions in the Plan. If a member leaves and begins employment with a reciprocal employer, this is counted as a transfer.
- Currently, age-based termination rates are used, with separate tables used for each sex. Vested termination rates do not appear to be strongly correlated to age.
- The actual number of vested terminations was higher than the expected number for females and lower for males.
- Members with less than five years of service at termination have been assumed to take a refund of contributions, unless they have transferred to a reciprocal agency. This assumption has very little impact on the Plan's liabilities.

Recommendation

Summary of Experience versus Proposed Assumptions

	Eligible Exposure	Actual Terminations	Expected Terminations	Actual to Expected Ratio
Males	1,344	36	34.4	104.8%
Females	3,099	68	67.5	100.7%
Combined	4,443	104	101.9	102.1%

	Actual Average Age	Expected Average Age
Males	45.5	43.7
Females	46.1	43.1
Combined	45.9	43.3

- New assumptions are proposed, comprised of separate service-based tables for males and females.
- The proposed assumptions bring the expected number of terminations within 6% of the actual number. In addition, there is much stronger agreement between actual and expected behavior at each age and service grouping [see Charts 9 and 10].

General Vested Termination Rates – Current Assumption

Age	Male	Female
20	0.0%	0.0%
25	1.1%	2.3%
30	1.9%	1.9%
35	2.4%	4.6%
40	2.3%	2.3%
45	2.3%	4.4%
50	2.3%	2.0%
55	1.8%	1.7%
60	1.5%	1.4%
65	0.0%	0.0%

- 50% of those who terminate are assumed to transfer to a reciprocal employer.

The number of reciprocal transfers reported over the past three years has been less than this assumption: only 15 out of 95 members who terminated with a vested benefit (at least five years of service) were reported as transferring to a reciprocal employer. However, data concerning the number of members who transfer is not always accurate, because there is difficulty tracking the employment history of members after they terminate service with the County.

General Vested Termination Rates – Proposed Assumption

Service	Male	Female
0-4 years	1.0%	0.5%
5-9 years	3.3%	4.0%
10-19 years	5.5%	2.5%
20-29 years	2.0%	2.5%
30+ years	0.0%	0.0%

- No terminations are assumed for participants who are eligible for retirement.
- We recommend an assumption that 25% of those who terminate with at least five years of service will transfer to a reciprocal employer, and 100% of those terminating with less than five years of service will transfer.

Chart A-9: MCERA General Comparison of Actual and Expected Terminations

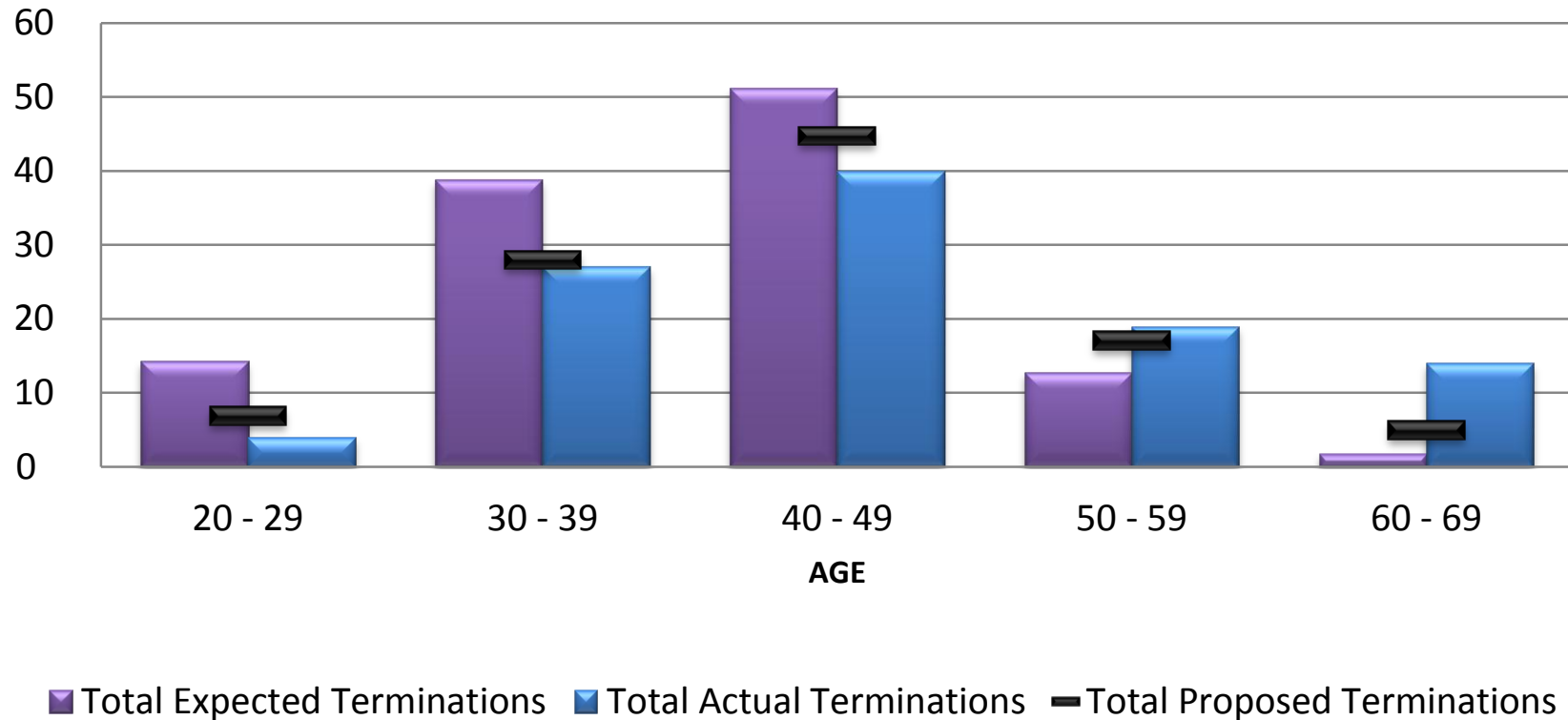


Chart 9: Comparison of Expected, Actual and Proposed Number of Terminations by Age for Male and Female General Service Members
 In this chart, we note that the proposed number of terminations is closer to the actual number at each age group.

