Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

Indiana Public Retirement System

Public Employees' Retirement Fund

Actuarial Valuation as of
June 30, 2019

www.CavMacConsulting.com

Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

November 6, 2019

Board of Trustees
Indiana Public Retirement System
1 North Capitol, Suite 001
Indianapolis, IN 46204

Dear Members of the Board:

At your request, we performed an actuarial valuation of the Public Employees' Retirement Fund (PERF) as of June 30, 2019, for the purpose of estimating the actuarial required contribution for the plan year ending June 30, 2021. The major findings of the valuation are contained in this report, which reflects the benefit and funding provisions in place on June 30, 2019, including the expansion of the current pre-retirement death benefit eligibility for members with at least 10 years of service as passed in House Enrolled Act No. 1059. There were no changes to the actuarial methods and assumptions.

In preparing our report, we relied, without audit, on information (some oral and some in writing) supplied by Indiana Public Retirement System (INPRS) staff. This information includes, but is not limited to, statutory provisions, member data and financial information. We did review the data to ensure that it was reasonably consistent and comparable with data from prior years. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete, our results may be different and our calculations may need to be revised.

We certify that all costs and liabilities for PERF have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the plan and reasonable expectations); and which, in combination, offer the best estimate of anticipated experience affecting the plan. Nevertheless, the emerging costs will vary from those presented in this report to the extent actual experience differs from that projected by the actuarial assumptions.

While the assumptions were generally developed by the prior actuary, we believe they are reasonable. The Board has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix C. Specifically, we presented the proposed assumptions for the 2019 valuations to the Board on February 22, 2019, and the Board subsequently adopted their use. These assumptions are applicable to both the funding and Governmental Accounting Standards Board (GASB) Statement Number 67 valuation calculations, unless otherwise noted.

3802 Raynor Pkwy, Suite 202, Bellevue, NE 68123
Phone (402) 905-4461 • Fax (402) 905-4464
www.CavMacConsulting.com
Offices in Kennesaw, GA • Bellevue, NE

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements.

We prepared a Risk Report for the INPRS Board in August 2019 that contains information which is relevant to PERF and should be considered part of this valuation report. Although the report was prepared using the data, methods, and assumptions of the June 30, 2018 valuation report, it is our professional opinion that the results of the risk report are substantially applicable to the June 30, 2019 valuation report as well.

Actuarial computations presented in this report are for purposes of determining the funding rates for the Plan. The calculations in the enclosed report have been made on a basis consistent with our understanding of the Plan's funding requirements and goals as adopted by the Board. Additionally, we have included actuarial computations for use in preparing certain reporting and disclosure requirements under Governmental Accounting Standards Board Statements Number 67 and Number 68. Determinations for purposes other than meeting these funding and disclosure requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

The Comprehensive Annual Financial Report (CAFR) for INPRS contains several exhibits that disclose the actuarial position of the System. This report provides data and tables that we prepared for use in the following sections of the CAFR:

Financial Section:

- Note 1 - Tables of Plan Membership
- Note 7 - Net Pension Liability and Actuarial Information - Defined Benefit Plans
- Schedule of Changes in Net Pension Liability and Plan Fiduciary Net Position
- Schedule of Contributions
- Schedule of Notes to Required Supplementary Information

Actuarial Section:

- Summary of INPRS Funded Status (Included in the Executive Summary)
- Historical Summary of Actuarial Valuation Results by Retirement Plan
- Summary of Actuarial Assumptions, Methods and Plan Provisions
- Analysis of Financial Experience (Included in the Unfunded Actuarial Accrued Liability Reconciliation)
- Solvency Test
- Schedule of Active Member Valuation Data
- Schedule of Retirants and Beneficiaries

Statistical Section:

- Membership Data Summary
- Ratio of Active Members to Annuitants
- Schedule of Benefit Recipients by Type of Benefit Option
- Schedule of Average Benefit Payments

The consultants who worked on this assignment are pension actuaries. Cavanaugh Macdonald's advice is not intended to be a substitute for qualified legal or accounting counsel.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and the assumptions and methods used meet the guidance provided in the applicable Actuarial Standards of Practice. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

The calculations were completed in compliance with applicable law and the calculations for GASB disclosure, in our opinion, meet the requirements of GASB 67 and GASB 68. We are available to answer any questions on the material contained in the report, or to provide explanations or further details as may be appropriate.

We respectfully submit the following report and look forward to discussing it with you.

Sincerely,

Brent A. Banister

Patrice Beckham

Brent A. Banister Ph.D., FSA, EA, MAAA, FCA
Chief Actuary

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

Sections	Page

This report presents the results of the June 30, 2019 actuarial valuation of the Public Employees' Retirement Fund (PERF). The primary purposes of performing this actuarial valuation are to:

- Determine the level of contributions for the plan year ending June 30, 2021 that will be sufficient to meet the funding policy set out by the Board to comply with Indiana statutes.
- Disclose asset and liability measurements as well as the current funded status of the plan on the valuation date.
- Compare actual and expected experience under the Plan during the plan year ending June 30, 2019.
- Analyze and report on trends in plan contributions, assets and liabilities over the past several years.

VALUATION RESULTS

Legislation was passed through House Enrolled Act No. 1059 to expand the current pre-retirement death benefit to apply to all active and inactive members who have at least 10 years of service, the current general vesting requirement. This provides new coverage for active and inactive members with 10 to 15 years of service (before age 65) and inactive members who die prior to age 50. There were no changes to the actuarial methods and assumptions or the funding policy between the June 30, 2018 and June 30, 2019 valuations.

The actuarial valuation results provide a "snapshot" view of the plan's financial condition on June 30, 2019. The plan's UAAL changed from $3.267 billion last year to $3.418 billion this year and the funded ratio decreased from 79.7% to 79.4%. The primary factors behind this reduction include a liability actuarial loss resulting from salary which were larger than assumed and an actuarial loss on the actuarial value of assets as portions of prior losses were recognized. Actual contributions exceeded the actuarially determined contribution needed by about $154 million, offsetting nearly half the actuarial losses.

A summary of the key results from the June 30, 2019 actuarial valuation compared to the June 30, 2018 valuation is shown in the following table. Further detail on the valuation results can be found in the following sections of this Executive Summary.

Valuation Results	June 30, 2018	June 30, 2019
Unfunded Actuarial Accrued Liability	$ 3,267,442,985	$ 3,418,258,147
Funded Ratio (Actuarial Assets)	79.69%	79.38%
Normal Cost	3.58%	3.60%
UAAL Amortization	4.25%	4.47%
Actuarially Determined Contribution Rate	7.83%	8.07%
Surcharge	0.43%	0.44%
Total Contribution Rate	8.26%	8.51%

Numerous components, as examined in the following discussion, contributed to the change in the plan's assets, liabilities, and actuarial determined contribution rate between June 30, 2018 and June 30, 2019.

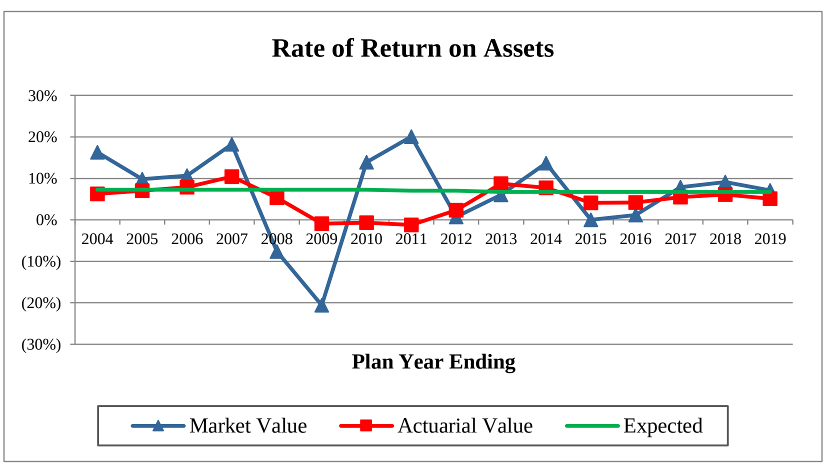
ASSETS

As of June 30, 2019, the plan had net assets of $13.271 billion, when measured on a market value basis. This was an increase of $577 million from the prior year.

The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the actuarial required contribution rate. An asset valuation method, which smoothes the effect of market fluctuations, is applied to determine the value of assets used in the valuation, termed the actuarial value of assets. In this year's valuation, the actuarial value of assets is $13.158 billion, an increase of $334 million from the prior year. The components of change in the asset values are shown in the following table:

		Market Value		Actuarial Value
Net Assets, June 30, 2018	$	12,694,327,690	$	12,823,929,955
- Receipts	+	583,050,510	+	583,050,510
- Expenditures, Net of Administrative Expenses	-	894,297,814	-	894,297,814
- Net Investment Income	+	887,916,085	+	645,119,369
Net Assets, June 30, 2019	$	13,270,996,471	$	13,157,802,020
Estimated Rate of Return, Net of Expenses		7.1%		5.1%

The estimated rate of return on the actuarial value of assets was 5.1%, which was lower than the 6.75% investment return assumption applicable for the year ended June 30, 2019. As a result, there was an experience loss on assets of $210 million. The estimated investment return on the market value of assets for FY 2019 of 7.1% resulted in a change in the deferred investment experience from a net deferred investment loss of $130 million in last year's valuation to a net deferred investment gain of $113 million in the current valuation. See Tables 1 through 4 of this report for detailed information on the market and actuarial value of assets.



The rate of return of the actuarial value of assets has been less volatile than the market value return, illustrating the benefits of using an asset smoothing method.

LIABILITIES

The actuarial accrued liability is that portion of the present value of future benefits that is allocated to past service. The remaining portion will be paid by future normal costs. The difference between this liability and the actuarial value of assets as of the valuation date is called the unfunded actuarial accrued liability (UAAL). The dollar amount of unfunded actuarial accrued liability is reduced if the contributions to the plan exceed the normal cost for the year plus interest on the prior year's UAAL.

The unfunded actuarial accrued liability, including expected future COLAs, is shown as of June 30, 2019 in the following table:

	Market Value	Actuarial Value
Actuarial Accrued Liability	$ 16,576,060,167	$ 16,576,060,167
Value of Assets	13,270,996,471	13,157,802,020
Unfunded Actuarial Accrued Liability	$ 3,305,063,696	$ 3,418,258,147
Funded Ratio	80.06%	79.38%

See Table 5 of this report for the development of the unfunded actuarial accrued liability.

The net change in the total UAAL from June 30, 2018 to June 30, 2019 was an increase of $151 million. This liability increase includes the actuarial loss from salary increases of over $100 million and actuarial loss on assets of $210 million, offset by $154 million of contributions in excess of the actuarially determined contribution. House Enrolled Act No. 1059 resulted in a minimal in liabilities. The components of the change in the base UAAL are quantified in Table 7 of this report. See Table 8 and Table 9 of this report for a breakdown of the components of experience gains/losses for greater detail.

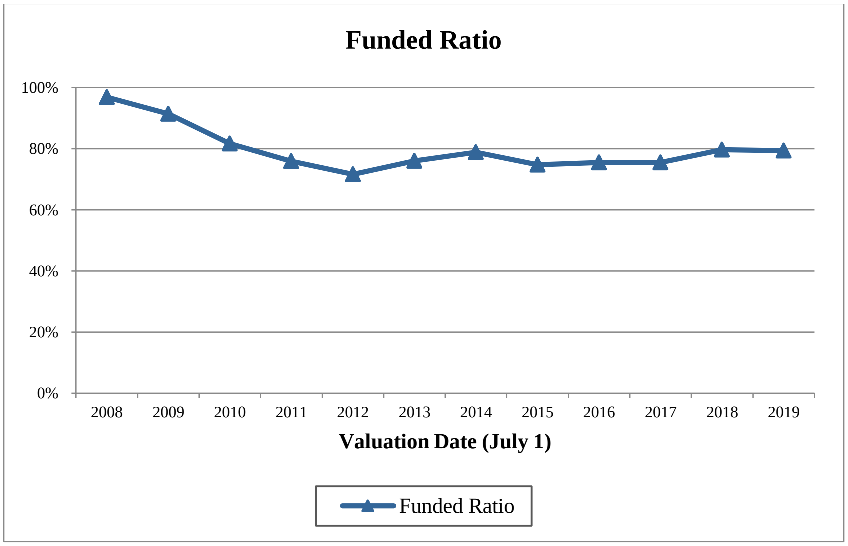
An evaluation of the UAAL on a pure dollar basis may not provide a complete analysis since only the difference between the assets and liabilities (which are both large numbers) is reflected. Another way to evaluate the UAAL and the progress made in its funding is to track the funded ratio, the ratio of the actuarial value of assets to the actuarial accrued liability. The funded status information, which is based on the actuarial value of assets, is shown below (in millions).

	6/30/2015	6/30/2016	6/30/2017	6/30/2018	6/30/2019
Funded Ratio	74.8%	75.5%	75.5%	79.7%	79.4%
UAAL (in millions)	$3,848.7	$3,855.9	$4,007.3	$3,267.4	$3,418.3

Note: Results before 2018 exclude the DC assets in the funded ratio calculation.

Note that the funded ratio does not indicate whether or not the plan assets are sufficient to settle benefits earned to date. The funded ratio, by itself, also may not be indicative of future funding requirements. In addition, if the funded ratios were shown using the market value of assets, the results would differ.

The funded ratio over a longer period of years is shown in the following graph. The Plan's funded status has been steady for a number of years.



Note: Funded ratios exclude DC account balances.

ACTUARIALLY DETERMINED CONTRIBUTION RATE

The Plan's actuarially determined contribution rate consists of two components:

- A "normal cost" for the portion of projected liabilities allocated by the actuarial cost method to service of members during the year following the valuation date.

- An "unfunded actuarial accrued liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

The UAAL contribution rate is determined by calculating the amortization payment on the UAAL as a level dollar amount over 20 years for each new amortization base. Because the COLA portion of the benefits are funded through the surcharge, this portion of the benefit only considers the base benefit without any COLA. If the Fund funded ratio exceeds 100% on a combined basis (base benefits plus future assumed COLAs), all prior amortization bases are eliminated and the negative UAAL (or "surplus") is amortized over an open 30-year period, as an offset to other Fund costs.

In addition to the components above that are designed to fund the guaranteed base benefit, the Board is responsible for determining the surcharge to fund future COLAs and/or 13th checks. Because there are five plans that must, by law, provide the same COLA or 13th check each year, the funding strategy needs to consider the funding needs of the entire System as well as the specific fund. The long-term assumption is that a COLA of 0.4% will be granted starting in 2022, 0.5% starting in 2034, and then 0.6% in 2039 and beyond. Considering the biennial budgeting cycle in Indiana, the near-term goal is to accumulate funds by June 30, 2021 to fund the two COLAs in the following biennium (January, 2022 and January, 2023). For calendar year 2019, the surcharge rate is 0.43% and the newly calculated rate will be effective January 1, 2020. Under this approach, the calculated surcharge rate for PERF will be 0.44%. See Table 12 for further details.

