

**INVESTMENT SUMMARY:**  
***QUARTER ENDING DECEMBER 31, 2017***



**DALLAS POLICE & FIRE  
PENSION SYSTEM**

**March 8, 2018**

**Rhett Humphreys, CFA, Partner**

**Keith Stronkowsky, CFA, Senior Consultant**



BOSTON | ATLANTA | CHARLOTTE | CHICAGO | DETROIT | LAS VEGAS | PORTLAND | SAN FRANCISCO

# **Q4 2017 PERFORMANCE & ASSET ALLOCATION**

NEPC, LLC

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# INDEX PERFORMANCE SUMMARY AS OF 12/31/2017

	2010	2011	2012	2013	2014	2015	2016	Q1	Q2	Q3	Oct	Nov	Dec	Q4	YTD
<b>MSCI EM</b>	18.9%	-18.4%	18.2%	-2.6%	-2.2%	-14.9%	11.2%	11.4%	6.3%	7.9%	3.5%	0.2%	3.6%	7.4%	37.3%
<b>MSCI EAFE</b>	7.8%	-12.1%	17.3%	22.8%	-4.9%	-0.8%	1.0%	7.2%	6.1%	5.4%	1.5%	1.0%	1.6%	4.2%	25.0%
<b>MSCI ACWI</b>	12.7%	-7.3%	16.1%	22.8%	4.2%	-2.4%	7.9%	6.9%	4.3%	5.2%	2.1%	1.9%	1.6%	5.7%	24.0%
<b>S&amp;P 500</b>	15.1%	2.1%	16.0%	32.4%	13.7%	1.4%	12.0%	6.1%	3.1%	4.5%	2.3%	3.1%	1.1%	6.6%	21.8%
<b>Russell 1000</b>	16.1%	1.5%	16.4%	33.1%	13.2%	0.9%	12.1%	6.0%	3.1%	4.5%	2.3%	3.0%	1.1%	6.6%	21.7%
<b>Russell 2500</b>	26.7%	-2.5%	17.9%	36.8%	7.1%	-2.9%	17.6%	3.8%	2.1%	4.7%	1.5%	3.3%	0.3%	5.2%	16.8%
<b>JPM GBI-EM Glob Div</b>	15.7%	-1.8%	16.8%	-9.0%	-5.7%	-14.9%	9.9%	6.5%	3.6%	3.6%	-2.8%	1.7%	2.0%	0.8%	15.2%
<b>Russell 2000</b>	26.9%	-4.2%	16.3%	38.8%	4.9%	-4.4%	21.3%	2.5%	2.5%	5.7%	0.9%	2.9%	-0.4%	3.3%	14.6%
<b>BC US STRIPS 20+ Yr</b>	10.9%	58.5%	3.0%	-21.0%	46.4%	-3.7%	1.4%	1.8%	6.1%	0.7%	0.1%	1.5%	2.8%	4.5%	13.7%
<b>BC US Long Credit</b>	10.7%	17.1%	12.7%	-6.6%	16.4%	-4.6%	10.2%	1.7%	4.7%	2.2%	0.7%	0.4%	2.0%	3.2%	12.2%
<b>BC US Govt/Cred Long</b>	10.2%	22.5%	8.8%	-8.8%	19.3%	-3.3%	6.7%	1.6%	4.4%	1.5%	0.4%	0.5%	1.9%	2.8%	10.7%
<b>JPM EMBI Glob Div</b>	12.2%	7.3%	17.4%	-5.3%	7.4%	1.2%	10.2%	3.9%	2.2%	2.6%	0.4%	0.1%	0.7%	1.2%	10.3%
<b>BC Muni High Yield</b>	7.8%	9.2%	18.1%	-5.5%	13.8%	1.8%	3.0%	4.1%	2.0%	1.5%	0.3%	0.3%	1.3%	1.8%	9.7%
<b>BC US Corporate HY</b>	15.1%	5.0%	15.8%	7.4%	2.5%	-4.5%	17.1%	2.7%	2.2%	2.0%	0.4%	-0.3%	0.3%	0.5%	7.5%
<b>BC Global Agg</b>	-5.3%	-5.3%	-4.1%	2.7%	-0.6%	3.3%	2.1%	1.8%	2.6%	1.8%	-0.4%	1.1%	0.3%	1.1%	7.4%
<b>CS Hedge Fund</b>	10.9%	-2.5%	7.7%	9.7%	4.1%	-0.7%	1.2%	2.1%	0.8%	1.8%	1.3%	0.1%	-	1.4%	6.2%
<b>BC Municipal</b>	2.4%	10.7%	6.8%	-2.6%	9.1%	3.3%	0.2%	1.6%	2.0%	1.1%	0.2%	-0.5%	1.0%	0.7%	5.4%
<b>FTSE NAREIT Eqy REITs</b>	28.0%	8.3%	18.1%	2.5%	30.1%	3.2%	8.5%	1.2%	1.5%	0.9%	-1.0%	2.7%	-0.2%	1.5%	5.2%
<b>CS Leveraged Loan</b>	10.0%	1.8%	9.4%	6.2%	2.1%	-0.4%	9.9%	1.2%	0.8%	1.1%	0.7%	0.1%	0.4%	1.2%	4.2%
<b>BC US Agg Bond</b>	6.5%	7.8%	4.2%	-2.0%	6.0%	0.5%	2.6%	0.8%	1.4%	0.8%	0.1%	-0.1%	0.5%	0.4%	3.5%
<b>BC TIPS</b>	6.3%	13.6%	7.0%	-8.6%	3.6%	-1.4%	4.7%	1.3%	-0.4%	0.9%	0.2%	0.1%	0.9%	1.3%	3.0%
<b>BBG Commodity</b>	16.8%	-13.3%	-1.1%	-9.5%	-17.0%	-24.7%	11.8%	-2.3%	-3.2%	2.5%	2.1%	-0.5%	3.0%	4.7%	1.7%
<b>BC US Govt/Cred 1-3</b>	2.8%	1.6%	1.3%	0.6%	0.8%	0.7%	1.3%	0.4%	0.3%	0.3%	0.0%	-0.2%	0.0%	-0.2%	0.8%
<b>Alerian MLP</b>	35.9%	13.9%	4.8%	27.6%	4.8%	-32.6%	18.3%	3.9%	-6.4%	-3.0%	-4.1%	-1.4%	4.7%	-0.9%	-6.5%

Source: Bloomberg, Barclays, Alerian, Nareit, MSCI, JP Morgan, Credit Suisse



# TRAILING RETURNS: BY BROAD COMPOSITE

	Market Value (\$)	% of Portfolio	3 Mo (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	7 Yrs (%)	Rank	10 Yrs (%)	Rank	Return (%)	Since
<b>DPPF</b>	<b>2,099,918,772</b>	<b>100.0</b>	<b>1.2</b>	<b>99</b>	<b>5.1</b>	<b>99</b>	<b>-1.8</b>	<b>99</b>	<b>1.2</b>	<b>99</b>	<b>1.9</b>	<b>99</b>	<b>0.9</b>	<b>99</b>	<b>6.0</b>	<b>Jun-96</b>
<i>Policy Index</i>			3.3	62	15.2	37	9.8	1	10.0	6	9.1	6	6.2	17	--	<i>Jun-96</i>
<b>Total Equity</b>	<b>710,171,843</b>	<b>33.8</b>	<b>3.8</b>	<b>--</b>	<b>-5.0</b>	<b>--</b>	<b>-1.3</b>	<b>--</b>	<b>4.6</b>	<b>--</b>	<b>4.6</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>4.6</b>	<b>Dec-10</b>
<i>Total Equity Policy Index</i>			6.3	--	26.8	--	--	--	--	--	--	--	--	--	--	<i>Dec-10</i>
<b>Total Fixed Income</b>	<b>340,069,071</b>	<b>16.2</b>	<b>0.6</b>	<b>69</b>	<b>3.7</b>	<b>91</b>	<b>2.6</b>	<b>65</b>	<b>3.1</b>	<b>46</b>	<b>5.4</b>	<b>21</b>	<b>5.1</b>	<b>40</b>	<b>5.7</b>	<b>Jul-06</b>
<i>Total Fixed Income Policy Index</i>			1.1	29	8.5	35	--	--	--	--	--	--	--	--	--	<i>Jul-06</i>
<b>Total Real Assets</b>	<b>788,167,344</b>	<b>37.5</b>	<b>-0.8</b>	<b>--</b>	<b>11.2</b>	<b>--</b>	<b>-5.7</b>	<b>--</b>	<b>-2.9</b>	<b>--</b>	<b>-2.8</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>-2.8</b>	<b>Dec-10</b>
<i>Total Real Assets Policy Index</i>			3.2	--	12.6	--	--	--	--	--	--	--	--	--	--	<i>Dec-10</i>
<b>Total GAA</b>	<b>144,927,028</b>	<b>6.9</b>	<b>3.8</b>	<b>31</b>	<b>8.4</b>	<b>81</b>	<b>5.3</b>	<b>44</b>	<b>4.8</b>	<b>56</b>	<b>5.7</b>	<b>53</b>	<b>4.1</b>	<b>61</b>	<b>4.2</b>	<b>Jul-07</b>
<i>Total GAA Policy Index</i>			3.1	55	14.2	48	8.1	11	7.3	29	7.4	19	7.1	9	7.2	<i>Jul-07</i>
<b>Cash Equivalents</b>	<b>116,583,486</b>	<b>5.6</b>	<b>0.2</b>	<b>--</b>	<b>0.9</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>1.0</b>	<b>Apr-15</b>
<i>91 Day T-Bills</i>			0.3	--	0.9	--	0.4	--	0.3	--	0.2	--	0.3	--	0.5	<i>Apr-15</i>

Policy Indexes are calculated using policy benchmarks and policy weights of the underlying sub composites.

