

Arizona State Retirement System

Global Tactical Asset Allocation (GTAA)

Asset Class Review

October 21, 2013

Gary R. Dokes, Chief Investment Officer, ASRS

Dave Underwood, Assistant Chief Investment Officer, ASRS

John Doran, Assistant Portfolio Manager, ASRS

Allan Martin, Partner, NEPC



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Evolution of ASRS GTAA Program:

- **The ASRS Tactical Asset Allocation (TAA) program was initiated in 1984, migrating to a Global TAA strategy in 2003 with the hiring of Goldman Sachs and Bridgewater Associates.**
- **In 2007, Goldman Sachs' \$1.4 billion mandate was terminated due to organizational, investment process and volatility of return concerns. Deutsche Bank Advisors (DB) was subsequently hired as a replacement manager.**
- **In 2010, the DB GTAA team left to start an independent investment management boutique, QS Investors (QSI), and the mandate migrated to QSI. The ASRS subsequently terminated QSI in 2011 as a result of the following concerns:**
 - QSI's separation from Deutsche Bank breaks an implicit commitment with analyst teams used as resources for qualitative inputs.
 - QSI's strategy appeared to be delivering a higher component of equity beta compared to other GTAA manager alpha strategies.
 - QSI's performance lead to concerns of increased business risk in the future.

Evolution of ASRS GTAA Program:

- **Windham Capital Management was hired in 2011 to replace QSI, with a mandate size of up to \$500 million.**
- **The ASRS modified the Bridgewater GTAA mandate in 2011.**
 - The account structure migrated from a separately managed portfolio to Bridgewater's Pure Alpha Strategy commingled investment vehicle.
 - Bridgewater's Pure Alpha Strategy provides ASRS with greater diversification benefits than the existing ASRS mandate, i.e., an increased opportunity set to include trading in emerging market debt and emerging market FX, and a smaller risk allocation for each trade is made within the fund.

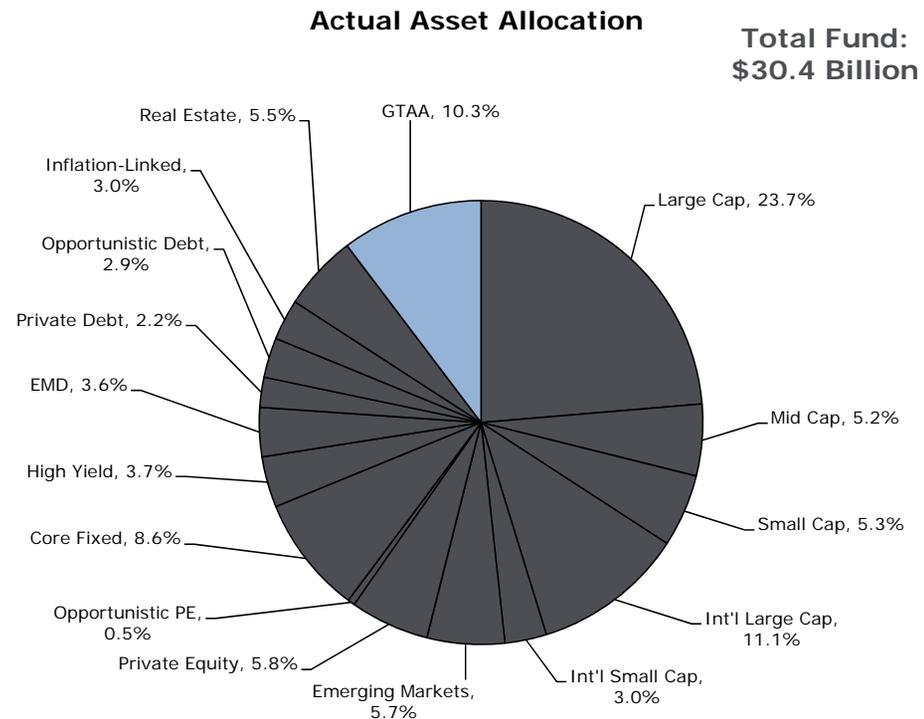
ASRS Perspectives of GTAA Asset Class

- **ASRS favors a more traditional GTAA approach based on the following beliefs and expectations:**
 - GTAA should provide the ASRS with a systematic framework for making macro-level tactical asset class investment decisions.
 - GTAA is viewed as an “alpha-generator” whose returns should primarily result from portfolio positioning in the economic beta asset classes in which the ASRS invests.
 - GTAA should require a demonstrated skill set in predicting the dispersion of longer-term asset class returns.
- **ASRS disfavors GTAA products in hedge fund structures due in part to high fee structure and portfolio transparency issues.**
- **The purpose of the ASRS GTAA program is:**
 - To allocate 10% +/- 5% of ASRS assets to alpha-generating strategies that provide diversification benefits relative to the ASRS SAA Policy by making global tactical asset class investments.
 - The GTAA mandate has a passively managed Custom Benchmark, or “beta” portion, which is made up of asset classes that are primarily part of the ASRS SAA Policy, and an alpha portion, which is expected to add value in both rising and falling markets through portfolio positioning relative to the beta portion.

- **Market Value: \$3.1 B**
 - Policy Target: 10% +/- 5%

- **Investment Managers**

- Bridgewater Associates
 - Inception: 12/31/2003
 - Portfolio: \$2.6 B
- Windham Capital
 - Inception: 9/30/2011
 - Portfolio: \$0.5 B



- **ASRS Custom GTAA Benchmark:**

- 50% S&P 500; 19% MSCI EAFE; 28% Barclays Capital U.S. Aggregate; 3% Dow Jones/UBS Commodities Index

Note: Domestic Equity, International Equity, Fixed Income, Real Estate and Commodities allocations exclude GTAA portfolios.

