



**NORTH DAKOTA PUBLIC EMPLOYEES
RETIREMENT SYSTEM**

Actuarial Valuation as of July 1, 2012

Discussion of Valuation Results and Projections

October 30, 2012

Brad Ramirez, FSA, MAAA, EA, FCA

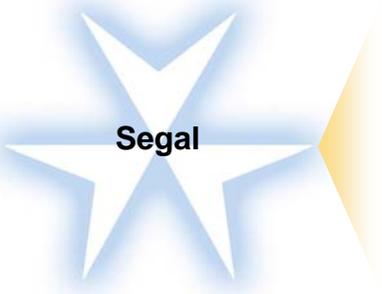
Tammy Dixon, FSA, MAAA, EA

Copyright ©2012 by The Segal Group, Inc., parent of The Segal Company. All rights reserved. #5218264



 **SEGAL**

Discussion Topics



- **Summary of Valuation Highlights**
- **Membership and Demographics**
- **Valuation Results and Projections**

 **SEGAL** 1

Actuarial Methods

➤ Asset valuation method (actuarial value of assets)

- Smoothing of investment gains or losses
- PERS uses a five-year smoothing method
 - Investment returns above or below the expected return are recognized over five years
- No market value corridor is applied (e.g., actuarial value must fall within 80% to 120% of market value)

➤ Cost method

- Allocation of liability between past service and future service
 - PERS uses the entry age normal cost method
 - Retiree Health Insurance Credit Fund uses the projected unit credit cost method
 - Most retirement systems use the entry age normal cost method

➤ Amortization method

- 20-year “open” period to pay off unfunded actuarial accrued liability
- Based on level percentage of payroll
- Governmental Accounting Standards Board requires 30-year maximum period to determine the Annual Required Contribution
- An open amortization period will yield contributions that reduce the unfunded actuarial accrued liability, but will not pay it off

Economic Assumptions

➤ Interest Rate

- 8%

➤ Salary Increase Rates

- Based on service
- Ranges from 8.25% for new members to 4.86% for members with 5 or more years of service (5.0% for all years for Judges)

➤ Payroll Growth

- 4.5% (4.0% for Judges)

Summary of Valuation Highlights – PERS and HPRS

- Market value of assets returned -0.20% for year ending 6/30/12 (Segal calculation)
 - Gradual recognition of deferred gains resulted in -0.15% return on actuarial assets
 - Unrecognized investment losses represent about 6% of market assets
- Net impact on funded ratio was a decrease from 70.5% (as of 7/1/2011) to 65.1% (as of 7/1/2012)
- Market value of combined assets for PERS and HPRS was \$1.785 billion vs. \$1.811 billion last year
- Combined actuarial value of assets for PERS and HPRS was \$1.675 billion vs. \$1.700 billion last year
- Total actuarial value of assets is 93.9% of market value of assets
- Unrecognized appreciation or depreciation will be recognized in subsequent valuations

Summary of Valuation Highlights

	Changes in Statutory Contribution Rates Due to Senate Bill 2108	
	Member	Employer
Main System Full-Time Employees	5.00%	5.12%
Effective January 2013	6.00	6.12
Main System Part-Time Employees	10.12	0.00
Effective January 2013	12.12	0.00
Judges	6.00	15.52
Effective January 2013	7.00	16.52
Highway Patrol	11.30	17.70
Effective January 2013	12.30	18.70
Law Enforcement (without Prior Service)	4.50	N/A
Effective January 2013	5.00	
	Member Rate for Employees of Political Subdivisions	Member Rate for Employees of the BCI
Law Enforcement (with Prior Service)	4.50%	5.00%
Effective January 2013	5.00	6.00

Summary of Valuation Highlights

- Some employer rates are determined by the Board of Retirement rather than set in statute

	Employer Contribution Rates Determined by the Board of Retirement
Law Enforcement without Prior Service	6.93%
Effective January 2013	7.43
Law Enforcement with Prior Service (Employees of Political Subdivisions)	8.81
Effective January 2013	9.31
Law Enforcement with Prior Service (Employees of the BCI)	9.31
Effective January 2013	10.31

Summary of Valuation Highlights

- Recommended contribution as a percent of payroll

	2012-2013	2011-2012	Statutory/ Approved 2012-2013
Main	12.24%	11.36%	5.12%-6.12%
Judges	16.33%	15.96%	15.52%-16.52%
National Guard	7.40%	7.08%	6.50%
Law Enforcement (with Prior Service)	10.69%	10.96%	8.81%-9.31%*
Law Enforcement (without Prior Service)	7.33%	7.56%	6.93%-7.43%
Highway Patrol	26.83%	27.13%	17.70%-18.70%
Retiree Health	0.90%	0.88%	1.14%
Job Service	0.00%	0.00%	0.00%

*Rates shown are for employees of Political Subdivisions. Rates for employees of BCI are 9.31-10.31%

- Funded Ratio (AVA)

	July 1, 2012	July 1, 2011
PERS	65.1%	70.5%
HPRS	70.3%	73.7%
Retiree Health	51.9%	49.6%
Job Service	104.3%	108.7%

Membership – Main System

	2012	2011	Change
Active:			
• Number	20,738	20,359	+1.9%
• Payroll	\$781.6 mil	\$785.4 mil	-0.5%
• Average Age	47.1 years	47.3 years	- 0.2 years
• Average Service	10.5 years	10.6 years	- 0.1 years
Retirees and Beneficiaries			
• Number	8,222	7,746	+6.1%
• Total Monthly Benefits	\$7.9 mil	\$ 7.0 mill	+13.1%
• Average Monthly Benefit	\$965	\$906	+6.5%

Membership – Judges

	2012	2011	Change
Active:			
• Number	49	49	+0.0%
• Payroll	\$6.1 mil	\$6.2 mil	-1.5%
• Average Age	58.1 years	57.1 years	+ 1.0 years
• Average Service	17.6 years	16.5 years	+ 1.1 years
Retirees and Beneficiaries			
• Number	34	34	+0.0%
• Total Monthly Benefits	\$122,548	\$122,602	+0.0%
• Average Monthly Benefit	\$3,604	\$3,606	+0.0%

Membership – National Guard

	2012	2011	Change
Active:			
• Number	32	30	+6.7%
• Payroll	\$1.3 mil	\$1.3 mil	-1.4%
• Average Age	36.2 years	36.3 years	-0.1 years
• Average Service	5.4 years	5.7 years	-0.3 years
Retirees and Beneficiaries			
• Number	10	9	+11.1%
• Total Monthly Benefits	\$10,441	\$10,019	+4.2%
• Average Monthly Benefit	\$1,044	\$1,113	-6.2%

Membership – Law Enforcement with Prior Main System Service

	2012	2011	Change
Active:			
• Number	207	196	+5.6%
• Payroll	\$9.5 mil	\$8.8 mil	+7.3%
• Average Age	39.7 years	40.0 years	-0.3 years
• Average Service	8.0 years	8.3 years	-0.3 years
Retirees and Beneficiaries			
• Number	37	32	+15.6%
• Total Monthly Benefits	\$61,160	\$52,781	+15.9%
• Average Monthly Benefit	\$1,653	\$1,649	+0.2%

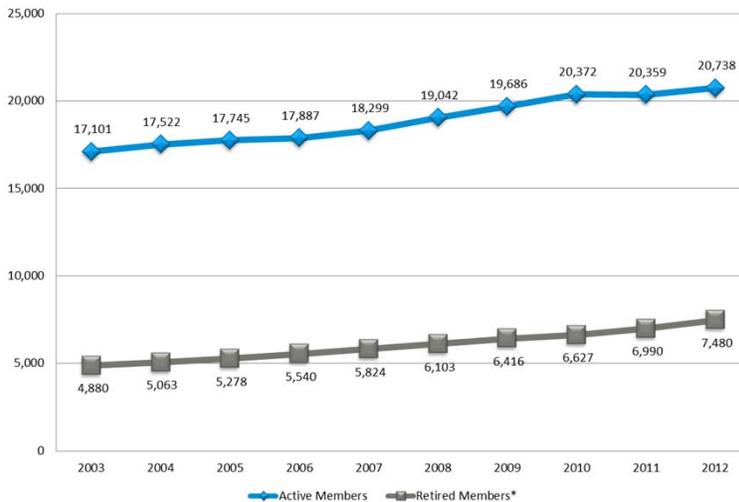
Membership – Law Enforcement Without Prior Main System Service

	2012	2011	Change
Active:			
• Number	65	61	+6.6%
• Payroll	\$2.4 mil	\$2.4 mil	-2.3%
• Average Age	38.0 years	37.7 years	+0.3 years
• Average Service	3.3 years	2.5 years	+0.8 years
Retirees and Beneficiaries			
• Number	0	0	N/A
• Total Monthly Benefits	N/A	N/A	N/A
• Average Monthly Benefit	N/A	N/A	N/A

