# WASHINGTON STATE

## Law Enforcement Officers' and Fire Fighters' Plan 2 Retirement Board


# 2016 Actuarial Valuation Report

# Office of the State Actuary

*"Supporting financial security for generations."*


**Mailing Address**
Office of the State Actuary
PO Box 40914
Olympia, Washington 98504-0914

**Physical Address**
2100 Evergreen Park Dr. SW
Suite 150

**Phone**
Reception: 360.786.6140
TDD: 711
Fax: 360.586.8135

**Electronic Contact**
state.actuary@leg.wa.gov
leg.wa.gov/osa/


## Report Preparation

### OFFICE OF THE STATE ACTUARY

Matthew M. Smith, FCA, EA, MAAA
*State Actuary*

Kelly Burkhart
Sarah Baker
Mitch DeCamp
Graham Dyer
Aaron Gutierrez, MPA, JD
Beth Halverson
Michael Harbour, ASA, MAAA
Lisa Hawbaker
Luke Masselink, ASA, EA, MAAA
Corban Nemeth
Darren Painter
Stephanie Roman, MA, JD
Frank Serra
Christi Steele
Kyle Stineman, ASA
Keri Wallis
Lisa Won, ASA, FCA, MAAA

### LEOFF PLAN 2 RETIREMENT BOARD

Steve Nelsen
*Executive Director*

Jessica Burkhart
Ryan Frost
Tammy Harman
Jessie Jackson
Paul Neal
Tim Valencia

## Additional Assistance

Department of Retirement Systems
Washington State Investment Board
Legislative Support Services

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# TABLE OF CONTENTS

# Office of the State Actuary

*"Supporting financial security for generations."*

## Letter of Introduction

## Law Enforcement Officers' and Fire Fighters' Retirement System Plan 2 Actuarial Valuation Report As of June 30, 2016

November 2017

As required under Chapter 41.45 RCW, this report documents the results of an actuarial valuation of the Law Enforcement Officers' and Fire Fighters' Retirement System Plan 2 (LEOFF 2).

The primary purpose of this valuation is to determine contribution requirements for LEOFF 2 based on a June 30, 2016, measurement date and under the funding policy established by the LEOFF 2 Retirement Board. These contribution requirements are purely informational since, according to state law, this "off-cycle" valuation is not used to determine contribution rates. This valuation also provides information on the funding progress and developments in the plan over the past year.

This report is organized into four sections.

- Summary of Key Results.
- Actuarial Exhibits.
- Participant Data.
- Appendices.

The **Summary of Key Results** section provides a high-level summary of the valuation results for LEOFF 2. The next two sections of the report provide detailed actuarial asset and liability information and participant data. The **Appendices** provide access to a summary of the principal actuarial assumptions and methods, a summary of the major plan provisions, and additional information used to prepare this valuation.

The LEOFF 2 Retirement Board has received the 2016 Recognition Award For Funding from the Public Pension Coordinating Council (PPCC). The PPCC is a coalition of three national retirement associations, which establish Public Pension Standards that reflect minimum expectations for public retirement system management, administration, and funding.

PO Box 40914 | Olympia, Washington 98504-0914 | state.actuary@leg.wa.gov | leg.wa.gov/osa/
Phone: 360.786.6140 | Fax: 360.586.8135 | TDD: 711

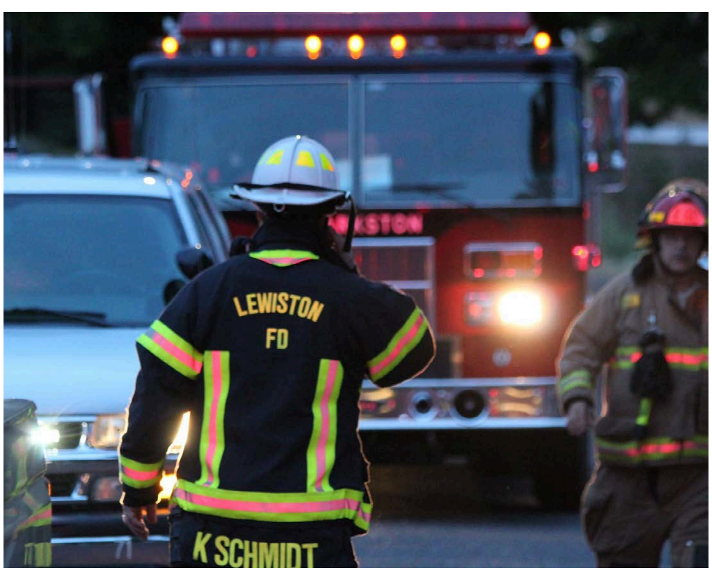
We encourage you to submit any questions you might have concerning this report to our regular address or our e-mail address at state.actuary@leg.wa.gov. We also invite you to visit our website (leg.wa.gov/osa), for further information regarding the actuarial funding of the Washington State retirement systems.

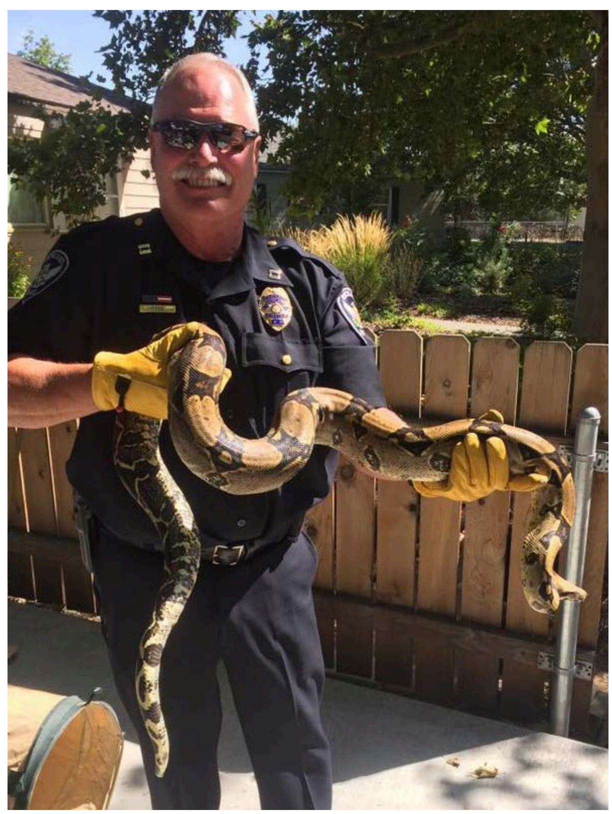
Sincerely,

Matthew M. Smith, FCA, EA, MAAA
State Actuary

Lisa A. Won, ASA, FCA, MAAA
Deputy State Actuary


# I. Summary of Key Results





## INTENDED USE

The purpose of this report is to provide information on the funding progress and contribution rates required to fund the Law Enforcement Officers' and Fire Fighters' Retirement System (LEOFF) Plan 2 based on the June 30, 2016, measurement date and based on the funding policies described in this section. This report also discloses the data, assumptions, and methods we used to develop the contribution rates. The contribution rates in the report are informational only. This is an "off-cycle" valuation, which means that the contribution rates developed in this valuation represent an update on the statutory contribution rates from the prior year's valuation. This report is not intended to satisfy the accounting requirements under the Governmental Accounting Standards Board (GASB) rules.

