



# Quarterly Investment Performance Analysis

Wyoming State Treasurer's Office

Period Ended: December 31, 2018





## Memorandum

To	Wyoming State Loan and Investment Board
From	RVK, Inc.
Subject	Investment Performance Analysis Commentary
Date	December 31, 2018

Outlined below please find a summary of significant observations regarding performance of the State's Funds for the period ended December 31, 2018. We hope this summary will facilitate your review of our Investment Performance Analysis Report.

The Total Fund returned -2.6% net of fees during the fourth quarter as risk assets produced negative returns during the quarter. Long-term performance for the Total Fund remains strong, with the State earning returns of 4.4% and 5.6% per annum over the trailing seven- and ten-year periods.

Absolute results were negative for most of the State's investment pools, with all nine modestly underperforming their respective benchmarks during the quarter. The State's non-permanent funds with larger strategic allocations to fixed income investments generated higher returns on both an absolute and relative basis compared to the State's permanent funds.

The Bloomberg US Aggregate Bond Index increased by 1.6% as the yield curve flattened materially in the fourth quarter. Diversification away from core US bonds detracted from relative results as most fixed income segments underperformed US Treasuries. However, this diversification continues to provide a benefit to absolute and relative returns over longer-term periods. The Internal Intermediate Gov't Fixed Income portfolio generated the highest absolute return among the State's fixed income managers in the fourth quarter, returning 1.9%. Credit fixed income generated the lowest absolute return among fixed income sectors, returning -3.1% as investors sought the safety of Treasuries during the volatile market conditions. Emerging markets debt generated positive absolute returns during the quarter, but composite performance underperformed its benchmark by 1.0%. The State's core fixed income managers kept pace with the broad market index, collectively returning 1.5%.

US equity markets delivered negative returns across market capitalizations and styles during the fourth quarter. Major US equity indices finished the quarter in negative territory, with the Russell 3000 Index returning -14.3% for the quarter. The State's US equity composite returned -14.6% during the fourth quarter, modestly trailing the broad market index. State Street All Cap outperformed the broad market index by 0.8%. Epoch returned -15.5%, underperforming the Russell 3000 Index by 1.2%, as holdings within health

**PORTLAND OFFICE**  
1211 SW 5th Avenue  
Suite 900  
Portland, Oregon 97204  
MAIN 503.221.4200

**CHICAGO OFFICE**  
30 N LaSalle Street  
Suite 3900  
Chicago, Illinois 60602  
MAIN 312.445.3100

**NEW YORK OFFICE**  
1 Penn Plaza  
Suite 2128  
New York, New York 10119  
MAIN 646.805.7075



care and financials detracted from results.

Developed international markets underperformed emerging markets during the quarter, with the MSCI EAFE Index returning -12.5% and the MSCI Emerging Markets Index returning -7.5%. The State's international equity composite returned -12.1% during the quarter, underperforming the MSCI ACW Ex US Index by 0.7%. Passively managed strategies within the State's international equity portfolio kept pace with their respective benchmarks, while Fisher and Arrowstreet trailed their respective benchmarks by 1.9% and 1.4%, respectively.

Mixed assets, including preferred stock, MLPs, and convertible bonds, generated negative absolute returns during the quarter. Cohen & Steers returned -3.5% but outperformed its benchmark by 2.1%. Harvest returned -20.8% as MLPs fell sharply in the fourth quarter. Allianz, the State's convertible bonds manager, generated a return of -9.3%, keeping pace with its benchmark.

Core real estate continued a trend of delivering modest, positive returns and ended the 2018 calendar year as the best performing asset class by a wide margin. The capital appreciation component of returns decreased slightly from the prior quarter, but the income component remains in line with historical levels. The State's core real estate composite earned 1.7% in the fourth quarter, keeping pace with the NCREIF ODCE Index.

The Diversified Hedge Funds composite returned -2.3% during the quarter, outperforming the HFRI FOF Comp Index by 2.7%. Grosvenor Diversified Hedge Funds and Internal Diversified Hedge Funds returned -3.9% and 0.0%, respectively. The PAAMCO - Jackalope Fund returned -1.8% during the quarter, also outperforming the index.

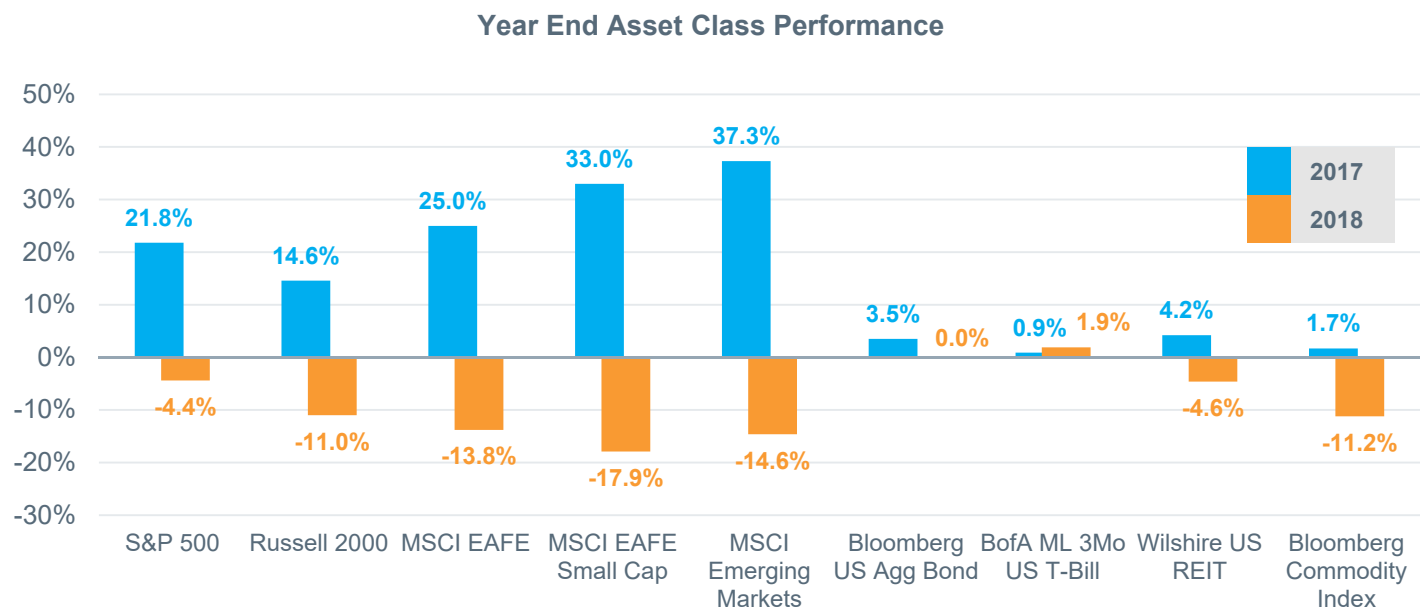
# Executive Summary

## Preface: 2017

- 2017 was a picturesque year for markets, characterized by low volatility and strong returns.
- Many asset classes were bolstered by synchronized global growth, strong corporate profits, and prolonged accommodative monetary policy.

## 2018

- A year later and there is a stark contrast. So what happened?



## Objective

- The following presentation provides a holistic review of 2018, distilling major capital market themes that occurred throughout the year.
- Specifically, we review broad economic conditions, market volatility, and take a deep-dive into the fourth quarter. We also highlight key themes for 2019.

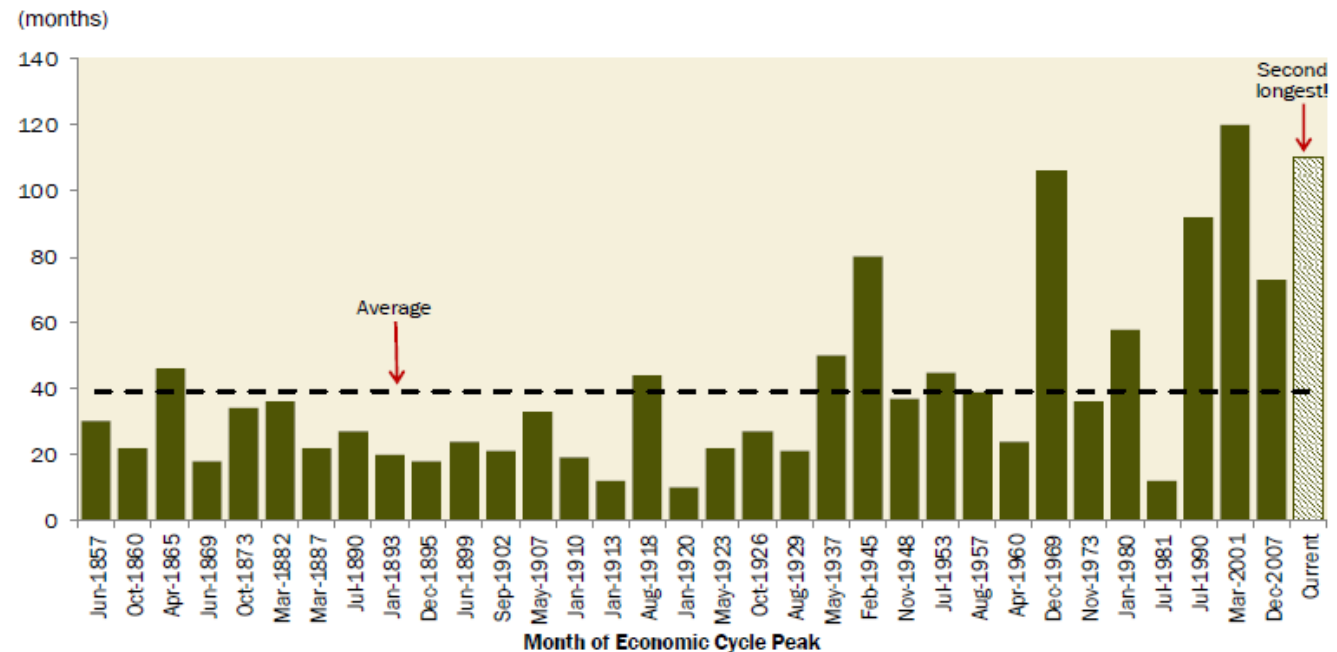
# Macroeconomic Conditions

## Economic Cycles

### Current Cycle

- The general consensus is that the US economy (along with other developed nations) is finally decelerating, with growth expectations tapering off throughout the transition.

#### United States: Duration of Economic Expansions



Source: Gluskin Sheff + Associates Inc., based off of National Bureau of Economic Research data. As of November 30, 2018.

### Key Takeaways

- A mature economy, combined with liquidity tightening as the Fed removes monetary stimulus, can lead to even slower growth and increase downside risk potential.
- Cyclical changes in the economy can create short-term friction for investors, but they should not take precedent over longer-term secular themes when focusing on portfolio construction.



# 2018 High Level Review

## 2018 – Overview

### Notable Statistics: Year in Review

- Solid global GDP growth at 3.7%.
- Earning growth, propped up by the tax stimulus, was a key driver for US equity markets.
- First trillion dollar company (Apple).
- Federal Reserve: 4 rate hikes throughout the year.

### Market Movements: Year in Review

- Aside from a hiccup in February, most markets were able to regain ground throughout the second and third quarters.
- US equity markets did well leading up to the fourth quarter. The rest of the world did not keep pace with the US, but international developed countries were able to post modest gains over the summer, while emerging countries felt more pressure from trade war tensions and unfavorable exchange rates.

#### Market Performance (%)

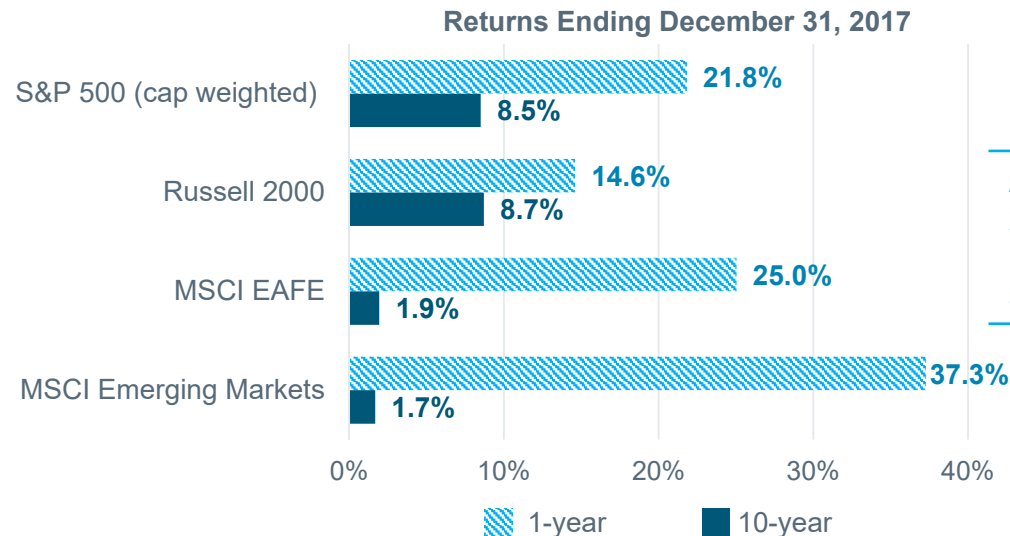
		Monthly		-----Monthly Returns-----			
	Dec 31 2017 YTD	Feb 2018	Sep 30 2018 YTD	Oct 2018	Nov 2018	Dec 2018	Dec 31 2018 YTD
S&P 500 (cap weighted)	21.8	-3.7	10.6	-6.8	2.0	-9.0	-4.4
Russell 2000	14.6	-3.9	11.5	-10.9	1.6	-11.9	-11.0
MSCI EAFE	25.0	-4.5	-1.4	-8.0	-0.1	-4.9	-13.8
MSCI Emerging Markets	37.3	-4.6	-7.7	-8.7	4.1	-2.7	-14.6
Bloomberg US Agg Bond	3.5	-0.9	-1.6	-0.8	0.6	1.8	0.0
US 30 Yr Treasury	2.7	3.1	3.2	3.4	3.3	3.0	3.0
Bloomberg Commodity Index	1.7	-1.7	-2.0	-2.2	-0.6	-6.9	-11.2

# 2018 High Level Review

## 2018 – A Year of Mean Reversion

### Equity Markets: Long-Term Perspective

- For equity markets in particular, 2018 could be viewed as a year of mean reversion.
- 2017 market returns were well above historical norms. Even without headline events, the sustainability of this growth was bound to come under pressure.



Against this backdrop, 2018 year-end market performance may not seem as severe.

### Economic Data: Can Good get Better?

- A healthy economy, strong job market, high corporate earnings, and relatively low interest rates may appear inconsistent with the negative stock market performance, particularly during the fourth quarter.
- However, economic data tends to be backward looking while capital markets are forward-looking.

#### Economic Indicators:

- The unemployment rate is at its lowest since 1969
- 115 consecutive months of manufacturing expansion

#### Concern for Future Outlook:

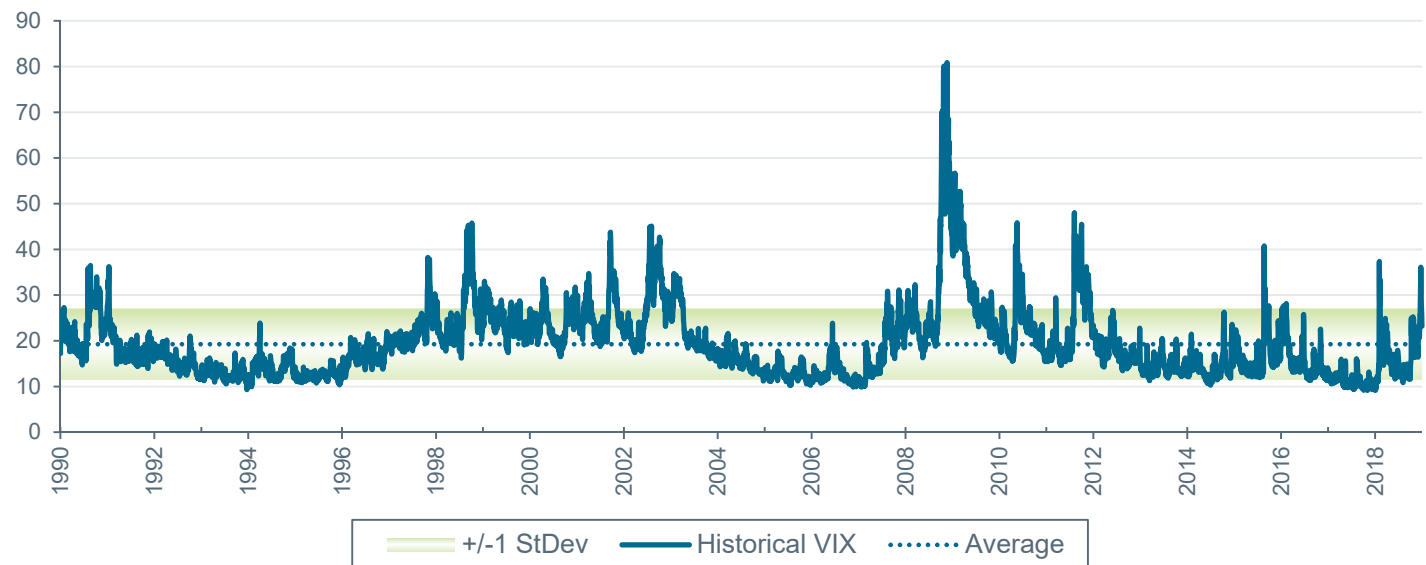
*Is there still room for meaningful improvement?*

# Market Volatility

## Historical Context

### Long-Term Average of the VIX Index

- Volatility has been subdued since the Financial Crisis due to accommodative monetary policy.
- Prior to 2018, there were long periods of very low volatility compared to historical standards, with a handful of episodic occurrences largely influenced by macro events (e.g. China growth worries in 2015 and Brexit in 2016).



### Volatility in Post-Crisis Bull Market

- While volatility was often lower than historical norms since 2009, price changes were not completely absent from the market.

	2013	2014	2015	2016	2017	2018
Number of S&P 500 Price Changes Greater than 1%	38	38	72	48	8	64

- From a historical volatility perspective, 2017 was more of an outlier than 2018.

Source: RVK calculations based on CBOE and Standard & Poor's data.



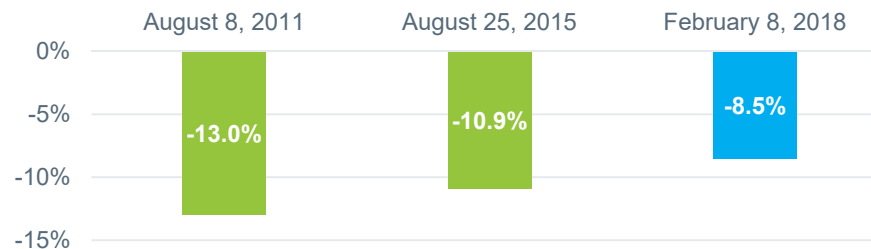
# Market Volatility

## February Deep Dive

### February Market Volatility

- After a strong 2017, markets exhibited fragility in February 2018, with the S&P 500 Index dropping 10.2% by the close of February 8<sup>th</sup>.
- We noted in our memo that this was the largest 5-day market correction since 2015, coming after over 400 days without a 5% or greater correction.

**Three Largest 5-day Corrections for the S&P 500 Index  
since market bottom in 2009**



#### Note:

While the S&P 500 returned -3.7% for the month of February, it was up 2.7% year-to-date through June 30, 2018.

Source: RVK calculations based on Standard & Poor's data.

### Drivers Behind Volatility

- At the beginning of the month, the Labor Department's job's report sparked concerns about wages and inflation, which was received poorly by the markets.
- The drawdown was further exacerbated by the trading mechanics of short volatility products.  
  
Short Volatility Refresh: Our February memo also discussed how short volatility strategies were another contributing factor to the correction. Short volatility products are inverse bets on market volatility, i.e. they profit when a volatility index, such as the VIX, goes down. In a low volatility environment, they can provide consistent positive returns.  
  
However, they are very susceptible to volatility spikes and when the VIX increased 116% on February 5<sup>th</sup>, these strategies plummeted. Many of the available products were also concentrated in US equity volatility indices, further adding to the downward pressure during the month.
- With short volatility strategies, the market correction transitioned from an information-based trade surrounding economic data to a liquidity trade unrelated to asset or economic fundamentals.

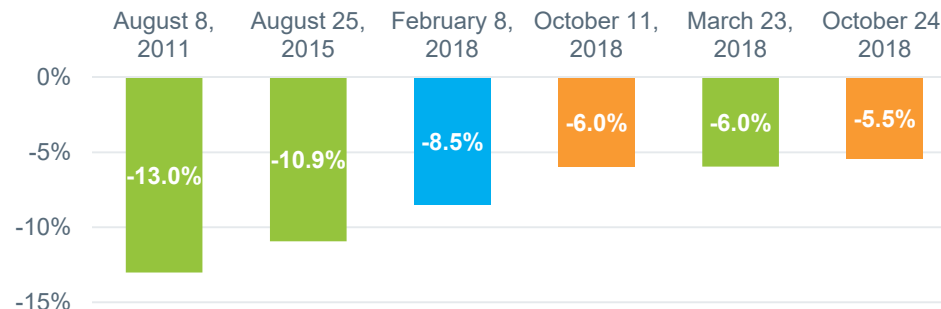
# Market Volatility

## October Deep Dive

### October Market Volatility

- From a high on September 20<sup>th</sup> through October 26<sup>th</sup>, the S&P 500 index declined by more than 9%, and finished the month of October down -6.8% after enduring two large drawdowns about a week apart.

#### Largest 5-day Corrections for the S&P 500 Index since market bottom in 2009



Source: RVK calculations based on Standard & Poor's data.

### Well Cited Drivers

- The US-China trade war is the most often cited source of negative pressure on the stock market.
  - As these are the two largest economies in the world, any disruption can have a ripple effect throughout the world.
- The yield curve has also been another source of dismay, with its continued flattening and anticipation of inversion.
  - Historically, recessions have been preceded by an inverted yield curve, although inversion does not guarantee a recession.

### Key Takeaways

- China trade talks may have been the catalyst for the October market downturn.
- However, this then prompted the market to reprice future expectations of many factors that were already percolating:
  - Higher interest rates
  - Lower earning expectations for 2019
  - Maturing economic cycles around the globe

## Summary – 2018

Source: Macrotrends LLC. Based off of monthly returns, adjusted for inflation using headline CPI. As of 12/31/2018.

# Fourth Quarter Highlights

## 2018 Q4 – The Fed

### Central Bank Influence: Mixed Messages

- Against a backdrop of tweets and trade wars, it was the Federal Reserve that seemed to have an inordinate influence on the markets during the fourth quarter of 2018.
- While rate hikes were anticipated, the inconsistent messaging seemed to amplify other concerns that were already on the periphery.

	Oct <sup>1</sup>	Nov	Dec
Tone	Hawkish	Dovish	???
FOMC Meeting Highlights	<p>“...we may go way past neutral. But we are a long way from neutral at this point” – Chairman Powell Oct 3<sup>rd</sup></p> <p>“Interest rates...remain just below the broad range of estimates of the level that would be neutral for the economy — that is, neither speeding up nor slowing down growth” – Chairman Powell Nov 28<sup>th</sup></p> <p>1. Fed lowered expected rate hikes in 2019 from 3 (announced in September 2018) down to 2 2. Balance Sheet woes: “It will be substantially smaller than it is now” – Chairman Powell Dec 19<sup>th</sup></p>		
Federal Funds Rate (Target)	2.25% (↑ 0.25%)	2.25% (no change)	2.50% (↑ 0.25%)
Market Reaction	Negative	Favorable	Negative

- Growth concerns were a strong undercurrent throughout the fourth quarter, but the Fed also played a crucial role. Sequential FOMC meetings with somewhat contrasting messages spurred negative sentiment as the market struggled to interpret the Fed’s direction. Renewed interest in the balance sheet also gave the impression that the Fed was going to be less accommodative going forward.

**Notes:** “FOMC” stands for Federal Open Market Committee.

<sup>1</sup> Actual FOMC meeting was occurred between September 25-26.

# 2019 Market Outlook

## Potential Themes

### Global Growth Projections

- Global growth is expected to slow:

#### IMF Growth Expectations



#### Notes from the International Monetary Fund's ("IMF") most recent Economic Outlook:

- Global growth forecasts were modestly reduced from the October Outlook due to "carry over from softer momentum in the second half of 2018."
- The report also indicated that "escalation of trade tensions beyond those already incorporated in the forecast remains a key source of risk."
- Other global risks on the horizon include: "no-deal" withdrawal of the United Kingdom from the European Union and a larger than expected slowdown in China's economy.

Source: IMF, World Economic Outlook Update, January 21, 2019.

### Corporate Earnings (US)

- The corporate tax cut that helped lift stocks in 2018 will not be a significant contributor going forward. Corporate earnings will instead have to rely on profit margins and organic company growth, potentially making companies even more susceptible in an environment of uncertainty.

### Recession Probability

- A recent Reuters poll of economists showed that the median predicted probability of a recession within the next year is 20%, while the probability of a recession within the next two years rose above 40%.

# 2019 Market Outlook

## Potential Themes

### The Fed: Major Factor for Markets in 2019

- The main concern is how the Fed will handle a two variable experiment involving short-term interest rates and balance sheet reduction.

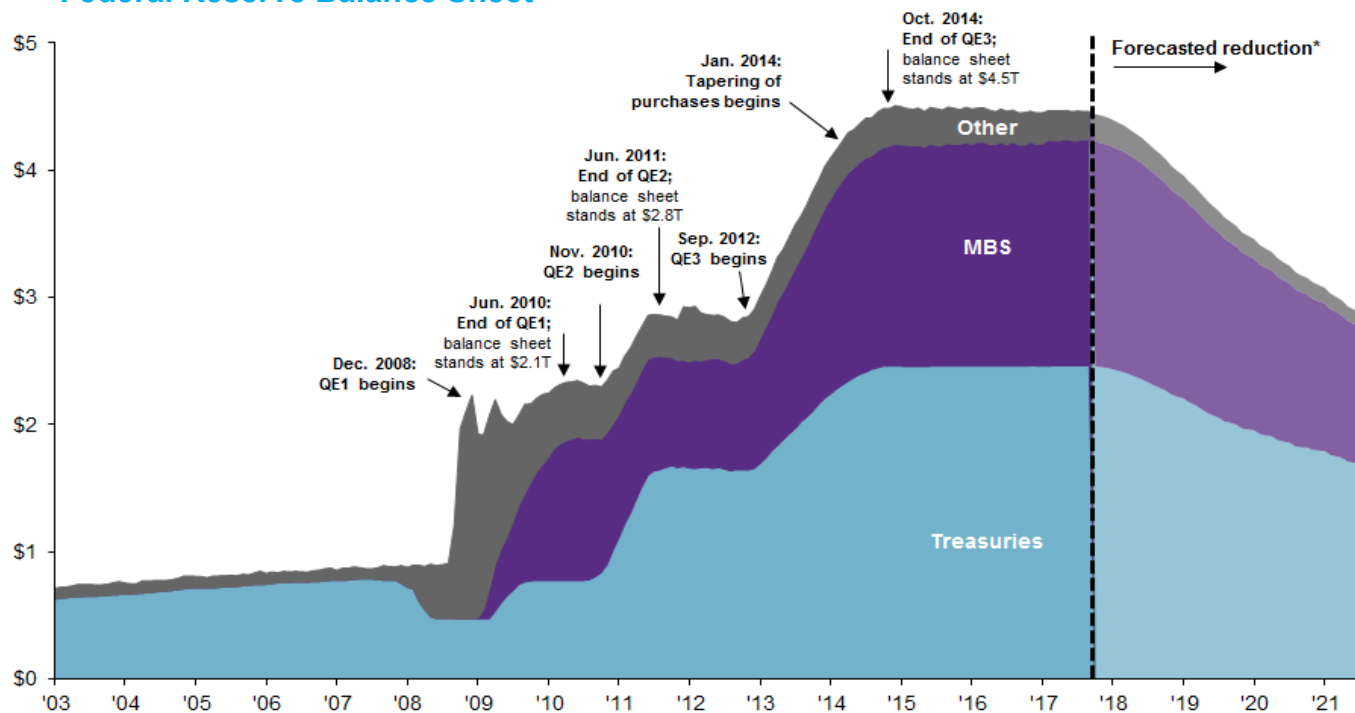
#### Quantitative Tightening Refresh:

Since the Financial Crisis, the Fed accumulated approximately \$4.5 trillion in assets, mainly composed of US Treasuries and mortgage-backed securities ("MBS"), from their large-scale asset purchasing program, Quantitative Easing.