Arizona State Retirement System

GTAA Performance Summary

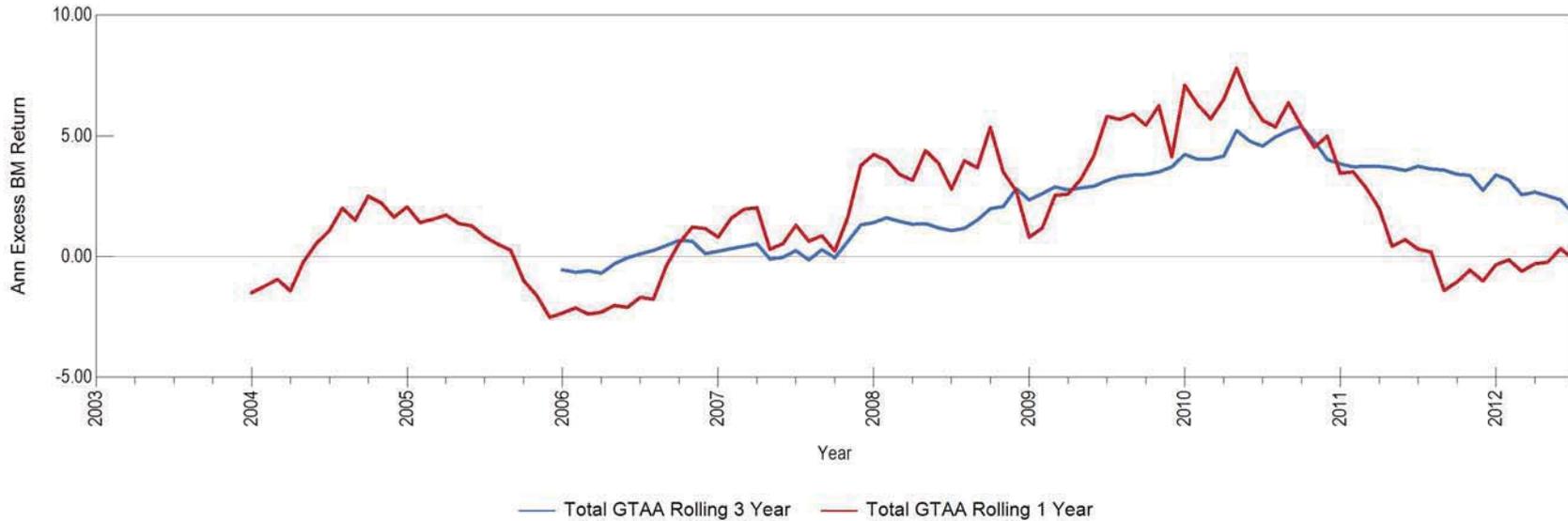
	Market Value (\$)	% of Portfolio	3 Mo (%)	Rank	6 Mo (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	10 Yrs (%)	Rank	Return (%)	Since
Total GTAA	3,138,706,276	10.3	-0.6	11	4.5	10	12.7	8	14.0	1	8.1	1	--	--	7.3	Jan-04
<i>ASRS Custom GTAA Benchmark</i>			<u>0.0</u>	4	<u>5.8</u>	7	<u>12.8</u>	8	<u>12.3</u>	2	<u>5.3</u>	17	<u>6.7</u>	63	<u>5.8</u>	<i>Jan-04</i>
<i>Over/Under</i>			-0.6		-1.3		-0.1		1.7		2.8				1.5	
<i>eA Global TAA Net Median</i>			-2.4		0.5		5.2		6.8		3.4		7.4		6.0	<i>Jan-04</i>
Bridgewater	2,616,819,792	8.6	-0.2	6	5.0	9	13.2	7	15.5	1	9.6	1	--	--	8.4	Jan-04
<i>ASRS Custom GTAA Benchmark</i>			<u>0.0</u>	4	<u>5.8</u>	7	<u>12.8</u>	8	<u>12.3</u>	2	<u>5.3</u>	17	<u>6.7</u>	63	<u>5.8</u>	<i>Jan-04</i>
<i>Over/Under</i>			-0.2		-0.8		0.4		3.2		4.3				2.6	
<i>eA Global TAA Net Median</i>			-2.4		0.5		5.2		6.8		3.4		7.4		6.0	<i>Jan-04</i>
Windham	521,886,484	1.7	-2.6	62	1.9	33	10.4	13	--	--	--	--	--	--	11.1	Oct-11
<i>Windham Custom GTAA Benchmark</i>			<u>-0.1</u>	5	<u>5.8</u>	6	<u>12.7</u>	8	<u>12.6</u>	2	<u>5.2</u>	18	<u>7.0</u>	60	<u>15.6</u>	<i>Oct-11</i>
<i>Over/Under</i>			-2.5		-3.9		-2.3								-4.5	
<i>eA Global TAA Net Median</i>			-2.4		0.5		5.2		6.8		3.4		7.4		7.7	<i>Oct-11</i>

Note: Performance, ranks and medians are reported net of fees.

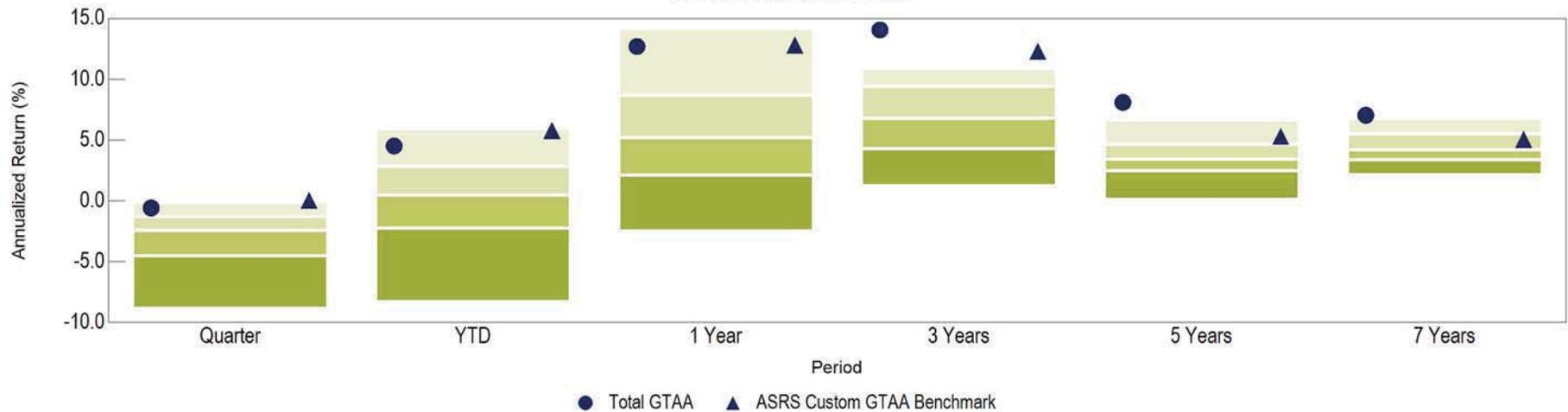
Rankings are from highest (1) to lowest (100) in the eVestment Alliance Universe.

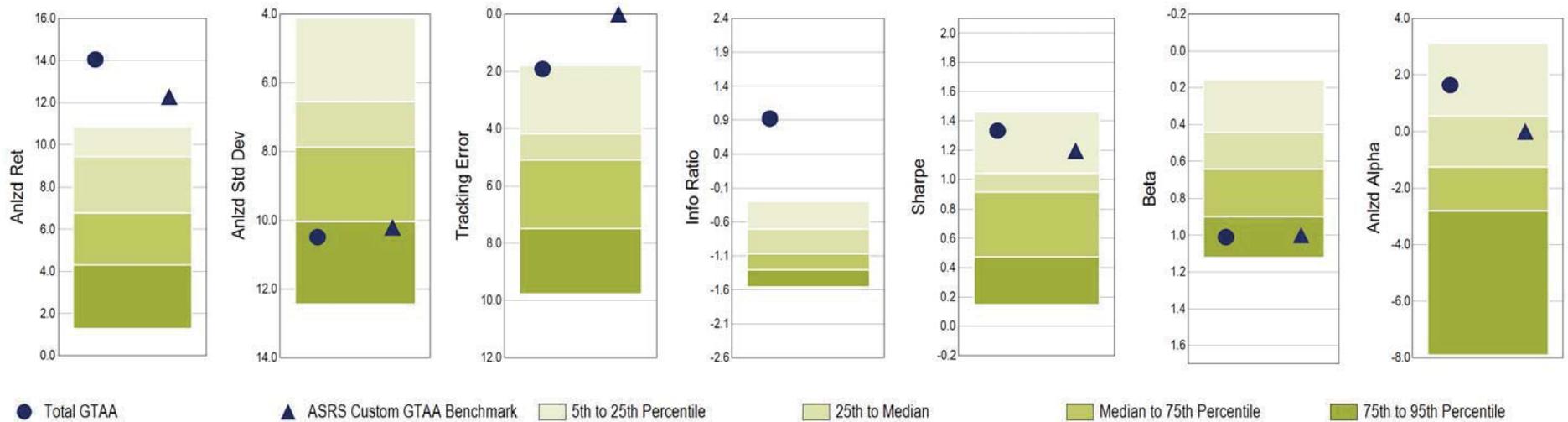
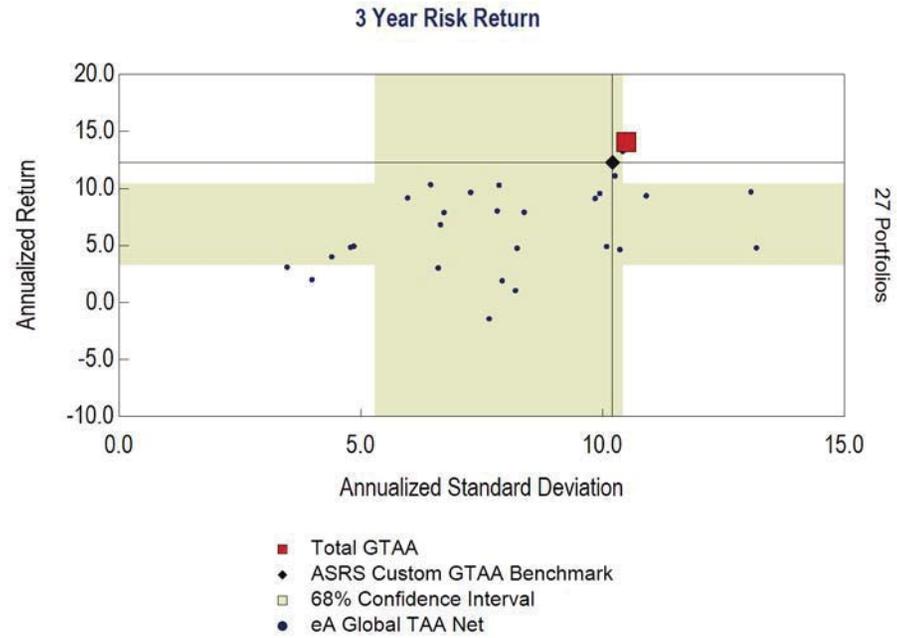
Composition of ASRS Custom GTAA Benchmark and Windham Custom GTAA Benchmark can be found in the appendix.