The total employer rate is the sum of the contributions to fund the base benefits plus the surcharge. The total employer contribution rate is lowered part way toward the normal cost rate when the funded ratio is over 105% funded, and then ultimately reduced to the normal cost rate should the Fund reach 120% funded. The Board could decide, however, to set the rate higher in order to provide a sufficient surcharge for the COLA funding while preserving the base funding.

See Table 13 of this report for the detailed development of the contribution rates which are summarized in the following table:

	June 30, 2018	June 30, 2019
Normal Cost	3.58%	3.60%
UAAL Amortization	4.25%	4.47%
Actuarially Determined Contribution Rate	7.83%	8.07%
Surcharge	0.43%	0.44%
Total Contribution Rate	8.26%	8.51%

The actuarial required contribution, determined this year based on the snapshot of the plan taken on the valuation date of June 30, 2019, will change each year as the deferred investment experience is recognized and other experience (both investment and demographic) impacts the plan. Therefore, it is expected to change each year.

SUMMARY OF PRINCIPAL RESULTS

	June 30, 2017	June 30, 2018	June 30, 2019
MEMBERSHIP			
Active Members	134,909	132,176	129,099
Inactive Vested Members	30,816	31,924	33,062
Retired Members and Beneficiaries	82,309	85,100	86,961
Disabled Members	2,821	2,890	2,971
Total Members	250,855	252,090	252,093
Projected Annual Salaries of Active Members	$ 5,130,436,746	$ 5,210,209,085	$ 5,335,373,772
Annual Retirement Payments for Retired Members, Disabled Members and Beneficiaries	$ 757,851,321	$ 801,550,526	$ 829,034,603
ASSETS AND LIABILITIES			
Net Assets			
Market Value of Assets (MVA)	$ 14,644,671,525	$ 12,694,327,690	$ 13,270,996,471
Actuarial Value of Assets (AVA)	15,098,919,673	12,823,929,955	13,157,802,020
Actuarial Accrued Liability (AAL)	19,106,214,994	16,091,372,940	16,576,060,167
Unfunded Actuarial Accrued Liability (UAAL):			
AAL - AVA	$ 4,007,295,321	$ 3,267,442,985	$ 3,418,258,147
Funded Ratios			
AVA / AAL	79.03%	79.69%	79.38%
MVA / AAL	76.65%	78.89%	80.06%
CONTRIBUTIONS			
Normal Cost	3.94%	3.58%	3.60%
Amortization of UAAL	6.32%	4.25%	4.47%
Actuarially Determined Contribution Rate	10.26%	7.83%	8.07%
Surcharge	0.00%	0.43%	0.44%
Total Contribution Rate	10.26%	8.26%	8.51%

Note: Liability and funded ratio results for 2018 and 2019 include both the base benefit and the supplemental benefit.

This report presents the actuarial valuation results of the Public Employees' Retirement Fund as of June 30, 2019. This valuation was prepared at the request of the Indiana Public Retirement System.

Please pay particular attention to our actuarial certification letter, where the guidelines employed in the preparation of this report are outlined. We also comment on the sources and reliability of both the data and the actuarial assumptions upon which our findings are based. Those comments are the basis for our certification that this report is complete and accurate to the best of our knowledge and belief.

A summary of the findings which result from this valuation is presented in the previous section. Section 3 describes the assets and investment experience of the plan. Sections 4 and 5 describe how the obligations of the plan are to be met under the actuarial cost method in use. Section 6 provides information required by the Governmental Accounting Standards Board (GASB) for reporting and disclosure under GASB 67 and GASB 68.

This report includes several appendices:

- Appendix A — Schedules of valuation data classified by various categories of members.
- Appendix B — A summary of the current benefit structure, as determined by the provisions of governing law on June 30, 2019.
- Appendix C — A summary of the actuarial methods and assumptions used to estimate liabilities and determine contribution rates.
- Appendix D — A glossary of actuarial terms.

In many respects, an actuarial valuation can be thought of as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is June 30, 2019. On that date, the assets available for the payment of benefits are appraised. The assets are compared with the liabilities of the plan, which are generally in excess of assets. The actuarial process then leads to a method of determining the contributions needed by members and the employer in the future to balance the plan assets and liabilities.

Market Value of Assets

The current market value represents the "snapshot" or "cash-out" value of plan assets as of the valuation date. In addition, the market value of assets provides a basis for measuring investment performance from time to time.

Table 1 summarizes the changes in the market value of assets for the last two years for the base benefits, whereas Table 2 shows the changes for the supplemental reserve account. Table 15 (in the GASB section) provides detail regarding the allocation of investments in the trust.

Actuarial Value of Assets

The market value of assets, representing a "cash-out" value of plan assets, may not be the best measure of the plan's ongoing ability to meet its obligations. To arrive at a suitable value of assets for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens swings in the market value while still indirectly recognizing market values. Under the asset smoothing methodology, the difference between the actual and assumed investment return on the market value of assets is recognized evenly over a five-year period.

Table 3 shows the development of the actuarial value of assets (AVA) as of the valuation date for the base benefits and Table 4 shows the information for the supplemental benefits.

TABLE 1

DEVELOPMENT OF MARKET VALUE OF ASSETS
(Base Benefits)

		June 30, 2018		June 30, 2019
1. Market Value of Assets, Beginning of Year	$	14,644,671,525	$	12,694,327,690
2. Receipts				
a. Member (Includes Purchased Service) [1]	$	83,112,201	$	294,752
b. Employer (Includes Purchased Service) [2]		571,373,825		570,851,947
c. Miscellaneous		120,646		882,074
d. Total	$	654,606,672	$	572,028,773
3. Expenditures				
a. Benefit Payments	$	916,720,007	$	888,510,777
b. Refund of Contributions		21,490,475		0
c. Member Reassignment Transfers		7,030,159		5,787,037
d. Administrative Expense		20,844,003		18,471,916
e. Transfer to Defined Contribution		2,849,380,019		0
f. Miscellaneous Expenditures		64,600		0
g. Total	$	3,815,529,263	$	912,769,730
4. Investment Return				
a. Investment Income	$	1,208,925,772	$	904,887,104
b. Securities Lending Income		1,652,984		1,017,050
c. Total Investment Return	$	1,210,578,756	$	905,904,154
5. Market Value of Assets, End of Year: (1) + (2d) - (3g) + (4c)	$	12,694,327,690	$	13,259,490,887
6. Rate of Return on Market Value of Assets, Net of Expenses [3]		9.10%		7.08%

[1] Includes $285,489 of member service purchases during fiscal year 2018 and $294,752 of member service purchases during fiscal year 2019.
[2] Includes $274,886 of employer service purchases during fiscal year 2018 and $23,003 of employer service purchases during fiscal year 2019.
[3] Based on individual fund experience. Assumes cash flows occur at mid-year.

TABLE 2

DEVELOPMENT OF MARKET VALUE OF ASSETS
(Supplemental Benefits)

	June 30, 2018	June 30, 2019
1. Market Value of Assets, Beginning of Year	$ 0	$ 0
2. Receipts		
a. Employer Surcharge	$ 0	$ 11,021,737
b. Lottery Allocation	0	0
c. Miscellaneous	0	0
d. Total	$ 0	$ 11,021,737
3. Expenditures		
a. Benefit Payments	$ 0	$ 0
b. Administrative Expense	0	0
c. Miscellaneous Expenditures	0	0
d. Total	$ 0	$ 0
4. Investment Return		
a. Investment Income	$ 0	$ 483,707
b. Securities Lending Income	0	140
c. Total Investment Return	$ 0	$ 483,847
5. Market Value of Assets, End of Year: (1) + (2d) - (3d) + (4c)	$ 0	$ 11,505,584
6. Rate of Return on Market Value of Assets, Net of Expenses [1]	N/A	8.78%

[1] Based on individual fund experience. Assumes cash flows occur at mid-year.

TABLE 3

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS
(Base Benefits)

		For Plan Year Ending June 30, 2019
1. Market Value, as of June 30, 2018	$	12,694,327,690
2. Receipts [1]	$	572,028,773
3. Expenditures, Net of Administrative Expenses [2]	$	(894,297,814)
4. Expected Return on Assets [3]	$	845,990,539
5. Expected Market Value as of June 30, 2019: (1) + (2) + (3) + (4)	$	13,218,049,188
6. Actual Market Value as of June 30, 2019	$	13,259,490,887
7. Year end 2019 asset gain/(loss): (6) - (5)	$	41,441,699

8. Deferred Investment Gains and Losses

	Year Ended June 30:		Gain/(Loss)	Factor		Deferred Amount
a.	2016	$	(628,978,831)	20%	$	(125,795,766)
b.	2017		95,467,510	40%		38,187,004
c.	2018		279,267,274	60%		167,560,364
d.	2019		41,441,699	80%		33,153,359
e.	Total				$	113,104,961

9. Initial Actuarial Value as of June 30, 2019: (6) - (8e)	$	13,146,385,926
10. Constraining Values		
a. 80% of Market Value: (6) x 0.8	$	10,607,592,710
b. 120% of Market Value: (6) x 1.2	$	15,911,389,064
11. Actuarial Value as of June 30, 2019	$	13,146,385,926
12. Actuarial Rate of Return, Net of Expenses [4]		5.09%
13. Actuarial Value of Assets as a Percent of Market Value: (11) / (6)		99.1%
14. Actuarial Value of Assets		
a. Base Benefits	$	13,146,385,926
b. Supplemental Benefits	$	11,416,094
c. Total	$	13,157,802,020

[1] Includes Employer Contributions, Employee Service Purchases, and Miscellaneous Receipts.
[2] Includes DB Benefit Payments, Member Reassignment Transfers, and Miscellaneous Expenses.
[3] Assumes cash flows occur at mid-year and a return assumption of 6.75%.
[4] Assumes cash flows occur at mid-year.

TABLE 4

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS
(Supplemental Benefits)

		For Plan Year Ending June 30, 2019
1. Market Value, as of June 30, 2018	$	0
2. Receipts	$	11,021,737
3. Expenditures, Net of Administrative Expenses	$	0
4. Expected Return on Assets [1]	$	371,984
5. Expected Market Value as of June 30, 2019: (1) + (2) + (3) + (4)	$	11,393,721
6. Actual Market Value as of June 30, 2019	$	11,505,584
7. Year end 2019 asset gain/(loss): (6) - (5)	$	111,863

8. Deferred Investment Gains and Losses

	Year Ended June 30:		Gain/(Loss)	Factor		Deferred Amount
a.	2016	$	0	20%	$	0
b.	2017		0	40%		0
c.	2018		0	60%		0
d.	2019		111,863	80%		89,490
e.	Total				$	89,490

9. Initial Actuarial Value as of June 30, 2019: (6) - (8e)	$	11,416,094
10. Constraining Values		
a. 80% of Market Value: (6) x 0.8	$	9,204,467
b. 120% of Market Value: (6) x 1.2	$	13,806,701
11. Actuarial Value as of June 30, 2019	$	11,416,094
12. Actuarial Rate of Return, Net of Expenses [2]		7.16%
13. Actuarial Value of Assets as a Percent of Market Value: (11) / (6)		99.2%

[1] Assumes cash flows occur at mid-year and a return assumption of 6.75%.
[2] Assumes cash flows occur at mid-year.

In the previous section, an actuarial valuation was compared with an inventory process, and an analysis was given of the inventory of assets of the Public Employees' Retirement Fund as of the valuation date, June 30, 2019. In this section, the discussion will focus on the commitments (future benefit payments) of the plan, which are referred to as its liabilities.

The liability calculations for the June 30, 2019 Public Employees' Retirement Fund valuation are based on census data collected as of June 30, 2018. Standard actuarial techniques are used to adjust these results from June 30, 2018 to June 30, 2019. While these roll-forward techniques are based on all actuarial assumptions being met during the intervening year, there will, of course, be many of the assumptions that will not be met exactly. In general, this does not materially affect the resulting calculations or conclusions in this report. Should there be a year in which events, such as plan changes, occur that would affect the results, adjustments in the roll-forward methods would be made to appropriately reflect the events.

All liabilities reflect the benefit provisions and actuarial assumptions in place as of June 30, 2019.

Actuarial Accrued Liability

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. An actuarial cost method is a mathematical technique that allocates the present value of future benefits into annual costs. In order to do this allocation, it is necessary for the funding method to "breakdown" the present value of future benefits into two components:

(1) that which is attributable to the past and

(2) that which is attributable to the future.

Actuarial terminology calls the part attributable to the past the "past service liability" or the "actuarial accrued liability." The portion allocated to the future is known as the present value of future normal costs, with the specific piece of it allocated to the current year being called the "normal cost."

Table 5 contains the calculation of actuarial accrued liability for the Plan under the Entry Age Normal actuarial cost. This amount is split between the base benefit and the supplemental benefit. Once permanent COLAs have been granted, the obligation for future payments will also be included.

TABLE 5

ACTUARIAL ACCRUED LIABILITY
(Base and Supplemental Benefits)

			Supplemental Benefits					
As of June 30, 2019		**Base Benefits**		***Granted***		***Future***		**Total**
1. Actuarial Accrued Liability								
a. Active & Inactive Members	$	8,150,022,952	$	0	$	357,547,553	$	8,507,570,505
b. In-pay Members		7,886,986,917		0		181,502,745		8,068,489,662
c. Total	$	16,037,009,869	$	0	$	539,050,298	$	16,576,060,167
2. Actuarial Value of Assets	$	13,146,385,926	$	0	$	11,416,094	$	13,157,802,020
3. Unfunded Actuarial Accrued Liability: (1c) - (2)	$	2,890,623,943	$	0	$	527,634,204	$	3,418,258,147
4. Funded Ratio: (2) / (1c)		82.0%		N/A		2.1%		79.4%

TABLE 6

SOLVENCY TEST
(Base and Supplemental Benefits)

	Actuarial Accrued Liabilities (AAL)					Portion of AAL Covered by Assets			
Actuarial Valuation as of June 30	Active Member Contributions	Retirees and Beneficiaries	Active Member (Employer Financed Portion)	Total Actuarial Accrued Liabilities	Actuarial Value of Assets	Active Member Contributions	Retirees and Beneficiaries	Active Member (Employer Financed Portion)	Total Actuarial Accrued Liabilities
2019	$0	$8,068,490	$8,507,570	$16,576,060	$13,157,802	N/A	100.0%	59.8%	79.4%
2018	0	7,768,231	8,323,142	16,091,373	12,823,930	N/A	100.0	60.7	79.7
2017	2,770,962	7,834,962	8,500,291	19,106,215	15,098,920	100.0	100.0	52.9	79.0
2016	2,656,892	7,595,088	8,156,966	18,408,946	14,553,059	100.0	100.0	52.7	79.1
2015	2,717,173	6,981,308	8,282,087	17,980,568	14,131,884	100.0	100.0	53.5	78.6
2014	2,851,501	6,250,902	7,629,820	16,732,223	13,791,261	100.0	100.0	61.5	82.4
2013	2,796,103	6,367,819	6,981,759	16,145,681	12,947,283	100.0	100.0	54.2	80.2
2012	2,749,449	5,895,779	7,139,012	15,784,240	12,088,225	100.0	100.0	48.2	76.6
2011	2,805,023	5,370,786	6,737,338	14,913,147	12,000,586	100.0	100.0	56.8	80.5
2010	2,780,570	4,931,592	6,793,890	14,506,052	12,357,199	100.0	100.0	68.4	85.2

Note: Dollar amounts are in thousands of dollars. Amounts before 2018 reflect the inclusion of DC balances in both the active member contributions and the assets.

