Report 18-19
December 2018

State of Wisconsin Investment Board

STATE OF WISCONSIN



Legislative Audit Bureau

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Joint Legislative Audit Committee Members

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CONTENTS

Appendices

Response

STATE OF WISCONSIN | Legislative Audit Bureau
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Joe Chrisman
State Auditor

December 20, 2018

Senator Robert Cowles and
Representative Samantha Kerkman, Co-chairpersons
Joint Legislative Audit Committee
State Capitol
Madison, Wisconsin 53702

Dear Senator Cowles and Representative Kerkman:

We have completed an evaluation of the State of Wisconsin Investment Board (SWIB), as required under s. 25.17 (51m), Wis. Stats. As of December 2017, SWIB managed $117.0 billion in assets, which included investments of the Wisconsin Retirement System (WRS), the State Investment Fund, and five other funds. As of December 2017, the WRS Core Fund and Variable Fund exceeded five-year benchmarks with average annual investment returns of 8.6 percent and 13.3 percent, respectively.

The Core Fund's investment return did not meet the long-term expected rate-of-return assumption of 7.2 percent on a 20-year basis in 2016 and 2017. SWIB projects that it may earn investment returns between 6.2 percent and 6.8 percent annually for the next five to seven years. Although the asset allocation SWIB established for the Core Fund is intended to protect WRS participants from a large market downturn, we recommend that SWIB conduct additional "stress tests" that focus on the effect of sustained market downturns and certain other conditions.

SWIB is authorized to establish its own budget and to create or eliminate staff positions. From 2013 through 2017, SWIB's annual expenses increased by 21.7 percent. After considering the effect of increases in assets managed by SWIB, we found the increases in expenses were attributable to higher management fees paid to external investment managers for more-complex investment strategies, an information systems implementation, and the hiring of additional staff. SWIB had 188 full-time equivalent (FTE) positions and 40.0 contracted staff positions as of December 2017.

We recommend SWIB track future technology project expenses through a centralized process, develop policies to require Board approval for expenses that exceed the total budget, and report investment returns that include management fees and investment expenses to the Board. In response to concerns reported to our Fraud, Waste, and Mismanagement Hotline, we reviewed five recruitments conducted by SWIB in early 2018 and recommend that SWIB revise its hiring policy to ensure it equally considers all qualified applicants.

We appreciate the courtesy and cooperation extended to us by SWIB staff. A response from SWIB's executive director/chief investment officer follows the appendices.

Respectfully submitted,

Joe Chrisman
State Auditor

JC/SH/ss

Report Highlights ▪

SWIB managed $117.0 billion in assets as of December 2017.

Five-year average annual investment returns of all funds managed by SWIB exceeded established benchmarks.

The Core Fund five-year average annual investment return continued to rank ninth among ten large public pension plans.

SWIB has greater operational authority than most state agencies, including authority to establish its operating budget and create staff positions with Board of Trustees approval.

As of December 2017, SWIB had 188.0 authorized FTE positions, of which 41.5 percent provided investment management services.

The State of Wisconsin Investment Board (SWIB) invests assets for the Wisconsin Retirement System (WRS), the State Investment Fund (SIF), and five other funds. Assets managed by SWIB totaled $117.0 billion as of December 2017. The WRS Core Fund and Variable Fund accounted for 92.7 percent of assets managed. The WRS is intended to provide retirement benefits for more than 632,800 current and former state and local government employee participants. The Department of Employee Trust Funds (ETF) is responsible for managing WRS operations, and SWIB is responsible for managing WRS investments.

We have completed an evaluation of SWIB, as required under s. 25.17 (51m), Wis. Stats. In completing this evaluation, we:

- analyzed investment returns by comparing them to market-based benchmarks established by SWIB, the long-term expected rate-of-return assumption, and investment returns of other large public pension plans;
- assessed expenses, including expenses for management fees SWIB pays to external investment managers, technology projects, and internal operating expenses;
- examined staffing levels and trends in staffing, including the use of contracted staff;
- analyzed staff compensation, including salaries and bonuses;

- assessed staff retention and hiring practices; and
- reviewed investment of assets in Wisconsin.

Investment Performance

The Board of Trustees establishes market-based benchmarks with the guidance of a consultant to evaluate SWIB investment performance. As shown in Table 1, the average annual investment return for the five-year period as of December 2017 was 8.6 percent for the Core Fund and 13.3 percent for the Variable Fund. Both funds exceeded their five-year benchmarks as of December 2016 and December 2017. The investment returns for the six other funds SWIB managed as of December 2017 also exceeded their five-year benchmarks.

Table 1

Five-Year WRS Investment Performance Relative to Benchmarks
As of December 2017

	Investment Benchmark	Average Annual Investment Return[1]
Core Fund	8.2%	8.6%
Variable Fund	13.0	13.3

[1] Does not include management fees and other investment expenses.

SWIB invests Core Fund assets across several asset classes and has been implementing a long term plan intended to protect the Core Fund from significant market downturns. SWIB has worked to both increase assets managed by internal investment staff and develop internal expertise for its more-complex investment strategies, including multi-asset investments and a hedge fund strategy.

We also analyzed trends in Core Fund 20- and 30-year investment returns relative to the long-term expected rate-of-return assumption (return assumption) approved by the ETF Board. The Core Fund's investment return did not meet the long-term expected rate-of-return assumption of 7.2 percent on a 20-year basis in 2016 or 2017. However, the Core Fund's 30 year investment return remained above the return assumption as of December 2017.

From 2011 through 2018, the return assumption was 7.2 percent. Based on expected market conditions, SWIB anticipates Core Fund investment returns between 6.2 percent and 6.8 percent annually for the next five to seven years. The ETF Board approved a decrease in the return assumption to 7.0 percent for the December 31, 2018 valuation.

The Core Fund's five-year investment return ranked ninth among ten large public pension plans. Plan returns are affected by differences in plan structure, such as asset allocation, return assumptions, investment styles, funding levels, and risk tolerance levels. Because the WRS is well funded, SWIB does not experience the same pressure to achieve high returns as the other plans and invested WRS assets more conservatively in order to limit risk. SWIB staff indicated that the Core Fund is positioned to perform better than its peers in less-favorable market conditions, which are anticipated in the coming years.

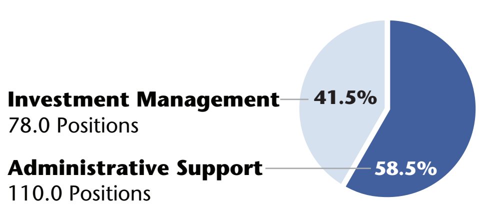
Investment and Operating Expenses

2011 Wisconsin Act 32, the 2011-13 Biennial Budget Act, granted SWIB the authority to establish its own operating budget and to create staff positions outside of the legislative budget process. SWIB's annual expenses totaled $427.4 million in 2017, an increase of 21.7 percent since 2013.

After considering the effect of increases in assets managed by SWIB, we found the increase in expenses was attributable to higher management fees paid to external investment managers for more-complex investment strategies, an information systems implementation, and the hiring of additional staff. The Board authorized an additional 14.7 full-time equivalent (FTE) positions during 2017. As shown in Figure 1, SWIB had 188.0 authorized FTE positions as of December 2017, which included 78.0 FTE positions for investment management staff, or 41.5 percent.

Figure 1

Authorized FTE Positions
As of December 2017



Total Positions: 188.0

In addition to authorized FTE positions, SWIB also had 40 contracted staff positions as of December 2017. Contracted staff assisted SWIB in effectively using newly implemented information systems and performed ongoing administrative support responsibilities. The Board authorized an additional 15.0 FTE positions in June 2018 to begin converting contracted staff positions to FTE positions.

Statutes and Board policies provide that SWIB may not exceed the Board approved internal operating budget without additional Board approval. Although Board policies require SWIB to annually submit a total budget and the Board has approved the total budget in recent years, Board policies do not require SWIB to seek additional approval when actual expenses are projected to exceed the budgeted amount. SWIB's expenses exceeded the total budget in FY 2016-17 and in FY 2017-18, largely due to higher management fees.

Compensation and Staff Retention

SWIB is authorized to compensate staff through salaries, bonuses, and fringe benefits. Pursuant to the Board approved compensation plan and compensation policy, staff salaries are to be within range of an established comparison group median. Overall compensation provided to SWIB investment management staff for 2017 performance was at 93.2 percent of this median. SWIB paid $29.4 million in salaries and fringe benefits to staff in 2017. For 2017 performance, 150 staff also received bonuses totaling $11.5 million. This is a lower amount than for prior years due to lower investment returns relative to benchmarks.

In response to concerns reported to our Fraud, Waste, and Mismanagement Hotline, we reviewed five recruitments SWIB conducted in early 2018. We found there were between 11 and 61 applicants for these five positions. However, SWIB conducted an in-person interview with only the one applicant who was ultimately hired for each position. Available information also indicated that SWIB staff showed preference before the positions were posted for those individuals who were ultimately hired.

In October 2018, the Board approved a hiring policy that encourages SWIB staff to identify and meet with potential applicants, but it does not establish an application and selection process to ensure equal consideration of all qualified applicants. We recommend SWIB work with its Board to revise the policy and improve its documentation.

Wisconsin Investments

SWIB invests in Wisconsin through a range of asset classes, including public equity securities, fixed income, multi-asset, private equity and debt, and real estate. SWIB has two dedicated investment strategies for investing in Wisconsin: private debt and venture capital strategies. As of December 2017, investment returns for these strategies exceeded established benchmarks. Wisconsin investments must meet the same investment standards as other investments. However, not all venture capital investments were located in Wisconsin.

Recommendations

We recommend that the State of Wisconsin Investment Board work with the Board of Trustees, as appropriate, to:

☑ conduct additional stress tests of the Wisconsin Retirement System and report the test results *(p. 29)*;

☑ centrally track future technology project expenses and report such expenses quarterly *(p. 42)*;

☑ develop policies that require Board of Trustees approval of projected expenses that exceed the total approved budget, or portions thereof *(p. 49)*;

☑ more clearly identify whether reported investment returns include management fees and other investment expenses *(p. 51)*;

☑ report investment returns that include management fees and other investment expenses *(p. 51)*; and

☑ improve its application and selection process by revising its hiring policy to ensure equal consideration of all qualified applicants and improve its documentation *(p. 63)*.

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Introduction ■

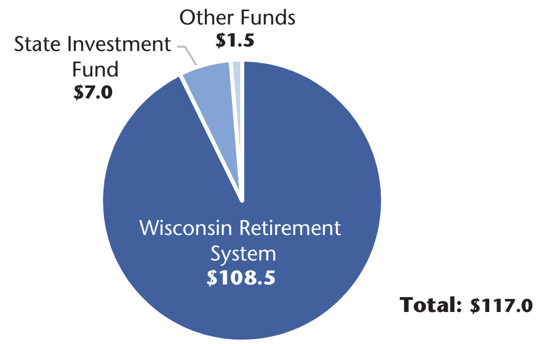
Statutes require SWIB to provide prudent and cost-effective management of the assets it holds in trust by investing them in a manner that is consistent with their intended purpose. Although SWIB is a state agency, it operates as an independent agency with a governing Board of Trustees. The Board of Trustees establishes investment and staffing philosophies and policies with which SWIB must comply.

As of December 2017, SWIB managed $117.0 billion in assets.

SWIB is responsible for significant investment responsibilities on behalf of the State. As shown in Figure 2, SWIB managed $117.0 billion in assets as of December 2017. Of the total, $108.5 billion, or 92.7 percent, was in the WRS, which is intended to fund retirement benefits for more than 632,800 current and former state and local government employee participants. ETF is responsible for managing WRS operations, and SWIB is responsible for managing WRS investments.

Figure 2

Assets Managed
As of December 2017
(in billions)



Section 25.17 (1), Wis. Stats., also requires that SWIB invest the available assets of 77 state funds, 61 of which participate in the State Investment Fund (SIF) for short-term investment and cash management. The 61 state funds invested in the SIF are shown in Appendix 1. One of these funds is the Local Government Investment Pool, which includes the assets of more than 1,000 local units of government that have chosen to invest in the SIF rather than in other options available for the investment of cash balances.

In addition to the WRS and SIF, SWIB managed assets for five other funds in 2016 and 2017:

- EdVest Tuition Trust Fund;
- Historical Society Trust Fund;
- Injured Patients and Families Compensation Fund;
- Local Government Property Insurance Fund; and
- State Life Insurance Fund.

Of these funds, two were entirely invested in the SIF and two were managed by external investment managers. SWIB may choose to hire external investment managers under its investment authority to supplement its existing staff, when it needs additional investment expertise, or when it is cost effective. Additional information about each of these funds is shown in Appendix 2.

In 2018, SWIB assumed responsibility for investing assets of the University of Wisconsin (UW) System Trust Fund. SWIB is contractually required to serve as a fiduciary in carrying out investment management responsibilities, follow established investment guidelines, maintain adequate records, and report on investment activities to UW System as requested. UW System estimated that having SWIB invest these assets will create savings in administrative costs and management fees over time. As of June 2018, $419.5 million in assets of UW System Trust Fund were managed by SWIB, which used two external investment managers to invest these assets.

Board of Trustees

SWIB is governed by a nine-member Board of Trustees.

The SWIB Board of Trustees is made up of nine members. As shown in Appendix 3, Board members include the Secretary of the Department of Administration, two WRS participants, and six individuals appointed by the Governor and confirmed by the Senate to serve six-year terms. Five of the appointed members must have at least ten years of experience making investments, and one must have at least ten years of financial experience, including in local government.

Board members have a fiduciary responsibility to administer the assets of each fund solely for the purpose of the fund at a reasonable cost and to manage investments with care, skill, prudence, and diligence. The Board met eight times in 2016, six times in 2017, and nine times in 2018. In these meetings, a variety of subjects were discussed, including asset allocation, budget proposals, comparison to other investment managers, investment performance, staff compensation, and staffing. All Board members serve on at least one of four committees. For many decisions that the Board makes, the applicable committee first reviews proposals, has in-depth discussions about the proposals, and makes recommendations to the Board.

Following recommendations we made in report 16-15, the Board revised its committee structure to establish the Audit and Finance Committee. This committee annually reviews proposed budgets and receives budget updates. In 2016 and 2017, committees often met in conjunction with Board meetings regarding audit activity, investment benchmarks, staff compensation, and strategic planning and corporate governance.

The Board appoints the SWIB executive director and the internal audit director. Although the Board establishes the overall investment plan for SWIB-managed funds, it delegates day-to-day investment management and operational decisions to SWIB senior management, including the executive director, chief legal counsel, chief investment officer, chief operating officer, and chief financial officer, who are to operate within the objectives, guidelines, and policies established by the Board. Additionally, the Board has delegated certain investment decisions to a SWIB staff investment committee, which meets regularly to make operational investment decisions, including changes to investment guidelines and strategies.

SWIB Operations

SWIB has greater operational authority than most state agencies. For example, 2011 Wisconsin Act 32, the 2011-13 Biennial Budget Act, granted SWIB the authority to establish its operating budget and create staff positions outside of the legislative budget process. Additionally, the Board is authorized to establish SWIB staff compensation independent of the state compensation plan.

Statutory authority allowing SWIB to make any investments determined to meet its fiduciary responsibilities as well as increased flexibility in managing its operating budget have contributed to changes in SWIB investment strategies, internal operations, and technology over the past ten years. As shown in Table 2, assets managed by SWIB increased 72.6 percent from 2008 to 2017. Over this same period, annual expenses nearly doubled and authorized positions increased 51.2 percent. In addition, the percentage of WRS investments SWIB internally managed increased from 37.7 percent in 2008 to 62.4 percent in 2017. Consequently, while SWIB continues to use external investment managers in areas in which it seeks additional expertise, the use of external investment managers to supplement its existing staff has decreased.

Table 2

Key Operational Information
As of December

	2008	2017	Percentage Change
Assets Managed	$67,805,000,000	$117,011,000,000	72.6%
Annual Expenses	$223,500,000	$427,400,000	91.2
Authorized Positions[1]	124.3	188.0	51.2
Internal Management of WRS Assets	37.7%	62.4%	65.5

[1] Includes permanent full-time equivalent (FTE) positions and short-term, project FTE positions.

SWIB is excluded from standard state procurement procedures for contracts pertaining to investment management, such as external investment managers and investment research services. In 2016 and 2017, SWIB entered into 192 contracts and incurred expenditures with over 900 vendors.

To evaluate the management of SWIB operations in 2016 and 2017, we:

- analyzed investment returns by comparing them to performance benchmarks established by SWIB, the long-term expected rate-of-return assumption, and investment returns of other large public pension plans;
- assessed expenses, including expenses for management fees SWIB pays to external investment managers, technology projects, and internal operating expenses;
- examined staffing levels and trends in staffing, including the use of contracted staff;
- analyzed staff compensation, including salaries and bonuses;
- assessed staff retention and hiring practices; and
- reviewed investment of assets in Wisconsin.

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Investment Performance ▪

SWIB invests assets of the Core Fund across several asset classes and has been implementing a long-term plan intended to protect the Core Fund from significant market downturns. Although SWIB has met market-based benchmarks for the Core Fund and Variable Fund, the Core Fund 20-year investment return did not meet the 7.2 percent return assumption for 2016 or 2017. We also found that Core Fund investment returns continued to rank lower than other large public pension plans. We recommend that SWIB consider completing additional simulations under various market and other conditions, referred to as "stress tests," to understand how such changes may affect investment returns and the WRS.

WRS Structure and Asset Allocation

As of December 2017, SWIB managed $108.5 billion in WRS assets, or 92.7 percent of all assets managed by SWIB. The WRS is a defined-benefit plan that provides participants with lifelong monthly retirement benefits that are determined for each participant using a formula based on the number of years of service and highest three years of salary. It is funded by employer contributions, current employee contributions, and investment earnings. A fundamental objective of the WRS is to invest these contributions so that investment income will be sufficient to pay projected future benefits. SWIB manages the investments of the WRS in two funds:

- The Core Retirement Investment Trust Fund (Core Fund) is a diversified fund that typically is invested for the long term in several types of investments and provides less volatile investment returns. The investments in the Core Fund totaled $100.3 billion as of December 2017.