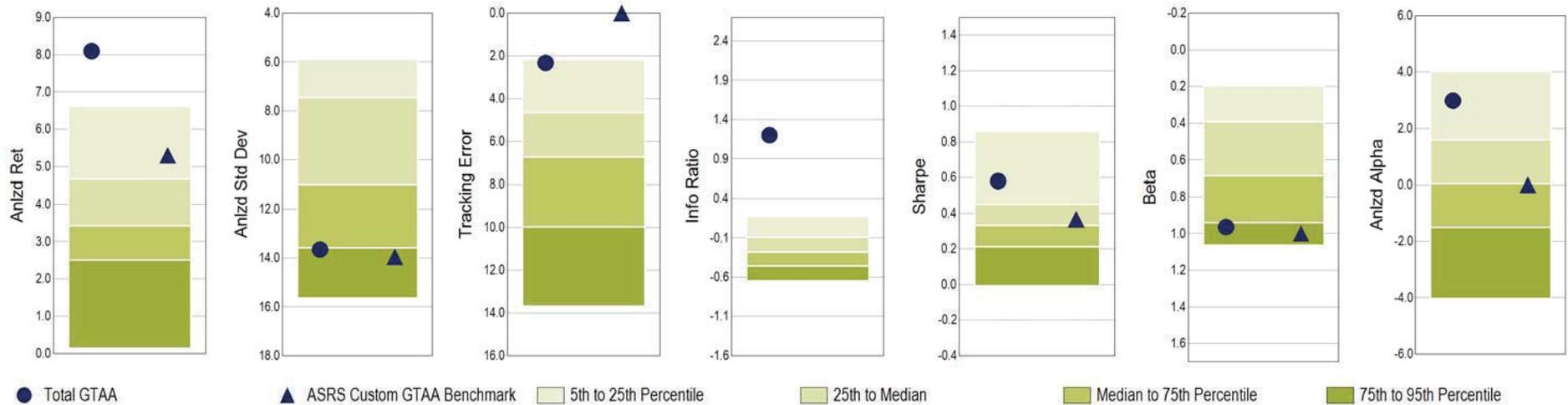
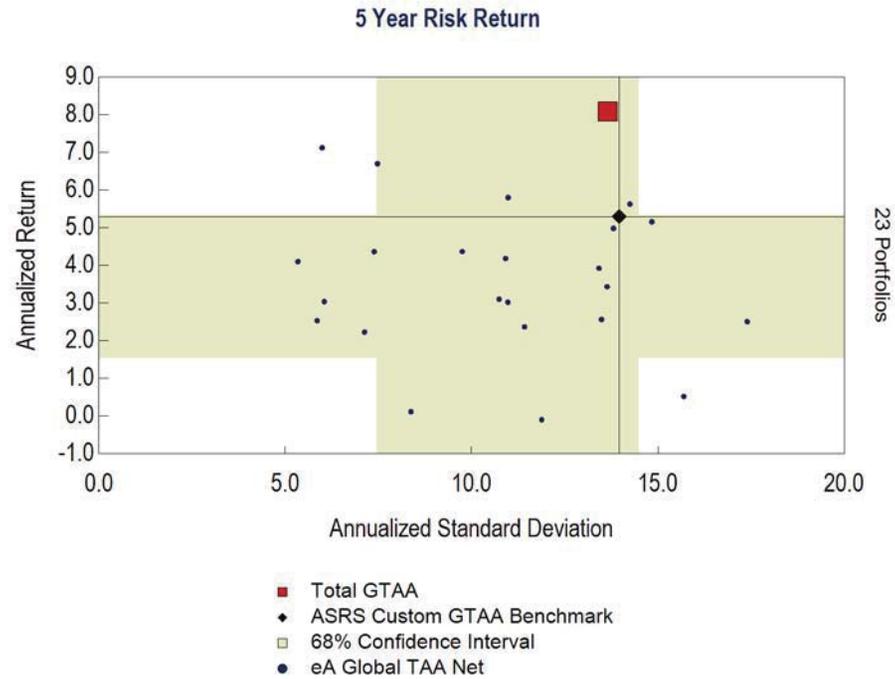
Rolling Annual Excess Benchmark Return



eA Global TAA Net Accounts







GTAA Performance as of August 31, 2013

Arizona State Retirement System
Investment Management Division

ASRS Pension and HBS Assets
Public Securities Markets
Investment Managers Performance Summary

Period Ending August 31, 2013

(Final)

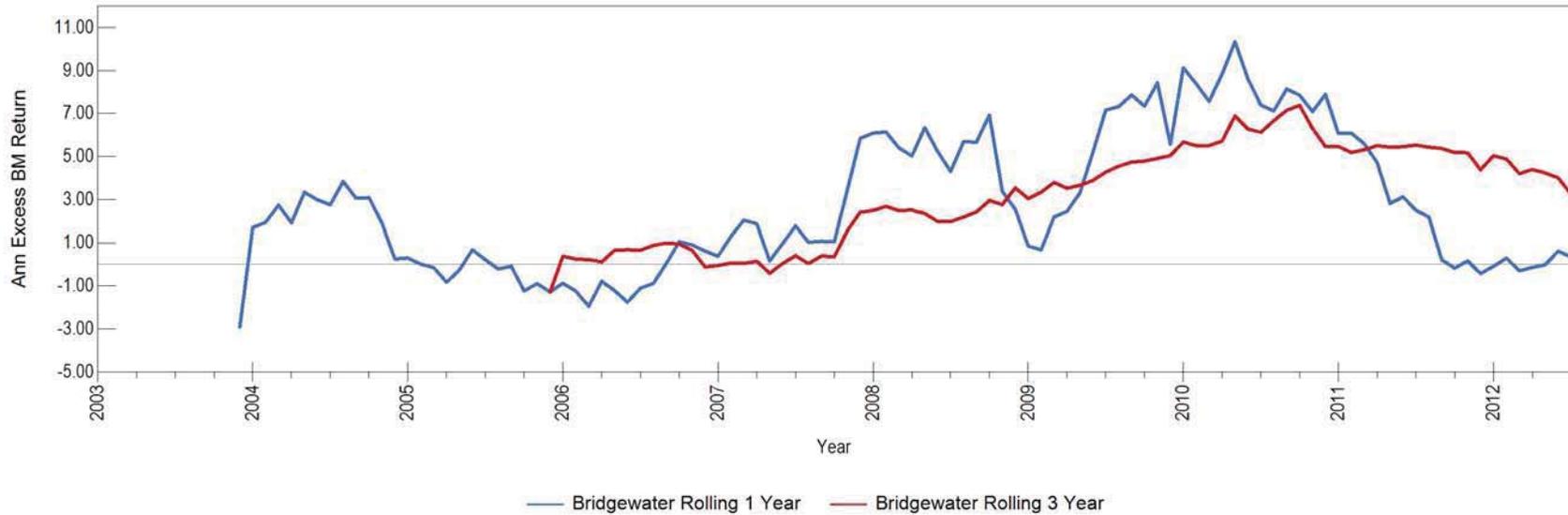
	Style	Inception	Amount (\$mil.)	Net Returns (%)								Excess Returns (basis points)									
				Month	3 Months	YTD	1 Year	Annualized			Inception	Month	3 Months	YTD	1 Year	Annualized			Inception		
								3 Years	5 Years	10 Years						3 Years	5 Years	10 Years			
GLOBAL TAA																					
Bridgewater: CT (Active)	Fundamental	12/31/03	2,695.3	-1.52	-0.03	8.05	12.14	14.88	10.42	--	8.42	6	12	18	76	295	459	--	256		
	Custom Benchmark			-1.58	-0.16	7.87	11.38	11.93	5.83	--	--										
Windham: MA (Active)	Quantitative	09/30/11	529.6	-1.82	-1.39	3.31	8.77	--	--	--	10.83	16	-61	-396	-187	--	--	--	-416		
	Custom Benchmark			-1.98	-0.78	7.27	10.63	--	--	--	--										
	Total Global TAA		3,224.9																		