## CONTRIBUTION RATES

We calculated the member, employer, and state contribution rates as a percentage of salary based on the long-term funding policy adopted by the LEOFF 2 Retirement Board (the Board). The summary table to the right shows contribution rates based on the 2016 valuation along with rates from the previous valuation. The **Actuarial Exhibits** section of this report shows how we developed these rates.

**Contribution Rates**

| | 2016 | 2015 |
|---|---|---|
| Member | 7.91% | 7.88% |
| Employer* | 4.75% | 4.73% |
| State | 3.16% | 3.15% |

**Excludes administrative expense rate.*

During the 2016 Interim, the Board adopted contribution rates for the 2017-19 and 2019-21 Biennia based on 100 percent of the normal cost under the Entry Age Normal (EAN) funding method. The rates adopted by the Board are based on their short-term funding policy. Please see the **Actuarial Certification Letter** for further details on this temporary funding policy. The table to the left shows the contribution rates adopted by the Board for 2017-21.

**Adopted Contribution Rates***

| | |
|---|---|
| Member | 8.75% |
| Employer** | 5.25% |
| State | 3.50% |

**Adopted for period 2017-21.*

***Excludes administrative expense rate.*

## CONTRIBUTION RATE-SETTING CYCLE

Under current Washington State law, in July of even-numbered years, the Board reviews the basic contribution rates calculated by the Board-retained actuary based on an actuarial valuation performed on asset, participant, and plan information compiled in odd-numbered years. In calculating basic contribution rates, the Board-retained actuary applies the statutory funding policies described in this section. The Board then adopts contribution rates for LEOFF Plan 2 as provided under RCW 41.26.720(1)(a). The adopted rates remain in place for the ensuing biennium, subject to revision by the Legislature.

RCW 41.45.070 requires that a temporary and supplemental contribution rate increase be charged to fund the cost of benefit enhancements enacted following the adoption of the basic rates. Supplemental contribution rates are included in the basic rates at the beginning of the next contribution rate-setting cycle.

## FUNDING POLICY

Washington State relies on systematic actuarial funding to finance the on-going cost of the state retirement systems. Under this financing approach, we reduce the cost of future pension payments by the expected long-term return on invested contributions. The LEOFF 2 funding policy splits the required contribution rate by 50 percent for members, 30 percent for employers, and 20 percent for the state.

## I. Summary of Key Results

The state's funding policy is found in RCW 41.45 — Actuarial Funding of State Retirement Systems. It includes the following goals:

- Provide a dependable and systematic process for funding the benefits to members and retirees of the Washington State Retirement Systems.
- Fully amortize the total cost of LEOFF Plan 1 not later than June 30, 2024.
- Continue to fully fund LEOFF 2 as provided by law.
- Establish long-term employer contribution rates that will remain a relatively predictable proportion of future state budgets.
- Fund, to the extent feasible, all benefits over the working lives of those members so that the taxpayers who receive the benefit of those members' service pay the cost of those benefits.

The Board adopted minimum contribution rates equal to 90 percent of the normal cost rate calculated under the Entry Age Normal (EAN) actuarial cost method.

If all actuarial assumptions are realized and all future contributions required under this funding policy are made, we expect the funding policy to accumulate sufficient assets to provide for all future benefits for current members when due.

The Washington State Investment Board (WSIB) directs the investment of retirement system contributions. RCW 43.33A.110 requires WSIB to maximize investment returns at a prudent level of risk.

### COMMENTS ON 2016 RESULTS

Many factors can influence how actuarial valuation results change from one measurement date to the next. Those factors include: changes in the covered population; changes in plan provisions, assumptions, and methods; and experience that varies from our expectations.

For this valuation, we observed no significant changes in the covered population. We also made no significant changes to our actuarial assumptions or methods. No plan provisions changed that materially affect expected plan costs.

In terms of annual plan experience, the actual rate of investment return was 2.65 percent and below the assumed rate. The rate of investment return on the actuarial (or smoothed) value of assets was lower than expected for the plan year as well. We also observed lower than expected salary growth for the year when estimating plan liabilities and the present value of future salaries.

Detailed gain and loss information by system can be found in the **Actuarial Exhibits** section of this report. Please see the **Actuarial Certification Letter** for additional comments on the 2016 valuation results.

### ACTUARIAL LIABILITIES

The next table summarizes key measures of actuarial liability along with the liabilities from last year's valuation. The Future Value of Fully Projected Benefits represents the total expected value of all future benefit payments for all members as of the valuation date. The Present Value of Fully Projected Benefits represents today's value of the Future Value of Fully Projected Benefits when we discount future benefit payments with the valuation interest rate. Put differently, if we invest the Present Value of Fully Projected Benefits as a lump sum amount at the valuation date and earn the valuation interest rate each year, there would be enough money to pay all future benefit payments for current members.

| Actuarial Liabilities | | |
|---|---|---|
| *(Dollars in Millions)* | **2016** | **2015** |
| Future Value of Fully Projected Benefits | $101,327 | $95,769 |
| Present Value of Fully Projected Benefits | $13,013 | $12,152 |
| Present Value of Accrued Benefits* | $9,571 | $8,838 |
| Unfunded Actuarial Accrued Liability | N/A | N/A |
| Valuation Interest Rate | 7.50% | 7.50% |

**Calculated using Entry Age Normal (EAN) cost method.*

The Actuarial Accrued Liability identifies the portion of the present value of future benefits that has been accrued as of the valuation date based on the EAN actuarial cost method. The Unfunded Actuarial Accrued Liability (UAAL) represents the excess, if any, of the Present Value of Accrued Benefits at the valuation date over the Actuarial Value of Assets. In other words, the UAAL equals the actuarial accrued liability at the valuation date not covered by current actuarial assets.