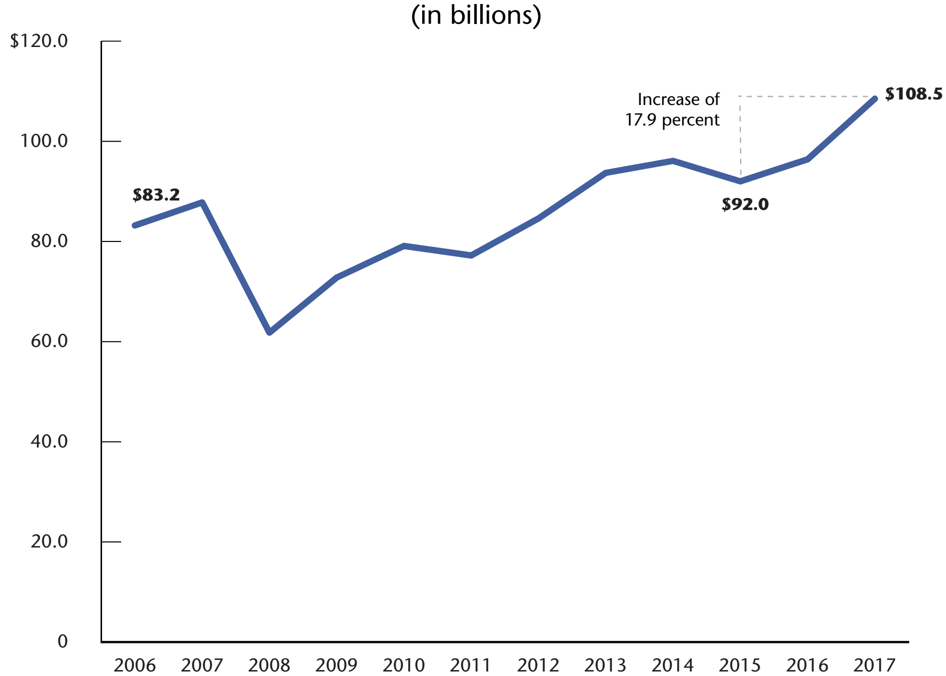
- The Variable Retirement Investment Trust Fund (Variable Fund) is a public equity securities fund, or stock fund, that provides returns that are typically more volatile than the Core Fund. WRS participants currently have the option to have 50.0 percent of their retirement contributions in the Variable Fund. As of December 2017, 40,877 retired participants and 56,507 active or inactive participants were invested in the Variable Fund, which totaled nearly $8.2 billion.

As of December 2017, WRS assets were $108.5 billion.

As shown in Figure 3, WRS assets increased from $83.2 billion as of December 2006 to $108.5 billion as of December 2017, or by 30.4 percent. In 2016 and 2017, WRS assets increased by $16.5 billion, or by 17.9 percent. WRS assets have generally increased since 2008. Pension contributions, payments to retired participants, and investment returns can each affect asset amounts.

Figure 3

WRS Assets
As of December
(in billions)



SWIB has a long-term investment philosophy focused on achieving strong 10- to 30-year investment returns. An industry study found that companies with long-term investment philosophies are likely to experience future returns of 0.5 percent to 1.5 percent higher than investors with short-term philosophies and are likely to experience less volatility. SWIB staff indicated that SWIB has also adopted specific investment strategies to protect WRS investments from market downturns of at least 10.0 percent. Finally, SWIB aims to grow investments to meet long-term benefit payments, avoid the devaluation of assets due to inflation, and generate moderate growth. To achieve these objectives, SWIB staff work with a consultant each year to develop an asset allocation plan designating asset class allocation targets. Each target represents the percentage of investments allocated to a particular asset class. The plan is presented to the Board of Trustees annually for review and approval. The most recent asset allocation plan was approved in December 2018.

Although the Board establishes the asset allocation plan, many specific investment decisions are made by SWIB staff. One decision made by SWIB staff is whether to adopt a passive or active strategy when selecting individual investments. A passive investment strategy attempts to match market investment returns exactly and is expected to trend consistent with market-based benchmarks. Alternatively, SWIB may choose an active investment strategy, which includes conducting intensive investment research to select investments, in order to earn returns greater than market-based benchmarks.

In 2017, SWIB staff implemented a largely passive investment strategy for the Variable Fund.

Statutes require Variable Fund assets to be primarily invested in public equity securities. The Board has approved an asset allocation for the Variable Fund that requires 30.0 percent of its public equity investments to be invested in international markets. In 2017, SWIB staff implemented a largely passive investment strategy for the Variable Fund, which it expects to result in investment returns that match the established benchmarks.

While Variable Fund investment occurs primarily in public equities, Core Fund assets were allocated across a variety of asset classes in 2016 and 2017 to diversify investments. The allocation of assets can have a significant effect on investment returns and risk exposure. SWIB has identified and recommended to the Board a future asset allocation target for the Core Fund. The achievement of this target depends on market conditions. Table 3 shows changes in the actual annual allocation of Core Fund assets as the future allocation target is approached.

Table 3

Core Fund Asset Allocation
As of December

Asset Class	Actual 2013	2014	2015	2016	2017	Future Target[1]
Public Equity Securities	50.5%	49.2%	50.9%	51.1%	50.9%	42.9%
Fixed Income	26.3	26.7	28.0	28.8	25.9	33.1
Inflation Protection	7.1	8.4	9.7	11.8	14.5	20.0
Private Equity and Debt	7.3	7.9	8.1	8.4	8.1	10.0
Real Estate	6.6	6.8	7.2	7.1	6.4	10.0
Multi-Asset[2]	5.1	6.6	2.5	0.8	2.6	4.0
Cash	1.0	0.8	0.2	0.8	0.5	0.0
Total[3]	**103.9%**	**106.4%**	**106.6%**	**108.8%**	**108.9%**	**120.0%**

[1] Achieving this allocation target will depend on future market conditions.

[2] Includes investments that span one or more traditional asset classes within the same investment strategy. Content of this class has changed since its creation in 2012, such as through reclassifying hedge fund investments in 2015.

[3] Exceeds 100.0 percent due to leverage of Core Fund assets.

SWIB projects that the future asset allocation target will perform well in a low-return, high-volatility market environment. To fully adopt the future allocation target, SWIB is expected to continue increasing Core Fund investments in fixed income, inflation protection, multi-asset, private equity and debt, and real estate classes while proportionally decreasing investments in public equity securities, which have returns that can fluctuate significantly from year to year. As of December 2017:

- Public equity securities was the largest asset class with $51.0 billion in investments. These investments consist of stocks and other publicly traded equity securities including domestic, international, and emerging market securities. Investments in public equity securities are highly susceptible to the overall market trends, and investment returns may fluctuate significantly from year to year.

- Fixed income securities was the second-largest asset class with $24.5 billion in investments. These investments consist of bonds, emerging market debt, government debts, and treasuries. Investments in fixed income securities are typically considered to have lower risk than other asset classes, but investment returns may also be lower.

- Inflation protection securities totaled $7.1 billion in investments. These investments consist of treasury inflation protected securities, which are frequently used to create leverage. Taking leverage into account, inflation protection securities assets were $14.5 billion. Treasury inflation protected securities are linked to inflation in order to protect investments from devaluation due to inflation.

- Private equity and debt securities totaled $8.2 billion in investments. These investments are made directly by SWIB or in conjunction with other investors through partnerships in which SWIB is a limited partner. SWIB largely invests in private equity as a limited partner in partnerships that buy out or invest in struggling companies or provide capital to emerging private companies. Because these investments typically cannot be sold or exchanged without a loss in value and often have investment cycles of more than five years, they are considered to be risky but are expected to outperform public equity markets in the long-term.

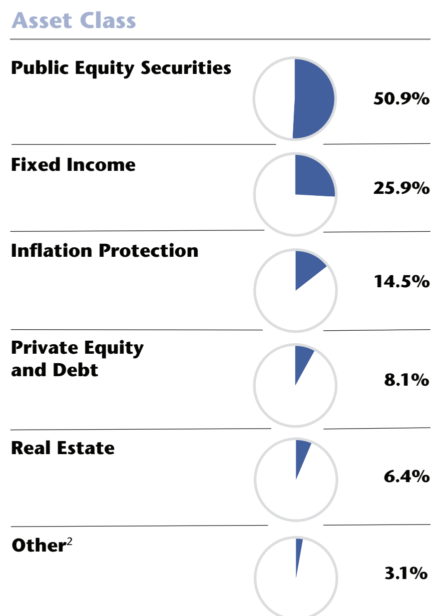
- Real estate securities totaled $6.4 billion in investments. These investments consist of various property types including commercial, industrial, and multifamily properties. Similar to private equity investments, real estate investments are largely in partnerships that acquire and manage a variety of properties.

- Multi-asset securities was the smallest asset class with $2.6 billion in investments. This asset class includes investments that span one or more traditional asset classes within a single investment strategy. Several of these strategies use derivatives, which are investments with a value that is dependent upon the price of one or more underlying assets.

An additional $0.5 billion was available as cash. SWIB also invests in a hedge fund strategy. This strategy is intended to have investment returns that are uncorrelated to public equities. As shown in Figure 4, 50.9 percent of Core Fund assets was invested in public equity securities as of December 2017. Many public equity securities follow general market activity and can experience more volatility than other types of investments. Because of this market volatility, SWIB plans to reduce the percentage of assets allocated to public equity securities.

Figure 4

Core Fund Investments, by Asset Class[1]
As of December 2017



[1] Exceeds 100.0 percent due to leverage of Core Fund assets.

[2] Includes multi-asset and cash asset classes.

As of March 2018, SWIB used leverage of 10.0 percent of Core Fund assets.

As of December 2017, SWIB used 8.9 percent leverage, or borrowed $8.9 billion against the Core Fund assets, in order to increase investments in other areas. According to SWIB performance data, the use of leverage has positively contributed to Core Fund investment returns, and SWIB has increased the use of leverage over time because increased investment diversification created through its use of leverage more efficiently increases investment returns while lowering the overall level of investment risk. The leverage amount increased to 10.0 percent of Core Fund assets in March 2018. If market conditions are favorable, SWIB plans to increase Core Fund leverage with further Board discussion and approval.

SWIB has focused on increasingly complex investment strategies in implementing the asset allocation approved by the Board.

SWIB has focused on increasingly complex investment strategies in implementing the asset allocation approved by the Board. SWIB anticipates that these strategies will maximize investment returns, diversify investments, and help protect against large market downturns. This is particularly true of strategies within the multi-asset class. In 2017, the class was composed of 60.0 percent public equities and 40.0 percent fixed income investments across six primary strategies. These strategies were intended to perform independently of the overall market. As a result, investments within the multi-asset class may underperform public equities when the market is strong. However, these investments are expected to perform well when the public equity market has a downturn.

SWIB allows internal investment management staff to implement new investment strategies within the multi-asset class as pilot strategies. As additional funding is added to successful strategies, the multi-asset investment strategies change over time. For example, SWIB included hedge fund investments within this class prior to 2015. Since 2015, hedge fund investments have been identified as a separate strategy. In 2015 and 2016, SWIB also included a risk parity strategy that SWIB anticipated would provide a fund-like return with less fluctuation in investment returns by using leverage to balance risk across different asset classes. However, it discontinued the strategy in 2016 because other investment strategies also incorporated this concept. Strategies currently represented in the multi-asset class have been included in the class since 2016.

SWIB began investing in hedge funds in 2011. As of December 2017, SWIB had $5.6 billion in a hedge fund strategy, of which 85.3 percent was managed externally. SWIB intends to continue increasing its investment in hedge funds to potentially reach hedge fund investments of $8.0 billion by 2020, with a long-term goal of reaching $10.0 billion dependent on market conditions.

In recent years, SWIB has worked to develop internal expertise for its more-complex investment strategies. Internal expertise decreases reliance on more costly external investment managers. In 2015, a small group of investment management staff dedicated to multi-asset and a hedge fund strategy was established. This group focuses on actively managing investments with the goals of earning investment returns in excess of the market, developing staff investment knowledge for which SWIB previously relied on external investment managers, and developing new investment strategies internally.

Benchmarks and Market Condition

SWIB uses market-based benchmarks to measure the performance of WRS investments. Benchmarks are established by the Board of Trustees with the guidance of a consultant. The consultant recommends industry-recognized standards for establishing market-based benchmarks to evaluate SWIB performance. Benchmarks may track a single market index or combine several indices. They typically include market indices such as Bloomberg Barclays Capital, Burgiss, Morgan Stanley World, and Russell indices. The selection of specific benchmarks changes as SWIB investments change. Benchmarks are intended to reflect market performance and are selected and weighted according to actual investments.

Through active management, SWIB attempts to exceed market-based benchmarks established by the Board of Trustees.

In managing WRS investments, SWIB attempts to exceed these benchmarks. As noted, SWIB may choose to use either passive or active strategies. For a large portion of Core Fund investments, SWIB attempts to exceed Board-established, market-based benchmarks, or perform better than other investment managers, through active management.

For most of 2016 and 2017, the overall stock market had high returns, continuing a broader trend of rising stock prices since the economic recession from 2007 to 2009. For example, the Morgan Stanley Capital International (MSCI) All Country World Index (ACWI) All Cap, a benchmark that tracks a large number of publicly traded companies in developed and emerging markets, recorded one-year investment returns of 8.4 percent and 24.0 percent in 2016 and 2017, respectively. Additionally, recent increases in interest rates have improved the returns of fixed income investments. For example, the Barclays Capital Government/Credit Index recorded one-year investment returns of 3.0 percent and 4.0 percent in 2016 and 2017, respectively.

In addition to investment returns, volatility is an indicator of market condition. Volatility is a measure of the variability of investment returns and can be used to measure the amount of risk present in the market. Different investment strategies may be chosen depending on the volatility within the market because high volatility can significantly affect the value of certain asset classes, such as public equity securities, that make up a significant portion of the WRS. However, volatility can also create opportunities for investment managers to gain higher investment returns through individual stock selection decisions.

According to a study measuring the volatility of Standard & Poor's 500 Index Fund, market volatility has been low in recent years and was particularly low in 2017. In comparison, 2008 was one of the highest volatility years. In 2018, volatility of market returns increased as can be observed through the large swings in market values and investment returns.

Performance Relative to Benchmarks

SWIB measures its investment performance relative to Board-established, market-based benchmarks. Each underlying asset class benchmark is used in determining overall composite market-based benchmarks for the Core Fund and the Variable Fund. Because benchmarks are meant to track underlying market-based investment returns, they differ over time and may be calculated monthly, annually, and over longer time periods. To assess the success of its WRS management strategies, SWIB focuses primarily on five-year investment returns.

Core Fund and Variable Fund investment returns exceeded 1-, 3-, 5-, and 10-year benchmarks as of December 2016 and December 2017.

As shown in Table 4, average annual investment returns for the five-year period as of December 2017 was 8.6 percent for the Core Fund and 13.3 percent for the Variable Fund. Both funds exceeded their five-year benchmark as of December 2016 and December 2017, as well as their 1-, 3-, and 10-year benchmarks. Consistent with market returns, one-year performance was particularly high in 2017 for both the Core Fund and the Variable Fund. One-year investment returns since 1982 are shown in Appendix 4 for the Core Fund and the Variable Fund.

Table 4

Investment Performance Relative to Benchmarks
As of December

Period	Core Fund		Variable Fund	
	Investment Benchmark	Average Annual Investment Return[1]	Investment Benchmark	Average Annual Investment Return[1]
One-Year				
2016	7.9%	8.6%	10.4%	10.6%
2017	15.7	16.2	23.1	23.2
Three-Year				
2016	4.4	4.6	5.4	5.5
2017	7.6	7.9	10.3	10.4
Five-Year				
2016	7.7	8.1	11.8	12.1
2017	8.2	8.6	13.0	13.3
Ten-Year				
2016	4.9	5.2	5.3	5.5
2017	5.5	5.9	6.8	7.1

[1] Does not include management fees and other investment expenses.

Core Fund and Variable Fund 1- and 5-year investment returns continued to meet or exceed benchmarks in 2016 and 2017 when including all investment expenses.

Except for select investments, investment returns shown in Table 4 do not include management fees and other investment expenses. Including management fees and other investment expenses in the calculation of investment returns lowers those returns. SWIB calculates investment returns by including management fees and other investment expenses for one- and five-year investment returns, but not for 3- and 10-year investment returns. When including these fees and expenses, Core Fund and Variable Fund investment returns continued to meet or exceed the 1- and 5-year benchmarks in 2016 and 2017.

As previously noted, public equities securities comprised just over half of the Core Fund asset allocation as of December 2017. Consequently, performance of this asset class significantly contributed to overall Core Fund investment returns. The one-year public equities securities investment return equaled the market-based benchmark in December 2017. Other asset class investment returns exceeded their benchmarks, including fixed income, private equity and debt, and real estate investments, which contributed to 2017 Core Fund investment returns in excess of the overall Core Fund benchmark.

The Core Fund multi-asset class has not consistently met established benchmarks.

Appendix 5 shows the investment performance of each Core Fund asset class in comparison to its benchmarks for 1-, 3-, 5-, and 10-year periods as of December 2016 and 2017. In 2017, all but one asset class met or exceeded its 1-, 3-, and 5-year benchmarks. Despite high investment returns of 14.5 percent in 2017, the multi-asset class did not meet its 1-, 3-, or 5-year benchmarks in 2017, whereas it exceeded its 10-year benchmark for 2017 by more than 1.0 percentage point. SWIB attributed the lower performance in the multi-asset class within the last five years to the performance of a discontinued risk parity investment strategy in comparison to its benchmark and a current strategy that had low returns in 2017.

As noted, the composition of the multi-asset class has changed in the last few years because hedge fund investments have been reclassified and a risk parity investment strategy was discontinued. The intent of this asset class, which is to develop new and innovative investment strategies, has remained the same over time. Therefore, changes in strategies within this asset class do not limit the usefulness of analyzing its long-term performance.

The hedge fund investment strategy within the Core Fund, which was previously a part of the multi-asset class, is intended to have investment returns that are uncorrelated to public equities. Hedge fund investments had a positive five-year investment return of 2.5 percent as of December 2017. This was 0.3 percentage points higher than the benchmark. However, one-year returns in 2017 did not meet the benchmark. SWIB attributed these returns to overall low market volatility, which is not an optimal market condition for hedge fund investments.

SWIB works with a consultant to conduct independent initial evaluations of external hedge fund managers and regularly assess their performance, investment philosophy, and structure. SWIB staff also conduct phone calls with managers at least quarterly and on-site visits to managers annually or biennially. From 2016 through 2017, SWIB terminated one hedge fund manager for poor performance and differences in investment philosophy.

Performance Relative to the Return Assumption

WRS pension benefits are primarily funded by employer contributions, current employee contributions, and investment earnings. Investment earnings represented 73.6 percent of total funding for the WRS from 2008 through 2017. As a result, the investment returns earned by SWIB are important to the financial stability of the WRS, and SWIB focuses on meeting the long-term expected rate-of-return assumption (return assumption) recommended by the ETF actuary and approved by the ETF Board.

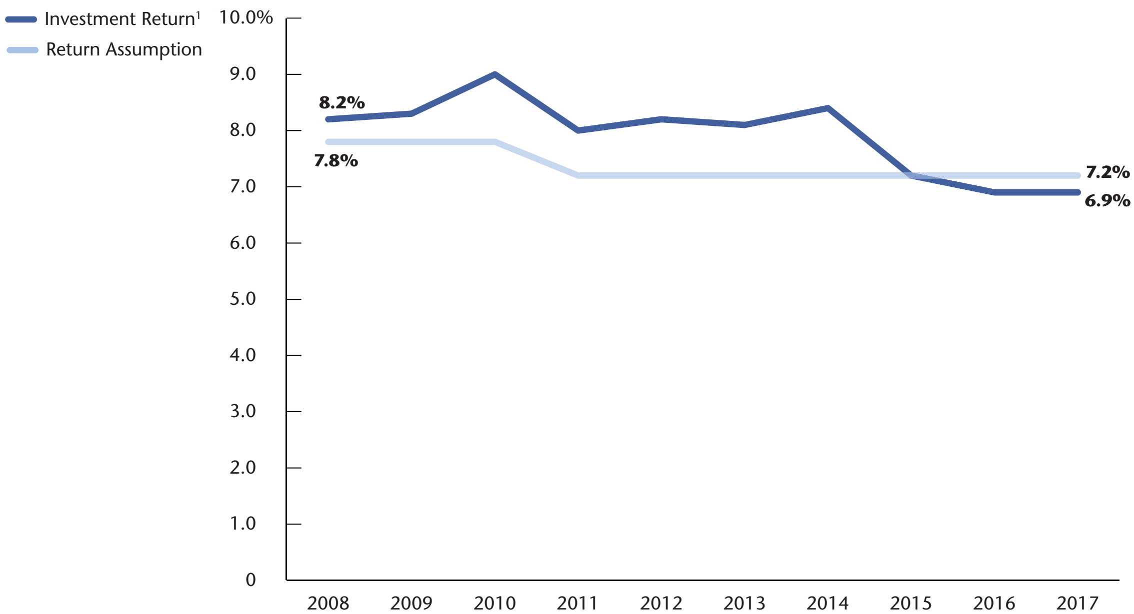
From 2011 through 2018, the return assumption was 7.2 percent. The ETF Board approved a decrease in the return assumption to 7.0 percent for the December 31, 2018 valuation. Because of the long-term nature of a pension plan and fluctuations in market performance from year to year, actual investment returns will not match the return assumption every year. In order to reduce volatility in contributions and payments to retired participants due to investment-return fluctuations, the Core Fund investment returns are smoothed over a five-year period. As was shown in Table 4, Core Fund average annual investment returns for the 1-, 3-, and 5-year periods as of December 2017 were above the return assumption but the return for the ten-year period was below the return assumption.

