



ARIZONA STATE TREASURER'S OFFICE

STATE OF ARIZONA TREASURER'S OFFICE STRESS TEST RESULTS OF OPERATING CASH FLOW AND ENDOWMENT DISTRIBUTIONS

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EXECUTIVE SUMMARY

This is the Arizona Treasurer's Office second annual report on stress testing the State of Arizona's operating cash balances and Permanent Land Endowment Trust Fund (PLETF) distributions.

The purpose of the annual stress tests is to provide policymakers a view on how budgeting decisions today can affect taxpayers tomorrow. Cash flow, whether for a home, business or government is critical. However, unlike a home or business, once the Arizona Legislature and Governor approve an annual budget, state agencies are authorized to spend money, regardless of cash flow.

During the Great Financial Crisis (GFC) from 2007 to 2009, the state eventually ran out of cash to pay its bills. Despite repeated warnings from the Arizona State Treasurer's Office (ASTO) in 2007, 2008 and 2009, the state kept spending money without regard to its income. By fiscal year 2010 (July 1, 2009 to June 30, 2010) the state's operating cash was in the red for 305 days. If not for a \$700 Million daily credit line negotiated by the ASTO in conjunction with the State Loan Commission, along with other emergency internal borrowing from state agency funds, the state would have failed to make payments on their obligations. (The loan commission, chaired by the State Treasurer, includes the Governor and the Director of the Department of Administration).

Furthermore, distributions from the Permanent Land Endowment Trust Fund (endowment) were zero in FY 2010 due to the methodology of the constitutional distribution formula governing payouts.

The annual ASTO stress tests estimate how long the state's cash balance would remain positive during a future economic downturn and whether there would be a decrease in endowment distributions. The purpose of our "what if" analysis is to assist policymakers with more information as they budget and to help the state prepare for future economic downturns.

General Fund Cash Flow

Steps taken by legislators and Governor Doug Ducey in the 2019 legislative session have improved cash flow projections for the state. Arizona is positioned to withstand recessions on par with the 1991 and 2001 recessions. However, the state is not positioned to withstand a recession like the GFC. Under a repeat of the GFC, the state would begin to feel cash flow stress within 16 months. This is an improvement of two months from last year's stress test results. However, the \$930 million K-12 rollover paid each July remains a problem that needs addressing. (See DEFINITIONS for information on the 'rollover'). While policymakers agreed to pay \$30 million of the rollover in FY 2022, more needs to be done.

Endowment Cash Flow

For endowment distributions, a repeat of any of the previous large stock market downturns since the 1980s would have ***minimal impact*** on distributions. With five more years of distributions under the existing Proposition 123 formula, only one year would see a slight year-over-year decrease in distributions based on the stress tests.

Finally, it is worth noting what a difference a year makes. When this report was first conducted in the Fall of 2018, equity markets were declining, the Federal Reserve was raising interest rates and a portion of the United States Treasury yield curve have begun to invert, traditionally seen as a sign that slower economic growth is on the horizon within 24 months.

Now, equity markets are hitting record highs, the Federal Reserve has reversed course, the yield curve, which inverted during 2019, has now normalized with longer dated notes yielding more than shorter term notes. Further, the state's operating cash balances are at historic highs and reached its highest level ever on June 25, 2019 of \$3.75 billion.

This underscores the lesson that financial conditions change quickly, and policymakers need to be prepared to change direction as well when it comes to revenue and expenditure forecasts.

OPERATING CASH FLOW BACKGROUND

A decade has passed since the GFC which resulted in the State of Arizona running out of operating cash and having to borrow as much as \$958 Million each day to pay teachers, public safety workers, health care providers and general government employees and operations. It was the first time since the mid 1950's that the ASTO had to issue Treasurer Warrant Notes (TWNS), a short-term IOU, to cover the checks that the state issued to pay salaries, vendors, and state aid to schools and local governments. This short-term debt was separate from other debt issued to fund operations during the GFC.

The operating cash balance consists of General Fund tax revenues, tax revenues that are not allowed to earn interest, and tax revenues allowed to earn interest but not invested on that day due to timing of notifications from state agencies to the ASTO. The operating cash is invested daily by the Treasurer's office in a variety of pooled funds. Interest earned on the operating balance is credited to the General Fund. State law requires the ASTO to pay all warrants issued by the Department of Administration. General Fund warrants can be paid from all operating monies and when no operating cash exists, then TWNS are issued to provide liquidity.

Records exist back to 1991 of the monthly average operating balance and to January 1996 of the daily operating balance. This historical data provides a record of the state's operating cash flows over several economic cycles, including three nationally-recognized recessions. In each of those recessions, operating cash declined on a year over year basis and went negative during the GFC. The cycles of these operating cash declines range from 18-42 consecutive months. Each cycle corresponded with the Arizona Legislature having to cut budgets, reduce spending, raise revenues, or enact accounting changes that had the effect of papering over a deficit on a "cash basis", while not helping to resolve the negative impacts of the state's operating cash balance. The three other periods that operating cash declined on a year over year basis were not recessionary but corresponded with budget pressures at the State Capitol. These three periods ranged from 9-20 months in duration. Thus, we can use the health of the operating cash flow balances (i.e. the monthly year over year change) as a proxy indicator of the overall health of the state's General Fund budget.

Currently, the state's operating cash balances are growing at a healthy rate and achieved record highs in in May and June of 2019, including a single day record on June 25, 2019 of \$3.75 billion. The ASTO monitors operating cash flow daily, updating current year forecasts in real time to spot any significant variances that would require notification to policy makers.