Membership – PERS

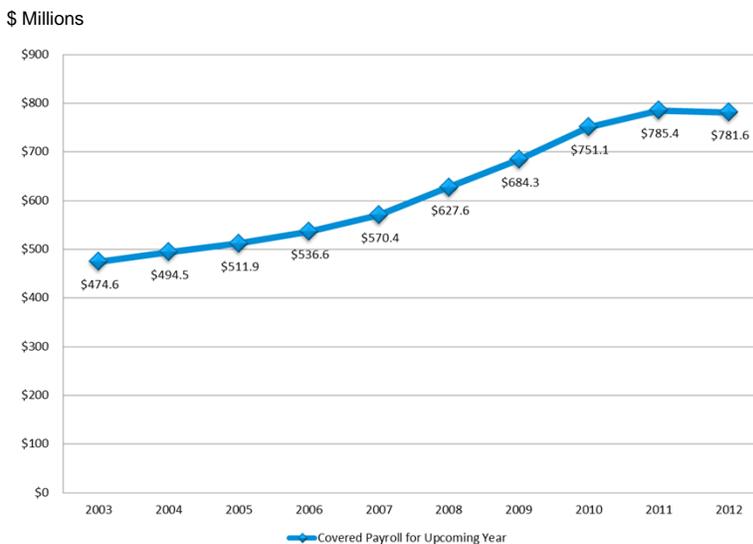
	2012	2011	Change
Active:			
• Number	21,091	20,695	+1.9%
• Payroll	\$800.9 mil	\$804.2 mil	-0.4%
• Average Age	47.0 years	47.2 years	-0.2 years
• Average Service	10.3 years	10.6 years	-0.3 years
Retirees and Beneficiaries			
• Number	8,303	7,821	+6.2%
• Total Monthly Benefits	\$8.1 mil	\$7.2 mil	+12.8%
• Average Monthly Benefit	\$979	\$921	+6.3%

Active and Retired Membership – Main System

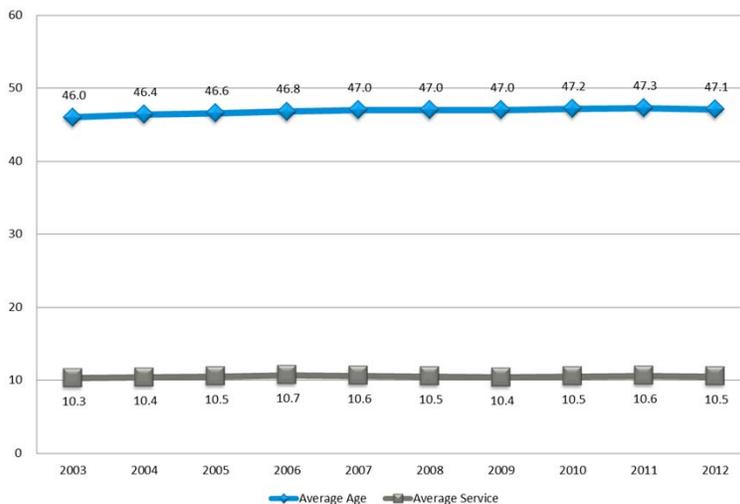


*Retired Members excludes beneficiaries.

Active Payroll – Main System



Average Age and Service of Active Members – Main System



SEGAL 16

Average Salary and Average Benefit – Main System



SEGAL 17

Assets – PERS and HPRS

- The market value of assets decreased from \$1.811 billion (as of June 30, 2011) to \$1.785 billion (as of June 30, 2012)
 - Segal determined the investment return was -0.20%, net of investment expenses
- The actuarial value of assets – which smooths investment gains and losses over five years – decreased from \$1.700 billion (as of June 30, 2011) to \$1.675 billion (as of June 30, 2012)
 - Investment return of -0.15%, net of investment expenses
 - Actuarial value is 93.9% of market
 - There is a total of \$110 million of deferred investment gains that will be recognized in future years
- The average annual return on market assets over the past 10 years is 6.4%
- The average annual return on actuarial assets over the past 10 years is 4.7%

Market Value of Assets (\$ in billions) – PERS and HPRS

Fiscal Year Ending June 30, 2012	
Beginning of Year	\$1.811
Contributions:	
• Employer	0.039
• Member	0.037
• Service Purchases	0.007
• Total	0.083
Benefits, Expenses and Refunds	(0.105)
Investment Income (net)	(0.004)
End of Year	\$1.785
Rate of Return	-0.20%

Actuarial Value of Assets (\$ in billions) – PERS and HPRS

1. Market Value of Assets as of June 30, 2011	\$1.811
2. Contributions, Interest, Dividends, Benefits and Expenses	<u>0.014</u>
3. Preliminary Market Value as of June 30, 2012	\$1.825
4. Actual Market Value as of June 30, 2012	<u>1.785</u>
5. Excess/(Shortfall) Return for Year Ended June 30, 2012	\$(0.040)

Excess/(Shortfall) Returns:

Year	Initial Amount	Deferral %	Unrecognized Amount
2012	\$(0.040)	80%	(\$0.032)
2011	0.289	60%	0.173
2010	0.153	40%	0.061
2009	(0.464)	20%	(0.092)
2008	(0.133)	0%	<u>0.000</u>
6. Total			\$0.110
7. Actuarial Value of Assets as of June 30, 2012 (4) - (6)			\$1.675
8. Actuarial Value of Assets as a % of Market Value of Assets			94%

★ SEGAL 20

Market Value of Assets (\$ in billions) – Main System

Fiscal Year Ending June 30, 2012	
Beginning of Year	\$1.708
Contributions:	
• Employer	0.035
• Member	0.036
• Service Purchases	0.006
• Total	<u>0.077</u>
Benefits and Refunds	(0.099)
Investment Income (net)	<u>(0.003)</u>
End of Year	\$1.683
Rate of Return	-0.20%

★ SEGAL 21

Market Value of Assets (\$ in millions) – Judges

Fiscal Year Ending June 30, 2012	
Beginning of Year	\$32.369
Contributions	1.363
Benefits and Refunds	(1.449)
Investment Income (net)	(0.065)
End of Year	\$32.218
Rate of Return	-0.20%

Market Value of Assets (\$ in millions) – National Guard

Fiscal Year Ending June 30, 2012	
Beginning of Year	\$2.315
Contributions	0.198
Benefits and Refunds	(0.153)
Investment Income (net)	(0.005)
End of Year	\$2.355
Rate of Return	-0.20%

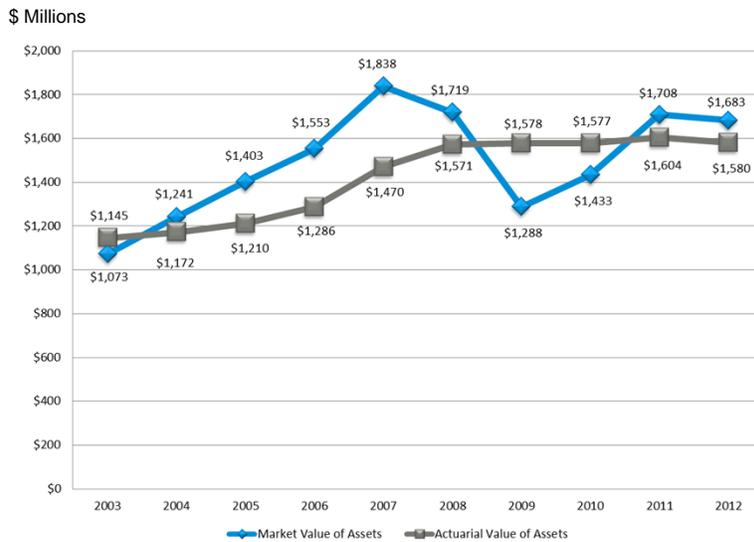
Market Value of Assets (\$ in millions) – Law Enforcement with Prior Main System Service

Fiscal Year Ending June 30, 2012	
Beginning of Year	\$14.590
Contributions	1.402
Benefits and Refunds	(0.744)
Investment Income (net)	(0.029)
End of Year	\$15.219
Rate of Return	-0.20%

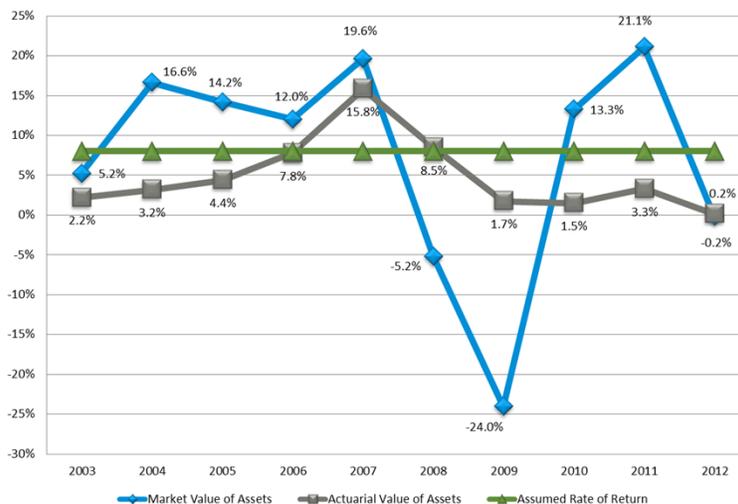
Market Value of Assets (\$ in millions) – Law Enforcement Without Prior Main System Service

Fiscal Year Ending June 30, 2012	
Beginning of Year	\$0.518
Contributions	0.281
Benefits and Refunds	(0.020)
Investment Income (net)	(0.001)
End of Year	\$0.778
Rate of Return	-0.20%

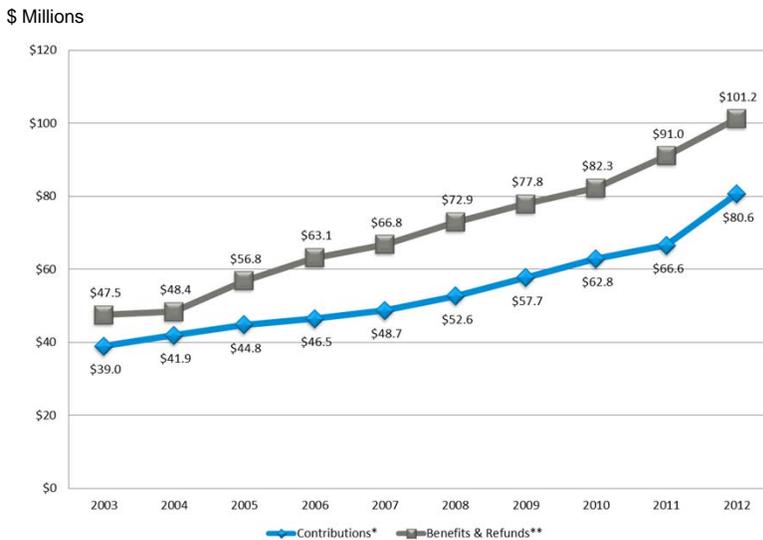
Market and Actuarial Values of Assets – Main System



