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Texas Emergency Services Districts

Financial Reserves Study

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Executive Summary

Emergency Services Districts (ESDs) support or directly provide emergency services in urban, suburban, and rural communities throughout Texas. Relative to other Texas special districts (including fire departments), ESDs' taxing powers (and other revenue-raising options) and expenditure flexibility are more constrained. Combined with the uncertainty of providing services in an environment of increasing exogenous events related to extreme weather (e.g., wildfires, winter storms, floods, and tornadoes), economic downturns and political shocks, such limited taxing power and spending flexibility necessitate the maintenance of substantial financial reserves. However, there is significant diversity in the financial reserve approaches across Texas ESDs, and no best practices have been established in setting reserve levels.

This report aims to begin developing a best-practices framework for ESD reserve sizing policy. It provides extensive background on the purpose, goals and previous research of financial reserves and details both the generic risks facing local governments and the more specific risks that ESDs need to mitigate. It also discusses reserve targets preferred by external stakeholders such as investors and the rating agencies. After analyzing how the reserves of Travis County ESD No. 2, and two other comparison ESDs in Texas respond to different risk scenarios, we provide some key takeaways for how ESDs can best size their reserves for optimal risk management and performance. While there is no one-size-fits-all answer to the ideal level of reserves, this report offers guidance on the requisite financial reserves to absorb weather, economic, and political shocks.

The overarching takeaway is that Texas ESDs need to maintain higher reserve levels than most other local governments to ensure that their provision of vital emergency services are not substantially compromised. Though there is no absolute reserve level for all ESDs, we find that reserve levels of at least six months of operating expenses are necessary to absorb significant exogenous shocks. This represents reserve levels greater than some previous research and GFOA best-practice recommendations for general purpose governments. Moreover, ESDs should consider that investors generally prefer reserve sizes at these levels. Ultimately, given the opportunity cost of reserves, each ESD should craft their own reserve strategy and educate stakeholders on optimal levels.

I. Introduction

In the aftermath of the January 2025 wildfires that devastated much of Los Angeles County, the critical role of emergency services in responding to natural disasters has never been more evident. The long-term impact of the wildfires on the Los Angeles community will be significant, and the cost of recovery efforts will likely offer further insights into the resources needed to rebuild after such disasters. This heightened awareness in the wake of a natural disaster underscores the importance of how state and local governments structure and manage their emergency services.

Following a natural disaster, such as a wildfire, it falls to local governments or municipalities to clean up the damage and help their constituents return to normalcy. Local governments and municipalities across the country are no strangers to the risks posed every day against governments–not only natural disasters, but also economic downturns, political events, and more. Many governments plan as best they can for these unforeseen events, often earmarking their financial reserves, or "rainy-day funds," in anticipation of the unexpected.

Travis County ESD No. 2, located in Pflugerville, Texas, identified a desire to investigate whether their current financial reserves could absorb potential shocks and determine the optimal level of reserves to properly mitigate sudden risks or potential challenges. As such, this report's stress-testing analysis of financial reserve levels focuses primarily on Travis County ESD No. 2, along with two comparison ESDs.

The report begins with an overview of Texas ESDs and how they compare to other special taxing districts in terms of their public finances (tax caps, spending, reserves, and financing practices). We then describe the general purpose and goals of financial reserves in the context of the multitude of risks local governments regularly face. We proceed with a review of previous private sector and academic research that discusses and estimates optimal reserve sizing for state and other types of local governments. Next, we describe both historical and modern recommendations from the Government Finance Officers Association (GFOA) on reserve level setting for general purpose governments.

The report then returns to Texas ESDs, detailing the unique financial stressors they confront. The report culminates with case studies of three ESDs (Travis No. 2, Bexar No. 2, and Harris No. 7), using stress-testing analysis to assess the financial resilience of these districts under different extreme weather, economic, and political shocks. Based on the preceding discussions and stress-

testing, the report concludes with a set of "key takeaways" for ESDs to consider in setting financial reserves.

II. Texas ESDs Overview

Each state in the United States has its own mechanisms for organizing emergency services. In Texas, Emergency Service Districts (ESDs) are independent, local governmental entities that support and provide local emergency services, including medical care, ambulance services, rural fire prevention and control services, and any other emergency services authorized by the Texas Legislature. They operate within county governments and can have overlapping jurisdictions as long as the services do not overlap.[1] This setup is unique, as many other states separate fire protection and EMS services; in Texas, these services can be combined within ESDs.[2] Some ESDs throughout the state provide services themselves, while others contract with local providers, such as local fire departments, to carry out their services.[3] A board of five commissioners governs each ESD.[4]

ESDs were created in 1949 by the authorization of Section 48-e, Article III of the Texas Constitution.[5] Established and organized in Chapter 775 (Emergency Services Districts)[6] of the Health and Safety Code, ESDs are one of the most popular forms of special purpose districts (SPDs), with over 300 active districts in 90 counties across the state. The initiation and specialization of ESDs lie in the hands of local taxpayers, who must vote to create a local ESD and then establish its financial authority. Due to this emphasis on local authority, the presence of ESDs depends on the taxpayers' needs and desires; some Texas counties vote to create multiple ESDs to cover various locales, while others opt to withhold from the practice altogether.[7]

To fund operations, ESDs have four main revenue-raising mechanisms:

- *Ad Valorem Property Tax:* ESDs can levy property taxes up to $0.10 per $100 of

[1] Texapedia. (n.d.). Emergency Services Districts. https://texapedia.info/local-government/emergency-services-districts/#:~:text=Area%20of%20Operations,-ESDs%20operate%20in&text=As%20of%202021%2C%20there%20were,do%20not%20provide%20duplicative%20services
[2] Safe-D. (n.d.). FAQs. https://www.safe-d.org/faqs
[3] Ibid.
[4] Ibid.
[5] *Texas Constitution*, art. III. (n.d.). https://statutes.capitol.texas.gov/Docs/CN/htm/CN.3.htm
[6] *Texas Health & Safety Code*, § 775. (n.d.). https://statutes.capitol.texas.gov/Docs/HS/htm/HS.775.htm
[7] Texapedia. (n.d.). Emergency Services Districts.

property valuation according to the Texas Health and Safety Code, Chapter 775; tax levels are determined at creation.[8]

- *Sales Tax:* ESDs may levy a sales tax between .125% to 2% of the local sales tax rate, with voter approval.[9] Revenue from sales tax can be used in an identical manner to the ad valorem property tax revenue.[10]
- *Billing:* ESDs can charge a fee for providing services, such as emergency medical care.[11]
- *Debt:* An ESD is authorized to issue bonds and notes to perform any of its powers, so long as the commissioners court approves their issuance.[12] A simple majority of County Commissioners and of voters in a bond election must approve any debt issuance, pursuant to Texas Health & Safety Code 775.076 and 775.077.[13] Debt for the purpose of real property or emergency services equipment only requires an ESD Commissioner's approval and do not require voter approval, pursuant to Texas Health & Safety Code 775.085. ESDs may levy taxes, as well as use funds on hand, real estate, or equipment for debt repayment.[14] Debt issuance should be aligned with capital improvement plans within the district. ESDs are prohibited from taking on indebtedness in excess of the amount of funds available.[15]

ESDs may also apply for federal grants from the Federal Emergency Management Agency (FEMA).[16] It is the responsibility of the chief elected official of a specific jurisdiction to request funding, and they must declare a disaster in order to receive funds.[17] FEMA funds are not meant to "fully compensate" a community after a disaster, and are instead meant to supplement state resources available.[18]

In terms of other funding opportunities available, some ESDs with a large volunteer presence can apply for grants from the Texas Rural Volunteer Fire Department Assistance Program, for

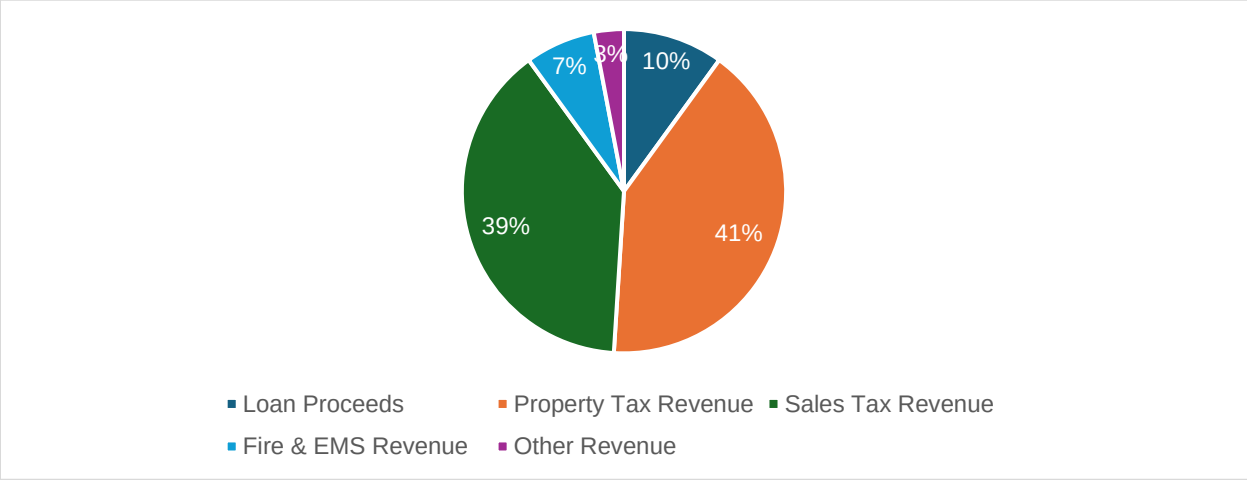
[8] Texas Health & Safety Code, Chapter 775. (n.d.).
[9] Safe-D. (n.d.). FAQs.
[10] Ibid.
[11] Safe-D. (n.d.). FAQs.
[12] Texas Health & Safety Code, Chapter 775. (n.d.).
[13] Ibid.
[14] Ibid.
[15] Ibid.
[16] Federal Emergency Management Agency (FEMA). (n.d.). *Grant programs for fire and emergency services*. https://www.fema.gov/grants
[17] Ahmad, S., & Wessel, D. (2024, December). What does the Federal Emergency Management Agency (FEMA) do, and how is it funded? Brookings Institution. https://www.brookings.edu/articles/what-does-fema-do/
[18] Texas Division of Emergency Management. (n.d.). Emergency management officials. Texas Department of Public Safety. https://www.tdem.texas.gov/recovery/emergency-management-officials

example.[19] ESDs can also apply for grants directly from the Texas Department of Emergency Management (TDEM).

ESDs must maintain a certain level of financial transparency to both lawmakers and the public to prevent abuse and misuse of taxpayer-generated funds, through measures like publicly available budgets and audits.[20] More specifically, the 85th Texas Legislature passed SB 625 in 2017, requiring SPDs, like ESDs, to submit financial information to the Comptroller of Public Accounts.[21] This information is accessible to the public through the Special Purpose District Public Information Database.

Each ESD leverages the above sources of funding in unique ways to meet needs. A visual representation of Travis County ESD No. 2's approved budget sources of funds from FY25 is shown in Figure 1 below.[22]

Figure 1: Travis County ESD No. 2 FY25 Approved Budget Sources of Funds[23]



Property taxes make up 41% of their revenue, sales taxes make up 39%, loan proceeds make up 10%, fire and EMS revenue makes up 7%, and other revenue sources make up the remaining 3% of expected revenue for FY25.

Property and sales taxes make up the vast majority of Travis County ESD No. 2's budgeted

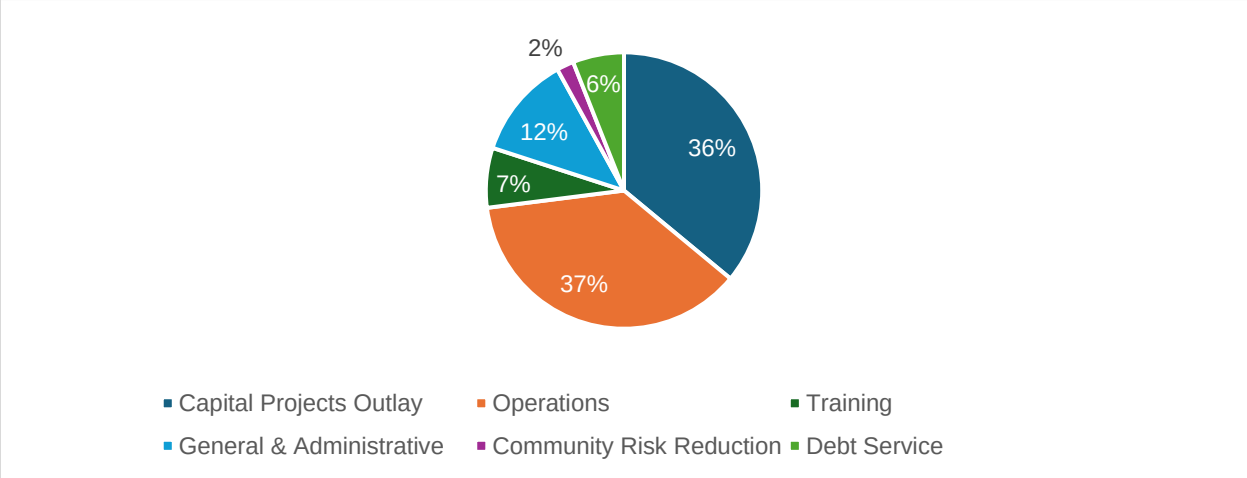
[19] Texas A&M Forest Service. (n.d.). *Rural volunteer fire department assistance program* https://tfsweb.tamu.edu/RuralVFDAssistanceProgram
[20] Safe-D. (n.d.). FAQs.
[21] Texas Comptroller of Public Accounts. (n.d.). *Special purpose district public information database (SB 625).* https://comptroller.texas.gov/transparency/local/sb625/
[22] Travis County Emergency Services District No. 2. (2024, September). *Fiscal Year 2025 Approved Budget.* https://www.pflugervillefire.org/wp-content/uploads/2024/12/FY25_TCESD2_Approved_Budget_FINAL.pdf
[23] Ibid.

sources of revenue. Its main source of funds is the property tax, a common practice for other ESDs across the state.[24] That said, some towns, such as Livingston, choose not to levy property taxes in favor of charging for emergency services via electric utility charges.[25] Property taxes mostly fund operational needs within the Department. Property taxes increased by 29% from the prior fiscal year due to an increase in the tax rate. On the other hand, sales tax revenue slightly decreased from the previous fiscal year, indicating a "downward trend" in this revenue source for this ESD.[26]

Travis County ESD No. 2 expected their revenue from fire and EMS services to increase by 13% in FY25 due to increased call volumes. They also took out multiple loans in FY24 to fund capital projects, so their Other Sources category is expected to decrease significantly in FY25. Loan proceeds primarily fund these capital projects.[27]

On the spending side, Travis County ESD No. 2's uses of funds for FY25 are shown in Figure 2 below[28].

Figure 2: Travis County ESD No. 2 FY25 Approved Budget Uses of Funds[29]



The majority of Travis County ESD No. 2's budget will be used for payroll expenses and

[24] Ibid.
[25] Tomlinson, C. (2024, February 19). Livingston, Texas, shows how property taxes could disappear—with a catch. *Houston Chronicle*. https://www.houstonchronicle.com/business/columnists/tomlinson/article/texas-property-taxes-electricity-bill-19999844.php
[26] Travis County Emergency Services District No. 2. (2024, September). *Fiscal Year 2025 Approved Budget*.
[27] Ibid.
[28] Ibid.
[29] Ibid.

employee benefits, which fall under their largest expense category of operations.[30] This accounts for 37% of their budget. Their next largest expense category is capital projects, which includes expenditures on vehicles and equipment.[31] This accounts for 36% of their budget. The remaining uses of funds include 12% for general and administrative costs, 7% for training, 6% for debt service, and 2% for community risk reduction.

III. Comparison to Other Texas Special Purpose Districts

Texas has over 3,350 active SPDs, each with its own unique purpose, structure, and financing capabilities.[32] There are roughly 40 types of SPDs that belong to six categories, each with unique revenue-raising mechanisms: health & safety, education, waste & water, economic & community development, agricultural development, and transportation.[33] While ESDs are unique in their structure and funding abilities, they share many qualities and revenue-raising mechanisms/constraints with other SPDs.

To fund operations, SPDs rely heavily on local taxes, specifically the property and sales tax. Of the 22 major SPD types in Texas, 10 have strict tax caps set by the Texas Constitution.[34] Though the specifics vary greatly depending on voter-approved tax levels, most districts have specific tax caps set by the state legislature; while the Texas Constitution fails to provide reasons as to why some districts do not receive tax limitations, the purpose is presumably to give greater authority to more "essential function" local governments under the supervision and approval of its constituents where reasonably necessary.

Generally, waste and water districts have the greatest taxation authority, as they have no constitutionally set property tax limit. Health & safety districts have the next highest taxation authority, ranging from $0.10 to $0.75 per $100 of property valuation. For education districts, independent school districts have the highest tax cap among all SPDs at $1.50 per $100 of property valuation, while junior/community colleges can collect up to $0.50 per $100 valuation. Transportation districts have lower tax caps, around $0.10 to $0.15 per $100 of property valuation. Agricultural development, economic and community development districts, and some

[30] Ibid.
[31] Ibid.
[32] Texas Public Policy Foundation. (2018). *Special purpose districts*. https://www.texaspolicy.com/wp-content/uploads/2018/08/Special-Purpose-Districts-copy.pdf
[33] Texas Senate. (2014, October). *Spotlight on special purpose districts*. https://senate.texas.gov/_assets/srcpub/Spotlight_Special_Purpose_Districts.pdf
[34] Ibid.

others do not have strict property tax maximums in the Texas Constitution; most of these are left to the discretion of voting constituents.[35] This allows greater flexibility while still relying on voter approval for development initiatives.[36]

Though the needs of each district type vary and are generally reflected by their individual tax caps, ESDs have one of the lowest property tax caps for all types of SPDs. Moreover, at $0.10 per $100 of property value, ESDs have the lowest taxation authority of their special district group (health & safety).[37]

The combined local sales and use tax rate in Texas is capped at 2%.[38] This includes city, county, transit, and other SPD taxes. SPDs may choose not to or may not be able to levy additional sales taxes depending on other sales tax levies in their local area.