I. Methodology of Tests

To stress cash flows, we applied a "what-if" scenario by calculating the percentage monthly declines in six prior recessionary periods of consecutive negative months, as seen in Exhibit 1, to the October 2019 average monthly balance of \$2.25 Billion. Applying this methodology

provides a variety of stress cases of cash flow over the previous three decades to predict drawdowns in operating balances. If projected operating balances fall below established risk tolerances, the state should immediately take steps to prevent a future negative operating balance. Including cash flow forecasts into the strategic budget planning process and day-to-day operations would be necessary steps to avoid running out of cash in the future.

Drawdown Period	Time Frame	Total Months	Beginning Average Balance (previous month)	Ending Average Balance	Lowest Average Balance
1991 Recession	Jul 1991 - Dec 1992	18	\$344 Million	\$182 Million	\$116 Million
Y2K slow down	Apr 1999 - Dec 1999	9	\$1,482 Million	\$1,374 Million	\$1,207 Million
2001 Recession	Mar 2001 - May 2003	27	\$1,651 Million	\$841 Million	\$792 Million
Great Financial Crisis	Jan 2007 - Jun 2010	42	\$2,181 Million	\$450 Million	-\$733 Million
2014-2015 slowdown	Apr 2014 - Jul 2015	16	\$2,107 Million	\$1,795 Million	\$1,369 Million
2016-2018 slowdown	Aug 2016 - Mar 2018	20	\$2,012 Million	\$1,937 Million	\$1,303 Million

Exhibit 1

II. Definition of Stress

Stress on operating cash varies throughout the year due to the seasonality of payments made by the state. The first sign of stress occurs if the average monthly operating cash balance falls below \$1 Billion. This is because each month, the state makes payments that approach \$1 Billion on the fifth business day of each month to various vendors, with Medicaid payments being the largest on that day. Further, if operating cash does not maintain a balance of \$2 Billion or more on average at the beginning of February each year, then cash flow stress will develop as state income tax refunds begin to be paid that month, and then five months later the K-12 education rollover must be paid along with prepayment of public safety pension contributions in early July.

III. Operating Cash Flow Results

Only in one of six scenarios does the state operating cash turn negative and not survive a downturn and that is a repeat of the 2007-2009 recession. A repeat of that downturn, which saw 42 consecutive months of year over year negative monthly cash flow, would result in the state's operating cash reaching stress levels in 16 months when operating cash drops to \$719 Million on average.

Severe stress would begin in 22 months with average balances dropping below \$449 Million and the state running out of cash in 28 months. (Exhibit 2 below.) Using the state's current \$1 Billion Budget Stabilization Fund (BSF) balance would delay negative cash flow by five months but would turn negative after the K-12 rollover was paid. (See DEFINITIONS for information on the BSF).

However, if the K-12 rollover did not exist, operating cash, while stressed, would not turn negative under a repeat of the 42-month GFC scenario. This would give policymakers time to address structural spending gaps during a severe recession, potentially avoiding the severe stress on operating cash flow. Bolstering the BSF to at least 15% of General Fund revenues, or approximately \$1.5 Billion, would provide a necessary buffer in the face of a severe recession.

Under all other scenarios, our estimates indicate Arizona has enough operating funds to remain solvent when compared against all other historic drawdowns of operating cash that have occurred since 1990. This also assumes no disruption or reduction in federal funds or extended federal government shutdowns that delay payments to states during these times.

For example, under the 1991 recession scenario, state cash flow becomes under stress in 16 months, with average cash balances falling to \$932 Million that month. With the current BSF balance of \$1 billion, there is the necessary cushion to drawdowns of operating cash. Reducing the K-12 rollover by at least a third would also ensure enough liquidity to endure the effects of an 18-month downturn in revenue as experienced in the 1990-1991-time frame.

The same caveats apply to a repeat of the 2001 recession scenario. Cash flow stress appears in 22 months when the average balance falls to \$958 Million. As with the 1991 recession, the BSF balance combined with a paydown of the K-12 rollover provides enough liquidity for cash flow to withstand the 27 consecutive months in declining year over year operating cash balances.