Net of fees returns shown on report are time weighted.



# TRAILING RETURNS: BY ASSET CLASS

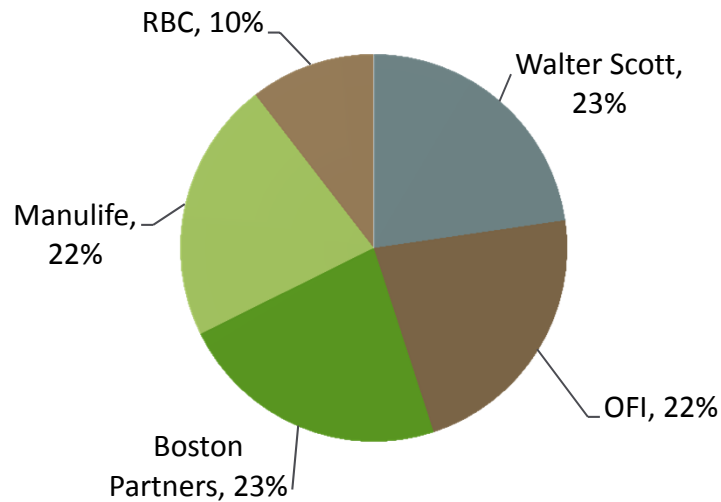
	Market Value (\$)	% of Portfolio	3 Mo (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	7 Yrs (%)	Rank	10 Yrs (%)	Rank	Return (%)	Since
<b>DPFP</b>	2,099,918,772	100.0	1.2	99	5.1	99	-1.8	99	1.2	99	1.9	99	0.9	99	6.0	Jun-96
<i>Policy Index</i>			3.3	62	15.2	37	9.8	1	10.0	6	9.1	6	6.2	17	--	Jun-96
<b>Global Equity</b>	430,846,971	20.5	5.7	37	27.3	25	10.6	28	11.9	42	9.6	50	5.5	49	6.7	Jul-06
<i>Global Equity Weighted Index</i>			5.8	34	24.6	42	9.4	44	11.4	49	9.3	55	5.6	47	6.7	Jul-06
<b>Emerging Markets Equity</b>	50,246,350	2.4	--	--	--	--	--	--	--	--	--	--	--	--	--	Jan-18
<i>MSCI Emerging Markets Gross</i>			7.5	--	37.8	--	9.5	--	4.7	--	2.9	--	2.0	--	--	Jan-18
<b>Private Equity</b>	229,078,522	10.9	0.6	--	-27.3	--	-16.9	--	-8.5	--	-5.4	--	-4.2	--	-0.7	Oct-05
<i>Russell 3000 + 3%</i>			7.1	--	24.7	--	14.4	--	19.0	--	16.9	--	11.8	--	12.1	Oct-05
<b>Short Term Core Bonds</b>	50,106,025	2.4	-0.1	--	--	--	--	--	--	--	--	--	--	--	0.2	Jun-17
<i>BBgBarc US Treasury 1-3 Yr TR</i>			-0.3	--	0.4	--	0.6	--	0.6	--	0.7	--	1.4	--	0.0	Jun-17
<b>Global Bonds</b>	66,210,329	3.2	0.0	91	11.6	7	2.8	60	1.5	70	3.2	63	--	--	3.2	Dec-10
<i>BBgBarc Global Aggregate TR</i>			1.1	30	7.4	53	2.0	78	0.8	82	2.0	83	3.1	82	2.0	Dec-10
<b>High Yield</b>	81,894,067	3.9	0.9	24	11.4	6	5.8	65	5.3	46	7.2	12	--	--	7.2	Dec-10
<i>BBgBarc Global High Yield TR</i>			0.9	25	10.4	6	7.1	9	5.7	34	7.2	12	8.1	1	7.2	Dec-10
<b>Bank Loans</b>	110,220,703	5.2	1.5	14	5.4	81	4.9	23	--	--	--	--	--	--	4.2	Jan-14
<i>S&amp;P/LSTA U.S. Leveraged Loan</i>			1.1	28	4.1	89	4.4	30	4.0	31	4.5	38	4.9	48	3.7	Jan-14
<b>Emerging Markets Debt</b>	20,319,725	1.0	0.1	91	14.8	23	7.2	21	1.9	57	4.3	57	--	--	4.3	Dec-10
<i>50% JPM EMBI/50% JPM GBI-EM</i>			1.0	44	12.7	47	4.9	64	1.2	60	3.7	58	--	--	3.7	Dec-10
<b>Private Debt</b>	11,318,223	0.5	-1.7	--	-22.9	--	--	--	--	--	--	--	--	--	-10.5	Jan-16
<i>Barclays Global High Yield +2%</i>			1.4	--	12.6	--	9.2	--	--	--	--	--	--	--	14.6	Jan-16
<b>Natural Resources</b>	210,173,800	10.0	-2.2	--	-2.8	--	3.6	--	5.4	--	5.6	--	--	--	5.6	Dec-10
<i>S&amp;P Global Natural Resources</i>			8.5	--	22.0	--	6.6	--	1.9	--	-0.1	--	-0.9	--	-0.1	Dec-10
<b>Infrastructure</b>	60,732,477	2.9	-0.1	--	72.5	--	16.1	--	11.4	--	--	--	--	--	10.9	Jul-12
<i>S&amp;P Global Infrastructure Index</i>			1.9	--	20.1	--	6.1	--	9.2	--	8.2	--	3.4	--	9.7	Jul-12
<b>Real Estate</b>	517,261,067	24.6	-0.2	--	2.4	--	-12.1	--	-7.2	--	-6.0	--	-4.7	--	3.6	Mar-85
<i>NCREIF Property Index</i>			1.8	--	7.0	--	9.4	--	10.2	--	10.8	--	6.1	--	8.0	Mar-85
<b>Risk Parity</b>	85,114,847	4.1	4.5	16	13.4	52	5.6	39	4.4	61	7.4	19	--	--	7.4	Dec-10
<i>60% MSCI ACWI/40% Barclays Global Agg</i>			3.9	31	17.1	29	6.5	20	6.8	38	6.1	44	4.3	57	6.1	Dec-10
<b>GTAA</b>	23,494,387	1.1	3.3	53	14.8	45	5.2	44	5.7	48	6.2	44	--	--	6.2	Dec-10
<i>60% MSCI ACWI/40% Barclays Global Agg</i>			3.9	31	17.1	29	6.5	20	6.8	38	6.1	44	4.3	57	6.1	Dec-10
<b>Absolute Return</b>	36,317,793	1.7	2.7	50	-5.0	84	5.8	18	5.8	23	--	--	--	--	6.0	Aug-11
<i>HFRX Absolute Return Index</i>			0.1	75	3.4	47	2.2	39	2.2	54	1.1	54	-1.0	86	1.6	Aug-11
<b>Cash Equivalents</b>	116,583,486	5.6	0.2	--	0.9	--	--	--	--	--	--	--	--	--	1.0	Apr-15
<i>91 Day T-Bills</i>			0.3	--	0.9	--	0.4	--	0.3	--	0.2	--	0.3	--	0.5	Apr-15



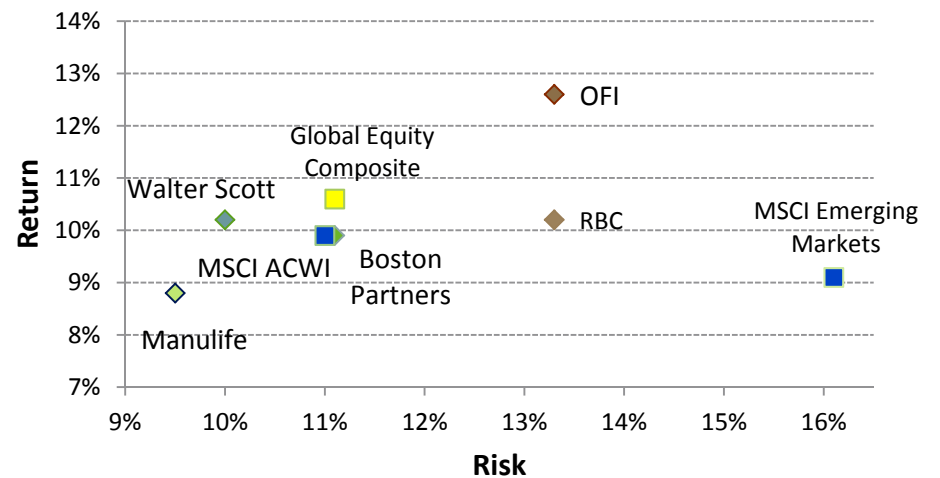
# PUBLIC EQUITY: COMPOSITE OVERVIEW

Manager	Benchmark	Descriptions
Boston Partners	MSCI ACWI	Value
Manulife	MSCI ACWI	Value
OFI	MSCI ACWI	Growth
Walter Scott	MSCI ACWI	Growth
RBC	MSCI Emerging Markets	Emerging Market Equity

## Public Equity Managers



## 3-Year Risk/Return\*



\*May not add to 100% due to rounding.

