How...

ASRS Employees Deliver Service With PRIDE!

PROFESSIONALISM

We promote, strive for and expect individuals, teams, and divisions to possess professional qualities and skills to lead the organization.

- Displays a friendly, respectful and courteous demeanor even when confronted by adversity
- Has proactive and responsive approach to internal and external customer needs
- Possesses good communication and active listening skills
- Is a trusted contributor (manager, leader, SME, analyst, teammate)
- Takes personal accountability • Has subject matter expertise
- Has critical thinking skills • Has an honest, fair, non-judgmental mind-set
- Is adaptable to beneficial change • Adheres to the ASRS Code of Conduct

RESULTS

We treasure the achievements of individuals, teams, divisions and the agency that energize the organization.

- Meets goals and objectives
- Completes projects
- Produces quality work products
- Satisfies customers
- Attains individual accomplishments
- Manages risks successfully

IMPROVEMENT

We appreciate individuals, teams or divisions who drive the agency forward with new,innovative ideas and solutions.

- Promotes new ideas
- Enhances outcomes and performance
- Solves problems
- Enhances morale
- Improves relationships
- Increases efficiency, effectiveness or reduces costs

DIVERSITY

We recognize that utilizing different talents, strengths and points of view, strengthens the agency and helps propel outcomes greater than the sum of individual contributors.

- Encourages an attitude of openness and a free flow of ideas and opinions
- Treats others with dignity and respect
- Works effectively to accomplish goals with teams comprised of dissimilar individuals
- Recognizes and promotes skills in others attained on and off the job

EXCELLENCE

We celebrate individuals, teams and divisions who exceed expectations and deliver service with a PRIDE that permeates the organization.

- Surpasses member, stakeholder and associate expectations
- Demonstrates a willingness to go the extra mile to engender a positive public image
- Embraces change in a manner that inspires others
- Accepts responsibility and challenges with enthusiasm
- Takes a personal interest in promoting teamwork through effective use of communication (verbal, non-verbal, written and technological techniques)
- Creates a motivated, healthy and productive work environment that celebrates and rewards the accomplishments of others

ARIZONA STATE RETIREMENT SYSTEM

ARIZONA STATE RETIREMENT SYSTEM

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Paul Matson
Director

AGENDA

NOTICE OF A PUBLIC MEETING OF THE
ARIZONA STATE RETIREMENT SYSTEM (ASRS)
INVESTMENT COMMITTEE

3300 North Central Avenue
14th Floor Conference Room
Phoenix, Arizona 85012

Monday, February 23, 2015
2:30 p.m.

Pursuant to A.R.S. § 38-431.02, notice is hereby given to the members of the Arizona State Retirement System (ASRS) Investment Committee (IC) and to the general public that the ASRS Investment Committee will hold a public meeting February 23, 2015 beginning at 2:30 p.m., in the 14th Floor Conference Room of the Arizona State Retirement System office, 3300 North Central Avenue, Phoenix, Arizona. Trustees of the Committee may attend either in person or by telephone conference call.

This is a regularly scheduled meeting of the Investment Committee; however, due to possible attendance by other ASRS Board Trustees, this meeting may technically become a meeting of the Board or one of its Committees. Actions taken will be consistent with Investment Committee governance procedures. Actions requiring Board authority will be presented to the full Board for final decision.

The Chair may take public comment during any agenda item. If any member of the public wishes to speak to a particular agenda item, they should complete a Request to Speak form indicating the item and provide it to the Committee Administrator.

This meeting will be teleconferenced to the ASRS office in Tucson, 7660 E. Broadway Blvd., Suite 108, Tucson, AZ 85710. The conference call to Tucson will be disconnected after 15 minutes if there are no attendees in the Tucson audience.

The Agenda for the meeting is as follows:

1. Call to Order; Roll Call (estimated time 4 min.)..Mr. Tom Connelly
Chair, Investment Committee

2. Approval of Minutes of the December 1, 2014 Investment Committee Meeting (Action item; estimated time 1 min.)..Mr. Tom Connelly

3. Presentation, Discussion, and Appropriate Action Regarding ASRS Investment Program Updates (Informational and discussion item; estimated time 20 min.) .... Mr. Paul Matson
Director, ASRS
.... Mr. Gary Dokes
Chief Investment Officer, ASRS
.... Mr. Dave Underwood
Assistant Chief Investment Officer, ASRS
.... Mr. Al Alaimo
Portfolio Manager of Fixed Income, ASRS
.... Mr. Karl Polen
Head of Private Markets Investing, ASRS
.... Mr. Eric Glass
Portfolio Manager of Private Markets, ASRS
.... Mr. Kien Trinh
Assistant Vice President, Risk Services, State Street Investment Analytics

   a. ASRS Fund Positioning
   b. IMD Investment House Views
   c. Asset Class Committee (ACC) Activities
   d. Tactical Portfolio Positioning
   e. IMD Projects, Research, and Initiatives
   f. Investment Risk Reports and Securities Lending Risk Metrics

Regarding the following agenda item, pursuant to A.R.S. § 38-431.03(A)(2) and A.R.S. § 38-718(P) notice is hereby given to Trustees of the ASRS Investment Committee and the general public that the ASRS Investment Committee may vote to go into executive session, in the event specific manager data is discussed that is deemed confidential/non-public information. The executive session will take place in the 14th floor conference room.

4. Presentation, Discussion, and Appropriate Action Regarding Independent Reporting, Monitoring and Oversight of the ASRS Investment Program – Includes Total Fund and Investment Performance Report Q4-14 (Informational and discussion item; estimated time 40 min.) .... Mr. Allan Martin
Partner, NEPC
.... Mr. Dan LeBeau
Consultant, NEPC

5. Presentation, Discussion, and Appropriate Action Regarding the Cash Management Program (Informational and discussion item; estimated time 20 min.) .... Mr. Paul Matson
.... Mr. Gary Dokes
.... Mr. Dave Underwood
.... Mr. John Doran
Assistant Portfolio Manager, ASRS
.... Ms. Lupita Breland
Portfolio Analyst, ASRS
.... Mr. Micheal Copeland
Investment Analyst, ASRS

6. Presentation, Discussion, and Appropriate Action Regarding the Investment Policy Statement (IPS)(Action item; estimated time 20 min.) .... Mr. Paul Matson
.... Mr. Gary Dokes

7. Requests for Future Agenda Items (Informational and discussion item; estimated time 5 min.) .... Mr. Tom Connelly
.... Mr. Gary Dokes

8. Call to the Public .... Mr. Tom Connelly

Those wishing to address the ASRS Committee are required to complete a Request to Speak form before the meeting indicating their desire to speak. Request to Speak forms are available at the sign-in desk and should be given to the Committee Administrator. Trustees of the Committee are prohibited by A.R.S. § 38-431.01(G) from discussing or taking legal action on matters raised during an open call to the public unless the matters are properly noticed for discussion and legal action. As a result of public comment, the Committee Chair may direct staff to study and/or reschedule the matter for discussion and decision at a later date.

9. The next ASRS Investment Committee Meeting is scheduled for Monday, April 20, 2015 at 2:30 p.m., at 3300 N. Central Avenue, 14th Floor Conference room, Phoenix, Arizona.

10. Adjournment of the ASRS Investment Committee Meeting

A copy of the agenda background material provided to Committee Trustees (with the exception of material relating to possible executive sessions) is available for public inspection at the ASRS offices located at 3300 North Central Avenue, 14th Floor, Phoenix, Arizona, and 7660 East Broadway Boulevard, Suite 108, Tucson, Arizona. The agenda is subject to revision up to 24 hours prior to meeting. These materials are also available on the ASRS website (https://www.azasrs.gov/web/BoardCommittees.do) approximately 48 hours prior to the meeting.

Persons with a disability may request a reasonable accommodation such as a sign language interpreter or alternate formats of this document by contacting Tracy Darmer, ADA Coordinator at (602) 240-5378 in Phoenix, at (520) 239-3100, ext. 5378 in Tucson or 1-800-621-3778, ext. 5378 outside metro Phoenix or Tucson. Requests should be made as early as possible to allow time to arrange the accommodations.

Dated February 18, 2015

ARIZONA STATE RETIREMENT SYSTEM

Gloria Trujillo Committee Administrator	Gary Dokes Chief Investment Officer

Agenda Item #2

ARIZONA STATE RETIREMENT SYSTEM

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Paul Matson
Director

MINUTES OF THE PUBLIC MEETING OF THE
ARIZONA STATE RETIREMENT SYSTEM
INVESTMENT COMMITTEE

HELD ON

Monday, December 1, 2014

2:30 p.m.

The Arizona State Retirement System (ASRS) Investment Committee (IC) met at 3300 N. Central Avenue, 14th Floor, Phoenix, AZ 85012. Mr. Tom Connelly, Chair, called the meeting to order at 2:30 p.m.

1. Call to Order; Roll Call; Opening Remarks

Present: Mr. Tom Connelly, Chair
Prof. Dennis Hoffman, Vice-chair (via teleconference)

A quorum was present for the purpose of conducting business.

2. Approval of Minutes of the October 20, 2014 Investment Committee Meeting

Motion: Mr. Tom Connelly moved to approve the minutes of the October 20, 2014 Public Meeting. Prof. Dennis Hoffman seconded the motion.

By a vote of 2 in favor, 0 opposed, 0 abstentions, 0 excused, the motion was approved.

3. Presentation, Discussion, and Appropriate Action Regarding ASRS Investment Program Updates

Mr. Gary Dokes, ASRS Chief Investment Officer (CIO), provided an overview of the Total Fund Portfolio Positioning, Tactical Positioning in addition to the underweights and overweights of each asset class. He briefly reviewed the House Views and the topics discussed and decisions made at Asset Class Committees.

Mr. Connelly questioned why the authority to make final decisions with the Securities Lending Program is given to the Director versus IMD staff. Mr. Paul Matson, ASRS Director, responded by explaining both the CIO and Director must concur on Public Market and Private Market decisions as well as other areas such the Securities Lending structure as determined by the Director. The Director is responsible for the investment division and is part of the decision-making process. This is also consistent with the ASRS governance paradigm and Governance Handbook whereby the Board and IC oversee the decisions made, and therefore the Director does not have a conflict by being engaged in decision-making when another body such as the Board and IC are engaged in oversight. In addition, the investment experience of the current ASRS Director should specifically not be excluded from investment decision-making.

Mr. Kien Trinh, State Street Investment Analytics, presented the State Street Risk Report. He discussed the monthly reallocation summary, month-end risk profile and total plan over view exposure. He noted excess risk over the policy benchmark as being unchanged with no major trends to report.

4. Presentation, Discussion, and Appropriate Action Regarding Independent Reporting, Monitoring and Oversight of the ASRS Investment Program – Includes Total Fund and Investment Performance Report Q3-14

Mr. Allan Martin, New England Pension Consultants (NEPC) Partner, presented information on the investment performance and monitoring/oversight of ASRS investment program.

Performance result: (as of September 30, 2014)

- 8.7% (20-year annualized net return) vs. 8% (actuarial assumer interest rate.)

	Quarter	**1 Year**	**3 Years**	5 Years	10 Years	Since Inception
Total Fund	-1.3%	**10.8%**	**14.2%**	11.1%	7.4%	9.9%
Interim SAA Policy*	-1.9%	**9.6%**	**13.7%**	10.5%	7.0%	9.7%
Excess Return	0.6%	**1.2%**	**0.5%**	0.6%	0.4%	0.2%

**Interim SAA Policy*: 25% S&P 500/5% S&P 400/5% S&P 600/14% MSCI EAFE/3% MSCI EAFE Small Cap/6% MSCI Emerging Markets/6% Russell 2000 (lagged one quarter)/14% Barclays Capital Aggregate/5% Barclays Capital High Yield/4% JP Morgan GBI-EM Global Diversified/3% S&P/LSTA Levered Loan Index + 250 basis points (lagged one quarter)/6% NCREIF ODCE (lagged one quarter)/4% Dow Jones/UBS Commodities Index.

Note: Interim SAA Policy includes a proration of 1% Private Equity and 2% Real Estate, which are unfunded. Private Equity was prorated to domestic equity; Real Estate was prorated to domestic equity and fixed income.

Mr. Martin further presented the Total Fund Risk Statistics vs. the Peer Universe as well as NEPC's independent oversight and compliance of the Total Fund.

5. Presentation, Discussion, Update and Appropriate Action with Respect to the Asset Allocation Study

Mr. Matson provided the Committee with an update of the Asset Allocation Study and advised the Committee of the framework currently in place for the study. Mr. Martin and Mr. Chris Levell, NEPC Consultants, presented the Committee with analyses of different asset mixes (strawmen) which utilized various time period capital market assumptions developed by both NEPC and IMD staff. Discussion ensued regarding the merits of each strawman and the nature of the markets as it related to asset class inputs and their possible strategic/tactical portfolio allocations.

6. Presentation, Discussion, and Appropriate Action Regarding the IC Meeting 2015 Schedule

Mr. Dokes presented the proposed 2015 IC meeting schedule. He noted the meeting dates occur on a bi-monthly basis and are aligned with the Board meeting schedule. Mr. Connelly supported the proposed schedule and asked if anyone was in objection with the suggested schedule. The Committee accepted the schedule by unanimous consent.

7. Presentation, Discussion, and Appropriate Action Regarding ASRS Inflation-Linked Asset Class

Mr. Karl Polen, Head of Private Markets Investments and Mr. Eric Glass, Private Markets Portfolio Manager provided an in-depth presentation regarding the ASRS inflation-linked asset class. Mr. Polen and Mr. Glass gave comprehensive presentations on the performance and strategies on real estate, agriculture, infrastructure, and commodities.

8. Requests for Future Agenda Items

Mr. Connelly suggested NEPC provide the IC at some future date with a better understanding of the Fund performance metrics used in NEPC's Total Fund Risk Statistics vs. Peer Universe pages of their ASRS Investment Objectives/Performance Report.

9. Call to the Public

Mr. Jim Baker provided the Committee with general information and comments relating to the Oaktree Capital organization.

10. Adjournment

The meeting adjourned at 5:40 p.m.

Respectfully submitted,

ARIZONA STATE RETIREMENT SYSTEM

Gloria Trujillo Date Investment Committee Administrator	Gary Dokes Date Chief Investment Officer

Agenda Item #3

ARIZONA STATE RETIREMENT SYSTEM

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Paul Matson
Director

MEMORANDUM

TO: The Arizona State Retirement System (ASRS) Investment Committee (IC)

FROM: Mr. Paul Matson, Director
Mr. Gary Dokes, Chief Investment Officer (CIO)
Mr. Dave Underwood, Assistant Chief Investment Officer
Mr. Al Alaimo, Fixed Income Portfolio Manager
Mr. Karl Polen, Head of Private Markets Investing
Mr. Eric Glass, Portfolio Manager of Private Markets

DATE: February 11, 2015

RE: **Agenda Item #3:** Presentation, Discussion, and Appropriate Action Regarding ASRS Investment Program Updates

Purpose
To present and discuss information regarding ASRS investment program updates and Investment Risk Reports.

Recommendation
Informational only; no action required.

Background
The CIO and IMD Portfolio Managers will present and facilitate a discussion of the ASRS Investment Program.

The topics listed below are intended to comprehensively cover how ASRS investments are managed, what and why recent strategic/tactical investment decisions have been made and share other information regarding the investment activities of the ASRS.

a. ASRS Fund Positioning
b. IMD Investment House Views
c. Asset Class Committee (ACC) Activities
d. Tactical Portfolio Positioning
e. IMD Projects, Research, and Initiatives
f. Investment Risk Reports and Securities Lending Risk Metrics

Additionally, on a quarterly basis; the Director includes in the Board Packet the two primary Investment Risk reports IMD uses to help monitor and manage macro-level Total Fund investment risk. These reports along with other portfolio risk and positioning reports provide the CIO with valuable information needed to manage the ASRS Total Fund.

The Director and CIO will discuss the Total Fund, State Street truView Risk Report as well as IMD's Securities Lending Risk Metrics.

Attachments:

From ASRS
- Investment Program Updates Report

From State Street
- truView Risk Report – as of November 31, 2014

From ASRS
- Securities Lending Risk Metrics – as of January 31, 2015

Arizona State Retirement System

Investment Committee

Investment Program Updates

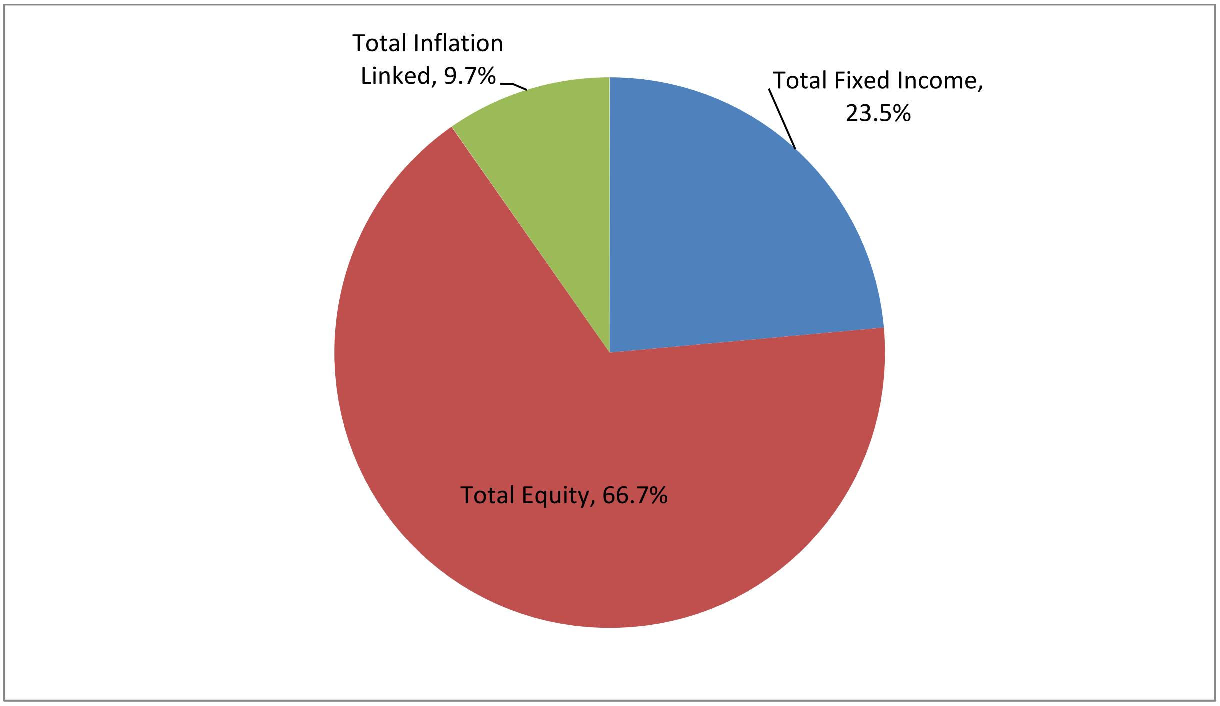
February 23, 2015

Presented by:
Gary R. Dokes, Chief Investment Officer, ASRS
David Underwood, Assistant Chief Investment Officer, ASRS
Karl Polen, Head of Private Markets Investing, ASRS
Al Alaimo, Fixed Income Portfolio Manager, ASRS
Eric Glass, Portfolio Manager of Private Markets, ASRS

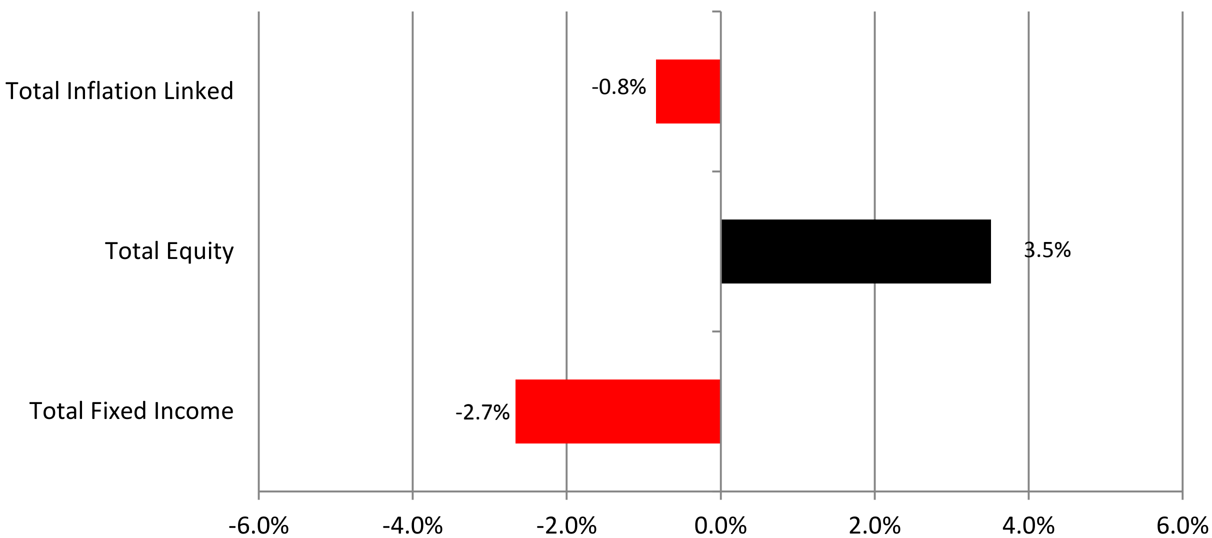
CONTENTS

TOTAL FUND POSITIONING – 01/30/2015

ACTUAL PORTFOLIO



ACTUAL PORTFOLIO (ASSUMED GTAA ALLOCATION VS. ADJUSTED SAA POLICY *)



**Real Estate and Private Equity actual weight is equal to policy weight during the implementation of the asset class.*

**Over/Underweights include both GTAA positions as well as IMD tactical considerations.*

Note: Opportunistic & Private Debt, Opportunistic Private Equity, Farmland & Timber, Real Estate and Private Equity market values are reported on a quarter-lag and adjusted to include the current quarter's cash flows. Within the Assumed GTAA Allocation vs. Adjusted SAA Policy chart, Real Estate was prorated to domestic equity, international equity and fixed income. Private Equity was prorated to domestic equity.

Pension (Plan, System, HBS Assets)		ASRS Market Value Report				As of:		Friday, January 30, 2015	
Account Manager	Account Manager Style	Fixed Income		Equity		Inflation Linked		Total	Pct of Fund
		Active	Enh/Passive	Active	Enh/Passive	Active	Enh/Passive		
State Street B&T: Boston	Operating Cash (non-assetized)		54,125,995					54,125,995	0.16%
	Operating Cash (assetized)		84,754,003					84,754,003	0.25%
	Cash Total							**$138,879,997**	0.41%
								Cash Policy Range	**0.00%**
GTAA Managers (2)	Active GTAA	1,134,132,831						1,134,132,831	3.37%
Blackrock: San Francisco	Passive (Intermediate Gov Credit)		24,435,446					24,435,446	0.07%
ASRS: Phoenix	Enhanced Passive F2		1,913,120,766					1,913,120,766	5.68%
Blackrock: San Francisco	Passive (US Debt Index)		447,481,884					447,481,884	1.33%
	Core Fixed Income Total							**$3,519,170,928**	10.45%
								Core Fixed Income Policy	**13.00%**
Columbia: Minneapolis	Active	801,832,454						801,832,454	2.38%
JP Morgan: Indianapolis	Active	476,627,006						476,627,006	1.42%
	High Yield Fixed Income Total							**$1,278,473,215**	3.80%
								High Yield Fixed Income Policy	**5.00%**
	US Fixed Income Total							**$4,797,644,142**	14.25%
								US Fixed Income Policy Range: 8% - 28%	**18.00%**
PIMCO (local): Newport Beach	Active	211,533,020						211,533,020	0.63%
Ashmore (blended): London	Active	209,160,811						209,160,811	0.62%
	EM Debt Total							**$420,693,830**	1.25%
								EM Debt Policy	**4.00%**
	Opportunistic Debt							**$1,092,834,407**	3.25%
								Opportunistic Debt Policy Range: 0% - 10%	**0.00%**
	Private Debt Total							**$1,478,310,235**	4.39%
								Private Debt Policy	**3.00%**
	Fixed Income Total							**$7,928,362,612**	23.54%
								Total Fixed Income Policy Range: 15% - 35%	**25.00%**
Intech: FL	Active (Growth)			477,289,652				477,289,652	1.42%
LSV: Chicago	Active (Value)			799,259,047				799,259,047	2.37%
GTAA Managers (2)	Active GTAA			867,983,607				867,983,607	2.58%
ASRS: Phoenix	Passive E2				5,011,472,705			5,011,472,705	14.88%
ASRS: Phoenix	Enhanced Passive E7				778,643,247			778,643,247	2.31%
ASRS: Phoenix	Enhanced Passive E8				538,220,000			538,220,000	1.60%
ASRS: Phoenix	Risk Factor Portfolio				534,422,530			534,422,530	1.59%
	Large Cap Equity Total							**$9,007,313,796**	26.75%
								Large Cap Policy	**23.00%**
Wellington: Boston	Active (Core)			415,048,895				415,048,895	1.23%
CRM: New York	Active (Value)			99,511,937				99,511,937	0.30%
ASRS: Phoenix	Passive E3 (Growth)				517,397,104			517,397,104	1.54%
ASRS: Phoenix	Passive E4 (Value)				514,318,044			514,318,044	1.53%
	Mid Cap Equity Total							**$1,546,275,980**	4.59%
								Mid Cap Policy	**5.00%**
TimesSquare: New York	Active SMID (Growth)			451,835,103				451,835,103	1.34%
DFA: Santa Monica	Active (Value)			371,319,595				371,319,595	1.10%
Champlain:Vermont	Active (Core)			91,582,683				91,582,683	0.27%
ASRS: Phoenix	Passive E6				475,972,183			475,972,183	1.41%
	Small Cap Equity Total							**$1,390,709,564**	4.13%
								Small Cap Policy	**5.00%**
	U.S. Equity Total							**$11,944,299,340**	35.47%
								US Equity Policy Range: 26% - 38%	**33.00%**
Brandes: San Diego	Active (Value)			548,532,560				548,532,560	1.63%
GTAA Managers (2)	Active GTAA			970,613,062				970,613,062	2.88%
American Century	Active (EAFE)			498,314,634				498,314,634	1.48%
Trinity Street	Active (EAFE)			308,842,731				308,842,731	0.92%
Thompson Siegel Walmsley	Active (EAFE)			148,531,185				148,531,185	0.44%
Blackrock: San Francisco	Passive (EAFE)				2,241,260,342			2,241,260,342	6.66%
	Large Cap Developed Non-US Equity Total							**$4,718,315,181**	14.01%
								Large Cap Developed Policy	**14.00%**
AQR: Greenwich	Active (EAFE SC)			167,957,574				167,957,574	0.50%
DFA: Santa Monica	Active (EAFE SC)			197,314,274				197,314,274	0.59%
Franklin Templeton: San Mateo	Active (EAFE SC)			371,514,033				371,514,033	1.10%
Blackrock: San Francisco	Passive (EAFE SC)				430,709,757			430,709,757	1.28%
	Small Cap Developed Non-US Equity Total							**$1,167,498,233**	3.47%
								Small Cap Developed Policy	**3.00%**
William Blair: Chicago	Active (EM)			472,216,275				472,216,275	1.40%
Eaton Vance: Boston	Active (EM)			468,496,496				468,496,496	1.39%
LSV: Chicago	Active (EM)			293,819,765				293,819,765	0.87%
Blackrock: San Francisco	Passive (EM)				655,703,864			655,703,864	1.95%
	Emerging Markets Equity Total							**$1,890,236,399**	5.61%
								Emerging Markets Policy	**6.00%**
	Non-US Equity Total							**$7,776,049,813**	23.09%
								Non-US Equity Policy Range: 16% - 28%	**23.00%**
	Private Equity Total							**$2,369,211,641**	7.04%
								Private Equity Policy Range: 5% - 9%	**7.00%**
	Opportunistic Equity							**$382,378,334**	1.14%
								Opportunistic Equity Policy Range: 0% - 3%	**0.00%**
	Equity Total							**$22,471,939,128**	66.73%
								Total Equity Policy Range: 53% - 73%	**63.00%**
Gresham: New York						545,199,435		545,199,435	1.62%
GTAA Managers (2)	Active GTAA					211,964,872		211,964,872	0.63%
	Commodities Total							**$757,164,307**	2.25%
								Commodities Policy Range: 1% - 7%	**4.00%**
GTAA Manager (1)	Active GTAA					36,775,802		36,775,802	0.11%
	Real Estate Total							**$2,065,223,972**	6.13%
								Real Estate Policy Range: 6% - 10%	**8.00%**
	Infrastructure Total							**$300,000,000**	0.89%
								Infrastructure Policy Range: 0% - 3%	**0.00%**
	Farmland & Timber Total					151,503,684		**$151,503,684**	0.45%
								Farmland & Timber Policy Range: 0% - 3%	**0.00%**
	Opportunistic Inflation Linked Total							**$0**	0.00%
								Opportunistic I/L Policy Range: 0% - 3%	**0.00%**
	Inflation Linked Total							**$3,273,891,963**	9.72%
								Inflation Linked Policy Range: 7%-15%	**12.00%**
	TOTAL Amounts	$4,311,610,111	$3,616,752,501	$10,773,796,344	$11,698,142,784	$3,425,395,647	$0	**$33,674,193,703**	**Total Fund**
	TOTAL Percent	12.80%	10.74%	31.99%	34.74%	10.17%	0.00%		

Asset Class	Actual Portfolio	SAA Policy: Target (Range)	Rebalancing Assumed Port	Rebalancing Adj Policy	Assumed - Adjusted % diff	Assumed - Adjusted $ diff	Policy Band check Actual - Adj	Passive Min	Passive Actual
Cash	0.41%	0%	0.00%		0.00%				
Core	10.45%	13%						**50%**	**73%**
High Yield	3.80%	5%							
US Fixed Income	14.25%	18% (8-28%)	13.97%	18.52% (9-29%)	-4.55%	-$1,532,991,136	**OK**		
EM Debt	1.25%	4%		4.00%					
Opportunistic Debt	3.25%	0% (0-10%)	3.25%	0% (0-10%)	3.25%	$1,092,834,407	**OK**		
Private Debt	4.39%	3%		3.00%					
Total Fixed Income	**23.54%**	**25% (15-35%)**	**22.86%**	**25.52% (16-36%)**	**-2.67%**	**-$898,346,223**	**OK**		
Large Cap	26.75%	23%							
Mid Cap	4.59%	5%							
Small Cap	4.13%	5%							
US Equity	**35.47%**	**33% (26-38%)**	**37.01%**	**33.77% (27-39%)**	**3.24%**	**$1,090,736,112**	**OK**	**50%**	**67%**
Developed Large Cap	14.01%	14%							
Developed Small Cap	3.47%	3%							
Emerging Markets	5.61%	6%							
Non-US Equity	**23.09%**	**23% (16-28%)**	**22.60%**	**23.47% (16-28%)**	**-0.87%**	**-$291,438,138**	**OK**	**30%**	**50%**
Private Equity	7.04%	7% (5-9%)	7.04%	7.04% (5-9%)	0.00%	$0	**OK**		
Opportunistic Equity	1.14%	0% (0-3%)	1.14%	0% (0-3%)	1.14%	$382,378,334	**OK**		
Total Equity	**66.73%**	**63% (53-70%)**	**67.78%**	**64.27% (54-71%)**	**3.51%**	**$1,181,676,308**	**OK**		
Commodities	2.25%	4% (1-7%)	2.00%	4.07% (1-7%)	-2.07%	-$698,057,968	**OK**		
Real Estate	6.13%	8% (6-10%)	6.02%	6.13% (4-8%)	-0.11%	-$36,775,802	**OK**		
Infrastructure	0.89%	0% (0-3%)	0.89%	0% (0-3%)	0.89%	$300,000,000	**OK**		
Farmland & Timber	0.45%	0% (0-3%)	0.45%	0% (0-3%)	0.45%	$151,503,684	**OK**		
Opportunistic I/L	0.00%	0% (0-3%)	0.00%	0% (0-3%)	0.00%	$0	**OK**		
Total Inflation Linked	**9.72%**	**12% (8-16%)**	**9.37%**	**10.21% (6-14%)**	**-0.84%**	**-$283,330,085**	**OK**		
Total	**100.00%**	**100%**	**100%**	**100%**	**0.00%**	**$0**		**30%**	**43%**
								Internally Managed Portfolios:	
Total GTAA								**$9,749,144,048**	**29%**
Bridgewater	$2,642,323,685	7.8%							
Windham	$579,146,489	1.7%							
Total	**$3,221,470,175**	**9.6%**							
Policy	**10% ±5%**	**OK**							

Opportunistic definitions:
An investment in a category that is not included in the ASRS Asset Allocation policy and represents an investment opportunity that is tactical in nature.

(Notable changes from the previous month are highlighted in RED)

FEBRUARY 2015

U.S. EQUITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**
   - Economic data suggests stable, sub-trend growth into 2015.
   - U.S. unemployment, persistently high until recently is displaying sustained improvement although income growth has not despite some anecdotal evidence of isolated upward pressure on wages.
   - At risk longer term due to stimulus measures, inflation remains generally subdued.
   - Liquidity remains ample; Federal Reserve policy remains accommodative without its asset purchases program.
   - Overall U.S. corporate profits are still growing, but with decelerating momentum; revenues have begun trending up modestly although high profit margins are no longer expanding.

2. Valuations: **NEUTRAL**
   - US equity markets backpedaled coming in 2015 as macro data and earnings reports were mixed, oil and copper prices continued to fall, and foreign exchange market volatility rose.
   - Though marginally rich, they remain near historic averages: S&P 500, 14.3x- 6.1x, S&P MID, 16.8x-19.1x; S&P SC600, 17.0x-19.9x.
   - Historic P/Es imply advances of 5-10% for mid and small caps; 9-12% for S&P 500.
   - Still rising earnings and low yields on 10-Yr Treasury notes combine for equity risk premiums that are favorably above the 4.0% long-range average for large caps, whereas those of mid- and small-caps are around 4.0%.

3. Sentiment: **NEUTRAL**
   - Short-term caution has moved up a notch following the sustained advance of equity markets without a significant pullback throughout 2013 and 2014.
   - Lessened near-term equity market volatility (i.e., VIX Index) still reflects growing acceptance of risk-oriented assets.
   - The relative strength of the U.S. Dollar continues to encourage assets into U.S. equities.

Commentary:

Early in to 2015, over-all allocation to U.S. stocks is 31.9% of Total Fund ("*Plan*"), reflecting both 2014's tactical views and the result of porting assets from the class to the Plan's private equity and real estate asset classes. By sub-class, the large-cap component is 23.0% of Plan; mid-cap is 4.6% and small 4.2%, respectively.

Large-cap stocks outperformed small-cap and mid-cap stocks over the course of 2014, the reverse of that seen in 2013, as the latter recalibrated comparatively rich valuations. Asset flows into passive index funds also drove some of that outperformance and in the process elevated valuations of all classes of U.S. stocks. Although more upwardly biased in mid-February, the US equity markets had trailed off in January as

participants weighed mixed earnings reports and the macro implications of sliding oil and commodity prices. Volatility ticked up as well, affected by an abrupt rise in foreign exchange market volatility brought on by dual surprise policy announcements from the Swiss National Bank and the Bank of Canada.
Nonetheless, valuations of domestic equities are nearly unchanged from late 2104, as are underlying fundamentals. Though they are ample, valuations still don't greatly surpass long-range levels. Top down 2015 EPS growth estimates are a generally bullish 9%. The positive impact from lower oil price, whose sectors have seen the greatest downgrades, is expected to feed through into upgrades to sectors outside of energy as 2015 progresses. The current economic environment in the U.S. looks fairly good in comparison to most alternatives. Payout ratios are still conservative; ongoing dividend growth should also support equities prices. Interestingly, cash levels in U.S. institutional portfolios have stayed at a relatively defensive average 10.6% of portfolio assets, similar to four to six months ago and versus an historic 5.0% median.

A strong USD is often a counterpart for weak USD commodity prices; this seems to be the case now. Whether driven by cyclical forces or secular factors, prices of commodities overall, are suppressed most visibly the energy-related. These soft prices confirm a low inflation setting, which, together with responsible monetary policy is helping to firm-up the USD despite a tepid economic setting. Robust investment flows into equities from outside the U.S., substantiated by anecdotal evidence, are more than counterbalancing whatever headwinds the USD makes for corporations. Moreover, U.S. small and mid-cap firms derive fewer revenues from abroad than large-cap multinationals, an advantage amid USD strength and the stronger U.S. economic backdrop.

Concern in the U.S. about deflation, as opposed to disinflation, has crept in, accelerated by the fall-off in the prices of oil and other commodities. The annualized CPI rate moving below 1% in December added to this concern. The U.S. isn't immune to deflation, appearing better protected than other economies, but it seems odd against a previous recent worry that (U.S.) QE would instead spark inflation. Consequences of deflation are penchants to delay, in aggregate, personal consumption and business spending (foregoing near term purchase awaiting sale prices); and weakened capacity to justify, or sustain, debt (debt costs remain fixed; value of purchases fall). Although the U.S. is experiencing an economic sector-specific decline in prices, not deflation, none of the propensities to slow spending have yet to surface. They do, however, bear monitoring as they can be one indication of a weakening capital market.

The "NEUTRAL" opinions on Sentiment and Valuations are unchanged as is the "POSITIVE" opinion on Fundamentals.

CURRENT PORTFOLIO POSTURE: OVERWEIGHT vs. SAA target

NON – U.S. EQUITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **NEUTRAL**
    - Eurozone GDP growth remains subpar and that of the lesser-developed economies also remains off pace.
    - Relatively inexpensive and available money supports a shift toward risk assets.
    - Monetary and economic policies are focused on controlling economic growth and fiscal stability.

2. Valuations: **POSITIVE**
   - Reasonable global valuations relative to U.S.; price-to-book values of 1.5x - 1.8x; P/Es of 13.7x – 15.4x on trend earnings.
   - Dividend yields are incrementally more favorable -ranging from 1.5x to 1.6x that of the S&P500.

3. Sentiment: **POSITIVE**
   - Money flows continue toward both U.S. and developed markets non-U.S. equities; excepting the emerging economies markets. investors are less guarded and remain constructive on global risks despite some near tern risk aversion volatility.
   - Major non-U.S. markets performance has strengthened early in to 2015.

Commentary:

Global growth is languishing in the low 3% range and is destined for some time to grow slowly. Of the big economies, the US and UK look most solid. Japan is suffering from adverse demographics, the euro area from poor past policy. China is slowing and might be weaker than it looks. Lower oil prices will subdue inflation for now. USD strength and weaker-than-forecast Chinese demand threaten commodity exporters. The US is the ray of hope among the advanced countries, followed by the UK; both are moving towards higher interest rates in mid-2015.

Now that U.S. QE is holstered and US monetary policy inches toward normalcy, the markets – currencies, commodities, stocks and high-yield bonds – have responded with renewed volatility. Foreign exchange has also played a part. The relative valuation of the USD is pivotal for US-based investors. Expectations are for continued USD strength well into 2015. Sensing this may blunt potentially solid returns resulting from attractive valuations, the equity markets are churning over the short run.

Coming in to 2015, investors misinterpreted the decline in oil and other energy prices since mid-2014 as a symptom of weakening global economic activity. That was understandable since these declines were the third largest since 1980 and there isn't much economic momentum outside the U.S. Instead, these price declines are supply-driven, much like the late 1980s.

The price decline will no doubt help petroleum importing economies. Yet capital markets are wary seeing these declines not as supply driven, but a symptom of underlying global economic weakness. It has been apparent that global growth is tepid and irregular. But that is less of factor in affecting the demand side of the oil and natural gas situation. In contrast, many companies, capital markets and economies benefit from lower oil prices. Yet persistence of the weak global economic growth effect case has meant most haven't yet experienced a response to lower energy prices. Prices of oil have moved below the marginal cost of supply high cost venues like shale and offshore. As well, Saudi Arabia is firm in tis stance of maintaining share at the expense of both OPEC peers and non-OPEC producers. This will only hasten the shake out of marginal producers, but sets the stage for a sustained period of lower oil prices.

Despite the complicated market environment and recent volatility across the capital markets, the case is still favorable for equities, especially non-U.S. markets. Central bankers globally are starting to take the lead of the U.S. in managing QE against weak economic. Several have initiated more accommodation in monetary policies. While results might be obscure, monetary stimulus has proven to elevate equities prices. Bank of Japan and European Central Bank QE programs support the broader risk taking even if it comes at the expense of weakened currency exchange rates. The prospect of somewhat better relative growth and lower capital markets valuations make Europe and Japan attractive over the short term, but other obstacles may hinder economic progress. With little growth, no inflation and scant job creation, the Eurozone is subject to political risk. This is one risk that could temper investor sentiment.

