

FUND EVALUATION REPORT

Worcester Retirement System

Quarterly Review
February 9, 2017



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Retirement System Summary

**PRIT Allocation Comparison
Aggregate Assets
As of December 31, 2016**

	Actual Asset Allocation ^{1,2} (%)	Target Allocation (%)	Target Range (%)	PRIT Actual Asset Allocation ¹ (%)
Total Retirement System	NA	NA	NA	NA
Global Equity Assets	42	43	30-56	43
<i>Domestic Equity Assets</i>	21	22	17-27	20
<i>International Developed Market Equity Assets</i>	13	12	7-17	12
<i>International Emerging Market Equity Assets</i>	8	9	6-12	8
Fixed Income Assets	24	21	10-32	21
<i>Core Fixed Income Assets</i> ³	13	14	8-20	12
<i>Value-Added Fixed Income Assets</i> ⁴	10	7	2-12	8
Real Estate Assets	15	10	5-15	10
Hedge Fund Assets	3	2	0-4	9
Private Equity Assets	7	10	7-13	11
Portfolio Completion Strategies / GTAA	6	7	4-10	1
Real Assets (Natural Resources, Timber, Infrastructure)	4	7	3-10	4
Cash	<1	0	0-5	1

¹ Numbers may not sum to 100% due to rounding.

² Asset classes include a pro-rata allocation of the System's 6.5% holding of the PRIT Core Fund.

³ Retirement System figures include investment grade bonds and TIPS.

⁴ Retirement System figures include high yield fixed income and emerging market debt.

