

**Mendocino County
Employees' Retirement Association**

**Independent Review of Actuarial Valuation as of June 30, 2009 and
Experience Study (July 1, 2005 – June 30, 2008)**

February 8, 2011

EFI ACTUARIES | EFI/LIABILITY MANAGEMENT SERVICES, INC.

The nation's leader in plan-specific, interactive asset allocation optimization counseling

WASHINGTON, DC ✕ PHILADELPHIA ✕ SEATTLE ✕ SAN FRANCISCO

Contents

Executive Summary	1
Organization of the Report	4
Scope of the Report.....	4
Review of Participant Data	5
Review of Actuarial Assumptions and Methods.....	12
Demographic Assumptions.....	12
Economic Assumptions.....	16
Rate of expected return on plan assets	16
Rates of salary increase and inflation	17
Rates of COLA growth	18
Actuarial Methods	19
Actuarial Cost Method	20
Amortization Policy	20
Asset Smoothing	20
Reserve Policies.....	21
Liability and Cost Calculations.....	22
Liabilities and Cost	22
Employee Contribution Rates	23
Impact of Recommended Assumption Changes.....	24
Certification	25
Appendix: Demographic Assumption Analysis	26

Executive Summary

Under a contract agreement with the Mendocino County Employees' Retirement Association (MCERA), EFI Actuaries (EFI) has conducted an independent actuarial review of the Actuarial Valuation as of June 30, 2009 (the Report) and the Experience Study covering the period from July 1, 2005 – June 30, 2008. The purpose of this study is to review independently the actuarial reports performed by MCERA's consulting actuary, Buck Consultants (Buck, the Actuary), to describe any shortcomings or errors, and to make any necessary recommendations.

We would like to thank the members of the Buck team, as well as the Staff at MCERA, for providing their cooperation during the audit process.

The main findings of our review are as follows:

- The Buck calculations appear to be correct based on their assumptions

As a result of our efforts, we are able to confirm that the liabilities and costs computed in the valuation as of June 30, 2009 appear reasonably accurate in aggregate, *given the assumptions used by Buck and the data provided by MCERA*. However, our calculations differed from the Actuary's for one of the smaller valuation groups (Probation).

- The actuarial assumptions used by Buck are seriously flawed.

During the course of reviewing the Experience Study we encountered a number of demographic assumptions used by the current Actuary that are unreasonable and fall outside the range of generally accepted actuarial principles. These issues arose because Buck considered only the age of the members when conducting their analysis of demographic assumptions (i.e. rates of retirement, withdrawal, and disability).

While basing rates on age alone can be appropriate for some assumptions – such as rates of mortality – rates of withdrawal are generally more related to career length than age. By ignoring the impact of service, the assumptions Buck developed have systematically underestimated the liabilities and costs of the Plan.

In particular, the application of withdrawal rates only by age results in an erroneous assumption that a significant number of members eligible for a service retirement benefit will instead withdraw their contributions and forgo any employer-paid benefit. Buck has acknowledged that this is an inappropriate assumption, both for MCERA and for other '37 Act systems.

Our review produced a number of additional observations and conclusions:

- In addition to the withdrawal rates, we identified several other non-economic actuarial assumptions proposed in Buck's Experience Study that would be better represented by an alternative set of assumptions. These assumptions reflect actual MCERA experience more accurately and would be less likely to result in actuarial gains or losses going forward, and include:
 - More conservative mortality rates – for males in particular,
 - Service-based rates of deferred vested terminations, and
 - Modified age-based service retirement rates, which are applied only when a member is eligible for a service-retirement benefit.

We recommend that the next experience study also include an examination of the impact of the conversion of sick leave to service credit at retirement.

- The economic assumptions proposed in Buck's review represent a reasonable set of assumptions. However, there are some areas where our recommended assumptions would differ, or where we wish to offer additional comments:
 - Buck has recommended that the assumption for the growth rate in future COLAs should be the same as the 3% cap on the COLAs. Using simulation analysis, we have shown that the expected growth in the COLA should be less than the cap – around 2.8%. The annual CPI increase will vary, fluctuating above and below the assumed rate of inflation. Based on current and anticipated future rates of inflation, members will not accumulate enough in COLA banks to offset years in which actual inflation is below the 3% cap. Accordingly, the average COLA will be somewhat below 3%; our simulations suggest around 2.8%.
 - The current expected rate of return of 8.00% (4.00% real return) falls within a reasonable range. However, based on a simulation of MCERA's target asset mix using the expected returns, volatilities and correlations provided by MCERA's investment manager (Callan Associates), the odds of achieving this return appear less than even, so a lower return assumption should be considered.
 - Buck recommended that no real "across the board" salary increase assumption be included in the projections of future wages. We support this recommendation based on the current economic conditions.
- We independently collected data from MCERA, and performed a reconciliation of this data with the prior year's information. Although the data we used in our parallel valuation was similar to that used by Buck in their report, there are some differences described later in this Report.

- We analyzed the growth in pay that occurs during a member's career, known as merit/longevity increases – as distinct from the across the board salary increases – and we have a number of recommendations:
 - The current age-based merit/longevity increases should be replaced by service-based rates, since service is generally a better predictor of the level and timing of these pay increases.
 - A load should be added to the terminal pay for service retirements to account for the impact of the vacation cash outs that frequently occur just before retirement.

Organization of the Report

This report is organized in several sections:

- The Executive Summary presents the conclusions of the report.
- We describe the scope of this independent review.
- We summarize our reviews of the Data, Actuarial Assumptions and Methods, and Liability and Cost Calculations.
- The Appendix contains detail in support for our Demographic Assumption Analysis

Scope of the Report

The two primary objectives of our review were to determine if the Plan's actuary used appropriate valuation methods and assumptions, and determine if they were applied properly. The scope of our review included an analysis of each of the following:

- We collected both raw data from MCERA and edited data from Buck. We performed an independent analysis on the raw data, to confirm the information used in the actuarial valuation and the demographic behavior used as the basis for the investigation of experience.
- We reviewed and evaluated the actuarial methods and assumptions disclosed in the valuation report and investigation of experience.
- We collected and reviewed benefit calculations for individual plan participants.
- We independently determined the liabilities and normal cost and compared them to those presented in the valuation report.
- We collected asset information from MCERA and independently calculated the actuarial value of assets.
- We confirmed the employee contribution rates shown by age for each group.
- Using our independently determined liabilities and normal costs, we calculated the total required contribution (cost), and compared it to the results presented in the valuation report. Aside from the assets, liabilities, and costs shown in the valuation report, we also reviewed the content of the report for completeness and compliance with actuarial standards of practice.

Review of Participant Data

As part of the annual actuarial valuation process, the Actuary collects member data from MCERA and then confirms that the data collected is reasonable and reconciles this data with that from the prior valuation. As part of an investigation of experience, the Actuary collects data over a longer time period (from July 1, 2005 – June 30, 2008 in this case) and performs a similar reconciliation to determine the actual rates of decrement (retirement, disability, termination, etc.) that have occurred over the study period.

For our review, we performed a completely independent data analysis. We collected both raw information from MCERA, as well as the final data that was used by Buck in their actuarial valuation and investigation of experience. We conducted our own reconciliation of the data, including a computation of the number of decrements for each cause (such as retirements, disabilities, deaths, etc.) and exposures (the number of members eligible for each cause of decrement) over the study period.

Our independent data analysis resulted in several findings:

1. As part of our analysis of the data over the period of study for the investigation of experience, we found one area – relating to the number of terminations counted during the experience study period – which appeared to be incorrectly calculated in Buck's analysis. We believe that Buck carried many Courts active members as terminated in the July 1, 2006 valuation because they were not reported by Mendocino County. Courts began processing their own payroll at this time and we believe that the conversion resulted in a loss of data for the July 1, 2006 valuation.
2. After reviewing the information provided by MCERA and the final data file provided by Buck, we asked a number of follow up data questions of the MCERA Staff. Based on the responses to the questions, we generated a final data file that differed from Buck's for a number of reasons:
 - a) Three members are included in the active liabilities by Buck and the inactive liabilities by EFI. These members are reported as "extra-help" members. These members are active employees working in ineligible positions. EFI treats these members as if they had terminated with a vested benefit; we compute liabilities assuming no future service accrual, but assuming increases in pay and interest on member contributions.
 - b) Four members (3 active, 1 retiree) included in liabilities by Buck are not included by EFI since they were either reported as deceased by MCERA, or MCERA indicated that these members are not receiving benefits. Two of these members appear to be counted twice in the Buck data due to changes in the unique identifier used to update information.
 - c) 26 members (3 active, 21 deferred vested, 1 retiree and 1 beneficiary) included by EFI in liabilities are not included by Buck.

- d) 45 members are valued by both EFI and Buck, but with different statuses. This can cause a slight change in liabilities since the mortality assumption is different for some status types.
- e) 92 non-vested members with funds on account are not included in the information provided by Buck but are reported in the MCERA data. EFI included these members in the member counts. Buck may be computing liabilities for these members and not reporting them since they are non-vested terminations.
- f) EFI valued two members as Tier 1 deferred vested members instead of Tier 3 deferred vested members.
- g) Total benefit amounts differed by \$37,261. When excluding members valued by one actuary and not the other, total benefit amounts differed by \$35,548. These differences are not significant.

We would be happy to provide Buck and the MCERA Staff with a listing of the individuals and the reasoning behind our changes.

- 3. Based on the discussions with the MCERA staff regarding the data provided to Buck, we found several areas in which data provided to the actuary could be improved. Providing this information would allow the actuary to compute more accurate liabilities.

a) Service Issues

- i. The entry date (DOE) reported for an active member is not adjusted for members with breaks in service. This results in service being overstated for those members who have terminated and subsequently re-entered active service.
- ii. Reciprocal Service is tracked by MCERA, but not provided to the actuary. Reciprocal service affects members' vesting service and therefore their vested liabilities. Not including reciprocal service can understate vested liabilities.
- iii. Members working in a non-contributory capacity (extra-help) are reported to the actuary as active members. If the actuary is not aware that these members are working in a non-contributory capacity, the actuary will continue to project pay and service for these members even though they are no longer contributing to the Plan or accruing service. This overstates liabilities.

The simplest way to resolve these service issues would be to report accrued service to the actuary as of the valuation date. Service could be reported in total or divided among the various service types: current service, purchased prior service, purchased public service and reciprocal service. Breaking the service down into individual components allows the actuary to project eligibility and benefit service separately since not all service types are included in benefit and/or eligibility service.

In addition, providing the actuary with a list of members working in a non-contributory capacity would allow the actuary to carry the liabilities for these members without service accruals, but allowing pay to increase.

b) Terminated Members

- i. Date of termination is reported for terminations occurring during the valuation year, but not for terminations occurring prior to the current valuation year.

Date of termination is necessary to compute service and estimate benefits. Providing either service or termination date would allow for a more accurate estimate of benefit service.

- ii. No pay history is provided for terminated members.

Providing final average pay or pay history for terminated members allows the actuary to compute vested benefits for members.

- iii. There is no code distinguishing members who terminate because they transfer to reciprocal agencies. Members transferring to reciprocal agencies are identified in the year of termination, but in subsequent years these members are shown only as terminations.

Reciprocal members benefit from any increase in earnings gained at the reciprocal agency. EFI increases the benefits and thus the liabilities of these members based on payroll increase assumptions. Deferred vested member benefits are frozen at termination and do not benefit from earnings increases of future employment, so they produce lower liabilities than transferred members.

4. We investigated the handling of member pay in several ways:

- a) We reviewed all benefit calculations for the members who began receiving a service or disability retirement during fiscal year 2008-2009, comparing the final average pay amounts used in the benefit calculations with the pay amounts provided in the actuarial valuation data, to verify that the valuation data included all special pay amounts that should be included in pensionable earnings, such as longevity payments, car allowances and bilingual pay.

Our analysis showed that these premium pays were *not* included in the compensation provided to the Actuary. This was confirmed by Staff and the Actuary independently as part of the June 30, 2010 actuarial valuation process. According to Staff, all such pay amounts are now being provided to the Actuary. In the minutes of the Retirement Board as of September 15, 2010, it was reported that the premium pay amounts would add approximately 1.7% to base wages. This estimate appears reasonable, given our review of the retirement calculations.

Most of the premium pay categories represent payments that can be expected to occur throughout a member's career. Therefore, once reported as part of the pay information to the Actuary, they should be fully reflected in the projection of future benefit payments.

