

Building Capacity and Preparedness for Extreme Weather Events in Shreveport, Louisiana

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Executive Summary

Shreveport, Louisiana sits in the northwest corner of the state on the banks of the Red River. Once a thriving economic center, the city has experienced its share of challenges due to the loss of major industrial players over the most recent decades. Although the city is working to attract new industries and employers to the area, there continues to be significant socioeconomic challenges across the region. Looking forward, Shreveport has many opportunities to build resilience and capacity amongst residents, while setting the city up for future success. As a city with these economic challenges looking for opportunities to grow, Shreveport provides an interesting context for studying climate adaptation initiatives in the south central U.S.

In the coming years, Shreveport is likely to experience higher temperatures, which are exacerbated by the urban heat island effect. Shreveport also experiences intense precipitation events from tropical systems and severe storms, which also bring high winds and the potential for tree damage. Aside from these natural hazards, the city deals with water quality issues, air quality concerns, and a limited capacity to apply for federal funding opportunities.

When it comes to planning for future hazards, Shreveport regularly participates in the development of the Caddo Parish Hazard Mitigation Plan. These planning documents, required for municipalities to be eligible for certain types of federal funds, outline natural hazards the parish is vulnerable to and actions that might be taken to mitigate impacts. In the most recent update of the parish hazard mitigation plan, there was little to no resident participation in the planning process and proposed actions were incremental.

Shreveport has the opportunity to tackle many of its challenges simultaneously while also making investments which will increase the city's resilience. By prioritizing vulnerable residents when investing in new infrastructure or developing new mechanisms for residents to participate in the planning process, Shreveport can work to increase the preparedness for all residents when it comes to extreme weather events. Investing in resilience can also include using new types of green infrastructure to minimize flooding impacts, reduce the urban heat island effect, and make Shreveport more green at the same time. With continued action and prioritization of low-capacity communities, Shreveport can maintain its image as a leader in northwest Louisiana.





SCIPP

A NOAA RISA TEAM

This study was conducted by researchers from the Southern Climate Impacts Planning Program (SCIPP), which is a National Oceanic and Atmospheric Administration (NOAA) Regional Integrated Scientific Assessment (RISA) team. SCIPP works to understand the impacts of climate variability and change across the south-central U.S. This includes studying how cities are preparing to handle the challenges associated with extreme weather variability, while also building capacity and creating resources on climate hazards. The work presented in this report on Shreveport is part of a larger study investigating climate adaptation in low-capacity cities throughout the region: Tulsa, Oklahoma, Fayetteville, Arkansas, and Shreveport, Louisiana. This study was approved by the University of Oklahoma's Institutional Review Board (#15845).

Study Objectives

- 1 Assess the extent of climate adaptation planning in Shreveport
- 2 Understand how community members experience climate change impacts and how these impacts are captured in Shreveport's planning efforts
- 3 Develop ways to improve climate adaptation planning in Shreveport

Introduction

Geography and Climate Hazards

The City of Shreveport is located in northwest Louisiana, where it lies on the Red River, in a relatively flat, low-lying area. In addition to the Red River, there are multiple bayous in the region. Cross Lake, which provides drinking water supply to Shreveport, is in the northwest portion of the city. Shreveport's climate is characterized by lengthy hot and humid summers and more mild winters [1]. Particularly concerning for human health is the warming of overnight low temperatures [2], as higher nighttime temperatures prevent the body from cooling down [3]. Additionally, flooding due to backups along area bayous affect the city, as does localized flooding from heavy thunderstorm and tropical storm downpours [2].

