

**City of Fresno Employees
Retirement System**

ACTUARIAL EXPERIENCE STUDY

**Analysis of Actuarial Experience
During the Period
July 1, 2012 through June 30, 2015**



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San Francisco, CA 94104

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May 17, 2016

Board of Retirement
City of Fresno Employees Retirement System
2828 Fresno Street, Suite 201
Fresno, CA 93721-1327

**Re: Review of Non-Economic Actuarial Assumptions for the June 30, 2016
Actuarial Valuation**

Dear Members of the Board:

We are pleased to submit this report of our review of the actuarial experience of the City of Fresno Employees Retirement System. This study utilizes the census data from the last three actuarial valuations ending June 30, 2015. The study includes the proposed actuarial assumptions to be used effective with the June 30, 2016 valuation.

The review of the economic assumptions for use in the June 30, 2016 valuation is provided in a separate report.

We are Members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

We look forward to reviewing this report with you and answering any questions you may have.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Angelo".

Paul Angelo, FSA, MAAA, FCA, EA
Senior Vice President & Actuary

A handwritten signature in black ink, appearing to read "Andy Yeung".

Andy Yeung, ASA, MAAA, EA
Vice President & Actuary

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I. INTRODUCTION, SUMMARY, AND RECOMMENDATIONS

To project the cost and liabilities of the Pension Fund, assumptions are made about all future events that could affect the amount and timing of the benefits to be paid and the assets to be accumulated. Each year actual experience is compared against the assumptions, and to the extent there are differences, the future contribution requirement is adjusted.

If assumptions are changed, contribution requirements are adjusted to take into account a change in the projected experience in all future years. There is a great difference in both philosophy and cost impact between recognizing the actuarial deviations as they occur annually and changing the actuarial assumptions. Taking into account one year's gains or losses without making a change in the assumptions means that that year's experience was temporary and that, over the long run, experience will return to what was originally assumed. Changing assumptions reflects a basic change in thinking about the future, and it has a much greater effect on the current contribution requirements than recognizing gains or losses as they occur.

The use of realistic actuarial assumptions is important in maintaining adequate funding, while paying adequate benefit amounts to participants already retired and to those near retirement. The actuarial assumptions used do not determine the "actual cost" of the plan. The actual cost is determined solely by the benefits and administrative expenses paid out, offset by investment income received. However, it is desirable to estimate as closely as possible what the actual cost will be so as to permit an orderly method for setting aside contributions today to provide benefits in the future, and to maintain equity among generations of participants and taxpayers.

This study was undertaken in order to review the demographic actuarial assumptions and to compare the actual experience with that expected under the current assumptions during the three-year experience period from July 1, 2012 through June 30, 2015. The study was performed in accordance with Actuarial Standard of Practice (ASOP) No. 35, "Selection of Demographic and Other Non-economic Assumptions for Measuring Pension Obligations" and, as appropriate, ASOP No. 27 "Selection of Economic Assumptions for Measuring Pension Obligations." These Standards of Practice put forth guidelines for the selection of the various actuarial assumptions utilized in a pension plan actuarial valuation. Based on the study's results and expected near-term experience, we recommend various changes in the current actuarial assumptions.

We are recommending changes in the assumptions for retirement from active employment, pre-retirement mortality, healthy life post-retirement mortality, disabled life post-retirement mortality, vested

termination, disability, DROP election, percentage of members married, spouse age difference, and salary increases.

Our recommendations for the major actuarial assumption categories are as follows:

Retirement Rates - The probability of retirement at each age at which participants are eligible to retire.

Recommendation: We recommend adjusting the retirement rates to those developed in Section III (B) to anticipate slightly later retirement. We also recommend maintaining the current marriage/domestic partnership assumption, maintaining the assumed age difference between male members and their spouses, but adjusting the assumed age difference between female members and their spouses.

Mortality Rates - The probability of dying at each age. Mortality rates are used to project life expectancies.

Recommendation: We used experience for a six-year period including both the current and the prior experience study periods to study this assumption. In addition, we included a somewhat larger margin under the current “static” approach for anticipating future mortality improvements to partially reflect the anticipated effect of any future recommendation to use a “generational” approach for anticipating future mortality improvement.

For non-disabled members and all beneficiaries, we adjust post-retirement mortality rates as developed in Section III (C) to anticipate slightly longer assumed life expectancy. For disabled retirees, we adjust mortality rates as developed in Section III (D) to anticipate slightly longer assumed life expectancy.

We recommend adjusting the rates for the pre-retirement mortality assumptions as developed in Section III (C). In addition, we recommend that all pre-retirement deaths be continued to be assumed as non-service connected deaths.

Termination Rates - The probability of leaving employment at each age and receiving either a refund of contributions or a deferred vested retirement benefit.

Recommendation: We recommend adjusting the termination rates as developed in Section III (E) to reflect slightly lower incidence of termination. We also recommend decreasing the percentage of terminated members expected to receive a refund of contributions during the first five years of service, while increasing the percentage after the first five years.

Disability Incidence Rates - The probability of becoming disabled at each age.

Recommendation: We recommend adjusting the disability rates to those developed in Section III (F) to reflect lower incidence of disability.

DROP Assumptions - The probability that a participant elects DROP and the duration of DROP participation.

Recommendation: We recommend increasing the current DROP participation probability during the fifth year eligible from 10% to 15%, and extending the assumed DROP election period to include a 10% rate in the sixth year eligible. We recommend maintaining the current assumption for the length of time members are assumed to remain in DROP.

Individual Salary Increases - Increases in the salary of a member between the date of the valuation to the date of separation from active service.

Recommendation: We recommend decreasing the merit and promotion rates to those developed in Section III (H) to reflect past experience.

Section II provides some background on basic principles and the methodology used for the experience study and for the review of the demographic actuarial assumptions. A detailed discussion of the experience and reasons for the proposed changes is found in Section III.

Section IV shows the estimated cost impact of the recommended assumptions (including the economic assumptions as recommended in our separate report) for the June 30, 2016 valuation.

II. BACKGROUND AND METHODOLOGY

In this report, we analyzed the “demographic” or “non-economic” assumptions only. Our analysis of the “economic” assumptions for the June 30, 2016 valuation is provided in a separate report. Demographic assumptions include the probabilities of certain events occurring in the population of members, referred to as “decrements,” e.g., withdrawal from service, disability retirement, service retirement, DROP election, and death after retirement. We also review the individual salary increases net of inflation (i.e., the merit and promotion assumptions) in this report.

Demographic Assumptions

In order to determine the probability of an event occurring, we examine the “decrements” and “exposures” of that event. For example, taking withdrawal from service, we compare the number of employees who actually withdraw in a certain age and/or service category (i.e., the number of “decrements”) with those who could have withdrawn (i.e., the number of “exposures”). For example, if there were 500 active employees in the 20-24 age group at the beginning of the year and 50 of them left during the year, we would say the probability of withdrawal in that age group is $50 \div 500$ or 10%.

The reliability of the resulting probability is highly dependent on both the number of decrements and the number of exposures. For example, if there are only a few people in a high age category at the beginning of the year (number of exposures), we would not lend as much credence to the probability of withdrawal developed for that age category, especially if it is out of line with the pattern shown for the other age groups. Similarly, if we are considering the death decrement, there may be a large number of exposures in, say, the age 20-24 category, but very few decrements (actual deaths); therefore, we would not be able to rely heavily on the probability developed for that category.

One reason we use several years of experience for such a study is to have more exposures and decrements, and therefore more statistical reliability. Another reason for using several years of data is to smooth out fluctuations that may occur from one year to the next. However, we also calculate the rates on a year-to-year basis to check for any trend that may be developing in the later years.

III. ACTUARIAL ASSUMPTIONS

A. ECONOMIC ASSUMPTIONS

The economic assumptions are reviewed in a separate report titled “Review of Economic Actuarial Assumptions for the June 30, 2016 Actuarial Valuation.”

B. RETIREMENT RATES

The age at which a member retires from service (i.e., who did not retire on a disability pension) will affect both the amount of the benefits that will be paid to that member as well as the period over which funding must take place.

The table on the following page shows the observed service retirement rates based on the actual experience over the past three years. The observed service retirement rates were determined by comparing those members who actually retired from service to those eligible to retire from service. This same methodology is followed throughout this report and was described in Section II. Also shown are the current rates assumed and the rates we propose.

Consistent with the prior experience study, for actives over age 55, the actual retirement experience was only a reflection of those members who never elected to participate in the DROP. However, effective January 28, 2008, actives may retire or participate in the DROP as early as age 50 with an actuarially reduced early retirement benefit. Also consistent with the prior experience study, in order to analyze the retirement experience between 50 and 54, we have included the experience for actives who either retired or elected the DROP before age 55. We have treated those DROPs as if they were retirements because the benefits received by those members were equivalent to the benefits otherwise payable at age 55 and the rates of DROP elections are much lower than those observed for members after age 55. We have also continued to assume that DROP election assumptions would not start until age 55.

Age	Current Rate of Retirement	Actual Rate of Retirement	Proposed Rate of Retirement
50	2.00%	3.35%*	2.00%
51	2.00	2.08*	2.00
52	3.00	1.91*	3.00
53	3.00	5.61*	3.00
54	5.00	1.90*	3.00
55	6.00	6.67	6.00
56	6.00	0.81	3.00
57	6.00	2.38	4.00
58	6.00	3.54	5.00
59	6.00	6.32	6.00
60	8.00	5.75	7.00
61	10.00	11.39	10.00
62	10.00	7.25	10.00
63	11.00	6.35	10.00
64	18.00	7.14	12.00
65	20.00	8.16	15.00
66	20.00	20.00	20.00
67	25.00	18.75	22.00
68	40.00	18.18	30.00
69	50.00	16.67	30.00
70+	100.00	11.11	100.00

* Includes members who elected the DROP before age 55.

Chart 1 compares actual experience with the assumed and the proposed rates of retirement.

In prior valuations, deferred vested members were assumed to retire at age 56. The average age at retirement over the prior three years was 54.9 for the 36 deferred vested members who retired. We recommend reducing the assumed retirement age for deferred vested participants to age 55 consistent with this experience and also the experience observed at the last experience study.