Chart A-10: MCERA General Comparison of Actual and Expected Terminations

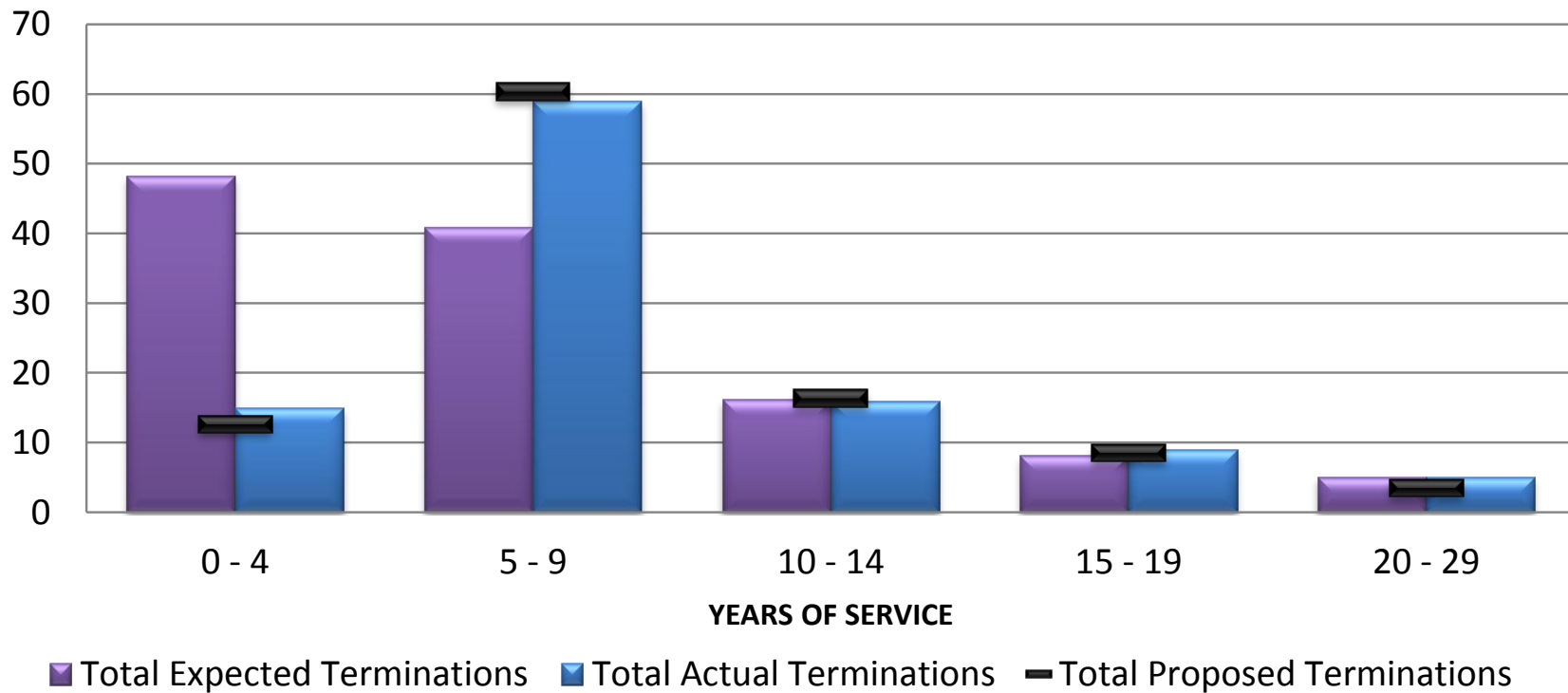


Chart 10: Comparison of Expected, Actual and Proposed Number of Terminations by Service for General Service Members
In this chart, we note that the proposed number of terminations is closer to the actual number at the early service groups.

Vested Termination (Safety)

Current Assumption

Summary of Experience versus Current Assumptions (Ages 20-59)

	Eligible Exposure	Actual Terminations	Expected Terminations	Actual to Expected Ratio
Males	601	13	16.4	79.0%
Females	246	7	7.3	95.3%
Combined	847	20	23.7	84.1%

	Actual Average Age	Expected Average Age
Males	35.5	32.5
Females	32.4	31.7
Combined	34.5	32.3

- Currently, termination rates that decrease with age are used, with a single table used for both sexes.
- It is assumed that 50% of those who terminate will go to work with a reciprocal employer. Over the three year study period, 50% of those who terminated with at least five years of service were reported as transferring to a reciprocal employer, consistent with the assumption.
- There is little vested termination experience among the safety members, particularly for the female members. However, the actual number of vested terminations was greater than expected.
- Members with less than five years of service at termination have been assumed to take a refund of contributions, unless they have transferred to a reciprocal agency.

Recommendation

Summary of Experience versus Proposed Assumptions (ages 20-59)

	Eligible Exposure	Actual Terminations	Expected Terminations	Actual to Expected Ratio
Males	601	13	14.2	91.7%
Females	246	7	6.3	111.8%
Combined	847	20	20.5	97.9%

	Actual Average Age	Expected Average Age
Males	35.5	35.3
Females	32.4	33.7
Combined	34.5	34.8

- For the most recent three year period, rates of termination were more closely tied to service than age. Due to the small amount of experience for females, unisex rates are recommended.
- The proposed assumptions are service-based, and bring the expectations closer to recent experience and improve agreement in the number of terminations by age [see Chart 11]. In addition, there is much stronger correlation between actual and expected behavior based on service [see Chart 12].
- Based on the experience over the past three years, it is appropriate to maintain the assumption that 50% of those who terminate will go to work with a reciprocal employer, except that all of those who terminate with less than five years of service will be assumed to transfer to a reciprocal employer.

Safety Vested Termination Rates – Current Assumption (Representative Rates)

Age	Termination Rate
20	0.0%
25	3.1%
30	4.5%
35	2.3%
40	1.7%
45	1.4%
50+	0.7%

- No terminations are assumed for participants who are eligible for retirement.

Safety Vested Termination Rates – Proposed Assumption

Service	Termination Rate
0-4 years	1.5%
5-9 years	4.5%
10-14 years	3.0%
15-19 years	0.5%
20+ years	0.0%

- No terminations are assumed for participants who are eligible for retirement.

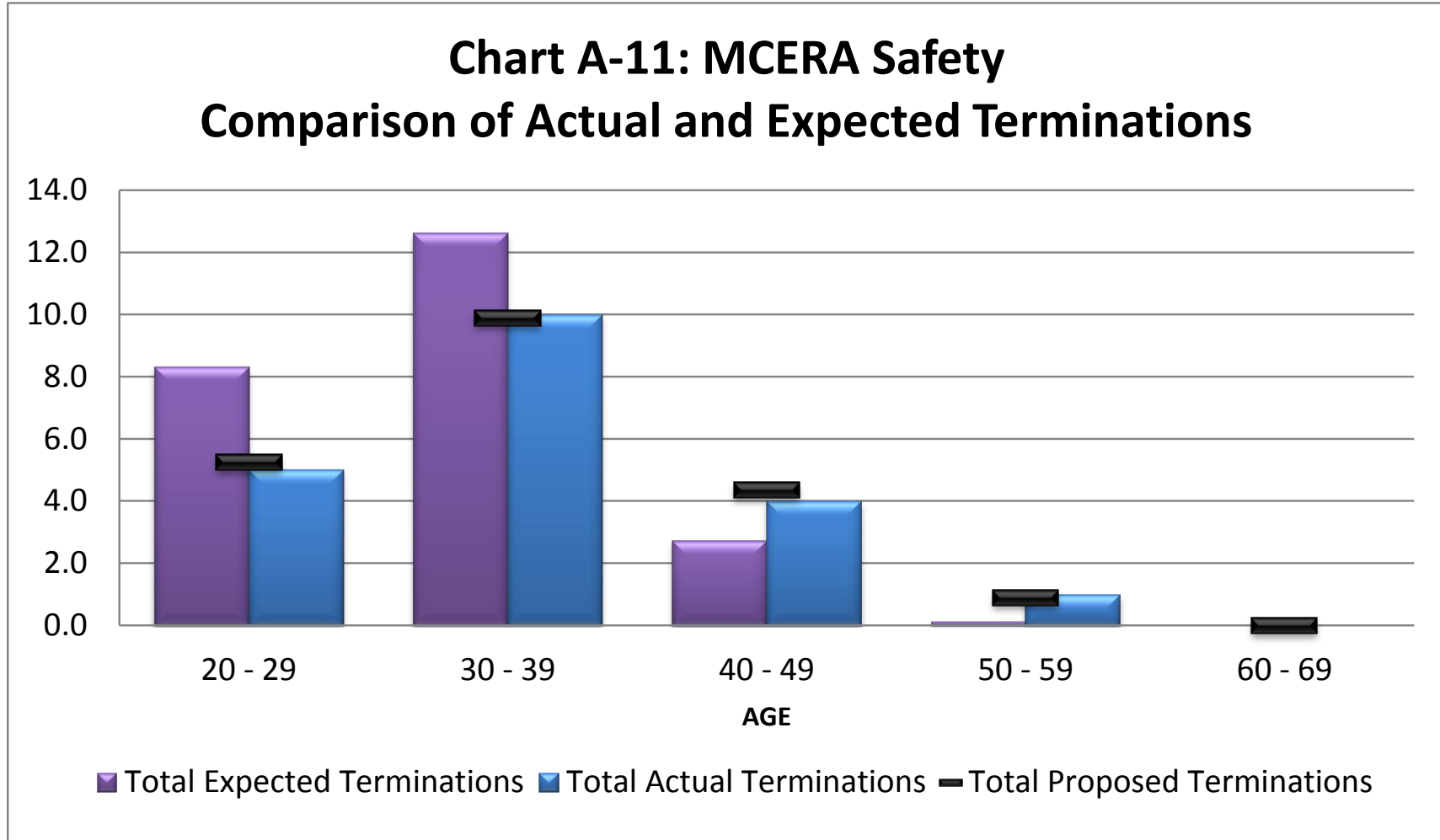


Chart 11: Comparison of Expected, Actual and Proposed Number of Terminations by Age for Male and Female Safety Members
In this chart, we note that the proposed number of terminations is closer to the actual number at each age group.