The paradox is that available liquidity is supportive for re-rating equity risk premiums. Equity risk premiums on international stocks of over 5% exceed those of the U.S. by about 100 basis points. Both imply ample compensation for investment, more so for the former. Falling yields among high-yield bonds and other compressions of credit spreads are further magnifying the relative advantage available in current equity risk premiums.

For the capital markets, the diverging growth prospects of the US, on one hand, and the Eurozone and Japan, on the other, add up to one thing: dollar strength. Add to that, that the Fed will be tightening rates while the BOJ and ECB will be on a balance-sheet expansion tack, then the scope for considerable and extended USD strength is magnified. With the Fed likely to raise rates more slowly than in previous cycles, stock values and bond yields will move according to the USD.Risk assets are likely to continue attracting investment.

Emerging markets (EM) overall, are enigmatic, but of late are trading more favorably. Having undergone two years of price correction, valuations for the most part remain attractive as compared to those of the developed economies. But an inherent “value trap” persists, as economic fundamentals continue to shift about for the larger countries, weaken for those with large external debt balances, yet are surprisingly solid for many others. Up until recently, capital was withdrawn indiscriminately from EM equity markets, despite select opportunities at the specific company level. Risk of capital flight from EM lingers. Therefore, Staff intends to maintain the modest under-allocation versus SAA policy target while these countervailing forces play out.

Staff has kept U.S. and overall Non-U.S. equities allocations more neutral to SAA policy since late 4Q2013. It had wanted to see sustainably stronger global economic growth relative to that of the U.S. before increasing the relative proportion of Non-U.S. equities. As those preconditions have yet to materialize, it will continue the current neutral versus policy stance.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT vs. SAA target

FIXED INCOME

Primary Markets Metrics & Indicators:

1. Fundamentals: **NEUTRAL**
   - Over the past few years, fundamentals in the fixed income markets have been dominated by an extremely accommodative monetary policy by the Federal Reserve. This has included massive, unprecedented bond buying programs of both treasury bonds and agency MBS securities known as “quantitative easing” that began in 2009 during the credit crisis and ended for the most part in 2014. The fear for bond investors had been that the cessation of quantitative easing by the Fed would lead to higher long-term rates. Despite the effective end of quantitative easing by the Fed and the possibility of further tightening in monetary policy later this year through the raising of the Fed Funds rate from near zero levels, long-term U.S. interest rates have recently fallen to record lows and may remain low by historical standards for quite some time for a number of reasons. These include slowing growth and disinflationary (or deflationary) pressures in many regions of the world including Europe and China, accommodative monetary policies in other countries including

most notably the recent adoption of quantitative easing by the European Central Bank ("ECB"), and exceptionally low competing long-term interest rates in other developed countries.

2. Valuations: **NEGATIVE**
   - The core fixed income market is relatively unattractive due to low overall yields as Treasury rates remain at low levels and investment-grade credit spreads are relatively tight. That being said, core fixed income remains a safe haven in times of market turbulence and tends to perform well when risky assets such as equities sell off.
   - With a benign outlook for corporate defaults (excluding the energy sector of the high yield market) and an overall demand in the market for yield, the valuation of high yield bonds is less attractive than in the immediate years after the credit crisis of 2008-2009. That being said, in the fourth quarter of 2014, both spreads and yields spiked in the high yield market as due to technical selling pressure and a sharp drop in oil prices which hurt the outlook for bonds in the energy sector. Despite the potential for defaults in the energy sector, the outlook for the vast majority of industries the high yield market remains quite favorable and we believe the high yield market will likely achieve low to mid-single-digit returns this year.
   - While emerging market debt denominated in local currencies offers attractive yields, it comes with the added risk that emerging market currencies depreciate in value relative to the U.S. dollar resulting in poor returns as had happened both in 2013 and 2014. Of most concern is the potential for a sustained period of US dollar appreciation as has occurred periodically in the past (such as the 1990's) that could adversely affect the returns of EM local currency debt going forward. In December 2014, we withdrew $275 million from our emerging market debt managers to fund capital calls from a number of strategies including private debt.
   - Private debt offers the most attractive opportunity in the fixed income markets with double-digit yields readily available for investors willing to accept illiquidity. We continue to identify new opportunities to increase our overweight in this asset class vs. the 3% SAAP target.
   - Select areas of opportunistic debt such as distressed debt (both corporate and structured credit) and excess mortgage-servicing rights ("MSRs") also offer opportunities to potentially achieve double-digit returns.

3. Sentiment: **NEUTRAL**
   - Following a multi-decade period of declining interest rates, IMD has modest concerns that investors sentiment is shifting away from fixed income. That being said, going forward, IMD believes demand will continue for income producing assets particularly those which offer a yield premium.

Commentary:

IMD remains underweight in its overall fixed income target due to the relatively low yields offered in the public fixed income markets as well as the risk of potentially higher treasury rates at some point in the future. ASRS is currently underweight in its SAAP target for core fixed income, high yield and emerging market debt while being overweight in private debt. While core fixed income offers important defensive characteristics to potentially balance out the overall risks of the total fund portfolio, low levels of U.S. Treasuries and generally tight spreads in the investment-grade bond markets make it generally unattractive. In high yield, which historically is less sensitive to higher interest rates, spreads have compressed to levels which make potential returns less compelling than in prior years. In emerging market debt, we are concerned about the currency risk embedded in the local currency bond markets of this asset class as well as weakened fundamentals in a number of major emerging market countries.

IMD sees the most attractive opportunities in fixed income in select credit markets -- particularly private debt and opportunistic debt -- where compelling yield and total return opportunities exist. Opportunistic debt includes a number of mandates mostly in distressed debt that are likely to provide very attractive returns.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT vs. SAA target

REAL ESTATE

Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**
   - Improved levels of demand and easing credit conditions, combined with broad improvement in the economy, are supportive of continued expansion of commercial lending and building. Better levels of occupancy while there is a lack of construction has resulted in rising rents.
   - Our review of property market fundamentals leads to emphasize apartments, industrial properties, medical office buildings, senior housing self-storage, and student housing in our current investing efforts for demographic and macro policy reasons.
   - There are relatively few foreclosures on high quality property, but there continues to be pressures on refinancing of legacy leverage structures and we participate in those transactions through several of our manager relationships.
   - Single family housing continues to exhibit tight supply and moderate demand driven by healing household balance sheets, improved employment conditions, and continued affordability. This should lead to reacceleration of new construction and continued moderate price increases. Recovery in construction and NOI has been led by apartments to date.
2. Valuations: **NEUTRAL**
   - On a total market basis, valuations have recovered from recession lows but are still about 5% below prior peak. However, coastal markets have rebounded more strongly than interior markets.
   - High quality coastal market properties are trading at historic low cap rates; however these cap rates still reflect approximately a normal spread to treasury. The financing market for assets of this quality has recovered and supports these valuations by providing fixed rate financing that mitigates the risk of later cap rate expansion. International investors looking for safe assets have contributed to demand in the coastal markets.
   - Recent increases in treasury rates do not appear to have affected commercial real estate valuations. Many observers believe that ~100bps of rate increase was already discounted into cap rates.
   - At the end of December, REITs are trading at a 7% premium to NAV with an average dividend yield of 3.7%. This reflects a 148bps spread to the 10 year treasury, which is a bit higher than the historical average of 108bps.
3. Sentiment: **POSITIVE**
   - U.S. focused real estate fund raising rose 13% to $76 billion per year. U.S. focused dry powder has trended down to approximately $80 billion.
   - Global commercial real estate transaction volume peaked at around $700 billion in 2007, but dropped to about a third of that during the global financial crisis. Current volume of approximately $550 billion is double the recession trough, but still well below the peak.
   - Debt availability has improved considerably since the depth of the recession, but is still tight by historic standards for all but the most desirable properties. Construction financing remains a considerable challenge, even for well justified projects.

Commentary:

IMD continues to implement its separate account real estate strategic manager program. ASRS 2015 real estate pacing plan called for $700 million to $1.2 billion in new commitments; including $500 to $750M allocated to new managers, $100M to $200M in closed-end funds, and $100M to $300M to existing separate account managers.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT vs. SAA target (in program funding/build-out phase)

PRIVATE EQUITY

Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**
   - The U.S. economy continues to show steady improvement.
     - ◊ Oil has recently undergone a significant price correction which will reduce service costs and temper production growth in the medium term. Debt markets have locked up and equity transactions will take time to sort out. We expect industry consolidation at the margin favoring low cost producers with less leverage and more production hedged.
     - ◊ Healthcare is being reshaped to implement the requirements of "Obamacare"
     - ◊ The U.S. continues to be a global leader in technology innovation.
   - Europe continues to struggle in recovering from the financial crisis with the ECB increasing its stimulus efforts by buying €60B per month. Its problems are exacerbated by a unified currency without unified fiscal policy and it is expected to experience a very slow recovery.
   - Emerging markets have slowed while the largest emerging markets are transitioning to focus on domestic consumption.

1. Valuations: **NEUTRAL**
   - US median purchase price multiples in 2014 were 8.9x, down from the 10.0x 2013 levels (which were close to the previous peak).
   - The leveraged loan and high yield debt markets were active in 2014 but down from 2013 highs. Single B high yield spreads have widened to ~530bps.
   - The US median Debt/EBITDA ratio of 5.8x in 2014 was down from 6.5X in 2013 (slightly above the previous peak).

2. Sentiment: **NEUTRAL**
   - Globally, $495B (994 funds) have closed in 2014 compared to $528B (1,187 funds) in 2013. Dry powder of nearly $1.2T globally has remained flat.
   - The global number of buyout deals rose from 3,260 in 2013 to 3,423 in 2014 while the aggregate value of deals increased from $302B to $332B.
   - Exits were up in 2014 to 1,691 from 1,622 in 2013 while the 2014 aggregate value of $441B was considerably higher than the $330B in 2013.
   - The IPO market in 2014 remained strong ($87B) but was down slightly from the 2013 level ($91B).

Commentary:

Areas of emphasis are U.S middle market buyout with focus on managers with strong operational capability. Vertical strategies in energy, healthcare and technology are under consideration. IMD will reduce emphasis on large buyout strategies though larger managers with specialized deal flow remain of interest. IMD will continue to monitor Europe for a favorable reentry point and look for opportunities to capitalize upon distress. IMD's pacing plan called for $600M in commitments for 2015.

CURRENT PORTFOLIO POSTURE: UNDERWEIGTH vs. SAA target (in program funding/build-out phase)

COMMODITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **NEGATIVE**
   - The Fed ended its tapering program in November but reiterated that inflation continues to run below the FOMC's long-term objective. As Europe has begun to deal with its economic weakness with stimulus, the US dollar has strengthened on a relative basis.
   - Most commodity sectors appear well supplied, particularly for the current global growth environment.
   - The decision by Saudi Arabia not to reduce production in spite of increased global supply growth has roiled the energy markets with the short term effect of rig lay downs in the US while the budgetary impacts globally begin to add up.
   - Corn and wheat stockpiles have recently hit multi-year highs while world food prices continue to slide. Energy markets reflect the continued growth in US production as WTI and Brent prices have fallen by more than $50 from their June highs. Metals have weakened as precious metals have suffered from US dollar strength while industrial metals still exhibit weak demand.
2. Valuations: **NEUTRAL**
   - The index fell to a low of 203 in January 2015, which hadn't been seen since February 2009.
   - TTM: coffee and cattle have been the leaders while the energy complex has been the biggest laggard.
   - The index on a YTD (TTM) basis is down 2.1% (19.2%) as all of the index sub-groups have posted negative returns but most markedly in energy.
3. Sentiment: **NEGATIVE**
   - The moderate growth and weak inflation environment in the U.S. has tempered investor enthusiasm for commodities and resulted in outflows from commodities.
   - Exogenous geopolitical shocks have not resulted in price spikes; weather has been favorable.
   - Looking across the individual commodities, most remain well supplied, which has been reflected in prices as inflationary fears have abated.

Commentary:

IMD has maintained a tactical underweight relative to the SAAP during 2013 and into 2014 after recognizing the potential effects of Fed tapering and Chinese transition. IMD recognizes that Fed's actions will be data dependent but the QE program has ended. As a result of the changing dynamics in the energy markets IMD reduced its exposure to commodities in December and will continue to monitor the situation closely.

The North American shale play has resulted in increased US energy production and represents a long-term phenomenon. China's growth rate is also moderating and the era of infrastructure build-out which fueled a portion of the demand for commodities (particularly industrial metals) is abating. Precious metals may also be challenged as the US has moved to the front of the global recovery and other countries' stimulus should result in US dollar strength at the margin. While grains are currently well supplied, the unpredictability of weather inhibits long-term forecasting.

IMD will closely monitor the growth and inflation dynamics globally with improving economic conditions and inflationary pressures serving as a catalyst which may initiate a neutral position.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT vs. SAA target

OPPORTUNISTIC INVESTMENTS

IMD continues to monitor and assess co-investment flow from real estate, private equity and debt managers for select opportunistic investments with favorable capital market dynamics. Opportunistic investments are tactical in nature AND are outside ASRS SAAP benchmarks or absolute return oriented.

CURRENT PORTFOLIO POSTURE: Approx. 4.5% of ASRS TOTAL MARKET VALUE

GLOSSARY

Commentary: Provides verbiage on 1) the current asset class market environment and possible changes to this environment and 2) ASRS asset class portfolio positioning relative to ASRS SAA policy, its rationale for positioning and anticipated changes which may occur in such positioning.

Current Portfolio Posture: Indicates ASRS asset class position relative to its asset allocation policy weight. "Overweight" indicates an asset class weight is greater than its policy target, "Neutral" indicates an equal weight and "Underweight" indicates a lesser weight than its policy target.

Investment House Views: Synthesizes IMD's current and forward-looking investment perspectives and tactical positioning in asset classes and investment strategies in which the ASRS invests.

Primary Market Metrics and Indicators: Broadly-defined metrics (Fundamentals, Valuations, and Sentiments) applied universally to ASRS asset classes and used collectively to evaluate existing market conditions. Indicators ("Positive," "Neutral" and "Negative") reflect IMD's existing views of these metrics and, in addition to other factors, generally determine the basis for the existing (and possible future changes) to ASRS aggregate portfolio position relative to or within ASRS SAA policy targets.

2014 ASSET CLASS COMMITEE AND IC MEETINGS								
2014		Asset Class Committees				Board Committee		Grand Totals
		Private Market Committee (PRIVMC)		Public Market Committee (PUBMC)		Investment Committee (IC)		
Quarter	Month	Dates	Total	Dates	Total	Dates	Total	
1st	January	1/15 1/31	2	1/31	1	1/31	1	9
	February	2/21	1			2/20 2/24	2	
	March	3/24	1	3/27	1			
2nd	April	04/22	1	04/17	1	04/21	1	9
	May	05/12 05/27 05/28	3					
	June	06/19 06/26	2			06/23	1	
3rd	July	07/01 07/14 07/21	3					7
	August	08/08 08/20	2			08/18	1	
	September	09/23	1					
4th	October	10/17 10/23	2			10/20	1	6
	November	11/19 11/21	2	11/13	1			
	December	12/18	1			12/01	1	
Totals			19		4		8	31

2015 ASSET CLASS COMMITEE AND IC MEETINGS									
2015		Asset Class Committees					Board Committee		Grand Totals
		Private Market Committee (PRIVMC)			Public Market Committee (PUBMC)		Investment Committee (IC)		
Quarter	Month	Dates		Total	Dates	Total	Dates	Total	
1^{st}	January	01/23	01/29	2					3
	February	02/27		1					
	March								
2^{nd}	April								
	May								
	June								
3^{rd}	July								
	August								
	September								
4^{th}	October								
	November								
	December								
Totals				3					3

11/19/14

- **Real Estate Investments**

  - The Committee approved granting Forest City variances permitting investment in a property located near Oakland, CA. It was noted that the Oakland market is performing well with rental increases in the market amongst the highest in the country.

  - The Committee approved granting Ventas a variance permitting investment in a property located near the New Orleans market.

- **Private Equity Program**

  - The Committee approved providing direction to the private markets investment team to proceed with investments for the 2015 calendar year with guidance of anticipated investment levels of $600 million of new commitments during the year.

  - The Committee confirmed the following future meeting dates: Dec 18, 2014 and Jan 23, 2015

11/21/14

- **Private Debt Program**

  - The Committee approved a $300 million commitment to a European direct lending mandate utilizing up to 1.0x leverage.

12/18/14

- **Real Estate Investments**

  - The Committee approved granting Ventas a variance permitting an investment in a project located in Palm Beach, FL.

  - The Committee approved a co-investment of up to $70 million in a lower Manhattan redevelopment converting a former office building to retail and condos. It was noted that the acquisition and redevelopment of the property is at an investment cost below the cost of new construction.

  - The Committee approved a plan of investments for the 2015 calendar year with guidance on investment amounts targeted at $500 million to $1 billion in new separate account investments, $100 to $300 million in addition to existing separate account relationships and $100 to $300 million in comingled fund investments for a total amount of investment ranging from $700 million to $1.6 billion.

01/23/15

➢ **Private Equity Program**

- The Committee approved a $50 million dollar investment in a high performing transatlantic middle market buyout firm. Final legal negotiations are pending.

- The Committee approved a $50 million dollar investment in a top performing energy fund manager with which ASRS has prior investment experience.

- The Committee approved an increase to $401 million in the ASRS commitment with a firm pursuing a European direct lending mandate.

- The Committee approved a $500 million commitment to a senior secured direct lending mandate with a firm with which ASRS has prior investment experience. Final legal negotiations are pending.

- The Committee approved a $300 million commitment to a separate account to invest in grocery anchored shopping centers. Final legal negotiations are pending.

The Committee confirmed the following future meeting dates: February 27, 2015; March 20, 2015; April 23, 2015 and May 18, 2015.

01/29/2015

➢ **Private Debt Program**

- The Committee approved a proposed waiver to the concentration limits for the RFM Cactus Private Debt Mandate to accommodate a pending transaction. Final legal negotiations are pending.

TACTICAL PORTFOLIO POSITIONING

Asset class tactical positioning is a function of Investment House Views and an assessment of relative value between ASRS asset classes and their positioning to ASRS Strategic Asset Allocation Policy (SAAP).

The Total Fund carries more notable SAA policy relative underweights in core fixed income, high yield, EM debt, and commodities, and higher relative over-weights in opportunistic debt, large-cap domestic equities. The CIO will discuss this more detail at the IC meeting.

Note: tactical portfolio positioning is captured in the ASRS Asset Allocation report; the performance results of tactical positioning (vs. policy targets) are reflected in the ASRS Quarterly Total Fund Performance Attribution Analysis.

IMD (INVESTMENT MANAGEMENT DIVISION) ACTIVITIES, PROJECTS AND RESEARCH INITIATIVES

- ASRS and NEPC presented for discussion and engagement ASRS proposed new Strategic Asset Allocation Policy (SAAP) Study to the Investment Committee on February 9. As result, the IC approved the recommendation to present the SAAP Study to the full Board for approval on February 27. Implementation will occur consistent with IMD Investment House Views and ability to prudently reallocate between public and private investment strategies.

- The redesigned ASRS securities lending program began lending securities in November. The program includes two parts: 'agency lending' via State Street to create a conservative strategic lending program and 'opportunistic lending' to profit from relatively large or one-off individual lending transactions, the latter of which will be evaluated and approved on a case-by-case basis by the Director and CIO.

- ASRS Cash Management Program has been implemented. The goals of the program are to provide required Fund liquidity, mitigate cash drag, minimize transaction costs and optimize manager portfolios rebalancing. The CIO and IMD staff will be making a presentation to the IC in February.

- As a standard course of business, IMD meets with both incumbent and potential investment managers to discuss macro-economies and capital markets as well as providing a means to review new initiatives, relationships and new strategy offerings. Since the last IC meeting, IMD has met via conference call or in-person with a total of 99 investment managers: Private markets (RE, PE, Debt) – 72 and Public markets (Equity and Debt) – 27.

- IMD internally manages 7 public equities and fixed income portfolios which had an aggregate market value of over $10 billion or 29% of Total Fund. For the 1-year ending December 31, 3 of 7 met or exceeded their benchmarks, and 7 of 7 portfolios met or exceeded their benchmarks on an inception-to-date basis.

- In January, 2015 the IMD held an educational seminar on energy markets with presentations by sector leaders from Blackstone, Highbridge and EnCap.
- IMD hosted a (Listed) Options Theory Seminar for staff jointly with the Options Industry Council, the CBOE and Deutsche Bank.

STATE STREET GLOBAL SERVICES.

STATE STREET INVESTMENT ANALYTICS

Executive Presentation

To: Arizona State Retirement System

truView Risk Report November 30, 2014

Produced by State Street Investment Analytics, Risk Services

Monthly Reallocation Summary*

Month Ending November 30, 2014

Portfolio Reductions

- TOTAL GTAA
  - $132M – BRIDGEWATER
- TOTAL OPPORTUNISTIC DEBT
  - $ 5M – GUGGENHEIM
- **TOTAL REDUCTIONS****
  - **$137M**

Portfolio Additions

- TOTAL MASTER CASH
  - $137M – MASTER CASH
- **TOTAL ADDITIONS****
  - **$137M**

***Based on State Street accounting records for public markets and therefore exclude private market drawdowns.**
****Reductions and additions do not include plan distributions.**

Monthly Reallocation Summary*

Month Ending December 31, 2014

Portfolio Reductions

- TOTAL FIXED INCOME
  - $ 175M – ASHMORE EMERGING MKT DEBT FUND
  - $ 100M – PIMCO EMERGING MARKET DEBT FUND
- TOTAL GLOBAL INFLATION LINKED
  - $ 100M – GRESHAM
- TOTAL GTAA
  - $399M – GTAA TRANSITION FUND
- **TOTAL REDUCTIONS****
  - **$774M**

Portfolio Additions

- TOTAL MASTER CASH
  - $774M – MASTER CASH
- **TOTAL ADDITIONS****
  - **$774M**

***Based on State Street accounting records for public markets and therefore exclude private market drawdowns.**
****Reductions and additions do not include plan distributions.**

Monthly Risk Summary

Month Ending November 30, 2014

Month-end Risk Profile

• For another month, Historical Risk (95% VaR) for all asset classes remain relatively constant from prior months with minimal changes. Total Plan risk decreased 14bps and the Policy Benchmark had a corresponding decrease of 20bps. A steady market environment has helped produce a stable risk profile since the beginning of this year.

• Excess risk over the Policy Benchmark remains unchanged at -0.8%.

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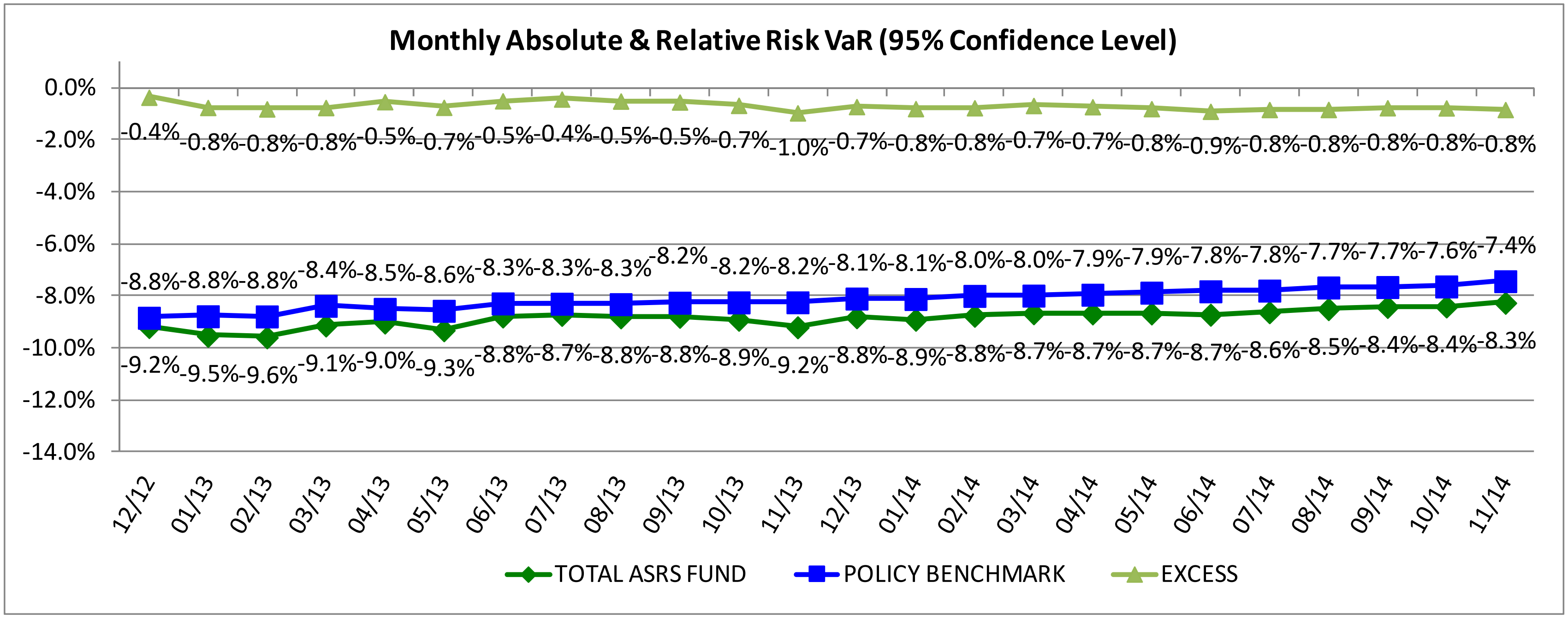


ARIZONA STATE RETIREMENT SYSTEM

TOTAL PLAN EXPOSURE OVERVIEW

As of November 30, 2014

Sector (Public US Equity Only)		$ Value	% Value	**Blended US BM	Difference
CONSUMER NON-CYCLICAL	$	2,552,038,364	22.4%	22.9%	(0.4%)
FINANCIAL	$	1,799,682,727	15.8%	16.8%	(1.0%)
TECHNOLOGY	$	1,348,173,612	11.8%	13.5%	(1.7%)
INDUSTRIAL	$	1,269,645,462	11.1%	10.4%	0.8%
CONSUMER CYCLICAL	$	1,152,646,403	10.1%	9.3%	0.8%
COMMUNICATIONS	$	936,170,011	8.2%	11.7%	(3.5%)
ENERGY	$	853,281,237	7.5%	9.2%	(1.7%)
FUNDS	$	541,597,152	4.8%	0.0%	4.8%
UTILITIES	$	388,556,798	3.4%	3.2%	0.3%
BASIC MATERIALS	$	375,583,788	3.3%	3.0%	0.3%
CASH	$	134,383,118	1.2%	0.0%	1.2%
GOVERNMENT	$	25,629,801	0.2%	0.0%	0.2%
INDEX	$	7,798,665	0.1%	0.0%	0.1%
DIVERSIFIED	$	2,042,025	0.0%	0.0%	(0.0%)
GRAND TOTAL	**$**	**11,387,229,162**	**100.0%**	**100.0%**	**0.0%**

Country Category (Total Plan)		$ Value	% Value	*Blended TOTAL BM	Difference
NORTH AMERICA	$	25,821,403,509	76.5%	67.4%	9.1%
EUROPE DEVELOPED	$	3,692,142,294	10.9%	13.9%	(2.9%)
ASIA DEVELOPED	$	1,835,813,866	5.4%	8.9%	(3.4%)
ASIA EM	$	1,240,507,429	3.7%	4.5%	(0.8%)
LATIN AMERICA	$	605,775,585	1.8%	3.0%	(1.2%)
AFRICA	$	287,714,200	0.9%	1.0%	(0.1%)
EUROPE EM	$	145,637,385	0.4%	0.9%	(0.5%)
MIDDLE EAST	$	124,948,213	0.4%	0.5%	(0.1%)
GRAND TOTAL	**$**	**33,753,942,480**	**100.0%**	**100.0%**	**0.0%**

Market Cap^ (Public Equities Only)		$ Value	% Value	*Blended TOTAL BM	Difference
1) 0 - 100M	$	4,592,532	0.0%	0.0%	0.0%
2) 100M - 500M	$	447,281,172	2.3%	1.9%	0.4%
3) 500M - 1B	$	659,268,543	3.3%	3.7%	(0.4%)
4) 1B - 5B	$	3,221,164,439	16.2%	30.3%	(14.1%)
5) 5B - 10B	$	2,129,825,545	10.7%	15.5%	(4.8%)
6) 10B - 50B	$	5,950,977,429	30.0%	28.7%	1.3%
7) >50B	$	7,447,900,919	37.5%	19.9%	17.6%
GRAND TOTAL	**$**	**19,861,010,578**	**100.0%**	**100.0%**	**100.0%**

^Excludes cash and non-traded securities

	Top 20 Issuer (Total Plan)		$ Value	% Value	Market Cap	Sector	Industry Group
1	CASH***	$	1,644,526,069	4.9%		FINANCIAL	INVESTMENT COMPANIES
2	SPDR S&P 500 ETF TRUST	$	1,054,047,120	3.1%	7) 50B+	FUNDS	EQUITY FUND
3	FANNIE MAE	$	749,493,761	2.2%		MORTGAGE SECURITIES	COMMERCIAL MBS
4	US TREASURY N/B	$	739,203,642	2.2%		GOVERNMENT	SOVEREIGN
5	TREASURY BILL	$	672,057,990	2.0%		GOVERNMENT	SOVEREIGN
6	APPLE INC	$	223,697,234	0.7%	7) 50B+	TECHNOLOGY	COMPUTERS
7	MICROSOFT CORP	$	186,737,127	0.6%	7) 50B+	TECHNOLOGY	SOFTWARE
8	FREDDIE MAC	$	180,701,251	0.5%		GOVERNMENT	SOVEREIGN
9	EXXON MOBIL CORP	$	171,784,801	0.5%	7) 50B+	ENERGY	OIL&GAS
10	JOHNSON & JOHNSON	$	143,823,049	0.4%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
11	ISHARES MSCI USA MOMENTUM FACT(	$	138,801,600	0.4%	2) 100M - 500M	FUNDS	EQUITY FUND
12	ISHARES MSCI USA QUALITY FACTOR I	$	136,687,100	0.4%	3) 500M - 1B	FUNDS	EQUITY FUND
13	VANGUARD TOTAL STOCK MARKET ET	$	134,729,395	0.4%	7) 50B+	FUNDS	EQUITY FUND
14	ISHARES MSCI USA VALUE FACTOR ET	$	134,079,000	0.4%	3) 500M - 1B	FUNDS	EQUITY FUND
15	ISHARES MSCI USA SIZE FACTOR ETF	$	132,029,452	0.4%	2) 100M - 500M	FUNDS	EQUITY FUND
16	ISHARES MSCI EMERGING MARKETS E	$	123,529,772	0.4%	6) 10B - 50B	FUNDS	EQUITY FUND
17	PROCTER & GAMBLE CO/THE	$	110,474,240	0.3%	7) 50B+	CONSUMER NON-CYCLICAL	COSMETICS/PERSONAL CARE
18	PFIZER INC	$	110,263,288	0.3%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
19	VANGUARD FTSE DEVELOPED MARKE	$	107,161,092	0.3%	6) 10B - 50B	FUNDS	EQUITY FUND
20	CHEVRON CORP	$	107,006,008	0.3%	7) 50B+	ENERGY	OIL&GAS

*__Blended TOTAL BM__: 26% SP500, 5% SP400, 5% SP600, 5% R2000, 14% MSCI EAFE, 6% MSCI EM, 3% MSCI Sml Cap, 17% BC US AGG, 5% BC US HY, 6% FTSE NAREIT GLOBAL, 4% DJ-UBS COMMODITY, 4% JPM EMBI.

**__Blended US BM__: 72% SP500, 14% SP400, 14% SP600.

***__Cash__ does not represent an IMD tactical view; **Cash** includes the ASRS Master Cash balance, manager- level portfolio cash & equivalents and cash collateralizing sundry portfolio-level futures contracts.

ARIZONA STATE RETIREMENT SYSTEM

As of November 30, 2014

INTERNATIONAL EQUITY EXPOSURE OVERVIEW

Sector (Public Intl Equity Only)		$ Value	% Value	*Blended NON-US BM	Difference
FINANCIAL	$	1,755,114,348	25.2%	25.8%	(0.5%)
CONSUMER NON-CYCLICAL	$	1,280,080,309	18.4%	19.2%	(0.8%)
CONSUMER CYCLICAL	$	910,684,900	13.1%	11.9%	1.2%
INDUSTRIAL	$	862,293,892	12.4%	11.6%	0.8%
COMMUNICATIONS	$	607,449,878	8.7%	8.8%	(0.1%)
BASIC MATERIALS	$	386,330,604	5.6%	6.8%	(1.3%)
ENERGY	$	383,156,037	5.5%	6.3%	(0.8%)
TECHNOLOGY	$	346,474,685	5.0%	5.2%	(0.2%)
UTILITIES	$	219,156,463	3.1%	3.4%	(0.3%)
CASH	$	105,444,326	1.5%	0.0%	1.5%
DIVERSIFIED	$	68,603,770	1.0%	1.0%	(0.1%)
INDEX	$	35,160,153	0.5%	0.1%	0.4%
FX	$	(17,700)	(0.0%)	0.0%	(0.0%)
GRAND TOTAL	**$**	**6,959,931,665**	**100.0%**	**100.0%**	**0.0%**

Country Category (Public Intl Equity Only)		$ Value	% Value	*Blended NON-US BM	Difference
EUROPE DEVELOPED	$	3,209,317,313	46.1%	47.9%	(1.8%)
ASIA DEVELOPED	$	1,789,013,349	25.7%	30.5%	(4.7%)
ASIA EM	$	1,056,529,978	15.2%	13.3%	1.9%
LATIN AMERICA	$	360,378,746	5.2%	4.6%	0.6%
AFRICA	$	189,350,147	2.7%	2.2%	0.5%
NORTH AMERICA	$	186,962,927	2.7%	0.1%	2.6%
MIDDLE EAST	$	99,873,495	1.4%	0.9%	0.5%
EUROPE EM	$	68,505,711	1.0%	0.6%	0.4%
GRAND TOTAL	**$**	**6,959,931,665**	**100.0%**	**100.0%**	**0.0%**

	Top 20 Industry Groups (Public Intl Only		$ Value	% Value	*Blended NON-US BM	Difference
1	BANKS	$	897,914,081	12.9%	13.5%	(0.6%)
2	PHARMACEUTICALS	$	413,148,759	5.9%	6.6%	(0.7%)
3	TELECOMMUNICATIONS	$	388,773,602	5.6%	5.9%	(0.3%)
4	INSURANCE	$	362,450,619	5.2%	4.6%	0.6%
5	OIL&GAS	$	346,934,880	5.0%	5.7%	(0.7%)
6	FOOD	$	319,541,491	4.6%	4.3%	0.3%
7	RETAIL	$	265,768,466	3.8%	3.1%	0.7%
8	AUTO MANUFACTURERS	$	233,551,894	3.4%	3.1%	0.2%
9	DIVERSIFIED FINAN SERV	$	206,454,883	3.0%	3.0%	(0.1%)
10	CHEMICALS	$	174,174,843	2.5%	3.1%	(0.6%)
11	COMMERCIAL SERVICES	$	172,291,028	2.5%	1.8%	0.7%
12	SEMICONDUCTORS	$	171,975,221	2.5%	2.8%	(0.3%)
13	ELECTRIC	$	155,616,459	2.2%	2.3%	(0.1%)
14	REAL ESTATE	$	153,817,220	2.2%	2.3%	(0.1%)
15	MINING	$	128,512,463	1.8%	2.3%	(0.5%)
16	ENGINEERING&CONSTRUCTI(	$	124,570,142	1.8%	1.7%	0.1%
17	BEVERAGES	$	123,249,255	1.8%	2.1%	(0.3%)
18	BUILDING MATERIALS	$	122,990,294	1.8%	1.3%	0.5%
19	TRANSPORTATION	$	115,833,279	1.7%	1.6%	0.1%
20	INTERNET	$	109,683,053	1.6%	1.2%	0.4%

Market Cap** (Public Intl Equities Only)		$ Value	% Value	*Blended NON-US BM	Difference
1) 0 - 100M	$	3,788,766	0.1%	0.0%	0.1%
2) 100M - 500M	$	130,737,787	1.9%	0.9%	1.0%
3) 500M - 1B	$	246,822,681	3.6%	2.2%	1.5%
4) 1B - 5B	$	1,270,183,665	18.7%	15.7%	3.0%
5) 5B - 10B	$	850,283,178	12.5%	12.0%	0.5%
6) 10B - 50B	$	2,549,679,958	37.5%	36.5%	0.9%
7) >50B	$	1,755,384,622	25.8%	32.7%	(6.9%)
GRAND TOTAL	**$**	**6,806,880,657**	**100.0%**	**100.0%**	**100.0%**

**Excludes cash and non-traded securities

*__Blended NON-US BM__: 61% MSCI EAFE, 26% MSCI EM, 13% MSCI Sml Cap.

