Independent Study of Actuarial Costs to Close NDPERS

August 14, 2014

Arthur J. Gallagher & Co.

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- Segal July 1, 2013 Actuarial Valuation report (pages 27&28)

This report is intended for use by the North Dakota Legislative Management Government Finance Committee. The purpose of the report is to summarize results of an independent review by Gallagher Benefit Services, Inc., a division of Arthur J. Gallagher & Co. (Gallagher) of information originally prepared by The Segal Company for the NDPERS relative to the costs if NDPERS is closed to new employees.

Participant data for this review was provided by both NDPERS and The Segal Company and the results included herein are dependent on the accuracy of that data. Results were based on an attempted match of the July 1, 2013 actuarial valuation report, the Plan provisions in effect at that time, and except as noted, the assumptions used for that valuation.

Gallagher expresses no opinion on the proposed plan design changes other than providing a range of reasonable cost forecasts as noted in this report. The actuaries preparing this report are members of the American Academy of Actuaries and meet the Qualification Standards to provide the actuarial opinions contained in this report.

Executive Summary

August 14, 2014

Representative Jeff Delzer & Legislative Management Government Finance Committee Members
State Capitol
Bismarck, ND

Chairman Delzer & Committee Members:

Gallagher Benefit Services, Inc., a division of Arthur J. Gallagher & Co. (Gallagher) is pleased to provide an independent study of the actuarial costs of the North Dakota Public Employees Retirement System (NDPERS) Main System if it is closed to new state employees.

This report will discuss several findings related to the cost estimates provided by The Segal Company (Segal) to NDPERS. The findings are mainly related to adjustments made by Segal that result in inconsistencies between their valuation results and their closed plan study results. The adjustments are concerning for several reasons: (1) the adjustments were not disclosed to NDPERS, (2) the adjustments were made to valuation outputs that had been carefully calculated based on reasonable Board approved assumptions, (3) the adjustments do not appear to be based on the results of an actuarial software calculation system, but rather reflect an arbitrary adjustment methodology, and (4) the magnitude of the adjustment ($264M) is significant.

The adjustments made by Segal significantly impacted the cost estimates provided by Segal to NDPERS for the estimated one-time contribution needed to fully fund the Plan if closed for either State or both State and Political Subdivision employees. This report will provide detail to support and to summarize the above findings. The report will also provide additional information that will be helpful to understand the impact of other assumptions on the cost estimates.

Background

This report is in response to a request by the Legislative Management Council for an independent study of the actuarial costs of the North Dakota state employee main defined plan if it is closed to new state employees. Also, in accordance with the Personal Service Contract, an independent valuation using raw census data was to be performed. The report also addresses requests by the Council to review and comment on Plan assumptions. Requests were also made to demonstrate how defined contribution benefit amounts would differ from the defined benefits provided by this Plan. That information is provided separately as it does not specifically fall under the scope of the audit. This report attempts to meet the scope of requested services as well as provide the Committee with other information that we believe is important to fully understand the potential cost impact of closing the Plan.

Our work includes a review of the Participant data, the Plan's assumptions, and the Plan's provisions. We have also reviewed the July 1, 2013 Actuarial Valuation report, the March 6, 2014 Study, and Segal's 2010 Actuarial Experience Study for the period from July 1, 2004 through June 30, 2009. Collectively we believe that all of the information provided to us for our review allows us to perform a complete analysis of Segal's plan closure cost estimates.

We presented preliminary findings to the Committee on July 1st and August 5th. Due to the preliminary nature of those reports, some adjustments to our results have been made and final results are reflected in this report. These changes are primarily related to the sensitivity analysis results. We also present results in a different order within this report to help clarify the information and make findings clearer to understand.

Key Findings

Our key findings all relate to the March 6, 2014 Study. A review of the Participant data, actuarial assumptions, and July 1, 2013 actuarial valuation did not result in any significant findings related to those items. Relatively less significant comments resulting from our review for those components of the audit are noted in Sections One and Two of this report. The more significant findings related to the March 6, 2014 Study are summarized below:

	Gallagher Finding	Gallagher Comments
Issue #1 Disclosure	• Segal's March 6, 2014 Study results are not consistent with their July 1, 2013 Actuarial Valuation results. • Segal made adjustments to the July 1, 2013 valuation outputs to reduce projected benefit payments from years 2014 through 2028 without disclosing in their report the reason for the change or the magnitude of the cost impact. • The adjustments reduced estimated plan costs by $264M.	• Segal's March 6, 2014 study states that "cost estimates are based on the July 1, 2013 actuarial valuation results." • Actuarial Standards of Practice (ASOP) No. 41 states that an actuarial report should "identify the methods, procedures, assumptions, and data used by the actuary with sufficient clarity that another actuary qualified in the same practice area could make an objective appraisal of the reasonableness of the actuary's work as presented in the actuarial report."
Issue #2 Methodology	• The reason provided for the adjustment, fewer observed retirements than expected, was identified in the July 1, 2013 Actuarial Valuation as ***increasing*** costs. This contradicts the reductions in the Study. • Segal said no other adjustments were made, implying no offsetting increases for increased benefits at later retirements or higher contributions due to later retirements.	• Segal explained the reduction in projected benefit payments was due to "The current valuation assumptions (as approved by the Board of Trustees) appear to have higher rates of assumed retirement than are currently being observed." • Gallagher results (see July 1 presentation) have shown that adjustments due to retirement assumptions do not significantly impact present values. A $264M present value adjustment due to retirement differences seems disproportionately large.
Issue #3 Omission	• Segal excluded from the Study the impact of Participants entering after 7/1/2013 and before the assumed closure date of 1/1/16.	• The inclusion of Participants during this period adds significant benefit payments to the Plan. However, additional assumed Member and Employer contributions are nearly offsetting.

The above findings were all a result of noting inconsistencies between Segal's July 1, 2013 Actuarial Valuation results, which were matched closely by Gallagher, and Segal's March 6, 2014 Study results. Generally speaking, our opinion is that Segal's Actuarial Valuation results are reasonable based on the Participant data, plan provisions, and assumptions provided. Our concerns entirely relate to the adjustments made in the March 6, 2014 Study.

The adjustments made for purposes of the Study have a significant impact on the results communicated as either the date of insolvency if the Plan is closed or the cost to fully fund the Plan if it is closed. The cost impact can be summarized as follows:

	Segal March 6, 2014 Letter Results Based on Adjusted Benefit Payments	Gallagher's Estimate Based on Unadjusted Benefit Payments	Difference
Projected Values if Plan is Closed for State Employees Only			
Years to insolvency	35 Years	30 Years	5 Years
One-time contribution to fully fund	$163M	$301M	$138M
Projected Values if Plan is Closed for State and Political Subdivision Employees			
Years to insolvency	42 Years	32 Years	10 Years
One-time contribution to fully fund	$99M	$445M	$346M

We believe it is very important to note that the differences stated above are almost entirely due to adjustments Segal made to their July 1, 2013 Actuarial Valuation outputs. Very little is due to differences between Segal's July 1, 2013 Actuarial Valuation and Gallagher's replication of those results. The differences are not due to the difference of opinion between two actuaries, rather the difference is primarily due to two different methodologies employed by Segal. Further detail of these results is provided in Section Three of this report.

Understanding that even the best developed assumptions will not be met, our report includes a sensitivity analysis that demonstrates the potential cost impact under different sets of economic and demographic assumptions. This information was not part of the audit of Segal's results, but rather is information we believe is valuable when considering the potential cost of these closed Plan scenarios. The sensitivity analysis is provided in Section Five of this report.

Report Contents

This report consists of the following components:

- A ***Participant Data Review*** to verify that the Participant data provided by NDPERS to The Segal Company (Segal), the Plan's actuary, was consistent with the Participant data that was used by Segal for purposes of their July 1, 2013 Actuarial Valuation and their March 6, 2014 letter to NDPERS summarizing the cost of closing the Plan to future State and Political Subdivision employees (the March 6, 2014 Study).

- A ***July 1, 2013 Actuarial Valuation Audit*** to verify the accuracy of the July 1, 2013 Actuarial Valuation.
- A ***Closed Plan Cost Study Audit*** to verify the accuracy of Segal's March 6, 2014 Study results that provided estimates of projected dates of insolvency and required contributions to fully fund the Plan if the Plan is closed to future State employees only or State and Political Subdivision employees.
- An ***Actuarial Assumption Review*** to provide a thorough analysis of the economic and demographic assumptions and the actuarial cost methods used to determine the results presented by the Plan's actuary.
- A ***Sensitivity Analysis*** to demonstrate the potential range of costs and insolvency dates if the Plan's current assumptions are not precisely met.
- A ***Summary of Conclusions*** to state the significant findings of the previous five sections.

Conclusion

The role of an actuary is to use the best information available from past experience to estimate future outcomes. In our opinion, Segal performed that role well when recommending assumptions and performing the July 1, 2013 Actuarial Valuation. Our concern lies entirely with their variance from the valuation results when performing the March 6, 2014 Study. In particular, Segal adjusted outputs, rather than relying on results based on well thought through assumptions.

While lack of disclosure of the changes is concerning, the larger concern is the magnitude of the change and that the adjustments do not appear to be consistent with the reasoning provided. If Segal believes an adjustment to the assumptions was prudent, a better approach would have been to adjust the assumption and then rely on the outputs from their valuation process. The absence of that approach creates the appearance that the adjustment was arbitrary as well as being inconsistent with some findings within the Actuarial Valuation report. Based on our experience and calculations, fewer retirements than observed would not create such a significant liability reduction.

For those reasons, it is our opinion that Segal's estimates of the contributions to fully fund the closed plan scenarios are significantly understated. At a minimum, we believe they are inconsistent with the outputs generated from the Board approved assumptions. Alternatively, if the adjustments made for the Study are considered to be reasonable, the implication would be that the Actuarial Valuation results are significantly overstating the actual cost of the Plan.

Gallagher appreciates the opportunity to provide services to the Committee. If you have any questions regarding our report, or if you would like additional information, please contact us.

Sincerely,

Douglas A. Anderson, M.A.A.A., E.A., A.S.A.
Senior Vice President, Actuarial & Retirement Services
Arthur J. Gallagher & Co.

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Section One – Participant Data Review

Gallagher received two Participant data files. One file was a duplicate of the data provided by NDPERS to Segal for purposes of performing the July 1, 2013 Actuarial Valuation. The other file was provided by Segal and represented their adjusted Participant data file as used for the July 1, 2013 Actuarial Valuation. The file provided by Segal was used for the validation audit described in Section Two without any adjustments. This is to ensure that the valuation audit result differences are not due to Participant data differences.

The two files were compared with the intention of determining whether any significant data issues resulted from the transmission from NDPERS to Segal. The data was also reviewed for general reasonableness. Specifically this means checking each data field for potential data outliers (excessive salaries, service, dates of birth, dates of hire, etc.).

Gallagher found that the two files matched and had reasonable field values for over 99% of the records. The remaining less than 1% had issues as noted here:

Issue	Count	Comments
Missing Records	63	Based on EEID, 60 records (mostly retirees) from NDPERS don't appear in Segal's file; 3 records from Segal don't appear in NDPERS file.
Spouse DOB	1	NDPERS reported year as 2080; Segal appeared to correct to 1980
Benefit Amount	6	Benefit amount differs for 6 retirees; differences range from 5.6% high to 15.3% high.
Deferred Benefit Amount	138	NDPERS reports benefit amount for vested terminated participants as $0; Segal shows benefit as >$0.
Employee Contributions	38	NDPERS reports employee account balance as $0; Segal shows balance as >$0. 36 of 38 are new hires; 2 are retirees.
Benefit Service	37	NDPERS reports benefit service as 0; Segal shows service as >0. 36 of 37 are new hires; 1 is terminated vested.

