Environmental Justice and the Informal City

Research Report

Authors

Ariadna Reyes, PhD
Bernardo Vargas, PhD Candidate
Josh Newton, PhD
Luis Macias, PhD Student

UNIVERSITY OF TEXAS ARLINGTON

We thank the residents of Springville for trusting us and sharing their life stories with us. Thank you to the funders who made this research possible: the Mellon Foundation's Crossing Latinidades Humanities Initiative and the University of Texas at Arlington for multiple streams of funding, including the Interdisciplinary Research Grant 2023-2024, the 2021-2022 Research Enhancement Program, and the 2022 and 2023 Geisel Grants.

Contents

1. RESEARCH OVERVIEW AND CASE STUDY

***Figure 1**. In close proximity to city water infrastructure, the Springville community lacks access to piped water.*

In 2017, a journalist wrote about the irony of a water treatment plant located near the low-income community of Springville, Texas,[1] which did not have access to piped water. Formerly enslaved African Americans had founded Springville as a freedmen's town in the 1870s but it had never received municipal piped water and other basic services. The article included the perspective of a resident who compared their situation to that of Flint, Michigan. Unlike Flint, rural and unincorporated areas in the United States typically lack municipal services (Purifoy 2021; Seamster and Purifoy 2020) but the comparison of Springville to Flint was nonetheless plausible: Springville residents also experienced well water pollution and relied on donated or purchased water bottles for daily needs. The article concluded that Springville was deadlocked between impoverished residents who could not afford to leave the community for a better place to live and county officials who saw no reason to take responsibility or action.

Researchers, including Reyes and Newton, found this article in November 2021 while researching environmental injustice and informal housing in the Dallas-Fort Worth metropolitan area. It led them to read every academic and news report on Springville they could find. They realized that their research needed to bring them closer to understanding the issues of Springville, felt a strong need to act, yet were unsure how to build relationships in a

[1] To ensure confidentiality, we anonymize the community name and all personal names, places, and locations.

neighborhood without connections. In March 2022, they drove through Springville for the first time, expecting nothing more than to see the community firsthand. The hospitable character of Springville residents quickly expanded that limited plan. As they entered Springville, a resident stopped them in the middle of the road to ask who they were and what they were doing in Springville. That person introduced them to a longstanding leader in the community who invited them to attend a town hall meeting where they heard the history of the community, listened to resident experiences, and ate BBQ with local stakeholders and environmental justice activists in the area. This meeting solidified their commitment to Springville as an appropriate research site.

Drawing on participatory action research methods and humanistic methodologies, Dr. Reyes developed a research project to understand better how impoverished Latinx residents experience environmental and climate injustices in an unincorporated community of color in North Texas. This proposal was incorporated into a larger project to understand how low-income Latinx residents in Texas, California, and Illinois experience environmental and climate injustice. In August 2022, Reyes and colleagues from the University of Illinois-Chicago and the University of California-Irvine were awarded a Crossing Latinidades Collaborative Research Grant, which provided financial support for extensive fieldwork from August 2022 to July 2024. Over the past two years, Ariadna Reyes has worked with research partners Josh Newton, Bernardo Vargas, and Luis Macias, who have contributed extensively to developing and implementing research methods tailored to documenting the conditions of this multi-racial, unincorporated community and how its impoverished Black, Latinx, and white residents understand and articulate environmental and climate injustice. The researchers have attended several meetings in Springville and have engaged residents in participatory research to understand the issues from their perspectives and imagine solutions based on their ideas and experiences.

The research that produced the date in this report was developed in three phases. The first phase consisted of observational and spatial analysis methods that allowed the team to develop base maps of the community. This process revealed that Dallas County data and mapping of Springville were inaccurate or poorly updated, so the team began collecting spatial data from observations in order to accurately map actual community land use. The second phase involved the implementation of 45 household surveys and 11 in-depth interviews on housing, water and energy infrastructure. During this phase, they learned that residents had deep awareness of and concern about environmental injustices in their neighborhood, extending to challenging experiences of climate-induced weather events. This finding led to a third research phase bringing residents into deeper participation through in-depth interviews, oral histories, and photovoice. Throughout the research phases, local activists and residents provided documents on Springville history. From this research base, the researchers are now developing ideas based on academic theory that will help to shape understanding of Springville's issues. The following sections put Springville in historical context , then focus on data and Springville residents' ideas about environmental and climate issues.