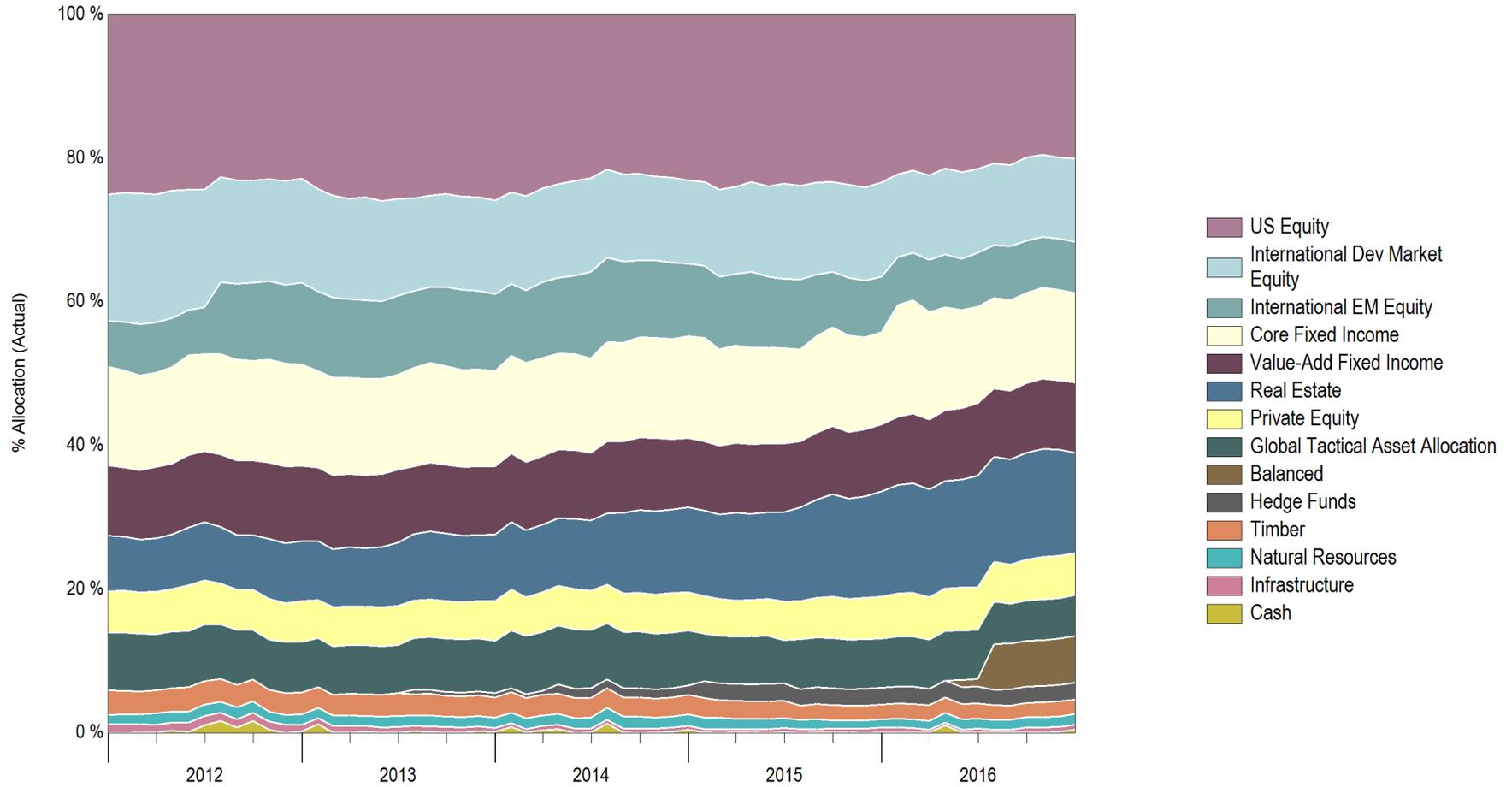


As of December 31, 2016

Allocation vs. Policy Targets

	Current Balance	Current Allocation	Policy	Policy Range	Within IPS Range?
US Equity	\$168,891,896	20%	22%	17% - 27%	Yes
International Dev Market Equity	\$97,142,080	12%	12%	7% - 17%	Yes
International EM Equity	\$59,663,036	7%	9%	6% - 12%	Yes
Core Fixed Income	\$104,583,588	12%	14%	9% - 19%	Yes
Value-Add Fixed Income	\$82,058,714	10%	7%	2% - 12%	Yes
Real Estate	\$117,284,123	14%	10%	5% - 15%	Yes
Private Equity	\$49,149,505	6%	10%	7% - 13%	No
Global Tactical Asset Allocation	\$47,713,082	6%	7%	4% - 10%	Yes
Balanced	\$54,496,590	6%	0%	0% - 15%	Yes
Hedge Funds	\$19,537,642	2%	2%	0% - 4%	Yes
Timber	\$16,613,627	2%	3%	2% - 4%	No
Natural Resources	\$12,959,868	2%	2%	1% - 3%	Yes
Infrastructure	\$5,652,688	1%	2%	0% - 3%	Yes
Cash	\$3,602,717	0%	0%	0% - 5%	Yes
Total	\$839,349,156	100%	100%		