See the **Actuarial Exhibits** section of this report for a summary of actuarial liabilities, and see the Interactive Reports page of our website for Projected Benefit Payments by year. Also, see the Glossary for brief explanations of the actuarial terms.

## ASSETS

The table below shows the Market Value of Assets and Actuarial (or smoothed) Value of Assets along with approximate rates of investment return.

To limit the volatility in contribution rates and funded status due to short-term market fluctuations, we smooth (or defer recognition of) the difference between actual and expected annual investment returns over a period not to exceed eight years. The Actuarial Value of Assets equals the Market Value of Assets less the Total Deferred Investment Gains and (Losses) at the valuation date. The Actuarial Value of Assets can never be less than 70 percent or greater than 130 percent of the Market Value of Assets.

| Assets | | |
|---|---|---|
| *(Dollars in Millions)* | **2016** | **2015** |
| Market Value of Assets | $10,194 | $9,833 |
| Actuarial Value of Assets | 10,021 | 9,320 |
| Contributions* | 304 | 294 |
| Disbursements | 208 | 162 |
| Investment Return | 244 | 430 |
| Other** | $22 | $19 |
| Rate of Return on Assets*** | 2.65% | 4.93% |

**Employee and Employer.*

***Includes transfers, restorations, payables, etc.*

****This is the time-weighted rate of return on the Market Value of Assets, net of expenses. The Actuarial Value of Assets is used in determining contribution rates.*

See the **Actuarial Exhibits** section of this report for additional information on the plan's assets as well as the development of the Actuarial Value of Assets.

## FUNDED STATUS

The funded status helps readers evaluate the health of a pension plan. A history of funded status measured consistently over a defined period helps readers evaluate a plan's funding progress over time. The funded status represents the portion of the actuarial accrued liability covered by today's actuarial assets. A plan with a 100 percent funded status has one dollar in actuarial assets for each dollar of accrued liability at the valuation date. A plan with a funded status of at least 100 percent is generally considered to be on target with its financing plan. However, a plan more/less than 100 percent funded is not automatically considered over-funded/at-risk.

The next table displays the funded status for LEOFF Plan 2. In this report, we present funded status based on the EAN cost method only. Prior reports included funded status results based on the Projected Unit Credit (PUC) cost method.

| Funded Status | | |
|---|---|---|
| *(Dollars in Millions)* | **2016** | **2015** |
| a. Entry Age Normal Accrued Liability | $9,571 | $8,838 |
| b. Market Value of Assets* | 10,194 | 9,818 |
| c. Deferred Gains/(Losses) | 173 | 498 |
| d. Actuarial Value of Assets (b-c) | 10,021 | 9,320 |
| Unfunded Liability - Entry Age Normal (a-d) | ($450) | ($482) |
| **Entry Age Normal Funded Ratio (d/a)** | **105%** | **105%** |

*Note: Totals may not agree due to rounding.*

**LEOFF Plan 2 2015 Market Value of Assets reduced by a $15.799 million payable to the LEOFF 2 Benefit Improvement Account due by 6/30/2016, discounted by 7.5% to 6/30/2015..*

## PARTICIPANT DATA

The following table summarizes the participant data used in the actuarial valuation for the plan year ending June 30, 2016, along with information from last year's valuation. See the **Participant Data** section of this report for additional information.

| Participant Data | | |
|---|---|---|
| | **2016** | **2015** |
| **Active Members** | | |
| Number | 17,186 | 17,019 |
| Total Salaries *(in millions)* | $1,786 | $1,743 |
| Average Annual Salary | $103,947 | $102,411 |
| Average Attained Age | 43.5 | 43.6 |
| Average Service | 14.5 | 14.7 |
| **Retirees and Beneficiaries** | | |
| Number | 4,259 | 3,710 |
| Average Annual Benefit | $44,711 | $42,344 |
| **Terminated Members** | | |
| Number Vested | 953 | 785 |
| Number "Non-Vested" | 1,806 | 1,693 |

## KEY ASSUMPTIONS

The next table displays key economic assumptions used in the actuarial valuation. These assumptions are unchanged from our last valuation.

| Key Assumptions | |
|---|---|
| Valuation Interest Rate | 7.50% |
| Salary Increase | 3.75% |
| Inflation | 3.00% |
| Growth in Membership* | 1.25% |

**Applies to the LEOFF 1 funding method only.*


# II. Actuarial Exhibits


MSA


Car Wash
SELF SERVE GASOLINE
CASH/ CARD
CREDIT / DEBIT
299 9 REGULAR 309 9
CITY OF
TORCH RUN

# Office of the State Actuary

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## Actuarial Certification Letter

## Law Enforcement Officers' and Fire Fighters' Retirement System Plan 2 Actuarial Valuation Report As of June 30, 2016

November 2017

This report documents the results of an actuarial valuation of the Law Enforcement Officers' and Fire Fighters' Retirement System Plan 2 (LEOFF 2) as defined under Chapter 41.26 of the Revised Code of Washington. The primary purpose of this valuation is to determine contribution requirements for the retirement plan as of the June 30, 2016, measurement date, consistent with the prescribed funding policy established by the LEOFF 2 Retirement Board (the Board). These contribution requirements are purely informational since, according to state law, this "off-cycle" valuation is not used to determine contribution rates. This valuation also provides information on the funding progress and developments in the plan over the past year. This valuation report should not be used for other purposes. Please replace this report with a more recent report when available.

Future actuarial measurements may differ significantly from the current measurements presented in this report if plan experience differs from that anticipated by the assumptions or changes occur in the methods, assumptions, plan provisions or applicable law. We have not performed analysis of the potential range of such future measurements for the purposes of this valuation. Please see the risk assessment on our website for stochastic analysis of possible future outcomes.

The valuation results summarized in this report involve calculations that require assumptions about future economic and demographic events. We believe that the assumptions and methods used in the underlying valuation are reasonable and appropriate for the primary purpose stated above. The use of another set of assumptions and methods, however, could also be reasonable and could produce materially different results. Actual results may vary from our expectations.

The assumptions used in this valuation for investment return, inflation, and salary growth were adopted by the Board in the 2011 Interim. The membership growth assumption was prescribed by the Legislature. Please see our latest Economic Experience Study report for further information on the economic assumptions.

