

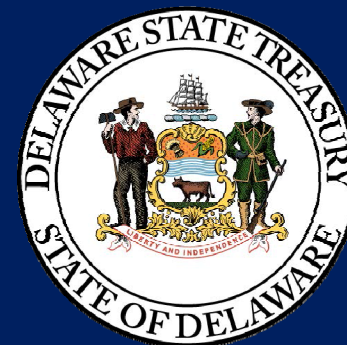
# INVESTMENT PERFORMANCE SUMMARY

## OFFICE OF THE STATE TREASURER & CASH MANAGEMENT POLICY BOARD

Month Ending March 31, 2019

John Krimmel, CPA, CFA, Partner

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

# CALENDAR YEAR INDEX PERFORMANCE

	2013	2014	2015	2016	2017	2018	Jan	Feb	Mar	YTD	5yr	10yr
Reserve Custom Index	0.12%	1.1%	0.86%	1.15%	1.00%	1.59%	1.00%	0.07%	1.42%	2.19%	1.58%	1.76%
Endowment Custom Index	14.46%	5.43%	-0.07%	5.71%	14.52%	-5.07%	5.10%	1.78%	1.56%	8.63%	5.31%	9.12%
Citi 3 Mo Treasury Bill	0.05%	0.03%	0.27%	0.84%	0.31%	1.86%	0.20%	0.19%	0.21%	0.60%	0.72%	0.41%
BAML 1-3 Yr Govt/Credit A+	0.55%	0.72%	0.66%	1.07%	0.70%	1.65%	0.30%	0.14%	0.62%	1.10%	1.14%	1.43%
BAML 1-5 Yr Govt/Credit A+	0.10%	1.42%	1.07%	1.30%	1.02%	1.50%	0.40%	0.10%	0.86%	1.41%	1.47%	1.98%
BAML 5-10 Yr Govt/Credit A+	-3.80%	6.60%	1.90%	2.00%	3.00%	0.59%	1.10%	-0.11%	2.11%	3.13%	3.03%	4.27%
BBrg Barclays US Aggregate	-2.02%	5.97%	0.55%	2.65%	3.54%	0.01%	1.10%	-0.06%	1.92%	2.94%	2.74%	3.77%
BC Municipal Bond	-2.60%	9.10%	3.30%	0.20%	5.40%	1.28%	0.80%	0.54%	1.58%	2.90%	3.73%	4.72%
BC US Corp High Yield	7.40%	2.50%	-4.50%	17.10%	7.50%	-2.08%	4.50%	1.66%	0.94%	7.26%	4.68%	11.26%
BC Long Treasuries	-12.70%	25.10%	-1.20%	1.30%	8.50%	-1.80%	0.70%	-1.22%	5.26%	4.67%	5.44%	5.13%
BC US Long Credit	-6.60%	16.40%	-4.60%	10.20%	12.20%	-6.80%	3.50%	-0.07%	4.33%	7.86%	5.38%	9.00%
MSCI World Index	26.68%	4.94%	0.87%	7.51%	22.40%	-8.71%	7.80%	3.01%	1.31%	12.48%	6.78%	12.38%

