Demographic Experience Study Preview
Mortality Rates, Retirement Rates, and Merit Scale

Chris Jasperson

Actuarial Assistant

Office of the State Actuary

"Securing tomorrow's pensions today."

What Is A Demographic Experience Study?

- Review of assumptions
    - Look at historical data
    - Compare actual to what previous assumptions predicted
- Opportunity to change assumptions
    - Incorporate future expectations
    - Methods
    - Formats

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
1

Why Do We Perform Demographic Experience Studies?

- Ensure assumptions are reasonable
  - Assumptions impact estimates of how and when the actual costs of the plan will occur
  - Reasonable assumptions contribute to reasonable funding
- Things change
  - Behaviors
  - Benefits
  - Plan provisions

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
2

Today's Presentation

- Preview three assumptions
- For each preview we will discuss
  - How the rates are used
  - General effect of changing rates
  - What the historical data is shows
  - Future expectations
  - Assumption format
- Next Steps
  - No recommendations at today's meeting

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
3

Assumption Changes Impact Costs

- Cost impacts will always be short-term
    - All assumptions will be re-examined in six years
- Assumption changes impact the timing of plan costs
- The actual long-term cost of the plan will be determined by actual experience

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
4

Mortality Rates Are Improving

Year	Life Expectancy
1900	47.3
1920	54.1
1940	62.9
1960	69.7
1980	73.7
2000	77.0

U.S. Census Bureau; all races, all genders

- Life expectancy has increased about two years per decade since 1960

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
5

Mortality Rates Are Improving

- RP-2000 mortality table
- Reasonable mortality improvement method
  - Recommended 50 percent of Scale AA last rate-setting cycle
- Age offsets can be used to better fit a table to a plan

How Are Mortality Rates Used?

- Pre-retirement mortality rates determine if a member will make it to retirement

- Post-retirement mortality rates determine how long benefits will be paid

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
7

General Effect Of Changing Mortality Rates

- When mortality rates increase
  - Annuity benefits paid over a shorter period of time
  - Future salary stream is shorter => fewer contributions collected
  - Most likely results in a decrease in contribution rates
- When mortality rates decrease/mortality improves
  - Annuity benefits paid longer over a longer period of time
  - Future salary stream is longer => more contributions collected
  - Most likely results in an increase in contribution rates

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
8

Historical Data Showing Fewer Deaths Than Expected

- **Possible reasons**
  - Apparent mortality improvement
  - Poor fit with prior assumption

Pre-Retirement			
Age	**Actual**	**Expected**	**Ratio**
20-24	0	2	0.00
25-29	0	13	0.00
30-34	1	32	0.03
35-39	12	54	0.22
40-44	37	67	0.55
45-49	41	75	0.55
50-54	51	63	0.81
55-59	15	35	0.43
60-64	11	12	0.88
65+	3	3	1.10
Total	**171**	**356**	**0.48**

Post-Retirement			
Age	**Actual**	**Expected**	**Ratio**
50-54	2	4	0.49
55-59	14	20	0.71
60-64	36	35	1.03
65-69	53	55	0.96
70-74	80	90	0.89
75-79	120	134	0.90
80-84	132	144	0.92
85-89	81	93	0.88
90-94	43	50	0.86
95-99	11	11	1.03
Total	**572**	**635**	**0.90**