As of December 2016 and December 2017, Core Fund 20-year investment returns were below the return assumption established for the WRS.

Although SWIB typically focuses on five-year investment returns to evaluate investment performance, we also reviewed Core Fund 20-year average annual investment returns including management fees, which lowers investment returns. The 20-year period is more consistent with the long-term focus of the WRS. As of December 2016, the Core Fund 20-year average annual investment return was below the return assumption for the first time in ten years, as shown in Figure 5. This continued for the 20-year period as of December 2017.

Figure 5

Core Fund 20-Year Investment Returns Relative to Return Assumption
As of December



[1] Represents average annual investment returns including management fees.

Although the Core Fund 20-year average annual investment returns have been more consistently reported, we also analyzed the 30-year average annual investment returns for the Core Fund. As of December 2017, the Core Fund 30-year average annual investment return of 8.9 percent remained above the return assumption.

Investment returns affect the benefit payment amounts received by retired WRS participants. Appendix 6 shows the annual benefit payment adjustments for retired participants for the Core Fund and the Variable Fund for the past 15 years. Retired participants received payment increases in each of the last five years that ranged from 0.5 percent to 4.7 percent from the Core Fund. Variable Fund retired participants received payment increases in 4 of the last 5 years that ranged from 2.0 percent to 25.0 percent, as shown in Appendix 6.

Investment returns also have a direct effect on contribution rates paid by employers and current employees. Employee and employer contribution rates are calculated by ETF using a methodology that takes multiple factors into account. One of the most significant factors considered is investment performance smoothed over five years for the Core Fund. As shown in Table 5, the total WRS contribution rate for general employees has steadily increased, from 11.0 percent of wages in 2010 to 13.6 percent in 2017, or by 23.6 percent.

Table 5

Total Contribution Rates for General Employees in the WRS

	Total Contribution Rate[1]
2010	11.0%
2011	11.6
2012	11.8
2013	13.3
2014	14.0
2015	13.6
2016	13.2
2017	13.6
2018	13.4
2019	13.1

[1] Includes both the employer share and the employee share of contributions and benefit adjustment contributions, but does not include employer-specific prior-service cost rates.

Increases in contribution rates can be primarily attributed to investment losses experienced during the economic recession from 2007 to 2009. Due, in part, to the Core Fund exceeding the return assumption in three of the five years prior to 2017, the ETF Board approved contribution rate decreases in 2018 and 2019. Although contribution rates have decreased in the last two years, sustained investment returns lower than the return assumption may result in future increases to contribution rates in order to maintain the fully funded status of the WRS.

SWIB anticipates Core Fund investment returns between 6.2 percent and 6.8 percent for the next five to seven years.

SWIB staff indicated that it has become more difficult and expensive to find investment opportunities that can generate investment returns to meet the return assumption of 7.2 percent. Based on expected market conditions, SWIB anticipates Core Fund investment returns between 6.2 percent and 6.8 percent annually for the next five to seven years. However, SWIB has reported to the ETF Board that the WRS will continue to meet the current return assumption on a long-term basis. We found the expectation of lower future investment returns was consistent with expectations of the broader investment community. Many investors believe that the high returns experienced in 2016 and 2017 are not sustainable and that returns for public equities may decline to between 4.0 percent and 6.5 percent annually on average for each of the next 10 to 20 years.

Since future market and other conditions may affect pension plan performance, it is important to understand how public pension plans will perform under different conditions. A research project conducted by employees of the Pew Charitable Trusts and published by Harvard University in May 2018 recommended that public pension plans complete "stress testing" to better understand the effect of various market and other conditions. Such stress tests are intended to predict how a plan would perform under various market and other conditions.

For example, based on data gathered by Pew, a stress test assuming 5.0 percent investment returns each year for the next 20 years determined that the WRS would remain funded at over 85.0 percent. However, instead of the funding level declining in this manner, the risk-sharing nature of the WRS would result in increased contribution rates paid by employers and employees and adjustments to dividends for retired participants. Performing stress tests under such sustained market downturn scenarios assists SWIB and ETF, their respective boards, and legislators in understanding the potential impacts should such events occur. As of June 2018, seven states have statutorily required their large public pension plans to conduct stress testing.

Currently, SWIB and ETF both conduct analyses to assess how changes in investment returns would affect the WRS. Every other year, SWIB contracts with the WRS actuary to conduct some of these analyses. SWIB regularly analyzes how different market conditions are likely to affect the Core Fund. However, these analyses generally focus only on large, short-term changes in the market to determine the appropriate asset allocation.

Although such analyses are important to understand the effects of Core Fund asset allocation under different market conditions, they do not provide information about how a long-term market downturn or how changes in state laws could affect the fiscal condition of the WRS. For example, requirements to outsource certain investment activities, the merger of other plans with the WRS, and restriction of investments in certain markets could each have a significant impact on SWIB's investment strategies. Although the WRS is in a better financial position than most other large public pension plans, it is important for SWIB and ETF, their respective boards, and legislators to understand the results of regular, standardized, long-term stress testing.

☑ **Recommendation**

We recommend the State of Wisconsin Investment Board:

- *conduct additional stress tests that focus on sustained market downturns and those that consider potential changes to state laws that could affect the investment strategy of the WRS; and*

- *report on the long-term market conditions and potential changes to state laws under which stress tests were conducted and the results of its most recent stress testing under those scenarios to the Joint Legislative Audit Committee by December 2, 2019.*

Performance Relative to Other Public Pension Plans

To assess the relative performance of SWIB investment strategies and asset allocation decisions, we routinely compare the investment performance of the Core Fund to other large public pension plans. Comparisons among these other large public pension plans are affected by differences in plan structure, such as asset allocation, cash flow needs, investment styles, funding levels, return assumptions, risk tolerance levels, and statutory or other restrictions on allowable investments. SWIB asset allocation and investment strategies for the WRS are affected by the financial position of the WRS, which is stronger than that of many other large public pension plans.

We selected nine large public pension plans to compare with the WRS. Variations among plans can fundamentally affect their comparability. In 2017, return assumptions ranged from 7.0 percent to 8.5 percent among the peer group. The Core Fund had the second-lowest return assumption at 7.2 percent. In 2017, the percentage of assets managed externally ranged from less than 30.0 percent to 100.0 percent among the peer group. The Core Fund had the fourth-lowest percentage of assets externally managed. Additionally, the Variable Fund option, which results in participants having one-half of their contributions invested in public equity investments in addition to those in the Core Fund and is unique to the WRS. More detailed information about the peer group is shown in Appendix 7.

Whether a plan has sufficient assets to meet its estimated future pension obligations also affects the investment strategy of the plan. In 2017, the WRS was the only pension plan in the peer group that was fully funded, which means that its assets were equal to or exceeded the estimated amount needed to meet future pension obligations. Other peer group plans did not have sufficient assets to meet their estimated future pension obligations. Instead, these plans had assets ranging from 50.5 percent to 89.5 percent of what was expected to be needed to meet their future pension obligations.

Despite differences among public pension plans, comparing investment returns among the peer group provides another perspective on how to interpret Core Fund investment performance. Although each plan in the peer group is structured differently and faces different financial pressures, each plan ultimately faces the same market conditions.

The five-year investment return for the Core Fund as of December 2017 ranked ninth among ten public pension plans.

Table 6 shows average annual investment returns for the Core Fund and the nine other peer group plans for the 1-, 3-, 5-, and 10-year periods as of December 2017. These returns include management fees but not other investment expenses. Including management fees results in a lower reported investment return. The five-year investment return for the Core Fund, which SWIB has identified as its primary performance measure, continued to rank ninth among the peer group. With an average annual investment return of 5.5 percent, the Core Fund ranked seventh for the ten-year investment returns, which ranged from 4.2 percent to 6.9 percent among the peer group pension plans.

Table 6

Comparison of Average Annual Investment Returns among Selected Public Pension Plans[1]
As of December 2017

	One-Year		Three-Year		Five-Year		Ten-Year	
Public Pension Plan	Return	Rank	Return	Rank	Return	Rank	Return	Rank
Minnesota State Board	18.3%	1	8.4%	2	10.7%	1	6.9%	1
Washington State Investment Board	16.8	5	9.2	1	10.1	2	5.9	5
Florida State Board[2]	17.0	3	8.2	5	9.4	3	5.8	6
Ohio Public Employees Retirement System	16.8	5	8.3	3	9.2	4	5.9	5
Teachers Retirement System of Texas	17.3	2	8.2	5	9.1	6	6.0	3
Virginia Retirement System	14.3	9	7.9	6	9.1	6	5.4	8
California Public Employees Retirement System[2]	15.7	7	7.6	8	9.0	7	4.9	9
New Jersey Division of Investments	15.0	8	7.4	9	8.7	8	6.0	3
WRS Core Fund	**15.8**	**6**	**7.6**	**8**	**8.3**	**9**	**5.5**	**7**
Pennsylvania Public School Employees' Retirement System	12.2	10	6.9	10	7.6	10	4.2	10

[1] Returns are presented including management fees, which lowers the investment return.

[2] Approximation to include management fees but not other investment expenses.

SWIB has adopted an asset allocation plan primarily to meet the 7.2 percent return assumption on a long-term basis. Because the WRS is well-funded, SWIB does not experience the same pressure to achieve high returns as other plans in the peer group. Additionally, seven of the peer group plans, including the plans with the highest returns, were attempting to achieve a higher return assumption. Investment returns of plans also reflect differences in asset allocation decisions. For example, during 2017, the Minnesota State Board allocated more assets to public equity securities and private equities than did the Core Fund. Similarly, the Washington State Investment Board allocated significantly more assets to private equities and real estate than did the Core Fund during 2017.

SWIB has invested WRS assets more conservatively than its peers did in order to limit risk. Due to the strong financial position of the WRS, SWIB staff indicated it is not necessary to make riskier investments. Further, SWIB staff indicated that the Core Fund is positioned to perform better than its peers in less-favorable market conditions, which are anticipated in the coming years.

We further compared the 2017 ranking of Core Fund investment returns to return rankings of the same peer group that we completed in 2015. As shown in Table 7, the rankings of Core Fund investment returns improved for 1-, 3-, and 10-year periods and remained the same for the 5-year period as of December 2017 compared to the rankings for periods as of December 2015. However, the Core Fund continued to rank in the lower half for all periods assessed.

Table 7

Investment Return Rankings of the Core Fund among Selected Public Pension Plans[1]
As of December

Period	2015	2017
One-Year	9	6
Three-Year	9	8
Five-Year	9	9
Ten-Year	8	7

[1] Includes management fees with approximations where plans did not report returns including management fees.

A SWIB consultant found the five-year investment return of the Core Fund ranked in the bottom quartile of large public pension plan returns as of December 2017.

SWIB also regularly assesses its performance compared to other investors. For example, it annually contracts with a consultant to compare Core Fund investment performance to the performance of other large public pension plans. The consultant found that the Core Fund 1-, 3-, 5-, and 10-year investment returns as of December 2017 ranked at or below the comparison group median. The Core Fund five-year return was in the bottom quartile of comparison group returns. The consultant concluded that this ranking was attributable to differences in asset allocation among plans. For example, it identified that SWIB allocated a larger percentage of investments to more conservative fixed income assets and a smaller percentage to real estate investments.

Non-WRS Fund Investment and Performance

As of December 2017, the assets for the SIF, EdVest Tuition Trust Fund, Historical Society Trust Fund, Injured Patients and Families Compensation Fund, Local Government Property Insurance Fund, and State Life Insurance Fund were valued at $8.5 billion, or

7.3 percent of assets managed by SWIB. Two of these funds were managed by external investment managers.

Of these six funds, four exceeded their one-year benchmark as of December 2017. As of December 2017, the Historical Society Trust Fund, Injured Patients and Families Compensation Fund, and State Life Insurance Fund all had one-year investment returns of between 7.2 percent and 17.1 percent and the Local Government Property Insurance Fund had a one-year investment return of 2.0 percent. These returns were 0.3 to 1.1 percentage points higher than their benchmarks. SIF returns were below its benchmark by 0.1 percentage points with a one-year return of 0.9 percent as of December 2017. Returns of the EdVest Tuition Trust Fund were below its benchmark by 0.2 percentage points with a 1.0 percent return as of December 2017.

The six non-WRS funds managed by SWIB had five-year returns that exceeded their benchmarks as of December 2017.

All six funds had five-year returns that exceeded their benchmarks as of December 2017. These investment returns exclude management fees and other investment expenses. Information about these funds is presented in Appendix 2.

■ ■ ■ ■

Investment and Operating Expenses ▪

As part of its fiduciary responsibilities, the Board of Trustees is responsible for investing assets in a prudent and cost-effective manner. We identified that SWIB expenses increased during 2016 and 2017. After we considered the effect of increased assets SWIB managed, we found that the increases in SWIB expenses were attributable to three primary factors: management fees paid for external investment management expertise; information systems implementation; and internal operating expenses. During 2017, the Board authorized additional full-time equivalent (FTE) positions, most of which were for administrative support staff. In addition to FTE positions approved by the Board, SWIB also relied on contracted staff positions. We include several recommendations to improve the Board's monitoring of investment expenses.

SWIB Expenses

SWIB does not receive general purpose revenue from the state. Instead, as authorized by s. 25.187 (2), Wis. Stats., SWIB bills an allocated amount for its internal operating costs, including staff salaries, bonuses, and supplies, to the agencies that administer the funds for which SWIB invests available assets. SWIB is also authorized by s. 20.536 (1) (k), Wis. Stats., to expend the amounts it receives from these agencies. SWIB has had the authority to establish its own internal operating budget since 2011. Other expenses for SWIB investment activities, such as external investment managers and external support services, are charged directly against investment earnings. Expenses for external support services include fees for asset custody, consulting, external investment research, investment systems implementation, and legal services. Whether SWIB receives payments from agencies or charges its expenses directly against investment earnings, all SWIB expenses are incurred by the funds for which SWIB invests available assets.

The Board of Trustees considers and approves an annual total budget for all SWIB expenses.

SWIB staff prepare an annual total budget, which SWIB refers to as the total cost of management plan, each fiscal year and present it to the Board of Trustees for consideration and approval. Although statutes authorize SWIB to establish and monitor its internal operating budget, Board policy requires SWIB to provide a total budget, which is subject to Board approval. The total budget includes estimated management fees for external investment managers SWIB hires, costs for external support services, and the internal operating budget, including information about the number of authorized positions. SWIB staff estimate most total budget expenses, such as custodial fees and management fees, because they vary based on the amount of assets managed, investment performance, and SWIB needs.

From 2013 to 2017, SWIB expenses increased by 21.7 percent.

As shown in Table 8, SWIB expenses increased from $351.2 million in 2013 to $427.4 million in 2017, or by 21.7 percent. Management fees, which are fees paid to external investment managers, fluctuated during this period based on the amount of assets managed and investment performance. For example, management fees decreased by $49.7 million from 2013 to 2015 and increased by $85.1 million from 2015 to 2017. A list of the highest-paid external investment managers in 2017 is Appendix 8. The SWIB expenses remaining include internal operating costs, such as staff compensation, and payments to vendors for a wide range of external support services.

Historically, the largest SWIB expenses have been management fees paid to external investment managers hired to invest assets for which SWIB seeks external expertise, such as hedge fund, private equity, and real estate investments. Management fees paid for these investments typically consisted of two components: contractually determined base fees and conditional performance fees. Base fees are set fees calculated as a percentage of assets invested and are automatically incurred, whereas performance fees are fees that vary based on circumstances and are typically calculated based on investment returns.

Table 8

SWIB Expenses, by Calendar Year
(in millions)

	2013	2014	2015	2016	2017
Management Fees:					
Public Equity Securities[1]	$156.0	$138.4	$114.1	$113.1	$156.8
Private Equity[2]	98.3	94.8	92.0	122.5	133.1
Real Estate[2]	49.2	51.4	47.7	48.2	49.0
Subtotal	303.5	284.6	253.8	283.8	338.9
External Support Services[3]	12.8	17.5	26.9	34.8	40.0
Internal Operating Expenses:					
Salaries and Fringe Benefits	22.4	24.7	26.3	27.1	29.4
Bonuses[4]	8.0	13.3	12.2	11.1	13.8
Supplies and Permanent Property[5]	4.5	4.0	4.7	5.0	5.3
Subtotal	34.9	42.0	43.2	43.2	48.5
Total	**$351.2**	**$344.1**	**$323.9**	**$361.8**	**$427.4**

[1] Includes fees for external management of publicly traded securities and base and performance fees for externally managed active strategies, including hedge funds.

[2] Excludes certain management fees, also known as "carried interest." Because carried interest fees are charged directly to investment returns, they are not reported with other SWIB expenses.

[3] Includes fees for asset custody, consulting, external investment research, investment systems implementation, and legal services. A list of the highest paid vendors that provided these services in 2017 is Appendix 9.

[4] Bonus payments made within the calendar year are shown prior to any withholding on these amounts. Bonus payments on performance are paid in the following calendar year.

[5] Includes expenses for office space, research, supplies, and travel.

As noted, in recent years, the amount of assets managed by SWIB has increased as has the allocation of Core Fund assets to more complex investment strategies for which SWIB has relied on external investment managers that are more expensive. For example from 2013 to 2017, SWIB increased its average investment in selected asset classes and strategies:

- hedge fund investments by $2.9 billion;
- private equity investments by $1.2 billion; and
- real estate investments by $819.2 million.

In report 16-15, we recommended that SWIB report carried interest fees to the Board because they are not reported with other SWIB expenses.

In addition to expenses included in SWIB expense reports, some external private equity and real estate investments incur additional charges in the form of "carried interest." Carried interest is a type of management fee based on investment performance that is charged directly to investment returns. Because SWIB does not receive a bill for these fees, they are excluded from SWIB expense reports. In report 16-15, we recommended that SWIB track these fees consistently and report them to the Board of Trustees on an annual basis. In December 2017, SWIB began providing this information to the Board. As shown in Table 9, SWIB was charged $259.1 million in carried interest fees in 2017.