Bridgewater Associates, LP:

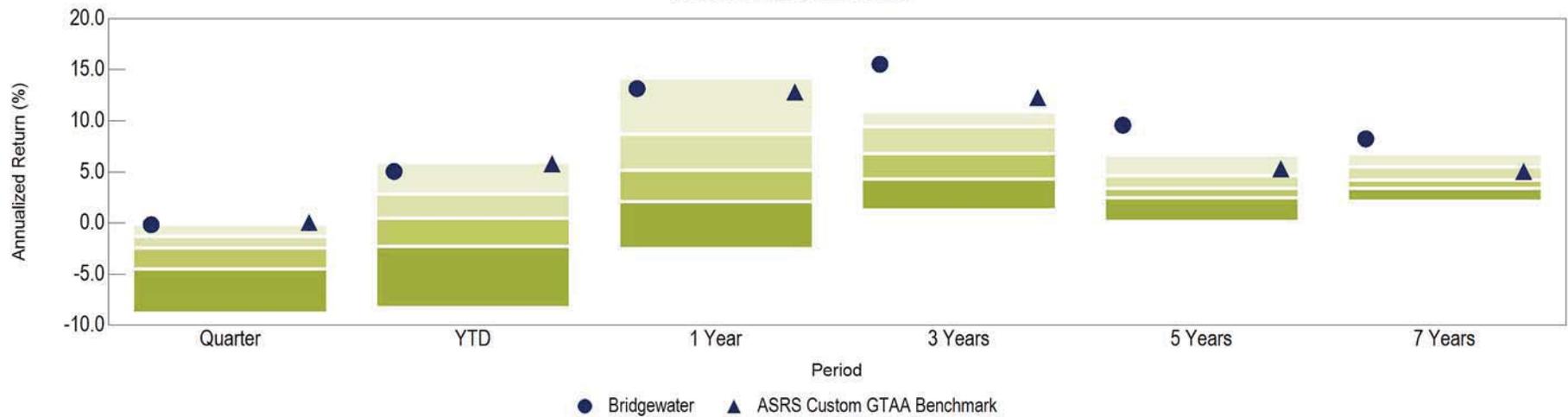
- Portfolio Profile
- Portfolio Performance
- Portfolio Risk/Return
- Portfolio "Winning Percentage"
- Performance Attribution
- Key Positions as of 9/30/2013

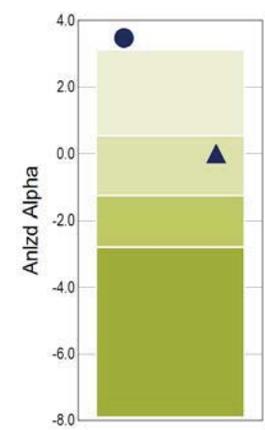
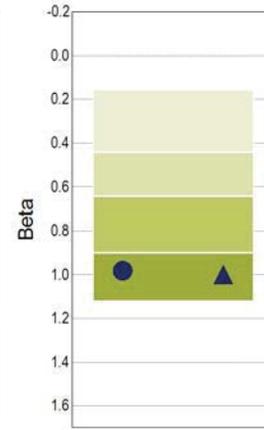
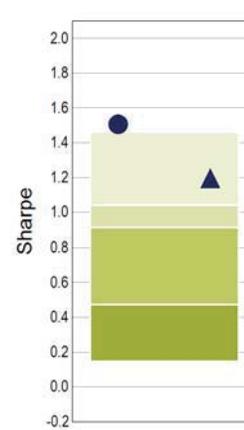
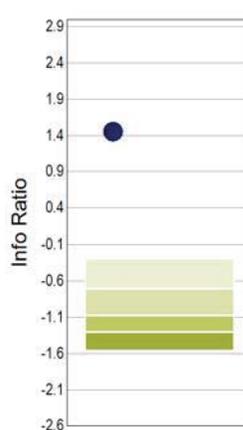
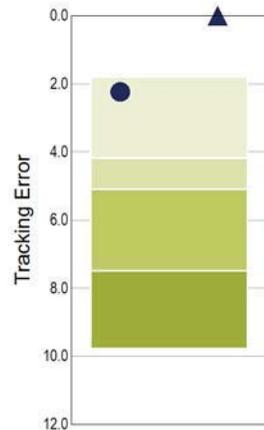
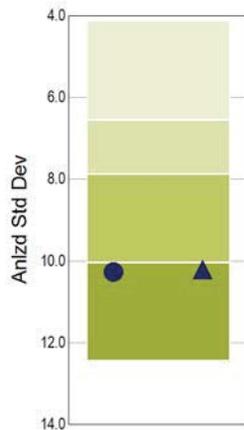
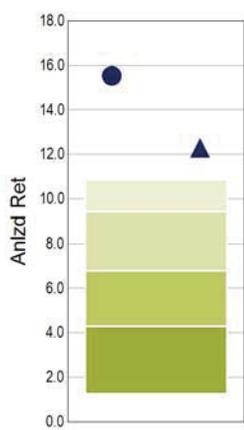
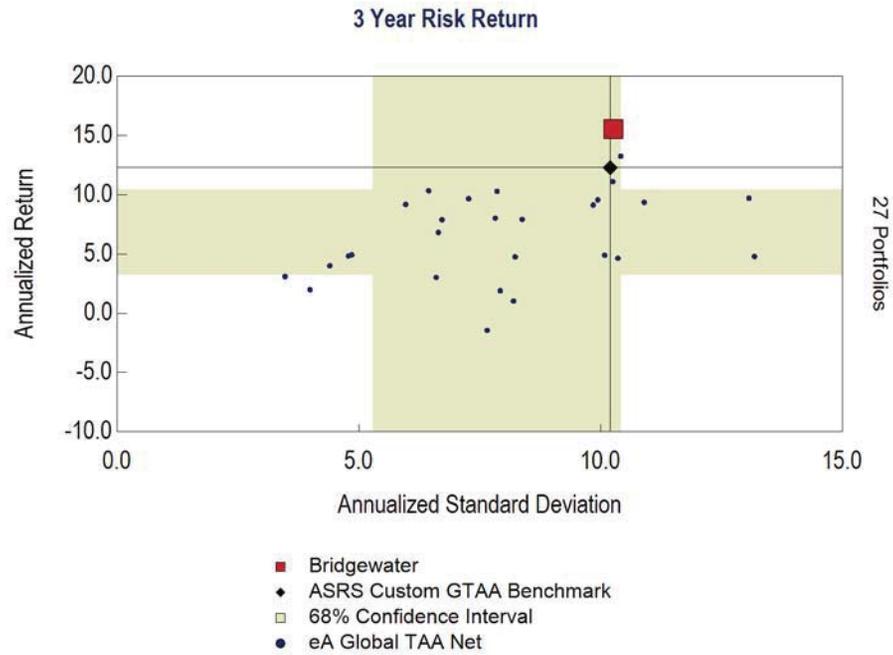
Portfolio Size	\$2.6 Billion
Expected Excess Return	3.75%
Expected Tracking Error (Active Risk)	3.75%
Expected Information Ratio	1.00
Management Fees	35bps on the first \$1,437,000,000 85bps thereafter
Portfolio Structure	3.75% Alpha Return Overlay on ASRS GTAA Custom Benchmark
Investment Process	Fundamental
<p>Bridgewater's Pure Alpha Strategy is a global active investment strategy with the goal of generating high risk-adjusted returns without any bias to the performance of markets or other active managers. The strategy is structured around Bridgewater's fixed income, equity, currency, commodity, and credit trading strategies, which are the products of over 35 years of accumulated research into the fundamental drivers of global asset returns. Bridgewater implements their understanding of these drivers of markets systematically across 100+ markets, and then builds a diversified portfolio of positions such that no source of value added will have a disproportionate impact on total portfolio's return and risk.</p>	

