



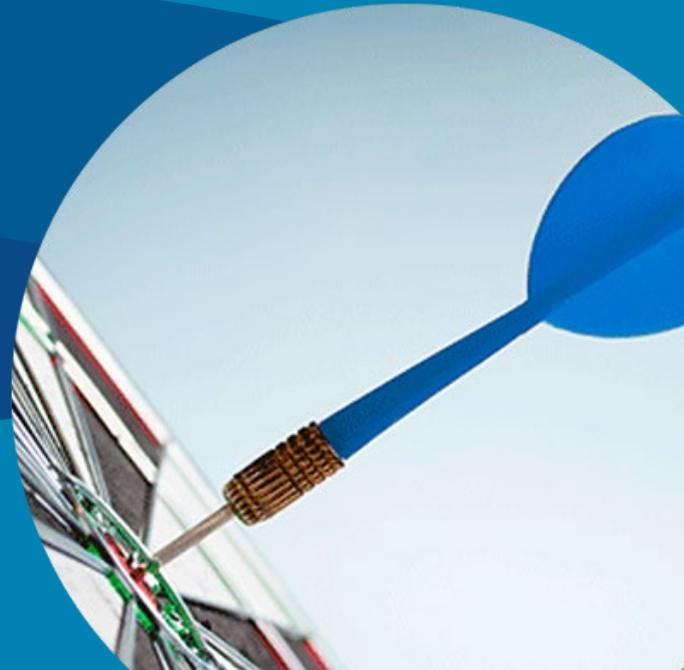
Bay County Employees' Retirement System (BCERS)

– Experience Study Discussion

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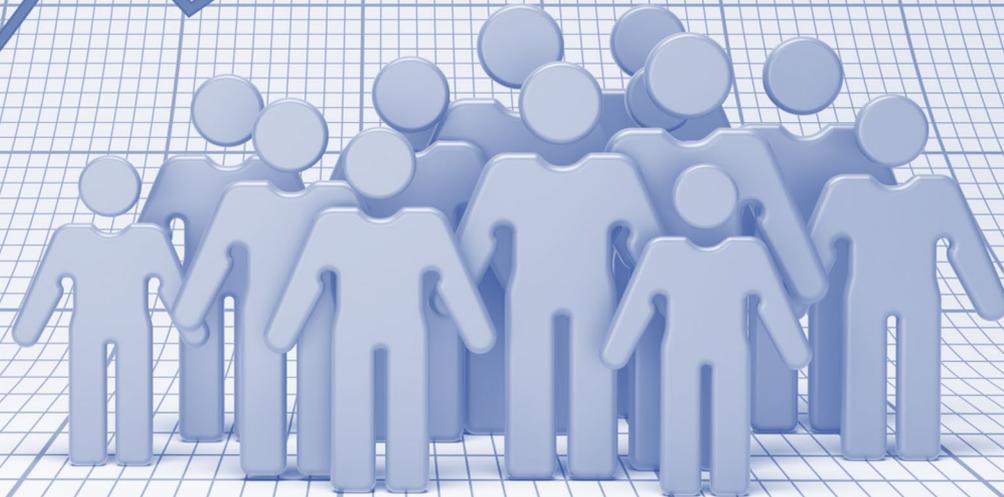
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INTRODUCTION



Introduction

- We calculate actuarial liabilities of the BCERS for funding and accounting valuations
- To perform the valuations, we must make assumptions about the future experience of the System with regard to various risk areas
- The results of the liability calculations depend upon those assumptions

Introduction

Primary Risks

Demographic	Economic
Normal Retirement	Price Inflation
Early Retirement	Wage Inflation
Death-in-Service	Investment Return
Disability	
Turnover	
Pre & Post Retirement Mortality	
Merit and Longevity Pay Increases	

Also studied amortization/asset methods, administrative expenses, factors & loads

Introduction

- Assumptions should be carefully chosen and continually monitored
 - Continued use of outdated assumptions can lead to ...