ARIZONA STATE RETIREMENT SYSTEM

As of November 30, 2014

TOTAL FIXED INCOME EXPOSURE OVERVIEW

Sector (Public Fixed Income Only)	$ Value	% Value	*Blended FI BM	Difference
GOVERNMENT	$ 1,425,195,077	32.8%	40.4%	(7.6%)
MORTGAGE SECURITIES	$ 757,670,437	17.4%	20.0%	(2.6%)
FINANCIAL	$ 388,357,770	8.9%	8.7%	0.2%
COMMUNICATIONS	$ 364,900,849	8.4%	5.4%	3.0%
CONSUMER NON-CYCLICAL	$ 305,224,420	7.0%	5.1%	2.0%
ENERGY	$ 242,866,675	5.6%	6.3%	(0.7%)
CONSUMER CYCLICAL	$ 225,624,656	5.2%	3.7%	1.5%
INDUSTRIAL	$ 176,378,552	4.1%	3.3%	0.7%
CASH	$ 106,501,845	2.5%	0.0%	2.5%
UTILITIES	$ 93,832,323	2.2%	2.2%	(0.1%)
TECHNOLOGY	$ 91,018,471	2.1%	1.4%	0.7%
BASIC MATERIALS	$ 79,790,165	1.8%	2.3%	(0.5%)
BANK LOANS	$ 37,551,262	0.9%	0.0%	0.9%
INDEX	$ 27,048,415	0.6%	0.6%	0.1%
DIVERSIFIED	$ 10,452,490	0.2%	0.2%	0.1%
ASSET BACKED SECURITIES	$ 7,480,084	0.2%	0.3%	(0.2%)
FUNDS	$ 4,810,964	0.1%	0.0%	0.1%
SWAP	$ 173,529	0.0%	0.0%	0.0%
FX	$ (983,668)	(0.0%)	0.0%	(0.0%)
GRAND TOTAL	**$ 4,343,894,317**	**100.0%**	**100.0%**	**0.0%**

Top 20 Industry Groups (Public Fixed Income Only)	$ Value	% Value	*Blended FI BM	Difference
1 SOVEREIGN	$ 1,354,486,016	31.2%	38.7%	(7.5%)
2 FNMA COLLATERAL	$ 545,346,066	12.6%	8.5%	4.0%
3 TELECOMMUNICATIONS	$ 197,541,438	4.5%	3.0%	1.5%
4 OIL&GAS	$ 172,641,013	4.0%	4.7%	(0.7%)
5 BANKS	$ 147,416,321	3.4%	4.9%	(1.5%)
6 MEDIA	$ 138,984,293	3.2%	2.0%	1.2%
7 DIVERSIFIED FINAN SERV	$ 134,653,678	3.1%	2.2%	0.9%
8 CASH	$ 106,501,845	2.5%	0.0%	2.5%
9 FGLMC COLLATERAL	$ 98,382,515	2.3%	5.1%	(2.8%)
10 ELECTRIC	$ 93,152,006	2.1%	2.1%	0.1%
11 HEALTHCARE-SERVICES	$ 93,130,410	2.1%	1.2%	1.0%
12 RETAIL	$ 70,522,175	1.6%	1.3%	0.4%
13 COMMERCIAL MBS	$ 67,592,676	1.6%	1.3%	0.2%
14 SOFTWARE	$ 58,762,057	1.4%	0.6%	0.7%
15 PIPELINES	$ 57,973,445	1.3%	1.1%	0.2%
16 COMMERCIAL SERVICES	$ 52,213,180	1.2%	0.8%	0.4%
17 CHEMICALS	$ 50,363,934	1.2%	0.7%	0.5%
18 PHARMACEUTICALS	$ 49,431,439	1.1%	0.9%	0.2%
19 MUNICIPAL	$ 43,219,648	1.0%	0.6%	0.4%
20 PACKAGING&CONTAINERS	$ 42,737,053	1.0%	0.6%	0.4%

Credit Rating Group** (Public Fixed Income Only)	$ Value	% Value	*Blended FI BM	Difference
01) AAA	$ 1,764,641,890	45.0%	47.1%	(2.2%)
02) AA	$ 141,902,247	3.6%	3.7%	(0.1%)
03) A	$ 446,663,073	11.6%	9.4%	2.2%
04) BBB	$ 583,253,914	13.6%	14.7%	(1.1%)
05) BB	$ 615,764,864	11.0%	11.9%	(0.9%)
06) B	$ 540,682,880	10.0%	9.2%	0.8%
07) CCC	$ 151,625,545	3.2%	3.1%	0.1%
08) CC	$ -	0.0%	0.0%	(0.0%)
09) C	$ -	0.0%	0.0%	(0.0%)
10) D	$ -	0.0%	0.0%	0.0%
11) Not Rated	$ 99,359,904	2.1%	0.7%	1.4%
GRAND TOTAL	**$ 4,343,894,317**	**100.0%**	**100.0%**	**0.0%**

Maturity Bucket (Public Fixed Income Only)	$ Value	% Value	*Blended FI BM	Difference
0-1Y	$ 190,663,208	4.6%	0.7%	3.9%
1Y-3Y	$ 567,866,167	13.7%	18.1%	(4.4%)
3Y-5Y	$ 668,405,557	16.1%	16.2%	(0.1%)
5Y-10Y	$ 1,690,117,793	40.7%	30.5%	10.2%
10Y-15Y	$ 188,723,522	4.5%	5.7%	(1.1%)
15Y+	$ 1,012,267,832	24.4%	28.8%	(4.4%)
GRAND TOTAL	**$ 4,318,044,079**	**100.0%**	**100.0%**	**100.0%**

***Blended TOTAL BM**: 66% BC US AGG, 19% BC US HY, 15% JPM EMBI.

ARIZONA STATE RETIREMENT SYSTEM **TOTAL PLAN RISK OVERVIEW**

As of November 30, 2014

Strategy	$ Value	% Value	Historical VaR 95%	HVaR Contri 95%	HVaR Contri % to Total	Parametric VaR 95%	PVaR Contri 95%	PVaR Contri % to Total	Exp Tail Loss 95%	Exp Tail Loss Contri 95%	Exp Tail Loss Contri % to Total	Max Loss	Std Dev	Downside Risk (8%)	Downside Risk Contri (8%)	Downside Risk Contri (8%) to Total
MONTHLY RISK																
MASTER CASH	$ 314,709,480	1%	(0.0%)	(0.0%)	0.0%	(0.0%)	(0.0%)	0.0%	(0.0%)	(0.0%)	0.0%	(0.0%)	0.0%	(0.6%)	(0.0%)	0.0%
TOTAL FIXED INCOME	$ 4,343,894,317	13%	(2.4%)	(0.1%)	1.6%	(2.1%)	(0.1%)	1.9%	(3.7%)	(0.2%)	1.7%	(5.6%)	1.3%	(1.4%)	(0.1%)	2.1%
US EQUITY	$ 11,387,229,162	34%	(9.5%)	(3.4%)	41.2%	(8.9%)	(2.9%)	38.4%	(15.8%)	(5.3%)	39.6%	(30.6%)	6.2%	(4.5%)	(1.5%)	38.4%
INTERNATIONAL EQUITY	$ 6,959,931,665	21%	(10.5%)	(1.9%)	22.9%	(10.2%)	(2.0%)	26.3%	(16.3%)	(3.2%)	24.1%	(36.8%)	6.8%	(4.9%)	(1.0%)	25.4%
REAL ESTATE	$ 1,734,432,272	5%	(12.6%)	(0.7%)	7.9%	(11.5%)	(0.6%)	7.4%	(20.3%)	(1.0%)	7.4%	(39.0%)	7.5%	(5.7%)	(0.3%)	7.3%
FARMLAND & TIMBER	$ 146,009,313	0%	(9.4%)	(0.0%)	0.5%	(8.4%)	(0.0%)	0.5%	(15.3%)	(0.1%)	0.5%	(29.8%)	5.6%	(4.4%)	(0.0%)	0.5%
PRIVATE EQUITY	$ 2,172,192,527	6%	(12.4%)	(0.8%)	9.6%	(11.1%)	(0.7%)	8.9%	(19.2%)	(1.2%)	9.1%	(36.1%)	7.3%	(5.5%)	(0.4%)	9.0%
PRIVATE DEBT	$ 1,282,068,751	4%	(7.2%)	(0.2%)	2.7%	(6.6%)	(0.2%)	3.1%	(12.4%)	(0.5%)	3.4%	(25.1%)	4.4%	(3.5%)	(0.1%)	3.2%
OPPORTUNISTIC EQUITY	$ 338,102,859	1%	(11.6%)	(0.1%)	1.4%	(10.2%)	(0.1%)	1.3%	(18.1%)	(0.2%)	1.3%	(34.3%)	6.8%	(5.2%)	(0.1%)	1.3%
OPPORTUNISTIC DEBT	$ 1,035,665,948	3%	(6.1%)	(0.2%)	2.0%	(5.9%)	(0.2%)	2.3%	(11.4%)	(0.3%)	2.6%	(23.8%)	4.1%	(3.3%)	(0.1%)	2.4%
GLOBAL INFLATION LINKEI	$ 724,820,162	2%	(7.3%)	(0.1%)	1.3%	(7.4%)	(0.1%)	1.5%	(11.8%)	(0.2%)	1.5%	(24.9%)	4.6%	(3.8%)	(0.1%)	1.6%
GTAA	$ 3,314,886,024	10%	(7.3%)	(0.7%)	8.9%	(6.8%)	(0.7%)	8.6%	(11.8%)	(1.2%)	8.6%	(25.8%)	4.4%	(3.6%)	(0.3%)	8.9%
GRAND TOTAL	**$ 33,753,942,480**	**100%**	**(8.3%)**	**(8.3%)**	**100.0%**	**(7.6%)**	**(7.6%)**	**100.0%**	**(13.4%)**	**(13.4%)**	**100.0%**	**(28.2%)**	**5.2%**	**(3.9%)**	**(3.9%)**	**100.0%**
INTERIM POLICY BENCHMARK			*(7.4%)*			*(6.8%)*			*(11.9%)*			*(25.4%)*	*5.9%*	*(3.5%)*		

Strategy	$ Value	% Value	Historical VaR 95%	HVaR Contri 95%	HVaR Contri % to Total	Parametric VaR 95%	PVaR Contri 95%	PVaR Contri % to Total	Exp Tail Loss 95%	Exp Tail Loss Contri 95%	Exp Tail Loss Contri % to Total	Max Loss	Std Dev	Downside Risk (8%)	Downside Risk Contri (8%)	Downside Risk Contri (8%) to Total
ANNUALIZED RISK																
MASTER CASH	$ 314,709,480	1%	(0.0%)	(0.0%)	0.0%	(0.0%)	(0.0%)	0.0%	(0.0%)	(0.0%)	0.0%	N/A	0.0%	(2.2%)	(0.0%)	0.0%
TOTAL FIXED INCOME	$ 4,343,894,317	13%	(8.3%)	(0.5%)	1.6%	(7.3%)	(0.5%)	1.9%	(12.7%)	(0.8%)	1.7%	N/A	4.4%	(4.8%)	(0.3%)	2.1%
US EQUITY	$ 11,387,229,162	34%	(33.0%)	(11.8%)	41.2%	(30.7%)	(10.2%)	38.4%	(54.9%)	(18.4%)	39.6%	N/A	21.4%	(15.5%)	(5.2%)	38.4%
INTERNATIONAL EQUITY	$ 6,959,931,665	21%	(36.4%)	(6.5%)	22.9%	(35.2%)	(7.0%)	26.3%	(56.5%)	(11.2%)	24.1%	N/A	23.7%	(17.0%)	(3.4%)	25.4%
REAL ESTATE	$ 1,734,432,272	5%	(43.5%)	(2.3%)	7.9%	(39.7%)	(1.9%)	7.4%	(70.4%)	(3.4%)	7.4%	N/A	25.9%	(19.7%)	(1.0%)	7.3%
FARMLAND & TIMBER	$ 146,009,313	0%	(32.5%)	(0.2%)	0.5%	(29.1%)	(0.1%)	0.5%	(52.9%)	(0.2%)	0.5%	N/A	19.4%	(15.3%)	(0.1%)	0.5%
PRIVATE EQUITY	$ 2,172,192,527	6%	(42.8%)	(2.7%)	9.6%	(38.5%)	(2.4%)	8.9%	(66.7%)	(4.2%)	9.1%	N/A	25.2%	(19.2%)	(1.2%)	9.0%
PRIVATE DEBT	$ 1,282,068,751	4%	(25.1%)	(0.8%)	2.7%	(22.7%)	(0.8%)	3.1%	(42.9%)	(1.6%)	3.4%	N/A	15.3%	(12.1%)	(0.4%)	3.2%
OPPORTUNISTIC EQUITY	$ 338,102,859	1%	(40.1%)	(0.4%)	1.4%	(35.5%)	(0.3%)	1.3%	(62.6%)	(0.6%)	1.3%	N/A	23.4%	(18.0%)	(0.2%)	1.3%
OPPORTUNISTIC DEBT	$ 1,035,665,948	3%	(21.2%)	(0.6%)	2.0%	(20.4%)	(0.6%)	2.3%	(39.5%)	(1.2%)	2.6%	N/A	14.1%	(11.3%)	(0.3%)	2.4%
GLOBAL INFLATION LINKEI	$ 724,820,162	2%	(25.2%)	(0.4%)	1.3%	(25.7%)	(0.4%)	1.5%	(40.7%)	(0.7%)	1.5%	N/A	16.1%	(13.0%)	(0.2%)	1.6%
GTAA	$ 3,314,886,024	10%	(25.4%)	(2.5%)	8.9%	(23.4%)	(2.3%)	8.6%	(41.0%)	(4.0%)	8.6%	N/A	15.3%	(12.4%)	(1.2%)	8.9%
GRAND TOTAL	**$ 33,753,942,480**	**100%**	**(28.6%)**	**(28.6%)**	**100.0%**	**(26.5%)**	**(26.5%)**	**100.0%**	**(46.3%)**	**(46.3%)**	**100.0%**	**N/A**	**17.9%**	**(13.5%)**	**(13.5%)**	**100.0%**
INTERIM POLICY BENCHMARK			*(25.7%)*			*(23.7%)*			*(41.3%)*			**N/A**	*20.5%*	*(12.3%)*		

Strategy	$ Value	% Value	Beta SP500	Corr SP500	Beta MSCI EAFE	Corr MSCI EAFE	Duration	Convexity	Notional Exposure	Gross Exposure	Gross Leverage
MASTER CASH	$ 314,709,480	1%	0.00	0.00	(0.00)	(0.00)			$ 314,709,480	$ 314,709,480	100.0%
TOTAL FIXED INCOME	$ 4,343,894,317	13%	0.10	0.43	0.10	0.54	4.90	0.004	$ 4,085,002,202	$ 4,747,299,370	109.3%
US EQUITY	$ 11,387,229,162	34%	1.07	0.99	0.83	0.90	0.19	0.000	$ 11,591,065,289	$ 11,407,661,578	100.2%
INTERNATIONAL EQUITY	$ 6,959,931,665	21%	1.10	0.90	1.02	0.98	1.87	0.038	$ 6,960,385,321	$ 6,988,862,516	100.4%
REAL ESTATE	$ 1,734,432,272	5%	1.22	0.91	1.02	0.90			$ 1,734,432,272	$ 1,734,432,272	100.0%
FARMLAND & TIMBER	$ 146,009,313	0%	1.00	1.00	0.77	0.91			$ 146,009,313	$ 146,009,313	100.0%
PRIVATE EQUITY	$ 2,172,192,527	6%	1.24	0.96	0.95	0.86			$ 2,172,192,527	$ 2,172,192,527	100.0%
PRIVATE DEBT	$ 1,282,068,751	4%	0.73	0.93	0.59	0.88	0.51	0.004	$ 1,282,987,306	$ 1,282,851,153	100.1%
OPPORTUNISTIC EQUITY	$ 338,102,859	1%	1.18	0.98	0.90	0.88			$ 338,102,859	$ 338,102,859	100.0%
OPPORTUNISTIC DEBT	$ 1,035,665,948	3%	0.69	0.96	0.55	0.89			$ 1,035,665,948	$ 1,035,665,948	100.0%
GLOBAL INFLATION LINKEI	$ 724,820,162	2%	0.27	0.66	0.24	0.69	0.23	0.001	$ 1,448,964,942	$ 724,820,162	100.0%
GTAA	$ 3,314,886,024	10%	0.52	0.97	0.44	0.97	4.70	(0.749)	$ 4,914,301,601	$ 4,570,265,994	137.9%
GRAND TOTAL	**$ 33,753,942,480**	**100%**	**0.84**	**0.98**	**0.70**	**0.95**	**4.21**	**(0.037)**	**$ 36,023,819,060**	**$ 35,462,873,172**	**105.1%**

STATE STREET GLOBAL SERVICES.

STATE STREET INVESTMENT ANALYTICS

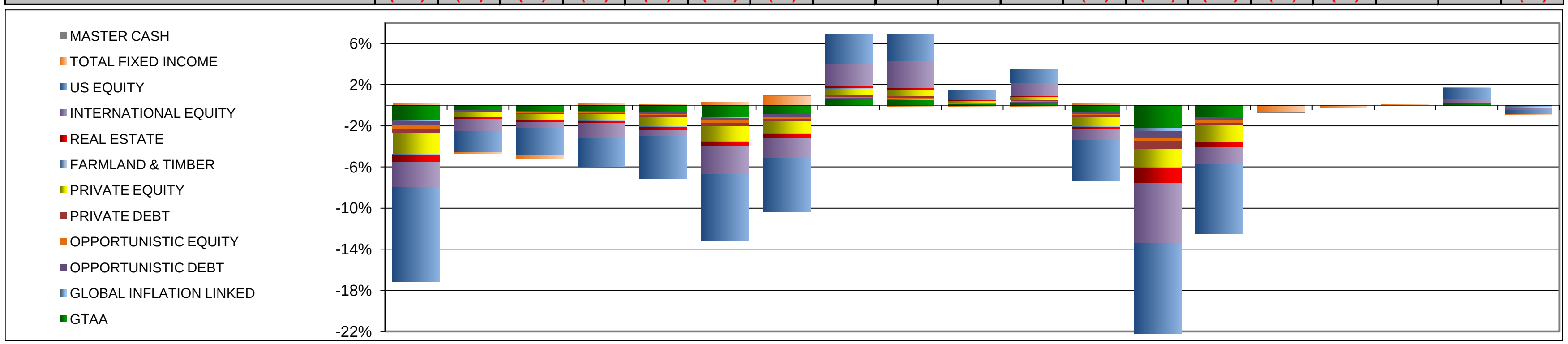
ARIZONA STATE RETIREMENT SYSTEM

As of November 30, 2014

TOTAL PLAN STRESS TESTS

Strategy	$ Value	% Value	Black Monday - 5 Day	Gulf War - 5 Day	Bond Crash: Feb 94 - May 94	Asian Crisis 97-98 - 5 day	Russian Crisis - 5 Day	Nasdaq Correction: July 98 - Aug 98	Russian Debt Crisis Aug-Oct	IR Steepening: Sept 98 - Nov 98	Emerging Markets Rally: Jan 99 - May 99	Fed Tightening: April - June 99	Nasdaq Rally: Nov 99 - Jan 00	9/11 Attack - 5 Day	09-10-2008	S&P 500 -20%	IR Parallel Shift +100bps	Spread Up 100bps	Inflation +1%	Gold Shock -20%	Oil Shock -20%
			Historical Scenarios													Predictive Scenarios					
Stress Test Stand Alone																					
MASTER CASH	$ 314,709,480	0.9%	0.0	(0.0)	(0.0)	0.0	0.0	0.0	0.0	0.0	(0.0)	(0.0)	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	0.0	0.0	0.0
TOTAL FIXED INCOME	$ 4,343,894,317	12.9%	0.9	(0.6)	(3.5)	0.9	0.7	2.4	7.0	(0.6)	(1.5)	(0.7)	(1.1)	1.5	(5.0)	(0.1)	(4.9)	(0.2)	0.3	0.0	(0.1)
US EQUITY	$ 11,387,229,162	33.7%	(27.4)	(6.0)	(7.7)	(8.3)	(12.1)	(19.0)	(15.6)	8.6	7.9	2.8	4.2	(11.7)	(26.7)	(20.2)	0.0	0.0	(0.0)	3.3	(1.2)
INTERNATIONAL EQUITY	$ 6,959,931,665	20.6%	(11.8)	(5.9)	(2.5)	(6.9)	(2.9)	(13.0)	(9.7)	10.1	12.5	(0.2)	5.9	(4.8)	(28.4)	(7.8)	0.0	0.0	(0.0)	2.0	(0.8)
REAL ESTATE	$ 1,734,432,272	5.1%	(12.7)	(2.8)	(3.6)	(3.8)	(5.6)	(8.9)	(7.2)	4.0	3.6	1.3	1.9	(5.4)	(28.0)	(9.3)	(0.0)	0.0	0.0	0.0	(0.4)
FARMLAND & TIMBER	$ 146,009,313	0.4%	(27.2)	(6.0)	(7.8)	(8.2)	(12.0)	(19.1)	(15.4)	8.6	7.8	2.8	4.1	(11.6)	(27.0)	(20.0)	0.0	0.0	0.0	0.0	(1.2)
PRIVATE EQUITY	$ 2,172,192,527	6.4%	(32.3)	(7.1)	(9.2)	(9.8)	(14.3)	(22.7)	(18.3)	10.2	9.3	3.3	4.9	(13.8)	(26.9)	(23.7)	(0.0)	0.0	0.0	0.0	(1.5)
PRIVATE DEBT	$ 1,282,068,751	3.8%	(11.0)	(2.4)	(3.2)	(3.3)	(4.9)	(7.8)	(6.2)	3.5	3.2	1.1	1.7	(4.7)	(20.4)	(8.1)	(0.0)	(0.0)	0.0	0.0	(0.5)
OPPORTUNISTIC EQUITY	$ 338,102,859	1.0%	(31.0)	(6.8)	(8.9)	(9.4)	(13.7)	(21.9)	(17.6)	9.8	8.9	3.2	4.7	(13.2)	(27.1)	(22.8)	0.0	0.0	0.0	0.0	(1.4)
OPPORTUNISTIC DEBT	$ 1,035,665,948	3.1%	(14.1)	(3.1)	(4.0)	(4.3)	(6.3)	(10.0)	(8.0)	4.5	4.1	1.5	2.1	(6.0)	(22.5)	(10.4)	(0.0)	0.0	0.0	0.0	(0.6)
GLOBAL INFLATION LINKEI	$ 724,820,162	2.1%	(0.0)	0.0	0.0	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	(0.0)	(16.2)	0.0	0.0	0.0	0.0	(4.1)	(3.6)
GTAA	$ 3,314,886,024	9.8%	(15.5)	(4.5)	(5.4)	(5.5)	(6.7)	(12.3)	(9.2)	6.2	5.6	0.9	2.9	(6.8)	(22.3)	(11.7)	(0.7)	0.0	0.1	1.7	(1.0)
GRAND TOTAL	**$ 33,753,942,480**	**100.0%**	**(17.1)**	**(4.7)**	**(5.3)**	**(5.9)**	**(7.0)**	**(12.8)**	**(9.5)**	**6.8**	**6.7**	**1.3**	**3.4**	**(7.1)**	**(23.1)**	**(12.5)**	**(0.7)**	**(0.2)**	**0.0**	**1.6**	**(0.9)**
INTERIM POLICY BENCHMARK			**(14.6)**	**(4.3)**	**(5.7)**	**(5.4)**	**(5.8)**	**(11.6)**	**(7.4)**	**6.7**	**6.7**	**1.0**	**3.1**	**(5.9)**	**(20.9)**	**(10.6)**	**(1.4)**	**(0.6)**	**0.1**	**0.6**	**(0.8)**

Stress Test Contribution																					
MASTER CASH	$ 314,709,480	0.9%	0.0	(0.0)	(0.0)	0.0	0.0	0.0	0.0	0.0	(0.0)	(0.0)	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	0.0	0.0	0.0
TOTAL FIXED INCOME	$ 4,343,894,317	12.9%	0.1	(0.1)	(0.5)	0.1	0.1	0.3	0.9	(0.1)	(0.2)	(0.1)	(0.1)	0.2	(0.6)	(0.0)	(0.6)	(0.2)	0.0	0.0	(0.0)
US EQUITY	$ 11,387,229,162	33.7%	(9.3)	(2.0)	(2.6)	(2.8)	(4.1)	(6.4)	(5.3)	2.9	2.6	0.9	1.4	(4.0)	(9.0)	(6.8)	0.0	0.0	(0.0)	1.1	(0.4)
INTERNATIONAL EQUITY	$ 6,959,931,665	20.6%	(2.4)	(1.2)	(0.5)	(1.4)	(0.6)	(2.7)	(2.0)	2.1	2.6	(0.0)	1.2	(1.0)	(5.9)	(1.6)	0.0	0.0	(0.0)	0.4	(0.2)
REAL ESTATE	$ 1,734,432,272	5.1%	(0.7)	(0.1)	(0.2)	(0.2)	(0.3)	(0.5)	(0.4)	0.2	0.2	0.1	0.1	(0.3)	(1.4)	(0.5)	(0.0)	0.0	0.0	0.0	(0.0)
FARMLAND & TIMBER	$ 146,009,313	0.4%	(0.1)	(0.0)	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	0.0	0.0	0.0	0.0	(0.1)	(0.1)	(0.1)	0.0	0.0	0.0	0.0	(0.0)
PRIVATE EQUITY	$ 2,172,192,527	6.4%	(2.1)	(0.5)	(0.6)	(0.6)	(0.9)	(1.5)	(1.2)	0.7	0.6	0.2	0.3	(0.9)	(1.7)	(1.5)	(0.0)	0.0	0.0	0.0	(0.1)
PRIVATE DEBT	$ 1,282,068,751	3.8%	(0.4)	(0.1)	(0.1)	(0.1)	(0.2)	(0.3)	(0.2)	0.1	0.1	0.0	0.1	(0.2)	(0.8)	(0.3)	(0.0)	(0.0)	0.0	0.0	(0.0)
OPPORTUNISTIC EQUITY	$ 338,102,859	1.0%	(0.3)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.2)	0.1	0.1	0.0	0.0	(0.1)	(0.3)	(0.2)	0.0	0.0	0.0	0.0	(0.0)
OPPORTUNISTIC DEBT	$ 1,035,665,948	3.1%	(0.4)	(0.1)	(0.1)	(0.1)	(0.2)	(0.3)	(0.2)	0.1	0.1	0.0	0.1	(0.2)	(0.7)	(0.3)	(0.0)	0.0	0.0	0.0	(0.0)
GLOBAL INFLATION LINKEI	$ 724,820,162	2.1%	(0.0)	0.0	0.0	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	(0.0)	(0.3)	0.0	0.0	0.0	0.0	(0.1)	(0.1)
GTAA	$ 3,314,886,024	9.8%	(1.5)	(0.4)	(0.5)	(0.5)	(0.7)	(1.2)	(0.9)	0.6	0.5	0.1	0.3	(0.7)	(2.2)	(1.2)	(0.1)	0.0	0.0	0.2	(0.1)
GRAND TOTAL	**$ 33,753,942,480**	**100.0%**	**(17.1)**	**(4.7)**	**(5.3)**	**(5.9)**	**(7.0)**	**(12.8)**	**(9.5)**	**6.8**	**6.7**	**1.3**	**3.4**	**(7.1)**	**(23.1)**	**(12.5)**	**(0.7)**	**(0.2)**	**0.0**	**1.6**	**(0.9)**
INTERIM POLICY BENCHMARK			**(14.6)**	**(4.3)**	**(5.7)**	**(5.4)**	**(5.8)**	**(11.6)**	**(7.4)**	**6.7**	**6.7**	**1.0**	**3.1**	**(5.9)**	**(20.9)**	**(10.6)**	**(1.4)**	**(0.6)**	**0.1**	**0.6**	**(0.8)**



GLOSSARY	DEFINITION	INTERPRETATION
Historical VaR 95%	A risk metric that is derived from a full revaluation historical simulation of the risk factors impacting a portfolio, making no assumption of the tail distribution, and reporting the largest loss likely to be suffered over a holding period (1Month for ASRS) 5 times out of 100, or 1 month out of 20	Value at Risk is a number, measured in price units or as percentage of portfolio value, which tells you that in a defined large percentage of cases (usually 95% or 99%) your portfolio is likely to not lose more than that amount of money. Or said the other way around, in a defined small percentage of cases (5% or 1%) your loss is expected to be greater than that number.
HVaR Contri 95%	This is the decomposition of the VaR, making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
HVaR Contri % to Total	This is the VaR contribution displayed in percent.	
Parametric VaR 95%	A risk metric that is derived from a full revaluation historical simulation of the risk factors impacting a portfolio, making a Normal distribution assumption of the tail distribution, and reporting the largest loss likely to be suffered over a holding period (1Month for ASRS) 5 times out of 100, or 1 month out of 20.	Value at Risk is a number, measured in price units or as percentage of portfolio value, which tells you that in a defined large percentage of cases (usually 95% or 99%) your portfolio is likely to not lose more than that amount of money. Or said the other way around, in a defined small percentage of cases (5% or 1%) your loss is expected to be greater than that number.
PVaR Contri 95%	This is the decomposition of the VaR, making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
PVaR Contri % to Total	This is the VaR contribution displayed in percent.	
Exp Tail Loss 95%	Also known as Conditional VaR or ETL, it is derived by taking a weighted average between the VaR and losses exceeding the VaR. If VaR is reported at 95.0%, then ETL will average the losses between 95.1% to 99.9%. It is a risk measure that assesses the risk beyond VaR and into the tail end of the distribution of loss.	A measure that produces better incentives for traders than VaR is expected shortfall. This is also sometimes referred to as Conditional VaR, or tail loss. Where VaR asks the question 'how bad can things get?', expected shortfall asks 'if things do get bad, what is our expected loss?
Exp Tail Loss Contri 95%	This is the decomposition of the ETL making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
Exp Tail Loss Contri % to Total	This is the ETL contribution displayed in percent.	
Max Loss	The maximum projected loss.	
Downside Risk (8.7%)	A risk metric that distinguishes between "good" and "bad" returns by assigning risk only to those returns below a return specified by an investor. Downside risk is considered a more effective risk measure than standard deviation (volatility) for two important reasons: 1) it is investor specific, and 2) it identifies return distributions that have higher probabilities for negative ("left tail") market events. Downside risk is also referred to as downside deviation or target semi-deviation.	A 5 % downside risk with an 8.7% MAR means that the conditional average underperformance (below 8.7% annual) is 5%, adjusted for a positive skew (greater than the MAR). Effectively, downside risk amplifies a big loss (by squaring the distance of that loss to the target) and smoothes out the risk measure by taking into account the gains setting them up to be equal to the target MAR.
Downside Risk Contri (8.7%)	This is the decomposition of the downside risk, making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
Downside Risk Contri (8.7%) to Total	This is the downside risk contribution displayed in percent.	

Securities Lending Risk Metrics

	2 – Year Swap Spread (bps)	S&P/ISDA U.S. Financials Select 10 Index	5-Year Financial OAS (bps)	TED Spread (bps)	CBOE VIX Index (vol)	Windham Systemic Risk	Windham Turbulance
1/31/2015	24	62	123	25	21	High	High
12/31/2014	23	58	117	22	19	High	High
11/30/2014	22	55	113	22	13	Low	Moderate
10/31/2014	21	59	112	23	14	Low	Moderate
9/30/2014	25	67	107	22	16	Low	Low
8/31/2014	22	53	99	21	12	Low	Low
7/31/2014	20	59	95	22	17	Low	Low
6/30/2014	13	53	96	21	12	Low	Low
5/31/2014	14	54	99	20	11	Low	Low
4/30/2014	12	56	99	20	13	Low	Low
3/31/2014	13	61	103	20	14	Low	Low
2/28/2014	13	60	104	19	14	Low	Low
1/31/2014	13	71	111	22	18	Low	Low
12/31/2013	11	60	109	18	14	Low	Low
11/30/2013	9	68	118	18	14	Low	Low
10/31/2013	12	79	125	21	14	Low	Moderate
9/30/2013	14	90	139	24	17	Low	Moderate
8/31/2013	16	89	142	24	17	Low	High
7/31/2013	17	91	142	23	13	Low	High
6/30/2013	16	106	158	24	17	Low	High
5/31/2013	16	84	134	25	16	Low	Moderate
4/30/2013	14	91	137	23	14	Low	Moderate
3/31/2013	18	101	142	21	13	Low	Low
2/28/2013	15	99	141	18	16	Low	Low
1/31/2013	17	101	146	23	14	Low	Low
12/31/2012	14	116	155	27	18	Low	Low
11/30/2012	12	126	163	23	16	Low	Moderate
10/31/2012	10	130	158	21	19	Low	Moderate
9/30/2012	13	142	179	27	16	Low	Moderate
8/31/2012	18	164	206	35	17	Low	High
7/31/2012	20	179	223	35	19	Low	High
6/30/2012	25	191	253	38	17	Low	Moderate
5/31/2012	35	221	272	40	24	Low	Moderate
4/30/2012	29	179	239	37	17	Low	Moderate
3/31/2012	25	158	227	40	16	Low	Moderate
2/29/2012	26	171	245	41	18	Low	Moderate
1/31/2012	30	186	278	49	19	High	Moderate
12/31/2011	48	248	337	57	23	High	Moderate
11/30/2011	42	263	349	53	28	High	Moderate
10/31/2011	33	219	281	44	30	High	Moderate
9/30/2011	33	268	332	35	43	High	Moderate

LEGEND

	RISK FACTORS	Green	Yellow	Red
1	**2 – Year Swap Spread**	< 40 bps	40 - 60 bps	> 60 bps
2	**S&P/ISDA US Financial Select 10**	< 100 bps	100 - 200 bps	> 200 bps
3	**5-Year Financial OAS**	< 125 bps	125 - 200 bps	> 200 bps
4	**TED Spread**	< 50 bps	50 - 100 bps	> 100 bps
5	**CBOE VIX Index**	< 25 Vol	25 - 35 Vol	> 35 Vol
6	**Windham Systemic Risk**	Low	n/a	High
7	**Windham Turbulence**	Low	Moderate	High

2 – Year Swap Spread	The spread paid by the fixed-rate payer of an interest rate swap over the rate of the 2-year Treasury. The reported 2-year swap spread from Bloomberg is a composite price - calculated average of best bid/ask pricing.
S&P/ISDA US Financial Select 10	The S&P/ISDA US Financial Select 10 tracks major domestic financial 5-year CDS rates. The Index uses and average weighting methodology of the current liquid, "on the run" active contract.
5-Year Financial OAS	The Barclay's U.S. Aggregate Financial Average Option Adjusted Spread; the option adjusted investment grade financial corporate bond spread over 5-year Treasury bonds.
TED Spread	The TED Spread is calculated as the difference between three-month LIBOR expressed in USD and the corresponding yield on 3-month Treasury Bills, expressed in basis points.
CBOE VIX Index	The Chicago Board Options Exchange VIX Index measures the weighted average implied volatility of the S&P 500 using call and put prices over the front two months with a wide range of strike prices.
Windham Systemic Risk	Windham Capital's proprietary measure of the extent to which markets are unified or tightly coupled, called the absorption ratio. When markets are tightly coupled, they are more fragile and negative shocks propagate more quickly and broadly than when markets are loosely linked. Windham reports Systemic Risk as High or Low; there is no Moderate designation for Systemic Risk.
Windham Turbulence	Windham Capital's proprietary measure of the statistical unusualness of a set of returns given their historical pattern of behavior; including extreme price moves, decoupling of correlated assets and convergence of uncorrelated assets. Windham reports Turbulence as High, Moderate, or Low.

Agenda Item #4

NEPC, LLC

To: The Arizona State Retirement System (ASRS) Investment Committee (IC)

From: Mr. Allan Martin, Partner, Consultant, NEPC

Mr. Dan LeBeau, Consultant, NEPC

Date: February 13, 2015

Subject: Agenda Item #4: Presentation, Discussion and Appropriate Action Regarding Independent Reporting, Monitoring and Oversight of the ASRS Investment Program – Includes Total Fund and Investment Performance Report Q4-14

Purpose

To present and discuss information regarding the independent reporting, monitoring and oversight of the ASRS Investment Program.

In addition to the Total Fund Report, NEPC and IMD Staff will provide a detailed review of the quarterly ASRS Investment Performance Report (IPR).

Recommendation

Informational only; no action required.

Notice

Regarding this agenda item, pursuant to A.R.S. § 38-431.03(A)(2) and A.R.S. § 38-718(P) notice is hereby given to Trustees of the ASRS Investment Committee and the general public that the ASRS Investment Committee may vote to go into executive session, in the event specific manager data is discussed that is deemed confidential/non-public information.

Background

NEPC is responsible for providing an independent reporting, monitoring and oversight function from the Investment Program information which is presented by the CIO and IMD.

As a result, NEPC has developed reports for both the IC and Board designed to 1) provide the appropriate level of investment information for the purposes of independent oversight (ASRS SAAP compliance, Asset Class Committee minutes review, investment selection due diligence packet compliance, etc.); 2) provide ASRS investment program performance relative to its goals/objectives (presented quarterly); and 3) communicate NEPC's perspectives on the market environment, investment outlook or other initiatives or topics they believe are important to convey to the IC and Board.

More specific to the IC, NEPC will provide the IC with an ASRS Investment Performance Report (IPR) on a quarterly basis, which will provide investment manager-level detail information for discussion by NEPC and IMD staff. In addition, IMD will provide one or more staff reports related to ASRS private investments or other asset class/managers. These reports will be marked as confidential/non-public and, prior to a discussion of individual manager performance, the IC will move to executive session.

As of December 31, 2014 the Total Fund's market value was approximately $34.2 billion.

For the one-year period ending December 31, 2014, the Total Fund returned 6.2% (net of fees), outperforming the Interim SAA Policy by 1.9%. For the three-year period, the Total Fund produced a return of 12.4% per annum, outperforming the Interim SAA Policy by 0.7%. Over the past ten years, the Total Fund has returned 6.6% per annum, and since inception, the portfolio's performance is 9.9%.

Attachments:

- NEPC's Independent Reporting, Monitoring and Oversight reports
- ASRS Investment Performance Report (IPR) for period ending December 31, 2014. (Confidential/Non-Public) – distributed at the meeting

Arizona State Retirement System

Independent ASRS Investment Program Oversight for the Period Ending December 31, 2014

February 23, 2015

Allan Martin, Partner, NEPC
Dan LeBeau, Consultant, NEPC

NEPC, LLC

Contents

ASRS Investment Objectives/Performance

Note: All of the data shown on the following pages is as of December 31, 2014 and reflects the deduction of investment manager fees, unless otherwise noted.

ASRS Investment Objectives

Macro

- Objective #1: Achieve a twenty-year rolling annual total fund net rate of return equal to or greater than the actuarial assumed interest rate.

- Objective #2: Achieve one- and three-year rolling annual total fund net rates of return equal to or greater than the return of the ASRS Strategic Asset Allocation Policy (SAAP) Benchmark.

- Objective #3: Achieve one- and three-year rolling annual net rates of return for ASRS strategic asset classes that are equal to or greater than their respective strategic asset class benchmarks.

- Objective #4: Ensure sufficient monies are available to meet pension benefits, health insurance, member refunds, administrative payments, and other cash flow requirements.

Micro

Source: ASRS Strategic Plan, March 2013

Total Fund Performance

- Objective #1: Achieve a twenty-year rolling annual total fund net rate of return equal to or greater than the actuarial assumed interest rate.

	20 Year Annualized Return
Total Fund	8.7%
Constant 8%	8.0%
Excess Return	0.7%

Goal Met: Yes

Total Fund Performance

- Objective #2: Achieve one- and three-year rolling annual total fund net rates of return equal to or greater than the return of the ASRS Strategic Asset Allocation Policy (SAAP) Benchmark.

	Quarter	**1 Year**	**3 Years**	5 Years	10 Years	Since Inception (6/30/75)
Total Fund	1.1%	**6.2%**	**12.4%**	10.5%	6.6%	9.9%
Interim SAA Policy[1]	0.4%	**4.3%**	**11.7%**	9.8%	6.3%	9.6%
Excess Return	0.7%	**1.9%**	**0.7%**	0.7%	0.3%	0.3%

1 Year Goal Met: Yes
3 Year Goal Met: Yes

[1]Composition of SAA Policy can be found in the appendix.

Total Fund Attribution Analysis

Total Plan	1 Year	3 Years	5 Years
Allocation Effect[1]	0.35%	0.69%	0.32%
Manager Selection Effect[2]	0.86%	-0.03%	0.11%
Interaction Effect[3]	0.66%	0.11%	0.35%
Residual[4]	-0.02%	-0.09%	-0.10%
Excess Return	**1.85%**	**0.68%**	**0.68%**

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

1. Allocation Effect: Measures the impact of the decision to over/under weight assets classes relative to Interim SAAP weights**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio − Weight Asset Class Interim Policy Index)

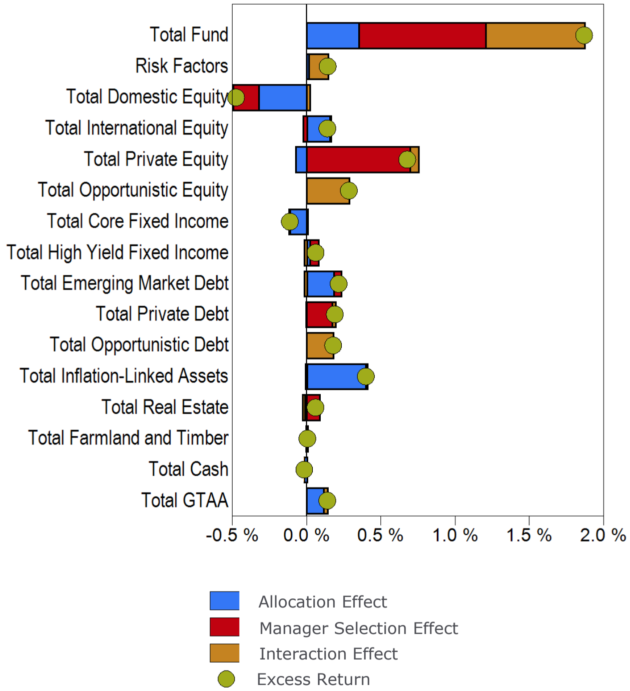
2. Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class − Return Asset Class in Interim Policy Index)]

3. Interaction Effect: Measures the impact of over/under weighting decisions and over/under performance. (Return Asset Class Portfolio (Weight Asset Class Portfolio − Weight Asset Class Policy Index))−(Return Asset Class Index (Weight Asset Class Portfolio − Weight Asset Class Index))

4. Residual: Contribution to excess return not captured in Allocation Effect, Manager Selection Effect and Interaction Effect.

Total Fund Attribution Detail

Attribution Effects
1 Year Ending December 31, 2014



1 Year Excess Return: +1.85%

- Allocation Effect: +0.35%
  - Commodities tactical underweight (+0.40%)
  - Emerging Market Debt tactical underweight (+0.19%)
  - Domestic Equity tactical underweight (-0.32%)
- Manager Selection Effect: +0.86%
  - Private Equity outperformed due to various managers (+0.70%)
  - Private Debt outperformed due to various managers (+0.17%)
  - Real Estate outperformed due to various managers (+0.08%)
  - Domestic Equity underperformed due to various managers (-0.17%)
- Interaction Effect: +0.66%
  - Opportunistic Equity outperformed due to various managers (+0.28%)
  - Opportunistic Debt outperformed due to various managers (+0.18%)
  - Equity Risk Factor Portfolio outperformed due to various exposures (+0.13%)
- Residual: -0.02%

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

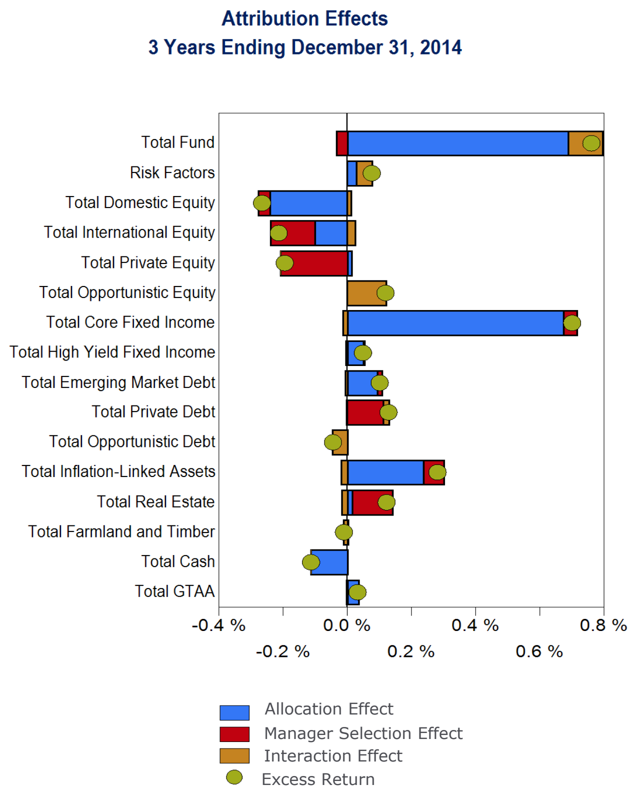
Allocation Effect: Measures the impact of the decision to over/under weight assets classes relative to Interim SAAP benchmark weights**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio − Weight Asset Class Interim Policy Index)

Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class − Return Asset Class in Interim Policy Index)]

Interaction Effect: Measures the impact of over/under weighting decisions and over/under performance. (Return Asset Class Portfolio (Weight Asset Class Portfolio − Weight Asset Class Policy Index))−(Return Asset Class Index (Weight Asset Class Portfolio − Weight Asset Class Index))

Residual: Contribution to excess return not captured in Allocation Effect, Manager Selection Effect and Interaction Effect.