\*Boston Partners and Manulife 3-year risk/reward obtained from manager separate account composites. RBC 3-year risk/reward obtained from eVestment separate account composite.

# PUBLIC EQUITY: TRAILING MANAGER RETURNS

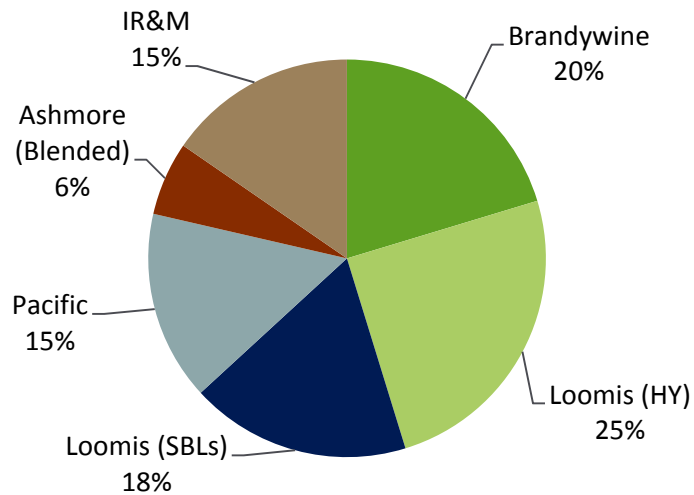
	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)	Return (%)	Since
<b>DPFP</b>	<b>2,099,918,772</b>	<b>100.0</b>	<b>1.2</b>	<b>5.1</b>	<b>-1.8</b>	<b>1.2</b>	<b>1.9</b>	<b>0.9</b>	<b>6.0</b>	<b>Jun-96</b>
Policy Index			3.3	15.2	9.8	10.0	9.1	6.2	--	Jun-96
InvestorForce Public DB Net Rank			99	99	99	99	99	99	76	Jun-96
<b>Public Equity</b>	<b>481,093,321</b>	<b>22.9</b>	<b>5.7</b>	<b>27.3</b>	<b>10.6</b>	<b>11.9</b>	<b>9.6</b>	<b>5.5</b>	<b>6.7</b>	<b>Jul-06</b>
Public Equity Weighted Index			5.8	24.6	9.4	11.4	9.3	5.6	6.7	Jul-06
<b>Global Equity</b>	<b>430,846,971</b>	<b>20.5</b>	<b>5.7</b>	<b>27.3</b>	<b>10.6</b>	<b>11.9</b>	<b>9.6</b>	<b>5.5</b>	<b>6.7</b>	<b>Jul-06</b>
Global Equity Weighted Index			5.8	24.6	9.4	11.4	9.3	5.6	6.7	Jul-06
eV All Global Equity Net Rank			37	25	28	42	50	49	41	Jul-06
Boston Partners Global Investors Inc	108,842,709	5.2	6.1	--	--	--	--	--	10.0	Jul-17
MSCI ACWI Gross			5.8	24.6	9.9	11.4	9.3	5.2	11.5	Jul-17
eV Global Large Cap Value Eq Net Rank			12	--	--	--	--	--	36	Jul-17
Manulife Asset Management LLC	105,126,247	5.0	3.9	--	--	--	--	--	6.1	Jul-17
MSCI ACWI Gross			5.8	24.6	9.9	11.4	9.3	5.2	11.5	Jul-17
eV Global Large Cap Value Eq Net Rank			75	--	--	--	--	--	90	Jul-17
OFI	108,045,254	5.1	6.3	35.3	12.6	13.3	11.0	7.3	6.6	Oct-07
MSCI ACWI Gross			5.8	24.6	9.9	11.4	9.3	5.2	4.9	Oct-07
eV Global Large Cap Growth Eq Net Rank			41	35	28	42	39	22	30	Oct-07
Walter Scott	108,782,217	5.2	6.1	24.2	10.2	10.6	9.6	--	9.7	Dec-09
MSCI ACWI Gross			5.8	24.6	9.9	11.4	9.3	5.2	10.0	Dec-09
eV Global Large Cap Growth Eq Net Rank			47	87	58	92	79	--	77	Dec-09
RREEF Global REIT	50,544	0.0								
eV Global REIT Net Rank										
<b>Emerging Markets Equity</b>	<b>50,246,350</b>	<b>2.4</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>Jan-18</b>
MSCI Emerging Markets Gross			7.5	37.8	9.5	4.7	2.9	2.0	--	Jan-18
eV Emg Mkts Equity Net Rank			--	--	--	--	--	--	--	Jan-18
RBC	50,246,350	2.4	--	--	--	--	--	--	--	Jan-18
MSCI Emerging Markets			7.4	37.3	9.1	4.3	2.6	1.7	--	Jan-18
eV Emg Mkts Equity Net Rank			--	--	--	--	--	--	--	Jan-18



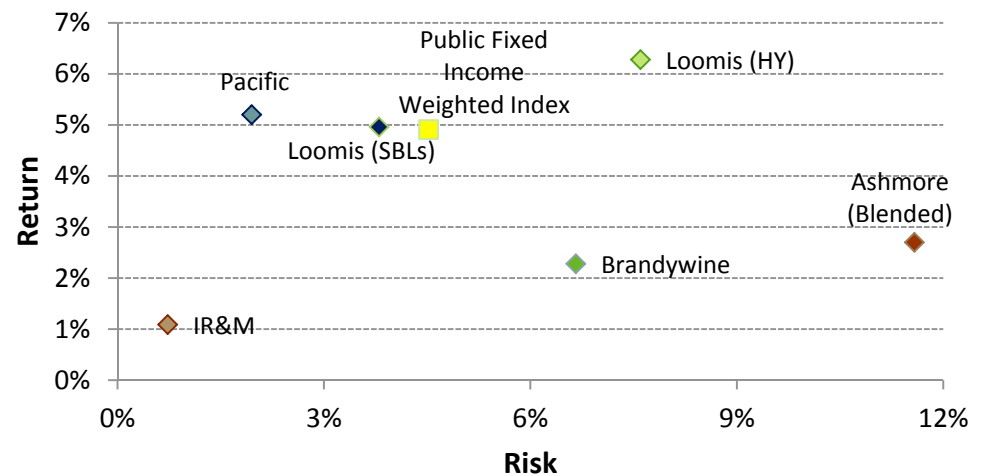
# PUBLIC FIXED INCOME: COMPOSITE OVERVIEW

Manager	Benchmark	Asset Class	Descriptions
Brandywine	Barclays Global Aggregate	Global Bonds	Aggressive, but diversified
Loomis (HY)	Barclays Global High Yield	High Yield	Aggressive
Loomis (BLs)	S&P/LSTA US Levered	Bank Loans	Bank Loans (min 65% of portfolio)
Pacific Asset Management	Credit Suisse Leveraged Loan	Bank Loans	Focus on largest, most liquid credits
Ashmore (Blended Currency)	50% JPM EMBI GD/25% JPM ELMI+/25% JPM GBI EM GD	Emerging Market Debt	Blended Currency EMD
IR&M	Barclays 1-3 Yr treasury	Short Term Core Bonds	Short Term Liquidity

**Public Fixed Income Managers**



**3-Year Risk/Return\***



\*Pacific Asset Management and IR&M 3-year risk/return obtained from manager composites.