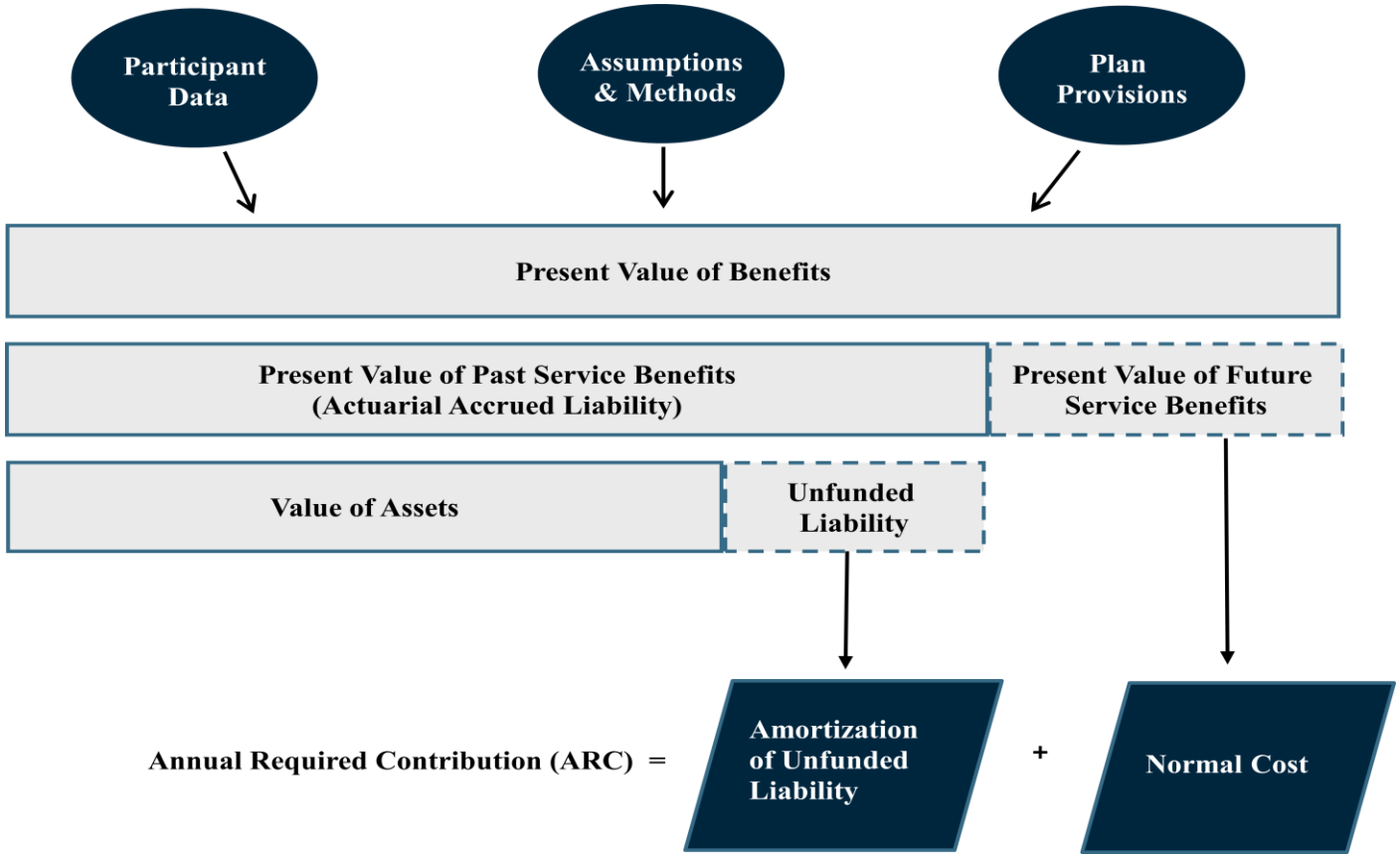
Although the above data questions were raised, the significance of these items is not of concern. It is common during the data review process for the actuary to review and question data. The adjustments noted above by Segal may either have been a result of clarifying questions to NDPERS or reasonable adjustments to conservatively estimate missing data fields. The adjustments made by Segal generally appear reasonable.

In our opinion, the impact of any inaccurate changes by Segal would not significantly impact the calculations within the July 1, 2013 Actuarial Valuation or the March 6, 2014 Study. The goal was to ensure no significant systemic errors occurred during data transition. None were observed; as a result, we did not request further clarification from NDPERS or Segal.

Section Two – July 1, 2013 Actuarial Valuation Audit

An actuarial valuation audit is an attempt to duplicate results obtained by the Plan's actuary using the same Participant data, assumptions, and plan provisions. If a reasonable match is obtained, it provides evidence that the actuary is correctly interpreting provisions, applying assumptions, and performing calculations. Since the March 6, 2014 Study was based on the July 1, 2013 actuarial valuation (except as noted by our audit findings), the performance of an actuarial audit is a very important step to complete prior to reviewing the March 6, 2014 Study results.

The actuarial validation audit attempts to replicate the calculation of all future benefit payments, the discounting of those benefit payments to determine a Present Value of Benefits, the allocation of those present values to past and future service, and finally the determination of the Annual Required Contribution (ARC). The valuation process is demonstrated below:



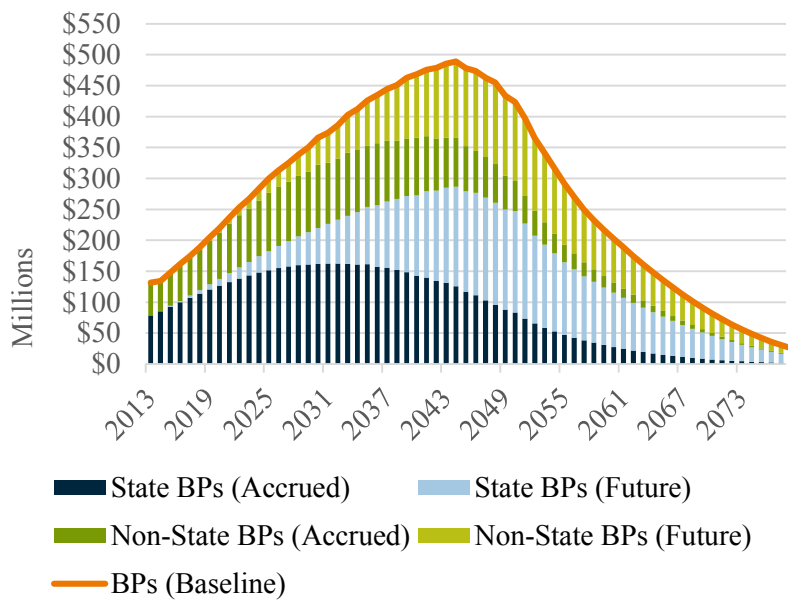
The first step of the actuarial valuation audit is to develop the projected expected benefit payments for each participant over the course of their entire possible lifetime. Since mortality tables extend to age 120, there is a chance, although small, of payments being made all the way up to that age for each Participant. The first figure below shows Gallagher's estimates of future benefit payments for both State and Non-State (Political Subdivision) employees. It also breaks those expected payments into those that have been earned to date and those that are expected to be earned prospectively. The expected benefit payments are anticipated to rise rapidly as a large number of employees reach retirement in the near future.

After benefit payments are projected for all current employees, each payment is discounted back to the valuation date at the same rate of interest that assets are assumed to earn. The Plan currently uses an 8% investment return assumption, net of expenses. As a result, all projected benefit payments are discounted to the valuation date at the rate of 8% per year. If the investment return assumption is lowered, the effect of discounting is less and the cost of the Plan will be higher.

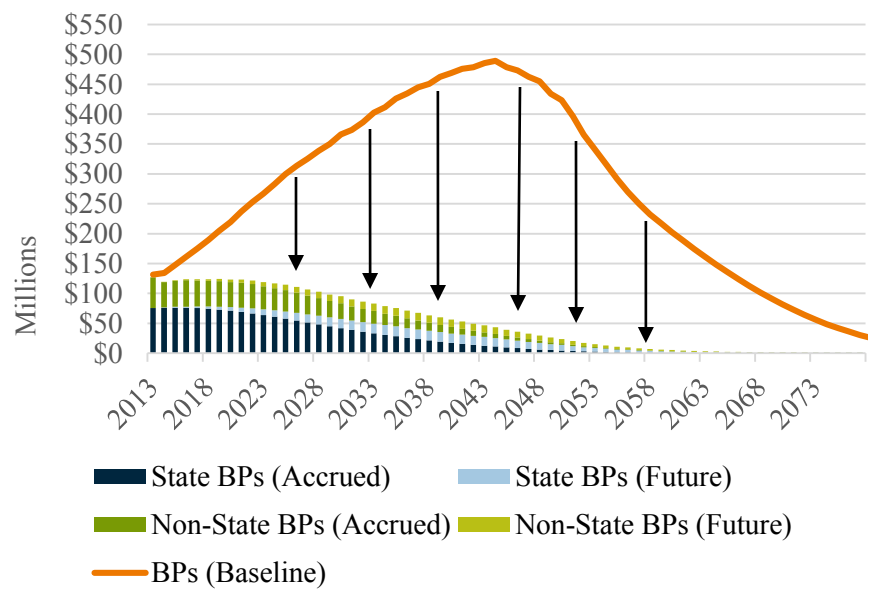
The Present Value of Benefits (PVB) provided by Segal was $3.4B. Gallagher's results also rounded to $3.4B. The actual difference was only $15M, which is a difference of less than 1%.

While the Present Value of Benefits may be closely matched, there is the possibility that projected benefit amounts may follow different patterns. These differences are a factor in the audit findings and will be explained in detail in Section Three.