Table 9

Carried Interest Cost, by Calendar Year[1]
(in millions)

Asset Class	2013	2014	2015	2016	2017
Private Equity[2]	$ 97.5	$118.7	$124.3	$157.6	$193.2
Real Estate	47.4	56.8	66.9	51.9	65.9
Total	**$144.9**	**$175.5**	**$191.2**	**$209.5**	**$259.1**

[1] Carried interest is an additional external management fee incurred for private equity and real estate investments that is charged directly to investment returns. SWIB does not report it as an expense, and it is not included in Table 8.

[2] Includes a strategy that invests in private equity and fixed income investments.

SWIB's total cost of investment increased more than the increase in the amount of assets managed from 2013 to 2017.

In order to assess how total cost of investment and changes in the amount of assets managed by SWIB are related, we analyzed total cost of SWIB investments, including carried interest fees, per $100 of assets managed. As of December 2017, SWIB managed 15.5 percent more assets than it did as of December 2013. If the cost of SWIB investments increased only because of increases in the amount of assets managed, the cost on a per $100 of assets managed would remain consistent. However, SWIB's total costs, including carried interest fees, increased by $0.10 for each $100 of assets from 2013 to 2017, totaling $0.61 for each $100 of assets in 2017 as shown in Table 10. As a result, the total cost of investment increased more than the increase in the amount of assets managed from 2013 to 2017.

Table 10

Total Cost of Investment Per $100 of Assets Managed, by Calendar Year

	Expenses[1]	Total Expenses Including Carried Interest[2]	Change in Total Expenses Including Carried Interest[2]
2013	$0.36	$0.51	$ –
2014	0.33	0.50	(0.01)
2015	0.32	0.51	0.01
2016	0.35	0.55	0.04
2017	0.38	0.61	0.06

[1] Includes expenses reported in Table 8.

[2] Includes carried interest, which is additional external management fees incurred for private equity and real estate investments that is charged directly to investment returns. SWIB does not report carried interest as an expense, and it is not included in Table 8.

We found that increases in expenses, after we considered the effect of increased assets SWIB managed, were attributable to three primary factors:

- management fees paid for external investment management expertise;
- information systems implementation; and
- internal operating expenses.

Management Fees

Although the proportion of WRS assets managed externally declined, management fees SWIB paid to external managers increased.

SWIB hires external investment managers in several asset classes, largely to supplement its internal investment management staff and to obtain expertise not otherwise available. Although the proportion of WRS assets managed externally decreased from 43.1 percent in 2013 to 37.6 percent in 2017, management fees SWIB paid to external investment managers continued to increase. This increase is due to increased complexity of those SWIB investment strategies for which SWIB uses external managers, an increased amount of assets allocated to these strategies, and the performance of these managers.

Management fees SWIB paid to external investment managers accounted for 78.4 percent and 79.3 percent of reported SWIB expenses in 2016 and 2017, respectively. From 2013 through 2017, external management fees for public equity securities, private equity, and real estate investments totaled $1.5 billion and increased by 11.7 percent over this period.

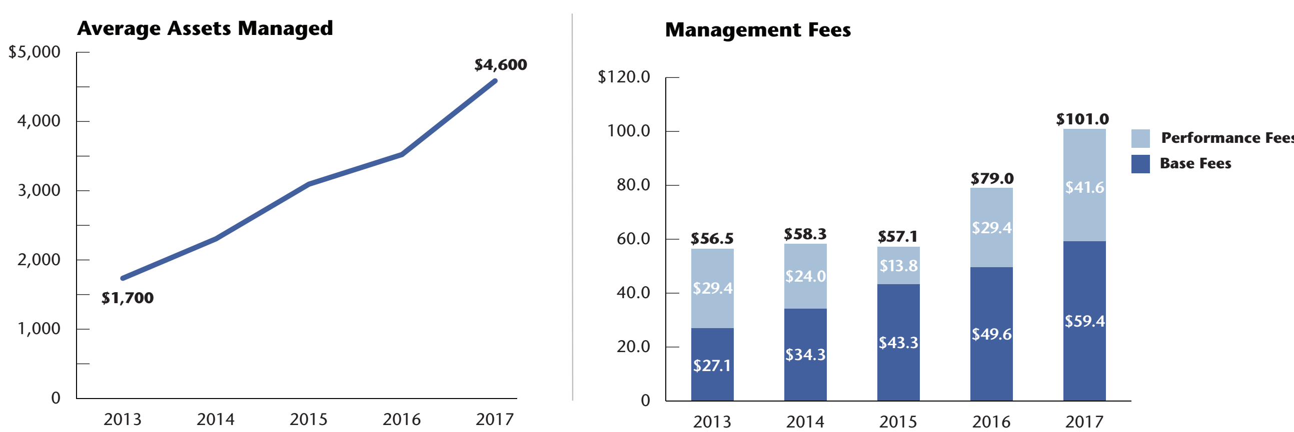
SWIB management fees for public equity securities and hedge fund strategy investments incurred the largest portion of management fees. Although public equity securities management fees increased slightly from 2013 through 2017, the fees SWIB paid to hedge fund managers accounted for a larger proportion of these management fees, increasing from 36.2 percent in 2013 to 64.4 percent in 2017.

Hedge fund fees SWIB paid in 2017 increased to $101.0 million, primarily because assets invested increased and investment returns exceeded benchmarks.

Management fees SWIB paid to hedge fund managers increased from $56.5 million in 2013 to $101.0 million in 2017, or by 78.8 percent. This increase is primarily attributable to an increase in Core Fund assets allocated to hedge fund investments. As shown in Figure 6, average hedge fund assets increased from $1.7 billion in 2013 to $4.6 billion in 2017, or by 170.6 percent. We also found that as investment in hedge funds has increased, the amount of management fees SWIB paid for each $100 in average hedge fund investments decreased from $3.30 in 2013 to $2.20 in 2017. SWIB hedge fund costs are lower than some other public pension plans because SWIB staff select hedge fund managers with the assistance of an external consultant rather than hiring an external manager to make fund selections as some other public pension funds do.

Figure 6

External Investment in Hedge Funds, by Calendar Year
(in millions)



Due to the cost of external hedge fund management, SWIB evaluates hedge fund performance by assessing investment returns that include management fees paid. As of December 2017, the five-year hedge fund investment return was 2.5 percent, which exceeded the established market-based benchmark of 2.3 percent. As hedge fund managers earn higher investment returns, they receive higher performance fees. For hedge fund investments, performance fees are typically calculated as a percentage of investment returns, an agreed upon rate, or investment performance in excess of a benchmark.

Information Systems Implementation

In 2014, SWIB began an information systems implementation project, the Agile Reliable Investment Enterprise System (ARIES) project. It was completed in June 2017. The purpose of the ARIES project was to update and expand the data management, finance, investment management, and trade operation capabilities of SWIB in order to support additional internal investment management and increasingly complex investment strategies. As part of the project, SWIB updated six information systems and implemented seven new systems, including data and investment management tools.

According to materials SWIB reported to the Board of Trustees, total project expenses were $45.1 million, which was less than the budgeted $48.0 million. Of total project expenses, $32.4 million, or 71.8 percent, were for external consultants involved in project planning, configuration, and implementation. The primary implementation consultant received $28.8 million for its work on the ARIES project and was the highest-paid external support services vendor in 2017, as shown in Appendix 9.

Although the ARIES project has helped SWIB improve its investment support and operations activities, SWIB continues to identify additional needs to support its current and future investment strategies. At a June 2018 Board meeting, SWIB reported that it lacked sufficient staff capacity and expertise in centralized data reporting, integrated information systems, and operations. As a result, SWIB is currently working to identify a series of new technology projects it plans to undertake through 2020. Because specific projects were not identified at the time, the Board approved $6.0 million in the fiscal year (FY) 2018-19 budget for additional technology projects to be specifically identified in the future.

SWIB had difficulty providing detailed information to support reported ARIES project expenses.

When we requested ARIES project expense information, SWIB had difficulty providing detailed information to support the expenses it had reported to the Board. Although SWIB ultimately provided the information requested, SWIB staff could not readily identify the information because SWIB used multiple systems to independently track project expenses and had staff turnover within its project management office.

SWIB plans to use a new accounting system, which was implemented as part of the ARIES project, to track future project expenses more readily. As SWIB engages in identifying, planning, and implementing future technology projects, it will be important for SWIB to maintain a centralized tracking process that can automatically generate detailed information to monitor project expenses. Since multiple projects are planned for the future, it will be important for SWIB to report complete project budget-to-expense information to the Board of Trustees.

☑ **Recommendation**

We recommend the State of Wisconsin Investment Board:

- *develop a specific budget for each future technology project;*
- *ensure that future technology project expenses are centrally tracked in a way that can automatically generate detailed project expense information for each project;*
- *monitor actual expenses of each project against the established budget;*
- *report to the Board of Trustees quarterly on actual technology project expenses compared to the established budget; and*
- *report to the Joint Legislative Audit Committee by June 28, 2019, on the proposed technology projects that will occur during FY 2018-19 and FY 2019-20; the budgets established for each project; and the status of its efforts to track and monitor project expense information.*

Internal Operating Budget Expenses

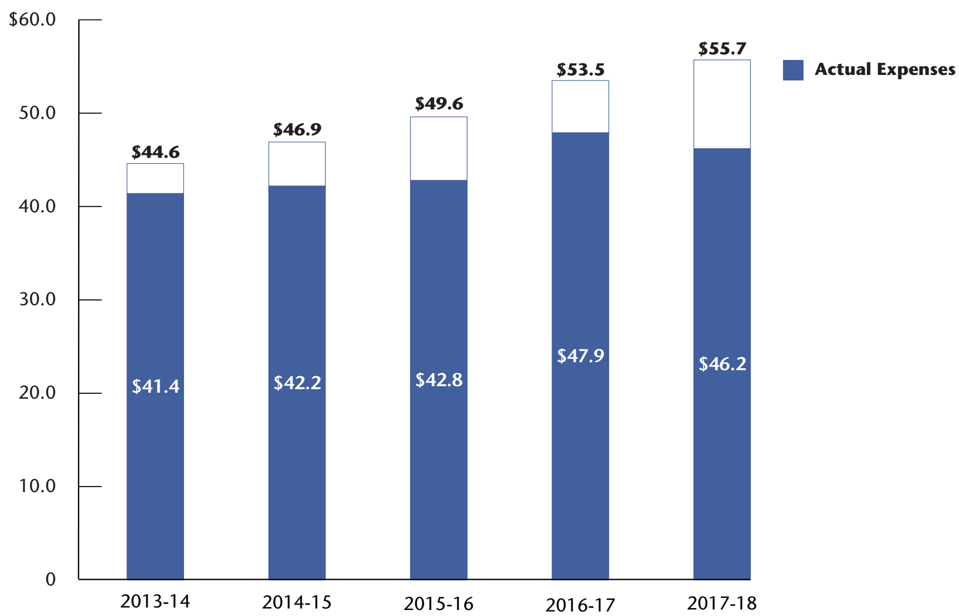
The internal operating budget largely includes expenses for staff compensation, including salaries, fringe benefits, and bonuses, as well as services and supplies. Since 2011, SWIB has had the authority to establish and monitor its own internal operating budget. The internal operating budget authorized by the Board of Trustees has increased over the past five years. During this time, the Board has also authorized additional staff to internally invest a larger share of assets and increased the complexity of investment strategies in the Core Fund.

SWIB internal operating expenses increased by 11.6 percent from FY 2013-14 to FY 2017-18 and were $46.2 million in FY 2017-18.

Although SWIB focuses on the calendar year for certain operations, such as payment of bonuses on the basis of calendar year investment performance, it reviews its internal operating budget on a fiscal year basis. As shown in Figure 7, SWIB expended $46.2 million for internal operations during FY 2017-18, which was $4.8 million, or 11.6 percent higher than expenses in FY 2013-14.

Figure 7

SWIB Internal Operating Budget and Actual Expenses, by Fiscal Year
(in millions)



Staffing

SWIB typically requests changes to its number of authorized FTE positions during the annual Board of Trustees budget approval process, but it may also seek Board approval for additional FTE positions throughout the year. SWIB staff are designated as unclassified civil service positions by Wisconsin statutes.

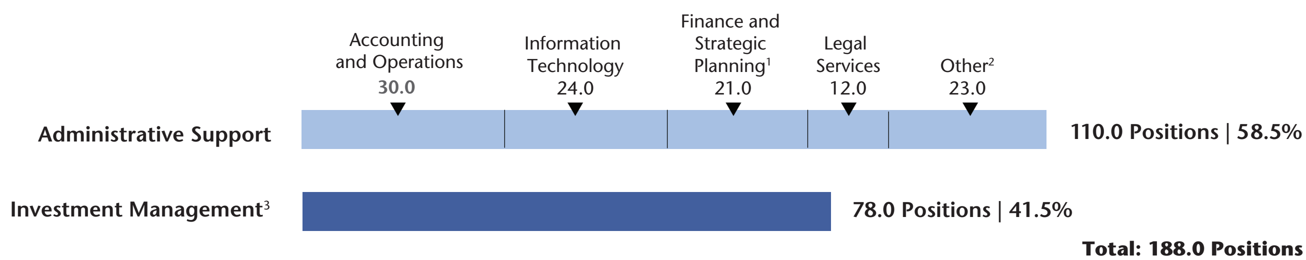
As of December 2017, SWIB had 188.0 authorized FTE positions.

As shown in Figure 8, SWIB had 188.0 authorized FTE positions as of December 2017. Investment management staff responsible for researching, selecting, and trading investments according to policies established by the Board accounted for 78.0 FTE positions, or

41.5 percent. The remaining 110.0 FTE positions, or 58.5 percent, provided administrative support and were responsible for accounting and operations, information technology, finance and strategic planning, legal services, and other activities.

Figure 8

Authorized FTE Positions
As of December 2017



[1] Includes 2.0 short-term, project FTE positions that largely worked on the ARIES project and were eliminated in 2018.

[2] Includes administrative, communications, human resources, internal audit, and other investment support services.

[3] Includes the executive director.

The Board of Trustees approved an additional 14.7 FTE positions in 2017.

SWIB has continued to add positions since July 2011, primarily as a result of changing investment strategies. As shown in Table 11, from July 2011 through December 2017, the number of authorized FTE positions increased by 62.8 positions, or 50.1 percent. Although no new positions were added in 2016, the Board of Trustees approved an additional 14.7 FTE positions in 2017.

Table 11

Additional Authorized FTE Positions
From July 2011 through December 2017

Time Period	Administrative Support	Investment Management	Total
From July 2011 through December 2015	33.5	14.6	48.1
2016	0.0	0.0	0.0
2017	12.7	2.0	14.7
Total	**46.2**[1]	**16.6**	**62.8**

[1] Includes 2.0 short-term, project FTE positions associated with the ARIES project.

Although SWIB has continued to increase the amount of assets managed internally, it has added more administrative support staff than investment management staff in recent years. Of the additional 62.8 FTE positions added from July 2011 through December 2017, 46.2 positions, or 73.6 percent, were for administrative support and 16.6 positions were for investment management activities.

Increased investment complexity and internal management of investments have increased SWIB's reliance on administrative support staff.

SWIB has long-term goals of further increasing the complexity of its investments and expanding its internal management of more complex strategies. To implement these goals, SWIB has focused on improving its technology infrastructure and ensuring that it has sufficient administrative support staff to assist in internally managing complex investment strategies. These factors have led SWIB to rely on administrative support staff to complete tasks such as data reconciliation, record keeping, trade review, and other investment support functions over more assets.

Although the ARIES project automated several administrative support staff functions and outsourced some repetitive tasks to the custodial bank, the project did not result in automating the transfer of all investment trade information between systems. For example, hedge fund, private equity, and real estate transactions continue to require significant administrative support staff time. Additionally, the project created new data reconciliation activities that administrative support staff must conduct.

Two external consultants SWIB hired recommended that the Board of Trustees increase administrative support staff.

Following the completion of the ARIES project in June 2017, SWIB engaged two consultants to assess its operational capacity. Both consultants recommended that SWIB establish additional administrative support positions to meet existing operational needs, based on current investment strategies. Based on these recommendations, the Board authorized 7.3 FTE administrative support positions in December 2017.

Contracted Staff Positions

Although SWIB reported that it had anticipated that the ARIES project would reduce staffing needs, it instead found that more staff were needed.

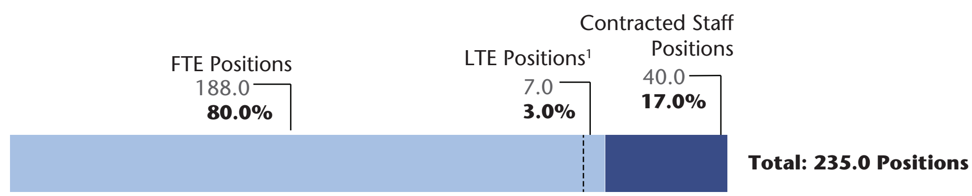
In addition to the administrative support positions approved by the Board in 2017, SWIB has also increased its reliance on contracted staff positions in recent years. In 2014, SWIB began using contracted staff to assist administrative support staff with ARIES project implementation efforts. Although SWIB completed the ARIES project in June 2017, the use of contracted staff positions continued in areas such as assisting SWIB in effectively using the new information systems and performing ongoing administrative responsibilities. SWIB reported that it had anticipated that the ARIES project would reduce staffing needs but found that more staff were needed. SWIB attributed this to an insufficient knowledge transfer from contracted staff positions to SWIB staff during the ARIES project implementation and continued increases in Core Fund investment strategy complexity during project implementation, which increased the workload of existing staff.

Considering all staff resources, SWIB had 235.0 positions as of December 2017, of which 80.0 percent were approved by formal action of the Board.

As of December 2017, SWIB had 40 contracted staff positions, as shown in Figure 9. As of April 2018, 30 were performing activities typically performed by SWIB FTE staff. For example, contracted staff positions assisted administrative support staff in completing data reconciliation activities that otherwise would have been assigned to FTE staff. The majority of contracted staff positions worked on-site and full-time at SWIB, excluding travel time from locations outside of Madison. Although information SWIB reported to the Board identified that contracted staff positions would be used for the ARIES project, SWIB reported to the Board in December 2017 on its continued use of some contracted staff positions following project completion, including some staff that were performing activities typically performed by FTE staff.

Figure 9

Total Staff Resources
As of December 2017



[1] Includes 13 interns and 1 staff, each limited to working a maximum of 1,039 hours, which is the equivalent of a 0.5 FTE position.

SWIB policies do not require Board approval for contracted staff positions. The Board also does not approve limited-term employee (LTE) positions because they are temporary in nature. As of December 2017, SWIB had 14.0 LTE employees, which is the equivalent of 7.0 FTE positions. When FTE positions are combined with contracted staff and LTE positions, SWIB had total staff resources of 235.0 FTE positions as of December 2017. Of the 235.0 positions, 188.0 positions, or 80.0 percent, were approved through formal action of the Board.

In June 2018, the Board approved 15.0 of 41.0 FTE positions requested, including the conversion of some contracted staff positions to FTE positions.

