Ceres

Leading with Transparency

A Guide to Strengthening Climate Disclosure and Resilience in the Municipal Bond Market

April 2025

Acknowledgments

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Thanks also to the colleagues at Ceres who provided invaluable editorial review and design support with this project, including Charles Gibbons, Heather Green, Eunyoung Lee, Holly Li, Jake Rascoff, and Steven Rothstein.

About Ceres

Ceres is a nonprofit advocacy organization working to accelerate the transition to a cleaner, more just, and sustainable world. United under a shared vision, our powerful networks of investors and companies are proving sustainability is the bottom line—changing markets and sectors from the inside out. For more information, visit ceres.org.

About Ceres Accelerator for Sustainable Capital Markets

The Ceres Accelerator for Sustainable Capital Markets is a center within Ceres that aims to transform the practices and policies that govern capital markets by engaging federal and state regulators, financial institutions, investors, and corporate boards to act on climate change as a systemic financial risk. For more information, visit ceres.org/accelerator.

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This report is intended to serve as a reference guide for municipal governments on best practices related to climate risks disclosure in financial documents. However, Ceres is not a registered municipal advisor. Recommendations outlined in this report are general in nature and are not intended as prescriptive for any specific organization. Organizations should contact their general counsel, auditors, bond counsel, and financial advisors prior to implementing any climate risk disclosure framework.

Executive Summary

State and local governments have been called the 'first responders' to the escalating risks of costly heatwaves, floods, drought, and storms. These disasters aren't isolated threats—they are growing material financial risks for public sector organizations nationwide. As global temperatures climb, the cost of repairing damage and rebuilding and adapting infrastructure and assets will be significant.

The $4 trillion municipal bond market will be crucial to funding these investments. Investors are increasingly evaluating climate risks before committing capital. Recent credit rating downgrades after the Los Angeles wildfires tied to future climate hazards reflect a shift in how the market assesses risk.

In response, municipal governments—states, counties, cities, airport authorities, public transit agencies, school districts, educational institutions—will need to provide more robust disclosure on their risks and how they are preparing to address them.

Current disclosure of the financial risks of climate change by state and local governments is lightly regulated, with practices that vary significantly within the public sector. Many public sector organizations provide little or no information to investors and the public, making it inadequate for sound investment decisions.

Strong climate disclosure is an opportunity for municipal governments to own the narrative on their preparedness, as well as a means to be better prepared organizationally to meet these risks.

To help municipalities in this effort, Ceres in this report:

- Outlines how public sector organizations, investors, and other market participants can **integrate resilience planning with climate risks disclosure**—a strategy that simultaneously preserves capital market access and provides transparency to investors.
- Highlights **emerging best practices** through examples spanning major metropolitan centers, transportation hubs, and water utilities.

Given the complexity and diversity of the municipal market, no "one size fits all" bond disclosure and climate resilience framework can apply to municipal securities. **Ceres recommends a layered approach to improving risk transparency**, with the following table summarizing the current state of reporting and Ceres' recommended disclosure practices.

Figure 1 • Current State of Reporting Requirements and Practices

	Current practice	Ceres recommended practice	Resource/best practice
Financial statements/ comprehensive annual financial reports	GASB, the accounting standard for government entities, requires that the material impacts of know events, such as the impairment of assets, be accurately recorded in financial statements.	Government entities should closely follow evolving GASB standards related to recording events in financial statements and include discussion in Management Discussion and Analysis (MD&A) of key material climate risks.	GASB ESG Standards
Bond offering documents	Issuers are required to disclose any material risks in their bond disclosures (Official Statements). Current disclosure practices on climate risk vary widely.	Issuers should include in their Official Statements a discussion of current risks due to adverse weather and detail current climate adaptation and resilience efforts.	Miami Dade County Water Revenue Bonds 2024 Official Statement (page 41) City of Boston Series 2023 A G.O. (page 47)
Climate resilience reporting	No formal regulatory requirements currently exist.	Issuers with over $1 billion of outstanding debt should issue a report based on Task Force on Climate-related Financial Disclosures framework that details climate governance, risks management, strategy and metrics/targets.	DC Water ESG Report

Introduction

On November 8, 2018, work crews from PG&E reported a small fire under a transmission line in the foothills of the Sierra Nevada mountains. Driven by strong winds and exceptionally dry conditions, the fire rapidly expanded and within two hours consumed the nearby city of Paradise, California. The Camp Fire ultimately burned 153,000 acres, destroyed over 18,000 structures and tragically resulted in 85 fatalities. The impact of the wildfire to the local economy was profound, with over $8.4 billion in insured losses.

The fire also resulted in one of the first weather-related municipal bond defaults in U.S. history.

In 2023, the Paradise Redevelopment Agency, responsible for funding local redevelopment infrastructure projects, reported in the continuing disclosure for its $1.4 million redevelopment bonds, issued in 2009, that due to a sharp decline in its property tax base "the amount on deposit in the reserve fund for the 2009 Bonds will be insufficient to pay the full amount of the principal and interest coming due and payable on the 2009 Bonds on June 1, 2024."

> **"Climate-related risks are underappreciated in the U.S. municipal bond market. Hurricanes, floods, and other extreme weather pose a host of financial challenges for state and local issuers."**
>
> — BlackRock Getting Physical: Assessing Climate Risk report

Two years after the Paradise Redevelopment default, the municipal bond market was rocked by the impacts of the January 2025 Los Angeles fires, further underscoring a growing challenge: as the impacts of the changing climate intensify, municipal governments face increasing financial vulnerabilities.

State and local governments have been called the "first responders" to the risks posed by worsening and costly heatwaves, floods, drought, and storms, responsible for mitigating its impacts and investing in community resilience. Municipal governments—states, counties, cities, airport authorities, public transit agencies, school districts, educational institutions—will have significant responsibilities for investing in the public infrastructure necessary to transition to a cleaner, more innovative economy and prepare our communities for resilience.

These investments will be financed in large part through the issuance of municipal securities, both taxable and tax-exempt. In 2023 an estimated $508 billion in municipal bonds were issued to fund

municipal capital improvements. Municipal Market Analytics forecasts climate adaptation projects will drive a doubling of these municipal debt issuance over the next decade.[1]

The complexity of the $4 trillion municipal market—where more than 50,000 state and local governments have outstanding bonds and 9,000 new bonds are issued annually—requires careful attention as risks from extreme weather grow more acute. Municipal issuers range from very small cities or school districts to large states, cities, and public utilities.

Across this diversified sector, a well-functioning interface between the capital markets and public sector organizations is essential for enabling the investments necessary for adaptation and resilience to extreme weather.

Many governmental entities will be impacted by extreme weather as general tax revenues, special tax revenue, and public utility (water, sewer, and power) revenues will come under pressure from extreme weather events.