- b) EFI did identify one category of special pay – vacation cash outs – that were not previously reported to the Actuary and that – according to Staff – will not generally appear in a member's reported pay until the year just prior to retirement. It is therefore appropriate to add an additional allowance to the liabilities for these pay amounts, since they will generally not be part of the reported pay in actuarial valuations conducted before retirement.

The vacation cash outs added approximately 3% on average to the Final Average Compensation of members with a 12 month compensation period, and ¾ of 1% to the Final Average Compensation for members with a 36 month period. Therefore it would be appropriate to include a load of 3% and 0.75% for the service retirement liabilities for members with 12 month and 36 month average compensation periods, respectively.

- c) We independently studied rates of member pay increase due to merit and longevity. Rates of salary increase used for the valuations were based on age, with higher increases assumed at younger ages. This is a typical pattern for assumed pay increases among public pension plans, and thus appears to be a reasonable assumption; however we recommend the use of service-based salary increases. A statistical analysis confirms that there is a stronger correlation of pay to service, which also holds true for each group, with an especially pronounced difference for Safety employees.

A summary of the correlation coefficients is shown below. A higher coefficient indicates a stronger correlation, so the service to pay relationship is evident here.

Group	Correlation of Age to Pay	Correlation of Service to Pay
General	.235	.305
Probation	.449	.584
Safety	.387	.762
All Groups	.212	.360

A typical pay increase pattern based on years of service includes an initial period of relatively high salary growth, followed by a typically lower mid-career rate, and often followed by an even lower ultimate rate (frequently less than 1% per year) in the later part of a member's career.

This pattern emerged among MCERA General and Probation members; however, the pattern was somewhat atypical for Safety members. Our analysis indicates higher increases might exist in later years for these employees.

We recommend the following longevity pay assumptions based on the current data. However, we also urge further study of the late career pay behavior seen in the recent Safety experience, due to the unusual nature of these rates of increase.

Group	Initial Increase Rate	Mid-Career Increase Rate	Ultimate Increase Rate
General	4.5%/year for 7 years	1.0%/year for years 8 to 18	0.0% after 18 years
Probation	4.5%/year for 10 years	N/A	1.5%/year after 10 years
Safety	6.5%/year for 4 years	0.0% for years 5 to 11	3.0%/year after 11 years

5. Based on the data provided to EFI, it appears that for at least a few members the COLA amount payable to those electing a Temporary Annuity (under Section 31810 of the CERL) is the same before and after the member reaches age 62. We are aware that there are other '37 Act systems that have used the same approach.

However, if the starting COLA is calculated based on the increased benefit amount (including the value of the Temporary Annuity) and this elevated COLA allowance continues to be paid to the member after reaching age 62, this could violate the requirement that the modified allowance have an equivalent actuarial value to the unmodified allowance. We believe Staff and the Actuary should review the calculation of the COLA for those with a Temporary Annuity, to ensure that the benefit payable under this optional form is actuarially equivalent to the unmodified benefit.

6. During the course of our review of the benefit calculations (see 4(b) above), we noted that some members received additional service credits for unpaid sick leave at retirement. The availability of this benefit was confirmed after review of some of the Memorandums of Understanding (MOUs) found on the County's website.

A liability should be estimated for the impact of unpaid sick leave on future retirement allowances. However, unlike vacation cash outs, the sick leave balances for members accumulate throughout a member's career. Therefore, rather than calculate an average load by reviewing the recent retirement calculations, it should be possible to formulate a more reliable estimate of the impact of sick leave by reviewing the actual accumulated sick leave balances for the current active employees and determining an assumption as to the rate of average future sick leave accruals and related service conversions.

The information necessary to conduct such a review was not collected as part of this study. We recommend that the Actuary include an examination of this issue as part of the next experience study.

After completing our independent review of the data, we then reviewed the age-service, age-benefit charts, and data summary information shown in the valuation report. We were able to verify that the information shown in the valuation report accurately represents the data actually used for the actuarial valuation.

The following is a detailed table showing the results of the data comparison. The reasons for the discrepancies have been identified above.

Table 1: Comparison of Participant Data as of June 30, 2009

	General			Safety			Probation		
	Buck	EFI	Ratio	Buck	EFI	Ratio	Buck	EFI	Ratio
Active Participants									
Number	1,164	1,162	99.8%	143	143	100.0%	62	61	98.4%
Average Age	48.6	48.7	100.2%	42.6	42.6	100.0%	42.8	42.3	98.8%
Average Service	8.4	8.5	101.2%	10.3	10.3	100.0%	7.7	7.4	96.1%
Average Pay	\$51,586	\$ 51,603	100.0%	\$63,337	\$63,270	99.9%	\$50,516	\$50,481	99.9%
Service Retired									
Number	650	649	99.8%	43	43	100.0%	19	19	100.0%
Average Age	68.6	68.5	99.9%	64.9	65.1	100.3%	59.2	59.2	100.0%
Average Monthly Total Benefit	\$1,386	\$1,392	100.4%	\$2,405	\$2,398	99.7%	\$2,449	\$2,449	100.0%
Beneficiaries/QDROS									
Number	105	107	101.9%	25	26	104.0%	1	1	100.0%
Average Age	74.0	74.0	100.0%	68.7	68.1	99.1%	60.0	59.8	99.7%
Average Monthly Total Benefit	\$1,007	\$998	99.1%	\$1,390	\$1,135	81.7%	\$442	\$442	100.0%
Non- Duty Disabled									
Number	47	47	100.0%	3	3	100.0%	1	1	100.0%
Average Age	62.4	62.4	100.0%	84	84.0	100.0%	63.0	62.8	99.7%
Average Monthly Total Benefit	\$887	\$887	100.0%	\$569	\$569	100.0%	\$484	\$484	100.0%
Duty Disabled									
Number	63	63	100.0%	50	48	96.0%	1	1	100.0%
Average Age	62.4	62.4	100.0%	62.4	62.6	100.3%	36.0	35.9	99.7%
Average Monthly Total Benefit	\$1,738	\$1,738	100.0%	\$2,675	\$2,727	101.9%	\$1,943	\$1,943	100.0%
Total In Pay									
Number	865	866	100.1%	121	120	99.2%	22	22	100.0%
Average Age	68.5	68.4	99.9%	65.1	65.2	100.2%	58.4	58.3	99.8%
Average Monthly Total Benefit	\$1,338	\$1,341	100.2%	\$2,261	\$2,275	100.6%	\$2,246	\$2,246	100.0%
Terminated Vested/Reciprocal									
Number	267	274	100.1%	42	44	99.2%	4	6	100.0%
Average Age	48.8	50.0	99.9%	41.9	42.3	100.2%	37.5	43.8	99.8%



Review of Actuarial Assumptions and Methods

To conduct an actuarial valuation, it is necessary to select and use a set of actuarial methods and assumptions. The demographic assumptions involve factors such as when people will retire, in addition to economic factors such as how the plan assets will grow. Actuarial methods affect how asset values are determined and how liabilities are allocated to various parts of a member's career.

Demographic Assumptions

The questions guiding our review of the demographic assumptions were the following:

- Do the rates of termination from active service due to retirement, withdrawal, disability, and death, follow reasonable patterns?
- Do the rates reflect the experience of the Plan?

To answer these questions, we performed a full parallel investigation of experience. First, as described above, we collected data from MCERA and performed an independent analysis. We then compared the assumptions proposed by Buck in their Experience Study report. A description of our analysis is below:

Retirement

While we found the recommended rates to be reasonable, we would propose different rates for each of the groups. Our proposed rates follow the same general pattern, but are more conservative in that they reflect the recent experience of earlier retirements, particularly between the ages of 50 and 60.

The table below shows our recommended retirement assumptions. We recommend that rates be applied only when a member is eligible to receive a service retirement benefit, as opposed to the current practice of applying rates based solely on age.

Age	General		Probation	Safety
	Male	Female	All	All
50-54	0.060	0.060	0.100	0.030
55-59	0.130	0.080	0.300	0.030
60-64	0.140	0.250	0.750	0.750
65-69	Buck rates OK		1.000	1.000
70+	1.000	1.000	1.000	1.000

Disability

Upon comparison of the actual to the expected number of both ordinary and duty related disabilities, we concluded that no changes are necessary at this time. The current assumptions were not particularly accurate; however, the limited experience left very little cause for adjustment. It is unclear whether Buck proposed a change in any of the rates, due to some inconsistencies between the Summary of Assumptions and the tables (Schedules 1 through 4) in their report.

Termination

We examined four types of terminations: withdrawals, non-vested terminations, vested terminations and transfers. As was mentioned in the data analysis section, we believe that Buck over-counted the number of terminations during the study period because of a discrepancy in the treatment of the Courts data.

We also found there to be a much stronger correlation between termination and years of service, rather than age. This was true for each of the four types, except transfers, for which no firm conclusions can be drawn due to limited experience.

We recommend the following assumptions for each group and type of termination. Note that withdrawals and non-vested terminations are combined in this table.

Termination Type	General	Probation	Safety
Vested Termination	2.0% for 0-4* yrs, 4.0% for 5-20, 0.0% 21+	8.0% for 5-9 yrs, 4.0% for 10-14, 0.0% for all other service levels	3.0% for 5-9 yrs, 1.5% for 10-15 yrs, 0.0% for all other service levels
Withdrawal/ Non-Vested Termination	4.0% for 0-20 yrs, 0.0% for 21+	9.0% for 0-4 yrs, 5.0% for 5-9 yrs, 0.0% for 10+	12.0% at 0 yrs, grading down to 0.0% at 20+ yrs
Transfer	0.4% for 0-14 yrs, 0.0% for 15+	1.7% for 0-9 yrs, 0.0% for 10+	1.7% for 0-9 yrs, 0.0% for 10+

* This rate was observed even though five years of service are required for vesting. Members who terminate with a vested benefit with low service may have transferred from and have earned service credit from a reciprocal employer.

Mortality

Upon review of recent mortality experience, Buck recommended no change in assumed rates of mortality. The reason cited was that the number of actual deaths matched the number expected. Upon closer inspection; however, we note that the number of deaths among male retirees and beneficiaries was lower than expected while the opposite was true for females. This warrants a change in assumption to a more recent table that reflects this very trend.



The Retired Pensioner (RP) 2000 Tables are the most current mortality tables generally used for pension funding. In particular, they reflect improved male mortality. The Society of Actuaries suggested a methodology for projecting mortality improvements using these tables. Using a Projection Scale AA, the RP 2000 Tables are adjusted for mortality improvements since the base year of the Tables (2000).

We recommend the use of the RP2000 Tables for Males and Females, projected from the base year of 2000 to 2010, to predict the mortality behavior of all healthy members, including active members and retirees, and for General and Safety/Probation members. Rather than assume all Safety and Probation members are male, we recommend using these members' actual gender and the corresponding male and female tables.

Given the reduced rate of mortality observed among the male members, we also recommend the use of a four year age setback for projecting male experience. For disabled members, we recommend the use of the same RP2000 projected tables, but using a four year age set-forward for male and female members.

Typically, actuaries prefer to see an actual-to-expected ratio (A/E ratio) greater than 100% when comparing the number of actual deaths to those expected, based on two primary factors:

- Rates of mortality are expected to improve over time (people will live longer in the future)
- Members who receive higher benefits generally have lower rates of mortality, and longer life expectancies, than members receiving lower benefit amounts. Basing mortality rates on the number of death alone can lead to underestimation of liabilities, even if the number and timing of deaths is accurately predicted for the group as a whole.

Based on our recent review of mortality in a number of '37 Act systems, we have found that the second factor (benefit size) has just as large of an impact on the analysis of A/E ratios as does the first (anticipated mortality improvements). Also, the analysis of mortality by benefit amount does not rely on assumptions about future changes in mortality rates – which are highly uncertain and about which there are significant disagreements among experts – but rather reveals important characteristics about mortality *that already clearly exist in the data*.

We computed the ratio of actual to expected deaths based on the mortality assumptions recommendations by Buck, and found that the ratio for the General retirees was 98% on a member-weighted basis, but only 83% on a benefit-weighted basis. This second number shows that the rates lack conservatism. A similar pattern was found with the Safety retiree population. The tables recommended by EFI and described above provide a desired margin under both a member and benefit-weighted basis, as is shown in the table below.

An additional consideration that the Board (and the County) may wish to keep in mind when setting post-retirement mortality assumptions concerns upcoming changes being proposed to the pension accounting standards proposed for public plans by the Government Accounting Standards Board (GASB). As part of their recent Exposure Draft, GASB has stated that they may require that public employers

expense *immediately* the full impact on any changes to post-retirement mortality assumptions to the accrued liabilities for their retirees.