TABLE 7

RECONCILIATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY
(Base Benefits)

	For Year Ending June 30, 2019
1. Unfunded Actuarial Accrued Liability as of June 30, 2018	$ 2,744,775,678
2. Normal Cost	186,525,485
3. Actuarially Determined Contribution	(407,805,682)
4. Interest	170,335,945
5. Expected Unfunded Actuarial Accrued Liability as of June 30, 2019	$ 2,693,831,426
6. Actuarial Value of Asset Changes	
a. Investment Experience (Gain)/Loss	$ 210,013,680
b. Contributions (Above)/Below the Actuarially Determined Contribution	$ (154,366,118)
7. Actuarial Accrued Liability Changes	
a. Actuarial Accrued Liability Experience (Gain)/Loss	$ 128,639,200
b. Additional Liability Due to Benefit Changes	12,505,755
c. Additional Liability Due to Assumption Changes	0
8. Total Experience (Gain)/Loss	$ 196,792,517
9. Unfunded Actuarial Accrued Liability as of June 30, 2019: (5) + (8)	$ 2,890,623,943

TABLE 8

ACTUARIAL GAIN/(LOSS)
(Base Benefits)

Liabilities		
1. Actuarial Accrued Liability as of June 30, 2018	$	15,568,705,633
2. Normal Cost for Plan Year Ending June 30, 2019		186,525,485
3. Benefit Payments During Plan Year[1]		(887,245,886)
4. Service Purchases (employee and employer)		317,755
5. Member Reassignment Transfers		(5,787,037)
6. Interest at 6.75%		1,033,348,964
7. Change Due to Benefit Changes[2]		12,505,755
8. Change Due to Assumption Changes		0
9. Expected Actuarial Accrued Liability as of June 30, 2019	$	15,908,370,669
10. Actuarial Accrued Liability as of June 30, 2019	$	16,037,009,869

Assets		
11. Actuarial Value of Assets as of June 30, 2018	$	12,823,929,955
12. Receipts During Plan Year		572,028,773
13. Expenditures, Excluding Expenses, During Plan Year		(894,297,814)
14. Interest at 6.75%		854,738,692
15. Expected Actuarial Value of Assets as of June 30, 2019	$	13,356,399,606
16. Actuarial Value of Assets as of June 30, 2019	$	13,146,385,926

Experience Gain / (Loss)		
17. Liability Actuarial Experience Gain/(Loss): (10) - (11)	$	(128,639,200)
18. Asset Actuarial Experience Gain/(Loss): (17) - (16)		(210,013,680)
19. Total Actuarial Experience Gain/(Loss): (18) + (19)	$	(338,652,880)

[1] Does not include miscellaneous expenses or benefit overpayments.
[2] House Enrolled Act No. 1059 expanded eligibility of the preretirement death benefit for members with 10 years of service.

TABLE 9

EXPERIENCE GAIN/(LOSS) ANALYSIS BY SOURCE
(Base Benefits)

Liability Sources		Gain/(Loss)
Retirement	$	(14,334,000)
Termination		(3,541,000)
Disability		(3,197,000)
Mortality		54,614,000
Salary		(104,733,000)
New Entrants/Rehires		(35,263,000)
Miscellaneous/COLA		(22,185,000)
Total Liability Experience Gain/(Loss)	$	(128,639,000)
as a % of AAL		(0.8%)
Asset Experience Gain/(Loss)	$	(210,014,000)
Net Actuarial Experience Gain/(Loss)	$	(338,653,000)

TABLE 10

PROJECTED BENEFIT PAYMENTS
(Base and Supplemental Benefits)

Plan Year Ending June 30	Benefit Amount
2020	$ 981,040,527
2021	1,023,648,785
2022	1,035,839,565
2023	1,078,483,933
2024	1,117,657,260
2025	1,157,216,660
2026	1,194,579,274
2027	1,230,006,474
2028	1,262,586,485
2029	1,292,227,021
2030	1,319,138,963
2031	1,342,853,855
2032	1,363,911,148
2033	1,380,969,365
2034	1,395,022,225
2035	1,406,628,997
2036	1,414,804,172
2037	1,419,716,544
2038	1,420,932,491
2039	1,419,563,115
2040	1,415,923,353
2041	1,409,105,717
2042	1,398,843,995
2043	1,385,848,639
2044	1,369,781,829
2045	1,351,064,616
2046	1,329,356,761
2047	1,304,782,125
2048	1,277,351,078
2049	1,247,438,479

Note: Payouts reflect nominal payouts for current members, assuming that all future assumptions are met.

The previous two sections were devoted to a discussion of the assets and liabilities of the plan. We now turn to considering how the benefits will be funded. The method used to determine the incidence of the contributions in various years is called the actuarial cost method. Under an actuarial cost method, the contributions required to meet the difference between current assets and current liabilities are allocated each year between two elements: (1) the normal cost rate and (2) the unfunded actuarial accrued liability contribution rate.

The term "fully funded" is often applied to a plan in which contributions at the normal cost rate are sufficient to pay for the benefits of existing employees as well as for those of new employees. More often than not, plans are not fully funded, either because of past benefit improvements that have not been completely funded, contribution levels, or because of actuarial deficiencies that have occurred because experience has not been as favorable as anticipated by the actuarial assumptions. Under these circumstances, an unfunded actuarial accrued liability (UAAL) exists. Likewise, when the actuarial value of assets is greater than the actuarial accrued liability, a surplus exists.

Description of Contribution Rate Components

The Entry Age Normal (EAN) actuarial cost method is used for the valuation. Under that method, the normal cost for each year from entry age to assumed exit age is a constant percentage of the member's year by year projected compensation. The portion of the present value of future benefits not provided by the present value of future normal costs is the actuarial accrued liability. The unfunded actuarial accrued liability/(surplus) represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. For PERF purposes, this calculation excludes consideration of future COLAs. The unfunded actuarial accrued liability is calculated each year and reflects experience gains and losses. New amortization bases are funded over 20 years.

Funding for future COLAs is provided by using a surcharge. This rate is intended to fund the COLAs anticipated to be granted in the next biennium by the start of that biennium.

In general, contributions are computed in accordance with a level percent-of-payroll funding objective. The contribution rate based on the June 30, 2019 actuarial valuation will be used to calculate the actuarially determined employer contribution rate to the Public Employees' Retirement Fund for the plan year ending June 30, 2021.

Contribution Rate Summary

In Table 11 the amortization payment related to the unfunded actuarial accrued liability/(surplus), as of June 30, 2019, is developed. The surcharge needed to fund the assumed COLAs is developed in Table 12. Table 13 develops the actuarial required contribution rate for the Plan. The contribution rates shown in this report are based on the actuarial assumptions and cost methods described in Appendix C. Additionally, in Table 14 the contribution amounts under alternative discount rates are provided to illustrate the sensitivity of the contribution requirements relative to the selection of the investment return assumption.

TABLE 11

SCHEDULE OF AMORTIZATION BASES
(Base Benefits)

Amortization Bases[1]	Original Amount [2]	June 30, 2019 Remaining Payments	Date of Last Payment	Outstanding Balance as of June 30, 2019	Annual Contribution
2006 Fresh Start - Political Only	233,415,887	17	7/1/2036	182,199,780	17,180,318
2007 UAAL Base - Political Only	4,630,369	18	7/1/2037	3,704,910	338,826
2008 State Fresh Start and PSD Experience	91,514,739	19	7/1/2038	75,732,074	6,735,841
2009 UAAL Base	618,751,215	20	7/1/2039	525,206,346	45,542,498
2010 UAAL Base	1,223,323,148	21	7/1/2040	1,062,759,931	90,041,345
2011 UAAL Base	788,425,716	22	7/1/2041	699,664,477	58,031,201
2012 UAAL Base	817,830,775	23	7/1/2042	740,063,527	60,195,529
2013 UAAL Base	(450,263,746)	24	7/1/2043	(414,825,778)	(33,141,164)
2014 UAAL Base	(211,870,908)	25	7/1/2044	(198,447,572)	(15,594,523)
2015 UAAL Base	954,017,677	26	7/1/2045	907,291,766	70,219,414
2016 UAAL Base	67,185,548	17	7/1/2036	61,784,481	5,825,896
2017 UAAL Base	217,123,363	18	7/1/2037	205,870,858	18,827,534
2018 UAAL Base	(1,186,925,679)	19	7/1/2038	(1,157,173,374)	(102,922,518)
2019 UAAL Base	196,792,517	20	7/1/2039	196,792,517	17,064,574
Total				$ 2,890,623,943	$ 238,344,771

1. Total UAAL Amortization Payments	$ 238,344,771
2. Projected Payroll for FY 2020	$ 5,335,373,772
3. UAAL Amortization Payment Rate	4.47%
4. Remaining Amortization Period in Years (Weighted)[3]	22.5

[1] Amortization bases prior to 2018 are the State and Political Subdivision bases combined.
[2] The original amounts from 2017 to 2013 were provided by the prior actuary. Amounts prior to that were estimated by INPRS.
[3] The weighted average remaining UAAL amortization period is calculated by weighting the remaining amortization period of each base by the amortization amount of each base.

TABLE 12

DEVELOPMENT OF SURCHARGE RATE
(Supplemental Benefits)

Projected COLAs in Next Biennium Beginning July 1, 2021		
First Anticipated COLA		
1. Date of COLA commencement		January 1, 2022
2. Rate of COLA		0.4%
3. Value as of July 1, 2021 of COLA	$	31,370,759
Second Anticipated COLA		
4. Date of COLA commencement		January 1, 2023
5. Rate of COLA		0.4%
6. Value as of July 1, 2021 of COLA		30,589,706
7. Total COLA Funding Requirement as of July 1, 2021: (3) + (6)	$	61,960,465
Funding Sources for Projected COLAs		
8. Assets as of June 30, 2019 Available for Future COLAs	$	11,416,094
9. Projected Contributions from 7/1/19 to 12/31/19		11,194,914
10. Expected Earnings through July 1, 2021		2,953,842
11. Projected Available Assets at July 1, 2021	$	25,564,849
12. Required Additional Funding for Anticipated COLAs: (7) - (11)		36,395,616
Surcharge Rate		
13. Projected Payroll from 1/1/20 to 6/30/20		2,603,468,267
14. Projected Payroll from 7/1/20 to 6/30/21		5,337,109,947
15. Value of (13) and (14) as of July 1, 2021	$	8,343,338,822
16. Surcharge Rate: (12) /(15)		0.44%

TABLE 13

ACTUARIAL REQUIRED CONTRIBUTION RATE
(Base and Supplemental Benefits)

	Base Benefits	Supplemental Benefits	Total
1. Projected Payroll for FY 2020	$ 5,335,373,772		
2. Normal Cost Rate as of June 30, 2018 Census	3.60%	0.17%	3.77%
a. State Normal Cost Rate	3.11%	0.15%	3.26%
b. Political Subdivision Normal Cost Rate	3.83%	0.18%	4.01%
3. Amortization of UAAL as of June 30, 2019			
a. Dollar Amount	$ 238,344,771		
b. Percent of Projected Pay	4.47%		
4. Preliminary Actuarially Determined Contribution Rate: (2) + (3b)	8.07%		
5. Supplemental Benefit Surcharge Rate (May not exceed 1%)		0.44%	
6. Actuarially Determined Contribution Rate	8.07%	0.44%	8.51%
7. Board Policy Contribution Rate	10.76%	0.44%	11.20%

TABLE 14

INVESTMENT RETURN SENSITIVITY
(Base and Supplemental Benefits)

	1.00% Decrease: (5.75%)	0.75% Decrease: (6.00%)	0.50% Decrease: (6.25%)	0.25% Decrease: (6.50%)	Current Assumption: (6.75%)
Funded Status					
Actuarial Accrued Liability	$18,578,972,386	$18,042,769,616	$17,531,120,459	$17,042,647,497	$16,576,060,167
Actuarial Value of Assets	13,157,802,020	13,157,802,020	13,157,802,020	13,157,802,020	13,157,802,020
Unfunded Actuarial Accrued Liability	$5,421,170,366	$4,884,967,596	$4,373,318,439	$3,884,845,477	$3,418,258,147
Funded Ratio	70.8%	72.9%	75.1%	77.2%	79.4%
Actuarially Determined Contribution Amount					
Normal Cost	$262,272,370	$245,212,295	$229,402,356	$214,743,141	$201,143,591
UAAL Amortization	424,974,570	388,998,789	353,542,657	318,583,011	284,097,793
Actuarially Determined Contribution Amount	$687,246,940	$634,211,084	$582,945,013	$533,326,152	$485,241,384
Actuarially Determined Contribution Rate	12.88%	11.89%	10.93%	10.00%	9.09%

	0.25% Increase: (7.00%)	0.50% Increase: (7.25%)	0.75% Increase: (7.50%)	1.00% Increase: (7.75%)	1.25% Increase: (8.00%)
Funded Status					
Actuarial Accrued Liability	$16,130,148,887	$15,703,779,584	$15,295,888,631	$14,905,478,111	$14,531,611,442
Actuarial Value of Assets	13,157,802,020	13,157,802,020	13,157,802,020	13,157,802,020	13,157,802,020
Unfunded Actuarial Accrued Liability	$2,972,346,867	$2,545,977,564	$2,138,086,611	$1,747,676,091	$1,373,809,422
Funded Ratio	81.6%	83.8%	86.0%	88.3%	90.5%
Actuarially Determined Contribution Amount					
Normal Cost	$188,520,273	$176,796,718	$165,902,818	$155,774,275	$146,352,102
UAAL Amortization	250,066,015	216,467,708	183,283,889	150,496,510	118,088,432
Actuarially Determined Contribution Amount	$438,586,288	$393,264,426	$349,186,707	$306,270,785	$264,440,534
Actuarially Determined Contribution Rate	8.22%	7.37%	6.54%	5.74%	4.96%

Note: Comparisons are based on funding the COLA in the same method as the base benefit, rather than with a surcharge. Consequently, these results are for comparative purposes only and will not match the actual results under the funding policy.