Projected Benefit Payments



Discounted Benefit Payments



The following is a summary of the differences between Segal's July 1, 2013 Actuarial Valuation and the results calculated by Gallagher:

	Segal July 1, 2013 Actuarial Valuation	Gallagher Results	Difference	Comments
Present Value of Benefits (PVB)				
Active Members:				The Actuarial Valuation Audit indicates that the Present Value of Benefits and the Actuarial Accrued Liability estimates by Gallagher are reasonably close to estimates by the Plan's actuary. Differences less than 5% are generally considered to be a reasonable match. Gallagher's PVB estimate is less than 1% different than the amount determined by the Plan's actuary.
▪ ***Retirement***	***$ 1,976,691,333***	***$ 1,975,840,698***	***0.0%***	
▪ ***Disability***	***51,346,152***	***49,765,185***	***(3.1%)***	
▪ ***Withdrawal***	***198,418,550***	***184,731,918***	***(6.9%)***	
▪ ***Death***	***59,213,630***	***58,586,035***	***(1.1%)***	
Actives Total:	***$ 2,285,669,665***	***$ 2,268,923,836***	***(0.7%)***	
Retired Members and Beneficiaries*	***943,671,725***	***940,013,710***	***(0.4%)***	
Inactive Non-retired Members	***154,900,691***	***159,939,147***	***3.3%***	
Total PVB	***$ 3,384,242,081***	***$ 3,368,876,693***	***(0.5%)***	
Development of Unfunded Actuarial Accrued Liability				
Actuarial Accrued Liability:				
▪ ***Active Members***	***$ 1,551,952,602***	***$ 1,617,869,073***	***4.2%***	
▪ ***Retired Members and Beneficiaries****	***943,671,725***	***940,013,710***	***(0.4%)***	
▪ ***Inactive Non-retired Members***	***154,900,691***	***159,939,147***	***3.3%***	
▪ ***Total AAL***	***$ 2,650,525,018***	***$ 2,717,821,930***	***2.5%***	
Actuarial Value of Assets	***1,632,915,720***	***1,632,915,720***	***0.0%***	
Unfunded Actuarial Accrued Liability	***$ 1,017,609,298***	***$ 1,084,906,210***	***6.6%***	

**Includes Special Prior Service Pensions*

	Segal July 1, 2013 Actuarial Valuation	Gallagher Results	Difference	Comments
Development of Annual Required Contribution (ARC)				
Normal Cost	***$ 89,254,673***	***$ 88,160,907***	***(1.2%)***	Normal Cost differences are also very small with a result matching within 1.2%.
Member Contributions (6.5%)	***(56,281,437)***	***(56,360,431)***	***0.1%***	
Net Employer Normal Cost	***$ 32,973,236***	***$ 31,800,476***	***(3.6%)***	Larger percentage differences appear in the UAAL and ARC due to the leveraging effect of taking differences to calculate these values. The amortization period is very sensitive to small results, particularly when the amortization period is high, or measured as infinite as in this case.
Administrative Expense	***1,100,000***	***1,100,000***	***0.0%***	
Amortization of UAAL	***71,019,268***	***75,715,897***	***6.6%***	
Annual Required Contribution	***$ 105,092,504***	***$ 108,616,373***	***3.4%***	
Total Payroll	***$ 865,868,265***	***$ 867,083,551***	***0.1%***	
Total ARC Percentage	***12.14%***	***12.53%***	***3.2%***	The success of the audit of the March 6, 2014 Study is dependent on the ability to accurately capture all future benefit payments. We believe the 0.5% difference in the Present Value of Benefits is an indication that Gallagher's valuation results are reasonably aligned with Segal's results.
Development of Amortization Period				
Annual Required Contribution	***12.14%***	***12.53%***	***3.2%***	
Member Contribution Increase	***(0.50%)***	***(0.50%)***	***0.0%***	
Total Scheduled Contribution	***(7.12%)***	***(7.12%)***	***0.0%***	
Contribution (Surplus)/Deficit	***4.52%***	***4.91%***	***8.6%***	In our opinion, the closeness of the actuarial valuation audit allows us to thoroughly assess the March 6, 2014 results.
Amortization Period	***Infinite***	***Infinite***		

Section Three – Closed Plan Cost Study Audit

Upon completing the July 1, 2013 Actuarial Valuation Audit, Gallagher was able to use the obtained projected benefit payments to independently project future dates of insolvency and required contribution amounts to fully fund the closed plan options as were developed by Segal in their March 6, 2014 Study. Upon completing these calculations, the difference in results was very surprising for the closed plan scenarios given how close the July 1, 2013 Actuarial Valuation was matched. This led to a more thorough inspection of projected benefit payments as provided by Segal in their March 6, 2014 Study. A review of Segal's projected benefit payments from their study showed that after discounting the projected benefits back to July 1, 2013, the present value of the Study benefit payment stream ($3,120M) was significantly less than the Present Value of Benefits as provided by Segal to Gallagher for match purposes ($3,384M).

The work to demonstrate this difference is included as an Attachment to this report. Segal was requested to respond to our inquiry about the $264M difference and provided the following response on July 16th: *"With respect to item 5, for the purposes of the closed group projection, we adjusted the benefit payments projected in the valuation to be closer to the actual benefit payments from the Main system. For example, in 2013, the unadjusted projected benefit payment amount was $179 million and the actual benefit payments from the Main system were $106 million."*

Seeking further clarification, Gallagher posed additional questions to Segal on July 23rd, and received the following responses on July 29th. The following are Gallagher's questions and Segal's answers, presented in their entirety:

Q. You note an adjustment for FYE 2014 benefit payments from an unadjusted amount of $179M to an amount more in alignment with $106M actual payments in FYE 2013. What is the reason for the overstatement of the FYE 2014 unadjusted amount?
A. The current valuation assumptions (as approved by the Board of Trustees) appear to have higher rates of assumed retirement than are currently being observed.

Q. How many other years were adjusted in a similar manner?
A. The adjustment was made for years prior to 2028.

Q. Were any adjustments made to benefit payments from the years 2030 to 2055. As shown on the attachment, these years show the largest differences between a BP stream discounting to $3,369 (Gallagher result) and $3,120M.
A. No adjustments were made in the years 2030 to 2055.

Q. What was the methodology for adjusting the benefit payments?
A. The benefit payments used in the projection were actual benefit payments as of June 30, 2013, increased by 8% per year for ten years, then 6% for five years, then the payment stream from the valuation system was used.

Q. Were adjustments made in a similar manner for State and Political Subdivision participants?
A. The adjustment was made for all PERS Main System benefit payments.

Q. Do all of these adjustments account for the $264M difference that I have calculated in the attached spreadsheet?
A. Our analysis indicates that the difference is mostly due to the adjustments in benefit payments and the difference in timing of payments between our valuation systems.

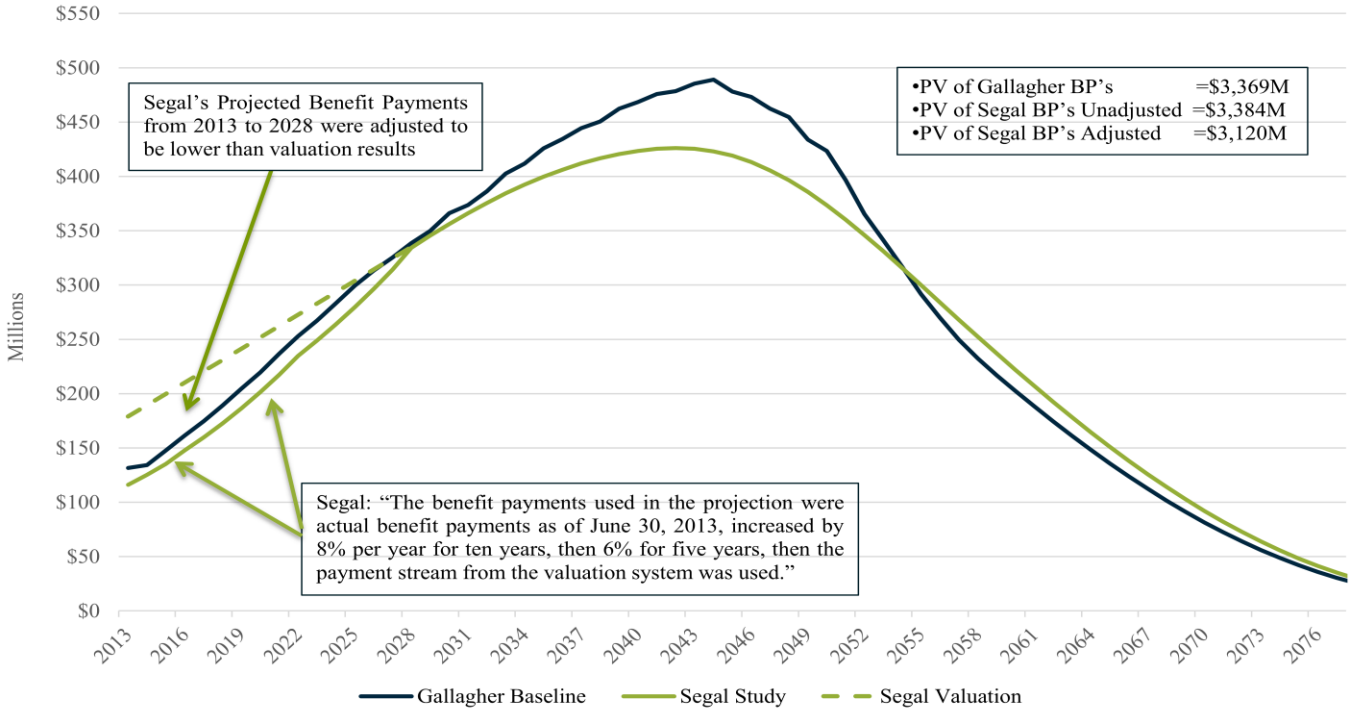
Q. Were any other adjustments made?
A. No.

Q. Should the adjustments made for the study also have been made for the July 1, 2013 actuarial valuation? Will they be considered for the 2014 actuarial valuation?
A. The July 1, 2013 actuarial valuation was based on the assumptions approved by the board, based on the most recent experience study. We will continue to monitor gains and losses in this area and will recommend changes, if necessary.

Q. Were the adjustments communicated either in writing or verbally to NDPERS?
A. The details of the adjustments were not communicated.

Q. Did the projections in the March 6th Study include benefit payments for employees that were expected to be hired after July 1, 2013 and before the assumed January 1, 2016 plan closure dates (for scenarios that assume plan closure)?
A. We did not include these employees in the plan closure projection.

The following graph summarizes how the adjustments made by Segal affect expected benefit payments and the Present Value of Benefits.



The adjustments made to the outputs by Segal were concerning for several reasons: (1) the adjustments were not disclosed to NDPERS, (2) the adjustments were made to valuation outputs that had been carefully calculated based on reasonable Board approved assumptions, (3) the adjustments do not appear to be based on the results of an actuarial software calculation system, but rather reflect on arbitrary adjustment methodology, and (4) the magnitude of the adjustment ($264M) is significant. In addition to these adjustments, as noted in their final answer on July 29th, Segal did not include the impact of Participants entering after July 1, 2013 and before the assumed January 1, 2016 plan closure date.

The most significant of these concerns is the methodology and magnitude of the adjustment. When retirement assumptions are not met, it often does not have a significant impact on present value results. It may change the timing of benefit payments, but the present value often does not change. This is a result of the trade-off of either paying less for longer, or more for a shorter period. When Gallagher was evaluating the impact of retirement assumption changes, we noted a common result which is that retirement assumption changes do not have a very significant impact on present values. This leads us to question the magnitude of benefit reductions by Segal in that they appear to be one-sided.