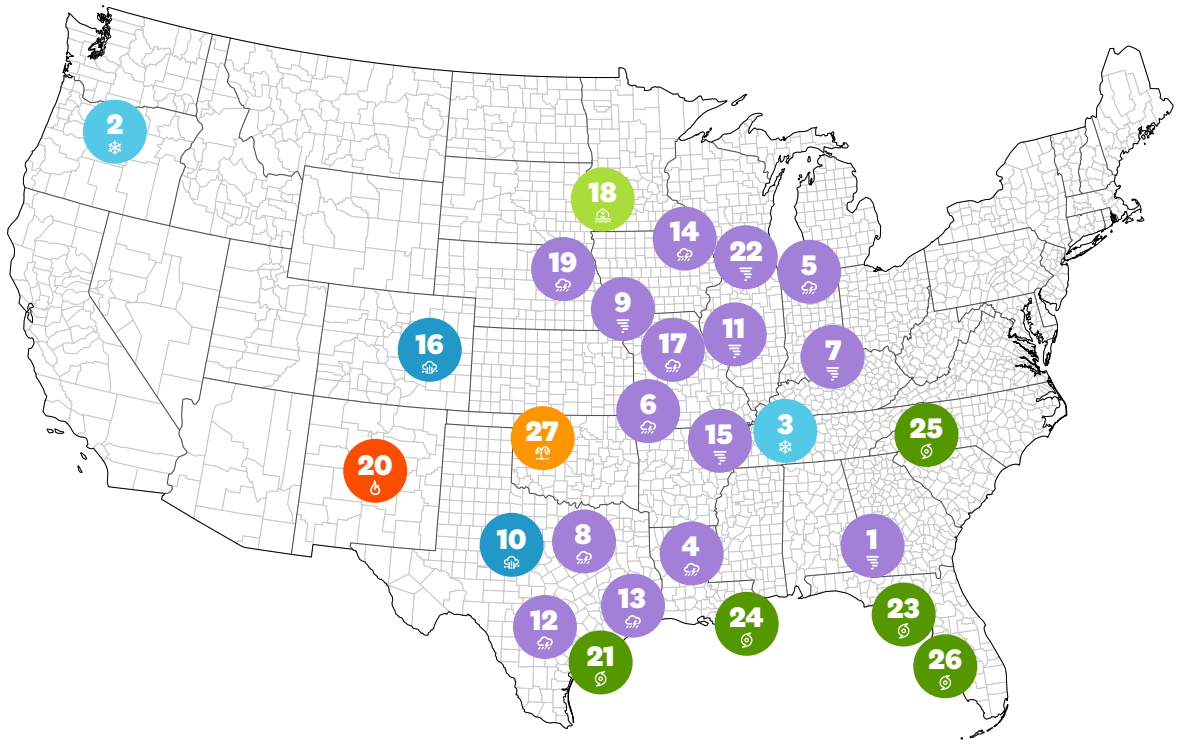
Cities and regional governments are already experiencing the impacts of increased severity of floods, wildfires, and urban heat islands. A 2024 NOAA report found that there have been 403 weather and climate disasters since 1980 with overall damages over $1 billion with a total cost of over $2.9 trillion.

Since municipal governments cannot relocate, climate risks pose a material financial challenge in the years ahead, especially for communities with limited resources, particularly those serving low-income residents with fewer resources and less flexibility to build resiliency efforts and take mitigation steps.

In response, investors have begun to use third-party data to evaluate these risks to municipal securities, while rating agencies have increasingly begun to incorporate resilience into their credit assessment. In 2024, S&P global researchers argued, "Ultimately, more transparency into U.S. issuer climate exposure is a first step in directing capital where it is most critically needed."

In the years ahead, good climate risk disclosure may become the "price of admission" to capital market access. Strong disclosure is an opportunity for municipal governments to own the narrative on their preparedness, as well as a means to be better prepared organizationally to meet these risks.

Figure 2 • U.S. 2024 Billion-Dollar Weather and Climate Disasters



1	Jan 8–10	Southern Tornado Outbreak and East Coast Storm	
2	Jan 12–14	Northwest Winter Storm	
3	Jan 14–17	Central, Southern, and Northeastern Winter Storm and Cold Wave	
4	Feb 10–12	Southern Severe Weather	
5	Feb 27–28	Central and Eastern Severe Weather	
6	Mar 12–14	Central and Eastern Severe Weather	
7	Apr 1–3	Central Tornado Outbreak and Eastern Severe Weather	
8	Apr 8–11	Southern and Eastern Severe Weather	
9	Apr 26–28	Central and Southern Tornado Outbreak	
10	Apr 27–28	Texas Hail Storms	
11	May 6–9	Central, Southern, and Southeastern Tornado Outbreak	
12	May 11–13	Southern Severe Weather	
13	May 16–17	Southern Derecho	
14	May 18–22	Central, Southern, and Eastern Severe Weather	
15	May 25–26	Central Tornado Outbreak	
16	May 31–Jun 1	Colorado Hail Storms and Southern Severe Weather	
17	Jun 12–14	Central and Eastern Severe Weather	
18	Jun 16–23	Upper Midwest Flooding	
19	Jun 24–26	Central and Northeastern Severe Weather	
20	Jun–Jul	New Mexico Wildfires	
21	Jul 8–9	Hurricane Beryl	
22	Jul 13–16	Central and Eastern Tornado Outbreak and Severe Weather	
23	Aug 5–9	Hurricane Debby	
24	Sep 11–12	Hurricane Francine	
25	Sep 24–29	Hurricane Helene	
26	Oct 9–10	Hurricane Milton	
27	2024	Southern/Eastern/Northwestern Drought and Heat Wave	

Source: NOAA

What Are the Climate Risks to Municipal Governments?

Municipal governments are increasingly vulnerable to risks from including flooding, wildfires and extreme heat. For instance, by 2035 around twice as many coastal communities in the U.S.—around 170—will face chronic inundation and possible relocation from affected areas, scientists estimate.

> **"As climate-related hazards increase in severity and frequency, we expect them to have more adverse economic and social ramifications for issuers, such as impaired asset values, costs to repair and rebuild infrastructure, lost economic opportunity, business disruption, health and safety risks, food insecurity and population displacement. These all have the potential to hurt credit outcomes, although the actual impact will vary significantly across regions."**
>
> —Moody's 2023 article

The escalating threats to municipalities have prompted growing analysis and assessment of how these risks impact credit ratings and government financial stability. In a recent report, for example, S&P Global found that "About 17% of U.S. counties face compound exposures to acute climate hazards such as cyclones or flooding during the 2020s under a medium–high climate change scenario." Moody's report on the tenth anniversary of the 2012 Hurricane Sandy in New York City concluded that it offered "a cautionary tale when viewed through the broader lens of future climate risks to our cities, infrastructure, and commercial real estate."

Extreme weather events will have profound long-term impacts on government organizations, including:

- Loss of assessed value for property tax
- Losses due to outflow of population from jurisdictions
- Direct damage to physical infrastructure due to extreme weather events
- Higher operating expense, including higher heating and cooling bills, and costs related to providing emergency services and relocation expenses
- Reduced operational capacity of assets
- High demand for public health and welfare services

- Higher insurance and claims cost
- Increase capital costs to build community resilience

Municipalities have already begun to experience revenue losses:

- **Hurricane Katrina** in 2005 resulted in over $200 billion in damages and the loss of 95,000 jobs in the New Orleans metropolitan.
- **Hurricane Sandy** in 2012 caused $63 billion in damages to the New York and New Jersey shoreline, with around 13% or $8 billion attributable to climate change. The impact of the storm to the City of New York was severe, with over 70,000 housing units and 800 buildings destroyed or damaged. The storm laid bare the risks to the city's future revenues, as a report by the New York City Controller highlighted, concluding that "the tax lots in the current 100-year floodplain are estimated to generate $2.0 billion in annual property taxes. As the floodplain grows, more tax lots will be put at risk, threatening $3.1 billion in annual projected property tax revenues by the 2050s."
- **The January 2025 wildfires** in Los Angeles were estimated by AccuWeather to have resulted in over $250 billion in damage and economic loss.