1.1 Springville's History of Environmental Injustice

Springville was established in the late 1870s as an unincorporated freedmen's town by twelve African Americans escaping racial segregation and violence with the intent to develop an

autonomous community. In Texas, counties are the regulatory authority overseeing unincorporated communities (Durst et al., 2023). Counties can solely enforce subdivision regulations in unincorporated communities without reference to zoning or building codes. For more than century, Dallas County's refusal to annex this community has deprived residents of essential services such as piped water and sanitation. Like many other low-income, unincorporated communities of color in Southern states, such as Texas and North Carolina (Purifoy, 2021; Seamster & Purifoy, 2020), Springville simply lacks municipal services widely understood to be essential. In addition to lack of paved roads, sidewalks, piped water, internet access, sewers, and trash pickup, to name a few services, residents are subject to people outside treating Springville as a dumping site for such things as tires and toxic waste, an illegal practice that is typically ignored by authorities.

Municipal service deficiencies mean residents must have coping strategies for the most everyday kinds of activities. For instance, African American residents built rudimentary wells and septic tanks in the 1960s, which enabled population growth. In 1970, 460 people were living in Springville. In the mid-1980s, residents complained that their wells were contaminated by sand from local mining operations and also smelled terrible, likely because of the nearby wastewater treatment plant. Such infrastructural deficiencies led to a dire situation, as Springville's population experienced massive displacement. By 2000, there were only 252 residents.

In the early 2000s, FEMA designated the community as a floodplain area. Since then, Dallas County has strictly enforced floodplain regulations, which require residents to build a levee or elevate houses at their own cost or relocate or demolish their homes with a county reimbursement of $350. The result: 150 properties were sold and 149 homes were destroyed. The floodplain designation also brought citations of residents who attempted to upgrade or repair their homes, thus ensuring future deterioration of the housing stock. While Dallas County does not provide municipal services, members of its sheriff department frequently patrol the community and cite residents for efforts to improve their lots. Floodplain designation has had negative ramifications beyond housing costs. Dallas County resolved that water and sewage infrastructure in Springville was impractical and financially infeasible. Insofar as other communities in the floodplain area have that infrastructure, it seems clear that the county's choice not to provide infrastructure is discriminatory and rooted in post-slavery racial segregation. These pressures further depleted Springville's population. In 2010, 88 people resided there as a result of well contamination and floodplain regulations. Since that time, despite the efforts of multiple news outlets, research teams, nonprofits, local environmental organizations, and activists, the community has continued to struggle without gaining any significant infrastructural improvements.

Over the last two decades, however, Springville has grown. Low-income people from Latin America and US-born white, Latinx, and Black residents have moved to there, attracted by its low land values. Our field research indicates that as of 2024 Springville has 132 residents, a 50% increase since 2010. Unfortunately, residents continue to face precarious living conditions and safety risks tied to absence of essential services and selective enforcement of floodplain regulations, both impeding their ability to improve their living conditions. As the data reported

here show, most residents live in precarious forms of housing and lack piped water, sewers, trash pickup, paved roads, and internet access.

2. MATERIALS AND METHODS

Figure 2*. Conducting in-depth interviews in Springville.*

This research project asks an overarching question: How do low-income residents in an unincorporated community in North Texas experience, endure, confront or resist environmental injustices? Three supporting research questions are: 1) What are the sociodemographic characteristics of residents in Springville? 2) What are the characteristics and deficiencies of housing in the community? 3)How do residents confront or endure daily environmental injustices? 4) How do they cope with extreme climate events? Table 1 shows the methods that address the research questions along with the information sources researchers have used to validate and triangulate findings.