GASB NO. 67 AND GASB NO. 68

The Governmental Accounting Standards Board issued Statement No. 67 (GASB 67), "Financial Reporting for Pension Plans" and Statement No. 68 (GASB 68), "Accounting and Financial Reporting for Pensions" in June 2012. The effective date for reporting under GASB 67 for the INPRS Plans was the fiscal year ending June 30, 2014. GASB 68's effective date for employers is the first fiscal year beginning after June 15, 2014.

The sections that follow provide the results of all the required calculations, presented in the order set out in GASB 68 for note disclosure and Required Supplementary Information (RSI). Some of this information was provided by the INPRS for use in this report.

The discount rate used for these disclosures is the assumed return on assets of 6.75%. We have verified that the current assets in conjunction with future contributions made on behalf of current members (including all contributions to fund any past service liability) will be sufficient to make the anticipated benefit payments to be provided to the current members.

To the best of our knowledge, the information contained in this report is complete and accurate. The calculations were performed by qualified actuaries according to generally accepted actuarial principles and practices, as well as in conformity with Actuarial Standards of Practice issued by the Actuarial Standards Board. The calculations are based on the current provisions of the plan, and on actuarial assumptions that are internally consistent and individually reasonable based on the actual experience of the plan. In addition, the calculations were completed in compliance with applicable law and, in our opinion, meet the requirements of GASB 67 and GASB 68.

TABLE 15

STATEMENT OF FIDUCIARY NET POSITION

			June 30, 2019
1. Assets			
a. Cash		$	1,346,078
b. Receivables			
i.	Contributions and Miscellaneous Receivables	$	8,139,539
ii.	Investments Receivable		137,099,161
iii.	Foreign Exchange Contracts Receivable		3,656,998,081
iv.	Interest and Dividends		34,307,091
v.	Receivables Due From Other Funds		3,965,246
vi.	Total Receivables	$	3,840,509,118
c. Investments			
i.	Short-Term Investments	$	0
ii.	Pooled Repurchase Agreements		2,557,415
iii.	Pooled Short-Term Investments		725,887,248
iv.	Pooled Fixed Income		4,483,900,560
v.	Pooled Equity		2,883,574,849
vi.	Pooled Alternative Investments		5,510,723,132
vii.	Pooled Derivatives		7,626,508
viii.	Pooled Investments		0
ix.	Securities Lending Collateral		44,716,728
x.	Total Investments	$	13,658,986,440
d. Net Capital Assets			4,911,154
e. Other Assets			201,212
f. Total Assets: a + b(vi) + c(x) + d + e		$	17,505,954,002
2. Liabilities			
a. Administrative Payable		$	6,171,377
b. Retirement Benefits Payable			994,193
c. Investments Payable			230,092,314
d. Foreign Exchange Contracts Payable			3,675,925,790
e. Securities Lending Obligations			44,716,728
f. Securities Sold Under Agreement to Repurchase			277,057,129
g. Due To Other Funds			0
h. Due to Other Governments			0
i. Total Liabilities: a + b + c + d + e + f + g + h		$	4,234,957,531
3. Fiduciary Net Position Restricted for Pensions: (1)(f) - (2)(i)		**$**	**13,270,996,471**

TABLE 16

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION

		For Fiscal Year Ending June 30, 2019
1. Fiduciary Net Position as of June 30, 2018	**$**	**12,694,327,690**
2. Additions		
a. Contributions		
i. Member Contributions		0
ii. Employer Contributions		581,850,681
iii. Service Purchases (Employer and Member) [1]		317,755
iv. Non-Employer Contributing Entity Contributions		0
v. Total Contributions	$	582,168,436
b. Investment Income/(Loss)		
i. Net Appreciation/(Depreciation)	$	799,982,523
ii. Net Interest and Dividend Income		192,842,643
iii. Securities Lending Income		1,282,334
iv. Other Net Investment Income		498,710
v. Investment Management Expenses		(82,404,645)
vi. Direct Investment Expenses		(5,548,420)
vii. Securities Lending Expenses		(265,144)
viii. Total Investment Income/(Loss)	$	906,388,001
c. Other Additions		
i. Member Reassignments		2,101,465
ii. Miscellaneous Receipts		882,074
iii. Total Other Additions	$	2,983,539
d. Total Revenue (Additions): a(v) + b(viii) + c(iii)	$	1,491,539,976
3. Deductions		
a. Pension, Survivor and Disability Benefits	$	888,510,777
b. Death and Funeral Benefits		0
c. Distributions of Contributions and Interest		0
d. Administrative Expenses [2]		18,471,916
e. Member Reassignments		7,888,502
f. Miscellaneous Expenses		0
g. Total Expenses (Deductions)	$	914,871,195
4. Net Increase (Decrease) in Fiduciary Net Position: (2)(d) - (3)(g)	**$**	**576,668,781**
5. Fiduciary Net Position as of June 30, 2019: (1) + (4)	**$**	**13,270,996,471**

[1] Service purchases paid by employer of $23,003 and employee of $294,752.

[2] Includes $1,185,544 of Hybrid Plan contributions and $301,756 of My Choice Plan contributions made by INPRS.

TABLE 17

SCHEDULE OF CHANGES IN NET PENSION LIABILITY

	For Fiscal Year Ending June 30, 2019		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) – (b)
1. Balance at June 30, 2018	$ 16,091,372,940	$ 12,694,327,690	$ 3,397,045,250
2. Changes for the Year:			
Service Cost (SC) [1]	195,382,841		195,382,841
Interest Cost	1,069,184,188		1,069,184,188
Experience (Gains)/Losses	101,180,620		101,180,620
Assumption Changes	0		0
Plan Amendments	12,919,637		12,919,637
Benefit Payments	(888,510,777)	(888,510,777)	0
Service Purchases			
Employer Contributions	23,003	23,003	0
Employee Contributions	294,752	294,752	0
Member Reassignments [2]	(5,787,037)	(5,787,037)	0
Employer Contributions [3]		581,850,681	(581,850,681)
Non-employer Contributions		0	0
Employee Contributions		0	0
Net Investment Income		906,388,001	(906,388,001)
Administrative Expenses [4]		(18,471,916)	18,471,916
Other		882,074	(882,074)
Net Changes	$ 484,687,227	$ 576,668,781	$ (91,981,554)
3. Balance at June 30, 2019	$ 16,576,060,167	$ 13,270,996,471	$ 3,305,063,696

[1] Service cost provided as of beginning of year. Interest to end of year is included in the interest cost.

[2] Includes net interfund transfers of employer contributed amounts.

[3] Includes $292,172 of withdrawal payments and $4,760,000 of state appropriations to the fund.

[4] Includes contributions made by INPRS for its employees of $1,185,544 in the Hybrid Plan and $301,756 in the My Choice Plan.

TABLE 18

DEFERRED OUTFLOWS OF RESOURCES

	June 30, 2018	Remaining Period	Recognition	June 30, 2019
1. Liability Experience				
June 30, 2019 Loss	$ 101,180,620	3.86	$ 26,212,596	$ 74,968,024
June 30, 2018 Loss	14,988,014	2.93	5,115,364	9,872,650
June 30, 2017 Loss	29,438,706	1.10	26,762,461	2,676,245
June 30, 2016 Loss	0	0.15	0	0
June 30, 2015 Loss	0	0.00	0	0
June 30, 2014 Loss	0	0.00	0	0
2. Assumption Changes				
June 30, 2019 Loss	$ 0	3.86	$ 0	$ 0
June 30, 2018 Loss	0	2.93	0	0
June 30, 2017 Loss	8,093,577	1.10	7,357,798	735,779
June 30, 2016 Loss	0	0.15	0	0
June 30, 2015 Loss	0	0.00	0	0
June 30, 2014 Loss	0	0.00	0	0
3. Investment Experience				
June 30, 2019 Loss	$ 0	5.00	$ 0	$ 0
June 30, 2018 Loss	0	4.00	0	0
June 30, 2017 Loss	0	3.00	0	0
June 30, 2016 Loss	241,577,910	2.00	120,788,957	120,788,953
June 30, 2015 Loss	171,685,504	1.00	171,685,504	0
Total Outflows: (1)+(2)+(3)	**$ 566,964,331**		**$ 357,922,680**	**$ 209,041,651**

Information was provided prospectively from June 30, 2013 for GASB No. 68 purposes. Results prior to 2018 were produced by the prior actuary.

In accordance with GASB, the original amortization period for liability experience and assumption changes are amortized over the expected future working lifetime of all members, whereas the investment experience is amortized over five years.

TABLE 19

DEFERRED INFLOWS OF RESOURCES

	June 30, 2018	Remaining Period	Recognition	June 30, 2019
1. Liability Experience				
June 30, 2019 Gain	$ 0	3.86	$ 0	$ 0
June 30, 2018 Gain	0	2.93	0	0
June 30, 2017 Gain	0	1.10	0	0
June 30, 2016 Gain	231,904	0.15	231,904	0
June 30, 2015 Gain	0	0.00	0	0
June 30, 2014 Gain	0	0.00	0	0
2. Assumption Changes				
June 30, 2019 Gain	$ 0	3.86	$ 0	$ 0
June 30, 2018 Gain	545,442,771	2.93	186,157,943	359,284,828
June 30, 2017 Gain	0	1.10	0	0
June 30, 2016 Gain	0	0.15	0	0
June 30, 2015 Gain	0	0.00	0	0
June 30, 2014 Gain	0	0.00	0	0
3. Investment Experience				
June 30, 2019 Gain	$ 60,648,906	5.00	$ 12,129,782	$ 48,519,124
June 30, 2018 Gain	240,651,809	4.00	60,162,953	180,488,856
June 30, 2017 Gain	72,004,469	3.00	24,001,491	48,002,978
June 30, 2016 Gain	0	2.00	0	0
June 30, 2015 Gain	0	1.00	0	0
Total Inflows: (1)+(2)+(3)	**$ 918,979,859**		**$ 282,684,073**	**$ 636,295,786**

Information was provided prospectively from June 30, 2013 for GASB No. 68 purposes. Results prior to 2018 were produced by the prior actuary.

In accordance with GASB, the original amortization period for liability experience and assumption changes are amortized over the expected future working lifetime of all members, whereas the investment experience is amortized over five years.

TABLE 20

DEFERRED INFLOWS / OUTFLOWS TO BE RECOGNIZED IN PENSION EXPENSE

Fiscal Year Ending June 30	Deferred Outflows	Deferred Inflows	Net Deferred Outflows/(Inflows)
Current Year:			
2019	$ 357,922,680	$ 282,684,073	$ 75,238,607
Future Years:			
2020	$ 155,528,937	$ 282,452,169	$ (126,923,232)
2021	30,969,882	269,421,107	(238,451,225)
2022	22,542,832	72,292,732	(49,749,900)
2023	0	12,129,778	(12,129,778)
2024	0	0	0
Thereafter	0	0	0

TABLE 21

PENSION EXPENSE UNDER GASB NO. 68

		For Fiscal Year Ending June 30, 2019
1. Service Cost, beginning of year		$ 195,382,841
2. Interest Cost, including interest on service cost		1,069,184,188
3. Member Contributions [1]		0
4. Administrative Expenses [2]		16,984,616
5. Expected Return on Assets [3]		(845,739,095)
6. Plan Amendments		12,919,637
7. Recognition of Deferred Inflows / Outflows of Resources Related to:		
a. Liability Experience (Gains) / Losses	57,858,517	
b. Assumption Change (Gains) / Losses	(178,800,145)	
c. Investment Experience (Gains) / Losses	196,180,235	
d. Total: (7a)+(7b)+(7c)		75,238,607
8. Miscellaneous (Income) / Expense		(882,074)
9. Total Collective Pension Expense: (1)+(2)+(3)+(4)+(5)+(6)+(7d)+(8)		523,088,720
10. Employer Service Purchases [4]		23,003
Pension Expense / (Income): (9) + (10)		**$ 523,111,723**

[1] Excludes member paid service purchases of $294,752.
[2] Excludes contributions made by INPRS for its employees of $1,185,544 in the Hybrid Plan and $301,756 in the My Choice Plan.
[3] Cash flows assumed to occur mid-year.
[4] To be expensed by the employers who purchased the service.

GASB NO. 67 and GASB NO. 68
NOTES TO THE FINANCIAL STATEMENTS

The material presented herein is a subset of the information requested as Notes to the Financial Statements. Required information not provided herein is to be supplied by the plan.

Actuarial Assumptions and Inputs

Significant actuarial assumptions and other inputs used to measure the total pension liability:

Type of Plan	The Public Employees' Retirement Fund is a cost-sharing multiple-employer plan for GASB accounting purposes.
Measurement Date	June 30, 2019
Valuation Date	
Assets:	June 30, 2019
Liabilities:	June 30, 2018 – The TPL as of June 30, 2019 was determined based on an actuarial valuation prepared as of June 30, 2018 rolled forward one year to June 30, 2019, using the following key actuarial assumptions and other inputs, such as benefit accruals and actual benefit payments during that time period.
Inflation	2.25%
Future Salary Increases	2.50% - 4.25% based on age
Cost-of-Living Increases	As of June 30, 2019: In lieu of a COLA on January 1, 2020 and January 1, 2021, members in pay were provided a 13th check on October 1, 2019 and October 1, 2020. Thereafter, the following COLAs, compounded annually, were assumed: 0.4% beginning on January 1, 2022 0.5% beginning on January 1, 2034 0.6% beginning on January 1, 2039 As of June 30, 2018: In lieu of a COLA on January 1, 2019, members in pay were provided a 13th check on October 1, 2018. It is assumed a 13th check would continue for the 2020 and 2021 fiscal years. Thereafter, the following COLAs, compounded annually, were assumed: 0.4% beginning on January 1, 2022 0.5% beginning on January 1, 2034 0.6% beginning on January 1, 2039

Mortality Assumption (Healthy)	RP-2014 (with MP-2014 improvement removed) Total Data Set Mortality Table, with future mortality improvement projected generationally using future mortality improvement inherent in the Social Security Administration's 2014 Trustee report.
Mortality Assumption (Disabled)	RP-2014 (with MP-2014 improvement removed) Disability Mortality Table, with future mortality improvement projected generationally using future mortality improvement inherent in the Social Security Administration's 2014 Trustee report.
Experience Study	The most recent comprehensive experience study was completed in April 2015 and was based on member experience between June 30, 2010 and June 30, 2014. The demographic assumptions were updated as needed for the June 30, 2015 actuarial valuation based on the results of the study.
Discount Rate	6.75%, net of investment expenses

The discount rate is equal to the expected long-term rate of return on plan investments, net of investment expense and including price inflation. There was no change in the discount rate from the prior measurement date.