> **"The increasing frequency and severity of climate hazards pose growing financial risks for local government issuers in the $4 trillion US municipal bond market … Given the illiquidity and often long duration of muni bonds, their investors as well are highly vulnerable to climate change and the potential for pricing correction due to changing insurance market dynamics, property and business losses from disasters, and rising infrastructure and emergency outlays."**
>
> —S&P Global Sustainable1 2024 article

Beyond responding to weather event damage, every public sector organization—cities, counties, public health care facilities, port authorities, public transit, public utilities and educational institutions—will have to make investments in resilience. These investments will need to be funded in part by issuing municipal debt and will require ongoing access to capital markets.

For example, the National Association of Clean Water Agencies (NACWA) estimated that costs of resilience investments for public water agencies will exceed $360 billion by 2050. Los Angeles County municipal, county, state, and federal governments will need to spend at least $12.5 billion through 2040 to prepare for extreme weather impacts, the Center for Climate Integrity estimated in 2024.

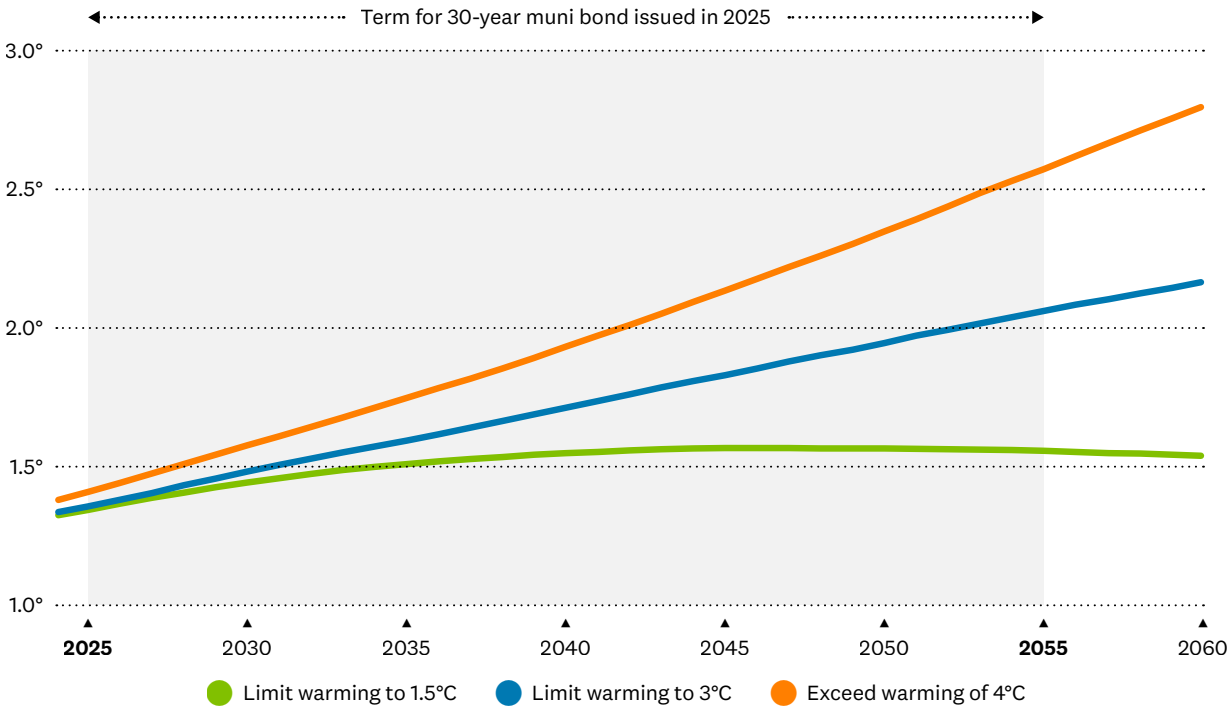
Figure 3 • Bonds Issued by Fire-Impacted Issuers in LA (in Billions USD)

Potential impacted credits	Amount outstanding
Los Angeles Department of Water & Power: Power System and Water System	$19.518B
Los Angeles Unified School District	$11.781B
Los Angeles County Metropolitan Transportation Authority sales tax revenue	$5.167B
Los Angeles Community College District	$4.920B
County of Los Angeles	$4.610B
Metropolitan Water District of Southern California	$4.275B
City of Los Angeles	$4.183B
City of Los Angeles Wastewater System revenue	$3.506B
Intermountain Power Agency	$1.808B
Santa Monica – Malibu Unified School District	$1.185B
Total	**$70.137B**

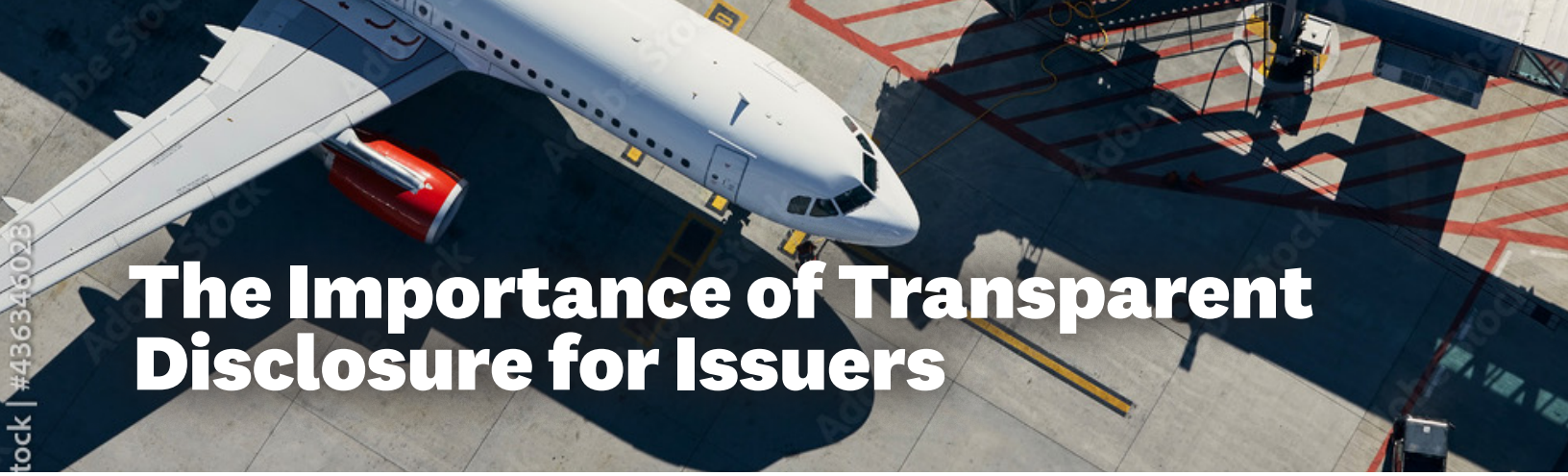
Source: Bloomberg Intelligence, as of January 15, 2025

Highlighting concerns about the financial impact the Los Angeles 2025 wildfires could have on municipal bond issuers, including liability and lower property tax revenues, and exposure to future disasters, S&P downgraded some bonds or put them on credit watch. Bloomberg Intelligence estimated that approximately 4,500 bonds, with outstanding principal of $70 billion, have been issued by fire impacted jurisdictions in the Los Angeles area.

Figure 4 • Forecasted Global Temperature Rise



Source: IPCC Data Center



The Importance of Transparent Disclosure for Issuers

While municipal securities have historically been very safe investments, with a less than 1% default rate for investment grade bonds, climate change has introduced increasing uncertainty into the municipal bond market. As extreme weather events become more common, investors will increasingly take these risks factors into consideration, particularly given the long duration of most municipal bonds.