Research Questions	Method	Source
What are the sociodemographic characteristics of residents in Springville?	Household Surveys	Residents from Springville Archives and historical documents from residents and local stakeholders Community Meetings with local stakeholders and environmental organizations Spatial datasets from the Dallas County Appraisal District
What are the characteristics and deficiencies of housing in the community?	Household Surveys Observational Methods Mapping	
How do residents confront or endure environmental injustices and extreme climate events?	Household Surveys In-Depth Interviews Photovoice	
3)How do residents confront or endure daily environmental injustices?		
4) How do they cope with extreme climate events?		

Table 1. *Research questions, methods, and sources of information.*

2.1 Data Collection Methods

Figure 3. *Researchers conducted in-person surveys.*

2.1.1 Observational Techniques

In preparation for participatory research, we conducted preliminary observations of the neighborhood by driving around to gather data on the characteristics of streets, housing units, and lots. This included analyzing the percentage of abandoned lots and buildings, the quality of streets and signs, the presence (or absence) of stormwater infrastructure, the quality of street lighting, and the availability and condition of green or public areas. This data enabled us to understand the challenges residents face in living in and moving around their neighborhood. It also helped us to realize that Dallas County data related to housing, land uses, and vacancy rates is highly inaccurate.

2.1.2 Spatial Analysis

We undertook multiple rounds of spatial analysis. The first datasets we consulted, from the American Community Survey (ACS) and the US Census Bureau, revealed poor documentation in peripheral unincorporated communities of color and little resolution of the ACS and census data. Next, to document Springville lot vacancy and occupancy, we turned to Dallas County

Appraisal District data (https://www.dallascad.org/DataProducts.aspx), including the 2022 Dallas County parcel shapefiles and property data in ArcGIS. The original intent was to use this spatial dataset to develop base maps to plan our survey and interview methods. Our early observations in the community, however, made it clear that county data was incomplete and inaccurate.

Thus, our next step was to continue observation and conduct household surveys to document occupancies, vacancies, and land uses. The first round of bottom-up mapping gave us a better sense of the reality of land use but we realized we still needed to accurately record data such as ownership of multiple lots. To solve this issue, we drove through the neighborhood using a GPS device to mark land use beginning and end points. We then geocoded these data points and overlayed them onto the county parcel map using ArcGIS. This allowed us to create a land use map that not only showed occupancies/vacancies and types of land use but also reflected to typical multi-lot use in Springville.

2.1.3 Household Surveys and In-Depth Interviews

We recruited household survey participants by knocking on doors and asking residents to answer a questionnaire in person. The surveys help document the characteristics of people, residential structures, and the energy and water systems residents use in their homes. Data collected from these surveys included information on the appliances, systems, or technologies people use to access potable water, electricity or natural gas, as well as the characteristics of sewage systems. Observations made during surveys indicate that there are 182 lots (of single or multiple parcels) in Springville, 62 of which have occupied residential structures. We conducted household surveys in 46 lots housing a total of 98 residents. Thus, we estimate that our survey may represent about 75% of the estimated total of occupied lots. Considering an average of 2.13 residents per lot, we estimate that the total population is nearly 132 residents.

In-depth interviews with eleven neighborhood residents helped refine and deepen our understanding of housing, infrastructure, and transportation issues. See the Appendix for Survey and Interview Instruments, for a complete list of survey and interview instruments.

2.1.4 Photovoice

Figure 4*. Springville social leaders attend a community meeting.*

Photovoice is a participatory method equipping participants with cameras to document aspects of their lives and provide experiential knowledge to researchers in a self-representing way. In this way, residents could frame the narrative of environmental injustice and climate change themselves, from their own points of view. Complementing information the research team gathers, photovoice lets residents decide what information is important. Researchers chose five household participants who expressed willingness to use photovoice. They either used a camera we provided or their cell phones if that was more comfortable. Participants took 30 to 50 photos recording what they consider to be their most pressing environmental or climate issues. In

addition, they recorded situations that bring them joy or happiness. Researchers used two coding categories: 1) types of injustices or events and 2) types of experiences photos captured, such as dwelling unit destruction or disaster responses.