Table 1 below details the tax rate caps for the major SPDs in Texas.

Table 1: Special District Types & Tax Rates[39]

District Type		**Tax Rate Maximum**		
Group	**Type**	**Property Valuation**	**Sales Tax**	**Source**
Waste & Water	Municipal Utility Districts	---	Up to 2%	§ 54.601 Texas Water code
	Water Improvement Districts	---	Up to 2%	§ 51.331 Texas Water Code
	Fresh Water Supply Districts	---	Up to 2%	§ 53.029 Texas Water Code
	Drainage Districts	---	---	
	Water Control & Improvement Districts	---	Up to 2%	§ 51.331 Texas Water Code
Health & Safety	Hospital Districts	$0.75 per $100 of property valuation	---	§281.107 Health and Safety Code
	Hospital Service Districts	$0.75 per $100 of property valuation	---	Art. IX §9-11, Tx. Constitution; §2861.121, §286.161 Health & Safety Code
	Mosquito Control Districts	$0.25 per $100 of property valuation	---	§344.001 Health & Safety Code
	Emergency Services Districts	$0.10 per $100 of property valuation	Up to 2%	Art. III §48-e, Tx. Constitution; §775.074, §776.075 Health & Safety Code
	Jail Districts	---	---	---

[35] Ibid.
[36] Texas Economic Development Council. (2022). *Local Economic Development Guide Book*. https://texasedc.org/assets/resources/GuideBook/tedc-guide-book-2nd-edition-with-links.pdf
[37] Texas Senate. (2014, October). *Spotlight on special purpose districts*.
[38] Texas Comptroller of Public Accounts. (n.d.). *Local sales and use tax collection – A guide for sellers*. https://comptroller.texas.gov/taxes/publications/94-105.php
[39] Texas Senate. (2014, October). *Spotlight on special purpose districts*.

	Crime Control & Prevention Districts	---	Up to 2%	§ 363.055 Texas Local Government Code
Education	Independent School Districts	$1.50 per $100 of property valuation	---	§45.001-0031 Texas Education Code
	Charter School Districts	---	---	---
	Junior/Community Colleges	$0.50 per $100 of property valuation	---	§ 130.122 Texas Education Code
Transportation	Road Districts	$0.15 per $100 of property valuation	---	Art. VIII §9, Texas Constitution; §256.052 Transportation Code
	Navigation Districts	$0.10 - $0.15 per $100 of property valuation	---	§ 61.236 Texas Water Code
	Road Utility Districts	$0.10 per $100 of property valuation	---	§441.191-192 Transportation Code
Agricultural Development	Agricultural Development Districts	---	---	---
	Noxious Weed Control Districts	---	---	---
Economic & Community Development	Municipal Development Districts	---	Up to 2%	§377.101 Local Govt Code
	Public Improvement Districts	---	---	---
	Tax Increment Reinvestment Zones	---	---	---
	Library Districts	---	Up to 0.5%	§326.095 Local Govt Code

Health and Safety

Other than ESDs, there are five other forms of health and safety SPDs: hospital districts, hospital service districts, mosquito control districts, jail districts, and crime control and prevention districts. Though they stand alone in function, ESDs are most similar to hospital and jail districts in terms of creation and revenue-raising mechanisms, as they all require a hearing and election for formation and can levy property taxes.[40]

Education

Independent School Districts (ISDs) are the most well-known and popular form of SPDs, with over 1,250 statewide. Though primarily funded through property taxes, district funds are often supplemented by state funding depending on need, making them unique.[41] Though ISDs and ESDs both levy property taxes, the former do it on a far larger scale; in recent years, school districts levied more than half of all local property taxes in Texas.[42] Other forms of educational

[40] Ibid.
[41] Ibid.
[42] Texas Comptroller of Public Accounts. (2023, December). *Property taxes in Texas*. https://comptroller.texas.gov/economy/fiscal-notes/archive/2023/dec/proptax.php

special districts, such as charter school districts and junior/community colleges, raise significant revenue through tuition and fees,[43] similar to ESDs raising revenue by billing for services.

Waste and Water

With over 1,600 districts and substantial taxation authority, SPDs relating to waste and water are vital to the functioning and health of local governments. These SPDs include, but are not limited to, water control and improvement, fresh water supply, municipal utility, water improvement, and drainage. All these SPDs have the power of eminent domain, levy maintenance and operation tax, issue revenue bonds, and have tax bonding authority.[44] These SPDs vary greatly from ESDs in terms of fiscal capacity and overall structure.

Economic and Community Development

Responsible for matters ranging from arts and entertainment to improving infrastructure, economic and community development, SPDs make Texas communities functional and engaging. These districts have various structures and financial levers, but municipal development districts and public improvement districts have the most authority; they can issue general obligation bonds and revenue bonds, levy property taxes, and create assessments.[45]

Agricultural Development

To sustain Texas's position as a leader in the nation's agricultural industry, agricultural development districts and noxious weed control districts provided needed assistance to farmers and ranchers.[46] Agricultural development districts have the power of eminent domain, can issue general obligation and revenue bonds, and create assessments, while noxious weed control districts can only create assessments.[47]

Transportation

There are three forms of transportation SPDs: road districts, road utility districts, and navigation districts. Road districts can issue general obligation and revenue bonds, levy property taxes, and create assessments. Road utility districts can levy property taxes and maintenance

[43] Texas Senate. (2014, October). *Spotlight on special purpose districts*.
[44] Ibid.
[45] Ibid.
[46] Ibid.
[47] Ibid.

taxes. Navigation districts, which generally provide for the construction and improvement of Texas's waterways, can issue both revenue and tax bonds and levy taxes.[48]

IV. Financial Reserves Overview

Financial reserves, often known as "rainy day funds" or the "unassigned fund balance" in accounting terms, are budgetary resources usually set aside to cover mismatches between revenues and expenses that unexpectedly arise after annual budget approval. Reserves are important risk management tools for all types of state and local governments, as they ensure these entities have a safety net to fall back on in the event of an unforeseen circumstance. In this sense, one can think of financial reserves as self-insurance, as opposed to purchasing an insurance policy to cover damages caused by some exogenous event.[49]

Governments face a variety of risks, such as revenue and expenditure volatility, extreme weather/natural disasters, public health, public safety, cybersecurity concerns, economic downturns, and political events. More specifically, ESDs can experience revenue and expenditure volatility due to their reliance on property and sales taxes for operational expenses. They can also experience extreme weather events or natural disasters, such as floods or wildfires, that would significantly impact their financial position. Public health and safety events, such as the recent COVID-19 pandemic, can also put strains on municipalities. Cybersecurity threats can also pose large risks to governments, severely inhibiting their operations. Additionally, economic downturns can threaten a government's financial health due to potential loss of revenue. Political events, such as voter propositions to eliminate revenue streams, can also severely impact a government's operations. We will discuss additional risks as they specifically relate to ESDs later in the report.

The use of reserves is a tool to mitigate and manage the impact of these risks. Financial reserves are a crucial part of any government's finances, but various factors affect their size and management. One important consideration is that while a certain level of financial reserves is essential, it comes with an opportunity cost—every dollar held in reserves is a dollar that could otherwise fund government programs or be returned to taxpayers. Additionally, many governments are resource-constrained, and it can be difficult to raise additional resources for

[48] *Water Code* Chapter 60. Navigation Districts -- General Provisions. (n.d.) https://statutes.capitol.texas.gov/Docs/WA/htm/WA.60.htm

[49] Kavanagh, S., Reitano, V., & Jones, P. (2023). *Should We Rethink Reserves?* Government Finance Officers Association. https://www.gfoa.org/materials/rethinkingreserves

reserves rather than deploying these dollars to other spending priorities. Financial information is also less accessible to citizens, and governments may find it challenging to communicate why and at what level reserves are necessary.[50] To account for rising distrust in tax-funded reserves, research for public organizations often proposes a shift from thinking of reserves as a savings account to thinking of them as an insurance policy.[51]

Balancing the need for financial reserves with considerations of opportunity cost and determining an appropriate reserve level for each government's unique context is critical to establishing strong financial management while engendering trust from taxpayers. Estimating such reserve levels is the focus of the rest of this report.

V. Private Sector Approaches to Financial Reserves

Before delving into government approaches and estimation of reserve levels, it is useful to lay out the high-level general approaches advocated by private sector businesses since these entities also use financial reserves to mitigate risk. These approaches include activities related to: 1) determining optimal reserve levels, 2) monitoring reserve levels, and 3) investing reserve funds.

Determining Optimal Reserve Levels

While some researchers seek to establish one blanket cap on reserves, these studies are usually ad hoc in nature and fail to integrate the nuances of different needs and abilities. For private businesses, bankers often suggest holding three to six months of operating expenses, while larger and more complex organizations should sometimes possess up to a year's worth of operations in their reserves.[52]

Monitoring Reserve Levels

After establishing a clear policy for minimum and maximum fund balances, organizations must closely and regularly monitor reserve levels to ensure funds are sufficient without being

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[50] Government Finance Officers Association. (2015). *Fund balance guidelines for the general fund*. Government Finance Officers Association. https://www.gfoa.org/fpc-reserves

[51] Kavanagh, S. Reitano, V. & Jones, P. (2023, May). *Should we rethink reserves?* Government Finance Officers Association. https://gfoaorg.cdn.prismic.io/gfoaorg/cd9544c4-8db9-49e6-beb1-3c39815fc464_Rethinking+ReservesR2.pdf

[52] Dubuque Bank & Trust. (n.d.). *Maximizing Cash Reserves for Business: How To Protect Assets and Plan for the Future. https://www.dubuquebank.com/resources/blog-post/maximizing-cash-reserves-business-how-protect-assets-and-plan-future*

unnecessarily large.[53] As discussed above, there is an opportunity cost to having too large of a reserve fund since these resources are ultimately sourced from taxpayer funds and could be used by the citizens in private sector economic activity. Quarterly examinations of the current state of funds are essential to ensure the balance aligns with policy and key objectives.[54] A key avenue for appropriately monitoring reserves is reasonably and accurately forecasting future cash flows to determine when and where reserve funds may be spent in the future. This allows organizations to strategically plan for their financial future and create a better landscape for decision-making, as decision-makers have a clearer picture of their short- and long-term financial health and wellbeing.[55]

After sufficient monitoring, reserve policies should be adjusted if they no longer fit the needs and desires of the organization. Over time, these policies need correction and adaptation to new and emerging risks, market conditions, and expenditure requirements.[56] While guidelines should never be adjusted for malicious or financially illogical reasons, they should properly reflect the current economic environment.

Investing Reserve Funds

Determining the ideal diversification strategy for reserves depends on the type of organization, liquidity requirements, and risk tolerance. Maintaining liquidity allows funds to be available during emergencies or market downturns. While keeping reserves liquid is essential to covering immediate needs, investing a portion of funds in a diverse array of investments creates an opportunity to rely less heavily on revenue. Many organizations invest in safe, liquid, interest-bearing assets like short-term CDs or high-interest savings accounts. Investing in a diverse array of low-risk investments spreads the risk over a variety of sectors, minimizing the risk of poor performance.[57]

ESDs are also subject to the Public Funds Investment Act, pursuant to Texas Government Code Chapter 2256.[58] TexPool and Texas CLASS are pooled investment funds where many ESDs maintain levels of reserves to take advantage of current high yields.[59] Investment returns

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[53] Treasure Financial. (2023, May 19). *Best practices for managing business cash reserves.* *https://www.treasurefi.com/blog/best-practices-for-managing-business-cash-reserves*
[54] Ibid.
[55] Ibid.
[56] Ibid.
[57] Ibid.
[58] Tex. Gov't Code § 2256 (2023)
[59] TexasCLASS. (n.d.). *Texas Cooperative Liquid Assets Securities System*. https://www.texasclass.com/; TexPool. (n.d.). *Your partner in the management of public funds*.

generate revenue from banks and other institutional investors, providing valuable income for ESDs beyond their tax base. In this sense, reserves provide a financial benefit beyond mitigating risks from exogenous shocks and providing access to credit markets.

VI. Previous Academic Research on Government Financial Reserve Levels

There has been a scattering of academic research analyzing and weighing-in on financial reserve setting levels for state and local governments over the last few decades. The paragraphs below describe this research literature mostly in sequential order from publication.

Kriz (2002)

While not the oldest research in this list, we begin with this article since it gives a good overview of various approaches and research on government reserve setting practices. While best practices usually depend on the organization's sector, Kriz claims that the minimum and maximum desirable amount depends on what the key risks are and how they affect four main factors: revenue growth, revenue volatility, desired expenditure growth, and interest rate earned on invested fund balances.[60] According to Kriz, "the optimal level of fund balances is shown to be critically determined by the volatility of a jurisdiction's revenue sources, the value that local government administrators place on future expenditures in relation to current expenditures, and the desired growth in expenditures in the jurisdiction."[61] Setting reserve levels for governmental agencies including ESDs is often trickier than their private-business-counterparts, as these organizations vary so widely in size, scope, risks, and revenue-raising potential.

Vasche and Williams (1987)

The authors hypothesize that the use of reserve funds for budget shortfalls in the form of revenue forecasting failures should be measured with public opinion, using California as their geography.[62] Using confidence intervals, their findings suggest state governments should keep a minimum of 10% of operating expenses in their reserves.[63]

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[60] Kriz, K. A. (2002). The optimal level of local government fund balances: A simulation approach. *Proceedings: Annual conference on taxation and minutes of the annual meeting of the National Tax Association*, 95, 78–84. http://www.jstor.org/stable/41954268
[61] Ibid.
[62] Vasche, J. D., & Williams, B. (1987). Optimal governmental budgeting: Contingency reserve funds. *Public Budgeting & Finance, 7*(4), 66–82.
[63] Ibid.

Navin and Navin (1997)

Using the Ohio Budget Stabilization Fund, this article uses correlation and regression to assess optimal reserve sizes in the circumstances of economic and revenue risks.[64] They find the optimal fund balance to be 13.51% of general fund expenditures, protecting the municipality from budgetary shortfalls with 68% confidence.[65]

Joyce (2001)

This article was the first to estimate optimal reserve sizes across multiple jurisdictions, using state reliance on income tax, federal aid, gambling revenue, and Medicaid revenue as they relate to the volatility of a state's budget for the analysis.[66] After creating a "volatility index" and observing a wide variance between states, Joyce's findings were inconclusive, and determined that there is no "one-size-fits-all" approach to optimal sizing.[67]

Dothan and Thompson (2009)

This article takes a different approach by analyzing a municipality's optimal spending rate based on economic factors like inflation and population growth, as well as revenue and timing of expenditures.[68] Using a hypothetical municipality, they estimate an ideal spending rate to be 2.4% of the jurisdiction's wealth, and the reserve fund should be maintained at 93.57% of their annual revenue.[69]

Marlowe (2011)

This article innovates further by comparing a sample of over 500 cities' unreserved fund balances, total general fund balances, and unrestricted net assets to their individual bond ratings.[70] Using probability to predict whether these three factors influence a city's bond rating, Marlowe finds that reserves have minimal impact on credit ratings.[71] His findings suggest

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[64] Navin, J. C., & Navin, L. J. (1997). The optimal size of countercyclical budget stabilization funds: A case study of Ohio. *Public Budgeting & Finance, 17*(3), 114–127
[65] Ibid.
[66] Joyce, P. G. (2001). What's so magical about five percent? A nationwide look at factors that influence the optimal size of state rainy day funds. *Public Budgeting & Finance, 21*(2), 62–87.
[67] Ibid.
[68] Dothan, M., & Thompson, F. (2009). A better budget rule. *Journal of Policy Analysis and Management, 28*(3), 463–478.
[69] Ibid.
[70] Marlowe, J. (2011). Beyond 5 percent: Optimal municipal slack resources and credit ratings. *Public Budgeting & Finance, 31*(2), 93–108.
[71] Ibid.

therefore suggest that maintaining a certain level of reserves may not have the impact other researchers have estimated.

Kriz (2015)

While Kriz uses his 2015 paper to help define best practices for municipalities to follow, other empirical research with varying approaches is important to consider in recommending best practices for reserve sizing. Historically, the question of optimal sizing has been a challenging one for researchers to consider, as there are a variety of factors unique to each municipality feeding into where the reserves come from, how they are used, and why. Acknowledging these challenges, researchers have used various geographies, models, and risk factors to assess their recommendations, as noted in this article.[72] In addition to discussing prior research in the article, Kriz conducts a Monte Carlo simulation to estimate future fund balance, using data from Omaha, Nebraska. The model involves estimating ratios between sales tax revenue and the level of taxable sales, as well as between property tax revenues and total property valuation. This model then simulates the probability of using reserves depending on whether the aforementioned ratios trigger a negative balance. Kriz finds that if Omaha wanted 75% certainty of retaining adequate reserves, they should keep nearly $5.5 million in reserves. If they wanted 95% certainty, they should keep nearly $15.5 million in reserves.[73]

Arapis and Chatterjee (2022)

The authors discuss how proactive saving for potential disaster experiences, especially for municipalities where disasters are more common or have taken place previously, leads to an "efficient fiscal savings strategy."[74] Using Pennsylvania municipalities as an example, Arapis and Chatterjee find those that had experience in dealing with disasters, and those who also had disaster management plans, found themselves with more cost savings and less reliance on fiscal reserves in the face of disaster. They ultimately recommend that governments with high risk of natural disasters maintain a minimum level of reserves to instigate initial response efforts. Preparing for disasters will promote higher cost savings for governments in the long run.[75]

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[72] Kriz, K.A. (2015). *Is There an Optimal Size of Fiscal Reserves for Local Governments?* In: Hou, Y. (eds) Local Government Budget Stabilization. Studies in Public Budgeting, vol 2. Springer, Cham. https://doi.org/10.1007/978-3-319-15186-1_9

[73] Ibid.