Historical Data Used

- Annual valuation data for Plans 1 and 2 combined from 1984 through 2006

- Counted actives, terminated-vesteds, retirees, and survivors
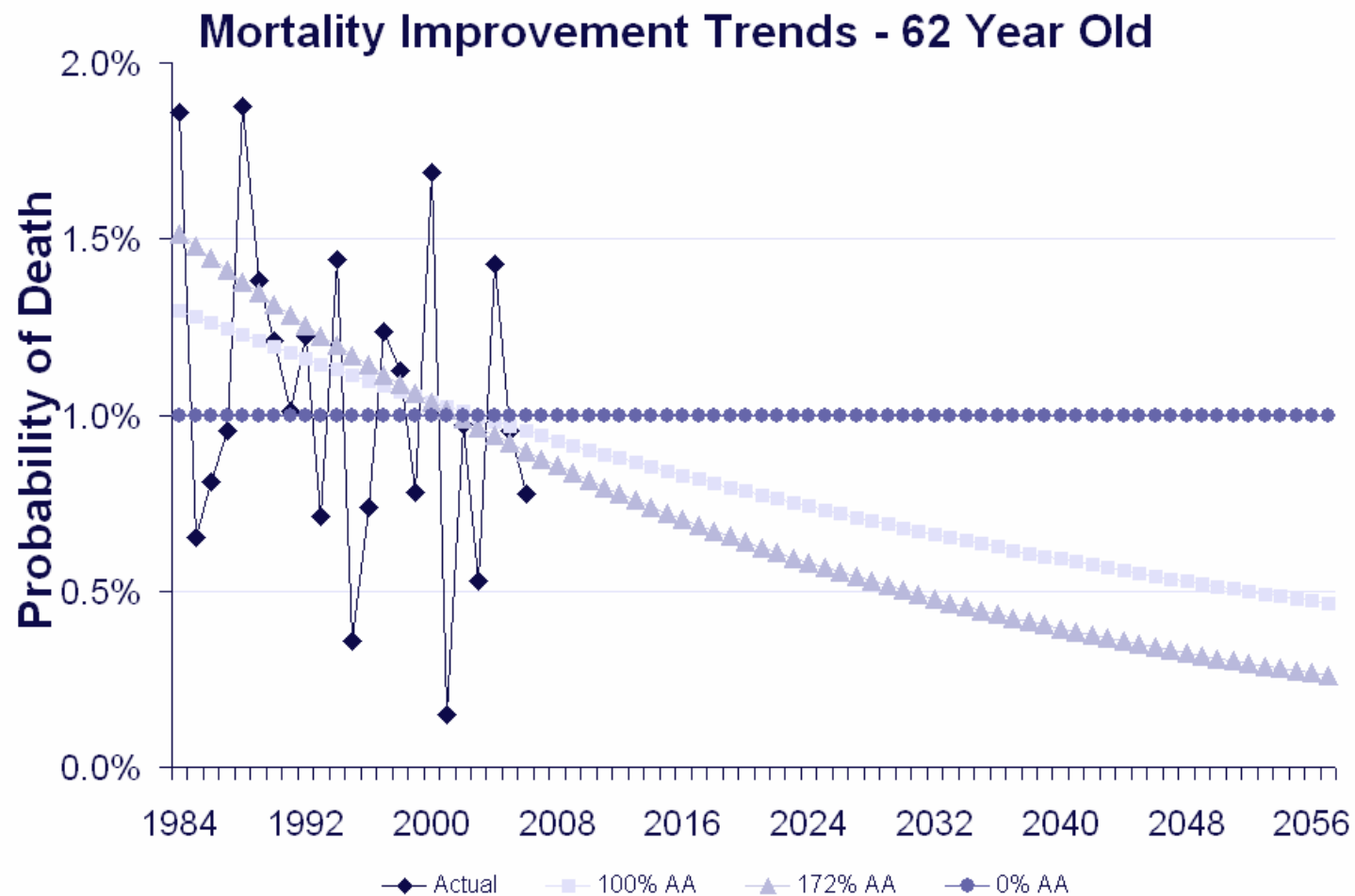
- Compared expected to actual deaths

How Much Improvement Do We See?

- Eight of nine age groupings show mortality improvement
- Improvement averages about 170 percent of scale AA

Ages	LEOFF 1 and 2	Scale AA	LEOFF as a % of Scale AA
40-44	-2.54%	1.02%	-249%
45-49	4.21%	1.51%	279%
50-54	3.92%	1.94%	202%
55-59	5.24%	1.70%	308%
60-64	3.34%	1.45%	230%
65-69	3.93%	1.36%	289%
70-74	0.92%	1.50%	61%
75-79	1.63%	1.28%	127%
80-84	2.58%	0.85%	303%
Average	2.58%	1.40%	172%

Office of the State Actuary
"Securing tomorrow's pensions today."

O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview

11

We Expect Mortality To Continue To Improve

Mortality Improvement Trends - 62 Year Old

Office of the State Actuary
"Securing tomorrow's pensions today."

O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview

12

Assumption Formats We Considered

- Current format
  - RP-2000 table
  - Varies by age and gender

- Alternate format
  - Determine best fit to an existing table
    - Based on past data and our best estimate for mortality improvement
  - Determine an appropriate level of mortality improvement
    - Based on both LEOFF and other systems' experience

- Other possible factors
  - Income level
  - Do actives and annuitants have different levels of mortality?