Figure 5. *A resident's photo illustrating trash burning practices.*

3. COMMUNITY CHARACTERISTICS

3.1 Race and Ethnicity

African American/Black is the largest group with 54%, followed by white at 24% and 22% Hispanic/Latinx. However, field observations suggest that Hispanic/Latinx is a larger group than our survey documented. Latinx residents were less likely to participate in the research because of fear of enforcement and other barriers.

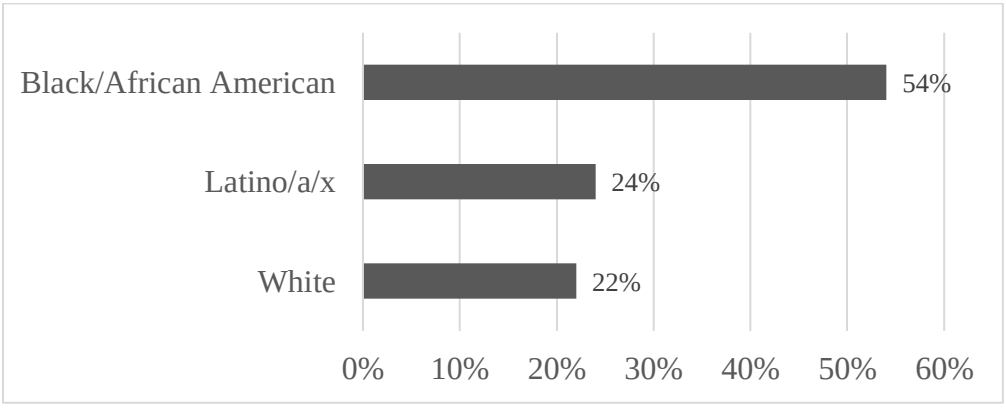

Figure 6*. Race and ethnicity distribution of Springville residents.*

3.2 Gender and Age

Among survey participants, males are the largest gender group, at 67%; 33% are female. Middle-aged people (40-59) comprise 48%, followed by older adults (60+) at 41%. Only 9% are younger than 40. This data suggests the community is a haven for middle-aged and older adults seeking stable housing.