PO Box 40914 | Olympia, Washington 98504-0914 | state.actuary@leg.wa.gov | leg.wa.gov/osa/
Phone: 360.786.6140 | Fax: 360.586.8135 | TDD: 711

Actuarial Certification Letter


The Board adopted updates to the demographic assumptions as part of their review of the 2007-2012 Demographic Experience Study results and adoption of the associated contribution rates. The Legislature was responsible for the selection of the actuarial cost and asset valuation methods. In our opinion, all methods, assumptions, and calculations are reasonable and are in conformity with generally accepted actuarial principles and standards of practice as of the date of this publication.

The Department of Retirement Systems (DRS) provided us with member and beneficiary data. We checked the data for reasonableness as appropriate based on the purpose of the valuation. The Washington State Investment Board (WSIB) and DRS provided financial and asset information. An audit of the financial and participant data was not performed. We relied on all the information provided as complete and accurate. In our opinion, this information is adequate and substantially complete for purposes of this valuation.

The asset smoothing method adopted during the 2003 Legislative Session (Chapter 11, Laws of 2003, E1) was intended to address the volatility of contribution rates under the aggregate funding method when used in combination with the existing asset allocation policy of WSIB. The combination of the current asset smoothing method with any other funding method or asset allocation policy may not be appropriate.

During the 2016 Interim, the Board adopted contribution rates based on 100 percent of the normal cost under the Entry Age Normal (EAN) funding method for the 2017-19 and 2019-21 Biennia. The Board's rate adoption for 2017-21 represents a continuation of their temporary funding policy that produces stable contribution rates, measured at June 30, 2016, that exceed the requirements under the plan's actuarial cost method and long-term funding policy. In our opinion, this temporary funding policy is reasonable and consistent with the Board's risk management and stable contribution rate goals. The adoption of contribution rates below the rates for 2017-21 could also be reasonable, but potentially inconsistent with the Board's goals.

The undersigned, with actuarial credentials, meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. While this report is intended to be complete, we are available to offer extra advice and explanations as needed.

Sincerely,

| | |
|---|---|
| Matthew M. Smith, FCA, EA, MAAA | Lisa A. Won, ASA, FCA, MAAA |
| State Actuary | Deputy State Actuary |

Office of the State Actuary November 2017

# CONTRIBUTION RATES

**Member and Employer Rate Summary**

| | 2016 | 2015 |
|---|---|---|
| Member | 7.91% | 7.88% |
| Employer* | 4.75% | 4.73% |
| State (Normal Cost) | 3.16% | 3.15% |
| State (Plan 1 UAAL) | 0.00% | 0.00% |
| Total State | 3.16% | 3.15% |

**Excludes administrative expense rate.*

**Development of Employer/State Rates**

| | LEOFF 2 |
|---|---|
| a. Total Normal Cost | 15.82% |
| b. Employee Normal Cost (a x 50%) | 7.91% |
| **c. Total Employer/State Normal Cost (a - b)** | **7.91%** |
| d. State Normal Cost (a x 20%) | 3.16% |
| e. Employer Normal Cost (c - d)* | 4.75% |
| f. Cost to Amortize UAAL | 0.00% |
| **g. Total Employer Contribution Rate (e + f)**** | **4.75%** |

**Excludes administrative expense rate.*

***The state pays 20% of the total normal cost for LEOFF 2. This reduces the total employer contribution rate from 7.91% to 4.75%.*

The following tables show the development of the normal cost rates. Consistent with the Law Enforcement Officers' and Fire Fighters' (LEOFF) Plan 2 Retirement Board's (the Board) funding policy, the normal cost rates include minimum contribution rates to provide stable and adequate contribution rates over time. The minimum rates are 90 percent of the normal cost calculated under the Entry Age Normal (EAN) funding method. Please see the Glossary for a more detailed explanation of EAN.

We include information for LEOFF Plan 1 because the prior funding policy required the state to amortize any LEOFF 1 Unfunded Actuarial Accrued Liability (UAAL) not later than June 30, 2024, using projected salaries of both LEOFF 1 and LEOFF 2 members.

| Development of Normal Cost Rates | | |
|---|---|---|
| *(Dollars in Millions)* | | **LEOFF 2** |
| **1. Calculation of Member Normal Cost Rate** | | |
| a. | Future Value of Fully Projected Benefits | $101,327 |
| b. | Present Value of Fully Projected Benefits | 13,013 |
| c. | Valuation Assets | 10,021 |
| d. | Unfunded Fully Projected Benefits (b - c) | 2,992 |
| e. | Plan 1 Present Value of Future Salaries (PVS) | N/A |
| f. | Plan 2 PVS | 19,632 |
| g. | Weighted PVS (2e + 2f) | $39,265 |
| h. | Employee Normal Cost (d / g) | 7.62% |
| i. | Employee Minimum Contribution Rate | 7.91% |
| j. | Employee Contribution Rate with Minimum | 7.91% |
| k. | Change In Plan Provisions (Laws of 2017) | 0.00% |
| l. | Employee Contribution Rate (j + k) | 7.91% |
| **2. Calculation of Employer/State Normal Cost Rate** | | |
| a. | Present Value of Fully Projected Benefits | $13,013 |
| b. | Valuation Assets | 10,021 |
| c. | Unfunded Fully Projected Benefits (a - b) | 2,992 |
| d. | Present Value of Employee Contributions | 1,496 |
| e. | Employer/State Responsibility (c - d) | $1,496 |
| f. | Plan 2 PVS | $19,632 |
| g. | Employer/State Normal Cost (e / f) | 7.62% |
| h. | Employer/State Minimum Contribution Rate | 7.91% |
| i. | Employer/State Contribution Rate with Minimum | 7.91% |
| j. | Change In Plan Provisions (Laws of 2017) | 0.00% |
| k. | Total Employer/State Contribution Rate (i + j) | 7.91% |
| **3. Contribution Rates Adopted for 2017-21** | | |
| a. | Employee Contribution Rate* | 8.75% |
| b. | Employer Contribution Rate (a - c)* | 5.25% |
| c. | State Contribution Rate* | 3.50% |
| **d.** | **Total Contribution Rate (a + b + c)** | **17.50%** |