Introduction

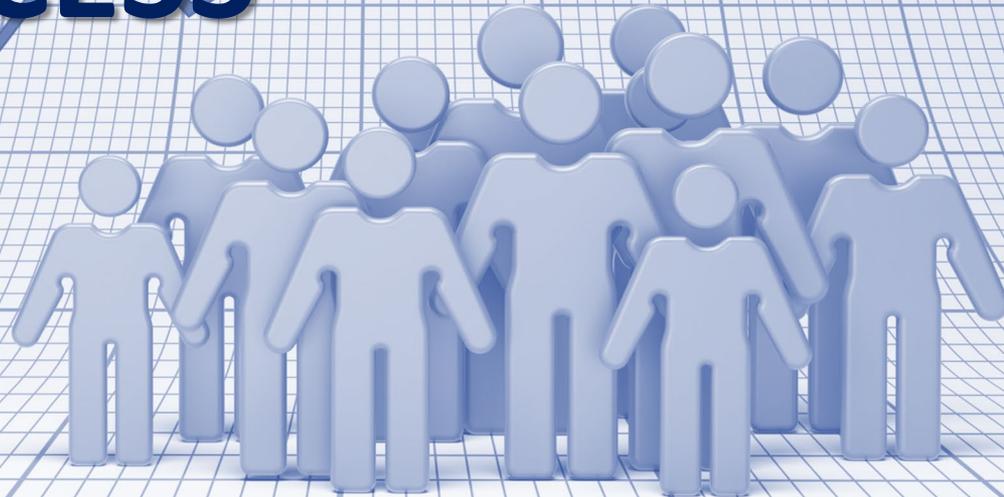
Understated costs resulting in:

- Sharp increases in required contributions at some point in the future leading to a large burden on future taxpayers
- In extreme cases, an inability to pay benefits when due

Overstated costs resulting in:

- Benefit levels that are kept below the level that could be supported by the employer and member contribution rates
- An unnecessarily large burden on the current generation of members, employers and taxpayers

EXPERIENCE STUDY PROCESS



Experience Study Process

Analysis

- Based upon experience during the 5-year period ending December 31, 2021
- Compared trends with prior studies
- Generally, we give confirmed trends more credibility than non-confirmed trends

Philosophy

Do not overreact to results from any single experience period

- It is better to make a series of small changes in the right direction, rather than a single large change that could turn out with hindsight to be in the wrong direction