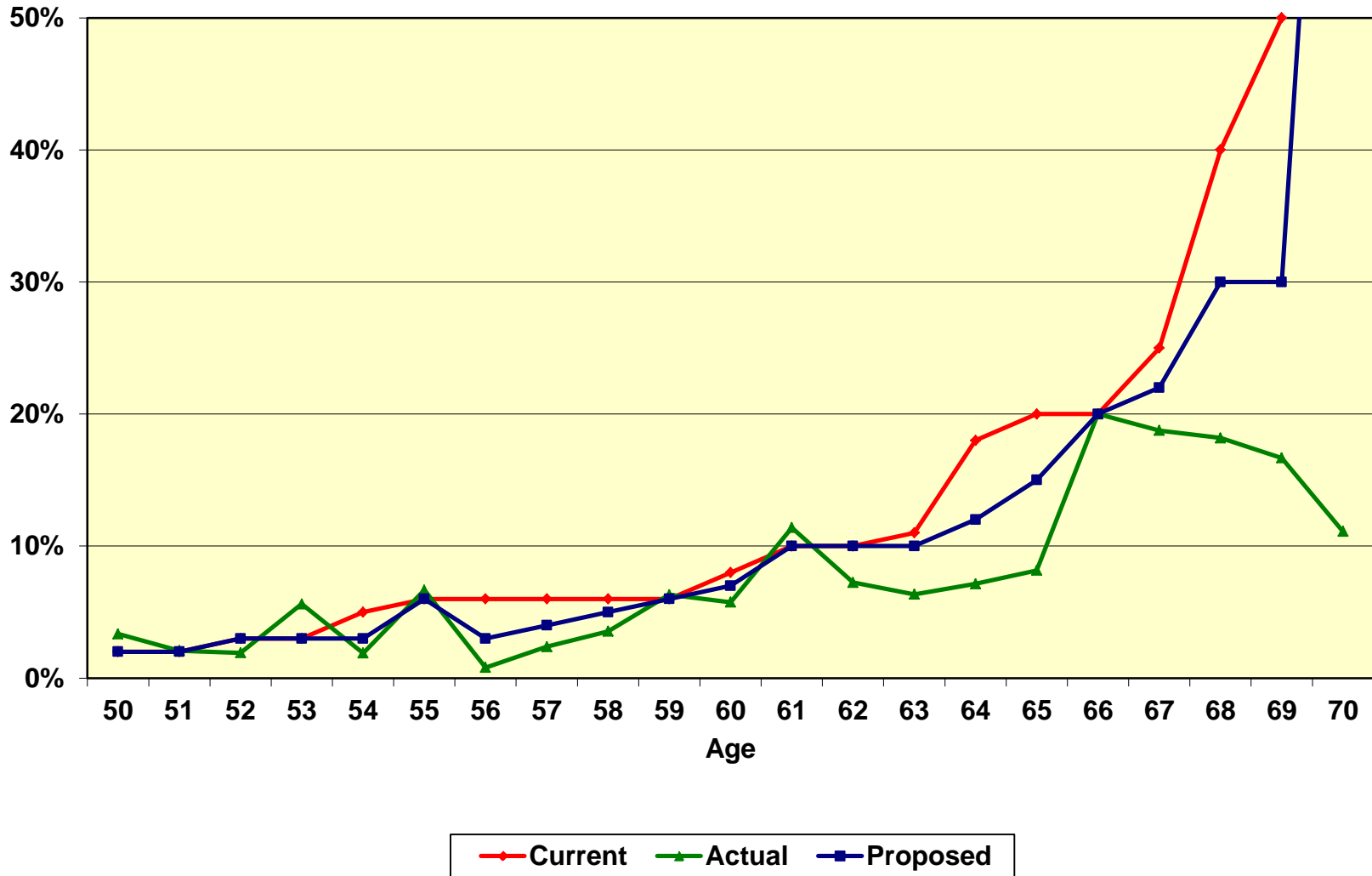
In prior valuations, it was assumed that 80% of all active male members and 55% of all active female members would be married or have an eligible domestic partner when they retired. According to experience of members who retired from active employment or started their participation in DROP during the last three years, about 76% of all male members and 62% of all female members were married or had a domestic partner at retirement. We recommend maintaining the male marriage/domestic partnership assumption of 80%. We also recommend maintaining the female marriage/domestic partnership assumption of 55% as this assumption was decreased from 60% to 55% only in the last experience study.

In prior valuations, it was assumed that when active members retire, the spouses of male members are three years younger, and the spouses of female members are three years older. Based on observed experience from members who retired during the last three years that showed a difference between the average male member and a female spouse of -2.64 years and between the average female member and a male spouse of 1.23 years, we recommend maintaining the assumption that the spouses of male members are three years younger, and changing the spousal age assumption for female members from three years older to two years older. All spouses will be assumed to be of the opposite sex to the member until we have more actual experience concerning domestic partners.

Reciprocity Assumption

Due to the distinctive design of the plan which requires that the salary rate from the most recent salary resolution prior to the date of retirement be used in determining final average salary for deferred vested members, in effect there is already an implicit assumption in the valuation that 100% of all deferred vested members will receive benefits as though they were on reciprocity. For that reason, an explicit reciprocity assumption is not necessary. It should be noted that this assumption is currently applied only to deferred vested members with over five years of service. With this experience study, we are recommending this assumption be applied also to a certain proportion of deferred members with less than five years of service who are assumed to go on to work at a reciprocal employer, as discussed in Section III (E).

Chart 1 Retirement Rates



C. MORTALITY RATES - HEALTHY

The “healthy” mortality rates project the life expectancy of a member who retires from service (i.e., who did not retire on a disability pension). Also, the “healthy” pre-retirement mortality rates project what proportion of members will die before retirement. The table currently being used for post-service retirement mortality rates is the RP-2000 Combined Healthy Mortality Table (separate tables for males and females), projected with scale AA to 2021, set back one year.

The Society of Actuaries (SOA) has recently published the RP-2014 family of mortality tables and associated life expectancy improvement scales. Within that family of mortality tables, there are mortality rates developed for annuitants on a “headcount” weighted basis that weight all retirees at the same age the same way without regard to the level of benefits those annuitants are receiving from a retirement plan. Mortality rates are also developed for annuitants on a “benefit” weighted basis, with higher credibility assigned to experience from annuitants receiving larger benefits. The headcount-weighted basis is the more common practice and is the approach used by Segal in the past for its California public system clients (including the City of Fresno) and by other public sector actuaries in California.

As for the life expectancy improvement scales, they can be applied in one of two ways. Currently, the more common application is to use a “static” approach to anticipate a fixed level of mortality improvement for all annuitants receiving benefits from a retirement plan. This is in contrast to a “generational” approach where each future year has its own mortality table that reflects the forecasted improvements, using the published improvement scales. The static approach is used by Segal for its California public system clients (including the City of Fresno) and is still most commonly used by other public sector actuaries in California and nationwide.

The SOA is in the process of collecting data from public sector plans so that they can develop mortality tables based on public sector experience comparable to the RP-2014 mortality tables developed using data collected from private and multi-employer plans. Furthermore, after publishing the two-dimensional MP-2014 life improvement expectancy scale, the SOA has replaced it with the two-dimensional MP-2015 life improvement expectancy scale to remove some of the conservatism built into the MP-2014 scale and to better reflect the most recent data of mortality improvement from the Social Security Administration. Segal believes that given the trend in the retirement industry to move towards generational mortality, it would be prudent for the Board to adopt the Headcount-Weighted RP-2014 mortality table, adjusted for City of Fresno experience. However, given that there is a large difference between the generational MP-2014 and MP-2015, Segal recommends that the City continue to use a static mortality improvement but with

adjustments that would nearly double the 10% margin we have recommended in the past to anticipate the move towards a “generational” approach in a future experience study.

Once the SOA has included data from public sector plans in developing the new tables, we will also include a discussion with the Board on whether to consider the benefit weighted mortality rates in the experience study. Finally, note that in order to use more actual City of Fresno experience in our analysis, we have used experience for a six-year period from both the current and the last experience study periods to study this assumption.

In the table below, we have provided the approximate increase in the total employer and member contribution rates based on the different approaches to build in margin for future mortality improvements.

	Employer and Member Normal Cost Impact Combined	Impact on Actuarial Accrued Liability (Estimated Dollar Amounts in Thousands)
Headcount Weighted RP-2014 – Static approach with increased margin	0.04% of payroll	\$13,549
Benefit Weighted RP-2014 – Static approach without increased margin	0.08% of payroll	\$12,340
Headcount Weighted RP-2014 – Generational approach	0.58% of payroll	\$28,541

Pre-Retirement Mortality

In prior experience studies, the pre-retirement mortality rates for active and deferred vested members were set equal to the post-retirement mortality rates for retirees since the actual number of deaths among this group was generally not large enough to provide a statistically creditable analysis. However, this approach is not compatible with our current proposal because the post-retirement RP-2014 Healthy Annuitant table does not include rates for ages below 50.

From the RP-2014 family of tables, we recommend that pre-retirement mortality follow the Headcount-Weighted RP-2014 Employee Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional scale MP-2015, times 85%, all to account for the lower observed incidences of pre-retirement death. In addition, based on recent experience, we recommend that all pre-retirement deaths are assumed to be non-service connected.

Post-Retirement Mortality (Service Retirements)

Among service retired member and beneficiaries, the actual deaths compared to the expected deaths under the current and the proposed assumptions for the last six years are as follows:

	Healthy Retirees and All Beneficiaries		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	144	173	146
Female	<u>121</u>	<u>137</u>	<u>113</u>
Total	265	310	259
Actual / Expected	117%		120%

The ratio of actual to expected deaths under the current assumption was 117%. We recommend changing to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional scale MP-2015, set forward one year. This will bring the actual to expected ratio for the most recent six year period to 120% for this group.