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



# TOTAL FUND PERFORMANCE DETAIL-NET OF FEES

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	2 Yrs (%)	3 Yrs (%)	4 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
<b>Delaware Total Consolidation</b>	<b>2,265,259,288</b>	<b>100.00</b>	<b>0.97</b>	<b>1.94</b>	<b>3.27</b>	<b>3.61</b>	<b>2.35</b>	<b>1.88</b>	<b>1.66</b>	<b>1.54</b>	<b>1.23</b>	<b>2.01</b>	<b>Jan-05</b>
<b>Total Liquidity &amp; Reserve</b>	<b>2,196,231,993</b>	<b>96.95</b>	<b>0.96</b>	<b>1.70</b>	<b>3.31</b>	<b>3.68</b>	<b>2.18</b>	<b>1.69</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>1.73</b>	<b>Jan-16</b>
<b>Total Liquidity</b>	<b>929,036,712</b>	<b>41.01</b>	<b>0.31</b>	<b>0.84</b>	<b>2.03</b>	<b>2.62</b>	<b>1.80</b>	<b>1.50</b>	<b>1.29</b>	<b>1.12</b>	<b>0.92</b>	<b>1.78</b>	<b>Jan-05</b>
PFM Asset Management	465,675,928	20.56	0.27	0.82	1.93	2.57	1.82	1.57	1.36	1.19	--	1.10	Jun-13
Wilmington Liquidity	463,360,784	20.46	0.36	0.86	2.12	2.66	1.71	1.39	1.21	1.05	0.99	4.20	Jan-85
<b>Total Reserve</b>	<b>1,267,195,281</b>	<b>55.94</b>	<b>1.43</b>	<b>2.31</b>	<b>4.27</b>	<b>4.55</b>	<b>2.48</b>	<b>1.85</b>	<b>1.74</b>	<b>1.70</b>	<b>1.62</b>	<b>2.33</b>	<b>Jan-05</b>
<i>Reserve Custom Index</i>			<u>1.42</u>	<u>2.19</u>	<u>4.36</u>	<u>4.39</u>	<u>2.35</u>	<u>1.66</u>	<u>1.59</u>	<u>1.58</u>	<u>1.76</u>	<u>2.52</u>	<i>Jan-05</i>
Over/Under			0.01	0.12	-0.09	0.16	0.13	0.19	0.15	0.12	-0.14	-0.19	
JPM Intermediate	311,175,769	13.74	0.66	1.31	2.83	3.24	1.81	1.38	1.38	1.38	--	1.28	Jun-13
<i>J.P. Morgan Custom Index</i>			<u>0.62</u>	<u>1.10</u>	<u>2.66</u>	<u>2.94</u>	<u>1.64</u>	<u>1.19</u>	<u>1.23</u>	<u>1.30</u>	<u>1.62</u>	<u>1.18</u>	<i>Jun-13</i>
Blackrock Financial Mangement	314,081,487	13.87	0.89	1.58	3.26	3.65	--	--	--	--	--	3.54	Mar-18
<i>Blackrock Custom Index</i>			<u>0.86</u>	<u>1.41</u>	<u>3.22</u>	<u>3.40</u>	<u>1.86</u>	<u>1.34</u>	<u>1.35</u>	<u>1.39</u>	<u>1.66</u>	<u>3.35</u>	<i>Mar-18</i>
Chandler Asset Management	323,741,597	14.29	2.02	3.26	5.59	5.96	3.14	2.21	2.05	2.07	--	1.78	Jun-13
Lazard Financial Management	318,196,428	14.05	2.14	3.08	5.40	5.33	--	--	--	--	--	5.39	Mar-18
<i>Chandler/Lazard Custom Index</i>			<u>2.11</u>	<u>3.13</u>	<u>5.79</u>	<u>5.60</u>	<u>2.94</u>	<u>2.06</u>	<u>1.88</u>	<u>1.81</u>	<u>1.88</u>	<u>5.38</u>	<i>Mar-18</i>
<b>Total Endowment</b>	<b>69,027,295</b>	<b>3.05</b>	<b>1.34</b>	<b>9.18</b>	<b>2.79</b>	<b>2.18</b>	<b>6.39</b>	<b>7.51</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>5.34</b>	<b>Aug-15</b>
<i>Endowment Custom Index</i>			<u>1.56</u>	<u>8.63</u>	<u>3.45</u>	<u>4.46</u>	<u>6.49</u>	<u>7.28</u>	<u>5.13</u>	<u>5.31</u>	<u>9.12</u>	<u>5.37</u>	<i>Aug-15</i>
Over/Under			-0.22	0.55	-0.66	-2.28	-0.10	0.23				-0.03	
SEI Funds	23,841,116	1.05	1.39	9.51	2.76	2.76	6.54	8.24	--	--	--	6.41	Aug-15
MSIFT Global Strategist	22,307,245	0.98	1.14	8.13	2.55	0.94	6.35	6.86	--	--	--	4.70	Aug-15
JP Morgan Diversified	22,878,523	1.01	1.47	9.87	2.63	2.24	6.66	8.14	--	--	--	5.55	Aug-15
Cash Account	411	0.00	0.19	0.58	1.35	1.74	1.26	0.94	--	--	--	0.79	Aug-15

Notes: Net of Fees. Results for periods longer than one year are annualized.

Performance history through 12/2015 is from BNY Mellon. NEPC Performance start date is January 2016. Fiscal Year end is June 30.

Prior to 03/01/2018 Reserve Custom Index is comprised of 75% BofA Merrill Lynch 1-5 year Govt/Corporate A+ or Better/ 25% 6 Month Treasury Bill.