Total Fund Attribution Detail



3 Year Excess Return: +0.68%

- Allocation Effect: +0.69%
  - Public Markets Fixed Income tactical underweight (+0.81%)
  - Commodities tactical underweight (+0.24%)
  - Domestic Equity tactical underweight (-0.24%)
- Manager Selection Effect: -0.03%
  - Private Equity underperformed due to various managers (-0.21%)
  - International Equity underperformed due to various managers (-0.14%)
  - Real Estate outperformed due to various managers (+0.12%)
  - Private Debt outperformed due to various managers (+0.11%)
  - Commodities outperformed due to Gresham (+0.06%)
- Interaction Effect: +0.10%
  - Opportunistic Equity outperformed due to various managers (+0.12%)
  - Opportunistic Debt underperformed due to various managers (-0.05%)
- Residual: -0.09%

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

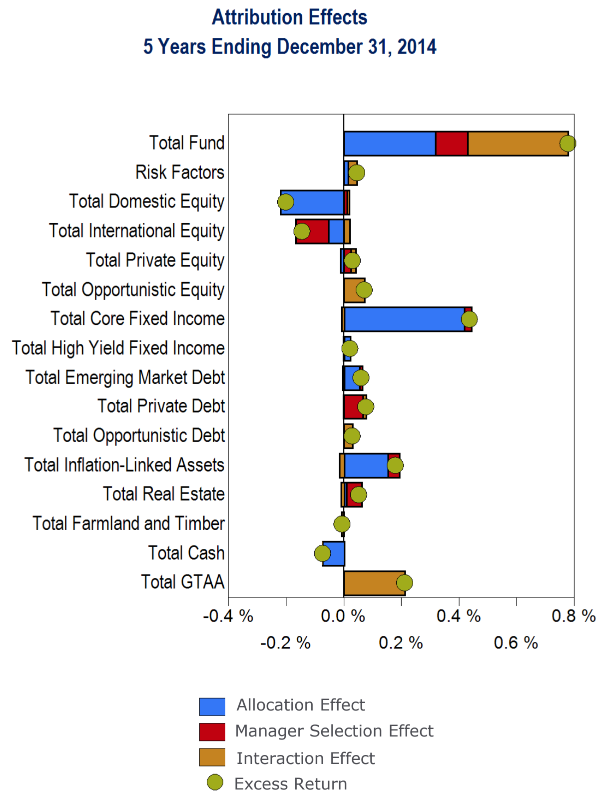
Allocation Effect: Measures the impact of the decision to over/under weight assets classes relative to Interim SAAP benchmark weights**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio − Weight Asset Class Interim Policy Index)

Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class − Return Asset Class in Interim Policy Index)]

Interaction Effect: Measures the impact of over/under weighting decisions and over/under performance. (Return Asset Class Portfolio (Weight Asset Class Portfolio − Weight Asset Class Policy Index))−(Return Asset Class Index (Weight Asset Class Portfolio − Weight Asset Class Index))

Residual: Contribution to excess return not captured in Allocation Effect, Manager Selection Effect and Interaction Effect.

Total Fund Attribution Detail



5 Year Excess Return: +0.68%

- Allocation Effect: +0.32%
  - Public Markets Fixed Income tactical underweight (+0.50%)
  - Commodities tactical underweight (+0.15%)
  - Domestic Equity tactical underweight (-0.22%)
- Manager Selection Effect: +0.11%
  - Private Debt outperformed due to various managers (+0.07%)
  - Real Estate outperformed due to various managers (+0.05%)
  - Commodities outperformed due to Gresham (+0.04%)
  - International Equity underperformed due to various managers (-0.11%)
- Interaction Effect: +0.35%
  - GTAA outperformed due to Bridgewater (+0.21%)
  - Opportunistic Equity outperformed due to various managers (+0.07%)
  - Opportunistic Debt outperformed due to various managers (+0.03%)
- Residual: -0.10%

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

Allocation Effect: Measures the impact of the decision to over/under weight assets classes relative to Interim SAAP benchmark weights**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio − Weight Asset Class Interim Policy Index)

Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class − Return Asset Class in Interim Policy Index)]

Interaction Effect: Measures the impact of over/under weighting decisions and over/under performance. (Return Asset Class Portfolio (Weight Asset Class Portfolio − Weight Asset Class Policy Index))−(Return Asset Class Index (Weight Asset Class Portfolio − Weight Asset Class Index))

Residual: Contribution to excess return not captured in Allocation Effect, Manager Selection Effect and Interaction Effect.

Asset Class Performance vs. Benchmark – Public Markets

- Objective #3: Achieve one- and three-year rolling annual net rates of return for ASRS strategic asset classes that are equal to or greater than their respective strategic asset class benchmarks.

	1 Year Return	3 Year Return
ASRS Total Domestic and Int'l Equity[1]	5.2%	16.1%
ASRS Custom Total Equity Benchmark	5.1%	16.2%
Excess Return	0.1%	-0.1%
ASRS Domestic Equity	11.5%	20.3%
ASRS Custom Domestic Equity Benchmark	12.0%	20.4%
Excess Return	-0.5%	-0.1%
ASRS International Equity	-4.2%	9.4%
ASRS Custom Int'l Equity Benchmark	-4.1%	9.9%
Excess Return	-0.1%	-0.5%
ASRS Public Markets Fixed Income	3.6%	2.6%
ASRS Custom Fixed Income Benchmark	3.1%	2.3%
Excess Return	0.5%	0.3%
ASRS Inflation-Linked	-17.1%	-8.2%
ASRS Custom Inflation-Linked Benchmark	-17.0%	-9.4%
Excess Return	-0.1%	1.2%
ASRS GTAA	5.5%	12.0%
ASRS Custom GTAA Benchmark	5.4%	12.0%
Excess Return	0.1%	0.0%

[1]Performance of ASRS Total Domestic and Int'l Equity includes the performance of the ASRS Domestic Equity and ASRS International Equity asset classes and the Equity Risk Factor Portfolio with an inception date of 6/1/2013.

Note: Composition of ASRS Custom Asset Class Benchmarks can be found in the appendix.

Goal Met: Partially

Asset Class Performance vs. Benchmark – Private Markets[1]

- Objective #3: Achieve one- and three-year rolling annual net rates of return for ASRS strategic asset classes that are equal to or greater than their respective strategic asset class benchmarks.

	1 Year Return	3 Year Return	IRR Since Inception	Inception Date
ASRS Private Equity	16.7%	16.2%	13.0%	Oct-07
Russell 2000	3.9%	21.3%	12.3%	
Excess Return	12.8%	-5.1%	0.7%	
ASRS Opportunistic Equity[2]	45.7%	28.2%	31.9%	Apr-11
ASRS Private Debt	12.9%	--	14.1%	Jul-12
S&P/LSTA Levered Loan Index + 250 bps	6.4%	--	6.6%	
Excess Return	6.5%	--	7.5%	
ASRS Opportunistic Debt[2]	11.0%	11.3%	12.1%	Jan-08
ASRS Real Estate	12.9%	13.3%	6.2%	Oct-05
NFI - ODCE Index	11.4%	11.3%	5.8%	
Excess Return	1.5%	2.0%	0.4%	
ASRS Farmland and Timber	4.6%	--	1.6%	Jul-13
CPI ex-Food and Energy + 350 bps	5.2%	--	5.3%	
Excess Return	-0.6%	--	-3.7%	

[1]Performance of private markets portfolios and corresponding benchmarks are reported on a one quarter lag. Performance shown as of September 30, 2014.

[2]Net absolute rate of return expectations range from 10-14% per annum.

Note: Time-weighted performance of private markets portfolios shown for the one- and three-year periods to reconcile Total Fund performance as it is reported on a time-weighted basis. Due to the drawdown nature of private markets portfolios in which the investment managers call capital over time, dollar-weighted performance, or internal rate of return (IRR) is a more appropriate measure of the performance of ASRS private markets portfolios.

Goal Met: Partially

Cash Management

- Objective #4: Ensure sufficient monies are available to meet pension benefits, health insurance, member refunds, administrative payments, and other cash flow requirements.

Month	Cash In	Cash Out	Balance as of 1st Business Day
Jan-14	$386,764,591	($190,949,369)	$352,809,530
Feb-14	$210,787,413	($191,680,149)	$189,010,112
Mar-14	$679,587,225	($192,454,469)	$486,243,101
Apr-14	$455,478,123	($192,789,720)	$246,095,874
May-14	$328,489,975	($193,063,809)	$162,815,927
Jun-14	$143,781,061	($193,481,152)	$90,885,762
Jul-14	$249,555,269	($196,223,085)	$101,745,713
Aug-14	$196,994,381	($198,736,874)	$141,827,348
Sep-14	$365,370,874	($199,232,408)	$165,530,449
Oct-14	$321,707,041	($200,104,305)	$139,949,815
Nov-14	$314,711,411	($200,572,009)	$111,628,426
Dec-14	$467,265,987	($200,810,121)	$275,989,580

All Pension Obligations, Capital Calls and Other Requirements Met with Available Cash

Goal Met: Yes

Note:

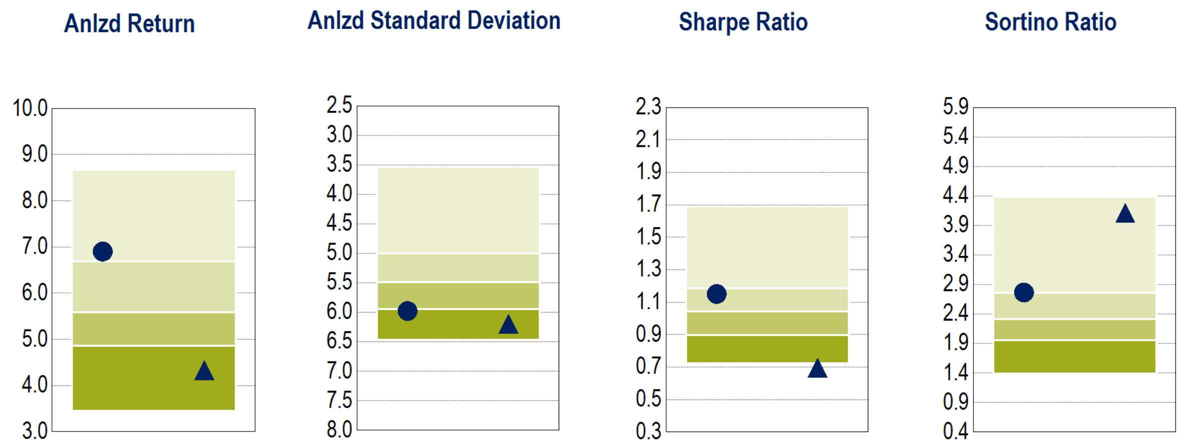
Cash In - The balance as of the business day prior to the monthly pension run payment, comprised of month-to-date contributions and excess cash held to fund manager(s) or as a tactical allocation.

Cash Out - The monthly pension run payment.

Total Fund Risk Statistics vs. Peer Universe

Total Fund vs. IFx Public DB > $1B Gross(USD)(peer)

1 Year



	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
● Total Fund				
Value	6.9	6.0	1.2	2.8
%tile	17	77	33	26
▲ Interim SAA Policy				
Value	4.3	6.2	0.7	4.1
%tile	80	89	96	7
Universe				
5th %tile	8.7	3.5	1.7	4.4
25th %tile	6.7	5.0	1.2	2.8
Median	5.6	5.5	1.0	2.3
75th %tile	4.9	5.9	0.9	2.0
95th %tile	3.5	6.5	0.7	1.4

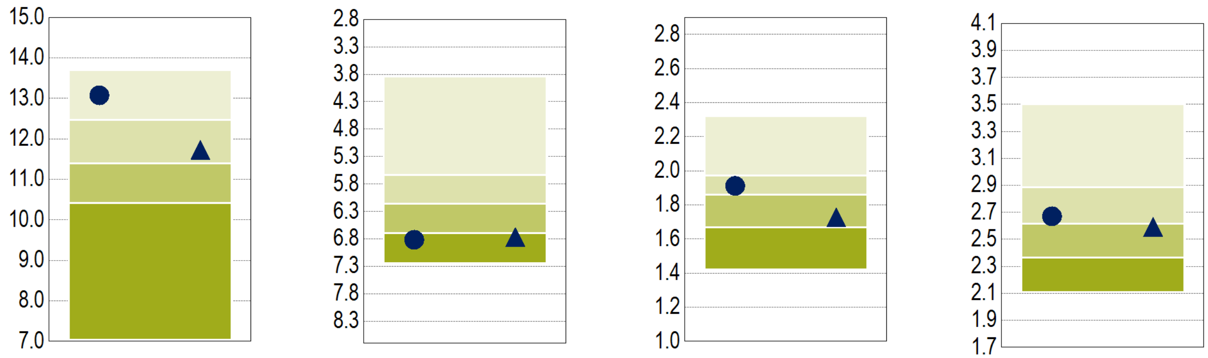
Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross of fee returns; and survivorship bias in that poorly performing funds may no longer report results.
Universes are constructed using gross of fee returns; therefore, ASRS rank is based on gross of fee returns.
Rankings are from highest (1) to lowest (100) in the InvestorForce Public Funds > $1 Billion Universe.
The InvestorForce Public Funds > $1 Billion Universe contains 67 observations for the period ending December 31, 2014, with total assets of $617.9 billion.
Composition of Interim SAA Policy can be found in the appendix.

Total Fund Risk Statistics vs. Peer Universe

Total Fund vs. IFx Public DB > $1B Gross(USD)(peer)

3 Year

Anlzd Return | Anlzd Standard Deviation | Sharpe Ratio | Sortino Ratio



Anlzd Return

● Total Fund	
Value	13.1
%tile	17
▲ Interim SAA Policy	
Value	11.7
%tile	42
Universe	
5th %tile	13.7
25th %tile	12.5
Median	11.4
75th %tile	10.4
95th %tile	7.1

Anlzd Standard Deviation

● Total Fund	
Value	6.8
%tile	87
▲ Interim SAA Policy	
Value	6.8
%tile	85
Universe	
5th %tile	3.8
25th %tile	5.6
Median	6.1
75th %tile	6.7
95th %tile	7.2

Sharpe Ratio

● Total Fund	
Value	1.9
%tile	43
▲ Interim SAA Policy	
Value	1.7
%tile	69
Universe	
5th %tile	2.3
25th %tile	2.0
Median	1.9
75th %tile	1.7
95th %tile	1.4

Sortino Ratio

● Total Fund	
Value	2.7
%tile	41
▲ Interim SAA Policy	
Value	2.6
%tile	59
Universe	
5th %tile	3.5
25th %tile	2.9
Median	2.6
75th %tile	2.4
95th %tile	2.1

Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross of fee returns; and survivorship bias in that poorly performing funds may no longer report results.
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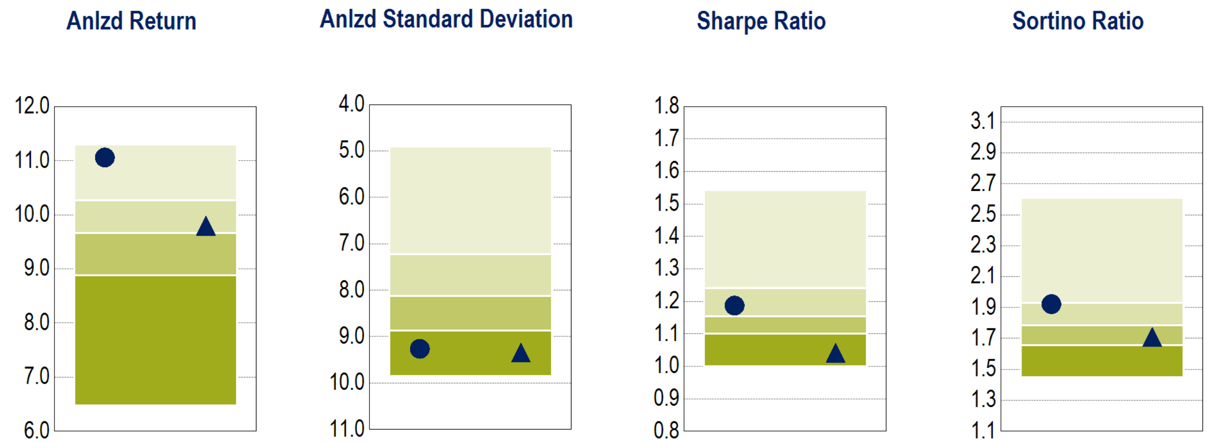
Total Fund Risk Statistics vs. Peer Universe

Total Fund vs. IFx Public DB > $1B Gross(USD)(peer)

5 Year



	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
● Total Fund				
Value	11.1	9.3	1.2	1.9
%tile	7	86	37	29
▲ Interim SAA Policy				
Value	9.8	9.3	1.0	1.7
%tile	48	88	89	67
Universe				
5th %tile	11.3	4.9	1.5	2.6
25th %tile	10.3	7.2	1.2	1.9
Median	9.7	8.1	1.2	1.8
75th %tile	8.9	8.9	1.1	1.7
95th %tile	6.5	9.8	1.0	1.5

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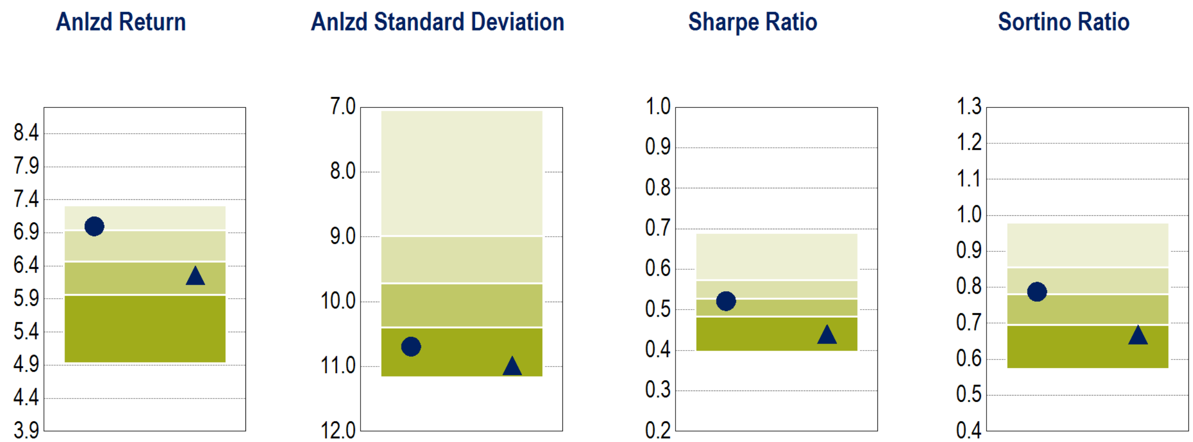
Total Fund Risk Statistics vs. Peer Universe

Total Fund vs. IFx Public DB > $1B Gross(USD)(peer)

10 Year



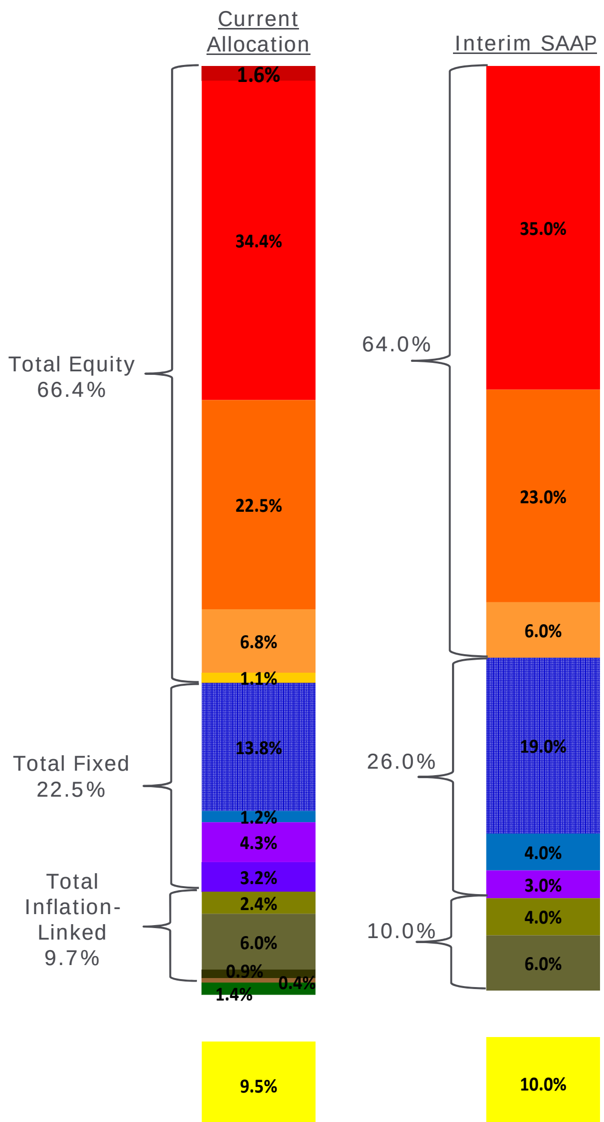
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
● Total Fund				
Value	7.0	10.7	0.5	0.8
%tile	22	88	57	45
▲ Interim SAA Policy				
Value	6.3	11.0	0.4	0.7
%tile	65	91	85	85
Universe				
5th %tile	7.3	7.0	0.7	1.0
25th %tile	7.0	9.0	0.6	0.9
Median	6.5	9.7	0.5	0.8
75th %tile	6.0	10.4	0.5	0.7
95th %tile	4.9	11.2	0.4	0.6

Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross of fee returns; and survivorship bias in that poorly performing funds may no longer report results.
Universes are constructed using gross of fee returns; therefore, ASRS rank is based on gross of fee returns.
Rankings are from highest (1) to lowest (100) in the InvestorForce Public Funds > $1 Billion Universe.
The InvestorForce Public Funds > $1 Billion Universe contains 67 observations for the period ending December 31, 2014, with total assets of $617.9 billion.
Composition of Interim SAA Policy can be found in the appendix.

Independent Oversight/Compliance

Note: All of the data shown on the following pages is as of December 31, 2014 and reflects the deduction of investment manager fees, unless otherwise noted.

SAA Policy Compliance



	Current Mkt Value	Current Allocation	Interim SAAP	Difference	Policy Range	Within Range
Total Domestic and International Equity[1]	**$20,014,156,499**	**58.5%**	**58.0%**	**0.5%**		
Domestic Equity[3]	**$11,761,599,199**	**34.4%**	**35.0%**	**-0.6%**	**26% - 38%**	**Yes**
U.S. Large Cap[2]	*$8,744,595,200*	*25.6%*	*25.0%*	*0.6%*		
U.S. Mid Cap	*$1,574,006,298*	*4.6%*	*5.0%*	*-0.4%*		
U.S. Small Cap	*$1,442,997,701*	*4.2%*	*5.0%*	*-0.8%*		
International Equity[3]	**$7,707,235,911**	**22.5%**	**23.0%**	**-0.5%**	**16% - 28%**	**Yes**
Developed Large Cap[2]	*$4,675,963,159*	*13.7%*	*14.0%*	*-0.3%*		
Developed Small Cap	*$1,169,023,387*	*3.4%*	*3.0%*	*0.4%*		
Emerging Markets	*$1,862,249,364*	*5.4%*	*6.0%*	*-0.6%*		
Private Equity[4]	**$2,334,272,042**	**6.8%**	**6.0%**	**0.8%**	**5% - 9%**	**Yes**
Opportunistic Equity[4,6]	**$374,912,037**	**1.1%**	**0.0%**	**1.1%**	**0% - 3%**	**Yes**
Total Equity	**$22,723,340,578**	**66.4%**	**64.0%**	**2.4%**	**53% - 70%**	**Yes**
U.S. Fixed Income	**$4,715,578,932**	**13.8%**	**19.0%**	**-5.2%**	**8% - 28%**	**Yes**
Core[2]	*$3,452,110,205*	*10.1%*	*14.0%*	*-3.9%*		
High Yield	*$1,263,468,727*	*3.7%*	*5.0%*	*-1.3%*		
Emerging Market Debt	**$418,364,158**	**1.2%**	**4.0%**	**-2.8%**		
Private Debt[4]	**$1,474,167,707**	**4.3%**	**3.0%**	**1.3%**		
Opportunistic Debt[4,6]	**$1,089,483,616**	**3.2%**	**0.0%**	**3.2%**	**0% - 10%**	**Yes**
Total Fixed Income	**$7,697,594,412**	**22.5%**	**26.0%**	**-3.5%**	**15% - 35%**	**Yes**
Commodities[2]	**$815,809,393**	**2.4%**	**4.0%**	**-1.6%**	**1% - 7%**	**Yes**
Real Estate[2,4]	**$2,065,827,277**	**6.0%**	**6.0%**	**0.0%**	**6% - 10%**	**Yes**
Infrastructure	**$300,000,000**	**0.9%**	**0.0%**	**0.9%**	**0% - 3%**	**Yes**
Farmland and Timber	**$151,503,742**	**0.4%**	**0.0%**	**0.4%**	**0% - 3%**	**Yes**
Opportunistic Inflation-Linked[5]	**$0**	**0.0%**	**0.0%**	**0.0%**	**0% - 3%**	**Yes**
Total Inflation-Linked	**$3,333,140,412**	**9.7%**	**10.0%**	**-0.3%**	**8% - 16%**	**Yes**
Cash[5]	**$467,270,100**	**1.4%**	**0.0%**	**1.4%**		
Total	**$34,221,345,501**	**100.0%**	**100.0%**	**0.0%**		
Global Tactical Asset Allocation (GTAA)[2]	**$3,242,787,016**	**9.5%**	**10.0%**	**-0.5%**	**5% - 15%**	**Yes**

[1]Total Domestic and International Equity includes Equity Risk Factor Portfolio with assets of $545.3 million.

[2]GTAA allocation distributed into U.S. Large Cap Equity, Int'l Developed Large Cap Equity, Core Fixed Income, Commodities and Real Estate.

[3]Domestic Equity, International Equity and U.S. Fixed Income market values include residual values remaining in terminated manager accounts.

[4]Values shown for private markets portfolios include cash flows that occurred during 4Q 2014.

[5]Cash includes money for the upcoming monthly pension distribution.

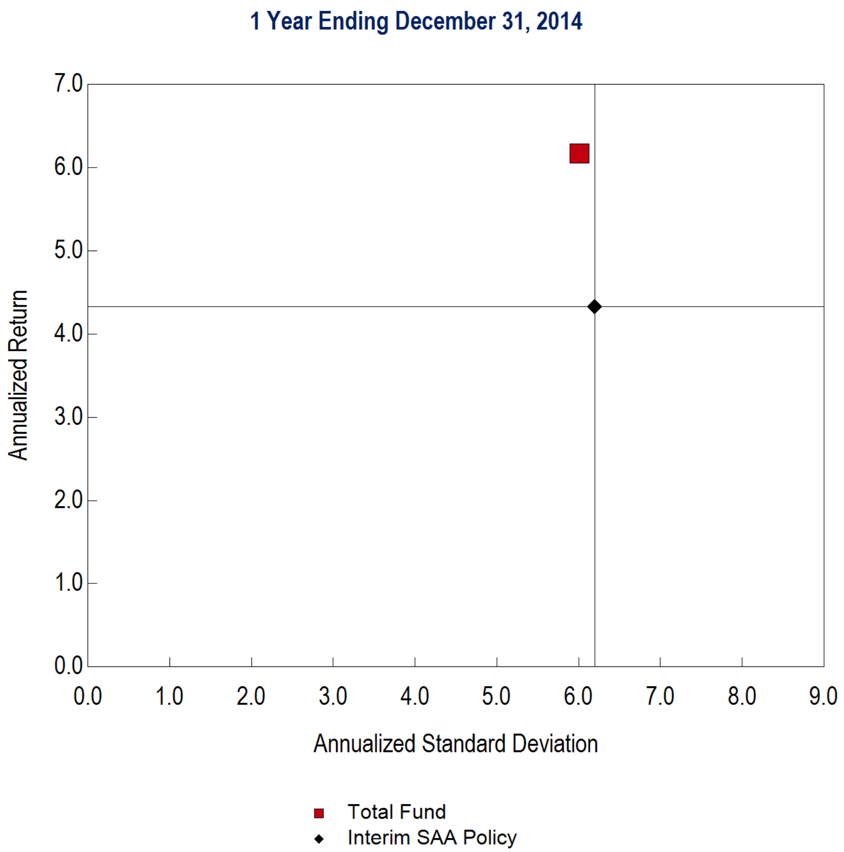
[6]Aggregate Opportunistic asset classes not to exceed 10%.

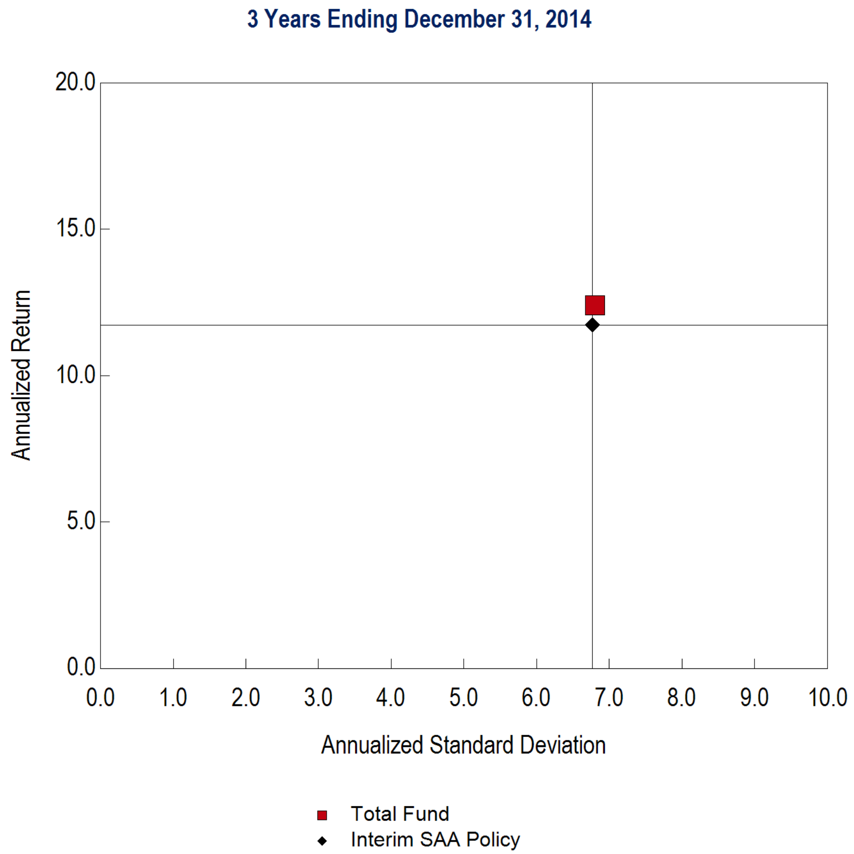
Note: Interim SAA Policy includes proration of 1% Private Equity and 2% Real Estate, which are unfunded.

Policy Ranges shown are relative to the long-term SAAP, causing some asset classes to be out of range while implementation of the long-term SAAP is in process.

Market values include manager held cash.

Total Fund Analysis





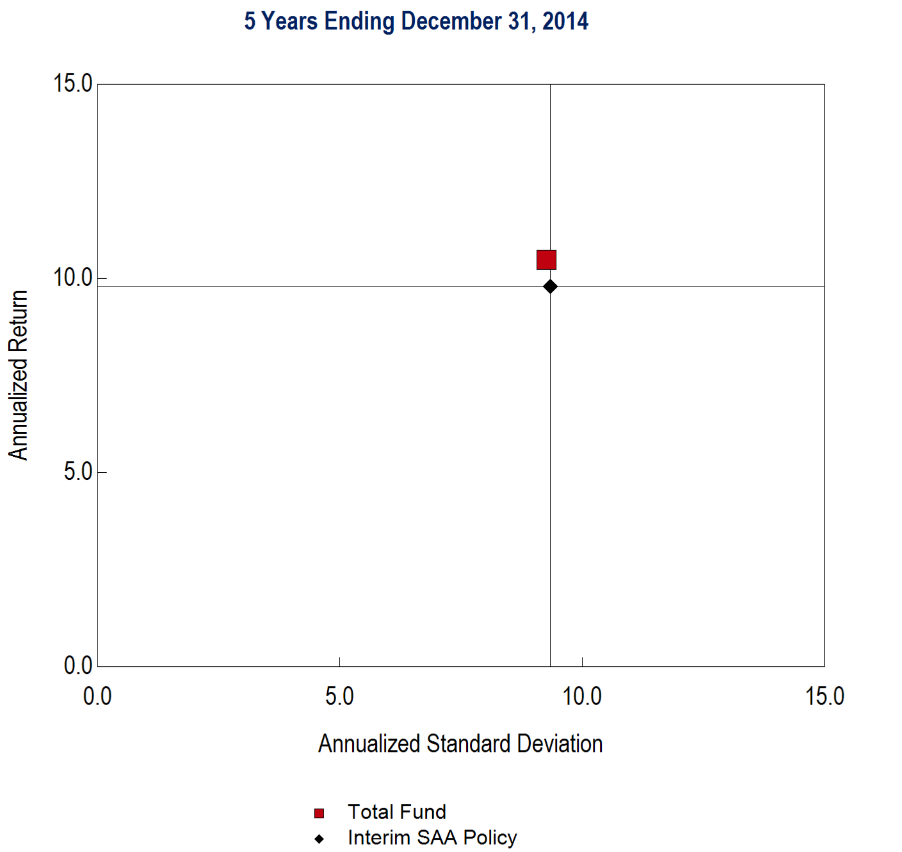
1 Year Ending December 31, 2014

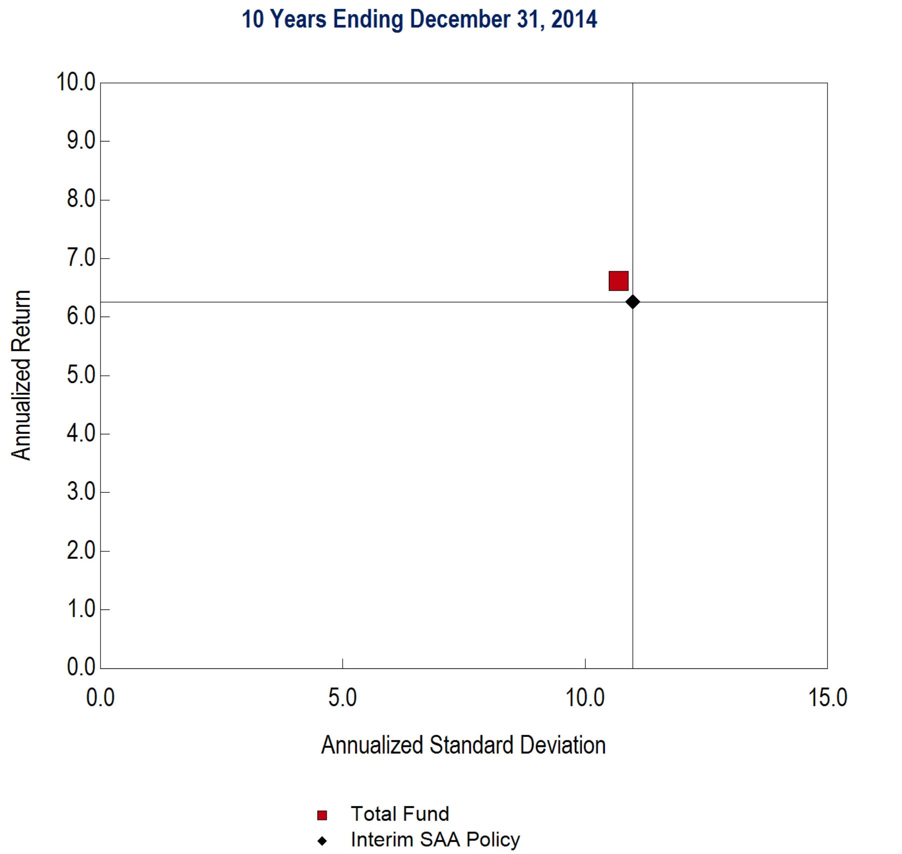
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	6.2%	6.0%	1.0	2.5
Interim SAA Policy	4.3%	6.2%	0.7	4.1

3 Years Ending December 31, 2014

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	12.4%	6.8%	1.8	2.5
Interim SAA Policy	11.7%	6.8%	1.7	2.6

Total Fund Analysis





5 Years Ending December 31, 2014

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	10.5%	9.3%	1.1	1.8
Interim SAA Policy	9.8%	9.3%	1.0	1.7

10 Years Ending December 31, 2014

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	6.6%	10.7%	0.5	0.7
Interim SAA Policy	6.3%	11.0%	0.4	0.7

Asset Class Performance Summary - Public Markets

	Market Value ($)	% of Portfolio	3 Mo (%)	Rank	6 Mo (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	10 Yrs (%)	Rank	Inception (%)	Since
Total Fund	**34,221,345,501**	**100.0**	**1.1**	**--**	**-0.2**	**--**	**6.2**	**--**	**12.4**	**--**	**10.5**	**--**	**6.6**	**--**	**9.9**	**Jul-75**
Interim SAA Policy			*0.4*	--	*-1.6*	--	*4.3*	--	*11.7*	--	*9.8*	--	*6.3*	--	*9.6*	*Jul-75*
Over/Under			0.7		1.4		1.9		0.7		0.7		0.3		0.3	
Actual Benchmark			*0.6*	--	*-1.0*	--	*5.1*	--	*12.1*	--	*9.9*	--	*6.3*	--	--	*Jul-75*
Total Domestic and International Equity[1]	**18,164,680,985**	**53.1**	**1.7**	**--**	**-0.9**	**--**	**5.2**	**--**	**16.1**	**--**	**12.0**	**--**	**6.8**	**--**	**6.8**	**Jan-98**
ASRS Custom Total Equity Benchmark			*1.9*	--	*-0.9*	--	*5.1*	--	*16.2*	--	*12.0*	--	*6.9*	--	*6.1*	*Jan-98*
Over/Under			-0.2		0.0		0.1		-0.1		0.0		-0.1		0.7	
Total Domestic Equity	**10,867,172,487**	**31.8**	**5.3**	**51**	**4.6**	**38**	**11.5**	**33**	**20.3**	**38**	**15.9**	**38**	**8.3**	**52**	**11.4**	**Jul-75**
ASRS Custom Domestic Equity Benchmark			*5.9*	*42*	*5.0*	*33*	*12.0*	*30*	*20.4*	*36*	*15.8*	*39*	*8.1*	*58*	*11.5*	*Jul-75*
Over/Under			-0.6		-0.4		-0.5		-0.1		0.1		0.2		-0.1	
eA All US Equity Net Median			*5.3*		*3.6*		*9.1*		*19.3*		*15.3*		*8.4*		*12.6*	*Jul-75*
Total International Equity	**6,752,187,108**	**19.7**	**-3.7**	**75**	**-9.1**	**72**	**-4.2**	**61**	**9.4**	**72**	**4.8**	**77**	**4.4**	**86**	**6.1**	**Apr-87**
ASRS Custom Int'l Equity Benchmark			*-3.6*	*74*	*-8.9*	*71*	*-4.1*	*59*	*9.9*	*65*	*5.2*	*69*	*5.5*	*72*	*5.8*	*Apr-87*
Over/Under			-0.1		-0.2		-0.1		-0.5		-0.4		-1.1		0.3	
eA All ACWI ex-US Equity Net Median			*-2.5*		*-7.9*		*-3.4*		*10.9*		*6.5*		*6.0*		*7.7*	*Apr-87*
Total Public Markets Fixed Income	**4,019,981,496**	**11.7**	**0.3**	**65**	**-0.8**	**84**	**3.6**	**55**	**2.6**	**63**	**4.5**	**55**	**4.9**	**42**	**8.4**	**Jul-75**
ASRS Custom Fixed Income Benchmark			*-0.2*	*87*	*-1.6*	*88*	*3.1*	*60*	*2.3*	*69*	*4.2*	*61*	*4.6*	*54*	--	*Jul-75*
Over/Under			0.5		0.8		0.5		0.3		0.3		0.3		--	
eA All US Fixed Inc Net Median			*0.7*		*0.7*		*3.9*		*3.5*		*4.8*		*4.6*		*8.2*	*Jul-75*
Total Inflation-Linked Assets	**570,997,289**	**1.7**	**-13.1**	**--**	**-22.6**	**--**	**-17.1**	**--**	**-8.2**	**--**	**-3.4**	**--**	**--**	**--**	**-3.4**	**Feb-10**
ASRS Custom Inflation-Linked Benchmark			*-12.1*	--	*-22.5*	--	*-17.0*	--	*-9.4*	--	*-4.7*	--	*-0.1*	--	*-5.1*	*Feb-10*
Over/Under			-1.0		-0.1		-0.1		1.2		1.3				1.7	
Total GTAA	**3,242,787,016**	**9.5**	**0.9**	**43**	**-1.8**	**56**	**5.5**	**11**	**12.0**	**1**	**11.8**	**1**	**7.8**	**9**	**8.0**	**Jan-04**
ASRS Custom GTAA Benchmark			*1.2*	*30*	*-0.3*	*37*	*5.4*	*12*	*12.0*	*1*	*9.8*	*1*	*6.1*	*36*	*6.5*	*Jan-04*
Over/Under			-0.3		-1.5		0.1		0.0		2.0		1.7		1.5	
eA Global TAA Net Median			*0.7*		*-1.6*		*3.3*		*6.7*		*5.3*		*5.8*		*6.4*	*Jan-04*

[1]Performance of ASRS Total Domestic and International Equity includes the performance of the ASRS Domestic and International Equity asset classes and the Equity Risk Factor Portfolio with an inception date of 6/1/2013. NEPC began calculating Total Domestic and International Equity performance in January 2009. Monthly performance data from January 1998 - December 2008 was provided by State Street.