The following is summary of the findings resulting from the Closed Plan Audit:

	Gallagher Finding	Gallagher Comments
Issue #1 Disclosure	• Segal's March 6, 2014 Study results are not consistent with their July 1, 2013 Actuarial Valuation results. • Segal made adjustments to the July 1, 2013 valuation outputs to reduce projected benefit payments from years 2014 through 2028 without disclosing in their report the reason for the change or the magnitude of the cost impact. • The adjustments reduced estimated plan costs by $264M.	• Segal's March 6, 2014 study states that "cost estimates are based on the July 1, 2013 actuarial valuation results." • Actuarial Standards of Practice (ASOP) No. 41 states that an actuarial report should "identify the methods, procedures, assumptions, and data used by the actuary with sufficient clarity that another actuary qualified in the same practice area could make an objective appraisal of the reasonableness of the actuary's work as presented in the actuarial report."
Issue #2 Methodology	• The reason provided for the adjustment, fewer observed retirements than expected, was identified in the July 1, 2013 Actuarial Valuation as ***increasing*** costs. This contradicts the reductions in the Study. • Segal said no other adjustments were made, implying no offsetting increases for increased benefits at later retirements or higher contributions due to later retirements.	• Segal explained the reduction in projected benefit payments was due to "The current valuation assumptions (as approved by the Board of Trustees) appear to have higher rates of assumed retirement than are currently being observed." • Gallagher results (see July 1 presentation) have shown that adjustments due to retirement assumptions do not significantly impact present values. A $264M present value adjustment due to retirement differences seems disproportionately large.
Issue #3 Omission	• Segal excluded from the Study the impact of Participants entering after 7/1/2013 and before the assumed closure date of 1/1/16.	• The inclusion of Participants during this period adds significant benefit payments to the Plan. However, additional assumed Member and Employer contributions are nearly offsetting.

In addition to the above findings we observed that Segal's cost to close and fully fund both groups (State Employees and Political Subdivision) was lower than the State employees only. We would expect, and our results showed, that the combined group, if closed, would require a higher one-time contribution to fully fund the Plan than if only the State employees group was closed and separated.

Finally, we observed some differences in the projections for the open group scenarios, both when the entire Plan is assumed to remain open and for just the Political Subdivision group. In general, our projections resulted in more favorable funding than Segal's results. This likely is due to different methodology as our results were based on total active headcounts remaining constant, whereas Segal assumed 4.5% total payroll growth.

The following quantifies the impact of the previously stated findings:

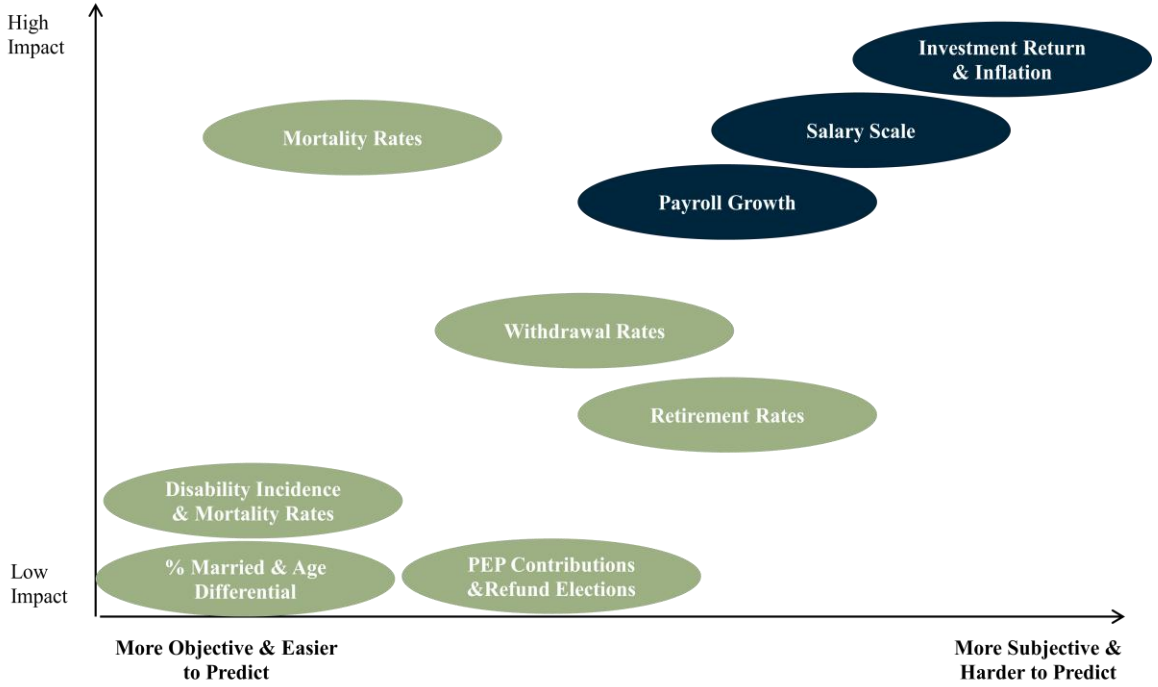
	Segal	Gallagher	Difference
Estimated Present Values as of July 1, 2013 for:			
July 1, 2013 Actuarial Valuation Result	$3,384M	$3,369M	($15M)
Segal Adjustments for Study	(264M)	0M	264M
All Participants as of 7/1/13	$3,120M	$3,369M	$249M
New Participants entering between 7/1/13 and 1/1/16	0M	112M	112M
All Participants entering before 1/1/16	$3,120M	$3,481M	$361M
Estimated Future Contributions for:			
New Participants entering between 7/1/13 and 1/1/16	$0M	$155M	$155M
Main System – Existing Plan No Change (entire group)			
Years to reach fully funded status	63 Years	38 Years	25 Years
One-time contribution to fully fund	$0M	$0M	$0M
Main System – Existing Plan No Change (Political Subdivision)			
Years to reach fully funded status	45 Years	26 Years	19 Years
One-time contribution to fully fund	$0M	$0M	$0M
Projected Values for Closed State Employee Only			
Years to insolvency	35 Years	30 Years	5 Years
One-time contribution to fully fund	$163M	$301M	$138M
Projected Values if Both Groups are Closed			
Years to insolvency	42 Years	32 Years	10 Years
One-time contribution to fully fund	$99M	$445M	$346M

Section Four – Actuarial Assumption Review

In the July 1, 2013 Actuarial Valuation Audit section of this report, the assumptions and methods used by the Plan's actuary to calculate liabilities were applied to determine the accuracy of the estimated liabilities. In this Actuarial Assumption Review section, the assumptions and methods are examined for reasonableness. In Section Five, the impact of changes to the assumptions and methods are explored. The key assumptions consist of ***economic assumptions*** regarding investment returns, salary increases, and inflation and ***demographic assumptions*** related primarily to individual participant expectations for turnover, disability, retirement, and death.

From time to time, assumption changes are warranted. The most effective way to study and update assumptions is to perform an experience study to evaluate actual plan experience versus expectations. Experience studies are common for public sector plans and are typically done in five-year intervals. The results of the most recent Experience Study prepared by Segal were provided to us. The study covered the period from July 1, 2004 through June 30, 2009. The Plan's actuary determines the value of liabilities and assets using ***actuarial cost methods***. An actuarial cost method is used to separate the total liability into past service and future service components and convert current liability estimates into recommended funding requirements. An Actuarial Asset Value is used to determine how asset values should be determined each year. Other cost methods are used to determine how assumptions should be applied to value liabilities.

The following is a guide to the impact of each assumption on valuation results from high to low. Also shown is the relative difficulty to develop an assumption. For example, the investment return assumption has a very high impact on the liability estimate, but is also the most subjective and difficult to predict. Economic assumptions are shown in blue. Demographic assumptions are shown in green.

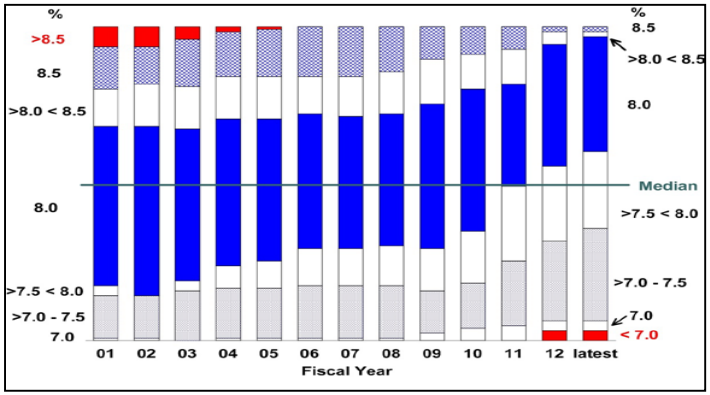
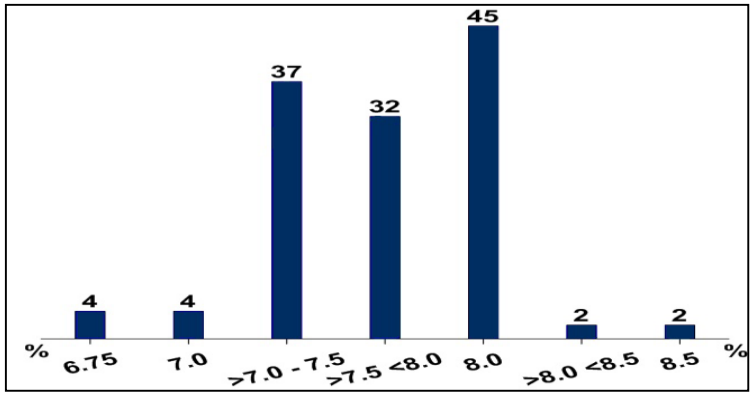


I. Economic Assumptions	
Actuarial Valuation Assumption	**Gallagher Analysis**
Inflation Rate:	***Inflation Rate:***
3.5% per year	The inflation assumption should reflect long-term future expected inflation. The inflation assumption is only implicitly used in the actuarial valuation as a component of the investment return assumption, salary increase assumption, and total payroll growth assumption. Segal relied primarily on historical data as well as on a survey by the National Association of Retirement Plan Administrators (NASRA) for their recommendation. Their experience study includes data from 1930 to 2009 which supports that over any given 15 year period, the median inflation rate has been 3.5%. Since this assumption is only implicitly used within other assumptions, we are only concerned that it is reasonable and consistent with those assumptions.

I. Economic Assumptions (continued)

Actuarial Valuation Assumption	Gallagher Analysis
Investment Return:	***Investment Return:***
8.00% per year after investment expenses	The investment return assumption should reflect long-term future expected investment returns based on the Plan's investment policy. Segal evaluated the future expected investment returns of SEI, the Plan's investment consultant as well as the returns obtained from a survey from 11 California Counties. The expected returns, including the weighted averages were as follows:

Asset Class	2009 Asset Allocation	SEI's Assumed ROR	Segal sample ROR	June 30, 2013 Allocation
Domestic Large Cap Equity	30%	8.40%	7.19%	16.6%
Domestic Small Cap Equity	10%	10.30%	7.89%	4.8%
Developed International Equity	10%	9.20%	7.63%	11.1%
Global Equity	0%	--%	--%	16.0%
Emerging Market Equity	5%	13.60%	10.49%	3.5%
Domestic Fixed Income	24%	3.90%	2.74%	12.0%
High Yield Fixed Income	5%	6.20%	5.62%	5.0%
International Fixed Income	5%	2.80%	2.50%	5.0%
Real Estate	5%	5.10%	4.80%	10.0%
Private Equity	5%	10.40%	10.40%	5.0%
Infrastructure	0%	--%	--%	5.0%
Commodities (Timber)	0%	--%	--%	5.0%
Cash and Equivalents	1%	0.10%	0.66%	1.0%
Total Portfolio	100%	7.31%	6.06%	100%
Inflation		2.30%	3.50%	
Expenses		(0.60%)	(0.60%)	
Total Portfolio		9.01%	8.96%	
Risk Adjustment			(0.96%)	
Recommended Assumption			8.00%	

I. Economic Assumptions (continued)	
Actuarial Valuation Assumption	**Gallagher Analysis**
Investment Return (continued)	***Investment Return (continued)***
8.00% per year after investment expenses	The SEI forecast was discounted by Segal in favor of the results from the survey of the 11 California Counties. Segal stated that this allows for "… a broader range of capital market information…." The investment consultants for the 11 California Counties were not listed, so it is difficult to tell whether this is a broader range of information. Also, it would seem as though SEI may have a better understanding of some of the specific investments held by NDPERS. Nevertheless, the methodology used by Segal is reasonable and reflects that differences of opinion can exist for the same investment allocation, Both methods shown by Segal resulted in a Total Portfolio expected return close to 9% before expenses. Segal adjusted the Total Portfolio expected return to reflect (1) assumed expenses of 0.60%, and (2) a Risk Adjustment of 0.96%. The Risk Adjustment accounts for the impact of investment volatility. The net result was an 8.0% recommendation. The recommended assumption was consistent with other large public sector plans back in 2010. However, as noted below, there has been a 10 year trend towards more conservative assumptions. Where 8% used to be the median assumption, the median is now below 8%. The majority of plans now use an assumption of less than 8%.   *Source: NASRA Issue Brief: Public Pension Plan investment Return Assumption, Updated April 2014* Our conclusion is that Segal used a reasonable approach to recommend a reasonable assumption. However, a trend has been towards the use of more conservative assumptions in large public sector plans. As a result, we will demonstrate the impact of a more conservative assumption of 7.5% in our Sensitivity Analysis section of this report.