Chart A-12: MCERA Safety Comparison of Actual and Expected Terminations

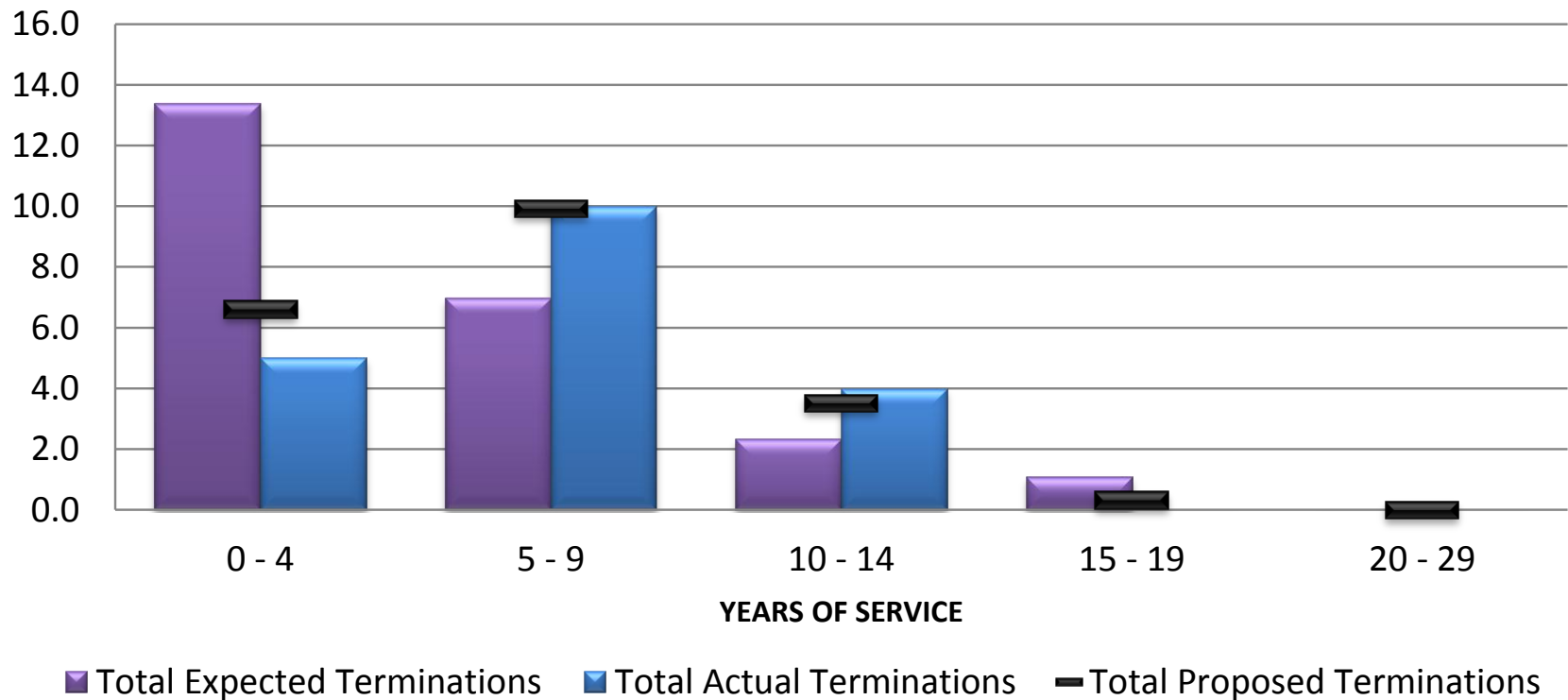


Chart 12: Comparison of Expected, Actual and Proposed Number of Terminations by Service for Safety Members
In this chart, we note that the proposed number of terminations is closer to the actual number at the all service groups.

Non-Duty Disability (General)

Current Assumption

Summary of Experience versus Current Assumptions

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	1,206	2	2.9	68.3%
Females	2,578	3	4.5	67.0%
Combined	3,784	5	7.4	67.5%

	Actual Average Age	Expected Average Age
Males	49.5	52.6
Females	47.3	54.0
Combined	48.2	53.5

- Members are eligible for non-duty disability retirement if they are permanently disabled after five years of service.
- The overall number and rate of actual and expected disabilities are relatively low.
- There were slightly fewer disabilities than expected.

Recommendation

- Over the study period, the number of non-duty disabilities occurring has been close to the number assumed, for both males and females; therefore no changes to this assumption are recommended.

Current Representative Assumed Rates

Age	Male	Female
20	0.00%	0.00%
25	0.04%	0.01%
30	0.08%	0.02%
35	0.08%	0.03%
40	0.13%	0.04%
45	0.19%	0.09%
50	0.24%	0.18%
55	0.32%	0.28%
60	0.42%	0.46%

- We recommend that the ordinary disability rates not be applied to members with less than five years of service, as they are not eligible to receive a non-duty related disability benefit.

Non-Duty Disability (Safety)

Current Assumption

Summary of Experience versus Current Assumptions (Aggregated)

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	405	0	0.3	0.0%
Females	137	0	0.1	0.0%
Combined	542	0	0.4	0.0%

- Members are eligible for non-duty disability retirement if they are permanently disabled after five years of service.
- The amount of experience is extremely limited: there were no non-duty disabilities during the past three years, and less than one expected.

Recommendation

- There are only a few non-duty disabilities for safety members. This lack of data means that we should be cautious in changing our assumptions.
- We proposed retaining the current assumptions for safety non-duty disability rates until the next experience study, when the data for the next three years can be aggregated with the experience from the current study.

Safety Non-Duty Disability Rates –Representative Assumed Rates

Age	Unisex
20	0.00%
25	0.02%
30	0.03%
35	0.04%
40	0.06%
45	0.09%
50	0.12%
55	0.16%
60	0.00%

- We recommend that the ordinary disability rates not be applied to members with less than five years of service, since they are not eligible to receive a non-duty related disability benefit.

Duty Disability (General)

Current Assumption

Summary of Experience versus Current Assumptions

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	1,812	0	2.9	0.0%
Females	3,919	2	4.0	50.4%
Combined	5,731	2	6.9	29.0%

- Members are eligible for service-connected disability retirement if they are permanently disabled in the line of duty.
- Current assumptions for service-connected disabilities are based on age and gender, and are applied to all General members.
- The number of actual male and female duty-related disabilities was below the expected number in the most recent three-year period, although the experience is extremely limited. In addition, the prior experience study performed by Buck Consultants also indicated a very low number of service-connected disabilities (0 male, 1 female).

General Duty Disability – Current Assumption (Representative Rates)

Age	Male	Female
20	0.008%	0.008%
25	0.016%	0.015%
30	0.040%	0.023%
35	0.072%	0.030%
40	0.096%	0.038%
45	0.144%	0.068%
50	0.192%	0.120%
55	0.240%	0.210%
60	0.336%	0.315%

Recommendation

Summary of Experience versus Proposed Assumptions

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	1,812	0	1.5	0.0%
Females	3,919	2	2.0	100.8%
Combined	5,731	2	3.5	57.9%

- Due to the low number of service-connected disabilities in the current and previous studies, the current rates were reduced by 50% to produce new duty disability rates. These rates produce a lower overall number of expected disabilities.
- Because of the paucity of the experience, we propose combining the experience of the current period with that of the next period to obtain a more robust sample from which to formulate conclusions.