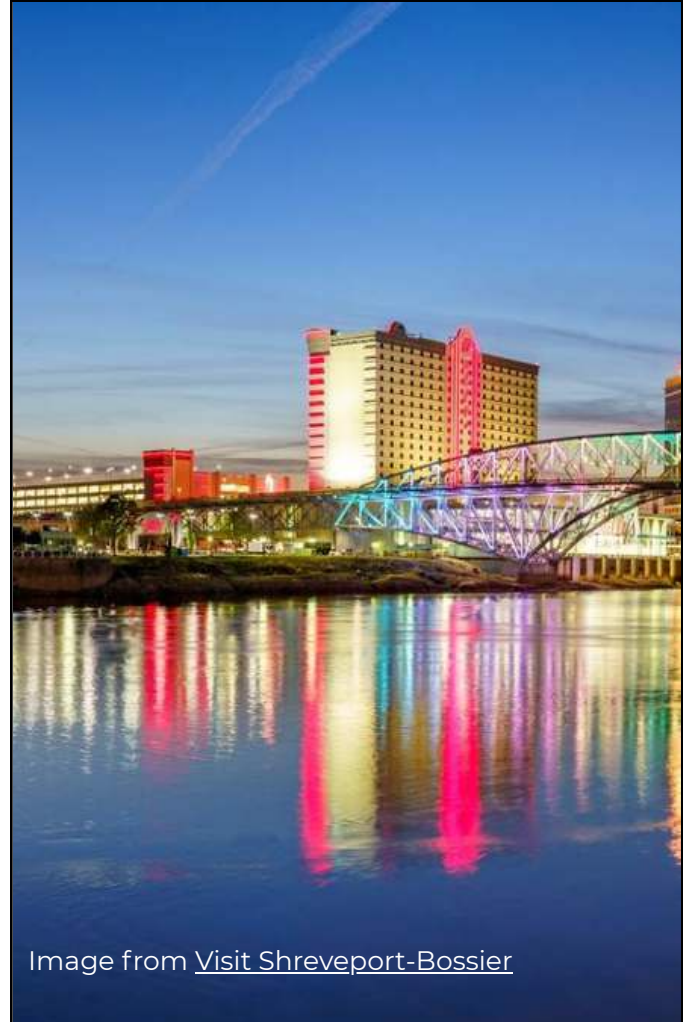


Image from [Visit Shreveport-Bossier](#)



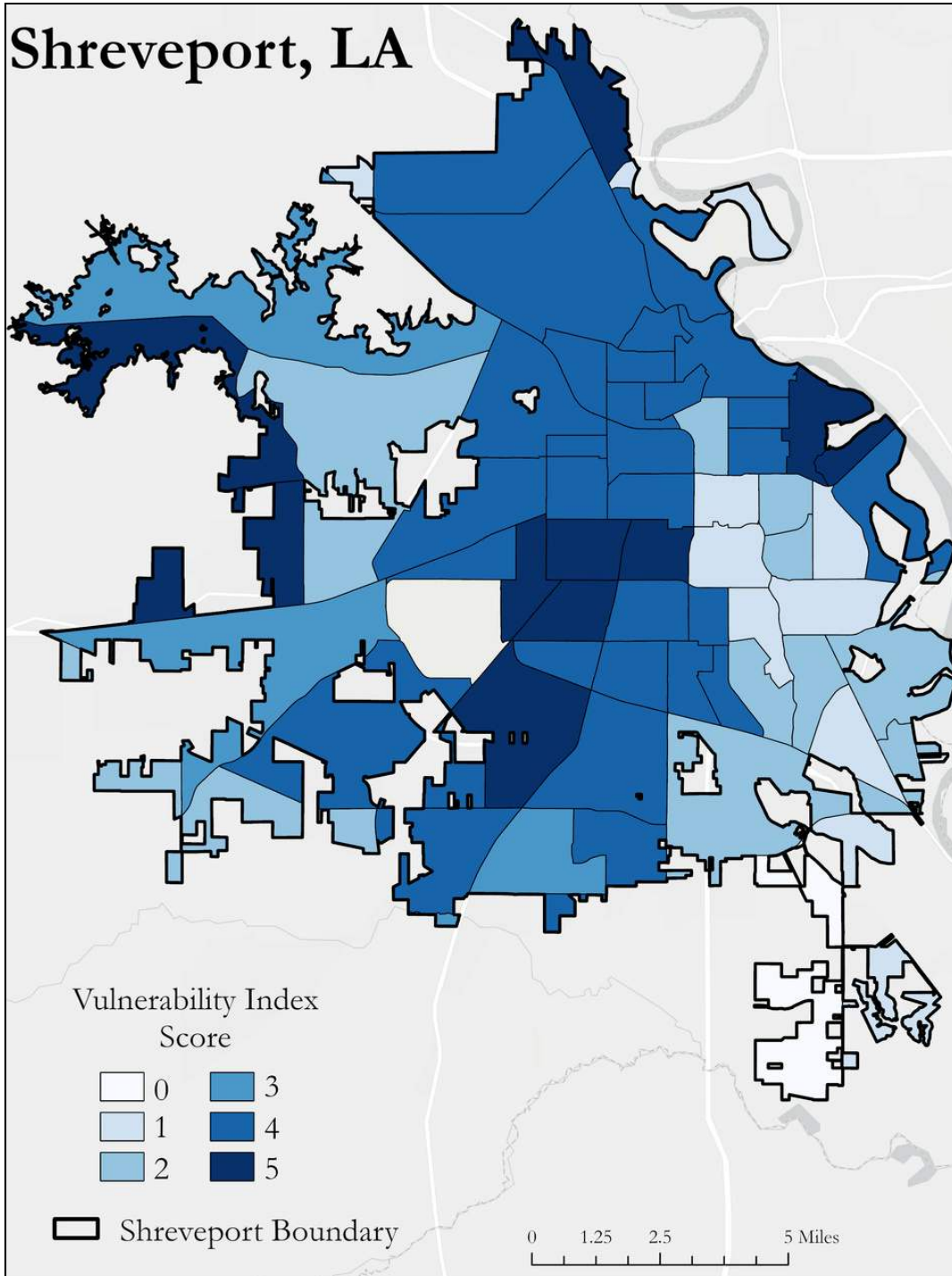
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Economic Challenges

