ARIZONA STATE TREASURER'S OFFICE

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

Eileen I. Klein, Arizona State Treasurer

December 19, 2018

EXECUTIVE SUMMARY

Budget discussions at state capitols primarily focus on the amount of revenues and spending projected for the current and coming budget years. Rarely is there discussion of the *timing* of actual revenue and expenditures to meet the budget appropriated by lawmakers and Governors. However, cash flow for operating government, just like a business, is critical. But unlike a business, once government has approved a budget through appropriation bills, it becomes legal authorization for state agencies to spend money, regardless of cash flow. Spending by agencies goes on auto-pilot until long after an economic downturn becomes evident.

Arizona learned this the hard way during the Great Financial Crisis (GFC) from 2007 to 2009. Due to a combination of a precipitous decline in revenues that began in 2007, exacerbated by a slow reaction to recalibrate spending over three budget cycles, the state eventually ran out of cash to pay its bills. Despite repeated warnings on the decline in operating cash from the Arizona State Treasurer's Office (ASTO) in 2007, 2008 and 2009, the state kept spending money without regard to its income, much like someone who thinks they have money in the bank because their checkbook still has checks in it.

The result was in fiscal year 2010 (July 1, 2009 to June 30, 2010) the state 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 Department of Administration Director).

Unlike a business whose revenues are cut during a downturn and expenses can also be reduced by selling or reducing production, state government expenses increase in a downturn. Demands for social services increase and state aid to schools increase as property tax revenues decline. During the GFC, federal stimulus monies (ARRA) mandated the state NOT make cuts to services and maintain pre-recession levels of spending. With the expansion of Medicaid under the Affordable Care Act, the federal government induced state spending for programs beyond the levels supported by voters or which state revenues could support on their own. Many of the interventions from the GFC, intended as emergency, one-time measures, have persisted, which threaten the state's ability to withstand a future recession. To see a list of all the measures enacted see:
https://www.azleg.gov/jlbc/compbudgetsolutionsFY2016.pdf

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

Ten years after the GFC ushered in the great recession, the ASTO has conducted stress tests on the state's operating cash balance and the endowment distributions. These first-time tests provide 1) an estimate of how long the state's cash balance would remain positive during any future economic downturn; and 2) anticipate whether there would be a decrease in endowment distributions. The purpose of our "what if" analysis, set up to be done on a regular basis, is to assist policymakers with more information as they budget and to help the state prepare for future economic downturns.

A key central role of ASTO is to pay for the checks written by state agencies and to invest cash not being immediately used to pay bills. The interest earnings on that operating cash benefits the state's General Fund.

General Fund Cash Flow

The good news on cash flow is the state is positioned to withstand recessions on par with the 1991 and 2001 recessions. The bad news is the state is ***not*** positioned to withstand a repeat of the GFC unless steps are taken to shore up the state's finances and reverse some of the extraordinary tools used to balance the budget in the last economic downturn. Under the present course, if another economic cycle occurs like the one seen during the GFC, the state would begin to feel cash flow stress within 14 months, severe stress within 17 months and negative balances within 20 months. This is an acceleration from when the state ran out of money 10 years ago and the reason is the $930 Million K-12 education 'rollover' paid each July (See DEFINITIONS for information on the 'rollover'). To be clear, the GFC and subsequent Great Recession was an extraordinary event with extensive consequences for the private and public sectors and is not the best yardstick to measure preparedness. To illustrate this point, between FY 07 and FY 10, state individual income tax, corporate income tax and sales tax each fell between 35% to 58%. This was an astonishing three-year decline that is hopefully not repeated. It is not in the state's interest to stockpile limited resources to prepare for a recurrence of such an event, but some immediate actions are needed to prepare for the next downturn to moderate impacts to the state budget.

Endowment Cash Flow

For endowment distributions, a repeat of the GFC or the tech bubble stock market downturn of 2001 would have ***minimal impact*** on distributions. With six 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, as this report was going through the final editing and review process, we note that portions of the United State Treasury yield curve have begun to invert, traditionally seen as a sign that slower economic growth is on the horizon within 24 months. If this holds true, such a slowdown would occur in fiscal year 2020 or 2021 and policy makers need to be prepared. An inverted yield curve is when shorter dated United States Treasuries yield more than longer

dated Treasury bonds. In this case the 2-year a 3-year notes in early December yielded more than the 5-year note, for the first time since 2007. It is notable to remember that current market conditions differ from those experienced during past inversions and this may not directly relate to the overall health of the United States economy.