General Duty Disability – Proposed Assumption (Representative Rates)

Age	Male	Female
20	0.004%	0.004%
25	0.008%	0.008%
30	0.020%	0.012%
35	0.036%	0.015%
40	0.048%	0.019%
45	0.072%	0.034%
50	0.096%	0.060%
55	0.120%	0.105%
60	0.168%	0.158%

Duty Disability (Safety)

Current Assumption

Summary of Experience versus Current Assumptions

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	713	4	8.8	45.5%
Females	270	0	3.0	0.0%
Combined	983	4	11.8	34.0%

- Members are eligible for service-connected disability retirement if they are permanently disabled in the line of duty.
- Current assumptions for service-connected disabilities are based on age, and are applied to all Safety members.
- The number of actual duty-related disabilities was below the expected number in the most recent three-year period, although the experience is extremely limited. In addition, the prior experience study performed by Buck Consultants also indicated a very low number of service-connected disabilities (1 Safety duty-disability).

Safety Duty Disability – Current Assumption (Representative Rates)

Age	Rate
20	0.650%
25	0.725%
30	0.838%
35	1.013%
40	1.275%
45	1.563%
50	1.988%
55	2.087%
60	0.000%

Recommendation

Summary of Experience versus Proposed Assumptions

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	713	4	4.4	91.0%
Females	270	0	1.5	0.0%
Combined	983	4	5.9	67.9%

- Due to the low number of service-connected disabilities in the current and previous studies, the current rates were reduced by 50% to produce new duty disability rates. These rates produce a lower overall number of expected disabilities.
- Because of the paucity of the experience, we propose combining the experience of the current period with that of the next period to obtain a more robust sample from which to formulate conclusions.

Safety Duty Disability – Proposed Assumption (Representative Rates)

Age	Rate
20	0.325%
25	0.363%
30	0.419%
35	0.506%
40	0.638%
45	0.782%
50	0.994%
55	1.263%
60	0.000%

Other Demographic Assumptions

<p>Terminal (Ventura) Pay Load</p> <ul style="list-style-type: none"> • Under the Ventura Settlement, members are able to cash out some or all of their leave time (up to 160 hours) in the year prior to retirement; the cashed out pay then gets included in the members' final average compensation. • The prior actuary (Buck Consultants) included a load of 6.92% for Tier 1 members and 2.31% for Tier 2 members to Final Average Compensation to account for this cash out. • This is equivalent to assuming that members will cash out 90% of the maximum allowable time in the year of retirement: $90\% \times 160 \text{ hours} / 2080 \text{ hours worked per year} = 6.92\%$ for Tier 1. The load is divided by 3 for Tier 2 ($6.92\% / 3 = 2.31\%$) to account for the fact that these members use three year averaging for their final compensation. • We performed an analysis of the retirement calculations which occurred during the prior year. As part of this analysis, we compared the final average compensation in the actual benefit calculations to the expected final compensation based on the rate of pay from the prior valuation data and any known pay raises that occurred during the year. • For the 84 Tier 1 members who retired from active status for whom we had prior year pay information, the actual final average compensation exceeded the expected value by around 7.5%. There were not enough retiring Tier 2 members to formulate reliable results. 	<p>Recommendation</p> <ul style="list-style-type: none"> • We believe the current terminal pay loads (6.92% to Tier 1, 2.31% for Tier 2) are reasonable and recommend that they be retained.. • These terminal pay loads will continue to be applied only to retirement benefits. • We will continue to monitor terminal pay experience and adjust this assumption as necessary. Modifications may also be necessary if there are any changes to the terminal payout policies, or if there are any changes to the policies which govern the accumulation of leave.
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<p>Commencement Age for Deferred Vested Members</p> <ul style="list-style-type: none"> • Currently, General members with a deferred vested benefit (including those working for a reciprocal employer) are assumed to commence receiving benefits at age 60. Safety members are assumed to have their benefits commence at age 50. • The actual average commencement age for the period of this study for the General members was 59, close to the current deferral age. • The average commencement age for the current study period was 56 for Safety members, significantly later than the current assumption. • Under the prior retirement formula, the maximum Safety benefit did not occur until age 55. Under the current formula the maximum benefit is reached at age 50. • Some members may choose to defer their retirement beyond their maximum formula date, particularly if they are currently working for a reciprocal employer. 	<p>Recommendation</p> <ul style="list-style-type: none"> • We recommend a change to the assumed commencement age for deferred vested General members, reducing it from 60 to 59. We recommend that the Safety member commencement age be increased from 50 to 53. • We will continue to monitor this assumption. In particular for the Safety members, we anticipate that the average commencement age may change over time as the members employed under the new benefit formula begin to supplant the members under the prior formula.
<p>Family Composition</p> <ul style="list-style-type: none"> • Currently, 50% of General female members, 80% of General male members and 90% of Safety members (regardless of gender) are assumed to be married and elect an unmodified retirement allowance at retirement, thereby making them eligible for an unreduced 60% survivor's benefit (100% if the retirement is related to a duty disability). • We calculated the liabilities of the retired members of the Plan using the actual benefit elections for the current retirees and disabled members. We also calculated the liabilities of the Plan using the assumed percentages of members with covered spouses and unmodified benefits, instead of using their actual elections. • The liabilities under the actual elections were very close to the liabilities computed under the assumed elections (within 0.5%). 	<p>Recommendation</p> <ul style="list-style-type: none"> • We recommend that the current family composition assumptions be retained.

Longevity and Promotion Pay Increases (General)

Pay increases consist of three components: Increases due to cost of living maintenance (inflation), increases related to non-inflationary pressures on base pay (such as productivity increases), and increases in individual pay due to merit, promotion, and longevity. Increases due to cost of living and non-inflationary base pay factors are addressed in a later section of this report.

Current Assumption

Age	Current Representative Assumed Increase
20	6.52%
25	2.43%
30	1.03%
35	1.10%
40	0.82%
45	0.45%
50	0.56%
55	0.54%