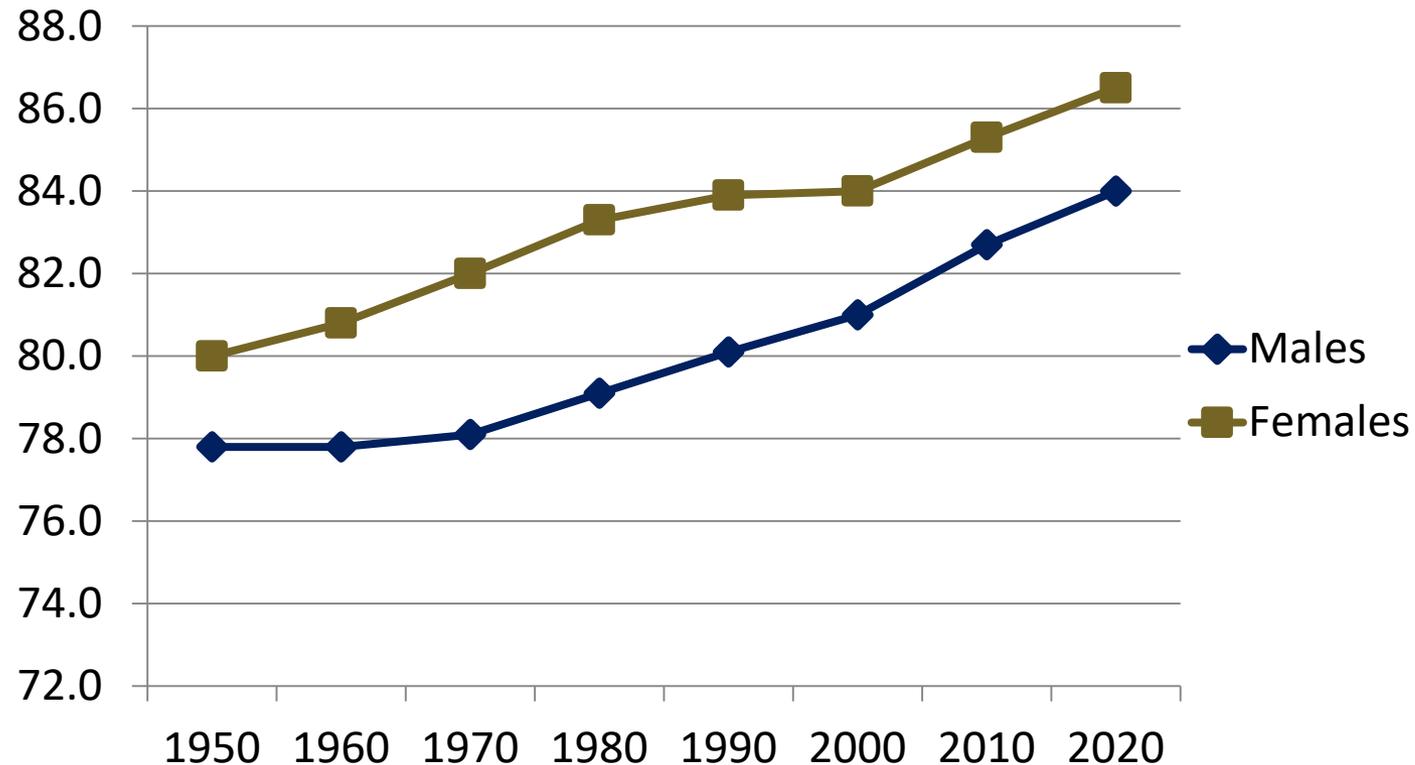
Assumptions

- Demographic assumptions typically recommended by actuary and adopted by Board
- Economic assumptions – actuary recommends range of reasonable economic alternatives and Board adopts based on input from actuary and advisors

DEMOGRAPHIC ASSUMPTIONS



Life Expectancy at Age 65 by Calendar Year



www.cdc.gov/nchs/hus/contents2013.htm#017 and SSA for 2020.

The figures are expectations over the entire U.S. Population.

Things That Impact Life Expectancy

Increase Life Expectancy

- **↑ Medical technology**
- **↑ Health care access**
- **Better sanitation**
- **Health consciousness**
- **Cleaner environment**

Reduce Life Expectancy

- **COVID – long-term?**
- **Environmental factors**
- **Inactivity**
- **Processed foods**
- **Obesity**
- **Opioid crisis**
- **Stress**

Discussion

- COVID Impact – Short-term
 - U.S. life expectancy fell in 2021 for the second year in a row, driven by COVID-19 deaths*
 - Nearly two-year decline from 2020 to 76.1 years marked the largest two-year drop in life expectancy at birth in close to a century^

* Provisional government data published in August 2022

^ U.S. Centers for Disease Control and Prevention

New Mortality Tables for Public Sector

- The Society of Actuaries released the “Pub-2010” tables in 2019
 - Based on public sector experience
 - Broken out based on occupation (General, Teacher, Safety)
 - Many other breakdowns

Public Pension Mortality Study Highlights

- For each job category, rates were developed for:
 - Employees
 - Retirees
 - Disabled Retiree
 - Contingent Survivors
- For each sub-category, rates were developed for:
 - Total Subpopulation
 - Above Median
 - Below Median
- All of these tables were developed on head count and benefit weighted basis for both males and females

Mortality Experience

Comparison of Current and Proposed Tables

Table	Age	Male Life Expectancy	Female Life Expectancy
Current ⁽¹⁾	65	20.10	22.58
Pub-General ⁽²⁾	65	21.28	23.76
Pub-Safety ⁽³⁾	65	20.89	22.81

⁽¹⁾ RP-2014 Healthy Annuitant Generational Mortality Tables, extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale, resulting in a base year of 2006 with future mortality improvements assumed each year using scale MP-2016.

⁽²⁾ Pub-2010 General Healthy Annuitant Mortality Tables, amount-weighted, and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.

⁽³⁾ Pub-2010 Safety Healthy Annuitant Mortality Tables, amount-weighted, and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.

Mortality Experience - Recommendations

Base Table

Current
Mortality
Rates

- Adopt the Pub-2010 Fully Generational Amount-Weighted, General/Public Safety, Male and Female Mortality Tables

Projection Scale Table

Future
Mortality
Rates

- Adopt the MP-2021 projection scale



Similar adjustments for Disabled and Pre-Retirement mortality tables

Summary of Experience Study – Demographic Results and Recommendations

Decrement	Recommendation	Impact on Plan Costs*
Mortality	Rates generally decreased	Increase
Retirement	Rates increased: DWS, Library, BABH Rates decreased: Sheriff, Road Commission No change: General, MCF	Increase for DWS, Library, and BABH. Decrease for Sheriff and Road Commission.
Early Retirement	No change	N/A
Turnover (quits)	Rates increased: MCF (Select), BABH (Select) Rates decreased: MCF (Ultimate), General (Ultimate), DWS (Select) No change: Sheriff's, Road Commission	In general, increasing these rates puts downward pressure on liabilities and vice versa.
Disability	No change	N/A
Merit and Longevity Pay Increases	No change	N/A

*Total Plan Cost Impact (Demographic and Economic) on slides 46-49

ECONOMIC ASSUMPTIONS



Current Economic Assumptions

Price Inflation	2.50%
Wage Inflation/Payroll Growth	3.25%
Investment Return	7.25%

Comments on Economic Assumption Selection

- We are not investment experts, we look at the following items:
 - Historical Trends
 - Forward expectations of Investment Consultants
 - Comparison to other Systems
- Typically a Board decision with input from Investment Experts and Actuary
- But Actuary must comply with Actuarial Standards of Practice and certify the assumption as reasonable