Note: Performance, ranks and medians are based on net of fee performance data. Rankings are from highest (1) to lowest (100) in the eVestment Universe.

Composition of Interim SAA Policy and ASRS Custom Asset Class Benchmarks can be found in the appendix.

Asset Class Performance Summary - Private Markets

	Market Value ($)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	Inception (%)	IRR (%)	Since
Total Fund	**34,221,345,501**	**100.0**	**1.1**	**6.2**	**12.4**	**10.5**	**9.9**	**--**	**Jul-75**
Interim SAA Policy			*0.4*	*4.3*	*11.7*	*9.8*	*9.6*	--	*Jul-75*
Over/Under			0.7	1.9	0.7	0.7	0.3	--	
Actual Benchmark			*0.6*	*5.1*	*12.1*	*9.9*	--	--	*Jul-75*
Total Private Equity	**2,296,309,757**	**6.7**	**1.7**	**16.7**	**16.2**	**15.7**	**5.3**	**13.0**	**Oct-07**
Russell 2000 1 QTR Lagged			*-7.4*	*3.9*	*21.3*	*14.3*	*6.0*	*12.3*	*Oct-07*
Over/Under			9.1	12.8	-5.1	1.4	-0.7	0.7	
Total Opportunistic Equity[1]	**372,297,570**	**1.1**	**-1.8**	**45.7**	**28.2**	**--**	**23.7**	**31.9**	**Apr-11**
Total Private Debt	**1,265,984,479**	**3.7**	**2.0**	**12.9**	**--**	**--**	**15.3**	**14.1**	**Jul-12**
S&P/LSTA Leveraged Loan Index + 250 bps 1 QTR Lagged			*0.2*	*6.4*	--	--	*8.0*	*6.6*	*Jul-12*
Over/Under			1.8	6.5			7.3	7.5	
Total Opportunistic Debt[1]	**1,074,792,940**	**3.1**	**1.5**	**11.0**	**11.3**	**--**	**9.1**	**12.1**	**Jan-08**
Total Real Estate	**2,045,413,190**	**6.0**	**2.0**	**12.9**	**13.3**	**12.4**	**4.1**	**6.2**	**Oct-05**
NCREIF ODCE 1 QTR Lagged			*3.0*	*11.4*	*11.3*	*11.3*	*5.2*	*5.8*	*Oct-05*
Over/Under			-1.0	1.5	2.0	1.1	-1.1	0.4	
Total Farmland and Timber	**116,439,488**	**0.3**	**0.2**	**4.6**	**--**	**--**	**-39.1**	**1.6**	**Jul-13**
CPI ex-Food and Energy + 350 bps 1 QTR Lagged			*1.1*	*5.2*	--	--	*5.2*	*5.3*	*Jul-13*
Over/Under			-0.9	-0.6			-44.3	-3.7	

[1]Net absolute rate of return expectations range from 10-14% per annum.

Note: Performance is based on net of fee performance data.

Performance data for Total Private Equity, Total Opportunistic Equity, Total Private Debt, Total Opportunistic Debt, Total Real Estate, and Total Farmland and Timber and corresponding benchmarks is lagged by one quarter. Performance data and market values provided by Grosvenor Capital Management.

Prior to 3Q 2012, the performance of the Total Private Debt and Total Opportunistic Debt asset classes was reported in aggregate. Effective 6/30/2012, the Fund's allocations to Private Debt and Opportunistic Debt were separated and will be reported separately going forward.

Time-weighted performance of private markets portfolios shown to reconcile Total Fund performance as it is reported on a time-weighted basis. Due to the drawdown nature of private markets portfolios in which the investment managers call capital over time, dollar-weighted performance, or internal rate of return (IRR) is a more appropriate measure of ASRS private markets portfolios.

Composition of Interim SAA Policy can be found in the appendix.

Public Market Asset Class Analysis

3 Years Ending December 31, 2014

	% of Tot	Anlzd Ret	Rank	Anlzd Std Dev	Rank	Anlzd AJ	Rank	Tracking Error	Rank	Info Ratio	Rank	Beta	Sharpe Ratio
Total Fund	100.0%	12.4%	--	6.8%	--	0.8%	--	1.2%	--	0.6	--	1.0	1.8
Interim SAA Policy	--	11.7%	--	6.8%	--	--	--	--	--	--	--	--	1.7
Total Domestic and International Equity	53.1%	16.1%	--	10.0%	--	0.2%	--	0.6%	--	-0.2	--	1.0	1.6
ASRS Custom Total Equity Benchmark	--	16.2%	--	10.2%	--	--	--	--	--	--	--	--	1.6
Total Domestic Equity	31.8%	20.3%	38	9.5%	19	0.1%	31	0.6%	1	-0.2	50	1.0	2.1
ASRS Custom Domestic Equity Benchmark	--	20.4%	36	9.6%	20	--	32	--	--	--	--	--	2.1
Total International Equity	19.7%	9.4%	72	12.8%	55	-0.3%	80	0.7%	1	-0.8	96	1.0	0.7
ASRS Custom Int'l Equity Benchmark	--	9.9%	65	13.1%	70	--	76	--	--	--	--	--	0.8
Total Public Markets Fixed Income	11.7%	2.6%	63	3.8%	71	0.2%	92	0.5%	1	0.6	49	1.0	0.7
ASRS Custom Public Markets Fixed Income Benchmark	--	2.3%	69	3.6%	69	--	96	--	--	--	--	--	0.6
Total Inflation-Linked Assets	1.7%	-8.2%	--	12.4%	--	0.9%	--	2.4%	--	0.5	--	1.0	-0.7
ASRS Custom Inflation-Linked Benchmark	--	-9.4%	--	12.7%	--	--	--	--	--	--	--	--	-0.7
Total GTAA	9.5%	12.0%	1	8.0%	79	-1.5%	33	1.5%	1	-0.1	1	1.1	1.5
ASRS Custom GTAA Benchmark	--	12.0%	1	7.1%	58	--	23	--	--	--	--	--	1.7

Note: Performance is reported net of fees.
Underlying composites do not add up to 100% because the chart excludes private markets composites.
Ranks for statistics shown above are based on the respective universe against which the portfolio is ranked on the asset class performance summary that precedes this section of the analysis.
Rankings are from highest (1) to lowest (100) in the eVestment Universe.
Composition of Interim SAA Policy and ASRS Custom Benchmarks can be found in the appendix.

Public Market Asset Class Analysis

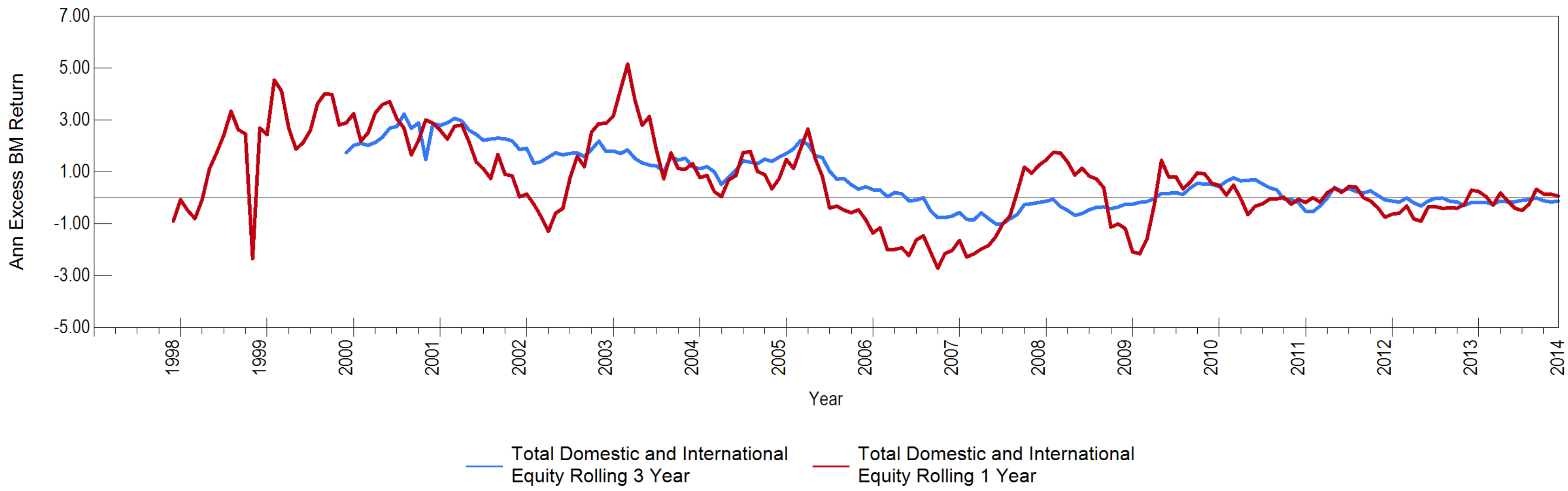
5 Years Ending December 31, 2014

	% of Tot	Anlzd Ret	Rank	Anlzd Std Dev	Rank	Anlzd AJ	Rank	Tracking Error	Rank	Info Ratio	Rank	Beta	Sharpe Ratio
Total Fund	100.0%	10.5%	--	9.3%	--	0.8%	--	1.0%	--	0.7	--	1.0	1.1
Interim SAA Policy	--	9.8%	--	9.3%	--	--	--	--	--	--	--	--	1.0
Total Domestic and International Equity	53.1%	12.0%	--	14.1%	--	0.2%	--	0.6%	--	0.0	--	1.0	0.8
ASRS Custom Total Equity Benchmark	--	12.0%	--	14.2%	--	--	--	--	--	--	--	--	0.8
Total Domestic Equity	31.8%	15.9%	38	13.8%	31	0.0%	34	0.6%	1	0.0	35	1.0	1.1
ASRS Custom Domestic Equity Benchmark	--	15.8%	39	13.7%	30	--	33	--	--	--	--	--	1.1
Total International Equity	19.7%	4.8%	77	16.1%	38	-0.3%	76	1.0%	1	-0.4	95	1.0	0.3
ASRS Custom Int'l Equity Benchmark	--	5.2%	69	16.5%	52	--	71	--	--	--	--	--	0.3
Total Public Markets Fixed Income	11.7%	4.5%	55	3.3%	63	0.3%	92	0.6%	1	0.6	38	1.0	1.3
ASRS Custom Public Markets Fixed Income Benchmark	--	4.2%	61	3.2%	62	--	97	--	--	--	--	--	1.3
Total Inflation-Linked Assets	1.7%	-3.4%	--	13.2%	--	1.0%	--	2.5%	--	0.5	--	0.9	-0.3
ASRS Custom Inflation-Linked Benchmark	--	-4.7%	--	13.8%	--	--	--	--	--	--	--	--	-0.3
Total GTAA	9.5%	11.8%	1	9.9%	86	1.9%	9	1.9%	1	1.1	1	1.0	1.2
ASRS Custom GTAA Benchmark	--	9.8%	1	9.6%	82	--	36	--	--	--	--	--	1.0

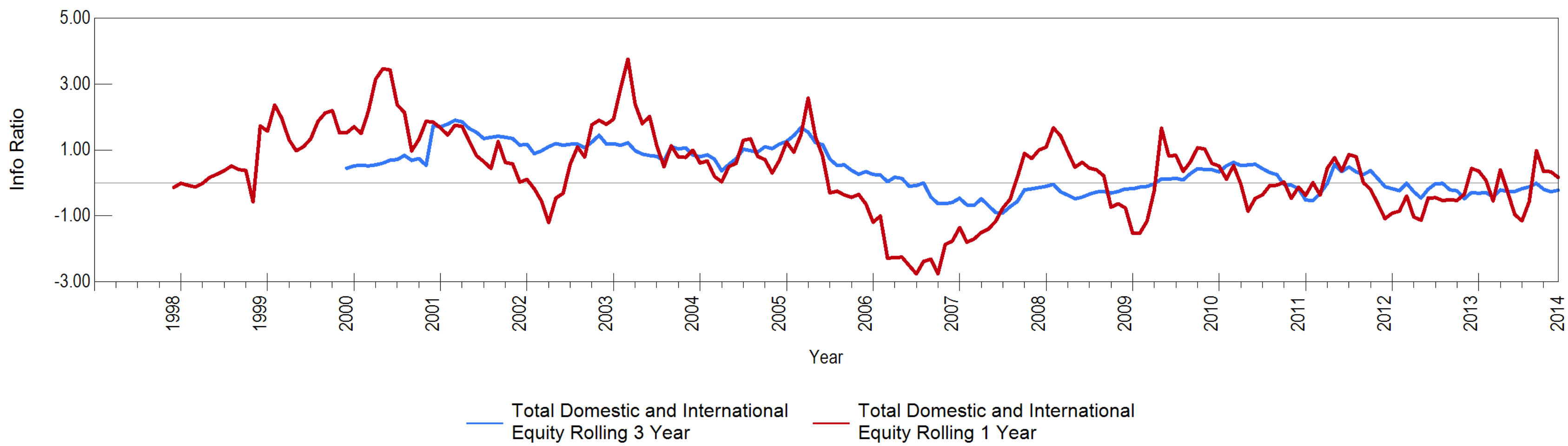
Note: Performance is reported net of fees.
Underlying composites do not add up to 100% because the chart excludes private markets composites.
Ranks for statistics shown above are based on the respective universe against which the portfolio is ranked on the asset class performance summary that precedes this section of the analysis.
Rankings are from highest (1) to lowest (100) in the eVestment Universe.
Composition of Interim SAA Policy and ASRS Custom Benchmarks can be found in the appendix.

Asset Class Analysis - Total Domestic and International Equity

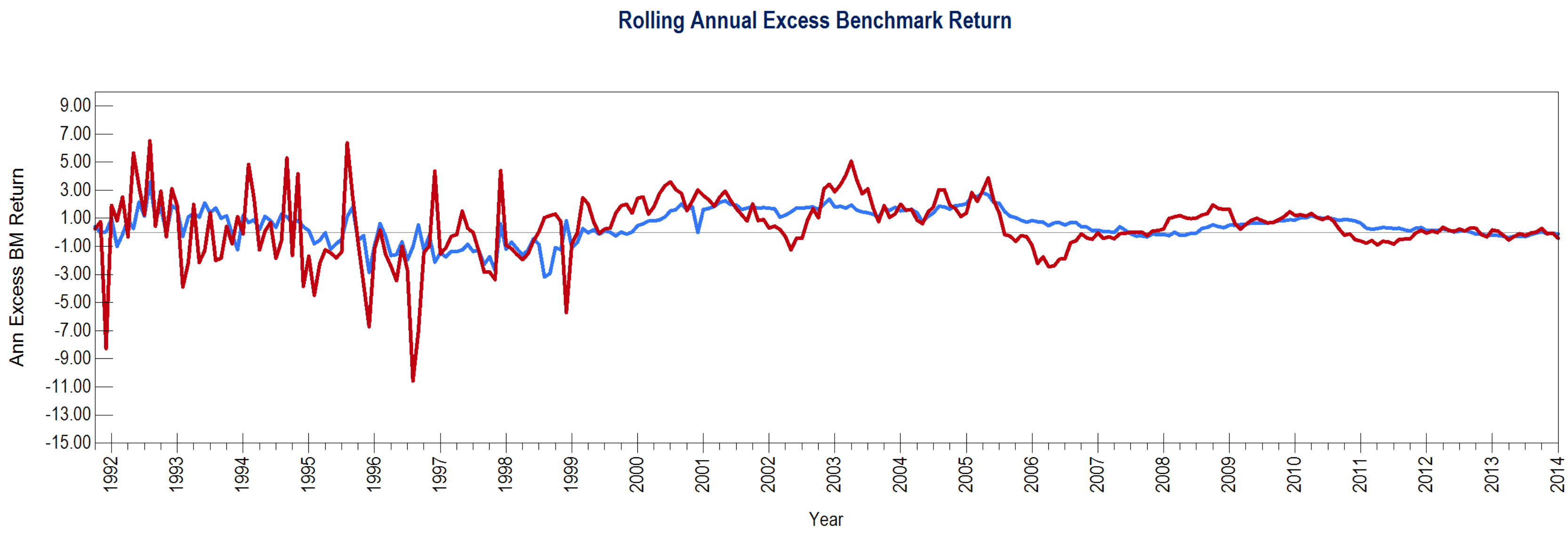
Rolling Annual Excess Benchmark Return

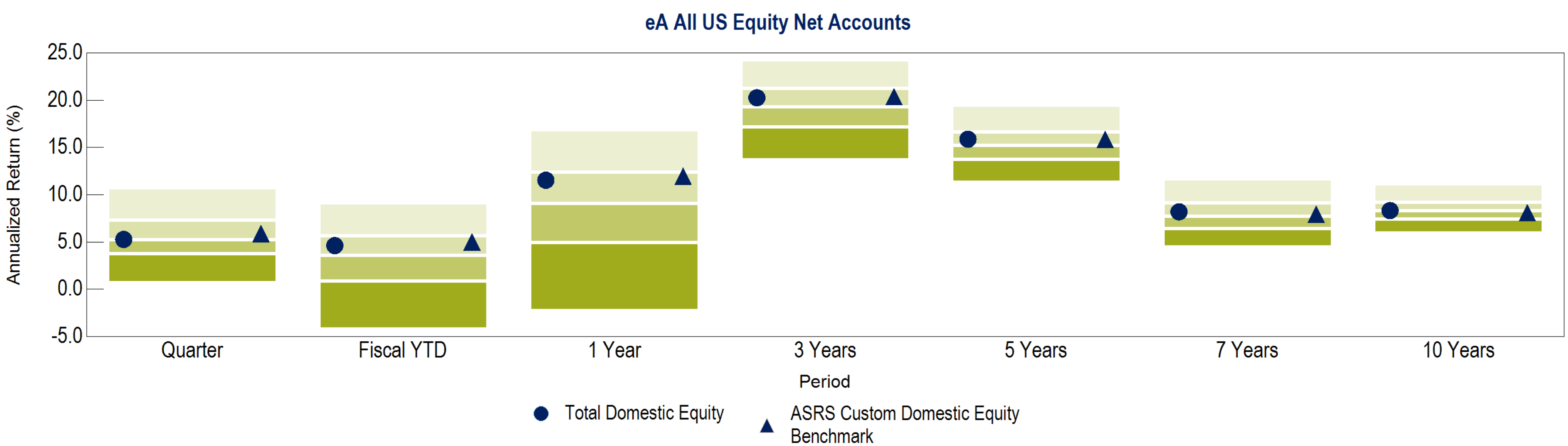


Rolling Information Ratio



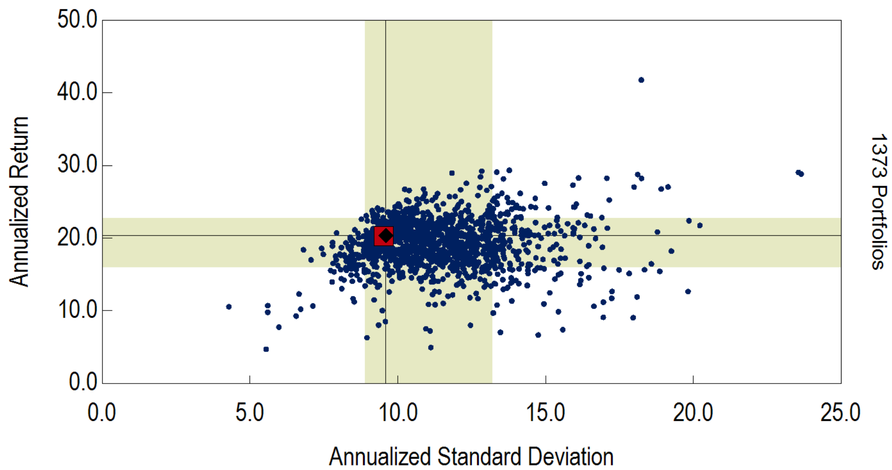
Asset Class Analysis - Total Domestic Equity





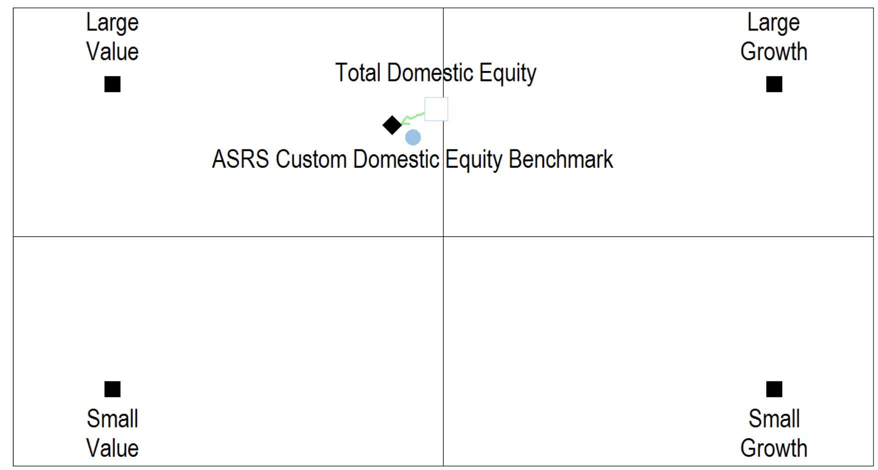
Asset Class Analysis - Total Domestic Equity

3 Year Risk Return



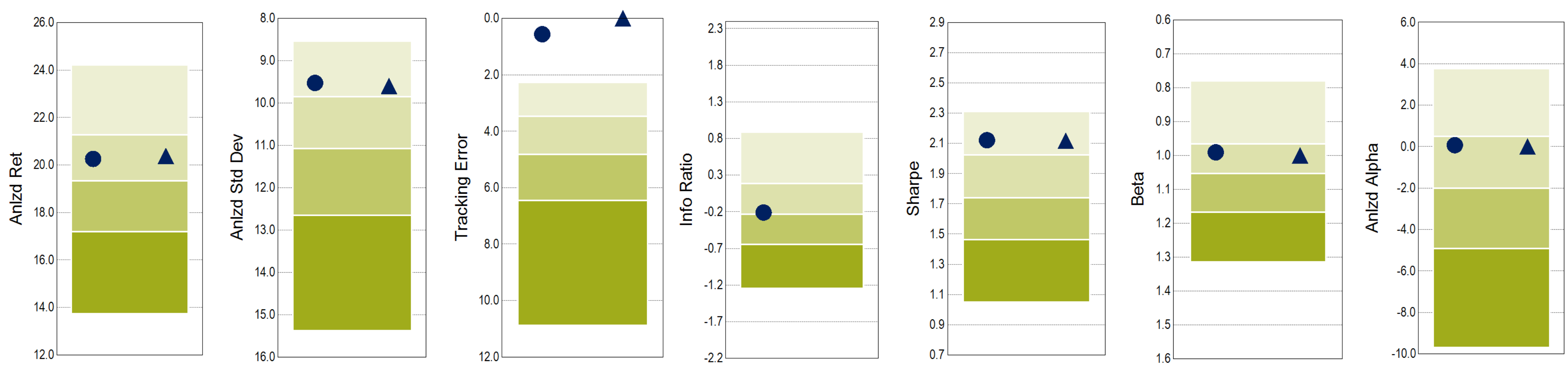
- Total Domestic Equity
- ASRS Custom Domestic Equity Benchmark
- 68% Confidence Interval
- eA All US Equity Net

3 Year Style Map



First Rolling Period   Last Rolling Period

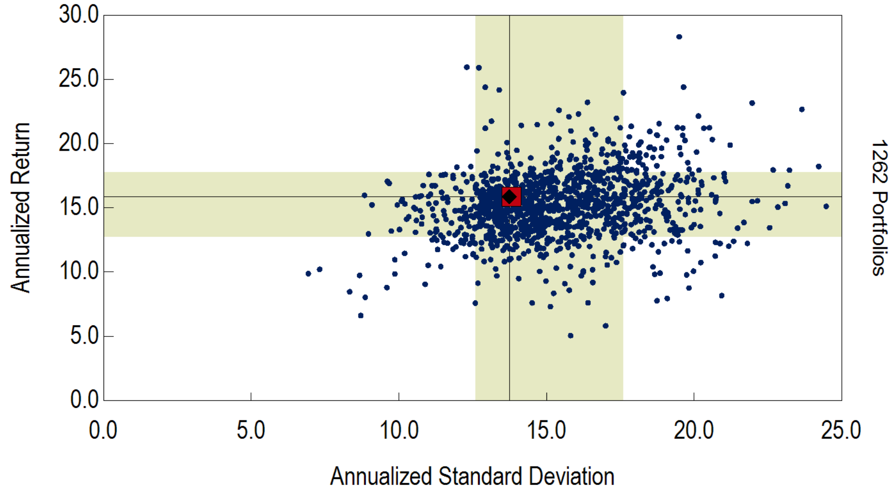
*Style map is returns based.



Total Domestic Equity   ASRS Custom Domestic Equity Benchmark   5th to 25th Percentile   25th to Median   Median to 75th Percentile   75th to 95th Percentile

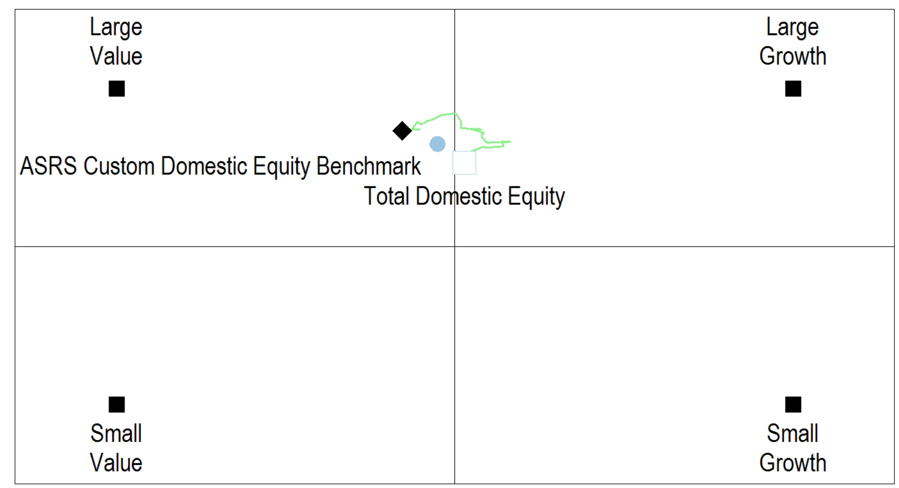
Asset Class Analysis - Total Domestic Equity

5 Year Risk Return



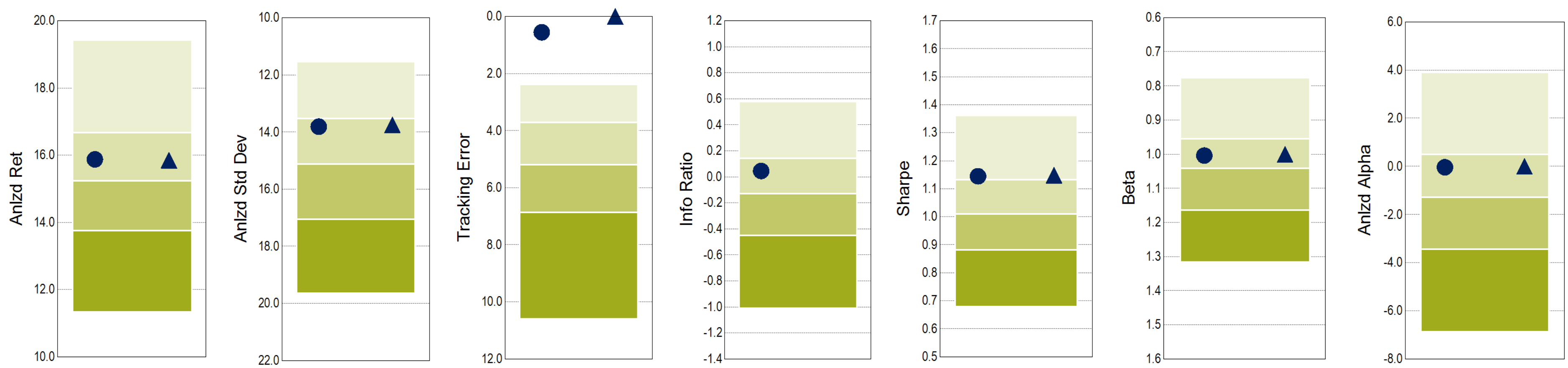
- Total Domestic Equity
- ASRS Custom Domestic Equity Benchmark
- 68% Confidence Interval
- eA All US Equity Net

5 Year Style Map



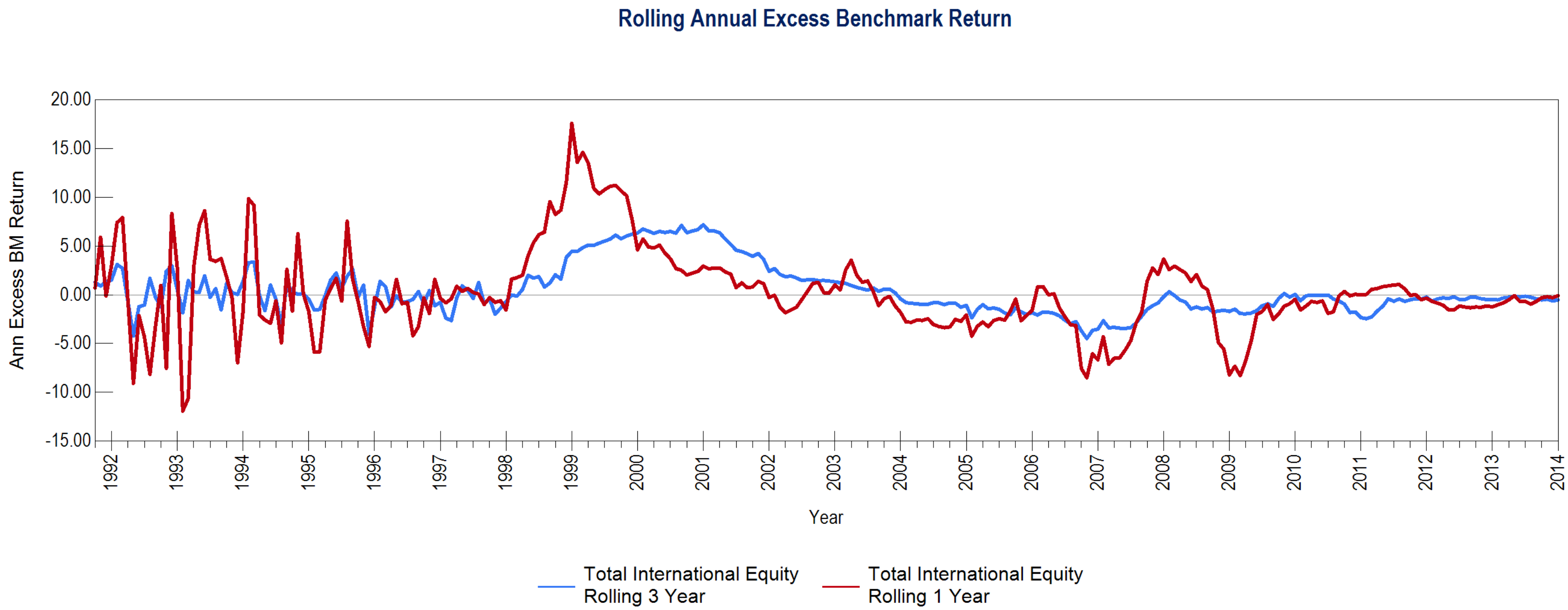
First Rolling Period   Last Rolling Period

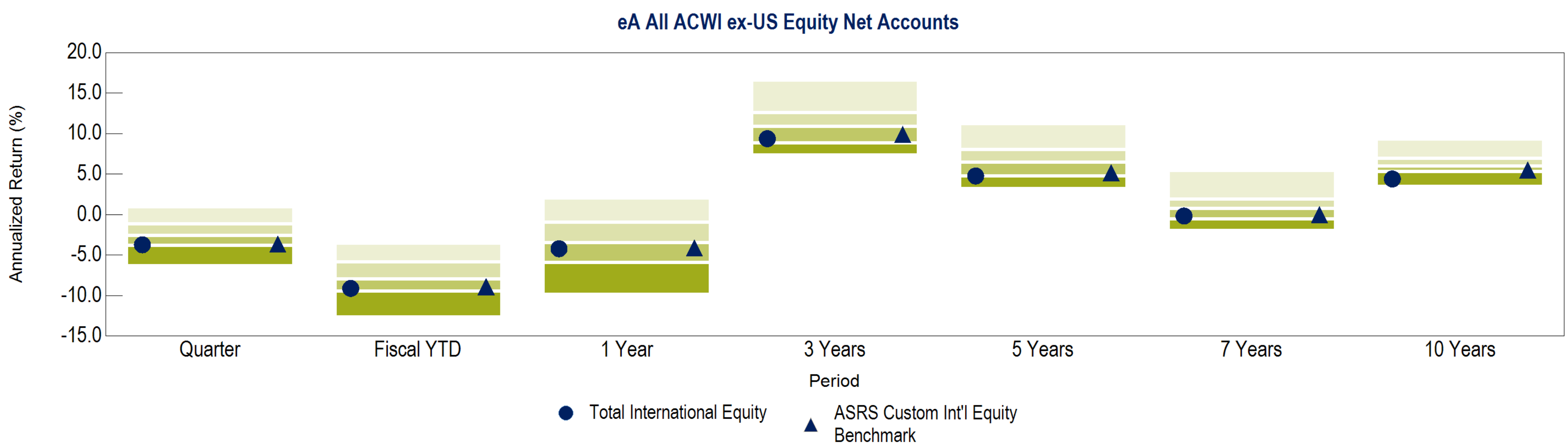
*Style map is returns based.