*Note: Totals may not agree due to rounding.*

**LEOFF 2 rate: 50% Employee, 30% Employer, 20% State.*

| Amortization of the Plan 1 Unfunded Actuarial Accrued Liability (UAAL) | | |
|---|---|---|
| *(Dollars in Millions)* | | LEOFF 1 |
| a. | Future Value of Fully Projected Benefits | $10,129 |
| b. | Present Value of Fully Projected Benefits (PVFB) | 4,202 |
| c | Valuation Assets | 5,275 |
| d. | Actuarial Present Value of Future Normal Costs | 0 |
| e. | UAAL (b - c - d) | (1,073) |
| f. | Expected UAAL Contributions to 2017 | 0 |
| g. | Remaining UAAL (e - f) | ($1,073) |
| h. | Amortization Date | 6/30/2024 |
| i. | Present Value of Projected Salaries beyond 2013 | $8,072 |
| j. | Preliminary Contribution Rate (g/ i)* | (13.30%) |
| k. | Change In Plan Provisions (Laws of 2014) | 0.00% |
| l. | Contribution Rate to Amortize the UAAL (j + k)* | (13.30%) |

*Note: Totals may not agree due to rounding.*
**No LEOFF 1 UAAL contributions are required when the plan is fully funded under current funding methods and assumptions.*

## ACTUARIAL LIABILITIES

| Present Value of Fully Projected Benefits | |
|---|---|
| *(Dollars in Millions)* | LEOFF 2 |
| **Active Members** | |
| Retirement | $8,718 |
| Termination | 155 |
| Death | 126 |
| Disability | 401 |
| ROC* on Termination | 100 |
| ROC* on Death | 148 |
| **Total Active** | **$9,648** |
| **Inactive Members** | |
| Terminated | $283 |
| Service Retired | 2,772 |
| Disability Retired | 183 |
| Survivors | 127 |
| **Total Inactive** | **$3,365** |
| **Laws of 2017** | **0** |
| **2016 Total** | **$13,013** |
| **2015 Total** | **$12,152** |

*Note: Totals may not agree due to rounding.*
**Return of Contributions.*

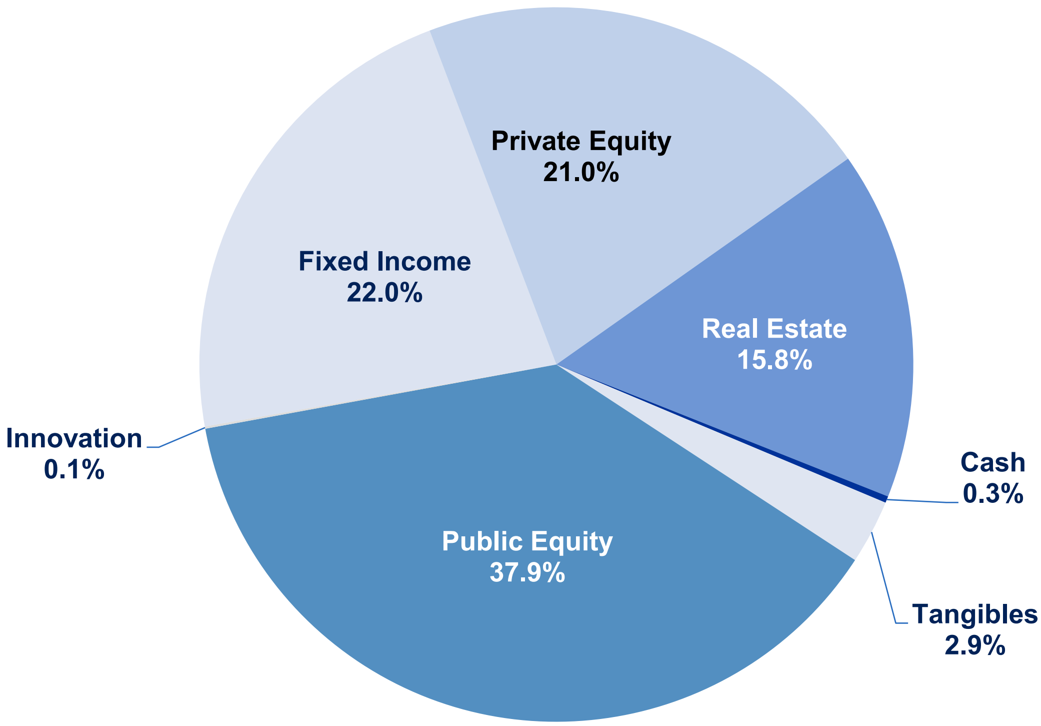
| Entry Age Normal Accrued Liability* | |
|---|---|
| *(Dollars in Millions)* | LEOFF 2 |
| **Active Members** | |
| Retirement | $5,849 |
| Termination | 31 |
| Death | 45 |
| Disability | 221 |
| ROC** on Termination | (29) |
| ROC** on Death | 89 |
| **Total Active** | **$6,206** |
| **Inactive Members** | |
| Terminated | $283 |
| Service Retired | 2,772 |
| Disability Retired | 183 |
| Survivors | 127 |
| **Total Inactive** | **$3,365** |
| **Laws of 2017** | **0** |
| **2016 Total** | **$9,571** |
| **2015 Total** | **$8,838** |

*Note: Totals may not agree due to rounding.*
**Calculated using the Entry Age Normal (EAN) cost method. This method was not used to determine contribution requirements.*
***Return of Contributions.*

We report expected projected benefit payments on our website by year under the assumed interest rate. We also show benefit payment projections that vary by interest rate assumptions. For more information or to view project benefit payments, please visit the Interactive Reports page on our website.

## PLAN ASSETS

**Retirement Commingled Trust Fund (CTF) Asset Allocation**




**Cash:** Highly liquid, very safe investments that can be easily converted into cash, such as Treasury Bills and money-market funds.

**Fixed Income:** Securities representing debt obligations and usually having fixed payments and maturities. Different types of fixed income securities include government and corporate bonds, mortgage-backed securities, asset-backed securities, convertible issues, and may also include money-market instruments.

**Innovation:** Fund that provides the ability to invest in a broad range of assets that fall outside the traditional asset classes or management style of existing asset classes.

**Public Equity:** Shares of U.S. and non-U.S. corporations that trade on public exchanges or "over-the-counter." The ownership of a corporation is represented by shares that are claimed on the corporation's earnings and assets.

**Private Equity:** The infusion of equity capital into a private company (one that is not available on the public markets). Private equity investments include securities that are not listed on a public exchange and are not easily accessible to most individuals. These investments range from initial capital in start-up enterprises to leveraged buyouts of mature corporations.

**Real Estate:** An externally-managed selection of partnership investments with the majority of the partnerships invested in high-quality real estate leased to third parties.