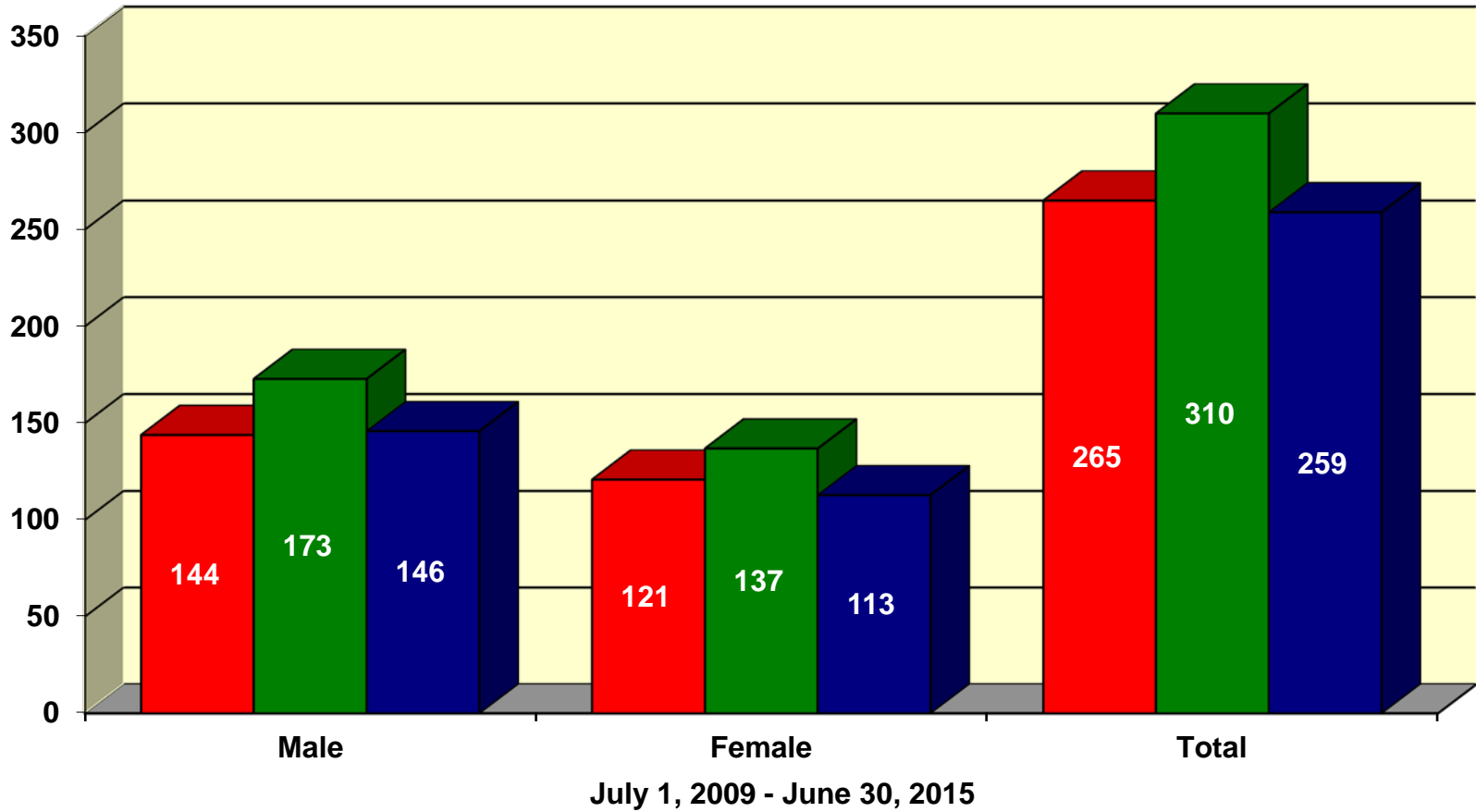
Chart 2 compares actual to expected deaths under the current and the proposed assumptions over the last six years. Experience shows that there were more deaths than predicted by the current table.

Chart 3 shows the life expectancies under the current and the proposed tables.

Mortality Table for Member Contributions and Optional Benefits

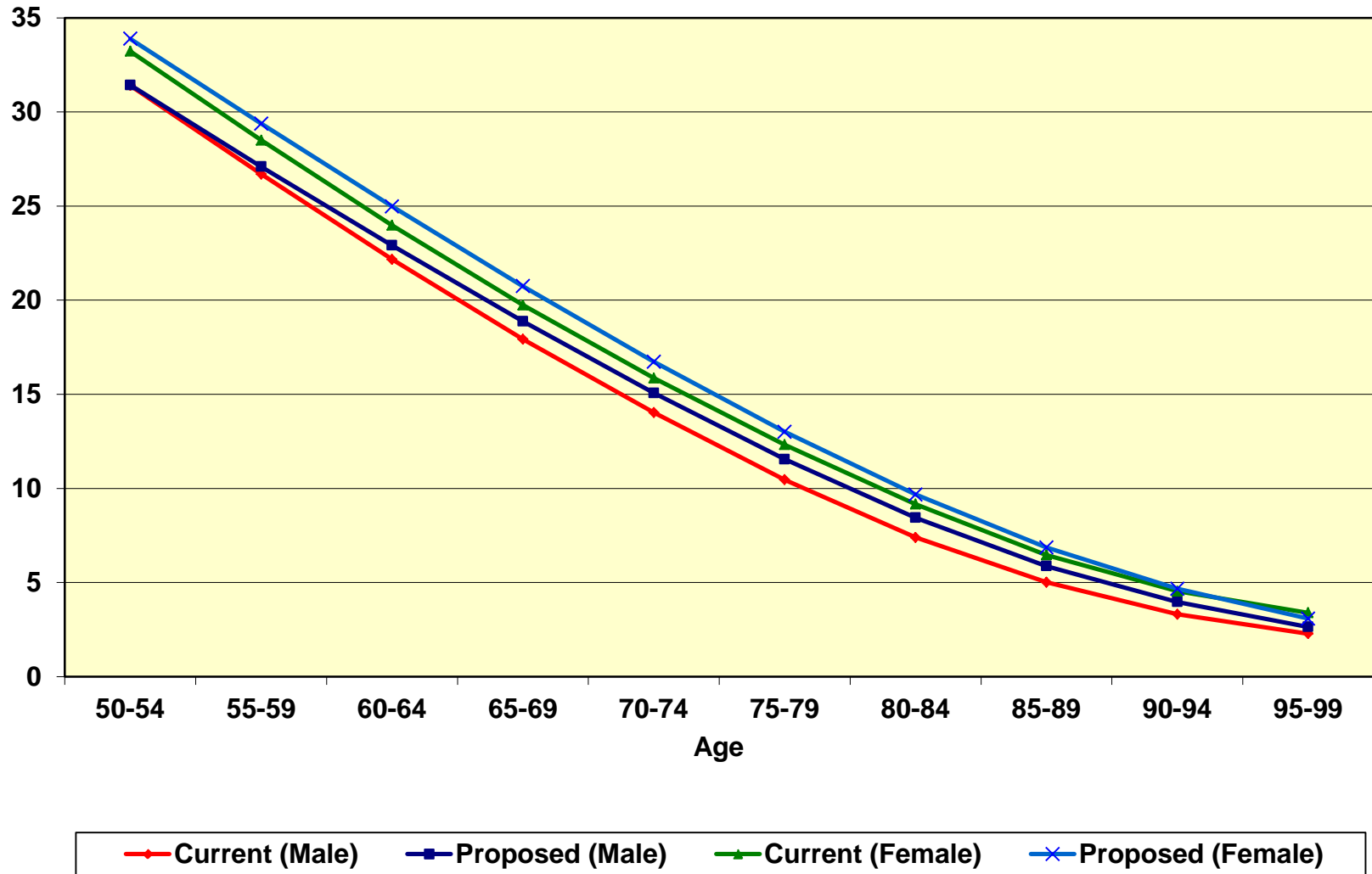
We recommend the mortality table used for determining contributions be changed from the RP-2000 Combined Healthy Mortality Table projected with scale AA to 2021, set back one year, weighted 65% male and 35% female to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP-2015, set forward one year, weighted 65% male and 35% female. This is based on the proposed post-retirement mortality table and the actual gender distribution for current members.

Chart 2
Post - Retirement Deaths
Non-Disabled Members and All Beneficiaries



■ Expected - Current
 ■ Actual
 ■ Expected - Proposed

Chart 3
Life Expectancies
Non-Disabled Members and All Beneficiaries



D. MORTALITY RATES - DISABLED

Since death rates for disabled members can differ from those of healthy members, a different mortality assumption is often used. The table currently being used is the RP-2000 Combined Healthy Mortality Table (separate tables for males and females), projected with scale AA to 2021, set forward three years.

The number of actual deaths compared to the number expected under the current and the proposed assumptions for the last six years has been as follows:

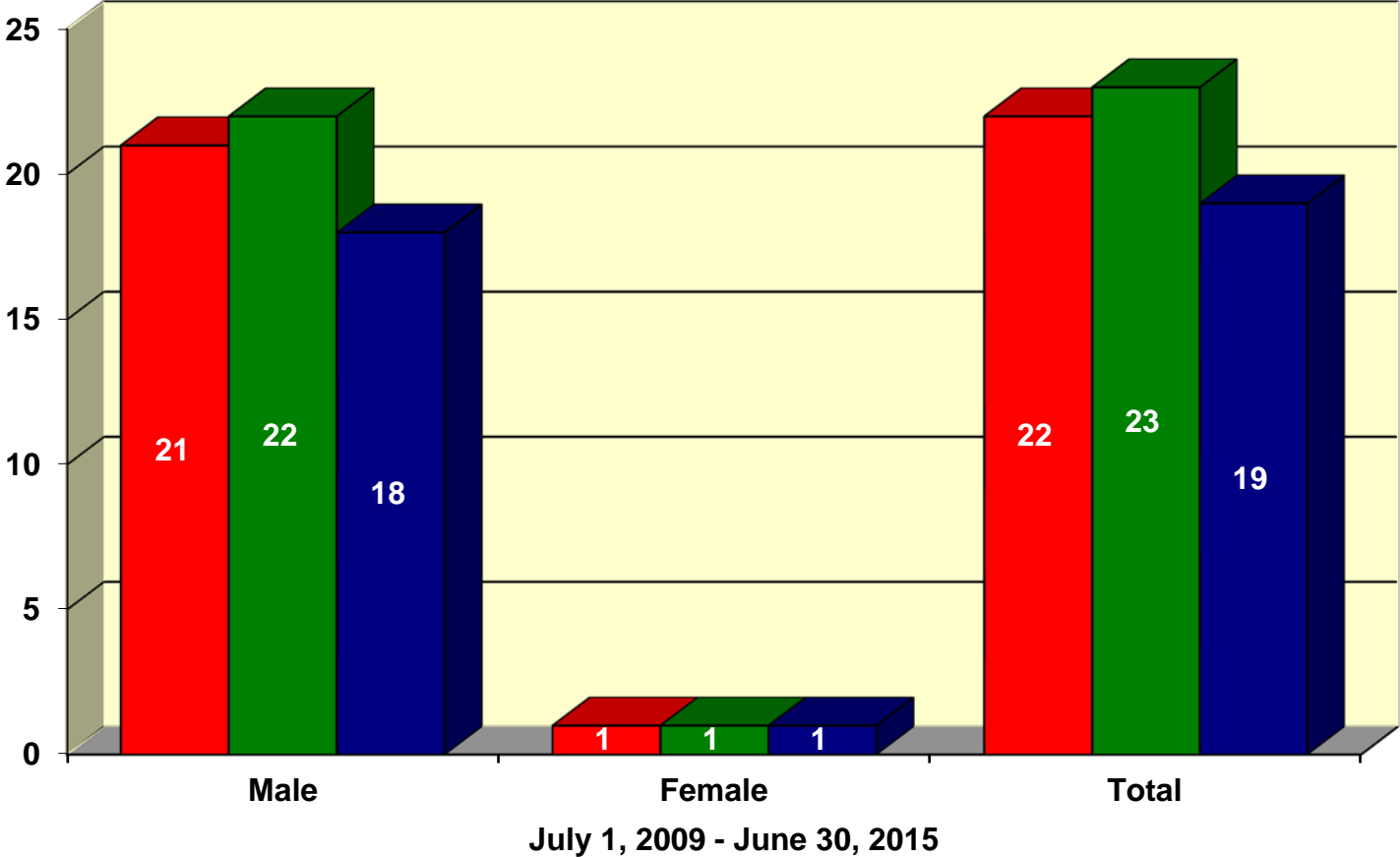
	Disabled		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	21	22	18
Female	<u>1</u>	<u>1</u>	<u>1</u>
Total	22	23	19
Actual / Expected	105%		121%