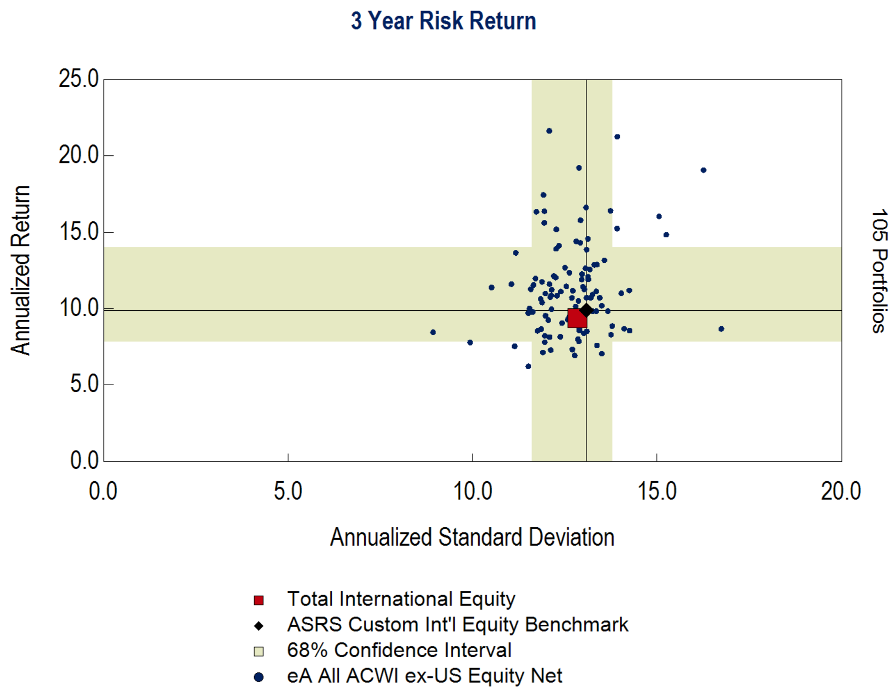
Total Domestic Equity   ASRS Custom Domestic Equity Benchmark   5th to 25th Percentile   25th to Median   Median to 75th Percentile   75th to 95th Percentile

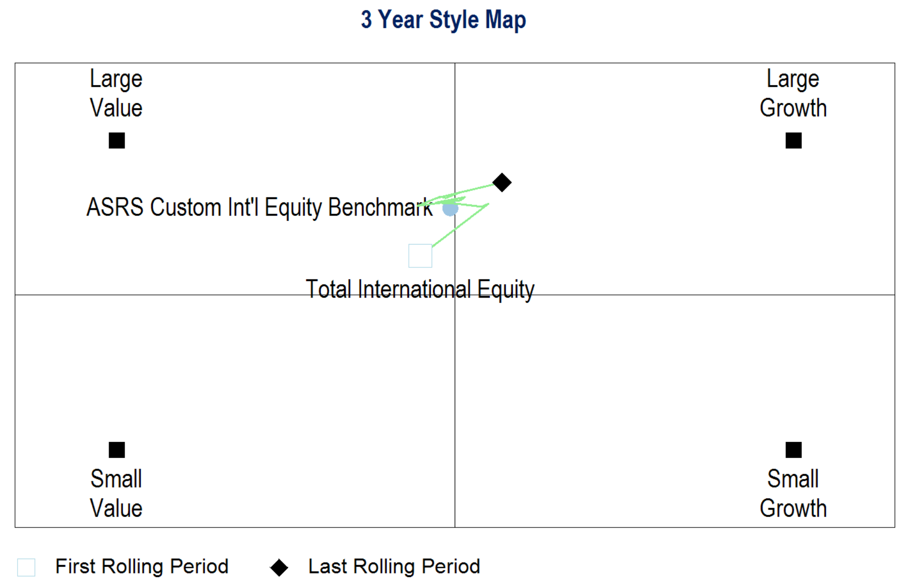
Asset Class Analysis - Total International Equity





Asset Class Analysis - Total International Equity





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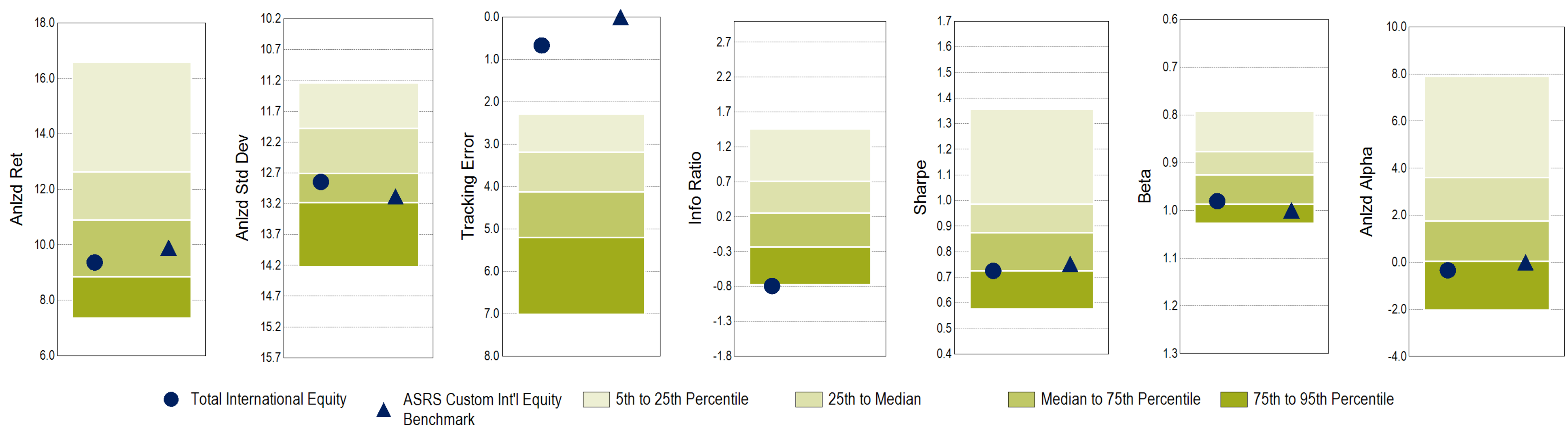
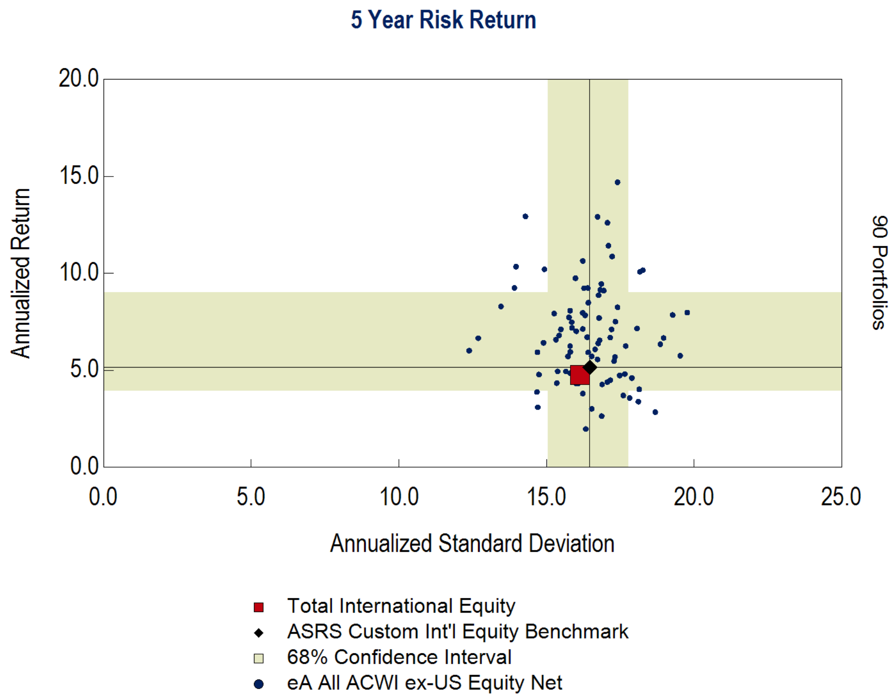


Asset Class Analysis - Total International Equity



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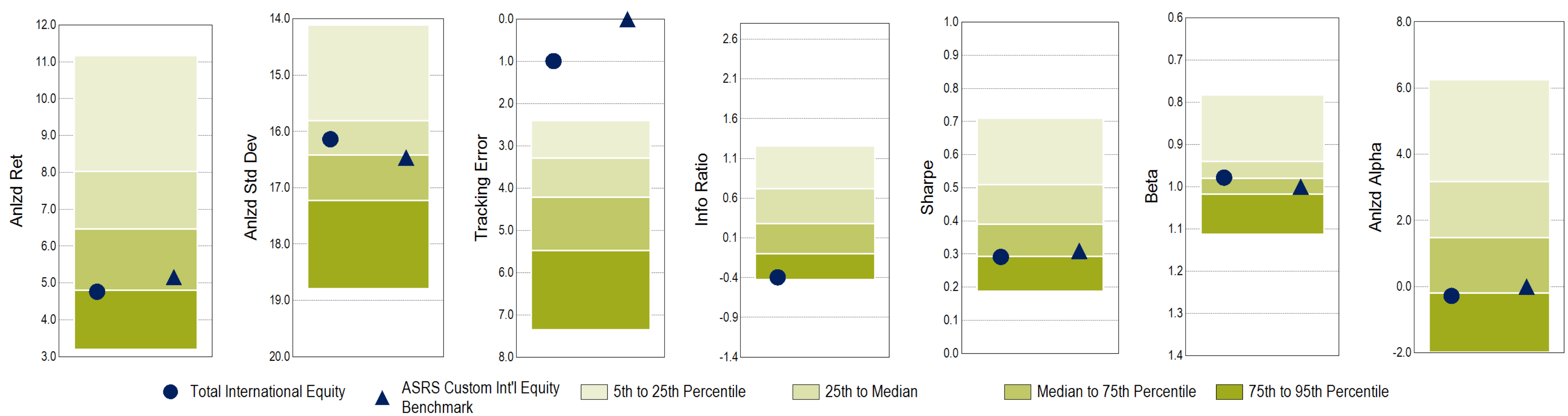
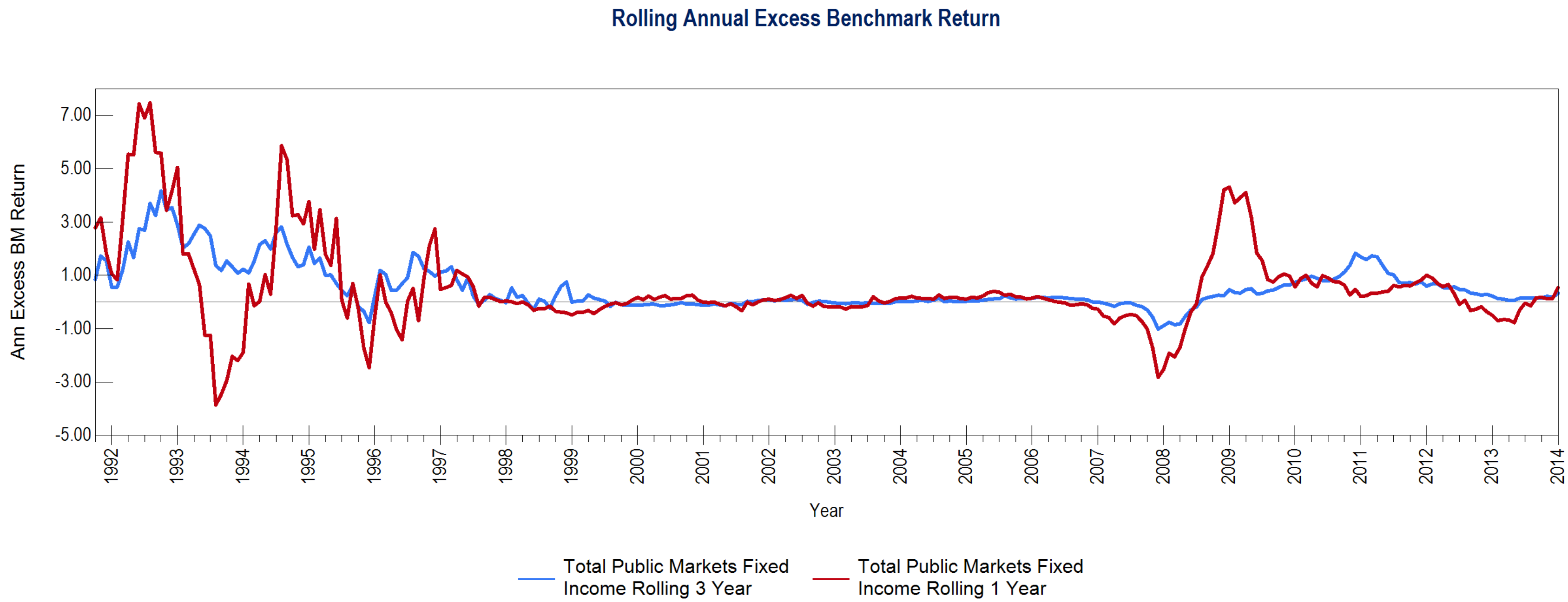
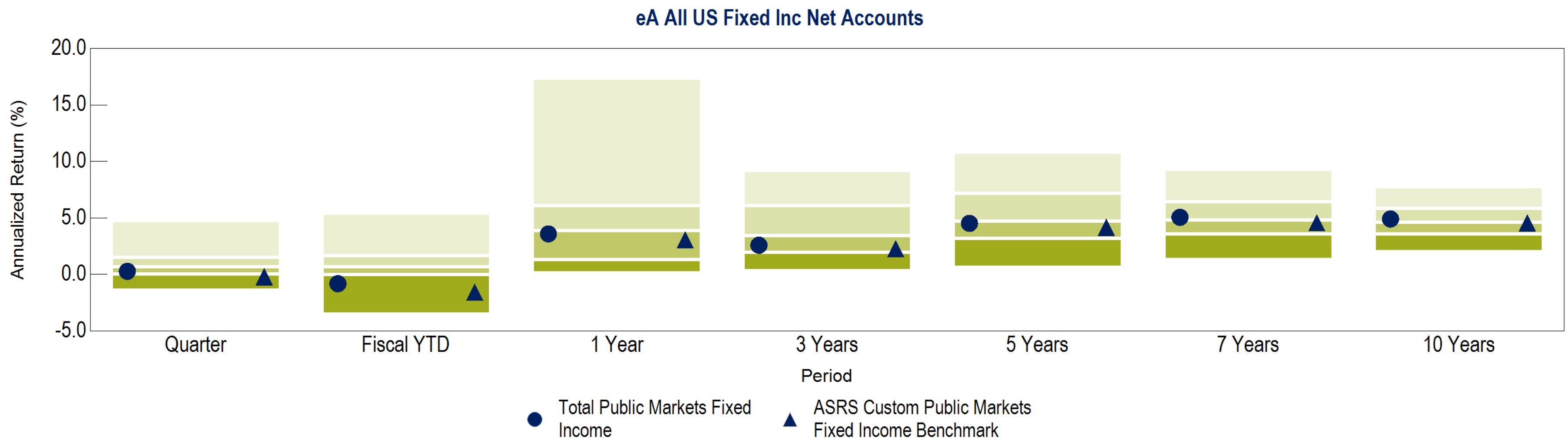


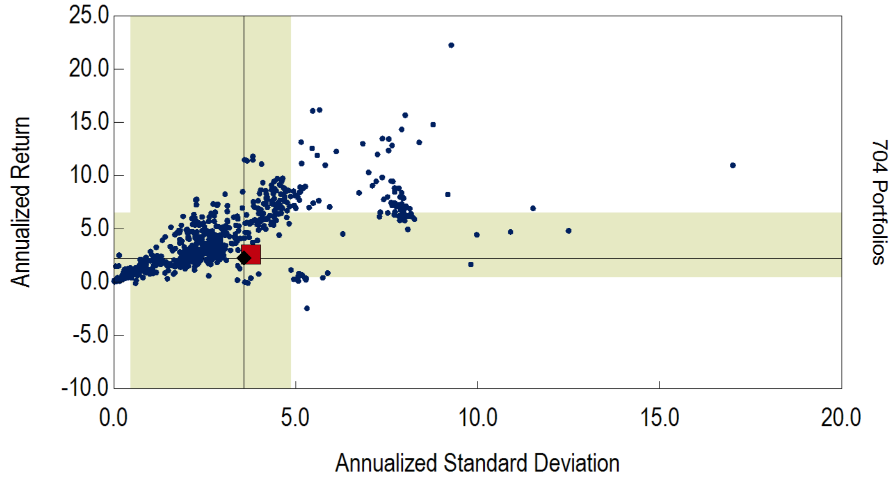
Asset Class Analysis - Total Public Markets Fixed Income





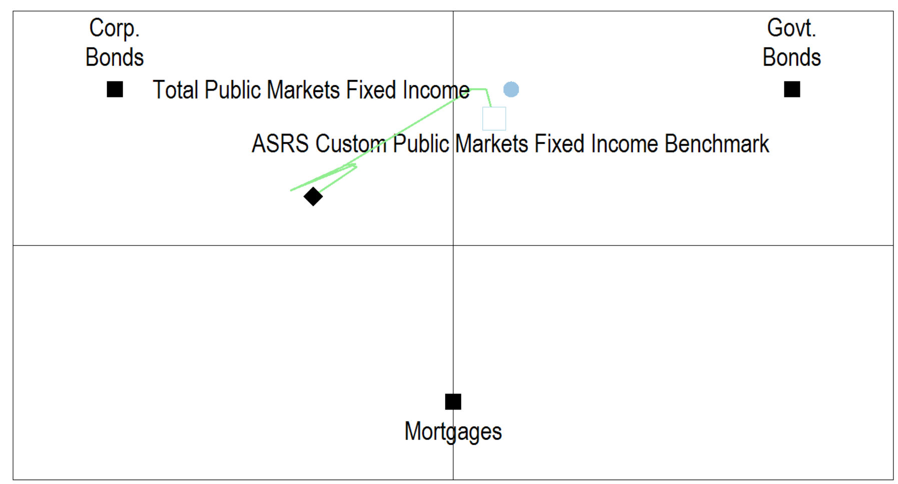
Asset Class Analysis - Total Public Markets Fixed Income

3 Year Risk Return



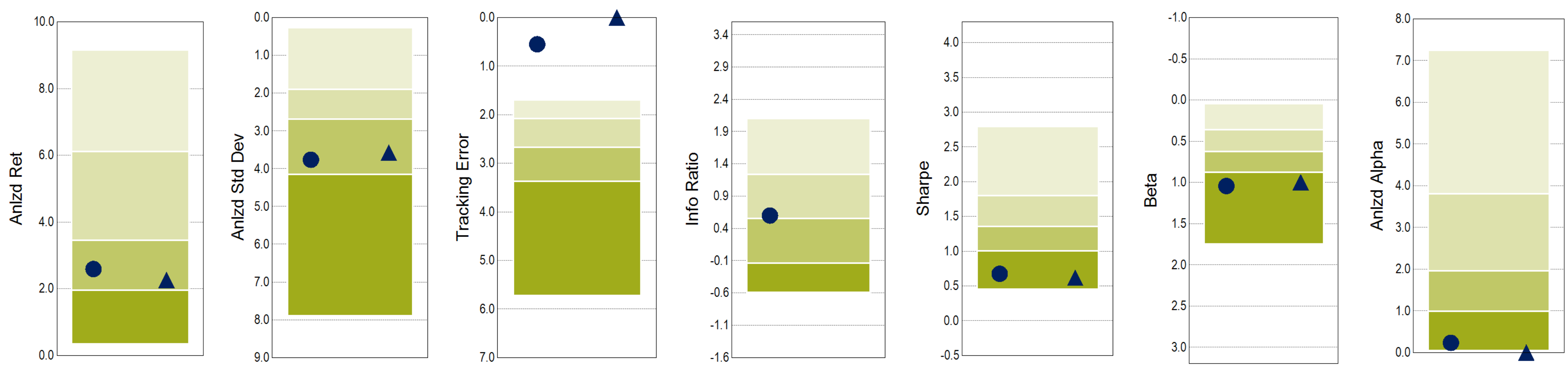
- Total Public Markets Fixed Income
- ASRS Custom Public Markets Fixed Income Benchmark
- 68% Confidence Interval
- eA All US Fixed Inc Net

3 Year Style Map



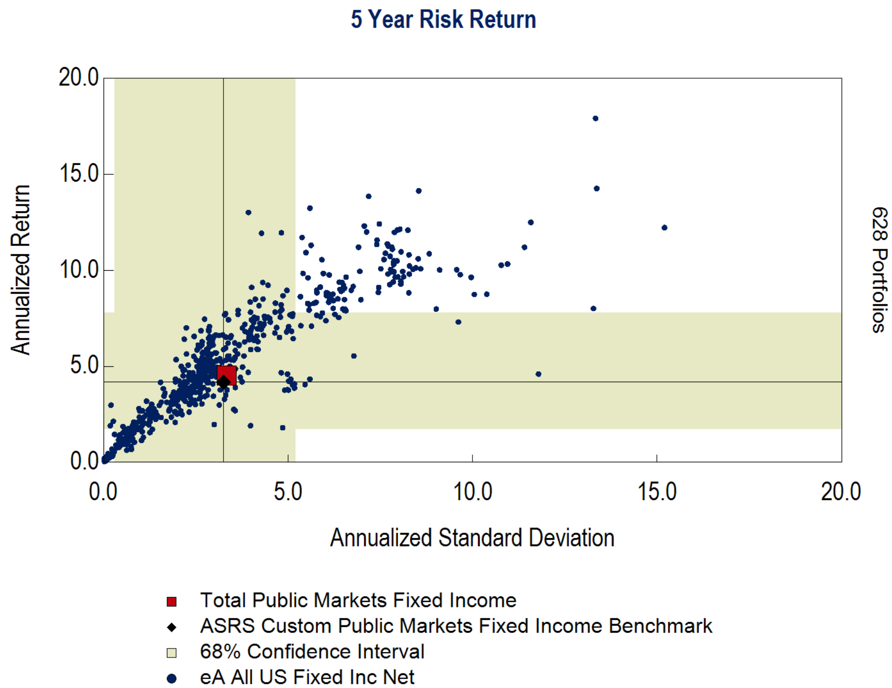
- First Rolling Period
- Last Rolling Period

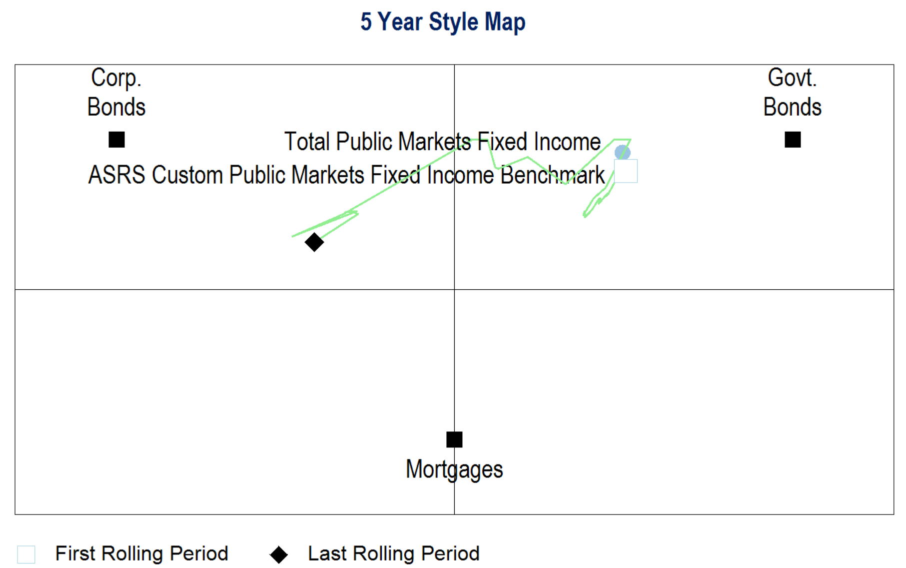
*Style map is returns based.



- Total Public Markets Fixed Income
- ASRS Custom Public Markets Fixed Income Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Asset Class Analysis - Total Public Markets Fixed Income





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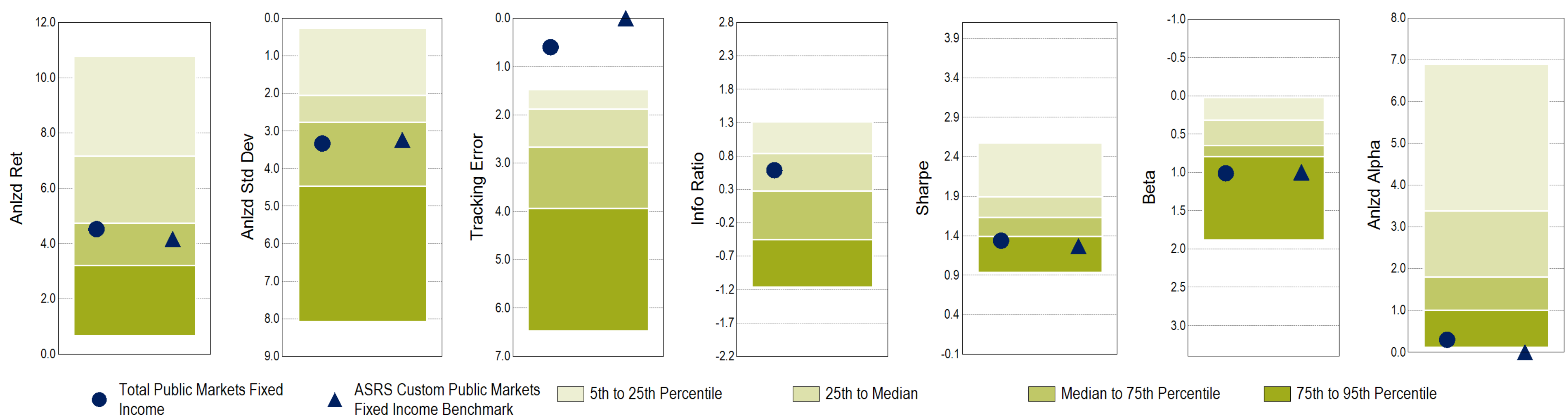
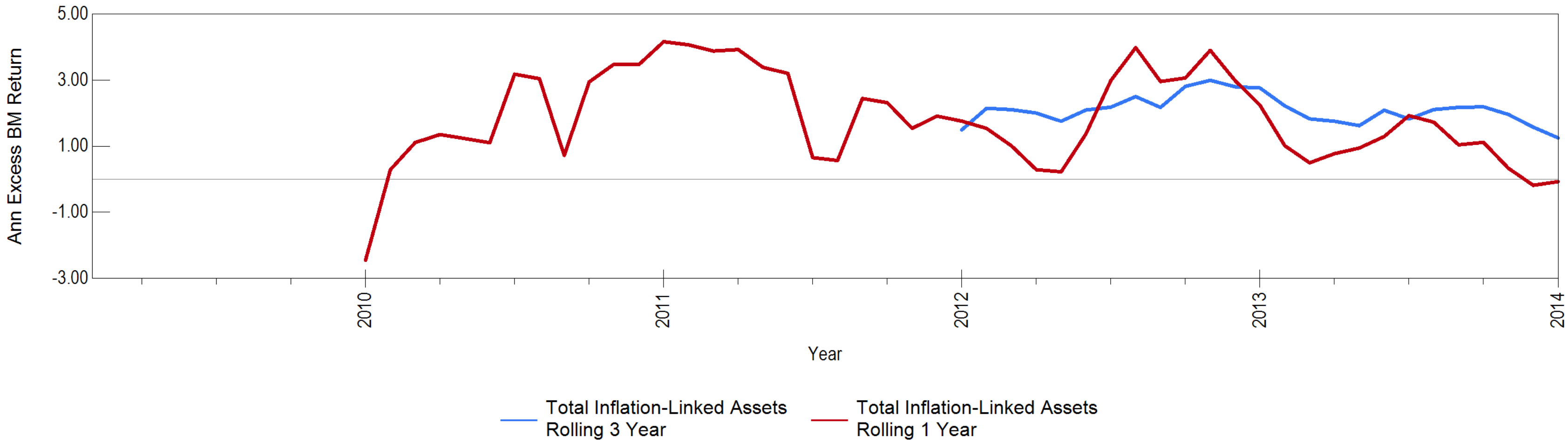
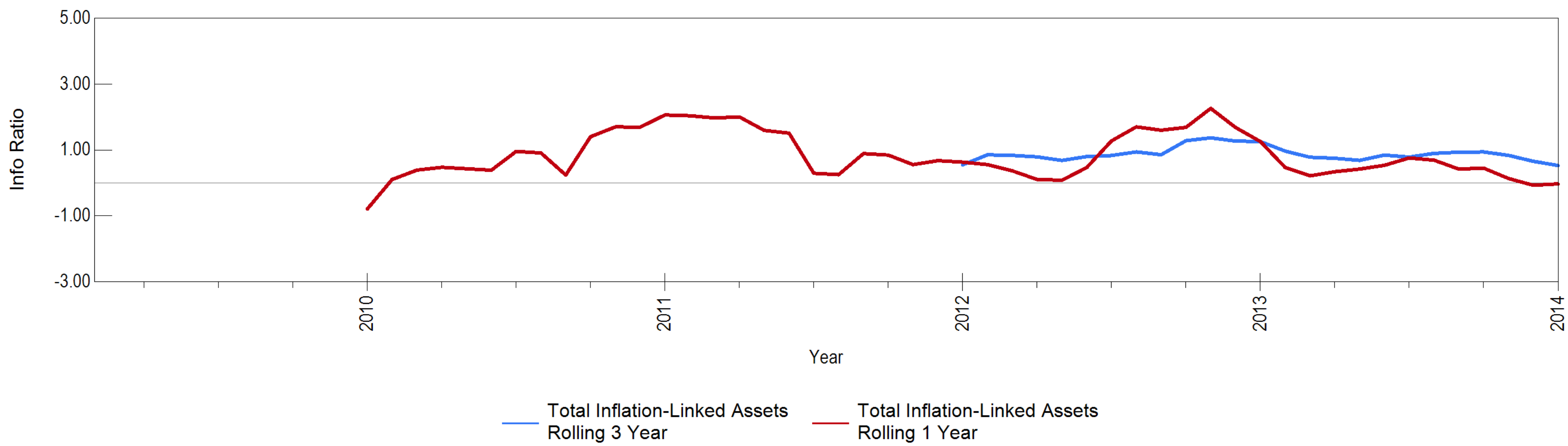


Asset Class Analysis - Total Inflation-Linked Assets

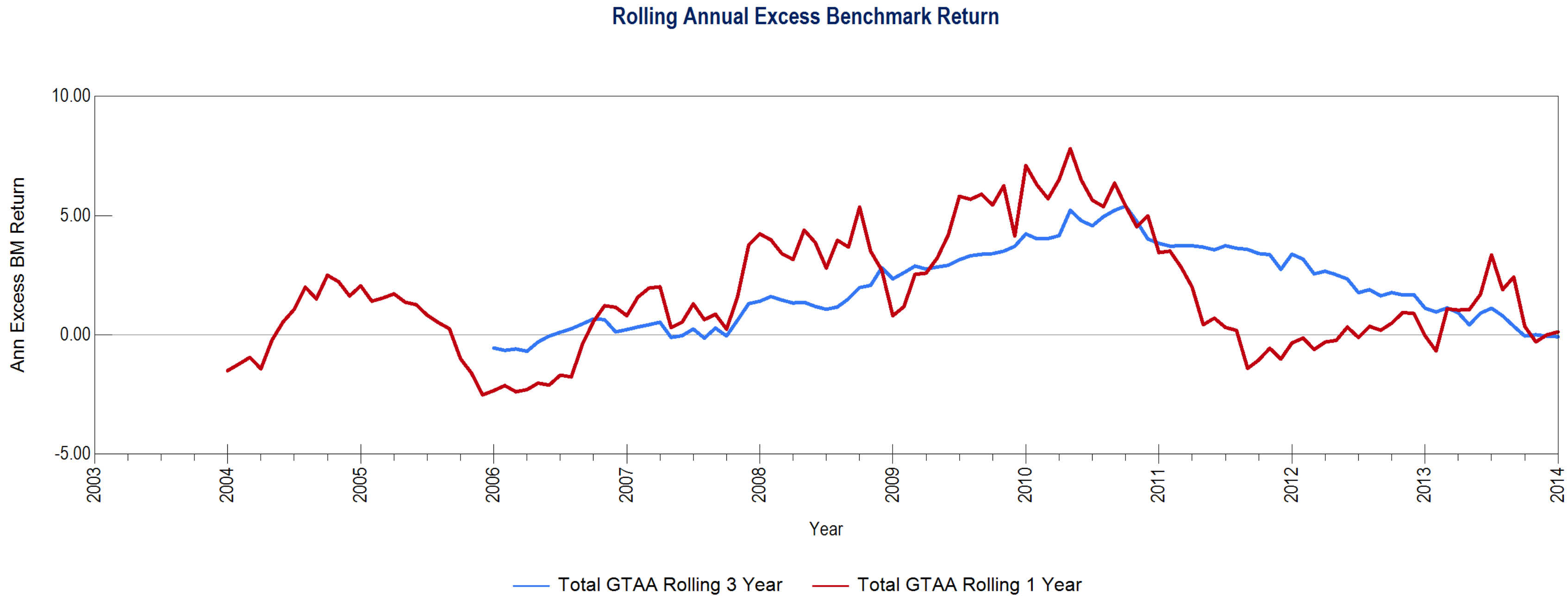
Rolling Annual Excess Benchmark Return

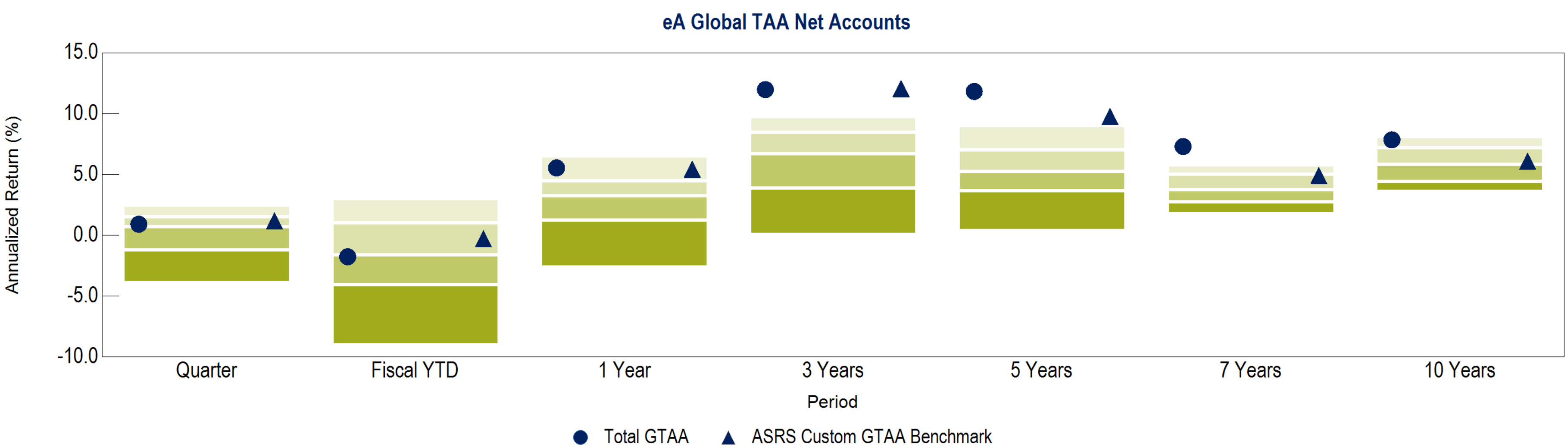


Rolling Information Ratio

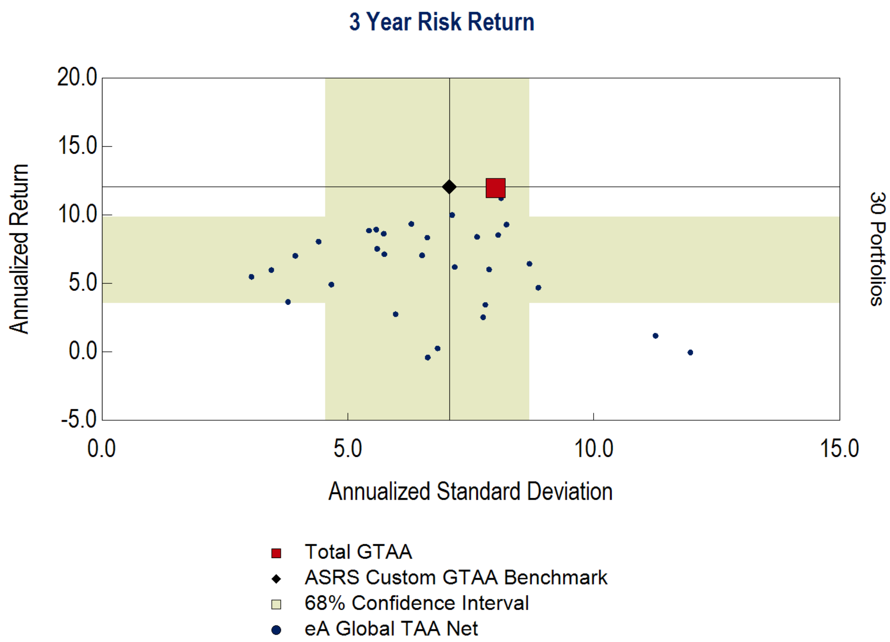


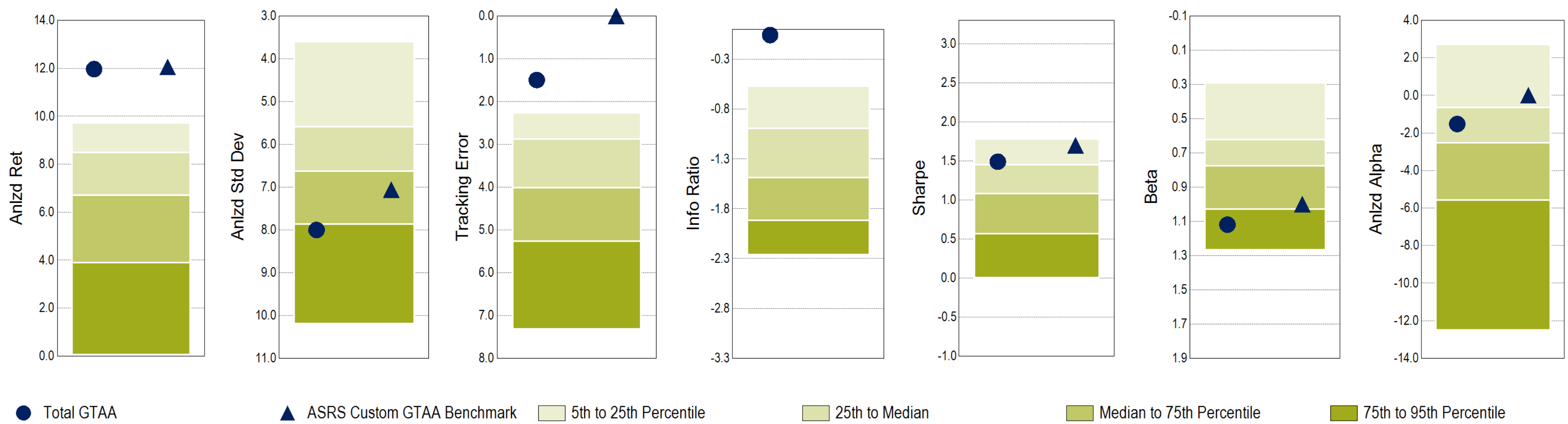
Asset Class Analysis - Total GTAA



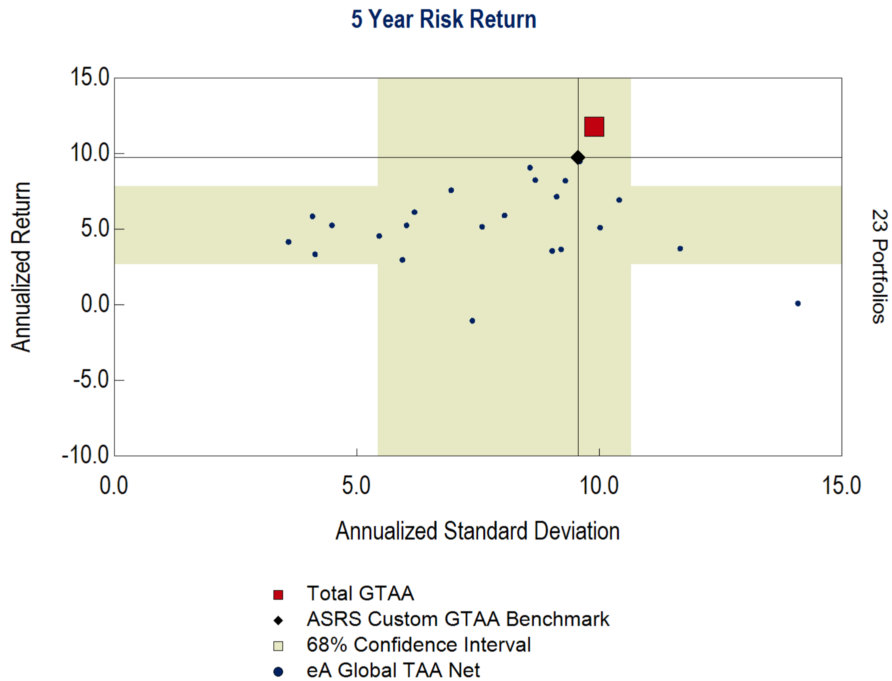


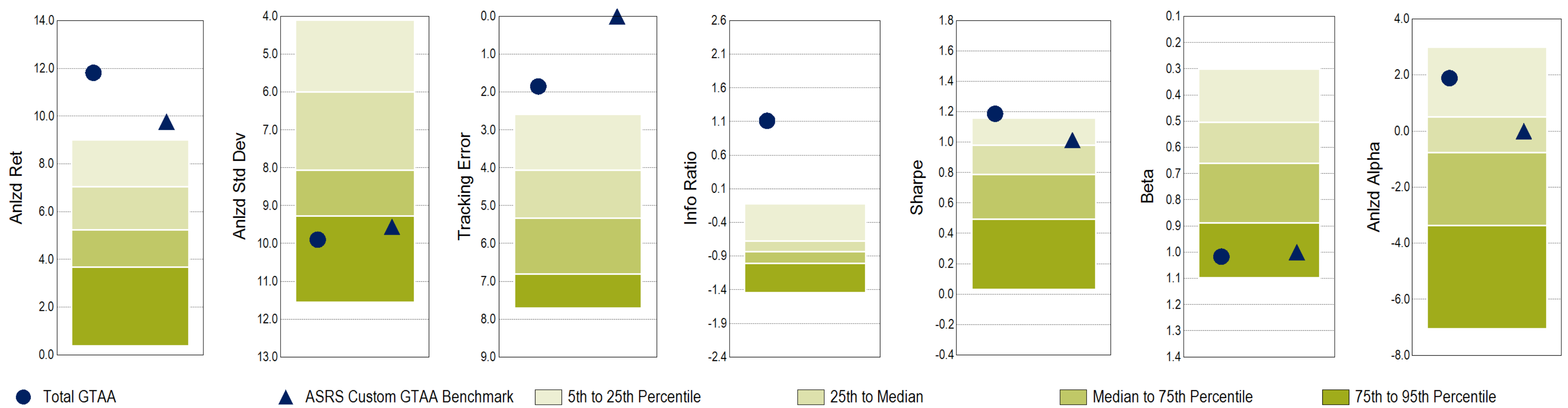
Asset Class Analysis - Total GTAA





Asset Class Analysis - Total GTAA





Asset Class Committee Monitoring

- **Six Asset Class Committee meetings have been held since the last time we provided an update on the ASRS Asset Class Committee Meetings.**

- **November 13, 2014 – Public Markets Committee**
  - Review of Public Equity Program Staff Report
    - Public Equities Asset Class
    - Public Fixed Income Asset Class

- **November 19, 2014 – Private Markets Committee**
  - Monthly Status Report, General Discussion and Deal Flow
    - Anticipated investment levels of Private Debt and Opportunistic Fixed Income asset classes and pipeline for investments in private debt space reviewed
  - Variance Requests
    - RCLCO recommended the ASRS approve three variance requests from existing real estate managers to invest in properties that do not meet the investment criteria of the respective portfolios
      - Variance Request 1 – not required after further review and determination that property in question does indeed reside within a pre-approved market for investment
      - Variance Request 2 – required as apartment building investment under review is complete and stable and the assumable loan on the property exceeds 50% of acquisition price
        - Investment leverage risk is mitigated by the fact that the property was recently appraised at a value higher than the acquisition price, the loan has a favorable interest rate, and the building is complete and stable in a market with growing rents
      - Variance Request 3 – required as medical office building investment under review has lease rollover that exceeds 20% in the next two years
        - Risks associated with exceeding the lease rollover limit mitigated by the fact that the building is in a superior location near a hospital campus and the manager has interviewed tenants with expiring leases, and tenants occupying 30,000 sq. feet of the 33,000 sq. feet in expiring leases intend to renew
    - Committee approved the recommendation
  - 2015 Private Equity Pacing Model and Implementation Plan
    - Anticipate $600 million of new private equity commitments during the year
    - Committee approved the recommended commitment pace for 2015, noting that the actual amount may differ as determined by the committee as market conditions evolve throughout the year

Asset Class Committee Monitoring

- **November 21, 2014 – Ad Hoc Private Markets Committee**
  - Private Debt Manager Recommendation ($300 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Debt is 3%)
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
    - Committee approved the recommendation

- **December 18, 2014 – Private Markets Committee**
  - Monthly Status Report, General Discussion and Deal Flow
  - Variance Request
    - RCLCO recommended the ASRS approve two variance requests from an existing real estate manager to invest in properties that do not meet the investment criteria of the portfolio
      - Variance Request 1 – required as senior housing development investment under review includes a third party developer with a promoted return structure that exceeds the maximum return structure allowed in the investment guidelines and a 10% equity contribution, which is below the 15% minimum
        - The investment potentially offers an attractive risk-adjusted return compared to other development opportunities being evaluated
      - Variance Request 2 – not required after further review and manager's decision to not proceed with the transaction
    - Committee approved the recommendation
  - Niche and Tactical Real Estate Co-Investment Recommendation ($50 - $70 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Real Estate is 8%)
    - The ASRS is currently invested with this manager in multiple funds
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
    - Committee approved the recommendation pending legal approvals under the Niche and Tactical Real Estate Program
  - REIT Analysis Discussion
    - Review of Staff analysis of REITs

Asset Class Committee Monitoring

- **December 18, 2014 – Private Markets Committee (cont.)**
  - 2015 Real Estate Pacing Model and Implementation Plan
    - Anticipate $700 million - $1.6 billion of new real estate commitments during the year
      - Target $500 million to $1 billion in new separate account investments;
      - $100 million to $300 million in additions to existing separate account relationships; and
      - $100 million to $300 million in new commingled fund investments
    - Committee approved the recommended commitment pace for 2015, noting that the actual amount may differ as determined by the committee as market conditions evolve throughout the year
  - Opportunistic Equity Disposition Discussion
    - Staff provided a review of the holding's characteristics and recommended a disposition plan according to guidelines outlined within the recommendation
    - No action was taken on this item

- **January 23, 2015 – Private Markets Committee**
  - Monthly Status Report, General Discussion and Deal Flow
    - Discussion included a review of private markets investments that may be directly or tangentially impacted by changes in energy expectations (oil, natural gas, etc.)
  - Private Equity Manager Recommendation ($50 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 7%)
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
    - Committee approved the recommendation
  - Private Equity Manager Recommendation ($50 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 7%)
    - The ASRS has invested with this manager in a prior fund
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
    - Committee approved the recommendation

- **January 23, 2015 – Private Markets Committee (cont.)**
  - Private Debt Manager Recommendation – Additional Commitment ($101 million; $300 million original commitment)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Debt is 3%)
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
    - Committee approved the recommendation
      - The Committee approved the original $300 million investment at the November 21, 2014 PRIVMC meeting
  - Private Debt Manager Recommendation ($500 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Debt is 3%)
    - The ASRS has invested with this manager in a prior fund
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
    - Committee approved the recommendation
  - Niche and Tactical Real Estate Investment Recommendation ($300 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Real Estate is 8%)
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
    - Committee approved the recommendation
  - Separately Managed Account Portfolio Review
    - RCLCO presented the results of its semi-annual portfolio review of the separately managed real estate accounts
  - Real Estate Pipeline Discussion

Asset Class Committee Monitoring

- **January 29, 2015 – Ad Hoc Private Markets Committee**
  - Private Debt Variance Request and Investment Guideline Amendment
    - Staff recommended the ASRS approve a variance request from an existing private debt manager to make an investment that would cause the overall portfolio to exceed concentration limits
      - Required because investment would exceed the maximum position limit for any single investment in the portfolio and maximum limit on preferred equity investments in the portfolio
        - While structured as preferred equity, the investment has mezzanine loan characteristics
    - Committee approved the recommendation
      - In addition to approving the variance request, the Committee also authorized an amendment to the manager's investment guidelines allowing similar preferred equity investments having mezzanine loan characteristics be treated as mezzanine for concentration limit purposes

General Observations

- **The Fund continues to make significant progress moving the portfolio from the Interim SAAP toward the long-term SAAP.**
  - Full implementation results in a further reduction of 2% within U.S. Equities and 1% within U.S. Core Fixed Income and an addition of 2% to Real Estate and 1% to Private Equity.