**Tangibles:** The tangible asset portfolio invests in sectors such as infrastructure, timber, agriculture, natural resources, commodities, or other sectors consistent with the goals of the asset class.

| Change in Market Value of Assets | |
|---|---|
| *(Dollars in Millions)* | **LEOFF 2** |
| **2015 Market Value** | **$9,833** |
| **Revenue** | |
| **Contributions** | |
| Employee | 152 |
| Employer/State | 152 |
| Total Contributions | 304 |
| Investment Return | 244 |
| Restorations | 22 |
| Transfers In | 0 |
| Miscellaneous | 0 |
| **Total Revenue** | **$570** |
| **Disbursements** | |
| Monthly Benefits | 184 |
| Refunds | 7 |
| Total Benefits | 191 |
| Transfers Out | 16 |
| Expenses | 2 |
| **Total Disbursements** | **$208** |
| **Payables** | $0 |
| 2016 Market Value | $10,194 |
| 2016 Actuarial Value | $10,021 |
| **Ratio (AV/MV)** | **98%** |

*Note: Totals may not agree due to rounding.*

| Calculation of Actuarial Value of Assets | | | | |
|---|---|---|---|---|
| *(Dollars in Millions)* | | | | **LEOFF 2** |
| a. | Market Value at 6/30/2016 | | | $10,194 |
| b. | Deferred Gains and (Losses) | | | |
| | **Plan Year Ending** | **Deferred** | **Remaining** | |
| | 6/30/2016 | 6 | 5 | (414) |
| | 6/30/2015 | 3 | 1 | (89) |
| | 6/30/2014 | 8 | 5 | 548 |
| | 6/30/2013 | 5 | 1 | 64 |
| | 6/30/2012 | 7 | 2 | (111) |
| | 6/30/2011 | 8 | 2 | 175 |
| | Total Deferral | | | $173 |
| c. | Market Value less Deferral (a - b) | | | $10,021 |
| d. | 70% of Market Value of Assets | | | $7,136 |
| e. | 130% of Market Value of Assets | | | $13,253 |
| f. | **Actuarial Value of Assets*** | | | **$10,021** |

*Note: Totals may not agree due to rounding.*

**Actuarial Value of Assets can never be less than 70% or greater than 130% of the market value of assets.*

| Investment Gains and (Losses) for Prior Year | | |
|---|---|---|
| *(Dollars in Millions)* | | **LEOFF 2** |
| a. | 2015 Market Value (at WSIB) | $9,804 |
| b. | Total Cash Flow | 114 |
| c. | 2016 Market Value (at WSIB) | 10,162 |
| d. | Actual Return (c - b - a) | $245 |
| 8 | Weighted Asset Amount | $9,894 |
| f. | Expected Return (7.5% x e) | 742 |
| g. | Investment Gain/(Loss) for Prior Year (d - f) | (497) |
| h. | Dollar-Weighted Rate of Return | 2.48% |

*Note: Totals may not agree due to rounding.*

## FUNDED STATUS

In our actuarial valuation report, we calculate a plan's funded status by comparing (a) the plan's current assets, determined under an asset valuation method, to (b) the actuarial accrued liability of its members calculated under an actuarial cost method. Funded status can vary significantly depending on the purpose of the measurement and the assumptions and methods used to determine the funded status.

Based on the purpose of the measurement, actuaries can select from several acceptable actuarial cost methods when measuring a plan's funded status. The cost methods vary in the manner they allocate benefits to past and future time periods. Generally speaking, benefits allocated to past service are considered accrued (or earned). Please see the Glossary for an explanation of the actuarial cost methods we use in this actuarial valuation.

Consistent with financial reporting under Governmental Accounting Standards Board (GASB) requirements, we report funded status using the EAN actuarial cost method. However, the funded status measures we share in this report may still vary from those presented in the Department of Retirement Systems (DRS) Comprehensive Annual Financial Report (CAFR). These differences occur because the assumptions and methods that apply for determining contribution requirements (under a funding valuation) may not apply for financial reporting under GASB accounting standards (an accounting valuation). Put another way, these measurements still represent distinct measurements for distinct purposes and the results may vary between the two reports.

To determine the present value (today's value) of accrued benefits we discount future benefits to the valuation date using the valuation interest rate. The valuation interest rate is adopted by the LEOFF Plan 2 Retirement Board and is consistent with the long-term expected return under the plan's funding policy. (Note: This discount rate may vary from the rate used for financial reporting under GASB accounting standards.)

In addition to the valuation interest rate, we use the same long-term assumptions to develop the funded status measure in this report as we use for determining the contribution requirements of the plan. We don't expect the assumptions to match actual experience over short-term periods. However, we do expect these assumptions to reasonably approximate average annual experience over long-term periods. This measure of funded status is consistent with the state's current funding policy and financing plan for future retirement benefits.

For reporting funded status and calculating contribution requirements, we also use an asset valuation method to determine the Actuarial Value of Assets (AVA). This asset valuation method smooths the inherent volatility in the Market Value of Assets (MVA) by deferring a portion of annual investment gains or losses for a certain number of years. Investment gains and losses occur when the annual return on investments varies from the long-term assumed rate. To determine the 2016 investment gains or losses, we used an investment return assumption of 7.5 percent. The AVA provides a more stable measure of the plan's assets on an ongoing basis.

With this background in mind, we display the funded status on an "actuarial value" basis. For the actuarial basis, we use the assumed long-term rate of return and actuarial value of assets consistent with the plan's funding policy.

It's also reasonable and acceptable to report funded status using other assumptions and methods. The resulting funded status will change with the use of assumptions and methods that vary from what we present in this report. Please visit the Interactive Reports page of our website for funded status measures that vary by interest rate assumptions and asset valuation methods.

We include information for LEOFF Plan 1 because the prior funding policy required the state to amortize any LEOFF 1 UAAL not later than June 30, 2024, using projected salaries of both LEOFF 1 and LEOFF 2 members.

**Funded Status on an Actuarial Value Basis***

| *(Dollars in Millions)* | LEOFF 2 | LEOFF 1 |
|---|---|---|
| EAN Accrued Liability | $9,571 | $4,197 |
| Valuation Assets | $10,021 | $5,275 |
| Unfunded Liability | ($450) | ($1,078) |
| **Funded Ratio** | | |
| **2016** | **105%** | **126%** |
| 2015 | 105% | 125% |
| 2014 | 107% | 127% |

**Liabilities valued using the EAN cost method at an interest rate of 7.5% (7.7% for LEOFF 1). All assets have been valued under the actuarial asset method.*

Generally speaking, under current funding policy, when a plan is less/more than 100 percent funded, we expect higher/lower contribution requirements in the near term to return to a 100 percent funded status over time. A plan with a funded status above 100 percent will require future contributions if the plan has not yet accumulated sufficient assets to pay both the expected cost of benefits that have been earned today and the expected cost of benefits that will be earned by current members in the future. As of the valuation date, and under the data, assumptions and methods used for this actuarial valuation, only LEOFF Plan 1 has sufficient assets to cease ongoing contributions.