Rolling Annual Excess Benchmark Return

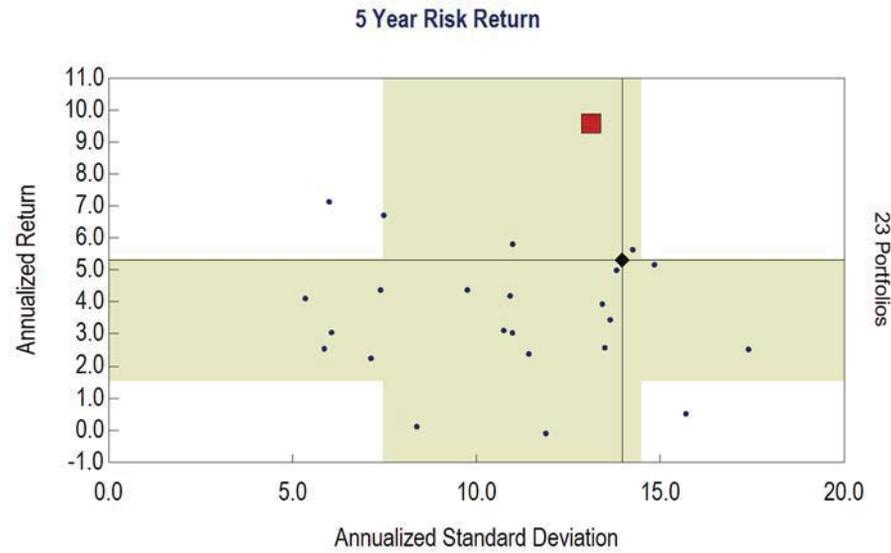


eA Global TAA Net Accounts

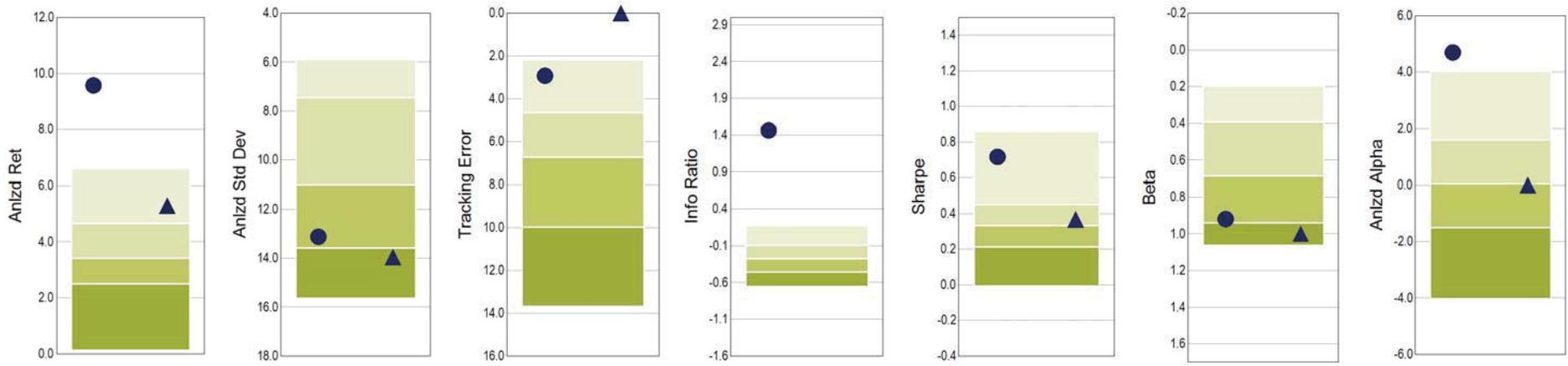




● Bridgewater ▲ ASRS Custom GTAA Benchmark □ 5th to 25th Percentile □ 25th to Median □ Median to 75th Percentile □ 75th to 95th Percentile



- Bridgewater
- ◆ ASRS Custom GTAA Benchmark
- 68% Confidence Interval
- eA Global TAA Net



- Bridgewater
- ▲ ASRS Custom GTAA Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Portfolio Performance as of June 30, 2013:

Arizona State Retirement System
Gross of Fees Performance Summary Table

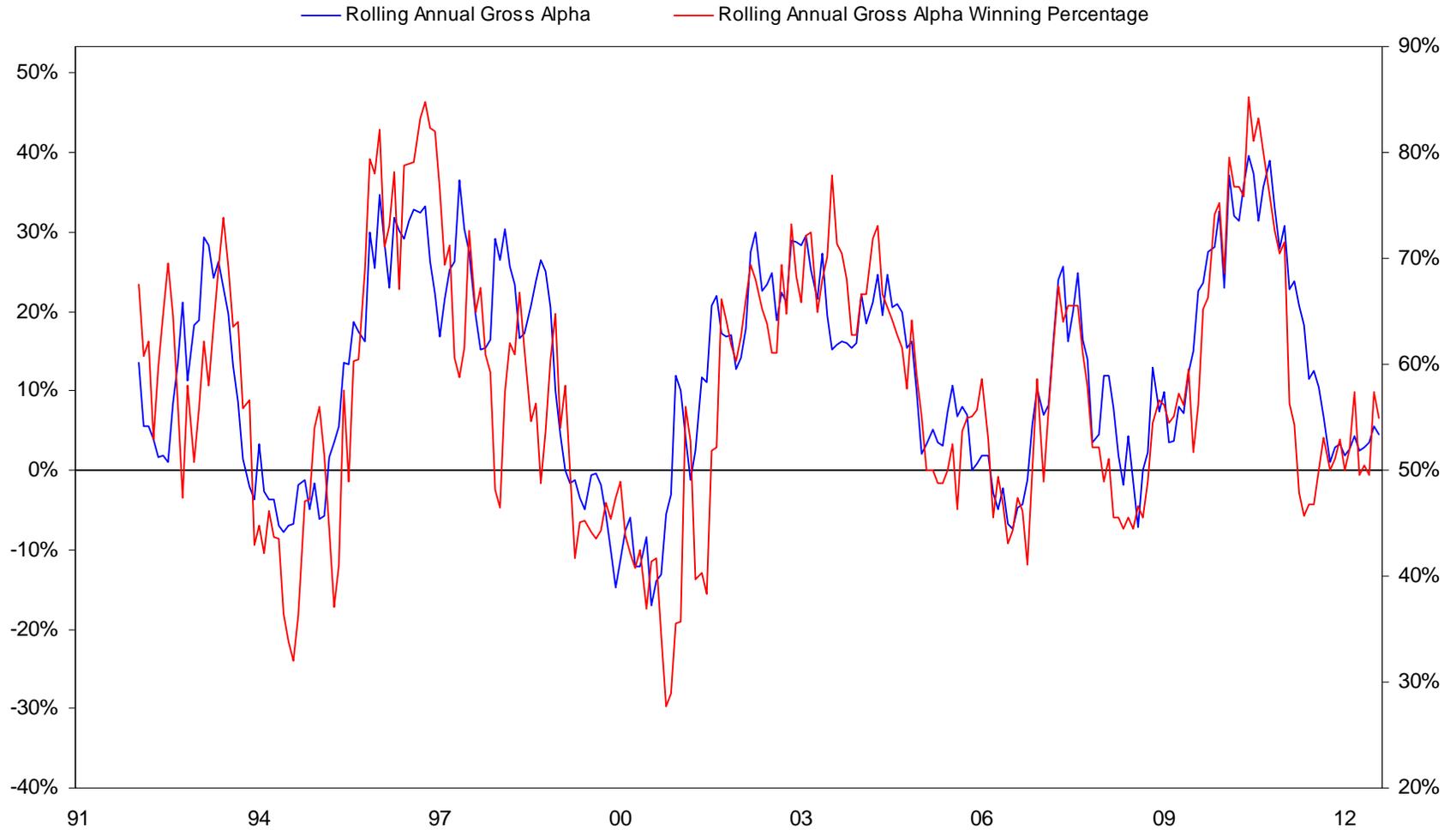
	Total Return	- Official Benchmark Return	= Alpha
2004	12.26 %	10.59 %	1.67 %
2005	6.09 %	5.73 %	0.37 %
2006	13.20 %	14.20 %	- 1.00 %
2007	7.89 %	7.00 %	0.88 %
2008	- 21.37 %	- 27.87 %	6.50 %
2009	23.07 %	21.82 %	1.24 %
2010	21.73 %	12.05 %	9.68 %
2011	7.65 %	1.06 %	6.59 %
2012	13.65 %	13.11 %	0.54 %
2013 YTD	5.47 %	5.79 %	- 0.32 %
Inception	121.11 %	70.12 %	50.98 %
Annual Return	8.71 %	5.75 %	2.96 %