The INPRS Board of Trustees has established a funding policy of setting the employer contribution rate equal to the greater of 11.2% (the current contribution rate) or a rate equal to the actuarially determined contribution rate, which is based on the assumptions and methods selected by the Board for the annual actuarial valuations and projected covered member payroll. The June 30, 2019 actuarial valuation assumes a long-term rate of return on assets of 6.75%, a 20-year level dollar closed method for amortizing the future layers of unfunded actuarial accrued liability (30 years for amortization layers established prior to June 30, 2016), and a 5-year smoothing method for recognizing investment gains and losses in the actuarial value of assets.

In the past several years, the Board has followed its current funding policy and the State has complied in its contributions to the plan. Therefore, if past practice is continued, the appropriations will be sufficient to fully fund the plan within 20 to 30 years. In the past, deterministic projections have shown the actuarially determined contribution rate to reach a peak of 10.9% which is slightly below the current rate. As a result, it is presumed that the projected plan assets will be sufficient to cover the future benefit payments for current members and a detailed projection of plan assets and cash flows has not been prepared.

Discount Rate Sensitivity

	1% Decrease 5.75%	Current Rate 6.75%	1% Increase 7.75%
Net Pension Liability	$5,307,975,915	$3,305,063,696	$1,634,481,640

Classes of Plan Members Covered

The June 30, 2019 valuation was performed using census data provided by INPRS as of June 30, 2018. Standard actuarial techniques were used to roll forward the total pension liability computed as of June 30, 2018 to the June 30, 2019 measurement date using actual benefit payments during that period of time.

Number as of June 30, 2018	
1. Currently Receiving Benefits:	
Retired Members, Disabled Members, and Beneficiaries	89,932
2. Inactive Members Entitled To But Not Yet Receiving Benefits	33,062
3. Inactive Non-vested Members Entitled to a Refund of Member Contributions	0
4. Active Members	129,099
Total Covered Plan Members: (1)+(2)+(3)+(4)	252,093

Money-Weighted Rate of Return

The money-weighted rate of return equals investment performance, net of pension plan investment expense, adjusted for the changing amounts actually invested. For the fiscal year ending June 30, 2019, the money-weighted return on the plan assets is 7.3%.

Components of Net Pension Liability

As of June 30, 2019		
Total Pension Liability	$	16,576,060,167
Fiduciary Net Position		13,270,996,471
Net Pension Liability	$	3,305,063,696
Ratio of Fiduciary Net Position to Total Pension Liability		80.06%

GASB NO. 67 AND GASB NO. 68: REQUIRED SUPPLEMENTAL INFORMATION
SCHEDULE OF CHANGES IN THE TOTAL PENSION LIABILITY AND PLAN FIDUCIARY NET POSITION

Fiscal Year Ending June 30	2013	2014	2015	2016	2017	2018	2019
Total Pension Liability							
Total Pension Liability - beginning	$15,784,239,911	$16,145,680,789	$16,732,222,649	$17,980,568,263	$18,408,946,980	$19,106,214,994	$16,091,372,940
DC Account Balances - beginning [1]	2,749,448,762	2,796,102,616	2,851,500,608	2,717,173,311	2,656,892,220	2,770,961,812	0
DB Pension Liability - beginning	$13,034,791,149	$13,349,578,173	$13,880,722,041	$15,263,394,952	$15,752,054,760	$16,335,253,182	$16,091,372,940
Service Cost (SC), beginning-of-year	270,973,983	258,069,653	273,909,865	191,055,506	194,101,310	202,323,634	195,382,841
Interest Cost, including interest on SC	875,615,527	895,453,921	936,403,574	1,018,992,903	1,051,217,483	1,088,503,109	1,069,184,188
Experience (Gains)/Losses	(104,470,833)	(15,161,517)	247,977,703	(4,869,991)	82,963,628	20,103,378	101,180,620
Assumption Changes	0	0	488,354,517	0	22,809,173	(731,600,714)	0
Plan Amendments	(167,485,633)	(42,984,699)	0	0	(22,765,723)	0	12,919,637
DC Annuitizations	107,520,485	119,094,145	196,788,238	75,035,755	78,792,615	43,873,966	0
Actual Benefit Payments	(662,283,487)	(680,203,104)	(752,895,719)	(786,606,562)	(820,721,414)	(860,613,831)	(888,510,777)
Member Reassignments	(5,083,018)	(3,124,531)	(8,155,200)	(5,441,493)	(3,617,572)	(7,030,159)	(5,787,037)
Service Purchases	0	0	289,933	493,690	418,922	560,375	317,755
Net Change in Total Pension Liability	314,787,024	531,143,868	1,382,672,911	488,659,808	583,198,422	(243,880,242)	484,687,227
DB Pension Liability - ending	$13,349,578,173	$13,880,722,041	$15,263,394,952	$15,752,054,760	$16,335,253,182	$16,091,372,940	$16,576,060,167
DC Account Balances - ending [1]	2,796,102,616	2,851,500,608	2,717,173,311	2,656,892,220	2,770,961,812	0	0
(a) Total Pension Liability - ending	$16,145,680,789	$16,732,222,649	$17,980,568,263	$18,408,946,980	$19,106,214,994	$16,091,372,940	$16,576,060,167
Plan Fiduciary Net Position							
Plan Fiduciary Net Position – beginning	$12,243,753,114	$12,720,601,718	$14,104,287,554	$13,907,666,213	$13,870,502,444	$14,644,671,525	$12,694,327,690
DC Account Balances - beginning [1]	2,749,448,762	2,796,102,616	2,851,500,608	2,717,173,311	2,656,892,220	2,770,961,812	0
DB Plan Fiduciary Net Position – beginning	$9,494,304,352	$9,924,499,102	$11,252,786,946	$11,190,492,902	$11,213,610,224	$11,873,709,713	$12,694,327,690
Contributions – employer	455,658,474	526,089,688	538,059,283	615,773,383	558,892,767	571,373,825	581,873,684
Contributions – non-employer	0	0	0	0	0	0	0
Contributions – member	0	0	0	442,809	589,663	708,034	294,752
Net investment income	563,532,572	1,393,813,042	(10,667,128)	147,106,621	870,591,483	1,093,094,099	906,388,001
Actual benefit payments	(662,283,487)	(680,203,104)	(752,895,719)	(786,606,562)	(820,721,414)	(860,613,831)	(888,510,777)
Net member reassignments	(5,083,018)	(3,124,531)	(8,155,200)	(5,441,493)	(3,617,572)	(7,030,159)	(5,787,037)
DC Annuitizations	107,520,485	119,094,145	196,788,238	75,035,755	78,792,615	43,873,966	0
Administrative expense	(29,181,276)	(27,433,396)	(25,506,518)	(24,098,191)	(24,483,053)	(20,844,003)	(18,471,916)
Other	31,000	52,000	83,000	905,000	55,000	56,046	882,074
Net change in Plan Fiduciary Net Position	430,194,750	1,328,287,844	(62,294,044)	23,117,322	660,099,489	820,617,977	576,668,781
DB Plan Fiduciary Net Position – ending	$9,924,499,102	$11,252,786,946	$11,190,492,902	$11,213,610,224	$11,873,709,713	$12,694,327,690	$13,270,996,471
DC Account Balances - ending [1]	2,796,102,616	2,851,500,608	2,717,173,311	2,656,892,220	2,770,961,812	0	0
(b) Plan Fiduciary Net Position - ending	$12,720,601,718	$14,104,287,554	$13,907,666,213	$13,870,502,444	$14,644,671,525	$12,694,327,690	$13,270,996,471
Net Pension Liability - ending, (a) - (b)	$3,425,079,071	$2,627,935,095	$4,072,902,050	$4,538,444,536	$4,461,543,469	$3,397,045,250	$3,305,063,696

[1] Effective January 1, 2018, DC account balances are handled by a third party annuity provider and are treated as a separate defined contribution plan.
Information was provided prospectively from June 30, 2013 for GASB No. 67 and GASB No. 68 purposes. Results prior to 2018 were produced by the prior actuary.

GASB NO. 67 AND GASB NO. 68: REQUIRED SUPPLEMENTAL INFORMATION

SCHEDULE OF THE NET PENSION LIABILITY

Fiscal Year Ending June 30	2013	2014	2015	2016	2017	2018	2019
Total Pension Liability	$16,145,680,789	$16,732,222,649	$17,980,568,263	$18,408,946,980	$19,106,214,994	$16,091,372,940	$16,576,060,167
Plan Fiduciary Net Position	12,720,601,718	14,104,287,554	13,907,666,213	13,870,502,444	14,644,671,525	12,694,327,690	13,270,996,471
Net Pension Liability	$3,425,079,071	$2,627,935,095	$4,072,902,050	$4,538,444,536	$4,461,543,469	$3,397,045,250	$3,305,063,696
Ratio of Plan Fiduciary Net Position to Total Pension Liability	78.79%	84.29%	77.35%	75.35%	76.65%	78.89%	80.06%
Covered-employee payroll [1]	$4,700,000,000	$4,896,635,240	$4,804,145,033	$4,868,709,366	$4,997,555,495	$5,083,130,815	$5,205,242,704
Net Pension Liability as a percentage of covered-employee payroll	72.87%	53.67%	84.78%	93.22%	89.27%	66.83%	63.49%

[1] As provided by INPRS.

Information was provided prospectively from June 30, 2013 for GASB No. 67 and GASB No. 68 purposes. Results prior to 2018 were produced by the prior actuary.

GASB NO. 67 AND GASB NO. 68: REQUIRED SUPPLEMENTAL INFORMATION

SCHEDULE OF EMPLOYER CONTRIBUTIONS

Fiscal Year Ending June 30	2013	2014	2015	2016	2017	2018	2019
Actuarially Determined Contribution [1]	$464,046,667	$528,562,365	$517,716,612	$491,999,602	$496,867,070	$502,205,573	$527,836,147
Actual employer contributions [2]	$455,658,474	$519,575,670	$536,202,332	$547,684,477	$558,660,887	$571,098,939	$581,850,681
Annual contribution (deficiency) / excess	($8,388,193)	($8,986,695)	$18,485,720	$55,684,875	$61,793,817	$68,893,366	$54,014,534
Covered-employee payroll [3]	$4,700,000,000	$4,896,635,240	$4,804,145,033	$4,868,709,366	$4,997,555,495	$5,083,130,815	$5,205,242,704
Actual contributions as a percentage of covered-employee payroll	9.69%	10.61%	11.16%	11.25%	11.18%	11.24%	11.18%

[1] The State and Political Subdivision employer rates were applied to the actual covered employee payroll for the fiscal year to determine the contribution amount.
State - The actuarially determined contribution rate was developed in the actuarial funding valuation completed one year prior to the fiscal year.
Political Subdivisions - The rate is determined as the average of these two rates:
a. Actuarially determined contribution rate for January-June was developed in the actuarial funding valuation completed one year prior to the fiscal year.
b. Actuarially determined contribution rate for July-December was developed in the actuarial funding valuation completed two years prior to the fiscal year.

[2] Excludes service purchases paid for by the employer of $23,003.

[3] As provided by INPRS.

Information was provided prospectively from June 30, 2013 for GASB No. 67 and GASB No. 68 purposes. Results prior to 2018 were produced by the prior actuary.

GASB NO. 67 AND GASB NO. 68: REQUIRED SUPPLEMENTAL INFORMATION

SCHEDULE OF MONEY-WEIGHTED RETURNS

For Fiscal Year Ending June 30	Money-Weighted Return
2019	7.3%
2018	9.3%
2017	7.6%
2016	1.1%
2015	0.3%
2014	12.3%
2013	5.8%

Information was provided prospectively from June 30, 2013 for GASB No. 67 and GASB No. 68 purposes. Returns provided by INPRS.

Appendix	**Page**

MEMBER DATA RECONCILIATION

	Active Members	Inactive Vested	Inactive Deceased	Disabled	Retired	Beneficiary	Total
1. As of June 30, 2017 [1]	**132,176**	**31,737**	**187**	**2,890**	**74,870**	**10,230**	**252,090**
2. Data Adjustments							
New Participants	15,490	0	0	0	0	0	15,490
Rehires	464	(463)	0	0	(1)	0	0
Terminations:							
Not Vested	(12,547)	0	0	0	0	0	(12,547)
Deferred Vested	(3,388)	3,388	0	0	0	0	0
Disability	(110)	0	0	110	0	0	0
Retirements	(2,774)	(1,934)	0	0	4,708	0	0
Refund / Benefits Ended	0	(130)	(3)	(4)	0	(62)	(199)
Transfer / Millie Morgan	(18)	(240)	0	0	0	0	(258)
Deaths:							
With Beneficiary	(49)	(17)	(21)	(38)	(693)	818	0
Without Beneficiary	(127)	(104)	(32)	(76)	(2,137)	(852)	(3,328)
Entitled to Future Benefit	(18)	(17)	35	0	0	0	0
Data Corrections [2]	0	674	2	89	65	15	845
Net Change	(3,077)	1,157	(19)	81	1,942	(81)	3
3. As of June 30, 2018 [3]	**129,099**	**32,894**	**168**	**2,971**	**76,812**	**10,149**	**252,093**

[1] Effective January 1, 2018, DC accounts are treated as a separate defined contribution plan. Accordingly, these counts exclude members with non-vested pension benefits.

[2] Includes adjustments by INPRS resulting from a comphrehensive review of disableds who had previoulsy aged into retirement and are now treated as retired.

[3] Valuation results as of June 30, 2019 were calculated using June 30, 2018 census data, adjusted for certain activity before the valuation date. Headcounts may include multiple records for individuals, such as members with multiple periods of service.