In June 2018, SWIB requested Board approval for an additional 41.0 FTE positions, including a combination of new FTE positions and a conversion of existing contracted staff positions to permanent FTE positions. To support the request, SWIB staff conducted a cost-benefit analysis and estimated that converting the contracted staff positions would reduce overall costs by $3.5 million to $7.0 million annually because the cost of contracted staff positions was higher than the estimated costs of FTE staff conducting the same activities. At the time, the Board authorized 15.0 of the 41.0 FTE positions requested, allowing SWIB discretion in determining which specific positions to prioritize establishing. The Board authorized fewer additional FTE positions than SWIB had requested due to concerns raised by Board members about how SWIB would recruit and train such a large number of new staff in a short period. At the same time, the Board indicated that it would consider approving additional positions in the future.

Board Oversight of SWIB Budget

SWIB did not detail its planned use of contracted staff positions beyond the completion of the ARIES project as part of its FY 2017-18 total budget request to the Board. Unlike FTE and LTE staff positions, the cost of additional contracted staff positions was charged to external support services rather than the internal operating budget. Traditionally, the Board has not monitored external support services as closely as internal operating budget expenses or required approval for external support services in excess of the amount presented in the total budget.

The Board has not required SWIB to seek additional approval when actual expenses are projected to exceed the budgeted amounts.

Statutes permit SWIB to establish its internal operating budget, which includes staff compensation, supplies, and permanent property. Board policies require SWIB to annually submit a total budget, including the budget amounts for internal operating expenses, management fees, and external support services. Additionally, Board policies provide that SWIB may not exceed the Board-approved internal operating budget amount without additional Board approval. Recently, the Board has approved the total budget rather than only the internal operating budget. However, with the exception of the internal operating budget, it has not required SWIB to seek additional approval when actual expenses are projected to exceed the budgeted amounts.

In report 16-15, we noted that the Board did not receive budget updates throughout the year or perform a budget-to-actual expense review. As a result, we recommended that more frequent updates on actual expenses be presented to the Board. Since 2017, SWIB has presented budget-to-actual expense updates at each Audit and

Finance Committee meeting. In these updates, SWIB staff present the same level of detail as in the Board-approved total budget, including identifying internal operating expenses, management fees, and external support services expenses. SWIB also provides information to show when actual or projected actual expenses may be higher than the Board-approved amounts. Since 2017, this has allowed Board members the opportunity to discuss costs that were higher than anticipated.

SWIB actual expenses were higher than the total budget in FY 2016-17 and FY 2017-18.

As was shown in Figure 7, SWIB's internal operating expenses were within the Board-approved amount for each year presented. However, actual total SWIB expenses were higher than the total budget by $3.8 million in FY 2016-17 and by $6.8 million in FY 2017-18, as shown in Table 12. In each year, SWIB paid higher management fees and, in FY 2016-17, SWIB also paid more for external support services than was budgeted.

Table 12

Total Budget and Actual Expenses, by Fiscal Year
(in millions)

	Total Budget	Actual Expenses	Under Budget/ (Over Budget)
2015-16	$411.4	$315.5	$95.9
2016-17	398.1	401.9	(3.8)
2017-18	439.7[1]	446.5	(6.8)

[1] Includes a $4.0 million increase approved by the Board in December 2017.

In each Audit and Finance Committee meeting between August 2017 and June 2018, SWIB projected that it would exceed the Board-approved total budget for FY 2017-18. In December 2017, SWIB requested and the Board approved a $4.0 million FY 2017-18 budget increase for external support services, including $1.5 million for contracted staff positions. At the same time, SWIB also exceeded the management fee amount set forth in the approved total budget without requesting an increase in management fees or the total budget.

SWIB has less control over external support services and management fees for external investment managers than the internal operating budget, since support service needs vary over time and some management fees are dependent on investment performance. However, the Board now approves the total budget, rather than only the internal operating budget. As such, its monitoring of expenses throughout the year should be inclusive of all expenses. To further improve Board oversight of SWIB expenses, Board policies could be revised to require Board approval when actual expenses are projected to exceed the Board-approved total budget amount. This would increase transparency of SWIB expenses in areas such as planned use of contracted staff positions.

Although budget authority increases could be requested at any Board meeting, the Board may wish to identify the timing and format of these requests to its Audit and Finance Committee. The Board may also wish to consider the level of budget and expense detail SWIB should provide. Such detail could include information about plans for hiring additional external investment managers, the extent of performance fees paid by SWIB based on external manager investment performance, the planned use and cost of contracted staff positions, and the planned use and cost of external support services.

☑ **Recommendation**

We recommend that the State of Wisconsin Investment Board work with the Board of Trustees to develop policies that require Board approval of projected expenses that exceed the total approved budget, or portions thereof. We also recommend that the State of Wisconsin Investment Board report the status of its efforts to establish such policies to the Joint Legislative Audit Committee by June 28, 2019.

Assessing Expense Increases against Investment Performance

To assess the general cost effectiveness of investment management, SWIB annually compares Core Fund expenses to other pension plans. SWIB uses a consultant to compare its expenses to 14 other large public pension plans, five of which are included in the peer group listed in Table 6. According to the most recent comparison, which is based on 2016 information, Core Fund expenses were less than those of the comparison group by $0.13 per $100 of assets managed. Of this amount, the consultant attributed $0.06 to SWIB having larger amounts of internal and passive investment management and attributed $0.07 to the Core Fund asset allocation having lower proportions of higher-cost investments than the other public pension plans in the comparison group.

Lower costs maximize investment returns for the funds over which SWIB has management responsibilities.

The Core Fund has historically been a comparatively low-cost public pension fund. Lower costs maximize investment returns for the funds over which SWIB has management responsibilities. Despite the WRS consistently having lower expenses than other public pension plans, its expenses have steadily increased in recent years, as was shown in Table 10. In order to maximize investment returns, the Board of Trustees has approved increased spending in certain areas, such as establishing and expanding Core Fund asset allocation to more complex investment strategies, investments in technology, and increased staff compensation in order to recruit and retain qualified staff.

SWIB investment reports do not consistently report performance that includes investment expenses.

Historically, SWIB has reported to the Board investment returns relative to investment benchmarks without including investment expenses, which would lower investment returns. SWIB staff indicated that its current method of reporting is consistent with industry standards. However, this approach limits the ability of the Board and the public to assess whether higher investment expenses may contribute to higher investment returns. Further, because some investment strategies, such as hedge funds, report investment returns including management fees, the Board does not receive investment performance information consistently across all investment types.

Because investment expenses allocated to the WRS are not available to fund benefit payments, ETF includes SWIB investment expenses in its calculation of annuitant dividends, contribution rate adjustments, and investment returns for WRS participants. In recent years, we also identified that reporting investment performance that includes investment expenses has become more common. For example, since 2013, SWIB has calculated investment returns including all investment expenses, largely for internal use, such as for determining staff bonus awards. We also observed that eight of the nine public pension plans in the peer group listed in Table 6 publicly reported investment returns including management fees, and one of the nine plans reported investment returns including management fees and other investment expenses.

The ARIES project provided SWIB the capacity to calculate investment expenses alongside returns.

Prior to the ARIES project, SWIB was unable to compile all expenses at the same time as it calculated investment returns. With automation of expense allocation through the ARIES project, SWIB now has the technological capacity to calculate investment return information including investment expenses on a monthly basis. Because of this update, SWIB has been assessing changes to its internal performance reporting and may benefit from establishing more detailed standards and disclosures to clearly identify which investment expenses are included in reported performance information.

Assessing the full cost of complex investment strategies along with investment performance may provide the Board valuable information regarding whether higher expenses contribute to higher investment returns. For example, the Board may benefit from having investment return information that includes management fees and other investment expenses at a detailed level, such as by asset class or investment strategy, similar to performance information currently reported without expenses. Given the budgeting and expense flexibility granted by the Legislature and Governor and the fiduciary responsibilities of the Board to prudently invest assets with a goal of maximizing investment returns, including all expenses in assessing investment returns would provide the Board more complete information with which to assess proposed investment management fees and requests for additional staff positions.

☑ Recommendation

We recommend the State of Wisconsin Investment Board work with the Board of Trustees to:

- *more clearly identify whether reported investment returns include management fees and other investment expenses;*
- *report investment return information that includes management fees and other investment expenses at a detailed level to the Board of Trustees; and*
- *report to the Joint Legislative Audit Committee by June 28, 2019, on the status of its efforts to implement this recommendation.*

▪ ▪ ▪ ▪

Compensation and Staff Retention ▪

The Board of Trustees approves compensation policies, including the amount of bonuses awarded to staff, and has established a comparison group to assist in developing these policies. The comparison group includes banks, insurance companies, and internally managed pension plans. The Board targets overall compensation for SWIB staff to approximate the median of this comparison group. In 2017, SWIB paid a total of $43.2 million in salaries, bonuses, and fringe benefits. Overall compensation for SWIB investment staff was 93.2 percent of the median comparison group compensation. In response to concerns reported to our Fraud, Waste, and Mismanagement Hotline, we reviewed five recruitments conducted by SWIB in early 2018 and recommend that SWIB revise its hiring policy and improve its documentation.

SWIB Compensation Structure

SWIB is authorized under s. 25.16 (7), Wis. Stats., to compensate staff through salaries, bonuses, and fringe benefits. With the exception of the internal audit director and internal audit staff, the executive director is authorized to set SWIB staff salaries and fringe benefits. Additionally, the Board approves annual staff bonuses, which are based on both qualitative and quantitative measures of performance and are intended to help attract and retain qualified staff.

SWIB uses a consultant to determine staff compensation relative to a comparison group.

To assist in determining appropriate staff compensation levels, SWIB uses a consultant to make comparisons to other financial institutions. The identified comparison group includes banks, insurance companies, and internally managed pension plans, excluding east and west coast financial centers. The comparison group does not include other public pension plans and is not limited to organizations of a similar size. Pursuant to the Board-approved compensation plan and compensation philosophy, staff salaries may be set up to 50.0 percent of the comparison group median.

The Board considers salary expenses during the annual budget process. In 2017, SWIB paid $29.4 million in salaries and fringe benefits to staff. Excluding project staff and LTE staff, 175 staff received on average $120,000 in salaries and fringe benefits in 2017. The average salary and fringe benefits for senior management and investment management directors was $246,500 while the average salary and fringe benefits for all other FTE staff was $109,900.

Staff may receive salary increases through market adjustments, merit increases, and promotions. SWIB compensation policies identify a long-term goal for staff salaries to approximate the median salaries of the comparison group. SWIB provided 79 merit increases for performance in FY 2015-16 and 99 merit increases in FY 2016-17, totaling $437,900 and $522,800, respectively.

Bonuses

Administrative support and investment management staff are eligible to receive bonuses based on performance.

Statutes permit SWIB to provide bonus compensation to administrative support and investment management staff with Board approval. For the purpose of determining bonuses, which SWIB refers to as incentive compensation, staff are assigned a "maximum incentive opportunity," which varies by position and is based on qualitative and quantitative performance measures. Qualitative measures are based on individual staff contributions. Quantitative measures are based on the one-year and five-year investment returns relative to benchmarks for investments directly managed by individual staff as well as of overall asset class and Core Fund performance. As noted, since 2013, SWIB has based quantitative bonus awards on investment returns, including management fees and other investment expenses.

The maximum incentive opportunity for investment management staff is established to approximate the comparison group top quartile performance rather than median performance. As a result, if investment management staff significantly exceed their investment benchmark, the individualized maximum potential bonuses will exceed the comparison group median. From 2013 through 2017, administrative support staff were eligible to receive bonuses of up to 10.0 percent of their salaries based on qualitative measures and of up to 25.0 percent of their salaries based on the one-year and five-year performance of the Core Fund.

For 2016 investment performance, SWIB paid 152 staff $13.8 million in bonuses, which was the highest amount awarded since 2013.

Table 13 shows bonus amounts paid to administrative support and investment management staff for performance from 2013 through 2017. For 2016 performance, 152 staff received $13.8 million in bonuses. This was the highest amount of bonuses awarded since bonuses for 2013 performance. For 2017 performance, 150 staff received $11.5 million in bonuses.

Table 13

Staff Bonuses, by Performance Year

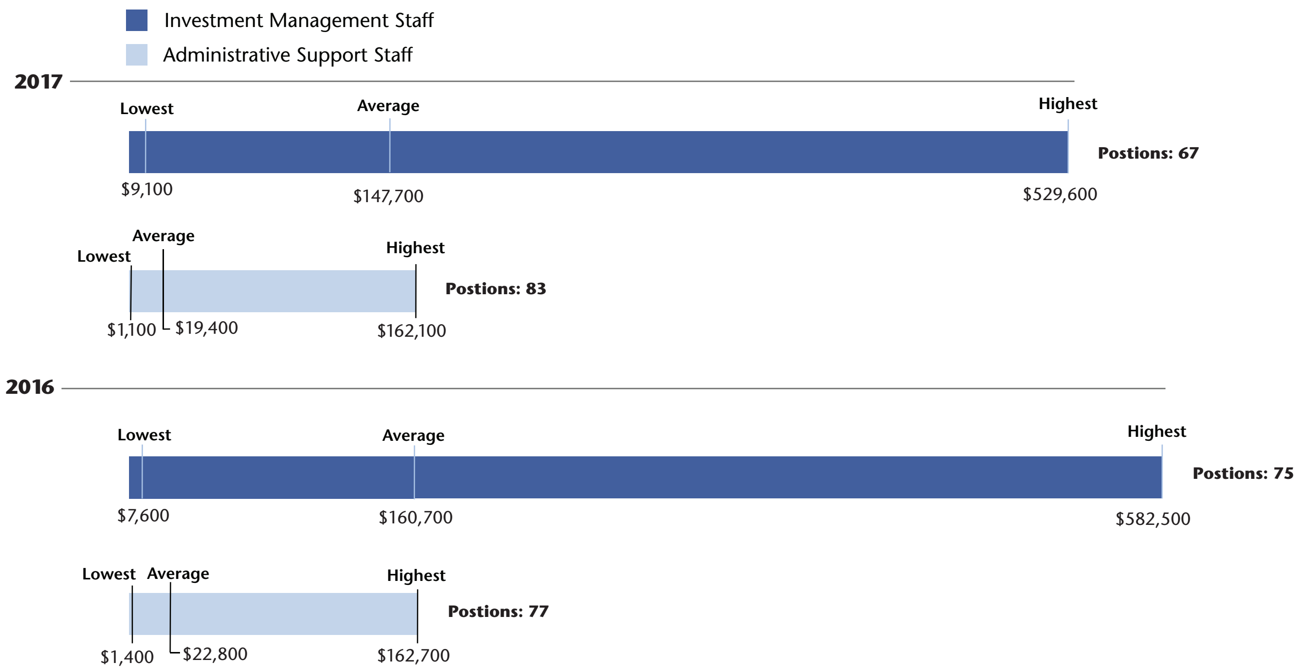
		Staff Receiving Bonuses			
Performance Year[1]	Total Awarded (in millions)	Investment Management Staff	Administrative Support Staff	Total	Percentage of Eligible Staff
2013	$13.3	67	76	143	99.3%
2014	12.2	70	72	142	98.6
2015	11.1	75	75	150	97.4
2016	13.8	75	77	152	98.7
2017	11.5	67	83	150	97.4

[1] Bonuses are paid to staff in the following calendar year.

As shown in Figure 10, individual bonuses awarded to investment management staff ranged from $7,600 to $582,500 for 2016 performance and from $9,100 to $529,600 for 2017 performance. Individual bonuses awarded to administrative support staff ranged from $1,400 to $162,700 for 2016 performance and from $1,100 to $162,100 for 2017 performance.

Figure 10

Individual Staff Bonus Award Variance, by Staff Type
Performance Year 2016 and 2017



SWIB calculates the amount of bonuses available based on several factors, including the compensation comparison group median, investment performance, and the number of eligible investment management staff. As noted, the number of investment management staff has increased in recent years.

As shown in Table 14, the amount of bonuses available to investment management staff increased each performance year from 2013 through 2016 and decreased for 2017. However, the amount of bonuses awarded for each performance year decreased from 2013 through 2015, increased for 2016, and decreased for 2017. Of the $18.3 million available for bonus awards for 2017 performance, investment management staff were awarded bonuses totaling $9.9 million, or 54.1 percent. This is the lowest percentage of available bonuses awarded for performance from 2013 through 2017.

Table 14

Investment Management Staff Bonuses, by Performance Year
(in millions)

Performance Year[1]	Amount Available	Amount Awarded	Percentage
2013	$14.6	$11.6	79.5%
2014	15.9	10.6	66.7
2015	16.2	9.6	59.3
2016	18.6	12.0	64.5
2017	18.3	9.9	54.1

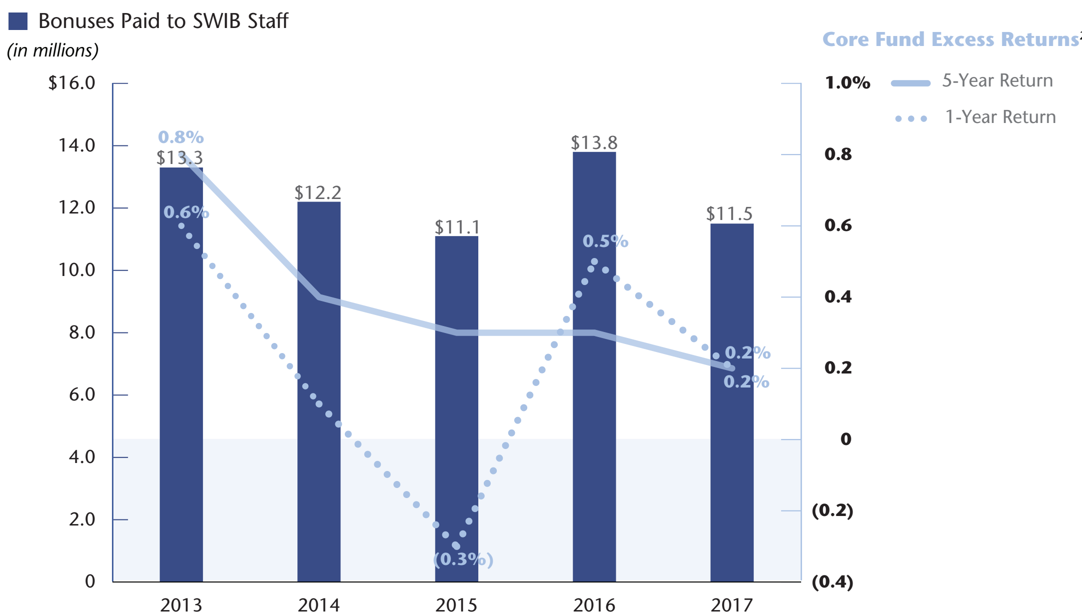
[1] Bonuses are paid to staff in the following calendar year.

SWIB's lower bonuses for 2017 performance were due, in part, to lower Core Fund one- and five-year excess returns relative to the benchmarks.

At least 75.0 percent of the quantitative measures used to calculate bonuses are based on five-year investment performance while up to 25.0 percent are based on one-year investment performance. One way to quantitatively measure investment performance is through the calculation of excess returns, or the portion of investment returns greater than the market-based benchmarks. As shown in Figure 11, the total amount of bonuses awarded increased from $11.1 million for 2015 performance to $13.8 million for 2016 performance, although the five-year excess return for the Core Fund compared to the benchmark was the same for these years. SWIB identified two reasons for the higher 2016 bonuses: a significantly higher one-year excess return for the Core Fund compared to the benchmark and increases in the maximum amount of bonuses available to investment management staff following a routine adjustment using comparison group data. The $11.5 million in bonuses awarded for 2017 performance was lower than the amount awarded for 2016 performance primarily because the Core Fund one- and five-year excess returns compared to the benchmarks were both lower in 2017.