Arizona State Retirement System
Net of Fees Performance Summary Table

	Total Return	- Official Benchmark Return	= Alpha
2004	11.87 %	10.59 %	1.28 %
2005	5.73 %	5.73 %	- 0.00 %
2006	12.81 %	14.20 %	- 1.39 %
2007	7.41 %	7.00 %	0.40 %
2008	- 21.74 %	- 27.87 %	6.13 %
2009	22.59 %	21.82 %	0.77 %
2010	21.16 %	12.05 %	9.11 %
2011	7.08 %	1.06 %	6.02 %
2012	13.04 %	13.11 %	- 0.07 %
2013 YTD	5.18 %	5.79 %	- 0.61 %
Inception	112.07 %	70.12 %	41.95 %
Annual Return	8.23 %	5.75 %	2.48 %

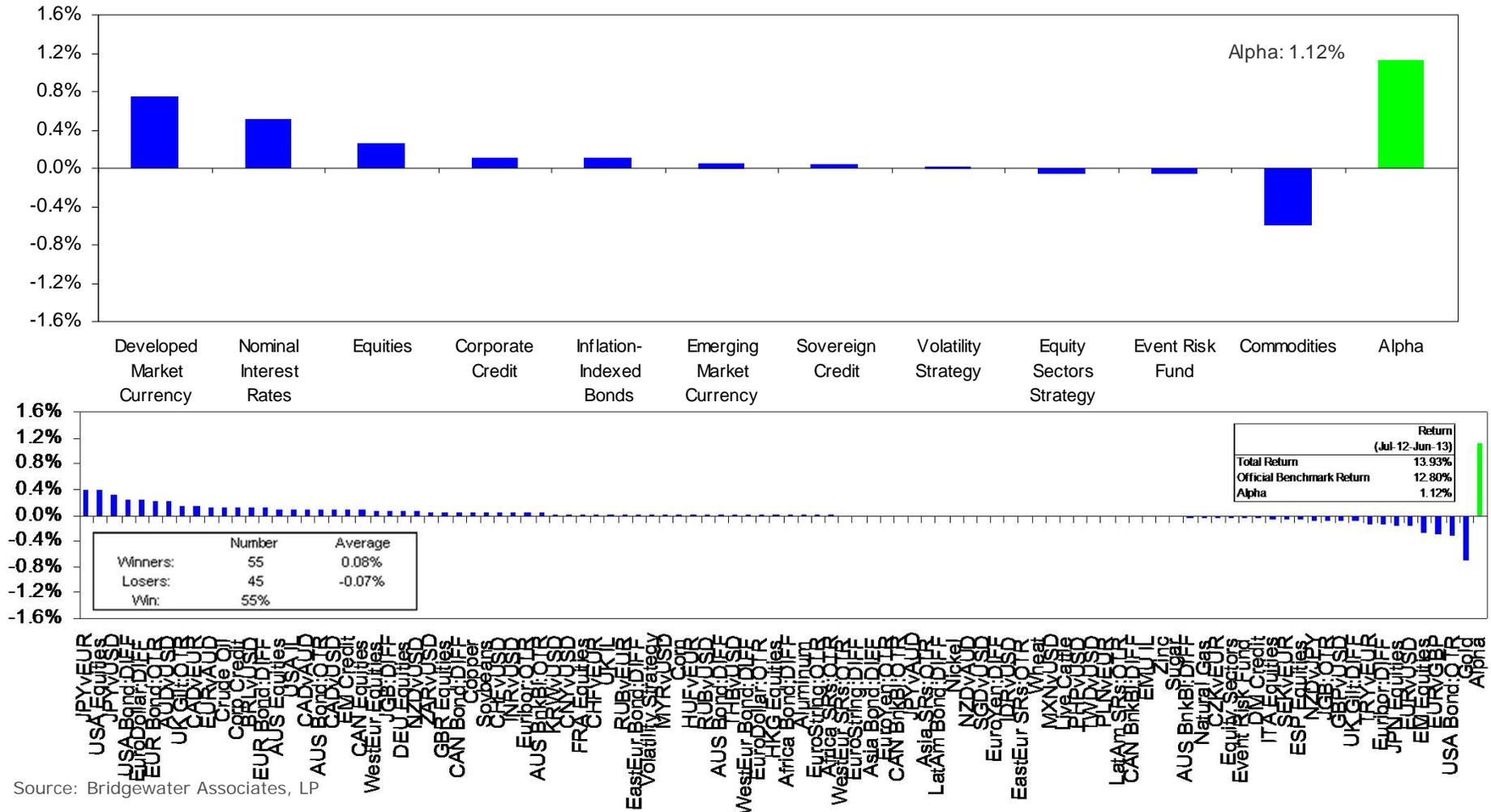
Note: Inception of the mandate was January 2004. Performance is estimated through June 30, 2013.
 Effective March 2007, concurrent with the expansion of the account's leeway, the target tracking error of the mandate was decreased from 4.00% to 3.75%.
 PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS. Performance shown for Arizona's Pure Alpha mandate (4% tracking error before March 2007, 3.75% tracking error thereafter).
 Source: Bridgewater Associates, LP

Portfolio Winning Percentage through June 30, 2013:



GTAA Manager Analysis - Bridgewater

Performance Attribution/Alpha – 1 Year Ending June 30, 2013:



Source: Bridgewater Associates, LP

Note: The attribution charts shown are based upon the gross of fees returns of the above-referenced account, as managed by Bridgewater. Performance is estimated for the periods referenced. Where shown, gross of fees returns will be reduced by the investment advisory fees and any other expenses that may be incurred in the management of the account or investment. Attribution is based on Bridgewater analysis. PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS. No part of this material may be (i) copied, photocopied or duplicated in any form by any means or (ii) redistributed without the prior written consent of Bridgewater Associates, LP.

Bridgewater Key Positions as of September 30, 2013

		← Bearish			Bullish →			
		Strongly Bearish	Moderately Bearish	Slightly Bearish	Neutral	Slightly Bullish	Moderately Bullish	Strongly Bullish
Currencies	US Dollar							
	Euro							
	Japanese Yen							
	Pound Sterling							
	Australian Dollar							
	Canadian Dollar							
	Swiss Franc							
	Brazilian Real							
	Indian Rupee							
	Korean Won							
	Mexican Peso							
	Russian Ruble							
	Short Rates	USA						
Japan								
Euroland								
UK								
Australia								
Canada								
Bonds	USA							
	Japan							
	Euroland							
	UK							
	Australia							
Equities	World							
Commodities	Copper							
	Oil							
	Gold							
Credit	Developed Corporate							
	Emerging Sovereign							

Windham Capital Management:

- Firm Strategy and Profile
- Portfolio Performance
- Portfolio Risk/Return
- Recent Portfolio Changes
 - October 1, 2013
 - June 21, 2013
- Windham Investment Risk Cycle