In October 2017, the Fed began Quantitative Tightening to reduce the size of their balance sheet. Maturing securities were no longer being replaced to remain on the balance sheet, resulting in an "auto-pilot" roll-off of \$50 billion per month.

- Quantitative Easing was unprecedented monetary policy, and the unwinding of that policy, Quantitative Tightening, will be unprecedented as well.

### Federal Reserve Balance Sheet



Source: JP Morgan *Guide to the Markets* 3Q 2017.

### Federal Funds Rate Expectations<sup>1</sup>

	2019	2020
FOMC Yr-End Est.	2.88%	3.13%
Market Expectations <sup>1</sup>	2.53%	2.39%
<b>Federal Funds Rate (12/31/2018)</b>	<b>2.40%</b>	
<b>FOMC Long-Run Projection</b>	<b>2.75%</b>	

<sup>1</sup>Per JP Morgan, data as of 12/19/18.  
Source: JP Morgan *Guide to the Markets* 1Q 2019.



# Annual Asset Class Performance

As of December 31, 2018

Calendar Year Performance												Annualized Statistics (01/2006 - 12/2018)			
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	CYTD (As of 12/18)		Return	Standard Deviation	Sharpe Ratio
Best ↑ ↓ Worst	5.24	78.79	35.17	15.99	18.64	38.82	14.07	15.02	21.95	27.19	12.32	US Equity Custom Index - US All Cap	7.63	14.19	0.51
	3.06	49.13	26.85	14.47	16.83	32.39	13.88	13.33	21.31	21.83	8.35	S&P 500 Index - US Large Cap	7.75	14.14	0.52
	-5.22	45.12	21.74	14.26	16.76	32.39	13.69	5.65	13.11	21.13	6.72	Russell 2000 Index - US Small Cap	6.93	18.87	0.39
	-6.46	45.01	16.77	11.11	16.35	29.75	12.50	5.47	12.74	17.52	1.87	International Equity Custom Index - International	2.64	17.02	0.17
	-10.01	32.46	16.36	7.84	16.00	24.96	11.82	1.38	11.96	15.21	0.18	Cambridge US PE Index - Private Equity	12.00	9.63	1.11
	-21.37	27.17	15.68	3.49	16.00	21.08	11.22	0.55	10.69	14.65	0.01	NCREIF ODCE Index - Core Real Estate	6.92	8.15	0.72
	-22.61	26.46	15.06	2.11	14.96	15.29	9.42	0.48	10.44	13.70	-0.59	NCREIF Property Index - Value-Added Real Estate	7.63	6.10	1.05
	-23.62	26.46	15.06	2.11	13.36	13.94	7.66	0.18	9.94	9.11	-4.09	HFRI FOF Comp Index	2.04	5.09	0.19
	-26.11	21.98	14.99	0.66	10.94	10.98	5.97	-0.27	8.77	7.77	-4.25	ICE BofAML All Cnvrts Index (All Qual) - Convertibles	6.95	11.72	0.53
	-33.79	13.41	13.11	-1.16	10.77	8.96	4.89	-1.47	7.97	7.62	-4.38	S&P U.S. Preferred Stock Index	4.45	16.93	0.27
	-35.73	11.47	10.82	-1.75	10.54	4.22	3.37	-3.24	4.50	6.96	-5.24	S&P MLP Index (TR)	6.64	18.80	0.37
	-37.00	5.93	9.28	-4.18	4.95	0.12	2.95	-4.41	2.65	5.20	-6.21	Bloomberg US Agg Bond Index - Fixed Income	3.94	3.14	0.87
	-37.00	1.17	6.54	-5.18	4.79	-0.17	0.18	-5.66	1.94	3.54	-11.01	Credit Custom Index - Fixed Income	5.04	6.53	0.60
	-37.46	-16.85	5.70	-5.72	4.21	-2.02	-3.87	-14.92	0.51	0.84	-11.67	JPM GBI-EM Gbl Dvfd Index (USD) - EMD	4.67	12.43	0.34
	-43.06	-29.76	0.73	-13.71	0.26	-8.98	-5.72	-35.07	0.38	-5.58	-14.20	JP Morgan Cash Custom Index - Cash Equiv	1.50	0.57	1.25

The Cambridge US Private Equity Index is shown for informational purposes only. Due to availability of data, current quarter performance assumes a 0.00% return. Calculations are based on a quarterly periodicity.

## ASSET CLASS SUMMARY

**US Equity:** The **US Equity** structure employs a core-satellite approach, which gains passive, low-cost beta exposure at its core and active management only where the highest conviction strategies can add value – All Cap. The core component of the portfolio utilizes passive management coupled with low beta, minimum volatility strategies that are intended to outperform a market-capitalization weighted index at a similar absolute risk level. Active management in the All Cap space provides investment managers the flexibility to adjust for valuations across market capitalizations. The single Small Cap investment manager is an exchange-traded fund designed to track the Small Cap market benchmark.

**International Equity:** The **International Equity** structure follows an ACWI Ex US approach, which offers coverage of the broad international equity market, including developed and emerging markets. The International Equity portfolio is comprised of both passive and active management styles. The mix of passive and active management helps to minimize costs, while striving to maximize the probability of alpha generation at a similar absolute risk level.

**Private Equity:** The **Private Equity** asset class has primarily been accessed through fund of funds and customized fund of one structures. Investments also include exposure to direct co-investments and secondaries. Recent commitments within this asset class have added global diversification to the portfolio.

**Real Estate:** The **Real Estate** portfolio currently consists of Core and Non-Core Real Estate investments. The overall asset class structure has remained relatively conservative with regard to asset types and the use of financial leverage. Core Real Estate has historically been focused on diversified US markets, while Non-Core Real Estate investments allow the portfolio to take advantage of real estate market fundamentals. Recent commitments within Non-Core Real Estate have added global diversification through European-focused investments.

**Diversified Hedge Funds:** The **Diversified Hedge Funds** structure historically consisted of multi-Hedge Fund of Fund investments. In 2015, the portfolio began a transition to a core-satellite approach, utilizing a single Fund of Fund manager and satellite direct Hedge Funds. Initial funding was completed in July 2018 for a custom fund of one, consisting of a discretionary multi-strategy FoF portfolio and a non-discretionary portfolio of direct hedge funds managed by the Treasurer's Office. An increase in the use of direct Hedge Funds is anticipated to lower external management expenses and allow for greater control over the program.

**Convertible Bonds:** The **Convertible Bonds** portfolio consists of a single, specialized investment manager. The portfolio focuses on convertible issuers that demonstrate the ability to improve fundamental characteristic and attempts to participate in the majority of the upside, while limiting the downside of the underlying equity to nearly half.

**Preferred Stock:** The **Preferred Stock** portfolio consists of a single, specialized preferred stock investment manager. The portfolio invests in a diversified portfolio of preferred securities including exchange-traded and over-the-counter preferreds and contingent convertibles (CoCos). The investment team seeks to take advantage of the various term structures of preferreds in order to optimize the yield and interest rate sensitivity of the portfolio.

**MLPs:** The **MLPs** portfolio consists of a single, specialized investment manager. The portfolio investment objective is to deliver both high yield and stable growth through the disciplined application of its fundamental bottom-up analysis as well as its trading strategies and investments in MLP and energy infrastructure assets.

**Fixed Income:** The **Fixed Income** portfolio employs a core-satellite approach. Serving as “the anchor” to the portfolio, Core Fixed Income aims to preserve capital, by providing relatively “safe” investments and stable income. The Internally Managed Portfolio also provides liquidity and safety of capital. Treasury Inflation Protected Securities (“TIPS”) provide passive protection against expected changes in inflation. The satellite portfolios serve as dedicated specialists. Credit Fixed Income provides diversification from traditional fixed income investments and the potential for enhanced return. The custom credit portfolios are largely driven by allocations to bank loans, high yield fixed income securities, and investment grade credit. Investments in Emerging Market Debt (Local Currency) diversify US Dollar exposure and provide opportunities to capitalize on global growth trends. Opportunistic Fixed Income is employed to capitalize on severe market dislocations, such as European Debt.

## INDEX GLOSSARY

**MSCI ACW:** The **MSCI All Country World Index** is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets. The index consists of the 23 developed countries that make up the MSCI World Index as well as the following emerging market countries: *Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Russia, Qatar, South Africa, Taiwan, Thailand, Turkey, and United Arab Emirates.*

**Russell 3000:** The **Russell 3000 Index** is a market-capitalization weighted index of 3,000 widely held equity securities designed to measure performance of the entire US stock market.

**US Equity Custom Index:** The **US Equity Custom Index** consists of the S&P 500 Index (Cap Wtd) through September 2014 and the Russell 3000 Index thereafter.

**State Street All Cap Custom Index:** The **State Street All Cap Custom Index** consists of 69% Russell 3000 Index, 24% FTSE RAFI US 1000 Index, and 7% MSCI USA Minimum Volatility Index.

**S&P 500:** The **S&P 500 Index (Cap Wtd)** is a commonly recognized, market-capitalization weighted index of 500 widely held equity securities designed to measure broad US equity performance.

**Russell 2000:** The **Russell 2000 Index** measures the performance of the small-cap segment of the US equity market. It includes approximately 2,000 of the smallest securities by market cap from the Russell 3000 Index.

**International Equity Custom Index:** The **International Equity Custom Index** consists of the MSCI EAFE Index through July 2010 and the MSCI ACW Ex US Index thereafter.

**MSCI EAFE:** The **MSCI EAFE (Europe, Australasia, Far East) Index** is designed to measure equity market performance of 21 developed countries, excluding the US & Canada: *Australia, Austria, Belgium, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and the United Kingdom.*

**MSCI ACW Ex US:** The **MSCI ACW (All Country World) Ex US Index** consists of large cap and mid cap representation within the same countries that comprise the MSCI ACW Index, excluding the United States.

**MSCI ACW Ex US IM:** The **MSCI ACW (All Country World) Ex US Investable Market Index** consists of large cap, mid cap, and small cap representation within the same countries that comprise the MSCI ACW Index, excluding the United States.

**FTSE All World Ex US:** The **FTSE All World Ex US Index** is a free float-adjusted market capitalization weighted index that is comprised of large- and mid-cap stocks providing coverage of Developed and Emerging Markets excluding the US. The index is derived from the FTSE Global Equity Index Series (GEIS), which covers 98% of the world's investable market capitalization.

**S&P US Preferred Stock:** The **S&P US Preferred Stock Index** covers the US market of capital stock that pays dividends at a specified rate and has a preference over common stock in the payment of dividends and the liquidation of assets.

**S&P MLP:** The **S&P MLP Index** is a float-adjusted, cap-weighted index of energy MLPs and publicly traded limited liability companies, which have a similar legal structure to MLPs and share the same tax benefits. Constituents must have a minimum float-adjusted market cap of USD 300 million.

**ICE BofAML All Convertibles:** The **ICE BofA Merrill Lynch All Convertibles Index (All Qualities)** is a market capitalization-weighted index of domestic corporate convertible securities that are convertible to common stock.

**NCREIF ODCE:** The **NCREIF ODCE (Open End Diversified Core) Index** is an index of investment returns reporting on both a historical and current basis the results of 36 open-end commingled funds pursuing a core investment strategy, some of which have performance histories dating back to the 1970s. The NCREIF ODCE Index is capitalization-weighted and performance is time-weighted.

**NCREIF Property:** The **NCREIF Property Index** prepared by the National Council of Real Estate Investment Fiduciaries is a quarterly time series composite return measure for over 6,000 individual commercial real estate properties acquired in the private market for investment purposes. Total performance represents returns from appreciation and income, and includes multi-family, office, retail, and industrial properties.

**HFRI FOF Comp Index:** The **HFRI FOF (Fund of Funds) Comp Index** average is created by Hedge Fund Research, Inc. and contains over 800 funds of hedge funds that are each invested in multiple investment strategies.

**Bloomberg US Agg Bond:** The **Bloomberg US Aggregate Bond Index** covers the US dollar-denominated, investment-grade, fixed-rate, taxable bond market of SEC-registered securities: US Treasury and agency bonds, domestic corporate debt, and mortgage-backed securities.

**Bloomberg US Agg Int Index:** The **Bloomberg US Aggregate Intermediate Index** covers the subsection of the Bloomberg US Aggregate Bond Index with remaining maturities between one and ten years.

**C.S. McKee Custom Index:** The **C.S. McKee Custom Index** consists of the Bloomberg US Agg Bond Index through January 2018 and the Bloomberg US Agg Int Index thereafter.

**PIMCO Custom Index:** The **PIMCO Custom Index** consists of the Bloomberg US Agg Bond Index through February 2018 and the Bloomberg US Agg Int Index thereafter.

**Credit Custom Index:** The **Credit Custom Index** consists of 20% Bloomberg US Credit Index, 20% ICE BofA Merrill Lynch US High Yield Master II Constrained Index, and 60% S&P/LSTA Leveraged Loan Index.

**S&P/LSTA Leveraged Loan:** The **S&P/LSTA Leveraged Loan Index** reflects the market-weighted performance of institutional leveraged loans in the US loan market.

**CS Western European Hi Yld:** The **Credit Suisse Western European High Yield Index** is designed to mirror the investable universe of the Western European high yield debt market. The index includes issues denominated in \$US and Western European currencies.

**JPMorgan GBI-EM Gbl Dv'd:** The **JPMorgan GBI-EM Global Diversified Total Return Index (Unhedged)** is a global emerging markets index that consists of regularly traded, liquid fixed-rate, domestic currency government bonds.

**Bloomberg US Trsy: US TIPS:** The **Bloomberg US Treasury: US TIPS Index** is an unmanaged index that consists of inflation-protected securities issued by the US Treasury.

**Bloomberg US Govt/Credit: Long Trm Bond:** The **Bloomberg US Gov't/Credit Long Term Bond Index** covers the non-securitized component of the US Aggregate Index, with maturities of 10 years or more. It includes investment grade, US dollar-denominated, fixed-rate Treasuries, government-related and corporate securities.

**Bloomberg US Govt: Long Trm Bond:** The **Bloomberg US Gov't Long Term Bond Index** covers public US government obligations with remaining maturities of ten years or more.

**Bloomberg US Credit: Long Trm Bond:** The **Bloomberg US Credit Long Term Bond Index** covers public US investment grade corporate bonds with remaining maturities of ten years or more.

**Bloomberg US Govt: Int Trm Bond:** The **Bloomberg US Gov't Intermediate Term Bond Index** covers public US government obligations with remaining maturities between one and ten years.

**Bloomberg US Corp Int Trm Bond:** The **Bloomberg US Corporate Intermediate Term Bond Index** covers US investment grade corporate bonds with remaining maturities between one and ten years.

**Bloomberg US Gov't/Credit 1-3 Yr Bond Index:** The **Bloomberg US Gov't/Credit 1-3 Year Bond Index** covers all medium and larger issues of U.S. government, investment-grade corporate, and investment-grade international dollar-denominated bonds that have maturities of between one and three years and are publicly issued.

**Bloomberg US Gov't 1-3 Yr Bond Index:** The **Bloomberg US Gov't 1-3 Year Bond Index** covers public US government obligations with remaining maturities between one and three years.

**Bloomberg US Credit 1-3 Yr Bond Index:** The **Bloomberg US Credit 1-3 Year Bond Index** covers public investment-grade corporate, and investment-grade international dollar-denominated bonds that have maturities of between one and three years.

**JP Morgan Blended Index:** The **JP Morgan Blended Index** consists of an equal-weighted allocation to the ICE BofAML 1-3 Year US Treasury Index, ICE BofAML 1-3 Year Agencies Index, and ICE BofAML 0-3 Year Weighted Average Life Mortgage Index.

## Total Fund Performance

	Allocation		Performance (%)							
	Market Value (\$)	%	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years
<b>Total Fund</b>	<b>20,153,521,320</b>	<b>100.0</b>	<b>-2.6</b>	<b>-1.4</b>	<b>-1.4</b>	<b>-1.4</b>	<b>4.1</b>	<b>3.4</b>	<b>4.4</b>	<b>5.6</b>
Wyoming State Actual Allocation Index			-2.3	-1.3	-1.5	-1.5	3.7	3.4	4.3	5.0
Difference			-0.3	-0.1	0.1	0.1	0.4	0.0	0.1	0.6
<b>Permanent Funds</b>	<b>14,444,731,858</b>	<b>71.7</b>	<b>-3.7</b>	<b>-2.4</b>	<b>-2.5</b>	<b>-2.5</b>	<b>4.6</b>	<b>3.7</b>	<b>5.4</b>	<b>6.4</b>
<b>Non-Permanent Funds</b>	<b>5,708,789,462</b>	<b>28.3</b>	<b>0.0</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>2.5</b>	<b>2.2</b>	<b>2.1</b>	<b>3.6</b>

## Asset Class Performance

	Allocation		Performance (%)					
	Market Value (\$M)	%	QTD	FYTD	1 Year	3 Years	5 Years	10 Years
US Equity	1,401	7.0	-14.6	-9.1	-7.6	7.6	7.0	12.9
US Equity Custom Index			-14.3	-8.2	-5.2	9.0	8.2	12.9
Difference			-0.3	-0.9	-2.4	-1.4	-1.2	0.0
Int'l Equity	1,824	9.1	-12.1	-11.1	-14.7	4.1	0.5	6.3
Int'l Equity Custom Index			-11.5	-10.8	-14.2	4.5	0.7	5.7
Difference			-0.6	-0.3	-0.5	-0.4	-0.2	0.6
Hybrid Assets	899	4.5	-13.7	-11.0	N/A	N/A	N/A	N/A
Private Equity	586	2.9	N/A	N/A	N/A	N/A	N/A	N/A
Core Real Estate	634	3.1	1.7	3.4	7.7	7.3	9.4	5.8
NCREIF ODCE Index (AWA)			1.5	3.4	7.4	7.3	9.4	6.0
Difference			0.2	0.0	0.3	0.0	0.0	-0.2
Value-Added Real Estate	294	1.5	N/A	N/A	N/A	N/A	N/A	N/A
Diversified Hedge Funds	469	2.3	-2.3	-2.0	-0.8	1.5	1.3	4.8
HFRI FOF Comp Index			-5.0	-4.8	-4.1	1.3	1.4	3.1
Difference			2.7	2.8	3.3	0.2	-0.1	1.7
Core Fixed Income	4,817	23.9	1.5	1.7	0.5	2.3	2.6	N/A
BB US Agg Bond Index			1.6	1.7	0.0	2.1	2.5	3.5
Difference			-0.1	0.0	0.5	0.2	0.1	N/A
Credit Fixed Income	1,702	8.4	-3.1	-1.4	-1.1	4.3	3.0	N/A
Credit Custom Index			-3.0	-1.3	-0.6	5.0	3.3	8.5
Difference			-0.1	-0.1	-0.5	-0.7	-0.3	N/A
Opportunistic Fixed Income	222	1.1	-1.1	0.9	4.1	7.4	N/A	N/A
CS Western Euro Hi Yld Index			-3.3	-1.0	-1.1	6.1	4.9	12.8
Difference			2.2	1.9	5.2	1.3	N/A	N/A
EMD (Local)	366	1.8	1.1	-1.7	-9.1	4.3	-2.1	N/A
JPM GBI-EM Gbl Dvf'd Index			2.1	0.2	-6.2	5.9	-1.0	3.5
Difference			-1.0	-1.9	-2.9	-1.6	-1.1	N/A
TIPS	710	3.5	-0.5	-1.4	-1.5	2.2	1.8	N/A
BB US TIPS Index (Series B)			-0.5	-1.4	-1.5	2.2	1.8	3.6
Difference			0.0	0.0	0.0	0.0	0.0	N/A

## Market Value by Investment Pool

	Market Value (\$)	Allocation (%)
Permanent Mineral Trust	7,603,910,667	37.7
Common School Permanent Land Fund	3,908,617,817	19.4
Permanent Land Fund	186,630,512	0.9
University Permanent Land Fund	22,381,033	0.1
Hathaway Scholarship	565,450,818	2.8
Higher Education	115,224,236	0.6
Workers Compensation Fund	2,042,516,777	10.1
Pool A	243,608,717	1.2
State Agency Pool	5,465,180,745	27.1

## Schedule of Inv. Assets - Total Fund Ex Public Purpose Investments

Period Ending	Beginning MV (\$)	Net Cash Flow (\$)	Gain/Loss (\$)	Ending MV (\$)	% Return
FYTD	20,275,652,821	-257,688,932	-282,245,801	19,735,718,088	-1.4

## Asset Class Performance (Cont.)

	Allocation		Performance (%)					
	Market Value (\$M)	%	QTD	FYTD	1 Year	3 Years	5 Years	10 Years
Long Duration Fixed Income	567	2.8	N/A	N/A	N/A	N/A	N/A	N/A
BB US Gov't Crdt LT Index			0.8	0.3	-4.7	4.0	5.4	5.9
Difference			N/A	N/A	N/A	N/A	N/A	N/A
Int. Gov't Fixed Income	1,871	9.3	1.9	2.0	1.8	1.5	2.3	2.2
BB US Gov't Int Trm Index			2.2	2.1	1.4	1.2	1.5	1.8
Difference			-0.3	-0.1	0.4	0.3	0.8	0.4
Low Duration Fixed Income	1,507	7.5	N/A	N/A	N/A	N/A	N/A	N/A
BB US Gov't Crdt 1-3 Yr Index			1.2	1.5	1.6	1.2	1.0	1.5
Difference			N/A	N/A	N/A	N/A	N/A	N/A
Cash Equivalents	1,866	9.3	0.6	1.1	1.9	1.1	0.7	0.6
JPM Cash Custom Index			0.7	1.1	1.9	1.0	0.7	0.6
Difference			-0.1	0.0	0.0	0.1	0.0	0.0
Public Purpose Investments	418	2.1	N/A	N/A	N/A	N/A	N/A	N/A

Performance shown is net of fees and excludes Public Purpose Investments. Pooled investment performance and market values shown reflect State Agency participation and are calculated on a capital-weighted basis using beginning-period allocations. Hybrid Assets includes preferred stock, convertibles, and MLPs. Performance for Private Equity and Value-Added Real Estate is calculated on an IRR basis.



Wyoming State Treasurer's Office  
Asset Allocation & Performance

As of December 31, 2018

	Allocation		Performance (%)									
	Market Value (\$)	%	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years	Since Incep.	Inception Date
<b>Permanent Funds</b>	<b>14,444,731,858</b>	<b>71.7</b>	<b>-3.7</b>	<b>-2.4</b>	<b>-2.5</b>	<b>-2.5</b>	<b>4.6</b>	<b>3.7</b>	<b>5.4</b>	<b>6.4</b>	<b>5.7</b>	<b>07/01/2002</b>
<b>Permanent Mineral Trust</b>	<b>7,603,910,667</b>	<b>37.7</b>	<b>-4.1</b>	<b>-2.7</b>	<b>-2.7</b>	<b>-2.7</b>	<b>4.7</b>	<b>3.8</b>	<b>5.6</b>	<b>6.5</b>	<b>5.7</b>	<b>06/01/2001</b>
Permanent Mineral Trust - Actual Allocation Index			-4.0	-2.6	-2.6	-2.6	4.5	3.9	5.5	6.0	5.1	
Difference			-0.1	-0.1	-0.1	-0.1	0.2	-0.1	0.1	0.5	0.6	
<b>Common School Permanent Land Fund</b>	<b>3,908,617,817</b>	<b>19.4</b>	<b>-4.0</b>	<b>-2.7</b>	<b>-2.7</b>	<b>-2.7</b>	<b>4.7</b>	<b>3.9</b>	<b>5.7</b>	<b>6.7</b>	<b>5.9</b>	<b>06/01/2001</b>
Common School - Actual Allocation Index			-3.8	-2.5	-2.6	-2.6	4.5	4.0	5.6	6.0	5.1	
Difference			-0.2	-0.2	-0.1	-0.1	0.2	-0.1	0.1	0.7	0.8	
<b>Permanent Land Fund</b>	<b>186,630,512</b>	<b>0.9</b>	<b>-3.8</b>	<b>-2.5</b>	<b>-2.5</b>	<b>-2.5</b>	<b>4.7</b>	<b>3.8</b>	<b>5.5</b>	<b>6.3</b>	<b>4.9</b>	<b>02/01/2006</b>
Permanent Land Fund - Actual Allocation Index			-3.7	-2.4	-2.4	-2.4	4.5	3.9	5.4	5.8	4.5	
Difference			-0.1	-0.1	-0.1	-0.1	0.2	-0.1	0.1	0.5	0.4	
<b>University Permanent Land Fund</b>	<b>22,381,033</b>	<b>0.1</b>	<b>-4.8</b>	<b>-3.0</b>	<b>-2.7</b>	<b>-2.7</b>	<b>5.2</b>	<b>4.1</b>	<b>5.7</b>	<b>6.4</b>	<b>4.8</b>	<b>05/01/2006</b>
University PLF - Actual Allocation Index			-4.6	-2.8	-2.4	-2.4	5.0	4.2	5.7	6.1	4.6	
Difference			-0.2	-0.2	-0.3	-0.3	0.2	-0.1	0.0	0.3	0.2	
<b>Hathaway Scholarship</b>	<b>565,450,818</b>	<b>2.8</b>	<b>-3.9</b>	<b>-2.7</b>	<b>-3.1</b>	<b>-3.1</b>	<b>4.1</b>	<b>3.4</b>	<b>4.9</b>	<b>6.2</b>	<b>4.8</b>	<b>09/01/2007</b>
Hathaway Scholarship - Actual Allocation Index			-3.8	-2.5	-2.9	-2.9	4.0	3.6	4.9	5.7	4.6	
Difference			-0.1	-0.2	-0.2	-0.2	0.1	-0.2	0.0	0.5	0.2	
<b>Higher Education</b>	<b>115,224,236</b>	<b>0.6</b>	<b>-4.1</b>	<b>-3.0</b>	<b>-3.4</b>	<b>-3.4</b>	<b>4.0</b>	<b>3.3</b>	<b>4.8</b>	<b>6.2</b>	<b>4.7</b>	<b>09/01/2007</b>
Higher Education - Actual Allocation Index			-3.9	-2.7	-3.1	-3.1	3.9	3.5	4.8	5.7	4.6	
Difference			-0.2	-0.3	-0.3	-0.3	0.1	-0.2	0.0	0.5	0.1	
<b>Workers Compensation Fund</b>	<b>2,042,516,777</b>	<b>10.1</b>	<b>-1.4</b>	<b>-0.5</b>	<b>-0.9</b>	<b>-0.9</b>	<b>3.9</b>	<b>3.2</b>	<b>4.2</b>	<b>5.8</b>	<b>5.2</b>	<b>06/01/2001</b>
Workers Compensation - Actual Allocation Index			-1.1	-0.3	-1.0	-1.0	3.6	3.3	4.1	5.2	4.9	
Difference			-0.3	-0.2	0.1	0.1	0.3	-0.1	0.1	0.6	0.3	
<b>Non-Permanent Funds</b>	<b>5,708,789,462</b>	<b>28.3</b>	<b>0.0</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>2.5</b>	<b>2.2</b>	<b>2.1</b>	<b>3.6</b>	<b>3.7</b>	<b>07/01/2002</b>
<b>Pool A</b>	<b>243,608,717</b>	<b>1.2</b>	<b>-0.4</b>	<b>0.1</b>	<b>-0.4</b>	<b>-0.4</b>	<b>2.5</b>	<b>2.4</b>	<b>2.4</b>	<b>4.2</b>	<b>4.1</b>	<b>01/01/2000</b>
Pool A - Actual Allocation Index			-0.2	-0.1	-1.4	-1.4	1.7	2.3	2.0	3.4	4.8	
Difference			-0.2	0.2	1.0	1.0	0.8	0.1	0.4	0.8	-0.7	
<b>State Agency Pool</b>	<b>5,465,180,745</b>	<b>27.1</b>	<b>0.1</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>2.5</b>	<b>2.2</b>	<b>2.1</b>	<b>3.6</b>	<b>3.9</b>	<b>06/01/2001</b>
State Agency Pool - Actual Allocation Index			0.1	0.4	-0.4	-0.4	1.8	2.1	1.8	3.0	3.7	
Difference			0.0	0.2	1.0	1.0	0.7	0.1	0.3	0.6	0.2	
<b>Total Fund</b>	<b>20,153,521,320</b>	<b>100.0</b>	<b>-2.6</b>	<b>-1.4</b>	<b>-1.4</b>	<b>-1.4</b>	<b>4.1</b>	<b>3.4</b>	<b>4.4</b>	<b>5.6</b>	<b>5.3</b>	<b>10/01/1996</b>
Wyoming State Actual Allocation Index			-2.3	-1.3	-1.5	-1.5	3.7	3.4	4.3	5.0	5.2	
Difference			-0.3	-0.1	0.1	0.1	0.4	0.0	0.1	0.6	0.1	