Recent research underscores that shift. A 2024 Brookings study found that "municipal bonds with higher climate risk exposures have higher costs of borrowing." Similarly, a June 2024 Municipal Market Analytics report cautioned that "bondholders can start to assume that any lack of related disclosure in a 2024 municipal bond offering belies a lack of issuer consideration of these risks."[2]

"In response to these impacts and the concern that climate change will increase the frequency and severity of natural disasters, the financial industry is increasing its focus on climate change risk in its assessments of drinking water, wastewater, and stormwater (water sector) utilities. As a result, utilities that sufficiently identify, manage, and disclose their climate change risk and resiliency efforts can influence their credit ratings, investor relations, and ability to attract investors and access insurance coverage at an affordable price."

— EPA March 2024 report

Issuers who institute strong disclosure practices are likely to be better positioned to raise capital and to protect their access to capital markets and fund their transition to a cleaner, more resilient economy. Investors and rating agencies are already integrating climate risk analysis into their analysis, using their own or third-party datasets to analyze exposure to sea level rise, hurricanes, wildfires, and other risks. In the absence of strong disclosure by issuers, investors and rating agencies will be left to reach their own conclusions about the ability of a given issuer to meet its risks, which could impact borrowing costs or market access. Thorough disclosure will allow issuers to tell their own story regarding their risk mitigation efforts.

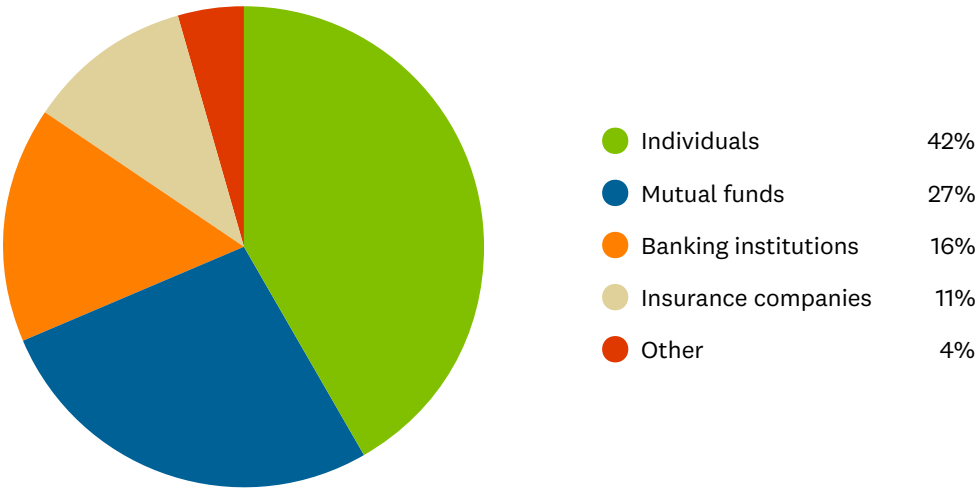
The Importance of Transparent Disclosure for Investors

Municipal securities are widely held by individual and institutional investors. These securities are typically owned for long periods and are less actively traded than corporate or federal government securities. The wide variety and type of municipal securities means that investors rely heavily on the securities credit rating from Moody's, S&P, or Fitch at the time of issuance in making purchasing decisions. Given the historic low level of defaults in municipal securities, over 90% of outstanding securities are rated "investment grade," holding a credit rating of BBB⁻ or higher.

As a result of this overall high credit quality and the complexity of researching securities across a variety of issuers, large investors generally manage exposure through diversification across geographic regions and sectors (cities, state, education, etc.) and types (general obligation and revenue bonds) rather than conducting issuer-specific risks assessment.

However, extreme weather risks are now altering risk assessment approaches. Both individual and institutional investors are beginning to factor these risks more directly into purchasing decisions.

Figure 5 • Municipal Security Investors



Source: U.S. Federal Reserve

Rating agencies have substantially upgraded their tools to analyze climate risk for issuers and incorporate those risks into their credit assessments.

Rating agencies also now issue ESG credit evaluations, which include assessment of transition risks and robustness of resilience planning. For example, S&P Global's description of environmental climate credit factors includes "Climate transition risk factors, including those related to climate policy; legal, technology, and market changes to address mitigation; and adaptation requirements related to climate change…physical risk factors, including event-driven or longer-term shifts in climate patterns, such as hurricanes or chronic heat waves."

Institutional investors, who play a key role in the municipal market, holding over a quarter of all bonds, are increasingly using third-party data services to analyze risks for sea rise, flooding, and fire for specific geographic regions.

For these large investors, which include Pimco, BlackRock, Vanguard, Franklin Templeton, Invesco and State Street, climate risk has become a growing factor in their "buy" decisions. A 2019 BlackRock report concluded that "Extreme weather events pose growing risks for the credit worthiness of state and local issuers in the $3.8 trillion U.S. municipal bond market" and that "Climate-related risks are underappreciated in the U.S. municipal bond market. Hurricanes, floods and other extreme weather pose a host of financial challenges for state and local issuers."

Individual investors, the largest holders of municipal securities, are also likely to increasingly take climate risk into the portfolio decisions.

In July 2023, Charles Schwab issued a report to clients on how to "weather proof your muni portfolio." Similarly, investment firm VanEck, with over $100 billion in assets under management, advised in a 2022 report that "material changes (*in the municipal market*) include changes in climate—shifts in weather patterns, levels of water in sea and rivers, winds, risk of fires from droughts and higher temperatures—and will test the resilience of our society, infrastructure, and capital markets… muni bond timeframes of multiple decades, savvy investors can choose to allocate to geographic areas that may encounter fewer risks and scrutinize areas where higher risks are expected."

In the years ahead, individual investors are likely to increasingly require access to assessment of risks by issuers and also information about what steps the issuer has taken to address those risks.

Financial Disclosure of Climate-related Risks

As extreme weather events increasingly impact public infrastructure and communities nationwide, municipal bond issuers and investors recognize the critical value of strong risk disclosure. Transparency benefits both by improving risk assessment, market confidence, and long-term financial stability.

The following section outlines how these risks are currently reported across three separate documents—Audited Financial Statements and Management Discussion and Analysis (MD&A), Bond Disclosure Documents, and Sustainability, ESG, and Climate Action reports—and highlights emerging best practices to strengthen transparency and resilience.

1 · Financial Statements

Annual financial statements are required to disclose financial material impacts to the valuation of assets and liabilities. These requirements are established by the Governmental Accounting Standards Board (GASB). GASB standards require that any loss that is financially material to the entity, including climate-related losses, be accurately reflected in financial statements. These reporting requirements surface in a variety of GASB pronouncements related to material impairment of asset (GASB 42 and GASB 72), "going concern" (GASB 56), asset retirement obligation (ARO, GASB 83), claims and judgments (GASB 10), investment valuation (GASB 40), and environmental remediation and obligations (GASB 49).

As the impacts of extreme weather have accelerated, climate-related financial issues have started to be reflected in some GASB documents.

In May 2022, GASB released its Intersection of Environmental, Social and Governance Matters with Governmental Accounting Standards report. The report states that "accountability is the cornerstone of all financial reporting" and that "ESG matters, predominantly social and governance matters, intersect with the notion of being publicly accountable to citizens in many GASB standards."