Asset Returns – PERS and HPRS



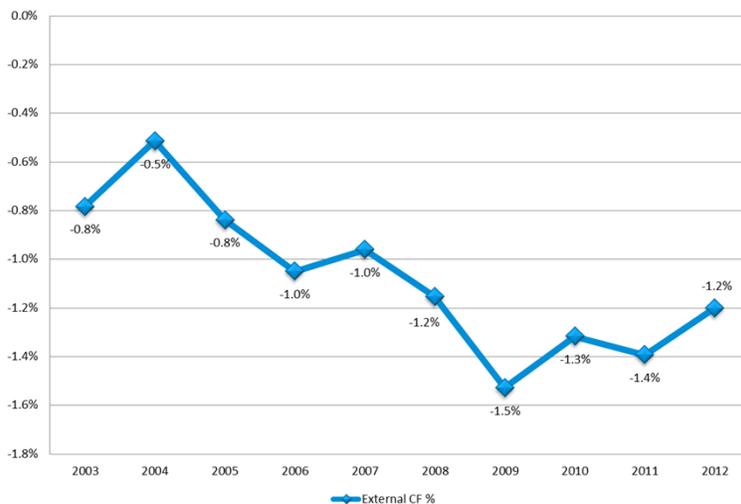
Contributions vs Benefits and Refunds – PERS



* Includes member and employer contributions, and service purchases

** Includes administrative expenses

External Cash Flow as a % of Market Value – PERS



Valuation Results (\$ in millions) – Main System

	July 1, 2012	July 1, 2011
Actuarial Accrued Liability:		
• Active Members	\$1,396	\$1,399
• Inactive Members	171	116
• Retirees and Beneficiaries	<u>875</u>	<u>769</u>
Total	\$2,442	\$2,284
Actuarial Assets	<u>1,580</u>	<u>1,604</u>
Unfunded Accrued Liability	\$862	\$680
Funded Ratio	64.7%	70.2%



Actuarially Recommended Contribution – Main System

	July 1, 2012	July 1, 2011
Normal Cost Rate	10.04%	9.81%
Member Rate	<u>5.50%</u>	<u>4.50%</u>
Employer Normal Cost Rate	4.54%	5.31%
Amortization of UAAL	<u>7.70%</u>	<u>6.05%</u>
Actuarially Recommended Contribution	12.24%	11.36%
Employer Rate	5.12-6.12%	4.12-6.12%
Contribution Sufficiency/(Deficiency)	(5.62%)	(3.74%)



Valuation Results (\$ in millions) – Judges

	July 1, 2012	July 1, 2011
Actuarial Accrued Liability:		
• Active Members	\$19.455	\$17.762
• Inactive Members	0.355	0.343
• Retirees and Beneficiaries	<u>13.873</u>	<u>13.953</u>
Total	\$33.683	\$32.058
Actuarial Assets	<u>30.238</u>	<u>30.388</u>
Unfunded Accrued Liability	\$3.445	\$1.670
Funded Ratio	89.8%	94.8%

Actuarially Recommended Contribution – Judges

	July 1, 2012	July 1, 2011
Normal Cost Rate	18.73%	19.50%
Member Rate	<u>6.50%</u>	<u>5.50%</u>
Employer Normal Cost Rate	12.23%	14.00%
Amortization of UAAL	<u>4.10%</u>	<u>1.96%</u>
Actuarially Recommended Contribution	16.33%	15.96%
Employer Rate	15.52-16.52%	14.52-16.52%
Contribution Sufficiency/(Deficiency)	0.69%	2.06%

Valuation Results (\$ in millions) – National Guard

	July 1, 2012	July 1, 2011
Actuarial Accrued Liability:		
• Active Members	\$1.073	\$1.137
• Inactive Members	0.369	0.283
• Retirees and Beneficiaries	<u>0.973</u>	<u>0.952</u>
Total	\$2.415	\$2.372
Actuarial Assets	<u>2.211</u>	<u>2.174</u>
Unfunded Accrued Liability	\$0.204	\$0.198
Funded Ratio	91.6%	91.6%

 SEGAL 34

Actuarially Recommended Contribution – National Guard

	July 1, 2012	July 1, 2011
Normal Cost Rate	10.31%	10.03%
Member Rate	<u>4.00%</u>	<u>4.00%</u>
Employer Normal Cost Rate	6.31%	6.03%
Amortization of UAAL	<u>1.09%</u>	<u>1.05%</u>
Actuarially Recommended Contribution	7.40%	7.08%
Employer Rate	6.50%	6.50%
Contribution Sufficiency/(Deficiency)	(0.90%)	(0.58%)

 SEGAL 35

Valuation Results (\$ in millions) – Law Enforcement with Prior Main System Service

	July 1, 2012	July 1, 2011
Actuarial Accrued Liability:		
• Active Members	\$13.134	\$13.071
• Inactive Members	1.037	0.597
• Retirees and Beneficiaries	<u>7.831</u>	<u>6.871</u>
Total	\$22.002	\$20.539
Actuarial Assets	<u>14.284</u>	<u>13.698</u>
Unfunded Accrued Liability	\$7.718	\$6.841
Funded Ratio	64.9%	66.7%

 SEGAL 36

Actuarially Recommended Contribution – Law Enforcement with Prior Main System Service

	July 1, 2012	July 1, 2011
Normal Cost Rate	9.92%	9.85%
Member Rate	<u>4.92%</u>	<u>4.30%</u>
Employer Normal Cost Rate	5.00%	5.55%
Amortization of UAAL	<u>5.69%</u>	<u>5.41%</u>
Actuarially Recommended Contribution	10.69%	10.96%
Employer Rate*	8.81-9.31%	8.31-9.31%
Contribution Sufficiency/(Deficiency)	(0.85%)	(2.65%)

*Rates shown are for employees of Political Subdivisions.
Rates for BCI employees are 9.31-10.31% as of July 1, 2012 and 8.31-9.31% as of July 1, 2011.

 SEGAL 37

Valuation Results (\$ in millions) – Law Enforcement without Prior Main System Service

	July 1, 2012	July 1, 2011
Actuarial Accrued Liability:		
• Active Members	\$0.830	\$0.586
• Inactive Members	0.103	0.079
• Retirees and Beneficiaries	<u>0.000</u>	<u>0.000</u>
Total	\$0.933	\$0.665
Actuarial Assets	<u>0.730</u>	<u>0.486</u>
Unfunded Accrued Liability	\$0.203	\$0.179
Funded Ratio	78.3%	73.1%

Actuarially Recommended Contribution – Law Enforcement without Prior Main System Service

	July 1, 2012	July 1, 2011
Normal Cost Rate	11.49%	11.30%
Member Rate	<u>4.75%</u>	<u>4.25%</u>
Employer Normal Cost Rate	6.74%	7.05%
Amortization of UAAL	<u>0.59%</u>	<u>0.51%</u>
Actuarially Recommended Contribution	7.33%	7.56%
Employer Rate	6.93-7.43%	6.43-7.43%
Contribution Sufficiency/(Deficiency)	0.35%	0.62%

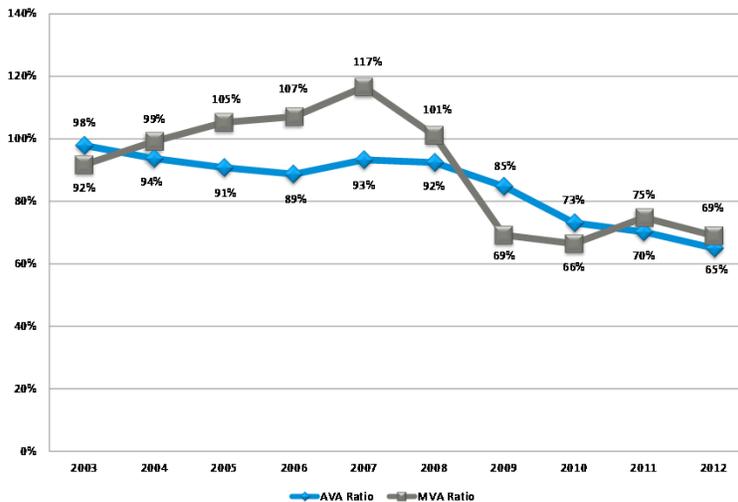
Valuation Results (\$ in millions) – PERS

	July 1, 2012	July 1, 2011
Actuarial Accrued Liability:		
• Active Members	\$1,430	\$1,431
• Inactive Members	173	117
• Retirees and Beneficiaries	<u>898</u>	<u>791</u>
Total	\$2,501	\$2,339
Actuarial Assets	<u>1,627</u>	<u>1,650</u>
Unfunded Accrued Liability	\$874	\$689
Funded Ratio	65.1%	70.5%