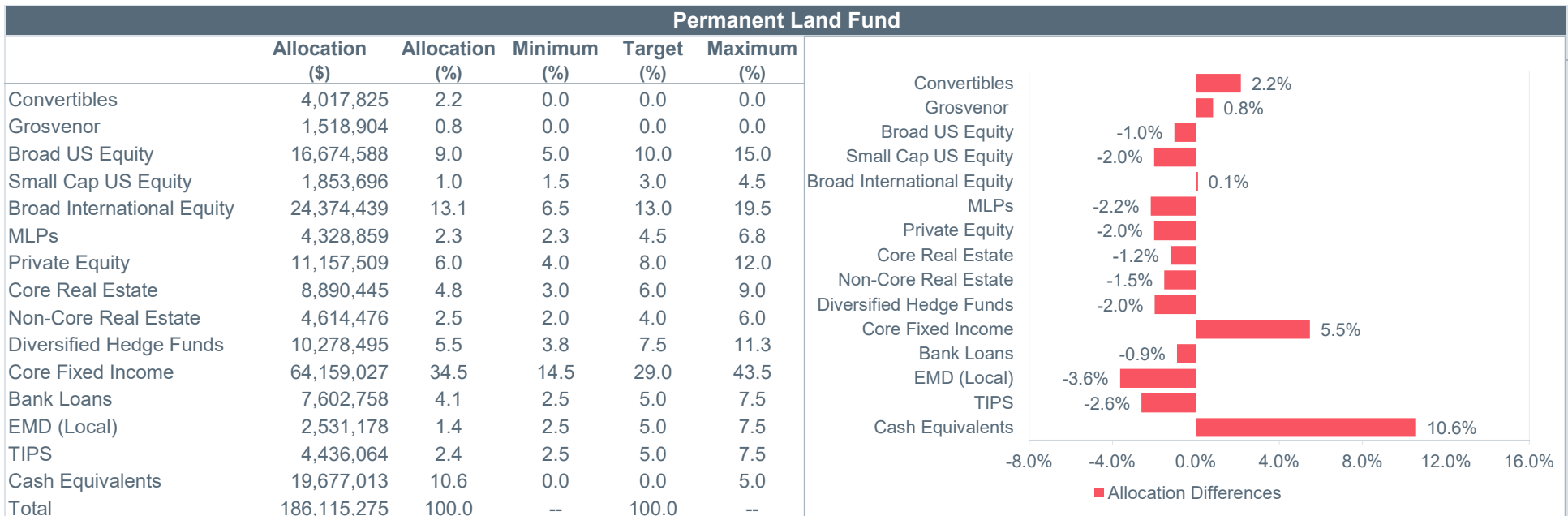
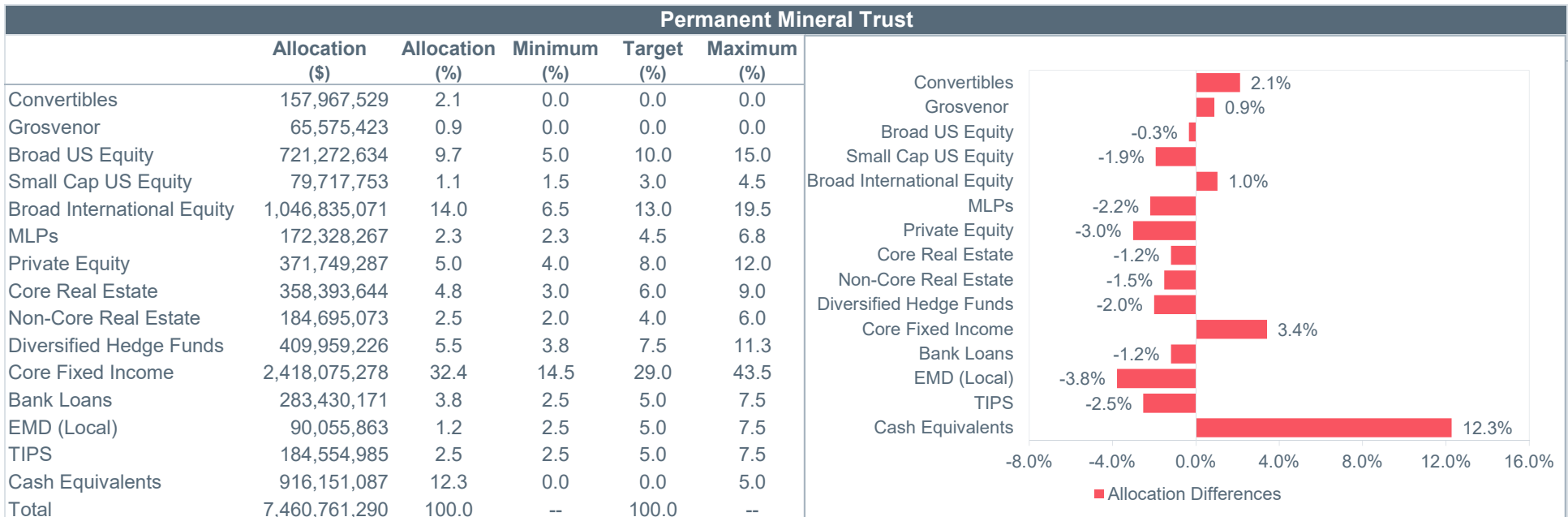
Performance shown is net of fees. Wyoming State Treasurer's Office fiscal year ends on June 30th.

Investment Profile					Long-Term Target Allocation								
<p><b>Fund Type:</b> Permanent Fund</p> <p><b>Main Objective:</b> Produce maximized long-term investment income and capital gains while providing an appropriate level of safety and liquidity.</p> <p><b>Primary Investment Goals:</b> Capital appreciation, total return, and protection against inflation. Capital preservation and liquidity are important secondary goals.</p> <p><b>Long-Term Return Expectation:</b> CPI + 3%</p> <p><b>Maximum Equity Allocation:</b> 70%</p> <p><b>Current Long-Term Target Equity Allocation:</b> 56%</p> <p><b>Spending Policy</b></p> <ul style="list-style-type: none"><li>• <b>Permanent Mineral Trust Fund:</b> 5% of the five-year trailing average market value, calculated on the first day of the fiscal year. In fiscal year 2021, the spending rate will be 4.75%. In fiscal year 2022 and thereafter, the spending rate will be 4.5%.</li><li>• <b>Hathaway Scholarship:</b> The amount necessary to fully fund scholarships awarded under W.S. 21-16-1301 <i>et seq.</i></li></ul>					Minimum Range (%)	Target (%)		Maximum Range (%)					
					Permanent Mineral Trust	-	100.00	-					
					Broad US Equity	5.00	10.00	15.00					
					Small Cap US Equity	1.50	3.00	4.50					
					International Equity	6.50	13.00	19.50					
					MLPs	2.25	4.50	6.75					
					Private Equity	4.00	8.00	12.00					
					Core Real Estate	3.00	6.00	9.00					
					Value Added Real Estate	2.00	4.00	6.00					
					Diversified Hedge Funds	3.75	7.50	11.25					
					Core Fixed Income	14.50	29.00	43.50					
					Credit Fixed Income	2.50	5.00	7.50					
					EMD	2.50	5.00	7.50					
TIPS	2.50	5.00	7.50										
Cash (inv. in SAP)	0.00	0.00	5.00										
Thematic Allocation					Risk Metrics								
					5 Years				10 Years				
					PMTF	PLF	UPLF	Hath	PMTF	PLF	UPLF	Hath	
					Sharpe Ratio	0.8	0.8	0.8	0.7	1.0	1.0	1.0	1.0
					Standard Deviation	4.1	3.9	4.5	3.8	6.2	5.9	6.1	5.6
Beta	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3					
Comparative Performance													
Allocation					Performance (%)								
	Market Value (\$)	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years				
Permanent Mineral Trust	7,603,910,667	-4.1	-2.7	-2.7	-2.7	4.7	3.8	5.6	6.5				
PMTF Actual Allocation Index		-4.0	-2.6	-2.6	-2.6	4.5	3.9	5.5	6.0				
Difference		-0.1	-0.1	-0.1	-0.1	0.2	-0.1	0.1	0.5				
Permanent Land Fund	186,630,512	-3.8	-2.5	-2.5	-2.5	4.7	3.8	5.5	6.3				
PLF Actual Allocation Index		-3.7	-2.4	-2.4	-2.4	4.5	3.9	5.4	5.8				
Difference		-0.1	-0.1	-0.1	-0.1	0.2	-0.1	0.1	0.5				
University Permanent Land Fund	22,381,033	-4.8	-3.0	-2.7	-2.7	5.2	4.1	5.7	6.4				
UPLF Actual Allocation Index		-4.6	-2.8	-2.4	-2.4	5.0	4.2	5.7	6.1				
Difference		-0.2	-0.2	-0.3	-0.3	0.2	-0.1	0.0	0.3				
Hathaway Scholarship	565,450,818	-3.9	-2.7	-3.1	-3.1	4.1	3.4	4.9	6.2				
Hathaway Actual Allocation Index		-3.8	-2.5	-2.9	-2.9	4.0	3.6	4.9	5.7				
Difference		-0.1	-0.2	-0.2	-0.2	0.1	-0.2	0.0	0.5				

Performance shown is net of fees and annualized for periods greater than one year. Wyoming State Treasurer's Office fiscal year ends on June 30th. Beta is calculated relative to the MSCI ACW Index (Net). Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding. Thematic Allocation shown represents the Permanent Mineral Trust.

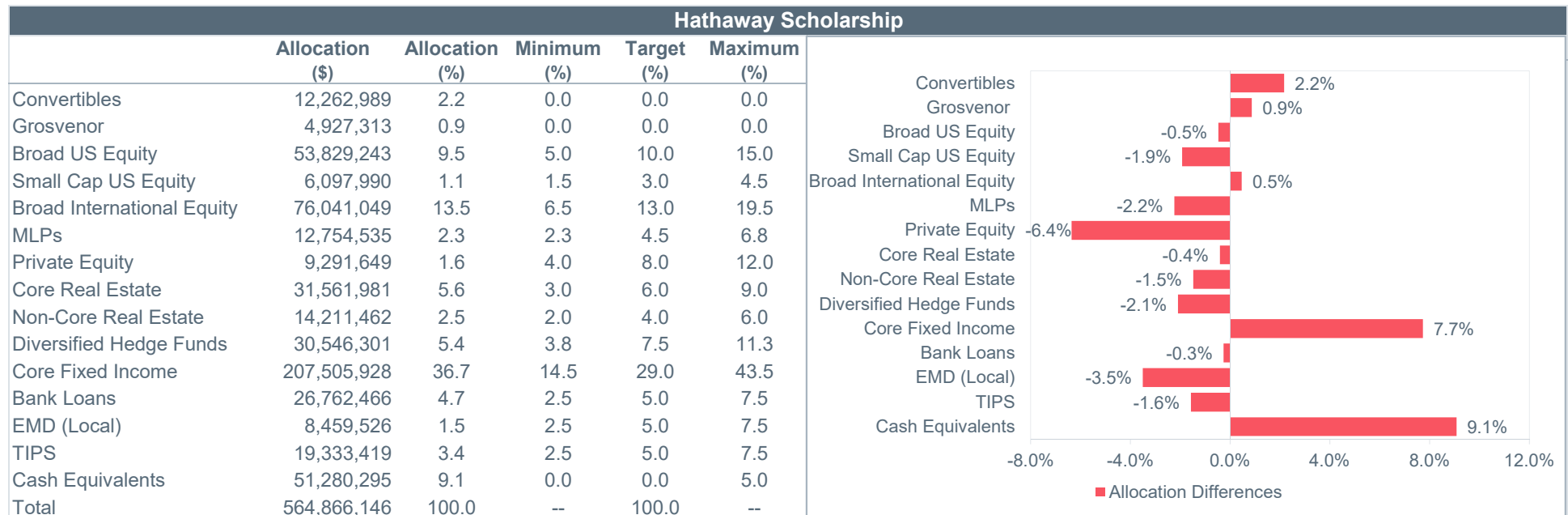
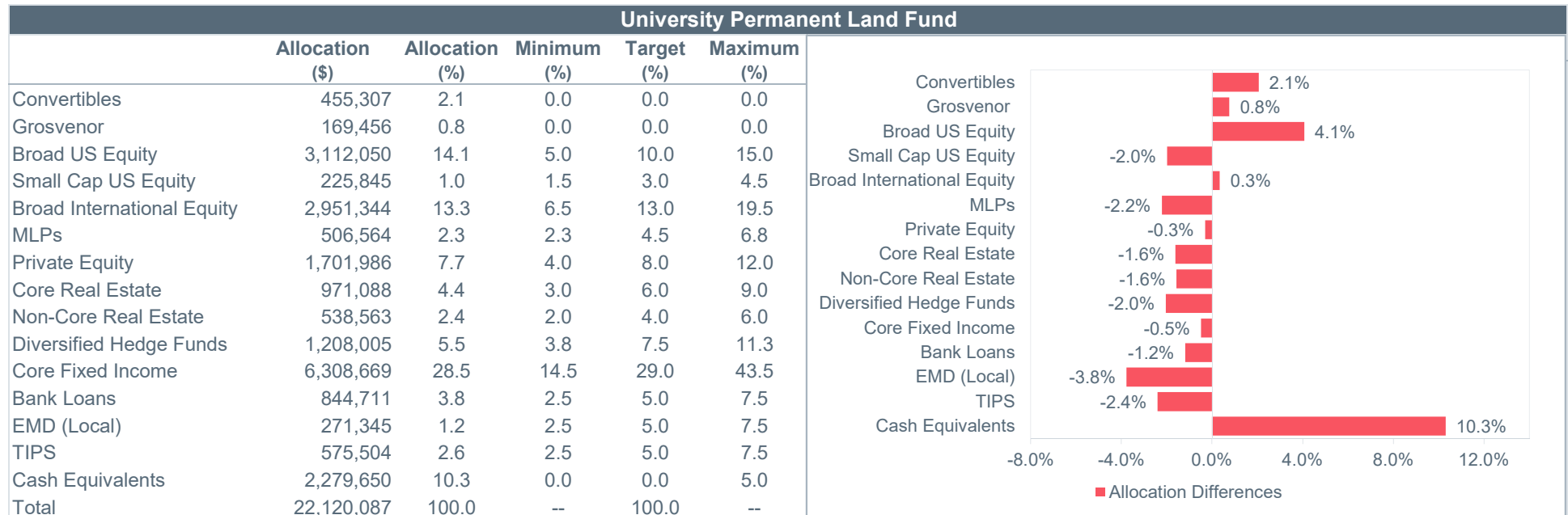
**Wyoming State Treasurer's Office**  
**Permanent Funds - Long-Term Total Return Focus**  
**Asset Allocation vs. Long-Term Target**

As of December 31, 2018

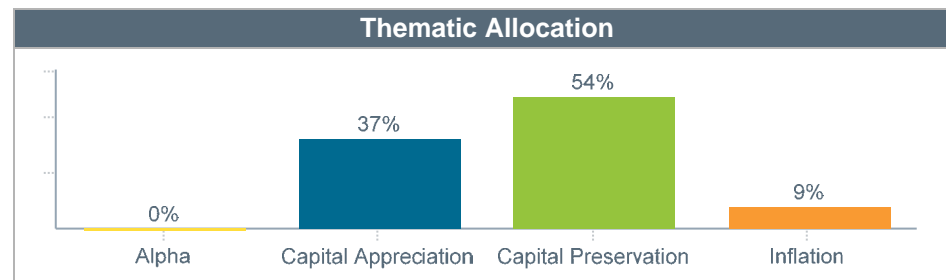


Wyoming State Treasurer's Office  
Permanent Funds - Long-Term Total Return Focus  
Asset Allocation vs. Long-Term Target

As of December 31, 2018



Investment Profile
<b>Fund Type:</b> Permanent Fund <b>Main Objective:</b> Produce maximized long-term investment income and capital gains while providing an appropriate level of safety and liquidity. <b>Primary Investment Goals:</b> Income generation, capital appreciation, total return, and protection against inflation. Capital preservation and liquidity are important secondary goals. <b>Long-Term Return Expectation:</b> CPI + 3% <b>Maximum Equity Allocation:</b> 70% <b>Current Long-Term Target Equity Allocation:</b> 44%
<b>Spending Policy</b> <ul style="list-style-type: none"> <li>• <b>Common School Permanent Land Fund:</b> 5% of the five-year trailing average market value, calculated on the first day of the fiscal year. In fiscal year 2021, the spending rate will be 4.75%. In fiscal year 2022 and thereafter, the spending rate will be 4.5%.</li> <li>• <b>Higher Education:</b> 4.75% of the five-year trailing average market value, calculated on the first day of the fiscal year.</li> </ul>

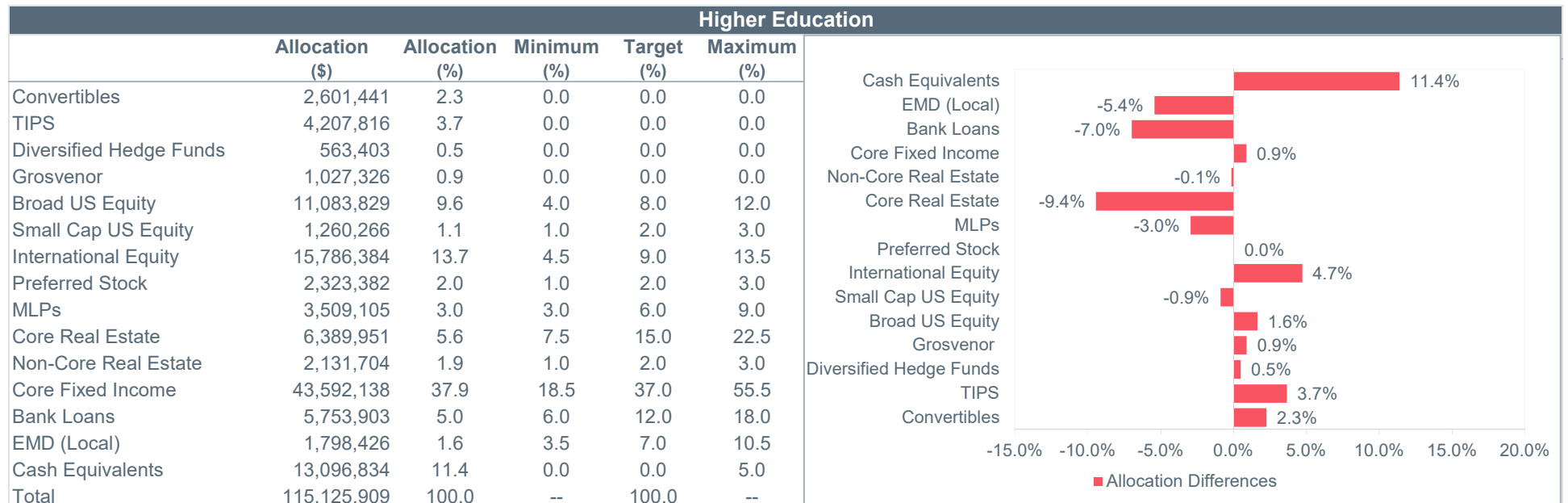
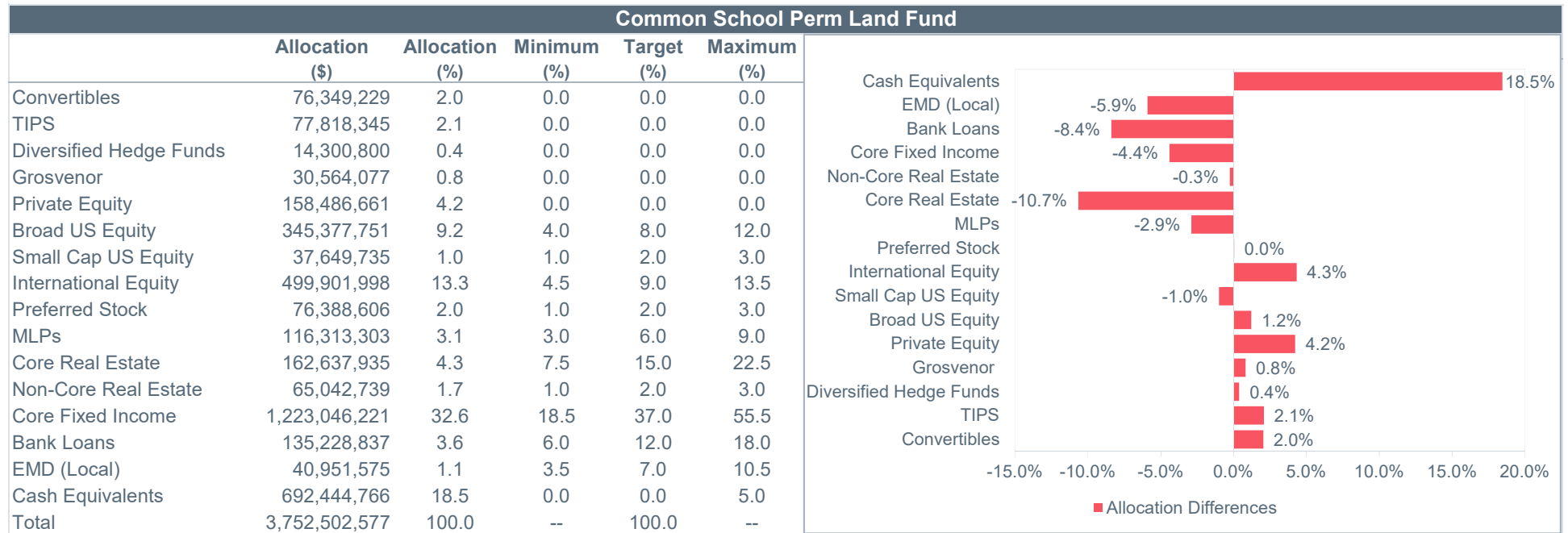


Long-Term Target Allocation			
	Minimum Range (%)	Target (%)	Maximum Range (%)
Common School PLF	-	100.00	-
Broad US Equity	4.00	8.00	12.00
Small Cap US Equity	1.00	2.00	3.00
International Equity	4.50	9.00	13.50
Preferred Stock	1.00	2.00	3.00
MLPs	3.00	6.00	9.00
Core Real Estate	7.50	15.00	22.50
Value Added Real Estate	1.00	2.00	3.00
Core Fixed Income	18.50	37.00	55.50
Credit Fixed Income	6.00	12.00	18.00
EMD	3.50	7.00	10.50
Cash (inv. in SAP)	0.00	0.00	5.00

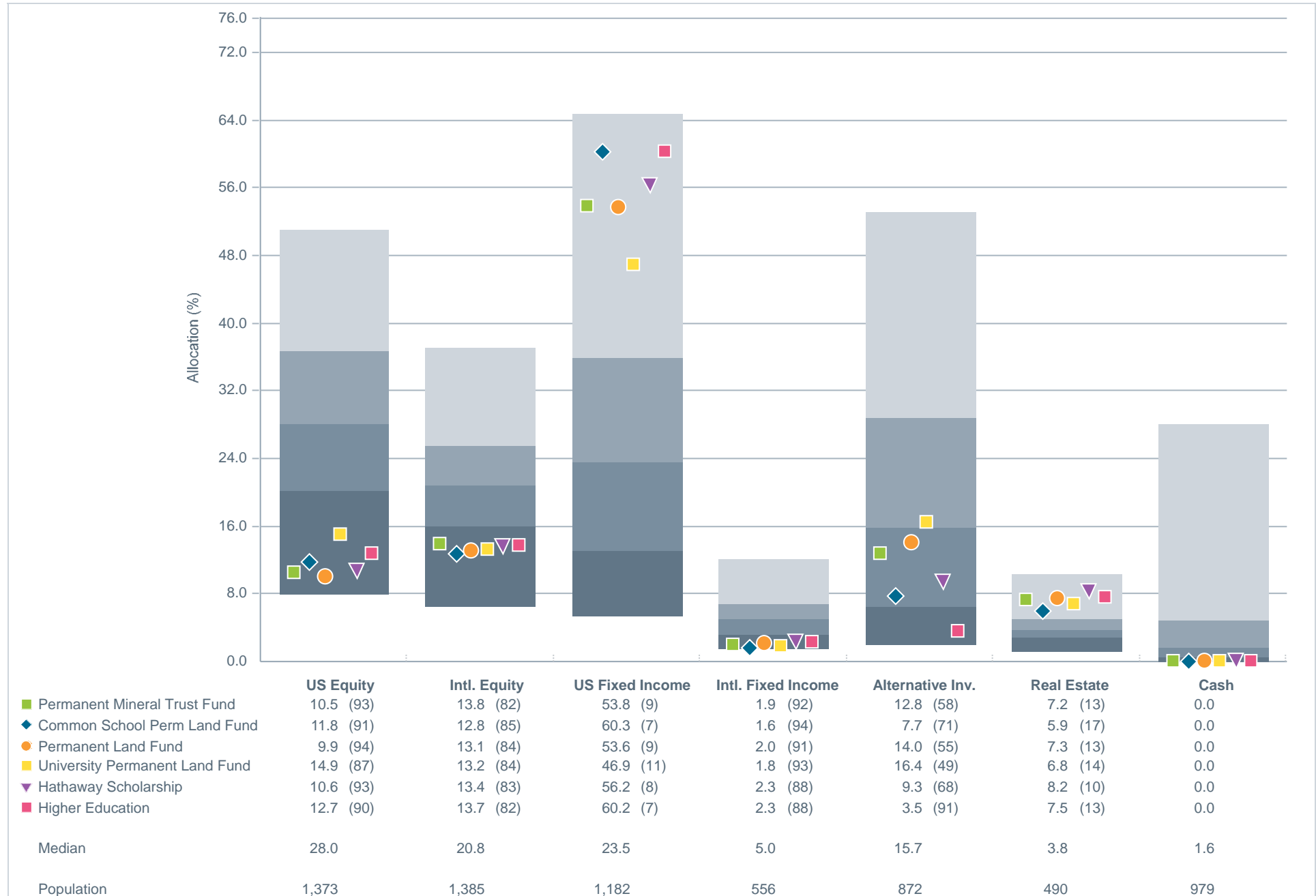
Risk Metrics				
	5 Years		10 Years	
	CSPLF	HiEd	CSPLF	HiEd
Sharpe Ratio	0.8	0.7	1.0	1.0
Standard Deviation	4.0	3.9	6.2	5.7
Beta	0.4	0.4	0.4	0.4

Comparative Performance									
	Allocation	Performance (%)							
	Market Value (\$)	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years
<b>Common School Perm Land Fund</b>	<b>3,908,617,817</b>	<b>-4.0</b>	<b>-2.7</b>	<b>-2.7</b>	<b>-2.7</b>	<b>4.7</b>	<b>3.9</b>	<b>5.7</b>	<b>6.7</b>
CSPLF - Actual Allocation Index		-3.8	-2.5	-2.6	-2.6	4.5	4.0	5.6	6.0
Difference		-0.2	-0.2	-0.1	-0.1	0.2	-0.1	0.1	0.7
<b>Higher Education</b>	<b>115,224,236</b>	<b>-4.1</b>	<b>-3.0</b>	<b>-3.4</b>	<b>-3.4</b>	<b>4.0</b>	<b>3.3</b>	<b>4.8</b>	<b>6.2</b>
Higher Education - Actual Allocation Index		-3.9	-2.7	-3.1	-3.1	3.9	3.5	4.8	5.7
Difference		-0.2	-0.3	-0.3	-0.3	0.1	-0.2	0.0	0.5

Performance shown is net of fees and annualized for periods greater than one year. Wyoming State Treasurer's Office fiscal year ends on June 30th. Beta is calculated relative to the MSCI ACW Index (Net). Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding. Thematic Allocation shown represents the Common School Permanent Land Fund.