With its favorable position on the Red River, following the discovery of oil in Louisiana, Shreveport became a major economic player in the state. With the loss of oil jobs following the collapse of the Louisiana oil market in the 1980s [4] and the closure of a General Motors' plant in 2012 [5], the city has experienced a decline in population. Efforts are underway to attract new industries to the area, including a new renewable energy logistics company and the construction of a facility that will make parts for wind and solar farms [6]. Still, Shreveport's population has declined significantly in the past few decades, especially as the number of jobs requiring four-year degrees has dwindled [6]. The shrinking population has led to a declining tax base, affecting the ability of the city to invest in climate adaptation infrastructure.

Demographics

Over 183,000 people live in Shreveport, half of whom identify as Black based on the 2023 American Community Survey. The population has been declining steadily over time, decreasing 3.7 percent between 2010 and 2022 [6]. Driving this decrease is the lack of economic opportunities in the region, as the city's median income of \$48,000 per year lags behind the rest of Louisiana and the country. Further exacerbating this issue is the high poverty rate in Shreveport. At over 21 percent, the city's poverty rate is more than double the U.S rate [7]. This combination of socioeconomic factors leaves a large portion of the city's residents highly vulnerable to the impacts of extreme weather.



In order to understand existing vulnerability in Shreveport, we created an index to highlight social and economic variability. Using data from the American Community Survey [8], we identified Census tracts which exceeded the state average across two variables (percent of the population that is non-white and median rent) and which were below the state average for median income, median home value, and the percent of the population with a Bachelor's degree. Each tract was given a score of 0 (false) or 1 (true) for each variable. Then, the individual scores were summed to create a vulnerability index for the city. Higher scores on the index indicate areas with higher levels of vulnerability.

Caddo Parish Hazard Mitigation Plan

In the United States, local governments are required to develop Hazard Mitigation Plans in order to apply for and receive some types of federal funding [9]. These documents outline potential exposures to natural hazards and how communities would be affected, should those hazards occur [10]. Shreveport is a member of the Caddo Parish Hazard Mitigation Plan, which was most recently updated in 2025. In addition to documenting hazard exposure, the plan also outlines potential mitigation actions which can be taken to reduce risk and vulnerability within Shreveport and other municipalities in Caddo Parish [11].

Shreveport Green

Shreveport Green is one of the main environmental organizations in the city of Shreveport. The organization operates multiple sustainability programs. These programs include mobile farmers markets, litter and waste cleanups, community gardens and urban farms, hazardous waste recycling, and urban greening. In addition, Shreveport Green also runs the ShreveCORE program, an opportunity for young adults in the city to be employed and work on sustainability challenges. ShreveCORE projects have focused on remediating unused lots in low-income neighborhoods, building urban gardens, conducting litter cleanups, and working to distribute trees at annual giveaways [12].