This report will first discuss operating cash flow and its importance to the state's budget picture and then will discuss the stress testing of the endowment distributions. At the end of the report our charts provide the details of the what if scenarios of the stress tests.

I. 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 in April 2018, reversed a 20-month trend of weakened cash flows that began in August 2016. 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.

II. 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 2018 average monthly balance of $1.8 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 having to run 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

III. 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.

IV. 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 lasted 42 consecutive months of year over year negative monthly cash flow, would result in the state's operating cash reaching stress levels in 14 months when operating cash drops to $900 Million on average.

Severe stress begins in 17 months with average balances dropping below $600 Million and the state running out of cash in 20 months when the K-12 rollover payment is made. (Exhibit 2 below.) Draining the state's current $432 Million Budget Stabilization Fund (BSF) balance would delay negative cash flow by maybe two months. (See DEFINITIONS for information on the BSF).

Eliminating the K-12 rollover helps tremendously as operating cash does not fall below $1 Billion until 28 months into a severe recession. In this scenario, policymakers have two years to address any structural spending gaps with revenue and expenses, potentially delaying further declines of cash flow. In addition, bolstering the BSF to at least 15% of General Fund revenues, or approximately $1.5 Billion, would also provide a necessary buffer in the face of a severe recession.

Under all other scenarios, our estimates indicate Arizona will have enough operating funds to remain solvent when compared against all other historic drawdowns of operating cash that have occurred since 1990, provided steps are taken in the next legislation session to increase the size of the BSF and decrease the size of the K-12 rollover. **This also assumes no disruption or reduction in federal funds or extended federal government shut downs that delay payments to states.**

For example, under the 1991 recession scenario, state cash flow becomes under stress in 10 months, with average cash balances falling to $924 Million that month and a low of $817 Million three months later. Increasing the BSF to the pre-2007 levels of $730 Million would provide a necessary cushion to drawdowns of operating cash. Likewise, 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 14 months when the average balance falls to $902 Million. A low point occurs eight months later at $779 Million. As with the 1991 recession, an increase in the BSF and 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.