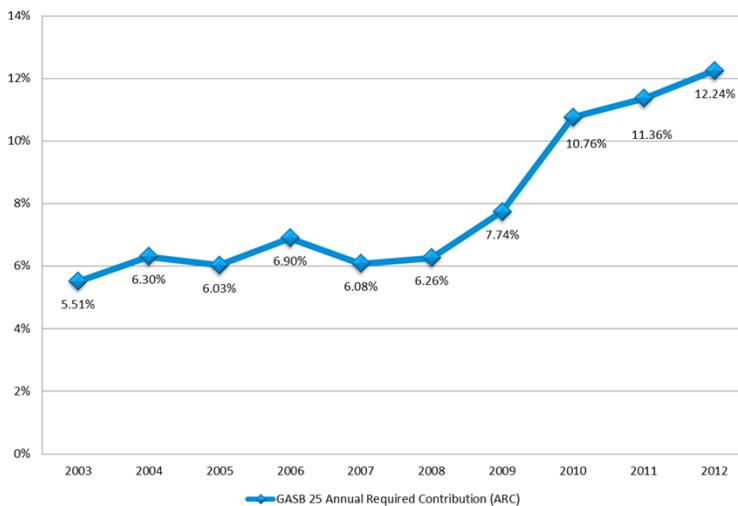
Actuarial Value of Assets and Actuarial Accrued Liability—Main System



Funded Ratios – Main System



GASB 25 Annual Required Contribution (ARC) – Main System



Membership – Highway Patrol

	2012	2011	Change
Active:			
• Number	145	133	+9.0%
• Payroll	\$8.2 mil	\$8.0 mil	+2.1%
• Average Age	36.8 years	37.7 years	- 0.9 years
• Average Service	10.5 years	11.3 years	- 0.8 years
Retirees and Beneficiaries			
• Number	116	115	+0.9%
• Total Annual Benefits	\$3.7 mil	\$3.6 mill	+3.8%
• Average Monthly Benefit	\$2,654	\$2,580	+2.9%

Assets – Highway Patrol

- The market value of assets decreased from \$52.7 million (as of June 30, 2011) to \$51.2 million (as of June 30, 2012)
 - Segal determined the investment return was -0.20%, net of investment expenses
- The actuarial value of assets – which smooths investment gains and losses over five years – decreased from \$49.5 million (as of June 30, 2011) to \$48.1 million (as of June 30, 2012)
 - Investment return of -0.15%, net of investment expenses
 - Actuarial value is 93.9% of market
 - There is a total of \$3.2 million of deferred investment gains that will be recognized in future years
- The average annual return on market assets for PERS and HPRS over the past 10 years is 6.4%
- The average annual return on actuarial assets for PERS and HPRS over the past 10 years is 4.7%

Valuation Results (\$ in millions) – Highway Patrol

	July 1, 2012	July 1, 2011
Actuarial Accrued Liability:		
• Active Members	\$29.187	\$29.741
• Inactive Members	1.847	1.373
• Retirees and Beneficiaries	<u>37.422</u>	<u>36.031</u>
Total	\$68.456	\$67.145
Actuarial Assets	<u>48.094</u>	<u>49.480</u>
Unfunded Accrued Liability	\$20.362	\$17.665
Funded Ratio	70.3%	73.7%

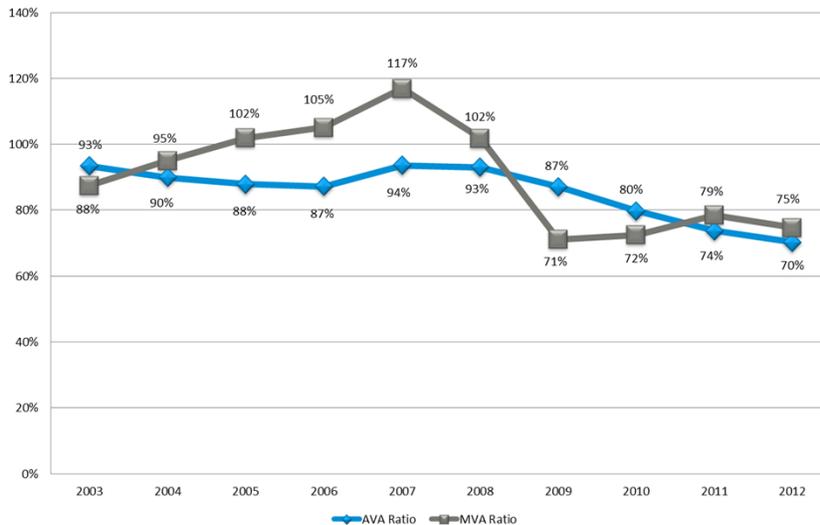
★ SEGAL 46

Actuarially Recommended Contribution – Highway Patrol

	July 1, 2012	July 1, 2011
Normal Cost Rate	21.23%	22.52%
Member Rate	<u>11.80%</u>	<u>10.80%</u>
Employer Normal Cost Rate	9.43%	11.72%
Amortization of UAAL	<u>17.40%</u>	<u>15.41%</u>
Actuarially Recommended Contribution	26.83%	27.13%
Employer Rate	17.7-18.7%	16.7-18.7%
Contribution Sufficiency/(Deficiency)	(7.63%)	(6.93%)

★ SEGAL 47

Funded Ratios – Highway Patrol



Membership – Job Service

	2012	2011	Change
Active:			
• Number	19	23	-17.4%
• Payroll	\$1.0 mil	\$1.2 mil	-13.1%
• Average Age	58.6 years	58.1 years	+0.5 years
• Average Service	35.7 years	35.3 years	+0.4 years
Retirees and Beneficiaries			
Non Travelers			
• Number	133	128	+3.9%
• Total Monthly Benefits	\$311,193	\$280,849	+10.8%
• Average Monthly Benefit	\$2,340	\$2,194	+6.6%
Travelers			
• Number	79	85	-7.1%
• Total Monthly Benefits	\$54,571	\$52,460	+4.0%
• Average Monthly Benefit	\$691	\$617	+11.9%

Assets – Job Service

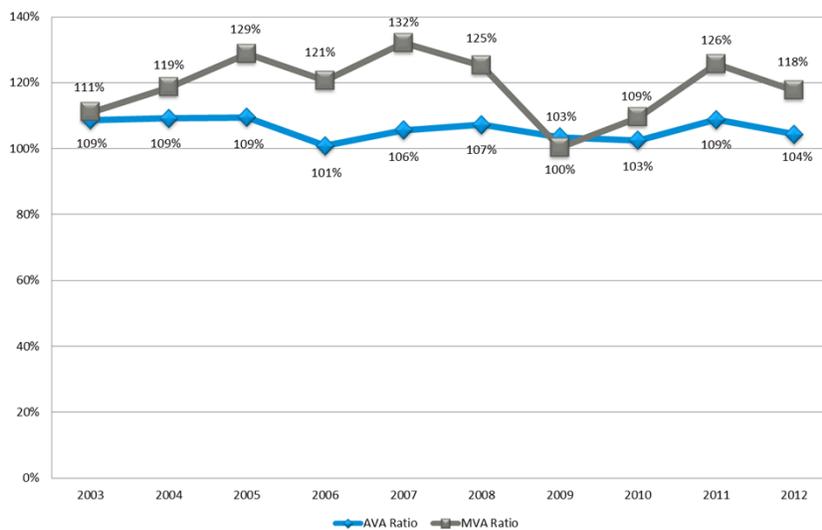
- The market value of assets decreased from \$85.7 million (as of June 30, 2011) to \$84.7 million (as of June 30, 2012)
 - Segal determined the investment return was 3.67%, net of investment expenses
- The actuarial value of assets – which smooths investment gains and losses over five years – increased from \$74.2 million (as of June 30, 2011) to \$75.1 million (as of June 30, 2012)
 - Investment return of 6.95%, net of investment expenses
 - Actuarial value is 88.7% of market
 - There is a total of \$9.6 million of deferred investment gains that will be recognized in future years

Valuation Results (\$ in millions) – Job Service

	July 1, 2012	July 1, 2011
Actuarial Accrued Liability:		
• Active Members	\$10.197	\$11.573
• Inactive Members	0.661	0.958
• Retirees and Beneficiaries	<u>61.184</u>	<u>55.704</u>
Total	\$72.042	\$68.235
Actuarial Assets	<u>75.118</u>	<u>74.190</u>
Unfunded/(Overfunded) Accrued Liability	\$(3.076)	\$(5.955)
Funded Ratio*	104.3%	108.7%

*No contributions are scheduled as long as the funded ratio exceeds 100%.

Funded Ratios – Job Service



Based on PVB.

Membership – Retiree Health Insurance Credit Fund

	2012	2011	Change
Active:			
• Number	21,462	21,062	+1.9%
• Payroll	\$824.9 mil	\$829.0 mil	-0.5%
• Average Age	47.0 years	47.1 years	-0.1 years
• Average Service	10.3 years	10.5 years	-0.2 years
Retirees and Beneficiaries			
• Number	4,442	4,242	+4.7%
• Total Annual Benefits	\$6.3 mil	\$5.9 mil	+6.8%
• Average Monthly Benefit	\$118	\$116	+1.7%

Assets – Retiree Health Insurance Credit Fund

- The market value of assets increased from \$58.7 million (as of June 30, 2011) to \$63.9 million (as of June 30, 2012)
 - Segal determined the investment return was 2.65%, net of investment expenses
- The actuarial value of assets – which smooths investment gains and losses over five years – increased from \$53.7 million (as of June 30, 2011) to \$58.3 million (as of June 30, 2012)
 - Investment return of 1.83%, net of investment expenses
 - Actuarial value is 91.2% of market
 - There is a total of \$5.6 million of deferred investment gains that will be recognized in future years