This could result in a very significant expense charge in any year in which mortality tables have changed. Plans and sponsors may wish to consider whether it makes sense to try to incorporate sufficient conservatism in their rates now, when changes to the liability can still be amortized over many years of expense charges, rather than waiting until the standards have changed and the full impact must be recognized in a single year.

We recognize, however, that introducing additional conservatism in the current fiscal environment is difficult. Moreover, the issues identified here with respect to GASB only apply to the sponsor's financial statements; GASB's actions will have no impact on required funding policies.

Summary of Demographic Analysis

The table below shows the actual to expected ratios for each of the above assumptions. Ratios are shown as reported by Buck based on their recommendations, as well as by EFI based on our recommendations.

Assumption	A/E Ratio (Buck)	A/E Ratio (EFI)
Retirement	80%	90%
Withdrawal	108%	104%
Transfers	N/A	85%
Vested Termination	119%	104%
Disability (combined)	44%	43%
Mortality (active)	111%	140%
Mortality (retired) – count basis	100%	110%
benefit weighted	N/A	103%

An actual to expected ratio close to 100% generally indicates a strong correlation between assumptions and recent experience. Illustrations supporting our recommendations are included in the Appendix.



Economic Assumptions

The questions guiding our review of the economic assumptions were the following:

- Rate of expected return on plan assets – Does the rate reasonably represent the expected return based on the plans asset mix? Is it overly aggressive or conservative?
- Rates of salary increase and inflation – Are the salary increase rates reasonable with respect to the populations? Is the rate of inflation within a reasonable range? Is the rate of real return (expected return less inflation) reasonable?
- Rates of Cost of Living Adjustment (COLA) growth – Are the COLA growth rates reasonable with respect to the provisions of the Plan and the inflation assumption?

Rate of expected return on plan assets

The rate of expected return on assets suggested in the investigation of experience and used in the valuation was 8.0%, coupled with an assumed increase in the cost of living of 4% annually. Overall, this rate is reasonable considering the asset allocation, and represents a moderately optimistic outlook for the expected long-term return.

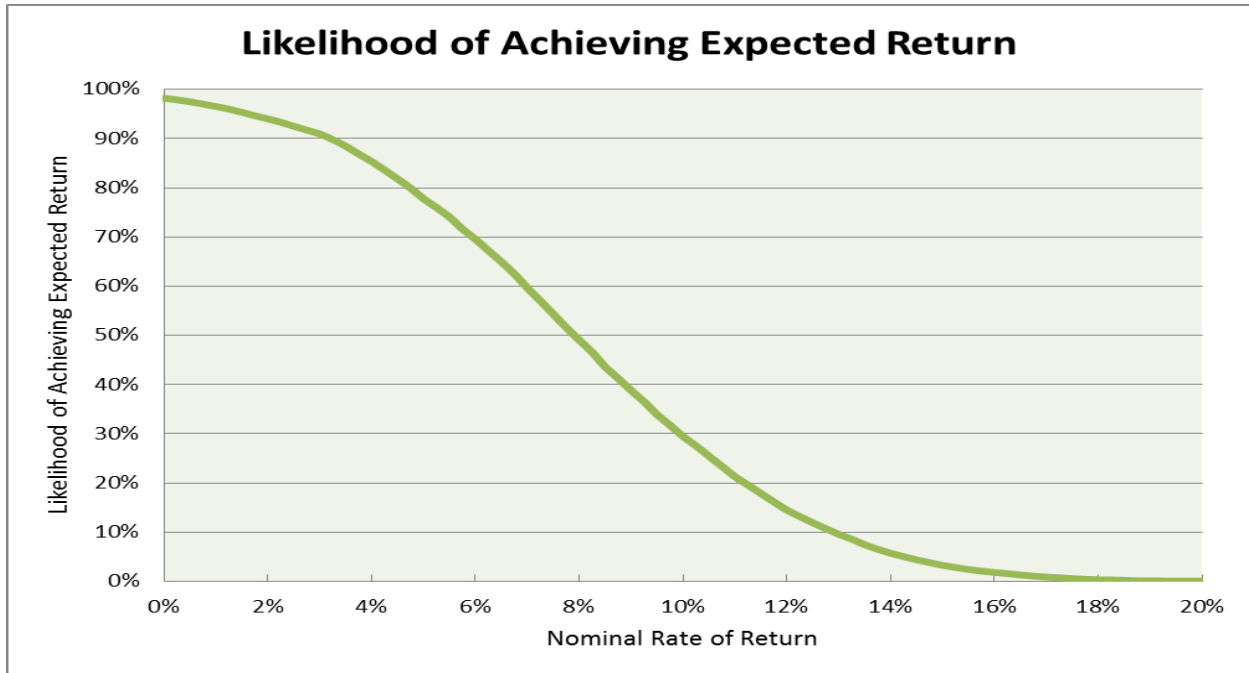
In the Chart below, we have simulated the return derived using MCERA's current target allocation. The simulated returns are derived using the following algorithm:

1. The expected returns, standard deviation and correlation matrix for each asset class were provided by the investment consultant (Callan Associates).
2. The expected returns for each class were modified to adjust for half of the difference in the inflation assumption used by the investment consultant (2.75%) and the proposed inflation assumption used for actuarial purposes (4.0%). Returns were adjusted by only 50% of the difference in inflation because assets generally perform less well in more inflationary environments.
3. 10,000 simulation trials for repeated ten year periods were run, and the mean compound rate of return on MCERA assets was computed for each of them.
4. Given the distribution of returns, we have created a chart that shows the likelihood of the compound 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, and the percentage has been increased to 0.21%. The simulated rates of return in our simulation were reduced by 0.20% to allow for administrative expenses.

The mean return from this simulation was 7.89%, for a real return of 3.89%. Note that the curve crosses the 50% likelihood threshold right around this point, meaning that chances are slightly better than 50/50 that a 7.75% return would be achieved over a ten year period. A lower return assumption would result in a higher likelihood of achieving the expected return.

All things considered, the 8.0% return assumption recommended by Buck Consultants is reasonable. However, our simulation results suggest that it is somewhat optimistic and, based on the assumptions provided by Callan Associates, the odds of meeting the assumption over the next 10 years are less than even. Therefore, we recommend that consideration be given to decreasing the assumed return to 7.75%. It should be noted that many other major plans in California and nationwide are considering comparable reductions in their assumed returns.



Rates of salary increase and inflation

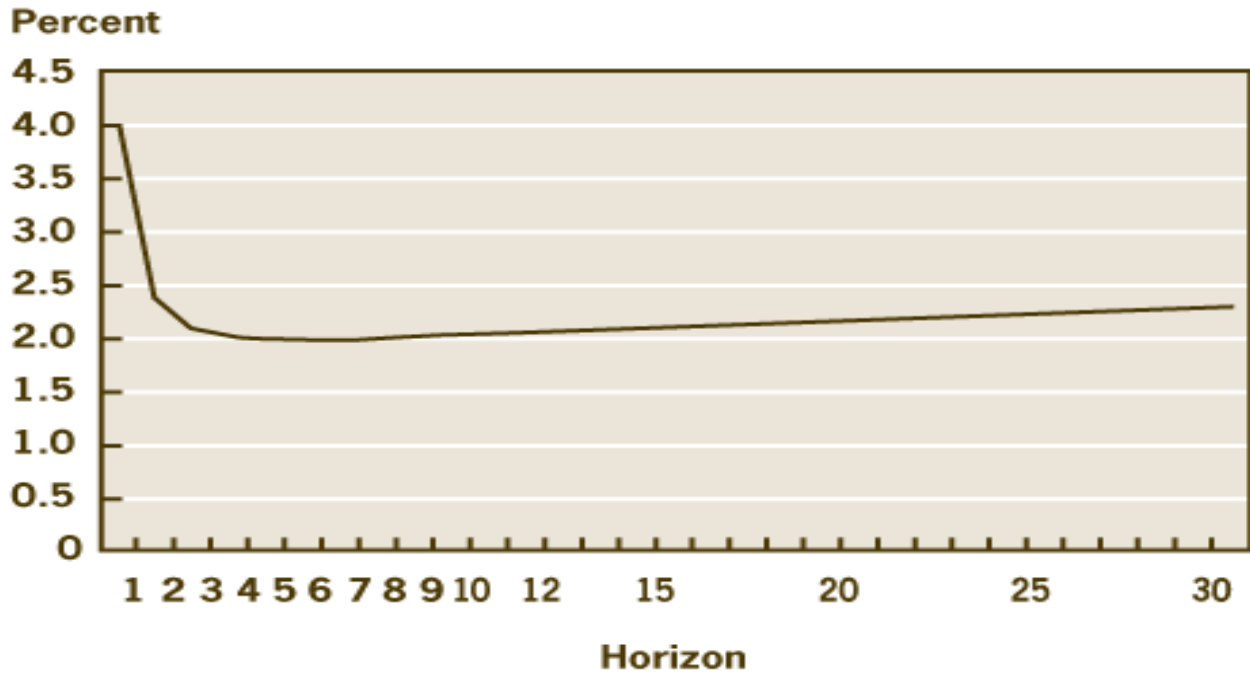
In the June 30, 2008 actuarial valuation, the assumed rate of future inflation was reduced from 4.75% to 4.0%, which we believe was a reasonable recommendation.

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 the 30-year projection of expected inflation rates shown in the graph below.

An assumption of 2.75% 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. If current market and professional expectations continue to indicate low levels of future inflation, it would be appropriate to consider an additional reduction in the inflation assumption.

In their actuarial valuation of June 30, 2009, Buck Consultants also recommended a rate of expected payroll growth (excluding individual increases based on longevity/merit) of 4.00%, equaling the rate of

inflation. This is equivalent to assuming that there will be no real increases in member wages due to productivity, at least in the foreseeable future.



(Source: Joseph G. Haubrich, Cleveland Federal Reserve website. As of September 1, 2009)
<http://www.clevelandfed.org/research/commentary/2009/0809.cfm#back2fn2>)

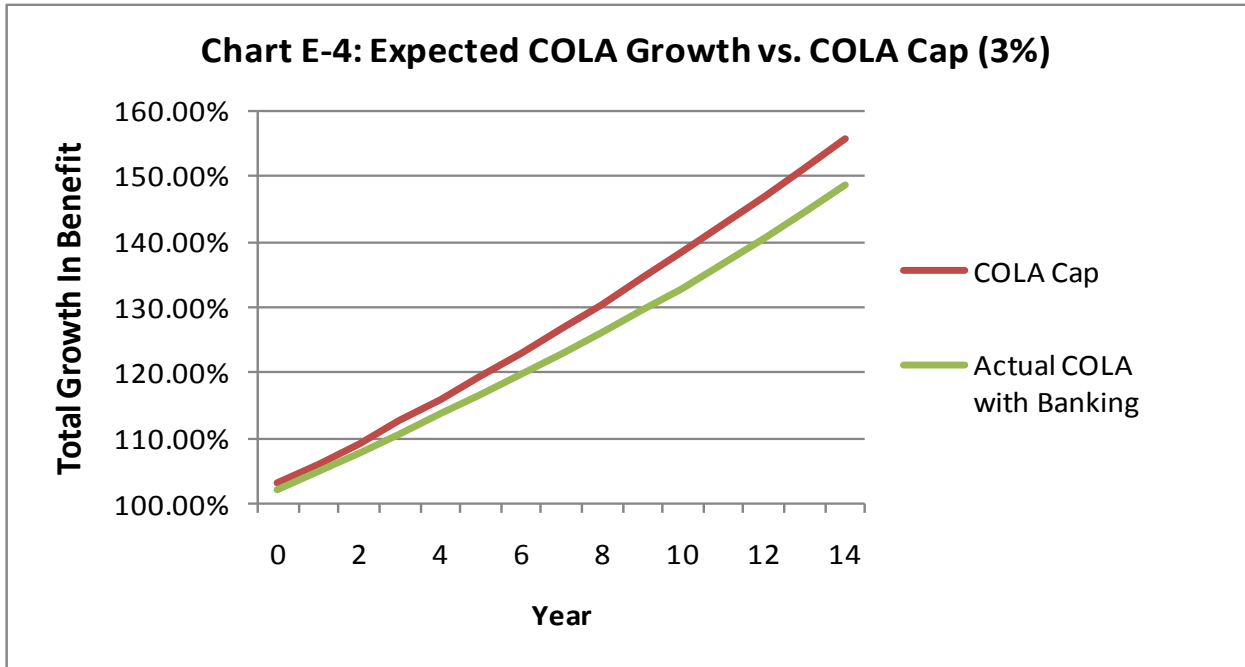
We believe this assumption regarding real wage growth is reasonable, at least for now. Current budgetary constraints make it extremely unlikely that bargaining units will be successful in negotiating salary increases above inflation, at least until sponsors are able to recover from the current economic crisis. In addition, there are other areas of employee compensation - specifically pension contributions and healthcare costs - that are likely to increase more rapidly than general inflation over the next few years. Therefore, wages increases may have to increase *less* rapidly than inflation in order for overall compensation to avoid significant growth above inflation; we have seen evidence of this recently where bargaining groups are agreeing to at least temporary freezes or reductions in wages.