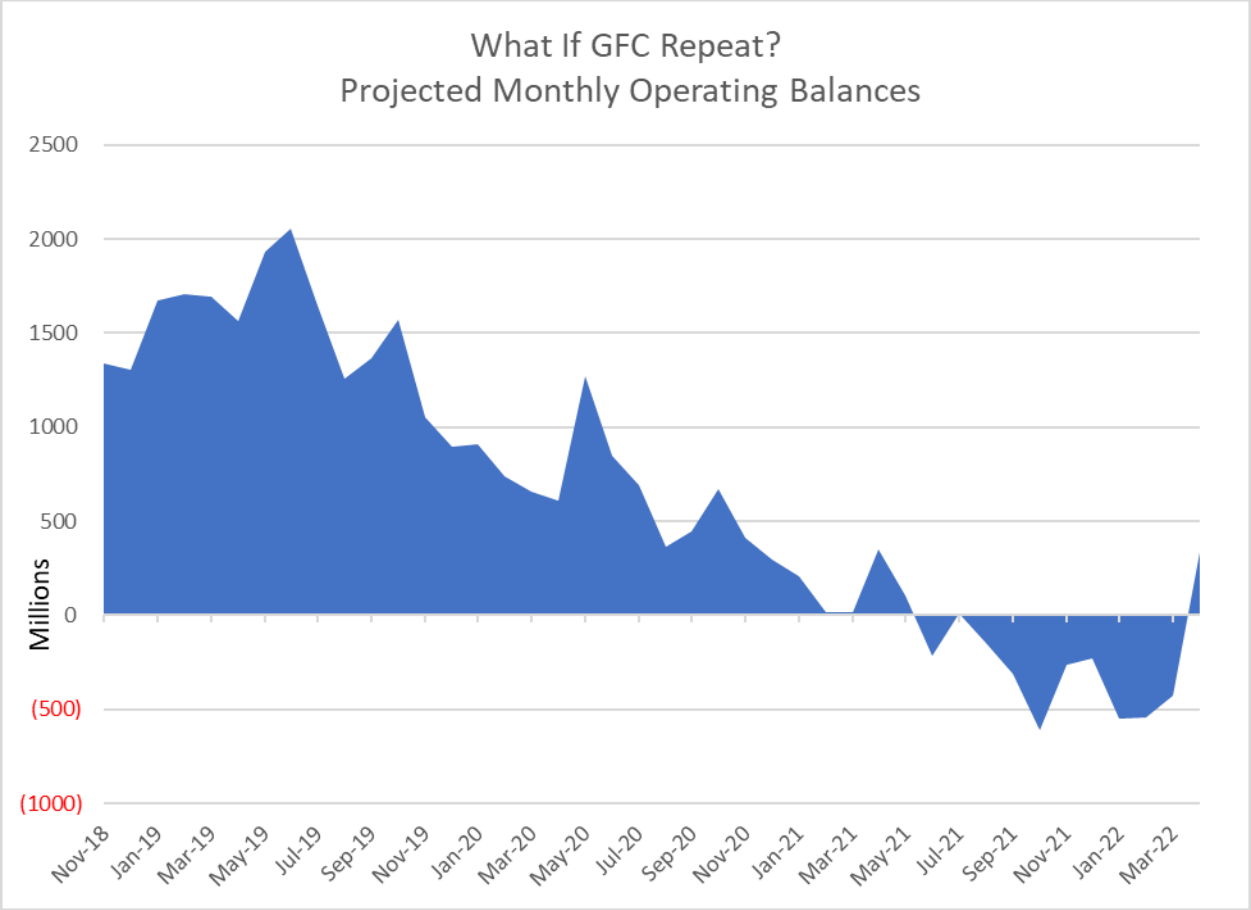

What If GFC Repeat?
Projected Monthly Operating Balances
2500
2000
1500
1000
500
0
(500)
(1000)
Millions
Nov-18
Jan-19
Mar-19
May-19
Jul-19
Sep-19
Nov-19
Jan-20
Mar-20
May-20
Jul-20
Sep-20
Nov-20
Jan-21
Mar-21
May-21
Jul-21
Sep-21
Nov-21
Jan-22
Mar-22

Exhibit 2

V. TWNS vs BONDS

In addition to the stress testing of cash flows, the ASTO also revisited the daily cash balances during the GFC to observe what would have occurred if the state had opted to continue to issue TWNS instead of the $1.5 Billion in long term debt issued to balance the budget in FY 2010. The long-term borrowing came from mortgaging state buildings and future revenue from the Arizona State Lottery.

The following review is not meant as a critique of decisions made during 2009 and 2010, an extraordinary and unprecedented time. Rather this analysis of borrowing should be used as a reference point for future decision makers in the event of a severe recession in the future. For example, it is not clear if the $700 Million letter of credit with Bank of America would have been granted if the $1.5 Billion in long-term borrowing was not planned, along with the 3-year one cent sales tax increase approved in May 2010 as well as the permanent budget cuts made in 2009 and 2010.

During FY 2010, the ASTO negotiated in conjunction with the State Loan Commission, a 3-year credit line with Bank of America for up to $700 Million. However, $1.5 Billion in long-term debt was issued and sold and deposited in operating cash by June 2010. At that point, the ASTO canceled the credit line as forecasts showed operating cash would now remain positive due to the $1.5 Billion in borrowing and the enactment by the voters of the temporary one cent sales tax, which generated more than $800 Million in revenue a year. Prior to the $700 Million credit facility that was put in place in November 2009, the ASTO issued TWNS to an internal investment pool managed by the ASTO on behalf of the state to ensure cash was available to pay bills.

In the what if scenario of not receiving the $1.5 Billion from the long-term borrowing, the combination of the $700 Million credit facility and the internal investment Pool 3 balances would have been more than enough to provide liquidity for the state's operating cash through FY 2012 at a far cheaper cost of borrowing than the 20-year long term debt that was issued.

For example, the state's cost of short term borrowing for cash in FY 2010 was under 1% while the average rate of the long-term borrowing was 3.99%. Total cost of issuing TWNS in FY 2010 was about $3.9 Million including interest costs and legal fees. The 3-year cost of the facility would have been about $12 Million. The cost of the 20-year financing of the $1.5 billion was about $658 Million if the bonds are not retired or pre-paid once the no-call period expires in FY 2020. More than half the interest costs, $382 Million, will have been paid by FY 2020.