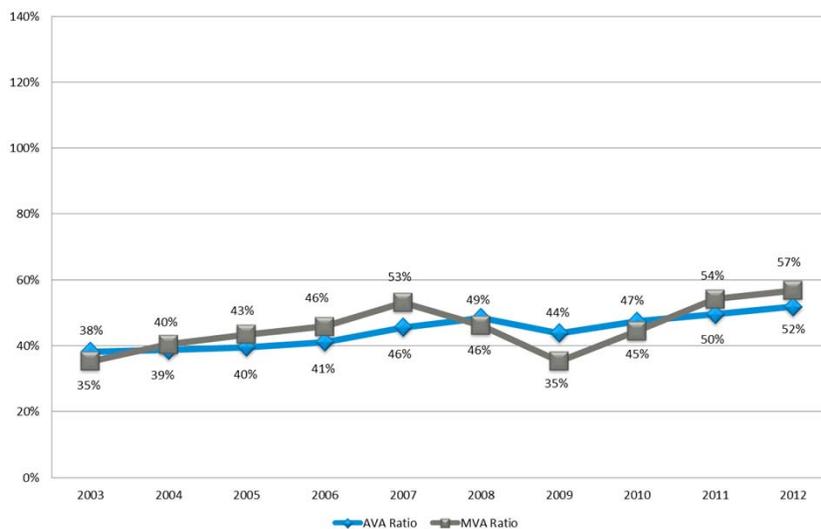
Valuation Results (\$ in millions) – Retiree Health Insurance Credit Fund

	July 1, 2012	July 1, 2011
Actuarial Accrued Liability:		
• Active Members	\$58.337	\$57.478
• Retirees and Beneficiaries	<u>54.036</u>	<u>50.907</u>
Total	\$112.373	\$108.385
Actuarial Assets	<u>58.307</u>	<u>53.730</u>
Unfunded Accrued Liability	\$54.066	\$54.655
Funded Ratio	51.9%	49.6%

Actuarially Recommended Contribution – Retiree Health Insurance Credit Fund

	July 1, 2012	July 1, 2011
Normal Cost Rate	0.40%	0.40%
Amortization of UAAL	<u>0.50%</u>	<u>0.48%</u>
Actuarially Recommended Contribution	0.90%	0.88%
Employer Rate	1.14%	1.14%
Contribution Sufficiency/(Deficiency)	0.24%	0.26%

Funded Ratios – Retiree Health Insurance Credit Fund

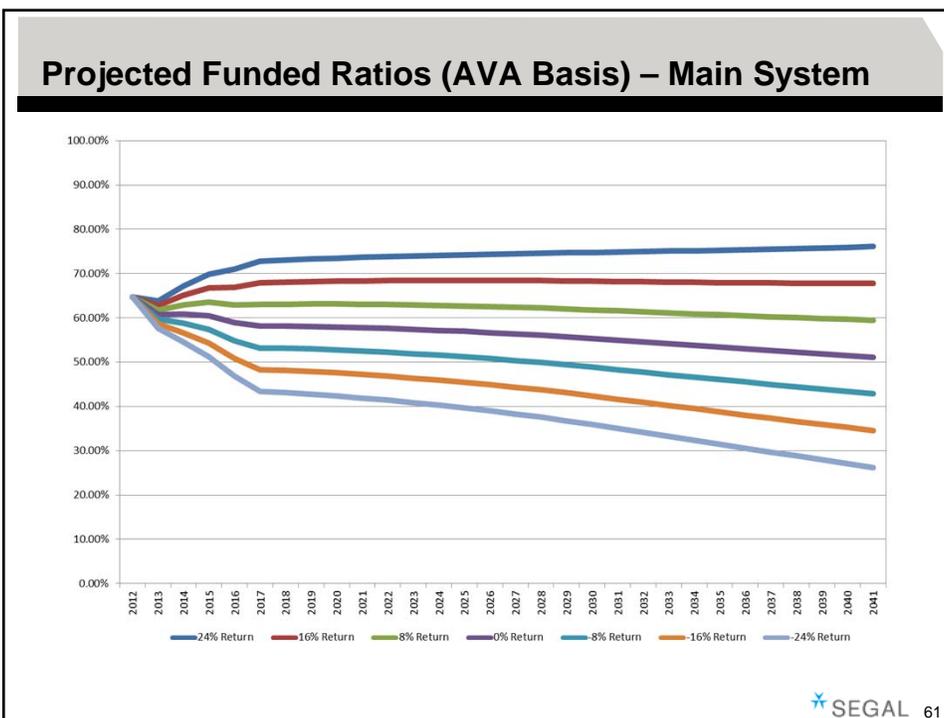
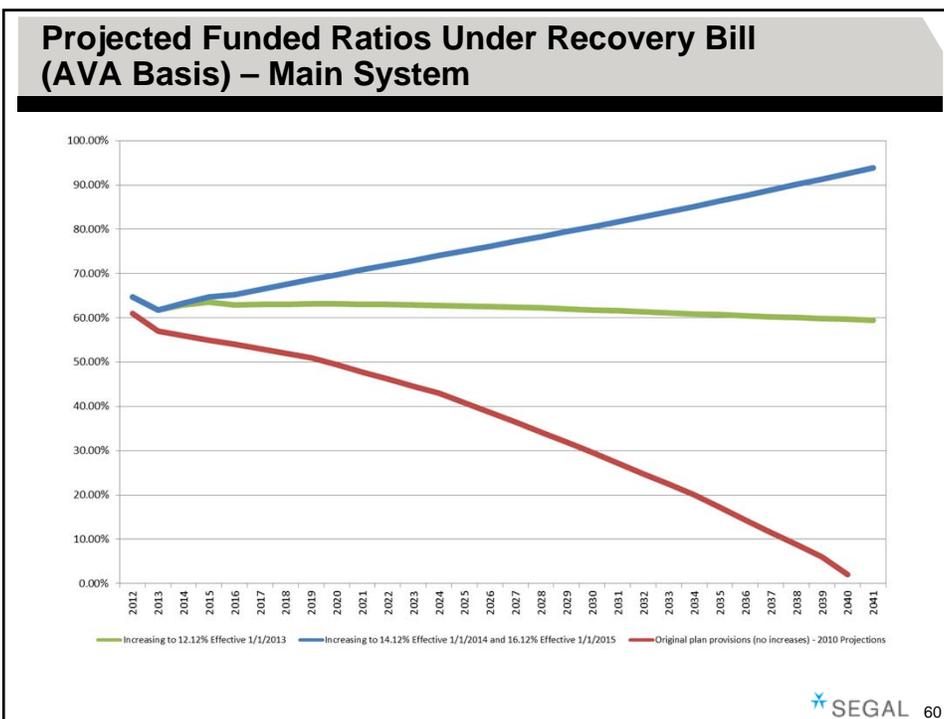


Valuation Results - Comments

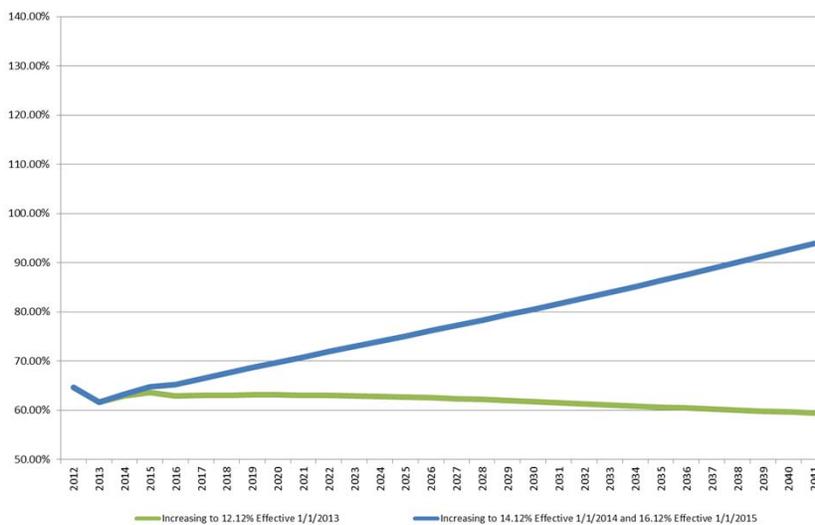
- Potential risks to the system:
 - Continued aging of population
 - Unforeseen demographic “shocks”
 - Change in asset return environment
- Board should consider projections, studies, etc., to help quantify these risks, and make changes to the system, if appropriate
- The asset valuation and amortization methods should be reviewed to make sure that they are in line with the Board’s funding objectives
- Contributions are being made in accordance with the funding policy but the Plans remain unfunded. A change in the policy could accelerate an improvement of the funded ratios.

Projections

- Projections of estimated funded ratios for 30 years
 - Based on investment return scenarios ranging from -24% to +24% for 2012/2013
 - Assumed Fund earns 8% per year
 - All other experience is assumed to emerge as expected
- Projections for Recovery Bill contribution increases
 - Based on contribution rate increases effective January 1, 2014 and January 1, 2015 in Proposed Bill Number 13.0103.02000
 - All other experience is assumed to emerge as expected
- Target Funded Ratios
 - Based on investment return scenarios ranging from -24% to 24% for 2012/2013
 - Assumed Fund earns indicated return thereafter
 - All other experience is assumed to emerge as expected
- Projections, by their nature, are not a guarantee of future results. The modeling projections are intended to serve as illustrations of future financial outcomes that are based on the information available to us at the time the modeling is undertaken and completed, and the agreed-upon assumptions and methodologies described herein. Emerging results may differ significantly if the actual experience proves to be different from these assumptions or if alternative methodologies are used. Actual experience may differ due to such variables as demographic experience, the economy, stock market performance and the regulatory environment.