Economic Assumptions

ASOP No. 27

Guidance regarding the selection of economic assumptions is governed by Actuarial Statement of Practice (ASOP) No. 27

ASOP No. 27 requires that the selected economic assumptions be consistent with one another

That is, the selection of the investment return assumption should be consistent with the selection of the wage inflation and price inflation assumptions

Economic Assumptions

ASOP No. 27

Actuary must select reasonable assumptions

- Appropriate for purposes of measurement
- Reflects actuary's professional judgment
- Takes into account historical and current data
- Has no significant bias except when provision for adverse deviation (more conservative assumption)
- Reflects actuary's estimate of future experience

Historical Prices and Wages – as of Dec. 31, 2022

Year	Annual Increase in		
	Prices (CPI-U)	Wages (NAE)	Difference
3-Year Avg	4.9%	5.0%	0.1%
5-Year Avg	3.8%	4.5%	0.7%
10-Year Avg	2.6%	3.5%	0.9%
20-Year Avg	2.5%	3.2%	0.7%
30-Year Avg	2.5%	3.4%	0.9%
50-Year Avg	4.0%	4.4%	0.4%

Inflation

Price Inflation

- Long-term historical averages at 4%, while shorter term averages range between 2.6% and 4.9%
- Investment consulting firms' forward-looking expectations vary between 2.26%-2.90%
- 2023 annual report of the Social Security Trustees uses 2.4% as the intermediate assumption
- Recommend keeping price inflation assumption of 2.5%

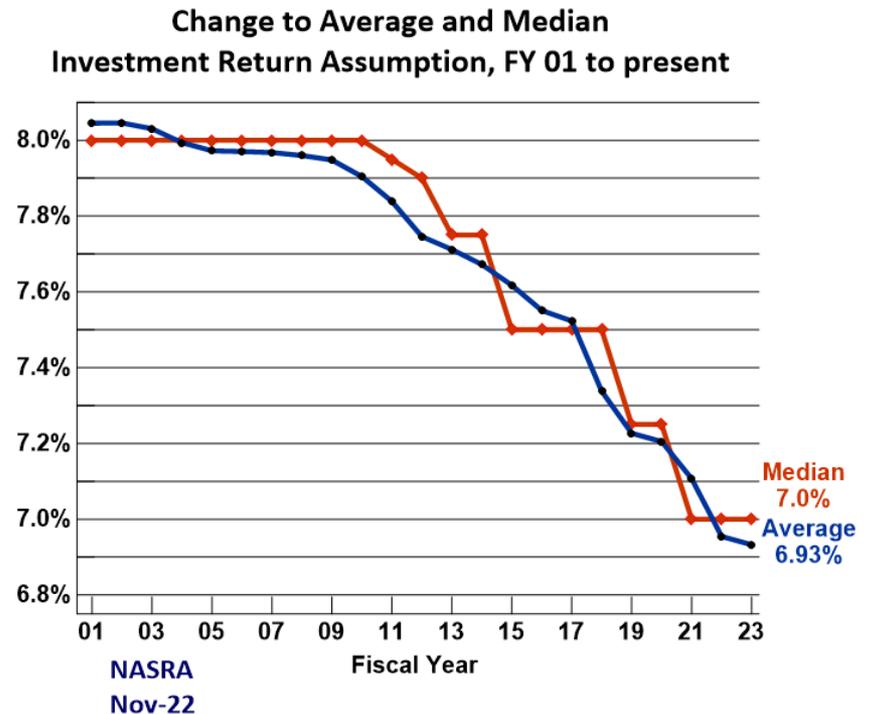
Inflation

Wage Inflation

- Generally comfortable with spread over Price inflation of 0.50% to 1.00%
- We suggest wage inflation assumption exceed price inflation by 0.50%
- Recommend decreasing Wage Inflation assumption to 3.00%

Investment Return National Trends

- Assumed rates of return are being reduced across the country
- NASRA study of public pension plan investment return assumptions
 - Median rate: 7.00%
 - Lowest rate: 5.25%
 - Highest rate: 7.55%