Endowment Custom Index is comprised of 60% MSCI World Index/40% Barclays Capital Aggregate.

BlackRock Custom Index consists of BofA Merrill Lynch 1-5 Year Corporate/Government A+ or Better.

J.P. Morgan Custom Index consists of 100% 1-3 Year BofA Merrill Lynch Corporate/Government A+ or Better.

Chandler/Lazard Custom Index consists of 100% 5-10 Year BofA Merrill Lynch Corporate/Government A+ or Better.



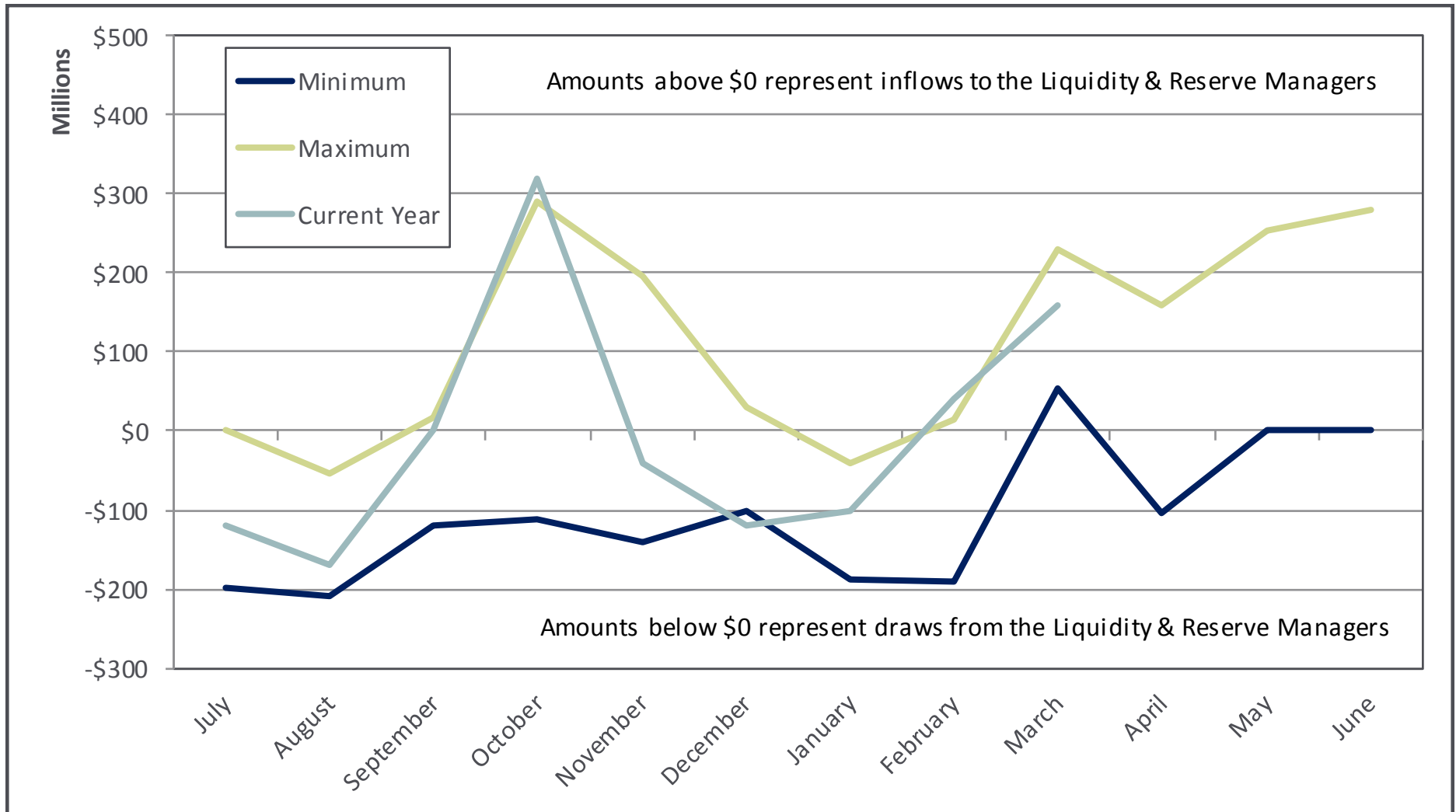
# YIELD AND DURATION POSITIONING

Liquidity Portfolio Yield & Duration Analysis						
Portfolio				Benchmark		
	<u>Portfolio Value</u>	<u>Yield</u>	<u>Duration</u>		<u>Yield</u>	<u>Duration</u>
PFM	\$ 465,675,928	2.59%	0.43	6-Month Treasury Bill	2.38%	0.41
Wilmington Trust	\$ 463,360,784	2.58%	0.77	6-Month Treasury Bill	2.38%	0.41
<b>Total Liquidity</b>	<b>\$ 929,036,712</b>	<b>2.59%</b>	<b>0.60</b>	<b>6-Month Treasury Bill</b>	<b>2.38%</b>	<b>0.41</b>