In addition to formal recording of material risks in audit balance sheet and income statements, management should identify material risks in its Management Discussion and Analysis (MD&A) introduction to the financial statements. The MD&A, a required element of financial statements, is intended to "provide an objective and easily readable analysis of the government's financial activities based on currently known facts, decisions or conditions." GASB 34 states that the MD&A should "conclude with a description of currently known facts, decisions, or conditions that are expected to

have a significant effect on financial position or results of operations." Management judgment should determine the extent to which discussion in the MD&A or footnotes to the financial statements of climate risks would improve the transparency and accountability of the entity's financial statements to the public.

Municipal bond issuers may need to consult the International Public Sector Accounting Standards Board's (IPSASB) standards, which include accrual-based and sustainability reporting guidelines for public sector entities, including national, regional, and local governments. IPSASB has issued draft SRS ED 1 disclosure requirements aligned with Task Force for Climate-related Financial Disclosures (TCFD) and IFRS S2 provides additional public sector application guidance (see the Climate Action Reporting section later in this document).

Current Best Practices for Financial Statement Disclosure

Many public entities currently identify key financial risks in their MD&A, as well as the introductory or overview section of the financial statements. However, climate-related financial risk remains an underrepresented risk, with few entities currently recognizing it within their MD&As, despite its growing financial materiality.

To illustrate emerging best practices, the following examples highlight how certain entities have incorporated these risks into their MD&A or the introduction to their annual financial report:

- **Seattle City Light 2023 Audited Financial Statements** "Hydro Risk: Due to the Department's reliance on hydroelectric generation, weather can significantly affect its operations. Hydroelectric generation depends on the amount of snowpack in the mountains upstream of the Department's hydroelectric facilities, springtime snowmelt timing, run-off, and rainfall. Hydroelectric operations are also influenced by flood control and environmental considerations including protection of fish."
- **City of New Orleans 2022 Annual Comprehensive Financial Report** "Resiliency and Sustainability: New Orleans remains on the frontlines of climate change. Key accomplishments include:
  - Office of Resilience and Sustainability (ORS) released updated Climate Action Plan highlighting the initiatives in place to tackle the climate crisis and outlining ambitious goals to reduce our greenhouse gas emissions and achieve Net Zero, or carbon neutrality, by 2050
  - Mayor's Office of Transportation partnered with Entergy New Orleans to construct 30 electric vehicle (EV) charging stations in 25 locations as part of the Climate Action for a Resilient New Orleans strategy."
- **Sonoma County Water Agency 2023 Audited Financial Statements** "The 2023 fiscal year painted a clear picture of some of the types of extreme weather associated with climate change—beginning in the midst of an historic drought with severely impacted reservoirs, only to progress into heavy winter rains and flooding, low temperatures and even some rarely sighted snow around Sonoma County. Despite heavy winter rains, Sonoma Water delivered 23 percent less water than projected due to historic drought conditions and diligent community conservation efforts prior to the winter rains.... Climate Resiliency: The Sonoma County Climate Action &

Resiliency Division was established in May 2021. The Division is responsible for implementing the Board's vision for climate action and building climate resiliency in the County".

- **City of Paradise, CA 2022 Audited Financial Statements** "The Camp Fire of November 8, 2018 was the most destructive wildfire in California State history. Rebuilding of the 10,000 structures destroyed has begun, but it will take over a decade before the Town of Paradise is restored. A community visioning process was completed with a consensus that a more resilient fire-resistant town be rebuilt. With the help of Federal, State, and local partners, the Town has continued long-term recovery planning and projects. The Town is planning to restore the facilities and equipment lost or damaged during the fire through a combination of insurance claims, FEMA assistance, and outside funding sources. FEMA and California Governor's Office of Emergency Services will assist the Town with infrastructure restoration through public assistance and hazard mitigation grants."

2 · Bond Issuance and Official Statements

The bond offering document (Official Statement) is issued prior to the sale of any municipal security and it outlines the critical legal and financial information necessary for investors to make informed decisions about purchasing a given security. The Official Statement is the main vehicle for communicating risks, including climate-related risks, of municipal securities to investors. However, **current risk disclosure in Official Statements is inconsistent and inadequate to fully communicate material climate risks to investors**.

Regulatory Framework for Official Statement Disclosure

The current fragmented regulatory environment for municipal securities contributes to the lack of consistent, detailed risk disclosure. The oversight of municipal securities is primarily the responsibility of the U.S. Securities and Exchange Commission (SEC) and Municipal Securities Rulemaking Board (MSRB). The current regulatory environment has been described as a "self-regulatory" model (SRO), which grants substantial latitude to municipal issues on the content and form of pre-issuance disclosure. However, municipal security transactions are subject to SEC anti-fraud regulations, which prohibit making a false statement of material fact or making a materially misleading statement in connection with the issue of municipal securities.

Ceres Climate Risk Scorecard

The Ceres Climate Risk Scorecard evaluates the actions of 10 federal financial agencies to protect capital markets from climate-related financial risks. The MSRB "protects and strengthens the municipal bond market, enabling access to capital, economic growth, and societal progress in communities across the country." The Ceres Climate Risk Scorecard recommends that the MSRB:

- Conduct research and educate municipal issuers, investors, and other stakeholders about climate-related physical and transition risks.
- Examine the quality of climate-related disclosures in the Official Statements and Continuing Disclosures Agreements of municipal bonds to determine whether disclosure is adequate for market participants to assess underlying climate risks.
- Conduct and release a study on climate risk to assist market participants, policymakers, and the public identify and understand disclosures made by municipal securities issuers and obligors—similar to its 2021 Municipal Securities Market COVID-19-Related Disclosure Summary.
- Work with the SEC to update regulations to require more extensive disclosures on the material climate risks of municipal bonds, as well as the efforts by municipal issuers to mitigate these risks.

Under SEC Rule 10b5 "It shall be unlawful for any person…to make any untrue statement of a material fact or to omit to state a material fact necessary in order to make the statements made, in the light of the circumstances under which they were made, not misleading…." Prior to issuance of a municipal security, underwriters require issuers to certify that the Official Statement does not contain any untrue statements of a material fact or omit to state any material fact.

Underwriters may also require "negative assurance" from bond counsel and/or disclosure counsel, as well as from the own underwriter's counsel, in the form of a letter stating that nothing came to their attention that leads them to believe that the Official Statement contains an untrue statement of a material fact or material omission. The SEC also requires, under Rule 15c2-12, that underwriters reasonably determine that issuers have undertaken to provide ongoing information to investors, including annual financial statements and notification of the occurrence of sixteen defined events, such as defaults and ratings changes.

"It is established securities law that any climate risks that are material must be disclosed."

—Mark Kim, Chief Executive Officer, Municipal Securities Rulemaking Board

Under this framework, municipal issuers are required to include discussion of any material risks to bond holders in their offering documents (Official Statements). The standard for materiality has been that an omitted fact is "material" if there is a substantial likelihood that a reasonable investor would consider it important in making an investment decision.

Related to climate risks, a working committee of the National Association of Bond Lawyers (NABL) concluded "…reasonable investors should know that a state economy could encounter a recession, or that an earthquake, forest fire, hurricane, tornado, or other force of nature could devastate a community.... Similarly, an issuer is not required to disclose factors indicating a generic risk, unless the factors indicate that the risk is materially more likely to occur to or have a greater impact on the issuer (or issuers in the same sector) than to, or on, issuers generally."

However, despite growing weather-related risks, MSRB has yet to issue guidance on disclosure of these types of risks. In contrast, MSRB did issue a COVID-19 Related Disclosure Summary "to assist market participants, policymakers and the general public with identifying disclosures made by issuers of municipal securities, and obligors, in connection with the novel Coronavirus Disease (COVID-19) pandemic and related Federal relief programs." The summary indicated that showed 75% of Official Statements from January 2020 to March 2021 included COVID-19 disclosures.