What is quantifiable is $730 Million in the BSF was not enough to prevent operating cash flow from going negative. The state would have needed $2.2 Billion in cash reserves prior to the GFC to potentially prevent a negative cash flow scenario.

VI. 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 averaged 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.

VII. Methodology of Endowment Tests

VIII. 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 2018. 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 have been declared the start of market downturns and applied those monthly returns to our ending balance of October 2018 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.

IX. 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 $400,000 a month from $31 Million in FY 2021 to $30.7 Million in FY 2022 before increasing again in FY 2023 to $31.3 Million. This compares to the $28.8 Million monthly distribution in FY 2019.

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 $3.95 Billion in February 2020 from the $5.8 Billion on October 31, 2018. It would then again reach $5.8 Billion by October 2021, while also paying out about $31 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 further reduces the value of a fund.

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

X. Recommendations

There will be another economic downturn in Arizona; the only question is when. 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 all bad 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 current balance of the Budget Stabilization Fund to the maximum 7% of the General Fund revenues which will be in the range of $750 to $800 Million for FY 2019. Currently at $432 Million ($460 million once a loan to the Department of Public Safety is paid back by September 2019), the fund is $300 Million less than it was prior to the last recession, which proved to be grossly insufficient to adequately address the decline in revenues. The present balance is roughly 4% of General Fund revenue and only 1% of total revenues. It should be noted that the BSF would already be at its maximum level if lawmakers had consistently followed the formula since 2014.

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 on-going 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".

XI. 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. The state is not prepared for another severe recession but is well placed to weather milder recessions like what occurred in 1991 and 2001; at least when it comes to operating cash flow forecasts.

Policymakers should take steps soon to prepare for the next economic downturn.

XII. Definitions

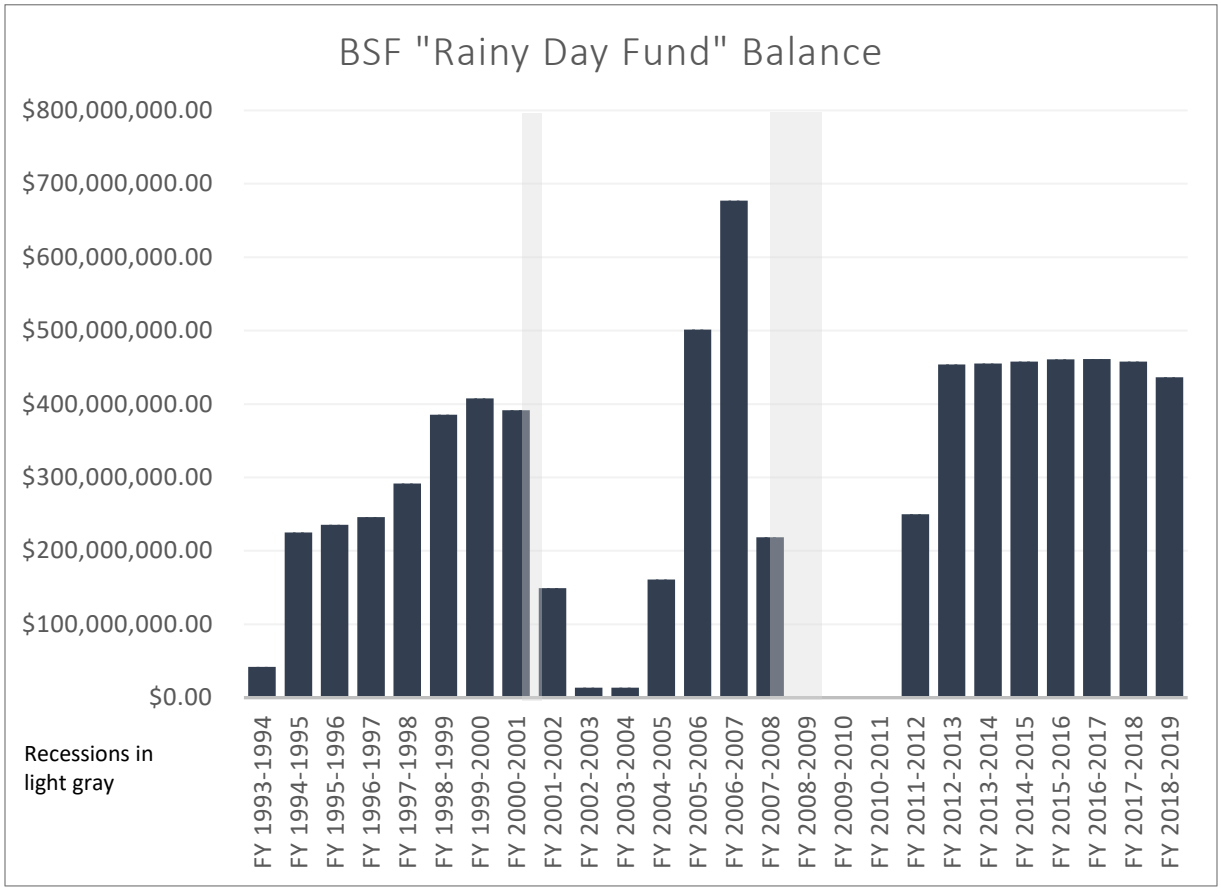
WHAT IS THE K-12 ROLLOVER?