[74] Arapis, T., & Chatterjee, V. (2023). Saving for Natural Disasters: Evidence From Pennsylvania Local Governments. State and Local Government Review, 55(2), 120-138. https://doi.org/10.1177/0160323X221145920

[75] Ibid.

In conclusion, academic research on optimal reserve sizing has progressed over time, starting primarily with state-level research while later evolving to center around local governments. As the research has become more robust, so have the recommendations for the optimal reserve sizes. The research reports somewhat conflicting results, some recommending a large portion of operating expenses or revenue as necessary, while others argue reserve levels have minimal importance to overall financial health. Additionally, while some studies suggest specific percentages, others argue that a one-size-fits-all approach is impractical. Overall, the literature underscores the complexity of determining ideal reserve levels, as different governments face unique risks and revenue structures. From these various perspectives, it remains clear that determining optimal reserve levels is highly dependent on numerous factors, some of which we will discuss later in this report.

VII. GFOA Recommended Practices on Financial Reserves

The Government Finance Officers Association (GFOA) is one of the oldest professional associations for government finance officials. Local governments rely extensively on the research and best practices advanced by GFOA. GFOA has long offered best practices for the setting of financial reserves for state and local governments (what we call "Basic GFOA Guidance"). In recent years, it has begun to "rethink" such guidance especially for governments with greater financial uncertainty (what we call "New GFOA Guidance").

Basic GFOA Guidance

Historically, GFOA has recommended somewhat rigid guidelines for general governments to keep in reserve, such as 5% of the operating budget or two months' operations costs. It encourages governments to establish their own formal policies on the level of fund balance maintained in the General Fund, urging them to articulate a clear framework for how governments should adjust their reserve levels in a given period.[76]

Moreover, GFOA recommends that governments have a plan in place to replenish the reserves should they fall below the prescribed optimal level within one to three years of use.[77] Non-recurring revenues such as budget surpluses and excess resources from other funds can be used to replenish the reserve, though these types of funds should not be used for recurring

[76] Government Finance Officers Association. (2015). *Fund balance guidelines for the general fund*. Government Finance Officers Association. https://www.gfoa.org/fpc-reserves
[77] Ibid.

expenditures. Governments may experience challenges replenishing funds within the suggested time horizon, such as budgetary constraints, extreme events, political shocks, economic conditions, or external financing expectations.[78]

GFOA has always acknowledged that a government's unique financial situation should be dispositive in terms of the ultimate setting of financial reserves. For example, it clearly states that the level of unrestricted fund balance in the general fund may exceed basic recommended levels in certain contexts such as: uncertain predictability of revenues and expenditures, exposure to significant one-time delays in funding, drain on general fund resources from other funds, negative impact on bond ratings, or commitments and assignments for other purposes.[79] As we will discuss in more depth later, the unique qualities of ESD public finance align well with some of these criteria supporting larger financial reserves.

New GFOA Guidance

GFOA has developed a series of reports in recent years under the broad theme of "Rethinking Budgeting." One of these reports focuses on reserve optimization for local governments that may lead to recommendations outside the standard best practices offered by GFOA in the past.[80] More specifically, recognizing increasing uncertainty facing local governments, GFOA recommends reexamining reserve management strategies to establish adequate reserve levels to meet the unique needs of different municipalities.[81] Reserves are a way to manage risk, and with the increasing frequency of climate-related events and other potential exogenous shocks that governments could experience, maintaining a certain level of reserves is prudent risk mitigation. That said, given mounting governmental distrust, rising costs, and resource constraints, GFOA has reevaluated their previous approach to account for idiosyncrasies between governments.[82] They now propose a risk-based assessment approach tailored to specific municipalities as a method to ameliorate this process, maintaining local solutions as the ideal scenario.[83]

Determining an appropriate amount of funds to dedicate to financial reserves is highly complicated and not an exact science, so organizations must develop a clear and well-developed

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[78] Ibid.
[79] Ibid.
[80] Kavanagh, S., Reitano, V., & Jones, P. (2023). *Should We Rethink Reserves?* Government Finance Officers Association. https://www.gfoa.org/materials/rethinkingreserves
[81] Ibid.
[82] Civic Federation. (2023, September). GFOA recommends governments rethink their reserve policies. https://www.civicfed.org/node/4150
[83] Kavanagh, S., Reitano, V., & Jones, P. (2023). *Should We Rethink Reserves?* Government Finance Officers Association. https://www.gfoa.org/materials/rethinkingreserves

fund-setting policy. Finding the "sweet spot" for government reserves is particularly tricky due to the current political climate and increasing risk of exogenous shocks. Diminishing citizen trust in government can lead to public suspicion and frustration towards large reserves, but having insufficient reserves risks leaving governments susceptible to exogenous shocks.

Despite wavering public opinion, sufficient store of reserves is essential to all organizations functioning properly, and should be based on firm policy and clear, achievable savings goals. Most importantly, GFOA is clear in all of its guidance (basic and new) that reserve levels should be set proportionately to the risks the government faces.

To this end, GFOA recommends governments conduct risk assessments to help estimate reserve targets and understand potential shocks they may need to mitigate. The first step of this risk analysis is to determine an adequate range of target reserve levels.[84] With this range in mind, governments can then assess the various risks to which they may be exposed, a process aided by a GFOA-published template.[85] This tool allows governments to see what types of risks they could expect, and whether their target reserve range is adequate in absorbing said risks. The tool attaches numerical values to each risk level, allowing governments to see a final scoring of their risk level based on their answers. The final score then leads to an ultimate recommendation of optimal reserve size.

It is important to note the recommendations made by GFOA are for general purpose governments and may not be applicable to specialized governments, such as ESDs. As stated above, the revenue and spending constraints of ESDs in Texas necessitate even greater fiscal slack to mitigate the various risks they face.

VIII. Rating Agency/Investor Considerations

Two other stakeholders keenly interested in the reserve levels of governments are the credit rating agencies and the lenders (i.e., investors) of funds to governments. All governments, including ESDs, should be responsive to the preferences of these two stakeholders since both determine the government's access to capital and cost of capital (i.e., interest rate they pay to borrow funds) for infrastructure and cash flow purposes. Municipalities' financial profiles, determined by analyzing available fund balances, operations, and reactivity to exogenous

[84] Ibid.
[85] Government Finance Officers Association. (2020). *General fund reserve calculation worksheet*. https://www.gfoa.org/materials/general-fund-reserve-calculation-worksheet

shocks, play a large role in how credit agencies rate their creditworthiness.[86] Fitch states their financial profile analysis hinges largely on the "resilience of an issuer's available reserves," as adequate reserves indicate a municipality's flexibility in managing their finances should a shock or emergency arise.[87]

According to Fitch's credit rating methodology, municipalities with limited budget flexibility should maintain a higher percentage of revenue in their reserves because they are more likely to rely on these reserves in the event of a shock. Conversely, municipalities with greater budget flexibility do not need to maintain as high of a percentage of their revenue in their reserves, as they have more cushion in their budget. Fitch assesses both budget flexibility and reserve levels of municipalities as a part of their financial profile analysis process; therefore, adhering to these guidelines should result in more favorable credit ratings.[88]

Moody's publishes rating targets for general purposes governments as follows:[89]

Table 2: Moody's Rating Targets[90]

Rating	Fund Balance
AAA	Associated with a fund balance greater than 35% of revenues
AA	Associated with a fund balance between 25% and 35% of revenues
A	Associated with a fund balance between 15% and 25% of revenues

20% of Moody's ratings are based on fund balance, though raters also consider local factors and unique circumstances as they relate to fund balances.[91]

Of course, like in personal finance, higher credit ratings and lower default risk as perceived by investors are associated with lower interest costs for governments like ESDs. In these cases, lower interest rates directly translate to having more resources for capital projects and public services. Higher credit ratings are also politically valuable in that chief executives, legislative bodies, and finance leaders often use them to tout their financial stewardship on behalf of the public.

However, as underscored by GFOA, governments need to be wary of setting reserve levels too

[86] Fitch Ratings. (2024, April 2). *U.S. public finance local government rating criteria*. Rating Criteria.
[87] Ibid.
[88] Ibid.
[89] Government Finance Officers Association. (n.d.). *Rethinking reserves.* https://www.gfoa.org/materials/rethinkingreserves
[90] Moody's Investors Service. (2024, July 24). *US cities and counties: Rating methodology*. https://ma.moodys.com/rs/961-KCJ-308/images/PBM_1401434.pdf
[91] Ibid.

high to maximize credit ratings.[92] As discussed previously, there is clearly an opportunity cost to having reserves, especially at high levels. Moreover, maximizing credit ratings may not be beneficial in all situations. For example, there are times in the financial markets in which the difference in interest rates between rating categories (e.g., AAA compared to AA) may not be significant. In this case, tying up additional dollars in reserves to achieve a AAA rating may not provide any material interest cost benefit. Also, governments that do not anticipate borrowing significant amounts from the capital markets or plan to borrow with short maturities may not need to be as responsive to the preferences of these outside entities. Rather, governments in these situations should set reserves at levels appropriate for their individual risk profiles.

IX. Texas ESD Risk Descriptions

ESDs face several risks that hold the potential for increased demand or cost of providing services, both of which necessitate sufficient financial reserves to ensure liquidity and continuation of efforts.

Extreme Weather

Extreme weather can have profound impacts on municipal spending. The Federal Reserve Bank of Boston reports that a one-degree Fahrenheit increase in average temperature results in a "3.2% increase in real per capita total general-fund expenditures" of local governments on average."[93] Other extreme weather events, such as droughts, wildfires, and hurricanes, also have fiscal implications.

These extreme weather events, explained in more detail below, significantly impact not only government spending, but household spending as well.[94] Research shows home insurance premiums for those living in high-risk zones rose 22% from 2020-2023.[95] Increased household costs can lead to lower municipal revenue generation than expected, exacerbating tight financial situations in mitigating climate-related risks.

It is expected that Texas will experience increased risks from heat, precipitation, and fire due to

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[92] Ibid.
[93] Zhao, B. (2022). *The Impact of Weather on Local Government Spending—Federal Reserve Bank of Boston*. https://www.bostonfed.org/publications/research-department-working-paper/2022/the-impact-of-weather-on-local-government-spending
[94] Ibid.
[95] Milman, O. (2024, December 5). How climate risks are driving up insurance premiums around the US – visualized. *The Guardian*. https://www.theguardian.com/environment/2024/dec/05/climate-crisis-insurance-premiums

incidences of extreme weather over the next 30 years. Overall, the Houston area faces the highest extreme weather risk and Laredo faces the lowest.[96]

Compared to other states, Texas ranks:[97]

- 3rd for heat risk
- 10th for drought risk
- 15th for fire risk
- 36th for storm risk
- 38th for flood risk

Heat: A major climate risk Texans will face in coming years is the increase in severity and length of extreme heat. While this affects different regions in the state to varying degrees, 2024 saw more extreme heat and 100+ degree days statewide than the historical norm,[98] and the upcoming years will likely be even more dangerous.[99] These exorbitant temperatures lead to a number of health issues, like heart disease, heat stroke, dehydration, and worsening asthma.[100] Children are particularly vulnerable to such conditions, as their bodies cannot regulate heat as well as adults'. At two major Dallas hospitals, emergency room visits for heat-related illness in children increased by 170% over the past two decades.[101] This trend supports predictions that the need for emergency services will increase in the coming years, which requires an increase in funding and potentially reserve levels for ESDs to sustain optimal services.

Drought: As part of the Southern Plains region, several geographic features lead to Texas experiencing frequent and consequential droughts.[102] During the summers, Texas faces the aforementioned extreme heat, which results in higher rates of evaporation, thereby drying the region.[103] In the winters, Texas often faces a weather pattern called La Niña, which results in

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[96] ClimateCheck. (n.d.). *Texas climate risk report*. https://climatecheck.com/texas
[97] Ibid.
[98] Thorton, G. (2024, September 4). *Summer 2024 recap*: *Did we get the forecast right?* KVUE. https://www.kvue.com/article/weather/summer-2024-weather-forecast-recap/269-e883e420-4323-4f51-abf1-a1552d91287c
[99] Schneider, R., & D'Souza, S. (2024, July 1). *Texas' extreme weather and climate change: A growing crisis*. Texas Tribune. https://www.texastribune.org/2024/07/01/texas-extreme-weather-climate-change/#:~:text=Climate%20scientists%20and%20academics%20say,state%20is%20likely%20to%20worsen
[100] World Health Organization. (2021). Climate change, heat and health. https://www.who.int/news-room/fact-sheets/detail/climate-change-heat-and-health
[101] Sattler, L. (2024, November 14). *Texas hospitals see nearly threefold increase in children's ER visits for heat-related illnesses: 'Warrants further attention and action.'* The Cool Down. https://www.thecooldown.com/green-tech/heat-related-illnesses-in-children-er-visits-rising/#:~:text=What's%20happening%3F,problems%20between%202012%20and%202023.
[102] National Integrated Drought Information System. (n.d.). *Texas drought information*. https://www.drought.gov/states/texas
[103] Ibid.

warmer and drier conditions.[104] These frequent droughts increase rates of wildfires and shortages in water supply needed for human consumption, medical needs, and firefighting, impacting ESDs.[105]

Wildfire: Texas is among the top states facing wildfire risk.[106] Though 90% of Texas wildfires are caused by people "burning debris or improperly using equipment,"[107] Texas also faces higher wildfire risk than many other states due to its low levels of humidity and masses of dry fuels.[108] In particular, San Antonio and Austin rank in the United States' top ten riskiest cities for wildfire concentration.[109] Around 3.2 million housing units in Texas are in the "wildland-urban interface zone," which is an area where structures are co-located with undeveloped land, increasing wildfire risk.[110] Wildfires create a sudden spike in demand for firefighting services to extinguish the flames, paramedics for increased risk from burns and smoke, and police forces for emergency evacuations.[111]

Wildfires also increase both revenues and expenditures of municipal governments, as they work to combat fires and ameliorate infrastructure to protect against future damage. Liao and Kousky, in their report on the fiscal impacts of California wildfires, estimate sales taxes, property taxes, and local expenditures increase in the aftermath of a wildfire.[112] The sale and re-valuation of homes, as well as rebuilding costs, drive these increases, but the researchers find wildfires have an overall negative impact on municipalities' financial situations.[113] Additional research shows wildfires negatively impact the real estate market, as their residual smoke decreases home values and market liquidity.[114]

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[104] Ballard, J. (2025, January 4). *It's 2025 and La Niña still hasn't formed in the Pacific. Here's what that means for winter in Texas*. Houston Chronicle. https://www.houstonchronicle.com/news/houston-weather/forecast/article/texas-winter-weather-la-nina-20009194.php
[105] National Integrated Drought Information System. (n.d.). *Texas drought information*.
[106] Federal Emergency Management Agency. (n.d.). *Wildfire risk in the U.S.* https://hazards.fema.gov/nri/wildfire
[107] Wasson, M. (2024, October 7). *Texas among the states most at risk for wildfires. Here's what homeowners can do*. San Antonio Express News. https://www.expressnews.com/san-antonio-weather/article/texas-wildfire-risk-homeowners-property-19808195.php
[108] Texas Division of Emergency Management. (n.d.). *2022 Texas wildfires*. https://tdem.texas.gov/disasters/2022-wildfires
[109] Wasson, M. (2024, October 7). *Texas among the states most at risk for wildfires*.
[110] Hegar, G. (2025). *Texas communities face elevated wildfire threats*. Texas Comptroller of Public Accounts. https://comptroller.texas.gov/economy/fiscal-notes/infrastructure/2025/fire-cost/
[111] Cybersecurity and Infrastructure Security Agency. (n.d.). *Wildfires*. https://www.cisa.gov/topics/critical-infrastructure-security-and-resilience/extreme-weather-and-climate-change/wildfires
[112] Liao, Y., & Kousky, C. (2022). The fiscal impacts of wildfires on California municipalities. *Journal of the Association of Environmental and Resource Economists*, *9*(2), 307–343. https://doi.org/10.1086/717492
[113] Ibid.
[114] Addoum, J., Gounopouls, D., Gustafson, M., Lewis, R., & Nguyen, T. (2024, March). *The Impact of Wildfire Smoke on Real Estate Market*.

Storm/flood: Overarching research on hurricanes across the country posits that these extreme weather events increase municipalities' reliance on debt to finance rebuilding efforts and public services.[115] This is due to a decrease in tax revenue while community members deal with the aftershock of a hurricane's destruction.