Based on the actual experience, we recommend changing the mortality to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional scale MP-2015, set forward four years. This will bring the actual to expected ratio for the most recent six year period to 121% for this group.

Chart 4 compares actual to expected deaths under the current and the proposed assumptions over the last six years. Experience shows that there were about the same number of deaths as predicted by the current table.

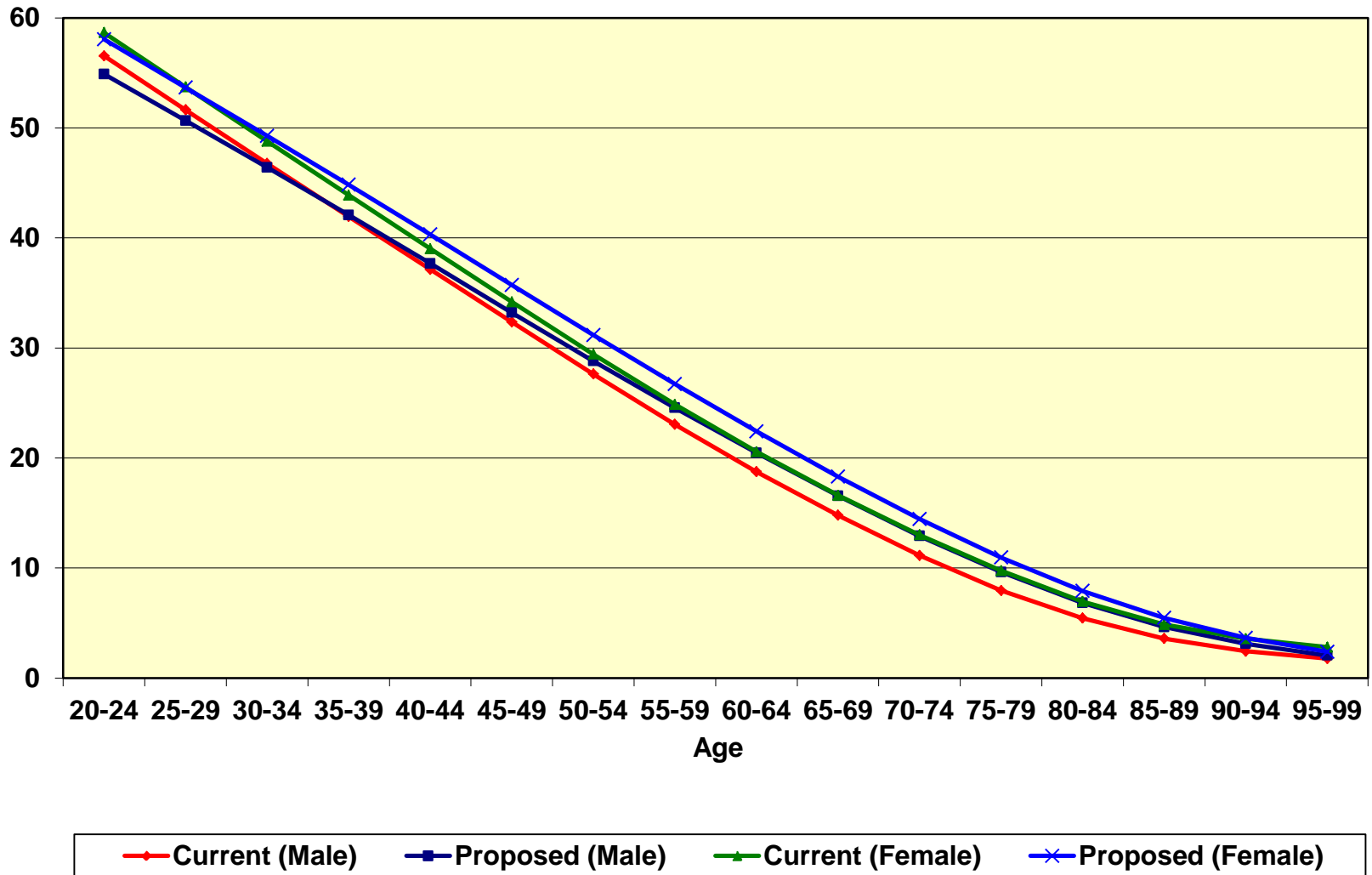
Chart 5 shows the life expectancies under the current and the proposed tables.

**Chart 4
Post - Retirement Deaths
Disabled Members**



■ Expected - Current
 ■ Actual
 ■ Expected - Proposed

Chart 5
Life Expectancies
Disabled Members



E. TERMINATION RATES

Termination rates include all terminations for reasons other than death, disability, or retirement. Under the current assumptions, there is an overall assumed incidence of total termination combined with a separate assumption for the percent of members who would elect to withdraw their contributions (ordinary withdrawal) versus a deferred retirement benefit (vested termination). The termination experience (total) over the last three years separated between those members with under five years of service and those with five or more years of service is as follows:

Rates of Termination (Less than Five Years of Service)

<u>Service</u>	<u>Current Rates</u>	<u>Observed Rates</u>	<u>Proposed Rates</u>
0 – 1	12.00%	13.24%	12.00%
1 – 2	8.00	11.85	10.00
2 – 3	6.00	1.03	5.00
3 – 4	5.00	6.38	5.00
4 – 5	3.50	5.88	5.00

Rates of Termination (Five of More Years of Service)

<u>Age</u>	<u>Current Rates</u>	<u>Observed Rates</u>	<u>Proposed Rates</u>
20 – 24	7.50%	N/A	7.50%
25 – 29	7.50	4.26%	7.00
30 – 34	6.50	9.28	7.00
35 – 39	5.75	7.44	6.00
40 – 44	5.00	2.27	4.00
45 – 49	4.50	2.29	3.50
50+	Not calculated*	Not calculated*	Not calculated*

* *Not calculated since these members are assumed to either retire or continue working.*

As stated in the service retirement section of this report, there is currently no explicit assumption to anticipate that a member will leave the City to work for a reciprocal employer because there is already an implicit assumption in the valuation that 100% of all deferred vested members with over five years of service are on reciprocity. Members with less than five years of service are normally not entitled to a deferred vested benefit unless they elect to leave their contributions on deposit and go on to work for a reciprocal employer, in which case they may become entitled to a deferred vested benefit once they accumulate a total of five years of service between both the City and the reciprocal employer. At the time of the last experience study, we suggested after discussions with the Retirement System that data related

to members who terminated with less than five years of service but went on to work for a reciprocal employer should be validated and provided to Segal for this experience study. Based on that data, over the past three years, 63 members with less than five years of service have terminated employment and did not subsequently return to active status within the City of Fresno. Of those, 9 (approximately 14%) were either shown to have retired or are currently flagged as working for a reciprocal employer with their contributions on deposit. Accordingly, for members with less than five years of service, we recommend an 85% assumption for the election of a withdrawal of contributions, with the remaining 15% of members assumed to elect a deferred vested benefit.

For members with five or more years of service, based on the actual experience that 47% elected a withdrawal of contributions, we recommend that the current 40% assumption for the election of a withdrawal of contributions be increased to 45%. Similarly, we recommend the remaining 60% of members currently assumed to elect a deferred vested benefit be reduced to 55%.

Based upon the recent experience, we recommend modifying the current termination assumptions for members with less than five years of service and members with five or more years of service.

Chart 6 compares actual to expected terminations (both withdrawal and vested terminations) over the past three years for both the current and proposed assumptions.

Chart 7 shows the current and the proposed termination rates for members with less than five years of service.

Chart 8 shows the current and the proposed termination rates for members with five or more years of service.

We continue to propose that termination rates be set at 0% at any age where members are assumed to retire. In other words, at those ages, members will either retire (and commence receiving a benefit) or continue working.