There has been significant work in the field of corporate climate disclosures. While the SEC issued a rule in March 2024, it has been tied up in court and is likely to be repealed or significantly altered under the new administration. However, 30 countries, representing 55% of the world GDP have either approved or are in the process of approving corporate climate disclosure rules. This is in addition to the legislation that was enacted in California and is being considered in other jurisdictions. Overall, there is much greater disclosure in corporate files than with municipal filings.

"On the disclosure front, the emerging issue of climate change-related risk should be fairly straightforward. When there is a weather event and damage to a city and people are saying 'What did the issuer say before?' [Sometimes] the answer is not good.... If you're a city within L.A. County and L.A. County is disclosing a particular issue, you should seriously consider whether you also should disclose it. You must look at your neighbors. There's very public information about flood risks, sea levels rising that affect specific areas. It's very well known so you can't stick your head in the sand."

—David Sanchez, Director, SEC Office of Municipal Securities

In addition, recent international climate disclosure regulations and laws for publicly traded companies could impact expectations for municipal disclosure moving forward. "Municipal participants should expect that, over time, many of the disclosures outlined in the new rule will be expected from municipal issuers too," said Lisa Washburn, chief credit officer & managing director at Municipal Market Analytics, in a 2024 Bond Buyer article.

Had the rule gone into effect, it would have required would have required companies to disclose two categories of information, one in the footnotes to the financial statements and the other outside of the financial statements. In the footnotes, companies would have provided information about (1) financial statement effects of severe weather events and other natural conditions, (2) carbon

offsets and renewable energy certificates (RECs) and (3) material impacts on financial estimates and assumptions as a result of severe weather events or disclosed climate-related goals or transition plans. Outside of the financial statements in their annual report, large companies would have disclosed material scope 1 and 2 GHG emissions, governance and oversight of material climate risks, material impact of climate risks on the company's strategy and business outlook, risk management process for material climate risks and material climate target and goals. While this rule is not applicable to municipal finance, it provides a clear signal about the significance of these risks in the capital markets and suggests that municipal finance climate disclosure expectations could be strengthened over time.

Current Climate Disclosure Inadequate

The current practices related to climate risk disclosure in Official Statements vary widely. Some issuers provide no climate risk disclosures while others include a detailed discussion. A 2020 study by the Brookings Institution of 510 bond documents found that "10.5% of revenue bonds include a mention of climate change, but that same mention is present in just 3.8% of General Obligation bonds."

Climate risk disclosure is also inconsistent for "green" or "sustainability" bonds that are issued to fund environmental projects. A 2019 study by the California Debt and Investment Advisory Committee found that, in fact, green bonds issuers were no more likely than regular issuers to have strong climate risk disclosure, and 27% of green bond issues had no climate risk disclosure.

> **"Without clear ESG information — either through a rating agency report or disclosures — potential buyers of municipal bonds are likely to conduct their own ESG analysis, which may not include all relevant information or context that a government can provide especially regarding steps taken to mitigate these risks. These factors should serve as motivation for governments issuing municipal bonds that are still questioning if ESG should be considered for their disclosure practices, to invest the time to explore the subject, consider its application, and communicate their efforts to address challenges, specifically with regard to climate change and other environmental risks of the ever-changing world."**
>
> — Government Finance Officers Association best practices

Even amongst issuers that have risks disclosure, no common approach exists. Issuers most frequently place discussion on climate hazards and risk in sections called "Risk Factors," "Special Risk Factors," and "Investor Considerations" and label the subsection with the detailed disclosure "Climate Change," "Climate Risks," or "Climate Change, Sea Level Rise and Flooding Damage." This organizational approach is consistent with guidance from the National Association of Bond Lawyers (NABL) which reported that "Courts have found that risk factor disclosures to be adequate when combined in a separate risks section, especially when prominent.... Risk factors should not, however, be buried within paragraphs of generic risks that are not material to the issue."

In analyzing current practices, Ceres, through an informal review of a sample of recent Official Statements, found that current disclosure generally provided eight different types of information.

Figure 6 • Summary of Current Examples of Climate Disclosure for Official Statements

Discussion topic	Purpose	Examples from Official Statements
1 Financial materiality and financial impacts	Identify if climate hazards could pose a material financial risk to issuers.	King County, WA: "The County anticipates that the (climate change) costs could be significant and could have a material adverse effect on the County's finances over time by requiring greater expenditures to prepare for, respond to, and counteract the effects of climate change." Boston, MA: "As a coastal city, Boston is exposed to the effects of rising sea levels, coastal flooding, and increasingly extreme weather conditions, all of which may adversely affect the property of the City, its businesses and residents in the future." Sonoma County Water Agency, CA: "The future fiscal impact of climate change on Sonoma Water is difficult to predict, but it could be significant, and it could have a material adverse effect on Sonoma Water's finances by requiring greater expenditures to counteract the effects of climate change, by changing the business and activities of Water Customers, or by decreasing the availability of water supplies to Sonoma Water." City of San Francisco, CA: "The CLEE Report estimated that implementing the [City's Climate Action Plan] across its six identified sectors could cost in the aggregate anywhere between a low of $2.291 billion to a high of $21.914 billion to be funded from a variety of sources, including a significant portion by the City."
2 Past climate/weather-related events	Detail impacts of past climate events	City of New Orleans, LA: "On August 29, 2005, Hurricane Katrina struck the Central Gulf Coast near New Orleans as a result of a Category 4 hurricane. Failure of several sections of the levee system surrounding the City resulted in flooding that inundated approximately 80 percent of the City with water up to 20 feet deep in some places."
3 Risk identification	Identify specific climate-related risks	City of San Francisco, CA: "The study stated that a 48-inch increase in the bay's water level in coming decades could cause more than 100,000 Bay Area jobs to be relocated, nearly 30,000 lower-income residents to be displaced, and 68,000 acres of ecologically valuable shoreline habitat to be lost." City of Santa Rosa High School District: "the occurrence of natural disasters within the boundaries of the District could result in substantial damage to property within the District … and in turn, could substantially reduce assessed valuations of such property.

Figure 6 • Summary of Current Examples of Climate Disclosure for Official Statements (continued)

Discussion topic	Purpose	Examples from Official Statements
4 Governance & planning and metrics	Identify how the issuers is organized to address climate risk, what resilience planning efforts have been established and how progress is tracked	City of Seattle, WA: "The City's Office of Sustainability and Environment … coordinates the implementation of the Seattle Green Deal, the Seattle Climate Action Plan …" City of St. Paul, MN: "City officials take climate change seriously and have developed a Climate Action & Resilience Plan (the "CARP") to provide a framework to address the impact of climate change on the City and its residents. The CARP focuses on achieving carbon neutrality citywide by 2050 and cut City operation emissions in half by 2030." City and County of Miami, FL: The County is addressing the threat of climate change in the following ways: (1) incorporating climate change goals into the Comprehensive Development Master Plan; (2) conducting regular community-wide greenhouse gas emissions inventories; (3) assessing the vulnerability of key public infrastructure and implementing a countywide Sea Level Rise Strategy that details key actions and capital projects that reduce risk to current and future flooding while providing a vision for the community to gracefully and equitably adapt to rising sea levels; and (4) implementing policies and initiatives to conserve water, energy, and fuel and protect natural spaces, including Biscayne Bay, that reduce greenhouse gas emissions and negative impacts on the environment. The County's climate change strategy is outlined in GreenPrint"
5 Actions and investments to date related to climate resilience	Provide details on what actions have been taken to date to prepare for climate change impacts	City of Seattle, WA: "… these investments include $2.8m to enact emission performance standards … $2.6m to support electric heat pump conversion … and additional climate resiliency actions guided by the recommendations from the Green New Deal Oversight Board."
6 Regulatory requirements	Describe state or other regulatory requirements related to climate change	City of St. Paul Sewer Revenue Bonds, MN: "On February 7 2023, Governor Walz signed Senate File 4 mandating Minnesota utilities to transition to carbon-free energy by 2040."