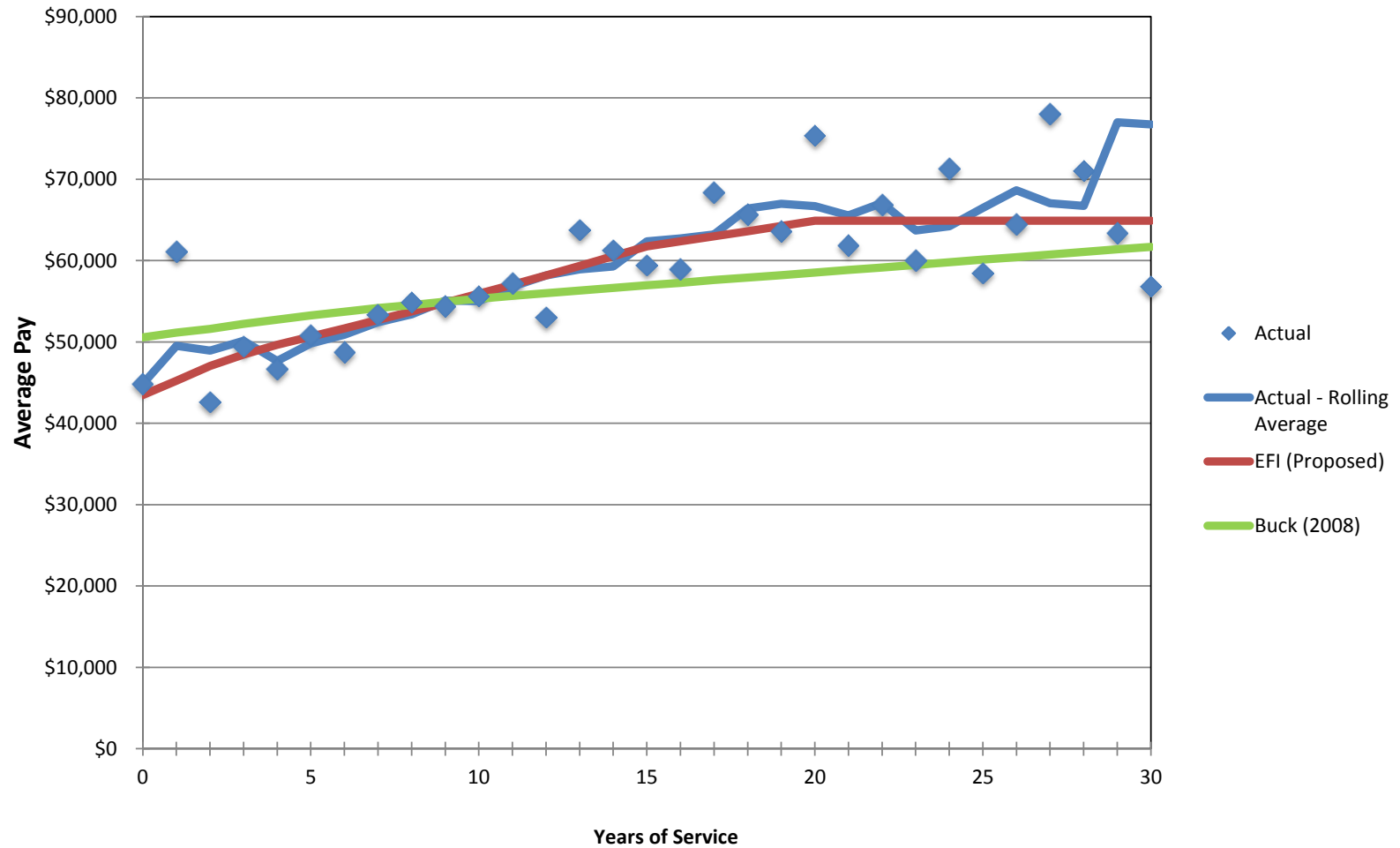
- Only increases due to merit (promotion and longevity) are considered here.
- The current assumptions, developed by the prior actuary, are based on age.
- In the chart below, the average pay of the active members as of July 1, 2010 has been plotted against service (blue points). A 5-year rolling average of the average pay has also been shown (blue line).
- A curve is fitted to the average pay data, and this curve is used to determine a pay increase due to merit. This is a *transverse* study of longevity and promotion pay increases; for a more detailed description of this type of study and its benefits, see the methodology section at the end of this report.

Recommendation

Years of Service	Assumed Increase
0 – 1	4.00%
2	3.00%
3	2.50%
4 - 14	2.00%
15 - 19	1.00%
20 +	0.00%

- New rates have been proposed that are based on service, rather than age. We have repeatedly found that individual longevity and promotion pay increases are more closely related to career length than age. Other actuaries who practice in the '37 Act systems have also reached the same conclusion.
- The line of best fit based on the new service-related assumptions (the red line in Chart A-9) is a better fit to the data than the age-based assumptions (green line).

**Chart A-13: MCERA General Service Members
 Average Pay vs. Years of Service**



Longevity and Promotion Pay Increases (Safety)

Current Assumption

Age	Current Representative Assumed Increase
20	1.99%
25	1.64%
30	1.34%
35	0.86%
40	0.44%
45	0.59%
50	0.53%
55	0.62%

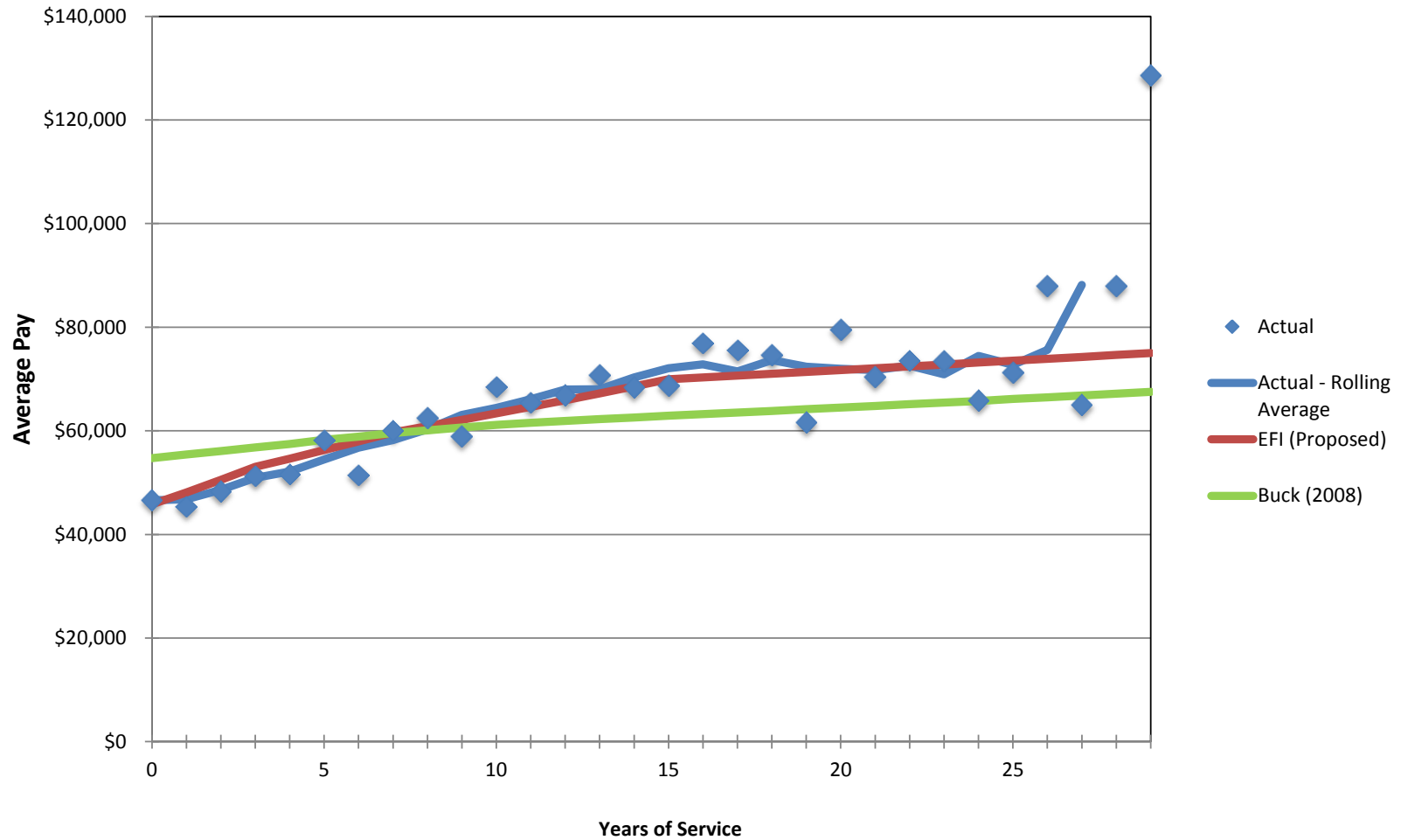
- Only increases due to merit (promotion and longevity) are considered here.
- The current assumptions, developed by the prior actuary, are based on age.
- In the chart below, the average pay of the active members as of July 1, 2010 has been plotted against service (blue points). A 5-year rolling average of the average pay has also been shown (blue line).
- A curve is fitted to the average pay data, and this curve is used to determine a pay increase due to merit. This is a *transverse* study of longevity and promotion pay increases; for a more detailed description of this type of study and its benefits, see the methodology section at the end of this report.

Recommendation

Years of Service	Assumed Increase
0 – 2	5.00%
3-6	3.00%
7 - 14	2.00%
15 +	0.50%

- New rates have been proposed that are based on service, rather than age. We have repeatedly found that individual longevity and promotion pay increases are more closely related to career length than age. Other actuaries who practice in the '37 Act systems have also reached the same conclusion.
- The line of best fit based on the new service-related assumptions (the red line in Chart A-9) is a better fit to the data than the age-based assumptions (green line).