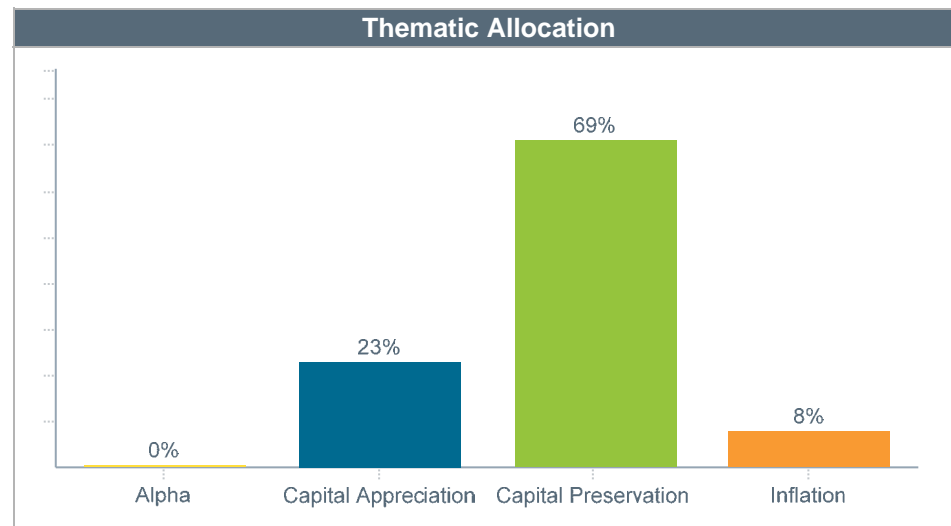


Parentheses contain percentile ranks. US Fixed Income allocation shown includes Convertibles and Cash (inv. in SAP).

Wyoming State Treasurer's Office  
Permanent Funds - Workers' Compensation Fund

As of December 31, 2018

Investment Profile
<b>Fund Type:</b> Permanent Fund <b>Main Objective:</b> Provide a return that assures the Workers' Compensation Fund will be self-funding or nearly self-funding in order to substantially reduce or eliminate the need for employer contributions. <b>Primary Investment Goals:</b> Long-term return, safety of capital, yield and capital appreciation. <b>Long-Term Return Expectation:</b> CPI + 3% <b>Maximum Equity Allocation:</b> 70% <b>Current Long-Term Target Equity Allocation:</b> 27% <b>Actuarial Discount Rate:</b> 2.5%* <b>Funded Status:</b> >100%* <b>Duration of Liabilities:</b> 11.4 years*
*As of the most recent report.



Comparative Performance									
	Allocation	Performance (%)							
	Market Value (\$)	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years
Workers' Compensation Fund	2,042,516,777	-1.4	-0.5	-0.9	-0.9	3.9	3.2	4.2	5.8
WC - Actual Allocation Index		-1.1	-0.3	-1.0	-1.0	3.6	3.3	4.1	5.2
Difference		-0.3	-0.2	0.1	0.1	0.3	-0.1	0.1	0.6

Performance shown is net of fees and annualized for periods greater than one year. Wyoming State Treasurer's Office fiscal year ends on June 30th. Beta is calculated relative to the MSCI ACW Index (Net). Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.

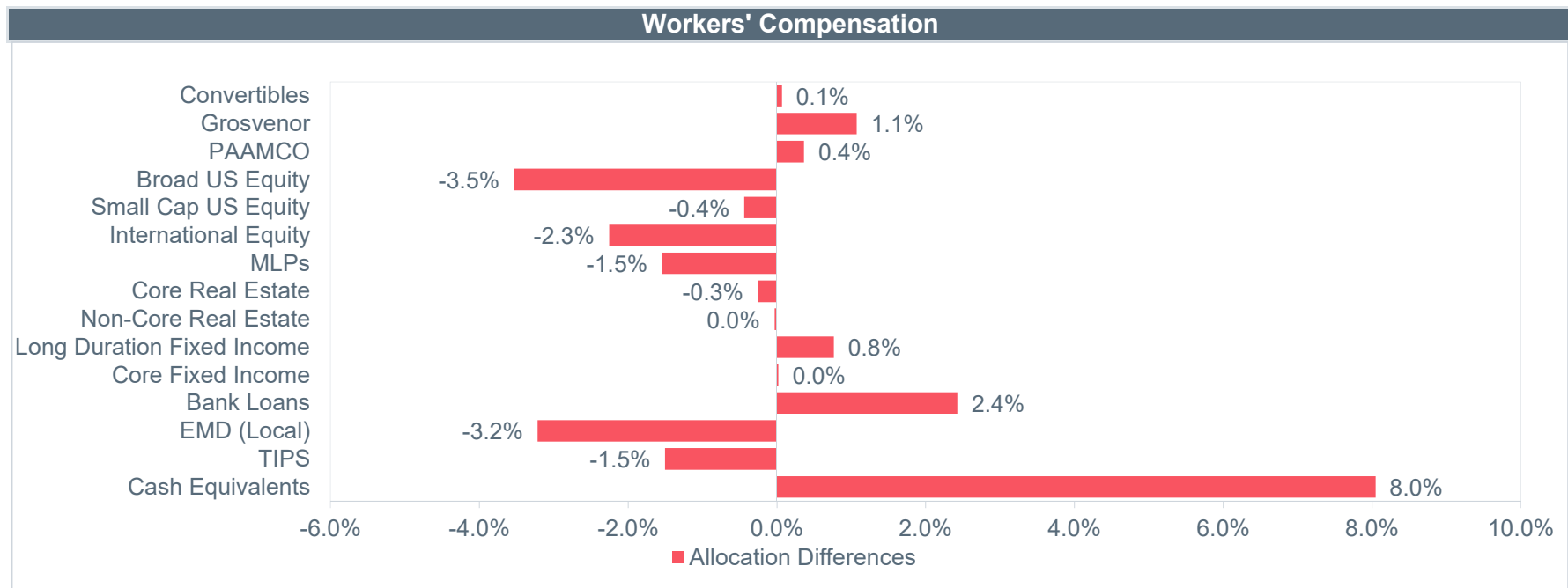
Long-Term Target Allocation			
	Minimum Range (%)	Target (%)	Maximum Range (%)
Workers Compensation Fund	-	100.00	-
Broad US Equity	4.50	9.00	13.50
Small Cap US Equity	0.50	1.00	1.50
International Equity	5.00	10.00	15.00
MLPs	1.50	3.00	4.50
Core Real Estate	1.50	3.00	4.50
Value Added Real Estate	0.50	1.00	1.50
Long Duration Fixed Income	13.50	27.00	40.50
Core Fixed Income	16.50	33.00	49.50
Credit Fixed Income	1.50	3.00	4.50
EMD	2.50	5.00	7.50
TIPS	2.50	5.00	7.50
Cash (inv. in SAP)	0.00	0.00	5.00

Fixed Income Characteristics vs. BB US Agg Bond Index		
	Portfolio	Benchmark
Effective Duration	8.2	5.9
Avg. Quality	Aa3	Aa1/Aa2
Yield To Maturity (%)	3.9	3.3
Coupon Rate (%)	3.6	3.2

Risk Metrics		
	5 Years	10 Years
Sharpe Ratio	0.9	1.2
Standard Deviation	2.8	4.5
Beta	0.2	0.3

Wyoming State Treasurer's Office  
Permanent Funds - Workers' Compensation Fund  
Asset Allocation vs. Long-Term Target

As of December 31, 2018



	Market Value	Allocation	Minimum	Target	Maximum
	(\$)	(%)	(%)	(%)	(%)
Convertibles	1,399,156	0.1	0.0	0.0	0.0
Grosvenor	21,928,812	1.1	0.0	0.0	0.0
PAAMCO	7,454,027	0.4	0.0	0.0	0.0
Broad US Equity	111,651,802	5.5	4.5	9.0	13.5
Small Cap US Equity	11,461,831	0.6	0.5	1.0	1.5
International Equity	158,149,184	7.7	5.0	10.0	15.0
MLPs	29,748,947	1.5	1.5	3.0	4.5
Core Real Estate	56,069,744	2.7	1.5	3.0	4.5
Non-Core Real Estate	19,800,101	1.0	0.5	1.0	1.5
Long Duration Fixed Income	566,946,515	27.8	13.5	27.0	40.5
Core Fixed Income	674,230,227	33.0	16.5	33.0	49.5
Bank Loans	110,805,351	5.4	1.5	3.0	4.5
EMD (Local)	36,470,523	1.8	2.5	5.0	7.5
TIPS	71,391,454	3.5	2.5	5.0	7.5
Cash Equivalents	164,317,177	8.0	0.0	0.0	5.0
Total	2,041,824,850	100.0	--	100.0	--

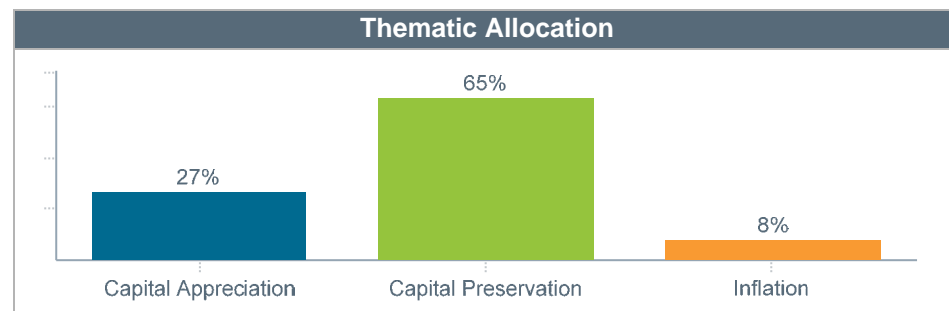
Market values were provided by the Treasurer's Office and may differ from the rest of the report.

Wyoming State Treasurer's Office  
Pool A Investment Account

As of December 31, 2018

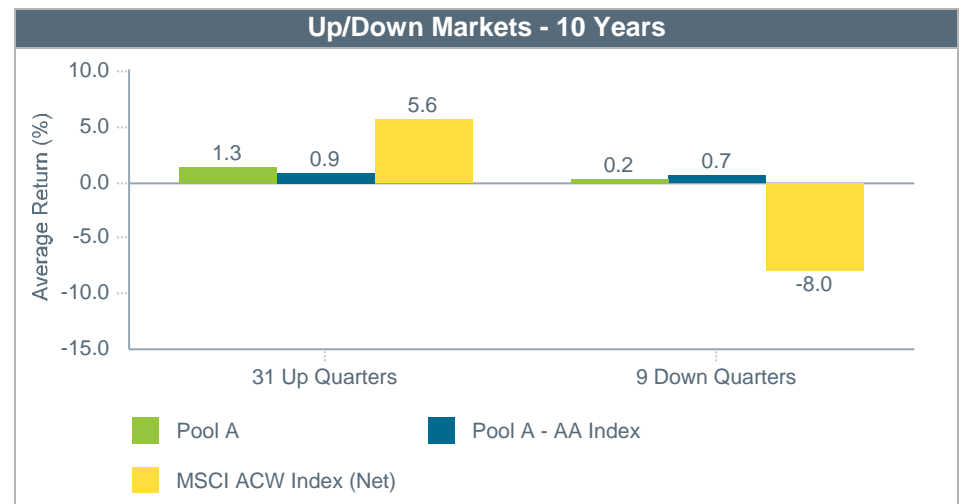
Investment Profile
<b>Fund Type:</b> Non-Permanent Fund
<b>Main Objective:</b> Provide a diverse array of securities including equities, while maintaining adequate liquidity, stability, and return on investment.
<b>Primary Investment Goal:</b> Pool A is intended to be moderately liquid and safely invested but also be invested for return and growth.
<b>Long-Term Return Expectation:</b> CPI + 2%
<b>Maximum Equity Allocation:</b> 60%
<b>Current Target Equity Allocation:</b> 23%
<b>Participating Funds:</b>
• Tobacco Settlement Trust Fund
• Wildlife and Natural Resource Trust Account
• Cultural Trust Fund
• Public Television Matching Fund Account
• Game and Fish Fund Trust Account

Risk Metrics		
	5 Years	10 Years
Sharpe Ratio	0.7	1.2
Standard Deviation	2.5	3.1
Beta	0.1	0.1



Comparative Performance									
	Allocation	Performance (%)							
	Market Value (\$)	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years
<b>Pool A</b>	<b>243,608,717</b>	<b>-0.4</b>	<b>0.1</b>	<b>-0.4</b>	<b>-0.4</b>	<b>2.5</b>	<b>2.4</b>	<b>2.4</b>	<b>4.2</b>
Pool A - Actual Allocation Index		-0.2	-0.1	-1.4	-1.4	1.7	2.3	2.0	3.4
Difference		-0.2	0.2	1.0	1.0	0.8	0.1	0.4	0.8

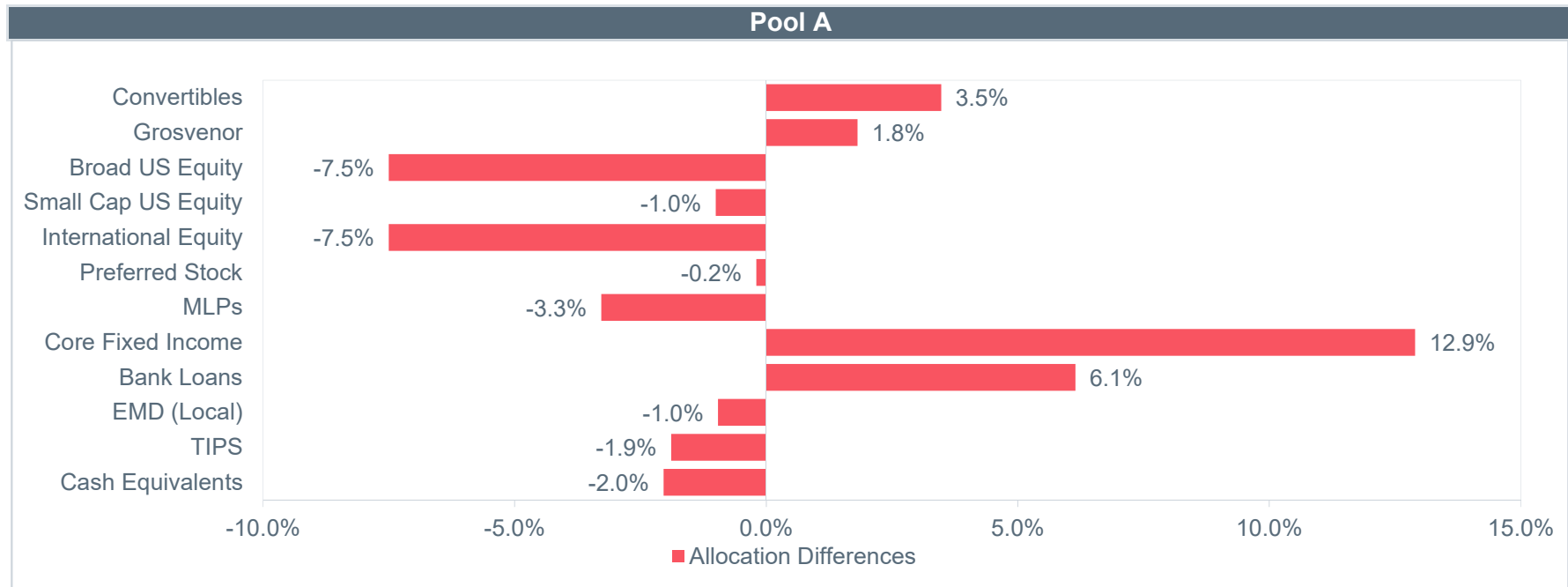
Long-Term Target Allocation			
	Minimum Range (%)	Target (%)	Maximum Range (%)
Pool A	-	100.00	-
Broad US Equity	3.75	7.50	11.25
Small Cap US Equity	0.50	1.00	1.50
International Equity	3.75	7.50	11.25
Preferred Stock	1.00	2.00	3.00
MLPs	2.50	5.00	7.50
Core Fixed Income	24.50	49.00	73.50
Credit Fixed Income	5.00	10.00	15.00
EMD	2.50	5.00	7.50
TIPS	4.00	8.00	12.00
Cash (inv. in SAP)	2.50	5.00	7.50



Performance shown is net of fees and annualized for periods greater than one year. Wyoming State Treasurer's Office fiscal year ends on June 30th. Beta is calculated relative to the MSCI ACW Index (Net). Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.

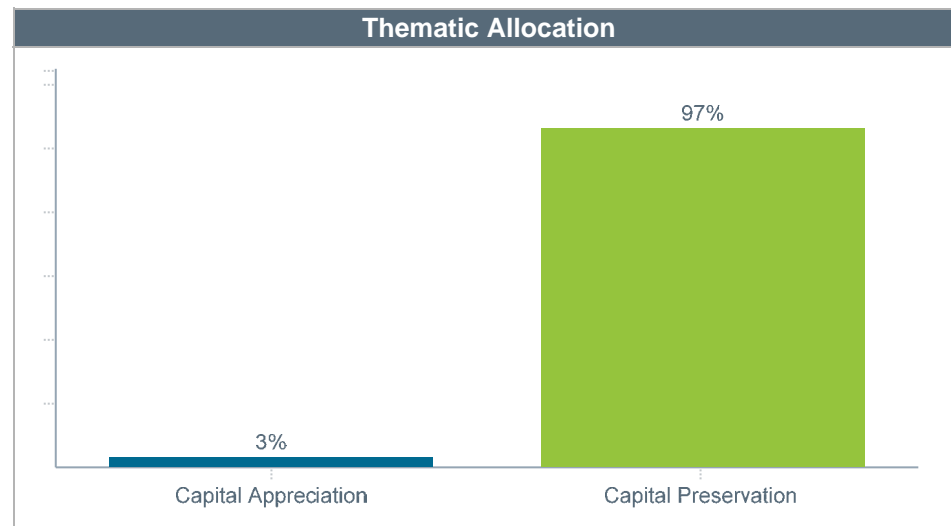
## Pool A

## Asset Allocation vs. Long-Term Target



	Market Value	Allocation	Minimum	Target	Maximum
	(\$)	(%)	(%)	(%)	(%)
Convertibles	8,488,584	3.5	0.0	0.0	0.0
Grosvenor	4,431,315	1.8	0.0	0.0	0.0
Broad US Equity	0	0.0	3.8	7.5	11.3
Small Cap US Equity	0	0.0	0.5	1.0	1.5
International Equity	0	0.0	3.8	7.5	11.3
Preferred Stock	4,402,131	1.8	1.0	2.0	3.0
MLPs	4,200,658	1.7	2.5	5.0	7.5
Core Fixed Income	150,822,721	61.9	24.5	49.0	73.5
Bank Loans	39,345,190	16.1	5.0	10.0	15.0
EMD (Local)	9,854,561	4.0	2.5	5.0	7.5
TIPS	14,891,990	6.1	4.0	8.0	12.0
Cash Equivalents	7,224,200	3.0	2.5	5.0	7.5
Total	243,661,351	100.0	--	100.0	--

Investment Profile
<b>Fund Type:</b> Non-Permanent Fund <b>Main Objective:</b> Produce an investment return so that State agencies have the advantage of better income from their invested funds, while maintaining stability. <b>Primary Investment Goal:</b> Capital preservation, yield, and liquidity <b>Long-Term Return Expectation:</b> CPI + 2% <b>Liquidity Constraints:</b> The Fund must meet the day-to-day cash flow needs of the State <b>Maximum Equity Allocation:</b> 0% <b>Current Target Equity Allocation:</b> 0%



Long-Term Target Allocation			
	Minimum Range (%)	Target (%)	Maximum Range (%)
State Agency Pool	-	100.00	-
Core Fixed Income	5.00	10.00	15.00
Int. Govt. Fixed Income	10.00	20.00	30.00
Low Duration Fixed Income	15.00	30.00	45.00
Credit Fixed Income	7.50	15.00	22.50
Opportunistic Fixed Income	0.00	0.00	0.00
EMD	2.50	5.00	7.50
TIPS	2.50	5.00	7.50
Convertibles	2.50	5.00	7.50
Cash Equivalents	5.00	10.00	15.00

Fixed Income Characteristics vs. BB US Agg Bond Index		
	Portfolio	Benchmark
Effective Duration	2.9	5.9
Avg. Quality	A1	Aa1/Aa2
Yield To Maturity (%)	3.7	3.3
Coupon Rate (%)	2.8	3.2

Risk Metrics		
	5 Years	10 Years
Sharpe Ratio	0.7	1.2
Standard Deviation	2.1	2.6
Beta	0.1	0.1

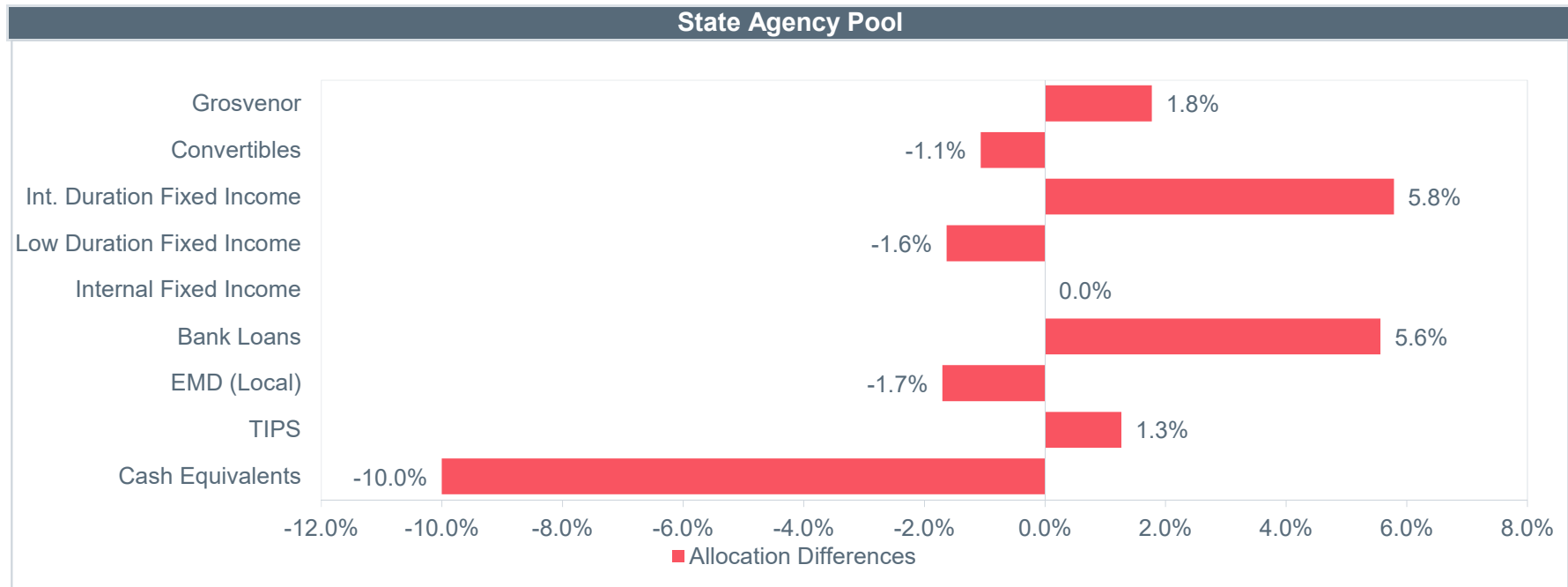
Comparative Performance									
	Allocation	Performance (%)							
	Market Value (\$)	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years
State Agency Pool	5,465,180,745	0.1	0.6	0.6	0.6	2.5	2.2	2.1	3.6
State Agency Pool - Actual Allocation Index		0.1	0.4	-0.4	-0.4	1.8	2.1	1.8	3.0
Difference		0.0	0.2	1.0	1.0	0.7	0.1	0.3	0.6

Performance shown is net of fees and annualized for periods greater than one year. Wyoming State Treasurer's Office fiscal year ends on June 30th. Beta is calculated relative to the MSCI ACW Index (Net). Calculations are based on quarterly periodicity. Allocations shown may not sum up to 100% exactly due to rounding.



Wyoming State Treasurer's Office  
State Agency Pool  
Asset Allocation vs. Long-Term Target

As of December 31, 2018



	Market Value (\$)	Allocation (%)	Minimum (%)	Target (%)	Maximum (%)
Grosvenor	94,218,320	1.8	0.0	0.0	0.0
Convertibles	208,985,167	3.9	2.5	5.0	7.5
Int. Duration Fixed Income	1,900,631,686	35.8	15.0	30.0	45.0
Internal Fixed Income	0	0.0	0.0	0.0	0.0
Low Duration Fixed Income	1,506,744,682	28.4	15.0	30.0	45.0
Bank Loans	1,092,194,965	20.6	7.5	15.0	22.5
EMD (Local)	175,364,890	3.3	2.5	5.0	7.5
TIPS	332,811,320	6.3	2.5	5.0	7.5
Cash Equivalents	0	0.0	5.0	10.0	15.0
Total	5,310,951,031	100.0	--	100.0	--

Wyoming State Treasurer's Office  
Asset Allocation & Performance

As of December 31, 2018

	Allocation		Performance (%)											Inception Date
	Market Value (\$)	%	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years	2017	Since Incep.		
US Equity	1,401,265,987	7.0	-14.6	-9.1	-7.6	-7.6	7.6	7.0	11.7	12.9	18.6	6.5	06/01/1997	
US Equity Custom Index			-14.3	-8.2	-5.2	-5.2	9.0	8.2	12.5	12.9	21.1	7.1		
Difference			-0.3	-0.9	-2.4	-2.4	-1.4	-1.2	-0.8	0.0	-2.5	-0.6		
Int'l Equity	1,824,039,468	9.1	-12.1	-11.1	-14.7	-14.7	4.1	0.5	4.9	6.3	27.7	4.8	01/01/2004	
International Equity Custom Index			-11.5	-10.8	-14.2	-14.2	4.5	0.7	4.8	5.7	27.2	4.5		
Difference			-0.6	-0.3	-0.5	-0.5	-0.4	-0.2	0.1	0.6	0.5	0.3		
Preferred Stock	83,114,119	0.4	-3.5	-2.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-2.0	07/01/2018	
S&P US Preferred Stock Index			-5.6	-5.4	-4.3	-4.3	2.1	5.1	6.1	9.6	9.1	-5.4		
Difference			2.1	3.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.4		
Convertibles	472,527,227	2.3	-9.3	-4.3	3.2	3.2	7.8	5.7	9.2	11.8	14.8	5.7	09/01/2000	
ICE BofAML All Cnvrts Index (All Qual)			-9.3	-5.7	0.2	0.2	7.9	5.9	9.7	12.2	13.7	5.1		
Difference			0.0	1.4	3.0	3.0	-0.1	-0.2	-0.5	-0.4	1.1	0.6		
MLPs	343,690,238	1.7	-20.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-21.4	08/01/2018	
S&P MLP Index (TR)			-17.8	-12.6	-11.7	-11.7	0.6	-6.6	-0.5	10.4	-5.6	-17.6		
Difference			-3.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-3.8		
Private Equity	585,806,732	2.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
S&P 500 Index+5%			-12.5	-4.6	0.4	0.4	14.7	13.9	18.3	18.8	27.9	13.1		
Difference			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Core Real Estate	634,439,696	3.1	1.7	3.4	7.7	7.7	7.3	9.4	9.7	5.8	7.0	5.9	01/01/2006	
NCREIF ODCE Index (AWA) (Net)			1.5	3.4	7.4	7.4	7.3	9.4	10.0	6.0	6.7	5.9		
Difference			0.2	0.0	0.3	0.3	0.0	0.0	-0.3	-0.2	0.3	0.0		
Value-Added Real Estate	293,992,928	1.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
NCREIF Property Index			1.4	3.1	6.7	6.7	7.2	9.3	9.7	7.5	7.0	6.5		
Difference			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Diversified Hedge Funds	468,732,278	2.3	-2.3	-2.0	-0.8	-0.8	1.5	1.3	3.8	4.8	4.9	2.2	12/01/2007	
HFRI FOF Comp Index			-5.0	-4.8	-4.1	-4.1	1.3	1.4	2.9	3.1	7.8	0.6		
Difference			2.7	2.8	3.3	3.3	0.2	-0.1	0.9	1.7	-2.9	1.6		
Core Fixed Income	4,816,970,622	23.9	1.5	1.7	0.5	0.5	2.3	2.6	N/A	N/A	3.6	1.8	01/01/2013	
Bloomberg US Agg Bond Index			1.6	1.7	0.0	0.0	2.1	2.5	2.1	3.5	3.5	1.7		
Difference			-0.1	0.0	0.5	0.5	0.2	0.1	N/A	N/A	0.1	0.1		

Performance shown is net of fees and excludes Public Purpose Investments (PPIs). Wyoming State Treasurer's Office fiscal year ends on June 30th. Wyoming State Treasurer's Office fiscal year ends on June 30th.