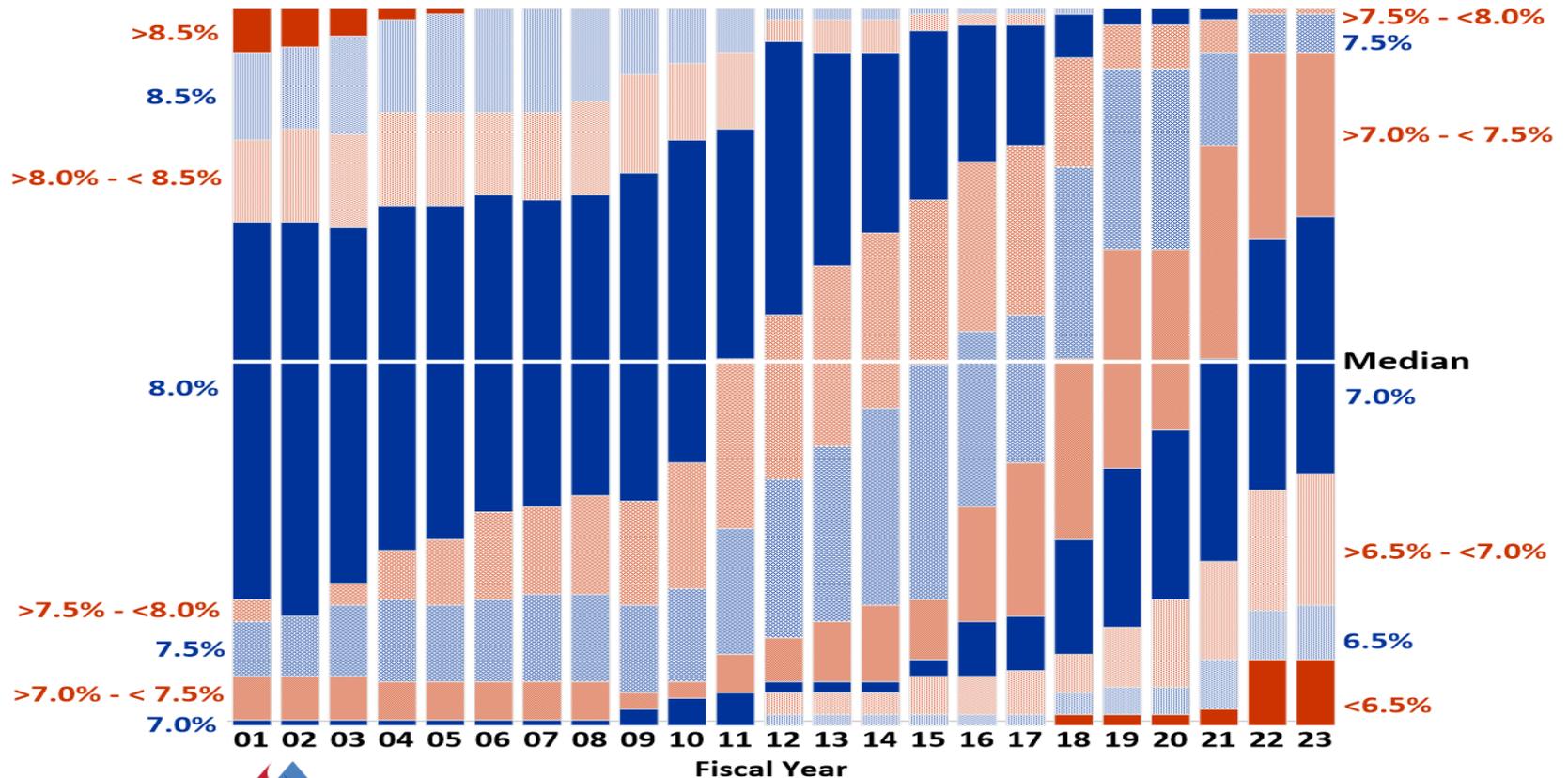


Source: NASRA Issue Brief: Public Pension Plan Investment Return Assumptions, Updated November 2022



Changing Return Expectations Over Time

Distribution of Investment Return Assumptions, FY 01 to present



NASRA Nov-22

Source: www.nasra.org



Investment Return

Capital Markets

- GRS does not provide investment advice
- GRS maintains a database of capital market assumptions from 12 different investment consulting firms
- GRS uses the capital market assumptions to estimate the return that each consultant would expect the client's portfolio to produce
 - The intention is to avoid giving undue weight to the expectation of any particular consulting firm

Investment Return

Capital Markets

- Actuarial expected return may differ from Investment Consultant
 - Differences in time horizon
 - Actuaries generally not allowed to include alpha
 - Assume that an active investment management strategy will produce superior investment performance compared to a passive management strategy
 - Actuaries are allowed to include margin for adverse deviation

Investment Consulting Firms Surveyed

- Aon Hewitt
- Blackrock
- BNY Mellon
- Callan
- Cambridge
- JP Morgan
- Meketa
- Mercer
- NEPC
- RV Kuhn
- Verus
- Wilshire

Bay County Asset Allocation¹

Asset Class	Target Allocation
Domestic Equity	78%
Broad Fixed Income	19%
Real Estate	1%
Cash	2%