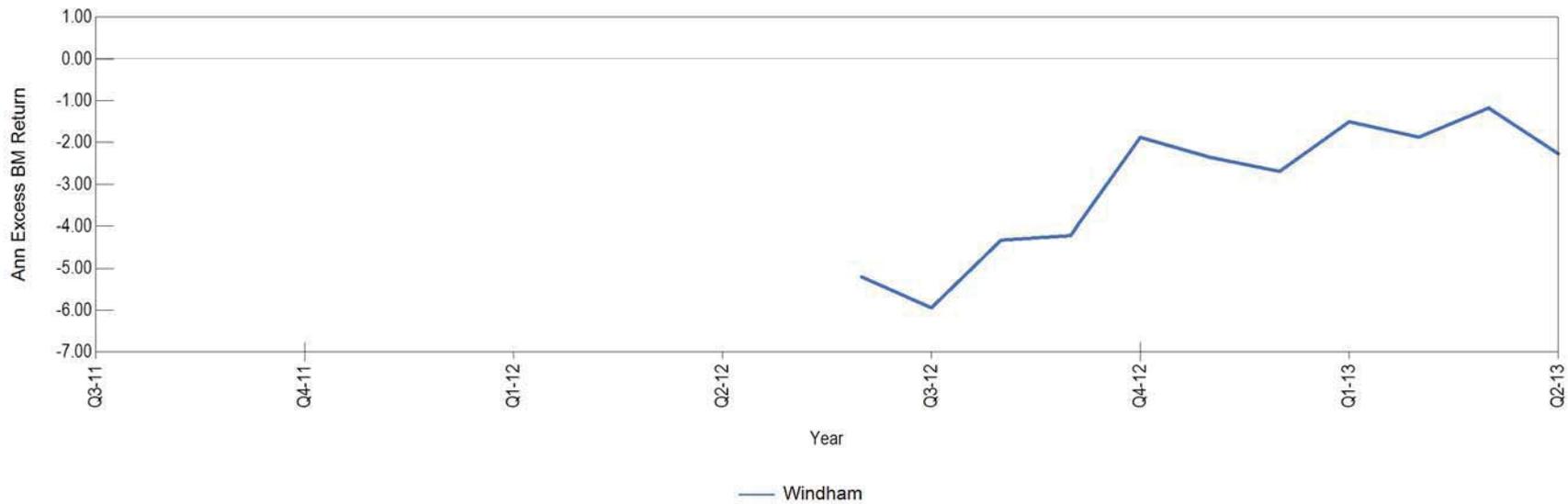
Firm and Strategy Profile:

- **Founded by Mark Kritzman in 1988.**
- **Windham actively manages a portfolio of exchange-traded funds (ETFs) to exploit return opportunities across asset classes while seeking to protect against downside risk using proprietary (quantitative) risk indicators to detect and anticipate when markets are calm, fragile or turbulent.**
- **Primary Risk measures – financial turbulence and systemic risk.**
 - Financial Turbulence measures the statistical unusualness of a set of returns given their historical pattern behavior.
 - Systemic Risk is measured through a statistic called the absorption ratio, which equals the fraction of market variability that is explained by a subset of the most important factors.

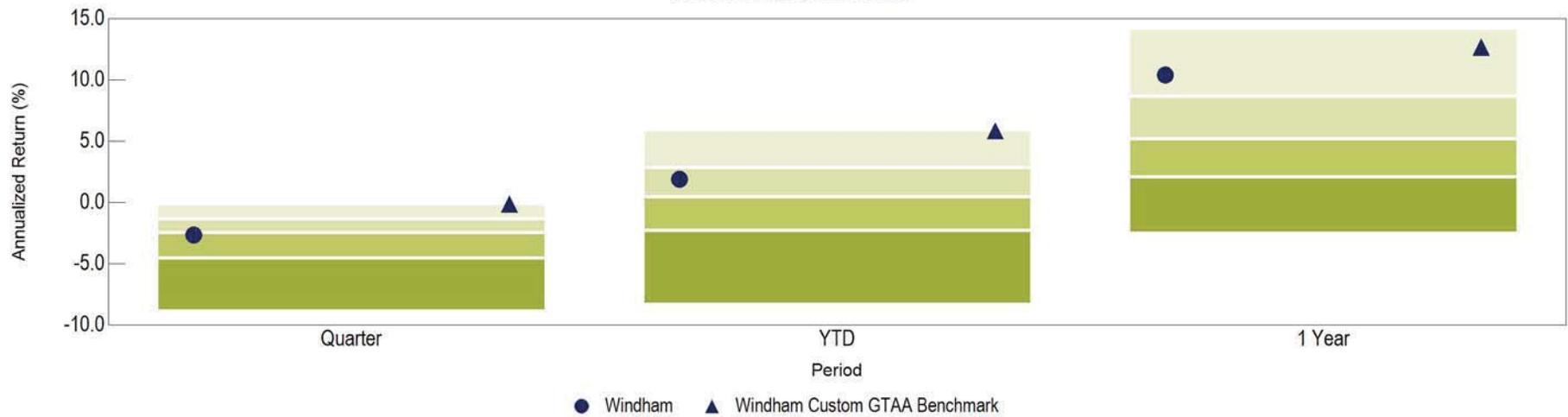
Firm and Strategy Profile (continued):

- **Investment merits and other rationale for selecting Windham Capital Management include:**
 - Strategy is innovative, logical and employs a scientific, unbiased approach to decision making processes.
 - Use of ETFs to access beta exposure provides greater portfolio transparency/liquidity, and is scalable.
 - The Windham investment process is consistent with ASRS Investment Beliefs.
 - Experienced management team with direct relationships with MIT, Government of Singapore Investment Corporation, State Street Associates, Institute for Quantitative Research in Finance, NEPC.
 - Favorable management fee structure compared to other GTAA strategies.
 - Strategy and investment process differs, provides diversification and complements Bridgewater's.

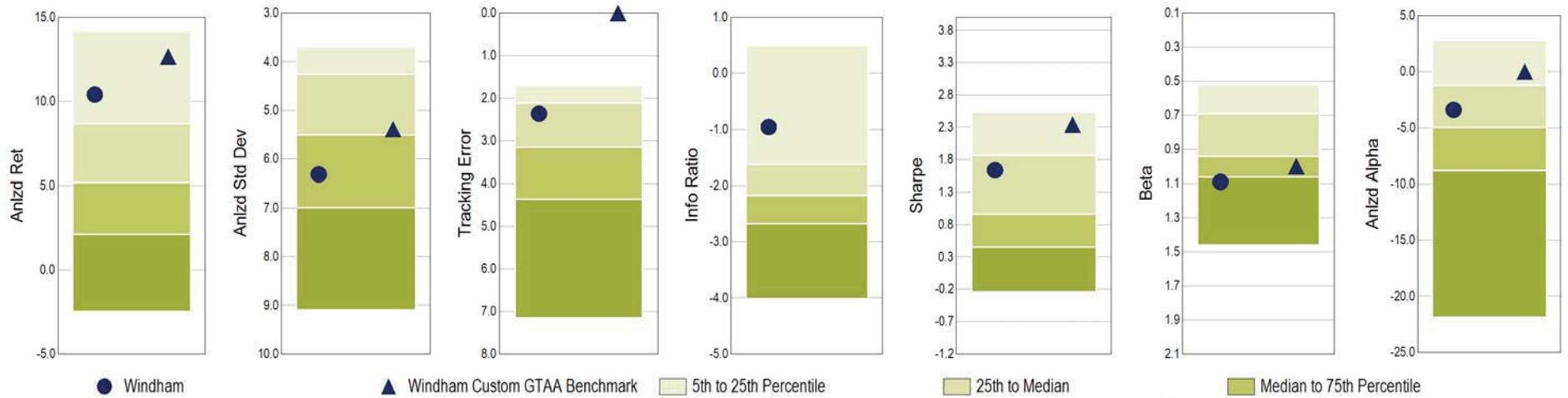
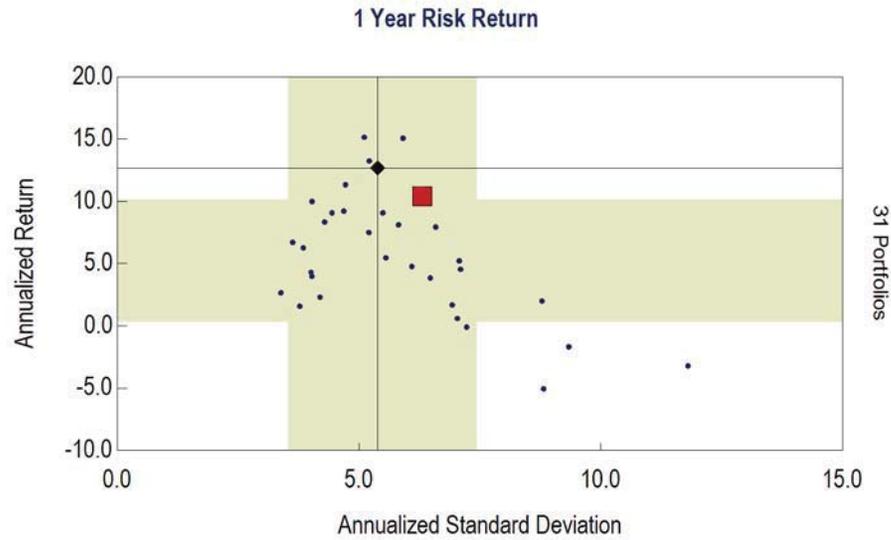
Rolling 1 Year Annual Excess Benchmark Return