Asset Allocation History
5 Years Ending December 31, 2016



As of December 31, 2016

Asset Class Performance Summary

	Market Value (\$)	% of Portfolio	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Retirement System	839,349,156	100.0	0.4	7.9	3.8	7.4	4.4	7.3	Oct-95
Total Retirement System (Net of Fees)			0.4	7.7	3.6	7.3	4.2	7.1	
<i>Custom Benchmark - Target Allocation</i>			0.6	8.7	4.6	7.8	4.9	--	Oct-95
<i>60% MSCI ACWI / 40% Barclays Global Aggregate</i>			-2.2	5.7	1.9	5.8	3.8	5.8	Oct-95
Domestic Equity	168,891,896	20.1	4.7	13.3	8.6	14.9	7.2	5.6	Aug-00
<i>Russell 3000</i>			4.2	12.7	8.4	14.7	7.1	5.2	Aug-00
International Developed Market Equity	97,142,080	11.6	-1.1	1.6	-0.5	7.8	1.5	4.5	Aug-00
<i>MSCI EAFE</i>			-0.7	1.0	-1.6	6.5	0.7	2.9	Aug-00
International Emerging Market Equity	59,663,036	7.1	-3.9	17.0	-2.4	2.8	3.7	5.6	Aug-06
<i>MSCI Emerging Markets</i>			-4.2	11.2	-2.6	1.3	1.8	3.7	Aug-06
Core Fixed Income	104,583,588	12.5	-2.3	3.6	2.5	1.8	4.9	4.5	May-05
<i>Custom Benchmark - Fixed Income</i>			-2.4	6.8	1.9	2.7	5.5	5.4	May-05
Value Added Fixed Income	82,058,714	9.8	-0.5	10.8	3.1	5.8	5.4	7.4	May-05
<i>Custom High Yield Benchmark</i>			-0.4	12.4	3.2	--	--	--	May-05
Private Equity	49,149,505	5.9	0.3	2.4	5.0	6.4	8.6	8.7	Oct-00
<i>Cambridge Associates Fund of Funds Composite 1-Quarter Lag</i>			2.7	4.6	10.6	10.3	9.1	5.6	Oct-00
Real Estate	117,284,123	14.0	1.0	8.3	11.2	11.4	5.5	7.7	Oct-00
<i>NCREIF-ODCE</i>			2.1	8.8	12.1	12.2	5.8	8.1	Oct-00
Balanced Assets	54,496,590	6.5	-0.3	--	--	--	--	3.9	Jun-16
<i>60% MSCI ACWI / 40% Barclays Global Aggregate</i>			-2.2	5.7	1.9	5.8	3.8	1.3	Jun-16
Global Tactical Asset Allocation	47,713,082	5.7	0.8	2.8	-2.0	1.8	--	1.7	Aug-07
<i>Spliced Benchmark</i>			-2.2	5.7	1.2	0.5	2.4	2.0	Aug-07
Hedge Funds	19,537,642	2.3	2.5	4.4	2.4	4.8	3.1	4.2	Jul-05
<i>HFRI Fund of Funds Composite Index</i>			0.9	0.5	1.2	3.4	1.3	2.6	Jul-05
Real Assets	35,226,183	4.2	-0.2	10.0	2.2	4.2	2.8	2.7	Oct-06
<i>CPI+3%</i>			0.7	5.1	4.2	4.4	4.9	4.8	Oct-06
Cash	3,602,717	0.4							



As of December 31, 2016

Trailing Performance

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Retirement System	839,349,156	100.0	--	0.4	7.9	3.8	7.4	4.4	7.3	Oct-95
Total Retirement System (Net of Fees)				0.4	7.7	3.6	7.3	4.2	7.1	
<i>Custom Benchmark - Target Allocation</i>				0.6	8.7	4.6	7.8	4.9	--	Oct-95
<i>60% MSCI ACWI / 40% Barclays Global Aggregate</i>				-2.2	5.7	1.9	5.8	3.8	5.8	Oct-95
Domestic Equity	168,891,896	20.1	20.1	4.7	13.3	8.6	14.9	7.2	5.6	Aug-00
<i>Russell 3000</i>				4.2	12.7	8.4	14.7	7.1	5.2	Aug-00
SSgA S&P 500 Index (Net of Fees)	77,367,058	9.2	45.8	3.8	12.0	8.9	14.7	7.0	5.9	Aug-98
<i>S&P 500</i>				3.8	12.0	8.9	14.7	6.9	5.8	Aug-98
SSgA Russell 1000 Growth Index (Net of Fees)	33,795,895	4.0	20.0	1.1	7.2	8.6	14.5	--	14.2	Nov-09
<i>Russell 1000 Growth</i>				1.0	7.1	8.6	14.5	8.3	14.1	Nov-09
SSgA Russell 1000 Value Index (Net of Fees)	35,690,065	4.3	21.1	6.6	17.3	8.6	14.8	5.8	7.3	Jul-05
<i>Russell 1000 Value</i>				6.7	17.3	8.6	14.8	5.7	7.3	Jul-05
SSgA S&P Midcap 400 Index (Net of Fees)	10,695,619	1.3	6.3	7.4	20.7	9.0	15.4	9.2	9.7	Sep-06
<i>S&P 400 MidCap</i>				7.4	20.7	9.0	15.3	9.2	9.6	Sep-06
Lee Munder Small Cap Value (Net of Fees)	11,343,259	1.4	6.7	12.9	28.4	10.6	15.8	--	14.7	Nov-09
<i>Russell 2000 Value</i>				14.1	31.7	8.3	15.1	6.3	14.5	Nov-09
International Developed Market Equity	97,142,080	11.6	11.6	-1.1	1.6	-0.5	7.8	1.5	4.5	Aug-00
<i>MSCI EAFE</i>				-0.7	1.0	-1.6	6.5	0.7	2.9	Aug-00
SSgA MSCI EAFE Index	78,303,557	9.3	80.6	-0.7	1.4	-1.3	6.8	1.1	5.3	Sep-04
<i>MSCI EAFE</i>				-0.7	1.0	-1.6	6.5	0.7	5.0	Sep-04
Acadian Non-U.S. Small Cap Equity (Net of Fees)	18,838,523	2.2	19.4	-2.9	2.8	3.1	11.8	3.4	7.4	Feb-05
<i>MSCI EAFE Small Cap</i>				-2.9	2.2	2.1	10.6	2.9	5.9	Feb-05