I. Economic Assumptions (continued)	
Actuarial Valuation Assumption	**Gallagher Analysis**
Salary Increases:	***Salary Increases:***
Various rates based on service and age, ranging from 8.25% at hire down to 4.86%	This assumption is based on inflation (3.5%) plus productivity (1.0%) plus merit (various). The merit component is based on 5 year historical data over and above inflation and productivity. Segal provided detailed calculations of the merit component. However, when developing their recommended assumption, they subjectively recommended assumptions up to almost 1% lower than the observed rates. The use of an assumption lower than observed values would seem to be an aggressive assumption (an assumption that results in lower liabilities). The subjective adjustment may have reflected the view that recently higher increases will not be sustained over a longer period of time. Our opinion is that it is reasonable and appropriate to use some subjectivity in setting assumptions. However, that reasoning was not disclosed. The assumption used by Segal does not seem unreasonable and future salary increases are very challenging to predict. We believe it is valuable for the Committee to understand the impact of alternative assumptions. Accordingly, our sensitivity analysis section of this report will include results based on salary increases both 10% higher and 10% lower than the current assumption.
Total Payroll Growth:	***Total Payroll Growth:***
Total payroll is assumed to increase 4.5% per year.	The total payroll growth assumption does not affect liability calculations, but does influence the Annual Required Contribution (ARC) and the expected future contributions to the Plan. Thus it will impact the open group projections, but not the closed group projections. Segal states that the assumption is based on 3.5% inflation plus 1.0% productivity growth. Other Segal reports we have reviewed do not necessarily use inflation plus productivity as the assumption. We believe it is possible that the inflation plus productivity approach may not appropriately capture shifts in demographics and the resulting pay adjustments that occur when an entry level hire replaces an experienced hire. The assumption could be supported by projecting results that reflect actual turnover, retirements, and individual salary increase rate increases. It is uncertain to us whether this analysis would justify the 4.5% assumption. Despite the above reservation, the closed group projections which are the primary focus of this audit are not dependant on this assumption. Instead, future benefit payments and contributions will be a function of all the other individual assumptions. As a result, we are not concerned with this assumption for closed group audit purposes.

II. Demographic Assumptions	
Actuarial Valuation Assumption	**Gallagher Analysis**
Mortality Rates:	***Mortality Rates:***
RP-2000 Combined Healthy Mortality Table setback 3 years for both males and females.	The mortality assumption was changed for the July 1, 2010 Actuarial Valuation and likely was a cause of the significant increase in required contribution resulting from the 2010 assumption changes. The table was based on actual experience, with a 10% margin for future mortality improvements (i.e. lower mortality rates are used than past results would seem to indicate). Segal indicated that the data from the study period showed that the proposed mortality table was close to observed rates for females. Since the proposed mortality table predicts total male and female mortality occurrences to be 11% higher than expected, the implication is that the proposed mortality rates for males would result in actual male deaths more than 11% higher than expected. In other words, the proposed table reflects observed female death rates, but would appear to be very conservative for males since it predicts significantly fewer deaths for males than past data observations would seem to indicate. Based on the above, it would seem that the 3-year setback for males may not have been necessary to create a margin for future mortality improvements. Segal acknowledged that this experience was not consistent with the experience of the prior study and noted that they will closely monitor this assumption in future studies. For purposes of understanding the sensitivity of results, we propose that the sensitivity analysis later in this report reflect the elimination of the 3-year setback for males. This would reduce the conservatism of the current assumption. We also suggest evaluating another assumption that is more conservative. We propose to evaluate the impact of using RP-2000 with Scale BB projected future mortality improvements.
Disability Incidence & Mortality Rates:	***Disability Incidence & Mortality Rates:***
• 33% (males) and 20% (females) of OASDI disability incidence rates • RP-2000 Disabled Retiree Mortality Table set back one year for males	Disability rates were lowered at all ages as a result of the 2010 Experience Study. The new assumption was still higher than the observed actual rates. The assumption may be conservative, but the low rates of incidence minimize the impact of this assumption. Disability benefits comprise less than 2% of total plan costs. This assumption does not seem unreasonable. We do not suggest considering alternative assumptions for the sensitivity analysis part of this study as resulting changes would not be significant.

II. Demographic Assumptions (continued)	
Actuarial Valuation Assumption	**Gallagher Analysis**
Withdrawal Rates:	***Withdrawal Rates:***
Current rates are as high as 22% in the first year of employment, dropping to 14% in the fourth year. Thereafter rates are based on age, decreasing from about 9% down to about 3% at age 55, and very small after age 55. Rates are the same for males and females.	Segal increased the withdrawal rates at each year of service under 5 years, but not as high as the observed rates. When service exceeds 5 years, recommended rates were close to the observed rates. Our experience within the State indicates withdrawal rates in the past five years have been increasing as alternative employment options have been increasing. We believe the current assumption is not unreasonable. Predicting long term future withdrawal rates can be very challenging. As a result, we recommend evaluating the impact of higher and lower withdrawal rates in the sensitivity analysis of section five. For demonstration purposes, we will evaluate if rates are either 10% higher and 10% lower at each age (e.g., currently 5.0%, would be evaluated at 4.5% and 5.5%)
PEP Election Rates and Refund Election Rates:	***PEP Election Rates and Refund Election Rates:***
• Members that contributed to PEP last year are assumed to continue each year prospectively • Members that contribute to PEP are assumed to contribute the maximum amount • Terminated members are assumed to elect the more valuable benefit between a Refund of contributions (including the PEP balance) and a deferred annuity	The form of benefit assumption is the most conservative approach that is possible. Segal indicates that few new participants start making elections. We recommend using this assumption and not looking at alternatives for purposes of the sensitivity analysis study in this report. Alternatives are difficult to assess without more data.

II. Demographic Assumptions (continued)	
Actuarial Valuation Assumption	**Gallagher Analysis**
Retirement Rates:	***Retirement Rates:***
Rates vary from age 55 to 75 and depend on eligibility for early retirement and unreduced retirement (age 65 and rule of 85)	The 2010 Experience Study changed the assumption to shift to earlier retirements. The recommended rates are consistent with observed data for unreduced benefit retirements. Recommended rates are generally higher than observed data for reduced benefit retirements. Periods of low rates are often followed by periods of higher rates and vice versa. Economic conditions are in flux and trends are difficult to predict. The current assumption is reasonable. For sensitivity analysis in section five, we believe it would be prudent to consider results if rates from age 55 to 59 are either increased or decreased by 5% per year. For example, the assumed retirement assumption of 10% at a certain age would be evaluated at 5% and 15%. This will have the effect of evaluating results if retirements shift earlier or later. Retirement rates are difficult to estimate, but often have minimal impact on valuation results as either a smaller benefit is assumed payable for a longer period or a larger benefit is assumed payable for a shorter period. The sensitivity analysis can help demonstrate that the net present value impact will be minimal.
Marriage & Spouse Age:	***Marriage & Spouse Age:***
• 80% males and 65% females assumed married at retirement • Male spouses are assumed 3 years older than female spouses	Segal stated that actual data indicated 84% of recently retired males were married and 70% of recently retired females were married. No explanation was given for why the assumption was not changed to be closer to the observed data. No data was included in the Experience Study for spouse age differences, but the age difference was changed from 4 to 3 years based on studies done for other systems. Gallagher's review of the 2013 data indicates that 85% of recently retired males and 75% of females are married. While there may be some evidence to support higher marriage rates, the current assumptions are not unreasonable. Since the assumption has little impact on valuation results, we do not suggest looking at different assumptions for sensitivity analysis reasons.

III. Cost Methods	
Actuarial Valuation Assumption	**Gallagher Analysis**
Actuarial Cost Method:	***Actuarial Cost Method:***
Entry Age Normal Actuarial Cost Method	This cost method is one of the cost methods permitted by GASB and is the most commonly used in large public sector pension valuations. We support continued use of this cost method.
Actuarial Asset Method:	***Actuarial Asset Method:***
The actuarial value of assets is a smoothed market value. Calculation of the actuarial value of assets begins with the market value of assets as of the valuation date. The expected amount of return over each of the last five years is calculated and subtracted from the actual amount of return for each year. The difference for each year is phased in to the valuation assets at a rate of 20 percent per year until it is fully recognized.	This assumption smoothes potential volatility in future funding requirements. It does not affect long-term funding of the plan. Any smoothing method is reasonable provided that it is consistently used and is not created with the intent to bias results. This method is reasonable.

Section Five – Sensitivity Analysis

Actuarial projection results will vary based on assumptions for future expectations. The sensitivity of results to different assumptions can help provide a better understanding of a reasonable range of outputs. In this section, we show the effect of different assumptions, as well as the impact of investment volatility.

Demographic Assumptions

The projections on the pages 26 and 27 include results under the baseline valuation assumption set as well as under two sets developed by Gallagher representing cost favorable and cost unfavorable sets of demographic assumptions.

	NDPERS July 1, 2013 Valuation	Gallagher Recommended Assumption Sets for Sensitivity Analysis	
		Cost Favorable (8% Best)	Cost Unfavorable (8% Worst)
Salary Increases	Rates based on Experience Study	10% lower	10% higher
Mortality Rates	Rates based on Experience Study	Study rates without Male margin	RP 2000 Table with projected improvements
Withdrawal Rates	Rates based on Experience Study	10% lower	10% higher
Retirement Rates	Rates based on Experience Study	Shifted later	Shifted earlier

The following graphs compare projected funding ratios for the two closed plan scenarios under the three sets of assumptions above. The Baseline results are based on Segal's valuation assumptions. The "8% Worst" results represent the Cost Unfavorable set of assumptions while the "8% Best" represent the Cost Favorable assumptions. The estimated cost to fully fund the Plan in each case is shown below the title in the legend.