**Chart A-14: MCERA Safety Members
Average Pay vs. Years of Service**



Mortality

Current Assumptions

Summary of Experience versus Current Assumptions

ACTIVE	Eligible Exposure	Actual Deaths	Expected Deaths	Actual to Expected Ratio
General (M)	1,812	5	3.8	131.0%
General (F)	3,938	6	4.5	134.7%
Safety (M)	731	0	1.2	0.0%
Safety (F)	273	1	0.4	26.9%
Combined	6,754	12	9.9	121.8%

RETIRED & SURVIVING SPOUSES	Eligible Exposure	Actual Deaths	Expected Deaths	Actual to Expected Ratio	Benefit-Weighted A/E Ratio
General (M)	1,495	57	58.0	98.4%	87.9%
General (F)	2,437	77	62.3	123.5%	123.8%
Safety (M)	354	7	7.0	99.5%	103.7%
Safety (F)	157	3	4.2	71.9%	55.4%
Combined	4,443	144	131.5	109.5%	101.1%

DISABLED	Eligible Exposure	Actual Deaths	Expected Deaths	Actual to Expected Ratio	Benefit-Weighted A/E Ratio
General (M)	269	5	9.5	52.6%	66.6%
General (F)	98	1	3.4	29.7%	29.8%
Safety (M)	382	7	13.2	52.9%	52.6%
Safety (F)	113	0	3.0	0.0%	0.0%
Combined	862	13	29.1	44.6%	50.4%

Proposed Assumptions

Summary of Experience versus Recommended Assumptions

ACTIVE	Eligible Exposure	Actual Deaths	Expected Deaths	Actual to Expected Ratio
General (M)	1,812	5	4.0	125.3%
General (F)	3,938	6	7.3	82.1%
Safety (M)	731	0	0.8	0.0%
Safety (F)	273	1	0.2	503.3%
Combined	6,754	12	12.3	97.4%

RETIRED & SURVIVING SPOUSES	Eligible Exposure	Actual Deaths	Expected Deaths	Actual to Expected Ratio	Benefit-Weighted A/E Ratio
General (M)	1,495	57	50.2	113.5%	103.8%
General (F)	2,437	77	71.3	108.0%	108.2%
Safety (M)	354	7	6.3	110.6%	116.9%
Safety (F)	157	3	4.6	64.8%	50.2%
Combined	4,443	144	132.5	108.7%	105.0%

DISABLED	Eligible Exposure	Actual Deaths	Expected Deaths	Actual to Expected Ratio	Benefit-Weighted A/E Ratio
General (M)	269	5	4.4	113.3%	91.1%
General (F)	98	1	1.9	52.0%	50.0%
Safety (M)	382	7	7.1	98.7%	132.2%
Safety (F)	113	0	0.7	0.0%	0.0%
Combined	862	13	14.1	92.1%	94.5%

- The current actuarial assumption is that non-disabled retired members and survivors will experience mortality in accordance with the 1994 Group Annuity Tables
- Male tables currently assumed for all Safety members ; their beneficiaries are assumed to be female.
- For valuation purposes, an adjustment has been made to the age of each Safety member; setting their age backward by one year, so that the member is anticipated to experience mortality with lesser frequency than the 1994 GA Male Table indicates.
- Rates for active General and Safety ordinary deaths and Safety member duty-related deaths are based on separate tables. Sample rates for each follow:

Sample Age	General Ordinary Male	General Ordinary Female	Safety Ordinary	Safety Duty-Related
22	0.030%	0.015%	0.030%	0.030%
27	0.040%	0.018%	0.050%	0.050%
32	0.050%	0.038%	0.080%	0.070%
37	0.070%	0.046%	0.130%	0.130%
42	0.100%	0.060%	0.200%	0.190%
47	0.160%	0.090%	0.290%	0.240%
52	0.240%	0.150%	0.420%	0.290%
57	0.380%	0.233%	0.600%	0.320%

- Rates for Disabled members are based on separate unisex tables for General and Safety members.
- The experience for Safety members is quite limited, especially among female members. We recommend using the same assumptions for General and Safety, particularly because the current data does not indicate a substantial difference in mortality experience between the two groups.

- As the number of female Safety members has increased over time, we recommend using separate male and female tables for Safety members.
- The Retired Pensioner (RP) 2000 Tables, published by the Society of Actuaries, are the most current ones generally used for pension funding.
- We prefer to have a positive margin between the actual number of deaths and the predicted number of deaths (i.e. an actual to expected ratio greater than 100%) for two reasons:

1. Overall mortality has historically improved, and is expected to improve in future years.
2. The RP2000 Tables were designed using benefit-weighted (rather than participant-weighted) data. This is because members with larger benefits tend to have lower mortality rates, at least at younger ages. Applying the tables on a participant basis, while accurately predicting the *number* of deaths, will tend to underestimate the impact on liabilities.

For example, the current assumptions underestimated the number of deaths by approximately 10% during the most recent three year period (109.5% actual/expected ratio). This would appear to provide a margin of conservatism for future mortality improvements. However, the ratio is lower (101.1%) when calculated using benefit-weighting, rather than just the number of deaths, leaving no margin for future mortality improvements.

- Both of these factors (mortality improvement and benefit-weighting) have a larger impact on the recommendations for male mortality rates than female, because the benefit-weighting affect tends to have a larger impact on the actuarial liabilities for male participants and male mortality has improved more quickly than female mortality.

<ul style="list-style-type: none"> • We propose the use of the RP2000 Combined Healthy Tables healthy retired members and beneficiaries, with a two year setback for males and no adjustment for females for the General and Safety members. • These assumptions would have provided a margin of 8.7% on a count-weighted basis between the actual and expected deaths over the most recent three year period, with a larger margin for males (13.2%) than females (5.4%) for the reasons indicated above. These assumptions also provide a reasonable margin for males and females on a benefit-weighted basis (5.9% and 4.0%, respectively). • We propose the use of the same mortality assumptions for the non-duty related mortality experience of the active members (RP2000 Combined Healthy Tables, with the same age adjustments as for the retirees). These assumptions would have provided a reasonable fit to the actual data over the recent period (97.4%). • We also propose the use of the RP2000 Combined Healthy Tables, with a three year set-forward for males and females, for the mortality experience of the disabled members. These assumptions would have provided a much better fit than the current assumptions to the actual data over the most recent three year period (92.1% vs. 44.6%). • We propose continuing the use of the current table for duty-related active Safety deaths. The amount of data available is too limited to develop a separate new table. 	
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Economic Assumptions

Introduction

Economic assumptions utilized in the development of liabilities and costs for a defined benefit plan include:

- The inflation assumption;
- The real investment return assumption;
- The real growth in pay relative to inflation; and
- COLA increases relative to inflation.

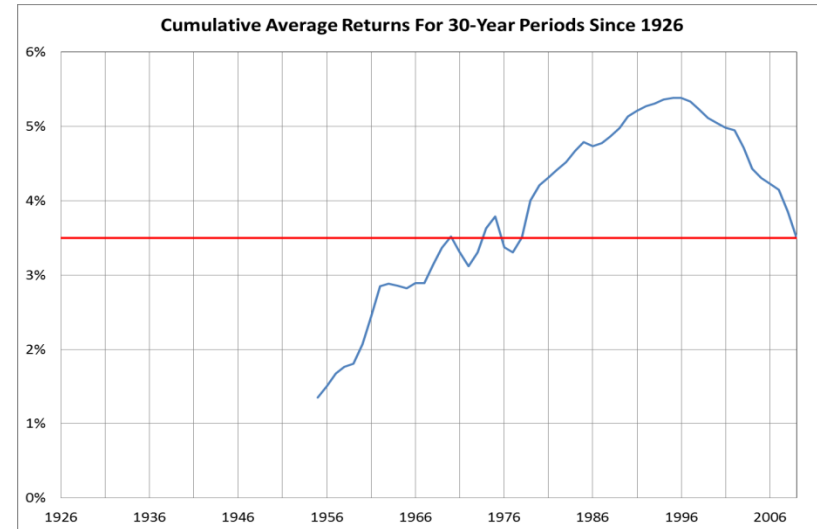
While we look to the past for indications of future economic behavior, we must also consider how the future may be expected to be different. In order to reflect the long-term nature of defined benefit plan funding in the development of these economic assumptions, it is appropriate to focus on long term trends.