Rates of COLA growth

Buck Consultants did not discuss the COLA assumption in any detail within the experience study; we assume that this is because the recommended rate of inflation (4.0%) is still above the COLA cap (3.0%).

However, we have done extensive analyses for a number of our '37 Act clients who have identical COLA provisions - COLA equal to CPI growth, capped at 3.0%, with CPI increases above the cap "banked" for future years. As part of these analyses, 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 interact with the changes in CPI. This approach is suggested in the Actuarial Standard of Practice governing the measurement of pension obligations (ASOP 4), where the impact of using a

deterministic procedure (i.e. assuming inflation will be 4.0% every year) could result in a poor measurement of the impact of certain benefit provisions.



This chart demonstrates that the expected growth in the COLA is expected to be below the cap, even if the expected average increase in the CPI (4.0%) is higher than the cap itself (3.0%). 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 our analysis, we recommend an assumed COLA growth rate of around 2.8% per year, given a 3.0% cap and 4.0% inflation assumption.

Actuarial Methods

The actuarial methods relate to the application of actuarial assumptions in the determination of Plan liabilities and contributions. These methods include the selection of the actuarial cost method, amortization policy, actuarial asset smoothing, and the calculation and use of reserves. The questions guiding our review of the actuarial methods were the following:

- Are the methods acceptable and appropriate for the intended purpose?
- Do the methods comply with relevant accounting and actuarial standards?

Actuarial Cost Method

The actuarial cost method used by Buck to value the MCERA pension plan is the Entry Age Normal Actuarial Cost method. This method is required by the '37 Act (CERL 31453.5). It is an acceptable and appropriate cost method, and is accurately described within the valuation reports.

Amortization Policy

MCERA is currently amortizing the unfunded liabilities of the Plan over a 30 year period from the June 30, 2009 valuation date. The initial actuarial valuation report produced by Buck did not correctly apply the amortization method as described. However, we were provided with a recomputed amortization schedule, as well as revised amortization payments (expressed as a percentage of payroll) for each of the Groups and Tiers as of June 30, 2009. We have confirmed that the revised results provided by Buck reflect the correct application of the amortization method as described.

This amortization policy represents the bare minimum standards of the '37 Act and the Government Accounting Standards Board's (GASB) disclosure standards – both of which currently allow for level percentage of pay amortization with a maximum period of 30 years. With a level percentage of pay amortization policy and a period of 17 or more years, the amortization payment in the current year will be less than the interest on the unfunded amount – no payment towards principal is made. Under this pattern (known as *negative amortization*) the unfunded liability will increase as a dollar amount until the amortization period drops below 17 years, even if all assumptions are met and the required employer contribution is made.

It should also be noted that GASB is in the process of reviewing their pension disclosure standards, and has indicated an intent to modify those standards in the coming years; shorter amortization periods are a likely outcome of this effort.

Asset Smoothing

The actuarial (or smoothed) value of assets is determined using a five year smoothing method. The Board recently elected to increase the corridor around the market value of assets from 20% to 25%. We have confirmed that the Buck report applies the actuarial smoothing method as described.

The Actuarial Standard of Practice which governs asset valuation methods (ASOP #44) requires that the actuarial asset value should fall within a “reasonable range around the corresponding market value” and that differences between the actuarial and the market value should be “recognized within a reasonable period of time.” Our view is that a 25% difference between the actuarial and market value constitutes a reasonable range.

The Standard also states that in lieu of satisfying both requirements above, the actuarial smoothing method can be deemed acceptable if the method either “(i) produces values within a sufficiently narrow range around market value or (ii) recognizes differences from market value in a sufficiently short period.” Many actuaries consider five year smoothing to be a “sufficiently” short period, which thus

removes the requirement that the actuarial asset value should fall within a reasonable range of the market value.

There are a number of '37 Act counties that use five year smoothing with no corridor around the market value of assets. We generally prefer to see both elements (reasonably close to market and reasonably short smoothing time) reflected in an actuarial smoothing policy, as is the case at MCERA.

Reserve Policies

We reviewed the new Interest Crediting and Undistributed Earnings Policy adopted by MCERA on June 16, 2010, to determine whether the Policy would be likely to result in a drag on the investment return by diverting gains in some years for purposes other than funding the basic Plan benefits.

This Policy gives the Retirement Board wide discretion in the application of earnings in excess of the actuarial assumption. Because of the discretion given the Board, and the lack of any automatic mechanism for applying excess earnings in the Policy or in statute, the Policy falls outside the range of actuarial models: Human decisions cannot be predicted.

Accordingly, no computer or mathematical model of the Interest Crediting Policy was constructed. However, we did have a few observations:

1. Because of the presence of a significant unfunded liability in the Plan, we do not anticipate any diversion of earnings or additional benefit awards in the near term.
2. In general, we have found it advantageous to include in such policies a mechanism for reconciling the various valuation reserves with the liabilities computed by the Fund actuary. The current policy includes such a mechanism, by requiring that the first use of the Undistributed Earnings shall be to bring the County Advances Reserve and the Retirement Members Reserve up to the level of the accrued liability.

Liability and Cost Calculations

The table below contains the comparison of the aggregate liabilities and costs shown in the MCERA Actuarial Valuation Report and our independent calculations. Although the normal cost and unfunded liability calculations are outside of the desired 5% tolerance level, the aggregate cost results fall within the 5% level.

This is not an unusual occurrence, as different actuarial valuation software systems will use slightly different techniques when assigning benefits to periods of prior service (accrued liability) and future service (normal cost). Because our estimates of the total Present Value of Benefits and the total employer contribution rates are within the desired tolerance level, we are comfortable that the results Buck has produced are accurate, given the underlying demographic information and assumptions shown in their report.

Liabilities and Cost

(\$ in Millions)	June 30, 2009	EFI Independent	Ratio
	<u>Valuation</u>	<u>Review</u>	
Present Value of Projected Benefits	476.1	476.2	100.0%
Actuarial Accrued Liabilities	403.2	413.9	102.7%
Actuarial Value of Assets	336.3	336.3	100.0%
Unfunded Accrued Liability (UAL)	66.9	77.6	116.0%
(Contribution as a Percentage of Payroll)			
Total Normal Cost	18.38%	17.93%	97.5%
Employee Contributions	9.84%	9.90%	100.6%
Employer Normal Cost	8.54%	8.03%	94.0%
<u>Amortization of Unfunded Liability</u>	<u>5.47%</u>	<u>6.20%</u>	<u>113.4%</u>
Total	14.01%	14.23%	101.6%

The table below contains the comparison of the costs by Group shown in the Buck report and our independent calculations. There is one discrepancy greater than 5% between our cost calculations and Buck's with respect to the one of the groups – the Probation members.

If the Board would like to pursue further investigation of the discrepancy for Probation members, additional test lives could be requested from Buck. However, because of the small number of members in this group, any changes to this group will not have a significant impact on the overall cost or level of agreement.

Total Employer Cost	<u>June 30, 2009 Valuation</u>	<u>EFI Independent Review</u>	<u>Ratio</u>
General	11.18%	11.13%	99.6%
Probation	18.45%	25.89%	140.3%
<u>Safety</u>	<u>31.23%</u>	<u>30.83%</u>	<u>98.7%</u>
Total	14.01%	14.23%	101.6%



Employee Contribution Rates

We attempted to verify the calculations of the individual employee contribution rates based on the applicable provisions of the CERL. Our calculations of the Basic employee contribution rates differed somewhat from those shown by Buck in the June 3, 2009 actuarial valuation report – by as much as 10% depending on entry age, group and tier, though the results are significantly closer at most ages.

We believe there may be some differences in the methodologies used to compute these rates. We suggest a number of methods / assumptions that we believe Buck could have used when determining their contribution rates which differ from the methods and assumptions that EFI generally uses:

1. Based on confirmation of Buck employee contribution rates at other '37 Act systems – we assume that Buck does not assume member contributions will cease once the member reaches 30 years of service.
2. Again, based on reviews of Buck employee contribution rates at other '37 Act systems – we assume that Buck has calculated the employee contribution rates assuming the member contributions are paid in a lump sum at the beginning of the year, rather than being paid throughout the year with each pay period.
3. Rather than using the full merit / promotion salary scale to project member pay from the date of hire to the specified retirement age, Buck may have used an average salary scale assumption across all ages, such as the 5.75% rate indicated on page 17 of their report.

If we recalculate our rates using these three alternative methods, our recomputed rates would be within 4% of the Buck employee contribution rates (or within 0.4% of payroll) for all entry ages, service groups and tiers.

We recommend that the Actuary review the calculations of the employee contribution rates to determine whether any of the above suggested potential methodological differences are in fact present, and if so, whether any of these methods should be modified. We would be happy to provide additional detail on our calculations if desired.

We also noted that in the valuation report it is stated on page 19 that the member Basic contributions for the General employees are determined according to Sections 31621.1 and 31621 of the CERL. According to our understanding, Section 31621.2 of the CERL should generally be applied to those entities providing benefits under 31676.12, unless otherwise adjusted by action of the Board of Supervisors. We urge Staff and the Actuary to review these sections of the CERL to confirm which section should be used to define the employee contribution rates.

Buck and EFI compute the Cost-of-Living contributions using substantially different methods: Buck applies a static load to the Basic contribution rates across all entry ages, with a different load used for each valuation group (General, Probation and Safety). This is a commonly used method within the '37 Act systems. EFI uses an alternative method, in which a separate COL contribution rate is determined

for a hypothetical member at each entry age, based on the contribution necessary to fund one half of the normal cost associated with the COLA across all decrements

We believe both methods to be acceptable. Again, we would be happy to provide additional detail on EFI's methods if desired.

Impact of Recommended Assumption Changes

As part of our review, we have calculated the projected impact on the current contribution rate of the major recommended assumption changes described in this Report. We understand that one of these changes – the recommendation to no longer apply withdrawal rates to members eligible for a service retirement benefit – has already been adopted as part of the actuarial valuation as of June 30, 2010.

We do not intend to imply that the other assumption recommendations represent the only possible set of reasonable assumptions. However, we believe it would be helpful to the Board to get an idea of the magnitude of the impact of the assumption changes. At the very least, it should give the Board a preview of the possible changes that may arise as part of the next experience study, scheduled to be completed for the period from July 1, 2008 through June 30, 2011.

Assumption	Recommendation	Impact on Plan Cost (as a % of payroll)	Impact on Current Plan Funded Ratio
Withdrawal	Cease applying withdrawal rates once member eligible for service retirement.	+ 2.1%	- 3.2%
Termination, Withdrawal, and Transfer	Implement new service-based rates, which decrease as service increases.	+ 1.6%	- 0.8%
Service Retirement	Adjust age-based rates. Apply only when eligible for service retirement benefit.	+ 2.7%	- 1.3%
Mortality	Propose use of RP-2000 tables projected to 2010, with age adjustments for male retirees and disabled members. Use same rates for General and Safety.	+ 1.5%	- 2.2%
Longevity and Promotion Pay Increases	Propose new service-based rates, with higher increases early in career.	+ 2.2%	- 0.5%
Terminal Pay Load	Apply 3% load to Tier 1 service retirements, 0.75% for Tiers 2 & 3.	+ 0.3%	- 0.3%
Economic Assumptions	Reduce return assumption to 7.75%. Reduce COLA growth assumption to 2.8%	+ 0.8%	- 0.9%
	Total Change	+ 11.2%	- 9.2%

In the table shown above, the impact of the assumption changes has been modeled using two different measurements: the affect on the employer contribution rate as a percentage of payroll and the impact on the current funded ratio.