7.5% Investment Return

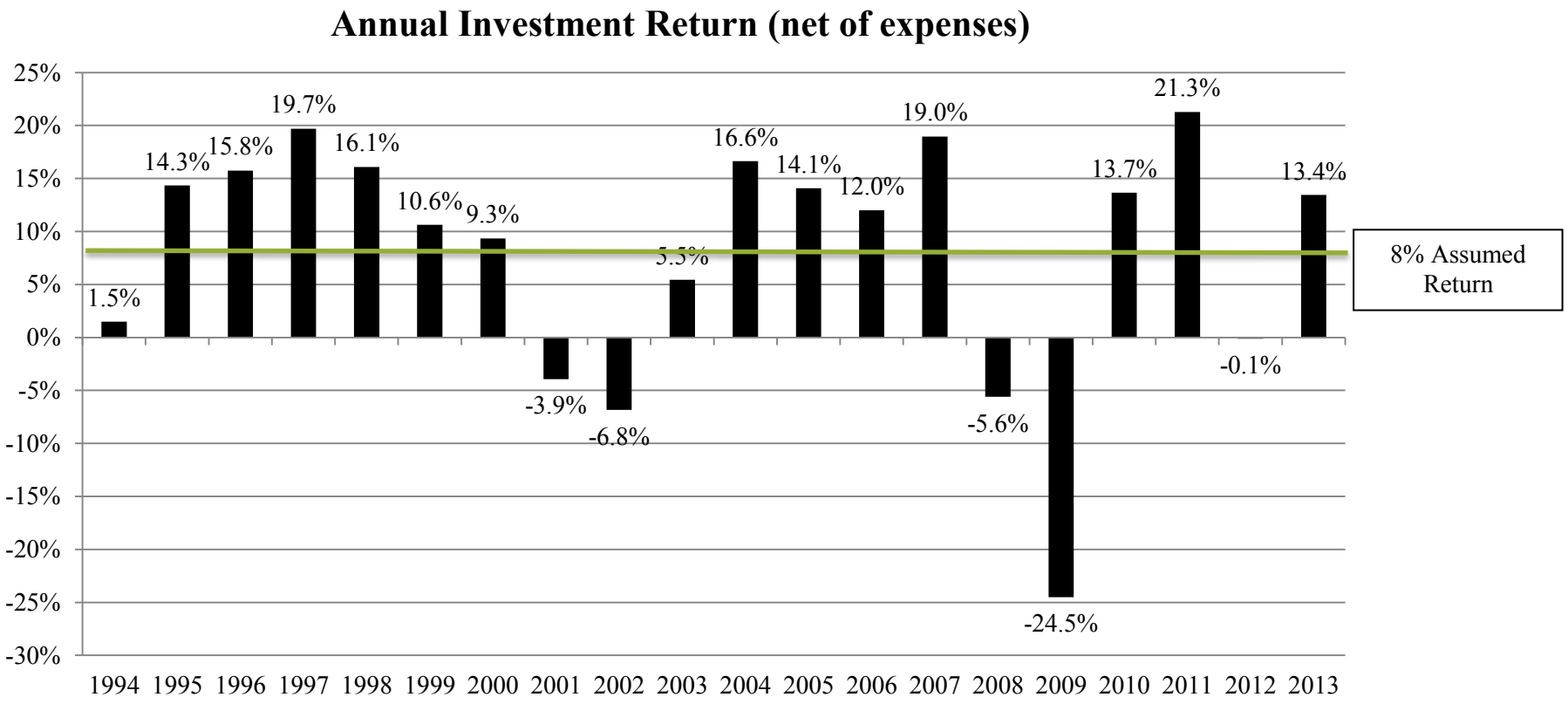
In addition to showing the effect of more or less conservative demographic assumptions, the following graphs show results if the plan's investment return is 7.5% per year. Because this assumption has the largest impact, this change has been shown in isolation (i.e., only the investment return was changed, all other assumptions are the same as the baseline valuation).

Investment Volatility

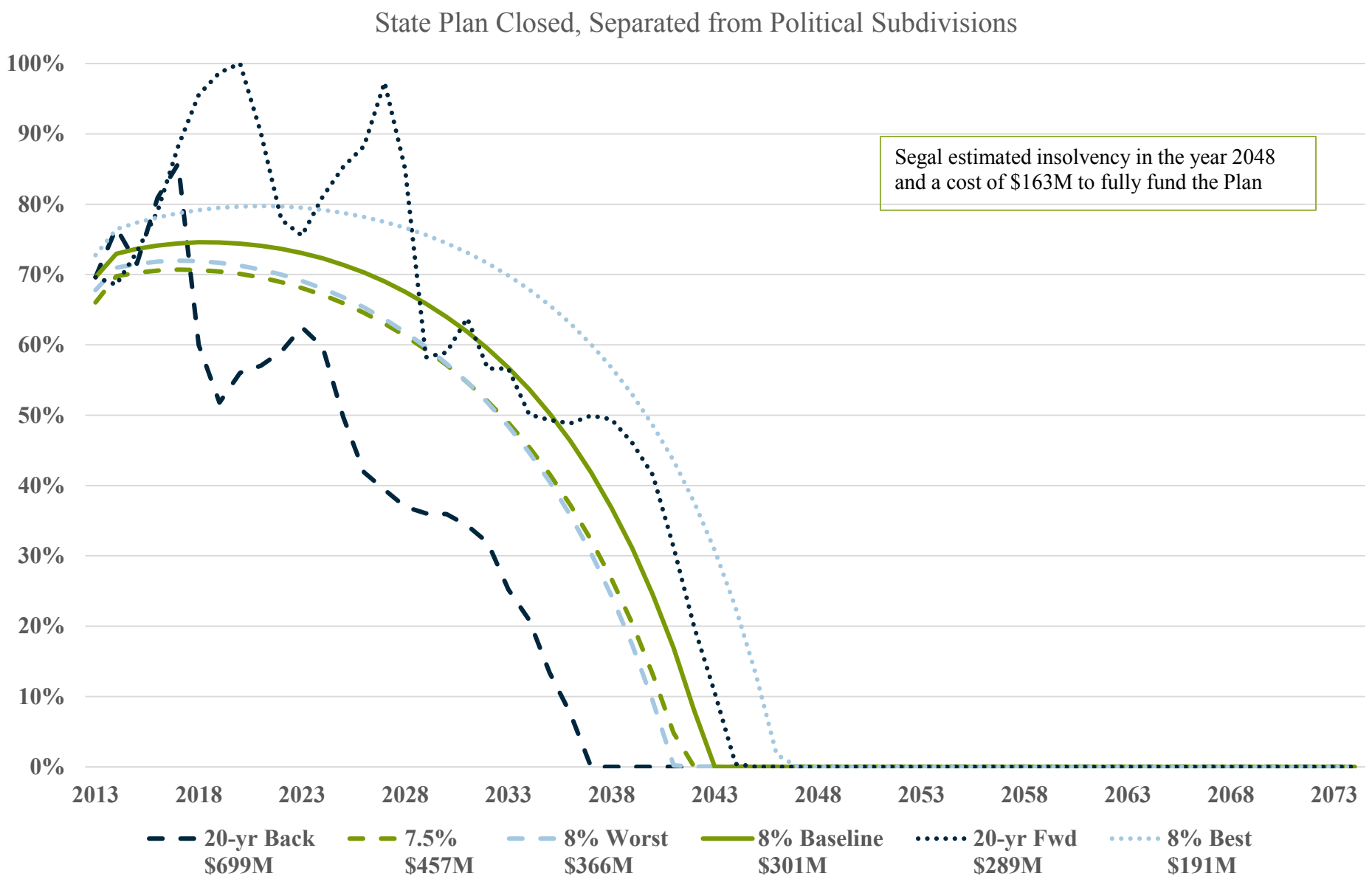
The graph at the bottom of this page shows actual annual investment return rates for NDPERS for the 20 years ending June 30, 2013. Note that the average arithmetic and annually compounded returns over the past 20 years have been close to the assumed return of 8%.

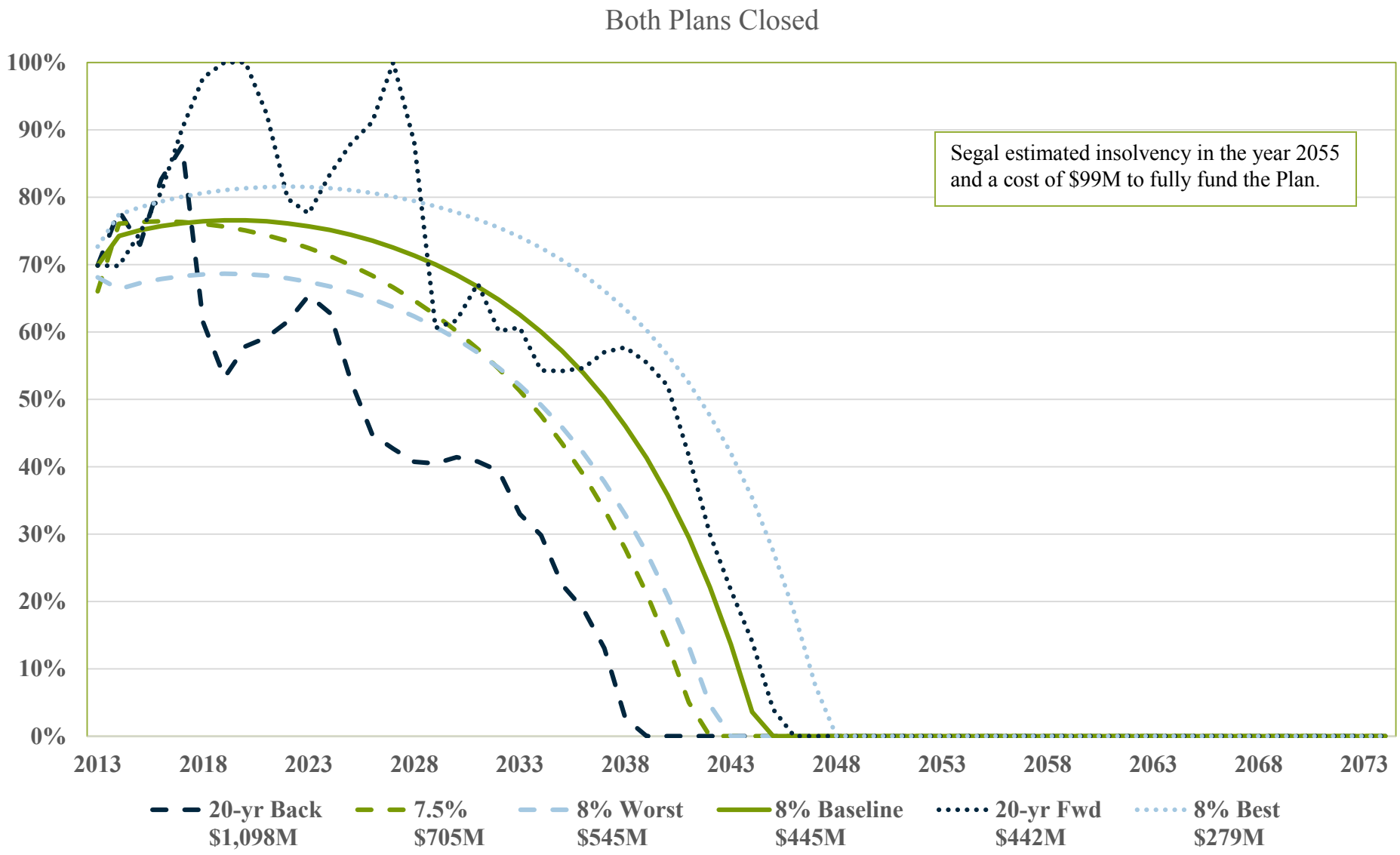
- Average arithmetic return from 1994 – 2013 (20 Years): 8.1%
- Average annual compounded return from 1994 – 2013 (20 Years): 7.4%

The Plan, like most pension plans, has experienced a significant amount of volatility over the past 20 years. This volatility explains the difference between the arithmetic average rate of return which is simply the sum of the annual returns divided by the number of years included in the sample as compared to the annual compounded average, which tracks the value of a fixed amount over that time period on an annually compounded method.