Chart 6
Actual Number of Terminations Compared to Expected

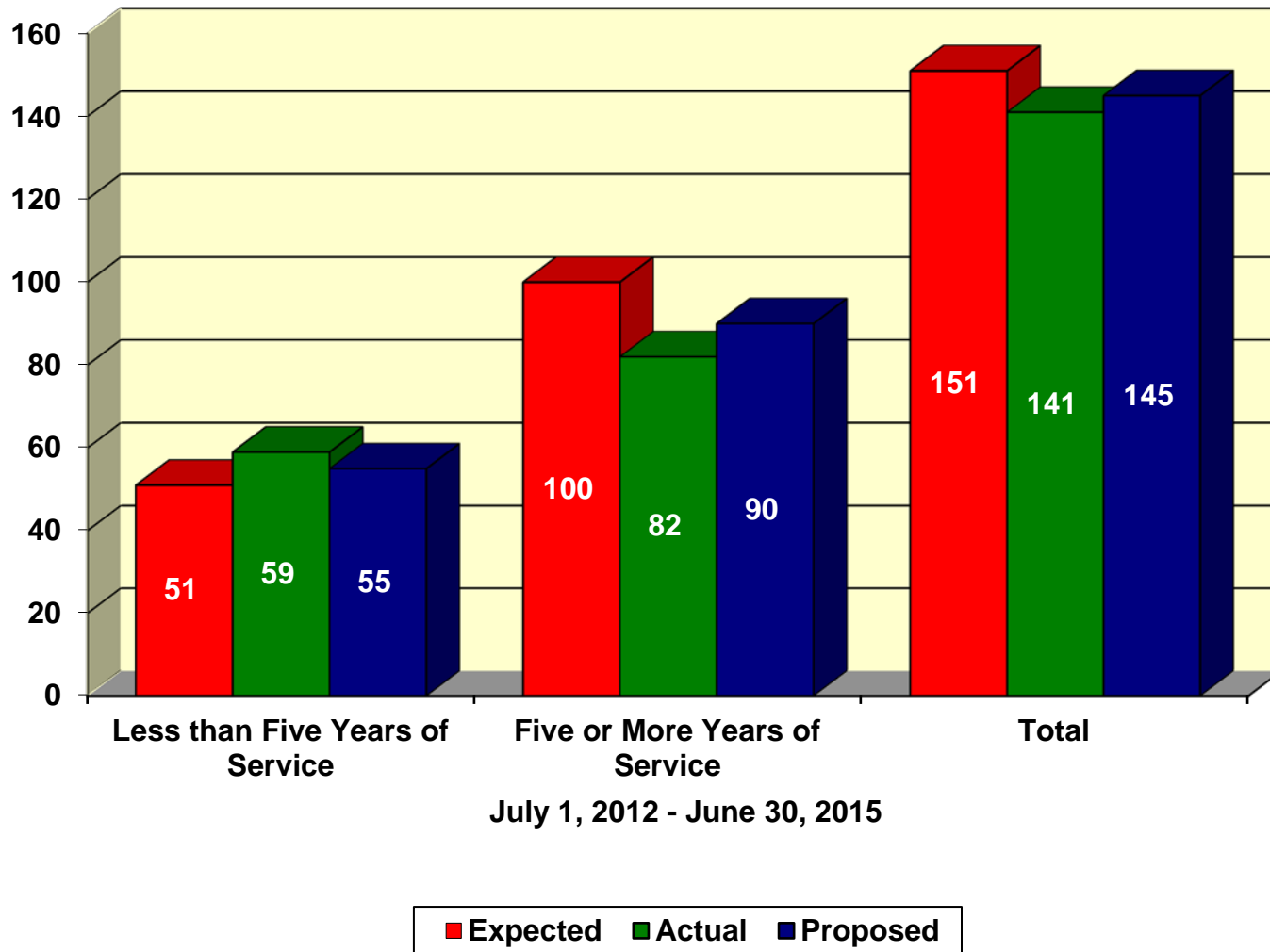


Chart 7
Termination Rates
(Less than Five Years of Service)

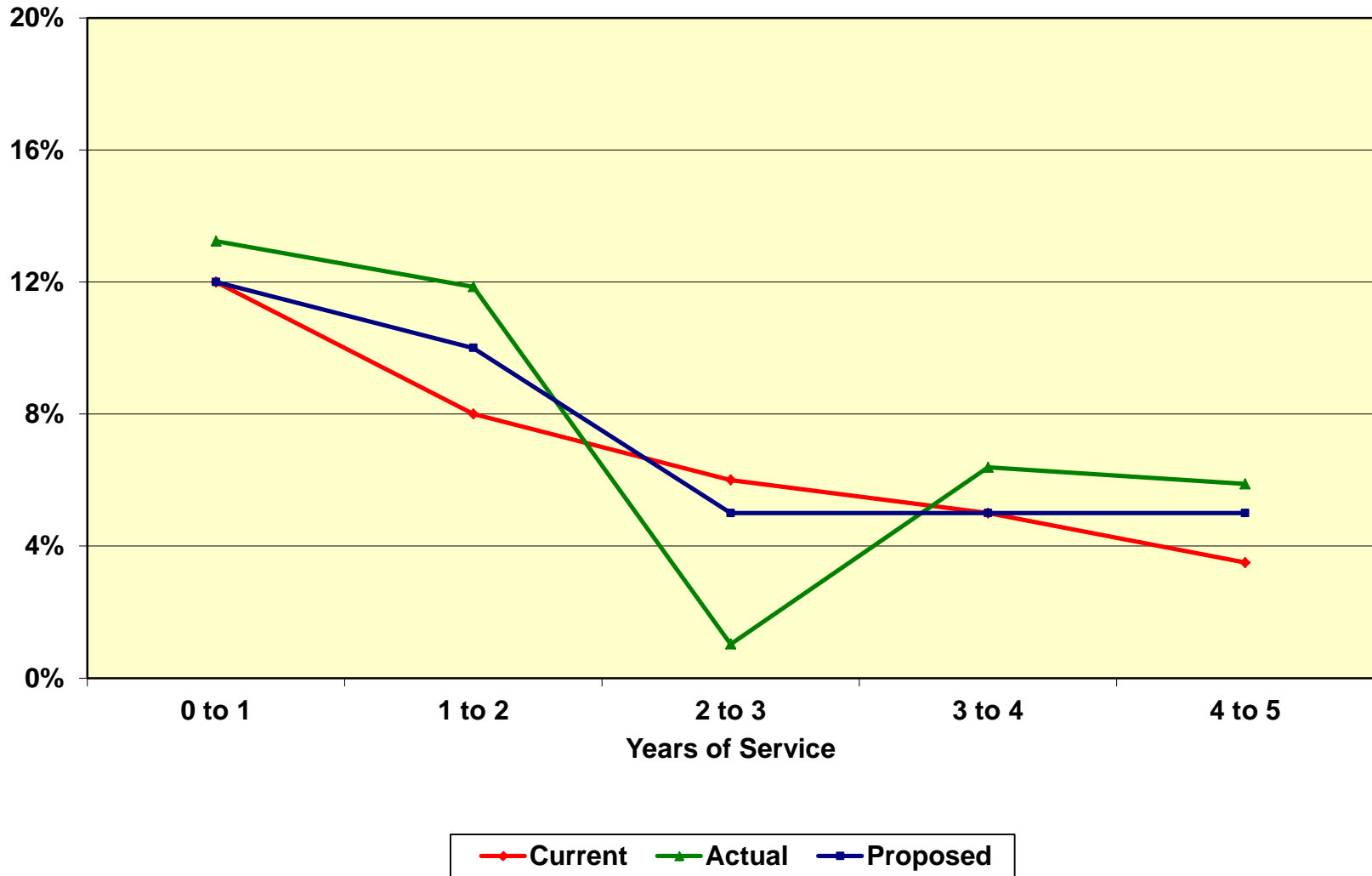
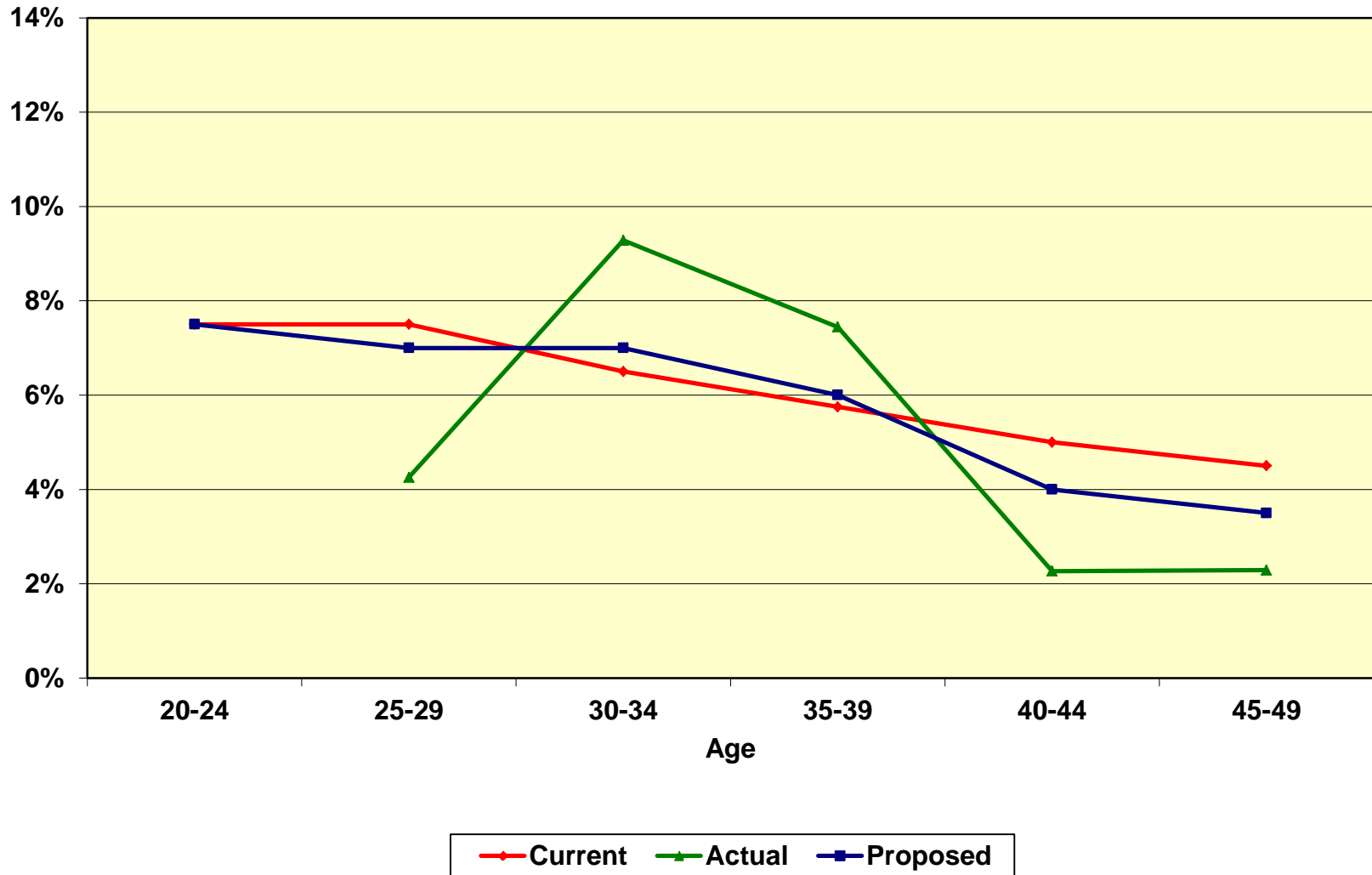


Chart 8
Termination Rates
(Five or More Years of Service)



F. DISABILITY INCIDENCE RATES

When a member becomes disabled, he or she may be entitled to a pension that may not depend on the member's years of service. The following summarizes the actual incidence of disabilities over the past three years compared to the current and proposed assumptions for disability incidence:

Rates of Disability Incidence

<u>Age</u>	<u>Current Rates</u>	<u>Observed Rates</u>	<u>Proposed Rates</u>
20 – 24	0.00%	0.00%	0.00%
25 – 29	0.00	0.00	0.00
30 – 34	0.01	0.00	0.01
35 – 39	0.10	0.00	0.05
40 – 44	0.20	0.33	0.20
45 – 49	0.40	0.00	0.20
50 – 54	0.55	0.09	0.30
55 – 59	0.75	0.46	0.60
60 – 64	1.50	0.79	1.10
65 – 69	1.50	3.25	2.25

We recommend decreasing the disability assumption for select age brackets below age 65 and increasing the disability assumption between the ages of 65 and 69.