Wyoming State Treasurer's Office  
Asset Allocation & Performance

As of December 31, 2018

	Allocation		Performance (%)										
	Market Value (\$)	%	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years	2017	Since Incep.	Inception Date
<b>Credit Fixed Income</b>	<b>1,701,968,353</b>	<b>8.4</b>	<b>-3.1</b>	<b>-1.4</b>	<b>-1.1</b>	<b>-1.1</b>	<b>4.3</b>	<b>3.0</b>	<b>N/A</b>	<b>N/A</b>	<b>4.9</b>	<b>2.8</b>	<b>04/01/2013</b>
Credit Custom Index			-3.0	-1.3	-0.6	-0.6	5.0	3.3	4.4	8.5	5.2	3.3	
Difference			-0.1	-0.1	-0.5	-0.5	-0.7	-0.3	N/A	N/A	-0.3	-0.5	
<b>Opportunistic Fixed Income</b>	<b>221,828,165</b>	<b>1.1</b>	<b>-1.1</b>	<b>1.0</b>	<b>4.1</b>	<b>4.1</b>	<b>7.4</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>9.7</b>	<b>6.0</b>	<b>07/01/2014</b>
CS Western Euro Hi Yld Index			-3.3	-1.0	-1.1	-1.1	6.1	4.9	8.0	12.8	8.4	4.2	
Difference			2.2	2.0	5.2	5.2	1.3	N/A	N/A	N/A	1.3	1.8	
<b>TIPS</b>	<b>710,020,897</b>	<b>3.5</b>	<b>-0.5</b>	<b>-1.4</b>	<b>-1.5</b>	<b>-1.5</b>	<b>2.2</b>	<b>1.8</b>	<b>N/A</b>	<b>N/A</b>	<b>3.1</b>	<b>-0.1</b>	<b>01/01/2013</b>
Bloomberg US Trsy US TIPS Index (Series B)			-0.5	-1.4	-1.5	-1.5	2.2	1.8	0.9	3.6	3.3	-0.1	
Difference			0.0	0.0	0.0	0.0	0.0	0.0	N/A	N/A	-0.2	0.0	
<b>Emerging Market Debt</b>	<b>365,757,886</b>	<b>1.8</b>	<b>1.1</b>	<b>-1.7</b>	<b>-9.1</b>	<b>-9.1</b>	<b>4.3</b>	<b>-2.1</b>	<b>N/A</b>	<b>N/A</b>	<b>15.9</b>	<b>-3.7</b>	<b>04/01/2013</b>
JPM GBI-EM Gbl Dvf'd Index (USD) (TR) (Unhedged)			2.1	0.2	-6.2	-6.2	5.9	-1.0	0.2	3.5	15.2	-2.4	
Difference			-1.0	-1.9	-2.9	-2.9	-1.6	-1.1	N/A	N/A	0.7	-1.3	
<b>Long Duration Fixed Income</b>	<b>566,946,515</b>	<b>2.8</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>01/01/2019</b>
Bloomberg US Gov't Crdt Lng Trm Bond Index			0.8	0.3	-4.7	-4.7	4.0	5.4	3.7	5.9	10.7	N/A	
Difference			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
<b>Low Duration Fixed Income</b>	<b>1,506,744,682</b>	<b>7.5</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>0.7</b>	<b>12/01/2018</b>
Bloomberg US Gov't Crdt 1-3 Yr Bond Index			1.2	1.5	1.6	1.6	1.2	1.0	1.0	1.5	0.8	0.8	
Difference			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-0.1	
<b>Intermediate Govt Fixed Income</b>	<b>1,871,401,273</b>	<b>9.3</b>	<b>1.9</b>	<b>2.0</b>	<b>1.8</b>	<b>1.8</b>	<b>1.5</b>	<b>2.3</b>	<b>1.6</b>	<b>2.2</b>	<b>1.8</b>	<b>4.6</b>	<b>10/01/1996</b>
Bloomberg US Gov't: Int. Term Bond Index			2.2	2.1	1.4	1.4	1.2	1.5	1.1	2.3	1.1	4.6	
Difference			-0.3	-0.1	0.4	0.4	0.3	0.8	0.5	-0.1	0.7	0.0	
<b>Public Purpose Investments</b>	<b>417,803,232</b>	<b>2.1</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	
<b>Cash Equivalents</b>	<b>1,866,471,022</b>	<b>9.3</b>	<b>0.6</b>	<b>1.1</b>	<b>1.9</b>	<b>1.9</b>	<b>1.1</b>	<b>0.7</b>	<b>0.5</b>	<b>0.6</b>	<b>0.8</b>	<b>1.5</b>	<b>01/01/2006</b>
JP Morgan Cash Custom Index			0.7	1.1	1.9	1.9	1.0	0.7	0.5	0.6	0.8	1.5	
Difference			-0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	
<b>Total Fund</b>	<b>20,153,521,320</b>	<b>100.0</b>	<b>-2.6</b>	<b>-1.4</b>	<b>-1.4</b>	<b>-1.4</b>	<b>4.1</b>	<b>3.4</b>	<b>4.4</b>	<b>5.6</b>	<b>8.6</b>	<b>5.3</b>	<b>10/01/1996</b>
Wyoming State Actual Allocation Index			-2.3	-1.3	-1.5	-1.5	3.7	3.4	4.3	5.0	8.2	5.2	
Difference			-0.3	-0.1	0.1	0.1	0.4	0.0	0.1	0.6	0.4	0.1	

Performance shown is net of fees and excludes Public Purpose Investments (PPIs). Wyoming State Treasurer's Office fiscal year ends on June 30th. Wyoming State Treasurer's Office fiscal year ends on June 30th.

Wyoming State Treasurer's Office  
Asset Allocation & Performance

As of December 31, 2018

	Allocation	Performance (%)									
	Market Value (\$)	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years	Since Incep.	Inception Date
<b>Public Equity</b>											
<b>US Equity Composite</b>	<b>1,401,265,987</b>	<b>-14.56</b>	<b>-9.09</b>	<b>-7.55</b>	<b>-7.55</b>	<b>7.58</b>	<b>7.04</b>	<b>11.71</b>	<b>12.88</b>	<b>6.47</b>	<b>06/01/1997</b>
US Equity Custom Index		-14.30	-8.20	-5.24	-5.24	8.97	8.17	12.45	12.95	7.07	
Difference		-0.26	-0.89	-2.31	-2.31	-1.39	-1.13	-0.74	-0.07	-0.60	
<b>All Cap US Equity Composite</b>	<b>1,261,674,909</b>	<b>-13.89</b>	<b>-8.07</b>	<b>-6.23</b>	<b>-6.23</b>	<b>7.92</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>7.87</b>	<b>11/01/2014</b>
Russell 3000 Index		-14.30	-8.20	-5.24	-5.24	8.97	7.91	12.46	13.18	7.12	
Difference		0.41	0.13	-0.99	-0.99	-1.05	N/A	N/A	N/A	0.75	
<b>State Street All Cap</b>	<b>1,025,583,500</b>	<b>-13.51</b>	<b>-7.55</b>	<b>-5.30</b>	<b>-5.30</b>	<b>8.86</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>6.56</b>	<b>01/01/2015</b>
State Street All Cap Custom Index		-13.72	-7.74	-5.50	-5.50	8.82	7.80	12.35	13.45	6.58	
Difference		0.21	0.19	0.20	0.20	0.04	N/A	N/A	N/A	-0.02	
Russell 3000 Index		-14.30	-8.20	-5.24	-5.24	8.97	7.91	12.46	13.18	6.78	
Difference		0.79	0.65	-0.06	-0.06	-0.11	N/A	N/A	N/A	-0.22	
<b>Epoch</b>	<b>236,091,409</b>	<b>-15.49</b>	<b>-10.26</b>	<b>-10.47</b>	<b>-10.47</b>	<b>6.59</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>5.23</b>	<b>11/01/2014</b>
Russell 3000 Index		-14.30	-8.20	-5.24	-5.24	8.97	7.91	12.46	13.18	7.12	
Difference		-1.19	-2.06	-5.23	-5.23	-2.38	N/A	N/A	N/A	-1.89	
<b>UW Portfolio Mgmt Program</b>	<b>1,323,962</b>	<b>-16.15</b>	<b>-8.79</b>	<b>-8.04</b>	<b>-8.04</b>	<b>7.49</b>	<b>7.29</b>	<b>9.32</b>	<b>9.39</b>	<b>4.17</b>	<b>04/01/2006</b>
S&P 500 Index (Cap Wtd)		-13.52	-6.85	-4.38	-4.38	9.26	8.49	12.70	13.12	7.56	
Difference		-2.63	-1.94	-3.66	-3.66	-1.77	-1.20	-3.38	-3.73	-3.39	
<b>Small Cap US Equity Composite</b>	<b>138,267,116</b>	<b>-20.26</b>	<b>-17.51</b>	<b>-18.31</b>	<b>-18.31</b>	<b>4.76</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>1.81</b>	<b>11/01/2014</b>
Russell 2000 Index		-20.20	-17.35	-11.01	-11.01	7.36	4.41	10.44	11.97	4.84	
Difference		-0.06	-0.16	-7.30	-7.30	-2.60	N/A	N/A	N/A	-3.03	
<b>Internal Equity Russell 2000</b>	<b>138,267,116</b>	<b>-20.26</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-22.11</b>	<b>09/01/2018</b>
Russell 2000 Index		-20.20	-17.35	-11.01	-11.01	7.36	4.41	10.44	11.97	-22.12	
Difference		-0.06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.01	
<b>International Equity Composite</b>	<b>1,824,039,468</b>	<b>-12.14</b>	<b>-11.09</b>	<b>-14.66</b>	<b>-14.66</b>	<b>4.10</b>	<b>0.49</b>	<b>4.93</b>	<b>6.35</b>	<b>4.80</b>	<b>01/01/2004</b>
International Equity Custom Index		-11.46	-10.84	-14.20	-14.20	4.48	0.68	4.85	5.70	4.48	
Difference		-0.68	-0.25	-0.46	-0.46	-0.38	-0.19	0.08	0.65	0.32	
<b>Internal International Equity Portfolio</b>	<b>146,137,638</b>	<b>-11.37</b>	<b>-10.58</b>	<b>-13.96</b>	<b>-13.96</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>6.86</b>	<b>02/01/2016</b>
FTSE All Wrld Ex US Index (Net)		-11.47	-10.71	-14.13	-14.13	4.58	1.05	5.22	6.99	7.30	
Difference		0.10	0.13	0.17	0.17	N/A	N/A	N/A	N/A	-0.44	

Performance shown is net of fees. US Equity Index consists of the S&P 500 Index through September 2014 and the Russell 3000 Index thereafter. International Equity Custom Index and Fisher Index both consist of the MSCI EAFE Index (Gross) through July 2010 and the MSCI ACW Ex US Index (Net) thereafter. Wyoming State Treasurer's Office fiscal year ends on June 30th. Since Inception date shown represents the first full month following initial funding.

Wyoming State Treasurer's Office  
Asset Allocation & Performance

As of December 31, 2018

	Allocation	Performance (%)									
	Market Value (\$)	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years	Since Incep.	Inception Date
<b>Northern Trust</b>	<b>968,887,999</b>	<b>-11.34</b>	<b>-10.67</b>	<b>-13.83</b>	<b>-13.83</b>	<b>4.68</b>	<b>0.82</b>	<b>5.00</b>	<b>N/A</b>	<b>4.01</b>	<b>08/01/2010</b>
MSCI ACW Ex US Index (Net)		-11.46	-10.84	-14.20	-14.20	4.48	0.68	4.85	6.57	3.88	
Difference		0.12	0.17	0.37	0.37	0.20	0.14	0.15	N/A	0.13	
<b>Fisher Investments</b>	<b>377,491,691</b>	<b>-13.40</b>	<b>-12.27</b>	<b>-15.92</b>	<b>-15.92</b>	<b>3.39</b>	<b>1.07</b>	<b>5.32</b>	<b>7.75</b>	<b>5.79</b>	<b>09/01/2004</b>
MSCI ACW Ex US Index (Net)		-11.46	-10.84	-14.20	-14.20	4.48	0.68	4.85	5.70	4.56	
Difference		-1.94	-1.43	-1.72	-1.72	-1.09	0.39	0.47	2.05	1.23	
<b>Arrowstreet</b>	<b>331,522,141</b>	<b>-13.32</b>	<b>-11.21</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-16.36</b>	<b>03/01/2018</b>
MSCI ACW Ex US IM Index (Net)		-11.88	-11.53	-14.76	-14.76	4.39	0.85	5.07	6.97	-15.28	
Difference		-1.44	0.32	N/A	N/A	N/A	N/A	N/A	N/A	-1.08	
<b>Hybrid Assets</b>											
<b>Cohen &amp; Steers</b>	<b>83,114,119</b>	<b>-3.51</b>	<b>-2.01</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-2.01</b>	<b>07/01/2018</b>
S&P US Preferred Stock Index		-5.65	-5.45	-4.25	-4.25	2.12	5.08	6.14	9.60	-5.45	
Difference		2.14	3.44	N/A	N/A	N/A	N/A	N/A	N/A	3.44	
<b>Allianz Global Investors</b>	<b>472,527,227</b>	<b>-9.29</b>	<b>-4.34</b>	<b>3.23</b>	<b>3.23</b>	<b>7.84</b>	<b>5.67</b>	<b>9.20</b>	<b>11.76</b>	<b>5.71</b>	<b>09/01/2000</b>
ICE BofAML All Cnvrts Index (All Qual)		-9.31	-5.75	0.18	0.18	7.95	5.90	9.71	12.19	5.13	
Difference		0.02	1.41	3.05	3.05	-0.11	-0.23	-0.51	-0.43	0.58	
<b>Harvest Fund Advisors</b>	<b>343,690,238</b>	<b>-20.83</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-21.40</b>	<b>08/01/2018</b>
S&P MLP Index (TR)		-17.80	-12.55	-11.67	-11.67	0.57	-6.59	-0.46	10.35	-17.60	
Difference		-3.03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-3.80	
<b>Real Estate</b>											
<b>Core Real Estate Composite</b>	<b>634,439,696</b>	<b>1.72</b>	<b>3.36</b>	<b>7.69</b>	<b>7.69</b>	<b>7.31</b>	<b>9.45</b>	<b>9.65</b>	<b>5.81</b>	<b>5.85</b>	<b>01/01/2006</b>
NCREIF ODCE Index (AWA) (Net)		1.52	3.42	7.36	7.36	7.27	9.41	9.96	6.01	5.94	
Difference		0.20	-0.06	0.33	0.33	0.04	0.04	-0.31	-0.20	-0.09	
<b>Clarion Lion</b>	<b>349,622,337</b>	<b>1.86</b>	<b>3.81</b>	<b>8.92</b>	<b>8.92</b>	<b>8.52</b>	<b>10.51</b>	<b>10.65</b>	<b>5.55</b>	<b>5.49</b>	<b>01/01/2006</b>
NCREIF ODCE Index (AWA) (Net)		1.52	3.42	7.36	7.36	7.27	9.41	9.96	6.01	5.94	
Difference		0.34	0.39	1.56	1.56	1.25	1.10	0.69	-0.46	-0.45	
<b>UBS Trumbull</b>	<b>284,817,359</b>	<b>1.55</b>	<b>2.80</b>	<b>6.19</b>	<b>6.19</b>	<b>5.90</b>	<b>8.00</b>	<b>8.33</b>	<b>5.77</b>	<b>5.59</b>	<b>07/01/2006</b>
NCREIF ODCE Index (AWA) (Net)		1.52	3.42	7.36	7.36	7.27	9.41	9.96	6.01	5.58	
Difference		0.03	-0.62	-1.17	-1.17	-1.37	-1.41	-1.63	-0.24	0.01	

Performance shown is net of fees. US Equity Index consists of the S&P 500 Index through September 2014 and the Russell 3000 Index thereafter. International Equity Custom Index and Fisher Index both consist of the MSCI EAFE Index (Gross) through July 2010 and the MSCI ACW Ex US Index (Net) thereafter. Wyoming State Treasurer's Office fiscal year ends on June 30th. Since Inception date shown represents the first full month following initial funding.

Wyoming State Treasurer's Office  
Asset Allocation & Performance

As of December 31, 2018

	Allocation	Performance (%)									
	Market Value (\$)	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years	Since Incep.	Inception Date
<b>Diversified Hedge Funds</b>											
<b>Diversified Hedge Funds Composite</b>	<b>468,732,278</b>	<b>-2.26</b>	<b>-2.04</b>	<b>-0.85</b>	<b>-0.85</b>	<b>1.51</b>	<b>1.31</b>	<b>3.83</b>	<b>4.81</b>	<b>2.19</b>	<b>12/01/2007</b>
HFRI FOF Comp Index		-5.01	-4.79	-4.09	-4.09	1.28	1.38	2.92	3.11	0.64	
Difference		2.75	2.75	3.24	3.24	0.23	-0.07	0.91	1.70	1.55	
<b>PAAMCO - Jackalope Fund</b>	<b>57,413,630</b>	<b>-1.77</b>	<b>-2.03</b>	<b>-0.86</b>	<b>-0.86</b>	<b>1.51</b>	<b>1.15</b>	<b>3.78</b>	<b>4.61</b>	<b>1.96</b>	<b>12/01/2007</b>
HFRI FOF Comp Index		-5.01	-4.79	-4.09	-4.09	1.28	1.38	2.92	3.11	0.64	
Difference		3.24	2.76	3.23	3.23	0.23	-0.23	0.86	1.50	1.32	
<b>Grosvenor Diversified Hedge Funds</b>	<b>240,400,391</b>	<b>-3.94</b>	<b>-3.17</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>-3.17</b>	<b>07/01/2018</b>
HFRI FOF Comp Index		-5.01	-4.79	-4.09	-4.09	1.28	1.38	2.92	3.11	-4.79	
Difference		1.07	1.62	N/A	N/A	N/A	N/A	N/A	N/A	1.62	
<b>Internal Diversified Hedge Funds</b>	<b>170,918,257</b>	<b>0.01</b>	<b>0.87</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>0.87</b>	<b>07/01/2018</b>
HFRI FOF Comp Index		-5.01	-4.79	-4.09	-4.09	1.28	1.38	2.92	3.11	-4.79	
Difference		5.02	5.66	N/A	N/A	N/A	N/A	N/A	N/A	5.66	

Performance shown is net of fees. US Equity Index consists of the S&P 500 Index through September 2014 and the Russell 3000 Index thereafter. International Equity Custom Index and Fisher Index both consist of the MSCI EAFE Index (Gross) through July 2010 and the MSCI ACW Ex US Index (Net) thereafter. Wyoming State Treasurer's Office fiscal year ends on June 30th. Since Inception date shown represents the first full month following initial funding.

Wyoming State Treasurer's Office  
Asset Allocation & Performance

As of December 31, 2018

	Allocation	Performance (%)									
	Market Value (\$)	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years	Since Incep.	Inception Date
<b>Fixed Income</b>											
<b>Core Fixed Income Composite</b>	<b>4,816,970,622</b>	<b>1.55</b>	<b>1.72</b>	<b>0.50</b>	<b>0.50</b>	<b>2.28</b>	<b>2.61</b>	<b>N/A</b>	<b>N/A</b>	<b>1.79</b>	<b>01/01/2013</b>
Bloomberg US Agg Bond Index		1.64	1.66	0.01	0.01	2.06	2.52	2.10	3.48	1.75	
Difference		-0.09	0.06	0.49	0.49	0.22	0.09	N/A	N/A	0.04	
<b>C.S. McKee</b>	<b>1,244,766,800</b>	<b>1.47</b>	<b>1.72</b>	<b>0.73</b>	<b>0.73</b>	<b>2.24</b>	<b>2.72</b>	<b>N/A</b>	<b>N/A</b>	<b>1.85</b>	<b>01/01/2013</b>
C.S. McKee Custom Index		1.80	1.91	0.74	0.74	2.30	2.67	2.20	3.55	1.87	
Difference		-0.33	-0.19	-0.01	-0.01	-0.06	0.05	N/A	N/A	-0.02	
<b>JP Morgan Core</b>	<b>1,403,670,794</b>	<b>1.69</b>	<b>1.71</b>	<b>0.33</b>	<b>0.33</b>	<b>2.05</b>	<b>2.66</b>	<b>N/A</b>	<b>N/A</b>	<b>1.88</b>	<b>01/01/2013</b>
Bloomberg US Agg Bond Index		1.64	1.66	0.01	0.01	2.06	2.52	2.10	3.48	1.75	
Difference		0.05	0.05	0.32	0.32	-0.01	0.14	N/A	N/A	0.13	
<b>PIMCO</b>	<b>2,168,533,029</b>	<b>1.50</b>	<b>1.73</b>	<b>0.47</b>	<b>0.47</b>	<b>2.60</b>	<b>2.74</b>	<b>N/A</b>	<b>N/A</b>	<b>1.82</b>	<b>01/01/2013</b>
PIMCO Custom Index		1.80	1.91	0.32	0.32	2.16	2.58	2.14	3.51	1.80	
Difference		-0.30	-0.18	0.15	0.15	0.44	0.16	N/A	N/A	0.02	
<b>Credit Fixed Income Composite</b>	<b>1,701,968,353</b>	<b>-3.11</b>	<b>-1.45</b>	<b>-1.12</b>	<b>-1.12</b>	<b>4.35</b>	<b>3.00</b>	<b>N/A</b>	<b>N/A</b>	<b>2.78</b>	<b>04/01/2013</b>
Credit Custom Index		-3.00	-1.28	-0.59	-0.59	5.00	3.26	4.44	8.48	3.25	
Difference		-0.11	-0.17	-0.53	-0.53	-0.65	-0.26	N/A	N/A	-0.47	
<b>Neuberger Berman Credit</b>	<b>770,047,247</b>	<b>-3.38</b>	<b>-1.84</b>	<b>-1.33</b>	<b>-1.33</b>	<b>3.56</b>	<b>2.70</b>	<b>N/A</b>	<b>N/A</b>	<b>2.79</b>	<b>04/01/2013</b>
Credit Custom Index		-3.00	-1.28	-0.59	-0.59	5.00	3.26	4.44	8.48	3.25	
Difference		-0.38	-0.56	-0.74	-0.74	-1.44	-0.56	N/A	N/A	-0.46	
<b>Seix</b>	<b>931,921,107</b>	<b>-2.87</b>	<b>-1.11</b>	<b>-0.95</b>	<b>-0.95</b>	<b>5.07</b>	<b>3.24</b>	<b>N/A</b>	<b>N/A</b>	<b>2.99</b>	<b>05/01/2013</b>
Credit Custom Index		-3.00	-1.28	-0.59	-0.59	5.00	3.26	4.44	8.48	3.10	
Difference		0.13	0.17	-0.36	-0.36	0.07	-0.02	N/A	N/A	-0.11	
<b>Opportunistic Fixed Income</b>											
<b>Grosvenor Silvery Lupine Fund</b>	<b>221,828,165</b>	<b>-1.12</b>	<b>0.95</b>	<b>4.12</b>	<b>4.12</b>	<b>7.43</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>6.04</b>	<b>07/01/2014</b>
CS Western Euro Hi Yld Index		-3.26	-1.03	-1.08	-1.08	6.07	4.90	8.05	12.78	4.24	
Difference		2.14	1.98	5.20	5.20	1.36	N/A	N/A	N/A	1.80	

Performance shown is net of fees. The Credit Custom Index consists of 20% Bloomberg US Credit Index, 20% ICE BofAML US HY Master II Const. Index, and 60% S&P/LSTA Leveraged Loan Index. The Internal Intermediate Gov't Fixed Income Portfolio Index consists of the Bloomberg US Gov't: Int. Term Bond Index; prior to December 2009 the index consisted of the Bloomberg US Gov't/Credit Bond Index. The C.S. McKee Custom Index consists of the Bloomberg US Agg Bond Index through January 2018 and the Bloomberg US Agg Int Index thereafter. The PIMCO Custom Index consists of the Bloomberg US Agg Bond Index through February 2018 and the Bloomberg US Agg Int Index thereafter.



Wyoming State Treasurer's Office  
Asset Allocation & Performance

As of December 31, 2018

	Allocation	Performance (%)									
	Market Value (\$)	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years	Since Incep.	Inception Date
<b>Emerging Market Debt Fixed Income Composite</b>	<b>365,757,886</b>	<b>1.13</b>	<b>-1.73</b>	<b>-9.06</b>	<b>-9.06</b>	<b>4.35</b>	<b>-2.12</b>	<b>N/A</b>	<b>N/A</b>	<b>-3.68</b>	<b>04/01/2013</b>
JPM GBI-EM Gbl Dvf'd Index (Unhedged)		2.11	0.25	-6.21	-6.21	5.91	-0.96	0.18	3.45	-2.42	
Difference		-0.98	-1.98	-2.85	-2.85	-1.56	-1.16	N/A	N/A	-1.26	
<b>Investec</b>	<b>188,467,563</b>	<b>0.94</b>	<b>-1.22</b>	<b>-8.21</b>	<b>-8.21</b>	<b>4.51</b>	<b>-1.71</b>	<b>N/A</b>	<b>N/A</b>	<b>-3.09</b>	<b>04/01/2013</b>
JPM GBI-EM Gbl Dvf'd Index (Unhedged)		2.11	0.25	-6.21	-6.21	5.91	-0.96	0.18	3.45	-2.42	
Difference		-1.17	-1.47	-2.00	-2.00	-1.40	-0.75	N/A	N/A	-0.67	
<b>Stone Harbor</b>	<b>177,290,323</b>	<b>1.32</b>	<b>-2.27</b>	<b>-9.96</b>	<b>-9.96</b>	<b>4.17</b>	<b>-2.55</b>	<b>N/A</b>	<b>N/A</b>	<b>-4.34</b>	<b>04/01/2013</b>
JPM GBI-EM Gbl Dvf'd Index (Unhedged)		2.11	0.25	-6.21	-6.21	5.91	-0.96	0.18	3.45	-2.42	
Difference		-0.79	-2.52	-3.75	-3.75	-1.74	-1.59	N/A	N/A	-1.92	
<b>TIPS</b>											
<b>State Street TIPS</b>	<b>710,020,897</b>	<b>-0.52</b>	<b>-1.42</b>	<b>-1.53</b>	<b>-1.53</b>	<b>2.16</b>	<b>1.81</b>	<b>N/A</b>	<b>N/A</b>	<b>-0.13</b>	<b>01/01/2013</b>
Bloomberg US Trsy US TIPS Index (Series B)		-0.49	-1.41	-1.48	-1.48	2.19	1.84	0.92	3.62	-0.10	
Difference		-0.03	-0.01	-0.05	-0.05	-0.03	-0.03	N/A	N/A	-0.03	
<b>Long Duration Fixed Income Composite</b>	<b>566,946,515</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>01/01/2019</b>
Bloomberg US Gov't Crdt Lng Trm Bond Index		0.78	0.31	-4.68	-4.68	4.03	5.37	3.68	5.88	N/A	
Difference		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
<b>Internal Long Duration Govt Fixed Income Portfolio</b>	<b>247,301,839</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>01/01/2019</b>
Bloomberg US Gov't Lng Trm Bond Index		4.16	1.22	-1.79	-1.79	2.63	5.90	2.76	4.15	N/A	
Difference		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
<b>Logan Circle</b>	<b>319,644,675</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>1.98</b>	<b>11/01/2018</b>
Bloomberg US Lng Crdt Index		-1.64	-0.40	-6.76	-6.76	4.87	5.08	4.36	7.40	2.04	
Difference		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-0.06	
<b>Intermediate Govt Fixed Income</b>											
<b>Internal Intermediate Govt Fixed Income Portfolio</b>	<b>1,871,401,273</b>	<b>1.93</b>	<b>2.00</b>	<b>1.85</b>	<b>1.85</b>	<b>1.55</b>	<b>2.34</b>	<b>1.59</b>	<b>2.25</b>	<b>4.57</b>	<b>10/01/1996</b>
Bloomberg US Gov't: Int. Term Bond Index		2.22	2.11	1.43	1.43	1.21	1.46	1.11	2.31	4.55	
Difference		-0.29	-0.11	0.42	0.42	0.34	0.88	0.48	-0.06	0.02	

Performance shown is net of fees. The Credit Custom Index consists of 20% Bloomberg US Credit Index, 20% ICE BofAML US HY Master II Const. Index, and 60% S&P/LSTA Leveraged Loan Index. The Internal Intermediate Gov't Fixed Income Portfolio Index consists of the Bloomberg US Gov't: Int. Term Bond Index; prior to December 2009 the index consisted of the Bloomberg US Gov't/Credit Bond Index. The C.S. McKee Custom Index consists of the Bloomberg US Agg Bond Index through January 2018 and the Bloomberg US Agg Int Index thereafter. The PIMCO Custom Index consists of the Bloomberg US Agg Bond Index through February 2018 and the Bloomberg US Agg Int Index thereafter.