The following graphs demonstrate the effect of investment volatility by showing the effect if historical returns for the prior 20 year period are repeated in the future. Results are shown both if returns are repeated in the same order forward (Fwd), or backward (Back).


State Plan Closed, Separated from Political Subdivisions
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2013
2018
2023
2028
2033
2038
2043
2048
2053
2058
2063
2068
2073
Segal estimated insolvency in the year 2048 and a cost of $163M to fully fund the Plan
20-yr Back $699M
7.5% $457M
8% Worst $366M
8% Baseline $301M
20-yr Fwd $289M
8% Best $191M


Both Plans Closed
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2013
2018
2023
2028
2033
2038
2043
2048
2053
2058
2063
2068
2073
Segal estimated insolvency in the year 2055 and a cost of $99M to fully fund the Plan.
20-yr Back $1,098M
7.5% $705M
8% Worst $545M
8% Baseline $445M
20-yr Fwd $442M
8% Best $279M

The following chart shows a summary comparison of Segal's estimated one-time cost to fully fund the closed plan scenarios with Gallagher's results. The Baseline result differences are primarily due to Segal's output adjustments as noted in Section Three. Also shown is a summary of the range in results when demographic assumptions are different than expected, as well as the impact of both investment volatility (with an 8% average return), or no investment volatility with a fixed 7.5% rate of return.

		Segal Result	Gallagher Result
State Plan Closed (separated from Political Subdivisions)	Baseline Result	$163M	$301M
	Results Reflecting 7.5% Investment Return		$457M
	Results Reflecting Alternative Demographic Assumptions		$191M to $366M
	Results Reflecting Investment Volatility (Repeating the past 20 years)		$289M to $699M
		Segal Result	**Gallagher Result**
Plan Closed for State and Political Subdivisions	Baseline Result	$99M	$445M
	Results Reflecting 7.5% Investment Return		$705M
	Results Reflecting Alternative Demographic Assumptions		$279M to $545M
	Results Reflecting Investment Volatility (Repeating the past 20 years)		$442M to $1,098M

The results are shown independently by category. The compounded effect of multiple factors is not shown. For example, if demographic experience was unfavorable and a 7.5% return with high volatility occurred, the result variances would be compounded.

Section Six – Summary of Conclusions

The following summarizes all conclusions from this report:

Conclusions

• Segal's Plan closure study was not based on the same outputs as the July 1, 2013 actuarial valuation.
• Segal adjusted costs downward to reflect fewer retirements. This contradicts the actuarial valuation which noted that fewer retirements increased plan costs.
• Segal's adjustments reduced the present value of projected benefit payments by about $264M.
• No other adjustments were made to reflect increased benefits or increased contributions due to deferred retirements.
• Segal did not include post 7/1/13 hires in their study.
• Gallagher estimates if no adjustments were made and post 7/1/13 hires were included:
  • If only the State employees group was closed and separated from the Non-State
  • The insolvency date would be in 30 years, not 35 years
  • The one-time contribution would be $301M instead of $163M
  • If the entire plan is closed
  • The insolvency date would be in 32 years, not 42 years
  • The one-time contribution would be $445M instead of $99M
• In addition to the above, alternative assumptions or actual investment returns with volatility may significantly affect the one time funding costs.
• If the adjustments to the closed plan study made by Segal are considered reasonable, then the Actuarial Valuation results significantly overstate the contribution required to fund the Plan.

Attachments

Laura Hafermann

From: Ramirez, Brad <bramirez@segalco.com>
Sent: Tuesday, July 29, 2014 2:14 PM
To: Doug Anderson
Cc: Sparb Collins (scollins@nd.gov); Dixon, Tammy; Mitchell, Laura; Larson, Brady A. (bradylarson@nd.gov); Knudson, Allen H. (aknudson@nd.gov)
Subject: RE: North Dakota Legislative Committee Audit

Doug,

Our responses are below. Please contact me if you have any further questions.

I'm out of the office this afternoon but will be back tomorrow.

Thanks,
Brad

From: Doug Anderson [mailto:Doug_Anderson@ajg.com]
Sent: Wednesday, July 23, 2014 10:06 AM
To: Ramirez, Brad
Cc: Sparb Collins (scollins@nd.gov); Dixon, Tammy; Mitchell, Laura; Larson, Brady A.; Knudson, Allen H.
Subject: RE: North Dakota Legislative Committee Audit

Brad,

Thank you for your response. After visiting with some representatives of the Legislative Committee, I do want to submit some follow-up questions so I can fully explain this situation to the Legislative Committee. I am primarily interested in understanding differences between your July 1, 2013 actuarial valuation results and the results in your March 6, 2014 letter to NDPERS.

On August 5th I will provide another update to the Legislative Committee. I would appreciate if you could provide answers to the following questions prior to that date.

1. You note an adjustment for FYE 2014 benefit payments from an unadjusted amount of $179M to an amount more in alignment with $106M actual payments in FYE 2013. What is the reason for the overstatement of the FYE 2014 unadjusted amount?

The current valuation assumptions (as approved by the Board of Trustees) appear to have higher rates of assumed retirement than are currently being observed.

2. How many other years were adjusted in a similar manner?

The adjustment was made for years prior to 2028.

3. Were any adjustments made to benefit payments from the years 2030 to 2055. As shown on the attachment, these years show the largest differences between a BP stream discounting to $3,369 (Gallagher result) and $3,120M.

No adjustments were made in the years 2030 to 2055.

4. What was the methodology for adjusting the benefit payments?

The benefit payments used in the projection were actual benefit payments as of June 30, 2013, increased by 8% per year for ten years, then 6% for five years, then the payment stream from the valuation system was used.

5. Were adjustments made in a similar manner for State and Political Subdivision participants?

The adjustment was made for all PERS Main System benefit payments.

6. Do all of these adjustments account for the $264M difference that I have calculated in the attached spreadsheet?

Our analysis indicates that the difference is mostly due to the adjustments in benefit payments and the difference in timing of payments between our valuation systems.

7. Were any other adjustments made?

No.

8. Should the adjustments made for the study also have been made for the July 1, 2013 actuarial valuation? Will they be considered for the 2014 actuarial valuation?

The July 1, 2013 actuarial valuation was based on the assumptions approved by the board, based on the most recent experience study. We will continue to monitor gains and losses in this area and will recommend changes, if necessary.

9. Were the adjustments communicated either in writing or verbally to NDPERS?

The details of the adjustments were not communicated.

10. Did the projections in the March 6th Study include benefit payments for employees that were expected to be hired after July 1, 2013 and before the assumed January 1, 2016 plan closure dates (for scenarios that assume plan closure)?

We did not include these employees in the plan closure projection.

Using scenario No. 5 from your March 6th letter, I am attempting to reconcile the $3,384M PVB you provided to us as a valuation result, with the $3,120M in the attached spreadsheet. Further to that end, we had matched your PVB for the valuation rather closely (we had $3,369M). As an estimate, we have valued the PVB as of July 1, 2013 for participants that had been hired in the past two and half years and obtain a PVB of roughly $150M. When combining that result with our match results, we have a PVB for this scenario of about $3,500M. Here is a summary:

	Segal Valuation	Segal Letter	Gallagher
Est. PVB @ 7/1/13 for Participants as of 7/1/13	$3,384		$3,369
Est. PVB @ 7/1/13 for New Participants entering between 7/1/13 and 1/1/16			150
Est. PVB @ 7/1/13 for all pre 1/1/16 Participants		$3,120	$3,519
Scenario 5 – Both Groups Closed- years to insolvency		42	30
Scenario 5 – Both Groups Closed - cost to fully fund		Approximately $100M (PV of unfunded BPs)	Approximately $350M ($100M - $15M + $264M + net effect of new hires)

The adjustments to the benefit payments and the timing of the benefit payments are responsible for the change in PVB.

As noted above, the difference between your results and ours leads to some more significant differences when evaluating insolvency periods and amounts needed to fully fund the plan. It is these differences that I wish to explain to the Committee.

Thank you for considering these questions as well as your past prompt responses to our requests.

Doug

Doug Anderson
Area Senior Vice President
Retirement Plan Consulting | Actuarial

Arthur J. Gallagher & Co.
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www.ajg.com
Gallagher Benefit Services, Inc.

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-----Original Message-----
From: Ramirez, Brad [mailto:bramirez@segalco.com]
Sent: Wednesday, July 16, 2014 6:26 PM
To: Doug Anderson
Cc: Sparb Collins (scollins@nd.gov); Dixon, Tammy; Mitchell, Laura
Subject: FW: North Dakota Legislative Committee Audit

Doug,

See our response below. Please let me know if you have any questions.

Thanks,
Brad

_____
From: Collins, J. Sparb [scollins@nd.gov]
Sent: Wednesday, July 16, 2014 5:20 PM
To: Ramirez, Brad
Subject: Re: North Dakota Legislative Committee Audit

Yes please forward and we can discuss

sparb

On Jul 16, 2014, at 4:13 PM, "Ramirez, Brad"
<bramirez@segalco.com<mailto:bramirez@segalco.com>> wrote:

Sparb,

With respect to item 5, for the purposes of the closed group projection, we adjusted the benefit payments projected in the valuation to be closer to the actual benefit payments from the Main system. For example, in 2013, the unadjusted projected benefit payment amount was $179 million and the actual benefit payments from the Main system were $106 million. The benefits Gallagher used were higher therefore their projected date of insolvency was sooner.

This results in a different outlay of projected payments as Doug pointed out below. We believe that this adjustment provides a more accurate projection for when the fund will become insolvent.

As always, 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.

If you would like, I will forward this explanation to Doug and see if he has any questions.

Thanks,
Brad

From: Doug Anderson [mailto:Doug_Anderson@ajg.com]
Sent: Wednesday, July 09, 2014 3:37 PM
To: Ramirez, Brad; Mitchell, Laura; Tanji, Hiroko
Cc: Collins, J. Sparb; Anthony Pluth
Subject: North Dakota Legislative Committee Audit

Hello Brad,

The purpose of this email is to update you on our work for the North Dakota Legislative Management Committee related to the NDPERS audit. On July 1st I presented an update to the Committee. Sparb may have provided you with a copy of our presentation. They key points were as follows:

1. We had no significant findings with respect to the participant data. We may have a few minor questions later, but it's not a high priority.

2. We were able to obtain a reasonable match of the July 1, 2013 actuarial valuation results (< 1.0% in total).

3. We had no significant issues with the assumptions recommended by Segal and adopted by NDPERS in 2010.

4. We had some recommendations for alternative assumptions that should be considered as they deliberate on plan design changes. This primarily is intended to recognize that no single assumption will be accurate and understanding the sensitivity of results to various assumptions is valuable.

5. We did identify some differences in projection results for the plan design options which in our opinion should be investigated and reconciled.