- **The Fund's performance for calendar year 2014 was driven by the Fund's allocation to private markets asset classes and U.S. equities.**
  - Private market asset classes account for approximately 20% of the Total Fund, with one-year returns ranging from 11.0% for opportunistic debt to 45.7% for opportunistic equity.
  - Underweight allocations to core, high yield and emerging market debt in favor of private and opportunistic debt strategies has proved to be a source of significant value add at the Total Fund level.
  - Generally, active managers across public equities underperformed their benchmarks, whereas collectively, active emerging markets equities managers were able to add significant value.

- **Additional $901 million in commitments to Private Debt asset class during Q4 consistent with House Views on the asset class's relative attractiveness and desire to increase overweight vs. current SAAP target.**
  - Continued build-out of private debt asset class provides an opportunity to generate equity-like returns with less volatility.

- **Tactical positioning consistent with IMD House Views.**
  - Opportunistic Equity, Opportunistic Debt and Equity Risk Factor portfolios have performed well, adding value on both a relative and absolute basis.

- **ASRS SAAP Benchmark evaluation is complete and a recommendation was made to the Investment Committee by Staff and NEPC on February 9, 2015.**

Market Environment Update and Outlook

Economic Environment

- **Fourth quarter "advanced" estimate of GDP growth remained positive, but decreased to an annual rate of +2.6%.**
  - Retail sales (ended December) rose to 1.9% on a year-over-year growth rate basis.
  - The inventory-to-sales ratio has remained mostly flat since early 2010 and closed at 1.3 in November.
  - Corporate profits as a percent of GDP increased, ending the fourth quarter at 12.2% and remain elevated relative to historical levels.
  - The U.S. trade deficit increased slightly in December.

- **The unemployment rate fell to 5.8% in December; U-6, a broader measure of unemployment, fell to 11.2% the fourth quarter.**

- **The Case-Schiller Home Price Index (as of 12/31) declined slightly to 167.11 from third quarter levels and is at levels higher than that of pre-financial crisis levels of 150.92.**

- **Rolling 12-month CPI decreased to 0.8% at the end of December; Capacity Utilization declined slightly to 79.7% in December.**

- **Fed Funds rate remains at 0.25%, while the 10-year Treasury Yield finished Q4 at 2.17%.**

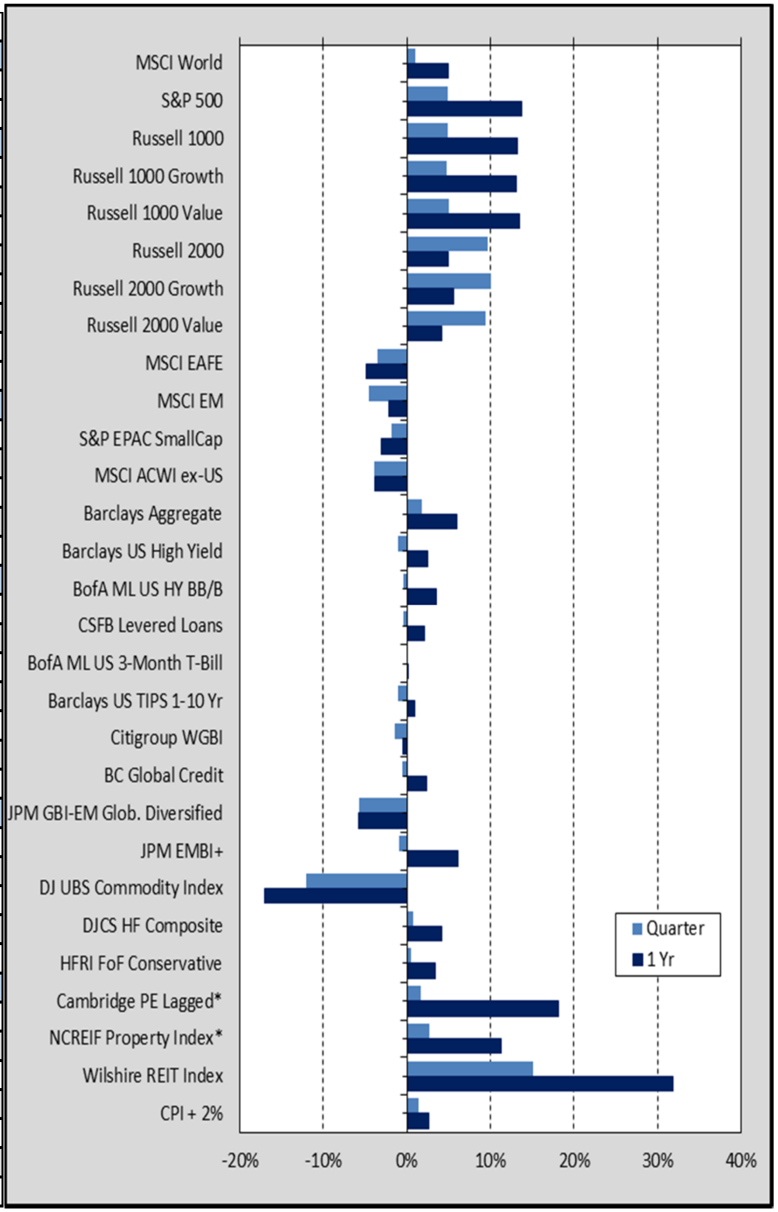
- **The Fed balance sheet continued to grow in 2014, while the European Central Bank balance sheet decreased in 2014.**
  - ECB announced it will be embarking on an asset purchasing stimulus plan.

- **S&P valuations decreased in December, remaining above the 10-year and long-term averages, which are nearly equal at 16.4x, using current price/earnings ratios.**
  - Cyclically-adjusted Shiller PE ratio is above the long-term average of 17.6x and above the 10-year average of 22.9x.

- **The U.S. Dollar continues to strengthen against a basket of major currencies as the Fed ends its quantitative easing program.**

Market Environment – Q4 2014 Overview

		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
World Equity Benchmarks						
MSCI World	World	1.0%	4.9%	15.5%	10.2%	6.0%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Equity Benchmarks						
S&P 500	Large Core	4.9%	13.7%	20.4%	15.5%	7.7%
Russell 1000	Large Core	4.9%	13.2%	20.6%	15.6%	8.0%
Russell 1000 Growth	Large Growth	4.8%	13.1%	20.3%	15.8%	8.5%
Russell 1000 Value	Large Value	5.0%	13.5%	20.9%	15.4%	7.3%
Russell 2000	Small Core	9.7%	4.9%	19.2%	15.6%	7.8%
Russell 2000 Growth	Small Growth	10.1%	5.6%	20.1%	16.8%	8.5%
Russell 2000 Value	Small Value	9.4%	4.2%	18.3%	14.3%	6.9%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
International Equity Benchmarks						
MSCI EAFE	International Developed	-3.6%	-4.9%	11.1%	5.3%	4.4%
MSCI EM	Emerging Equity	-4.5%	-2.2%	4.0%	1.8%	8.4%
S&P EPAC SmallCap	Small Cap Int'l	-1.9%	-3.1%	14.4%	8.9%	6.9%
MSCI ACWI ex-US	World ex-US	-3.9%	-3.9%	9.0%	4.4%	5.1%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Fixed Income Benchmarks						
Barclays Aggregate	Core Bonds	1.8%	6.0%	2.7%	4.5%	4.7%
Barclays US High Yield	High Yield	-1.0%	2.5%	8.4%	9.0%	7.7%
BofA ML US HY BB/B	High Yield	-0.4%	3.5%	8.1%	8.8%	7.2%
CSFB Levered Loans	Bank Loans	-0.4%	2.1%	5.8%	5.8%	4.7%
BofA ML US 3-Month T-Bill	Cash	0.0%	0.0%	0.1%	0.1%	1.5%
Barclays US TIPS 1-10 Yr	Inflation	-1.0%	0.9%	0.0%	2.8%	3.8%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Global Fixed Income Benchmarks						
Citigroup WGBI	World Gov. Bonds	-1.5%	-0.5%	-1.0%	1.7%	3.1%
BC Global Credit	Global Bonds	-0.5%	2.4%	5.1%	5.3%	4.8%
JPM GBI-EM Glob. Diversified	Em. Mkt. Bonds (Local)	-5.7%	-5.7%	0.1%	2.6%	6.7%
JPM EMBI+	Em. Mkt. Bonds	-0.9%	6.2%	4.7%	7.0%	7.7%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Alternative Benchmarks						
DJ UBS Commodity Index	Commodity	-12.1%	-17.0%	-9.4%	-5.5%	-1.9%
DJCS HF Composite	Hedge Fund	0.7%	4.1%	7.2%	5.9%	5.8%
HFRI FoF Conservative	Fund of Funds	0.5%	3.4%	5.1%	3.3%	2.5%
Cambridge PE Lagged*	Private Equity	1.7%	18.1%	17.1%	16.6%	15.1%
NCREIF Property Index*	Real Estate	2.6%	11.3%	11.1%	11.0%	8.1%
Wilshire REIT Index	REIT	15.1%	31.8%	16.4%	17.3%	8.3%
CPI + 2%	Inflation/Real Assets	1.4%	2.7%	3.3%	3.7%	4.3%



* As of 9/30/2014

Positives

- **Fed asset purchases come to an end**
  - Divergence in monetary policies signaling different investment environments globally
- **Q4 GDP growth estimated at 2.6%**
  - U.S. employment continues to gain
- **ECB announces further monetary easing through asset purchases in addition to negative short dated interest rates**
- **Developed world inflation is low**
  - In U.S., CPI for all Urban Consumers was negative in Q4 driven by lower energy

Negatives

- **Geopolitical instability drives volatility**
  - Instability in the Mid-East, Eastern Europe, Greece
- **Europe continues to see ongoing political and economic growth challenges**
- **U.S. Dollar strength continues to translate into negative dollar denominated returns in international markets**
- **Valuations remain above 10 year and long-term averages**
  - Developed Equity P/Es above median
  - Credit spreads near historically low levels
- **Volatility re-emerges; the VIX spiked substantially toward the end of the fourth quarter**
  - VIX spiked approximately 100% in mid-December

Global Equity

- **U.S. equities advanced in the fourth quarter amid increasing volatility.**
- **Small cap stocks outperformed large cap stocks during the quarter, with the Russell 2000 Index returning 9.7% and the S&P 500 Index returning 4.9%.**
- **International equities underperformed U.S. markets during the quarter, returning -3.9%, as measured by the MSCI ACWI ex-U.S. Index.**
  - Developed markets returned –3.6% as measured by the MSCI EAFE Index. Europe was the worst performing region returning -4.6%.
  - Emerging markets returned -4.5% as measured by the MSCI Emerging Markets Index in U.S. dollar terms. In local currency terms emerging markets were up 0.1%. Emerging countries in Europe (-6.45%) and Latin America (-6.13%) were the largest detractors in local currency terms.

Private Equity

- **New private equity commitments totaled $83 billion in Q4 2014, bringing total new commitments to $348 billion for the year, making 2014 the fifth straight year of increasing commitments.**
  - 2014 global PE fundraising pace increased 7% over 2013; U.S. fundraising exceeded 2013 totals by 4% or $9.4 billion.
- **Buyout and growth equity fund deal volume in both the U.S. and Europe gradually declined throughout 2014.**
  - Buyout and growth equity deals totaled $181 billion, approximately $3.0 billion less than 2013.
- **Venture capital commitments totaled $44.9 billion, outpacing total 2013 commitments by 33%.**
  - At 13% of total private equity raised, commitments are just below the 10-year historic relative average.
- **Mezzanine funds continue to face strong headwinds from a robust high yield market and an expanding supply of private debt.**
  - Mezzanine funds raised $16.5 billion or 5% of total private equity funds raised, $8.8 billion less than in 2013.
- **Asian private equity commitments accelerated in 2014 to $38.1 billion.**
  - Represents 11% of the 2014 total across all geographies. Asian funds raised $27.5 billion in 2013, with 70% by China-based firms.

Fixed Income

- **Risk aversion permeated fixed income markets in the fourth quarter amid growing concerns around global economic growth and geopolitical events.**
- **2 and 3 year Treasury yields increased by 20 basis points while the 10-year Treasury yield fell 33 basis points during the quarter, finishing at 2.17%.**
- **The Treasury yield curve flattened with the spread between two- and ten-year rates falling to 1.50%.**
- **Treasury Inflation-Protected Securities, or TIPS, underperformed nominal Treasuries due to lower inflation (expectations and actual), with the Barclays U.S. TIPS Index posting a loss of 1.0% during the quarter.**
- **Investment grade credit spreads continued to widen, ending December at 125 basis points.**
- **High yield bonds returned -1.0% as spreads increased to 483 basis points, up from 424 basis points, nearly 59 basis points wider than September 2014 levels.**
  - High yield markets were most significantly impacted by the decline of oil prices as energy makes up approximately 14% of the Barclays U.S. High Yield Bond Index.
- **Emerging markets debt continued to slow in the fourth quarter after a strong first half of the year.**
  - Concerns over geopolitical events, economic growth and a Fed rate increase caused local currency (JP Morgan GBI-EM Global Diversified – Unhedged) to fare worse than external currency (JP Morgan EMBI+) emerging markets debt, resulting in losses of 5.7% and 0.9%, respectively.

Market Environment

Commodities

- **Commodities sold off in the fourth quarter with the Bloomberg Commodity Index losing 12.1%.**
  - Oil continued to be the headline story with a decline of approximately 40% in the quarter on negative supply pressure from OPEC and on lower demand growth expectations.

Real Estate

- **NEPC continues to be neutral on core real estate in the U.S. and remains positive on non-core real estate, that is, value-add and opportunistic strategies.**

- **Within U.S. core real estate, strong fundamentals continue to be the story along with attractive income spreads relative to interest rates.**
  - The concerns for U.S. core real estate (and U.S. real estate, broadly) continues to be plentiful capital that is driving up pricing; and the market's expectation for higher future interest rates and their impact on capitalization rates and capital values.

- **U.S. REITs traded up relative to net asset values ending Q4 at a slight premium to NAV (long-term average is 2.4% above NAV).**
  - The Wilshire REIT Index ended the quarter up 15.1% and ended the year with a gain of 31.8%.
  - FFO multiples are up to approximately 18x remaining above the average of 12.5x since 2000.

- **Overall, the non-core real estate investment environment in the U.S. is normalizing; however, select areas remain attractive.**

- **Europe is viewed as the best place for a marginal dollar of non-core real estate investment.**
  - Europe is emerging from multi-year recession, but recovery is slow.
  - Banks in EU are still overleveraged and have significant real estate exposure (banks in Europe hold 90%+ of real estate debt or €2,300B; in the U.S. banks hold 49% of real estate debt).

Market Environment

Real Assets / Inflation-Linked Assets

- **Massive energy market dislocation.**
  - Private equity and private debt opportunities attractive.
  - Potential for public stressed/distressed credit, equity and commodity plays.
- **OPEC and Saudi Arabia have indicated a willingness to allow lower oil prices to persist in efforts to cement market share and reduce marginal supply.**
- **Select infrastructure opportunities are attractive.**
  - Target opportunistic strategies in niche sub-sectors to take advantage of market dislocations.
- **NEPC continues to believe in the long-term demand drivers in agriculture.**
  - Long-term commodity prices driven by growing emerging market demand.
- **Timber opportunity set limited but warrants further review**
  - 45% increase in housing starts forecasted; timber prices highly correlated

- **Be judicious with risk**
  - Avoid chasing risk for only marginal return enhancements
  - Less liquid opportunities may provide the best risk-adjusted approach, but liquidity needs should be incorporated (e.g., substituting direct lending for high yield)

- **Question the "traditional" approach; different investment environments require different perspectives of risk and return**
  - A low-return environment may require a fresh perspective
  - Continue to remove traditional portfolio constraints by adding active managers with skill to exploit inefficiencies within and across asset classes (e.g., flexible global equity, global asset allocation, absolute return fixed income)

- **Rethink fixed income portfolio structure in light of current market environment**
  - Use of an unconstrained/multi-sector fixed income portfolio may provide sound diversification and enhanced liquidity
  - Examine if alternatives are available to traditional portfolio positions (e.g., combining cash and long treasuries vs. holding core bond portfolio)

- **Review inflation hedging allocations in light of recent market action**
  - Some areas have likely sold off more than is warranted

- **Consider market weight or slightly over-weighted target allocation to developed non-U.S. equity**
  - Consider reducing the risk of the position by allocating to a currency hedged portfolio or implementing a currency hedge overlay

NEPC Updates

Fourth Quarter 2014

Highlights of Fourth Quarter Happenings at NEPC

NEPC Research

Recent White Papers Posted

- *Improving Asset Allocation with Factor Analysis (November 2014)* – Mark Cintolo, CAIA, Research Consultant
- *Improving Governance Under an OCIO Structure (October 2014)* – Steven Charlton, CFA, Director of Consulting Services
- *NEPC 2014 Defined Contribution Plan & Fee Survey: What Plan Sponsors Are Doing Now (October 2014)* – Ross Bremen, CFA, Partner; Dan Beaton, Senior Analyst


IMPROVING ASSET ALLOCATION WITH FACTOR ANALYSIS

Mark J. Cintolo, CAIA
Research Consultant, Asset Allocation

Professional Staff Updates

- **New Partner:** Sean Ruhmann, Partner, Director of Real Assets Research
- **New Principals**: Jeffrey Mitchell, CFA, CAIA, Principal, Senior Consultant ; Terri Sacramone, SPHR, Principal, Senior Human Resources Manager; and Michael Sullivan, Principal, Senior Consultant
- We are also pleased to announce that Daniel Hennessy has joined NEPC as a Senior Consultant located in our Redwood City, CA office. Daniel will be focusing on Taft-Hartley and Public Funds in the West.

Recent / Upcoming Events

- 2015 Market Outlook Webinar - January 22, 2015 at 3:00 PM EST.
- NEPC's 20th Annual Client Conference – May 19-20, 2015 in Boston at the Boston Convention & Exhibition Center (BCEC)

NEPC Gives Back

A team of NEPC employees participated in Movember once again this year. Movember is a global men's health charity requiring each 'Mo Bro' to sport a well-groomed mustache during the entire month of November to raise funds and awareness for men's prostate cancer, testicular cancer, and mental health. The team raised about $20,000 this year and ranked #49 nationally! Additionally, NEPC employees participated in Lee National Denim Day once again this year and raised $1,745. Lee National Denim Day is a fundraiser that takes place in October and was created by Lee Jeans to support the American Cancer Society's breast cancer programs.

NEPC Client Recognitions

Several of NEPC's clients were recognized by CIO Magazine recently. First, the October 2014 issue of CIO Magazine ranked the Power 100 CIOs, which included Tim Barrett, CIO of Texas Tech University System (#59), and Don Pierce, CIO of San Bernardino County Employees' Retirement Association (#61). Next, several NEPC clients were nominated for the CIO 2014 Industry Innovation Awards. Additionally, NEPC's client SBCERA was nominated for an Investor Intelligence Award in 'Portfolio Design'.

Appendix: SAA Policy History

Strategic Asset Allocation Policy (SAAP) History

- 7/1/75 – 12/31/79 – 40% S&P 500/60% Barclays Capital Aggregate
- 1/1/80 – 12/31/83 – 50% S&P 500/50% Barclays Capital Aggregate
- 1/1/84 – 12/31/91 – 60% S&P 500/40% Barclays Capital Aggregate
- 1/1/92 – 12/31/94 – 50% S&P 500/10% MSCI EAFE/40% Barclays Capital Aggregate
- 1/1/95 – 6/30/97 – 45% S&P 500/15% MSCI EAFE/40% Barclays Capital Aggregate
- 7/1/97 – 12/31/99 – 50% S&P 500/15% MSCI EAFE/35% Barclays Capital Aggregate
- 1/1/00 – 9/30/03 – 53% S&P 500/17% MSCI EAFE/30% Barclays Capital Aggregate
- 10/1/03 – 12/31/06 – 53% S&P 500/15% MSCI EAFE/ACWI ex-U.S.[1]/26% Barclays Capital Aggregate/6% NCREIF ODCE (lagged one quarter)
- 1/1/07 – 10/31/2009 – 31% S&P 500/7% S&P 400/7% S&P 600/18% MSCI ACWI ex-U.S./5% Russell 2000 (lagged one quarter)/26% Barclays Capital Aggregate/6% NCREIF ODCE (lagged one quarter)
- 11/1/2009 – 6/30/2012 – 28% S&P 500/6% S&P 400/6% S&P 600/13% MSCI EAFE/2% MSCI EAFE Small Cap/3% MSCI Emerging Markets/7% Russell 2000 (lagged one quarter)/24% Barclays Capital Aggregate/2% Barclays Capital High Yield/6% NCREIF ODCE (lagged one quarter)/3% Bloomberg Commodity Index
- **7/1/2012 – Present – 23% S&P 500/5% S&P 400/5% S&P 600/14% MSCI EAFE/3% MSCI EAFE Small Cap/6% MSCI Emerging Markets/7% Russell 2000 (lagged one quarter)/13% Barclays Capital Aggregate/5% Barclays Capital High Yield/4% JP Morgan GBI-EM Global Diversified/3% S&P/LSTA Levered Loan Index + 250 basis points (lagged one quarter)/8% NCREIF ODCE (lagged one quarter)/4% Bloomberg Commodity Index**

- *Interim SAA Policy: 25% S&P 500/5% S&P 400/5% S&P 600/14% MSCI EAFE/3% MSCI EAFE Small Cap/6% MSCI Emerging Markets/6% Russell 2000 (lagged one quarter)/14% Barclays Capital Aggregate/5% Barclays Capital High Yield/4% JP Morgan GBI-EM Global Diversified/3% S&P/LSTA Levered Loan Index + 250 basis points (lagged one quarter)/6% NCREIF ODCE (lagged one quarter)/4% Bloomberg Commodity Index

Note: Interim SAA Policy includes a proration of 1% Private Equity and 2% Real Estate, which are unfunded. Private Equity was prorated to domestic equity; Real Estate was prorated to domestic equity and fixed income. Recently approved Strategic Asset Allocation Policy effective July 1, 2012.

[1]MSCI EAFE/ACWI ex-U.S. Benchmark is the MSCI EAFE Index prior to 10/1/2005 and the MSCI ACWI ex-U.S. thereafter.

Note: All MSCI indices changed from Gross to Net of dividend withholding taxes effective 1/1/2014.

ASRS Custom Asset Class Benchmark History

- **ASRS Custom Total Equity Benchmark** was 77% S&P 500, 23% MSCI EAFE through 12/31/1999; 76% S&P 500, 24% MSCI EAFE through 9/30/2003; 78% S&P 500, 22% MSCI EAFE/ACWI ex-U.S.[1] through 12/31/2006; 49% S&P 500, 11% S&P 400, 11% S&P 600, 29% MSCI ACWI ex-U.S. through 10/31/2009; 48% S&P 500, 10% S&P 400, 10% S&P 600, 23% MSCI EAFE, 4% MSCI EAFE Small Cap, 5% MSCI Emerging Markets through 6/30/2012; 41% S&P 500, 9% S&P 400, 9% S&P 600, 25% MSCI EAFE, 5% MSCI EAFE Small Cap, 11% MSCI Emerging Markets thereafter.

- **ASRS Custom Domestic Equity Benchmark** was S&P 500 through 12/31/2006; 74% S&P 500, 13% S&P 400, 13% S&P 600 through 12/31/2010; 70% S&P 500, 15% S&P 400, and 15% S&P 600 thereafter.

- **ASRS Custom International Equity Benchmark** was MSCI EAFE through 9/30/2005; MSCI ACWI ex-U.S. through 12/31/2010; 72% MSCI EAFE, 11% MSCI EAFE Small Cap and 17% MSCI Emerging Markets through 6/30/2012; 61% MSCI EAFE, 13% MSCI EAFE Small Cap and 26% MSCI Emerging Markets thereafter.

- **ASRS Custom Public Markets Fixed Income Benchmark** was Barclays Capital U.S. Aggregate Index through 12/31/2010; 93% Barclays Capital U.S. Aggregate Index, 7% Barclays Capital U.S. High Yield Bond Index through 12/31/2012; 59% Barclays Capital U.S. Aggregate Index, 23% Barclays Capital U.S. High Yield Bond Index, 18% JP Morgan GBI-EM Global Diversified thereafter.

- **ASRS Custom Inflation-Linked Benchmark** was 100% Barclays Capital U.S. TIPS through 7/31/2010; 50% Barclays Capital U.S. TIPS, 50% Bloomberg Commodity Index through 8/31/2010; 30% Barclays Capital U.S. TIPS, 70% Bloomberg Commodity Index through 5/31/2011; 100% Bloomberg Commodity Index thereafter.

- **ASRS Custom GTAA Benchmark** was 56% S&P 500, 16% MSCI EAFE, 28% Barclays Capital Aggregate through 9/30/2011; 50% S&P 500, 19% MSCI EAFE, 28% Barclays Capital Aggregate, and 3% Bloomberg Commodity Index through 06/30/2012; 43% S&P 500, 25% MSCI EAFE, 28% Barclays Capital Aggregate, and 4% Bloomberg Commodity Index thereafter.

[1]MSCI EAFE/ACWI ex-U.S. Benchmark is the MSCI EAFE Index prior to 10/1/2005 and the MSCI ACWI ex-U.S. thereafter.

Note: All MSCI indices changed from Gross to Net of dividend withholding taxes effective 1/1/2014.

Reporting Methodology

- The client's custodian bank is NEPC's preferred data source unless otherwise directed. NEPC reconciles custodian data to manager data. If the custodian cannot provide accurate data, manager data may be used.

- Trailing time period returns are determined by geometrically linking the holding period returns, from the first full month after inception to the report date. Rates of Return are annualized when the time period is longer than a year. Performance is presented gross and/or net of fees as indicated.

- For managers funded in the middle of a month, the 'since inception' return will start with the first full month, although actual inception dates and cash flows are included in all respective Composite calculations.

- This report may contain forward-looking statements that are based on NEPC's estimates, opinions and beliefs, but NEPC cannot guarantee that any plan will achieve its targeted return or meet other goals.

Information Disclaimer

- **Past performance is no guarantee of future results.**
- **All investments carry some level of risk. Diversification and other asset allocation techniques are not guaranteed to ensure profit or protect against losses.**
- **Some index returns displayed in this report or used in calculation of a policy, allocation or custom benchmark may not be available from the source or may be preliminary and subject to change.**
- **NEPC's source for portfolio pricing, calculation of accruals, and transaction information is the Plan's custodian bank. Information on market indices and security characteristics is received from other sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained herein.**
- **This report is provided as a management aid for the client's internal use only. Performance in this report does not constitute a recommendation by NEPC.**
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Agenda Item #5

ARIZONA STATE RETIREMENT SYSTEM

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Paul Matson
Director

MEMORANDUM

TO: The Arizona State Retirement System (ASRS) Investment Committee (IC)

FROM: Mr. Gary Dokes, Chief Investment Officer (CIO)
Mr. Dave Underwood, Assistant Chief Investment Officer
Mr. John Doran, Assistant Portfolio Manager
Mrs. Lupita Breland, Portfolio Analyst
Mr. Mike Copeland, Investment Analyst

DATE: February 13, 2015

RE: **Agenda Item #5:** Presentation, Discussion, and Appropriate Action Regarding the ASRS Cash Management Program

Purpose
To present and discuss the ASRS investment program updates and Investment Risk Reports.

Recommendation
Informational only; no action required.

Background
The CIO, Assistant CIO and IMD Staff will present and facilitate a discussion of the ASRS Cash Management Program.

Attachments: ASRS Cash Management Program

Arizona State Retirement System

Cash Flow Management Program

February 23, 2015

Gary Dokes, CIO
Dave Underwood, Sr. Equity PM/ACIO
John Doran, Asst. PM
Lupita Breland, Portfolio Analyst
Micheal Copeland, Investment Analyst

Contents

Program Paradigm

- Proposition: Is there a better, more efficient way to manage ASRS cash flow needs while maintaining exposure to the market consistent with ASRS Strategic Asset Allocation and Investment House Views?
- Program design should be dynamic and modifiable given changes to future expected ASRS cash flow requirements and the availability of liquid asset class instruments, both listed futures and physical securities, to replicate beta exposure for ASRS Master Cash balances.
- The Program will be managed by IMD, use the cash management and transition services of ASRS custody bank and provide detail reporting to and oversight by the CIO and Asst. CIO

Program Objectives

- **Provide Sufficient Fund Liquidity:** The program is designed with ample liquidity to meet ASRS funding needs. The structure incorporates one day notification for transferring funds to Master Cash, allowing for a short notification timeline to meet monthly pension obligations and capital calls.

- **Mitigate Cash Drag:** The program benefits total return by synthetically exposing cash balances to the market, thereby mitigating cash drag on the portfolio. Moreover, the program simplifies the current process to meet benefit payment needs and capital calls.

- **Minimize Transaction Costs:** Using a transition manager allows for increased external crossing opportunities and "exchange for physical" transactions, minimizing transaction costs associated with liquidating target assets. Further, the proposal assumes targeting the most liquid available synthetic exposures for uninvested cash balances.

- **Optimize ASRS Manager Portfolios:** The program benefits existing managers by allowing for near frictionless portfolio rebalancing (transaction cost) to the extent a manager's portfolio is targeted as a funding source which will provide securities to a transition account.

General Process

Managed by State Street and overseen by the ASRS in two distinct phases:

- **Transition Phase:**
  - ASRS identifies target assets for total fund cash needs
  - State Street liquidates holdings and concurrently exposes cash to target exposure
  - State Street provides transition reports to review transition costs versus expectations
- **Cash Management Phase:**
  - ASRS determines the appropriate exposure for the account
  - ASRS monitors total fund cash needs and notifies State Street of flows
  - State Street maintains target exposures as cash balances fluctuate
  - State Street provides quarterly reviews of performance and tracking error

Implementation Phase - Overview

ASRS Decision Phase

- IMD targets assets for 3 – 4 month of total fund cash needs (~600M)
- IMD determines appropriate futures exposure / "Assetization"
- IMD specifies manager accounts and precise amounts for transition

Transition Phase

- IMD works with State Street and target managers to move securities to transition account
- State Street liquidates holdings and concurrently exposes cash balance to target exposure
- Cash and futures are moved in assetization account once the transition is complete

Cash Management Phase

- State Street maintains exposure in the assetization account (+/- 5% trading band)
- IMD monitors daily cash flows and instructs State Street to move cash as required
- Master Cash retains a buffer without assetization to meet funding needs for daily payments

Determining Operating Cash (Assetization) Market Exposure

Cash Management Schematic					
	CURRENT SAAP		Adjustment	Target Exposure	
	%	Benchmark		%	Benchmark
US Equity	23% 5% 5%	S&P 500 S&P 400 S&P 600	Prorate: a. +7 from Private Equity b. +4 from Real Estate c. +3 from Commodities 80% SPX / 20% R2K	33%	SPX
Private Equity	7% 40%	R2K		14%	R2K
Non-US Equity	14% 3% 6% 23%	MSCI EAFE MSCI EAFE Small Cap MSCI EM	Prorate: a. +1 from Real Estate b. +1 from Commodities	25%	MSCI EAFE
Fixed Income	13% 5% 4% 3% 25%	Aggregate HY Aggregate EMD Private Debt	Prorate: a. +3 from Real Estate Treasury futures duration matched to the AGG	28%	Barclay's US Treasury Index
Real Estate	8%	ODEC	RE and/ or Commodities may be included in later iterations via futures or ETF exposures.		
Commodities	4%	DJ-UBS TR		-	

Note: Target market exposure is derived by prorating non-liquid SAAP asset classes to arrive at a neutral position consistent with ASRS SAAP current or tactical position consistent with IMD Investment House Views.

Cash Flow Management Program

Implementation Examples

Using U. S. Public Equities as a Program Funding Source (example)

ASRS Decision Phase

- IMD targets U.S. Public Equity for $600M cash raise
- IMD determines 33% S&P 500, 14% R2K, 25% EAFE and 28% ‘Treasury Basket’
- CIO and Equity PM/aCIO specifies a ‘pro-rata’ slice of U.S. public equity

Transition Phase

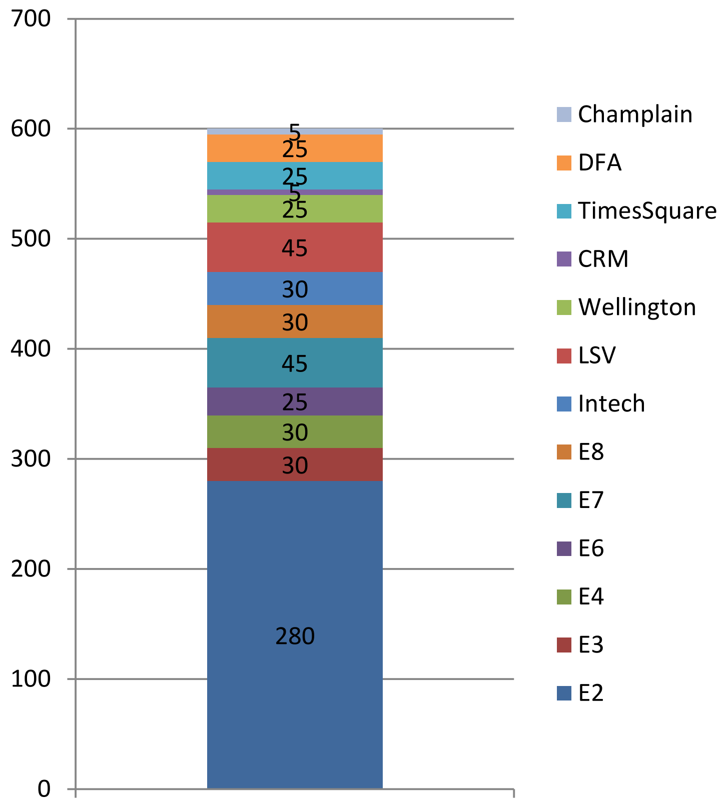
- IMD notifies managers to prepare a spreadsheet detailing holdings to be transferred
- State Street moves the securities and ‘certifies’ the holdings in the transition account
- State Street then prudently liquidates the securities and concurrently purchases futures
- State Street moves cash and futures to the equitization account

Cash Management Phase

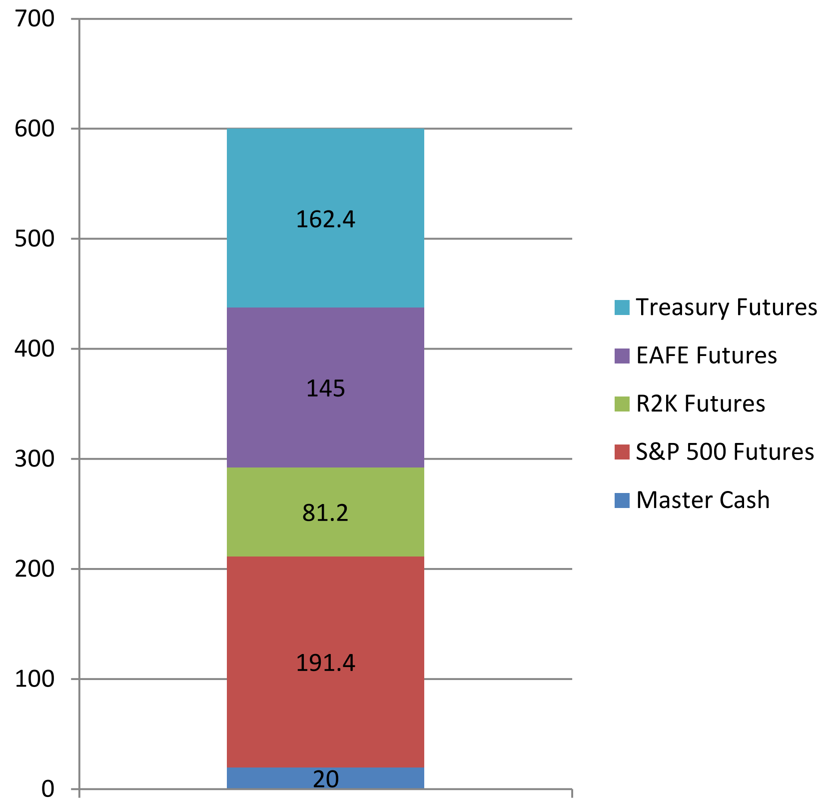
- IMD monitors daily cash flows and instructs State Street to move cash as required
- Equitization account exposed to the target exposure (+/- 5%)
- State Street overlays or removes exposure daily with access to ASRS custodial data

Using U. S. Public Equities as a Program Funding Source (example)

Target Manager Securities (pre-transition)

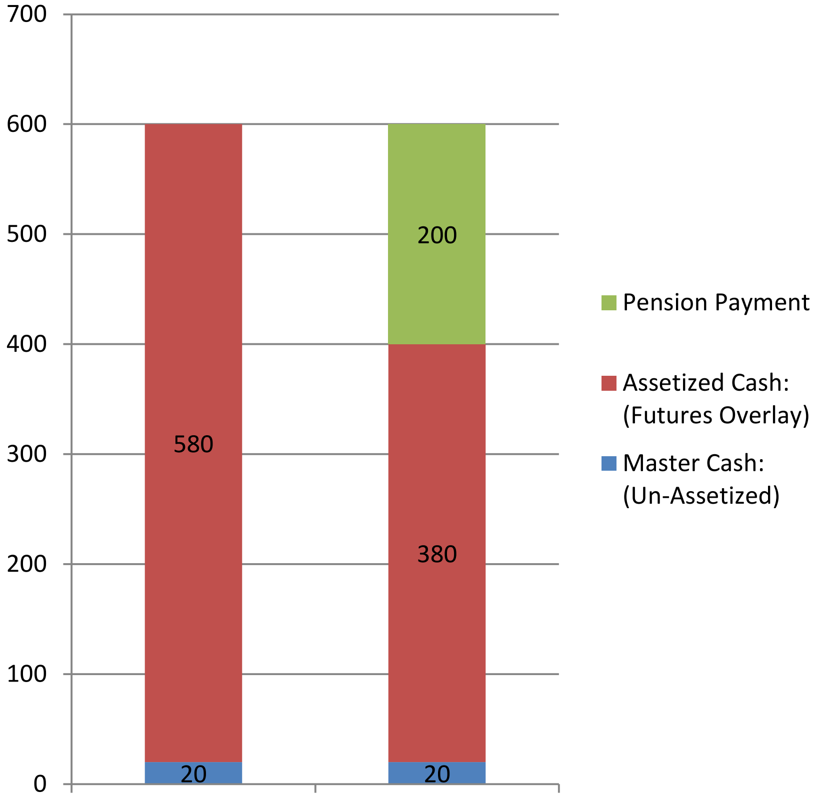


Cash Accounts (post-transition)



Funding of Pension Payment

$200 monthly pension run:



ASRS/State Street Process:

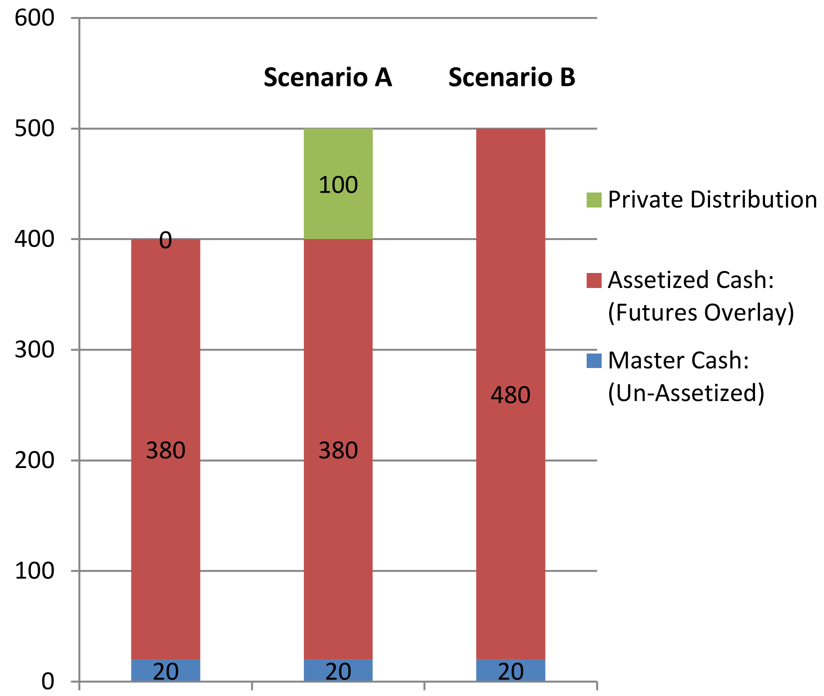
- ASRS monitors monthly pension run with final number no later than 5 business days prior to month end.
- ASRS notifies State Street to remove exposure and move proceeds to master cash on the first day of the month.
- State Street has stated that the overlay team can remove the exposure in the morning and move proceed thereafter.
- Assuming same day movement to master cash and disbursement for monthly pension run, there would be limited cash drag on the portfolio.