The funded status measures presented in this report are not sufficient to determine whether a plan has enough assets to terminate or settle the plan obligations.

## ACTUARIAL GAINS/LOSSES

The next table displays actuarial gains and losses, expressed as contribution rate changes. Actuaries use gain/loss analysis to compare actual changes to assumed changes in assets, liabilities, and salaries from various sources. We also use this analysis to determine:

- The accuracy of our valuation model and annual processing.
- Why contribution rates changed.
- The reasonableness of the actuarial assumptions.

Actuarial gains will reduce contribution rates; actuarial losses will increase contribution rates. Under a reasonable set of actuarial assumptions, actuarial gains and losses will offset over long-term experience periods.

| Change in State Contribution Rate by Source | | |
|---|---|---|
| **Change in Rate** | **LEOFF 1*** | **LEOFF 2**** |
| **2015 Rate Before Laws of 2016** | **(9.89%)** | **3.15%** |
| Remove Rate Floor / Ceiling | 0.00% | (0.17%) |
| LEOFF 1 Roll Forward Funding Method | (3.96%) | N/A |
| **2015 Adjusted Rate** | **(13.85%)** | **2.98%** |
| Liabilities | | |
| Salaries | (0.04%) | (0.17%) |
| Termination | 0.00% | (0.03%) |
| Retirement | (0.01%) | 0.01% |
| Disability | 0.00% | 0.00% |
| Mortality | (0.01%) | 0.00% |
| Return to Work | 0.00% | 0.31% |
| Inflation (CPI) | (1.05%) | N/A*** |
| Other Liabilities | 0.28% | 0.04% |
| **Total Liability Gains/Losses** | **(0.83%)** | **0.16%** |
| **Asset Gains/Losses** | **2.05%** | **0.08%** |
| **Present Value of Future Salaries Gains/Losses** | **(0.32%)** | **(0.17%)** |
| Incremental Changes | | |
| Plan Change | 0.00% | 0.00% |
| Method Change | 0.00% | 0.00% |
| Assumption Change | 0.00% | 0.00% |
| Correction Change | 0.00% | 0.00% |
| Experience Study Change | 0.00% | 0.00% |
| **Total Incremental Changes Gains/Losses** | **0.00%** | **0.00%** |
| **Other Gains/Losses** | **(0.35%)** | **(0.00%)** |
| **Total Change** | **0.55%** | **0.07%** |
| **2016 Preliminary Rate** | **(13.30%)** | **3.05%** |
| Increase from Applied Rate Floor | N/A | 0.11% |
| Laws of 2017 | 0.00% | 0.00% |
| **2016 Adjusted Rate** | **(13.30%)** | **3.16%** |

**The contribution rate is the UAAL rate for plan 1. No contributions are required under current law when the plan remains fully funded.*

***The state contribution rate to LEOFF 2 is 20% of the Normal Cost.*

****Inflation Gains/Losses included in Other Liabilities for LEOFF 2.*


# III. Participant Data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## OVERVIEW OF SYSTEM MEMBERSHIP

| Active Membership By Employer | |
|---|---|
| State Agencies | 132 |
| Higher Education | 115 |
| Community Colleges | 0 |
| K-12 | 0 |
| Counties | 2,845 |
| County Sub Divisions | 259 |
| First Class Cities | 5,102 |
| Other Cities | 4,832 |
| Ports | 180 |
| Education Service District | 0 |
| Fire Districts | 3,721 |
| Public Utility District | 0 |
| Water Districts | 0 |
| Energy Northwest | 0 |
| Unions | 0 |
| **TOTAL** | **17,186** |

Membership includes fire fighters; emergency medical technicians; law enforcement officers including sheriffs; university, port, and city police officers; and Department of Fish and Wildlife enforcement officers.

The following table summarizes participant data changes from last year's valuation to this year's valuation. We divide the participant data into two main categories:

- Actives – members accruing benefits in the plan.
- Annuitants – members and beneficiaries receiving benefits from the plan.

| Reconciliation of Participant Data | |
|---|---|
| **2015 Actives** | 17,019 |
| Transfers | 0 |
| Hires/Rehires | 1,129 |
| New Retirees | (480) |
| Deaths | (15) |
| Terminations | (467) |
| **2016 Actives** | **17,186** |
| **2015 Annuitants** | 3,710 |
| New Retirees* | 561 |
| Annuitant Deaths | (31) |
| New Survivors | 25 |
| Other | (6) |
| **2016 Annuitants** | **4,259** |
| **Ratio of Actives to Annuitants** | **4.04** |