Figure 6 · Summary of Current Examples of Climate Disclosure for Official Statements (continued)

Discussion topic	Purpose	Examples from Official Statements
7 Negative assurances	Establish the limits to entities' ability to forecast climate impacts	City of Miami, FL: "No assurances can be given as to whether future extreme weather events will occur that could materially impair the financial condition of the City" City of San Francisco, CA: "While the effects of climate change may be mitigated by the City's past and future investment in adaptation strategies, the City can give no assurance about the net effects of those strategies and whether the City will be required to take additional adaptive mitigation measures. If necessary, such additional measures could require significant capital resources."
8 Current and/or forecasted emissions	Provide information on current CO_2 emission levels	University of Washington, WA: "In 2022, an inventory was conducted that indicated the University had 106,170 metric tons of Scope 1 and Scope 2 CO_2 emissions, primarily from the central power plant at the Seattle campus"

3 · Climate Action Reporting

Many governments issue reports that include information on sustainability or resilience plans. While these reports are not directly related to bond issuance, they can provide a valuable avenue for municipalities to communicate to investors the breadth and depth of their resilience programs. **For investors, these documents are often the most detailed information available to the public and investors about governmental climate planning and risks and constitute an important source of information for rating agencies, financial investors and regulators.**

Given that these reports are not legally required, the reports can be customized to best match the needs of each entity and do not need approval from bond counsels. Relevant information in these government reports can also be posted on investor web sites, cited, or linked in the bond documents that are discussed above. These reports are voluntary and most frequently are issued on a standalone basis.

Current Best Practices for Climate Action Reporting

Although there are no regulatory requirements for these reports, a number of well-established frameworks can assist governmental entities in developing strong climate-related reporting.

Climate Action Plans and Roadmaps These documents usually document the organization's carbon emissions and risks and the plans to mitigate and adapt to extreme weather. ICLEI (Local Governments for Sustainability), a membership-based organization of over 600 U.S. cities and governments, provides a Climate Action Planning (CAP) Cohort for structured technical assistance

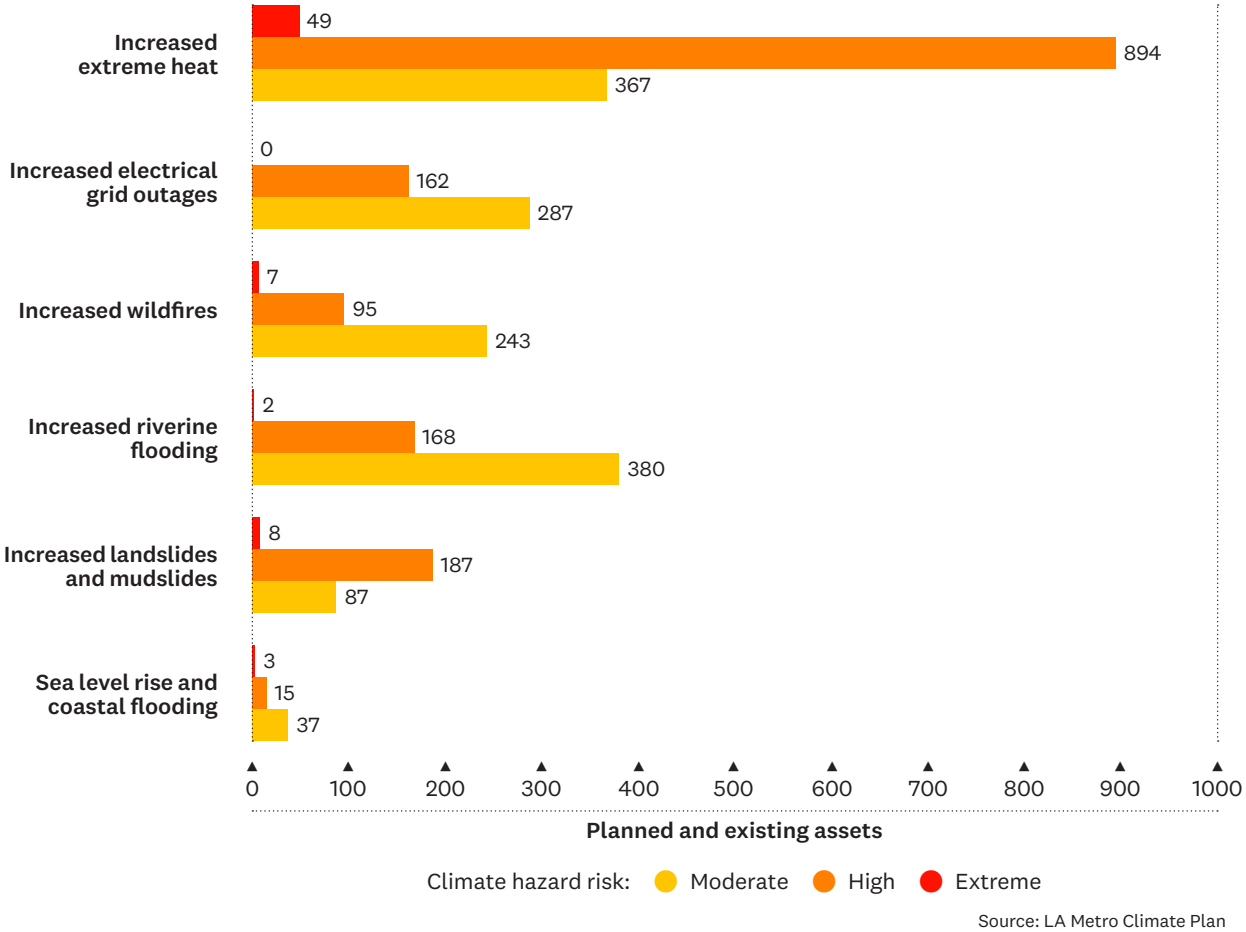
program to guide local governments through the steps of developing vulnerability assessments, adaptation goals, and disclosures for internal and external audiences.

A large number of public organizations issue excellent climate action plans and Ceres suggests that entities consult examples within their sector. Many agencies utilize a "live" plan that is regularly updated for project status and budgetary priorities. Best practice also links long-term goals and objectives with nearer term specific action steps and metrics with the plan.

Some examples of reports include:

- City of Ann Arbor
- City of Minneapolis
- Dallas Fort Worth International Airport
- University of Maryland

Figure 5 • Los Angeles Metro Assets at Risks to Climate Hazards



Source: LA Metro Climate Plan

Task Force on Climate-related Financial Disclosures TFCD was created in 2015 by the Financial Stability Board (FSB) for voluntary climate-related financial disclosures. The TCFD is one of the widest adopted frameworks, with over 5,000 supporters over 100 jurisdictions internationally. Some 97 of the 100 largest companies in the world support the TCFD or report in line with the

TCFD's recommendations, although only a small number of companies are in line with all 11 of the recommendations.