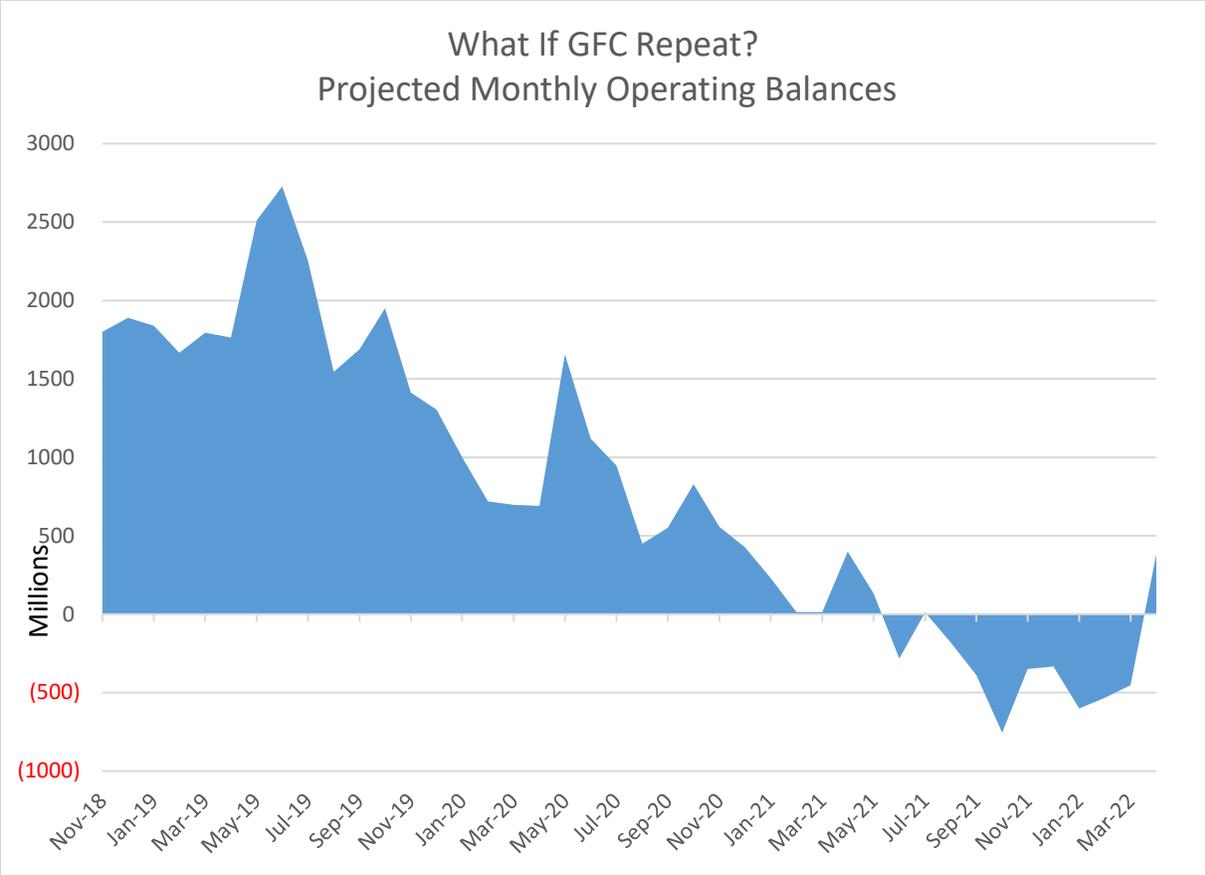


Exhibit 2



IV. Endowment Distributions Background

When Arizona became a state in 1912, the Federal Government deeded 10 million acres of land to be held in trust for 13 different governmental beneficiaries, the largest being K-12 public education. The land is held in trust for the beneficiaries and any income produced from the land is for the use of the beneficiaries. If any of the land is ever sold, the proceeds from the sale are deposited with the State Treasurer to be invested in perpetuity so that income will continue to be produced for the beneficiaries. The income distributed in any given years is controlled by a formula in the Arizona Constitution, which can only be changed by a vote of the public at a general election. After zero distributions in FY 2010, voters approved a flat 2.5% distribution formula at the ballot in 2012 and changed the formula again in 2016.

Currently, distributions are set at 6.9% of the average market value of the preceding five calendar years of the Endowment, paid out monthly. After FY 2025, distributions will be 2.5% of the five-calendar year rolling average market value in perpetuity.

V. Methodology of Endowment Tests

To stress test the 6.9% distributions, we applied the “what if” scenarios of previous stock market downturns to the market value of the endowment at the end of October 2019. We used the monthly total returns of the four current benchmarks the endowment is measured by to conduct the stress tests for the time periods selected. We began with the first negative month of what would have been declared the start of market downturns and applied those monthly returns to our ending balance of October 2019 through the time when the Standard and Poor’s 500 large cap stock index had returned to its previous high before the downturn.

The chosen periods were the GFC, the 2000 Tech Bubble Crash, the 1987 October Black Monday crash and the early 1980s recession. We also modeled deposits from the Land Department as they occurred during the GFC to mirror the same type of economic activity and movement of cash flows in the analysis but adjusted for the higher 6.9% distributions now required by law. For each period we applied the stress tests, we then carried monthly total returns from the benchmarks forward through two years after the 6.9% distributions end. This is to demonstrate how the formula would perform if history repeated similar market downturns.

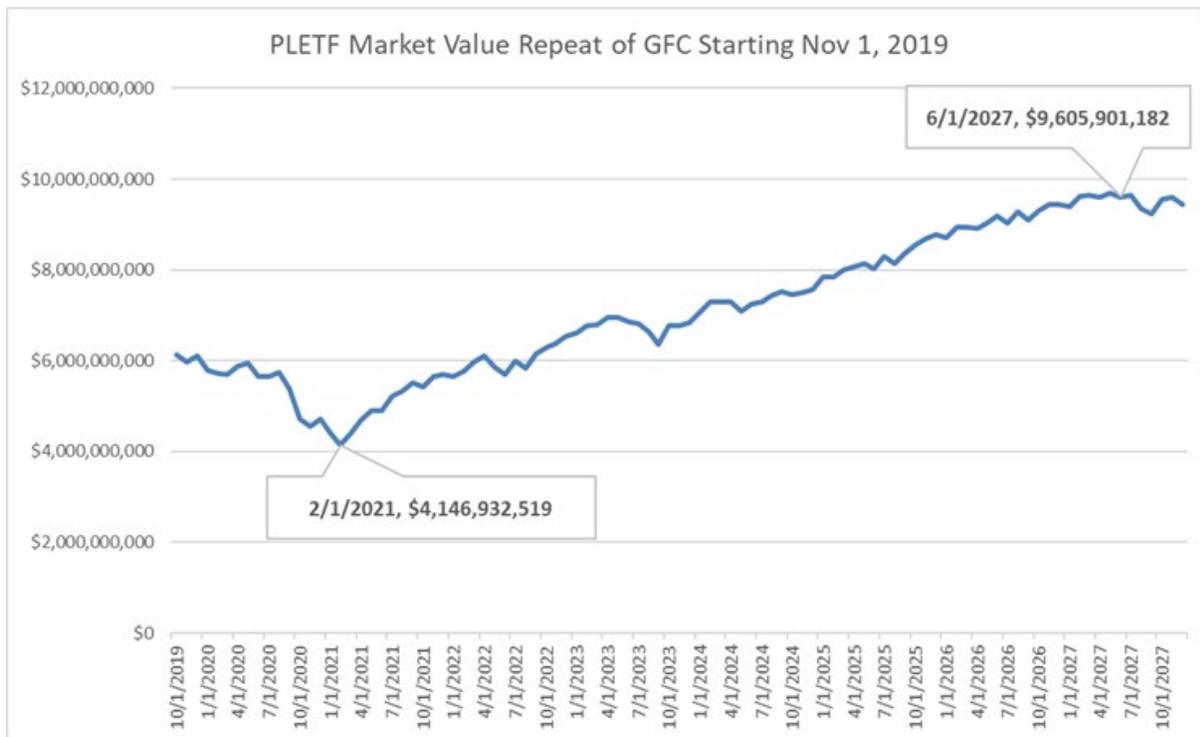
All results were based on macro level data of the combined endowment, and not the individual components of the 13 different beneficiaries. While K-12 Schools received about 87% of the land at statehood, they make up about 93% of the Endowment as more of their land has been sold since statehood on a percentage basis.