## PUBLIC FIXED INCOME: TRAILING MANAGER RETURNS

	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)	Return (%)	Since
<b>DPFP</b>	<b>2,099,918,772</b>	<b>100.0</b>	<b>1.2</b>	<b>5.1</b>	<b>-1.8</b>	<b>1.2</b>	<b>1.9</b>	<b>0.9</b>	<b>6.0</b>	<b>Jun-96</b>
Policy Index			3.3	15.2	9.8	10.0	9.1	6.2	--	Jun-96
InvestorForce Public DB Net Rank			99	99	99	99	99	99	76	Jun-96
<b>Public Fixed Income</b>	<b>328,750,848</b>	<b>15.7</b>	<b>0.7</b>	<b>9.6</b>	<b>4.8</b>	<b>3.6</b>	<b>5.8</b>	<b>--</b>	<b>5.8</b>	<b>Dec-10</b>
Public Fixed Income Weighted Index			0.9	7.9	4.9	4.0	5.4	--	5.4	Dec-10
<b>Short Term Core Bonds</b>	<b>50,106,025</b>	<b>2.4</b>	<b>-0.1</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>0.2</b>	<b>Jun-17</b>
BBgBarc US Treasury 1-3 Yr TR			-0.3	0.4	0.6	0.6	0.7	1.4	0.0	Jun-17
IR&M	50,106,025	2.4	-0.1	--	--	--	--	--	0.2	Jul-17
BBgBarc US Treasury 1-3 Yr TR			-0.3	0.4	0.6	0.6	0.7	1.4	0.0	Jul-17
eV US Short Duration Fixed Inc Net Rank			68	--	--	--	--	--	77	Jul-17
<b>Global Bonds</b>	<b>66,210,329</b>	<b>3.2</b>	<b>0.0</b>	<b>11.6</b>	<b>2.8</b>	<b>1.5</b>	<b>3.2</b>	<b>--</b>	<b>3.2</b>	<b>Dec-10</b>
BBgBarc Global Aggregate TR			1.1	7.4	2.0	0.8	2.0	3.1	2.0	Dec-10
eV All Global Fixed Inc Net Rank			91	7	60	70	63	--	63	Dec-10
Brandywine	66,210,329	3.2	0.0	11.6	2.3	1.7	4.1	5.4	5.1	Oct-04
BBgBarc Global Aggregate TR			1.1	7.4	2.0	0.8	2.0	3.1	3.7	Oct-04
eV All Global Fixed Inc Net Rank			91	7	73	68	45	35	49	Oct-04
<b>High Yield</b>	<b>81,894,067</b>	<b>3.9</b>	<b>0.9</b>	<b>11.4</b>	<b>5.8</b>	<b>5.3</b>	<b>7.2</b>	<b>--</b>	<b>7.2</b>	<b>Dec-10</b>
BBgBarc Global High Yield TR			0.9	10.4	7.1	5.7	7.2	8.1	7.2	Dec-10
eV Global High Yield Fixed Inc Net Rank			24	6	65	46	12	--	12	Dec-10
Loomis Sayles	81,894,067	3.9	0.9	11.5	6.3	6.6	7.6	8.5	9.9	Oct-98
BBgBarc Global High Yield TR			0.9	10.4	7.1	5.7	7.2	8.1	8.7	Oct-98
eV Global High Yield Fixed Inc Net Rank			24	6	35	12	1	1	1	Oct-98



## PUBLIC FIXED INCOME: TRAILING MANAGER RETURNS

	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)	Return (%)	Since
<b>Bank Loans</b>	<b>110,220,703</b>	<b>5.2</b>	<b>1.5</b>	<b>5.4</b>	<b>4.9</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>4.2</b>	<b>Jan-14</b>
<i>S&amp;P/LSTA U.S. Leveraged Loan</i>			1.1	4.1	4.4	4.0	4.5	4.9	3.7	Jan-14
<i>eV All Global Fixed Inc Net Rank</i>			14	81	23	--	--	--	33	Jan-14
Loomis Sayles Senior Rate and Fixed Income	59,314,339	2.8	1.6	5.6	5.0	--	--	--	4.3	Jan-14
<i>S&amp;P/LSTA U.S. Leveraged Loan</i>			1.1	4.1	4.4	4.0	4.5	4.9	3.7	Jan-14
<i>eV Float-Rate Bank Loan Net Rank</i>			5	7	17	--	--	--	13	Jan-14
Pacific Asset Management	50,906,364	2.4	1.3	--	--	--	--	--	1.8	Aug-17
<i>Credit Suisse Leveraged Loan</i>			1.2	4.2	4.5	4.3	4.7	4.6	1.4	Aug-17
<i>eV Float-Rate Bank Loan Net Rank</i>			18	--	--	--	--	--	11	Aug-17
<b>Emerging Markets Debt</b>	<b>20,319,725</b>	<b>1.0</b>	<b>0.1</b>	<b>14.8</b>	<b>7.2</b>	<b>1.9</b>	<b>4.3</b>	<b>--</b>	<b>4.3</b>	<b>Dec-10</b>
<i>50% JPM EMBI/50% JPM GBI-EM</i>			1.0	12.7	4.9	1.2	3.7	--	3.7	Dec-10
<i>eV All Emg Mkts Fixed Inc Net Rank</i>			91	23	21	57	57	--	57	Dec-10
Ashmore EM Blended Debt	20,318,294	1.0	--	--	--	--	--	--	1.7	Dec-17
<i>Ashmore Blended Debt Benchmark</i>			1.3	11.8	--	--	--	--	1.1	Dec-17
<i>eV All Emg Mkts Fixed Inc Net Rank</i>			--	--	--	--	--	--	19	Dec-17
Ashmore AEMLCB	1,430	0.0								
<i>eV All Emg Mkts Fixed Inc Net Rank</i>										

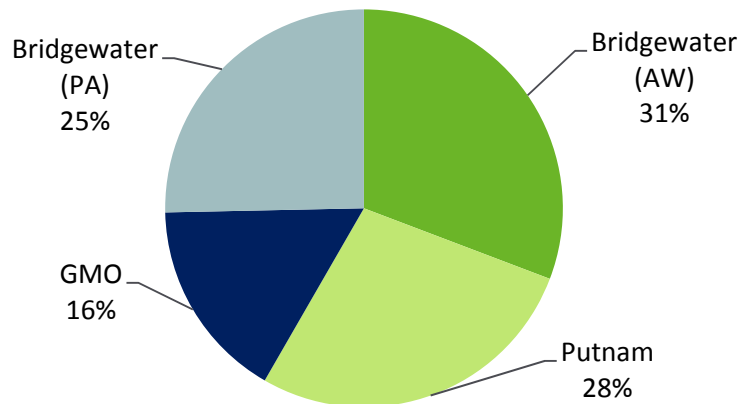


\*Ashmore Blended Debt Benchmark consists of 50% JPM EMBI / 50% JPM GBI-EM

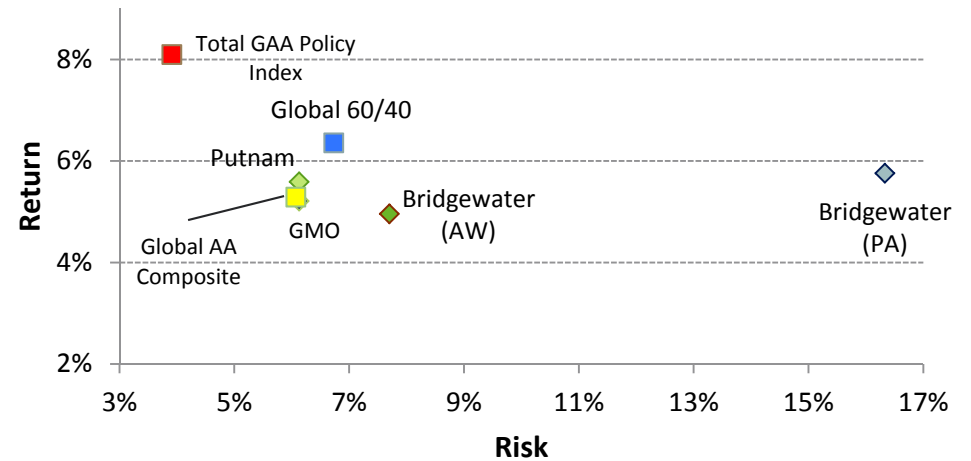
# GLOBAL ASSET ALLOCATION: COMPOSITE OVERVIEW

Manager	Benchmark	Asset Class	Descriptions
Bridgewater (All Weather)	Global 60/40	Risk Parity	Passive approach
Bridgewater (PAMM)	HFRX Absolute Return	Absolute Return	Global Macro Hedge Fund
GMO	Global 60/40	GTAA	Unconstrained
Putnam	Global 60/40	Risk Parity	Active approach

**GAA Managers**



**3-Year Risk/Return**



# GLOBAL ASSET ALLOCATION: TRAILING RETURNS

	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)	Return (%)	Since
<b>DPFP</b>	<b>2,099,918,772</b>	<b>100.0</b>	<b>1.2</b>	<b>5.1</b>	<b>-1.8</b>	<b>1.2</b>	<b>1.9</b>	<b>0.9</b>	<b>6.0</b>	<b>Jun-96</b>
Policy Index			3.3	15.2	9.8	10.0	9.1	6.2	--	Jun-96
InvestorForce Public DB Net Rank			99	99	99	99	99	99	76	Jun-96
<b>Total GAA</b>	<b>144,927,028</b>	<b>6.9</b>	<b>3.8</b>	<b>8.4</b>	<b>5.3</b>	<b>4.8</b>	<b>5.7</b>	<b>4.1</b>	<b>4.2</b>	<b>Jul-07</b>
Total GAA Policy Index			3.1	14.2	8.1	7.3	7.4	7.1	7.2	Jul-07
eV All Global Balanced / TAA Net Rank			31	81	44	56	53	61	73	Jul-07
<b>Risk Parity</b>	<b>85,114,847</b>	<b>4.1</b>	<b>4.5</b>	<b>13.4</b>	<b>5.6</b>	<b>4.4</b>	<b>7.4</b>	<b>--</b>	<b>7.4</b>	<b>Dec-10</b>
60% MSCI ACWI/40% Barclays Global Agg			3.9	17.1	6.5	6.8	6.1	4.3	6.1	Dec-10
eV All Global Balanced / TAA Net Rank			16	52	39	61	19	--	19	Dec-10
Bridgewater All Weather	44,861,428	2.1	4.4	13.1	5.0	3.6	7.6	5.5	6.1	Sep-07
91 Day T-Bill + 7%			2.0	8.0	7.4	7.3	7.2	7.3	7.4	Sep-07
eV All Global Balanced / TAA Net Rank			17	53	49	67	16	25	19	Sep-07
Putnam	40,253,419	1.9	4.6	13.7	5.6	4.7	5.6	--	6.6	Dec-09
60% MSCI World (Net) / 40% CITI WGBI			3.7	16.2	6.4	7.0	6.3	4.4	6.5	Dec-09
eV All Global Balanced / TAA Net Rank			13	51	39	59	54	--	44	Dec-09
<b>GTAA</b>	<b>23,494,387</b>	<b>1.1</b>	<b>3.3</b>	<b>14.8</b>	<b>5.2</b>	<b>5.7</b>	<b>6.2</b>	<b>--</b>	<b>6.2</b>	<b>Dec-10</b>
60% MSCI ACWI/40% Barclays Global Agg			3.9	17.1	6.5	6.8	6.1	4.3	6.1	Dec-10
eV All Global Balanced / TAA Net Rank			53	45	44	48	44	--	44	Dec-10
GMO	23,494,387	1.1	3.3	14.8	5.2	5.7	6.2	4.9	5.0	Sep-07
CPI + 5% (Seasonally Adjusted)			1.9	7.2	6.7	6.5	6.8	6.7	6.8	Sep-07
eV All Global Balanced / TAA Net Rank			53	45	44	48	44	46	44	Sep-07
<b>Absolute Return</b>	<b>36,317,793</b>	<b>1.7</b>	<b>2.7</b>	<b>-5.0</b>	<b>5.8</b>	<b>5.8</b>	<b>--</b>	<b>--</b>	<b>6.0</b>	<b>Aug-11</b>
HFRX Absolute Return Index			0.1	3.4	2.2	2.2	1.1	-1.0	1.6	Aug-11
eV All Macro Rank			50	84	18	23	--	--	16	Aug-11
Bridgewater PAMM	36,317,793	1.7	2.7	-5.0	5.8	5.8	--	--	6.0	Aug-11
HFRX Absolute Return Index			0.1	3.4	2.2	2.2	1.1	-1.0	1.6	Aug-11
eV All Macro Rank			50	84	18	23	--	--	16	Aug-11