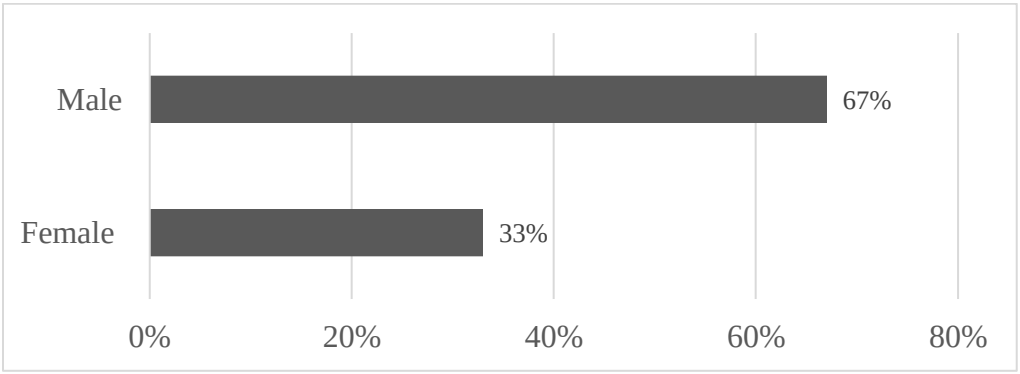

Figure 7. *Gender distribution of Springville residents.*

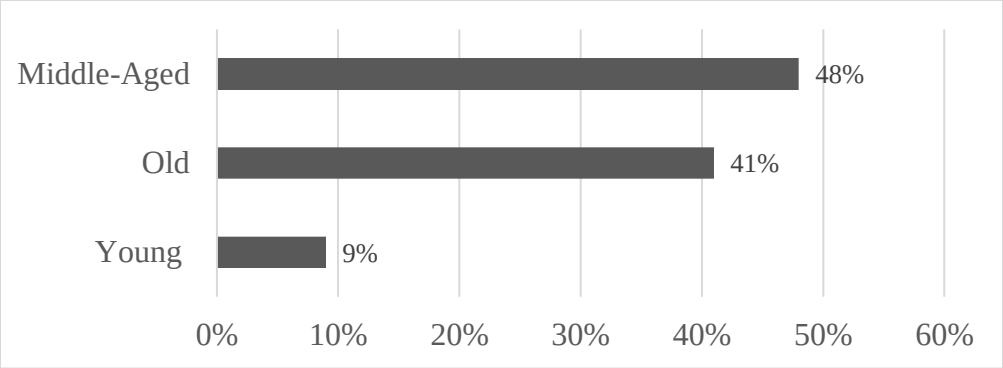

Figure 8. *Age distribution of participants.*

3.3 Recent Migration Patterns and Community Attachment

The survey provided insights into longitudinal trends of migration into Springville and residents' attachment to the community. Notably, of the 46 participants, more than 60% relocated to Springville from 2000 to 2023, a significant influx over these two recent decades. A smaller proportion, 26%, settled in between 1970 and 2000. Thirteen percent have lived in Springville since before 1970. The fact that people continue to migrate into the community indicate its dynamic nature but there is also a core of about 39% of participants who have lived there for at least two decades. Furthermore, some tenured residents have deep historical roots via their connection to Springville's founding members.

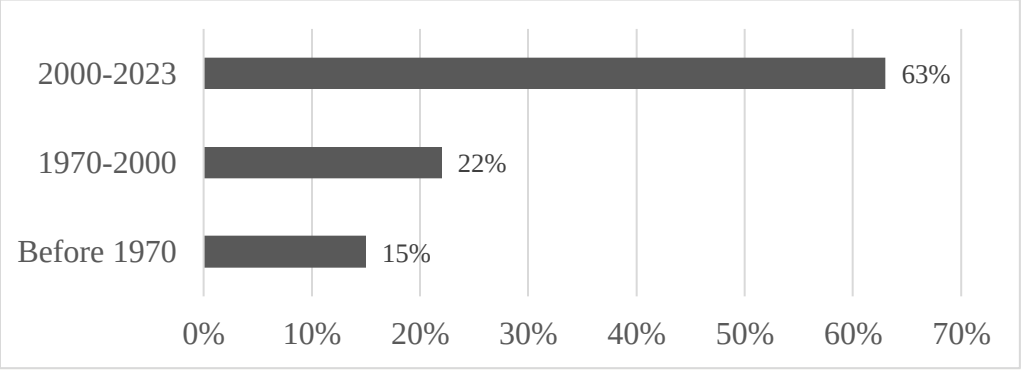

Figure 9. *Length of residence in Springville.*

3.4 Lots and Buildings

3.4.1 Ownership Status of Lots

More than half of residents, 55%, reported owning their lot, while renters represent 48% of the survey population, and 4% are squatters. We add a caveat about ownership data as represented in survey interviews: many residents understood the questions to be about ownership of their housing unit rather than the lot itself. Therefore, the ownership level may be lower. Furthermore, because of the lack of clean land titles due to its history and unincorporated status, ownership of many of the lots is uncertain. Residents of informal subdivisions and other unincorporated communities across the US do not have formal written documentation of land ownership (Ward,

de Souza, and Giusti 2004; Way 2010; Olmedo and Ward 2016). Thus, contracts for deeds are customary, and the lack of adequate financing obscures the valid owner of the lot.