Reserve Portfolio Yield & Duration Analysis						
Portfolio				Benchmark		
	<u>Portfolio Value</u>	<u>Yield</u>	<u>Duration</u>		<u>Yield</u>	<u>Duration</u>
JP Morgan	\$ 311,175,769	2.53%	1.73	BAML 1-3 Yr Govt/Credit A+	2.41%	1.81
BlackRock	\$ 314,081,487	2.49%	2.56	BAML 1-5 Yr Govt/Credit A+	2.40%	2.53
Chandler	\$ 323,741,597	2.68%	5.82	BAML 5-10 Yr Govt/Credit A+	2.61%	6.26
Lazard	\$ 318,196,428	2.60%	6.32	BAML 5-10 Yr Govt/Credit A+	2.61%	6.26
<b>Total Reserve</b>	<b>\$ 1,267,195,281</b>	<b>2.58%</b>	<b>4.13</b>	<b>Custom Reserve Benchmark</b>	<b>2.51%</b>	<b>4.22</b>



# CASH FLOWS – FISCAL YEAR 2019



The minimum and maximum bands are the historical high and low amounts over the preceding 10 fiscal years.



# MONTH ENDED MARCH 31, 2019

Change in Market Value Month Ending March 31, 2019											
	Beginning Market Value	Contributions	Withdrawals		Fees	Income	Unrealized Gain (Loss)	Realized Gain (Loss)	Amortization / Accretion	Ending Market Value	
Liquidity Managers											
PFM Asset Management	\$ 384,460,398	\$ 100,000,000	\$ (20,000,000)	\$	-	\$ 870,593	\$ 158,232	\$ 8,021	\$ 178,683	\$ 465,675,928	
Wilmington Liquidity	\$ 381,727,496	\$ 100,000,000	\$ (20,000,000)	\$	-	\$ 815,176	\$ 529,909	\$ 7,671	\$ 280,532	\$ 463,360,784	
Total Liquidity Managers	\$ 766,187,894	\$ 200,000,000	\$ (40,000,000)	\$	-	\$ 1,685,769	\$ 688,141	\$ 15,692	\$ 459,215	\$ 929,036,712	
Reserve Managers											
BlackRock Financial Management	\$ 311,297,743	\$ -	\$ -	\$	-	\$ 623,022	\$ 2,052,591	\$ 59,535	\$ 48,597	\$ 314,081,487	
Chandler Asset Management	\$ 317,337,713	\$ -	\$ -	\$	-	\$ 705,066	\$ 5,630,955	\$ (30,621)	\$ 98,483	\$ 323,741,597	
JPM Intermediate	\$ 309,142,184	\$ -	\$ -	\$	-	\$ 639,667	\$ 1,311,041	\$ 26,069	\$ 56,808	\$ 311,175,769	
Lazard Asset Management	\$ 311,543,066	\$ -	\$ -	\$	-	\$ 679,798	\$ 5,522,069	\$ 332,920	\$ 118,574	\$ 318,196,428	
Total Reserve Managers	\$ 1,249,320,706	\$ -	\$ -	\$	-	\$ 2,647,553	\$ 14,516,656	\$ 387,903	\$ 322,461	\$ 1,267,195,281	
Total Liquidity & Reserve Managers	\$ 2,015,508,600	\$ 200,000,000	\$ (40,000,000)	\$	-	\$ 4,333,322	\$ 15,204,797	\$ 403,595	\$ 781,676	\$ 2,196,231,993	
Land & Water Endowment											
SEI Funds	\$ 24,235,346	\$ 12,942	\$ (738,000)	\$	-	\$ 24,422	\$ 249,495	\$ 56,911	\$ -	\$ 23,841,116	
MSIFT Global Strategist	\$ 22,776,343	\$ 12,942	\$ (738,000)	\$	-	\$ 502	\$ 293,075	\$ (37,618)	\$ -	\$ 22,307,245	
JP Morgan Diversified	\$ 23,266,068	\$ 12,942	\$ (738,000)	\$	-	\$ 120,775	\$ 255,362	\$ (38,624)	\$ -	\$ 22,878,523	
Cash Account	\$ 2,401	\$ 2,250,426	\$ (2,252,826)			\$ 410	\$ -	\$ -	\$ -	\$ 411	
Total Land & Water Endowment	\$ 70,280,158	\$ 2,289,252	\$ (4,466,826)	\$	-	\$ 146,109	\$ 797,932	\$ (19,331)		\$ 69,027,295	
Total	\$ 2,085,788,758	\$ 202,289,252	\$ (44,466,826)	\$	-	\$ 4,479,431	\$ 16,002,730	\$ 384,264	\$ 781,676	\$ 2,265,259,288	