Chart 9 compares the actual number of disabilities over the past three years to that expected under both the current and proposed assumptions.

Chart 10 shows the current and the proposed disablement rates.

Chart 9
Actual Number of Disabilities Compared to Expected

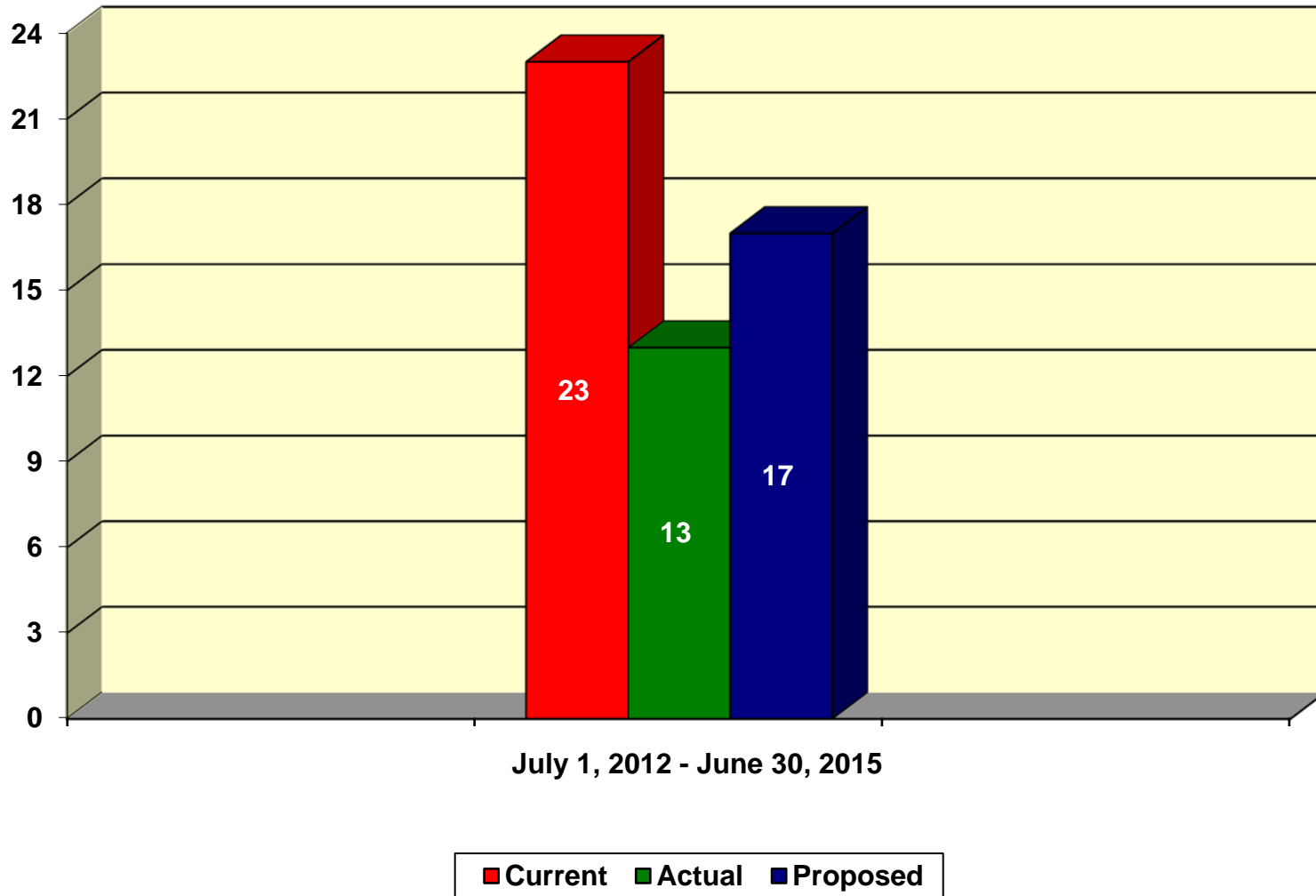
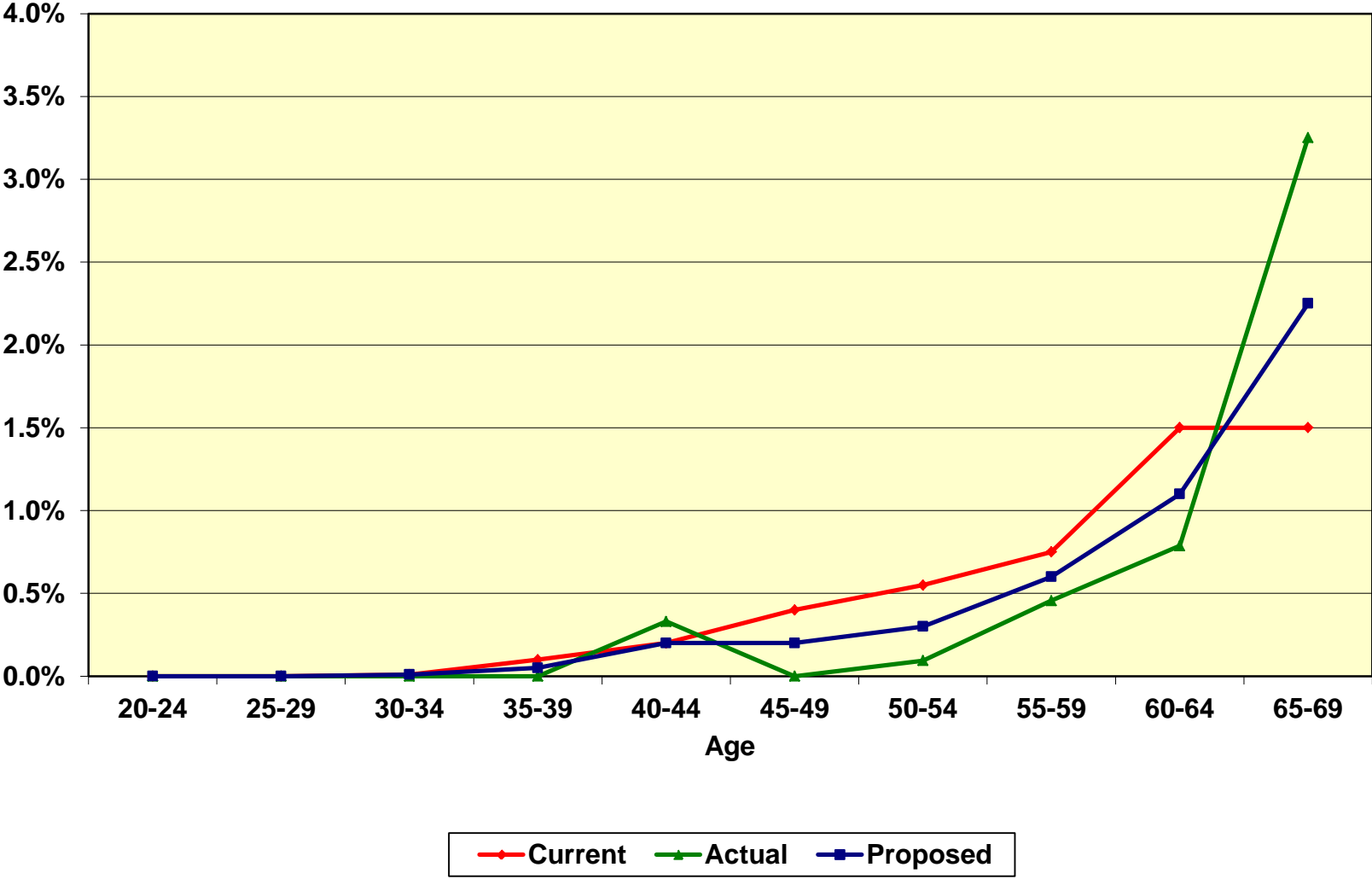


Chart 10
Disablement Rates



G. DROP ELECTION RATES

The DROP election experience over the last three years is shown below. As previously discussed, since there were relatively few members who elected DROP before attaining age 55, we have only included the DROP election experience for those who elected DROP after attaining age 55. Members who elected DROP before attaining age 55 are included in the retirement experience as described in Section III(B).