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 $744 Million can be deposited for Fiscal Year 2019. 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 GF revenues and was later lowered to 5% and then up to the 7% currently. See the graph below of the annual historical balance at the end of each fiscal year.



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-18	$1,042
Aug-91	$259	-6.16%	Dec-18	$1,315
Sep-91	$232	-14.39%	Jan-19	$1,832
Oct-91	$168	-38.24%	Feb-19	$1,386
Nov-91	$210	-7.89%	Mar-19	$1,784
Dec-91	$230	-5.35%	Apr-19	$1,874
Jan-92	$274	-2.49%	May-19	$2,222
Feb-92	$283	-2.75%	Jun-19	$2,341
Mar-92	$225	-16.04%	Jul-19	$1,531
Apr-92	$170	-38.18%	Aug-19	$924
May-92	$177	-46.04%	Sep-19	$860
Jun-92	$213	-38.08%	Oct-19	$1,123
Jul-92	$185	-21.61%	Nov-19	$817
Aug-92	$171	-33.98%	Dec-19	$868
Sep-92	$139	-40.09%	Jan-20	$1,098
Oct-92	$116	-30.95%	Feb-20	$957
Nov-92	$127	-39.52%	Mar-20	$1,079
Dec-92	$182	-20.87%	Apr-20	$1,483

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-18	$1,356
May-99	$1,370	-3.00%	Dec-18	$1,359
Jun-99	$1,241	-4.87%	Jan-19	$2,036
Jul-99	$1,250	-6.08%	Feb-19	$2,108
Aug-99	$1,207	-5.67%	Mar-19	$1,827
Sep-99	$1,301	-3.56%	Apr-19	$1,909
Oct-99	$1,297	-3.55%	May-19	$2,198
Nov-99	$1,322	-3.10%	Jun-19	$2,332
Dec-99	$1,374	-1.09%	Jul-19	$1,804

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-18	$1,354
Apr-01	$1,343	-8.71%	Dec-18	$1,279
May-01	$1,312	-5.93%	Jan-19	$2,013
Jun-01	$1,218	-4.07%	Feb-19	$2,153
Jul-01	$1,181	-7.28%	Mar-19	$1,796
Aug-01	$1,178	-7.89%	Apr-19	$1,824
Sep-01	$1,306	-8.39%	May-19	$2,088
Oct-01	$1,256	-14.76%	Jun-19	$2,052
Nov-01	$1,245	-18.09%	Jul-19	$1,494
Dec-01	$1,253	-17.53%	Aug-19	$1,233
Jan-02	$1,267	-24.93%	Sep-19	$1,197
Feb-02	$1,312	-20.53%	Oct-19	$1,441
Mar-02	$1,172	-20.17%	Nov-19	$1,081
Apr-02	$947	-29.50%	Dec-19	$902
May-02	$865	-34.04%	Jan-20	$1,328
Jun-02	$889	-26.99%	Feb-20	$1,572
Jul-02	$1,022	-13.44%	Mar-20	$1,555
Aug-02	$804	-31.69%	Apr-20	$1,246
Sep-02	$849	-35.02%	May-20	$1,357
Oct-02	$811	-35.42%	Jun-20	$1,325
Nov-02	$811	-34.83%	Jul-20	$974
Dec-02	$792	-36.84%	Aug-20	$779
Jan-03	$975	-23.06%	Sep-20	$921
Feb-03	$1,283	-2.23%	Oct-20	$1,409
Mar-03	$1,169	-0.20%	Nov-20	$1,079
Apr-03	$877	-7.42%	Dec-20	$835
May-03	$841	-2.87%	Jan-21	$1,290