Wyoming State Treasurer's Office  
Asset Allocation & Performance

As of December 31, 2018

	Allocation	Performance (%)									
	Market Value (\$)	QTD	FYTD	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years	Since Incep.	Inception Date
<b>Low Duration Fixed Income Composite</b>	<b>1,506,744,682</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>0.70</b>	<b>12/01/2018</b>
Bloomberg US Gov't Crdt 1-3 Yr Bond Index		1.18	1.52	1.60	1.60	1.24	1.03	1.01	1.52	0.78	
Difference		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-0.08	
<b>Internal Low Duration Govt Fixed Income Portfolio</b>	<b>1,104,000,628</b>	<b>1.19</b>	<b>1.49</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>1.90</b>	<b>03/01/2018</b>
Bloomberg US Gov't 1-3 Yr Bond Index		1.31	1.51	1.58	1.58	0.96	0.82	0.71	1.03	1.93	
Difference		-0.12	-0.02	N/A	N/A	N/A	N/A	N/A	N/A	-0.03	
<b>State Street Low Duration</b>	<b>402,744,055</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>0.69</b>	<b>12/01/2018</b>
Bloomberg US Crdt 1-3 Yr Bond Index		0.89	1.52	1.64	1.64	1.80	1.47	1.78	2.96	0.72	
Difference		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-0.03	
<b>Cash Equivalents</b>											
<b>JP Morgan Cash Composite</b>	<b>1,866,471,022</b>	<b>0.64</b>	<b>1.11</b>	<b>1.90</b>	<b>1.90</b>	<b>1.06</b>	<b>0.70</b>	<b>0.54</b>	<b>0.59</b>	<b>1.49</b>	<b>01/01/2006</b>
JP Morgan Cash Custom Index		0.66	1.13	1.87	1.87	1.03	0.69	0.55	0.64	1.50	
Difference		-0.02	-0.02	0.03	0.03	0.03	0.01	-0.01	-0.05	-0.01	
<b>Wyo-Star Cash Composite</b>	<b>683,471,214</b>	<b>0.72</b>	<b>1.16</b>	<b>1.75</b>	<b>1.75</b>	<b>0.98</b>	<b>0.69</b>	<b>0.55</b>	<b>0.62</b>	<b>3.25</b>	<b>10/01/1996</b>
Wyo-Star Cash Custom Index		0.74	1.16	1.77	1.77	0.98	0.69	0.57	0.68	2.64	
Difference		-0.02	0.00	-0.02	-0.02	0.00	0.00	-0.02	-0.06	0.61	
<b>WYO STAR II Total Fund</b>	<b>8,138,261</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>01/01/2019</b>
Bloomberg US Corp Int Bond Index		0.58	1.39	-0.23	-0.23	2.56	2.62	3.11	5.32	N/A	
Difference		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Performance shown is net of fees. The Credit Custom Index consists of 20% Bloomberg US Credit Index, 20% ICE BofAML US HY Master II Const. Index, and 60% S&P/LSTA Leveraged Loan Index. The Internal Intermediate Gov't Fixed Income Portfolio Index consists of the Bloomberg US Gov't: Int. Term Bond Index; prior to December 2009 the index consisted of the Bloomberg US Gov't/Credit Bond Index. The C.S. McKee Custom Index consists of the Bloomberg US Agg Bond Index through January 2018 and the Bloomberg US Agg Int Index thereafter. The PIMCO Custom Index consists of the Bloomberg US Agg Bond Index through February 2018 and the Bloomberg US Agg Int Index thereafter.

**Wyoming State Treasurer's Office**  
**Investment Values by Fund**  
December 31, 2018

	Total Investment Value	Fiscal Year Ending 06/30/18 Market Value	Current Market Value	% of MV
<b>Wyoming State Total Fund</b>	<b>\$19,891,129,270</b>	<b>\$20,599,864,561</b>	<b>\$20,153,521,320</b>	<b>100.0%</b>
<b>Permanent Mineral Trust</b>	<b>\$7,400,003,510</b>	<b>\$7,807,061,216</b>	<b>\$7,603,910,667</b>	<b>100.0%</b>
US Equity	\$699,578,356	\$902,200,321	\$800,990,387	10.5%
International Equity	\$1,039,515,629	\$1,195,656,643	\$1,046,835,071	13.8%
MLPs	\$224,522,617	\$0	\$172,328,267	2.3%
Convertible Bonds	\$137,484,327	\$154,560,618	\$150,166,529	2.0%
Private Equity	\$253,961,005	\$427,185,212	\$393,776,025	5.2%
Real Estate	\$465,185,227	\$547,895,605	\$550,590,525	7.2%
Diversified Hedge Funds	\$412,650,430	\$350,380,482	\$404,946,496	5.3%
Fixed Income	\$2,977,498,160	\$2,942,548,132	\$2,906,888,141	38.2%
Public Purpose Investments	\$119,393,495	\$123,953,002	\$119,393,495	1.6%
Cash (invested in State Agency Pool)	\$1,070,214,264	\$1,162,681,202	\$1,057,995,731	13.9%
<b>Common School Perm Land Fund</b>	<b>\$3,821,019,685</b>	<b>\$3,989,288,968</b>	<b>\$3,908,617,817</b>	<b>100.0%</b>
US Equity	\$334,010,381	\$431,979,724	\$383,027,486	9.8%
International Equity	\$494,970,390	\$570,972,998	\$499,901,998	12.8%
Preferred Stock	\$78,121,884	\$78,121,884	\$76,388,606	2.0%
MLPs	\$151,541,982	\$0	\$116,313,303	3.0%
Convertible Bonds	\$65,130,000	\$72,514,640	\$70,453,082	1.8%
Private Equity	\$99,184,728	\$190,648,126	\$168,755,922	4.3%
Real Estate	\$191,227,983	\$229,728,008	\$230,734,611	5.9%
Diversified Hedge Funds	\$14,183,323	\$127,081,061	\$14,266,615	0.4%
Fixed Income	\$1,440,400,572	\$1,234,096,745	\$1,405,762,756	36.0%
Public Purpose Investments	\$143,359,738	\$18,359,738	\$143,359,738	3.7%
Cash (invested in State Agency Pool)	\$808,888,705	\$1,035,786,044	\$799,653,700	20.5%
<b>Permanent Land Fund</b>	<b>\$181,154,633</b>	<b>\$198,047,815</b>	<b>\$186,630,512</b>	<b>100.0%</b>
US Equity	\$16,261,390	\$20,864,116	\$18,528,284	9.9%
International Equity	\$24,076,714	\$27,838,662	\$24,374,439	13.1%
MLPs	\$5,639,972	\$0	\$4,328,859	2.3%
Convertible Bonds	\$3,549,159	\$3,962,941	\$3,850,276	2.1%
Private Equity	\$7,720,679	\$12,731,523	\$11,632,917	6.2%
Real Estate	\$11,553,136	\$13,616,536	\$13,690,386	7.3%
Diversified Hedge Funds	\$10,328,061	\$8,710,560	\$10,152,563	5.4%
Fixed Income	\$79,039,554	\$78,264,960	\$77,349,249	41.4%
Cash (invested in State Agency Pool)	\$22,985,968	\$32,058,517	\$22,723,539	12.2%
<b>University Permanent Land Fund</b>	<b>\$20,563,565</b>	<b>\$23,206,526</b>	<b>\$22,381,033</b>	<b>100.0%</b>
US Equity	\$2,734,834	\$3,734,945	\$3,334,868	14.9%
International Equity	\$2,877,736	\$3,370,941	\$2,951,344	13.2%
MLPs	\$659,991	\$0	\$506,564	2.3%
Convertible Bonds	\$396,770	\$448,651	\$435,896	1.9%
Private Equity	\$643,153	\$2,055,536	\$1,962,082	8.8%
Real Estate	\$1,353,529	\$1,524,457	\$1,530,504	6.8%
Diversified Hedge Funds	\$1,213,914	\$1,050,152	\$1,193,238	5.3%
Fixed Income	\$8,020,634	\$7,942,943	\$7,833,936	35.0%
Cash (invested in State Agency Pool)	\$2,663,004	\$3,078,901	\$2,632,601	11.8%

**Wyoming State Treasurer's Office**  
**Investment Values by Fund**  
December 31, 2018

	Total Investment Value	Fiscal Year Ending 06/30/18 Market Value	Current Market Value	% of MV
<b>Wyoming State Total Fund</b>	<b>\$19,891,129,270</b>	<b>\$20,599,864,561</b>	<b>\$20,153,521,320</b>	<b>100.0%</b>
<b>Hathaway Scholarship</b>	<b>\$557,937,545</b>	<b>\$582,413,022</b>	<b>\$565,450,818</b>	<b>100.0%</b>
US Equity	\$52,242,917	\$67,496,921	\$59,927,233	10.6%
International Equity	\$74,253,249	\$86,862,174	\$76,041,049	13.4%
MLPs	\$16,617,597	\$0	\$12,754,535	2.3%
Convertible Bonds	\$10,710,409	\$12,172,394	\$11,826,338	2.1%
Private Equity	\$9,902,641	\$8,504,136	\$9,679,786	1.7%
Real Estate	\$35,943,923	\$46,159,970	\$46,403,467	8.2%
Diversified Hedge Funds	\$30,749,419	\$27,941,928	\$30,175,102	5.3%
Fixed Income	\$267,613,620	\$262,978,800	\$259,423,454	45.9%
Cash (invested in State Agency Pool)	\$59,903,769	\$70,296,700	\$59,219,853	10.5%
<b>Higher Education</b>	<b>\$114,086,012</b>	<b>\$120,117,913</b>	<b>\$115,224,236</b>	<b>100.0%</b>
US Equity	\$10,778,148	\$13,902,792	\$12,344,095	10.7%
International Equity	\$15,401,798	\$18,032,477	\$15,786,384	13.7%
Preferred Stock	\$2,376,100	\$2,376,100	\$2,323,382	2.0%
MLPs	\$4,571,934	\$0	\$3,509,105	3.0%
Convertible Bonds	\$2,248,679	\$2,562,780	\$2,489,922	2.2%
Real Estate	\$6,688,668	\$8,593,415	\$8,634,629	7.5%
Diversified Hedge Funds	\$558,709	\$5,006,285	\$562,056	0.5%
Fixed Income	\$56,162,731	\$55,192,176	\$54,450,088	47.3%
Cash (invested in State Agency Pool)	\$15,299,244	\$14,451,888	\$15,124,574	13.1%
<b>Workers Compensation Fund</b>	<b>\$2,030,322,291</b>	<b>\$2,035,610,128</b>	<b>\$2,042,516,777</b>	<b>100.0%</b>
US Equity	\$107,160,735	\$139,378,668	\$123,113,634	6.0%
International Equity	\$154,843,802	\$180,662,255	\$158,149,184	7.7%
MLPs	\$38,759,233	\$0	\$29,748,947	1.5%
Convertible Bonds	\$0	\$59,806,289	\$0	0.0%
Real Estate	\$55,073,527	\$76,472,069	\$76,848,502	3.8%
Diversified Hedge Funds	\$7,392,559	\$66,237,645	\$7,436,208	0.4%
Fixed Income	\$1,475,143,106	\$1,096,150,945	\$1,457,462,440	71.4%
Cash (invested in State Agency Pool)	\$191,949,329	\$416,902,257	\$189,757,862	9.3%
<b>Pool A</b>	<b>\$237,745,253</b>	<b>\$238,849,216</b>	<b>\$243,608,717</b>	<b>100.0%</b>
Preferred Stock	\$4,502,016	\$4,502,016	\$4,402,131	1.8%
MLPs	\$5,472,943	\$0	\$4,200,658	1.7%
Convertible Bonds	\$8,077,226	\$8,673,658	\$8,427,070	3.5%
Fixed Income	\$211,254,021	\$219,578,995	\$218,236,159	89.6%
Cash (invested in State Agency Pool)	\$8,439,047	\$6,094,547	\$8,342,700	3.4%
<b>State Agency Pool</b>	<b>\$5,528,296,776</b>	<b>\$5,605,269,757</b>	<b>\$5,465,180,745</b>	<b>100.0%</b>
Convertible Bonds	\$147,601,638	\$155,438,565	\$161,272,667	3.0%
Fixed Income	\$3,933,108,035	\$3,615,102,242	\$3,854,162,338	70.5%
Public Purpose Investments	\$111,195,023	\$122,156,392	\$111,195,023	2.0%
Cash Equivalents	\$1,336,392,080	\$1,712,572,558	\$1,338,550,716	24.5%

**Wyoming State Treasurer's Office**  
**Investment Values by Manager**  
December 31, 2018

	Total Investment Value	Fiscal Year Ending 06/30/18 Market Value	Current Market Value	% of MV
<b>Wyoming State Total Fund</b>	<b>\$19,891,129,270</b>	<b>\$20,599,864,561</b>	<b>\$20,153,521,320</b>	<b>100.0%</b>
<b>US Equity</b>	<b>\$1,222,766,761</b>	<b>\$1,579,557,486</b>	<b>\$1,401,265,987</b>	<b>7.0%</b>
State Street All Cap	\$838,476,906	\$1,137,708,518	\$1,025,583,500	
Epoch	\$218,362,873	\$269,713,108	\$236,091,409	
UW Portfolio Management Program	\$1,000,000	\$1,466,053	\$1,323,962	
Internal Equity Russell 2000	\$164,926,982	\$0	\$138,267,116	
RBC	\$0	\$170,669,808	\$0	
<b>International Equity</b>	<b>\$1,805,939,317</b>	<b>\$2,083,396,150</b>	<b>\$1,824,039,468</b>	<b>9.1%</b>
Internal International Equity Portfolio	\$135,000,000	\$166,293,614	\$146,137,638	
Northern Trust	\$968,882,175	\$1,101,957,364	\$968,887,999	
Fisher Investments	\$343,648,207	\$437,594,475	\$377,491,691	
Arrowstreet	\$358,408,936	\$377,550,696	\$331,522,141	
<b>Mixed Assets</b>	<b>\$966,198,111</b>	<b>\$631,160,344</b>	<b>\$899,331,584</b>	<b>4.5%</b>
Cohen & Steers	\$85,000,000	\$85,000,000	\$83,114,119	
Harvest	\$447,786,270	\$0	\$343,690,238	
Allianz Global Investors	\$433,411,842	\$546,160,344	\$472,527,227	
<b>Private Equity</b>	<b>\$371,412,206</b>	<b>\$641,124,533</b>	<b>\$585,806,732</b>	<b>2.9%</b>
Access Venture Partners II	\$3,801,445	\$14,384,623	\$4,623,887	
Cheyenne Capital	\$121,635,215	\$287,701,522	\$243,366,328	
Hamilton Lane Nowood	\$126,769,675	\$147,715,242	\$147,358,461	
Neuberger Berman Sauger	\$119,205,871	\$191,323,146	\$190,458,056	
<b>Real Estate</b>	<b>\$767,025,993</b>	<b>\$923,990,059</b>	<b>\$928,432,624</b>	<b>4.6%</b>
Clarion Lion	\$266,303,630	\$342,217,898	\$349,622,337	
UBS Trumbull	\$241,303,630	\$281,783,741	\$284,817,359	
Cornerstone	\$4,656,940	\$4,827,296	\$4,776,734	
Heitman	\$1,759,375	\$67,199	\$17,473	
M&G	\$65,347,538	\$54,156,241	\$48,858,148	
Northwood	\$114,447,406	\$145,919,605	\$149,612,642	
SC Capital	\$44,563,765	\$46,068,794	\$45,366,193	
TA Realty	\$1,802,058	\$2,622,422	\$269,535	
WestRiver	\$26,841,651	\$46,326,863	\$45,092,204	
<b>Diversified Hedge Funds</b>	<b>\$477,076,415</b>	<b>\$586,408,113</b>	<b>\$468,732,278</b>	<b>2.3%</b>
PAAMCO - Jackalope	\$57,076,415	\$511,408,113	\$57,413,630	
Grosvenor Diversified Hedge Funds	\$250,000,000	\$31,000,000	\$240,400,391	
Internal Diversified Hedge Funds	\$170,000,000	\$44,000,000	\$170,918,257	
<b>Fixed Income</b>	<b>\$11,999,446,206</b>	<b>\$11,279,881,593</b>	<b>\$11,761,638,393</b>	<b>58.4%</b>
C.S. McKee	\$1,250,141,923	\$1,239,782,750	\$1,244,766,800	
JP Morgan Core	\$1,417,913,636	\$1,398,403,539	\$1,403,670,794	
PIMCO	\$2,176,287,800	\$2,160,523,241	\$2,168,533,029	
Neuberger Berman Credit	\$803,565,335	\$922,183,704	\$770,047,247	
Seix	\$943,160,037	\$948,736,474	\$931,921,107	
Grosvenor Silvery Lupine Fund	\$171,010,797	\$281,156,865	\$221,828,165	
Investec	\$297,714,010	\$197,847,664	\$188,467,563	
Stone Harbor	\$297,712,381	\$186,907,000	\$177,290,323	
State Street TIPS	\$723,969,701	\$723,229,173	\$710,020,897	
Internal Long Duration Govt Portfolio	\$232,123,992	\$0	\$247,301,839	
Logan Circle	\$318,000,000	\$0	\$319,644,675	
Internal Int. Duration Govt Portfolio	\$1,868,275,080	\$1,852,289,491	\$1,871,401,273	
Internal Low Duration Govt Portfolio	\$1,099,571,515	\$1,368,821,692	\$1,104,000,628	
State Street Low Duration	\$400,000,000	\$0	\$402,744,055	
Neuberger Berman Core	\$0	\$1	\$0	
<b>Public Purpose Investments</b>	<b>\$417,803,232</b>	<b>\$324,211,740</b>	<b>\$417,803,232</b>	<b>2.1%</b>
<b>Cash &amp; Cash Equivalents</b>	<b>\$1,863,461,027</b>	<b>\$2,550,134,544</b>	<b>\$1,866,471,022</b>	<b>9.3%</b>
JP Morgan Cash Composite	\$1,863,461,027	\$2,550,134,544	\$1,866,471,022	

State of Wyoming  
State Loan and Investment Board  
Investment Policy Objective Review

December 31, 2018

Investment Policy Guidelines	Meeting Objective			Explanation
	Yes	No	N/A	
<b>1. Total Fund</b>				
Exceed the rate of inflation (C.P.I.) over a market cycle of 5-years.	✓			Wyoming returned 3.4% vs. 1.5% for the C.P.I. for the current 5-year period
Exceed a weighted index of the total fund's asset allocation and component benchmarks over rolling 5-year periods by an appropriate amount.	✓			Wyoming returned 3.4% vs. 3.4% for the Actual Allocation Index for the current 5-year period
Not more than 1% of the outstanding common shares of any corporation shall be owned by the State. An exception may be made for Alternative Investments.	✓			
Not more than 1.5% of the total book value of permanent funds shall be invested in the common stock of any corporation. An exception may be made for Alternative Investments.	✓			

	Yes	No	N/A	Explanation
<b>2. Investment Funds</b>				
<b>a) Permanent Mineral Trust Fund</b>				
Exceed a weighted index of the Fund's asset allocation and component benchmarks over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: Permanent Mineral Trust Fund return was 3.8% vs. 3.9% for the Actual Allocation Index
<b>b) Common School Permanent Land Fund</b>				
Exceed a weighted index of the Fund's asset allocation and component benchmarks over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: Common School Permanent Land Fund return was 3.9% vs. 4.0% for the Actual Allocation Index
<b>c) Permanent Land Fund</b>				
Exceed a weighted index of the Fund's asset allocation and component benchmarks over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: Permanent Land Fund return was 3.8% vs. 3.9% for the Actual Allocation Index
<b>d) University Permanent Land Fund</b>				
Exceed a weighted index of the Fund's asset allocation and component benchmarks over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: University Permanent Land Fund return was 4.1% vs. 4.2% for the Actual Allocation Index
<b>e) Hathaway Scholarship Endowment Fund</b>				
Exceed a weighted index of the Fund's asset allocation and component benchmarks over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: Hathaway Scholarship Endowment Fund return was 3.4% vs. 3.6% for the Actual Allocation Index
<b>f) Higher Education Endowment Fund</b>				
Exceed a weighted index of the Fund's asset allocation and component benchmarks over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: Higher Education Endowment Fund return was 3.3% vs. 3.5% for the Actual Allocation Index
<b>g) Workers Compensation Fund</b>				
Exceed a weighted index of the Fund's asset allocation and component benchmarks over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: Workers Compensation Fund return was 3.2% vs. 3.3% for the Actual Allocation Index
<b>h) Pool A</b>				
At least 5% to 10% of the fund balance should be invested in securities with maturities of less than one year.	✓			
Exceed a weighted index of the Fund's asset allocation and component benchmarks over a full market cycle, approximated by the most recent 5-year period.	✓			5-year: Pool A return was 2.4% vs. 2.3% for the Actual Allocation Index
<b>i) State Agency Pool</b>				
At least 10% to 15% of the fund balance should be invested in securities with maturities of less than one year.	✓			
No public and/or private equities are permitted.	✓			
Exceed a weighted index of the Fund's asset allocation and component benchmarks over a full market cycle, approximated by the most recent 5-year period.	✓			5-year: State Agency Pool return was 2.2% vs. 2.1% for the Actual Allocation Index



	Yes	No	N/A	Explanation
<b>3. US Equity Portfolios</b>				
<b>a) State Street Global Advisors – All Cap – Passive</b>				
A maximum of the greater of five percent (5%), or the benchmark weighting plus two percent (2%), of the total stock portfolio of a manager may be invested in any one security.	✓			Largest Holding: Apple Inc = 2.81%
A maximum of one percent (1%) of the outstanding float of shares of one company may be held in companies with market capitalizations of \$5 Billion or greater at the time of purchase. A maximum of five percent (5%) of the outstanding float of shares of one company may be held in companies with market capitalizations of less than \$5 Billion at the time of purchase.	✓			
The maximum allowable in any sector, as defined as Global Industry Classification System Level 1, is two and one-half (2.5) times the respective benchmark weighting, unless the contract with the investment manager specifically provides otherwise.	✓			
A minimum number of twenty (20) securities shall be held.	✓			
Meet performance of the State Street All Cap Custom Index, net of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 01/2015
<b>b) Epoch – All Cap</b>				
A maximum of the greater of five percent (5%), or the benchmark weighting plus two percent (2%), of the total stock portfolio of a manager may be invested in any one security.	✓			Largest Holding: Microsoft Corp = 5.74%
A maximum of one percent (1%) of the outstanding float of shares of one company may be held in companies with market capitalizations of \$5 Billion or greater at the time of purchase. A maximum of five percent (5%) of the outstanding float of shares of one company may be held in companies with market capitalizations of less than \$5 Billion at the time of purchase.	✓			
The maximum allowable in any sector, as defined as Global Industry Classification System Level 1, is two and one-half (2.5) times the respective benchmark weighting, unless the contract with the investment manager specifically provides otherwise.	✓			
A minimum number of twenty (20) securities shall be held.	✓			
Outperform the Russell 3000 Index, net of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 11/2014
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 11/2014

	Yes	No	N/A	Explanation
<b>c) Internal Equity Russell 2000 – Small Cap - Passive</b>				
A maximum of the greater of five percent (5%), or the benchmark weighting plus two percent (2%), of the total stock portfolio of a manager may be invested in any one security.	✓			Largest Holding: Integrated Device Tech Inc = 0.35%
A maximum of one percent (1%) of the outstanding float of shares of one company may be held in companies with market capitalizations of \$5 Billion or greater at the time of purchase. A maximum of five percent (5%) of the outstanding float of shares of one company may be held in companies with market capitalizations of less than \$5 Billion at the time of purchase.	✓			
The maximum allowable in any sector, as defined as Global Industry Classification System Level 1, is two and one-half (2.5) times the respective benchmark weighting, unless the contract with the investment manager specifically provides otherwise.	✓			
A minimum number of twenty (20) securities shall be held.	✓			
Meet performance of the Russell 2000 Index, net of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 09/2018

	Yes	No	N/A	Explanation
<b>4. International Equity Portfolios</b>				
<b>a) Internal International Equity Portfolio – Int’l – Passive</b>				
A maximum of the greater of five percent (5%), or the benchmark weighting plus two percent (2%), of the total stock portfolio of a manager may be invested in any one security.	✓			Largest Holding: Nestle SA = 1.29%
A maximum of one percent (1%) of the outstanding float of shares of one company may be held in companies with market capitalizations of \$5 Billion or greater at the time of purchase. A maximum of five percent (5%) of the outstanding float of shares of one company may be held in companies with market capitalizations of less than \$5 Billion at the time of purchase.	✓			
The maximum allowable in any sector, as defined as Global Industry Classification System Level 1, is two and one-half (2.5) times the respective benchmark weighting, unless the contract with the investment manager specifically provides otherwise.	✓			
A minimum number of twenty (20) securities shall be held.	✓			
Meet performance of the FTSE All World Ex US Index (Net), net of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception Date: 02/2016
<b>b) Northern Trust – Int’l – Passive</b>				
A maximum of the greater of five percent (5%), or the benchmark weighting plus two percent (2%), of the total stock portfolio of a manager may be invested in any one security.	✓			Largest Holding: Nestle SA = 1.35%
A maximum of one percent (1%) of the outstanding float of shares of one company may be held in companies with market capitalizations of \$5 Billion or greater at the time of purchase. A maximum of five percent (5%) of the outstanding float of shares of one company may be held in companies with market capitalizations of less than \$5 Billion at the time of purchase.	✓			
The maximum allowable in any sector, as defined as Global Industry Classification System Level 1, is two and one-half (2.5) times the respective benchmark weighting, unless the contract with the investment manager specifically provides otherwise.	✓			
A minimum number of twenty (20) securities shall be held.	✓			
Meet performance of the MSCI ACW Ex US Index (Net), before fees, over a full market cycle, approximated by the most recent five-year period.	✓			5-year: Northern Trust gross of fees return was 0.9% vs. 0.7% for the MSCI ACW Ex US Index (Net)

	Yes	No	N/A	Explanation
<b>c) Fisher – Int'l Active</b>				
A maximum of the greater of five percent (5%), or the benchmark weighting plus two percent (2%), of the total stock portfolio of a manager may be invested in any one security.	✓			Largest Holding: Tencent Holdings Ltd = 4.05%
A maximum of one percent (1%) of the outstanding float of shares of one company may be held in companies with market capitalizations of \$5 Billion or greater at the time of purchase. A maximum of five percent (5%) of the outstanding float of shares of one company may be held in companies with market capitalizations of less than \$5 Billion at the time of purchase.	✓			
The maximum allowable in any sector, as defined as Global Industry Classification System Level 1, is two and one-half (2.5) times the respective benchmark weighting, unless the contract with the investment manager specifically provides otherwise.	✓			
A minimum number of twenty (20) securities shall be held.	✓			
Outperform the MSCI ACW Ex US Index (Net)*, net of fees, over a full market cycle, approximated by the most recent five-year period.	✓			5-year: Fisher net of fees return was 1.1% vs. 0.7% for the MSCI ACW Ex US Index (Net)
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.		✗		5-year: Fisher ranked in the 58th percentile for International Equity

\*Fisher Index consists of MSCI EAFE Index (Gross) through July 2010 and the MSCI ACW Ex US Index (Net) thereafter.