Inflation

While historical trends are not entirely indicative of the future, they do often serve as a useful guide in determination of assumptions. However, there are elements of the future economic environment that may differ from the past due to structural changes. An important and fundamental case in point is the rate of inflation, which underlies each of the three elements of economic assumptions listed above.

The graph below shows the average rate of inflation over 30-year periods, with the earliest such period ending in 1955 and the latest

ending in 2009. We note in the chart that average inflation seemed to be increasing steadily until the 1990's when it leveled off and began to decrease. An examination of historical inflation could lead to the assumption that inflation is likely to be quite high, perhaps as high as 4%.



However, there are a number of reasons to believe that future inflation levels will not be as high as above graph would seem to suggest.

- An important reason for the high rate of inflation in the averages above is the nine-year period 1973-81 when inflation averaged 9.2% per year.
- The years 1973-81 featured unprecedented levels of household formation. The demand for new houses, cars, office space and equipment caused by the maturation of the post-war baby boom may have largely been responsible for

the high inflation during these years. Since 1982, increases have been in the range 0.1% to 4.6% with one exception (6.1% in 1990), averaging near 3.0% per year.

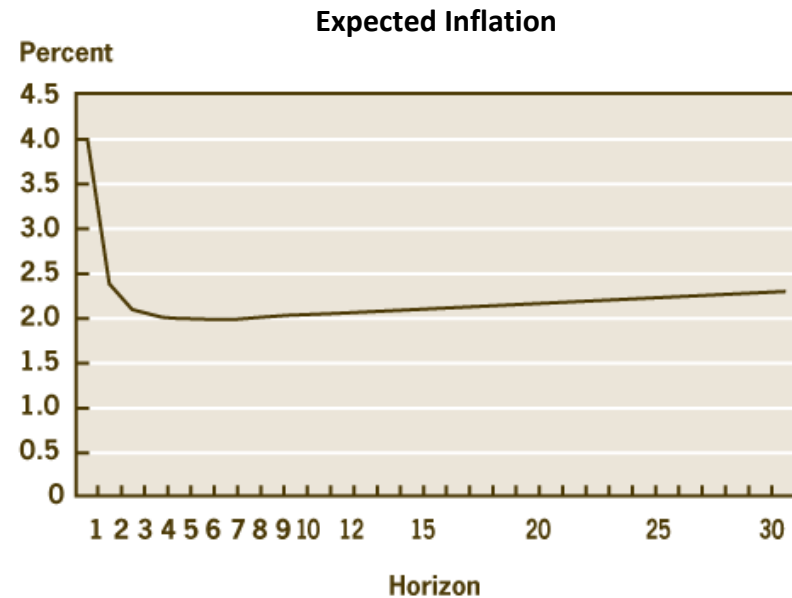
- The population of the United States is aging, which implies a greater likelihood of low inflation in the future. This has been observed in other countries with aging populations, such as Japan.
- The Federal Open Market Committee has policies in place to control inflation, making future levels more likely to remain relatively low.
- Financial markets offer evidence of what investors expect inflation to be in future years. Various securities, such as Treasury inflation-protected securities (TIPS), provide the necessary data for these analyses. As an example, a recent publication by the Federal Reserve Bank of Cleveland attempts to incorporate some of this market data. It contained a 30-year projection of expected inflation rates, shown in the Expected Inflation graph to the right.

An assumption of 2.50% may appear to match well with current market and professional expectations. However, the predictions of future inflation by experts are not unanimous. Some commentators note that the large current and expected future deficits increase the likelihood of higher levels of inflation in the future.

- Milliman, the investment consultant retained by MCERA, bases their capital market assumptions on an assumption that average inflation over the next 10 years will be 2.75%.

A change from the current 4.50% assumption to a 2.75% assumption would represent a sudden and drastic change in the assumptions,

which is not advisable. Therefore, we recommend reducing the inflation assumption from 4.50% to 3.50%, a significant but more moderate reduction. If, at the time of the next experience study, the markets and forecasters continue to indicate lower expectations of future inflation, further reductions in the assumption could be considered.



(Source: Joseph G. Haubrich, Cleveland Federal Reserve website. As of September 1, 2009)

(<http://www.clevelandfed.org/research/commentary/2009/0809.cfm#back2fn2>)

Investment Return

The investment return assumption depends on the anticipated average level of inflation and the anticipated average *real rate of return*, the investment return in excess of underlying inflation.

The expected average real rate of return is heavily dependent on asset mix: The portion of assets in stocks, bonds, and cash.

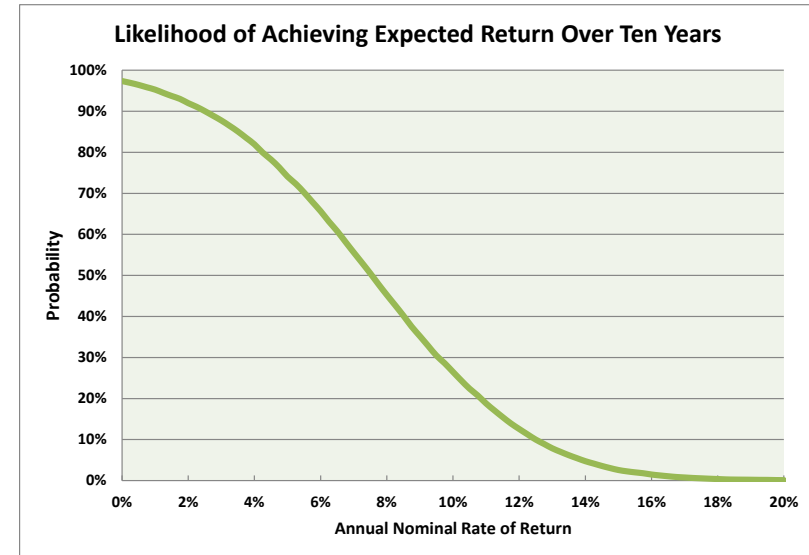
In the chart to the right, we have simulated the return derived using MCERA's actual target allocation. The simulated returns are derived by simulation, using the following algorithm:

1. The expected returns, standard deviation and correlation matrix for each asset class were provided by the investment consultant (Milliman).
2. The expected returns for each class were modified to adjust for the difference in the inflation assumption used by the investment consultant (2.75%) and the proposed inflation assumption used for actuarial purposes (3.5%).
3. 10,000 simulation trials for repeated ten year periods were run, and the mean geometric return was computed for each of them.
4. Given the distribution of returns, we have created a chart that shows the likelihood of the geometric mean return for a specific trial exceeding a specified assumption over a ten year period, after adjusting for administrative expenses.

According to Article 31580.2 of the '37 Act, administrative expenses (excluding certain technology expenses) may not exceed 0.18% of the assets of the retirement system. This provision of the Act has been modified to allow the expenses to be determined as a percentage of Plan liabilities. The rates of return in our simulation were reduced by 0.20% to allow for administrative expenses.

The mean return from this simulation was 7.47%, indicating a real return of 3.97%. Note that the curve crosses the 50% likelihood

threshold right around this point; in fact, chances are just slightly better than 50/50 that a 7.50% return would be achieved over a ten year period, given 3.5% inflation per year. A lower return assumption would result in a higher likelihood of achieving the expected return.



We noted above that a reasonable inflation assumption is around 3.50%. We recommend a nominal return assumption of 7.50%, which represents a slight increase in the real return assumption from 3.66% (8.16% - 4.50%) to 4.0% (7.5% - 3.5%)

Payroll Growth

Components of the payroll growth assumptions are:

- Inflation, and

- Other payroll growth not offset by salary reduction caused by replacement of terminating employees by new entrants.