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-18	$1,342
Feb-07	$2,396	-6.91%	Dec-18	$1,304
Mar-07	$2,101	-21.69%	Jan-19	$1,676
Apr-07	$1,990	-23.77%	Feb-19	$1,711
May-07	$2,288	-12.51%	Mar-19	$1,695
Jun-07	$2,079	-21.09%	Apr-19	$1,562
Jul-07	$2,197	-15.31%	May-19	$1,930
Aug-07	$1,936	-14.47%	Jun-19	$2,059
Sep-07	$2,082	-9.67%	Jul-19	$1,648
Oct-07	$1,941	-16.01%	Aug-19	$1,256
Nov-07	$1,880	-14.45%	Sep-19	$1,364
Dec-07	$1,893	-13.20%	Oct-19	$1,574
Jan-08	$1,875	-21.56%	Nov-19	$1,053
Feb-08	$1,652	-31.05%	Dec-19	$899
Mar-08	$1,143	-45.60%	Jan-20	$912
Apr-08	$859	-56.83%	Feb-20	$738
May-08	$890	-61.10%	Mar-20	$659
Jun-08	$815	-60.80%	Apr-20	$612
Jul-08	$1,450	-34.00%	May-20	$1,274
Aug-08	$795	-58.94%	Jun-20	$845
Sep-08	$876	-57.93%	Jul-20	$693
Oct-08	$564	-70.94%	Aug-20	$365
Nov-08	$613	-67.39%	Sep-20	$445
Dec-08	$804	-57.53%	Oct-20	$668

(continued)				
Jan-09	$739	-60.59%	Nov-20	$415
Feb-09	$542	-67.19%	Dec-20	$295
Mar-09	$264	-76.90%	Jan-21	$211
Apr-09	$16	-98.14%	Feb-21	$14
May-09	$18	-97.98%	Mar-21	$13
Jun-09	$470	-42.33%	Apr-21	$353
Jul-09	$116	-92.00%	May-21	$102
Aug-09	($200)	-125.16%	Jun-21	($213)
Sep-09	$11	-98.74%	Jul-21	$9
Oct-09	($226)	-140.07%	Aug-21	($146)
Nov-09	($431)	-170.31%	Sep-21	($313)
Dec-09	($733)	-191.17%	Oct-21	($609)
Jan-10	($463)	-162.65%	Nov-21	($260)
Feb-10	($423)	-178.04%	Dec-21	($230)
Mar-10	($686)	-359.85%	Jan-22	($547)
Apr-10	($635)	-4068.75%	Feb-22	($546)
May-10	($579)	-3316.67%	Mar-22	($429)
Jun-10	$450	-4.26%	Apr-22	$338

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-18	$1,410
May-14	$2,311	-4.78%	Dec-18	$1,334
Jun-14	$2,462	-8.07%	Jan-19	$1,967
Jul-14	$1,877	-3.35%	Feb-19	$2,169
Aug-14	$1,369	-19.89%	Mar-19	$1,552
Sep-14	$1,638	-16.98%	Apr-19	$1,644
Oct-14	$1,521	-16.61%	May-19	$1,900
Nov-14	$1,535	-17.16%	Jun-19	$1,994
Dec-14	$1,478	-22.01%	Jul-19	$1,423
Jan-15	$1,754	-21.45%	Aug-19	$1,174
Feb-15	$1,957	-19.37%	Sep-19	$1,285
Mar-15	$1,686	-19.98%	Oct-19	$1,451
Apr-15	$1,879	-10.44%	Nov-19	$1,262
May-15	$2,163	-6.40%	Dec-19	$1,249
Jun-15	$2,307	-6.30%	Jan-20	$1,844
Jul-15	$1,795	-4.37%	Feb-20	$2,074