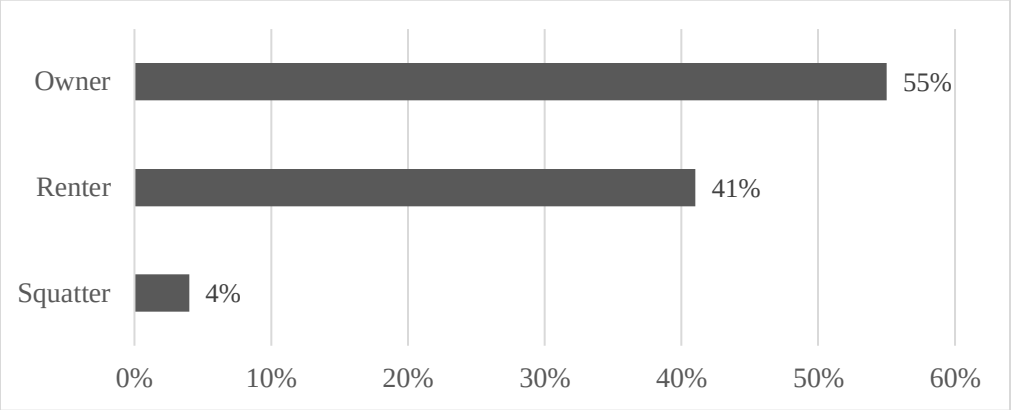

Figure 10. *Ownership status of Springville lots.*

Figure 11. *A Springville dwelling.*

3.4.2 Resident Use of Buildings

Forty-one percent of Springville's occupied lots are used for both residential space and informal businesses. These lots serve as places where people live and also engage in activities related to self-sufficiency or subsistence practices (scrapping, informal businesses, etc.). Additionally, 37% of the lots are used solely for residential purposes and 22% exclusively for informal businesses.

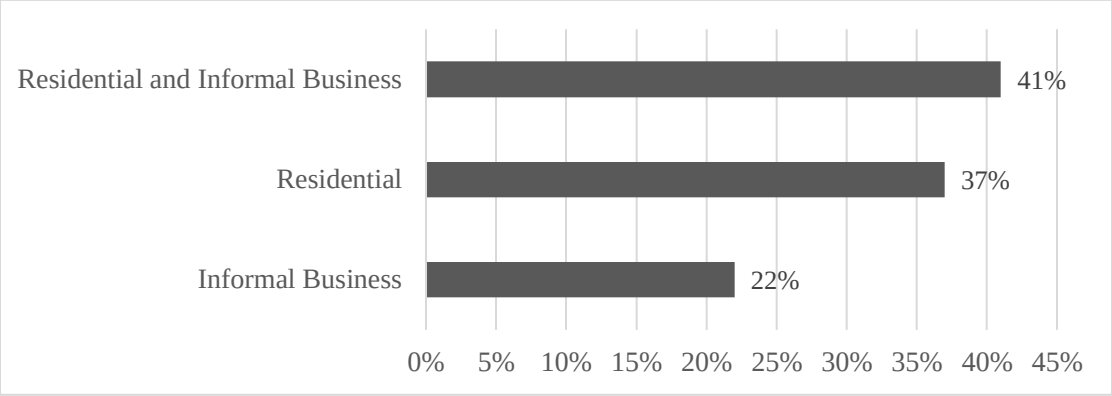

Figure12. *Resident use of buildings in Springville.*

Also s*ee* ***Figure 14****: Research team's bottom-up map of Springville land use.*

4. LAND USE MAPPING AND HOUSING

4.1 Land Use Mapping

As stated previously, our first round of spatial analysis consisted of visually mapping the Dallas County parcel shapefile, supplemented by residential and commercial property data in ArcGIS. Figure 13 shows the result.