Should all of the recommendations in this Report be adopted, an increase in the total current actuarial cost computed as part of the June 30, 2009 actuarial valuation of approximately 11.2% of pay would have resulted, increasing the cost from 14.2% of payroll (as computed by EFI) to 25.5%. The employee contributions would also need to be recomputed as a result of some 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.


Certification

We certify that this review was performed in accordance with generally accepted actuarial principles and practices.

Respectfully Submitted,

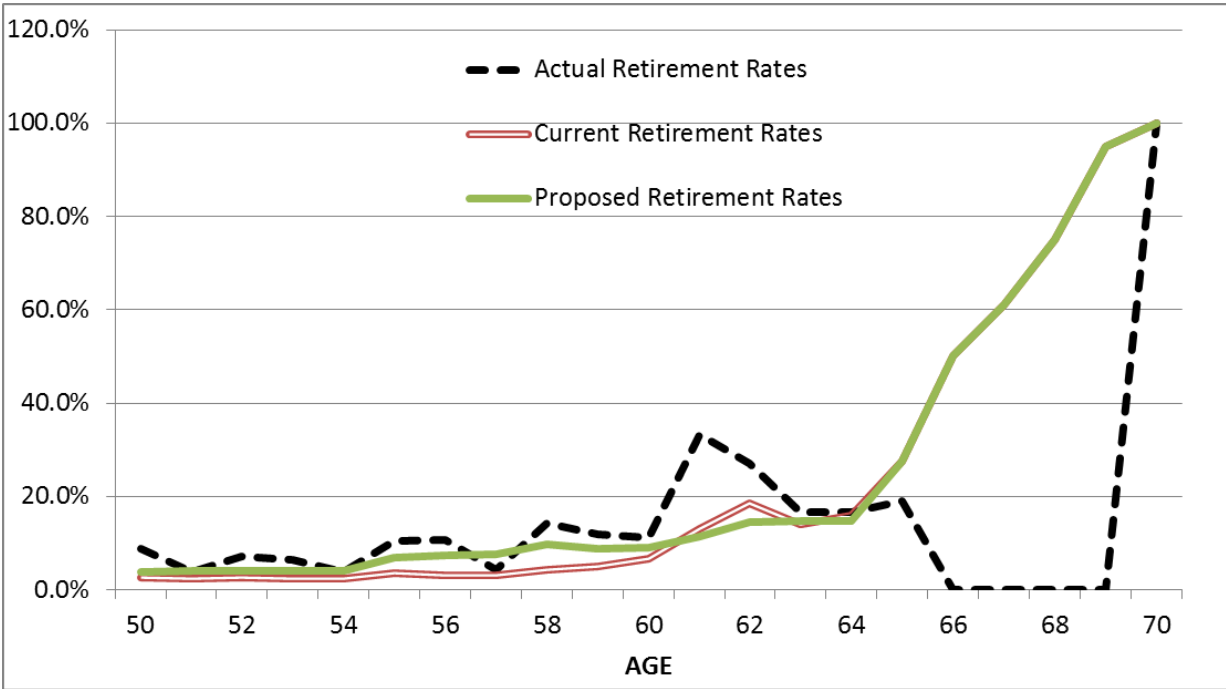


Graham A. Schmidt, ASA
(415) 439-5313

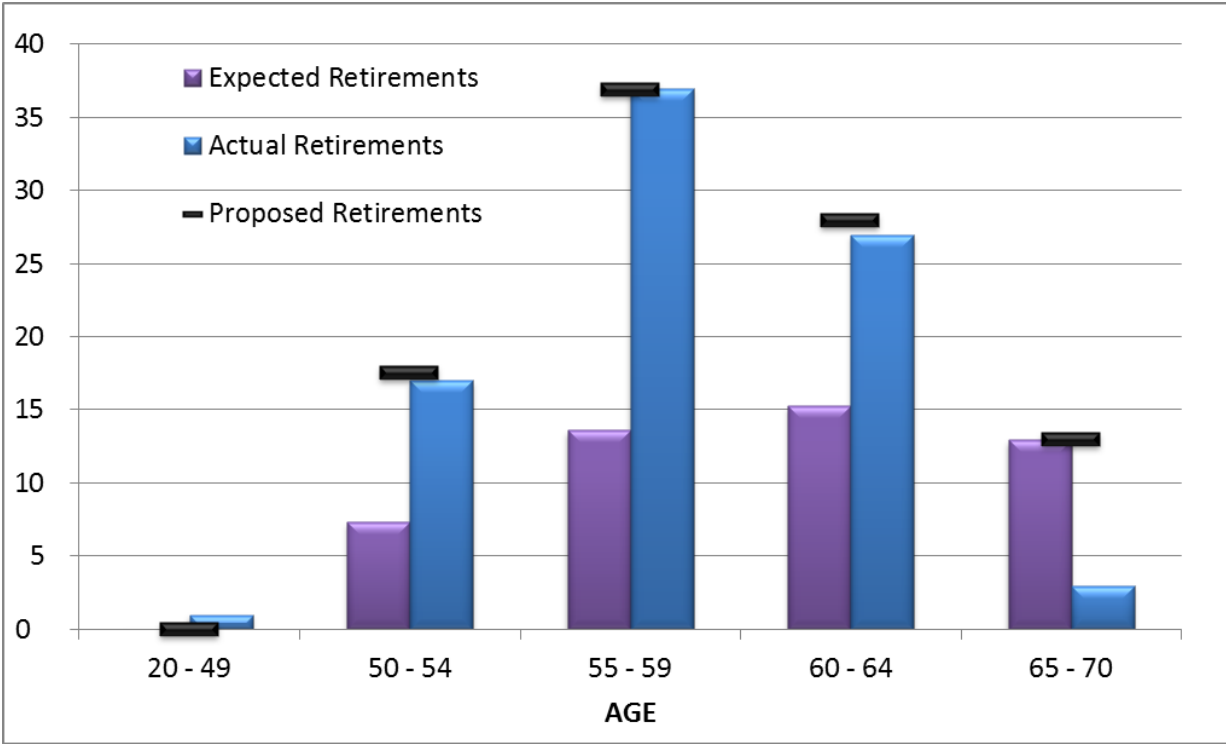


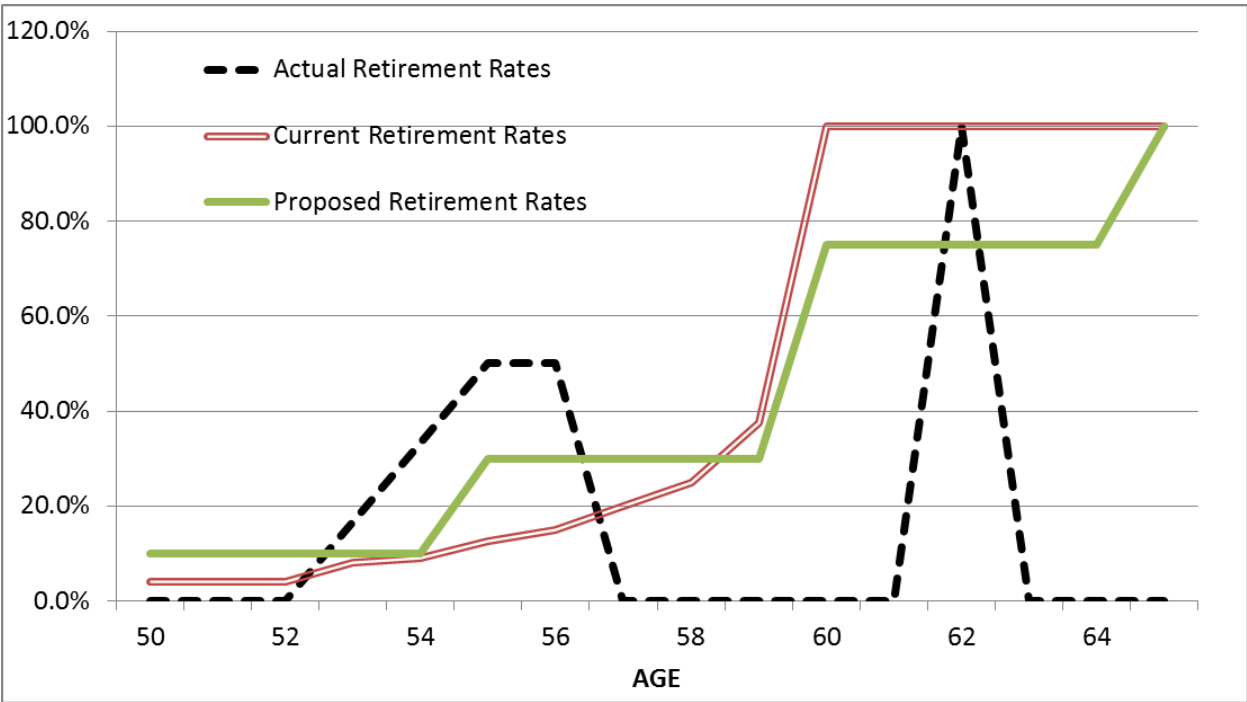
Robert T. McCrory, FSA
(206) 328-8628

Appendix: Demographic Assumption Analysis

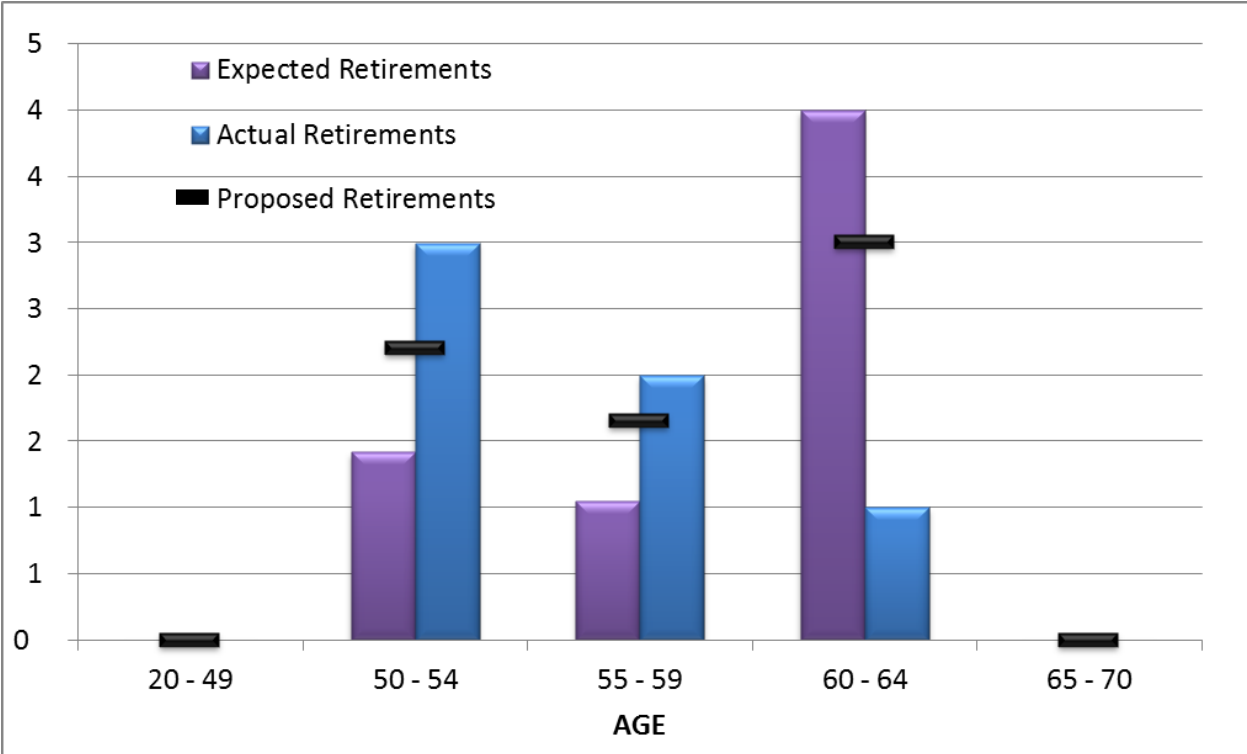


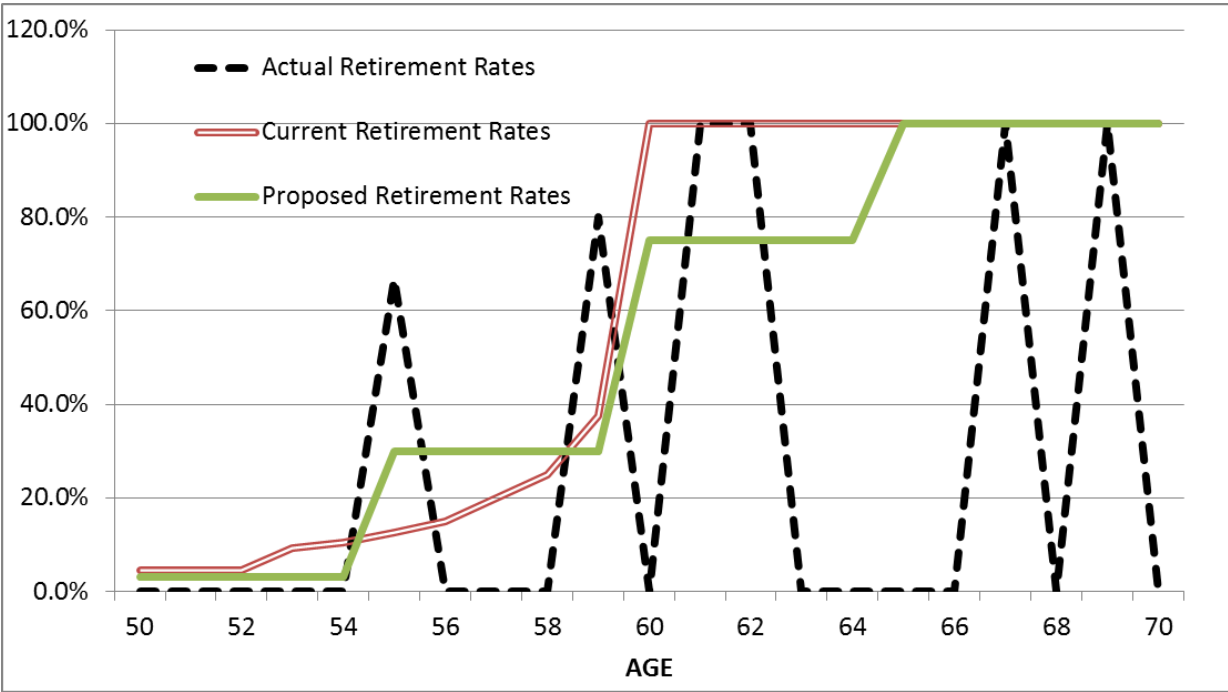
General Members, Retirements (male and female rates blended for graph above)