As of December 31, 2016

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
International Emerging Market Equity	59,663,036	7.1	7.1	-3.9	17.0	-2.4	2.8	3.7	5.6	Aug-06
<i>MSCI Emerging Markets</i>				-4.2	11.2	-2.6	1.3	1.8	3.7	Aug-06
PRIT Emerging Markets (Net of Fees)	59,663,036	7.1	100.0	-3.6	--	--	--	--	-2.1	Sep-16
<i>MSCI Emerging Markets</i>				-4.2	11.2	-2.6	1.3	1.8	-2.9	Sep-16
Core Fixed Income	104,583,588	12.5	12.5	-2.3	3.6	2.5	1.8	4.9	4.5	May-05
<i>Custom Benchmark - Fixed Income</i>				-2.4	6.8	1.9	2.7	5.5	5.4	May-05
IR&M Aggregate Bond	69,858,219	8.3	66.8	-2.7	3.4	--	--	--	3.1	Feb-14
<i>BBgBarc US Aggregate TR</i>				-3.0	2.6	3.0	2.2	4.3	2.6	Feb-14
IR&M Intermediate TIPS	34,725,369	4.1	33.2	-1.5	4.0	--	--	--	1.1	Feb-14
<i>BBgBarc US TIPS 1-10 Yr TR</i>				-1.5	4.0	1.5	0.7	3.8	1.0	Feb-14
Value Added Fixed Income	82,058,714	9.8	9.8	-0.5	10.8	3.1	5.8	5.4	7.4	May-05
<i>Custom High Yield Benchmark</i>				-0.4	12.4	3.2	--	--	--	May-05
High Yield Bonds	45,435,226	5.4	55.4	1.3	11.0	3.7	6.4	--	6.4	Jun-08
Loomis Sayles High Yield	23,120,890	2.8	50.9	1.4	14.6	4.6	8.4	7.3	8.1	Jan-96
<i>BBgBarc US High Yield TR</i>				1.8	17.1	4.7	7.4	7.5	7.2	Jan-96
Loomis Sayles Bank Loans	22,314,336	2.7	49.1	1.1	7.5	3.7	4.8	4.1	4.4	Oct-05
<i>Credit Suisse Leveraged Loans</i>				2.3	9.9	3.8	5.3	4.3	4.6	Oct-05
Lazard Emerging Market Debt Blend	26,807,016	3.2	32.7	-5.5	9.1	-0.9	--	--	-0.7	Aug-13
<i>50% JPM EMBI GD / 50% JPM GBI-EM</i>				-5.1	10.2	1.0	2.3	5.4	0.9	Aug-13
Mezzanine Debt	9,816,472	1.2	12.0	5.8	13.5	11.8	11.8	8.5	--	
Northstar Mezzanine Partners VI	4,309,998	0.5	43.9							
Newstone Capital Partners II	2,276,557	0.3	23.2							