Historical Data Shows Fewer Retirements Than Expected

- Possible reasons
  - True behavior still emerging
  - Poor fit with prior assumption

Annuitants			
Age	Actual	Expected	Ratio
50-54	185	595	0.31
55-59	139	512	0.27
60-64	57	150	0.38
65+	15	40	0.38
Total	396	1,298	0.31

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
14

How Are Retirement Rates Used?

- They determine when members stop working and begin drawing their pensions

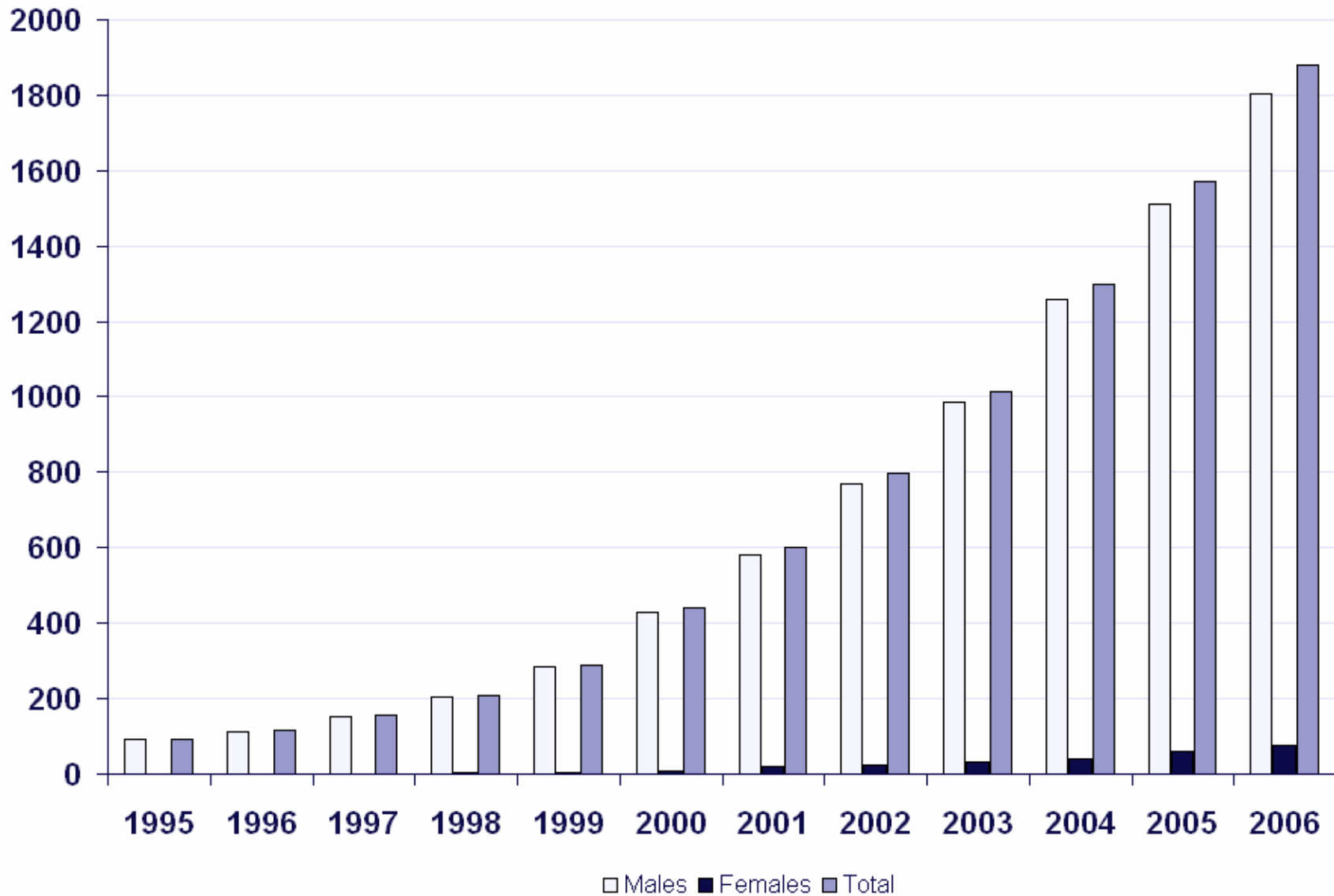# *General Effect Of Changing Retirement Rates*