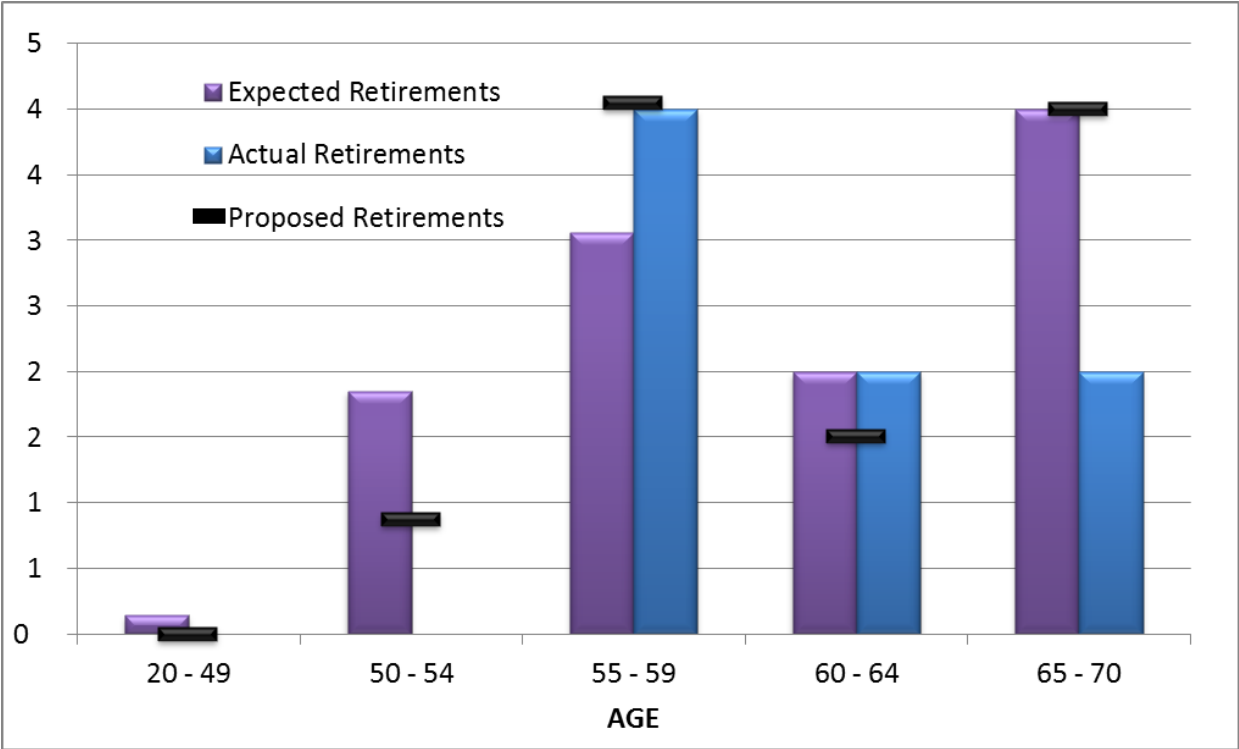


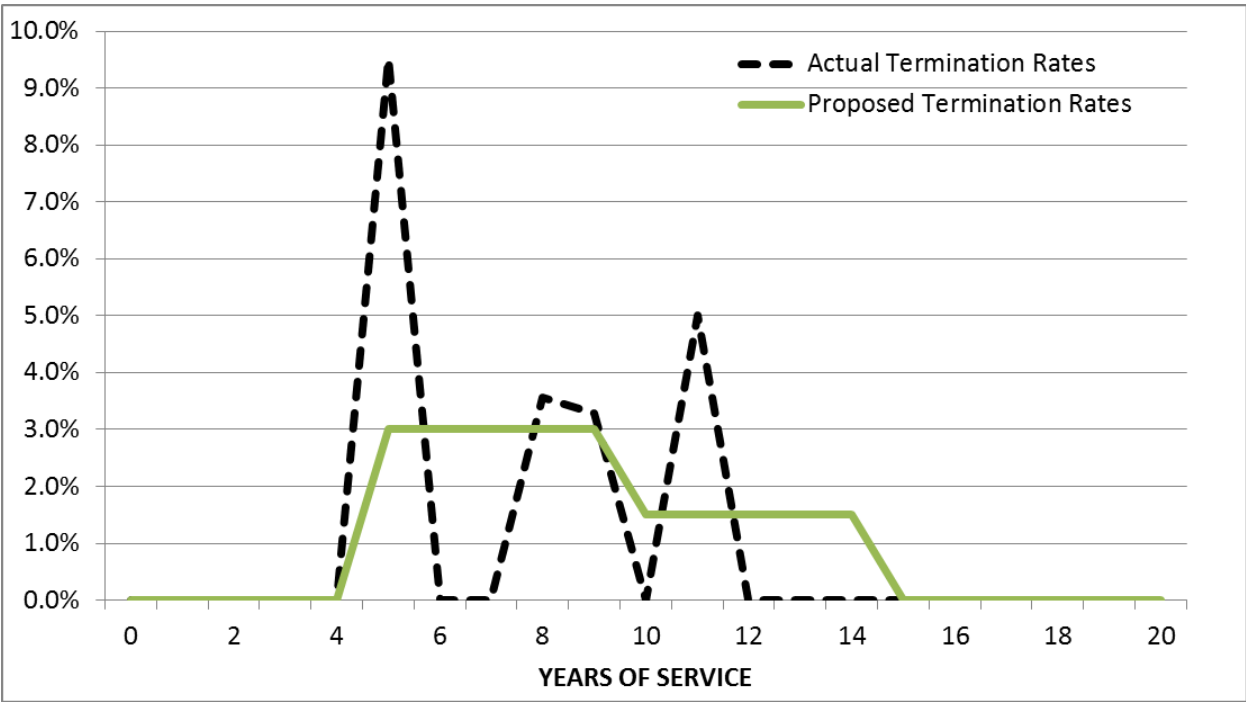
Probation Members, Retirements



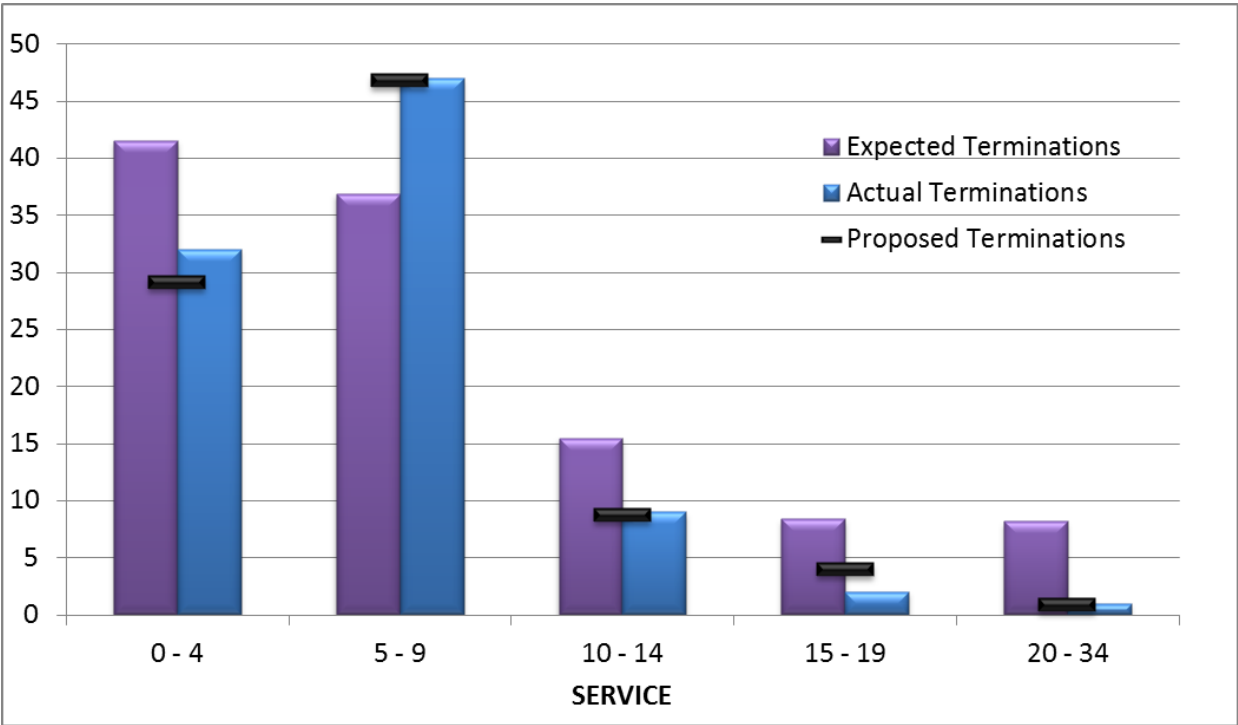


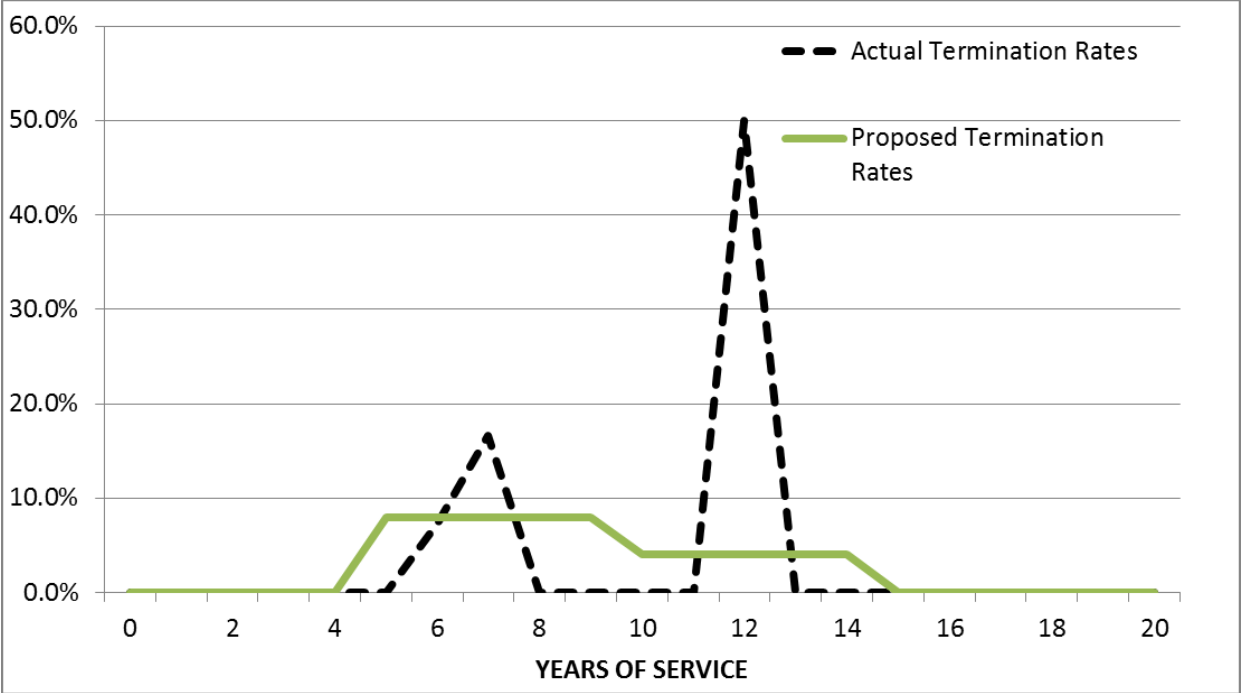
Safety Members, Retirements



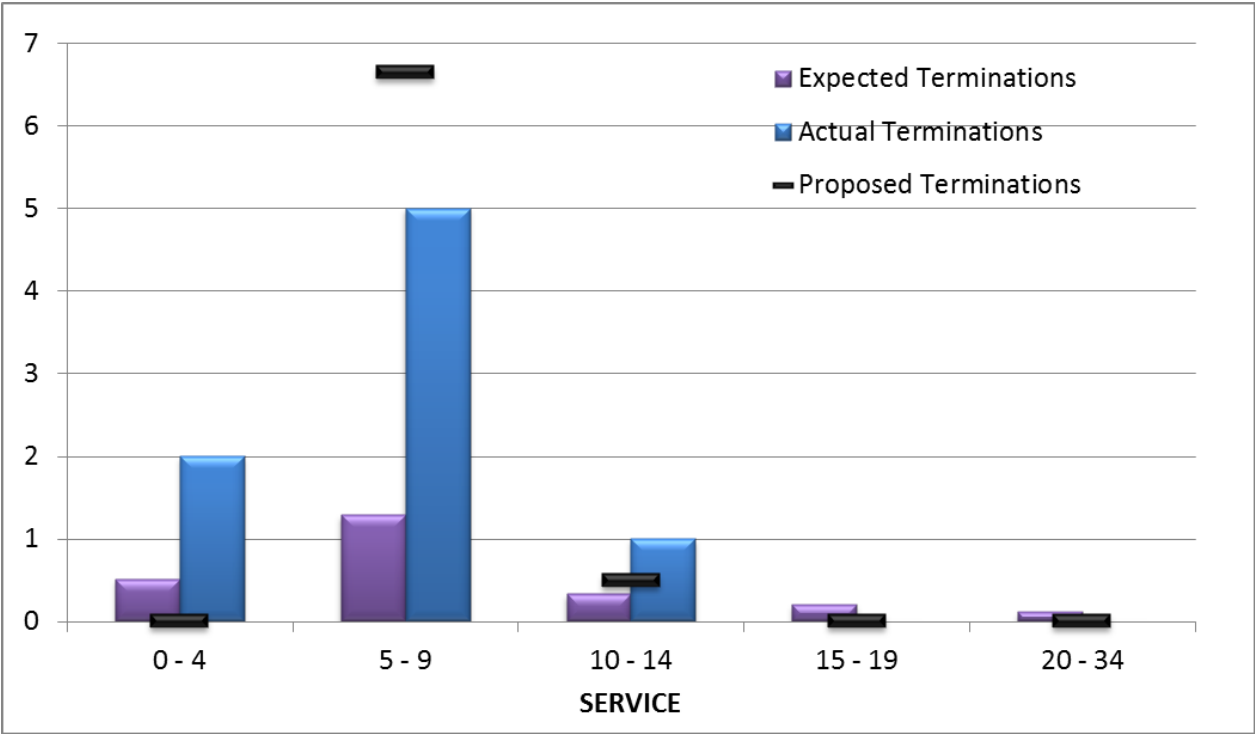