Figure 11

Total Bonuses Awarded Compared to Core Fund Excess Returns, by Performance Year[1]



[1] Investment return information includes management fees and all other investment expenses.

[2] Excess returns represent the portion of investment returns greater than the market-based benchmarks.

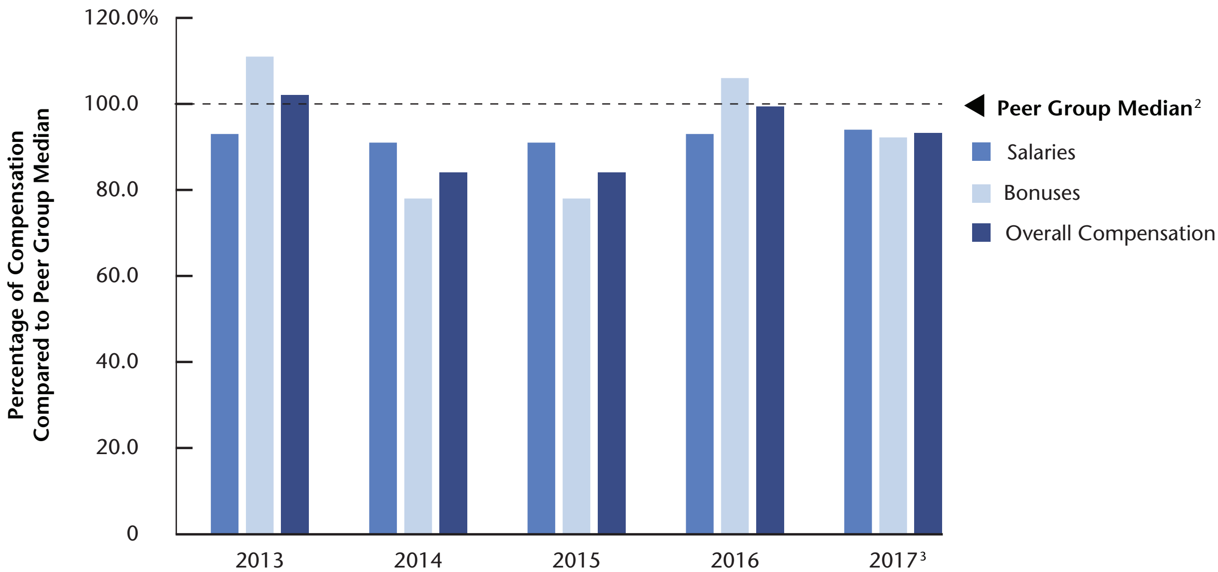
According to the SWIB compensation policy approved by the Board of Trustees, the objective of SWIB administrative support and investment management staff overall compensation is to approximate 100.0 percent of the median compensation of the comparison group for each group. Actual overall compensation levels may be above or below the median comparison group levels based on performance. Investment management staff may be awarded bonuses of up to 150.0 percent of the comparison group median while administrative support staff may be awarded bonuses of up to 125.0 percent of the median for exceptional performance.

For 2017 performance, overall compensation for investment management staff decreased relative to the comparison group median due to lower investment returns.

As shown in Figure 12, overall compensation for investment management staff ranged from 84.0 percent to 102.0 percent of the comparison group median for performance from 2013 through 2017. For 2016 performance, overall compensation for investment management staff was 99.0 percent of the comparison group median, while bonus compensation was 106.0 percent of the comparison group median. Overall compensation decreased to 93.2 percent of the comparison group median for 2017 performance due to lower investment returns.

Figure 12

SWIB Investment Management Staff Compensation Relative to Comparison Group Median, by Performance Year[1]



[1] Bonuses are paid to staff in the following calendar year. Includes only staff eligible for bonuses.

[2] Comparison group median determined by compensation consultant.

[3] 2016 group median compensation used for comparison to SWIB 2017 compensation levels. The percentages relative to the comparison group will be revised when 2017 compensation data becomes available.

In addition to the annual bonuses approved by the Board, SWIB compensation policies allow the executive director to award other lump-sum bonus payments to newly hired staff, including signing bonuses and bonuses to cover payments of health insurance premiums during the first two months of employment. SWIB paid 11 one-time, lump-sum bonus awards to new staff in 2016 for a total of $103,000 and 8 one-time, lump-sum bonus awards to new staff in 2017 for a total of $37,300.

Bonus Deferral Policy

When the Core Fund has a negative one-year investment return, Board policy requires that bonus awards be deferred for two years or until the Core Fund generates a positive absolute one-year return, whichever is later. Staff who leave SWIB employment before the end of the deferment period generally forfeit their bonuses.

When the policy was created, SWIB staff indicated that similar policies within the industry did not defer bonus awards each time there is a negative return but instead set a threshold for deferral based on the extent to which returns were negative. As a result, SWIB established a process that permits the Board to waive the deferral. In report 16-15, we recommended that guidance language for the bonus deferral waiver policy be expanded to include the consideration of certain factors. In February 2017, the Board updated the policy to require that it document its reasoning for waiving bonus deferrals and consider certain factors when making the decision including:

- the amount of the loss from the one-year return for the Core Fund;
- the five-year return of the Core Fund;
- the amount of excess return, including investment expenses, for the one-year and five-year performance of the Core Fund;
- the effect on the ability of SWIB to attract and retain highly qualified staff;
- the effect on WRS beneficiaries of the one-year investment return; and
- any additional criteria which the Board deems relevant in its determination.

The Board updated its bonus deferral waiver policy following our recommendation to do so in report 16-15.

Since its adoption in 2009, the bonus deferral policy has been invoked twice: in 2009 and 2016. The Board waived the deferral of bonuses for 2015 performance when the Core Fund had a one-year return of -0.4 percent. In 2016 and 2017, the one-year returns of the Core Fund were positive and the deferral policy was not invoked.

Staff Retention and Succession Planning

An increased focus on internal investment management places more operational pressure on SWIB to ensure that it has adequate internal staff with sufficient expertise in both administrative support and investment management activities. Staff retention and succession planning are important to this objective. One measure of compensation plan success is the retention of staff. We found that the staff turnover rate, including retirements, decreased from 10.3 percent in 2015 to 8.1 percent in 2017. However, the turnover rate increased to 12.3 percent from January 2018 through September 2018. As of September 2018, SWIB had 32.0 vacant FTE positions. The number of vacant positions is, in part, the result of new positions authorized by the Board in June 2018.

Although the overall turnover rate declined from 2015 through 2017, turnover in several senior management positions occurred. Of eight senior management positions at SWIB, only two were held by the same individual for at least three years as of December 2017.

SWIB annually engages in succession planning to identify key positions, potential internal candidates that could fill these positions in the event of a vacancy, and training opportunities for potential candidates. Identified key positions include the executive director, chief investment officer, and chief operations officer. The Board is also required by s. 25.156 (3), Wis. Stats., to designate an assistant director to assume the role of executive director on an interim basis in the event of an unexpected vacancy.

In July 2018, SWIB invoked its succession plan when the executive director resigned after six months at SWIB. The designated assistant director then became the interim executive director. The Board also appointed a new assistant director.

In October 2018, SWIB made several other organization changes, including establishing a deputy executive director and a new chief operating and technology officer position. The Board also appointed the current chief investment officer as the new executive director. This individual will now function as both the executive director and the chief investment officer. Under Wisconsin statutes, the executive director and chief investment officer are separate positions in SWIB with specified responsibilities, and the chief investment officer is supervised by the executive director. However, statutes do not prohibit the same individual from holding both positions.

Staff Application and Selection Process

As noted, all employees of SWIB hold positions in the unclassified service, which is defined as part of the civil service by Wisconsin statutes. In response to concerns reported to the Bureau's Fraud, Waste, and Mismanagement Hotline about the hiring process used by SWIB, we reviewed available information related to SWIB's application and selection process for five recruitments during three months in early 2018, including three recruitments for newly created senior positions. We also compared this process to that which had been used by SWIB for five recruitments in 2017.

It is difficult to conclude that SWIB equally considered all qualified applicants for the five 2018 recruitments we reviewed.

Section 230.01 (2) (bm), Wis. Stats., which applies to the civil service, provides that it is the policy of the State to recruit and select employees based on their relative skills, abilities, competencies, and knowledge, including using open processes to consider qualified applicants for initial employment. Although we did not assess and do not question whether the five employees SWIB hired in 2018 met the qualifications established in the publicly posted positions, it is difficult to conclude that SWIB equally considered all qualified applicants for the five 2018 recruitments we reviewed.

First, for the five 2018 recruitments we reviewed, we found there were between 11 and 61 applicants. However, SWIB conducted an in-person interview with only the one applicant who was ultimately hired. SWIB lacked documentation in its hiring files sufficient to explain why no other applicants in four of the five recruitments were selected for in-person interviews.

Second, the SWIB staff who were responsible for determining which applicants were interviewed also showed preference before the positions were posted for individuals who were ultimately hired. In one instance, an applicant emailed a SWIB staff member 17 days in advance of the public announcement of the position stating, "I had a brief discussion with [the Executive Director] after we met on Saturday and he said that he would use one of his approved positions to bring me on board and that we could fine tune my role subsequently." In another instance, available information indicated an interview occurred 26 days before the position was posted and 34 days before the individual submitted an application. In a third instance, a SWIB staff member responsible for evaluating applicants provided the draft position description to an applicant the day before the job announcement was posted.

Third, we found that for the five 2018 recruitments we reviewed, the applicant was offered the position within 10 to 26 days of the position being posted. In comparison, an average of two months elapsed from job posting to employment offer for the five 2017 recruitments we reviewed at SWIB. Further, although the position was posted for 13 days for one recruitment, available information indicated the date the job was posted was the same date the applicant who was ultimately hired submitted an application and was also interviewed.

Prior to October 2018, neither the Board of Trustees nor SWIB had formal policies that clearly identified requirements for its application and selection process. The absence of such a policy and the appointment of a new executive director who encouraged a faster process in early 2018 each contributed to the five 2018 recruitments we reviewed.

In October 2018, the Board of Trustees approved a hiring policy that discusses Board expectations for certain steps during the process. The hiring policy encourages SWIB staff to identify and meet with potential applicants, but it does not establish an application and selection process to ensure equal consideration of all qualified applicants. A revised policy could, for example, require separation between those staff who may encourage potential applicants to apply for positions and those staff who are responsible for subsequent decisions about which applicants will be interviewed. Such separation could also be achieved through greater involvement of human resources staff to help ensure that all qualified applicants have an equal opportunity to be considered. Once revised, SWIB should train its staff on the appropriate application of the policy to ensure it is understood and maintain sufficient documentation in hiring files to ensure it is consistently followed.

☑ Recommendation

We recommend that the State of Wisconsin Investment Board:

- *work with the Board of Trustees to improve its application and selection process by revising its hiring policy to ensure equal consideration of all qualified applicants;*
- *train staff on the appropriate implementation of the policy;*
- *maintain sufficient documentation in hiring files to ensure its hiring policy is consistently followed; and*
- *report to the Joint Legislative Audit Committee by June 28, 2019, on the status of its efforts to implement these recommendations.*

▪ ▪ ▪ ▪

Wisconsin Investments ▪

SWIB invests in Wisconsin through a range of asset classes, including public equity securities, fixed income, multi-asset, private equity and debt, and real estate. We found most Wisconsin investments, including the majority of Wisconsin investments made with WRS assets, are in public equity securities in companies operating outside of Wisconsin but with 20 or more Wisconsin employees. SWIB has two dedicated investment strategies for investing in Wisconsin: private debt and venture capital. Investments in Wisconsin must meet the same investment standards as other investments to fulfill the fiduciary responsibilities of the Board of Trustees. As of December 2017, we found that SWIB exceeded market-based benchmarks for its two dedicated strategies and 22.8 percent of venture capital investments was disbursed to companies headquartered in Wisconsin.

Overview of Wisconsin Investments

State statutes encourage SWIB to invest in Wisconsin while still fulfilling fiduciary responsibilities of the Board of Trustees. Where investments align with SWIB investment goals, it considers investments that may also benefit the state economy. SWIB does this by investing in and providing other resources to companies located or doing business in Wisconsin. Portions of WRS, SIF, Injured Patients and Family Compensation Fund, and State Life Insurance Fund assets were invested in Wisconsin investments in 2016 and 2017.

Wisconsin investments are made by SWIB in three types of investments:

- companies that are headquartered or have at least 30 percent of business operations in Wisconsin;

- companies with 20 or more Wisconsin employees; and

- venture capital funds managed by external managers located or active in Wisconsin.

In FY 2015-16 and FY 2016-17, the majority of Wisconsin investments were made in companies not headquartered in Wisconsin but with 20 or more Wisconsin employees. SWIB largely invested in companies that had manufacturing, distribution, or medical facilities in Wisconsin.

As of June 2017, SWIB reported $20.5 billion invested in Wisconsin investments.

As shown in Table 15, SWIB had $20.5 billion in Wisconsin investments as of June 2017. Of the total, 97.9 percent of these investments were made with WRS assets, largely in the form of public equity securities. The decision to make these Wisconsin investments was not necessarily specific to their affiliation with Wisconsin, as many were selected through passive investment management. All Wisconsin investments in the Injured Patients and Family Compensation Fund, State Life Insurance Fund, and SIF were made in the fixed income asset class.

Table 15

Wisconsin Investments, by Fund
As of June 2017
(in millions)

Fund	Amount	Percentage
WRS:		
Asset Class		
Public Equity Securities	$16,769.4	81.7%
Fixed Income	2,120.0	10.3
Private Equity and Debt	641.9	3.1
Multi-Asset	548.5	2.7
Real Estate	14.4	0.1
Subtotal	20,094.2	97.9
Injured Patients and Family Compensation Fund[1]	217.3	1.0
SIF[1]	180.8	0.9
State Life Insurance Fund[1]	42.0	0.2
Total	**$20,534.3**	**100.0%**

[1] Investments are in the fixed income asset class.

In 2016 and 2017, SWIB had two dedicated investment strategies for investing in Wisconsin: private debt and private equity. Both strategies used Core Fund assets and fell within existing private debt and equity strategies. During this time, SWIB had two FTE staff dedicated to actively managing Wisconsin private debt and private equity, or venture capital, investments. Investments within these two strategies totaled $641.9 million as of June 2017.

Wisconsin Private Debt Investments

The Core Fund's Wisconsin private debt strategy provides loans to companies that are headquartered in, operate in, or intend to invest proceeds in Wisconsin. These include long-term, fixed-rate loans and loans for which SWIB is not the primary debt holder. The objective of the strategy is to provide loans to companies that contribute to the Wisconsin economy while providing investment returns that fulfill the fiduciary responsibilities of the Board of Trustees. Consequently, Wisconsin private debt investments must meet the same standards used by SWIB to evaluate investments outside of Wisconsin.

For operational efficiency and transparency, SWIB restructured its administration of private debt investments in May 2015 to separate Wisconsin private debt investments from other regional private debt investments. Additionally, the region of allowable non-Wisconsin private debt investments was expanded. The region previously included only Illinois, Iowa, Michigan, and Minnesota. It was expanded to include Indiana, Ohio, and Pennsylvania.

Of all Wisconsin private debt investments in 2017, 68.3 percent were invested in the industrial sector, such as in food or consumer goods manufacturing. Other sectors in which SWIB invested include the financial, transportation, and utilities sectors. Companies may receive more than one loan. As of December 2017, the Core Fund's Wisconsin private debt investments included 64 loans with 38 companies that were valued at $421.3 million. The top ten borrowers, which represented 58.6 percent of Wisconsin private debt investments, had outstanding loans ranging from $14.7 million to $46.4 million as of December 2017. The largest borrower had six loans in 2016 and 2017.

The Core Fund's Wisconsin private debt investments exceeded all established benchmarks as of December 2017.

Due to restructuring of the Core Fund's Wisconsin private debt investment strategy, SWIB reports performance prior to 2016 in aggregate for Wisconsin and non-Wisconsin investments. As shown in Table 16, Wisconsin private debt investment returns exceeded the 1-, 3-, 5-, and 10-year period benchmarks as of December 2017. Additionally, the Core Fund did not experience any Wisconsin private debt loan defaults in 2016 or 2017.

Table 16

Wisconsin Private Debt Investment Performance
As of December 2017

Period	Investment Benchmark	Average Annual Investment Return
One-Year	5.7%	6.0%
Three-Year[1]	4.0	5.1
Five-Year[1]	3.7	5.4
Ten-Year[1]	6.1	7.6

[1] Includes non-Wisconsin private debt investment performance prior to 2016.

Wisconsin Venture Capital Investments

Wisconsin private equity investments include venture capital investments in companies or funds primarily located or active in Wisconsin. This investment strategy was established within the Core Fund in 2000 as a joint initiative of SWIB staff and the Board of Trustees. These investments must meet the same SWIB requirements as other private equity investments to fulfill the fiduciary responsibilities of the Board of Trustees. SWIB staff indicated that significant research and development occurring in Wisconsin, combined with comparatively low levels of external venture capital investment activity, presented increasing opportunities for potentially profitable investments in Wisconsin companies in 2016 and 2017. In March 2016, the Board of Trustees authorized SWIB staff to select Wisconsin venture capital investments without first gaining Board approval for each Wisconsin venture capital investment. Since this change, SWIB has continued to require internal approval for each investment from selected senior investment staff.

As of December 2017, $323.0 million of Core Fund assets were committed to Wisconsin venture capital investments.

SWIB has not significantly changed its venture capital investment strategy or the amount invested since 2015. The majority of the Core Fund's Wisconsin venture capital investments were made in existing venture capital funds that, in turn, invested in a number of individual companies, some of which were not based entirely in Wisconsin. As of December 2017, $323.0 million of Core Fund assets were committed to these venture capital investments. Most were in the information technology and life sciences sectors. Core Fund assets were also directly invested in companies, accounting for 4.1 percent of Wisconsin venture capital investments as of December 2017.

As shown in Table 17, $309.7 million of Core Fund assets were committed to ten venture capital funds as of December 2017. An additional $13.3 million of Core Fund assets in Wisconsin venture capital investments were committed directly to companies.

Table 17

Wisconsin Venture Capital Fund Commitments
As of December 2017
(in millions)

Fund (Year Established)	Amount Committed
Northgate Capital Fund (2011)	$ 80.0
Frazier Technology Venture Fund II (2004)	50.0
Baird Venture Partners Fund III (2008)	25.0
Baird Venture Partners Fund IB (2003)	25.0
Venture Investors Fund IV (2006)	25.0
Baird Venture Partners Fund IV (2014)	25.0
4490 Ventures Fund II (2017)	25.0
Venture Investors Fund V (2012)	24.7
Venture Investors Fund III (2000)	15.0
4490 Ventures Fund I (2014)	15.0
Total	**$309.7**

Investment of Core Fund assets in Wisconsin venture capital were made through the ten funds shown in Table 17. These funds make specific investments primarily in start-up companies. Of the total commitments to venture capital funds, $257.1 million, or 83.0 percent, had been invested as of December 2017. SWIB anticipates the majority of these funds will ultimately result in investment returns that exceed the amount invested within each fund, which is the overall goal of the venture capital investment strategy. However, it can take as many as fifteen years for SWIB to earn a return in excess of its investment.