VI. Endowment Distribution Results

The results of the tests on the endowment found that the distributions perform well through the stressed periods. For example, if a repeat of the GFC occurred, monthly payouts between year two and three would only decline by about \$193,674 a month from \$32.4 Million in FY 2022 to \$32.2 Million in FY 2023 before increasing again in FY 2024 to \$32.6 Million. This compares to the \$30.7 Million monthly distribution in FY 2020.

This projected performance might surprise some, but shouldn't, as the distribution formula is based on a percentage of the averaged market value for the preceding five years. This smooths out the shock of any stock market correction or bear market so that beneficiaries will not experience wild swings in the monthly income they receive from the endowment.

It should be noted that this doesn't mean the market value of the endowment doesn't decline in the market downturn. It does substantially. In the case of a repeat of the GFC the total market value of the endowment would decline to a projected low point of \$4.1 Billion in February 2021 from the \$6.1 Billion on October 31, 2019. It would then again reach \$6.1 Billion by April 2022, while also paying out about \$32 Million a month. It should be noted the market value of the endowment during the GFC also declined substantially and recovered from a high of \$2.7 Billion in December 2007 to a low of \$2.15 Billion in February 2009 before growing back above \$2.7 Billion by February 2010.



The reason the total value of the endowment can recover quickly is due to the disciplined investment policy adopted by the Treasurer and the State Board of Investment as dictated by the Arizona Constitution. The investment policy has determined that the best method to invest for the endowment is investing only in United States companies via a passive index strategy for equities (60% allocation) and an actively managed fixed income bond portfolio (40% allocation). This traditional 60/40 portfolio has demonstrated to provide stable returns with reduced volatility when compared to large endowments and pension funds across the country that have migrated to strategies that contain illiquid alternative investments. One consequence of these alternative strategies is during downturns, when distributions are needed, these alternative investments are not able to be sold, forcing their remaining stocks and bonds to be sold to raise cash. This action can significantly reduce the value of a fund even further during times of stress.

Further, during the GFC, many endowments saw historically non-correlated assets become highly correlated precisely at the time they had been intended to act as hedges against market volatility and offset risk and provide improved risk adjusted returns.

VII. Recommendations

While the economy in Arizona is strong, policy makers should prepare for any future economic downturn. Fortunately, there are measures lawmakers can take to mitigate the severity of a future economic downturn and its impact on the state budget and related operations. Each of these measures can shore up the state's operating cash flow and reduce the impacts of future budget cuts and additional debt.

ACTIONS TO IMPROVE CASH POSITION:

- Eliminate or substantially reduce the \$930 Million annual K-12 rollover payment. If not eliminated before a severe recession, daily operations of all state government, including distributions from tax collections to local governments, are at risk. At close to 9 percent of the annual General Fund budget of Arizona, the existence of the rollover exacerbates and inhibits all budget options in the future.
- While addressing the rollover, the state should also examine the payment schedule to school districts and charter schools. Currently, many schools are using lines of credit with county treasurers as stop-gap measures for monthly cash flows until the rollover is paid back every July.
- Increase the balance of the Budget Stabilization Fund to the maximum 10% of General Fund revenues each year. Currently at \$1 Billion, the fund is about \$100 Million less than the current maximum. Consider raising the cap to 15% of general fund revenues in the future.

ACTIONS TO IMPROVE CASH MANAGEMENT:

- Stop borrowing from the BSF. For the past several years, the lawmakers have been taking money out of the BSF for various items, thus preventing earnings on interest to compound.
- Amend state law to modernize the process in which the ASTO issues warrant notes. Most states can issue short-term commercial paper with maturities of 7-270 days to cover short-term cash flow deficits. This is a product used by the municipal finance sector and, if structured, would ensure in the future Arizona would have a wider range of investors and lower interest rate costs.
- Slow the rate of spending once a downturn in cash is evident. This requires quicker action by the executive branch and the Legislature to adjust spending in real time while revenues begin to decline. Enact a budget with triggers that reduces spending

automatically if revenues miss targets or enact a budget with triggers that only increases spending once revenues are received.