<b>d) Arrowstreet – Int'l Active</b>				
A maximum of the greater of five percent (5%), or the benchmark weighting plus two percent (2%), of the total stock portfolio of a manager may be invested in any one security.	✓			Largest Holding: Samsung Electronics Co = 2.78%
A maximum of one percent (1%) of the outstanding float of shares of one company may be held in companies with market capitalizations of \$5 Billion or greater at the time of purchase. A maximum of five percent (5%) of the outstanding float of shares of one company may be held in companies with market capitalizations of less than \$5 Billion at the time of purchase.	✓			
The maximum allowable in any sector, as defined as Global Industry Classification System Level 1, is two and one-half (2.5) times the respective benchmark weighting, unless the contract with the investment manager specifically provides otherwise.	✓			
A minimum number of twenty (20) securities shall be held.	✓			
Outperform the MSCI ACW Ex US IM Index (Net), net of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 03/2018
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 03/2018

	Yes	No	N/A	Explanation
<b>5. Preferred Stock</b>				
<b>a) Cohen &amp; Steers</b>				
Minimum issue credit rating for preferred stock at the time of purchase will be BB or equivalent.	✓			The portfolio currently holds securities which are rated below BB. Retention of these securities in the portfolio is permitted pursuant to Section 7.2 of the Investment Policy.
A maximum of 35% of the total portfolio of the investment manager may be invested in securities rated below investment grade.	✓			
A maximum of 10% of the total portfolio of the investment manager may be invested in any one issuer.	✓			
Outperform the S&P U.S. Preferred Stock Index, net of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 07/2018
	Yes	No	N/A	Explanation
<b>6. Convertible Bond Portfolios</b>				
<b>a) Allianz Global Investors</b>				
Outperform the BofA ML All Quality Convertible Bond Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: Allianz Global Investors net of fees return was 5.7% vs. 5.9% for the ICE BofAML All Quality Convertible Bond Index
	Yes	No	N/A	Explanation
<b>7. MLPs</b>				
<b>a) Harvest</b>				
A maximum of 15% or the benchmark weighting + 2%, whichever is greater, of the total portfolio may be invested in any one company.	✓			
Outperform the S&P MLP Index, net of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 08/2018

	Yes	No	N/A	Explanation
<b>8. Alternative Strategies</b>				
<b>Core Real Estate</b>				
<b>a) Clarion Lion</b>				
Outperform the NCREIF Fund Index – Open-End Diversified Core Equity (ODCE), net of fees, over a full market cycle, approximated by the most recent 5-year period.	✓			5-year: Clarion Lion net of fees return was 10.5% vs. 9.4% for the NCREIF ODCE Index (Net) (AWA)
<b>b) UBS Trumbull</b>				
Outperform the NCREIF Fund Index – Open-End Diversified Core Equity (ODCE), net of fees, over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: UBS Trumbull net of fees return was 8.0% vs. 9.4% for the NCREIF ODCE Index (Net) (AWA)
<b>Absolute Return</b>				
<b>c) PAAMCO</b>				
Outperform the 90-Day T-Bills by 300 basis points, net of all fees (including underlying fund manager fees), over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: PAAMCO net of fees return was 1.1% vs. 0.6% for the ICE BofAML 3 Mo US T-Bill Index
Outperform the HFRI FOF Comp Index, net of all fees (including underlying fund manager fees), over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: PAAMCO net of fees return was 1.1% vs. 1.4% for the HFRI FOF Comp Index
<b>d) Grosvenor Diversified Hedge Funds</b>				
Outperform the HFRI FOF Comp Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.			N/A	Inception date: 07/2018
<b>e) Internal Diversified Hedge Funds</b>				
Outperform the HFRI FOF Comp Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.			N/A	Inception date: 07/2018

	Yes	No	N/A	Explanation
<b>9. Fixed Income Portfolios</b>				
<b>a) C.S. McKee – Core</b>				
Obligations not issued or guaranteed by the US government, US agencies, or US government-sponsored corporations and agencies are subject to a five percent (5%) per issuer limit excluding investments in commingled vehicles.	✓			
Non-US dollar denominated securities are permitted, but shall comprise no more than ten percent (10%) of the portfolio market value.	✓			
Private mortgage-backed and asset-backed securities are limited to ten percent (10%) of the portfolio market value.	✓			
Commercial mortgage-backed securities are permitted but shall comprise no more than ten percent (10%) of the portfolio market value.	✓			
Commercial paper of all issuers shall not exceed \$500 million.	✓			
Duration must fall in the range of plus or minus twenty percent (20%) of the Bloomberg Barclays US Aggregate Bond Index.	✓			
Minimum Issue Credit Rating at the time of purchase will be: A1 or equivalent for commercial paper BBB- for Corporate Bonds BBB- for Mortgage-Backed Securities BBB- for Commercial Mortgage-Backed Securities BBB- for Asset-Backed Securities BBB- for Non-US Dollar Denominated Securities BBB- for Dollar Denominated Emerging Market Securities	✓			
Average portfolio credit quality must be A- or better.	✓			
Dollar denominated emerging market securities are permitted, but shall comprise no more than ten percent (10%) of the portfolio market value.	✓			
A minimum number of 25 securities shall be held.	✓			
Investments in mortgage interest only and principal only securities or their derivations are permitted, but shall comprise no more than five percent (5%) of the portfolio market value.	✓			
Private placements, including 144A securities are not permitted.	✓			
Outperform its Custom Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.	✓			5-year: C.S. McKee net of fees return was 2.7% vs. 2.7% for the C.S. McKee Custom Index
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.		✗		5-year: C.S. McKee ranked in the 51st percentile for Core Fixed Income



	Yes	No	N/A	Explanation
<b>b) JP Morgan – Core</b>				
Obligations not issued or guaranteed by the US government, US agencies, or US government-sponsored corporations and agencies are subject to a five percent (5%) per issuer limit excluding investments in commingled vehicles.	✓			
Non-US dollar denominated securities are permitted, but shall comprise no more than ten percent (10%) of the portfolio market value.			N/A	
Private mortgage-backed and asset-backed securities are limited to ten percent (10%) of the portfolio market value.	✓			
Commercial mortgage-backed securities are permitted but shall comprise no more than ten percent (10%) of the portfolio market value.	✓			
Commercial paper of all issuers shall not exceed \$500 million.			N/A	
Duration must fall in the range of plus or minus twenty percent (20%) of the Bloomberg US Aggregate Bond Index.	✓			
Minimum Issue Credit Rating at the time of purchase will be: A1 or equivalent for commercial paper BBB- for Corporate Bonds BBB- for Mortgage-Backed Securities BBB- for Commercial Mortgage-Backed Securities BBB- for Asset-Backed Securities BBB- for Non-US Dollar Denominated Securities BBB- for Dollar Denominated Emerging Market Securities	✓			
Average portfolio credit quality must be A- or better.	✓			
Dollar denominated emerging market securities are permitted, but shall comprise no more than ten percent (10%) of the portfolio market value.			N/A	
A minimum number of 25 securities shall be held.	✓			
Investments in mortgage interest only and principal only securities or their derivations are permitted, but shall comprise no more than five percent (5%) of the portfolio market value.	✓			
Private placements, including 144A securities are not permitted.	✓			
Outperform the Bloomberg US Aggregate Bond Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.	✓			5-year: JP Morgan net of fees return was 2.7% vs. 2.5% for the Bloomberg US Aggregate Bond Index
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.		✗		5-year: JP Morgan ranked in the 57th percentile for Core Fixed Income

	Yes	No	N/A	Explanation
<b>c) PIMCO – Core</b>				
Obligations not issued or guaranteed by the US government, US agencies, or US government-sponsored corporations and agencies are subject to a five percent (5%) per issuer limit excluding investments in commingled vehicles.	✓			
Non-US dollar denominated securities are permitted, but shall comprise no more than ten percent (10%) of the portfolio market value.	✓			
Private mortgage-backed and asset-backed securities are limited to ten percent (10%) of the portfolio market value.	✓			
Commercial mortgage-backed securities are permitted but shall comprise no more than ten percent (10%) of the portfolio market value.	✓			
Commercial paper of all issuers shall not exceed \$500 million.	✓			
Duration must fall in the range of plus or minus twenty percent (20%) of the Bloomberg US Aggregate Bond Index.	✓			
Minimum Issue Credit Rating at the time of purchase will be: A1 or equivalent for commercial paper BBB- for Corporate Bonds BBB- for Mortgage-Backed Securities BBB- for Commercial Mortgage-Backed Securities BBB- for Asset-Backed Securities BBB- for Non-US Dollar Denominated Securities BBB- for Dollar Denominated Emerging Market Securities	✓			
Average portfolio credit quality must be A- or better.	✓			
Dollar denominated emerging market securities are permitted, but shall comprise no more than ten percent (10%) of the portfolio market value.	✓			
A minimum number of 25 securities shall be held.	✓			
Investments in mortgage interest only and principal only securities or their derivations are permitted, but shall comprise no more than five percent (5%) of the portfolio market value.	✓			
Private placements, including 144A securities are not permitted.	✓			
Outperform its Custom Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.	✓			5-year: PIMCO net of fees return was 2.7% vs. 2.6% for the PIMCO Custom Index
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.		✗		5-year: PIMCO ranked in the 48th percentile for Core Fixed Income

	Yes	No	N/A	Explanation
<b>d) Neuberger Berman – Credit</b>				
Duration must not exceed plus two (2) years of the custom index.	✓			
Minimum Issue Credit Rating for commercial paper will be A1.	✓			
Average portfolio credit quality must be B or better.	✓			
Obligations of specific issuers are subject to five percent (5%) per issuer limit, excluding investments in commingled vehicles.	✓			
Standalone purchases of private placements, including 144A securities, are not allowed.	✓			
Outperform the State's custom benchmark as measured by twenty percent (20%) Bloomberg US Credit Index, twenty percent (20%) BofA Merrill Lynch US High Yield Master II Constrained Index and sixty percent (60%) S&P/LSTA Leveraged Loan Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: Neuberger Berman net of fees return was 2.7% vs. 3.3% for the Credit Custom Index
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.		✗		5-year: Neuberger Berman ranked in the 45th percentile for US Fixed Income
<b>Investment Grade Credit Sleeve:</b>				
Minimum Issue Credit Rating at the time of purchase will be: BBB- for individual securities.	✓			
Minimum of ten percent (10%) of the total portfolio must be invested in investment grade rated securities and a maximum of sixty percent (60%) of the total portfolio can be invested in investment grade rated securities.	✓			
<b>High Yield Sleeve:</b>				
Minimum Issue Credit Rating at the time of purchase will be: CCC- for individual securities. Securities that are not rated shall be, in the judgement of the investment manager, of credit quality equal or superior to the standards described above.	✓			
Maximum of forty percent (40%) of the total portfolio can be invested in high yield bonds.	✓			
<b>Bank Loan Sleeve:</b>				
Minimum Issue Credit Rating at the time of purchase will be: CCC for individual securities. Securities that are not rated shall be, in the judgement of the investment manager, of credit quality equal or superior to the standards described above.	✓			
Minimum of forty percent (40%) of the total portfolio must be invested in bank loans and a maximum of eighty percent (80%) of the total portfolio can be invested in bank loans.	✓			

	Yes	No	N/A	Explanation
<b>e) Seix – Credit</b>				
Duration must not exceed plus two (2) years of the custom index.	✓			
Minimum Issue Credit Rating for commercial paper will be A1.	✓			
Average portfolio credit quality must be B or better.	✓			
Obligations of specific issuers are subject to five percent (5%) per issuer limit, excluding investments in commingled vehicles.	✓			
Standalone purchases of private placements, including 144A securities, are not allowed.	✓			
Outperform the State's custom benchmark as measured by twenty percent (20%) Bloomberg US Credit Index, twenty percent (20%) BofA Merrill Lynch US High Yield Master II Constrained Index and sixty percent (60%) S&P/LSTA Leveraged Loan Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: Seix net of fees return was 3.2% vs. 3.3% for the Credit Custom Index
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.	✓			5-year: Seix ranked in the 30th percentile for US Fixed Income
<b>Investment Grade Credit Sleeve:</b>				
Minimum Issue Credit Rating at the time of purchase will be: BBB- for individual securities.	✓			
Minimum of ten percent (10%) of the total portfolio must be invested in investment grade rated securities and a maximum of sixty percent (60%) of the total portfolio can be invested in investment grade rated securities.	✓			
<b>High Yield Sleeve:</b>				
Minimum Issue Credit Rating at the time of purchase will be: CCC- for individual securities. Securities that are not rated shall be, in the judgement of the investment manager, of credit quality equal or superior to the standards described above.	✓			
Maximum of forty percent (40%) of the total portfolio can be invested in high yield bonds.	✓			
<b>Bank Loan Sleeve:</b>				
Minimum Issue Credit Rating at the time of purchase will be: CCC for individual securities. Securities that are not rated shall be, in the judgement of the investment manager, of credit quality equal or superior to the standards described above.	✓			
Minimum of forty percent (40%) of the total portfolio must be invested in bank loans and a maximum of eighty percent (80%) of the total portfolio can be invested in bank loans.	✓			

	Yes	No	N/A	Explanation
<b>f) Grosvenor Silvery Lupine Fund – Opportunistic Fixed Income</b>				
Outperform the CS Western European Hi Yld Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.			N/A	Inception date: 07/2014
<b>g) Investec – Emerging Market Debt (Local Currency)</b>				
Duration must fall in the range of plus or minus twenty percent (20%) of the index.	✓			
Minimum Issue Credit Rating at the time of purchase will be: A1 for commercial paper B- for individual securities Where a security is not rated at the issue level, the issuer rating will be relied upon.	✓			
Average portfolio credit quality must be BB+ or better.	✓			
Obligations of individual sovereign/quasi-sovereign issuer are subject to a twenty-five percent (25%) per issuer limit.	✓			
Private placements, including 144A securities are not allowed.	✓			There are four 144A securities held by this portfolio. Retention of these securities in the portfolio is permitted pursuant to Section 7.2 of the Investment Policy.
The investment manager, as part of managing the account, can take net investment positions of up to twenty percent (20%) of the portfolio in currency and currency forwards.	✓			
Outperform the JPM GBI-EM Gbl Dvf'd Index (USD) (TR) (Unhedged), net of fees, over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: Investec net of fees return was -1.7% vs. the return of -1.0% for the JPM GBI-EM Gbl Dvf'd Index (USD) (TR) (Unhedged)
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.		✗		5-year: Investec ranked in the 94th percentile for Emerging Market Debt (Local Currency)

	Yes	No	N/A	Explanation
<b>h) Stone Harbor – Emerging Market Debt (Local Currency)</b>				
Duration must fall in the range of plus or minus twenty percent (20%) of the index.	✓			
Minimum Issue Credit Rating at the time of purchase will be: A1 for commercial paper B- for individual securities Where a security is not rated at the issue level, the issuer rating will be relied upon.	✓			The portfolio currently holds securities which are rated below B-. Retention of these securities in the portfolio is permitted pursuant to Section 7.2 of the Investment Policy.
Average portfolio credit quality must be BB+ or better.	✓			
Obligations of individual sovereign/quasi-sovereign issuer are subject to a twenty-five percent (25%) per issuer limit.	✓			
Private placements, including 144A securities are not allowed.	✓			The portfolio holds private placement and 144A securities. Retention of these securities in the portfolio is permitted pursuant to Section 7.2 of the Investment Policy.
The investment manager, as part of managing the account, can take net investment positions of up to twenty percent (20%) of the portfolio in currency and currency forwards.	✓			
Outperform the JPM GBI-EM Gbl Dvf'd Index (USD) (TR) (Unhedged), net of fees, over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: Stone Harbor net of fees return was -2.6% vs. return of -1.0% for the JPM GBI-EM Gbl Dvf'd Index (USD) (TR) (Unhedged)
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.		✗		5-year: Stone Harbor ranked in the 100th percentile for Emerging Market Debt (Local Currency)
<b>i) State Street – US TIPS – Passive</b>				
Meet the performance of the Bloomberg US TIPS Index with minimal tracking error, gross of fees, over a full market cycle, approximated by the most recent 5-year period.	✓			5-year: State Street gross of fees return was 1.8% vs. 1.8% for the Bloomberg US TIPS Index and a tracking error of 0.3%

	Yes	No	N/A	Explanation
<b>j) Internal Int. Govt Fixed Income Portfolio – Intermediate Govt Fixed Income</b>				
Obligations issued or guaranteed by the U.S. government, U.S. agencies or U.S. government-sponsored corporations and agencies are eligible without limit.	✓			
Non-U.S. Government securities are allowed, up to a maximum of 20% of the portfolio.	✓			
Duration should not exceed +2 years of the index.	✓			
Outperform the Bloomberg US Gov't: Int. Term Bond Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.	✓			5-year: Int. Govt Fixed Income Portfolio net of fees return was 2.3% vs. return of 1.5% for the Bloomberg US Gov't Int. Term Bond Index
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.		✗		5-year: Int. Govt Fixed Income Portfolio ranked in the 47th percentile for Government Fixed Income



	Yes	No	N/A	Explanation
<b>k) Logan Circle – Long Duration Credit</b>				
Obligations issued or guaranteed by the U.S. government, U.S. agencies or U.S. government-sponsored corporations and agencies are eligible without limit.	✓			
All other issuers are subject to a 5% per issuer limit excluding investments in commingled vehicles	✓			
A maximum of 30% of the portfolio may be invested in U.S. dollar denominated non-U.S. fixed income securities.	✓			
A maximum of 10% of the portfolio may be invested in U.S. dollar denominated emerging market securities.	✓			
A maximum of the appropriate benchmark plus 5% of the portfolio may be invested in convertible and municipal securities.	✓			
Portfolio duration for long duration bond portfolios must be within plus or minus 2 years of the Bloomberg Barclays U.S. Government/Credit: Long Term Bond Index. Custom portfolios designed to match the duration of plan liabilities must be within plus or minus 1 year of the duration of plan liabilities.	✓			
Average portfolio quality will be BBB+ or better. Securities shall be rated investment grade at time of purchase.	✓			
Outperform the Bloomberg US Long Credit Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.			N/A	Inception date: 11/2018
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 11/2018
	Yes	No	N/A	Explanation
<b>l) Internal Long Duration – Long Duration Government</b>				
Obligations issued or guaranteed by the U.S. government, U.S. agencies or U.S. government-sponsored corporations and agencies are eligible without limit.	✓			
All other issuers are subject to a 5% per issuer limit excluding investments in commingled vehicles	✓			
A maximum of 30% of the portfolio may be invested in U.S. dollar denominated non-U.S. fixed income securities.	✓			
A maximum of 10% of the portfolio may be invested in U.S. dollar denominated emerging market securities.	✓			
A maximum of the appropriate benchmark plus 5% of the portfolio may be invested in convertible and municipal securities.	✓			
Portfolio duration for long duration bond portfolios must be within plus or minus 2 years of the Bloomberg Barclays U.S. Government/Credit: Long Term Bond Index. Custom portfolios designed to match the duration of plan liabilities must be within plus or minus 1 year of the duration of plan liabilities.	✓			
Average portfolio quality will be BBB+ or better. Securities shall be rated investment grade at time of purchase.	✓			
Outperform the Bloomberg US Gov Long Term Bond Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.			N/A	Inception date: 01/2019
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 01/2019

	Yes	No	N/A	Explanation
<b>m) State Street – Low Duration Credit</b>				
Obligations issued or guaranteed by the U.S. government, U.S. agencies or U.S. government-sponsored corporations and agencies are eligible without limit.	✓			
All other issuers are subject to a 5% per issuer limit excluding investments in commingled vehicles	✓			
Corporate securities will be subject to a maximum limit of 60%.		✗		This portfolio is managed specifically as a credit portfolio. The low duration asset class mandate has been split into an internal government component and an external credit component.
Agency Mortgage Backed Securities ("MBS") will be subject to a maximum limit of 5%. Non-agency MBS are not permissible.	✓			
Asset Backed Securities ("ABS"), excluding CMBS, will be subject to a maximum limit of 10%. Minimum rating at time of purchase is AAA, with the exception of up to 5% maximum ABS rated below AAA but no lower than A.	✓			
Commercial Mortgage Backed Securities ("CMBS") are subject to a maximum limit of 5%.	✓			
Portfolio duration must be within plus or minus 30% of the Bloomberg Barclays US Gov't/Credit: 1-3 Year Bond Index.	✓			
Meet the performance of the Bloomberg US Credit 1-3 Bond Year Index with minimal tracking error, gross of fees, over a full market cycle, approximated by the most recent 5-year period.			N/A	Inception date: 12/2018
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 12/2018
	Yes	No	N/A	Explanation
<b>n) Internal Low Duration – Low Duration Government</b>				
Obligations issued or guaranteed by the U.S. government, U.S. agencies or U.S. government-sponsored corporations and agencies are eligible without limit.	✓			
All other issuers are subject to a 5% per issuer limit excluding investments in commingled vehicles	✓			
Corporate securities will be subject to a maximum limit of 60%.	✓			
Agency Mortgage Backed Securities ("MBS") will be subject to a maximum limit of 5%. Non-agency MBS are not permissible.	✓			
Asset Backed Securities ("ABS"), excluding CMBS, will be subject to a maximum limit of 10%. Minimum rating at time of purchase is AAA, with the exception of up to 5% maximum ABS rated below AAA but no lower than A.	✓			
Commercial Mortgage Backed Securities ("CMBS") are subject to a maximum limit of 5%.	✓			
Portfolio duration must be within plus or minus 30% of the Bloomberg Barclays US Gov't/Credit: 1-3 Year Bond Index.	✓			
Outperform the Bloomberg US Gov 1-3 Year Bond Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.			N/A	Inception date: 03/2018
Performance should rank in the top 40th percentile of peer manager universe as measured by the State's Consultant, gross of fees, over a full market cycle, approximated by the most recent five-year period.			N/A	Inception date: 03/2018

	Yes	No	N/A	Explanation
<b>10. Cash and Cash Equivalents Portfolios</b>				
<b>JP Morgan Cash Composite*</b>				
<b>a) JP Morgan Treasury Cash</b>				
Portfolio's weighted average maturity is not to exceed 90 days.	✓			
Portfolio's maximum average cash flow weighted duration of the portfolio must not exceed 90 days.	✓			
The market value of the portfolio must remain within plus or minus one-half percent (0.5%) of one percent (1%) of amortized cost.	✓			
A maximum of 5% of total assets shall be placed in the securities of one issuer except for government securities.	✓			
Investment in any single issuer must not exceed 5% of the outstanding issues of that issuer except for government securities.	✓			
Investment performance must exceed Monitored Repurchase Agreement Rate and the cash equivalents allocation by the 90-day T-Bill rate, net of fees, over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: JP Morgan Treasury Cash net of fees return was 0.6% vs. 0.6% for the ICE BofAML 3 Mo US T-Bill Index
<b>b) JP Morgan Treasury Extended Cash</b>				
Portfolio's average cash flow weighted duration is not to exceed 3 years.	✓			
Average cash flow weighted duration is not to exceed 3 years.	✓			
Individual securities must not exceed cash flow weighted duration of greater than 5-years.	✓			
A maximum of 5% of total assets shall be placed in the securities of one issuer except for government securities.	✓			
Investment Performance must exceed an Equal Weighted Blend of the BofA Merrill Lynch 1-3 Year Agency, 1-3 Year Treasury, and a 0-3 Year Mortgage Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.	✓			5-year: JP Morgan Treasury Extended Cash net of fees return was 1.1% vs. 0.9% for the Blended Index
The extended portfolio must not exceed 35% of the total JP Morgan managed portfolio.	✓			

\*During the fourth quarter of 2011, JP Morgan Treasury Cash and JP Morgan Treasury Extended Cash were combined. Net of fees performance shown consists of performance calculated by RVK, Inc. prior to 12/31/2011 and performance calculated by JP Morgan thereafter.

	Yes	No	N/A	Explanation
<b>JP Morgan Wyo-Star Cash Composite*</b>				
<b>c) JP Morgan Wyo-Star Cash</b>				
Portfolio's weighted average maturity is not to exceed 90 days.	✓			
Portfolio's maximum average cash flow weighted duration of the portfolio must not exceed 90 days.	✓			
The market value of the portfolio must remain within plus or minus one-half percent (0.5%) of one percent (1%) of amortized cost.	✓			
A maximum of 5% of total assets shall be placed in the securities of one issuer except for government securities.	✓			
Investment in any single issuer must not exceed 5% of the outstanding issues of that issuer.	✓			
Investment performance must exceed Monitored Repurchase Agreement Rate and the cash equivalents allocation by the 90-day T-Bill rate, net of fees, over a full market cycle, approximated by the most recent 5-year period.		✗		5-year: JP Morgan Wyo-Star Cash net of fees return was 0.6% vs. 0.6% for the ICE BofAML 3 Mo US T-Bill Index
<b>d) JP Morgan Wyo-Star Extended Cash</b>				
Portfolio's average cash flow weighted duration is not to exceed 3 years.	✓			
Average cash flow weighted duration is not to exceed 3 years.	✓			
Individual securities must not exceed cash flow weighted duration of greater than 5-years.	✓			
A maximum of 5% of total assets shall be placed in the securities of one issuer except for government securities.	✓			
Investment Performance must exceed an Equal Weighted Blend of the BofA Merrill Lynch 1-3 Year Agency, 1-3 Year Treasury, and a 0-3 Year Mortgage Index, net of fees, over a full market cycle, approximated by the most recent 5-year period.	✓			5-year: JP Morgan Wyo-Star Extended Cash net of fees return was 0.9% vs. 0.9% for the Blended Index
The extended portfolio must not exceed 35% of the total JP Morgan managed portfolio.	✓			

\*During the fourth quarter of 2011, JP Morgan Wyo-Star Cash and JP Morgan Wyo-Star Extended Cash were combined. Net of fees performance shown consists of performance calculated by RVK, Inc. prior to 12/31/2011 and performance calculated by JP Morgan thereafter.

**Custom Benchmark Comments**

The Wyoming State Actual Allocation Index is calculated using beginning month asset class weights applied to the appropriate asset class benchmark return, using the US Equity Custom Index for US equities, MSCI ACW Ex US Index (Net) for international equities, manager specific benchmarks for fixed income, ICE BofA Merrill Lynch All Convertibles Index (All Qualities) for convertible bonds, NCREIF Open-End Diversified Core Equity Index (Gross) (AWA) for core real estate, NCREIF Property Index for value-added real estate, the State's actual private equity investment returns for private equity, HFRI FOF Comp Index for Diversified Hedge Funds, and ICE BofA Merrill Lynch 90 day US T-Bill rate for cash equivalents.

Pooled Fund actual allocation indices are calculated using beginning month asset class weights applied to the appropriate asset class benchmark return, using the US Equity Custom Index for US equities, MSCI ACW Ex US Index (Net) for international equities, manager specific benchmarks for fixed income, ICE BofA Merrill Lynch All Convertibles Index (All Qualities) for convertible bonds, NCREIF Open-End Diversified Core Equity Index for core real estate, NCREIF Property Index for value-added real estate, the State's actual private equity investment returns for private equity, HFRI FOF Comp Index for Diversified Hedge Funds, and the State Agency Pool Custom Index for the State Agency Pool allocation.

The US Equity Custom Index consists of the S&P 500 Index (Cap Wtd) through September 2014 and the Russell 3000 Index thereafter.