As of December 31, 2016

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Northstar Mezzanine Partners V	1,925,068	0.2	19.6							
Northstar Mezzanine Partners IV	750,640	0.1	7.6							
Newstone Capital Partners	450,486	0.1	4.6							
Northstar Mezzanine Partners III	103,723	0.0	1.1							
Private Equity	49,149,505	5.9	5.9	0.3	2.4	5.0	6.4	8.6	8.7	Oct-00
<i>Cambridge Associates Fund of Funds Composite 1-Quarter Lag</i>				2.7	4.6	10.6	10.3	9.1	5.6	Oct-00
Buyouts	37,916,070	4.5	77.1	0.4	3.1	3.9	6.4	9.9	10.9	Oct-05
American Securities Partners VI	9,048,733	1.1	23.9							
Riverside Capital Appreciation Fund VI	5,531,299	0.7	14.6							
Vitruvian Investment Partnership I	4,726,399	0.6	12.5							
Riverside Micro Cap Fund III	4,474,112	0.5	11.8							
Capital International Private Equity Fund VI	3,928,704	0.5	10.4							
Harvest Partners V	2,228,191	0.3	5.9							
Ridgemont II	3,694,748	0.4	9.7							
Riverside Capital Fund V	1,300,623	0.2	3.4							
Charlesbank Equity Fund VI	478,928	0.1	1.3							
TA XII	1,303,237	0.2	3.4							
Riverside Europe III	863,896	0.1	2.3							
2000 Riverside Capital Appreciation	220,577	0.0	0.6							

As of December 31, 2016

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
2003 Riverside Capital Appreciation	71,372	0.0	0.2							
Charlesbank Equity Fund V	45,250	0.0	0.1							
Fund of Funds	612,978	0.1	1.2	-7.4	-25.5	-9.2	-4.0	1.0	7.4	Oct-05
European Strategic Partners	99,300	0.0	16.2							
INVESCO Private Capital II	89,722	0.0	14.6							
PRIT Vintage Year 2016	423,955	0.1	69.2							
Venture Capital Funds	10,620,458	1.3	21.6	0.5	3.3	7.7	6.1	4.9	7.4	Oct-05
Ascent Venture Partners V	4,399,684	0.5	41.4							
Boston Millennia Partners III	2,214,328	0.3	20.8							
Asecent Venture Partners VI	1,690,092	0.2	15.9							
Boston Millennia Partners II	1,128,088	0.1	10.6							
Ascent Venture Partners II	535,557	0.1	5.0							
Ascent Venture Partners IV	325,720	0.0	3.1							
Ascent Venture Partners III	306,626	0.0	2.9							
Boston Capital Venture III	20,363	0.0	0.2							

Total Retirement System

As of December 31, 2016

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Real Estate	117,284,123	14.0	14.0	1.0	8.3	11.2	11.4	5.5	7.7	Oct-00
<i>NCREIF-ODCE</i>				2.1	8.8	12.1	12.2	5.8	8.1	Oct-00
Open-End Real Estate	107,904,783	12.9	92.0	0.7	7.9	11.6	11.5	4.5	7.4	Jan-99
PRIT Real Estate	55,699,694	6.6	51.6	-0.5	7.7	11.4	11.8	--	12.3	Apr-10
<i>NCREIF-ODCE</i>				2.1	8.8	12.1	12.2	5.8	13.7	Apr-10
<i>NCREIF ODCE Equal Weighted</i>				2.2	9.2	12.2	12.2	5.6	13.7	Apr-10
<i>Custom Benchmark</i>				0.6	8.7	11.6	11.9	--	13.2	Apr-10
INVESCO Core Real Estate USA	52,205,089	6.2	48.4	2.2	9.2	12.1	11.8	5.8	6.6	Apr-06
<i>NCREIF-ODCE</i>				2.1	8.8	12.1	12.2	5.8	6.5	Apr-06
<i>NCREIF ODCE Equal Weighted</i>				2.2	9.2	12.2	12.2	5.6	6.3	Apr-06
<i>NCREIF Property Index</i>				1.7	8.0	11.0	10.9	6.9	7.6	Apr-06
Non-Core Real Estate	9,379,340	1.1	8.0	6.8	16.2	16.9	17.9	--	12.7	Oct-05
AEW Partners VII	6,245,523	0.7	66.6							
AEW Partners VI	3,062,933	0.4	32.7							
Intercontinental Real Estate Investment Fund IV	57,833	0.0	0.6							
AREA Property Partners Fund II	13,051	0.0	0.1							
Balanced Assets	54,496,590	6.5	6.5	-0.3	--	--	--	--	3.9	Jun-16
60% MSCI ACWI / 40% Barclays Global Aggregate				-2.2	5.7	1.9	5.8	3.8	1.3	Jun-16
PRIT General Allocation Fund (Net of Fees)	54,496,590	6.5	100.0	-0.3	--	--	--	--	4.8	Jun-16
60% MSCI ACWI / 40% Barclays Global Aggregate				-2.2	5.7	1.9	5.8	3.8	2.1	Jun-16