Not all venture capital investments were made in companies located in Wisconsin. As of December 2017, $148.8 million of Wisconsin venture capital investments made through the strategy had been disbursed to companies. Of this amount, 22.8 percent was disbursed to companies headquartered in Wisconsin. The relative percentage invested in companies headquartered in Wisconsin has declined compared to our review of Wisconsin investments in report 16-15, when 26.3 percent of venture capital investments made through the strategy had been disbursed to companies headquartered in Wisconsin. This trend continued in 2016 and 2017 as funds returned SWIB capital for older investments and the funds in which SWIB invested in recent years have identified fewer Wisconsin-based investments.

As of December 2017, SWIB had committed $40.0 million to a venture capital partnership with the Wisconsin Alumni Research Foundation.

SWIB staff indicated that despite this decrease, the venture capital strategy goal of fostering and encouraging venture capital activity in Wisconsin has been successful. For example, since 2014, SWIB has participated in the 4490 Ventures Fund I in partnership with the Wisconsin Alumni Research Foundation (WARF), which is the private, nonprofit patent and licensing organization for the University of Wisconsin-Madison. SWIB began receiving investment returns on this investment in 2018, which was sooner than anticipated. In 2017, the partnership created a second fund, the 4490 Ventures Fund II. Both 4490 Ventures Funds focus on early-stage information technology investments primarily located in Wisconsin. Under these two funds, SWIB had committed a total of $40.0 million and invested $16.8 million as of December 2017.

Core Fund Wisconsin venture capital investments exceeded all established benchmarks as of December 2017.

As shown in Table 18, Wisconsin venture capital investment returns exceeded the established benchmarks for the 1-, 3-, 5-, and 10-year periods as of December 2017. The one-year return exceeded the benchmark by more than 10.0 percentage points as of December 2017.

Table 18

Wisconsin Venture Capital Investment Performance
As of December 2017

Period	Investment Benchmark	Average Annual Investment Return[1]
One-Year	7.0%	17.1%
Three-Year	7.2	14.0
Five-Year	11.2	15.4
Ten-Year	6.3	6.8

[1] Includes management fees but not other investment expenses.

■ ■ ■ ■

Appendices ■

Appendix 1

Funds Included in the State Investment Fund

As of December 2017

Fund	Agency or Department	Market Value
Local Government Investment Pool	Administration	$3,168,958,000
General Fund	Administration	1,552,921,000
Transportation Fund	Transportation	394,583,000
Capital Improvement Fund	Building Commission	323,043,000
Budget Stabilization Fund	Administration	284,123,000
Hospital Assessment Fund	Health Services	281,221,000
State Building Trust Fund	Building Commission	166,869,000
Lottery Fund	Revenue	121,896,000
Environmental Improvement Fund	Administration	102,951,000
Conservation Fund	Natural Resources	91,201,000
Petroleum Inspection Fund	Natural Resources	67,801,000
Common School Fund	Board of Commissioners of Public Lands	62,489,000
University Trust Fund—Income	University of Wisconsin System	55,249,000
Environmental Fund	Natural Resources	28,483,000
Waste Management Fund	Natural Resources	23,145,000
Uninsured Employers Fund	Workforce Development	21,072,000
Work Injury Supplemental Benefit Fund	Workforce Development	20,677,000
Universal Service Fund	Public Service Commission	20,525,000
Medical Assistance Trust Fund	Health Services	19,108,000
Support Collections Trust Fund	Children and Families	17,871,000
Economic Development Fund	Wisconsin Economic Development Corporation	16,376,000
Common School Fund Income	Board of Commissioners of Public Lands	12,491,000
Utility Public Benefits Fund	Administration	10,850,000
Veterans Mortgage Loan Repayment Fund	Veterans Affairs	10,366,000
Veterans Trust Fund	Veterans Affairs	9,640,000
Public Employee Trust Fund	Employee Trust Funds	9,195,000
Worker's Compensation Benefit Fund	Workforce Development	8,930,000
Agricultural Producer Security Fund	Trade, Agriculture, and Consumer Protection	8,625,000
Unemployment Program Integrity Fund	Workforce Development	7,838,000
Agricultural Chemical Cleanup Fund	Trade, Agriculture, and Consumer Protection	7,769,000
Agrichemical Management Fund	Trade, Agriculture, and Consumer Protection	7,619,000
University Trust Fund—Principal	University of Wisconsin System	7,277,000

Fund	Agency or Department	Market Value
Bond Security and Redemption Fund	Building Commission	$ 6,561,000
Critical Access Hospital Assessment Fund	Health Services	5,332,000
Land Information Fund	Administration	4,257,000
Election Administration Fund	Wisconsin Elections Commission	3,086,000
Tuition Trust Fund	Financial Institutions	2,358,000
Normal School Fund	Board of Commissioners of Public Lands	1,795,000
Heritage State Parks and Forests Trust Fund	Natural Resources	1,335,000
Transportation Infrastructure Loan Fund	Transportation	1,001,000
Military Family Relief Fund	Revenue	419,000
Dry Cleaner Environmental Response Fund	Revenue	352,000
Permanent Endowment Fund	Administration	329,000
Self-Insured Employers Liability Fund	Workforce Development	186,000
Working Lands Fund	Trade, Agriculture, and Consumer Protection	134,000
State Capitol Restoration Fund	State Capitol and Executive Residence Board	95,000
Investment and Local Impact Fund	Investment and Local Impact Fund Board	78,000
Mediation Fund	Director of State Courts	77,000
Historical Legacy Trust Fund	Wisconsin Sesquicentennial Commission	73,000
History Preservation Partnership Trust Fund	Wisconsin Historical Society	62,000
Wireless 911 Fund	Public Service Commission	32,000
Read to Lead Development Fund	Children and Families	25,000
Agricultural College Fund	Natural Resources	20,000
Children's Trust Fund	Child Abuse and Neglect Prevention Board	15,000
Unemployment Interest Payment Fund	Workforce Development	15,000
Benevolent Fund	Administration	13,000
University Fund	Board of Commissioners of Public Lands	1,000
VendorNet Fund	Administration	0
Industrial Building Construction Loan Fund[1]	–	(1,000)
Recycling and Renewable Energy Fund[1]	–	(1,000)
Police and Fire Protection Fund	Public Service Commission	(22,501,000)[2]

[1] This fund was discontinued when the Department of Commerce was eliminated by 2011 Wisconsin Act 32, the 2011-13 Biennial Budget Act.

[2] The Department of Administration reported that the negative fund value was due to a difference between when expenses were incurred and when revenues were received. In 2018, the fund value returned to a positive amount.

Appendix 2

Funds Managed by the State of Wisconsin Investment Board

As of December 2017

Fund	Agency or Department	Investment Manager[1]	Market Value (in millions)	1-Year Benchmark	1-Year Investment Return[2]
Wisconsin Retirement System Core Fund	Employee Trust Funds	State of Wisconsin Investment Board staff and various external managers	$100,329.0	15.7%	16.2%
Wisconsin Retirement System Variable Fund	Employee Trust Funds	State of Wisconsin Investment Board staff	8,179.3	23.1	23.2
State Investment Fund	Administration	State of Wisconsin Investment Board staff	6,991.0	1.0	0.9
Injured Patients and Families Compensation Fund	Office of the Commissioner of Insurance	External managers: BlackRock, Inc.; Dodge & Cox	1,371.8	6.4	7.2
State Life Insurance Fund	Office of the Commissioner of Insurance	State of Wisconsin Investment Board staff	119.3	7.1	7.3
Historical Society Trust Fund	Wisconsin Historical Society	External manager: BlackRock, Inc.	17.1	6.4	7.2
EdVest Tuition Trust Fund[3]	Financial Institutions	State of Wisconsin Investment Board staff	3.4	1.2	1.0
Local Government Property Insurance Fund[3]	Office of the Commissioner of Insurance	State of Wisconsin Investment Board staff	0.4	1.0	2.0

[1] External managers are hired by the State of Wisconsin Investment Board.

[2] Excludes management fees and other investment costs. Returns that did not meet benchmarks are in shaded cells.

[3] Fund is entirely invested in the State Investment Fund.

Appendix 3

Members, Board of Trustees

November 2018

Appendix 4

Wisconsin Retirement System
One-Year Investment Performance
As of December

Year	Core Fund		Variable Fund	
	Investment Benchmark	Investment Return[1]	Investment Benchmark	Investment Return[1]
1982[2]	27.7%	27.3%	–[3]	22.2%
1983	13.3	12.5	23.1%	24.7
1984	12.3	12.8	6.3	5.8
1985	23.8	27.5	30.9	32.7
1986	14.0	14.5	17.1	11.5
1987	3.0	2.2	3.0	(1.1)
1988	13.6	14.4	18.4	21.7
1989	19.9	19.2	27.0	22.6
1990	(1.7)	(1.5)	(8.6)	(11.3)
1991	22.8	20.5	31.9	27.1
1992	5.9	9.7	7.1	10.7
1993	12.2	15.0	14.7	16.5
1994	(0.1)	(0.6)	1.7	0.8
1995	24.4	23.1	29.2	25.6
1996	12.7	14.4	18.6	19.8
1997	17.4	17.2	22.8	21.6
1998	15.5	14.6	17.4	17.5
1999	13.9	15.7	23.2	27.8
2000	(1.4)	(0.8)	(8.8)	(7.2)
2001	(4.5)	(2.3)	(12.9)	(8.3)
2002	(8.2)	(8.8)	(19.9)	(21.9)
2003	24.0	24.2	32.1	32.7
2004	12.1	12.8	13.4	12.7
2005	8.0	8.6	8.0	8.3
2006	14.6	15.8	17.6	17.6
2007	9.6	8.7	7.3	5.6
2008	(24.8)	(26.2)	(39.0)	(39.0)
2009	19.9	22.4	32.0	33.7
2010	12.2	12.4	15.3	15.6
2011	0.9	1.4	(3.6)	(3.0)

Year	Core Fund		Variable Fund	
	Investment Benchmark	Investment Return[1]	Investment Benchmark	Investment Return[1]
2012	12.8%	13.7%	16.7%	16.9%
2013	12.9	13.6	28.0	29.0
2014	5.6	5.7	7.5	7.3
2015	(0.3)	(0.4)	(1.3)	(1.2)
2016	7.9	8.6	10.4	10.6
2017	15.7	16.2	23.1	23.2

[1] Does not include management fees and other investment expenses. Returns that did not meet benchmarks are in shaded cells.

[2] The Wisconsin Retirement System was established in its current form, effective January 1, 1982.

[3] Benchmark returns are unavailable for the first quarter of 1982.

Appendix 5

Wisconsin Retirement System
Performance of Individual Asset Classes

As of December 2017

Asset Class	Investment Benchmark	Average Annual Investment Return[1]
Public Equity Securities[2]		
One-Year	23.9%	23.9%
Three-Year	9.8	9.9
Five-Year	11.7	11.7
Ten-Year	5.7	6.0
Fixed Income[2]		
One-Year	5.0%	5.4%
Three-Year	2.6	2.9
Five-Year	2.0	2.2
Ten-Year	4.1	4.6
Inflation Protection[2]		
One-Year	3.1%	3.2%
Three-Year	0.8	0.8
Five-Year	(0.9)	(0.9)
Ten-Year	3.0	3.5
Real Estate[2]		
One-Year	7.7%	9.6%
Three-Year	10.9	12.2
Five-Year	11.6	13.5
Ten-Year	7.0	5.0
Private Equity and Debt[3]		
One-Year	12.9%	15.5%
Three-Year	9.6	11.6
Five-Year	10.9	12.9
Ten-Year	7.6	8.8
Multi-Asset[2]		
One-Year	16.4%	14.5%
Three-Year[4]	7.9	6.2
Five-Year[4]	7.6	6.3
Ten-Year[4]	4.9	5.9

Asset Class	Investment Benchmark	Average Annual Investment Return[1]
Hedge Fund Strategy[3, 5]		
One-Year	1.4%	0.8%
Three-Year	1.8	0.6

[1] Returns that did not meet benchmarks are in shaded cells.

[2] Does not include management fees and other investment expenses.

[3] Includes management fees but not other investment expenses.

[4] Includes hedge fund strategy.

[5] Performance of this public equity securities strategy was reported separately beginning April 2015.

As of December 2016

Asset Class	Investment Benchmark	Average Annual Investment Return[1]
Public Equity Securities[2]		
One-Year	9.2%	9.5%
Three-Year	3.8	3.7
Five-Year	10.3	10.5
Ten-Year	4.3	4.5
Fixed Income[2]		
One-Year	3.9%	4.4%
Three-Year	2.5	2.6
Five-Year	2.0	2.5
Ten-Year	4.4	4.9
Inflation Protection[2]		
One-Year	6.3%	6.4%
Three-Year	0.5	0.5
Five-Year	(0.2)	(0.1)
Ten-Year	3.8	4.3
Real Estate[2]		
One-Year	10.1%	10.8%
Three-Year	12.5	13.6
Five-Year	12.4	14.6
Ten-Year	8.0	5.7
Private Equity and Debt[3]		
One-Year	8.3%	10.0%
Three-Year	9.5	11.4
Five-Year	11.1	12.4
Ten-Year	8.2	9.4
Multi-Asset[2]		
One-Year	8.3%	5.9%
Three-Year[4]	3.7	3.8
Five-Year[4]	6.8	5.9
Ten-Year[4]	4.2	5.3
Hedge Fund Strategy[3,5]		
One-Year	1.0%	0.6%

[1] Returns that did not meet benchmarks are in shaded cells.

[2] Does not include management fees and other investment expenses.

[3] Includes management fees but not other investment expenses.

[4] Includes hedge fund strategy.

[5] Performance of this public equity securities strategy was reported separately beginning April 2015.

Appendix 6

Wisconsin Retirement System Effective Rates and Annuity Adjustments[1]

As of December

	Core Fund			Variable Fund		
Year	Investment Returns	Effective Rate	Annuity Adjustment[2]	Investment Returns	Effective Rate	Annuity Adjustment[2]
2003	24.2%	7.4%	1.4%	32.7%	34.0%	25.0%
2004	12.8	8.5	2.6	12.8	12.0	7.0
2005	8.6	6.5	0.8	8.3	9.0	3.0
2006	15.8	9.8	3.0	17.6	18.0	10.0
2007	8.8	13.1	6.6	5.6	6.0	0.0
2008	(26.2)	3.3	(2.1)	(39.0)	(40.0)	(42.0)
2009	22.4	4.2	(1.3)	33.7	33.0	22.0
2010	12.3	4.8	(1.2)	15.6	16.0	11.0
2011	1.4	1.5	(7.0)	(3.0)	(3.0)	(7.0)
2012	13.7	2.2	(9.6)	16.9	17.0	9.0
2013	13.6	10.9	4.7	29.0	31.0	25.0
2014	5.7	8.7	2.9	7.3	7.0	2.0
2015	(0.4)	6.4	0.5	(1.2)	0.0	(5.0)
2016	8.6	7.9	2.0	10.6	10.0	4.0
2017	16.2	8.5	2.4	23.2	24.0	17.0
10-Year Compounded Average	8.3	8.1	0.0	9.5	9.6	2.6
15-Year Compounded Average	7.6	7.8	0.2	7.3	7.3	0.7

[1] The effective rate and annuity adjustments for the Core Fund are initially based on the 7.2 percent actuarial assumed rate, although there is either an increase or decrease to this rate based on the actual investment returns earned during the prior five years, which smooth out large fluctuations in actual investments returns. Annuity adjustments take effect with the April annuities that are paid on May 1 based on the previous year's performance. Adjustments only occur if the amount changes the Core Fund annuity at least 0.5 percent or the Variable Fund annuity at least 2.0 percent. Annuity adjustments are generally 4.0 to 6.0 percent less than effective rate adjustments to account for the 5.0 percent investment return assumption factored into the annuities and other actuarial adjustments.

[2] Maximum adjustment that may be applied to a retired participant's benefit payment. Adjustments that would reduce a benefit payment are limited to increases a retired participant received in prior years because post-retirement adjustments may not result in benefit payments that are lower than the base benefit payment at the time of retirement. Consequently, not all retired participants experience the full amount of reductions determined for years with negative adjustments.

Appendix 7

Comparison of Plan Structure among Selected Public Pension Plans

2017

	Assets Managed (in billions)	Return Assumption	Funded Rate[1]
California Public Employees Retirement System	$350.0	7.4%	67.8%
Florida State Board	162.1	7.5	84.3
Minnesota State Board	68.4	8.5[2]	73.8
New Jersey Division of Investments	77.6	7.5	55.8
Ohio Public Employees Retirement System	86.6	7.5	84.9
Pennsylvania Public School Employees' Retirement System	56.0	7.3	51.8
Teachers Retirement System of Texas	147.4	8.0	80.5
Virginia Retirement System	78.3	7.0	77.4
Washington State Investment Board	98.4	7.7[3]	89.5
Wisconsin Retirement System Core Fund	**100.3**	**7.2**	**102.9**

[1] Comparison of plan assets to estimated future pension obligations.

[2] Includes three subplans of which one had a return assumption of 8.5 percent and two had return assumptions of 8.0 percent as of December 2017.

[3] Excludes three subplans for which information was not available.

Appendix 8

External Investment Managers

As of December 2017
(in millions)

External Investment Manager	Investment Strategies Managed	Expenses[1]	Assets Managed
D.E. Shaw & Co., L.P.	Hedge Funds and Public Markets	$ 20.1	$ 1,572.9
Marshall Wace, LLP	Hedge Funds	12.9	389.5
The Blackstone Group, L.P.	Private Equity and Real Estate	12.5	1,177.1
Two Sigma Investments, L.P.	Hedge Funds and Public Markets	12.2	747.0
PGIM, Inc.	Public Markets and Real Estate	9.6	1,305.8
Los Angeles Capital Management and Equity Research, Inc.	Public Markets	7.0	1,389.2
Vista Equity Partners, LLC	Private Equity	6.9	340.4
Capula Investment Management, LLP	Hedge Funds	6.5	237.2
Senator Global Opportunity Fund, L.P.	Hedge Funds	6.0	121.5
Bridgewater Associates, L.P.	Hedge Funds	5.4	170.6
BlackRock, Inc.	Public Markets	5.3	12,101.0
BFAM Asian Opportunities Fund, Ltd.	Hedge Funds	5.3	131.0
Highbridge Capital Management, LLC	Hedge Funds	5.0	215.8
TPG Capital, L.P.	Private Equity	4.9	378.6
Stone Milliner Asset Management, LLP	Hedge Funds	4.6	224.4
Pharo Management (UK), LLP	Hedge Funds	4.6	160.9
Loomis, Sayles & Company, L.P.	Public Markets	4.3	1,259.3
TSG Consumer Partners, LLC	Private Equity	4.2	85.4
Warburg Pincus, LLC	Private Equity	4.1	324.4
Ascend Wilson Fund, Lp	Hedge Funds	4.1	217.8
All Others	Various	193.4	19,606.4
Total		**$338.9**	**$42,156.2**

[1] Excludes some performance management fees for private equity and real estate investments known as carried interest.