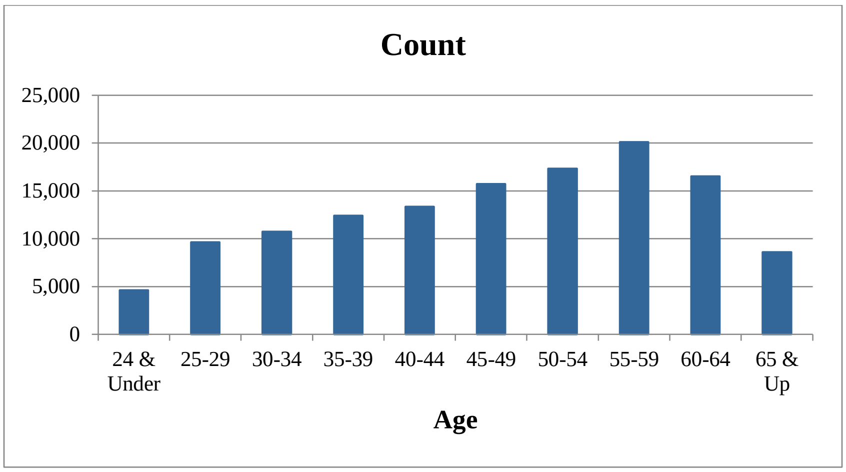
SUMMARY OF MEMBERSHIP DATA

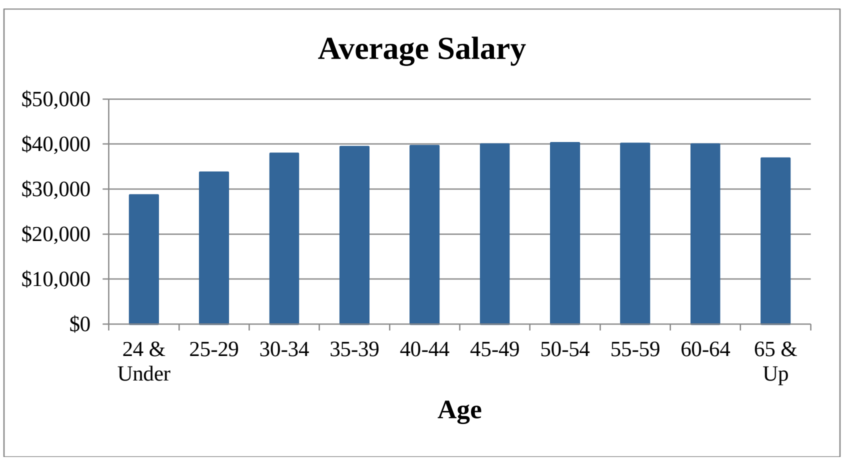
Valuation Date		June 30, 2018		June 30, 2019	% Change
Date of Membership Data [1]		July 1, 2017		July 1, 2018	
ACTIVE MEMBERS					
Number of Active Members [2]		132,176		129,099	(2.3%)
Annual Membership Data Salary [3]	$	4,898,743,091	$	4,993,318,176	1.9%
Anticipated Payroll for Next Fiscal Year	$	5,210,209,085	$	5,335,373,772	2.4%
Active Member Averages					
Age		47.4		47.5	0.2%
Service		11.2		11.2	0.0%
Annual Membership Data Salary	$	37,062	$	38,678	4.4%
INACTIVE MEMBERS					
Number of Inactive Members		31,924		33,062	3.6%
Inactive Member Averages					
Age		53.8		53.8	0.0%
Service		11.6		11.6	0.0%
RETIREES, DISABLEDS, AND BENEFICIARIES					
Number of Members					
Retired		74,870		76,812	2.6%
Disabled		2,890		2,971	2.8%
Beneficiaries		10,230		10,149	(0.8%)
Total		87,990		89,932	2.2%
Annual Benefits					
Retired		720,606,242		746,690,589	3.6%
Disabled		15,018,940		15,653,156	4.2%
Beneficiaries		65,925,344		66,690,858	1.2%
Total	$	801,550,526	$	829,034,603	3.4%
Annual Benefits					
Pension		668,585,196		696,864,914	4.2%
DC Plan Annuities		132,965,330		132,169,689	(0.6%)
Total	$	801,550,526	$	829,034,603	3.4%

[1] The valuation results were calculated using the prior year's census data and were adjusted for certain activity during fiscal year, such as new units, enlargements, or withdrawals.
[2] Data specs provided without data adjustments for activity that occurred during the year.
[3] Annualized for actives with less than a year of service. Actives with no salary provided are defaulted to the average salary.

ACTIVE MEMBERS [1]
As of June 30, 2018 for the June 30, 2019 Valuation

	Count of Members			FY 2018 Annual Membership Data Salary		
Age	Male	Female	Total	Male	Female	Total
24 & Under	2,327	2,300	4,627	$ 74,010,589	$ 58,574,274	$ 132,584,863
25-29	4,245	5,390	9,635	157,942,465	166,554,355	324,496,820
30-34	4,631	6,103	10,734	199,153,860	207,327,459	406,481,319
35-39	4,953	7,445	12,398	228,763,228	259,282,076	488,045,304
40-44	4,977	8,381	13,358	238,675,649	290,804,864	529,480,513
45-49	5,782	9,958	15,740	281,841,897	346,794,594	628,636,491
50-54	6,379	10,963	17,342	307,136,703	390,840,020	697,976,723
55-59	7,620	12,499	20,119	367,927,900	439,567,355	807,495,255
60-64	6,394	10,147	16,541	304,464,216	356,569,903	661,034,119
65 & Up	3,976	4,629	8,605	165,178,620	151,908,149	317,086,769
Total	51,284	77,815	129,099	$ 2,325,095,127	$ 2,668,223,049	$ 4,993,318,176





[1] Includes 520 actives who were missing a salary. Their salaries are defaulted to the average salary of $38,678.

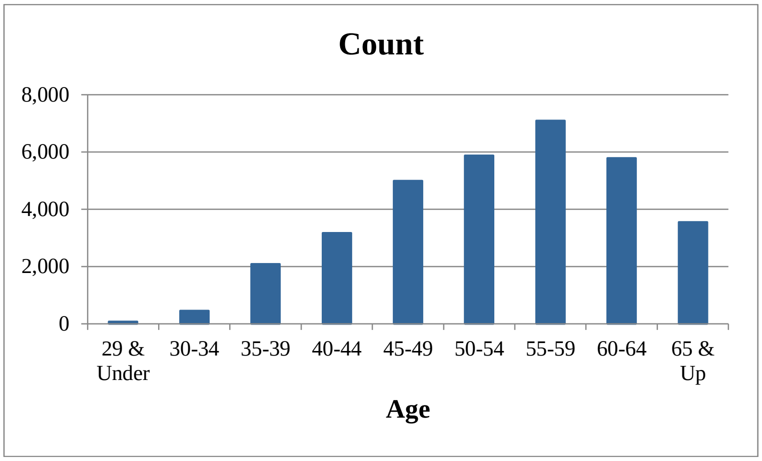
AGE AND SERVICE DISTRIBUTION [1]
As of June 30, 2018 for the June 30, 2019 Valuation

Age		0-4	5-9	10-14	15-19	20-24	25-29	30-34	Over 34	Total
24 & Under	Number	4,610	17	0	0	0	0	0	0	4,627
	Total Salary	$ 132,050,671	$ 534,192	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 132,584,863
	Average Sal.	$ 28,644	$ 31,423	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 28,655
25-29	Number	8,571	1,046	18	0	0	0	0	0	9,635
	Total Salary	$ 281,351,036	$ 42,440,625	$ 705,159	$ 0	$ 0	$ 0	$ 0	$ 0	$ 324,496,820
	Average Sal.	$ 32,826	$ 40,574	$ 39,176	$ 0	$ 0	$ 0	$ 0	$ 0	$ 33,679
30-34	Number	6,600	3,159	962	13	0	0	0	0	10,734
	Total Salary	$ 220,777,101	$ 140,196,431	$ 45,003,448	$ 504,339	$ 0	$ 0	$ 0	$ 0	$ 406,481,319
	Average Sal.	$ 33,451	$ 44,380	$ 46,781	$ 38,795	$ 0	$ 0	$ 0	$ 0	$ 37,869
35-39	Number	5,716	3,047	2,840	771	24	0	0	0	12,398
	Total Salary	$ 178,120,574	$ 131,507,247	$ 139,196,626	$ 38,002,015	$ 1,218,842	$ 0	$ 0	$ 0	$ 488,045,304
	Average Sal.	$ 31,162	$ 43,160	$ 49,013	$ 49,289	$ 50,785	$ 0	$ 0	$ 0	$ 39,365
40-44	Number	5,203	2,832	2,647	1,987	673	13	3	0	13,358
	Total Salary	$ 156,672,406	$ 112,028,246	$ 122,670,357	$ 102,583,675	$ 34,756,161	$ 650,555	$ 119,113	$ 0	$ 529,480,513
	Average Sal.	$ 30,112	$ 39,558	$ 46,343	$ 51,627	$ 51,644	$ 50,043	$ 39,704	$ 0	$ 39,638
45-49	Number	4,791	3,223	2,945	2,230	1,843	671	32	5	15,740
	Total Salary	$ 145,218,110	$ 117,726,179	$ 122,962,354	$ 105,197,818	$ 99,717,818	$ 36,008,091	$ 1,558,436	$ 247,685	$ 628,636,491
	Average Sal.	$ 30,311	$ 36,527	$ 41,753	$ 47,174	$ 54,106	$ 53,663	$ 48,701	$ 49,537	$ 39,939
50-54	Number	4,004	2,956	3,139	2,598	1,996	1,719	865	65	17,342
	Total Salary	$ 121,920,685	$ 104,227,344	$ 122,302,425	$ 110,527,466	$ 96,540,089	$ 92,645,134	$ 46,587,742	$ 3,225,838	$ 697,976,723
	Average Sal.	$ 30,450	$ 35,260	$ 38,962	$ 42,543	$ 48,367	$ 53,895	$ 53,859	$ 49,628	$ 40,248
55-59	Number	3,568	2,837	3,434	3,232	2,696	1,872	1,598	882	20,119
	Total Salary	$ 108,187,184	$ 101,065,987	$ 129,770,047	$ 127,980,440	$ 113,929,879	$ 90,882,842	$ 88,540,243	$ 47,138,633	$ 807,495,255
	Average Sal.	$ 30,322	$ 35,624	$ 37,790	$ 39,598	$ 42,259	$ 48,549	$ 55,407	$ 53,445	$ 40,136
60-64	Number	2,283	2,337	2,699	2,494	2,273	1,685	1,268	1,502	16,541
	Total Salary	$ 66,015,993	$ 82,804,711	$ 101,669,614	$ 96,212,834	$ 92,282,575	$ 74,415,458	$ 64,039,443	$ 83,593,491	$ 661,034,119
	Average Sal.	$ 28,916	$ 35,432	$ 37,669	$ 38,578	$ 40,599	$ 44,163	$ 50,504	$ 55,655	$ 39,963
65 & Up	Number	1,344	1,594	1,612	1,266	893	695	487	714	8,605
	Total Salary	$ 32,479,754	$ 49,377,312	$ 59,714,545	$ 48,782,439	$ 34,418,637	$ 28,765,139	$ 22,504,205	$ 41,044,738	$ 317,086,769
	Average Sal.	$ 24,166	$ 30,977	$ 37,044	$ 38,533	$ 38,543	$ 41,389	$ 46,210	$ 57,486	$ 36,849
Total	Number	46,690	23,048	20,296	14,591	10,398	6,655	4,253	3,168	129,099
	Total Salary	$ 1,442,793,514	$ 881,908,274	$ 843,994,575	$ 629,791,026	$ 472,864,001	$ 323,367,219	$ 223,349,182	$ 175,250,385	$ 4,993,318,176
	Average Sal.	$ 30,902	$ 38,264	$ 41,584	$ 43,163	$ 45,476	$ 48,590	$ 52,516	$ 55,319	$ 38,678

[1] Includes 520 actives who were missing a salary. Their salaries are defaulted to the average salary of $38,678.

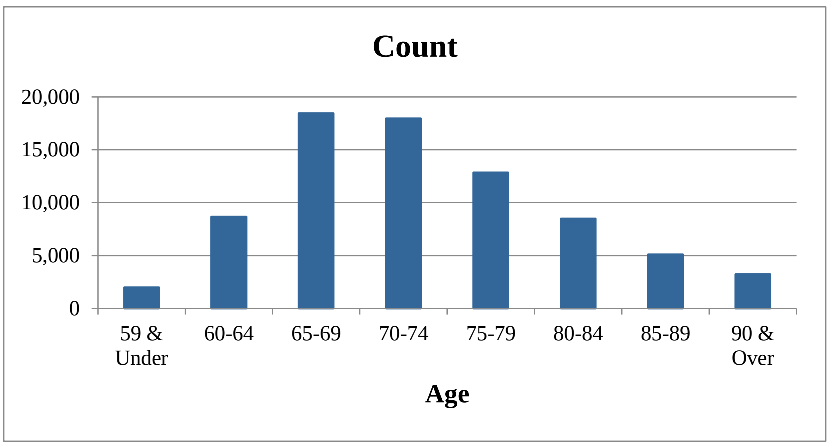
INACTIVE VESTED MEMBERS
As of June 30, 2018 for the June 30, 2019 Valuation

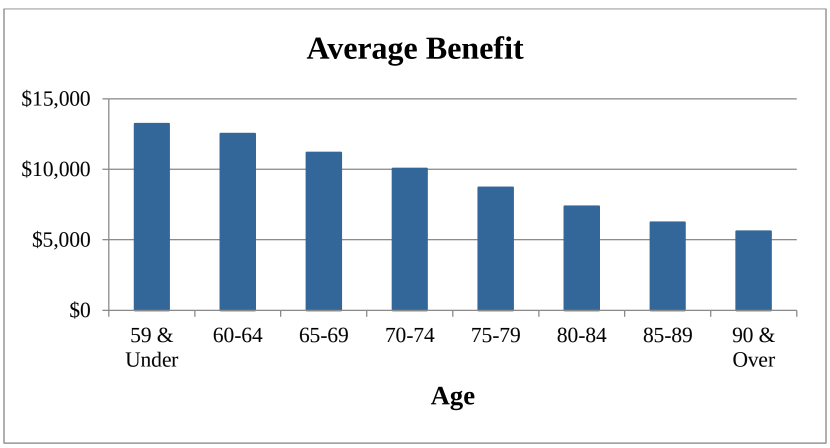
	Count of Members		
Age	Male	Female	Total
29 & Under	16	58	74
30-34	135	315	450
35-39	714	1,373	2,087
40-44	1,043	2,128	3,171
45-49	1,541	3,445	4,986
50-54	1,781	4,093	5,874
55-59	2,158	4,929	7,087
60-64	1,566	4,220	5,786
65 & Up	1,140	2,407	3,547
Total	10,094	22,968	33,062



RETIRED MEMBERS
As of June 30, 2018 for the June 30, 2019 Valuation

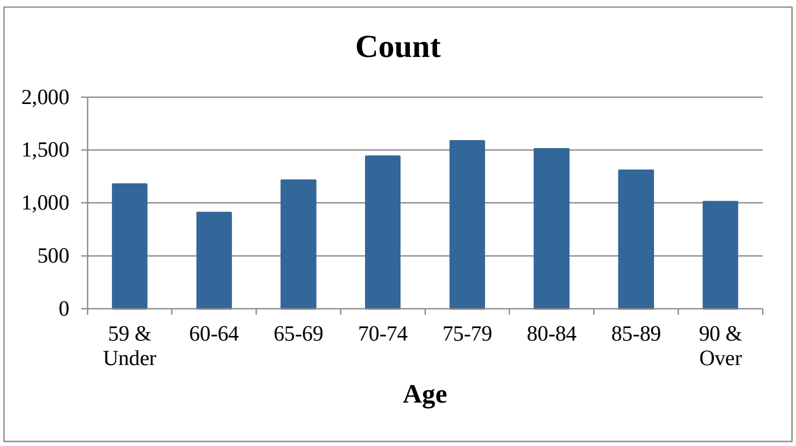
	Count of Members			Annual Benefits		
Age	Male	Female	Total	Male	Female	Total
59 & Under	922	1,059	1,981	$ 14,347,469	$ 11,842,812	$ 26,190,281
60-64	3,383	5,310	8,693	50,954,517	57,842,074	108,796,591
65-69	6,710	11,753	18,463	92,050,415	114,362,470	206,412,885
70-74	6,218	11,767	17,985	75,668,676	105,099,795	180,768,471
75-79	4,040	8,817	12,857	42,169,835	69,768,367	111,938,202
80-84	2,550	5,960	8,510	23,103,650	39,623,572	62,727,222
85-89	1,372	3,724	5,096	10,426,877	21,330,151	31,757,028
90 & Over	711	2,516	3,227	5,375,389	12,724,520	18,099,909
Total	25,906	50,906	76,812	$ 314,096,828	$ 432,593,761	$ 746,690,589