¹ As provided in the System's December 31, 2021 asset information

Investment Return (Arithmetic Expectation)

GRS 2023 CMAM						
Capital Market Assumption Set (CMA)	CMA Expected Nominal Return	CMA Inflation Assumption	Expected Real Return (2)–(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)	Standard Deviation of Expected Return (1-Year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	6.93%	2.50%	4.43%	2.50%	6.93%	13.82%
2	7.37%	2.90%	4.47%	2.50%	6.97%	13.78%
3	7.63%	2.50%	5.13%	2.50%	7.63%	14.43%
4	7.55%	2.26%	5.28%	2.50%	7.78%	14.07%
5	7.80%	2.31%	5.49%	2.50%	7.99%	15.30%
6	8.25%	2.90%	5.35%	2.50%	7.85%	14.01%
7	8.06%	2.51%	5.55%	2.50%	8.05%	15.18%
8	8.06%	2.41%	5.65%	2.50%	8.15%	15.05%
9	8.24%	2.28%	5.96%	2.50%	8.46%	13.78%
10	8.83%	2.54%	6.29%	2.50%	8.79%	14.14%
11	9.00%	2.62%	6.38%	2.50%	8.88%	14.10%
Average	7.97%	2.52%	5.45%	2.50%	7.95%	14.33%
Average from last 3 CMAMs					6.94%	14.23%



Investment Return (Geometric Expectation)

GRS 2023 CMAM				
Capital Market Assumption Set (CMA)	Distribution of 10-Year Average Geometric Net Nominal Return			Probability of Exceeding
	40th	50th	60th	7.25%
(1)	(2)	(3)	(4)	(5)
1	4.96%	6.05%	7.15%	39.09%
2	5.01%	6.09%	7.19%	39.45%
3	5.54%	6.67%	7.82%	44.93%
4	5.77%	6.88%	7.99%	46.61%
5	5.72%	6.92%	8.13%	47.25%
6	5.84%	6.95%	8.06%	47.25%
7	5.81%	7.00%	8.20%	47.88%
8	5.94%	7.12%	8.31%	48.87%
9	6.51%	7.60%	8.70%	53.23%
10	6.77%	7.89%	9.01%	55.75%
11	6.87%	7.98%	9.10%	56.59%
Average	5.89%	7.01%	8.15%	47.90%
Average from last 3 CMAMs over 10-year horizon		6.01%		

Observations

- No universal method for setting this assumption, but generally based on future forecasts of investment experts (not historical averages)
 - NOTE: Capital Market Assumptions show significant increases in the 2023 GRS CMAM

Observations

- No universal agreement on time horizon for this assumption, but generally between 10 and 20 years
- Survey data is not an exact science (requires some judgement)
 - Based on average of averages
 - Does not take into account client specific strategies or knowledge

Bay County Assumed Investment Return

- In summary, 7.25% remains reasonable
- Note: Changing the actuarial assumed rate of return should not impact the asset allocation strategy or actual investment return to the plan
 - Actuarial assumption is derived from current asset allocation (not vice versa)
 - Reflects future expectation of current allocation

Summary of Economic Scenarios

Measure	Current Assumption	Recommended Assumption	Impact on Plan Costs
Price Inflation	2.50%	2.50%	N/A
Wage Inflation	3.25%	3.00%	Decrease
Investment Return	7.25%	7.25%	N/A

The impact of changing the investment return assumption to 7.00% is shown on slides 46-49

MISCELLANEOUS ASSUMPTIONS AND METHODS



Miscellaneous Assumptions/Methods

- Amortization Policy and Asset Valuation Method
 - No change
- Administrative Expenses
 - Based on the results of this analysis below, we recommend a change in administrative expense from 0.50% to 0.45%

Valuation Year	Administrative Expenses	Total Valuation Payroll	Expense as Percent of Payroll
2017	\$ 345,465	\$ 49,297,119	0.70%
2018	193,917	50,435,136	0.38%
2019	249,848	53,016,775	0.47%
2020	233,211	53,610,531	0.44%
2021	193,015	55,419,522	0.35%
Total	\$ 1,215,456	\$ 261,779,083	0.46%

Miscellaneous Assumptions/Methods

- Load for unused sick & vacation time rolled into final average compensation at retirement

<u>Division</u>	<u>Actual</u>	<u>Current Assumption</u>	<u>Proposed Assumption</u>
General	2.85%	3.50%	3.25%
DWS	2.06	7.00	6.00
Library	4.62	4.50	4.50
MCF	2.54	5.00	4.00
Sheriff's Department	3.97	5.00	4.50
Road Commission	5.88	8.50	7.75