- When you assume earlier retirements (higher rates)
  - A smaller benefit is paid over a longer period of time
  - Future salary stream is smaller, shorter => fewer contributions collected
  - Both generally result in higher contribution rates
- When you assume later retirements (lower rates)
  - A larger benefit is paid over a shorter period of time
  - Future salary stream is larger, longer => more contributions collected
  - Both generally result in lower contribution rates

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
16
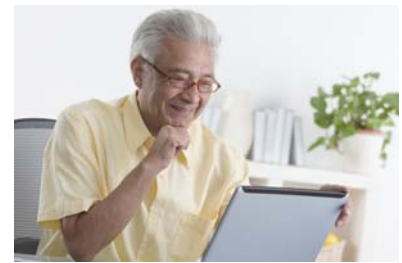
Historical Data Used

- Annual valuation data combined from 1995 through 2006

- Counted actives eligible to retire

- Compared them to actual retirements

- Things to note

  - Retirement age reduced from 55 to 53 in 2000

  - Nine-month valuation year in 2001

Office of the State Actuary
"Securing tomorrow's pensions today."

O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
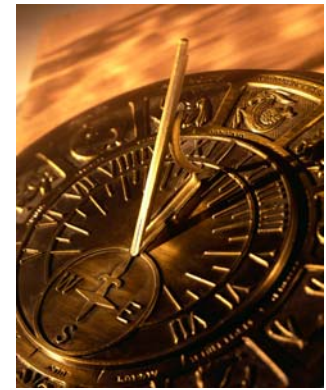
18

Future Expectations Are Mixed

- People are working longer
  - Longer lives
  - Higher health care costs
- Plan changes may provide incentives to retire earlier
  - Earlier retirement ages
  - Benefit improvements

Assumption Formats We Considered

- Current format
  - Rates vary by age
    - Same rates for males and females
    - Same rates for all age/service combinations
- Alternate formats
  - Rates vary by gender
  - Rates vary by category (LEO vs. FF)

Office of the State Actuary
"Securing tomorrow's pensions today."

O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview

20

Historical Data Shows Total Salary Increases Were Lower Than Expected

- The general salary increase assumption has not changed
- The merit scale expected to come down

Actual vs. Expected Total Salary Increases 2001 - 2006			
Service	Actual	Expected	Ratio
1	13.68%	16.73%	0.82
2	11.03%	12.96%	0.85
3	9.27%	11.40%	0.81
4	7.06%	9.20%	0.77
6	5.90%	7.84%	0.75
6-10	4.59%	6.75%	0.68
11-15	4.21%	6.31%	0.67
16-20	4.23%	6.08%	0.70
21+	3.78%	4.50%	0.84
Total	5.09%	7.15%	0.71

Two Types Of Salary Increase Assumptions

- **General salary increase** (not covered here)
  - Economic assumption
  - Set by the Board for LEOFF 2
  - Includes inflation and productivity components
  - Same for all service levels – currently 4.5 percent per year
- **Merit salary increases** (covered in this presentation)
  - Demographic assumption
  - Includes all other salary growth
  - Currently varies by system and service level

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
22

What Is Merit?

- If it isn't part of general salary growth, it's merit
  - Extra step increases
  - More overtime than usual
  - Promotions
  - Job reclassifications
  - Teachers taking on extra contracts
    - Coaching
    - Bonuses

Office of the State Actuary
"Securing tomorrow's pensions today."

O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview

23

How Do We Calculate The Merit Scale?

- We are discussing two methods with the auditor
- One method backs 4.5 percent general salary out of the total salary
- Another method backs out the estimated inflation increase for the period
- Length of period leads to a similar result from both methods

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
24

How Is The Merit Scale Used?

- The merit scale directly impacts
    - Future salary-based benefits
    - Value of future salary over which contributions will be collected
    - Refund amounts if members withdraw contributions

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
25

General Effects Of Changing Merit Scale

- When you assume higher merit scale
  - Annuity and return of contribution benefits increase
  - Future salary stream is larger => more contributions collected
  - Most likely results in an increase in contribution rates
- When you assume lower merit scale
  - Annuity and return of contribution benefits decrease
  - Future salary stream is smaller => fewer contributions collected
  - Most likely results in a decrease in contribution rates

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
26

Historical Data Used

- **All LEOFF active members 1984 – 2006**
  - Must have been active two years in a row
  - Must have been full-time both years

Office of the State Actuary
"Securing tomorrow's pensions today."