## Footnotes:

Values provided by Northern Trust and are reconciled to the audited custodian reports.

Income is a product of income received during the month plus accrued income.

Numbers may not add due to rounding.



# FISCAL YEAR TO DATE

	Change in Market Value Fiscal Year-to-Date Through March 31, 2019									
	Beginning Market Value	Contributions	Withdrawals	Fees	Income	Unrealized Gain (Loss)	Realized Gain (Loss)	Amortization / Accretion	Ending Market Value	
Liquidity Managers										
PFM Asset Management	\$ 492,906,444	\$ 340,000,000	\$ (375,013,748)	\$ (232,522)	\$ 5,603,308	\$ 827,415	\$ 64,524	\$ 1,520,507	\$ 465,675,928	
Wilmington Liquidity	\$ 489,669,700	\$ 458,885,000	\$ (493,885,000)	\$ (238,620)	\$ 5,334,582	\$ 1,520,549	\$ 222,401	\$ 1,852,171	\$ 463,360,784	
Total Liquidity Managers	\$ 982,576,144	\$ 798,885,000	\$ (868,898,748)	\$ (471,142)	\$ 10,937,891	\$ 2,347,964	\$ 286,925	\$ 3,372,678	\$ 929,036,712	
Reserve Managers										
BlackRock Financial Management	\$ 304,178,445	\$ -	\$ -	\$ (175,398)	\$ 5,237,375	\$ 5,687,691	\$ (1,241,494)	\$ 394,868	\$ 314,081,487	
Chandler Asset Management	\$ 306,602,083	\$ -	\$ -	\$ (174,995)	\$ 6,091,474	\$ 10,585,332	\$ (222,231)	\$ 859,935	\$ 323,741,597	
JPM Intermediate	\$ 302,598,195	\$ -	\$ -	\$ (238,520)	\$ 5,312,281	\$ 4,757,656	\$ (1,708,734)	\$ 454,891	\$ 311,175,769	
Lazard Asset Management	\$ 301,883,237	\$ 314	\$ -	\$ (272,274)	\$ 5,983,735	\$ 9,714,791	\$ (127,962)	\$ 1,014,588	\$ 318,196,428	
Total Reserve Managers	\$ 1,215,261,960	\$ 314	\$ -	\$ (861,187)	\$ 22,624,865	\$ 30,745,471	\$ (3,300,422)	\$ 2,724,282	\$ 1,267,195,281	
Total Liquidity & Reserve Managers	\$ 2,197,838,104	\$ 798,885,314	\$ (868,898,748)	\$ (1,332,329)	\$ 33,562,756	\$ 33,093,435	\$ (3,013,497)	\$ 6,096,960	\$ 2,196,231,993	
Land & Water Endowment										
SEI Funds	\$ 22,673,974	\$ 1,272,105	\$ (783,310)	\$ (60,075)	\$ 467,332	\$ (262,744)	\$ 533,835	\$ -	\$ 23,841,116	
MSIFT Global Strategist	\$ 21,282,497	\$ 1,197,411	\$ (763,184)	\$ -	\$ 780,447	\$ (2,103,365)	\$ 1,913,439	\$ -	\$ 22,307,245	
JP Morgan Diversified	\$ 21,816,446	\$ 1,225,484	\$ (784,269)	\$ -	\$ 372,483	\$ (1,426,700)	\$ 1,675,080	\$ -	\$ 22,878,523	
Cash Account	\$ 3,571,583	\$ 2,359,591	\$ (5,957,999)	\$ -	\$ 27,236	\$ -	\$ -	\$ -	\$ 411	
Total Land & Water Endowment	\$ 69,344,500	\$ 6,054,591	\$ (8,288,762)	\$ (60,075)	\$ 1,647,498	\$ (3,792,808)	\$ 4,122,354		\$ 69,027,295	
Total	\$ 2,267,182,604	\$ 804,939,905	\$ (877,187,510)	\$ (1,392,404)	\$ 35,210,254	\$ 29,300,627	\$ 1,108,857	\$ 6,096,960	\$ 2,265,259,288	