Rates of DROP Election (after attaining age 55)

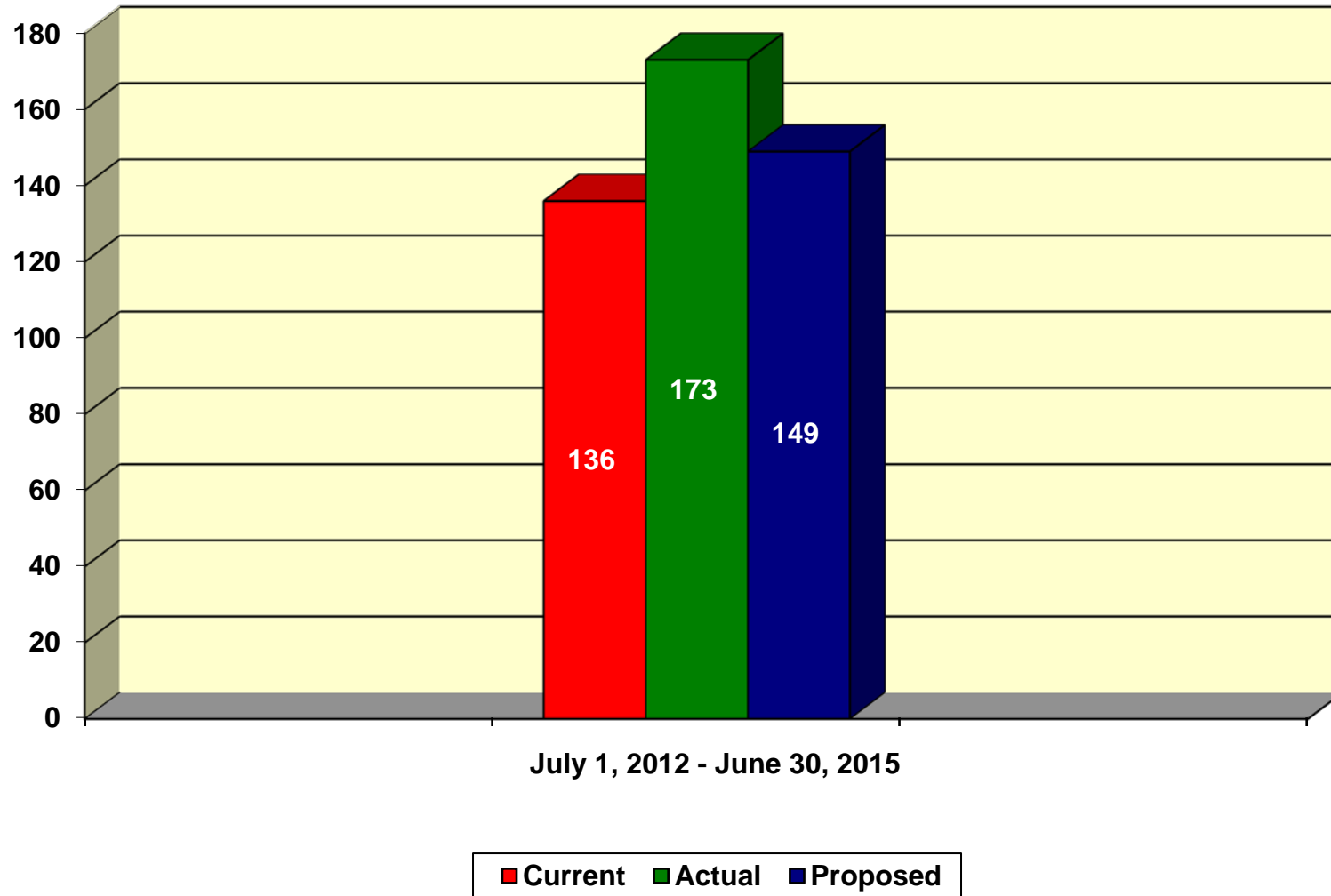
<u>Year Eligible</u>	<u>Current Rates</u>	<u>Observed Rates</u>	<u>Proposed Rates</u>
1st	30%	32.90%	30%
2nd	15	8.24	15
3rd	10	9.47	10
4th	10	11.94	10
5th	10	17.31	15
6th	0	10.00	10
Thereafter	0	10.31	0

Besides having assumptions to anticipate DROP election during the first 4 years of eligibility for DROP, the current assumption is that 10% of members will elect to enter DROP in their 5th year eligible, and that after the 5th year no member will elect to enter DROP. Experience in the last three years shows higher instances of DROP elections than currently assumed in the 5th year and beyond. Because of this, we recommend increasing the DROP election rate in the 5th year to 15%, and extending the assumed DROP election period to include a 10% DROP election rate in the 6th year eligible. Although members may still elect to enter DROP after their 6th year eligible, because the number of these members is relatively small and the financial impact of DROP election diminishes beyond the initial years of eligibility, we do not recommend extending the DROP election period beyond the 6th year at this time. However, we will continue to monitor this experience to determine if a change in this assumption may be warranted.

It is currently assumed that members remain in DROP for 6 years. Based on the experience of members who retired from the DROP during the past three years, the average number of years of participation in the DROP was 5.5. We recommend maintaining the current DROP participation period of 6 years.

Chart 11 compares actual to expected DROP elections over the past three years for both the current and proposed assumptions.

Chart 11
Actual Number of DROP Elections Compared to Expected



H. MERIT AND PROMOTION SALARY INCREASES

The System's retirement benefits are determined in large part by a member's compensation just prior to retirement or election to participate in the DROP. For that reason, it is important to anticipate salary increases that employees will receive over their careers. These salary increases are made up of three components:

- Inflationary increases;
- Real "across the board" increases; and
- Merit and promotion increases.

The inflationary increases are assumed to follow the recommended general annual inflation assumption of 3.00% discussed in our separate economic assumption report. We also discussed in that report our recommended assumption of an annual 0.50% "across the board" pay increase. Therefore, the total annual inflation and real "across the board" increase of 3.50% is used as the assumed annual rate of payroll growth at which payments to the UAAL or Prefunded Actuarial Accrued Liability are assumed to increase.

The annual merit and promotion increases are determined by measuring the actual increases received by members over the experience period, net of the inflationary and real "across the board" pay increases. This is accomplished by:

- Measuring each member's actual salary increase over each year of the experience period;
- Categorizing these increases into service groups;
- Removing the general salary increases (including inflation and "across the board" components) from these increases. These general increases are assumed to be equal to the increase in the members' average salary during the year;
- Averaging the remaining individual annual increases over the three-year experience period; and
- Modifying current assumptions to reflect some portion of these measured increases reflective of their "credibility."

Based on our analysis, we are recommending some adjustments in the merit and promotion assumptions for members.

The following table shows the average annual increases over the three-year experience period (July 1, 2012 through June 30, 2015) before removing the general increases (inflationary and “across the board” components):

<u>Years of Service</u>	<u>Increase</u>
0 - 1	9.28%
1 - 2	6.09
2 - 3	4.77
3 - 4	5.74
4 - 5	5.16
5 - 6	3.13
6 - 7	2.23
7 - 8	1.09
8 - 9	1.75
9+	1.28

The annual increase in average salary over this three-year period was about 1.3%. After removing these general increases, the following table shows the average annual merit and promotion increases for the three-year period. For reference purposes, we have also included the similar schedule with experience observed from the last study.

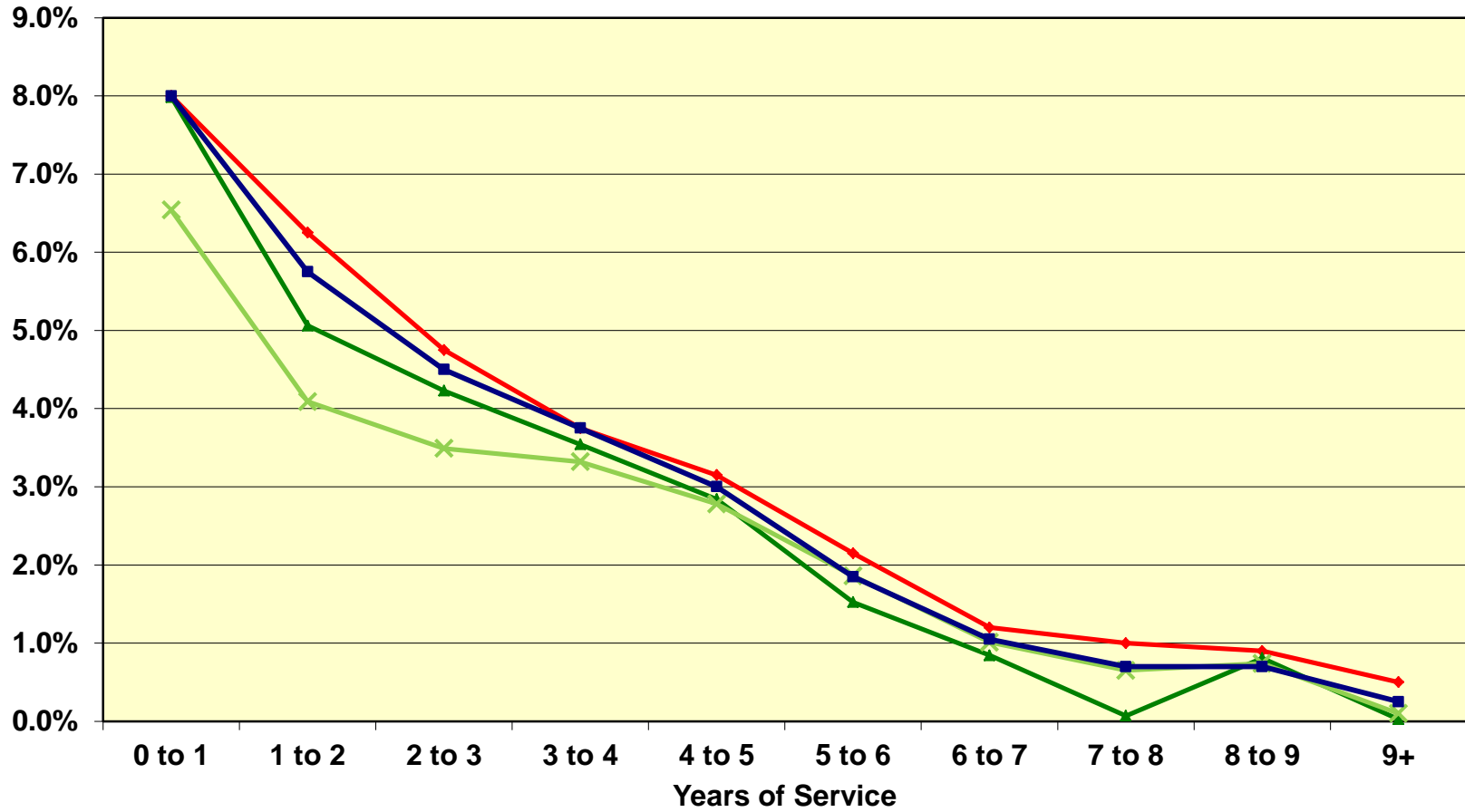
<u>Years of Service</u>	<u>Increase (Current Study)</u>	<u>Increase (Last Study)</u>
0 - 1	7.99%	6.54%
1 - 2	5.06	4.09
2 - 3	4.23	3.49
3 - 4	3.54	3.32
4 - 5	2.84	2.78
5 - 6	1.52	1.86
6 - 7	0.84	1.01
7 - 8	0.07	0.65
8 - 9	0.81	0.74
9+	0.03	0.10

The following table shows the current and recommended annual merit and promotion assumptions based on this recent experience:

<u>Years of Service</u>	<u>Current</u>	<u>Recommended</u>
0 - 1	8.00%	8.00%
1 - 2	6.25	5.75
2 - 3	4.75	4.50
3 - 4	3.75	3.75
4 - 5	3.15	3.00
5 - 6	2.15	1.85
6 - 7	1.20	1.05
7 - 8	1.00	0.70
8 - 9	0.90	0.70
9+	0.50	0.25

Chart 12 provides a graphical comparison of the current, actual experience and recommended merit and promotion increases.