<u>Division</u>	<u>Actual</u>	<u>Current Assumption</u>	<u>Proposed Assumption</u>
BABH	2.86%	4.50%	4.00%

Benefit Option Factors

- Option factors for benefit calculations

Age		Option A-120 10-Year Certain and Life		Option B-100 100% Joint & Survivor with Pop-up		Option C-50 50% Joint & Survivor with Pop-up	
		Present	Proposed 7.25%	Present	Proposed 7.25%	Present	Proposed 7.25%
Ret.	Ben.						
50	45	0.99349	0.99330	0.92401	0.92982	0.96051	0.96364
55	50	0.98847	0.98989	0.89948	0.91088	0.94708	0.95336
60	55	0.97896	0.98430	0.86853	0.88693	0.92964	0.94008
65	60	0.96183	0.97444	0.83103	0.85649	0.90772	0.92270

- Present basis: 7.50% interest, RP-2000 Mortality projected 20 years with Scale BB multiplied by 110% -- 50% male/50% female unisex mix
- Proposed basis: 7.25% interest, Pub-2010 General Mortality with a static 5-year projection to 2026 based on MP-2021 -- 40% male/60% female unisex mix

Early Retirement Reduction Factors

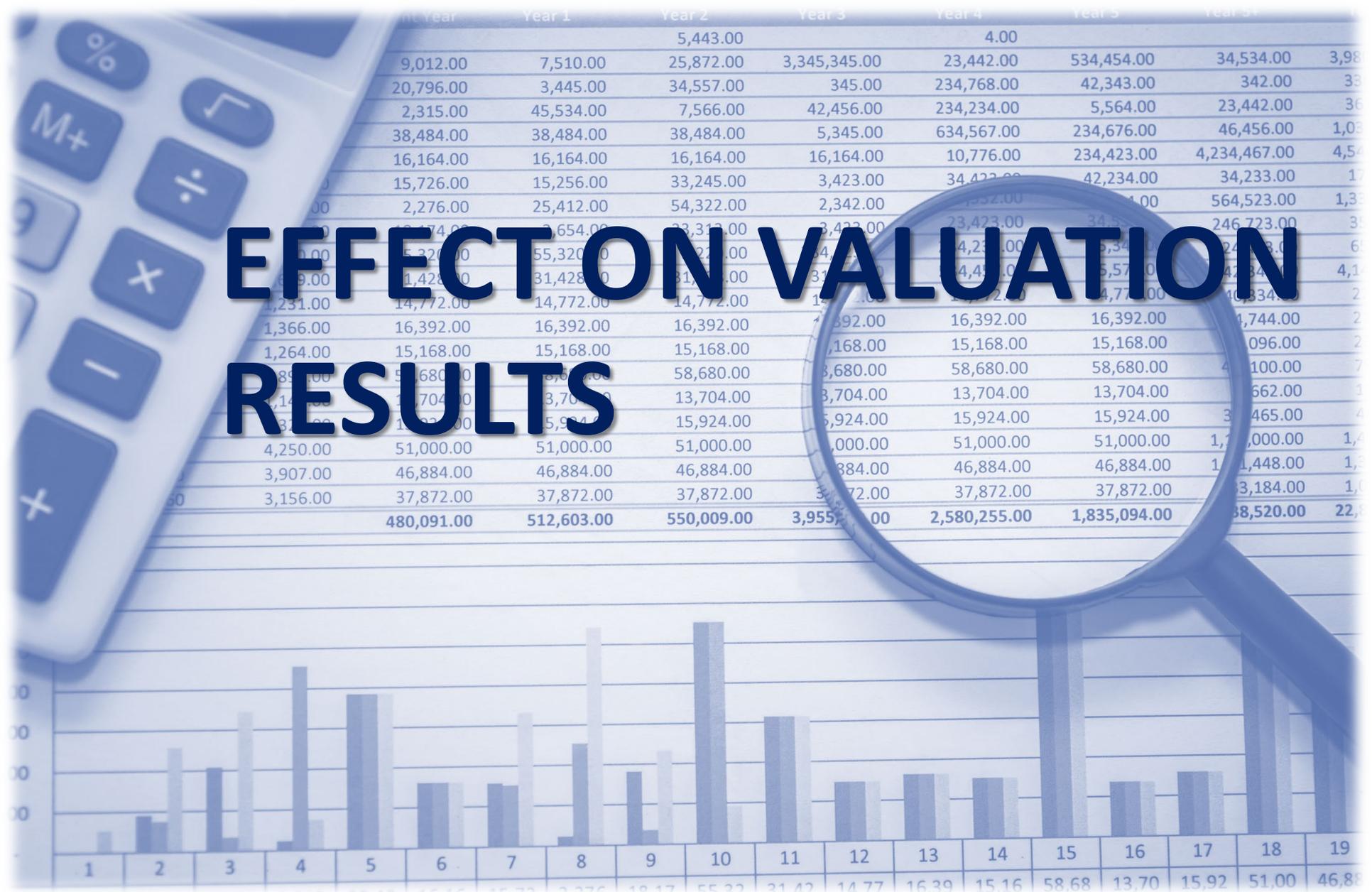
- Reduction factors for early retirement benefit calculations