Private Markets Portfolios Distribution

ASRS/State Street Process:

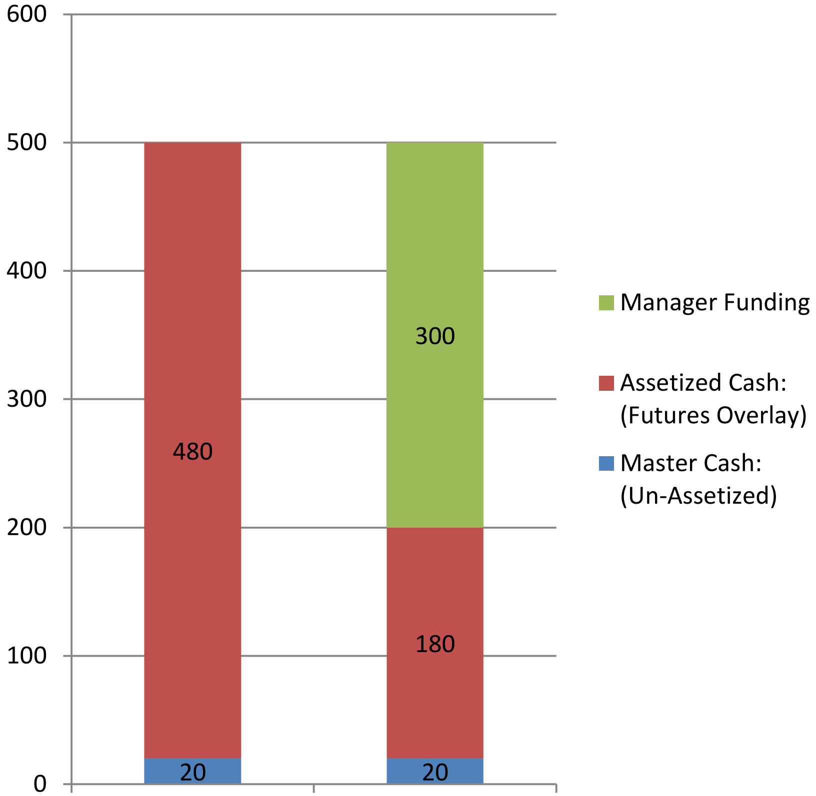
- ASRS monitors large distribution from external investments; e.g., private equity, private debt and real estate.
- Depending on the timing of the external wire, the ASRS may not capture the cash flow on the day the proceeds hit master cash – **Scenario A**.
- If the manager provides timely notification, the ASRS will verify the incoming wire and notify the State Street overlay team of the pending distribution so that the proceeds can be assetized at market close – **Scenario B**.

$100 Private Distribution:



Funding a New Investment Manager

$300 Manager Funding:



ASRS/State Street Process:

- ASRS retains a new investment manager intended to be funded via cash.
- ASRS notifies State Street to remove exposure and move proceeds to master cash on the funding date.
- State Street has stated that the overlay team can remove the exposure in the morning and move proceed thereafter.
- Assuming same day movement to master cash and concurrent funding, there would be limited cash drag on the portfolio .

Operational Considerations

- Assetized Cash will stand along side Master Cash in the fund structure and will be reported as a separate line item for the “Daily” and Quarterly Total Fund Reports.
- Investment contracts for both the transition and cash management phases have been negotiated in conjunction with outside counsel and signed.
- State Street will provide pre-trade cost estimates for all transitions including trading costs, taxes, market impact and spread. Shortly after completing a transition, State Street will conduct a post trade analysis and review.
- The securities in the “Assetized Cash” account will be managed by State Street in a separate account at the Custody Bank, allowing the IMD to closely monitor holdings and transactions to ensure target exposures match the specified benchmark.
- IMD has identified and begun tracking all significant cash flows, developing daily monitoring capabilities for Master Cash to ensure all cash flows are captured.
- State Street’s ‘True View’ risk report has look through capabilities and will incorporate the synthetic exposures in the assetized cash account.

Agenda Item #6

ARIZONA STATE RETIREMENT SYSTEM

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Paul Matson
Director

MEMORANDUM

TO: The Arizona State Retirement System (ASRS) Investment Committee (IC)

FROM: Mr. Paul Matson, Director
Mr. Gary R. Dokes, Chief Investment Officer

DATE: February 17, 2015

RE: **Agenda Item #6**: Presentation, Discussion and Appropriate Action Regarding ASRS Investment Policy Statement (IPS)

Purpose

To present, discuss, and take appropriate action regarding the ASRS Investment Policy Statement in order to:

1. Meet the annual review requirement of the Board Governance Policy Handbook.
2. Document the 'Cash Assetization Program' and the 'Transition Management Program'.

Recommendations

Move that the IC recommend to the Board the approval of proposed changes to the ASRS Investment Policy Statement as denoted in Exhibit 1.

Background

The ASRS has developed numerous investment documents which individually address specific aspects of its investment management program. These include the ASRS Investment Goals & Objectives, Investment Beliefs, Strategic Asset Allocation Policy (SAAP), Strategic Investment Policies (SIP), and the Board Governance Policy Handbook.

The Investment Policy Statement aggregates the aforementioned documents into a single macro-level investment document which capture key components of the ASRS investment program.

As the result of a review and discussions between the Director and CIO, revisions to the IPS were made. Revisions are marked in red in Exhibit 1 and reflect the development and implementation of the ASRS Cash Management Program, and provide greater clarity of verbiage in the investment cash considerations section.

Attachments:

ASRS Investment Policy Statement – Exhibit 1 (Proposed)
ASRS Investment Policy Statement – Exhibit 2 (Existing)

Exhibit 1

Exhibit 1 - Proposed

Investment Policy Statement (IPS)

BOARD APPROVED: 02/18/2011
REVISED: 11/16/2012
REVISED: 08/23/2013

Arizona State Retirement System

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PHOENIX, AZ 85012

TABLE OF CONTENTS

PURPOSE

The purpose of this Investment Policy Statement (IPS) is to set forth the investment, beliefs, goals & objectives, constraints and establish the guidelines for the development and implementation of the ASRS strategic and tactical asset allocation policy.

The ASRS recognizes that a well-articulated investment policy is important to the long-term success of achieving the ASRS investment objectives. As such, the ASRS has developed this IPS with the following goals in mind:

- To clearly and explicitly establish the objectives and parameters that govern the investments of the ASRS' assets;

- To establish a target asset allocation that is long-term in nature but dynamic to allow the ASRS to take advantage of market opportunities which is expected to achieve its investment rate of return objectives;

- To help protect the financial health of the ASRS through the implementation of this policy statement;

- To establish a framework for monitoring investment activity, and promote effective communication between the Board, Staff, and other involved parties.

INVESTMENT GOALS & OBJECTIVES

The ASRS has established a set of Investment Goals and Objectives that describe the macro-level expected outcomes that the ASRS seeks to achieve.

GOALS:

1. **Maximizes Fund Rates of Return for Acceptable Levels of Fund Risk.**

   This goal has an asset oriented focus. Here, the returns generated or earned by the investment Fund should be considered in conjunction with the risk or volatility that the Fund will support, where risk is essentially the possibility of a change in the value of the ASRS Fund attributed to changes in economic conditions, interest rates, dividend policy and other variables in any given year.

2. **Achieves 75th Percentile Rates of Return Compared to Peers.**

   This goal compares the performance of ASRS' aggregate investment portfolio to other public pension funds with over $1 billion of assets under management. Though ASRS' asset allocation policy will differ from other public pension funds given its risk return profile and investment beliefs, it is common practice to compare returns between comparable public pension funds.

3. **Achieves Long-term Fund Rates of Return Equal to or Greater than the Actuarial Assumed Interest Rate.**

This goal has a liability oriented focus. Here, the returns generated or earned by the investment Fund should be considered in conjunction with the actuarial assumed interest rate, where this interest rate is essentially an estimate of the long-term average of the combination of expected inflation rates and expected real rates of return. The actuarial assumed interest rate is also the discount rate used to calculate the present value of liabilities.

4. **Achieves Long-term Economic and Actuarial Funded Statuses of 100 percent.**

   This goal has a funded-status oriented focus. Here, the structuring of the investment Fund should be considered in conjunction with the level, volatility, and direction of the economic and actuarial funded status of the Fund. Although both actuarial and economic funded status levels are valuable for discussion and decision-making, economic-funded status is more reflective of financial condition and long-term policy implications. Economic-funded status is defined as the actual or market value of investments as a percentage of the actual or market value of liabilities and excludes such accounting constructs as smoothing and amortization.

5. **Mitigates Contribution Rate Volatility.**

   This goal has a contribution-rate orientation focus. Here, the structuring of the investment Fund should be considered in conjunction with the level, volatility, and direction of the contribution rates that will need to be paid by both employees and employers in the Fund. In general, lower levels and volatility in contribution rates are preferred.

Collectively, the above goals[1] incorporate the following elements that are important for a fund's comprehensive investment structure:

1. Complementary use of absolute and relative rates-of-return perspectives.

2. Complementary use of asset-only and asset-liability perspectives.

3. Complementary use of economic and actuarial perspectives.

OBJECTIVES:

Total Fund Performance

1. Achieve a 20-year rolling annual total fund net rate of return equal to or greater than the actuarial assumed interest rate.

2. Achieve 1-year and 3-year rolling annual total fund net rates of return equal to or greater than the return of the ASRS asset allocation policy (SAAP) Benchmark.

[1] Though important, Safety of Principal is not denoted as a separate goal, given its incorporation in other goals and the general acceptability of Modern Portfolio Theory. Liquidity of the Fund is also not denoted separately as it is a normal investment operating function and acts more as a constraint than an investment goal.

Asset Class Performance

3. Achieve 1-year and 3-year rolling annual net rates of return for ASRS strategic asset classes that are equal to or greater than their respective strategic asset class benchmarks.

Cash Flow Performance

4. Ensure sufficient monies are available to meet pension benefits, health insurance, member refunds, administrative payments, and other cash-flow requirements.

Refer to the ASRS Strategic Plan.

INVESTMENT BELIEFS

Frame of Reference

The following Investment Beliefs have been established to ensure the development of congruent and synergistic investment strategies, and to ensure the effective and efficient allocation of resources. These Investment Beliefs determine the general paradigm within which investment strategies are developed, investment ideas are reviewed, and investment decisions are implemented.

Modifications to these Investment Beliefs will occur if experiential, academic, conceptual, and/or practical perspectives suggest that a superior belief system exists.

Investment Beliefs

1. **Asset Class Decisions are Key**: In general, decisions with respect to which asset classes and sub-asset classes to invest in, and the allocations to these asset classes and sub-asset classes, have a greater impact on total fund investment returns than decisions in which specific securities to invest.

2. **Theories and Concepts Must be Sound:** Over longer periods of time, investment outcomes (e.g. rates of return, volatility) conform to logical theories and concepts. Significant deviations (e.g. internet bubble, pre-subprime erosion of risk premiums) from theoretically and conceptually sound investment constructs are usually not sustainable and are typically self-reverting.

3. **House Capital Market Views Are Imperative:** The development and articulation of sound *House Views* (e.g. views on interest rates, corporate spreads, asset valuations) will ensure consistency among investment decisions, clarity of investment direction, baselines for debates, and conformity of understanding.

4. **Investment Strategies Must be Forward Looking**: Investment strategies will be developed based on forward-looking insights, rather than simply on successful strategies of the past.

   Asset class valuations and security valuations are significantly affected by endogenous outcomes (e.g. earnings, GDP growth rates, competitive barriers) that are probabilistic, and these outcomes are typically well analyzed by the investment industry.

   Asset class valuations and security valuations are also significantly affected by random outcomes (e.g. natural disasters, certain supply & demand shocks) that are virtually unpredictable, and these outcomes are typically not analyzed directly by the investment industry.

   Asset class valuations and security valuations are also significantly affected by exogenous outcomes (e.g. foreign policies, global cultural interactions) that can possibly be modeled, and these outcomes are typically not analyzed by the investment industry.

5. **Public Markets are Generally Informationally Efficient:**

   Asset Class Valuations
   Asset class valuations (e.g. stock market levels versus interest rate levels) are often in equilibrium with one another, but anomalous situations do occur which result in disequilibria between asset class valuations. These disequilibria offer valuable investment opportunities which we will pro-actively seek and capitalize on.

   Security Valuations
   Security valuations (e.g. IBM versus Cisco) are often in equilibrium with one another, but private markets and anomalous public market situations do occur which result in disequilibria between security valuations. These disequilibria offer valuable investment opportunities which we will pro-actively seek and capitalize on.

   The extent of informational efficiency varies across asset classes.

   Private markets offer significant opportunities for asset mispricing and manager excellence which we will pro-actively seek and capitalize on.

6. **Market Frictions are Highly Relevant:** Market frictions (e.g. management fees, carried interest, revenue sharing, expenses, costs, transaction spreads, market impacts, taxes, commissions) can be significantly detrimental to investment performance and as a result transactions will be initiated only to the extent there is a strong level of conviction that they will result in increased investment returns or decreased risks net of all market frictions.

7. **Internal Investment Professionals are the Foundation of a Successful Investment Program:** In-house investment management capability engaged in direct portfolio management results in superior investment decision-making.

   In-house investment management pro-actively monitors capital markets in order to determine mispricing opportunities & allocate capital and will successfully increase risk adjusted returns.

   In-house investment professionals are more closely aligned with, and have a better understanding of, the purpose and risk & reward tolerance of the ASRS than external parties.

   In-house investment professionals will impact direct investment negotiations, better align economic interests, and influence investment industry conditions (e.g. private deal structures, fee levels, introduction of innovative products & strategies).

8. **External Investment Management is Beneficial:** External investment organizations can often offer greater expertise, resources, and/or flexibility than internal personnel for various investment strategies.

9. **Investment Consultants:** Investment consultants will be effectively utilized in the following four general categories, and utilization of consultants will be focused on situations where there is a demonstrable need in at least one of the four areas:

   - Independence: When oversight or controls should be enhanced

- Perspective: When internal perspectives are not broad enough
- Special Skills: When internal skills are not deep enough
- Resource Allocation: When IMD's resources can be enhanced.

10. **Trustee Expertise**: Trustees often have expertise in various areas of investment management, and this expertise should be utilized while ensuring separation between Board oversight and staff management.

Refer to IMD Investment Beliefs.

INVESTMENT ~~CONSTRAINTS~~CONSIDERATIONS

1. **Arizona State Statutes**
ASRS investments may be limited by Arizona Revised Statutes. To ensure compliance, checks and balances have been established which both reside within and external to the ASRS Investment Management Division. Reporting processes are implemented and, as appropriate, disseminated to the Director and the Board.~~The ASRS monitors its investment compliance to applicable investment Arizona statutes and regulations. Checks and balances have been established which both reside within and external to the ASRS Investment Management Division. Reporting protocols are implemented and, as appropriate, disseminated to the Director and the Board.~~

2. **Time Horizon**
The ASRS is managed on a going-concern basis with primary emphasis placed on long-term (20-30+ years) capital market expectations, which are evaluated in the context of relevant ranges of probable investment return outcomes. This long-term perspective enables the ASRS to combine the traditional cross-sectional diversification benefits of a large employee pooled plan with time-series diversification benefits of a multi-generational plan, resulting in higher expected short-term return volatility enabling higher long-term return expectations. The impact on contribution rates of any realized short-term volatility of returns will be mitigated through actuarial time-series diversification (smoothing) rather than by lower short-term return volatility at the expense of lower return expectations (and therefore higher aggregate contribution rates).
~~The ASRS is managed on an on-going-concern basis with primary emphasis placed on long-term capital market expectations (20-30+ years), which are evaluated in the context of relevant ranges of probable investment return outcomes.~~

3. **Liquidity and Cash-Flow**
The ASRS maintains a long-term investment horizon; however, managing short-term liquidity and cash-flow is paramount to ensure that pension obligations, health insurance, member refunds, administrative payments and other cash-flow requirements are made. This requires Investment Management and Financial Services Divisions to anticipate internal and external cash-flow needs, and to efficiently manage transactions in order to mitigate the costs of ensuring adequate liquidity.
~~The ASRS maintains a long-term investment horizon; however, managing liquidity and cash-flow is paramount to ensure that pension obligations, health insurance, member refunds, administrative payments and other cash-flow requirements are made. This requires Investment Management and Financial Services Divisions to anticipate internal and external cash-flow needs in order to preclude the use of alternative liquidity vehicles.~~

RISK MANAGEMENT, MONITORING AND REPORTING

The ASRS applies a risk management framework for identifying, managing and reporting on ASRS Investments. These include, but are not limited to, operational risk (e.g., internal and external portfolio(s) guideline compliance, cash management, securities lending, IMD business continuity, etc.) and investment risk (e.g., deviations from target allocation, manager oversight, performance measurement/attribution, ability to achieve investment objectives, etc.).

In conjunction with the agency risk management program, appropriate steps are taken to provide reasonable assurance to Executive Management and the Board that investment management programs are designed, implemented and maintained to achieve investment goals and objectives as referenced in the ASRS Strategic Plan.

Responsibilities reside with the ASRS investment staff, custody bank, general consultant, project consultants, investment managers, and ASRS Internal Audit.

Reporting periodicity and the level of investment information dissemination vary depending upon target audience. Daily report generation and investment monitoring reside with the custody bank and IMD/Internal Audit; Quarterly/Annual aggregate, portfolio positions, and asset class performance are reported to the IC/Board.

The use of leverage is defined in the applicable ASRS investment documentation. For separate account public market investments (internally or externally managed portfolios), authorization to permit or not permit leverage is explicitly denoted in the managers' Letter of Direction and Clarification; monitoring is conducted by IMD and ASRS consultants. For commingled public and private markets investments, authorization to permit or not permit leverage is explicitly denoted in the managers' contracts or partner agreements; monitoring is conducted by the designated partnership agreement external auditor and, as applicable, reviewed at limited partnership advisory meetings.

The use of derivatives is defined in the applicable ASRS investment documentation. For separate account public market investments (internally or externally managed portfolios), authorization to permit or not permit derivatives is explicitly denoted in the managers' Letter of Direction and Clarification; monitoring is conducted by IMD and ASRS consultants. For commingled public and private markets investments, authorization to permit or not permit derivatives is explicitly denoted in the managers' contracts or partner agreements; monitoring is conducting by the designated partnership agreement external auditor and, as applicable, reviewed at limited partnership advisory meetings.

The management of currency exposure is defined in the applicable ASRS investment documentation. For separate account public market investments (internally or externally managed portfolios), authorization to permit or not permit currency hedging is explicitly denoted in the managers' Letter of Direction and Clarification; monitoring is conducted by IMD and ASRS consultants. For commingled public and private markets investments, authorization to permit or not permit currency hedging is explicitly denoted in the managers' contracts or partner agreements; monitoring is conducting by the designated partnership agreement external auditor and, as applicable, reviewed at limited partnership advisory meetings.

ASSET ALLOCATION

As part of strategic asset allocation development, the ASRS asset mix will reflect investments in strategic and tactical asset classes and strategies whose collective risk/return profile are anticipated to achieve its long-term investment rate of return goals and objectives.

The ASRS employs a dynamic strategic asset allocation study approach whose initiation and periodicity will primarily be a function of market dynamics. The strategic asset allocation is used to determine the long-term policy asset weights. Investment opportunities and asset classes are constantly evolving and developing, such that they may become attractive and suitable for institutional investment portfolios before the next scheduled policy review. Therefore, asset allocation reviews in addition to periodic studies are conducted as warranted or triennially, whichever is shorter.

The strategic asset allocation study may include, but not be limited to, the following:

- Discussion and analysis of existing and evolving asset classes and investment strategies.
- Evaluation of expected sources of investment returns, risk and diversification (quantitatively/qualitatively).
- Reviewing investment industry developments (academic and pragmatic).
- Utilization of quantitative tools (e.g., efficient frontier mean-variance optimization, risk budgeting) and evaluation of multiple scenarios.
- Reviewing and engaging discussions regarding capital market assumptions.
- Reviewing asset allocation policies from other public and non-public entities.

Refer to the ASRS Strategic Asset Allocation Policy (SAAP) Schematic

CASH ASSETIZATION

The ASRS may utilize a derivative-based framework for efficient and cost effective cash management. This framework and processes are referred to as the Cash Assetization Program. Specifically, the Cash Assetization Program is designed for two fundamental reasons as follows:

- To facilitate fund liquidity by decreasing the settlement times and market frictions related to overall investment management.
- To retain unleveraged Total Fund market (beta) exposure, and concurrently offset the hindrance on investment performance from maintaining sizeable transitional cash balances intended to meet fund payment obligations (e.g., pension, health supplement, LTD, fees, accounts payable and associated capital calls).

The Cash Assetization Program is designed to maintain exposures to the approved Strategic Asset Allocation (SAA) capital markets, while reflecting the Tactical Asset Allocation (TAA) House Views.

The Program is designed to be dynamic and modifiable given changes to future expected ASRS cash flow requirements, and the availability of assetization instruments, including listed futures and physical securities. The Program will be directed and overseen by IMD, and may be implemented and managed by an external party, such as the cash management service of the ASRS custody bank. Primary oversight will be conducted by the CIO and Assistant CIO.

TRANSITION MANAGEMENT

The ASRS may utilize external transition management services for efficient and cost effective portfolio transition services. These services and processes are referred to as the Transition Management Program. Specifically, the Transition Management Program is designed to enhance the orderly and efficient transfer and conversion of assets from internally and/or externally managed portfolios identified:

- As sources of liquidity.
- For manager transitions.
- To implement House Views.
- For other portfolio transitions.

The Program is designed to be dynamic and modifiable given changes to future expected ASRS transitions and the availability of exchange and crossing networks. The Program will be directed and overseen by IMD, and may be implemented and managed by an external party, such as the transition services of the ASRS custody bank. Primary oversight will be conducted by the CIO and Assistant CIO.

REBALANCING

The ASRS has established and maintains an asset class rebalancing policy(s) which encompasses the guidelines and processes for identifying and determining potential courses of action precipitated by the ASRS asset class over/under weight deviations relative to its broad strategic asset allocation policy (SAAP), ASRS cash-flow needs and/or to take tactical positions between and within SAAP asset classes.

The frequency and magnitude of portfolio rebalancing is determined by the Investment Rebalancing Committee consisting of the Director, CIO, and IMD Asset Class Portfolio Managers. The CIO reports asset class rebalancing activities to the Director and, through the Director, to the Investment Committee and full Board.

Refer to the Strategic Investment Policy – Rebalancing

VOTING OF PORTFOLIO PROXIES

The ASRS votes its ownership interest with an objective of maximizing the present value of its investment. Proxy voting for the ASRS internally-managed equity ("E") portfolios and those assigned to external U.S. and non-U.S. equity managers shall not be influenced or directed by political or social prerogatives that may diminish or impair the economic value of an investment.

The ASRS currently engages Institutional Shareholder Services (ISS) and employs its research and voting guidelines for the voting of proxies for the "E" portfolios. This process is not applicable to ASRS externally-managed equity portfolios.

The ASRS external equity managers use their discretion to vote their portfolio proxies; voting records are monitored for consistency with both the individual external manager's voting policy and the ISS proxy voting policy. External equity manager voting records found to be inconsistent with or different from the ISS proxy voting policy are researched and documented. IMD retains the right to direct external equity managers' voting on any issue(s) if doing so is deemed beneficial to the Fund.

SECURITIES LITIGATION

The ASRS monitors and participates in securities litigations when appropriate to protect the ASRS interests. From time to time, class action lawsuits are brought against companies, their directors, and/or their officers, as well as third parties such as the companies' independent public accountants, for alleged violations of federal and state securities laws relating to various disclosure obligations and breaches of fiduciary or other duties. As a shareholder or bondholder, the ASRS may join or initiate a securities class action or pursue a private action when securities fraud and other acts of wrongdoing have taken place.

Monitoring and reporting is carried out by the ASRS contracted outside counsel who may make recommendations to the ASRS and depending on the merits of the recommendation are discussed by the Securities Litigations Oversight Committee (SLOC). In the event the SLOC recommends the ASRS consider pursuing lead plaintiff or private action, Board approval is required before such action can be taken.

Refer to the Strategic Investment Policy – Securities Litigation

SECURITIES LENDING

The ASRS is allowed to lend securities with either the custody bank or tri-party in a separate account or commingled security lending structure. The IMD will determine the ASRS securities lending program parameters (risk profile, aggregate lending balance, types of securities on loan, collateral requirements, etc.). The ASRS securities lending program primarily focuses on identifying loan intrinsic value.

MANAGEMENT OF INVESTMENT MANAGEMENT FEES (COST)

The ASRS strives to maintain an efficient and relatively low aggregate investment management fee structure. The ASRS internally-manage public market portfolios are managed to provide beta-like market returns with low management fees (approx 1 bps); external public and private portfolios are anticipated to generally provide alpha, take active risk and enable the ASRS the ability to access market capital opportunities which may not be available through ASRS internal investment program.

To the extent possible, the ASRS negotiates and monitors investment fees for external public and private investment managers. For external public equity managers, securities-level transaction(s) cost analyses will be evaluated by IMD staff. Those managers whose transaction costs appear high relative to the market in which they trade or who use soft dollars may be subject to participation to the ASRS commission recapture program.

The ASRS IMD staff will oversee public manager portfolio transitions, e.g., securities from one public manager to another. These transactions may be executed on a security-level basis by either IMD staff or through an intermediary who may possess skills and/or can execute transactions on a more effective cost basis. Pre- and post-transaction cost analyses (commission, trading costs, market impact, etc.) are evaluated by the IMD staff.

ROLES & RESPONSIBILITIES

The ASRS Board governance structure provides the Investment Committee (IC) with general investment oversight responsibilities. In addition, the Directors' Asset Class Committees implement Board policies and provide detail oversight of the ASRS investments. Specific duties of the IC and Asset Class Committees are outlined in the ASRS Board Governance Policy Handbook.

Refer to the ASRS Board Governance Policy Handbook

Exhibit 2

Exhibit 2 - Existing

Investment Policy Statement (IPS)

Board Approved: 02/18/2011
Revised: 11/16/2012
Revised: 08/23/2013

Arizona State Retirement System

3300 N Central Avenue
Phoenix, AZ 85012

TABLE OF CONTENTS

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GOALS:

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Reporting periodicity and the level of investment information dissemination vary depending upon target audience. Daily report generation and investment monitoring reside with the custody bank and IMD/Internal Audit; Quarterly/Annual aggregate, portfolio positions, and asset class performance are reported to the IC/Board.

The use of leverage is defined in the applicable ASRS investment documentation. For separate account public market investments (internally or externally managed portfolios), authorization to permit or not permit leverage is explicitly denoted in the managers' Letter of Direction and Clarification; monitoring is conducted by IMD and ASRS consultants. For commingled public and private markets investments, authorization to permit or not permit leverage is explicitly denoted in the managers' contracts or partner agreements; monitoring is conducted by the designated partnership agreement external auditor and, as applicable, reviewed at limited partnership advisory meetings.

The use of derivatives is defined in the applicable ASRS investment documentation. For separate account public market investments (internally or externally managed portfolios), authorization to permit or not permit derivatives is explicitly denoted in the managers' Letter of Direction and Clarification; monitoring is conducted by IMD and ASRS consultants. For commingled public and private markets investments, authorization to permit or not permit derivatives is explicitly denoted in the managers' contracts or partner agreements; monitoring is conducting by the designated partnership agreement external auditor and, as applicable, reviewed at limited partnership advisory meetings.

The management of currency exposure is defined in the applicable ASRS investment documentation. For separate account public market investments (internally or externally managed portfolios), authorization to permit or not permit currency hedging is explicitly denoted in the managers' Letter of Direction and Clarification; monitoring is conducted by IMD and ASRS consultants. For commingled public and private markets investments, authorization to permit or not permit currency hedging is explicitly denoted in the managers' contracts or partner agreements; monitoring is conducting by the designated partnership agreement external auditor and, as applicable, reviewed at limited partnership advisory meetings.

ASSET ALLOCATION

As part of strategic asset allocation development, the ASRS asset mix will reflect investments in strategic and tactical asset classes and strategies whose collective risk/return profile are anticipated to achieve its long-term investment rate of return goals and objectives.

The ASRS employs a dynamic strategic asset allocation study approach whose initiation and periodicity will primarily be a function of market dynamics. The strategic asset allocation is used to determine the long-term policy asset weights. Investment opportunities and asset classes are constantly evolving and developing, such that they may become attractive and suitable for institutional investment portfolios before the next scheduled policy review. Therefore, asset allocation reviews in addition to periodic studies are conducted as warranted or triennially, whichever is shorter.

The strategic asset allocation study may include, but not be limited to, the following:

- Discussion and analysis of existing and evolving asset classes and investment strategies.
- Evaluation of expected sources of investment returns, risk and diversification (quantitatively/qualitatively).
- Reviewing investment industry developments (academic and pragmatic).
- Utilization of quantitative tools (e.g., efficient frontier mean-variance optimization, risk budgeting) and evaluation of multiple scenarios.
- Reviewing and engaging discussions regarding capital market assumptions.
- Reviewing asset allocation policies from other public and non-public entities.

Refer to the ASRS Asset Allocation Policy Schematic.

REBALANCING

The ASRS has established and maintains an asset class rebalancing policy(s) which encompasses the guidelines and processes for identifying and determining potential courses of action precipitated by the ASRS asset class over/under weight deviations relative to its broad strategic asset allocation policy (SAAP), ASRS cash-flow needs and/or to take tactical positions between and within SAAP asset classes.

The frequency and magnitude of portfolio rebalancing is determined by the Investment Rebalancing Committee consisting of the Director, CIO, and IMD Asset Class Portfolio Managers. The CIO reports asset class rebalancing activities to the Director and, through the Director, to the Investment Committee and full Board.

Refer to the Strategic Investment Policy – Rebalancing.

VOTING OF PORTFOLIO PROXIES

The ASRS votes its ownership interest with an objective of maximizing the present value of its investment. Proxy voting for the ASRS internally-managed equity ("E") portfolios and those assigned to external U.S. and non-U.S. equity managers shall not be influenced or directed by political or social prerogatives that may diminish or impair the economic value of an investment.

The ASRS currently engages Institutional Shareholder Services (ISS) and employs its research and voting guidelines for the voting of proxies for the "E" portfolios. This process is not applicable to ASRS externally-managed equity portfolios.

The ASRS external equity managers use their discretion to vote their portfolio proxies; voting records are monitored for consistency with both the individual external manager's voting policy and the ISS proxy voting policy. External equity manager voting records found to be inconsistent with or different from the ISS proxy voting policy are researched and documented. IMD retains the right to direct external equity managers' voting on any issue(s) if doing so is deemed beneficial to the Fund.

SECURITIES LITIGATION

The ASRS monitors and participates in securities litigations when appropriate to protect the ASRS interests. From time to time, class action lawsuits are brought against companies, their directors, and/or their officers, as well as third parties such as the companies' independent public accountants, for alleged violations of federal and state securities laws relating to various disclosure obligations and breaches of fiduciary or other duties. As a shareholder or bondholder, the ASRS may join or initiate a securities class action or pursue a private action when securities fraud and other acts of wrongdoing have taken place.

Monitoring and reporting is carried out by the ASRS contracted outside counsel who may make recommendations to the ASRS and depending on the merits of the recommendation are discussed by the Securities Litigations Oversight Committee (SLOC). In the event the SLOC recommends the ASRS consider pursuing lead plaintiff or private action, Board approval is required before such action can be taken.

Refer to the Strategic Investment Policy – Securities Litigation.

SECURITIES LENDING

The ASRS is allowed to lend securities with either the custody bank or tri-party in a separate account or commingled security lending structure. The IMD will determine the ASRS securities lending program parameters (risk profile, aggregate lending balance, types of securities on loan, collateral requirements, etc.). The ASRS securities lending program primarily focuses on identifying loan intrinsic value.

MANAGEMENT OF INVESTMENT MANAGEMENT FEES (COST)

The ASRS strives to maintain an efficient and relatively low aggregate investment management fee structure. The ASRS internally-manage public market portfolios are managed to provide beta-like market returns with low management fees (approx 1 bps); external public and private portfolios are anticipated to generally provide alpha, take active risk and enable the ASRS the ability to access market capital opportunities which may not be available through ASRS internal investment program.

To the extent possible, the ASRS negotiates and monitors investment fees for external public and private investment managers. For external public equity managers, securities-level transaction(s) cost analyses will be evaluated by IMD staff. Those managers whose transaction costs appear high relative to the market in which they trade or who use soft dollars may be subject to participation to the ASRS commission recapture program.

The ASRS IMD staff will oversee public manager portfolio transitions, e.g., securities from one public manager to another. These transactions may be executed on a security-level basis by either IMD staff or through an intermediary who may possess skills and/or can execute transactions on a more effective cost basis. Pre- and post-transaction cost analyses (commission, trading costs, market impact, etc.) are evaluated by the IMD staff.

ROLES & RESPONSIBILITIES

The ASRS Board governance structure provides the Investment Committee (IC) with general investment oversight responsibilities. In addition, the Directors' Asset Class Committees implement Board policies and provide detail oversight of the ASRS investments. Specific duties of the IC and Asset Class Committees are outlined in the ASRS Board Governance Policy Handbook.

Refer to the ASRS Board Governance Policy Handbook.

Arizona State Retirement System
Investment Beliefs

FRAME OF REFERENCE

The following *Investment Beliefs* have been established to ensure the development of congruent and synergistic investment strategies, and to ensure the effective and efficient allocation of resources. These *Investment Beliefs* determine the general paradigm within which investment strategies are developed, investment ideas are reviewed, and investment decisions are implemented.

Modifications to these *Investment Beliefs* will occur if experiential, academic, conceptual, and/or practical perspectives suggest that a superior belief system exists.

INVESTMENT BELIEFS

1. Asset Class Decisions are Key

In general, decisions with respect to which asset classes and sub-asset classes to invest in, and the allocations to these asset classes and sub-asset classes, have a greater impact on total fund investment returns than decisions in which specific securities to invest.

2. Theories and Concepts Must be Sound

Over longer periods of time, investment outcomes (e.g. rates of return, volatility) conform to logical theories and concepts. Significant deviations (e.g. internet bubble, pre-subprime erosion of risk premiums) from theoretically and conceptually sound investment constructs are usually not sustainable and are typically self-reverting.

3. House Capital Market Views Are Imperative

The development and articulation of sound *House Views* (e.g. views on interest rates, corporate spreads, asset valuations) will ensure consistency among investment decisions, clarity of investment direction, baselines for debates, and conformity of understanding.

4. Investment Strategies Must be Forward Looking

Investment strategies will be developed based on forward-looking insights, rather than simply on successful strategies of the past.

Asset class valuations and security valuations are significantly affected by endogenous outcomes (e.g. earnings, GDP growth rates, competitive barriers) that are probabilistic, and these outcomes are typically well analyzed by the investment industry.

Asset class valuations and security valuations are also significantly affected by random outcomes (e.g. natural disasters, certain supply & demand shocks) that are virtually unpredictable, and these outcomes are typically not analyzed directly by the investment industry.

Asset class valuations and security valuations are also significantly affected by exogenous outcomes (e.g. foreign policies, global cultural interactions) that can possibly be modeled, and these outcomes are typically not analyzed by the investment industry.

5. Public Markets are Generally Informationally Efficient

Asset Class Valuations

Asset class valuations (e.g. stock market levels versus interest rate levels) are often in equilibrium with one another, but anomalous situations do occur which result in disequilibria between asset class valuations. These disequilibria offer valuable investment opportunities which we will pro-actively seek and capitalize on.

Security Valuations

Security valuations (e.g. IBM versus Cisco) are often in equilibrium with one another, but private markets and anomalous public market situations do occur which result in disequilibria between security valuations. These disequilibria offer valuable investment opportunities which we will pro-actively seek and capitalize on.

The extent of informational efficiency varies across asset classes.

Private markets offer significant opportunities for asset mispricing and manager excellence which we will pro-actively seek and capitalize on.

6. Market Frictions are Highly Relevant

Market frictions (e.g. management fees, carried interest, revenue sharing, expenses, costs, transaction spreads, market impacts, taxes, commissions) can be significantly detrimental to investment performance and as a result transactions will be initiated only to the extent there is a strong level of conviction that they will result in increased investment returns or decreased risks net of all market frictions.

7. Internal Investment Professionals are the Foundation of a Successful Investment Program

In-house investment management capability engaged in direct portfolio management results in superior investment decision-making.

In-house investment management pro-actively monitors capital markets in order to determine mispricing opportunities & allocate capital and will successfully increase risk adjusted returns.

In-house investment professionals are more closely aligned with, and have a better understanding of, the purpose and risk & reward tolerance of the ASRS than external parties.

In-house investment professionals will impact direct investment negotiations, better align economic interests, and influence investment industry conditions (e.g. private deal structures, fee levels, introduction of innovative products & strategies).

8. External Investment Management is Beneficial

External investment organizations can often offer greater expertise, resources, and/or flexibility than internal personnel for various investment strategies.

9. Investment Consultants

Investment consultants will be effectively utilized in the following four general categories, and utilization of consultants will be focused on situations where there is a demonstrable need in at least one of the four areas:

- Independence: When oversight or controls should be enhanced
- Perspective: When internal perspectives are not broad enough
- Special Skills: When internal skills are not deep enough
- Resource Allocation: When internal resources are not broad enough

10. Trustee Expertise

Trustees often have expertise in various areas of investment management, and this expertise should be utilized while ensuring separation between Board oversight and staff management.