- Eliminate unnecessary practices that constrict cash, e.g., prepayments on pension contributions at the beginning of the year or health insurance premiums.
- Better coordinate all state payments to maximize cash flows and maintain a healthy ending balance in the General Fund instead of budgeting to the last dollar.
- Examine operating cash updates that are regularly provided by ASTO as part of the ongoing state budget process.
- Enact budgets based upon budgetary data that is measured on a “modified accrual basis” and, thus, meets Generally Accepted Accounting Practices (GAAP) standards. This would negate the apparent benefit of budgetary “rollovers,” the “midnight reversion” and other budgetary gyrations that are only possible because Arizona’s annual financial reporting is made on a “modified cash basis.”

VIII. Conclusion

Liquidity risk must be identified, measured, and monitored in a timely and comprehensive manner. Arizona was hit hard in the last recession and its state government was not prepared for the impact. Although there are still obstacles that would hinder Arizona, the state is better prepared for another severe recession and is well placed to weather milder recessions like what occurred in 1991 and 2001 than it had been in the past, at least when it comes to operating cash flow forecasts. The K-12 rollover continues to be an outstanding problem that needs to be addressed to better prepare for the next economic downturn.

IX. Definitions

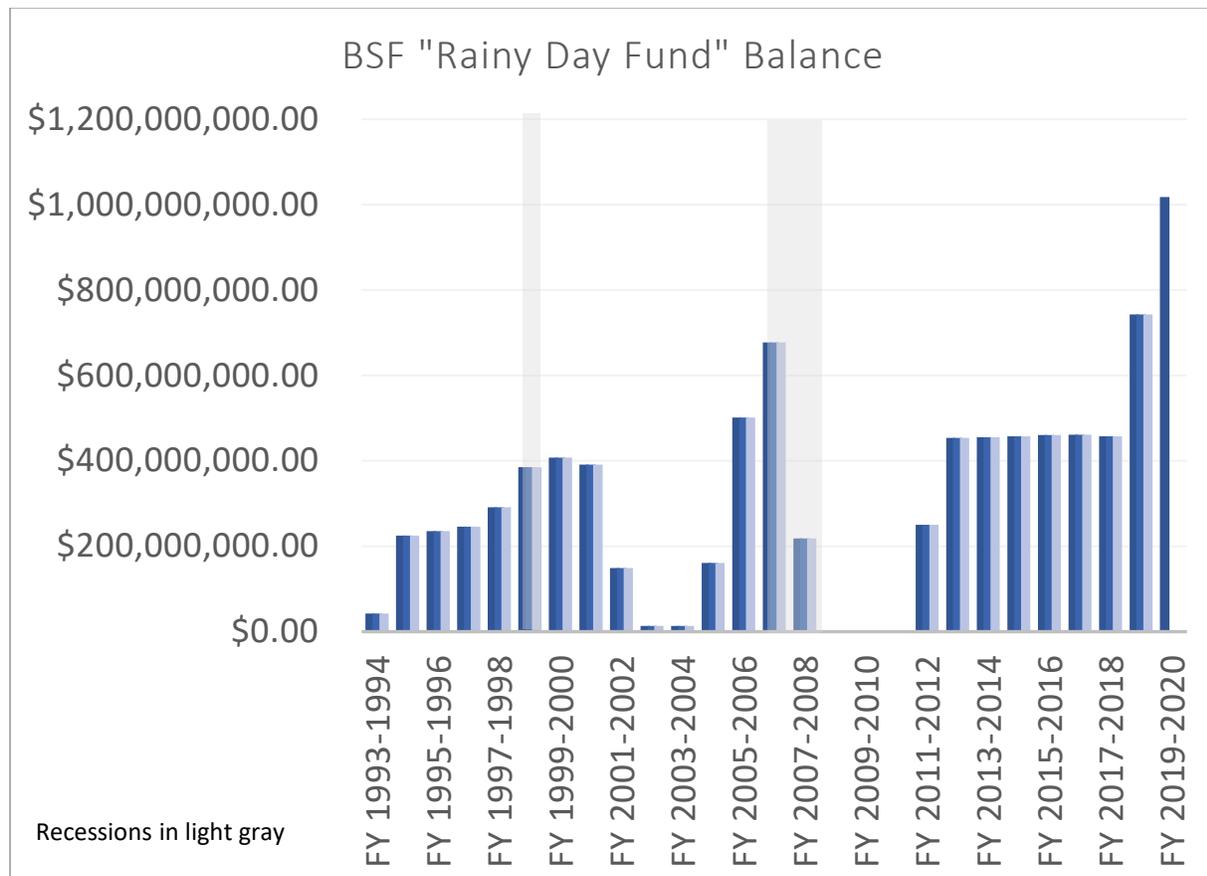
WHAT IS THE K-12 ROLLOVER?

During the Great Financial Crisis (GFC) of 2007-2010, the state needed to take extraordinary measures to balance the budget. One such tool was to delay K-12 school appropriations payments. Instead of making the required appropriations payment for June 2008 in June 2008, the state delayed the \$272 Million payment; pushing it into the next fiscal year beginning July 1. The state made the required July appropriations payment and carried the June payment as an

outstanding liability to K-12 schools. The state took the same action again in June 2009 (\$330 Million) and June 2010 (\$350 Million); this tool became known as the “rollover.” Beginning in fiscal year 2013, the rollover was eliminated for school districts with fewer than 600 students which drew down some of the liability. Currently, the three rollover payments total approximately \$930 Million owed to K-12 schools. The rollover applies only to district public schools; not charter public schools.

WHAT IS THE BUDGET STABILIZATION FUND (BSF)?