With regard to item #5 above, based on the close valuation match, we expected that our projections for the date of insolvency under good and bad assumptions should bracket the results from your March 6, 2014 letter to NDPERS. For example, the final scenario in that letter titled "Main Systems – Existing Plan with No New Entrants as of 1/1/2016" shows insolvency in the year 2055. Our results, which we expected to bracket the year 2055, instead ranged from 2045 to 2048.

While looking at this closer, we note a difference between the present value of projected benefit payments shown in that letter for that scenario and the present

value of benefits as of the valuation date that you provided to us in June. Specifically, the PV of benefit payments in the letter appears to be about $264M less than the PVB you provided to us for purposes of matching the valuation. This difference may explain why we had unexpected insolvency dates.

Can you review the attached Excel document where we attempt to reconcile your PV of BP's from the March 6th letter with the PVB provided to us for the valuation match? My expectation is that the PV of BP's for the scenario in the letter should actually be higher than the PVB for the valuation, rather than $264M lower, due to the inclusion of an additional two and half years of new hires.

I would appreciate any insight you have to help me understand this difference. I've also demonstrated the difference between your benefit payments in the exhibit and what we have calculated for our close match results. You can see that most of the difference in benefit payments appears from about 2030 to 2050.

My next update for the Committee is on August 5th and I hope to report on this issue at that time.

Please let me know if you have questions or would like to discuss this directly. I am out of the office until July 15th.

Thank you,
Doug

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<PVFB Reconciliation.xlsx>

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Thank you.

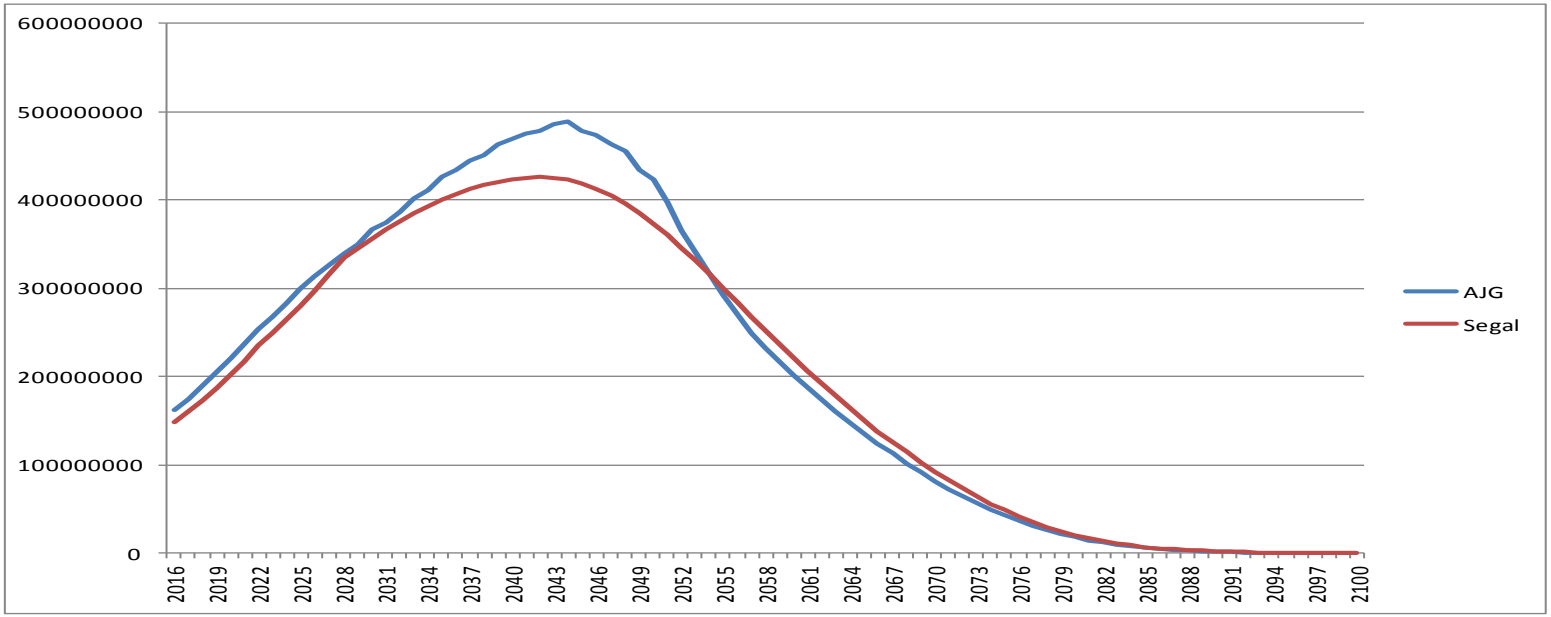
Segal July 1, 2013 Implied Total Present Value from Study	Segal July 1, 2013 Present Value Provided to Gallagher	Difference
$ 2,784,903,140		
335,339,266		
$ 3,120,242,406	$ 3,384,242,081	$ (263,999,675)

Attempt to obtain 7/1/2013 Benefit Payments via asset reconciliation

	Segal Provided Values
Actives	$ 2,285,669,665
Prior Service	10,275
Retirees & Bens	943,661,450
Inactive	154,900,691
	$ 3,384,242,081

Market Value of Assets (BOY)	Contributions	Earnings	Benefit Payments	Market Value of Assets (EOY)
1,899,500,000	113,600,000	151,900,000	116,300,000	2,048,700,000
2,048,700,000	127,000,000	164,000,000	125,400,000	2,214,300,000

Graph Comparison of Segal vs Gallagher Benefit Payments



March 6, 2014 Letter to NDPERS (pages 12-14) Results for Main Systems - Existing Plan with no New Entrants as of 1/1/2016. Discounted by Gallagher to July 1, 2013	
Total: $ 16,785,300,000	Total: $ 2,784,903,140

Plan Year Beginning	Benefit Payments	Discount Factor	PV of Benefit Payment
7/1/2013	N/A		N/A
7/1/2014	N/A		N/A
7/1/2015	N/A		N/A
7/1/2016	147,900,000	0.7639	112,975,697
7/1/2017	159,800,000	0.7073	113,023,792
7/1/2018	172,600,000	0.6549	113,034,271
7/1/2019	186,400,000	0.6064	113,029,420
7/1/2020	201,300,000	0.5615	113,022,682
7/1/2021	217,400,000	0.5199	113,020,602
7/1/2022	234,800,000	0.4814	113,024,453
7/1/2023	248,800,000	0.4457	110,892,186
7/1/2024	263,800,000	0.4127	108,868,341
7/1/2025	279,600,000	0.3821	106,841,561
7/1/2026	296,400,000	0.3538	104,871,505
7/1/2027	314,200,000	0.3276	102,934,682
7/1/2028	334,300,000	0.3033	101,407,054
7/1/2029	345,500,000	0.2809	97,041,184
7/1/2030	356,200,000	0.2601	92,635,659
7/1/2031	366,100,000	0.2408	88,157,700
7/1/2032	375,500,000	0.2230	83,723,372
7/1/2033	384,400,000	0.2064	79,359,037
7/1/2034	392,500,000	0.1912	75,028,959
7/1/2035	399,800,000	0.1770	70,763,335
7/1/2036	406,200,000	0.1639	66,570,476
7/1/2037	412,000,000	0.1517	62,519,458
7/1/2038	416,800,000	0.1405	58,562,815
7/1/2039	420,600,000	0.1301	54,719,201

Assumed Additional Amounts From Other Sources
Total: $ 335,339,266

Plan Year Beginning	Benefit Payments	Discount Factor	PV of Benefit Payment
7/1/2013	116,300,000	0.9623	111,909,727
7/1/2014	125,400,000	0.8910	111,727,969
7/1/2015	135,400,000	0.8250	111,701,570

Notes:

1. 7/1/2013 value determined as plug value to reconcile 7/1/2013 assets with 7/1/2014 assets (see calculation to the right)
2. 7/1/2014 and 7/1/2014 values obtained from March 6, Letter to NDPERS (pages 1-3) Results for Main Systems - Existing Plan No Change (entire group)

7/1/2040	423,500,000	0.1205	51,015,264
7/1/2041	425,500,000	0.1115	47,459,432
7/1/2042	426,100,000	0.1033	44,005,884
7/1/2043	425,400,000	0.0956	40,679,251
7/1/2044	423,100,000	0.0885	37,462,325
7/1/2045	419,100,000	0.0820	34,359,403
7/1/2046	413,200,000	0.0759	31,366,388
7/1/2047	405,600,000	0.0703	28,508,764
7/1/2048	396,500,000	0.0651	25,804,763
7/1/2049	385,700,000	0.0603	23,242,485
7/1/2050	373,500,000	0.0558	20,840,099
7/1/2051	360,200,000	0.0517	18,609,261
7/1/2052	346,000,000	0.0478	16,551,515
7/1/2053	331,000,000	0.0443	14,661,078
7/1/2054	315,600,000	0.0410	12,943,483
7/1/2055	299,900,000	0.0380	11,388,509
7/1/2056	284,000,000	0.0352	9,985,849
7/1/2057	268,100,000	0.0326	8,728,502
7/1/2058	252,400,000	0.0301	7,608,665
7/1/2059	237,000,000	0.0279	6,615,211
7/1/2060	221,800,000	0.0258	5,732,356
7/1/2061	207,000,000	0.0239	4,953,569
7/1/2062	192,400,000	0.0222	4,263,136
7/1/2063	178,200,000	0.0205	3,656,016
7/1/2064	164,300,000	0.0190	3,121,147
7/1/2065	151,000,000	0.0176	2,656,010
7/1/2066	138,100,000	0.0163	2,249,172
7/1/2067	125,800,000	0.0151	1,897,081
7/1/2068	114,000,000	0.0140	1,591,792
7/1/2069	102,800,000	0.0129	1,329,079
7/1/2070	92,100,000	0.0120	1,102,538
7/1/2071	82,100,000	0.0111	910,025
7/1/2072	72,700,000	0.0103	746,141
7/1/2073	63,900,000	0.0095	607,245
7/1/2074	55,800,000	0.0088	490,991
7/1/2075	48,300,000	0.0081	393,516
7/1/2076	41,500,000	0.0075	313,069
7/1/2077	35,400,000	0.0070	247,270
7/1/2078	29,800,000	0.0065	192,735
7/1/2079	24,900,000	0.0060	149,114

7/1/2080	20,600,000	0.0055	114,226
7/1/2081	16,900,000	0.0051	86,768
7/1/2082	13,700,000	0.0048	65,128
7/1/2083	11,000,000	0.0044	48,419
7/1/2084	8,700,000	0.0041	35,459
7/1/2085	6,800,000	0.0038	25,662
7/1/2086	5,300,000	0.0035	18,520
7/1/2087	4,100,000	0.0032	13,265
7/1/2088	3,100,000	0.0030	9,287
7/1/2089	2,400,000	0.0028	6,657
7/1/2090	1,800,000	0.0026	4,623
7/1/2091	1,300,000	0.0024	3,092
7/1/2092	1,000,000	0.0022	2,202
7/1/2093	700,000	0.0020	1,427
7/1/2094	500,000	0.0019	944
7/1/2095	400,000	0.0017	699
7/1/2096	300,000	0.0016	486
7/1/2097	200,000	0.0015	300
7/1/2098	200,000	0.0014	278
7/1/2099	100,000	0.0013	128
7/1/2100	-	0.0012	-