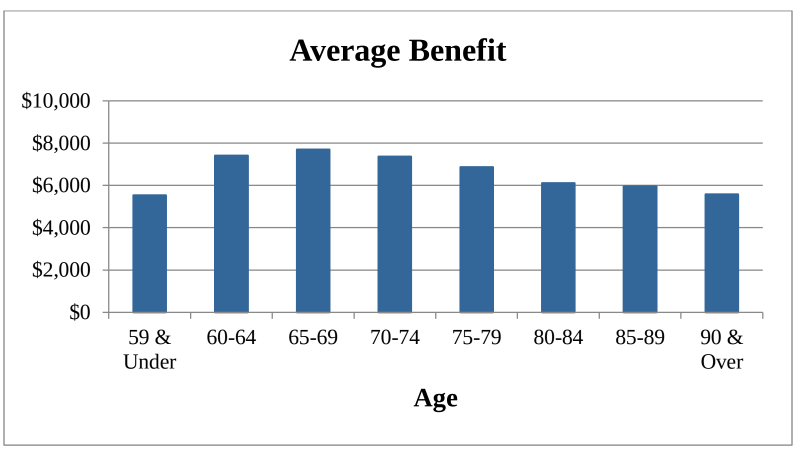




BENEFICIARIES RECEIVING BENEFITS
As of June 30, 2018 for the June 30, 2019 Valuation

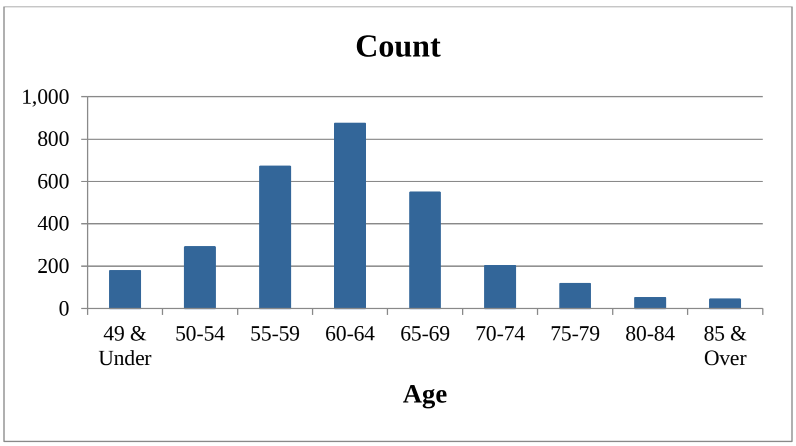
	Count of Members			Annual Benefits		
Age	Male	Female	Total	Male	Female	Total
59 & Under	310	866	1,176	$ 1,513,977	$ 4,992,186	$ 6,506,163
60-64	194	714	908	1,182,990	5,544,504	6,727,494
65-69	286	928	1,214	2,004,879	7,337,085	9,341,964
70-74	356	1,083	1,439	2,098,453	8,497,810	10,596,263
75-79	324	1,261	1,585	1,714,186	9,160,821	10,875,007
80-84	283	1,227	1,510	1,379,310	7,849,392	9,228,702
85-89	205	1,103	1,308	968,131	6,823,455	7,791,586
90 & Over	98	911	1,009	425,972	5,197,707	5,623,679
Total	2,056	8,093	10,149	$ 11,287,898	$ 55,402,960	$ 66,690,858

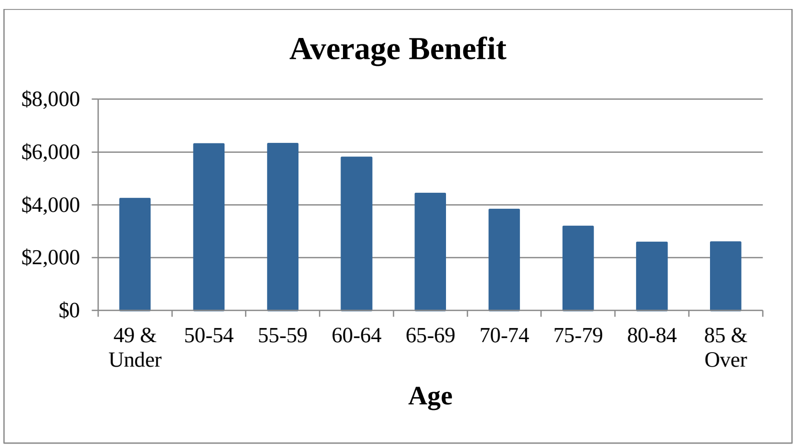




DISABLED MEMBERS
As of June 30, 2018 for the June 30, 2019 Valuation

	Count of Members			Annual Benefits		
Age	Male	Female	Total	Male	Female	Total
49 & Under	70	108	178	$ 339,506	$ 412,828	$ 752,334
50-54	126	164	290	1,007,068	818,317	1,825,385
55-59	284	386	670	2,102,971	2,122,122	4,225,093
60-64	369	504	873	2,458,337	2,590,437	5,048,774
65-69	232	316	548	1,119,488	1,301,931	2,421,419
70-74	93	109	202	407,749	361,870	769,619
75-79	43	74	117	163,462	207,506	370,968
80-84	20	30	50	50,623	78,049	128,672
85 & Over	9	34	43	21,847	89,045	110,892
Total	1,246	1,725	2,971	$ 7,671,051	$ 7,982,105	$ 15,653,156





ADDITIONAL IN PAY INFORMATION
As of June 30, 2018 for the June 30, 2019 Valuation

Schedule of Average Benefit Payments [1]

	Years of Credited Service						
For the Year Ended June 30, 2019	< 10 [2]	10 - 14	15 - 19	20 - 24	25 - 29	30 +	Total
Average Monthly Defined Benefit	$151	$293	$407	$570	$799	$1,287	$646
Average Monthly DC Annuity [3]	$47	$107	$147	$204	$276	$480	$235
Average Final Average Salary [4]	$25,474	$25,891	$28,012	$30,306	$33,884	$41,510	$31,643
Number of Benefit Recipients	3,144	15,439	22,063	17,764	13,538	17,984	89,932

[1]Calculated using the prior year census data, adjusted for certain activity during the fiscal year.
[2]Members with less than 10 years of service are: (1) a member receiving a disability benefit from INPRS; (2) a member who has at least eight years of creditable service as a county clerk, county auditor, county recorder, county treasurer, county sheriff or county coroner eligible for a normal retirement after reaching age 65 (applies to only members retiring after June 30, 2002); (3) a member who has at least eight years of creditable service as a state auditor, state treasurer, or secretary of state (whose term commences after the November 5, 2002 election).
[3]This represents those retirees who elected to receive their ASA as a supplemental monthly payment in addition to the monthly Defined Benefit payment.
[4]Excludes the 2,311 in-pay members who are missing a final average salary in the data.

ADDITIONAL IN PAY INFORMATION
As of June 30, 2018 for the June 30, 2019 Valuation

Schedule of Benefit Recipients by Type of Benefit Option [1]

Amount of Monthly Benefit (in dollars)	Number of Recipients by Benefit Option [2]: 5-Year Certain & Life[3]	Straight Life	Joint with 100% Survivor Benefits	Joint with Two-Thirds Survivor Benefits	Joint with One-Half Survivor Benefits	Survivors	Disability	Total Benefit Recipients
1-500	11,723	9,054	7,420	826	1,858	6,123	2,112	39,116
501-1,000	7,453	8,943	5,039	1,054	2,220	2,756	617	28,082
1,001-1,500	2,698	4,108	2,863	675	1,197	857	171	12,569
1,501-2,000	1,085	1,893	1,250	397	535	267	58	5,485
2,001-2,500	468	943	623	176	311	91	7	2,619
2,501-3,000	210	388	250	93	137	31	3	1,112
Over 3,000	123	377	197	107	118	24	3	949
Total	23,760	25,706	17,642	3,328	6,376	10,149	2,971	89,932

[1] Calculated using the prior year census data, adjusted for certain activity during the fiscal year.
[2] Beginning October 2014, social security integration can apply to any optional form.
[3] Includes members who elected a modified cash refund plus 5-year certain & life.

ADDITIONAL IN PAY INFORMATION
As of June 30, 2018 for the June 30, 2019 Valuation

Schedule of Retirees and Beneficiaries [1]

	Added to Rolls		Removed from Rolls		Rolls - End of Year				
	Number	Annual Benefits [2]	Number	Annual Benefits [2]	Number	Total Annual Benefits [2]	Percent Change In Total Annual Benefits	Average Annual Benefit	Percent Change In Average Annual Benefit
2018 [3]	5,077	$50,319	3,135	$21,565	89,932	$829,035	3.4%	$9,218	1.2%
2018 [3]	5,249	55,236	2,389	15,609	87,990	801,551	5.8	9,110	2.3
2017 [3]	4,855	49,980	2,913	18,808	85,130	757,851	3.9	8,902	1.5
2016 [3]	6,478	78,487	2,488	15,597	83,188	729,366	9.9	8,768	4.6
2015 [3]	5,489	60,538	2,241	14,107	79,198	663,767	7.4	8,381	3.0
2014 [3]	0	0	0	0	75,950	617,977	0.0	8,137	0.0
2013	5,231	55,523	2,273	13,898	75,950	617,977	7.2	8,137	3.0
2012	4,751	49,766	2,139	12,540	72,992	576,678	6.8	7,901	3.0
2011	5,402	56,185	2,188	11,698	70,380	539,747	8.3	7,669	3.4
2010	4,827	39,214	2,760	19,022	67,166	498,199	4.3	7,417	1.1

[1]Dollar amounts are in thousands except for the average annual benefit.
[2] Annual benefits includes members selecting an annuity for their ASA. End of year annual benefits are not equal to prior end of year annual benefits plus additions less removals due to beneficiary benefit changes, data changes, and COLA increases.
[3]The valuation results were calculated using the prior year census data, adjusted for certain activity during the fiscal year.

Definitions

Fiscal year	Twelve month period ending June 30.
Participation	All full time employees of the State of Indiana and all full time employees of Political Subdivisions which have adopted the plan become members of PERF upon date of hire.
Average monthly earnings	The monthly average of earnings during 20 quarters (in groups of 4 consecutive contribution quarters) preceding retirement that produce the highest such average. Earnings include basic salary, the member's 3% mandatory contribution paid by the employer, the member's salary reduction agreement under Section 125, 430(b), or 457 of the Internal Revenue Code, and up to $2,000 of additional compensation received from the employer in anticipation of the member's termination or retirement.
Member contributions	Each member is required to contribute to an Annuity Savings Account at the rate of 3% of pay (unless the employer has opted to make the contribution for the employee). These contributions are kept on deposit and credited with interest based on the investment elections of each member until such time as they are withdrawn or annuitized by the member. The Annuity Savings Account benefit is in addition to the annuity benefits provided by employer contributions. During FYE 2018, the Annuity Savings Accounts were completely separated from the defined benefit plan, and so are no longer relevant to the valuation process.
Minimum pension benefit	The minimum pension benefit paid to a member with 10 or more years of creditable service receiving any pension benefit is $180 per month.

Eligibility for Benefits

Deferred vested	10 or more years of vesting service and no longer active.
Disability retirement	5 or more years of vesting service and qualified for Social Security disability benefits or federal Civil Service disability benefits.
Early retirement	Age 50 with 15 or more years of vesting service.

Normal retirement	Earliest of: - Age 65 with 10 or more years of vesting service - Age 60 with 15 or more years of vesting service - Age 55 with sum of age and vesting service equal to 85 or more.
Pre-retirement death	10 or more years of vesting service.

Monthly Benefits Payable

Normal retirement	The normal retirement benefit is a pension payable for life with 60 months guaranteed and is equal to 1.1% of average monthly earnings multiplied by years of creditable service earned. The minimum monthly benefit is $180 if the member has at least 10 years of creditable service.
Early retirement	The early retirement benefit is the accrued retirement benefit determined as of the early retirement date and payable commencing at the normal retirement date. A member may elect to have the benefit commence prior to normal retirement provided the benefit is reduced by 1/10% for each of the first 60 months and by 5/12% for each of the next 120 months that the benefit commencement date precedes the normal retirement date. The minimum monthly benefit is $180 if the member has at least 10 years of creditable service.
Deferred retirement	The termination benefit is the accrued retirement benefit determined as of the termination date and payable commencing at age 65. If the member has 15 or more years of creditable service, then the member may elect to receive a reduced early retirement benefit prior to age 65. The minimum monthly benefit is $180 if the member has at least 10 years of creditable service.
Disability	The disability retirement benefit is the accrued retirement benefit determined as of the disability date and payable commencing the month following disability date without reduction for early commencement. The minimum monthly benefit is $180.
Pre-retirement death	The spouse or dependent beneficiary is entitled to receive the monthly life benefit payable immediately under the assumption that the member retired on the later of age 50 or the date before the date of death and elected the joint and full survivor option. The minimum monthly benefit is $180 if the member has at least 10 years of creditable service.