As a result of the trending rises in temperature and humidity, North and East Texas experience torrential downpours of rain, described as increasingly "intense and erratic."[116] Compared to benchmark levels, these areas see unusually high levels of precipitation; in 2024, the Huntsville area experienced a 180% increase in rainfall from its norm.[117] This phenomenon causes an increase in flood risk for affected and neighboring regions. Initiated by the Texas Legislature following several precipitation-related extreme weather events, including 2017's Hurricane Harvey, Texas released its first ever flood plan in 2024. The plan showed that one in six Texans live or work in an area at risk of flooding.[118] Increased storm and flood risk strongly affect ESD operations, as these weather conditions produce a myriad of situations that strain ESD resources.

Litigation

Recent Texas legislative sessions enacted changes in the Texas Property Tax Code that made it more favorable for property owners to litigate property tax disputes, resulting in increased legal expenses for ESD funds.[119] Bills contributing to this trend include SB 625 enacted in 2017,[120] which requires SPDs to provide the public new financial transparency measures on district finances and taxation, and SB 903 and HB 2080 enacted in 2021, both of which make litigation and access to district courts easier for constituents.[121]

For example, over the past decade, one Texas ESD experienced a 661% increase in lawsuits, with an 800% increase in the property value under litigation; they dedicated all surplus budget funds

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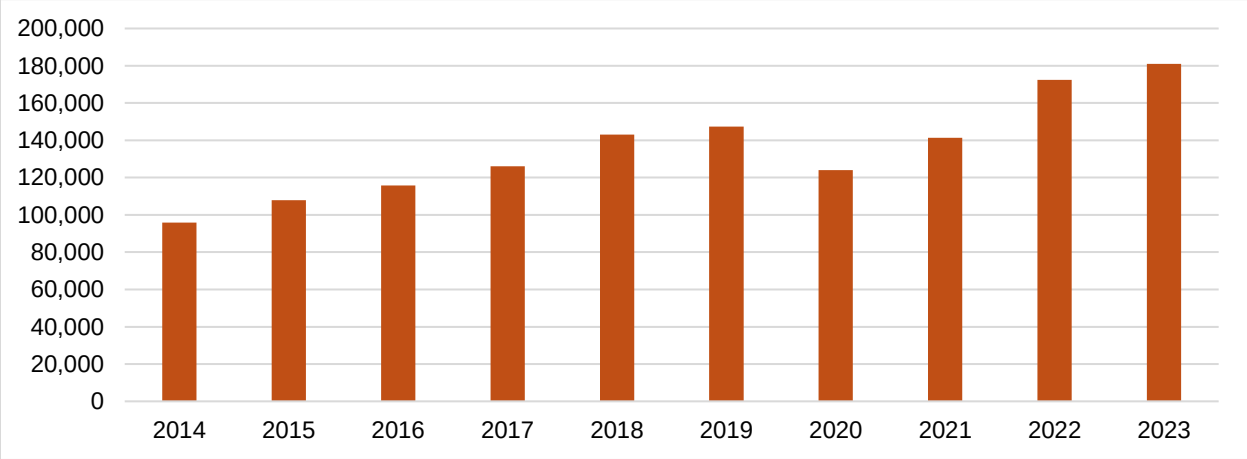
[115] Jerch, R., Kahn, M. E., & Lin, G. C. (2020). *Local Public Finance Dynamics and Hurricane Shocks* (Working Paper No. 28050). National Bureau of Economic Research. https://doi.org/10.3386/w28050
[116] Martinez, A. & Schumacher, Y. (2024, July 1). *Texas weather extremes likely to become normal, scientists say*. The Texas Tribune. https://www.texastribune.org/2024/07/01/texas-extreme-weather-climate-change/
[117] Ibid.
[118] Martinez, A. (2024, May 28). *Texas' first-ever statewide flood plan estimates 5 million live in flood-prone areas*. The Texas Tribune. https://www.texastribune.org/2024/05/28/texas-state-flood-plan/
[119] Mann, L. (2024, November 4). *RE: Fiscal Year 2024 Budget Amendment*. Travis Central Appraisal District.
[120] Texas Comptroller of Public Accounts. (n.d.). *Special purpose district financial and tax reporting*. *https://comptroller.texas.gov/transparency/local/sb625/#:~:text=SB%20625%20also%20requires%20the,the%20public%20free%20of%20charge*
[121] Colmenero, D. & Pilawski, A. (2021, June 30). *Recent Legislation Gives Taxpayers Greater Access to District Court in Challenging the Texas Comptroller's Denial of a Refund Claim or Assessment of Tax*. Meadows Collier: Attorneys at Law. https://www.meadowscollier.com/recent-legislation-gives-taxpayers-greater-access-to-district-court-in-challenging-the-texas-comptrollers-denial-of-a-refund-claim-or-assessment-of-tax-

to bolster their litigation reserve.[122] Currently, litigation is draining rainy day funds, and the issue is on track to worsen in coming years.

Property Tax Limitations

As described above, funding for ESDs comes from property taxes, so threats to property taxation are direct financial threats to these districts. A plateau or dip in property valuation or increased voter opposition to property taxes are dominant threats. Moreover, in recent years, property taxpayers have increasingly appealed their tax bills to reduce amounts owed as seen in Figure 3 below, for Travis County. After years of gains, the boom of the Texas housing market is beginning to fall, with four major cities (Houston, San Antonio, Dallas-Fort Worth, and Austin) seeing a decrease in home prices compared to the year prior.[123] Additionally, the Texas Legislature has been regularly trying to reduce local property taxes since 2018 and adjusted for inflation, it's working. A Texas Tribute survey of Texas households saw that these surveyed saw their property tax bill drop 28% on average in 2023 compared to the year prior.[124]

Figure 3: 10 Year History of Property Tax Appeal Volume, Travis Central Appraisal District[125]



Additionally, the 89th Legislative Session's SB 8, which recently passed in the Senate and has moved on for a vote in the House, would raise the homestead exemption from $100,000 to

[122] Mann, L. (2024, November 4). *RE: Fiscal Year 2024 Budget Amendment*
[123] Ramsey Solutions. (2024, August 22). *Texas housing market predictions 2024.* https://www.ramseysolutions.com/real-estate/texas-housing-market?srsltid=AfmBOorMBxIphF9daBQH7u2f2XJbiIz8UR67DAvUOui3bgwkusjW7BEu#cookie-banner
[124] Fechter, J. & Park, A. (2024, April 26). *Texas Republicans have tried to rein in property taxes for five years. Has it worked?* The Texas Tribune. https://www.texastribune.org/2024/04/26/texas-property-tax-cuts-analysis/
[125] Travis Central Appraisal District. (2024, March 4). *2023 Annual Report.* *https://traviscad.org/wp-content/uploads/2023-Annual-Report.pdf*

$140,000.[126] The bill aims to reduce the taxable value of homes in Texas, thereby reducing homeowners' property taxes. If passed, this law could impact ESDs' property tax revenue.

Volunteer Dependency

To stay financially afloat, fire departments rely heavily on volunteers; nationally, 65% of firefighters are volunteers.[127] However, the supply of volunteer firefighters is decreasing and most volunteers firefighters are older, especially in rural areas where it is not uncommon for volunteers to be well into retirement age.[128] In a 2023 survey, the State Firefighters' & Fire Marshals' Association of Texas (SFFMA) found the decreasing rate of voluntary firefighting is due largely to younger people having declining interest in the practice. [129] Reasons for the decline, based on survey responses and analyses of social media posts on the topic, include "older generations not being as welcoming to younger volunteers, a lack of training, outdated gear, and poor leadership."[130]

For ESDs with constrained budgets, leveraging volunteer service workers, such as volunteer firefighters, can alleviate financial burden while maintaining the ability to provide emergency services.[131] Volunteer firefighters have been on the front lines fighting the Los Angeles area wildfires as well as recent Texas wildfires in West and Central Texas. Adequate service would not be possible without these workforce reinforcements, and some argue staffing shortages are a large contributing factor to the continuation and exacerbation of wildfires.[132] Many states, including Texas, also deploy incarcerated people in firefighting roles.[133] While incarcerated firefighters get paid nominal amounts, their salaries are not accounted for in ESDs' budgets;

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[126] Maynard, A. (2025, February 12). Property tax reform bill sails through Texas Senate committee. *KBTX*. https://www.kbtx.com/2025/02/13/property-tax-reform-bill-sails-through-texas-senate-committee
[127] Becker, S. (2024, January 25). *The dire shortage of volunteer firefighters in the US.* BBC. https://www.bbc.com/worklife/article/20240124-the-dire-shortage-of-volunteer-firefighters-in-the-us
[128] Hilsenbeck, K. (2024, March 12). *Is volunteerism dying or has your marketing flatlined?* National Volunteer Fire Council. https://www.nvfc.org/is-volunteerism-dying-or-has-your-marketing-flatlined/#:~:text=The%20State%20Firefighters'%20%26%20Fire%20Marshals,seeing%20younger%20volunteers%20step%20up
[129] Ibid.
[130] Ibid.
[131] *The Value of Volunteer Firefighters | MTAS*. (2023, September). https://www.mtas.tennessee.edu/reference/value-volunteer-firefighters?utm_source=chatgpt.com
[132] Wigglesworth, A. (2024, September 29). *Staff shortage at U.S. Forest Service hampers Southland wildfire response, locals say*. Los Ángeles Times. https://www.latimes.com/environment/story/2024-09-29/california-wildfire-fight-hampered-by-forest-service-staffing
[133] Purdum, J. C. (2020, September 15). *Disaster work is often carried out by prisoners—for as little as 14 cents an hour*. Texas A&M Today. https://stories.tamu.edu/news/2020/09/15/disaster-work-is-often-carried-out-by-prisoners-for-as-little-as-14-cents-an-hour/

rather, they are paid out state or local correctional programs.[134] ESDs with tight budget constraints may rely more heavily on firefighting from incarcerated individuals.

Other Unique Factors to ESDs

Cyber security: ESDs rely on the internet to deliver many of their services, like having access to phone networks for 9-1-1 calls or logging patient records in a portal.[135] Cyber or ransomware attacks could impact ESDs' provision of vital services, impede operations, and make constituent information vulnerable.[136]

Rising operating and capital costs: The population in Texas is growing, increasing by 43% from 2000-2022.[137] This rapid growth can lead to a higher demand for ESD services, forcing ESDs to increase their already-constrained budgets.[138] To meet these demands, ESDs must increase their personnel expenses, an expenditure already constituting much of ESDs' budgets.

Higher service demands also require new facilities and equipment. Travis County ESD No. 2's capital expenditures have increased by more than 28% from the FY23 end of year estimate to the FY24 approved budget.[139] Other ESDs report increased capital expenditures as well, such as Travis County ESD No. 17.[140] With the rising costs of firefighter gear, medical supplies, and emergency services vehicles, ESDs are faced with mounting cost challenges.

Aging workforce: By 2030, over 11% of emergency medical services employees will be 65 or older and eligible for retirement. [141] Upon retirement, many of these employees will receive pension benefits. The Texas Pension Review Board's 2023 Guide to Public System Retirement reports that the overall amount of state pension funds has been decreasing, indicating signs of

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[134] Adams, C. (2025, January 13). *California prisoner firefighter program draws harsh criticism amid L.A. wildfires*. NBC News. https://www.nbcnews.com/news/nbcblk/la-wildfires-prisoner-firefighter-program-criticism-rcna187436
[135] American Hospital Association. (2024, October 7). A look at 2024's health care cybersecurity challenges. https://www.aha.org/news/aha-cyber-intel/2024-10-07-look-2024s-health-care-cybersecurity-challenges
[136] DiNatale, S. (2025, February 10). *CPS Energy: No personal customer data leaked in recirculating 2023 cyberattack*. San Antonio Express-News. https://www.expressnews.com/business/article/cps-energy-cyber-attacks-utilities-security-20154134.php
[137] U.S. Census Bureau. (2023, March). *Texas population passes the 30 million mark in 2022*. U.S. Department of Commerce. https://www.census.gov/library/stories/2023/03/texas-population-passes-the-30-million-mark-in-2022.html
[138] Pflugerville Fire Department. (n.d.). *Expenses*. https://www.pflugervillefire.org/expenses/
[139] Pflugerville Fire Department. (n.d.). *Transparency*. https://www.pflugervillefire.org/transparency/
[140] Travis County Emergency Services District No. 17. (2022). *FY22 approved budget document*. https://www.travisesd17.org/wp-content/uploads/2022/02/TCESD17_FY22_Approved_Budget_Document.pdf
[141] Texas Department of State Health Services. (2020). *EMS workforce factsheet*. https://www.dshs.texas.gov/sites/default/files/chs/hprc/publications/2020/EMS_factsheet_2020_2.pdf

future financial strain.[142] As more emergency services personnel qualify for retirement and begin receiving their pension benefits, this will put further financial stress on the overall pension system.[143] Adding more personnel to meet demands, as described above, could further exacerbate ESDs' increased pension liabilities.

Personnel expenses pressure: ESDs are restricted in their ability to generate revenue due to their limited revenue-raising mechanisms. They often rely on property taxes for revenue, which are capped at $0.10 per $100 of property valuation. This restricts their ability to generate revenue and makes it challenging to offer competitive salaries. Many fire departments are also experiencing volunteer shortages, forcing some to hire additional professional firefighters. [144] These hires further strain their budgets.

Legislative commitments: State and local legislative commitments, particularly those protecting emergency service workers, influence ESD operations. For example, Chapter 607 of the Texas Government Code mandates that ESDs must provide comprehensive workers' compensation and health benefits to their employees who are exposed to contagious diseases while working.[145] While these laws are essential to ensure firefighter and EMT safety, they introduce additional costs for ESDs to manage.

Lower reimbursement rates: ESDs are reimbursed for services provided at varying rates depending on the population and their insurance provider, a factor that can exacerbate financial strain.[146] In particular, Medicare and Medicaid often reimburse ESDs at lower rates than private insurance, meaning they receive less funding for provided services. This imbalance could strain ESD resources, particularly in areas with higher populations of publicly insured individuals. Additionally, more complex medical care (such as the emergency care EMTs provide in ambulances) can lead to higher reimbursements.[147] These reimbursements are vital to ESDs'

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[142] Public Retirement Benefits (PRB) Texas. (2023). *2023 Legislative Guide*. https://www.prb.texas.gov/wp-content/uploads/2023/03/2023-Legislative-Guide.pdf
[143] Ibid.
[144] CBS19. (2023, October 4). *Emergency services districts could be the answer to volunteer firefighter recruitment*. https://www.cbs19.tv/article/news/local/emergency-services-districts-could-be-the-answer-to-volunteer-firefighter-recruitment/501-d71613cb-f7d7-49e5-97e3-f6ec4b45df68
[145] Texas Legislature. (n.d.). *Tex. Gov't Code § 607. Benefits relating to public safety employees*. https://statutes.capitol.texas.gov/Docs/GV/htm/GV.607.HTM
[146] Kaiser Family Foundation. (2022, April 15). *How much more than Medicare do private insurers pay? A review of the literature*. KFF. https://www.kff.org/medicare/issue-brief/how-much-more-than-medicare-do-private-insurers-pay-a-review-of-the-literature/
[147] Centers for Medicare & Medicaid Services. (2024, November 1). *Calendar year (CY) 2025 Medicare physician fee schedule final rule*. https://www.cms.gov/newsroom/fact-sheets/calendar-year-cy-2025-medicare-physician-fee-schedule-final-rule

financial stability.

Access to federal and state grant opportunities: As mentioned earlier, FEMA and/or other federal agencies can aid ESDs in disaster response. FEMA funding was instrumental in preparing for and responding to disasters like Hurricane Harvey, though some ESDs have experienced delays in receiving funds.[148] TDEM and other state agencies are essential to augmenting ESDs' disaster response across the state.

These funding opportunities provide a tangible way to mitigate risks, though the dollar amount and timing of receipt of this funding is uncertain in terms of planning for potential disaster events. Such uncertainty is especially salient regarding the state of FEMA under President Trump's recent Executive Orders to review the agency's effectiveness.[149]

Relevance to capital markets: Given the unique risks presented above, credit rating agencies and investors/lenders have generally preferred higher amounts in reserve for ESDs than general purpose governments and even other SPDs. Only a handful of ESDs have sold bonds in the public market that would carry bond ratings.[150] For these type of public offerings, 90 days of operating expenses in reserves is the minimum amount acceptable to investors, with 180 days of operating expenses being the preferred level. Most borrowing has taken the form of privately placed direct loans with banks and other lending institutions. These lenders generally demand ESDs hold 180 days of operating expenses in their reserves, while maintaining reserves below this level is seen as a credit weakness.

As mentioned above, it is important to note financial reserves are not the only factor in a credit rating or a bond buying decision. Moreover, as discussed previously, responsiveness to the rating agencies or investors in setting reserves should be contingent on the amount, structure, and regularity of borrowing as well as specific current market conditions.

X. Case Study Overview

The previous sections of the report described the basic concepts around financial reserves and the unique risks Texas ESDs face, which reserves serve to mitigate against. We now turn to in-

[148] Federal Emergency Management Agency. (2018, November 1). Texas - DHS FEMA grant effectiveness case study. FEMA. https://www.fema.gov/case-study/texas-dhs-fema-grant-effectiveness-case-study
[149] Sommer, L. (2025, March 21). Trump order pushes states to handle preparing for disasters. NPR. https://www.npr.org/2025/03/21/nx-s1-5327595/trump-order-fema-states-disaster-response
[150] Conversation on January 28, 2025 with Ed King, Senior Vice President, Government Capital Securities Corporation

depth case study analyses of three Texas ESDs to begin to assess appropriate reserve fund levels under various stress test scenarios.