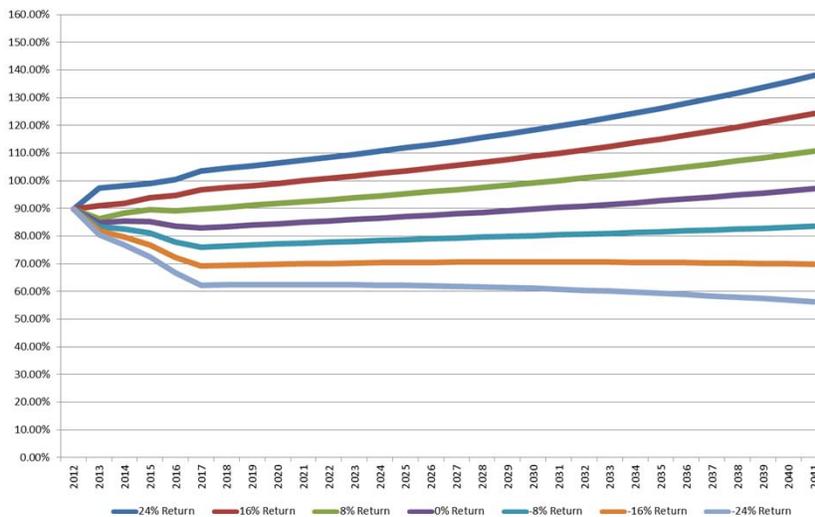
Projected Funded Ratios Under Recovery Bill (AVA Basis) – Main System



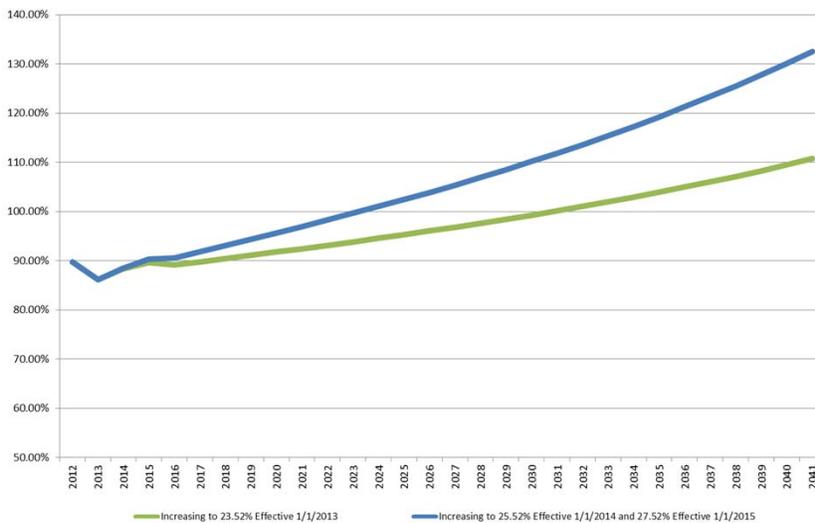
Target Funded Ratios – Main System

Target Funded Ratio	Rate of Return Required for All Years Beginning on and after 2013/2014 To Achieve Target						
	Assumed 2012/2013 Return						
	24%	16%	8%	0%	-8%	-16%	-24%
70%	7.7%	8.1%	8.7%	9.2%	9.8%	10.5%	11.3%
80%	8.3%	8.8%	9.3%	9.9%	10.5%	11.2%	12.0%
90%	9.0%	9.4%	9.9%	10.5%	11.1%	11.8%	12.6%
100%	9.5%	10.0%	10.5%	11.1%	11.7%	12.4%	13.1%

Projected Funded Ratios (AVA Basis) – Judges



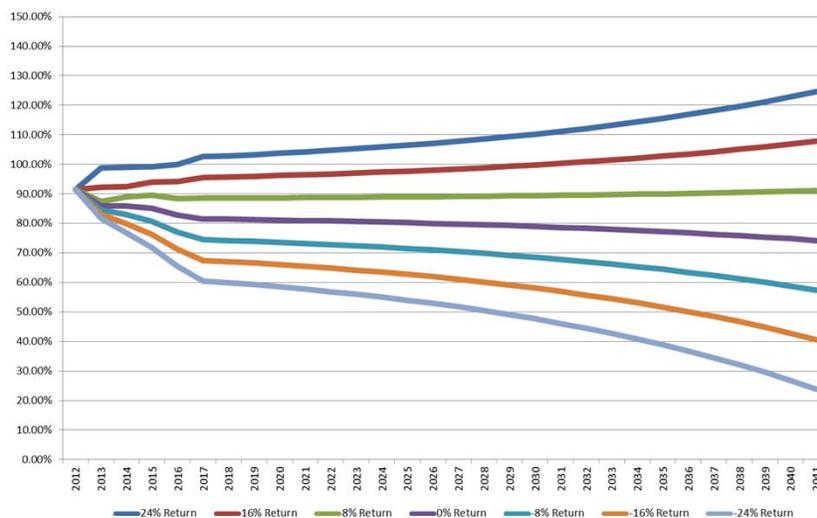
Projected Funded Ratios Under Recovery Bill (AVA Basis) – Judges



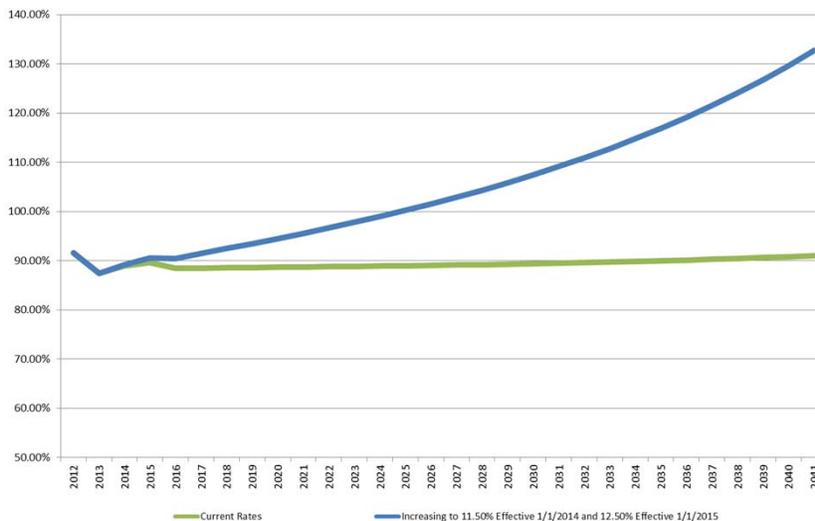
Target Funded Ratios – Judges

Target Funded Ratio	Rate of Return Required for All Years Beginning on and after 2013/2014 To Achieve Target						
	Assumed 2012/2013 Return						
	24%	16%	8%	0%	-8%	-16%	-24%
70%	5.2%	5.7%	6.2%	6.7%	7.3%	8.0%	8.7%
80%	5.9%	6.3%	6.8%	7.4%	8.0%	8.6%	9.3%
90%	6.5%	6.9%	7.4%	8.0%	8.6%	9.2%	9.9%
100%	7.0%	7.5%	8.0%	8.5%	9.1%	9.7%	10.4%

Projected Funded Ratios (AVA Basis) – National Guard



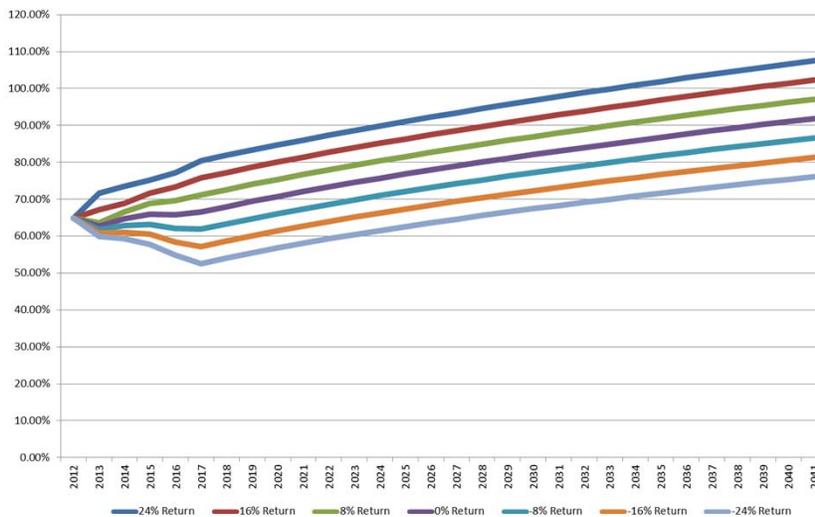
Projected Funded Ratios Under Recovery Bill (AVA Basis) – National Guard



Target Funded Ratios – National Guard

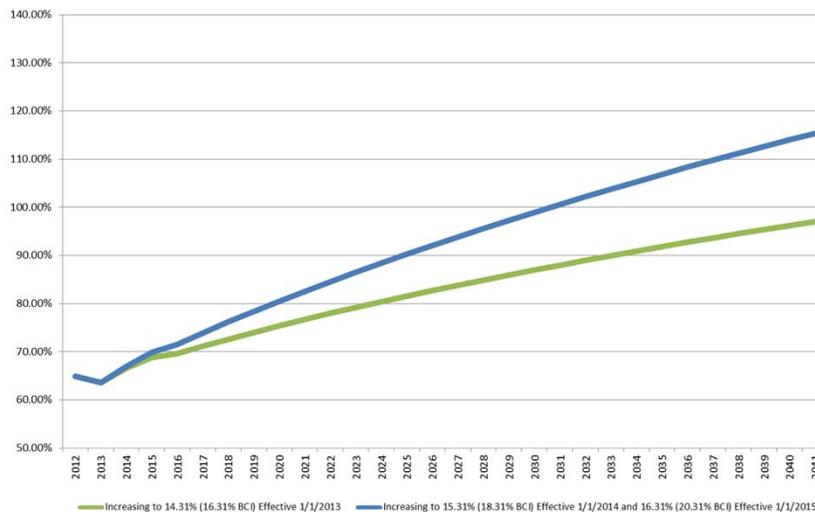
Target Funded Ratio	Rate of Return Required for All Years Beginning on and after 2013/2014 To Achieve Target						
	Assumed 2012/2013 Return						
	24%	16%	8%	0%	-8%	-16%	-24%
70%	5.9%	6.4%	6.9%	7.5%	8.2%	8.9%	9.7%
80%	6.5%	7.0%	7.5%	8.1%	8.8%	9.5%	10.2%
90%	7.0%	7.5%	8.0%	8.6%	9.3%	9.9%	10.7%
100%	7.5%	8.0%	8.5%	9.1%	9.7%	10.4%	11.1%