# **RISK/RETURN & COMPLIANCE ANALYSIS**

NEPC, LLC

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# TOTAL FUND RISK/RETURN

3 Years Ending December 31, 2017

	Anlzd Ret	Rank	Anlzd Std Dev	Rank
DPFP	-1.8%	99	6.7%	84
Policy Index	9.8%	1	3.9%	3
60 MSCI ACWI/40 BC Global Agg	6.5%	75	6.9%	90
InvestorForce Public DB Net Median	7.1%	--	5.9%	--

5 Years Ending December 31, 2017

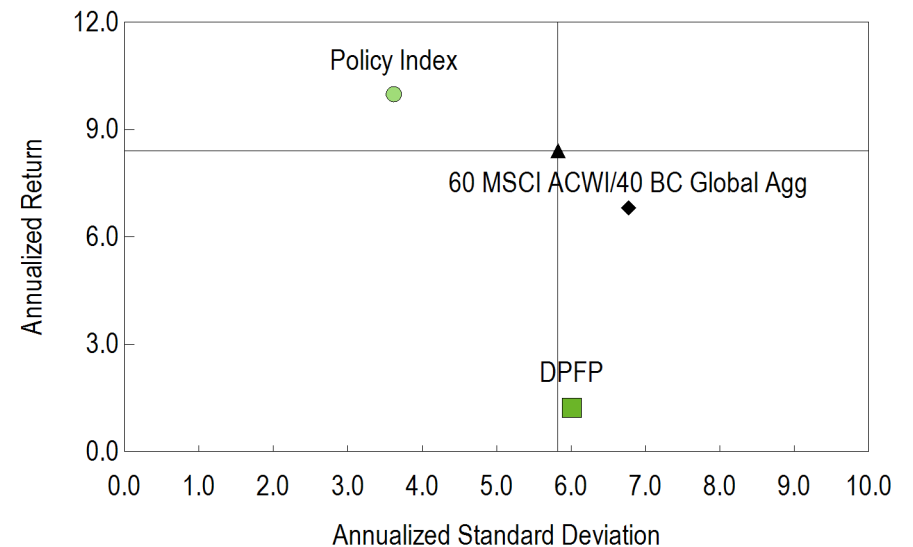
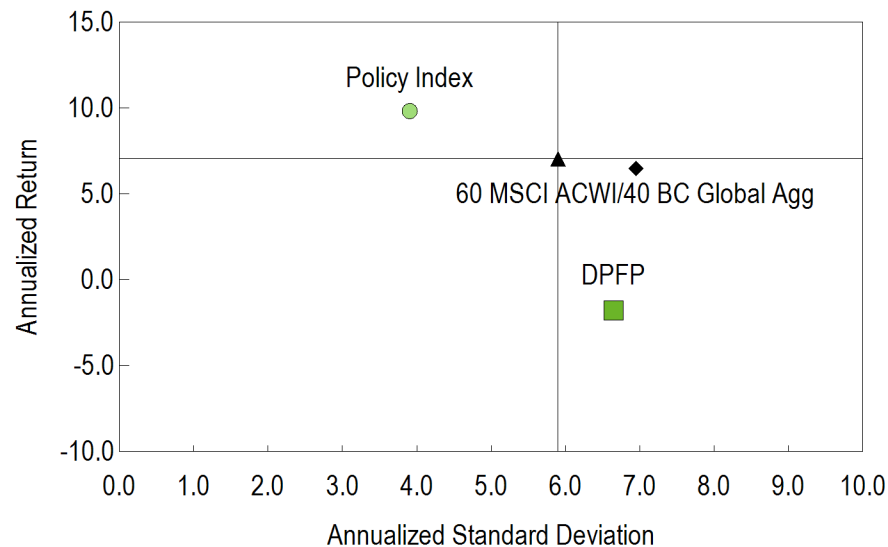
	Anlzd Ret	Rank	Anlzd Std Dev	Rank
DPFP	1.2%	99	6.0%	62
Policy Index	10.0%	6	3.6%	1
60 MSCI ACWI/40 BC Global Agg	6.8%	89	6.8%	89
InvestorForce Public DB Net Median	8.4%	--	5.8%	--

Sharpe Ratio Rank Sortino Ratio RF Rank

	Sharpe Ratio	Rank	Sortino Ratio RF	Rank
DPFP	-0.3	99	-0.3	99
Policy Index	2.4	1	4.8	1
60 MSCI ACWI/40 BC Global Agg	0.9	92	1.6	44
InvestorForce Public DB Net Median	1.1	--	1.5	--

Sharpe Ratio Rank Sortino Ratio RF Rank

	Sharpe Ratio	Rank	Sortino Ratio RF	Rank
DPFP	0.2	99	0.1	99
Policy Index	2.7	1	5.9	1
60 MSCI ACWI/40 BC Global Agg	1.0	98	1.9	80
InvestorForce Public DB Net Median	1.4	--	2.2	--



# POLICY COMPLIANCE TEST: TRADITIONAL MANAGERS

## 3 Year Rolling Excess Return Violations:

Manager	Return Rank	NEPC Recommendation
<b>Global Equity</b>		
Walter Scott	58	HOLD
<b>Public Fixed Income</b>		
Brandywine	73	HOLD

## 3 Year Rolling Risk-Adjusted Excess Return Violations:

Manager	Sharpe Ratio Rank	NEPC Recommendation
<b>Public Fixed Income</b>		
IR&M	52	HOLD
Brandywine	80	HOLD
Loomis Sayles HY	88	HOLD
Loomis Sayles SBL	83	HOLD
<b>GAA</b>		
Bridgewater AW	60	HOLD

## Qualitative Concerns:

Manager	NEPC Status
GMO <sup>1</sup>	HOLD (No Searches)

<sup>1</sup>NEPC no longer has concerns regarding the overall stability of GMO and assets under management for the asset allocation team. During the time NEPC has had GMO on HOLD, Ben Inker has remained the sole head of the asset allocation team, and there have been no major changes to the group. NEPC remains confident in the investment process and personnel on the asset allocation strategies. Effective 2/12/18, NEPC has upgraded the strategies from HOLD to NO ACTION.

Note: 'N/A' denotes that the Board has voted to terminate the manager in question. However, market exposure will be maintained with managers that have previously been approved for liquidation and to rebalance if additional cash is needed.