O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview

27

Comparison Of Methods

- Merit scale decreases as service increases
- Observed salary increases lower than expected
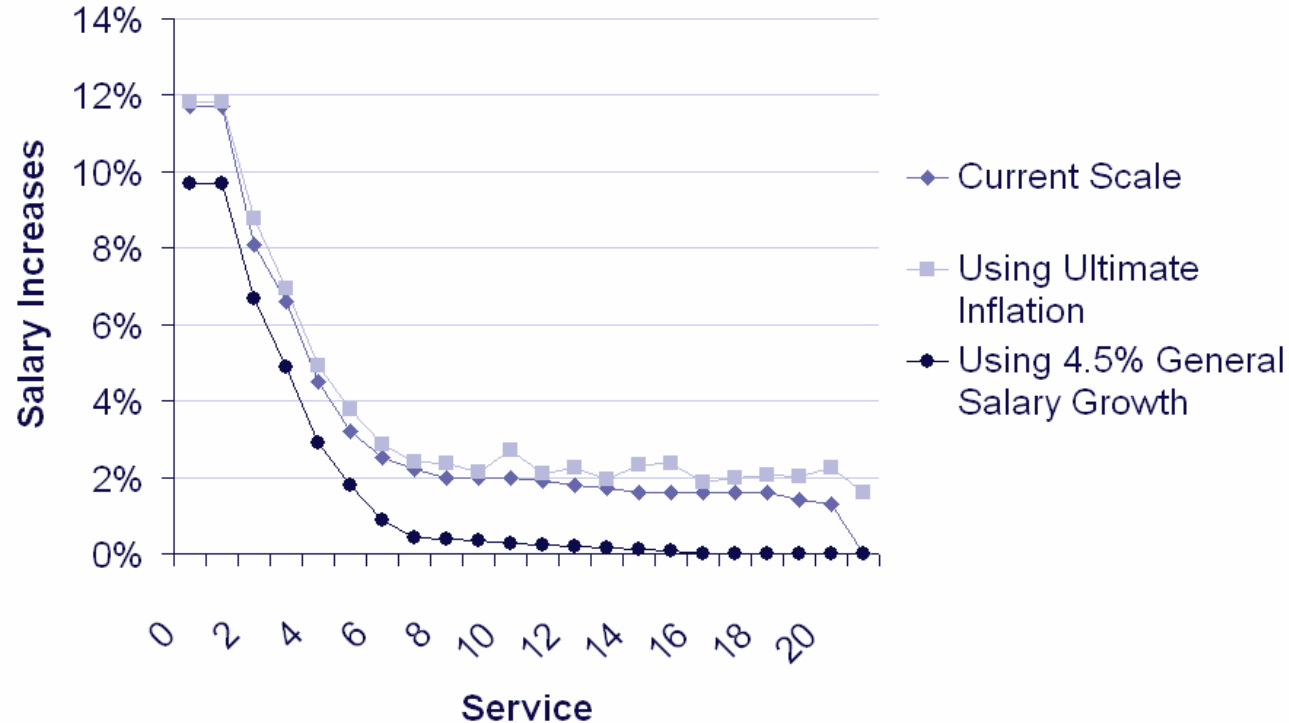
Future Expectations Depend On Method

- Discussions with auditor are in progress
- Different methods will require different applications of future expectations

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
29

Assumption Formats We Considered

- Current format
  - Table for the system that varies by service
- Alternate formats
  - Rates that vary separately by plan or age

Final Thoughts

- People are living longer

- They're retiring later in their careers

- Total salaries are lower

  - The merit scale may also come down depending on the method

Office of the State Actuary
"Securing tomorrow's pensions today."
O:/LEOFF_2_Board/2008/4-30/LEOFF_2_Board_Experience_Study_Preview
31

Next Steps

- Best estimate recommendations for these three assumptions will be developed and finalized by June
- At the May meeting we will preview
  - Termination rates
  - Disability rates
  - Other miscellaneous assumptions
- Audits of experience study and valuation are underway
- Assumption and contribution rate adoption by July 31