The State Street All Cap Custom Index consists of 69% Russell 3000 Index, 24% FTSE RAFI US 1000 Index and 7% MSCI USA Minimum Volatility Index (Net).

The International Equity Custom Index and the Fisher Custom Benchmark both consist of MSCI EAFE Index (Gross) through July 2010 and the MSCI ACW Ex US Index (Net) thereafter.

The Credit Custom Index consists of 20% Bloomberg US Credit Index, 20% ICE BofA Merrill Lynch US High Yield Master II Constrained Index, and 60% S&P/LSTA Leveraged Loan Index.

The Internal Intermediate Govt Fixed Income Portfolio Custom Index consists of the Bloomberg US Gov't: Int. Term Bond Index; prior to December 2009 the index consists of the Bloomberg US Gov't/Credit Bond Index.

The C.S. McKee Custom Index consists of the Bloomberg US Agg Bond Index through January 2018 and the Bloomberg US Agg Int Index thereafter.

The PIMCO Custom Index consists of the Bloomberg US Agg Bond Index through February 2018 and the Bloomberg US Agg Int Index thereafter.

The JP Morgan Blended Index consists of an equal-weighted allocation to the ICE BofA Merrill Lynch 1-3 Year US Treasury Index, ICE BofA Merrill Lynch 1-3 Year US Agencies Index, and ICE BofA Merrill Lynch 0-3 Year Weighted Average Life Mortgage Index.

The JP Morgan Cash Custom Index is calculated monthly using beginning of the month investment weights applied to each corresponding primary benchmark return. Currently, the primary benchmark for JP Morgan Cash is the ICE BofAML 3 Mo US T-Bill Index and for JP Morgan Extd is the JP Morgan Blended Index.

The Wyo-Star Cash Custom Index is calculated monthly using beginning of the month investment weights applied to each corresponding primary benchmark return. Currently, the primary benchmark for Wyo-Star Cash is the ICE BofAML 3 Mo US T-Bill Index and for Wyo-Star Extd is the JP Morgan Blended Index.

**Performance & Holding Comments**

RVK, Inc. shows performance beginning with the first full month following inception. Inception date shown for the Int'l Equity and JP Morgan Cash Composites represents the first date of performance calculated by RVK, Inc.

Performance shown for Pooled Funds is calculated on a capital-weighted basis using beginning-period allocations and does not reflect net cash flows.

Performance shown for the UW Portfolio Management Program prior to 07/01/2009 includes their participation in the State Agency Pool. Performance calculated for the UW Portfolio Management Program after 02/01/2013 has not been verified by RVK as the assets have been moved to a platform in which the custodian does not provide a reconcilable return.

Performance for the Internal Intermediate Govt Fixed Income Portfolio excludes distressed securities taken in-kind following the liquidation of WAMCO Core Plus.

Performance shown for the JP Morgan Cash Composite and the Wyo-Star Cash Composite consists of the respective operating and extended cash accounts.

Due to portfolio turnover, buy and hold attribution may not accurately represent quarterly performance relative to the benchmark.

Composite performance shown for Fixed Income is historically exclusive of convertibles.

**Alternative Investment Comments**

Reporting for Private Equity performance was changed from cost basis to the latest portfolio valuation adjusted for cash flows, consistent with the supplementary alternatives report. This methodology change involved reflecting the difference between cost value and the most recent valuation, resulting in a significant positive performance impact on the total fund during 2nd quarter 2008.

Valuations for value-added real estate and private equity were changed from a one-quarter lag to as of the most recent valuation, adjusted for subsequent cash flows. This methodology change involved reflecting all cash flows occurring during 4th quarter 2011 as of January 2012, resulting in a minor positive performance impact on the total fund during 1st quarter 2012. Investment (Cost) Values are not lagged.

Performance for value-added real estate and private equity investments is calculated on an IRR basis. For further analysis, please refer to the supplementary alternatives performance report.

Cheyenne Capital Fund valuations set forth herein could be materially different once underlying investments are realized. Market conditions at the time of exit could be substantially different than at the reporting period, resulting in valuations different than those represented above.

**Miscellaneous Comments**

Wyoming State Treasurer's Office fiscal year ends on June 30th.

Fixed Income style peer groups have low populations, and may cause ranks to change significantly from quarter to quarter.

"IM" is the acronym for Investment Metrics, the provider of peer group data used in ranking investment manager and asset class performance.

During the 4th quarter of 2012, WAMCO Core Plus, Neuberger Berman Core Plus, PIMCO Core Plus, PIMCO Mortgages, JP Morgan Mortgages, WAMCO Corporates, Logan Circle, and PIMCO Global/EM began the liquidation process to transition assets to the State's new fixed income asset class structure. The proceeds were used to fund State Street TIPS, C.S. McKee, JP Morgan Core, MacKay Shields, Neuberger Berman Core, PIMCO Core, and Wells Capital. During the 1st quarter of 2013, additional assets were transitioned to Neuberger Berman Credit, Seix, Investec, and Stone Harbor.

During the 4th quarter of 2014, State Street S&P 500 and Gabelli began the liquidation process to transition assets to the State's new US equity asset class structure. The proceeds were used to fund State Street All Cap, Epoch, Lazard, and RBC. During the 1st quarter of 2015, additional assets were transitioned to Arrowstreet.

During the 4th quarter of 2015, the Workers Compensation Fund was reclassified as a Permanent Fund.

During the 1st quarter of 2016, the State funded the Internal International Equity Portfolio, using proceeds from the liquidation of The Boston Company.

During the 3rd quarter of 2016, Bloomberg acquired the Barclays Global Family of Fixed Income Indices. Naming conventions have been updated to "Bloomberg" to reflect the acquisition.

During the 3rd quarter of 2016, MacKay Shields began the liquidation process, with proceeds used to increase allocations to C.S. McKee and the Internal Intermediate Govt Fixed Income Portfolio.

During the 1st quarter of 2017, Neuberger Berman Core and Wells Capital began their respective liquidation processes.

During the 2nd quarter of 2017, Manning & Napier began the liquidation process.

During the 4th quarter of 2017, Lazard began the liquidation process.

During the 4th quarter of 2017, Intercontinental Exchange (ICE) acquired the BofA Merrill Lynch Global Research FICC index platform. As a result, all BofA Merrill Lynch indices have been rebranded to "ICE BofA Merrill Lynch".

During the 1st quarter of 2018, Arrowstreet was reclassified as International Equity and the Internal Low Duration portfolio was funded.

During the 2nd quarter of 2018, Cohen & Steers, Grosvenor Diversified Hedge Funds, and Internal Diversified Hedge Funds were funded.

**Addendum**

**Miscellaneous Comments (Continued)**

During the 2nd quarter of 2018, the Hybrid Assets Composite was created for convertibles, preferred stock, and MLPs.

During the 2nd quarter of 2018, RBC began the liquidation process.

During the 3rd quarter of 2018, Internal Equity Russell 2000 was funded.

During the 3rd quarter of 2018, Harvest was funded.

During the 4th quarter of 2018, Logan Circle, Internal Long Duration Fixed Income Portfolio, and State Street Low Duration were funded.

## Glossary

**Active Return** - The difference between the investment manager/composite performance relative to the performance of an appropriate market benchmark.

**Active Share** - Measures the degree to which the holdings of a fund differ from the holdings of the benchmark. Active share is calculated by taking the sum of the absolute value of the differences of the weight of each holding in the fund versus the weight of each holding in the benchmark and dividing by two.

**Alpha** - A measure of the difference between a portfolio's actual returns and its expected performance, given its level of risk as measured by beta. It is a measure of the portfolio's historical performance not explained by movements of the market or a portfolio's non-systematic return.

**Alpha Ratio** - A measure of a portfolio's non-systematic return per unit of downside risk. It is measured by dividing the alpha of a portfolio by the downside risk. The non-systematic return is a measure of a portfolio's historical performance not explained by movements of the market.

**Average Quality** - Bond quality ratings are reported using the investment managers' and the index providers' preferred rating agency. *Average Quality for managers unable to provide this statistic is instead provided by Morningstar; if unavailable on Morningstar, it has been estimated using a credit quality distribution provided by the manager.* There are two primary rating agencies in the US. *Moody's* assigns ratings on a system that employs up to four symbols (consisting of letters and numbers) such as, Aaa, Aa2, etc., with Aaa being the highest or safest rating. *Standard & Poor's (S&P)* employs a system that uses + and - along with letters such as AAA, AA+, etc. The two rating agencies' systems are summarized below:

<u>S&amp;P</u>	<u>Moody's</u>	<u>Explanation</u>	<u>S&amp;P</u>	<u>Moody's</u>	<u>Explanation</u>
<b>Higher Credit Quality – Investment Grade</b>			<b>Lower Credit Quality – Below Investment Grade</b>		
AAA	Aaa	Prime/Highest credit quality	BB+	Ba1	Speculative/Low credit quality
AA+	Aa1	High credit quality	BB	Ba2	
AA	Aa2		BB-	Ba3	
AA-	Aa3		B+	B1	Highly speculative
A+	A1	Upper-medium credit quality	B	B2	
A	A2		B-	B3	
A-	A3		CCC+	Caa1	Substantial credit/default risk
BBB+	Baa1	Lower-medium credit quality	CCC	Caa2	Extremely speculative
BBB	Baa2		CCC-	Caa3	
BBB-	Baa3		CC	Ca	Vulnerable to default
			C	Ca	
			D	C	In default

**Benchmark Effect** - The difference between the blended return of each respective managers' benchmark within a composite and the composite's benchmark return.

**Beta** - A measure of the sensitivity of a portfolio to the movements in the market. It is a measure of a portfolio's non-diversifiable or systematic risk.

**Box Plots** - A graphical representation of the distribution of observations. From top to bottom, the four boxes represent the spread between the maximum value and the minimum value in each quartile. A quartile represents the values that divide the observations into four quarters (i.e., 1<sup>st</sup> quartile, 2<sup>nd</sup> quartile, 3<sup>rd</sup> quartile, and 4<sup>th</sup> quartile). The median observation is where the 2<sup>nd</sup> quartile and 3<sup>rd</sup> quartile meet.

**Buy and Hold Attribution** - At the beginning of the time period under analysis, the manager and benchmark portfolios are broken down into segments (i.e., styles, sectors, countries, and regions) based on the desired type of attribution. The formula assumes zero turn-over to the manager and benchmark portfolios throughout the period and calculates the segment returns ("buy and hold returns") to arrive at performance attribution. Due to portfolio turnover, buy and hold attribution may not accurately represent quarterly performance relative to the benchmark. Country, region, sector, and style allocations are as of the date one quarter prior to the reporting date, and the returns shown are for those segments throughout the quarter reported. Due to disclosure guidelines set by each investment manager, equity characteristics shown are as of the most recent date available. The following is the methodology for segment classification:

**Sector** - Attribution is calculated using the Global Industry Classification Standard (GICS) which is a detailed and comprehensive structure for sector and industry analysis. Stocks are classified by their primary sector, as defined by S&P Capital IQ data.

**Country/Region** - Attribution is calculated using the Morgan Stanley Capital International (MSCI) region standards. Stocks are classified by their domicile country/region, as defined by S&P Capital IQ data.

**Style** - Stocks are classified into the following style boxes: large/mid/small vs. growth/neutral/value. Stocks are classified along large/mid/small categories at the time of the Russell index rebalancing, using the index market cap boundaries as cutoff points. Stocks are classified along growth/neutral/value categories at the time of the Russell index rebalancing, using the price/book ratio as supplied by S&P Capital IQ. Stocks in the Russell 3000 Index portfolio are sorted by price/book ratio; names with the highest price/book ratio that make up 1/3 of the total market capitalization are assigned to the growth category, names that make up the subsequent 1/3 of the total market capitalization are assigned to the neutral category, while the balance of the names are assigned to the value category.

Portfolio Characteristics and Buy and Hold Attribution reports utilize product-specific data for all mutual funds and commingled funds.

### Capital Markets Review -

**Breakeven Inflation** - Measures the expected inflation rate at each stated maturity by taking the difference between the real yield of the inflation-linked maturity curve and the yield of the closest nominal Treasury maturity.

**Consumer Confidence** - Measures domestic consumer confidence as defined by the degree of optimism on the state of the economy that consumers express through saving and spending.

**Consumer Price Index (CPI)** - Measures the change in the price level of consumer goods and services.

**Federal Funds Rate** - The interest rate at which a depository institution lends funds maintained at the Federal Reserve to another depository institution overnight. It is one of the most influential interest rates in the US economy, since it affects monetary and financial conditions, which in turn have a bearing on key aspects of the broad economy including employment, growth and inflation.

**Option-Adjusted Spread** - Measures the flat spread of an index or bond to the Treasury yield curve after removing the effect of any embedded options.





## Glossary

- Purchasing Managers Index (PMI)** - Measures economic activity by surveying purchasing managers on a monthly basis as to whether business conditions have improved, worsened, or stayed the same.
- Real Gross Domestic Product (Real GDP)** - An inflation-adjusted measure that reflects the value of all goods and services produced by an economy in a given year.
- US Dollar Total Weighted Index** - Measures the value of the US Dollar relative to a basket of other world currencies. It is calculated as the weighted geometric mean of the dollar's value versus the EUR, GBP, CAD, SEK, CHF, and JPY.
- Unemployment Rate** - The percentage of the total labor force that is unemployed but actively seeking employment.
- VIX** - Measures the implied volatility of S&P 500 Index options by looking at the market's expectation of the S&P 500 Index volatility over the next 30 day period. Commonly referred to as the "fear index" or the "fear gauge."
- Cash Flow Effect** - The composite's active return minus the sum of each managers' active return minus the benchmark effect.
- Consistency** - The percentage of quarters that a product achieved a rate of return higher than that of its benchmark. The higher the consistency figure, the more value a manager has contributed to the product's performance.
- Convexity** - A measure of the shape of the curve that describes the relationship between bond prices and bond yields.
- Correlation** - A statistical measure of the relationship between asset class returns. A value of 1.00 is a perfect correlation; that is, the asset classes always move in the same direction. A value of -1.00 indicates a perfect negative correlation, in which the asset classes always move in opposite directions of each other. A value of 0 indicates there is no relationship between the direction of returns of the two asset classes. Correlation calculations only consider the direction of changes relative to two variables and not the magnitude of those changes.
- Coupon Rate** - The percentage rate of interest paid on a bond or fixed income security; it is typically paid twice per year.
- Current Yield** - The annual income of a security divided by the security's current price.
- Down Market Capture** - Down market by definition is negative benchmark return and down market capture represents the ratio in % terms of the average portfolios return over the benchmark during the down market period. The lower the value of the down market capture the better the product's performance.
- Downside Risk** - A measure similar to standard deviation, but focuses only on the negative movements of the return series. It is calculated by taking the standard deviation of the negative monthly returns. The higher the factor, the riskier the product.
- Earnings Per Share** - It is backward looking, calculated using the one year current EPS divided by the one year EPS five years ago.
- Effective Duration** - The approximate percentage change in a bond's price for a 100 basis point change in yield.
- Excess Return vs. Market** - Average of the monthly arithmetic difference between the manager's return and the benchmark return over a specified time period, shown on an annualized basis.
- Excess Return vs. Risk Free** - Average of the monthly arithmetic difference between the manager's return and the risk-free return (i.e., ICE BofAML 3 Mo US T-Bill Index unless specified otherwise) over a specified time period, shown on an annualized basis.
- Excess Risk** - A measure of the standard deviation of a portfolio's performance relative to the risk free return.
- Expense Ratios** - Morningstar is the source for mutual fund expense ratios.
- Gain/Loss** - The net increase or decrease in the market value of a portfolio excluding its Net Cash Flow for a given period.
- Indices** - All indices and related information are considered intellectual property and are licensed by each index provider. The indices may not be copied, used or distributed without the index provider's prior written approval. Index providers make no warranties and bear no liability with respect to the indices, any related data, their quality, accuracy, suitability and/or completeness.
- Information Ratio** - Measured by dividing the active rate of return by the tracking error. The higher the information ratio, the more value-added contribution by the manager.
- Liability Driven Investing (LDI)** - A method to optimally structure asset investments relative to liabilities. The change in liabilities is estimated by the Ryan Labs Generic PPA Index of appropriate duration for that Plan. This benchmark is based on generic data and is therefore an approximation. RVK is not an actuarial firm, and does not have actuarial expertise.
- Estimated Funded Status** - The estimated ratio of a Plan's assets relative to its future liabilities. This is calculated by dividing the Plan's asset market value by the estimated present value of its liabilities. The higher the estimated funded status, the better the Plan's ability to cover its projected benefit obligations. An estimated funded status of 100% indicates a Plan that is fully funded.
- Estimated PV of Liabilities** - An estimate of a Plan's future liabilities in present value terms. The beginning of the period liability is provided by the Plan's actuary. The period-end present value liability estimate provided in this report is derived by applying the estimated percentage change generated using the Ryan Labs Generic PPA Index with duration similar to that reported on the most recent actuarial valuation report.
- Duration of Liabilities** - The sensitivity of the value of a Plan's liabilities to changes in interest rates, as calculated by the Plan's actuary.
- Duration of Assets** - The dollar-weighted average duration of all the individual Plan assets.
- Estimated Plan Hedge Ratio** - The estimate of how well a Plan's investment portfolio is hedged against changes in interest rates - a primary driver of funded status movements. This is calculated by dividing the dollar-weighted values of both the Plan asset duration by the liability duration and multiplying by the estimated funded status. An estimated plan hedge ratio of zero indicates that the Plan's liabilities have not been hedged, whereas a value of one indicates fully hedged.
- Modified Duration** - The approximate percentage change in a bond's price for a 100 basis point change in yield, assuming the bonds' expected cash flows do not change.

## Glossary

**Mutual Fund Performance** - Whenever possible, manager performance is extended for any share class that does not have 10 years of history. Using Morningstar's methodology, a single ticker within the same fund family (often the oldest share class) is chosen to append historical performance.

**Net Cash Flow** - The sum, in dollars, of a portfolio's contributions and withdrawals. This includes all management fees and expenses only when performance shown is gross of fees.

### Peer Groups -

**Plan Sponsor Peer Groups** - RVK utilizes the Mellon Analytical Solutions Trust Universe along with the Investment Metrics Plan Sponsor Universe. The combined Mellon Analytical Solutions Trust Universe and Investment Metrics Plan Sponsor Universe is used for comparison of total fund composite results and utilizes actual client performance compiled from consultant and custodian data. The Plan Sponsor Peer Group database includes performance and other quantitative data for over 2,100 plans which include corporate, endowment, foundation, public, and Taft Hartley plans. Plan Sponsor Peer Groups are gross of fees.

**Investment Manager Peer Groups** - RVK utilizes Investment Metrics' Peer Groups for investment manager peer comparison and ranking. The Investment Metrics Peer Group database includes performance and other quantitative data for over 840 investment management firms and 29,000 investments products, across more than 160 standard peer groups. Mutual Fund Peer Groups are net of fees. For more information on Peer Groups, visit <https://www.invmetrics.com/style-peer-groups>.

**Percentile Rankings** - Percentile rank compares an individual fund's performance with those of other funds within a defined peer group of managers possessing a similar investment style. Percentile rank identifies the percentage of a fund's peer group that has a higher return (or other comparative measurement) than the fund being ranked. Conversely, 100 minus the individual fund's ranking will identify the percentage of funds within the peer group that have a lower return than the fund being ranked.

1 - Highest Statistical Value

100 - Lowest Statistical Value

*Example: American Funds AMCP;R-4 (RAFEX) is ranked in the 4<sup>th</sup> percentile within the IM US Equity Large-Cap Growth Funds (MF) Peer Group for the Sharpe Ratio. Within the IM US Equity Large-Cap Growth Funds peer group, 4% of the other funds performed better than American Funds AMCP;R-4 (RAFEX), while 96% of the funds performed worse.*

**Performance Methodology** - RVK calculates performance for investment managers and composites using different methodologies.

**Investment Managers** - Performance is calculated for interim periods between all large external cash flows for a given month and geometrically linked to calculate period returns. An external cash flow is defined as cash, securities, or assets that enter or exit a portfolio. RVK defines a "large cash flow" as a net aggregate cash flow of  $\geq 10\%$  of the beginning-period portfolio market value or any cash flow that causes RVK calculated performance to deviate from manager/custodian reported performance in excess of 5 basis points for a given month.

**Composites** - The Modified Dietz methodology is utilized to calculate asset class, sub-asset class, and total fund composite performance. The Modified Dietz method calculates a time-weighted total rate of return that considers the timing of external cash flows; however, it does not utilize interim period performance to mitigate the impact of significant cash in- and outflows to the composite.

RVK calculates performance beginning with the first full month following inception. Since inception performance may vary from manager reported performance due to RVK using the first full month of returns as the inception date. Performance for both managers and composites is annualized for periods greater than one year.

**Portfolio Characteristics** - Due to disclosure guidelines set by each investment manager, portfolio characteristics shown are as of the most recent date available.

**Price to Earnings Ratio** - The ratio of a company's share price to its per-share earnings

**Private Equity Quartile Ranks** - Private Equity quartile ranks are generated using vintage year peer group data provided by Thomson Reuters, and are based on each fund's annualized, since inception internal rate of return (IRR). Three Private Equity peer groups are available via Thomson Reuters: Buyout, Venture, and All Private Equity. Ranks are available quarterly, at a one-quarter lag.

**Return** - Compounded rate of return for the period.

**% Return** - The time-weighted rate of return of a portfolio for a given period.

**R-Squared** - The percentage of a portfolio's performance explained by the behavior of the appropriate benchmark. High R-Squared means a higher correlation of the portfolio's performance to the appropriate benchmark.

**Risk Free Benchmark** - ICE BofAML 3 Mo US T-Bill Index unless specified otherwise.

## Glossary

**RVK Liquidity Rating** - A qualitative method for determining the relative amount of liquidity in a portfolio. The characteristics considered when determining relative liquidity include trading volume, gates for redemption, leverage, nature of transactions, and pricing mechanisms. The RVK Liquidity Rating is calculated using beginning of month investment weights applied to each corresponding asset class liquidity rating.

<u>Asset Class</u>	<u>RVK Liquidity Rating</u>	<u>Asset Class</u>	<u>RVK Liquidity Rating</u>
<u>Liquid Investments</u>		<u>Less Liquid Investments</u>	
T-Bills and Treasuries	100	Fixed Income Plus Sector	50
Cash Equivalents	98	Bank Loans	50
TIPS	95	Stable Value (Plan Sponsor Directed)	50
US Large Cap Equity	95	Absolute Return Strategies	35
Diversified Real Return	93		
Stable Value (Participant Directed)	91		
Non-US Large Cap Equity	90	<u>Not Liquid Investments</u>	
Global Tactical Asset Allocation	88	Core Real Estate	25
US Small Cap Equity	85	Core Plus Real Estate	15
REITS	85	Non-Core Real Estate	5
Non-US Small Cap Equity	85	Private Equity Funds of Funds	5
Emerging Markets Equity	85		
Core Fixed Income	85		
Core Plus Fixed Income	80		

**Sector Allocation** - Negative fixed income sector allocation reflects manager's use of derivatives, short selling, or interest rate swaps.

**Sharpe Ratio** - Represents the excess rate of return over the risk-free return (i.e., ICE BofAML 3 Mo US T-Bill Index unless specified otherwise), divided by the standard deviation of the excess return to the risk free asset. The result is the absolute rate of return per unit of risk. The higher the value, the better the product's historical risk-adjusted performance.

**Simple Alpha** - The difference between the manager's return and the benchmark's return.

**Spread Duration** - The approximate percentage change in a bond's price for a 100 basis point change in its spread over a Treasury of the same maturity.

**Standard Deviation** - A statistical measure of the range of a portfolio's performance. The variability of a return around its average return over a specified time period.

**Time Period Abbreviations** - **QTD** - Quarter-to-Date. **CYTD** - Calendar Year-to-Date. **FYTD** - Fiscal Year-to-Date. **YOY** - Year Over Year.

**Thematic Classification** - Represents dedicated manager allocations; as such, thematic allocations are approximations. RVK categorizes the following asset classes as Alpha, Capital Appreciation, Capital Preservation, and Inflation:

<u>Alpha</u>	<u>Capital Appreciation</u>	<u>Capital Preservation</u>	<u>Inflation</u>
Absolute Return Strategies	Public Equity	Core Fixed Income	TIPS
Currency Overlay	Private Equity	CMBS Fixed Income	Bank Loans
	Preferred Securities	Asset Backed Fixed Income	Core Real Estate
	High Yield	Domestic Core Plus Fixed Income	Real Return
	Convertible Fixed Income	Mortgage Backed Fixed Income	Inflation Hedges
	TALF Funds	International Developed Fixed Income	REITS
	Distressed Debt	Cash Equivalents	Commodities
	Emerging Market Fixed Income	Stable Value	
	Value Added Real Estate		
	Opportunistic Real Estate		

**Total Fund Attribution** - The Investment Decision Process (IDP) model provides an approach to evaluating investment performance that applies to all asset classes and investment styles. The IDP model is based on a top-down hierarchy framework of investment decisions, with each decision contributing to the overall profit or loss. The IDP approach starts from the strategic asset allocation and follows the flow of the investments down to the manager's skill.

**Strategic Asset Allocation (SAA)** - The percentage return gained or lost from the long-term strategic asset allocation decision, the most significant determinant of long-term performance. SAA is the product of the target asset allocation multiplied by the corresponding benchmark returns.

**Tactical Asset Allocation (TAA)** - The percentage return gained or lost from not having been precisely allocated at the target asset allocation mix, whether by deviations that are tactical in nature or a by-product of moving towards the target mix. TAA is the product of the actual asset allocation multiplied by the broad asset class benchmarks, less the SAA.

**Style Selection (SS)** - The percentage return gained or lost from intentional style biases within each asset class (e.g. value rather than core or overweight to emerging markets relative to benchmark). SS is the product of the actual manager allocation within each asset class multiplied by their specific benchmark, less TAA.

**Manager's Skill (MS)** - The percentage return gained or lost from manager value added relative to their specific benchmark. MS is the product of the actual manager allocation multiplied by their achieved excess return.

**Total Fund Beta** - Total Fund Beta is calculated using the S&P 500 as the benchmark. It represents a measure of the sensitivity of the total fund to movements in the S&P 500 and is a measure of the Total Fund's non-diversifiable or systematic risk.

**Tracking Error** - A measure of the standard deviation of a portfolio's performance relative to the performance of an appropriate market benchmark.

## Glossary

**Treynor Ratio** - Similar to Sharpe ratio, but focuses on beta rather than excess risk (standard deviation). Treynor ratio represents the excess rate of return over the risk-free rate (i.e., ICE BofAML 3 Mo US T-Bill Index unless specified otherwise) divided by the beta. The result is the absolute rate of return per unit of risk. The higher the value, the better historical risk-adjusted performance.

**Unit Value** - The dollar value of a portfolio, assuming an initial nominal investment of \$100, growing at the compounded rate of %Return for a given period.

**Up Market Capture** - Up market by definition is positive benchmark return and up market capture represents the ratio in % terms of the average portfolios return over the benchmark during the up market period. The higher the value of the up market capture the better the product's performance.

**Yield to Maturity** - The rate of return achieved on a bond or other fixed income security assuming the security is bought and held to maturity and that the coupon interest paid over the life of the bond will be reinvested at the same rate of return. The 30-Day SEC Yield is similar to the Yield to Maturity and is reported for mutual funds.

**Yield to Worst** - The bond yield calculated by using the worst possible yield taking into consideration all call, put, and optional sink dates.



PORTLAND

CHICAGO

NEW YORK

**Disclaimer of Warranties and Limitation of Liability** - This document was prepared by RVK, Inc. (RVK) and may include information and data from some or all of the following sources: client staff; custodian banks; investment managers; specialty investment consultants; actuaries; plan administrators/record-keepers; index providers; as well as other third-party sources as directed by the client or as we believe necessary or appropriate. RVK has taken reasonable care to ensure the accuracy of the information or data, but makes no warranties and disclaims responsibility for the accuracy or completeness of information or data provided or methodologies employed by any external source. This document is provided for the client's internal use only and does not constitute a recommendation by RVK or an offer of, or a solicitation for, any particular security and it is not intended to convey any guarantees as to the future performance of the investment products, asset classes, or capital markets.