# ASSET ALLOCATION

NEPC, LLC

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# ASSET ALLOCATION: BROAD COMPOSITES

	Market Value \$	% of Portfolio	Policy %
Total Equity	710,171,843	33.8%	30%
Total Fixed Income	340,069,071	16.2%	33%
Total Real Assets	788,167,344	37.5%	25%
Total GAA	144,927,028	6.9%	10%
Cash	116,583,486	5.6%	2%
<b>Total DFPF</b>	<b>2,099,918,772</b>	<b>100%</b>	<b>100%</b>



# ASSET ALLOCATION: BY ASSET CLASS

	Current Allocation \$	Current Allocation %	Policy %
Global Equity	430,846,971	20.5%	20%
Emerging Market Equity	50,246,350	2.4%	5%
Private Equity	229,078,522	10.9%	5%
<i>Total Equity</i>	710,171,843	33.8%	30%
Short-Term Core Bonds	50,106,025	2.4%	2%
High Yield	81,894,067	3.9%	5%
Bank Loans	110,220,703	5.2%	6%
Emerging Market Debt	20,319,725	1.0%	6%
Global Bonds	66,210,329	3.2%	3%
Structured & AR Credit	--	0.0%	6%
Private Debt	11,318,223	0.5%	5%
<i>Total Fixed Income</i>	340,069,071	16.2%	33%
Natural Resources	210,173,800	10.0%	5%
Infrastructure	60,732,477	2.9%	5%
Real Estate	517,261,067	24.6%	12%
Real Assets – Liquid	--	0.0%	3%
<i>Total Real Assets</i>	788,167,344	37.5%	25%
Risk Parity	85,114,847	4.1%	5%
GTAA	23,494,387	1.1%	3%
Absolute Return	36,317,793	1.7%	2%
<i>Total GAA</i>	144,927,028	6.9%	10%
Cash	116,583,486	5.6%	2%
<b>Total</b>	<b>2,099,918,772</b>	<b>100%</b>	<b>100%</b>



# ASSET ALLOCATION: PORTFOLIO LOOKTHROUGH

	Lookthrough %	Actual %	Policy %
US Equity	10.0%	--	--
International Equity	9.8%	--	--
Emerging Markets Eq	3.6%	2.4%	5%
Global Equity	--	20.5%	20%
Private Equity	10.9%	10.9%	5%
<i>Total Equity</i>	34.3%	33.8%	30%
Short-Term Core Bonds	2.4%	2.4%	2%
High Yield	3.9%	3.9%	5%
Bank Loans	5.3%	5.3%	6%
Emerging Market Debt	1.2%	1.0%	6%
Global Bonds	5.8%	3.1%	3%
Structured & AR Credit	--	--	6%
Private Debt	0.5%	0.5%	5%
<i>Total Fixed Income</i>	19.1%	16.2%	33.0%

	Lookthrough %	Actual %	Policy %
Natural Resources	10.0%	10.0%	5%
Infrastructure	2.9%	2.9%	5%
Real Estate	25.2%	24.6%	12%
Real Assets – Liquid	--	--	3%
<i>Total Real Assets</i>	38.1%	37.5%	25%
Risk Parity	--	4.1%	5%
GTAA	--	1.1%	3%
Absolute Return	--	1.7%	2%
Hedge Funds*	2.6%	--	--
<i>Total GAA</i>	2.6%	6.9%	10%
Cash	5.5%	5.6%	2%

\*Hedge Fund lookthrough exposure due to GMO and Bridgewater Pure Alpha Major Markets allocations.



# ATTRIBUTION\*

- **Selection Effect**

- Contribution to excess return due to the over/under weighting of managers within asset classes
  - The Selection Effect of **-0.029%** is due to the underperformance of the DFPF Global Equity return vs. the Global Equity Index return. Based on policy, DFPF selected underperforming managers vs. the index.
    - $\text{Policy Weight} * (\text{Global Equity Return} - \text{Global Equity Index}) = \text{Selection Effect}$

- **Allocation Effect**

- Contribution to excess return due to the over/under weighting of asset classes
  - The Allocation Effect of **-0.042%** is due to the underweighting of the Global Equity allocation vs. the Global Equity Policy Allocation in October and also the out performance of the Global Equity Index, 2.0991% vs. the Total Plan Index, 1.0186% for October. DFPF was underweight to an outperforming sector in October resulting in a negative Allocation Effect for the quarter.
    - $(\text{Current Allocation} - \text{Policy Allocation}) * (\text{Global Equity Index} - \text{Total Policy Index}) = \text{Allocation Index}$

- **Interaction Effect**

- Is the resulting combination of the allocation and selection effects
  - $(\text{Global Equity Weight} - \text{Policy Weight}) * (\text{Global Equity Return} - \text{Global Equity Index Return}) = \text{Interaction Effect}$

	Portfolio Weights		Returns		Attribution Effects By			
	DFPF	Policy	DFPF	Index	Selection	Allocation	Interaction	Total*
Global Equity	20.5%	20.0%	5.680%	5.836%	-0.029%	-0.042%	-0.015%	-0.086%
Total*	100.0%	100.0%	1.173%	3.349%	-1.868%	0.255%	-0.564%	-2.177%

\*The attribution effects shown are for the quarter. To get the quarterly attribution effects the effects are first calculated monthly then linked using the Mencharo linking method to get the quarterly effects.



## ATTRIBUTION ANALYSIS: BY ASSET CLASS – 3 MONTHS ENDING DECEMBER 31, 2017

	Portfolio Weights		Returns		Attribution Effects By			
	DPPF	Policy	DPPF	Index	Selection	Allocation	Interaction	Total*
Global Equity	20.5%	20.0%	5.680%	5.836%	-0.029%	-0.042%	-0.015%	-0.086%
Emerging Markets Equity	2.4%	5.0%	0.493%	7.503%	-0.349%	-0.205%	0.349%	-0.205%
Private Equity	10.9%	5.0%	0.630%	7.110%	-0.321%	0.216%	-0.375%	-0.481%
Short Term Core Bonds	2.4%	2.0%	-0.136%	-0.277%	0.003%	-0.014%	0.001%	-0.010%
Global Bonds	3.2%	3.0%	0.008%	1.076%	-0.031%	-0.003%	-0.002%	-0.036%
High Yield	3.9%	5.0%	0.883%	0.866%	0.001%	0.028%	0.000%	0.029%
Bank Loans	5.2%	6.0%	1.463%	1.114%	0.021%	0.018%	-0.003%	0.036%
Structured & A/R Credit	0.0%	6.0%	0.000%	1.536%	-0.093%	0.109%	0.093%	0.109%
Emerging Markets Debt	1.0%	6.0%	0.122%	1.006%	-0.051%	0.118%	0.044%	0.112%
Private Debt	0.5%	5.0%	-1.684%	1.366%	-0.152%	0.083%	0.127%	0.059%
Natural Resources	10.0%	5.0%	-2.217%	8.472%	-0.533%	0.267%	-0.602%	-0.868%
Infrastructure	2.9%	5.0%	-0.089%	1.864%	-0.100%	0.031%	0.042%	-0.026%
Real Estate	24.6%	12.0%	-0.217%	1.800%	-0.245%	-0.207%	-0.271%	-0.724%
Liquid Real Assets	0.0%	3.0%	0.000%	1.878%	-0.057%	0.044%	0.057%	0.044%
Risk Parity	4.1%	5.0%	4.519%	3.853%	0.033%	-0.006%	-0.007%	0.020%
GTAA	1.1%	3.0%	3.261%	3.853%	-0.017%	-0.010%	0.011%	-0.016%
Absolute Return	1.7%	2.0%	2.680%	0.125%	0.053%	0.009%	-0.009%	0.053%
Cash Equivalents	5.6%	2.0%	0.229%	0.298%	-0.001%	-0.181%	-0.003%	-0.185%
<b>Total*</b>	<b>100.0%</b>	<b>100.0%</b>	<b>1.173%</b>	<b>3.349%</b>	<b>-1.868%</b>	<b>0.255%</b>	<b>-0.564%</b>	<b>-2.177%</b>

\*Total column may not add up due to rounding.



## ATTRIBUTION ANALYSIS: BY ASSET CLASS – 12 MONTHS ENDING DECEMBER 31, 2017

	Portfolio Weights		Returns		Attribution Effects By			
	DPFP	Policy	DPFP	Index	Selection	Allocation	Interaction	Total*
Global Equity	20.5%	20.0%	27.277%	24.624%	0.474%	-0.678%	-0.405%	-0.610%
Emerging Markets Equity	2.4%	5.0%	0.493%	37.752%	-1.755%	-1.004%	1.755%	-1.004%
Private Equity	10.9%	5.0%	-27.332%	24.706%	-2.734%	0.621%	-4.627%	-6.740%
Short Term Core Bonds	2.4%	2.0%	0.167%	0.425%	-0.006%	0.120%	0.012%	0.126%
Global Bonds	3.2%	3.0%	11.568%	7.396%	0.127%	0.003%	-0.012%	0.118%
High Yield	3.9%	5.0%	11.408%	10.433%	0.050%	0.058%	-0.024%	0.084%
Bank Loans	5.2%	6.0%	5.412%	4.118%	0.081%	0.282%	-0.036%	0.328%
Structured & A/R Credit	0.0%	6.0%	0.000%	7.263%	-0.461%	0.472%	0.461%	0.472%
Emerging Markets Debt	1.0%	6.0%	14.811%	12.738%	0.127%	0.122%	-0.107%	0.142%
Private Debt	0.5%	5.0%	-22.885%	12.624%	-1.984%	0.093%	1.224%	-0.668%
Natural Resources	10.0%	5.0%	-2.808%	21.976%	-1.263%	0.349%	-1.569%	-2.483%
Infrastructure	2.9%	5.0%	72.463%	20.127%	2.767%	0.174%	0.771%	3.711%
Real Estate	24.6%	12.0%	2.424%	6.975%	-0.565%	-1.021%	-0.647%	-2.232%
Liquid Real Assets	0.0%	3.0%	0.000%	7.214%	-0.229%	0.238%	0.229%	0.238%
Risk Parity	4.1%	5.0%	13.356%	17.093%	-0.178%	-0.027%	0.057%	-0.148%
GTAA	1.1%	3.0%	14.835%	17.093%	-0.064%	-0.036%	0.041%	-0.059%
Absolute Return	1.7%	2.0%	-4.974%	3.385%	-0.176%	0.038%	0.027%	-0.111%
Cash Equivalents	5.6%	2.0%	0.866%	0.922%	-0.001%	-1.356%	-0.004%	-1.361%
<b>Total*</b>	<b>100.0%</b>	<b>100.0%</b>	<b>5.008%</b>	<b>15.204%</b>	<b>-5.790%</b>	<b>-1.552%</b>	<b>-2.855%</b>	<b>-10.197%</b>

\*Total column may not add up due to rounding.