Three ESDs covering different areas of Texas participated in our study: Travis County ESD No. 2, Harris County ESD No. 7 and Bexar County ESD No. 2. Travis County ESD No. 2 resides in the greater Austin area, provides fire protection services and serves over 140,000 residents. Harris County ESD No. 7, one of 33 Houston ESDs, serves over 165,000 residents with nine fire stations.[151] Established in 2003,[152] Bexar County ESD No. 2 is one of 12 ESDs in the San Antonio area and provides fire protection for its constituents.[153] Figure 4 below details the location of each of these emergency service districts.

Figure 4: Map of Selected ESDs

All participating ESDs reside in high-risk areas for extreme heat,[154] but some hold unique challenges due to geographical differences. Bexar County ESD No. 2 holds a very high risk for drought and wildfire.[155] Harris County ESD No. 7 resides in a moderate-risk area for flooding[156] and wildfire, and hurricanes.[157] Travis County ESD No. 2 faces high risk regarding drought,

[151] Spring Fire Department. (n.d.). *Coverage area.* https://www.springfd.org/our-coverage-area/
[152] Bexar County ESD 2. (n.d.). *About ESD No. 2.* https://bc2fd.org/about/
[153] Bexar County. (n.d.). *Emergency service districts.* https://www.bexar.org/1849/Emergency-Services-Districts
[154] ClimateCheck. (n.d.). *Texas climate risk report.*
[155] ClimateCheck. (n.d.). *San Antonio, TX: Top climate change risks.* https://climatecheck.com/texas/san-antonio#:~:text=Drought%20risk%20in%20San%20Antonio%2C%20TX,-The%20average%20water&text=The%20Upper%20San%20Antonio%20watershed,in%20Extreme%20or%20Exceptional%20drought
[156] First Street. (n.d.). *Spring flooding risk.* https://firststreet.org/city/spring-tx/4869596_fsid/flood
[157] First Street. (n.d.). *Does Spring have wildfire risk?* https://firststreet.org/city/spring-tx/4869596_fsid/fire

wildfire, and flooding.[158]

Our general approach, described below, focuses on Travis County ESD No. 2. We then turn to Bexar County ESD No. 2 and Harris County ESD No. 7, completing the same stress tests for additional comparative purposes.

To conduct an analysis of how various exogenous shocks an ESD may experience would influence their reserve levels, we analyzed each ESD's audited financial reports and official budget statements to understand their current reserve levels and the various revenues and expenses of each ESD. We also discussed with each ESD their capital borrowing plans over the short-term. Based on these data, we simulated potential scenarios that may impact reserve levels, described further below. This "stress-testing" of each ESD ultimately allowed us to analyze how ESD reserve levels would fare as a result of exogenous shocks, simulating likely circumstances like an economic downturn, severe weather, and legislation impacting their revenue streams.

Current Stress-Testing Initiatives

The stress-testing approach we utilize has increasingly been adopted by larger government entities especially after the financial impacts these entities endured as a result of the 2007/2008 financial crisis and resultant Great Recession. For example, states across the country have engaged in budgetary stress-testing to predict how their governments will respond in the event of exogenous shocks to their economies. According to Pew, these stress tests "estimate the size of temporary budget shortfalls that would result from recessions or other economic events and gauge whether states are prepared for these events."[159]

Moody's Analytics also conducts stress-testing in each state annually, working to ensure states are fiscally prepared for future economic downturns. In their 2022 analysis, Moody's posits that preparation for potential recessions is paramount in maintaining municipal fiscal health.[160] In their report, they estimate potential fiscal stress on state budgets under a plausible recession scenario and analyze this against the amount of reserves states have held. Through their stress-testing, they find 39 states have confidently adequate reserves, four have mostly adequate

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[158] City of Austin. (n.d.). *Learn about climate change in Austin*. https://www.austintexas.gov/page/learn-about-climate-change-austin#:~:text=For%20Austin%2C%20some%20of%20the,Colder%20winter%20storms
[159] Pew Charitable Trust. *Tools for Sustainable State Budgeting*. (2023, November 15). https://pew.org/3PWAvjl
[160] Moody's Analytics. (2022, October). *Stress-testing states: Looking toward the next recession*. https://www.moodys.com/web/en/us/insights/economics/stress-testing-states-looking-toward-the-next-recession.html

reserves, and seven states do not have adequate reserves to withstand a "moderate recession."[161] While it is encouraging that the vast majority of states have adequate reserves to utilize in the event of recession, Moody's cautions there is still some uncertainty in how equipped states will be in mobilizing efforts to use reserves to ameliorate budgetary strains during a recession.[162]

These stress-tests, along with long-term budget assessments, help participating states identify potential pitfalls and course correct before it becomes too late. More specifically, stress tests allow states to introduce potential scenarios into their budgets and see how they can handle the fiscal shocks these scenarios create. This could include simulating how a state budget would respond in the event of a recession, for example. It should be noted that stress-testing for states is different than local governments given the different composition of revenues, types of expenses, general financial flexibility and political support. Nevertheless, the general approach is similar. According to the Pew report, below are some examples of states that have conducted stress tests as well as explanations of how these analyses helped improve state finances:

Utah

Utah completed a stress test on their budget in 2015, and they have since consistently conducted them. Their state constitution codified the budget stress test practice into law in 2018, and they have since projected a wide array of scenarios through fiscal year 2027.[163] These practices helped Utah quickly respond to COVID-19, minimizing its budgetary impact.

Maine

Maine also is mandated under state law to conduct budget stress-testing every two years, and their most recent test explored how a recession would impact tax collections through fiscal year 2027.[164] A 2018 stress test on a similar topic aided state legislators in eventually estimating how COVID-19 would impact tax collections, allowing them to maintain a certain level of reserves to handle revenue shortfalls.[165] Their stress test also analyzes revenue declines compared to their rainy-day fund balance in an effort to estimate their readiness for a recession.[166]

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[161] Ibid.
[162] Ibid.
[163] Pew Charitable Trusts. (2023, November 15). *Utah: Tools for sustainable state budgeting*. https://pew.org/3sfSKra
[164] Pew Charitable Trusts. (2023, November 15). *Utah: Tools for sustainable state budgeting*. https://pew.org/3sfSKra
[165] Ibid.
[166] Ibid.

Minnesota

Minnesota is mandated to conduct stress-testing each fall under law, and their processes work to recommend a desired reserve balance for their rainy-day fund each year.[167] They use an amalgamation of state tax collections and the current makeup of tax revenue in the budget to ensure the rainy-day fund level is sufficient to cover a "biennial deficit generated by revenue volatility."[168] In addition to transferring up to a third of a surplus in any given biennium into their rainy-day fund, these stress tests have led to increased reserve levels in the state.[169]

This report extends this general approach to the local governments and specifically emergency service districts in Texas.

XI. Travis County No. 2 ESD Case Study

Travis County ESD No. 2 GFOA Risk Assessment

Before detailing our stress-testing, we begin the case study analysis for Travis County ESD No. 2 with a return to the GFOA guidance on risk assessment. As mentioned previously, GFOA recently modified their traditional reserve recommendations to encourage governments to perform risk-based reserve analyses through a quantitative and qualitative risk assessment.[170]

In their guidance in terms of risk assessment, GFOA identified eight risk categories as noted in Table 3 below:

Table 3: GFOA Risk Assessment

	Risk Type	Risk Description
1	Extreme events	What is your vulnerability to extreme events?
2	Revenue source stability	How stable are your revenue sources?
3	Expenditure volatility	How volatile are your expenditures?
4	Leverage	What are major sources of leverage you are subject to? What are the implications of leverage for the organization's financial flexibility?

[167] Ibid.
[168] Minnesota Statutes, § 16A.152. (n.d.). https://www.revisor.mn.gov/statutes/cite/16A.152
[169] Pew Charitable Trusts. (2023, November 15). *Minnesota: Tools for sustainable state budgeting*. https://pew.org/49pnLcC
[170] Government Finance Officers Association. (2015). Fund balance guidelines for the general fund. Government Finance Officers Association. https://www.gfoa.org/fpc-reserves

5	Liquidity	What are your major sources of potential intra-period cash imbalances? How likely are liquidity risks to occur and what is their potential magnitude?
6	Other funds dependency	What other funds rely on the general fund for an important part of their funding? How likely is it that these funds will need the general fund to "backstop" them in an emergency?
7	Growth	What is the potential for sources of growth to cause imbalances in the revenue received from the growth and the expenditures needed to serve it?
8	Capital projects	What high priority capital projects don't have a funding source? What is the likelihood that reserves will be looked to as a funding source for the project?

Governments rate each risk category on a scale of 1-5, 5 being “very important” and 1 being “very unimportant” as it relates to the impact on their specific government operations and finances. The score from each category is summed, providing a final total. This total number corresponds to an overarching risk level, as well as a corresponding GFOA recommendation on financial reserve level size.

We asked Travis County ESD No. 2 finance staff to assess their own risk levels based on this guidance. The results of their assessment are shown in Table 4 below.

Table 4: Travis County ESD No. 2 Risk Assessment

Risk	Score	Result
Extreme events	5	**Very important.** We are subject to extreme events of severe potential magnitude which would require a quick and decisive response from our government. There are few alternative risk management approaches.
Revenue source stability	3	**Neutral.** We do not face an unusually high or low level of risk from revenue instability
Expenditure volatility	4	**Important.** We are subject to important potential expenditure spikes, such that we need reserves but we also have other risk mitigation approaches available
Leverage	3	**Neutral.** We do not face an unusually high or low level of risk from leverage
Liquidity	2	**Unimportant.** We have some minor potential intra-period cash imbalances.

Other funds dependency	2	**Unimportant.** There are a small number of funds that rely on the general fund, and the potential for the general fund to need to backstop them is small.
Growth	4	**Important.** We have some growth that will cause imbalances in the timing of revenues and expenditures.
Capital projects	1	**Very unimportant.** All high priority capital projects have funding sources.
Total	**24**	

According to this guide, with a score of 24, the GFOA risk assessment would conclude that Travis County ESD No. 2 *faces moderate to high-level of risk to retain through reserves*. Their guidance points toward a higher-than-recommended minimum target amount to retain in reserves due to this risk, around 26-35% of revenue, according to the GFOA rubric. We will evaluate if the guidance offered through this risk assessment provides a sufficient cushion to absorb the financial impacts from our specific stress-testing scenarios.

A couple limitations of the risk assessment above and our stress-testing analysis in general should be noted. First, as mentioned earlier, the GFOA risk assessment is intended for general purpose governments so it is somewhat less applicable to special purpose governments (like ESDs) who experience greater financial risks and possess less financial flexibility. Second, the general challenge in risk assessment is evaluating the likelihood of the specific risk(s) actually materializing. This requires more sophisticated modeling to assess the probability of the risks, which is beyond the scope of this report. The survey results from the GFOA survey instrument do not capture such probabilistic likelihoods. Moreover, in terms of our stress-testing analyses as described below, we simply estimate the impact on the finances of the three ESDs under specific exogenous shocks ignoring the specific likelihood of these scenarios occurring. We would encourage ESDs to consider using a more "probabilistic" approach to get a better sense of the efficacy of reserve levels against a full range of risks.[171]

Travis County ESD No. 2 Stress Test

Considering the GFOA analytical guidance above, we estimated reserve fund levels under various stress-tests simulating "shock scenarios." To simulate the shock scenarios, we first estimated a baseline level of assumptions and financial results driven by a mixture of real data (such as Travis County ESD No. 2's property tax levy annual growth rate or property tax rate) as

[171] Kavanagh, S. Reitano, V. & Jones, P. (2023, May). *Should we rethink reserves?*

well as assumptions regarding general revenue and expense growth rates, new capital loan interest rates, and new capital loans amounts. We call this our "base case."

We estimated the ending reserve fund balances each year between 2025 through 2029 at four starting financial reserve levels: 1) the actual reserve fund as of end of FY 2024, 2) 180 days FY 2025 budgeted operation expenses, 3) 90 days FY 2025 budgeted operation expenses and 4) 45 days FY 2025 budgeted operation expenses.

Our base case assumptions are shown in Table 5 below.

Table 5: Travis County ESD No. 2 Base Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	1%	1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	3%	3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	3%	3% annual payroll expenses and employee benefits growth rate
Other expenses	3%	3% annual all other expense line items growth rate
New capital loan amounts	Various	$5.6MM, $11.7MM, $13.7MM and $11.1MM in new loans sold in 2025, 2026, 2027 and 2028, respectively, for capital projects
New loans interest rate	5%	5% new loan interest rate
New loans amortization	10 years	10-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

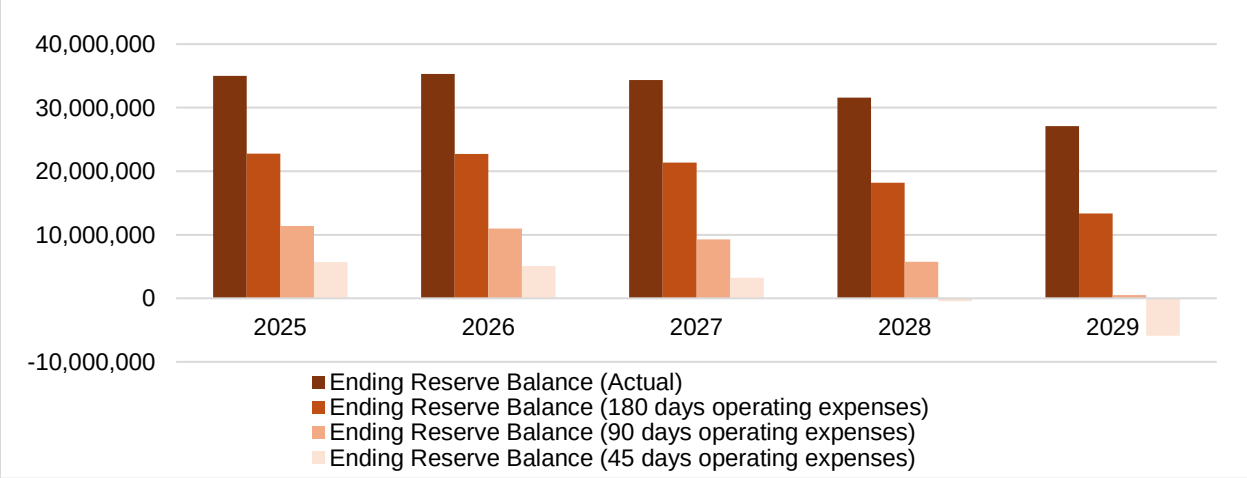
A few assumptions should be detailed. First, per state law, we assume the property tax levy each year grew by 3.5% and the assessed value of property in the ESD grew by 1% per year.[172] The 3.5% levy growth was used in each year so long as it did not result in a property tax rate greater than $0.100/$100 assessed value, which is the property tax rate cap for ESDs. If the 3.5% growth rate resulted in a property tax rate greater than $0.100/$100 assessed value, we

[172] Tex. Const. art. 3, § 9

estimated the levy using the $0.100/$100 assessed value property tax cap rate. In addition, we amortized new capital loans using level debt service over the useful life period provided by the ESDs (10 or 15 years) at an interest rate of 5%, which was roughly what these entities borrowed at in recent years. The annual capital loan amounts were provided by the ESDs. We assumed a conservative 3% return on the reserve fund balances. Based on their 2025 budget, Travis County ESD No. 2 had an ending reserve fund balance of $52.7 million, well over 180 days of operating expenses.[173] This represented the scenario of the "actual" starting reserve fund balance.

Figure 5 below details the ending reserve fund balances under each of the four starting reserve fund levels (actual, 180 days operating expenses, 90 days operating expenses and 45 days operating expenses) between 2025 and 2029. Under the actual starting 2025 reserve level and 180 days operating expense level, Travis County ESD No. 2 financial reserves remain above zero in all four years. However, the reserve levels turn negative beginning in 2028 under the 45-day scenario, and near-negative for the 90-day scenario in 2029. This indicates that the smaller starting reserve levels are inadequate to provide financial stability over the five-year period.

Figure 5: Travis County ESD No. 2 Reserve Balances by Year (Base Case)



With the base case established for Travis County ESD No. 2, we now stress test the data using shock scenarios in order to simulate how their reserve levels would respond. Each exogenous shock scenario is described below detailing the impact on reserve levels.

[173] Travis County Emergency Services District No. 2. (2024, September). *Fiscal Year 2025 Approved Budget*. https://www.pflugervillefire.org/wp-content/uploads/2024/12/FY25_TCESD2_Approved_Budget_FINAL.pdf

Economic Shock

The economic shock scenario is meant to simulate an economic recession, similar to the Great Recession of 2007-08.[174] We assumed the assessed property values' growth rates and sales tax growth rates would both decrease. While property tax values are less sensitive to changes in the economy, we assumed reductions in assessed property values due to the significant growth in property values in Texas over the last decade. We also assumed Travis County ESD No. 2 would issue less debt (50% compared to the base case) and cut down on the rate of growth on personnel expenses. Table 6 below outlines the assumptions we make for the economic shock stress test.