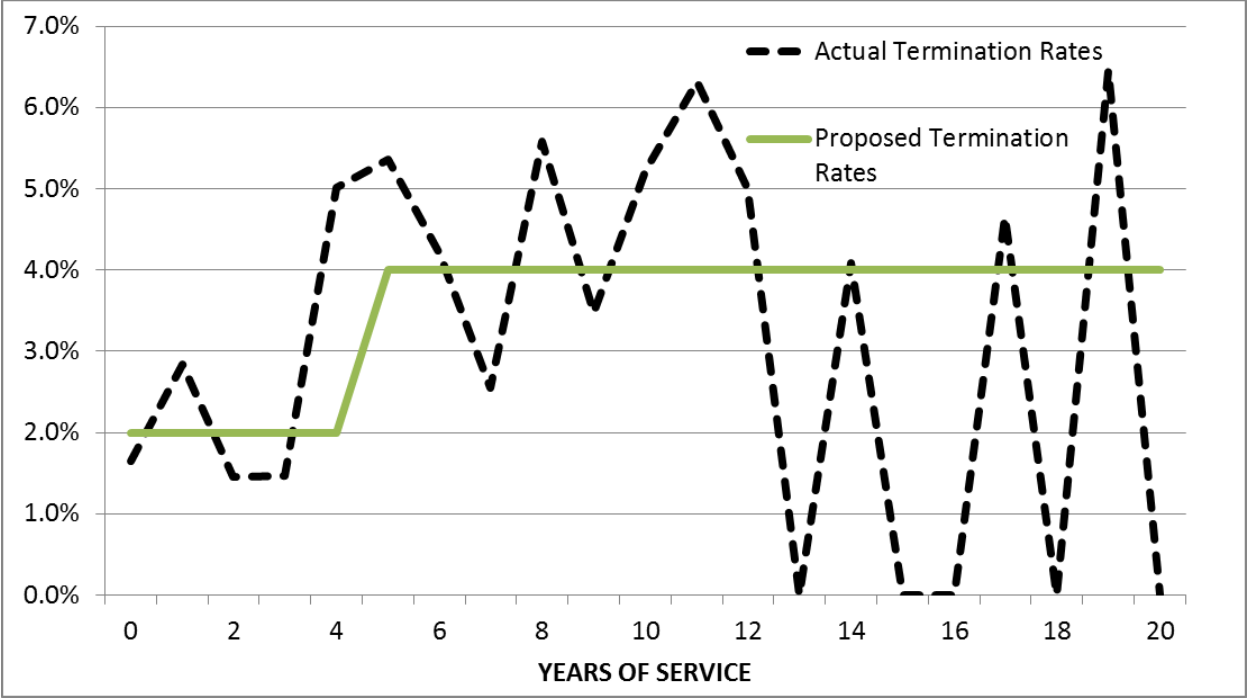
General, Vested Terminations



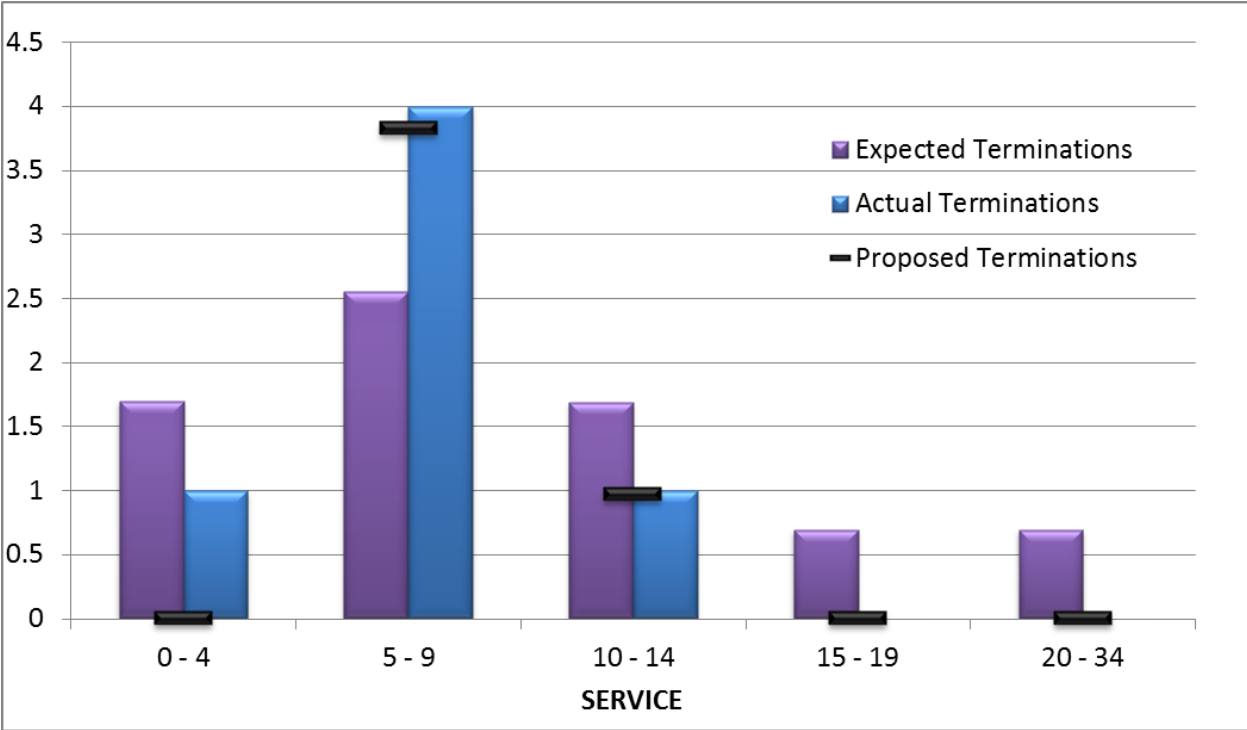


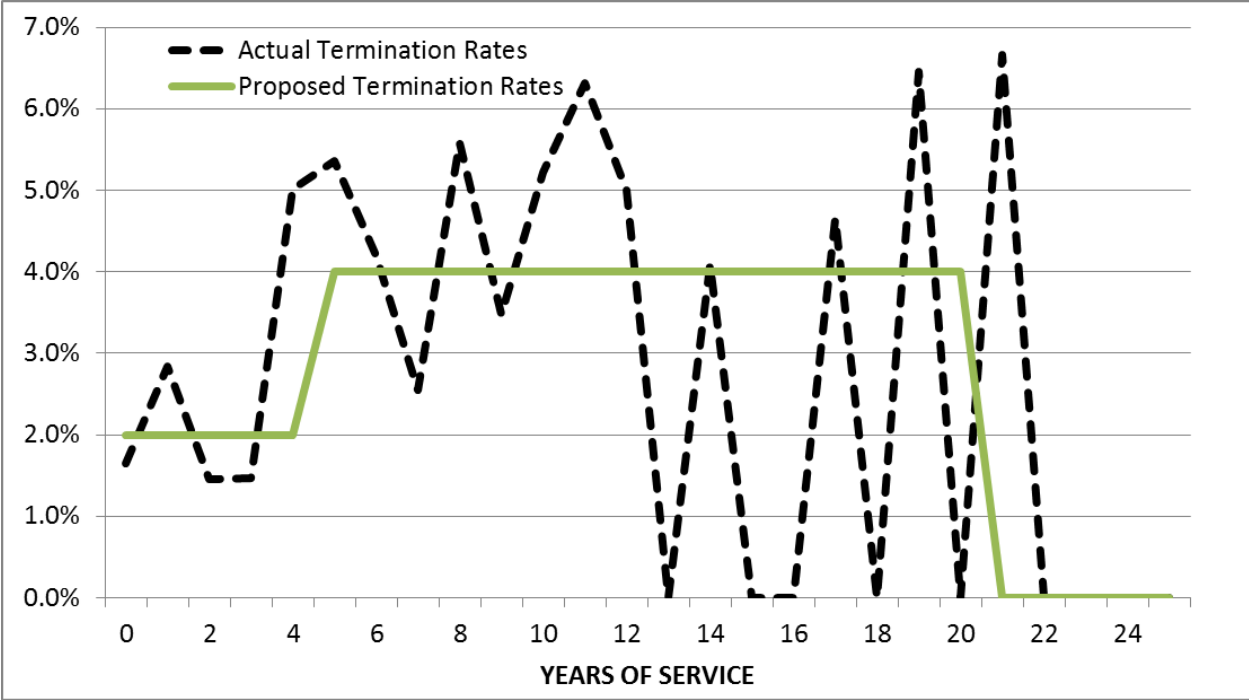
Probation Members, Vested Terminations



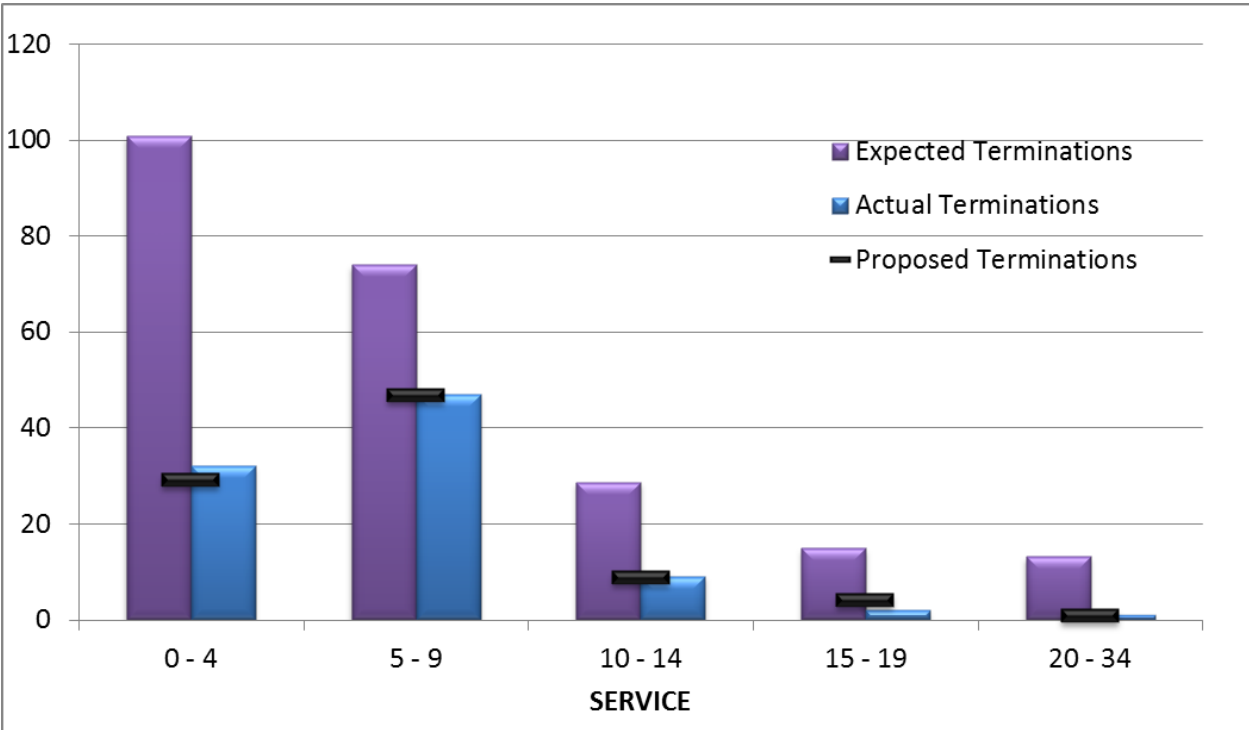