# APPENDIX

NEPC, LLC

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# FOOTNOTES

1. **Sustainable Asset Management** was included in the Global Natural Resources composite from 11/1/2008 to 3/31/2015 and included in the Global Equity composite from 4/1/2015 to present.
2. **Hudson Clean Energy** was included in the Global Natural Resources composite from 1/1/2010 to 3/31/2015 and included in the Private Markets composite from 4/1/2015 to 12/31/2015 and the Private Equity composite from 1/1/2016 to present.
3. **RREEF** was included in the Real Estate composite from 2/1/1999 to 12/31/2009 and included in the Global Equity composite from 1/1/2010 to present.
4. **Highland Crusader** was included in the Global Fixed Income composite from 7/1/2003 to 12/31/2015 and included in the Private Credit composite from 1/1/2016 to present.
5. **Highland Capital Management** was included in the Global Fixed Income composite from 1/1/2007 to 12/31/2015 and included in the Private Credit composite from 1/1/2016 to present.
6. **Oaktree Fund IV** was included in the Global Fixed Income composite from 1/1/2002 to 3/31/2015 and included in the Private Markets composite from 4/1/2015 to 12/31/2015 and included in the Private Credit composite from 1/1/2016 to present.
7. **Global Infrastructure composite** was included in the Private Markets composite history until 6/30/2012.
8. **Private Equity composite** includes Private Credit managers until 12/31/2015. From 01/01/2016 to present the Private Equity and Credit managers are now in separate composites.
9. **Policy index** changed on 4/1/2016 from 20% MSCI ACWI, 15% S&P 500+2%, 10% Global Natural Resources Benchmark, 15% Barclays Global Agg, 20% CPI+5%, 10% CPI +5%, 15% NCREIF PI to 20% MSCI ACWI (gross), 5% MSCI EM Equity (gross), 5% Russell 3000 +3%, 2% Barclays UST 1-3 Yr, 3% Barclays Global Agg, 5% Barclays Global HY, 6% S&P Leveraged Loan Index, 6% HFRX RV: FI (50/50- Abs/Corp), 6%50% JPM EMBI/50% JPM GBI-EM, 5% Barclays Global HY +2%, 5% S&P Global Nat Res, 5% S&P Global Infra, 12% NCREIF, 3% CPI +5%, 5% 60% MSCI ACWI/40% Barclays Global Agg, 3% 60% MSCI ACWI/40% Barclays Global Agg, 2% HFRX Abs Ret Index, 2% 90 Day T-Bill.
10. **Natural Resources** benchmark changed from the Global Natural Resources benchmark from 12/1/2010 to 12/31/2015 to the S&P Global Natural Resources benchmark 1/1/2016 to present.
11. **Infrastructure benchmark** changed from CPI +5% from 7/1/2012 to 12/31/2015 to S&P Global Infrastructure benchmark 1/1/2016 to present.
12. **Total Asset Allocation benchmark** changed from CPI+ 5% from 7/1/2007 to 12/31/2015 to 80% 60/40 MSCI ACWI & Barclays Global Agg and 20% HFRX
  - Absolute Return Index 1/1/2016 to present.





# GLOSSARY OF INVESTMENT TERMINOLOGY

**Alpha** - Measures the relationship between the fund performance and the performance of another fund or benchmark index and equals the excess return while the other fund or benchmark index is zero.

**Alpha Jensen** - The average return on a portfolio over and above that predicted by the capital asset pricing model (CAPM), given the portfolio's beta and the average market return. Also known as the abnormal return or the risk adjusted excess return.

**Annualized Excess Return over Benchmark** - Annualized fund return minus the annualized benchmark return for the calculated return.

**Annualized Return** - A statistical technique whereby returns covering periods greater than one year are converted to cover a 12 month time span.

**Beta** - Measures the volatility or systematic risk and is equal to the change in the fund's performance in relation to the change in the assigned index's performance.

**Information Ratio** - A measure of the risk adjusted return of a financial security, asset, or portfolio.

*Formula:*  
*(Annualized Return of Portfolio - Annualized Return of Benchmark)/Annualized Standard Deviation(Period Portfolio Return - Period Benchmark Return). To annualize standard deviation, multiply the deviation by the square root of the number of periods per year where monthly returns per year equals 12 and quarterly returns is four periods per year.*

**R-Squared** - Represents the percentage of a fund's movements that can be explained by movements in an index. R-Squared values range from 0 to 100. An R-Squared of 100 denotes that all movements of a fund are completely explained by movements in the index.

**Sharpe Ratio** - A measure of the excess return or risk premium per unit of risk in an investment asset or trading strategy.

**Sortino Ratio** - A method to differentiate between good and bad volatility in the Sharpe Ratio. The differentiation of up and down volatility allows the calculation to provide a risk adjusted measure of a security or fund's performance without upward price change penalties.

*Formula:*  
*Calculation Average (X-Y)/Downside Deviation (X-Y) \* 2*  
*Where X=Return Series X Y = Return Series Y which is the risk free return (91 day T-bills)*

**Standard Deviation** - The standard deviation is a statistical term that describes the distribution of results. It is a commonly used measure of volatility of returns of a portfolio, asset class, or security. The higher the standard deviation the more volatile the returns are.

*Formula:*  
*(Annualized Return of Portfolio - Annualized Return of Risk Free) / Annualized Standard Deviation (Portfolio Returns)*

**Tracking Error** - Tracking error, also known as residual risk, is a measure of the degree to which a portfolio tracks its benchmark. It is also a measure of consistency of excess returns. Tracking error is computed as the annualized standard deviation of the difference between a portfolio's return and that of its benchmark.

*Formula:*  
*Tracking Error = Standard Deviation (X-Y) \* √( # of periods per year)*  
*Where X = periods portfolio return and Y = the period's benchmark return*  
*For monthly returns, the periods per year = 12*  
*For quarterly returns, the periods per year = 4*

**Treynor Ratio** - A risk-adjusted measure of return based on systematic risk. Similar to the Sharpe ratio with the difference being the Treynor ratio uses beta as the measurement of volatility.

*Formula:*  
*(Portfolio Average Return - Average Return of Risk-Free Rate)/Portfolio Beta*

**Up/Down Capture Ratio** - A measure of what percentage of a market's returns is "captured" by a portfolio. For example, if the market declines 10% over some period, and the manager declines only 9%, then his or her capture ratio is 90%. In down markets, it is advantageous for a manager to have as low a capture ratio as possible. For up markets, the higher the capture ratio the better. Looking at capture ratios can provide insight into how a manager achieves excess returns. A value manager might typically have a lower capture ratio in both up and down markets, achieving excess returns by protecting on the downside, whereas a growth manager might fall more than the overall market in down markets, but achieve above-market returns in a rising market.

*UpsideCapture = TotalReturn(FundReturns)/TotalReturns(BMReturn) when Period Benchmark Return is > = 0*

*DownsideCapture = TotalReturn(FundReturns)/TotalReturns(BMReturn) when Benchmark < 0*



Source: InvestorForce

# GLOSSARY OF INVESTMENT TERMINOLOGY

**# Of Portfolios/Observations<sup>1</sup>** – The total number of data points that make up a specified universe

**Allocation Index<sup>3</sup>** - The allocation index measures the value added (or subtracted) to each portfolio by active management. It is calculated monthly: The portfolio asset allocation to each category from the prior month-end is multiplied by a specified market index.

**Asset Allocation Effect<sup>2</sup>** - Measures an investment manager's ability to effectively allocate their portfolio's assets to various sectors. The allocation effect determines whether the overweighting or underweighting of sectors relative to a benchmark contributes positively or negatively to the overall portfolio return. Positive allocation occurs when the portfolio is over weighted in a sector that outperforms the benchmark and underweighted in a sector that underperforms the benchmark. Negative allocation occurs when the portfolio is over weighted in a sector that underperforms the benchmark and under weighted in a sector that outperforms the benchmark.

**Agency Bonds (Agencies)<sup>3</sup>** - The full faith and credit of the United States government is normally not pledged to payment of principal and interest on the majority of government agencies issuing these bonds, with maturities of up to ten years. Their yields, therefore, are normally higher than government and their marketability is good, thereby qualifying them as a low risk-high liquidity type of investment. They are eligible as security for advances to the member banks by the Federal Reserve, which attests to their standing.

**Asset Backed Securities (ABS)<sup>3</sup>** - Bonds which are similar to mortgage-backed securities but are collateralized by assets other than mortgages; commonly backed by credit card receivables, auto loans, or other types of consumer financing.

**Attribution<sup>3</sup>** - Attribution is an analytical technique that allows us to evaluate the performance of the portfolio relative to the benchmark. A proper attribution tells us where value was added or subtracted as a result of the manager's decisions.