Appendix 9

Top Ten External Support Services Vendors[1]

2017

External Support Services Vendor	Services Provided	Expenses (in millions)
Citisoft, Inc.	Information Systems Update Planning and Implementation	$9.1
Bank of New York Mellon Corporation	Asset Custody and Investment Operations Services	7.2
FactSet Research Systems, Inc.	Financial and Economic Database	2.7
Bloomberg Finance, L.P.	Benchmark, Company, and Market Information	2.1
StepStone Group, LLC	Private Equity Consulting	1.4
C&A Consulting, LLC	Investment Organizational Consulting	1.2
Nuware Technology Corporation	Investment Information Technology Consulting	1.1
V-Soft Consulting, Inc.	Investment Information Technology Consulting	0.8
Charles River Systems, Inc.	Portfolio Management Trading Software	0.7
Sharp Decisions, Inc.	Investment Information Technology Consulting	0.7

[1] Includes fees for all services other than investment management, including asset custody, investment and operations consulting, and legal services.

Response ■

SWIB STATE OF WISCONSIN INVESTMENT BOARD

December 19, 2018

Mr. Joe Chrisman
State Auditor
Legislative Audit Bureau
22 East Mifflin, Suite 500
Madison, WI 53703

Dear Mr. Chrisman,

Thank you for the opportunity to review and comment on the management audit of the State of Wisconsin Investment Board (SWIB). SWIB's investment strategy and the State of Wisconsin's strong support has built one of the only fully-funded public pensions in the United States. SWIB's investment strategy is intended to help both protect and grow the Wisconsin Retirement System (WRS) assets that are relied upon by more than 632,000 participants for a more secure retirement.

The Legislative Audit Bureau's (LAB) report covers a broad range of topics, including some that are very complex in nature. SWIB is pleased that no significant concerns were identified during the audit. In addition, SWIB is already in nearly full compliance with three of the six recommendations. Rather than address every topic and recommendation, this response instead focuses on the four themes below where we disagree with LAB's conclusions or recommendations or where more information is necessary to put the report in the proper context:

- **Strong Performance:** SWIB's investment returns rank second among its peers when accounting for the WRS's goals and its fully funded status. On a long-term basis, SWIB is meeting or exceeding the WRS's investment target and beating its benchmarks on the 1-, 3-, 5-, and 10-year basis.
- **Informed and Balanced Approach to Risk:** SWIB has conducted robust investment stress testing for years to evaluate and strengthen its investment strategy. Since 2013, SWIB has worked with the Employee Trust Fund's (ETF) actuaries to conduct stress testing every two years. SWIB has incorporated stress testing results into its asset allocation and has tested multiple scenarios with different asset mixes over long periods of time.
- **Cost Optimization:** SWIB optimizes its costs, invests in its infrastructure, and spends less than its peers. Over the past 10 years, SWIB has spent $1.3 billion less than its peers. Because SWIB has made investments in its technology systems, it now diligently tracks and regularly reports its costs and performance relative to expectations at a more granular level.
- **Recruiting Top Talent:** SWIB actively recruits top talent to hire the best qualified candidates to work on behalf of the WRS. In a tight labor market, SWIB has been proactive in quickly and efficiently recruiting talented individuals.

<u>Strong Performance</u>: SWIB's investment returns rank second among its peers when accounting for the WRS's goals and its fully funded status.

Given the WRS's fully funded status and unique risk-sharing design, <u>*SWIB invests differently than its peers, who are underfunded, generally have higher investment targets, and need to have greater risk tolerances*</u>. Investment earnings account for about 75% of all WRS revenue, and returns over the long term have been strong. As LAB recognizes, the 30-year average annual investment return for the Core Fund was 8.9% as of December 2017, ahead of its 7.2% target.

LAB notes that that there are numerous differences in plan structure that should be considered when reviewing a peer comparison, including: "asset allocation, cash flow needs, investment styles, funding levels, return assumptions, risk tolerance levels, and statutory or other restrictions on allowable investments." In short, *differences in plan structure often result in different goals, which result in different asset allocations that then drive overall returns*.

When a plan is not fully funded, its effective rate of return will decrease because a portion of the assets are not available to earn investment returns.

Funding Level		Investment Return		Effective Rate of Return on Assets
100%	x	7.2%	=	7.2%
70%	x	7.2%	=	5.0%

The table below further illustrates this point. The report focused heavily on the net five-year returns. However, when comparing the effective rate to the target rate, SWIB returned 1.34% more than its investment goal and ranked second among its peers. Conversely, five seemingly high-performing funds underperformed their targets, and the overall return average for the group was under target.

Public Pension Plan	Funded Ratio	Net 5-year Returns (12/31/17)	5-year Effective Rate	Target Rate	Effective Rate vs. Target	Rank
Wisconsin Retirement System—Core Fund	**102.9%**	**8.30%**	**8.54%**	**7.2%**	**1.34%**	**2**
Washington State Investment Board	89.5%	10.12%	9.06%	7.7%	1.36%	1
Ohio Public Employees Retirement System	84.9%	9.20%	7.81%	7.5%	0.31%	5
Florida State Board	84.3%	9.40%	7.92%	7.5%	0.42%	3
Teachers Retirement System of Texas	80.5%	9.10%	7.33%	8.0%	-0.67%	6
Virginia Retirement System	77.4%	9.10%	7.04%	7.0%	0.04%	7
Minnesota State Board	73.8%	10.70%	7.90%	8.5%	-0.60%	4
California Public Employees Retirement System	67.8%	9.00%	6.10%	7.4%	-1.30%	8
New Jersey Division of Investments	55.8%	8.74%	4.88%	7.5%	-2.62%	9
Pennsylvania Public School Employees' Retirement System	51.8%	7.62%	3.95%	7.3%	-3.35%	10
Weighted Averages for 9 Peers (excluding SWIB)	**73.5%**		**6.87%**	**7.6%**	**-0.67%**	

As shown above and in Appendix 7 of the report, *all but one of the peers have higher target rates and no other plan is fully funded. Thus, SWIB can achieve its goals with less risk, which helps protect the WRS*. A thoughtful consideration of returns should adjust for funding levels to provide a more complete picture. As shown, eight funds have lower effective rates than SWIB. So, even though they may have earned a higher return than SWIB, half did not meet their necessary investment targets, and many have taken on large amounts of equity-like risks in their allocation.

SWIB has designed and built the Core Trust Fund to strike the best possible balance between protecting the WRS and growing its assets. LAB notes multiple times that *SWIB's asset allocation is intended to help protect the Core Fund from significant downturns*. Every year, as part of the process in developing the Core Fund's asset allocation, SWIB and its asset allocation consultant discuss what is referred to as a "Goldilocks Zone." This is an allocation in which the asset mix targeted is not "too hot" or "too cold" in terms of risk and expected returns but is appropriate for the Core Fund. SWIB does not believe it is prudent to invest in an asset mix outside of this zone.

The Core Fund's 20-year return at the end of 2017 was 6.9%, which is slightly below the ETF-determined target rate of 7.2%. This target consists of two amounts: a 4.0% real rate of return plus 3.2% that is assumed for wage growth. It is important to note that actual wage growth over the past 20 years has only been 2.5%, which shifts the actual target needed to fully fund the WRS closer to 6.5%. So, while the actual performance for the 20-year period has been slightly below the stated target rate, a meaningful conversation comparing returns with the target should also include this data.

As LAB notes, *both the Core Fund and Variable Fund exceeded their 1-, 3-, 5-, and 10-year benchmarks at the end of 2016 and 2017*. SWIB is proud of this consistent performance, which means that its investment strategy is working.

LAB has asked SWIB to more clearly identify when reported returns are net versus gross. While SWIB currently footnotes which asset classes are reported on a net basis in SWIB's official performance reports, SWIB will look for additional ways to clarify its reporting. LAB also recommended that SWIB report net of all costs investment return information at a detailed level to the Board of Trustees. SWIB already reports net of all fees investment return information on an annual basis to the Board but will look for ways to enhance that reporting.

Informed and Balanced Approach to Risk: SWIB has conducted robust investment stress testing since 2013 to evaluate and strengthen its investment strategy and make it more risk aware.

LAB makes two recommendations regarding stress testing, both based on its review of a 2018 Pew Charitable Trust study: 1) conduct additional stress tests that focus on sustained market downturns and 2) conduct additional stress tests that consider potential changes to state laws that could affect the investment strategy of the WRS.

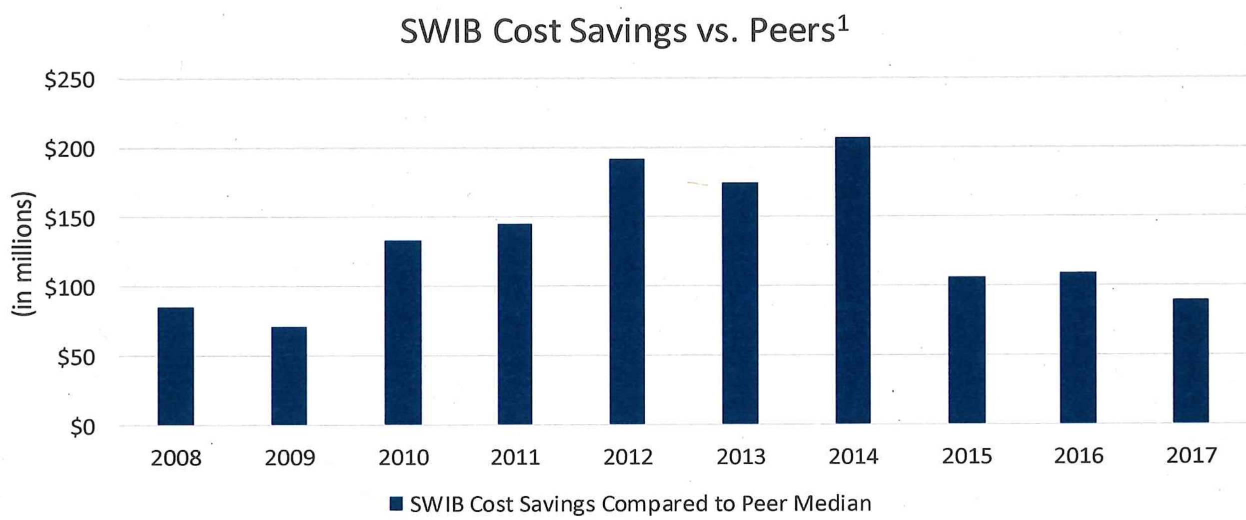
First, *SWIB already conducts comprehensive stress testing based on sustained market downturns that is substantially more robust than the Pew study model, according to ETF's actuaries*. The stress testing that SWIB conducts with ETF on a biennial basis reviews the effects of sustained low returns of 5.0% on the funded ratio, contribution rates, dividend rates, and retiree pool funding status. Pew's model covered only 50% of potential outcomes while the joint SWIB-ETF model covers more than 90% of potential outcomes, including more extreme outcomes for multiple asset allocations over multiple time periods. The Pew Study found Wisconsin to be the most robust plan it tested, remarking that "Wisconsin — by designing its pension plan with significant risk-sharing elements in addition to a strong funding policy — serves as an exemplar for managing cost volatility under virtually any scenario." Moreover, LAB incorrectly claims that SWIB's stress testing focused on only short-term changes to market conditions. In fact, SWIB's current stress testing covers 10-, 20-, and 50-year time horizons. All of SWIB's stress testing is available to the public, was provided to LAB, and will be conducted again in 2019.

Second, *SWIB does not find it practical to invent and then test the results of potential legislative changes that have neither been proposed nor suggested by the Legislature*. This would not be efficient, effective, or informative. SWIB and ETF already work with legislators when proposed legislative changes are suggested so that legislators can understand the potential effects on the WRS. SWIB will continue to address any specific changes introduced or under consideration and welcomes a continued partnership with the Legislature. Speculating about potential legislative changes is not SWIB's role or function.

Cost Optimization: SWIB optimizes its costs, invests in its infrastructure, and spends less than its peers. SWIB diligently tracks and reports its costs.

LAB notes that SWIB's expenses increased by 21.7% from 2013 to 2017. We expected this increase in costs given the 15.5% increase in assets under management over this same period and heavy investment in infrastructure and leading technology systems to help position us for the future. SWIB will continue to invest in its people, processes, and technology because those investments provide the greatest edge in achieving its long-term goals and delivering added returns.

While SWIB's total costs have increased since 2013, they have remained consistently and materially lower than its peers. For example, compared to its peers, *SWIB saved approximately $90 million in 2017 and $1.3 billion from 2008 to 2017, which is more than it spent in FY 2016, FY 2017, and FY 2018 combined.* The savings are driven by SWIB having fewer high cost assets and more internal management. In 2007, SWIB managed 21% of its assets internally. This has nearly tripled, and SWIB now manages approximately 60% internally. This has been one of the key contributors to SWIB's cost advantage that is summarized in the table below.



[1]This analysis compares SWIB's savings vs. the peer group median costs for every $100 under management and multiplies that average savings by SWIB's median assets under management.

Because SWIB manages so many assets internally, SWIB must also invest in its people. Until 2017, much of the needed staffing increases were postponed because of the significant changes that were occurring as SWIB implemented new systems and processes. In 2016, one of SWIB's independent consultants, CEM, recommended a staffing ratio of 1.7 to 1 between investment services (support) staff and investment management staff. At the time of their recommendation, SWIB operated at a 1 to 1 ratio.

As a short-term fix, SWIB used highly qualified contractors to help meet temporary needs during this transition period. As long-term needs have become clearer, SWIB is appropriately shifting from contractors to full-time staff with industry experience to fill these roles, which will also generate substantial additional savings to SWIB over time. Costs for contractors and staff are all included in the Board-approved Total Cost of Management Plan (the Plan), and the Board also receives quarterly spending updates.

LAB makes several recommendations around how SWIB manages and reports on costs it incurs and project investments it makes to generate value to the WRS. As important as it is to have a strong investment strategy, it is equally important to optimize costs. Every dollar saved is as good as a dollar earned through investment returns. SWIB focuses both on savings and returns because when we spend, we spend to make money and add value for the beneficiaries.

In connection with the ARIES project in 2017, *SWIB enhanced its tracking and reporting of project costs and, as reported to LAB, is already performing the actions recommended by LAB since 2017*. In 2016, SWIB implemented a new enterprise resource planning (ERP) system that allows all project costs (including technology costs) to be tracked at the most granular level and to allocate those costs directly to specific projects, business divisions, or to specific investment portfolios. Starting in 2017, the initiation of any project requires the creation of an expected budget to be tracked through the ERP system and analyzed by SWIB's Finance team. Detailed project costs and variances to the Plan are reviewed on a monthly basis by management with quarterly reporting around the total project budget and variance to the Board through Total Cost of Management reporting.

LAB also recommends that SWIB provide the budgets for each technology project for fiscal year (FY) 2020 by June 28, 2019. SWIB will know its overall technology budget as of that date, however it may not have a project-by-project budget. SWIB will provide all reporting that it provides to its Board to the Joint Legislative Audit Committee and will update the Committee on a periodic basis in FY 2020 as projects are initiated.

Annually, SWIB's Board approves the Plan for the FY, which includes both external and internal investment management costs along with the internal operating budget. *The Board currently approves all projected expenses that exceed the approved budget* and reviews expenses forecasted to exceed the Plan. SWIB reports to the Board its year-to-date actual costs, as well as full FY forecasted costs compared to the Plan on a quarterly basis, including forecasts of the internal operating budget through its Total Cost of Management reporting.

The bulk of SWIB's Total Cost of Management is comprised of management fees which are contractual and include a) base fees on assets under the control of an external manager and b) performance fees based on a share of the profits generated. *These management fees are contractual obligations that positively align incentives between SWIB and its external managers and that can vary based on investment performance*. SWIB aggressively negotiates with its external managers and has some of the most competitively priced fees in comparison to peers, according to SWIB's independent hedge fund consultant. When management fees exceed the Plan forecast, it means that there was strong investment performance, and that benefits the WRS.

Recruiting Top Talent: SWIB actively recruits top talent to hire the best qualified candidates to work on behalf of the WRS.

In 2018, SWIB hired 43 employees and 13 interns (through December 1st). A total of 3,958 people applied for those jobs, and SWIB interviewed 488 candidates by phone or in person, which is 12% of applicants. SWIB hires for very specialized positions and the necessary skills often require significant investment industry experience. *Finding the best qualified candidates is the chief objective in SWIB's hiring process*. SWIB successfully recruited top talent from premier investment management firms in 2018 including BlackRock, J.P. Morgan, Russell Investments, William Blair, Artisan Partners, Nuveen, and Heartland Advisors, as well as from top-rated pension plans like the Canada Pension Plan Investment Board.

To find the best qualified candidates, SWIB actively recruits for both open positions and positions that it anticipates in the future. SWIB encourages its employees to use their networks to bring people into the talent pool. SWIB became more proactive in 2018 to fill numerous vacancies and better address the need for deeply skilled candidates with industry experience. In discussions with SWIB, LAB agreed that talking with candidates before they applied or before the job was posted was an appropriate recruiting practice and not problematic.

However, in its report, LAB has characterized sourcing potential candidates in one's network as potentially limiting SWIB's review of other candidates. This is simply not the case. Sourcing candidates from the networks of existing employees is industry standard in both the public and private sector and a key avenue for generating a high-quality applicant pool.

Candidates are vetted against the entire applicant pool, whether they are sourced through public postings on SWIB's website and job sites, LinkedIn, or employees' networks. SWIB posts each open position on its website, LinkedIn, and other sites to cast a wide net for possible applicants. Selected candidates are then interviewed by a panel of employees to further help the hiring manager decide who is the most qualified and best fit for the role. LAB's suggestion that hiring managers should not be able to select whom to interview if they also sourced the candidate is inefficient and unworkable and would make it harder to hire the best candidates. Further, LAB fails to discuss numerous recruitments in 2018 where candidates who were sourced by hiring managers or other employees either were not selected or were not interviewed. LAB takes information out of context and mischaracterizes facts to come to its conclusions.

LAB states that SWIB only interviewed one candidate in person for each of the five positions it reviewed. SWIB interviews candidates it deems to be highly qualified and viable candidates for the position. As noted, only 12% of all applicants are interviewed. However, *in two of the five 2018 recruitments that LAB reviewed, SWIB interviewed more than one candidate*. In the first instance, LAB has dismissed the phone interviews that SWIB conducted, which provide a low-cost method to evaluate candidates outside of Wisconsin. In the second instance, LAB has ignored interviews conducted in an earlier recruitment for substantially the same position. If an applicant pool is particularly strong, then multiple candidates may be interviewed. However, SWIB only interviews candidates who are serious contenders.

LAB also highlights the speed with which some candidates were hired. Qualified candidates often have many opportunities and may be considering multiple job offers. A delay in the hiring process can result in losing a strong candidate to a competitor. *By consistently building a talent pool from its employees' networks, SWIB can speed up the hiring process*. Long recruitments are sometimes necessary but there is also a cost because they can be draining on the organization in terms of time and effort and require other employees to work double duty until the position is filled. An efficient recruitment of a great candidate is positive for SWIB and the WRS.

Although SWIB's records may not have fully documented its vetting process for each of its recruitments in 2018, SWIB in fact undertook a careful and thorough review and hired only the most highly qualified candidates. LAB concludes incorrectly that SWIB did not equally consider all qualified applicants in the five out of 43 recruitments that it reviewed in 2018. SWIB is planning, and has already taken steps, to increase its documentation so that its recruiting records better reflect the careful and thorough review that has been conducted and continues to be conducted for each recruitment in the pursuit of the most qualified candidates.

We appreciate the work of the LAB audit team in covering so many important topics in this report.

Sincerely,

David Villa
Executive Director/Chief Investment Officer