Image from [Visit Shreveport-Bossier](#)

Research Methods

Interviews

We conducted interviews with city staff and non-profit employees in Shreveport. Building on connections the SCIPP team had previously established in Shreveport, we worked to build relationships with new connections and learn about climate actions being taken in the city. We chose to conduct interviews to have in-depth conversations with participants about planning actions and challenges associated with extreme weather events in Shreveport.

Our interview participants came from a range of city departments, including Public Works, Water and Sewerage, and Economic Development. In these conversations, we spoke with staff about climate challenges they perceived throughout the city and which groups of people or areas of Shreveport might be more vulnerable to these hazards. We also discussed actions that had been taken in Shreveport so far to address environmental issues, as well as potentially upcoming projects. We closed our conversations by discussing what might be next for Shreveport, if the city were able to pursue new projects and initiatives. We also spoke with staff from Shreveport Green, the major sustainability non-profit in Shreveport, where we asked similar questions to gauge potential vulnerabilities, actions being taken, and desired next steps. We interviewed four people over Zoom, which ranged from 20 minutes to 1 hour in length.

Plan Analysis

Shreveport does not currently have an official sustainability or climate resilience plan, so we read the Caddo Parish Hazard Mitigation Plan to understand the city's approach to dealing with environmental hazards. In this review, we documented key strategies which were included in the plan and compared them to proposed actions we had discussed with interview participants. Doing so allowed us to understand how the city and parish are thinking about future challenges related to sustainability, climate change, and the environment. We were also interested in understanding to what extent the parish engaged with residents in drafting the Hazard Mitigation Plan.

Limitations

Our small number of participants is one of the main limitations of this study. After multiple unsuccessful attempts to recruit more participants, we chose to include the analysis of the Caddo Parish Hazard Mitigation Plan as an additional data source. The city is also guided by other planning documents, including the OneShreveport Master Plan, which was recently updated and adopted by city council in 2026. Our findings are not meant to represent an analysis of the entire local government in Shreveport, but instead speak to patterns we observed in the interviews conducted and the Hazard Mitigation Plan. Future studies could conduct more interviews or focus groups with other non-profits, city staff, or residents in Shreveport and include analysis of the new Master Plan.

Findings

1

Climate and Environmental Issues Identified

2

Other Issues in Shreveport

3

Actions Taken

4

Which Areas are Vulnerable?

5

Reactive, Not Proactive

Climate and Environmental

Issues Identified

In the south central United States, climate change is projected to cause higher temperatures, more days with temperatures over 100 degrees, and more intense precipitation events. These issues were highlighted by our interview participants as challenges for the City of Shreveport to address.

Temperature Extremes

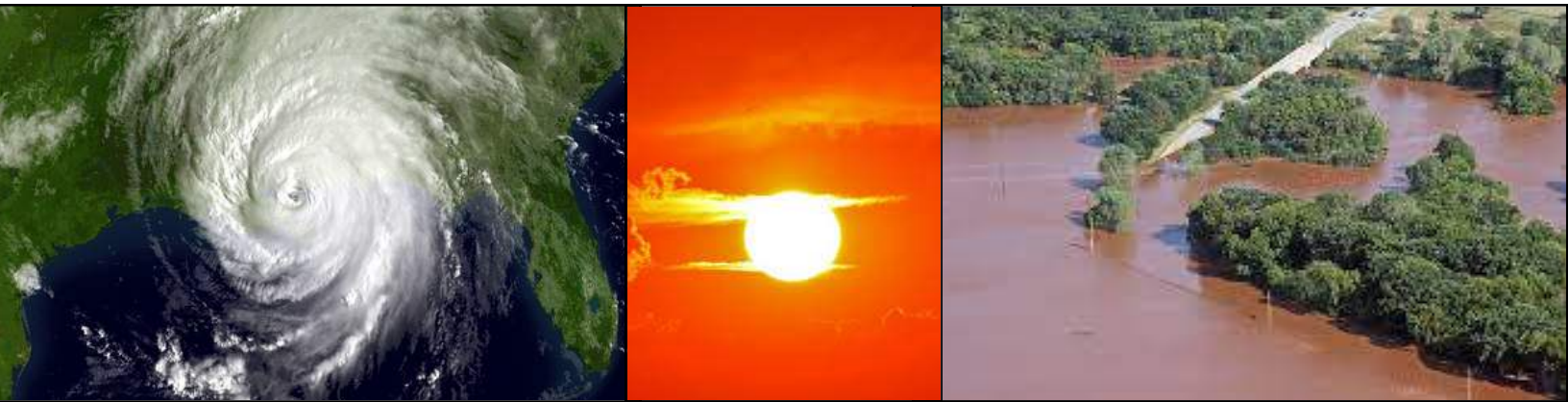
All of our participants noted the increasingly warm summer temperatures, with many days having temperatures exceeding 95 or 100 degrees. On average, the city has been experiencing 6 more days per decade with temperatures exceeding 95 degrees since 1970, a trend that is likely to continue as the climate warms [2]. The urban heat island also exacerbates temperatures in Shreveport, particularly as the city deals with a loss of green space and urban tree canopy. For many, the warm summer temperatures seemed inevitable, as one participant explained, “There’s nothing we can do about the heat. We’re in the south, so we’ve been dealing with it for a while.” For some, the hot summers were simply a part of life in Shreveport. However, participants also described experiencing more fluctuations in temperatures, with extreme winter weather posing a problem for the city. Every participant brought up the 2021 winter storm, where the city received 8 inches of snow and experienced temperatures around 0 degrees [13]. Participants described how the potential for more winter storms in the future might lead to challenges with water supply (from breaking water pipes), other infrastructure, and resident health and safety.