The Budget Stabilization Fund (BSF) for Arizona was enacted in 1990 (A.R.S. § 35-144). The fund is administered by the State Treasurer, who is responsible for transferring General Fund money into and out of the BSF as directed by the Legislature and Governor and as required by law. Under the statutory formula, a maximum of \$1.11 Billion can be deposited for Fiscal Year 2020. The BSF is like an emergency savings account and is designed to set revenue aside during times of above-trend economic growth and to utilize this revenue during times of below-trend growth. The BSF is also known as the “Rainy Day Fund.” When first enacted, the balance in the BSF was to be capped at 15% of general fund revenues and was later lowered to 5% then up to 7% and last year was increased to a 10% cap. See the graph below of the annual historical balance at the end of each fiscal year and the current balance.



Appendices

Appendix A

Operating Balance Drawdowns July 1991- December 1992

Note all \$ figures in millions

1991 Recession	Monthly Operating Balance	YOY Change	What If Scenario	Projected Monthly Balance
Jul-91	\$236	-26.48%	Nov-19	\$1,398
Aug-91	\$259	-6.16%	Dec-19	\$1,905
Sep-91	\$232	-14.39%	Jan-20	\$2,010
Oct-91	\$168	-38.24%	Feb-20	\$1,350
Nov-91	\$210	-7.89%	Mar-20	\$1,888
Dec-91	\$230	-5.35%	Apr-20	\$2,116
Jan-92	\$274	-2.49%	May-20	\$2,890
Feb-92	\$283	-2.75%	Jun-20	\$3,100
Mar-92	\$225	-16.04%	Jul-20	\$2,093
Apr-92	\$170	-38.18%	Aug-20	\$1,137
May-92	\$177	-46.04%	Sep-20	\$1,065
Jun-92	\$213	-38.08%	Oct-20	\$1,391
Jul-92	\$185	-21.61%	Nov-20	\$1,096
Aug-92	\$171	-33.98%	Dec-20	\$1,258
Sep-92	\$139	-40.09%	Jan-21	\$1,204
Oct-92	\$116	-30.95%	Feb-21	\$932
Nov-92	\$127	-39.52%	Mar-21	\$1,142
Dec-92	\$182	-20.87%	Apr-21	\$1,675

Appendix B

Operating Balance Drawdowns April 1999 – December 1999

Note all \$ figures in millions

Y2K Slowdown	Monthly Operating Balance	YOY Monthly Change	What If Scenario	Projected Monthly Balance
Apr-99	\$1,346	-4.32%	Nov-19	\$1,820
May-99	\$1,370	-3.00%	Dec-19	\$1,969
Jun-99	\$1,241	-4.87%	Jan-20	\$2,234
Jul-99	\$1,250	-6.08%	Feb-20	\$2,052
Aug-99	\$1,207	-5.67%	Mar-20	\$1,934
Sep-99	\$1,301	-3.56%	Apr-20	\$2,156
Oct-99	\$1,297	-3.55%	May-20	\$2,859
Nov-99	\$1,322	-3.10%	Jun-20	\$3,089
Dec-99	\$1,374	-1.09%	Jul-20	\$2,466

Appendix C

Operating Balance Drawdowns March 2001 – May 2003

Note all \$ figures in millions

2001 Recession	Monthly Operating Balance	YOY Monthly Change	What If Scenario	Projected Monthly Balance
Mar-01	\$1,468	-4.41%	Nov-19	\$1,818
Apr-01	\$1,343	-8.71%	Dec-19	\$1,853
May-01	\$1,312	-5.93%	Jan-20	\$2,209
Jun-01	\$1,218	-4.07%	Feb-20	\$2,096
Jul-01	\$1,181	-7.28%	Mar-20	\$1,901
Aug-01	\$1,178	-7.89%	Apr-20	\$2,060
Sep-01	\$1,306	-8.39%	May-20	\$2,715
Oct-01	\$1,256	-14.76%	Jun-20	\$2,717
Nov-01	\$1,245	-18.09%	Jul-20	\$2,042
Dec-01	\$1,253	-17.53%	Aug-20	\$1,517
Jan-02	\$1,267	-24.93%	Sep-20	\$1,482
Feb-02	\$1,312	-20.53%	Oct-20	\$1,785
Mar-02	\$1,172	-20.17%	Nov-20	\$1,451
Apr-02	\$947	-29.50%	Dec-20	\$1,307
May-02	\$865	-34.04%	Jan-21	\$1,457
Jun-02	\$889	-26.99%	Feb-21	\$1,530
Jul-02	\$1,022	-13.44%	Mar-21	\$1,645
Aug-02	\$804	-31.69%	Apr-21	\$1,407
Sep-02	\$849	-35.02%	May-21	\$1,764
Oct-02	\$811	-35.42%	Jun-21	\$1,755
Nov-02	\$811	-34.83%	Jul-21	\$1,331
Dec-02	\$792	-36.84%	Aug-21	\$958
Jan-03	\$975	-23.06%	Sep-21	\$1,140
Feb-03	\$1,283	-2.23%	Oct-21	\$1,745
Mar-03	\$1,169	-0.20%	Nov-21	\$1,449
Apr-03	\$877	-7.42%	Dec-21	\$1,210
May-03	\$841	-2.87%	Jan-22	\$1,415