As of December 31, 2016

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Global Tactical Asset Allocation	47,713,082	5.7	5.7	0.8	2.8	-2.0	1.8	--	1.7	Aug-07
<i>Spliced Benchmark</i>				-2.2	5.7	1.2	0.5	2.4	2.0	Aug-07
William Blair Macro Allocation Strategy (Net of Fees)	47,713,082	5.7	100.0	0.8	2.5	--	--	--	-5.9	Jun-15
<i>60% MSCI ACWI / 40% Barclays Global Aggregate</i>				-2.2	5.7	1.9	5.8	3.8	0.7	Jun-15
Hedge Funds	19,537,642	2.3	2.3	2.5	4.4	2.4	4.8	3.1	4.2	Jul-05
<i>HFRI Fund of Funds Composite Index</i>				0.9	0.5	1.2	3.4	1.3	2.6	Jul-05
PRIT Hedge Fund (Net of Fees)	19,537,642	2.3	100.0	2.5	4.4	2.7	--	--	4.0	Jul-13
<i>HFRI Fund of Funds Composite Index</i>				0.9	0.5	1.2	3.4	1.3	2.6	Jul-13
Real Assets	35,226,183	4.2	4.2	-0.2	10.0	2.2	4.2	2.8	2.7	Oct-06
<i>CPI+3%</i>				0.7	5.1	4.2	4.4	4.9	4.8	Oct-06
Timber	16,613,627	2.0	47.2	-2.1	2.4	0.9	2.3	1.4	2.1	Oct-05
RMK Select Timberland Investment Fund I	5,561,411	0.7	33.5							
Hancock Timberland VII	5,495,278	0.7	33.1							
RMK Select Timberland Investment Fund II	3,667,860	0.4	22.1							
RMK Balanced Timberland B	1,889,078	0.2	11.4							
Natural Resources (Public)	7,095,718	0.8	20.1	4.5	31.0	-4.8	-2.0	--	-6.0	May-11
SSgA Global Natural Resources Stock Index	7,095,718	0.8	100.0	4.5	31.0	-4.8	-2.0	--	-6.0	May-11
<i>S&P Global LargeMidCap Commodity and Resources GR USD</i>				4.6	31.5	-4.6	-1.9	2.4	-5.7	May-11
Natural Resources (Private)	5,864,150	0.7	16.6	-0.1	-10.0	-15.6	-1.6	--	6.0	Jul-10
White Deer Energy II	4,184,177	0.5	71.4							
White Deer Energy	1,679,973	0.2	28.6							

As of December 31, 2016

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Infrastructure	5,652,688	0.7	16.0	-0.2	39.0	37.9	26.6	--	15.5	Jun-08
Global Infrastructure Partners	3,353,725	0.4	59.3							
Global Infrastructure Partners III	2,298,963	0.3	40.7							
Cash	3,602,717	0.4	0.4							
State Street STIF - Cash	3,602,717	0.4	100.0							