Precipitation Variability

Flooding and more intense precipitation events were also frequently mentioned in our interviews. The city has taken steps to reduce flooding impacts, such as relocating homes from repetitive flood zones or improving drainage infrastructure through capital projects. Multiple participants expressed their belief that flooding problems had largely been solved throughout the city. For example, one participant told us, “The areas that are more flood-prone, those areas have already been addressed,” when we asked about flooding issues in Shreveport. There was a general perception that the city had done all it could in terms of dealing with flooding, but heavy rainfall events can still overwhelm the sewer system. Drought was also mentioned throughout our conversations, but concerns about it were mixed. Some participants did not view drought as a problem for Shreveport, while others noted concerns about water supply via Cross Lake. Others explained that drought periods were becoming more frequent as precipitation events are more spread out. In other words, while the same amount of precipitation may be falling, it was coming in shorter bursts, leaving room for drought conditions to develop in between precipitation events.

Hurricanes and Severe Thunderstorms

Though many hundreds of miles from the Gulf Coast, hurricanes do still affect Shreveport, particularly bringing heavy rains to the area. Participants also explained how, with more intense hurricanes hitting the coast, the storms were able to maintain their strength further north, leading to Shreveport experiencing more intense impacts. In the time since 2005, Shreveport has been affected by tropical systems 16 times [2]. Thunderstorms were also a challenge for the city, especially severe thunderstorms or derechos with high winds. In both hurricanes and thunderstorms, the heavy precipitation saturates the soil, which makes it easier for high winds to uproot trees. Shreveport has many areas of old growth trees, and losing these trees is a concern in any high precipitation/wind event. Some participants described the uneven cleanup following these types of events, where residents in low-income neighborhoods may have tree limbs sitting on their homes and downed limbs in their yards for months. Residents in more wealthy areas were able to deal with the tree damage sooner. High winds also frequently caused power outages in the city, the impacts of which would be exacerbated if the outages occurred during extremely hot or cold weather.