Table 6: Travis County ESD No. 2 Economic Shock Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	Various	-3%, -5%, -5%, 1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	Various	-3%, -7%, 6%, 3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	2%	2% annual payroll expenses and employee benefits growth rate
Other expenses	3%	3% annual all other expense line items growth rate
New capital loan amounts	Various	$2.8MM, $5.85MM, $6.85MM and $5.55MM in new loans sold in 2025, 2026, 2027 and 2028, respectively, for capital projects
New loans interest rate	5%	5% new loan interest rate
New loans amortization	10 years	10-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

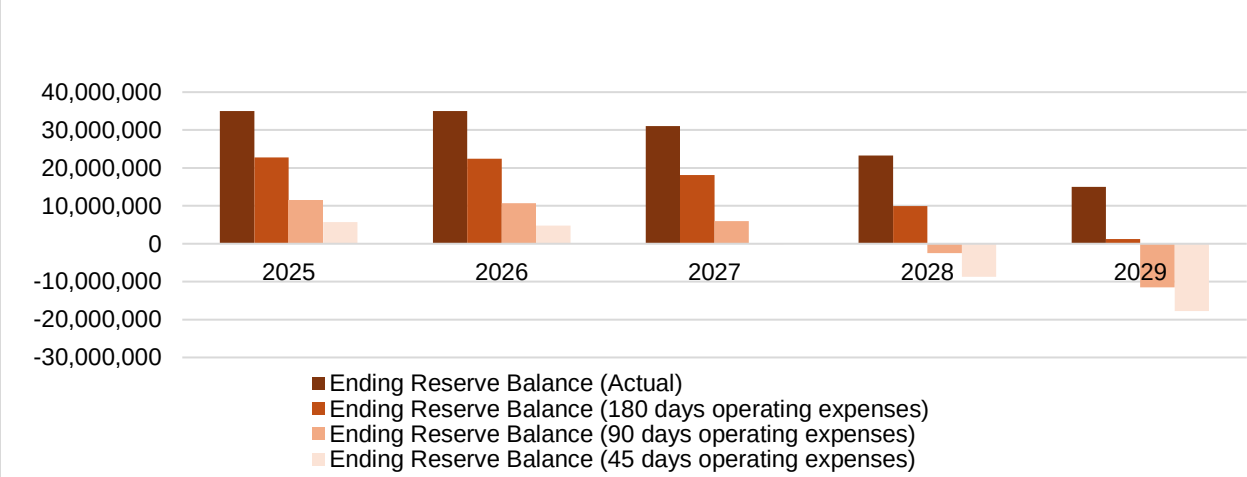
These adjusted assumptions for an economic shock modify the growth rates for property tax levies, assessed property values, sales tax, and personnel expenses. These assumptions also decrease the new capital loans taken out each year and the resultant principal and interest

[174] Langley, A. (2014) *Local Government Finances During and After the Great Recession* Lincoln Institute of Land Policy Local Government Finances During and After the Great Recession

payments.

The results of the economic shock stress test are shown in Figure 6 below.

Figure 6: Travis County ESD No. 2 Reserve Balances by Year (Economic Shock)



Based on its actual ending 2024 reserve fund level, Travis County ESD No. 2 can withstand an economic shock to their reserves, though it significantly diminishes the overall actual balance by 2029. Once we apply the 180-, 90-, and 45-day scenarios, the reserve balance diminishes further from 2025 through 2029. The 90- and 45-day balances become negative or near negative starting in 2027, and are fully negative by 2028. The 180-day balance diminishes toward zero by 2029 but remains slightly positive.

Severe Weather Shock

The severe weather shock in our stress test is meant to simulate an extreme weather event, in this case a significant wildfire event that extensively damaged assessed property in the district. In this scenario, we assumed the assessed property values' growth rates would decrease in the first year as property destroyed from the wildfire would fall off the tax rolls. Sales tax growth rates would also decrease in the first year as the weather event reduced economic activity in the district but increase steadily afterwards. We also assumed personnel expenses would increase sharply to deal with the severe weather work the ESD would need to perform and then normalize. Lastly, similar to the economic shock scenario, we assumed Travis County ESD No.2 would take on a lower amount of capital loans as a belt tightening measure. Table 7 below details assumptions for the severe weather shock stress test.

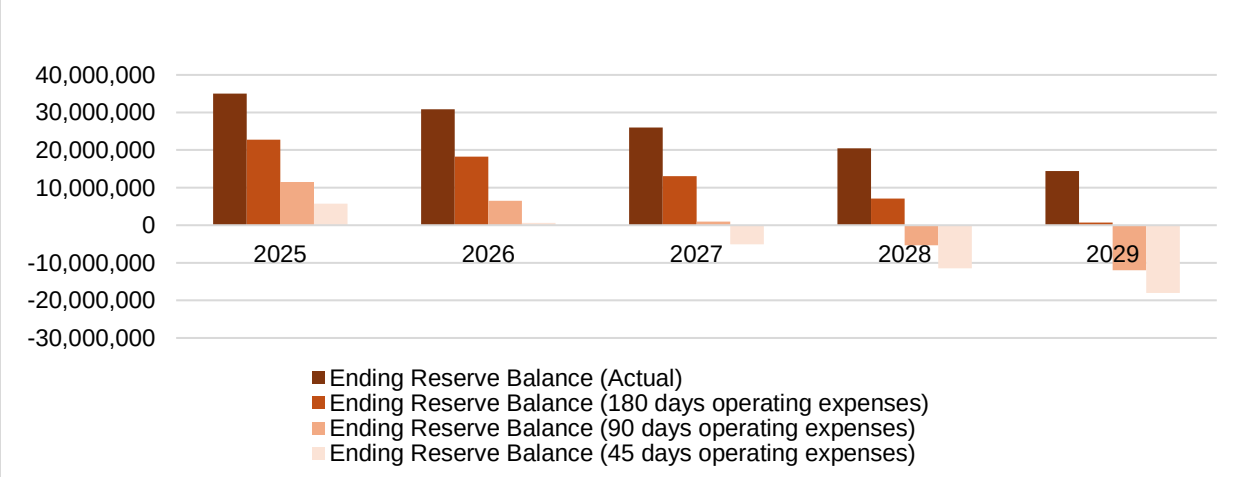
Table 7: Travis County ESD No. 2 Weather Shock Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	Various	-10% and 2% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	Various	-5% and 3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	Various	7% and 2% annual payroll expenses and employee benefits growth rate
Other expenses	Various	3% and 2% annual all other expense line items growth rate
New capital loan amounts	Various	$2.8MM, $5.85MM, $6.85MM and $5.55MM in new loans sold in 2025, 2026, 2027 and 2028, respectively, for capital projects
New loans interest rate	5%	5% new loan interest rate
New loans amortization	10 years	10-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

These adjusted assumptions for a severe weather shock modify the growth rates for property tax levies, assessed property values, sales tax, personnel expenses, and other expenses. These assumptions also decrease the new capital loans taken out each year such that the principal and interest payments on new loans also decline.

Figure 7 below details the results of the extreme weather shock stress test.

Figure 7: Travis County ESD No. 2 Reserve Balances by Year (Weather Shock)



Based on the actual level of their financial reserves at the end of 2024, Travis County ESD No. 2 can withstand a weather shock to their reserves, though it diminishes the overall actual balance by 2029. Once we apply the 180-, 90-, and 45-day scenarios, the reserve balance diminishes further from 2025 through 2029. The 90- and 45-day balances become negative or near negative starting in 2027. The 180-day balance approaches zero by 2029 but remains slightly positive.

Economic and Severe Weather Shock

The economic and severe weather shock is meant to simulate what may happen if a severe weather event were to occur during a period of economic downturn. This stress test combines the two previous scenarios and thus includes assumptions that include both scenarios. One could view this as a "worst case" scenario. Of note, we assumed assessed property values would sharply decrease in the first year after the shock. We assumed sales taxes would decrease at varying levels until three years post-shock. In addition, we assumed even lower annual capital loans relative to the economic and severe weather scenarios due to belt-tightening on borrowing.

Table 8 below details assumptions made in the economic and severe weather scenario.

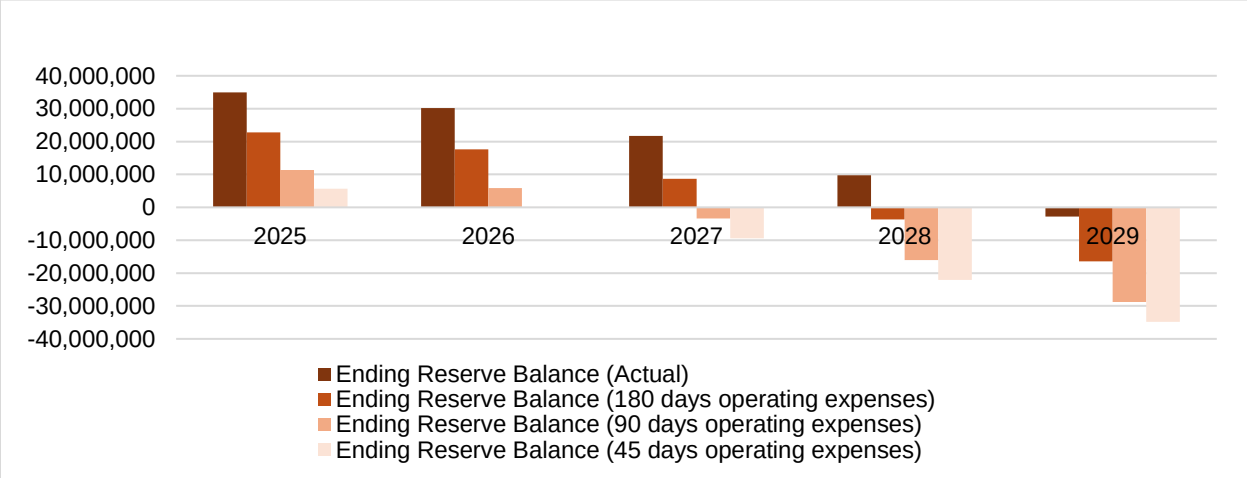
Table 8: Travis County ESD No. 2 Economic & Weather Shock Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	Various	-13%, -5%, -5%, 1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	Various	-5%, -7%, 6%, 3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	2%	7% and 2% annual payroll expenses and employee benefits growth rate
Other expenses	3%	3% and 2% annual all other expense line items growth rate
New capital loan amounts	$2MM	$2MM in new loans taken out each year for capital projects
New loans interest rate	5%	5% new loan interest rate
New loans amortization	10 years	10-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

These adjusted assumptions for a combined economic and weather shock modify the growth rates for property tax levies, assessed property values, sales tax, personnel expenses, and other expenses. These assumptions also decrease the principal and interest payments each year with smaller capital loans taken out.

The results of the economic and weather shock stress test are displayed in Figure 8 below.

Figure 8: Travis County ESD No. 2 Reserve Balances by Year (Economic and Weather Shock)



Using the actual reserve fund balance at the end of 2024, Travis County ESD No. 2's reserve balance will not be able to withstand a combined economic and weather shock; the actual reserve balance turns negative by 2029. Once we apply the 180-, 90-, and 45-day scenarios, reserve balances turn negative starting in 2026 and negative for all three starting reserve levels by 2028.

Political Shock

The political shock stress test simulates what would happen in the advent of fully eliminating sales tax revenue, a real scenario Travis County ESD No. 2 faced in their 2024 tax Proposition A ballot measure. Proposition A would have removed the 0.5% local sales and use tax in Pflugerville, and it would have decreased the same tax from 1% to 0.5% in other areas of the district.[175] Proponents of this ballot measure argued that Travis County ESD No. 2 did not

[175] Warhurst, G. (2024, September 24). Pflugerville voters to decide whether to cut ESD tax. *Community Impact*. https://communityimpact.com/austin/pflugerville-hutto/election/2024/09/24/pflugerville-voters-to-decide-whether-to-cut-esd-tax/

require revenue from sales taxes since it does not provide ambulance services.[176]

With the elimination of sales tax revenue, we assumed personnel and other expenses would sharply decrease in the first-year post-shock as the ESD's activities likely would be reduced with less funding. We also assumed they would decrease new capital loan amounts as there would be less need for new capital with a smaller service mandate.

Table 9 below details the assumptions for the political shock stress test.

Table 9: Travis County ESD No. 2 Political Shock Assumptions

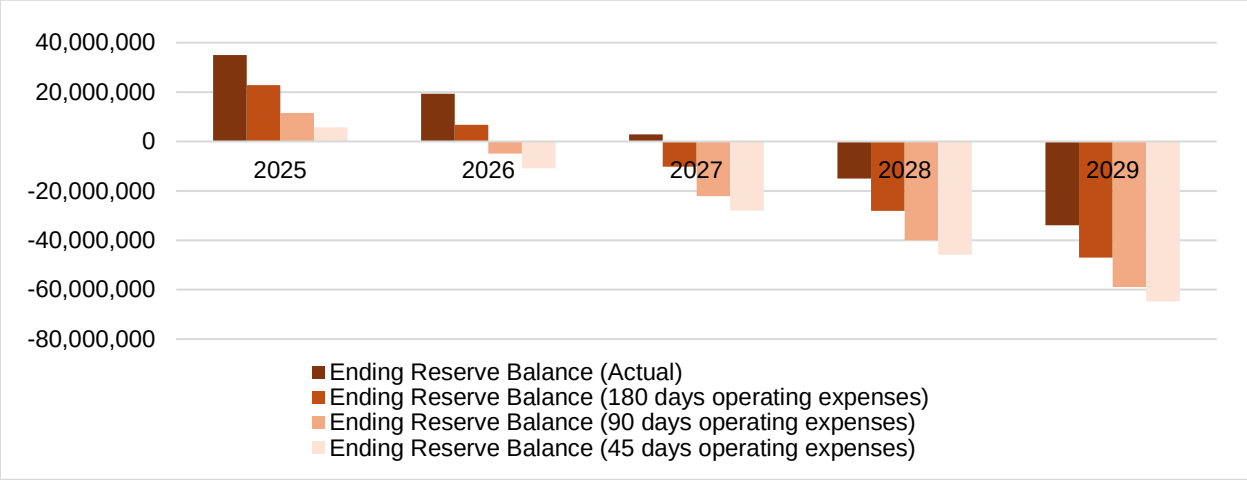
Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	1%	1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	$0	Sales tax eliminated
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	Various	-10% and 3% annual payroll expenses and employee benefits growth rate
Other expenses	Various	-10% and 3% annual all other expense line items growth rate
New capital loan amounts	$2MM	$2MM in new loans taken out each year for capital projects
New loans interest rate	5%	5% new loan interest rate
New loans amortization	10 years	10-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

These adjusted assumptions for a political shock modify the growth rates for personnel expenses and other expenses. With the reduction in new capital loans, annual principal and interest payments decline. Most dramatically, the sales tax in this scenario is also eliminated, a result of a simulated ballot proposition to eliminate the sales tax.

Figure 9 below details the results of the political shock stress test.

[176] Ibid.

Figure 9: Travis County ESD No. 2 Reserve Balances by Year (Political Shock)



The overall reserve level results are unsurprising when you eliminate 40% of the districts revenue sources. Travis County ESD No. 2's reserve balance will not be able to withstand a political shock; the actual reserve balance begins diminishing in 2026 and goes negative in 2028. Once we apply the 180-, 90-, and 45-day scenarios, reserve balances turn negative starting in 2026 and are fully negative in 2027 under all three starting reserve fund balance levels.

Key Findings from Travis County ESD No. 2 Case Study

1. Travis County ESD No. 2 is subject to several types of exogenous shocks, as identified above. Like all ESDs, Travis County ESD No. 2 has limited financial flexibility to absorb shocks outside of setting substantial reserves.
2. The actual reserve fund level as of the end of 2024 was sufficient to absorb the negative financial impacts under the 1) economic and 2) weather shock stress tests during the five-year period (2025-2029). This level of reserves was almost sufficient to mitigate the risk of a combined economic and weather shock but insufficient to guard against a political shock associated with full elimination of sales tax revenues.
3. 180 days of operating expenses is a minimum reserve level to absorb either an economic or a severe weather shock over the five-year period. 90 and 45 days of operating expenses is not sufficient to address either of these exogenous shocks.
4. The identified minimum reserve level of 180 days operating expenses is greater than the 26-35% of revenues reserve level recommended under the GFOA general purpose government risk assessment.
5. Reserve levels of 180 days of operating expenses are unlikely to absorb a worst-case

scenario such as a combined economic or weather shock or political shock. Even the relatively large actual reserve fund balance that Travis County ESD No. 2 currently holds would be depleted by 2028 if the sales tax was fully eliminated, and by 2029 in the event of a combined economic and weather shock.

XII. Bexar County No. 2 ESD and Harris County No. 7 Case Studies

Case Study 2: Bexar County ESD No. 2

We now turn to the other case studies beginning with Bexar County ESD No. 2. We use the same growth assumptions for all the scenarios as we did for the Travis County ESD No. 2 case study. As such, a detailed description of each scenario's assumptions will not be repeated here. Based on our review of their financial documents, Bexar County ESD No. 2 currently has over $35 million in their reserves, well over the 180 days of operating expenses requirement.[177]

Base Case

The base assumptions for Bexar County ESD No. 2 are described in Table 10 below.