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-18	$1,371
Sep-16	$1,694	-9.61%	Dec-18	$1,266
Oct-16	$1,672	-1.70%	Jan-19	$2,104
Nov-16	$1,634	-3.08%	Feb-19	$2,175
Dec-16	$1,693	-2.36%	Mar-19	$1,891
Jan-17	$2,255	5.42%	Apr-19	$2,087
Feb-17	$2,306	0.52%	May-19	$2,291
Mar-17	$1,968	-5.93%	Jun-19	$2,264
Apr-17	$1,961	-18.53%	Jul-19	$1,486
May-17	$2,215	-18.57%	Aug-19	$1,217
Jun-17	$2,147	-17.10%	Sep-19	$1,321
Jul-17	$1,635	-18.74%	Oct-19	$1,473
Aug-17	$1,303	-13.36%	Nov-19	$1,188
Sep-17	$1,455	-14.11%	Dec-19	$1,088
Oct-17	$1,472	-11.96%	Jan-20	$1,852
Nov-17	$1,417	-13.28%	Feb-20	$1,886
Dec-17	$1,401	-17.25%	Mar-20	$1,565
Jan-18	$2,140	-5.10%	Apr-20	$1,981
Feb-18	$2,244	-2.69%	May-20	$2,229
Mar-18	$1,937	-9.78%	Jun-20	$2,043

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	*$5,735,029,291*
FY2020	*$368,257,301*	*$30,688,108*	*$4,607,271,562*
FY2021	*$372,649,081*	*$31,054,090*	*$5,364,635,659*
FY2022	*$367,903,416*	*$30,658,618*	*$6,171,639,497*
FY2023	*$375,056,220*	*$31,254,685*	*$6,588,417,658*
FY2024	*$385,538,016*	*$32,128,168*	*$7,313,001,736*
FY2025	*$400,170,864*	*$33,347,572*	*$8,219,788,241*
FY2026	*$158,050,632*	*$13,170,886*	*$8,916,298,531*
FY2027	*$177,212,268*	*$14,767,689*	*$9,031,827,324*

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	*$5,947,158,125*
FY2020	*$368,318,306*	*$30,693,192*	*$5,852,573,846*
FY2021	*$383,430,790*	*$31,952,566*	*$5,721,991,478*
FY2022	*$393,955,085*	*$32,829,590*	*$6,035,952,109*
FY2023	*$399,619,880*	*$33,301,657*	*$6,949,118,996*
FY2024	*$412,812,404*	*$34,401,034*	*$7,556,512,897*
FY2025	*$430,883,252*	*$35,906,938*	*$8,170,780,614*
FY2026	*$165,924,599*	*$13,827,050*	*$9,005,741,661*
FY2027	*$179,436,989*	*$14,953,082*	*$8,433,414,990*

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	*$5,519,264,956*
FY2020	*$366,387,490*	*$30,532,291*	*$5,867,131,807*
FY2021	*$375,080,075*	*$31,256,673*	*$6,650,875,268*
FY2022	*$392,268,881*	*$32,689,073*	*$7,014,025,447*
FY2023	*$413,082,898*	*$34,423,575*	*$8,056,331,220*
FY2024	*$439,302,448*	*$36,608,537*	*$8,825,935,706*
FY2025	*$476,334,452*	*$39,694,538*	*$9,462,570,604*
FY2026	*$191,600,478*	*$15,966,706*	*$9,574,158,372*
FY2027	*$206,909,539*	*$17,242,462*	*$11,136,467,919*

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	*$5,807,599,192*
FY2020	*$367,954,857*	*$30,662,905*	*$5,513,473,874*
FY2021	*$377,943,554*	*$31,495,296*	*$7,122,590,317*
FY2022	*$392,057,381*	*$32,671,448*	*$7,599,464,022*
FY2023	*$425,274,400*	*$35,439,533*	*$7,924,336,129*
FY2024	*$456,752,597*	*$38,062,716*	*$10,560,931,877*
FY2025	*$506,573,448*	*$42,214,454*	*$12,147,102,042*
FY2026	*$213,094,350*	*$17,757,862*	*$12,275,221,528*
FY2027	*$244,182,631*	*$20,348,553*	*$13,538,646,933*