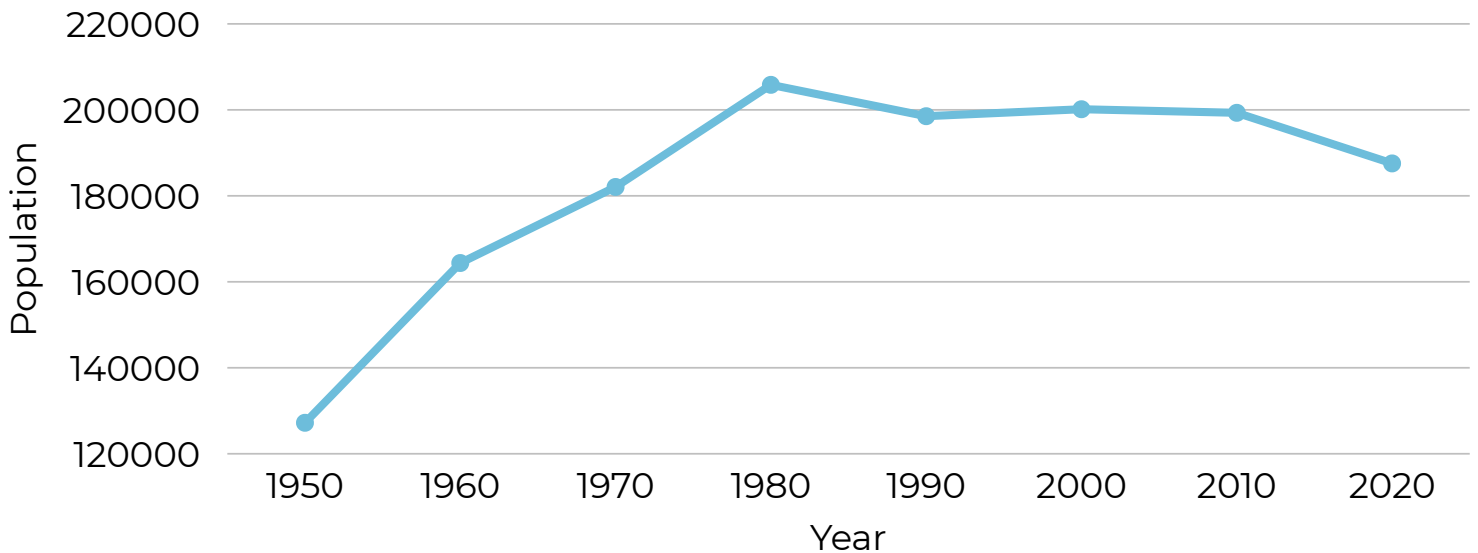
Water Quality and Quantity

The other main area of concern participants described was water quality and supply. Shreveport's water supply comes from Cross Lake. One participant explained how Shreveport's water supply is impacted by water usage in upstream lakes, particularly Lake O' the Pines near Dallas, which flows into Caddo Lake, and ultimately Twelvemile Bayou. In times of low water supply on Cross Lake, Shreveport pumps water from Twelvemile Bayou into the lake to shore up supply, but as the Dallas suburbs grow and more demands are placed on upstream supply, there are concerns about how much water will be leftover for Shreveport. The city also faces water quality challenges, particularly as oil and gas operations proliferate upstream from Cross Lake. One participant also explained how the water frequently tests high for manganese—which is a pollutant that causes neurological issues such as memory challenges, reduced motor skills, and symptoms similar to Parkinson's disease [14]. Additionally, the city has challenges with poor water quality and is currently under a consent decree with the EPA to address sanitary sewer overflows [15].

Other Challenges in Shreveport

Outside of environmental issues, Shreveport also deals with other challenges that limit the city's capacity. Most pressing is the city's declining tax base as a result of population loss [16], which affects city revenue and operating budgets each year. To supplement the budget, Shreveport has brought multiple bond issues to voters over the past years, raising funds for specific projects.

Shreveport Population (1950-2020)
Data from World Population Review [16]



The city also relies on federal funding to carry out projects, but many participants noted the decline in funding under the current federal administration. Between reduced opportunities and shifting timelines for applying, the city's capacity to obtain federal funds is rather limited. As one participant explained, **“The timeframe has shortened, that's the biggest thing I've noticed. They usually were three to six months, now they're three to four weeks. It's crazy.”**

In terms of implementing solutions to local problems, sometimes the city was unable to act because they did not have jurisdiction. For example, when describing air quality issues along major roads, one participant told us, “There's not much we can do there, because it's the higher traffic ones where the city doesn't own the roads.” Rather, the roads fell under the jurisdiction of the state, and Shreveport decision-makers were unable to take actions to limit air quality concerns. A final challenge was dealing with the politicization of climate change in the region, and trying to identify ways to reframe the need for dealing with extreme weather events. As one participant told us, **“We're working on saying that as opposed to identifying climate change, it's how the city can be more resilient and responsible.”** Framing actions in this positive light, rather than focusing on something more contentious has been one way city employees navigate talking about future extremes in Shreveport.