Table 10: Bexar County ESD No. 2 Base Case

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	1%	1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	3%	3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	3%	3% annual payroll expenses and employee benefits growth rate
Other expenses	3%	3% annual all other expense line items growth rate
New capital loan amounts	$20MM	$5MM in new loans taken out each year for capital projects
New loans interest rate	5%	5% new loan interest rate
New loans amortization	15 years	15-year level debt service amortization

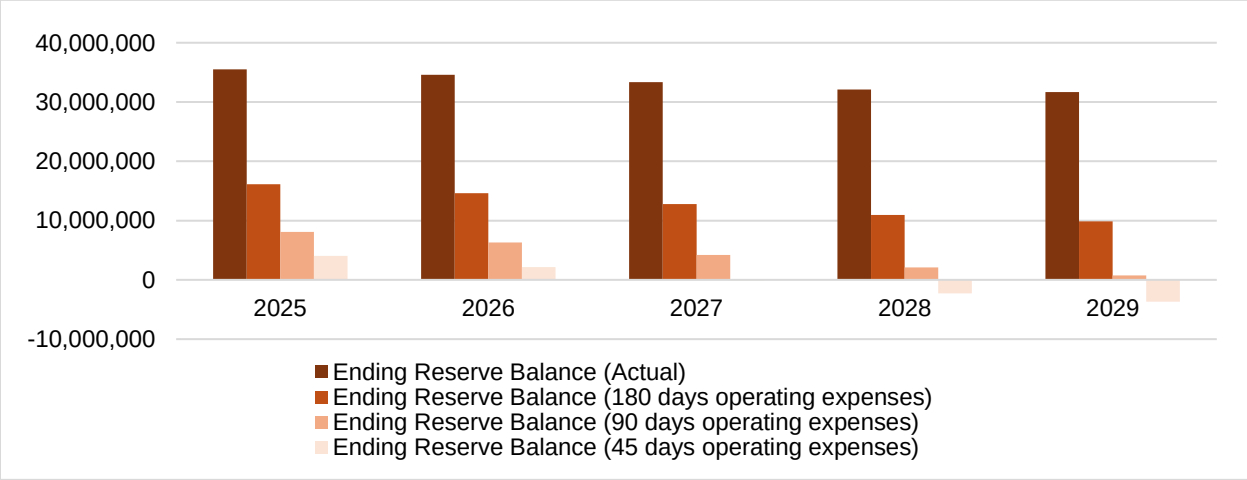
[177] (J. Brown, personal communication, March 25, 2025)

Reserves investment rate	3%	3% investment rate for reserve fund balance

Based on our analysis, if Bexar County ESD No. 2 kept only 45 days' worth of operating expenses in their reserves, the balance would be near negative in 2027 and negative by 2028. Under the three other reserve fund levels, the ESD would have positive reserve balances through 2029.

Figure 10 below illustrates simulated scenarios of Bexar County ESD No. 2's reserve levels based on actual ending 2024 reserve fund levels as well as reserves sized at operating expenses for 180, 90, and 45 days.

Figure 10: Bexar County ESD No. 2 Reserve Balances by Year (Base Case)



Economic Shock

Table 11 below outlines the assumptions we make for the economic shock stress test.

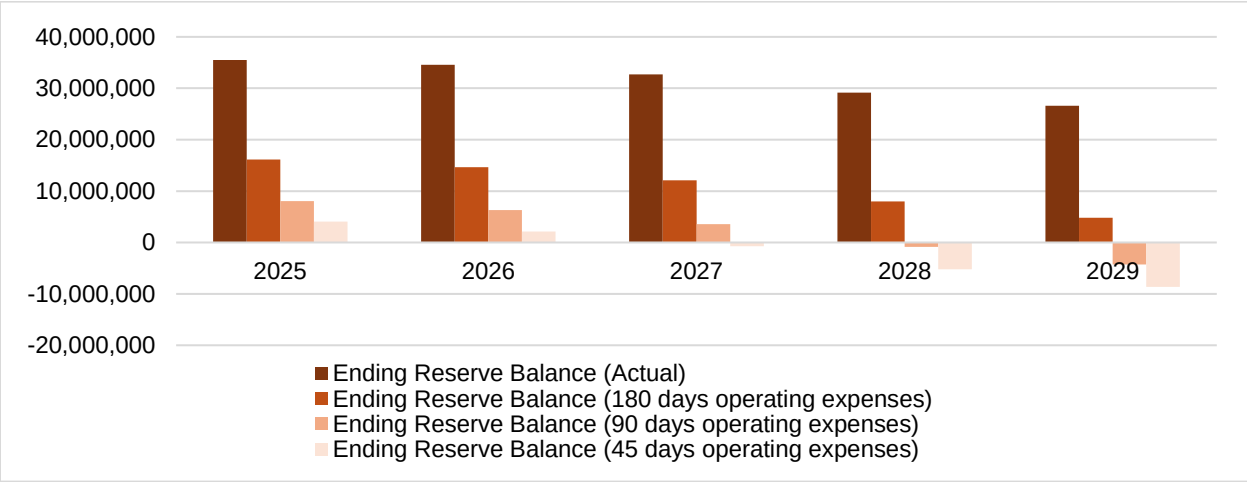
Table 11: Bexar County ESD No. 2 Economic Shock Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	Various	-3%, -5%, -5%, 1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	Various	-3%, -7%, 6%, 3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	2%	2% annual payroll expenses and employee benefits growth rate
Other expenses	0%	3% annual all other expense line items growth rate

New capital loan amounts	$10MM	$2.5MM in new loans taken out each year for capital projects
New loans interest rate	5%	5% new loan interest rate
New loans amortization	15 years	15-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

Figure 11 below details results of the economic stress test.

Figure 11: Bexar County ESD No. 2 Reserve Balances by Year (Economic Shock)



Based on their actual reserve level at the end of 2024 and 180 days operating expense reserve level, Bexar County ESD No. 2 can withstand an economic shock to their reserves, though it diminishes the overall actual balance by 2029. Once we apply the 90- and 45-day scenarios, the reserve balance diminishes further from 2025 through 2029. The 90- and 45-day balances become negative or near negative starting in 2027 and both reserve levels become negative in 2028.

Severe Weather Shock

Table 12 below outlines the assumptions we make for the severe weather shock stress test.

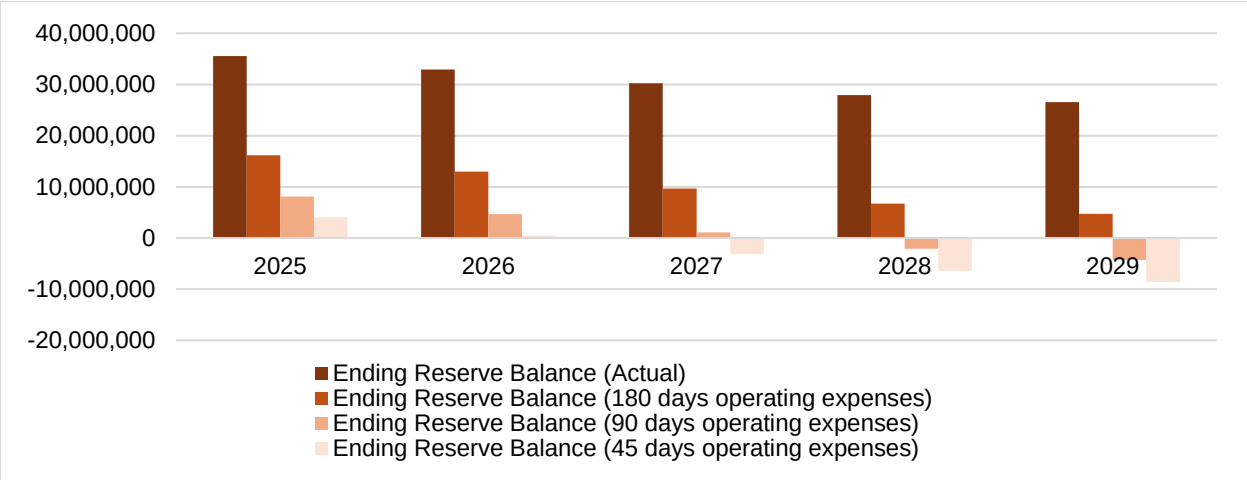
Table 12: Bexar County ESD No. 2 Weather Shock Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	Various	-10% and 2% annual assessed property value growth rate

Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	Various	-5% and 3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	Various	7% and 2% annual payroll expenses and employee benefits growth rate
Other expenses	Various	3% and 2% annual all other expense line items growth rate
New capital loan amounts	$10MM	$2.5MM in new loans taken out each year for capital projects
New loans interest rate	5%	5% new loan interest rate
New loans amortization	15 years	15-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

The results of the weather stress test are seen in Figure 12 below.

Figure 12: Bexar County ESD No. 2 Reserve Balances by Year (Weather Shock)



Based on their actual reserve level at the end of 2024 and 180 days operating expense reserve level, Bexar County ESD No. 2 can withstand a weather shock to their reserves, though it diminishes the overall actual balance by 2029. This is not the case for the 90- and 45-day scenarios, in which the reserve balance diminishes further from 2025 through 2029. The 45-day balance becomes negative or near negative starting in 2026, and the 90-day balance becomes negative in 2028.

Economic and Severe Weather Shock

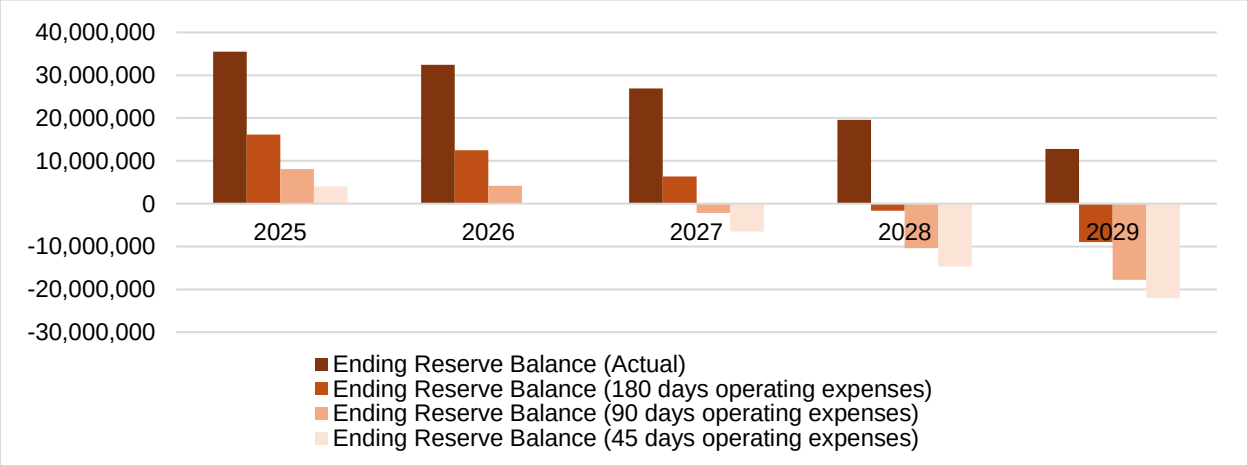
Table 13 below outlines the assumptions we make for the economic and severe weather shock stress test.

Table 13: Bexar County ESD No. 2 Economic & Weather Shock Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	Various	-13%, -5%, -5%, 1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	Various	-5%, -7%, 6%, 3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	2%	7% and 2% annual payroll expenses and employee benefits growth rate
Other expenses	Various	3% and 2% annual all other expense line items growth rate
New capital loan amounts	$10MM	$2.5MM in new loans taken out each year for capital projects
New loans interest rate	5%	5% new loan interest rate
New loans amortization	15 years	15-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

Figure 13 below details the results of the economic and weather stress test.

Figure 13: Bexar County ESD No. 2 Reserve Balances by Year (Economic & Weather Shocks)



Bexar County ESD No. 2's actual reserve balance at the end of 2024 will be able to withstand a combined economic and weather shock, though the actual reserve level will diminish significantly by 2029. The 180-day operating expenses balance becomes negative in 2028, the 90-day balance becomes negative in 2027, and the 45-day balance becomes negative in 2026.

Political Shock

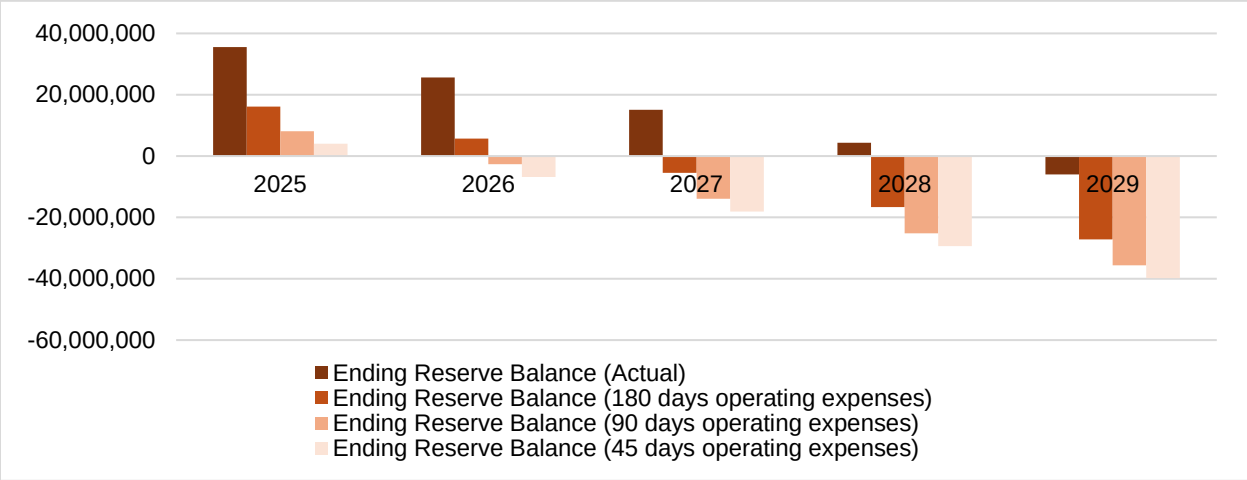
Table 14 below outlines the assumptions we make for the political shock stress test.

Table 14: Bexar County ESD No. 2 Political Shock Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	1%	1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	$0	Sales tax eliminated
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	Various	-10% and 3% annual payroll expenses and employee benefits growth rate
Other expenses	Various	-10% and 3% annual all other expense line items growth rate
New capital loan amounts	$10MM	$2.5MM in new loans taken out each year for capital projects
New loans interest rate	5%	5% new loan interest rate
New loans amortization	15 years	15-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

Figure 14 below details the results of the political stress test.

Figure 14: Bexar County ESD No. 2 Reserve Balances by Year (Political Shock)



Bexar County ESD No. 2's reserve balance will not be able to withstand a political shock; the actual reserve balance begins diminishing in 2026 and goes negative in 2029. Once we apply the 180-, 90-, and 45-day scenarios, reserve balances turn negative starting in 2026.

Case Study 3: Harris County ESD No. 7

According to their financial documents, Harris County ESD No. 7 currently has over $82 million in their reserves, well over the 180 days of operating expenses requirement.[178]

Base Case

The base assumptions for Harris County ESD No. 7 are described in Table 15 below.

Table 15: Harris County ESD No. 7 Base Case

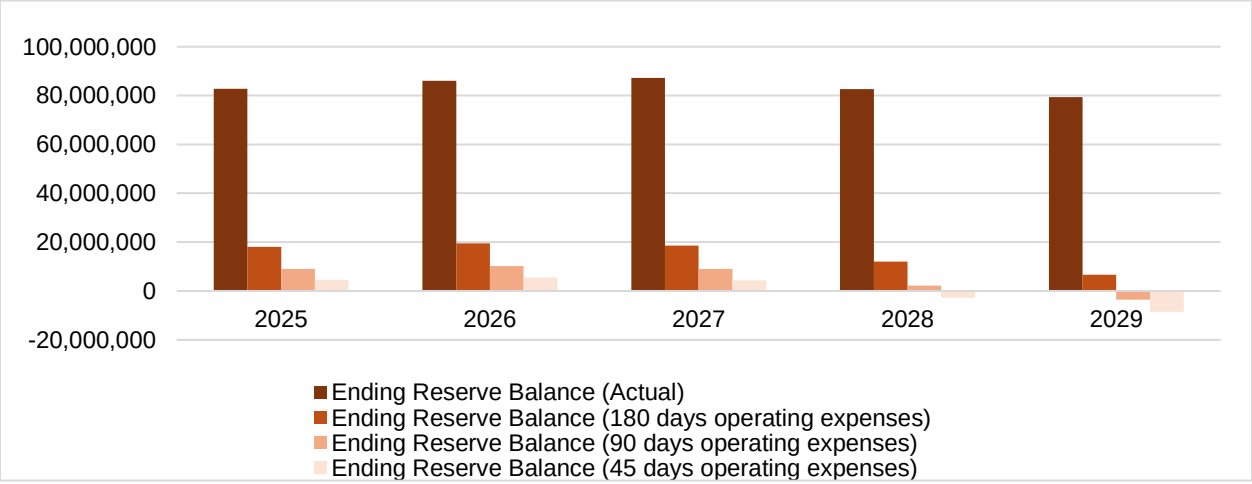
Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	1%	1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	3%	3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	3%	3% annual payroll expenses and employee benefits growth rate
Other expenses	3%	3% annual all other expense line items growth rate

[178] (M. Jahr, personal communication, March 11, 2025)

New capital loan amounts	Various	$10MMin new loans sold in 2025for capital projects; $29MM, $7MM,$5MM, and $3MM in capital expenses in 2025, 2026, 2028 and 2029, respectively; loans and reserves pay for these capital expenses
New loans interest rate	5%	5% new loan interest rate
New loans amortization	15 years	15-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

Figure 15 below illustrates the simulated scenarios for Harris County ESD No. 7's reserve levels based on actual reserve levels at the end of 2024 and operating expenses for 180, 90, and 45 days.

Figure 15: Harris County ESD No. 7 Reserve Balances by Year (Base Case)



Harris County ESD No. 7's actual reserve levels will remain positive through 2029, as well as the 180-day scenario. Reserve levels under the 90-, and 45-day scenarios are not sufficient over the five-year period. Levels turn negative in 2029 and 2028, respectively, under the 90- and 45-days of operating expenses reserve levels.

Economic Shock

Table 16 below outlines the assumptions we make for the economic shock stress test for Harris County ESD No. 7.