Such increases are often attributed to productivity gains. Other factors contributing to non-inflationary base salary increases include growth in the active workforce, bargaining pressures, competition among local employers, and workforce demographic issues.

The inflationary component is the assumed CPI (with a recommended rate of 3.5%). In general we recommend that long range gains due to productivity, the collective bargaining process or other pressures should be assumed to be zero or minimal. While productivity tends to increase in many sectors of the economy, any long-term assumption of salary growth beyond inflation carries with it an assumed improvement in *relative* standard of living.

Furthermore, all levels of government, from the smallest political subdivisions to counties, states, and the federal government, are under unprecedented financial stress. All of the usual sources of revenue have been seriously reduced. In addition, voters are unwilling to allow taxes to increase to make up the shortfall, and they are insisting that government services be substantially scaled back.

Based on these factors, we expect that wages of MCERA members are unlikely to keep up with inflation in the near to mid-term, let alone increase above inflation. Accordingly, EFI recommends assuming that member pay will increase in line with inflation, with no pay increases for productivity. We will continue to monitor this assumption; if inflationary pay increases resume, we will review the possibility of productivity increases in the future.

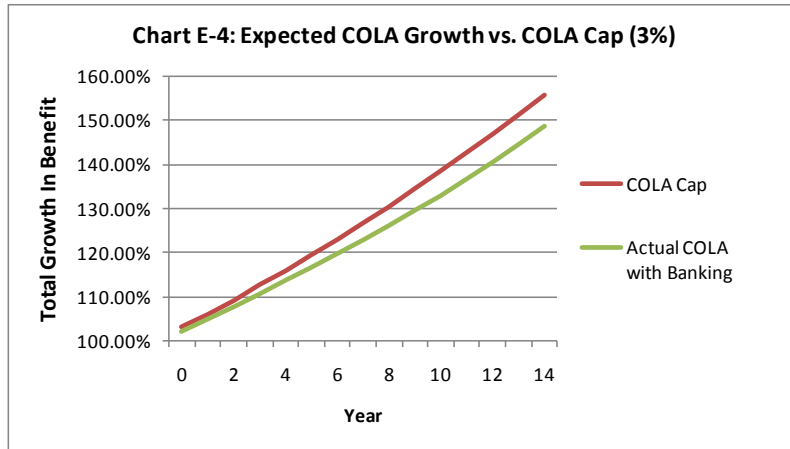
Therefore, the annual expected increase in base payroll would be 3.50%, reduced from 4.50% in the most recent valuation. This increase will be applied to all continuing active members, and to starting pay for new entrants when projections of future populations are required.

COLA Growth

Members of MCERA are eligible to receive automatic Cost of Living Adjustments (COLAs), based on the growth in the Bay Area Consumer Price Index (CPI) and reflecting a 3% cap on the annual COLA increase in any given year. Any increase in the CPI above the 3% maximum increase can be banked for future years in which the change in the CPI is below 3%.

It is necessary to determine an assumed rate of COLA growth, reflecting both inflation (i.e. the growth in the CPI) and the interaction of the CPI with the 3% COLA cap and banking mechanism. Currently, it is assumed that the COLA will grow by 3.0% per year.

We have produced statistical simulations of inflation, similar to our modeling of the investment return assumption, and then modeled how the COLA maxima and the banking process for each group interact with the changes in CPI.



The chart above demonstrates that the growth in the COLA is expected to be below the cap, even if the expected average increase in the CPI (3.5% based on our earlier recommendation) is higher than the cap itself (3.0% in this example). This occurs because there is often not a significant bank already in existence (such as in the early years of retirement); therefore, when there are years in which inflation is below the cap the shortfall is often not made up in future years.

Based on a 3.5% recommended inflation assumption, we recommend an assumed COLA growth rate of 2.70% per year, which represents a reduction from the 3.00% currently used.

Methodology

Purposes of the Experience Study

The first goal of this Experience Study is to review the recent past demographic experience of the Plan. We seek to understand the behavior of the participating members so that we can recommend actuarial assumptions concerning future demographic experience.

The second goal of this Study is to recommend economic assumptions to be used in computing liabilities and costs. These economic assumptions include the expected rate of return on Plan assets and the anticipated rate of increase in the Consumer Price Index (CPI). These assumptions are determined based on the investment strategy adopted by the Plan and on the past behavior of the capital markets and the CPI, and on future expectations.

Once adopted, the assumptions recommended by this Study will be used to determine future liabilities and costs and for purposes of evaluating prospective changes in benefits, eligibility conditions, and other aspects of the Plan's operations.

Importance of Accurate Assumptions

The liabilities and costs calculated in actuarial valuations and cost studies are based on a projection of future conditions. The actuary makes assumptions concerning the rates of retirement, withdrawal, termination, disability, and death among plan members. In addition, the actuary must project future earnings on plan assets, inflation, and growth in the pay of active members.

The actuary sets assumptions based on future expectations. In setting demographic assumptions, such as rates of retirement, the past experience of the covered group of employees is often the best

predictor of future behavior. When establishing economic assumptions, such as the expected return on plan assets, the historical behavior of the investment markets can serve as a guide.

Actuarial funding methods are designed so that, if the actuarial assumptions are met, plan costs will generally be a level percentage of member pay from year to year. If actual economic or demographic experience varies from that assumed, plan costs will rise or fall accordingly. Therefore, it is worth the effort to make our best estimate of future conditions so that the plan costs computed by the actuary will be as stable and predictable as possible.

Methodology (Demographic Assumptions)

One goal of this Study is to compute the probability of death, disability, retirement, withdrawal, or termination leading to a vested benefit at each age for active members and the probability of death at each age for inactive members.

To this end, we proceed as follows:

- We count the number of members leaving for each cause during the term of the Study. This is the number of decrements.
- We count the number of members who could have left for each cause during the Study. This is the exposure.
- When the exposure is sufficient, we divide the number of decrements by the exposure at each combination of age and service for an employee group to determine the probability of leaving due to the cause in question.
- Where feasible, experience has been examined separately by gender, as well as for General and Safety members. In some

cases, experience has been combined when male and female experience is similar or when there is insufficient data to produce reliable rates by sex.

When there is insufficient exposure to derive statistically reliable rates by age and service, we may combine exposures and decrements for groups of ages and service. Alternatively, we may compare the total number of actual decrements with the total number of decrements predicted by a standard actuarial table, and adopt a table that predicts decrements, in total, reasonably close to those that have been observed.

Where the rate of decrement is low and the underlying causes of the decrement in question are not expected to change significantly with time, we may combine the most recent experience with data from prior experience studies.

For the study of the merit (longevity and promotion) components of individual pay increases, we generally choose to use a *transverse* study. A reliable way to assess average increases in pay due to merit is to analyze average pay versus service for the current active members of a plan. With a homogeneous group of any size at all, the pattern of promotions and longevity increases during the career of an average employee is clearly visible in this analysis. This is a transverse study of longevity and promotion pay increases: The data is taken as of a particular point in time. *Longitudinal* studies, which use changes in pay collected over several years, are often unreliable due to the effects of inflation, collective bargaining, and management decisions during the term of the study.

Methodology (Economic Assumptions)

The Plan's economic assumptions are critically important in computing actuarial liabilities and costs. A careful determination of these assumptions requires an analysis of the past performance of the capital markets and the Plan's future investment outlook.

To this end, we proceed as follows:

- Based on a detailed analysis of recent past history and reasonable expectations for the future, a long term projection of the rate of inflation is determined.
- Based on the Plans' investment strategy and historical rates of return on various asset classes, the long term *real* rate of return on assets is projected. This is the return on assets in excess of inflation.
- The projected rate of inflation is combined with the assumption concerning merit pay increases to project future members' pay.
- The projected rate of inflation is combined with a model of the COLA provisions to project future growth in retiree benefits.
- The rate of inflation is combined with the estimated real return on assets to determine the overall return on assets.

Any estimate of future inflation and asset returns is difficult. Over time, there will be actuarial gains and losses as experience deviates from our assumptions.