Actions Taken

Shreveport has started addressing persistent environmental challenges across the city. The sewer and water infrastructure has been prioritized due to current and former consent decrees from the EPA. Improvements have included installing litter catchers in drainage systems, building new sewage storage facilities around Cross Lake, and capital projects to re-line sewer mains across town. Participants also described ongoing planning studies to prepare for future projects, such as one to install a new sewer lift station or update drainage plans. Shreveport has also done buyouts of repetitive flood zones, and the city is currently working on a new engineering study that may lead to more. Outside of investments in water infrastructure and dealing with flooding, Shreveport has had little capacity to take additional action to increase resilience.

However, Shreveport Green is leading some efforts that address sustainability and environmental issues in the city. For example, they host mobile farmers markets where residents can purchase fresh food at low cost, accompanied with cooking demonstrations to encourage healthy eating. Shreveport Green also runs hazardous waste collection events, though the city does not have a formal recycling program anymore. Additionally, the ShreveCORE program employs young adults in Shreveport in environment-focused jobs, providing them training in how to become arborists, work in farms and food, or waste reduction. Other non-profits in the area are starting a network of resilience hubs, and while that is being started, churches in the city also serve as community shelters. After a weather event, the city does open the recreation centers as shelters, but only if they still have power, as these buildings do not have generators.

Which Areas are Vulnerable?

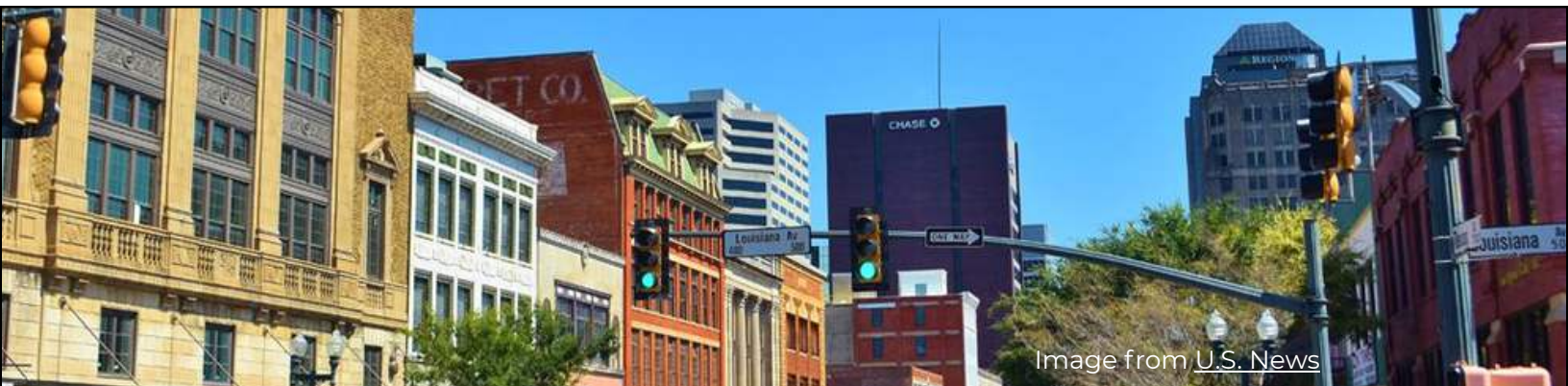
In our interviews, we asked participants to describe vulnerabilities they saw in Shreveport. Some struggled with answering this question, such as one participant who said “it’s kind of random.” Areas with more trees were acknowledged as being higher risk for damage, especially in storms and high winds. One participant explained, “Storms are going to affect everybody in the same way, but cleanup is different. When it comes to assistance, the more wealthy communities are going to get taken care of faster.” These wealthier areas are the neighborhoods on the outside periphery of Shreveport. Vulnerable neighborhoods are concentrated along I-49, which runs through the center of the city. Overall, there was limited awareness of vulnerabilities and neighborhoods with reduced capacity in Shreveport.