Appendix D

Operating Balance Drawdowns January 2007 – June 2010

Note all \$ figures in millions

Great Financial Crisis	Monthly Operating Balance	YOY change	What If Scenario	Projected Monthly Balance
Jan-07	\$2,390	-5.30%	Nov-19	\$1,801
Feb-07	\$2,396	-6.91%	Dec-19	\$1,890
Mar-07	\$2,101	-21.69%	Jan-20	\$1,839
Apr-07	\$1,990	-23.77%	Feb-20	\$1,666
May-07	\$2,288	-12.51%	Mar-20	\$1,794
Jun-07	\$2,079	-21.09%	Apr-20	\$1,764
Jul-07	\$2,197	-15.31%	May-20	\$2,510
Aug-07	\$1,936	-14.47%	Jun-20	\$2,727
Sep-07	\$2,082	-9.67%	Jul-20	\$2,252
Oct-07	\$1,941	-16.01%	Aug-20	\$1,545
Nov-07	\$1,880	-14.45%	Sep-20	\$1,689
Dec-07	\$1,893	-13.20%	Oct-20	\$1,949
Jan-08	\$1,875	-21.56%	Nov-20	\$1,413
Feb-08	\$1,652	-31.05%	Dec-20	\$1,303
Mar-08	\$1,143	-45.60%	Jan-21	\$1,000
Apr-08	\$859	-56.83%	Feb-21	\$719
May-08	\$890	-61.10%	Mar-21	\$698
Jun-08	\$815	-60.80%	Apr-21	\$692
Jul-08	\$1,450	-34.00%	May-21	\$1,657
Aug-08	\$795	-58.94%	Jun-21	\$1,120
Sep-08	\$876	-57.93%	Jul-21	\$947
Oct-08	\$564	-70.94%	Aug-21	\$449
Nov-08	\$613	-67.39%	Sep-21	\$551
Dec-08	\$804	-57.53%	Oct-21	\$828
Jan-09	\$739	-60.59%	Nov-21	\$557
Feb-09	\$542	-67.19%	Dec-21	\$427
Mar-09	\$264	-76.90%	Jan-22	\$231
Apr-09	\$16	-98.14%	Feb-22	\$13
May-09	\$18	-97.98%	Mar-22	\$14
Jun-09	\$470	-42.33%	Apr-22	\$399
Jul-09	\$116	-92.00%	May-22	\$133

Aug-09	(\$200)	-125.16%	Jun-22	(\$282)
Sep-09	\$11	-98.74%	Jul-22	\$12
Oct-09	(\$226)	-140.07%	Aug-22	(\$180)
Nov-09	(\$431)	-170.31%	Sep-22	(\$387)
Dec-09	(\$733)	-191.17%	Oct-22	(\$755)
Jan-10	(\$463)	-162.65%	Nov-22	(\$349)
Feb-10	(\$423)	-178.04%	Dec-22	(\$334)
Mar-10	(\$686)	-359.85%	Jan-23	(\$600)
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Apr-10	(\$635)	4068.75%	Feb-23	(\$532)
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May-10	(\$579)	3316.67%	Mar-23	(\$454)
Jun-10	\$450	-4.26%	Apr-23	\$382

Appendix E

Operating Balance Drawdowns April 2014 – July 2015

Note all \$ figures in millions

2014-2015 Slowdown	Monthly Operating Balance	YOY Monthly Change	What If Scenario	Projected Monthly Balance
Apr-14	\$2,098	-0.52%	Nov-19	\$1,892
May-14	\$2,311	-4.78%	Dec-19	\$1,933
Jun-14	\$2,462	-8.07%	Jan-20	\$2,159
Jul-14	\$1,877	-3.35%	Feb-20	\$2,112
Aug-14	\$1,369	-19.89%	Mar-20	\$1,642
Sep-14	\$1,638	-16.98%	Apr-20	\$1,856
Oct-14	\$1,521	-16.61%	May-20	\$2,472
Nov-14	\$1,535	-17.16%	Jun-20	\$2,641
Dec-14	\$1,478	-22.01%	Jul-20	\$1,944
Jan-15	\$1,754	-21.45%	Aug-20	\$1,445
Feb-15	\$1,957	-19.37%	Sep-20	\$1,592
Mar-15	\$1,686	-19.98%	Oct-20	\$1,797
Apr-15	\$1,879	-10.44%	Nov-20	\$1,695
May-15	\$2,163	-6.40%	Dec-20	\$1,809
Jun-15	\$2,307	-6.30%	Jan-21	\$2,023
Jul-15	\$1,795	-4.37%	Feb-21	\$2,020

Appendix F

Operating Balance Drawdowns August 2016 – March 2018

Note all \$ figures in millions

2016-2018 Slowdown	Monthly Operating Balance	YOY Monthly Change	What If Scenario	Projected Monthly Balance
Aug-16	\$1,504	-3.22%	Nov-19	\$1,841
Sep-16	\$1,694	-9.61%	Dec-19	\$1,835
Oct-16	\$1,672	-1.70%	Jan-20	\$2,308
Nov-16	\$1,634	-3.08%	Feb-20	\$2,118
Dec-16	\$1,693	-2.36%	Mar-20	\$2,002
Jan-17	\$2,255	5.42%	Apr-20	\$2,357
Feb-17	\$2,306	0.52%	May-20	\$2,980
Mar-17	\$1,968	-5.93%	Jun-20	\$2,999
Apr-17	\$1,961	-18.53%	Jul-20	\$2,031
May-17	\$2,215	-18.57%	Aug-20	\$1,498
Jun-17	\$2,147	-17.10%	Sep-20	\$1,636
Jul-17	\$1,635	-18.74%	Oct-20	\$1,825
Aug-17	\$1,303	-13.36%	Nov-20	\$1,595
Sep-17	\$1,455	-14.11%	Dec-20	\$1,576
Oct-17	\$1,472	-11.96%	Jan-21	\$2,032
Nov-17	\$1,417	-13.28%	Feb-21	\$1,836
Dec-17	\$1,401	-17.25%	Mar-21	\$1,656
Jan-18	\$2,140	-5.10%	Apr-21	\$2,237
Feb-18	\$2,244	-2.69%	May-21	\$2,899
Mar-18	\$1,937	-9.78%	Jun-21	\$2,706