Early Retirement Factors for an Employee Whose:

		Normal Retirement Age is 60		Normal Retirement Age is 55	
Age Ret.		Present	Proposed 7.25%	Age Ret.	
45		0.280428	0.296482	45	
50		0.420135	0.437491	50	
55		0.640292	0.654952		

- Present basis: 7.50% interest, RP-2000 Mortality projected 20 years with Scale BB multiplied by 110% -- 30% male/70% female unisex mix
- Proposed basis: 7.25% interest, Pub-2010 General Mortality with a static 5-year projection to 2026 based on MP-2021 -- 30% male/70% female unisex mix

EFFECT ON VALUATION RESULTS



Financial Impact – Pension (Excl. BABH)

- 2021 valuation results¹ – Funded Percentage

	Funded Percent (BCERS - Excluding BABH)		
	A	B	C
	Current Assumptions	Proposed Demographic & Economic Assumptions	
	7.25% / 3.25%	7.25% / 3.00%	7.00% / 3.00%
General	133.6 %	130.2 %	126.9 %
DWS	91.2 %	89.3 %	87.0 %
Library	125.5 %	121.5 %	118.8 %
MCF	126.8 %	122.7 %	119.3 %
Sheriff	138.0 %	135.1 %	131.5 %
Road Commission	101.1 %	98.9 %	96.6 %
Total	125.1 %	122.0 %	118.8 %

¹Illustrative impact – new assumptions will be first effective with 2022 valuation

Financial Impact – Pension (Excl. BABH)

- 2021 valuation results¹ – Employer Normal Cost

	Employer Normal Cost Percent (BCERS - Excluding BABH)		
	A	B	C
	Current Assumptions	Proposed Demographic & Economic Assumptions	
	7.25% / 3.25%	7.25% / 3.00%	7.00% / 3.00%
General	5.43 %	5.78 %	6.39 %
DWS	9.82 %	9.99 %	10.74 %
Library	\$91,887	\$92,685	\$99,942
MCF	5.29 %	5.30 %	5.87 %
Sheriff	9.09 %	9.23 %	10.07 %
Road Commission	9.95 %	9.90 %	10.74 %
Total	\$2,961,039	\$3,027,160	\$3,319,944

¹Illustrative impact – new assumptions will be first effective with 2022 valuation

Financial Impact – Pension (Excl. BABH)

- 2021 valuation results¹ – Employer Contribution

	Employer Contribution Rate (BCERS - Excluding BABH)		
	A	B	C
	Current Assumptions	Proposed Demographic & Economic Assumptions	
	7.25% / 3.25%	7.25% / 3.00%	7.00% / 3.00%
General	0.00 %	0.00 %	0.00 %
DWS	12.99 %	14.14 %	15.92 %
Library	\$0	\$0	\$0
MCF	0.00 %	0.00 %	0.00 %
Sheriff	0.00 %	0.00 %	0.00 %
Road Commission	8.91 %	10.51 %	13.25 %
Total	\$799,393	\$894,226	\$1,056,177

¹Illustrative impact – new assumptions will be first effective with 2022 valuation

Financial Impact – Pension (BABH)

- 2021 valuation results¹

	BABH		
	A	B	C
	Current Assumptions	Proposed Demographic & Economic Assumptions	
	7.25% / 3.25%	7.25% / 3.00%	7.00% / 3.00%
Funded Percent	110.0 %	106.5 %	103.4 %
Employer Normal Cost Percent	6.41 %	6.36 %	6.92 %
Unfunded Accrued Liability ERIP*	1.28 %	1.29 %	1.29 %
Employer Contribution Rate	4.17 %	5.19 %	6.88 %

* Unfunded accrued liability associated with the Early Retirement Incentive Program (ERIP).

¹Illustrative impact – new assumptions will be first effective with 2022 valuation

Implementation Schedule

- We recommend that the assumption changes be effective for the December 31, 2022 valuation EXCEPT for those changes that directly impact plan participants
 - Various factors used in benefit administration
- We recommend that changes affecting plan participants be effective January 1, 2025 in order to allow time for communication and update to computer systems

QUESTIONS

Thank you for the opportunity to meet with you today.



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- Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.
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