**Includes service and disability retirees.*

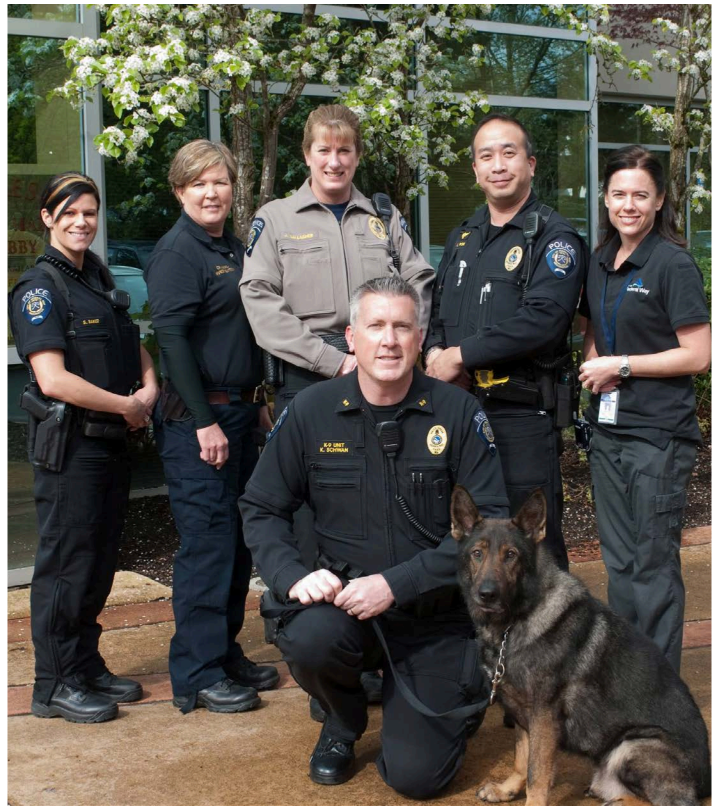
## SUMMARY OF PLAN PARTICIPANTS

| Summary of Plan Participants | 2016 | 2015 |
|---|---|---|
| **Active Members** | | |
| Number | 17,186 | 17,019 |
| Total Salaries (Millions) | $1,786 | $1,743 |
| Average Age | 43.5 | 43.6 |
| Average Service | 14.5 | 14.7 |
| Average Salary | $103,947 | $102,411 |
| **Terminated Members** | | |
| Number Vested | 953 | 785 |
| Number "Non-Vested" | 1,806 | 1,693 |
| **Retirees** | | |
| Number of Retirees (All) | 4,259 | 3,710 |
| Average Monthly Benefit, All Retirees | $3,726 | $3,529 |
| Number of New "Service Retirees" | 523 | 452 |
| Average Monthly Benefit, New "Service Retirees" | $4,632 | $4,430 |

## III. Participant Data

The following table contains the average age and service at retirement split for law enforcement officers and fire fighters.

| Retirement Age and Service | 2016 | 2015 |
|---|---|---|
| **All Law Enforcement Officers** | | |
| Average Age at Retirement | 55.6 | 55.4 |
| Average Service at Retirement | 22.7 | 22.2 |
| **All Fire Fighters** | | |
| Average Age at Retirement | 56.6 | 56.5 |
| Average Service at Retirement | 24.6 | 24.3 |



# IV. Appendices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M. DeBOCK
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# ACTUARIAL METHODS AND ASSUMPTIONS

To calculate the contribution rates necessary to pre-fund a plan's benefits, an actuary uses an actuarial cost method, asset valuation method, economic assumptions, and demographic assumptions. This section, together with the web pages linked below, list the actuarial methods and assumptions used for this valuation.

## ACTUARIAL METHODS

Please see the Actuarial Methods web page for descriptions of the actuarial cost methods and asset valuation method we use for this valuation.

## ACTUARIAL ASSUMPTIONS

This section lists the assumptions that change regularly, along with new assumption and method changes since the last actuarial valuation report. Otherwise, please see the Actuarial Assumptions web page for descriptions of all remaining assumptions.

### *DEMOGRAPHIC ASSUMPTIONS*

The Employee Contribution Rate assumption helps us estimate the value of accumulated employee contributions with interest if a member elects a refund of contributions instead of a deferred retirement allowance upon termination.

| Employee Contribution Rates for Savings Fund Accrual | |
|---|---|
| **LEOFF 2** | 8.75% |

*This assumption helps us estimate the value of accumulated employee contributions with interest if a member elects a refund of contributions instead of a deferred retirement allowance upon termination.*

## CHANGES IN METHODS AND ASSUMPTIONS SINCE THE LAST VALUATION

The only method change we made for LEOFF 2 was to correct how we value death benefits for terminated vested members. Prior to this correction, we applied factors at the time of termination, rather than at the time of death.

# SUMMARY OF PLAN PROVISIONS

The summary of key plan provisions used in the actuarial valuation are provided in two sets of tables. The table below contains plan provisions that can change frequently while the provisions that change less frequently can be found on our website: Summary of General Plan Provisions.

| Summary of Frequently Changing Plan Provisions - LEOFF | Plan 1 | Plan 2 |
|---|---|---|
| **COLA** | Full CPI* | Lesser of CPI* or 3% |
| **Changes in Plan Provisions Since Last Valuation** | None | Emergency Medical Technician Plan Membership, (C 309 L 17); Interruptive Military Service, (C 188 L 17) |

**CPI: Urban Wage Earners & Clerical Workers, Seattle-Tacoma-Bremerton, WA - All Items.*

# IV. Appendices

These tables present high-level summaries and are not meant to be exhaustive lists. For complete details of plan provisions, please refer to the statutes governing the systems or contact the plan administrator, DRS. In the unlikely event that information contained in these summary tables conflicts with state law, the law takes precedence.

## AGE DISTRIBUTIONS

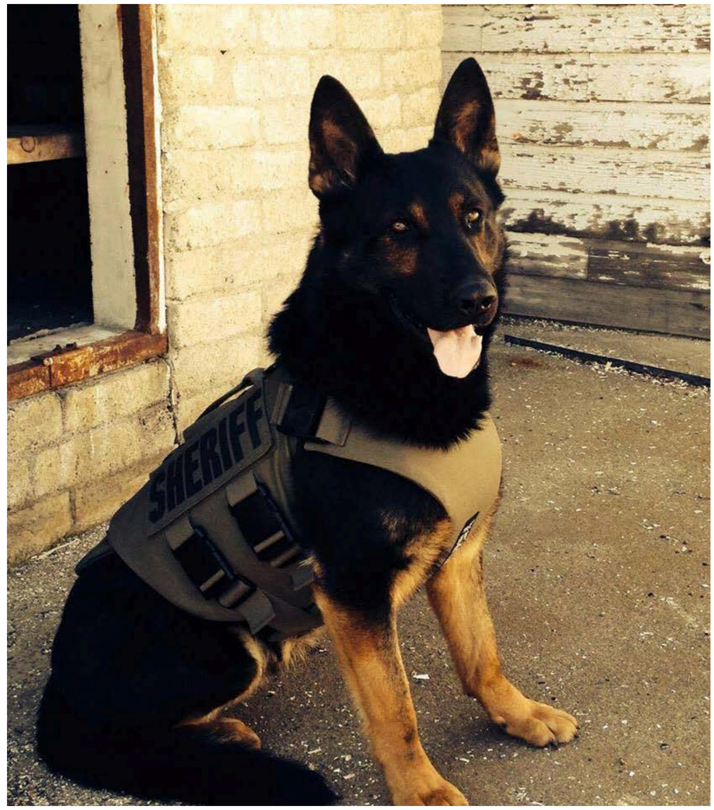
Please see the **Age Distribution** webpages for tables summarizing valuation statistics by system, plan, and member/annuitant age.

## HISTORICAL DATA

Please see the **Historical Data** webpage for tables summarizing valuations statistics by retirement system and valuation period.

## GLOSSARY

See the **Glossary** on our website.




# Law Enforcement Officers' and Fire Fighters' Plan 2 Retirement Board

# 2016 Actuarial Valuation Report

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