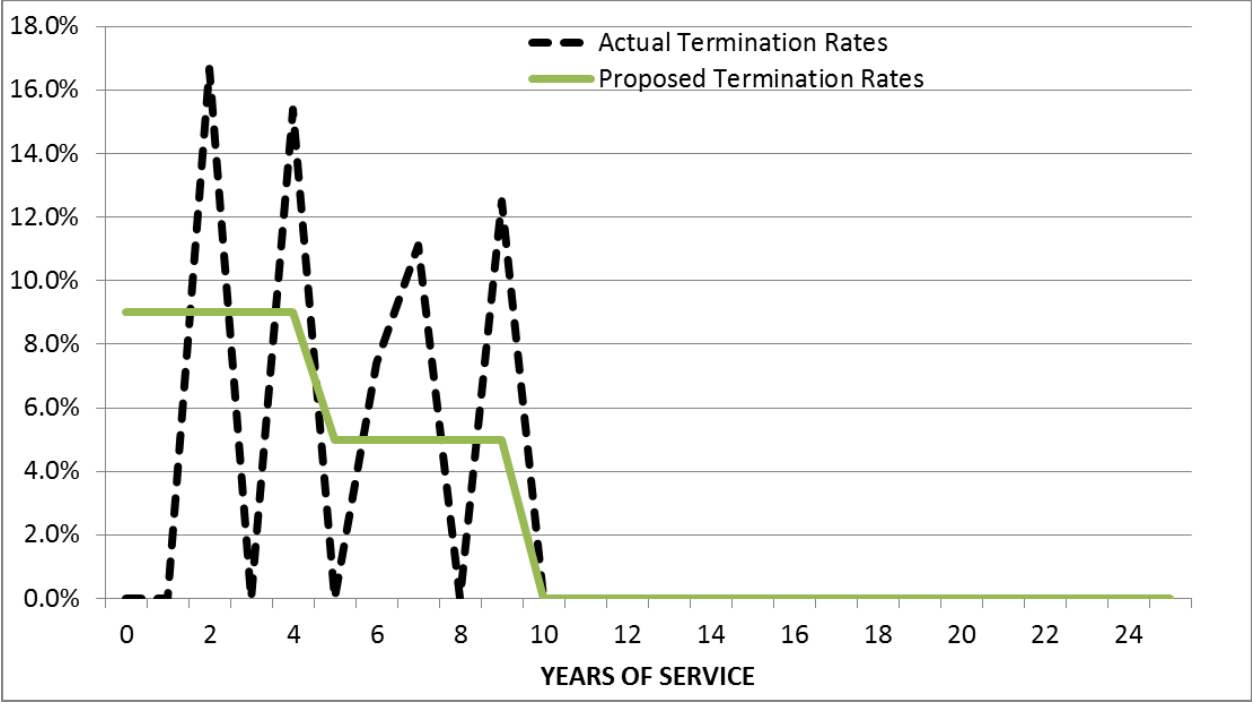
Safety Members, Vested Terminations



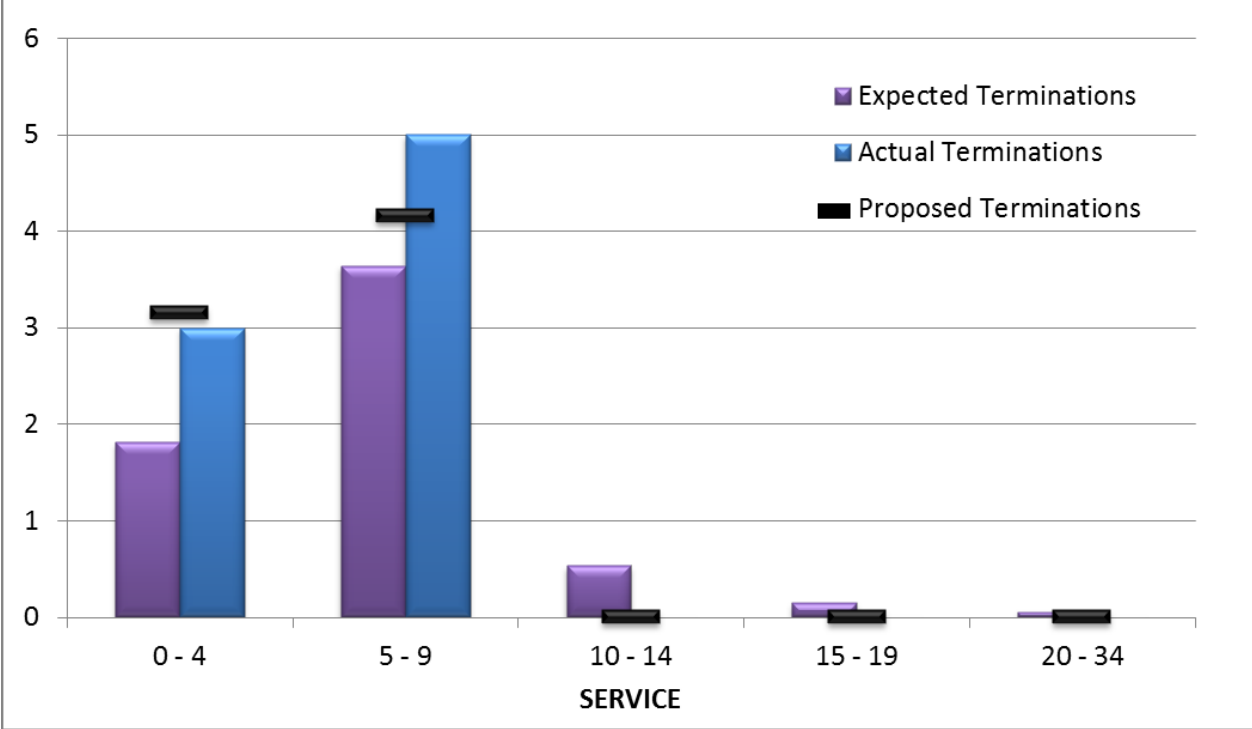


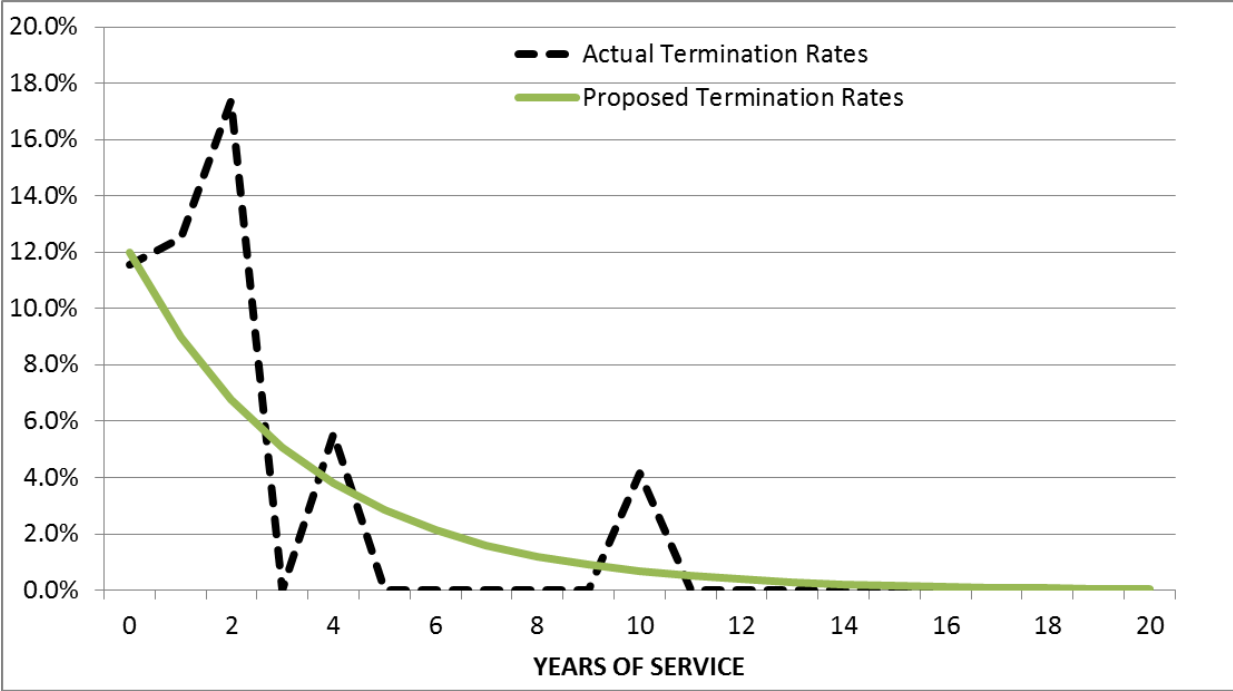
General Members, Withdrawals





Probation Members, Withdrawals





Safety Members, Withdrawals