**Average Effective Maturity<sup>4</sup>** - For a single bond, it is a measure of maturity that takes into account the possibility that a bond might be called back to the issuer.

For a portfolio of bonds, average effective maturity is the weighted average of the maturities of the underlying bonds. The measure is computed by weighing each bond's maturity by its market value with respect to the portfolio and the likelihood of any of the bonds being called. In a pool of mortgages, this would also account for the likelihood of prepayments on the mortgages.

**Batting Average<sup>1</sup>** - A measurement representing an investment manager's ability to meet or beat an index.

*Formula: Divide the number of days (or months, quarters, etc.) in which the manager beats or matches the index by the total number of days (or months, quarters, etc.) in the period of question and multiply that factor by 100.*

**Brinson Fachler (BF) Attribution<sup>1</sup>** - The BF methodology is a highly accepted industry standard for calculating the allocation, selection, and interaction effects within a portfolio that collectively explains a portfolio's underlying performance. The main advantage of the BF methodology is that rather than using the overall return of the benchmark, it goes a level deeper than BHB and measures whether the benchmark sector, country, etc. outperformed/or underperformed the overall benchmark.

**Brinson Hood Beebower (BHB) Attribution<sup>1</sup>** - The BHB methodology shows that excess return must be equal to the sum of all other factors (i.e., allocation effect, selection effect, interaction effect, etc.). The advantage to using the BHB methodology is that it is a highly accepted industry standard for calculating the allocation, selection, and interaction effects within a portfolio that collectively explains a portfolio's underlying performance.

**Corporate Bond (Corp)<sup>4</sup>** - A debt security issued by a corporation and sold to investors. The backing for the bond is usually the payment ability of the company, which is typically money to be earned from future operations. In some cases, the company's physical assets may be used as collateral for bonds.

**Correlation<sup>1</sup>** - A range of statistical relationships between two or more random variables or observed data values. A correlation is a single number that describes the degree of relationship between variables.

Data Source: <sup>1</sup>InvestorForce, <sup>2</sup>Interaction Effect Performance Attribution, <sup>3</sup>NEPC, LLC, <sup>4</sup>Investopedia, <sup>5</sup>Hedgeco.net



Source: InvestorForce

# GLOSSARY OF INVESTMENT TERMINOLOGY

**Coupon<sup>4</sup>** – The interest rate stated on a bond when it is issued. The coupon is typically paid semiannually. This is also referred to as the "coupon rate" or "coupon percent rate."

**Currency Effect<sup>1</sup>** - Is the effect that changes in currency exchange rates over time affect excess performance.

**Derivative Instrument<sup>3</sup>** - A financial obligation that derives its precise value from the value of one or more other instruments (or assets) at the same point of time. For example, the relationship between the value of an S&P 500 futures contract (the derivative instrument in this case) is determined by the value of the S&P 500 Index and the value of a U.S. Treasury bill that matures at the expiration of the futures contract.

**Downside Deviation<sup>1</sup>** - Equals the standard deviation of negative return or the measure of downside risk focusing on the standard deviation of negative returns.

*Formula:*

*Annualized Standard Deviation (Fund Return - Average Fund Return) where average fund return is greater than individual fund returns, monthly or quarterly.*

**Duration<sup>3</sup>** - Duration is a measure of interest rate risk. The greater the duration of a bond, or a portfolio of bonds, the greater its price volatility will be in response to a change in interest rates. A bond's duration is inversely related to interest rates and directly related to time to maturity.

**Equity/Debt/Cash Ratio<sup>1</sup>** - The percentage of an investment or portfolio that is in Equity, Debt, and/or Cash (i.e. A 7/89/4 ratio represents an investment that is made up of 7% Equity, 89% Debt, and 4% Cash).

**Foreign Bond<sup>3</sup>** - A bond that is issued in a domestic market by a foreign entity, in the domestic market's currency. A foreign bond is most often issued by a foreign firm to raise capital in a domestic market that would be most interested in purchasing the firm's debt. For foreign firms doing a large amount of business in the domestic market, issuing foreign bonds is a common practice.

**Hard Hurdle<sup>5</sup>** - is a hurdle rate that once beaten allows a fund manager to charge a performance fee on only the funds above the specified hurdle rate.

**High-Water Mark<sup>4</sup>** - The highest peak in value that an investment fund/account has reached. This term is often used in the context of fund manager compensation, which is performance based. Some performance-based fees only get paid when fund performance exceeds the high-water mark. The high-water mark ensures that the manager does not get paid large sums for poor performance.

**Hurdle Rate<sup>4</sup>** - The minimum rate of return on an investment required, in order for a manager to collect incentive fees from the investor, which is usually tied to a benchmark.

**Interaction Effects<sup>2</sup>** - The interaction effect measures the combined impact of an investment manager's selection and allocation decisions within a sector. For example, if an investment manager had superior selection and over weighted that particular sector, the interaction effect is positive. If an investment manager had superior selection, but underweighted that sector, the interaction effect is negative. In this case, the investment manager did not take advantage of the superior selection by allocating more assets to that sector. Since many investment managers consider the interaction effect to be part of the selection or the allocation, it is often combined with the either effect.

**Median<sup>3</sup>** - The value (rate of return, market sensitivity, etc.) that exceeds one-half of the values in the population and that is exceeded by one-half of the values. The median has a percentile rank of 50.

**Modified Duration<sup>3</sup>** - The percentage change in the price of a fixed income security that results from a change in yield.

**Mortgage Backed Securities (MBS)<sup>3</sup>** - Bonds which are a general obligation of the issuing institution but are also collateralized by a pool of mortgages.

**Municipal Bond (Muni)<sup>4</sup>** - A debt security issued by a state, municipality or county to finance its capital expenditures.

**Net Investment Change<sup>1</sup>** - Is the change in an investment after accounting for all Net Cash Flows.

**Performance Fee<sup>4</sup>** - A payment made to a fund manager for generating positive returns. The performance fee is generally calculated as a percentage of investment profits, often both realized and unrealized.

*Data Source: <sup>1</sup>InvestorForce, <sup>2</sup>Interaction Effect Performance Attribution, <sup>3</sup>NEPC, LLC, <sup>4</sup>Investopedia, <sup>5</sup>Hedgeco.net*



Source: InvestorForce

# GLOSSARY OF INVESTMENT TERMINOLOGY

**Policy Index<sup>3</sup>** - A custom benchmark designed to indicate the returns that a passive investor would earn by consistently following the asset allocation targets set forth in this investment policy statement.

**Price to Book (P/B)<sup>4</sup>** - A ratio used to compare a stock's market value to its book value. It is calculated by dividing the current closing price of the stock by the latest quarter's book value per share, also known as the "price-equity ratio".

**Price to Earnings (P/E)<sup>3</sup>** - The weighted equity P/E is based on current price and trailing 12 months earnings per share (EPS).

**Price to Sales (P/S)<sup>4</sup>** - A ratio for valuing a stock relative to its own past performance, other companies, or the market itself. Price to sales is calculated by dividing a stock's current price by its revenue per share for the trailing 12 months.

**Return on Equity (ROE)<sup>4</sup>** - The amount of net income returned as a percentage of shareholders equity. Return on equity measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested.

**Selection (or Manager) Effect<sup>2</sup>** - Measures the investment manager's ability to select securities within a given sector relative to a benchmark. The over or underperformance of the portfolio is weighted by the benchmark weight, therefore, selection is not affected by the manager's allocation to the sector. The weight of the sector in the portfolio determines the size of the effect—the larger the sector, the larger the effect is, positive or negative.

**Soft Hurdle rate<sup>5</sup>** - is a hurdle rate that once beaten allows a fund manager to charge a performance fee based on the entire annualized return.

**Tiered Fee<sup>1</sup>** - A fee structure that is paid to fund managers based on the size of the investment (i.e. 1.00% fee on the first \$10M invested, 0.90% on the next \$10M, and 0.80% on the remaining balance).

**Total Effects<sup>2</sup>** - The active management (total) effect is the sum of the selection, allocation, and interaction effects. It is also the difference between the total portfolio return and the total benchmark return. You can use the active management effect to determine the amount the investment manager has added to a portfolio's return.

**Total Return<sup>1</sup>** - The actual rate of return of an investment over a specified time period. Total return includes interest, capital gains, dividends, and distributions realized over a defined time period.

**Universe<sup>3</sup>** - The list of all assets eligible for inclusion in a portfolio.

**Upside Deviation<sup>1</sup>** - Standard Deviation of Positive Returns

**Weighted Avg. Market Cap.<sup>4</sup>** - A stock market index weighted by the market capitalization of each stock in the index. In such a weighting scheme, larger companies account for a greater portion of the index. Most indexes are constructed in this manner, with the best example being the S&P 500.

**Yield (%)<sup>3</sup>** - The current yield of a security is the current indicated annual dividend rate divided by current price.

**Yield to Maturity<sup>3</sup>** - The discount rate that equates the present value of cash flows, both principal and interest, to market price.

*Data Source: <sup>1</sup>InvestorForce, <sup>2</sup>Interaction Effect Performance Attribution, <sup>3</sup>NEPC, LLC, <sup>4</sup>Investopedia, <sup>5</sup>Hedgeco.net*



Source: InvestorForce

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