“
When it comes to assistance, the more wealthy communities are going to get taken care of faster.
”

Reactive, Not Proactive

Overall, Shreveport has taken a more reactive stance to dealing with climate and environmental challenges. Whether that be removing trees and opening shelters after severe thunderstorms and hurricanes, buying out properties that flood often, or investing in new infrastructure to deal with flooding issues, many of the solutions the city has implemented address symptoms of problems, rather than root causes. Across the departments we spoke with, there seemed to be little long-term vision for Shreveport, particularly as it relates to dealing with emerging climate challenges. In some instances, participants seemed to view problems as solved, or as if there was little else that could be done. For example, one participant described what the city might do with areas that had been purchased due to repetitive floods: **“Those areas are pretty much left as they are. There’s not much we can do for them. Like if you put a park or something in there, it’s going to be subjected to flooding. The only options are to put more plants or trees there. Most of the areas already have some trees.”** This limited perspective on what was possible within Shreveport was reflected across our interviews, as participants focused on solutions that relied on gray infrastructure to address problems via more traditional solutions.

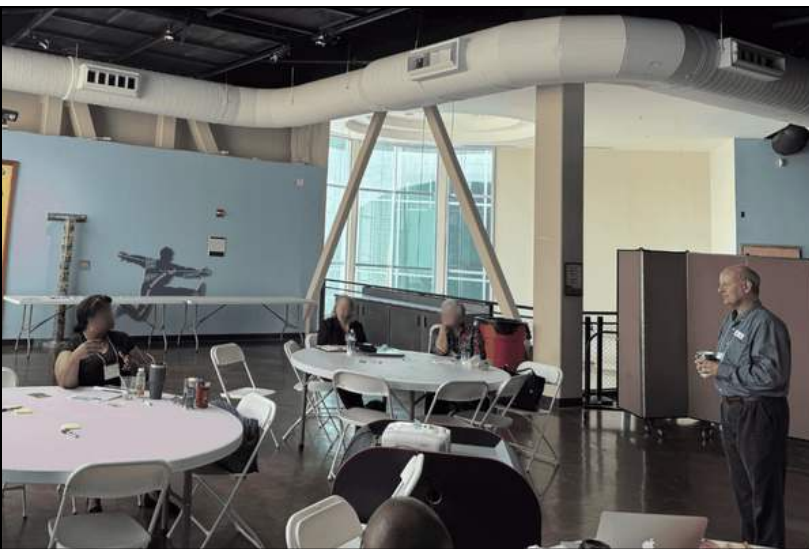
This reactive stance is also present in the Caddo Parish Hazard Mitigation Plan. Though not intended to help the parish with adapting to climate change, the plan is also more reactive to natural hazards. Mitigation actions at the parish level included retrofitting public buildings, investing in drainage improvements, enhancing outreach activities, or upgrading public warning systems. At the city level, Shreveport officials noted their intent to “evaluate building retrofits at such time we carry out any renovations.” The city also had plans to work with local homeland security to provide real-time warning information to residents, evaluate additional repetitive flood-loss projects as funds allowed, or include funds in their next bond proposal for generators at sewer lift stations. However, the community shelters in Shreveport also lack back up power sources and are not included in plans for installing new generators. In general, many of the existing proposed hazard mitigation actions are reactive to problems already ongoing in Shreveport, and fail to take into account the distribution of vulnerability throughout the city.



Recommendations

The recommendations below draw on this research in addition to the discussions that occurred at a March 2025 workshop involving other SCIPP team members and city leaders [17]. We offer opportunities for expanding resident involvement in city planning processes and addressing vulnerability in the city of Shreveport.

- When making investments in infrastructure to deal with heat, flooding, or storms, consider vulnerability in deciding which neighborhoods to prioritize.
- More thoroughly engage with residents when making decisions and developing planning documents. Develop a consistent communication mechanism to facilitate this engagement.
 - Expand emergency communication services to reach more residents
 - Communicate city news, planning updates and opportunities to participate, and emergency information in multiple languages (e.g., English and Spanish).



- Explore opportunities for implementing green infrastructure throughout Shreveport (e.g., creating bioswales and rain gardens, retention ponds, using porous pavers) to help mitigate stormwater runoff and urban heat effects. Prioritize placing this infrastructure in neighborhoods with the most flooding challenges.
- Work with community organizations to expand the resilience hub network, which can serve as community shelters during extreme heat/cold or after an extreme weather event. Prioritize placement of new hubs in most vulnerable communities.
 - Open additional facilities for longer hours (e.g., libraries) during heat waves and cold snaps.

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