Projected Funded Ratios (AVA Basis) – Law Enforcement with Prior Main System Service



★ SEGAL 70

Projected Funded Ratios Under Recovery Bill (AVA Basis) – Law Enforcement with Prior Main System Service

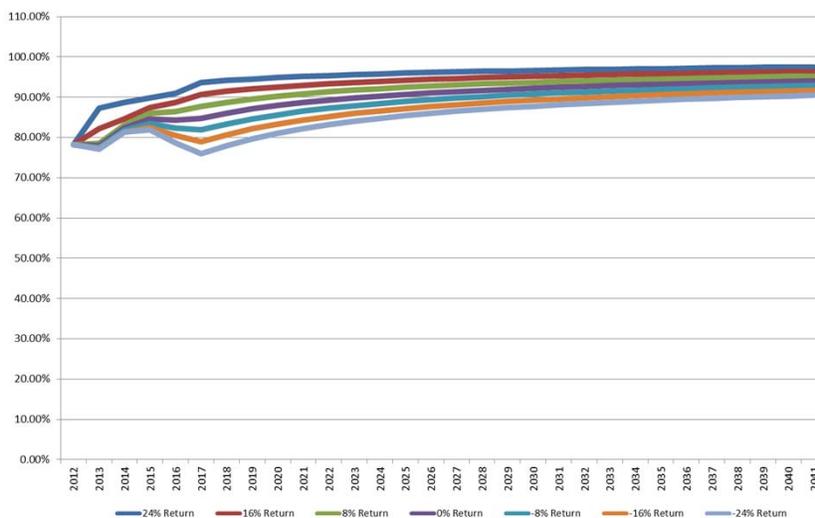


★ SEGAL 71

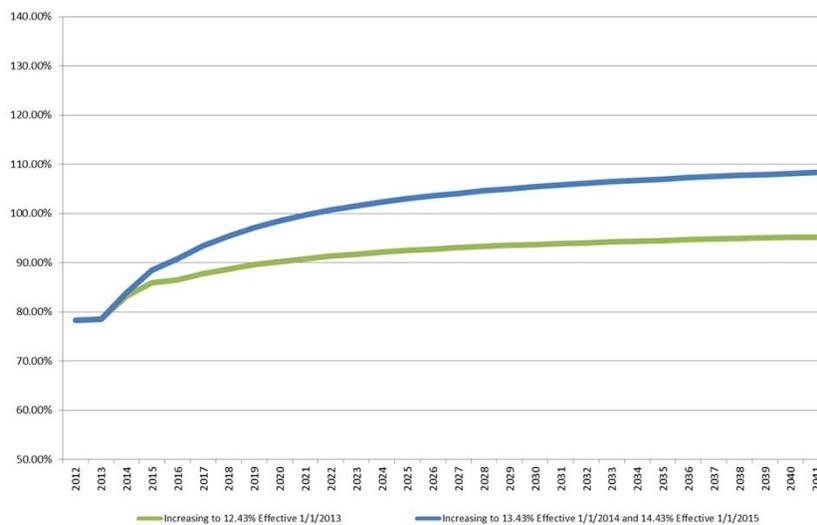
Target Funded Ratios – Law Enforcement with Prior Main System Service

Target Funded Ratio	Rate of Return Required for All Years Beginning on and after 2013/2014 To Achieve Target						
	Assumed 2012/2013 Return						
	24%	16%	8%	0%	-8%	-16%	-24%
70%	5.6%	6.0%	6.3%	6.7%	7.1%	7.6%	8.1%
80%	6.5%	6.9%	7.3%	7.7%	8.1%	8.6%	9.1%
90%	7.4%	7.7%	8.1%	8.5%	8.9%	9.4%	9.8%
100%	8.1%	8.4%	8.8%	9.2%	9.6%	10.1%	10.5%

Projected Funded Ratios (AVA Basis) – Law Enforcement without Prior Main System Service



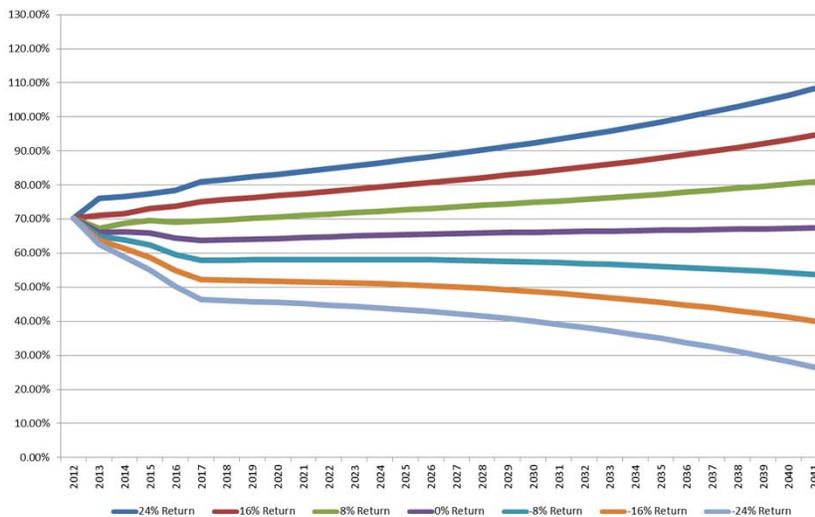
Projected Funded Ratios Under Recovery Bill (AVA Basis) – Law Enforcement without Prior Main System Service



Target Funded Ratios – Law Enforcement without Prior Main System Service

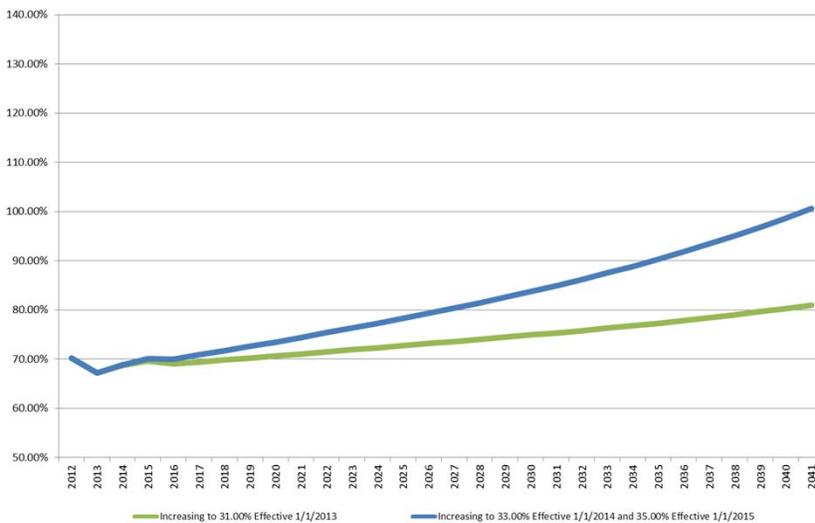
Target Funded Ratio	Rate of Return Required for All Years Beginning on and after 2013/2014 To Achieve Target						
	Assumed 2012/2013 Return						
	24%	16%	8%	0%	-8%	-16%	-24%
70%	4.6%	4.7%	4.8%	5.0%	5.1%	5.3%	5.4%
80%	6.0%	6.2%	6.3%	6.5%	6.6%	6.8%	6.9%
90%	7.3%	7.4%	7.6%	7.7%	7.9%	8.0%	8.2%
100%	8.3%	8.5%	8.6%	8.8%	9.0%	9.1%	9.3%