eA Global TAA Net Accounts



GTAA Manager Analysis - Windham



Portfolio Change – October 1st, 2013

10/1/2013		Domestic Equities	Foreign Equities	Real Estate	Commodities	Fixed Income
Trade #9						
Tactical Trade	Portfolio	30.02%	36.05%	6.50%	8.50%	18.93%
	ASRS BM	40.00%	23.00%	8.00%	4.00%	25.00%
	Difference	-9.98%	+13.05%	-1.50%	+4.50%	-6.07%
Turbulence	High	Moderate	Low	High	Moderate	Low
Systemic Risk	High	High	High	Low	Low	Low

Low Portfolio Risk Profile ←————→ High Portfolio Risk Profile

- On October 1st, 2013, the Windham Portfolio increased its allocation to risky assets due to a decrease in the firm’s measure of Financial Turbulence.**

 - The portfolio’s risk exposure is currently above the benchmark.
- Financial Turbulence captures the unusualness of asset class returns, measuring the significance of price movements and the interaction between asset classes.**

 - Current signals indicate the behavior of asset classes is “less volatile”, i.e. a more favorable environment for risk taking.
 - Should the Financial Turbulence figure decline, Windham will continue to increase its exposure to risky assets.
- Systematic Risk Index, which measures the likelihood of a global sell-off due to unforeseen shocks, remains low.**

 - Should the Systematic Risk Index rise, Windham would decrease its exposure to risky assets.

Source: Windham Capital Management

Portfolio Change – June 21st, 2013

6/21/2013		Domestic Equities	Foreign Equities	Real Estate	Commodities	Fixed Income
Trade #8						
<i>Tactical Trade</i>	Portfolio	30.04%	29.52%	5.51%	7.50%	27.43%
	ASRS BM	40.00%	23.00%	8.00%	4.00%	25.00%
	Difference	-9.96%	+6.52%	-2.49%	+3.50%	+2.43%
Turbulence	High	Moderate	Low	High	Moderate	Low
Systemic Risk	High	High	High	Low	Low	Low

Low Portfolio Risk Profile ←————→ High Portfolio Risk Profile

- On June 21st, 2013, the Windham Portfolio reduced its allocation to risky assets due to an increase in the firm’s measure of Financial Turbulence.**

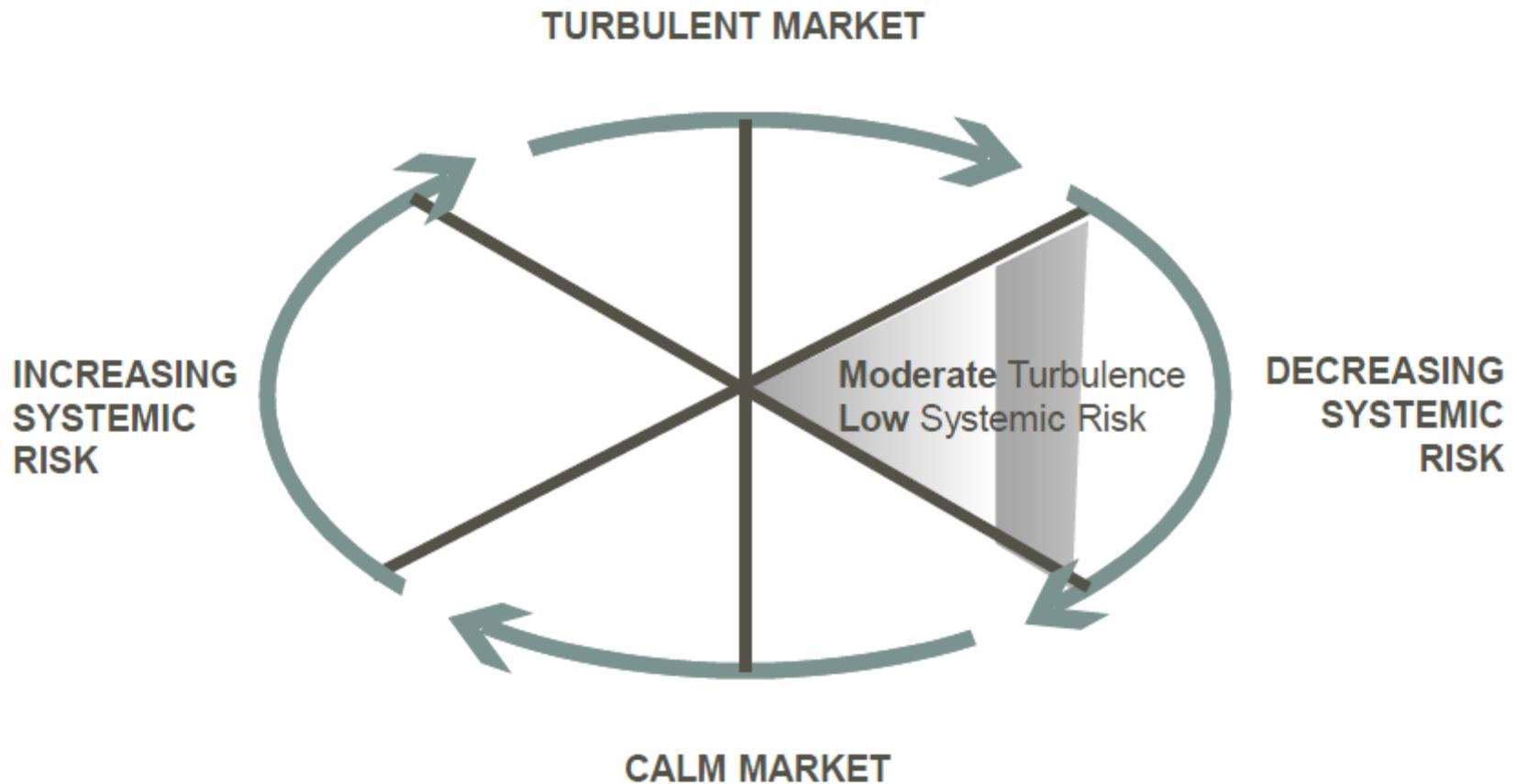
 - The portfolio’s risk exposure is currently in-line with the benchmark.
- Financial Turbulence captures the unusualness of asset class returns, measuring the significance of price movements and the interaction between asset classes.**

 - Current signals indicate the behavior of asset classes is “more unusual”, i.e. a less favorable environment for risk taking.
 - Should the Financial Turbulence figure decline, Windham will increase its exposure to risky assets.
- Systematic Risk Index, which measures the likelihood of a global sell-off due to unforeseen shocks, remains low.**

 - Should the Systematic Risk Index rise, Windham would decrease its exposure to risky assets.

Source: Windham Capital Management

Windham Investment Risk Cycle – Current Regime



Source: Windham Capital Management