Chart 12
Merit and Promotion Salary Increase Rates



◆ Current
 ▲ Actual (Current Study)
 × Actual (Last Study)
 ■ Proposed

IV. COST IMPACT OF ASSUMPTION CHANGES

The table below shows the changes in the employer and member contribution rates and actuarial accrued liability due to the recommended assumption changes as if they were applied in the June 30, 2015 actuarial valuation, broken down by source.

Source	Employer Normal Cost Contribution Rate Impact (% of Payroll) ¹	Average Member Contribution Rate Impact (% of Payroll) ²	Actuarial Accrued Liability (Estimated Dollar Amounts in Thousands)
Mortality	0.00%	0.04%	\$13,549
Economic	0.49	-0.11	1,750
All Other ³	<u>-0.72</u>	<u>-0.20</u>	<u>-7,913</u>
Total	-0.23%	-0.27%	\$7,386⁴

¹ Based on projected fiscal year 2015-2016 annual payroll for active non-DROP and DROP members of \$110,107,000.

² Based on projected fiscal year 2015-2016 annual payroll for active non-DROP members of \$88,091,000.

³ Primarily due to the reduction in assumed salary increases for continuing active and reciprocal members.

⁴ If the plan had an unfunded actuarial accrued liability, the increase of \$7,386,000 in accrued liability would be amortized over a 15-year period at the new assumed interest rate of 7.25%, with annual payments increasing at the new assumed annual payroll increase of 3.50% (i.e. 3.00 inflation plus 0.50% real across-the-board salary increase). This would result in a 0.59% increase in UAAL contributions (as a percent of payroll) for the next fifteen years.

APPENDIX A

CURRENT ACTUARIAL ASSUMPTIONS

Mortality Rates

Healthy: RP-2000 Combined Healthy Mortality Table (separate tables for males and females) projected with scale AA to 2021 set back one year.

Disabled: RP-2000 Combined Healthy Mortality Table (separate tables for males and females) projected with scale AA to 2021 set forward three years.

Employee Contribution Rates and Optional Benefits:

For healthy members: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2021 set back one year weighted 65% male and 35% female.

For beneficiaries: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2021 set back one year weighted 35% male and 65% female.

For disabled members: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2021 set forward three years weighted 65% male and 35% female.

Termination Rates Before Retirement:

Age	Rate (%)	
	Mortality	
	Male	Female
25	0.03	0.01
30	0.04	0.02
35	0.06	0.04
40	0.09	0.05
45	0.11	0.07
50	0.14	0.11
55	0.21	0.20
60	0.42	0.40
65	0.84	0.78

All pre-retirement deaths are assumed to be non-service connected.

Termination Rates Before Retirement (continued):

Rate (%)	
Age	Disability
20	0.00
25	0.00
30	0.01
35	0.06
40	0.16
45	0.32
50	0.49
55	0.67
60	1.20
65	1.50

All disabilities are assumed to be non-service connected.

Total Termination (Less than 5 years of service)	
Service	Rate (%)
0 - 1	12.00
1 - 2	8.00
2 - 3	6.00
3 - 4	5.00
4 - 5	3.50

100% of members are assumed to elect a withdrawal of contributions. No termination is assumed after a member is assumed to retire.

Termination Rates Before Retirement (continued):

Total Termination (5 or more years of service)	
Age	Rate (%)
20	7.50
25	7.50
30	6.90
35	6.05
40	5.30
45	4.70
50	0.00

40% of members are assumed to elect a withdrawal of contributions. The remaining members are assumed to elect a deferred vested benefit. No vested termination is assumed after a member is assumed to retire.

Retirement Rates:

Age	Rate (%)
50	2.00
51	2.00
52	3.00
53	3.00
54	5.00
55	6.00
56	6.00
57	6.00
58	6.00
59	6.00
60	8.00
61	10.00
62	10.00
63	11.00
64	18.00
65	20.00
66	20.00
67	25.00
68	40.00
69	50.00
70	100.00

DROP Assumptions:

	Male and Female (after attaining age 55)
First Year Eligible	30%
Second Year Eligible	15%
Third Year Eligible	10%
Fourth Year Eligible	10%
Fifth Year Eligible	10%
Thereafter	0%
<p>Members are assumed to remain in DROP for 6 years.</p>	
Retirement Age and Benefit for Deferred Vested Members:	For current deferred vested members, the retirement assumption is age 56. We assume no future deferred vested members will continue to work for a reciprocal employer.
Future Benefit Accruals:	1.0 year of service per year.
Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Inclusion of Deferred Vested Members:	All deferred vested members are included in the valuation.
Percent Married:	80% of male members; 55% of female members.
Age of Spouse:	Wives are 3 years younger than their husbands.
Net Investment Return:	7.50%, net of administration and investment expenses.
Employee Contribution Crediting Rate:	7.50%, assumed in the valuation.
Consumer Price Index:	Increase of 3.25% per year; Retiree COLA increases due to CPI are limited to maximum at 3.25% per year.

Salary Increases:

Annual Rate of Compensation Increase

Inflation: 3.25% per year;
plus 0.50% real across-the-board salary increase;
plus the following Merit and Promotion increases based on
completed years of service.

Years of Service	Annual Increase
0	8.00%
1	6.25
2	4.75
3	3.75
4	3.15
5	2.15
6	1.20
7	1.00
8	0.90
9+	0.50

APPENDIX B

PROPOSED ACTUARIAL ASSUMPTIONS

Post-Retirement Mortality Rates

- Healthy:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females) projected 20 years with the two-dimensional scale MP-2015, set forward one year.
- Disabled:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females) projected 20 years with the two-dimensional scale MP-2015, set forward four years.

Pre-Retirement Mortality Rates:

Headcount-Weighted RP-2014 Employee Mortality Table (separate tables for males and females) projected 20 years with the two-dimensional scale MP-2015 times 85%. All pre-retirement deaths are assumed to be non-service connected deaths.

Employee Contribution Rates and Optional Benefits:

For healthy members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP-2015, set forward one year, weighted 65% male and 35% female.

For beneficiaries: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP-2015, set forward one year, weighted 35% male and 65% female.

For disabled members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP-2015, set forward four years, weighted 65% male and 35% female.

Termination Rates Before Retirement:

Rate (%)		
Mortality		
Age	Male	Female
25	0.04	0.01
30	0.04	0.02
35	0.04	0.02
40	0.05	0.03
45	0.07	0.05
50	0.13	0.09
55	0.22	0.15
60	0.40	0.21
65	0.68	0.30

All pre-retirement deaths are assumed to be non-service connected.

Rate (%)	
Age	Disability
20	0.00
25	0.00
30	0.01
35	0.03
40	0.14
45	0.20
50	0.26
55	0.48
60	0.90
65	1.79

All disabilities are assumed to be non-service connected.

Termination Rates Before Retirement (continued):

Total Termination (Less than 5 years of service)	
Service	Rate (%)
0 - 1	12.00
1 - 2	10.00
2 - 3	5.00
3 - 4	5.00
4 - 5	5.00

85% of members are assumed to elect a withdrawal of contributions. No termination is assumed after a member is assumed to retire.

Total Termination (5 or more years of service)	
Service	Rate (%)
20	7.50
25	7.20
30	7.00
35	6.40
40	4.80
45	3.70
50	0.00

45% of members are assumed to elect a withdrawal of contributions. The remaining members are assumed to elect a deferred vested benefit. No vested termination is assumed after a member is assumed to retire.

Retirement Rates:

Age	Rate (%)
50	2.00
51	2.00
52	3.00
53	3.00
54	3.00
55	6.00
56	3.00
57	4.00
58	5.00
59	6.00
60	7.00
61	10.00
62	10.00
63	10.00
64	12.00
65	15.00
66	20.00
67	22.00
68	30.00
69	30.00
70	100.00

DROP Assumptions:

	Male and Female (after attaining age 55)
First Year Eligible	30%
Second Year Eligible	15%
Third Year Eligible	10%
Fourth Year Eligible	10%
Fifth Year Eligible	15%
Sixth Year Eligible	10%
Thereafter	0%
<p>Members are assumed to remain in DROP for 6 years.</p>	
Retirement Age and Benefit for Deferred Vested Members:	<p>For current deferred vested members, the retirement assumption is age 55. We assume no future deferred vested members will continue to work for a reciprocal employer.</p>
Future Benefit Accruals:	<p>1.0 year of service per year.</p>
Unknown Data for Members:	<p>Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.</p>
Inclusion of Deferred Vested Members:	<p>All deferred vested members are included in the valuation.</p>
Percent Married:	<p>80% of male members; 55% of female members.</p>
Age of Spouse:	<p>Male members are three years older than their spouses. Female members are two years younger than their spouses.</p>
Net Investment Return:	<p>7.25%, net of administration and investment expenses.</p>
Employee Contribution Crediting Rate:	<p>7.25%, assumed in the valuation.</p>
Consumer Price Index:	<p>Increase of 3.00% per year; Retiree COLA increases due to CPI are limited to maximum at 3.00% per year.</p>

Salary Increases:

Annual Rate of Compensation Increase

Inflation: 3.00% per year;
plus 0.50% real across-the-board salary increase;
plus the following Merit and Promotion increases based on
completed years of service.

Years of Service	Annual Increase (%)
0	8.00
1	5.75
2	4.50
3	3.75
4	3.00
5	1.85
6	1.05
7	0.70
8	0.70
9+	0.25

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