Projected Funded Ratios (AVA Basis) - Highway Patrol



★ SEGAL 76

Projected Funded Ratios Under Recovery Bill (AVA Basis) - Highway Patrol

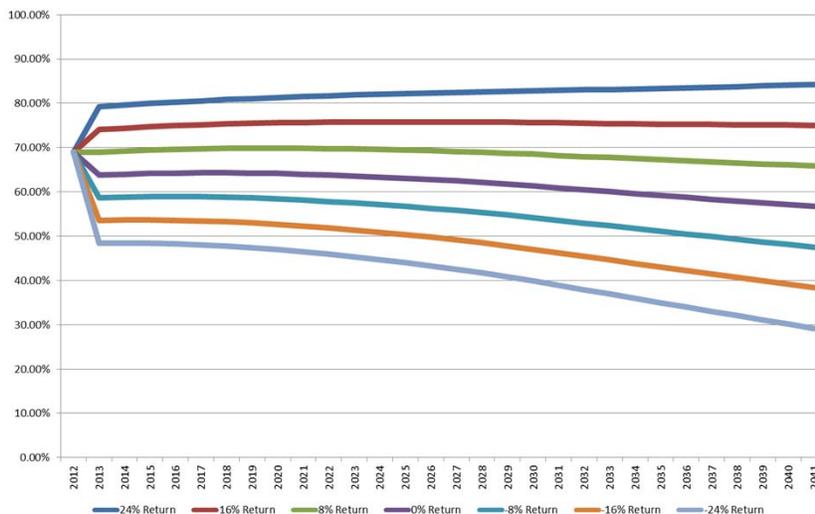


★ SEGAL 77

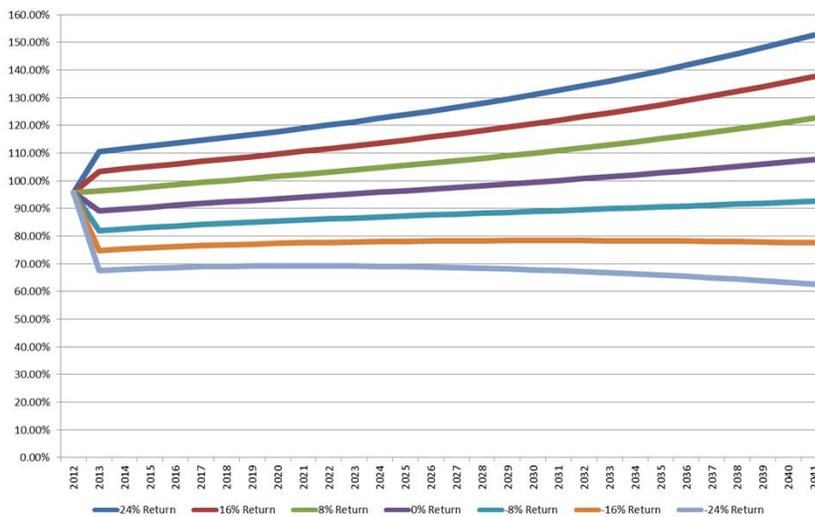
Target Funded Ratios - Highway Patrol

Target Funded Ratio	Rate of Return Required for All Years Beginning on and after 2013/2014 To Achieve Target						
	Assumed 2012/2013 Return						
	24%	16%	8%	0%	-8%	-16%	-24%
70%	6.6%	7.1%	7.6%	8.3%	8.9%	9.7%	10.4%
80%	7.2%	7.7%	8.3%	8.9%	9.5%	10.2%	11.0%
90%	7.8%	8.3%	8.8%	9.4%	10.1%	10.7%	11.5%
100%	8.3%	8.8%	9.3%	9.9%	10.5%	11.2%	12.0%

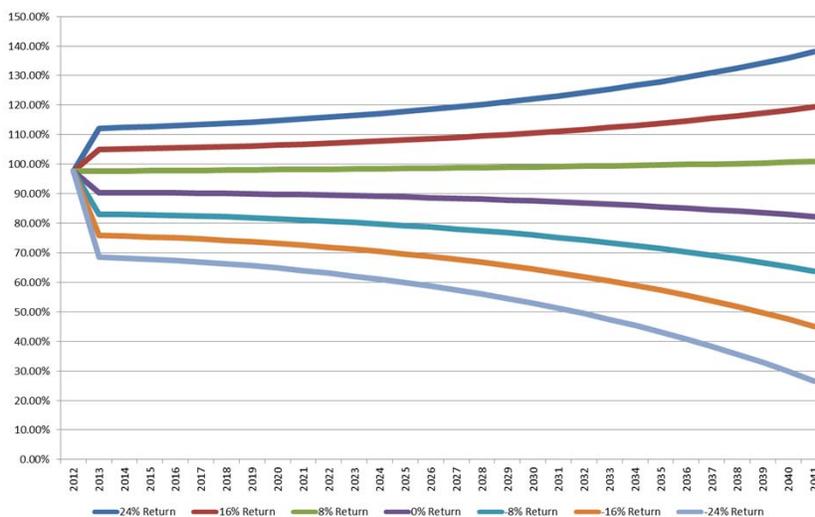
Projected Funded Ratios (MVA Basis) – Main System

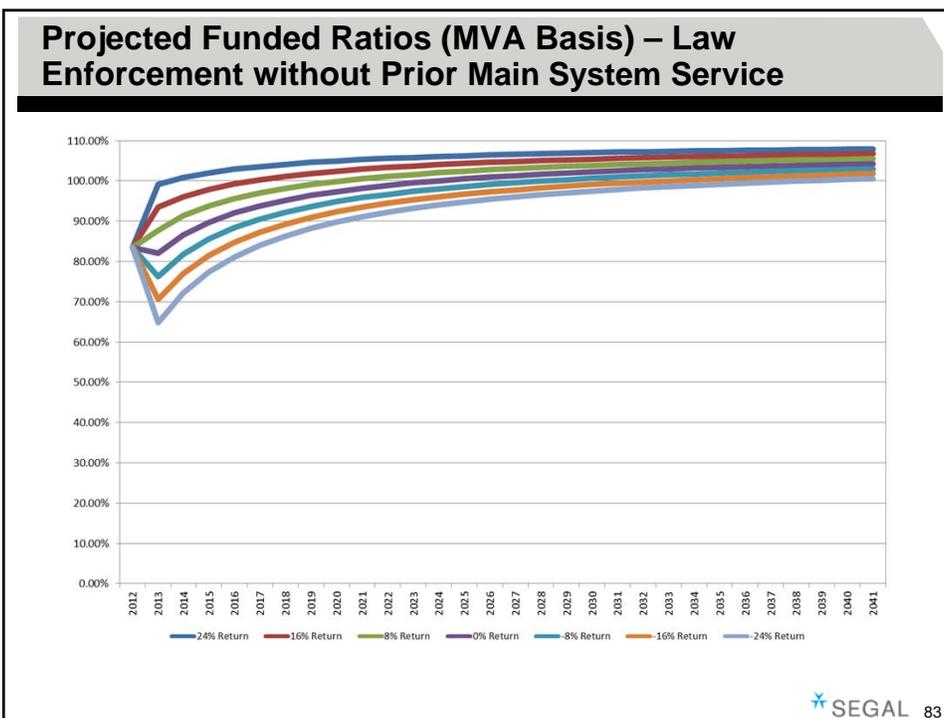
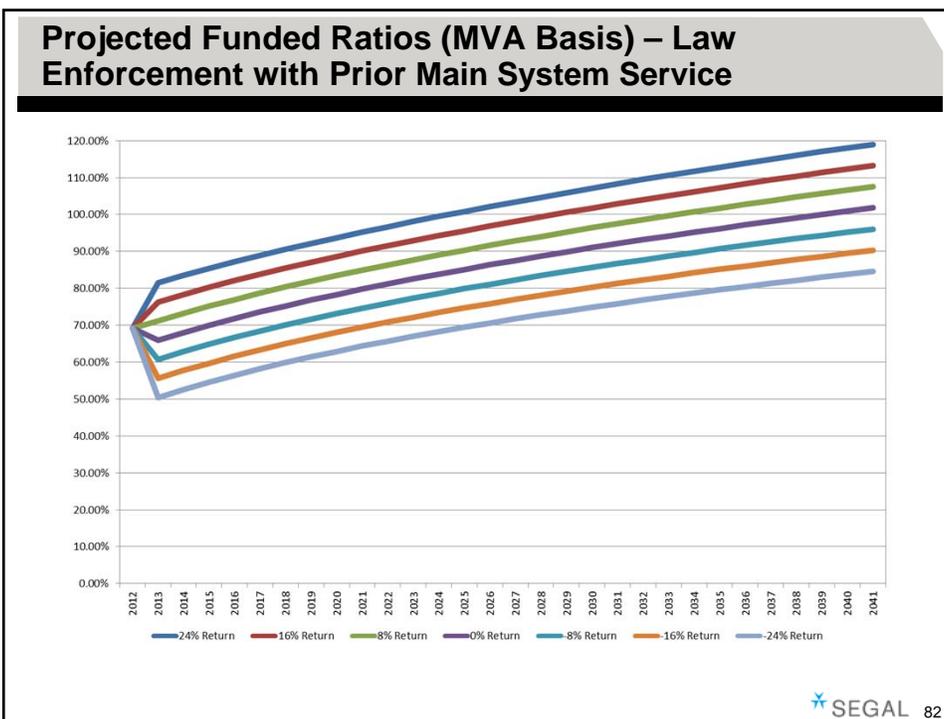


Projected Funded Ratios (MVA Basis) – Judges

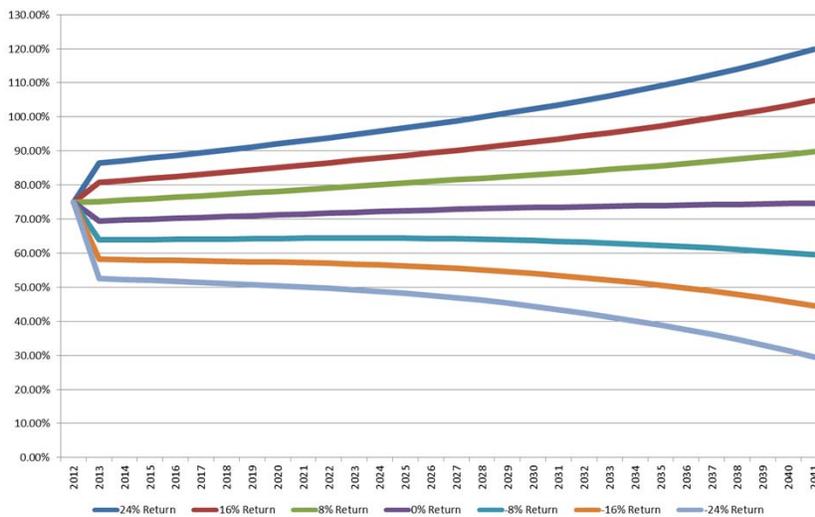


Projected Funded Ratios (MVA Basis) – National Guard





Projected Funded Ratios (MVA Basis) - Highway Patrol



★ SEGAL 84

Questions?

★ SEGAL

5670 Greenwood Plaza Blvd, Suite 425
Greenwood Village, CO 80111
T 303.714.9952

Brad Ramirez
bramirez@segalco.com

★ SEGAL

330 North Brand Blvd, Suite 1100
Glendale, CA 91203
T 818.956.6700

Tammy Dixon
tdixon@segalco.com



www.segalco.com

★ SEGAL 85