Appendix G

Tables of Endowment Distributions FY 2016- FY 2026

Note italicized figures are projections

Repeat of the 2007-2009 GFC starting Nov 1, 2018

Fiscal Year	Annual distributions	Monthly	Average Market Value
FY2016	\$277,442,315	\$23,120,193	\$5,104,537,489
FY2017	\$289,935,195	\$24,161,266	\$5,358,543,003
FY2018	\$316,998,617	\$26,416,551	\$5,790,067,354
FY2019	\$345,423,972	\$28,785,331	\$6,005,587,233
FY2020	\$367,974,828	\$30,664,569	\$5,451,717,370
FY2021	\$384,254,083	\$32,021,174	\$5,024,021,465
FY2022	\$388,906,722	\$32,408,893	\$6,023,550,402
FY2023	\$386,582,633	\$32,215,219	\$6,759,409,490
FY2024	\$391,829,987	\$32,652,499	\$7,338,491,283
FY2025	\$403,847,146	\$33,653,929	\$8,228,284,668
FY2026	\$152,985,950	\$12,748,829	\$9,105,417,472
FY2027	\$166,868,787	\$13,905,732	\$9,533,426,289

Appendix H

Tables of Endowment Distributions FY 2016- FY 2026

Note italicized figures are projections

Repeat of the 2000-2001 Tech Bubble starting Nov 1, 2018

Fiscal Year	Annual distributions	Monthly	Average Market Value
FY2016	\$277,442,315	\$23,120,193	\$5,104,537,489
FY2017	\$289,935,195	\$24,161,266	\$5,358,543,003
FY2018	\$316,998,617	\$26,416,551	\$5,790,067,354
FY2019	\$345,423,972	\$28,785,331	<i>\$6,028,723,564</i>
FY2020	\$367,974,828	\$30,664,569	<i>\$6,254,501,961</i>
FY2021	<i>\$384,874,370</i>	<i>\$32,072,864</i>	<i>\$6,185,051,075</i>
FY2022	<i>\$400,605,436</i>	<i>\$33,383,786</i>	<i>\$5,881,067,808</i>
FY2023	<i>\$414,303,556</i>	<i>\$34,525,296</i>	<i>\$6,936,538,523</i>
FY2024	<i>\$417,584,650</i>	<i>\$34,798,721</i>	<i>\$7,587,502,282</i>
FY2025	<i>\$431,745,184</i>	<i>\$35,978,765</i>	<i>\$8,297,793,115</i>
FY2026	<i>\$164,223,308</i>	<i>\$13,685,276</i>	<i>\$9,044,456,161</i>
FY2027	<i>\$174,439,764</i>	<i>\$14,536,647</i>	<i>\$9,423,376,477</i>

Appendix I

Tables of Endowment Distributions FY 2016- FY 2026

Note italicized figures are projections

Repeat of 1987 Black Monday crash starting Nov. 1, 2018

Fiscal Year	Annual distributions	Monthly	Average Market Value
FY2016	\$277,442,315	\$23,120,193	\$5,104,537,489
FY2017	\$289,935,195	\$24,161,266	\$5,358,543,003
FY2018	\$316,998,617	\$26,416,551	\$5,790,067,354
FY2019	\$345,423,972	\$28,785,331	\$5,879,049,271
FY2020	\$367,974,828	\$30,664,569	\$5,765,898,594
FY2021	\$380,878,048	\$31,739,837	\$6,721,600,124
FY2022	\$389,866,388	\$32,488,866	\$7,080,481,598
FY2023	\$410,968,885	\$34,247,407	\$7,967,184,378
FY2024	\$430,801,889	\$35,900,157	\$8,922,740,661
FY2025	\$461,116,153	\$38,426,346	\$9,782,640,377
FY2026	\$182,289,527	\$15,190,794	\$9,952,360,933
FY2027	\$202,373,236	\$16,864,436	\$10,867,313,718

Appendix J

Tables of Endowment Distributions FY 2016- FY 2026

Note italicized figures are projections

Repeat of early 1980s recessions starting Nov 1, 2018

Fiscal Year	Annual distributions	Monthly	Average Market Value
FY2016	\$277,442,315	\$23,120,193	\$5,104,537,489
FY2017	\$289,935,195	\$24,161,266	\$5,358,543,003
FY2018	\$316,998,617	\$26,416,551	\$5,790,067,354
FY2019	\$345,423,972	\$28,785,331	\$6,000,823,506
FY2020	\$367,974,828	\$30,664,569	\$5,871,453,306
FY2021	<i>\$384,125,900</i>	<i>\$32,010,492</i>	<i>\$6,480,425,606</i>
FY2022	<i>\$394,570,895</i>	<i>\$32,880,908</i>	<i>\$8,510,178,972</i>
FY2023	<i>\$412,345,184</i>	<i>\$34,362,099</i>	<i>\$9,227,549,536</i>
FY2024	<i>\$451,908,012</i>	<i>\$37,659,001</i>	<i>\$10,411,213,032</i>
FY2025	<i>\$498,047,947</i>	<i>\$41,503,996</i>	<i>\$12,737,895,401</i>
FY2026	<i>\$202,504,102</i>	<i>\$16,875,342</i>	<i>\$14,711,980,010</i>
FY2027	<i>\$236,836,313</i>	<i>\$19,736,359</i>	<i>\$14,896,558,025</i>