TFCD has been absorbed into the IFRS Foundation and climate disclosure is now covered under IFRS S2. While developed for use by the private sector, the TFCD/IFRS framework provides an excellent framework for public entities' reporting of these risks. The elements of a TCFD/IFRS S2 disclosure are:

- **Governance:** Disclose the organization's governance around risks.
- **Strategy:** Disclose actual and potential impacts of risks and strategy for mitigating them.
- **Risk management:** Disclose processes to identify and assess risks.
- **Performance and targets:** Disclose metrics and targets related to managing risks.

Some leading examples of public sector TFCD formatted reports include:

- FY23 DC Water ESG+R Report
- University of British Columbia
- City of Vancouver
- City of Toronto (within their CAFR)

CDP (formerly Carbon Disclosure Project) The non-profit CDP maintains a global environmental disclosure dataset which consolidates responses to standard questionnaires from public organizations related to report annual on sustainability and climate-related information and makes the database available to interested parties. CDP's questionnaire is consistent with the TCFD framework and provides excellent information both for investors and for public sector organizations to benchmark themselves against peers.

The resulting standardized, centralized data is disseminated to a global network of over 750 financial institutions that use the data to drive decision-making, including rating agencies and municipal bond investors. Since 2019, CDP and ICLEI have partnered to present a global unified reporting system for city governments. Local governments only report once, on the disclosure platform powered by CDP, to the CDP-ICLEI Track Cities questionnaire, which is also used by cities part of the C40 Cities, Global Covenant of Mayors for Climate & Energy (GCoM), and Science Based Targets Network.

As of 2024, more than 200 U.S. cities, states and public authorities, which includes approximately 20% of the U.S. biggest issuers by volume of debt outstanding, are already reporting through CDP disclosure annually.

Climate Resilience Planning

Resilience planning is the necessary precursor to resilience disclosure. To prepare for the impacts of extreme weather, cities across the globe are creating adaptation plans and making investments to improve the resilience of their communities.

As the impacts of worsening storms, fires, droughts, and rising seas increase, investors will be interested not only in assessing financial risks they are exposed to, but also in evaluating the preparedness of communities to meet those risks. Public organizations that have strong adaptation planning are likely to be rewarded by credit agencies and investors in the form of higher credit ratings and lower borrowing costs. Disclosure and resilience practices are therefore intimately linked.

As a Brookings report lays out, bond buyers are sensitive to these risks, reporting that "cities may attempt to manage their climate risk exposures by engaging in activities that would lower their climate news sensitivities and overall improve their resilience to both physical and transition risks of climate change… [R]educing the population's exposure to climate-related risks may help cities lower their climate news sensitivities."

While every public organization will need to customize a resilience planning approach that best matches its needs, current best practices include the development of a governance model, detailed risk identification at the major asset-class level (buildings, water infrastructure, etc.), a process for screening operating and capital budget proposals that reduce these risks and reporting metrics that allow progress towards adaptation to be measured and monitored. A number of approaches have been developed for organizations to use in building their resilience plans.

Some leading examples include:

- New York
- Climate Ready Boston
- Port Angeles Washington's Climate Resilience Plan
- North Carolina Climate Risk Assessment and Resilience Plan
- San Diego International Airport's Climate Resilience Plan

The Organizational Value of Disclosure

Preparing a city, county, state, university, or water district for worsening and costly heatwaves, floods, drought, and storms will require highly adaptive planning across engineering, finance, and operational units. Strong disclosure not only will enable ongoing access to financial markets to fund resilient related investments, but the production of risk reporting fosters cross-unit coordinate and communication of climate risk that might otherwise be overlooked. A quote often attributed to Dwight Eisenhower that "plans are worthless but planning is everything" underscores the importance of trying to peer into the future, however imperfectly, and prepare for change.

Ceres' Recommendations

The complexity and diversity of the municipal market ensure that no "one size fits all" disclosure framework can apply to municipal securities. Ceres recommends a layered approach to improving climate disclosure.

1 · Audited Financial Statements

All municipal entities should closely track evolving GASB guidance to ensure accurate recording of climate change impacts to their financial statements. Management Discussion and Analysis sections of the audited financial statements (MD&A) should outline material climate risks and summarize the status of the organization's resilience planning.

2 · Bond Disclosures (Official Statements)

All municipal bond issuers should work closely with bond counsel and advisors to develop a disclosure approach that is tailored to their organization and best promotes transparency to investors and regulators regarding climate risks. While each issuer will need to develop an approach that best fits their needs, Ceres recommends that all Official Statements, at a minimum, included the following elements:

- Description of past weather events that have had a material financial impact.
- Classification of risks: utilizing publicly available databases, such as FEMA's National Risk Index for Natural Hazards, detail which climate risks are material to a given jurisdiction.
- Identification of how planning for risk management and mitigation are organized and governed.

- A clear statement of how climate risks could impact payment of debt service.
- A discussion of the status of resilience planning. For each identified risk area, the issuer should provide a description of current and future steps that are being taken to mitigate the risks, including investments made to date to improve resilience.

These recommendations are consistent with those published by the Government Finance Officers Association (GFOA), which recommend issuers identify the primary risks, policy actions taken, summary of response efforts, and appropriate disclaimers.

3 · Resilience and Adaptation Planning and Reporting

A) **All public entities should evaluate and plan for climate resilience. State, county, and local governments should develop climate resilience plans, coordinating across all impacted departments, that identify climate risks and develop appropriate risk mitigation plans and strategies.**

B) **Government entities with over $1 billion of outstanding bonds should issue a standalone report that discloses the organization's climate mitigation and adaptation plan and actions.** By issuing a more detailed report than what is included in audit financial reports or bond documents, a resilience and adaptation report provides the most flexible, adaptable means for a public entity to communicate the full breath of its preparedness to meet the challenges of climate change to financial markets and investors.

These reports, consistent with the Task Force for Climate-related Financial Disclosures (TCFD), should include:

- **Governance:** The report should describe how climate resilience is organized within the jurisdiction. Is there a central office managing these risks? How are actions coordinated across major departments? What policy actions have been taken to prioritize resilience planning and execution?
- **Risks:** The report should detail the specific climate risks faced by a jurisdiction. How has the organization assessed its risks? What are the critical risks it faces in the future? How will risks impact organizational assets, revenues, and financial position?
- **Strategy:** The report should describe the organization's strategy for managing risks. The report should detail ongoing and planned expenditures in each risk category. If sea rise is the major risk, what investments is the organization planning to take to meet that challenge? How are risks prioritized and funded?
- **Metrics:** The report should address how the organization will monitor its resilience program over time to meet evolving climate risks. How with the organization track risks and impacts and adjust its strategy? Has the organization set targets for resilience?

4 · Federal and State Regulation

Federal and state regulators should provide stronger guidance, data sets, and training resources for municipal issues to strengthen their disclosure frameworks. For example, the State of California Debt and Investment Advisory Commission (DIAC), managed by the California State Treasurer's

office, provides reporting, training, and coordination services to municipal bond issuers in the state. Recommended improvements for MSRB oversight are laid out in the Ceres Climate Risk Scorecard recommendations above.

Implementation of these recommendations will enhance the consistent, thorough disclosure of climate risks to financial markets to ensure that public sector entities retain full access to capital markets. Strong disclosure and reporting will also provide a means of internally organizing, coordinating and empowering public sector organizations to meet the challenges of worsening and costly heatwaves, floods, drought, and storms.

1 Municipal Market Analytics, Daily Market Strategist, March 18, 2024

2 Weekly Outlook, MMA, June 3, 2024 page 2