## Footnotes:

Values provided by Northern Trust and are reconciled to the audited custodian reports.

Income is a product of income received during the month plus accrued income.

Numbers may not add due to rounding.



# DEFAC PROJECTION

	DEFAC Current Year	Δ From Previous Observation	FY 20	FY 20 Δ From Previous Observation	FY 21	FY 21 Δ From Previous Observation	FY 22	FY 22 Δ From Previous Observation	FY 23	FY 23 Δ From Previous Observation
	<u>Totals</u>		<u>Totals</u>		<u>Totals</u>		<u>Totals</u>		<u>Totals</u>	
Total Interest	\$38,956,421	(\$1,695,314)	\$45,226,364	(\$4,173,138)	\$44,596,691	(\$4,252,984)	\$43,634,922	(\$4,452,854)	\$42,669,544	(\$4,653,964)
Total Sweep Income	\$2,345,630	\$146,670	\$1,958,000	-	\$1,958,000	-	\$1,958,000	-	\$1,958,000	-
Change in Market Value	\$3,686,941	\$4,705,676	\$14,884,152	\$10,213,111	\$3,279,021	\$598,898	\$3,284,863	\$600,972	\$3,290,793	\$602,910
Less: School Special Fund Interest Payments	(\$15,400,705)	-	(\$25,000,000)	-	(\$25,000,000)	-	(\$25,000,000)	-	(\$25,000,000)	-
Less: Banking Services	(\$3,975,096)	-	(\$4,173,851)	-	(\$4,382,543)	-	(\$4,601,671)	-	(\$4,831,754)	-
Less: Investment Manager Fees	(\$1,734,138)	(\$501)	(\$1,599,287)	(\$10,920)	(\$1,599,287)	(\$10,920)	(\$1,599,287)	(\$10,920)	(\$1,599,287)	(\$10,920)
DEFAC Projection	\$23,879,052	\$3,156,530	\$31,295,379	\$6,029,054	\$18,851,882	(\$3,665,006)	\$17,676,828	(\$3,862,801)	\$16,487,296	(\$4,061,974)

As of 03/31/2019; An estimate was used for the March School and Special Fund Interest payment, which was unavailable at the time of publishing

**Interest rates broadly declined during the month following a dovish pivot from the Fed, causing the current year DEFAC projection to increase significantly**

The blended benchmark yield declined 24 basis points during the month to 2.48%

**Further declines in interest rate expectations caused DEFAC projections to fall in later years**





# ASSUMPTIONS FOR DEFAC PROJECTION

- ***Net Cash Flows – Assumed to be net neutral over the course of each fiscal year and follow historical seasonality patterns, FY 20 through FY 23 each follow the previous year's cash flow pattern***
- ***Changes in Yield – Actual changes reflected as they are realized, projected changes based on forward yield curve at 1 year and 5 year forward points***
- ***Interest – Actual interest reflected as it is realized, projected interest calculated as projected yield times projected market value***
- ***Banking Services – Flat estimate of \$331,258 per month; projected to increase 5% annually***
- ***School and Special Fund Interest Payments – Actual payments reflected as realized, projected payments calculated based on \$1B average balance and a range-bound rate as implied by the trailing 12M liquidity and liquidity & reserve returns***
- ***Investment manager fees – Estimated as 8.8 bps per year of assets under management***

### **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.
- 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 within.
- Some index returns displayed in this report or used in calculation of a policy, allocation or custom benchmark may be preliminary and subject to change.
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- This report may contain confidential or proprietary information and may not be copied or redistributed to any party not legally entitled to receive it.

### **Reporting Methodology**

- The client's custodian bank is NEPC's preferred data source unless otherwise directed. NEPC generally 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 manager fees as indicated on each page.
- 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 taken into account in all 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.