Cost-of-Living-Adjustments	The employer-funded monthly pension benefits for members in pay status are increased periodically to preserve purchasing power that is diminished due to inflation. Such increases are not guaranteed by Statute and will only be provided by legislative action. A "13th check" was paid to each member in pay status during fiscal year 2018, 2019, 2020 and 2021. The amount of the 13th check varied based on the years of creditable service the member had earned prior to retirement. Legislation passed in the 2018 legislative session creates a funding mechanism to provide for future benefit increases or 13th checks. The INPRS Board has the authority to have employers contribute up to 1% of member pay into the fund. Increases or payments are made upon passed legislation subject to the availability of funds to provide the benefit.
Forms of payment	
a. 5-Year Guaranteed Beneficiary Benefit (Option 10)	Member will receive a monthly benefit for the rest of their life. If the member dies before receiving benefits for 5 years, the beneficiary will receive that monthly benefit for the remainder of those 5 years or a lump sum distribution equal to the present value of those payments. After 5 years, there are no payments available to the beneficiary.
b. Benefit with No Guarantee (Option 20)	Member will receive a monthly benefit for life, but there are no monthly payments to anyone after death. However, the balance of the Annuity Savings Account will be distributed to the beneficiary or estate if it is larger than the payments previously made to the member.
c. Joint with Full Survivor Benefits (Option 30)	Member will be paid a monthly benefit for life. After death, the same monthly benefit will be paid to the beneficiary for their lifetime.
d. Joint with Two-Thirds Survivor Benefits (Option 40)	Member will be paid a monthly benefit for life. After death, two-thirds (2/3) of the benefit will be paid to the beneficiary for their lifetime.
e. Joint with One-Half Survivor Benefits (Option 50)	Member will be paid a monthly benefit for life. After death, one-half (1/2) of the benefit will be paid to the beneficiary for their lifetime.

f. Integration with Social Security (Option 61)	A member who retires between ages 50 and 62 may integrate the PERF monthly pension benefit with the member's estimated Social Security benefits. This does not affect the amount of the benefit received from the Social Security Administration. Before age 62, the member's benefits will equal the sum of the member's Social Security estimate, multiplied by actuarial factors, and the member's early retirement benefit. This will result in the member receiving a larger monthly benefit payment before age 62. After age 62, the member's benefit will equal the difference between the member's Social Security estimate, multiplied by actuarial factors, and the member's pre-62 monthly pension benefit. Depending upon the member's estimated Social Security disbursement, benefit payments may be greatly reduced or terminated at age 62.
g. 5-Year Guaranteed Beneficiary Benefit with ASA Cash Refund (Option 71)	In order to select this option, the member must choose to combine at least a portion of their ASA with their lifetime monthly pension benefit. If selected, the member will receive a monthly benefit for the rest of their life. If the member dies before receiving payments for 5 years, the beneficiary will receive the pension portion of their monthly benefit for the remainder of those 5 years or a lump sum equal to the present value of those remaining payments. Also, upon death (whether death occurs before or after receiving 5 years of benefits), the beneficiary may receive any remaining balance of the Annuity Savings Account.

Changes in Plan Provisions since the Prior Year

Legislation was passed through House Enrolled Act No. 1059 to expand the current pre-retirement death benefit to apply to all active and inactive members who have at least 10 years of service, the current general vesting requirement. This provides new coverage for active and inactive members with 10 to 15 years of service (before age 65) and inactive members who die prior to age 50.

ACTUARIAL METHODS

1. Actuarial Cost Method

The actuarial cost method is Entry Age Normal - Level Percent of Payroll.

The normal cost is calculated separately for each active member and is equal to the level percentage of payroll needed as an annual contribution from entry age to retirement age to fund projected benefits. The actuarial accrued liability on any valuation date is the accumulated value of such normal costs from entry age to the valuation date.

For funding, gains and losses occurring from census experience different than assumed, assumption changes, and benefit changes are amortized over a 20-year period with level payments each year. A new gain or loss base is established each year based on the additional gain or loss during that year and that base is amortized over a new 20-year period (gain or loss bases established prior to June 30, 2016 were amortized over 30 years and will continue to be amortized over 30 -year period). However, when the plan is at or above 100% funded (based on Actuarial Value of Assets), the past amortization bases are considered fully amortized and a single amortization base equal to the surplus is amortized over a 30-year period with level payments each year. Effective June 30, 2018, the bases are calculated without regards to the COLA provisions. The purpose of the method is to give a smooth progression of the costs from year to year and, at the same time, provide for an orderly funding of the unfunded liabilities.

For accounting, gains and losses occurring from census experience different than assumed and assumption changes are amortized into expense over the average expected future service of all plan participants. Gains and losses occurring from investment experience different than assumed are amortized into expense over a 5-year period. The effect of plan changes on the plan liability are fully recognized in expense in the year in which they occur.

Member census data as of June 30, 2018 was used in the valuation and adjusted, where appropriate, to reflect changes between June 30, 2018 and June 30, 2019. The valuation results from June 30, 2018 were rolled-forward to June 30, 2019 to reflect benefit accruals during the year less benefits paid.

2. COLA Surcharge

The COLA Surcharge is developed by determining the assets needed at the start of the next biennium to fund the post-retirement benefit increases anticipated to be granted in that biennium. This amount is divided by the present value of expected payroll over which the accumulations will occur.

3. Asset Valuation Method

Actuarial Value of Assets is equal to a five-year smoothing of gains and losses on the Market Value of Assets subject to a 20% corridor.

4. **Anticipated Payroll**

   The Anticipated Payroll for the fiscal year beginning July 1, 2019 is equal to the actual payroll during the year ending June 30, 2019, increased with one year of salary scale.

5. **Employer Contribution Rates**

   Based on the assumptions and methods previously described, an actuarially determined contribution rate is computed for each employer. The Board considers this information, but has ultimate authority in setting the employer contribution rates.

Changes in Methods since the Prior Year

None.

ACTUARIAL ASSUMPTIONS

Valuation Date — June 30, 2019

Economic Assumptions

1. Investment return — 6.75% per year, compounded annually (net of administrative and investment expenses)

2. Inflation — 2.25% per year

3. Salary increase

Age	Inflation	Productivity, Merit, and Promotion	Total Salary Growth
<31	2.25%	2.00%	4.25%
31-45	2.25%	1.50%	3.75%
46-55	2.25%	1.00%	3.25%
56-60	2.25%	0.50%	2.75%
>=61	2.25%	0.25%	2.50%

4. Cost-of-Living Adjustment (COLA) — In lieu of a COLA on January 1, 2020 and January 1, 2021, members in pay were provided a 13th check on October 1, 2019 and October 1, 2020. Thereafter, the following COLAs, compounded annually, were assumed:

0.4% beginning on January 1, 2022
0.5% beginning on January 1, 2034
0.6% beginning on January 1, 2039

Demographic Assumptions

1. Mortality — The mortality assumption includes an appropriate level of conservatism that reflects expected future mortality improvement.

   a. Healthy mortality — RP-2014 (with MP-2014 improvement removed) Total Data Set Mortality Tables projected on a fully generational basis using the future mortality improvement scale inherent in the mortality projection included in the Social Security Administration's 2014 Trustee Report.

   b. Disabled mortality — RP-2014 (with MP-2014 improvement removed) Disability Mortality Tables projected on a fully generational basis using the future mortality improvement scale inherent in the mortality projection included in the Social Security Administration's 2014 Trustee Report.

2. Disability

Attained Age	Sample Rates Male	Female
20	0.0067%	0.0050%
30	0.0208%	0.0158%
40	0.0646%	0.0496%
50	0.2005%	0.1556%
60	0.5815%	0.3751%
70	0.1000%	0.1000%
80	0.0000%	0.0010%

3. Retirement

			Service				
Age	10-14	15-25	26	27	28	29	30+
50-54	-	4%	4%	4%	4%	4%	4%
55	-	5%	5%	5%	5%	5%	14%
56	-	5%	5%	5%	5%	14%	10%
57	-	5%	5%	5%	14%	10%	10%
58	-	5%	5%	14%	10%	10%	10%
59	-	5%	14%	10%	10%	10%	10%
60	-	12%	12%	12%	12%	12%	12%
61	-	16%	16%	16%	16%	16%	16%
62	-	22%	22%	22%	22%	22%	22%
63	-	19%	19%	19%	19%	19%	19%
64	-	24%	24%	24%	24%	24%	24%
65-74	30%	30%	30%	30%	30%	30%	30%
75+	100%	100%	100%	100%	100%	100%	100%

4. Termination

Earnings < $20,000

	State	
Age	Male	Female
20-24	32%	34%
25-29	32%	33%
30-34	32%	30%
35-39	29%	30%
40-44	29%	24%
45-49	26%	24%
50-54	25%	22%
55-59	22%	20%
60+	22%	20%

	Political Subdivision	
Age	Male	Female
20-24	31%	36%
25-29	31%	34%
30-34	26%	25%
35-39	22%	18%
40-44	21%	15%
45-49	18%	12%
50-54	14%	11%
55-59	14%	11%
60+	14%	11%

State (Male)
Earnings >= $20,000

	Service										
Age	0	1	2	3	4	5	6	7	8	9	10+
20-24	23%	23%	23%	20%	20%	17%	17%	12%	12%	7%	7%
25-29	23%	23%	23%	19%	17%	17%	17%	12%	12%	7%	7%
30-34	22%	22%	19%	18%	16%	13%	13%	12%	7%	7%	7%
35-39	17%	17%	17%	17%	16%	10%	10%	9%	7%	6%	6%
40-44	17%	17%	14%	12%	12%	10%	9%	9%	7%	5%	5%
45-49	14%	14%	14%	10%	10%	10%	9%	7%	4%	4%	4%
50-54	14%	14%	9%	9%	9%	9%	9%	7%	4%	4%	4%
55-59	13%	13%	7%	7%	7%	7%	7%	7%	4%	4%	4%
60+	13%	13%	7%	7%	7%	7%	7%	7%	4%	4%	4%

State (Female)
Earnings >= $20,000

	Service										
Age	0	1	2	3	4	5	6	7	8	9	10+
20-24	23%	23%	23%	23%	17%	17%	13%	12%	11%	8%	8%
25-29	23%	23%	22%	21%	17%	17%	13%	12%	11%	8%	8%
30-34	21%	21%	21%	17%	15%	14%	12%	12%	11%	8%	8%
35-39	19%	19%	16%	16%	12%	12%	12%	12%	9%	8%	7%
40-44	18%	18%	16%	13%	12%	12%	9%	9%	8%	8%	6%
45-49	16%	16%	16%	13%	10%	10%	9%	9%	8%	8%	6%
50-54	16%	16%	15%	12%	10%	9%	9%	9%	6%	6%	6%
55-59	16%	16%	11%	11%	10%	9%	9%	9%	6%	6%	6%
60+	16%	16%	11%	11%	10%	9%	9%	9%	6%	6%	6%

Political Subdivisions (Male)
Earnings >= $20,000

	Service										
Age	0	1	2	3	4	5	6	7	8	9	10+
20-24	18%	18%	18%	18%	14%	12%	11%	11%	7%	7%	5%
25-29	18%	18%	18%	16%	14%	12%	11%	11%	7%	7%	5%
30-34	16%	16%	16%	15%	13%	11%	11%	11%	7%	7%	5%
35-39	15%	15%	12%	12%	12%	10%	9%	9%	7%	7%	5%
40-44	13%	13%	11%	11%	10%	10%	9%	9%	7%	7%	4%
45-49	11%	11%	11%	11%	9%	7%	7%	7%	7%	7%	4%
50-54	11%	11%	9%	9%	9%	7%	7%	6%	6%	4%	4%
55-59	11%	11%	7%	7%	7%	7%	7%	5%	5%	4%	4%
60+	8%	8%	7%	7%	7%	7%	7%	5%	5%	4%	4%

Political Subdivisions (Female)
Earnings >= $20,000

	Service										
Age	0	1	2	3	4	5	6	7	8	9	10+
20-24	22%	22%	19%	16%	14%	14%	11%	11%	9%	7%	7%
25-29	21%	21%	18%	16%	14%	14%	11%	11%	9%	7%	7%
30-34	16%	16%	16%	14%	14%	14%	11%	11%	9%	7%	7%
35-39	14%	14%	14%	12%	12%	12%	9%	9%	9%	7%	6%
40-44	13%	13%	12%	11%	10%	8%	8%	8%	8%	7%	4%
45-49	12%	12%	12%	10%	8%	8%	8%	7%	6%	6%	4%
50-54	11%	11%	10%	8%	8%	6%	6%	6%	6%	5%	4%
55-59	11%	11%	8%	8%	8%	6%	6%	6%	6%	4%	4%
60+	11%	11%	8%	8%	8%	6%	6%	6%	6%	4%	4%

Other Assumptions

1. Form of payment — 100% of members are assumed to elect a single life annuity with a five-year certain period (Option 10).

2. Marital status
   a. Percent married — 75% of male members and 60% of female members are assumed to be married and or to have a dependent beneficiary.

   b. Spouse's age — Male members are assumed to be three (3) years older than their spouses and female members are assumed to be two (2) years younger than their spouses.

3. Pay increase timing — Beginning of (fiscal) year. Payroll amounts stated in the valuation data are amounts projected to be paid during the current year.

4. Decrement timing — Decrements are assumed to occur at the beginning of the year.

5. Benefit commencement timing
   Active members — If eligible for a reduced early retirement benefit upon termination from employment, 33% commence immediately and 67% defer to earliest unreduced retirement age.

   If eligible for an unreduced retirement benefit upon termination from employment, 100% commence immediately.

Terminated vested members	100% defer to earliest unreduced retirement age. If currently eligible for an unreduced retirement benefit, 100% commence immediately.
6. Miscellaneous adjustments	For active and inactive vested members, a salary load of $400 was added to approximate the impact on average monthly earnings of unused sick leave accumulated at termination of employment.

Changes in Assumptions since the Prior Year

None.

Data Adjustments

Active and retired member data is reported as of June 30. Member census data as of June 30, 2018 was used in the valuation and adjusted, where appropriate, to reflect changes between June 30, 2018 and June 30, 2019. Standard actuarial roll-forward techniques were then used to project the total pension liability computed as of June 30, 2018 to the June 30, 2019 measurement date.

The member census data and the asset information for this valuation were furnished as of June 30, 2019. We did not audit the information provided, but we did review it thoroughly for reasonableness and compared it with the prior year's submission for consistency.

Actives and inactives with no date of birth are assumed to be the average age of the member population with their respective status. Additionally, payroll for new hires is annualized, and actives missing a salary are assumed to earn the average active salary amount.

Other Technical Valuation Procedures

Salary increases are assumed to apply to annual amounts.

Decrements are assumed to occur at the beginning of the year. Standard adjustments are made for multiple decrements.

No actuarial liability is included for participants who terminated without being vested prior to the valuation date, except those due a refund of contributions.

Accrued Service	Service credited under the plan that was rendered before the date of the actuarial valuation.
Actuarial Assumptions	Estimates of future experience with respect to demographic or economic events. Demographic assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of retirement plan benefits between future normal cost and actuarial accrued liability. Sometimes referred to as the "actuarial funding method."
Actuarial Equivalent	A single amount or series of amounts of equal value to another single amount or series of amounts computed on the basis of a given set of actuarial assumptions.
Actuarial Accrued Liability	The difference between the actuarial present value of plan benefits and the actuarial value of future normal costs. Also referred to as "accrued liability" or "actuarial liability."
Actuarial Present Value	The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.
Amortization	Paying off an interest-discounted amount with periodic payments of interest and principal, as opposed to paying off with lump sum payment.
Experience Gain (Loss)	The difference between actual experience and actuarial assumptions anticipated experience during the period between two actuarial valuation dates.
Normal Cost	The actuarial present value of retirement plan benefits allocated to the current year by the actuarial cost method.
Unfunded Actuarial Accrued Liability	The difference between actuarial liability and the actuarial value of assets. Sometimes referred to as "unfunded accrued liability" or "unfunded liability".
	Most retirement plans have unfunded actuarial liability. They arise anytime new benefits are added and anytime an actuarial loss is realized.