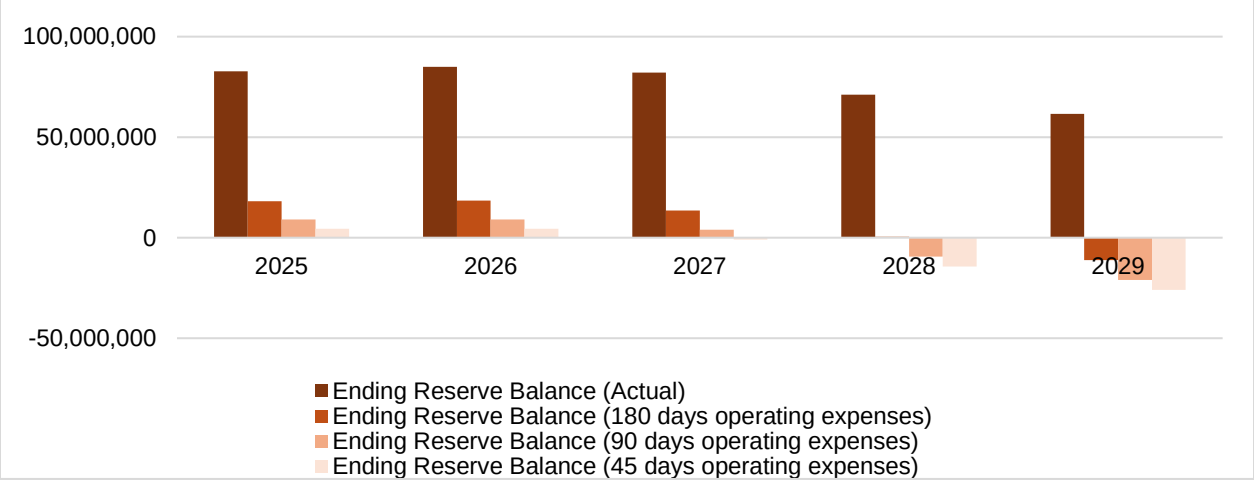
Table 16: Harris County ESD No. 7 Economic Shock Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap

Assessed property value	Various	-3%, -5%, -5%, 1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	Various	-3%, -7%, 6%, 3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	2%	2% annual payroll expenses and employee benefits growth rate
Other expenses	0%	3% annual all other expense line items growth rate
New capital loan amounts	Various	$10MM in new loans sold in 2025 for capital projects; $29MM, $7MM,$5MM, and $3MM in capital expenses in 2025, 2026, 2028 and 2029, respectively; loans and reserves pay for these capital expenses
New loans interest rate	5%	5% new loan interest rate
New loans amortization	15 years	15-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

Figure 16 below details the results of the economic stress test.

Figure 16: Harris County ESD No. 7 Reserve Balances by Year (Economic Shock)



Based on their actual reserves, Harris County ESD No. 7 can withstand an economic shock to their reserves, though it does diminish the overall balance. Once we apply the 180-, 90-, and 45-day scenarios, the reserve balance diminishes further from 2025 through 2029. The 45-day balance becomes negative starting in 2027, the 90-day scenario becomes negative in 2028, and the 180-day scenario turns negative in 2029.

Weather Shock

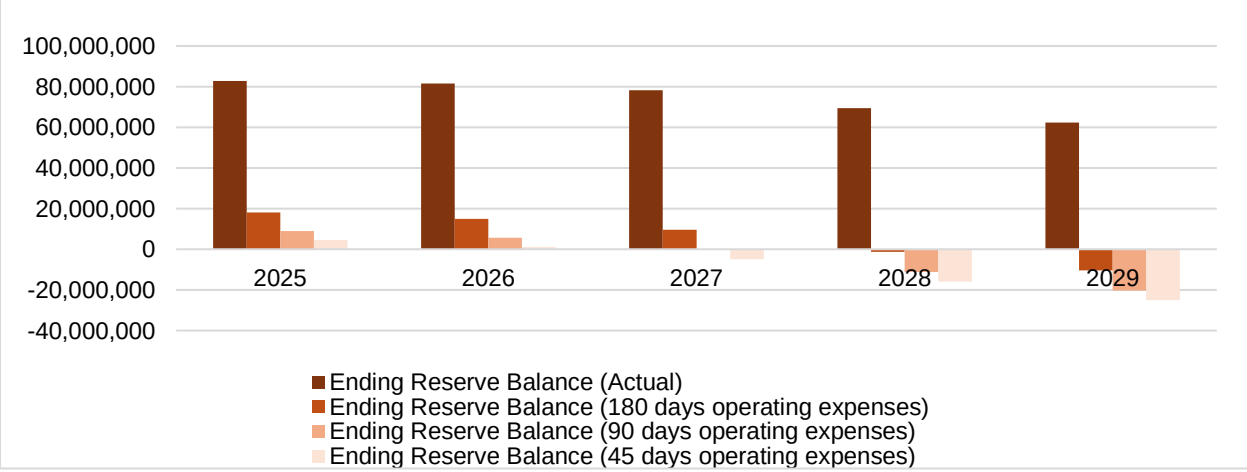
Table 17 below outlines the assumptions we make for the severe weather stress test for Harris County ESD No. 7.

Table 17: Harris County ESD No. 7 Weather Shock Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	Various	-10% and 2% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	Various	-5% and 3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	Various	7% and 2% annual payroll expenses and employee benefits growth rate
Other expenses	Various	3% and 2% annual all other expense line items growth rate
New capital loan amounts	Various	$10MM in new loans sold in 2025 for capital projects; $29MM, $7MM,$5MM, and $3MM in capital expenses in 2025, 2026, 2028 and 2029, respectively; loans and reserves pay for these capital expenses
New loans interest rate	5%	5% new loan interest rate
New loans amortization	15 years	15-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

Figure 17 below details the results of the severe weather stress test.

Figure 17: Harris County ESD No. 7 Reserve Balances by Year (Weather Shock)



Under the actual 2024 reserve fund balance, Harris County ESD No. 7 can withstand a weather shock to their reserves, though it does diminish the overall balance. Once we apply the 180-, 90-, and 45-day scenarios, the reserve balance diminishes further from 2025 through 2029. The 45-day balance becomes near negative starting in 2026, the 90-day scenario turns negative in 2027, and the 180-day balance also turns negative in 2028.

Economic and Severe Weather Shock

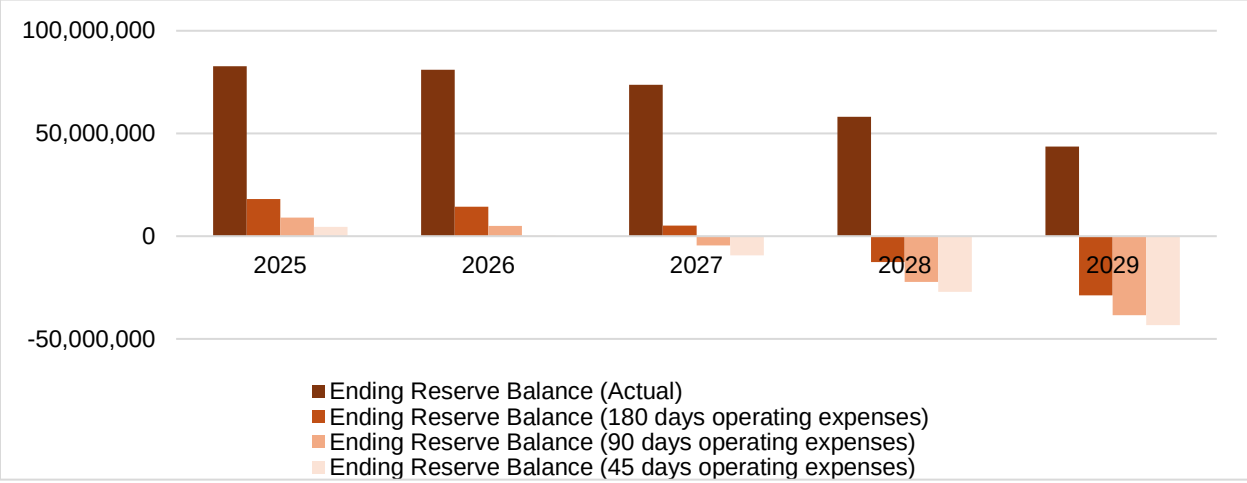
Table 18 below outlines the assumptions we make for the economic and severe weather shock stress test for Harris County ESD No. 7.

Table 18: Harris County ESD No.7 Economic & Weather Shock Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	Various	-13%, -5%, -5%, 1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	Various	-5%, -7%, 6%, 3% annual sales tax growth rate
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	2%	7% and 2% annual payroll expenses and employee benefits growth rate
Other expenses	Various	3% and 2% annual all other expense line items growth rate
New capital loan amounts	Various	$10MM in new loans sold in 2025 for capital projects; $29MM, $7MM,$5MM, and $3MM in capital expenses in 2025, 2026, 2028 and 2029, respectively; loans and reserves pay for these capital expenses
New loans interest rate	5%	5% new loan interest rate
New loans amortization	15 years	15-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

Figure 18 below details the results of the economic and weather stress test.

Figure 18: Harris County Emergency Services District No. 7 Reserve Balances by Year (Economic and Weather Shocks)



Under its actual reserve fund balance at the end of 2024, Harris County ESD No. 7 can withstand a combined economic and weather shock to their reserves, though the balance diminishes by 2029. Once we apply the 180-, 90-, and 45-day scenarios, the reserve balance diminishes further from 2025 through 2029. The 90- and 45-day balances become negative or near negative starting in 2026, and the 180-day balance turns negative in 2028.

Political Shock

Table 19 below outlines the assumptions we make for the political shock stress test for Harris County ESD No. 7.

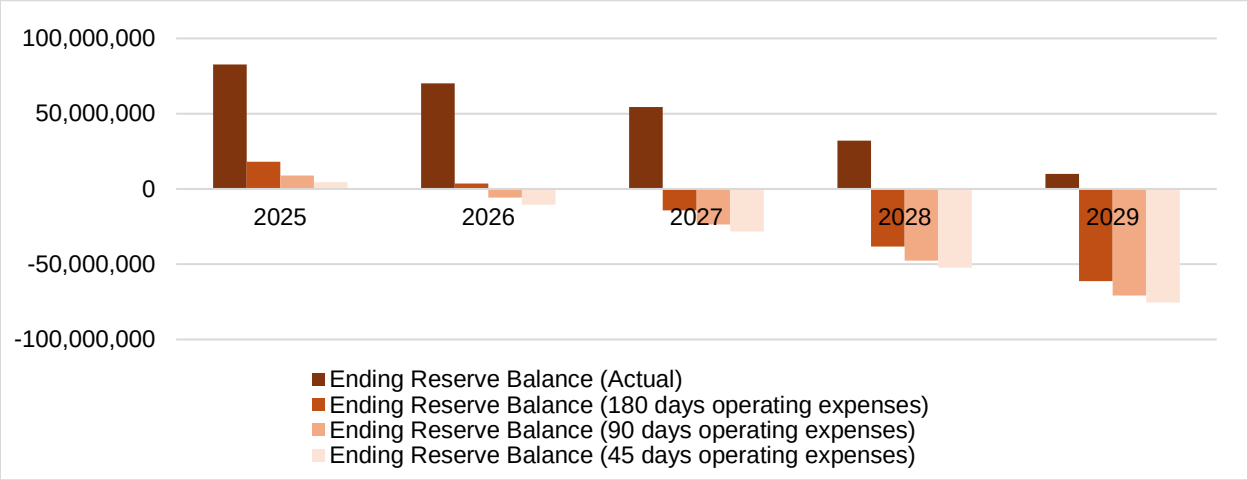
Table 19: Harris County ESD No. 7 Political Shock Assumptions

Assumption	Numerical	Description
Property tax levy growth	3.5%	3.5% property tax levy annual growth rate subject to rate cap
Assessed property value	1%	1% annual assessed property value growth rate
Property tax rate	$0.100	$0.100/$100 property tax rate cap
Sales tax	$0	Sales tax eliminated
Other revenues	3%	3% annual other revenues growth rate
Personnel expenses	Various	-10% and 3% annual payroll expenses and employee benefits growth rate
Other expenses	Various	-10% and 3% annual all other expense line items growth rate

New capital loan amounts	Various	$10MM in new loans sold in 2025 for capital projects; $29MM, $7MM,$5MM, and $3MM in capital expenses in 2025, 2026, 2028 and 2029, respectively; loans and reserves pay for these capital expenses
New loans interest rate	5%	5% new loan interest rate
New loans amortization	15 years	15-year level debt service amortization
Reserves investment rate	3%	3% investment rate for reserve fund balance

Figure 19 below details the results of the political stress test.

Figure 19: Harris County ESD No. 7 Reserve Balances by Year (Political Shock)



Using the actual reserve balance at the end of 2024, Harris County ESD No. 7 will be able to withstand a political shock, the actual balance diminishing significantly by 2029. Once we apply the 180-, 90-, and 45-day scenarios, reserve balances also diminish significantly and turn negative starting in 2026 for the 90- and 45-day scenarios, and in 2027 for the 180-day scenario.

Findings from Bexar County ESD No. 2 and Harris County ESD No. 7

1. In terms of trends and financial sustainability under different starting reserve levels, both ESDs had similar (although not identical) results to Travis County ESD No. 2.
2. The actual reserve fund levels at the end of 2024 were sufficient for both ESDs to absorb the negative financial impacts under the 1) economic, 2) weather and 3) economic and weather shock stress tests. This level of reserves was insufficient for Bexar ESD No. 2 to mitigate the risk of a political shock associated with full elimination of sales tax revenues. Harris ESD No. 7 actual reserve level was sufficient to absorb the political shock but this

was the result of reduced capital plan forecast in April 2025.

3. Bexar County ESD No. 2 can withstand an economic shock or severe weather shock with a minimum reserve level of 180 days of operating expenses.
4. Harris County ESD No. 7 needs reserves greater than 180 days of operating expenses to withstand an economic shock or weather shock.
5. Reserve levels of 180 days of operating expenses are unlikely to absorb a combined economic and weather shock for either ESD. This level of reserves will also not absorb a political shock related to the elimination of sales tax.
6. Harris County ESD No. 7 relies more on sales tax as a percentage of total revenues, causing a more drastic response to the political shock. Such reliance on the more volatile sales tax (relative to the property tax) makes Harris County ESD No. 7 more fallible to economic and weather shocks as well.

XIII. ESD Case Studies Key Takeaways

Below are some key takeaways from the case study analyses germane to these three specific ESDs:

- Each stress-testing scenario for all three ESDs exhibited reserve balances going negative by the end of the five-year testing under the smaller starting reserve levels of 45 and 90-days operating expenses.
- ESDs need 180 days of operating expenses (or more) in their reserves to absorb significant one-time exogenous shocks like a deep economic recession or severe weather event.
- In the event of a worst-case scenario such as a combined economic and weather shock or a political shock like elimination of an ESD's sales tax, 180 days operations reserve levels are not enough to mitigate the financial impacts.
- Unsurprisingly, the political shock stress test caused the most drastic outcomes for each ESD, with reserve balances turning negative under all starting reserve balances (except Harris ESD No. 7 large actual balance). This is logical, as a political shock like eliminating sales tax revenue, would be deeply challenging for ESDs to navigate.
- ESD reserve levels likely need to be greater than suggested by some previous research and GFOA best practices for general purpose governments.

XIV. Conclusion

The discussions offered in this report and its case study analyses underscore the crucial need for appropriate-sized reserves as a key risk management tool for ESDs, especially considering their constrained finances in terms of both revenues and expenditures. With little fiscal flexibility due to limited taxing power, financial reserves play an even more important role for ESDs relative to general purpose governments who have greater access to other financial tools and strategies.

This study was primarily motivated by Travis County ESD No. 2's desire to evaluate whether their current financial reserves could withstand potential shocks, and what the optimal level of reserves would be to mitigate unforeseen risks or challenges. Based on various stress tests conducted on Travis County ESD No. 2 reserves and supported by comparison cases (Bexar County ESD No. 2 and Harris County ESD No. 7), the case study results show that 180 days of operating expenses may be needed to absorb normal economic and extreme weather-related shocks. Greater than 180 days of operating expenses may be needed to mitigate significant political or multiple exogenous shocks. This suggests that academic research and best practices on financial reserves for general governments need to be modified for ESDs. While these reserve levels apply to our specific cases, it is important to note that there is no absolute optimal reserve level for all ESDs. Optimal reserve levels depend on a myriad of factors including the various risks discussed in this report that each ESD must mitigate.

Setting financial reserves is controversial given the opportunity cost of holding these financial assets rather than deploying them for other public spending or returning the dollars back to taxpayers. Thus, while market participants (lenders and investors) prefer higher rather than lower reserve levels, some citizens prefer the opposite. Moreover, setting reserve levels to satisfy rating agencies and investors may not be necessary for all ESDs and in certain market environments.

However, maintaining reserves at an optimal level is not only key for fiscal strategy, but also for prudent risk mitigation. With increased risk of exogenous shocks due to extreme weather, economic downturns, and political developments, ESD governments can rely on their reserves to sustain emergency service provision and demonstrate resilience against such events.

Maintaining an optimal reserve level may also help ESDs mitigate risk in the wake of President Trump's March 2025 Executive Order to shift disaster preparedness from the federal

government to state and local authorities.[179] With the current uncertainty of federal support in this environment, ESDs may consider adjusting their reserve levels to best prepare for the unknown as it relates to disaster response funding.

Considering both the resilience and opportunity cost that reserves provide, ESDs should perform detailed analyses on reserve levels and craft an effective communication strategy to educate various stakeholders including market participants, members of the legislature and perhaps most importantly the citizenry at large. We hope this report contributes to both these analytical and communication efforts.

[179] The White House. (2025, March 19). *Achieving efficiency through state and local preparedness* [Executive Order]. https://www.whitehouse.gov/presidential-actions/2025/03/test