4.1.1 Dallas County Map of Springville Land Use

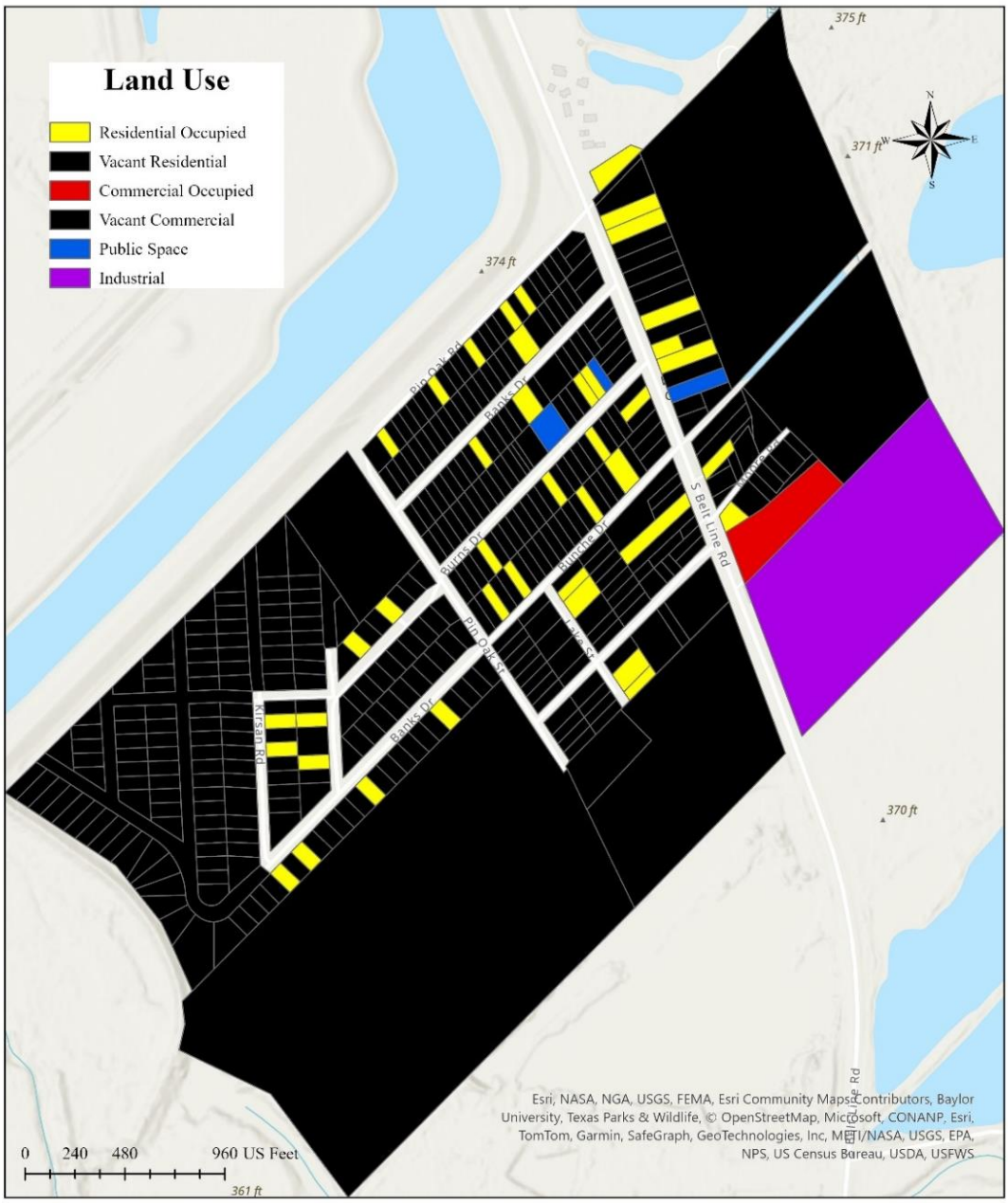

Figure 13. *Dallas County map of Springville land use. Source: Dallas County Appraisal District (2022) with county information elaborated by the authors.*

County data poorly documents the current state of occupancy and the diverse range of land uses in Springville. For instance, county data shows only one industrial and one commercial lot on the outskirts of the community. It shows three public spaces. Two of these are the churches in the community—First Baptist Church on Elm Drive and Fellowship Church on South Road—but one of these lots seems to be misclassified. County data also shows 41 residential plots and a high level of vacancy in the neighborhood.

The lack of accuracy or resolution of land uses and occupancy rates required us to conduct bottom-up mapping to achieve a more accurate record of Springville's residential, commercial, and public spaces.

4.1.2 Research Team's Bottom-Up Map of Springville Land Use

Our bottom-up mapping from observational data, survey data, and geocoded GPS coordinates documented the diverse range of land uses in Springville. We developed a land use classification that more accurately reveals the extent of vacancy and residential land use. Our observations helped disaggregate residential land use into occupied and abandoned categories. We also observed commercial, industrial, and public spaces, as well as land expropriated by the county. Figure 14 presents the map that resulted from this process.

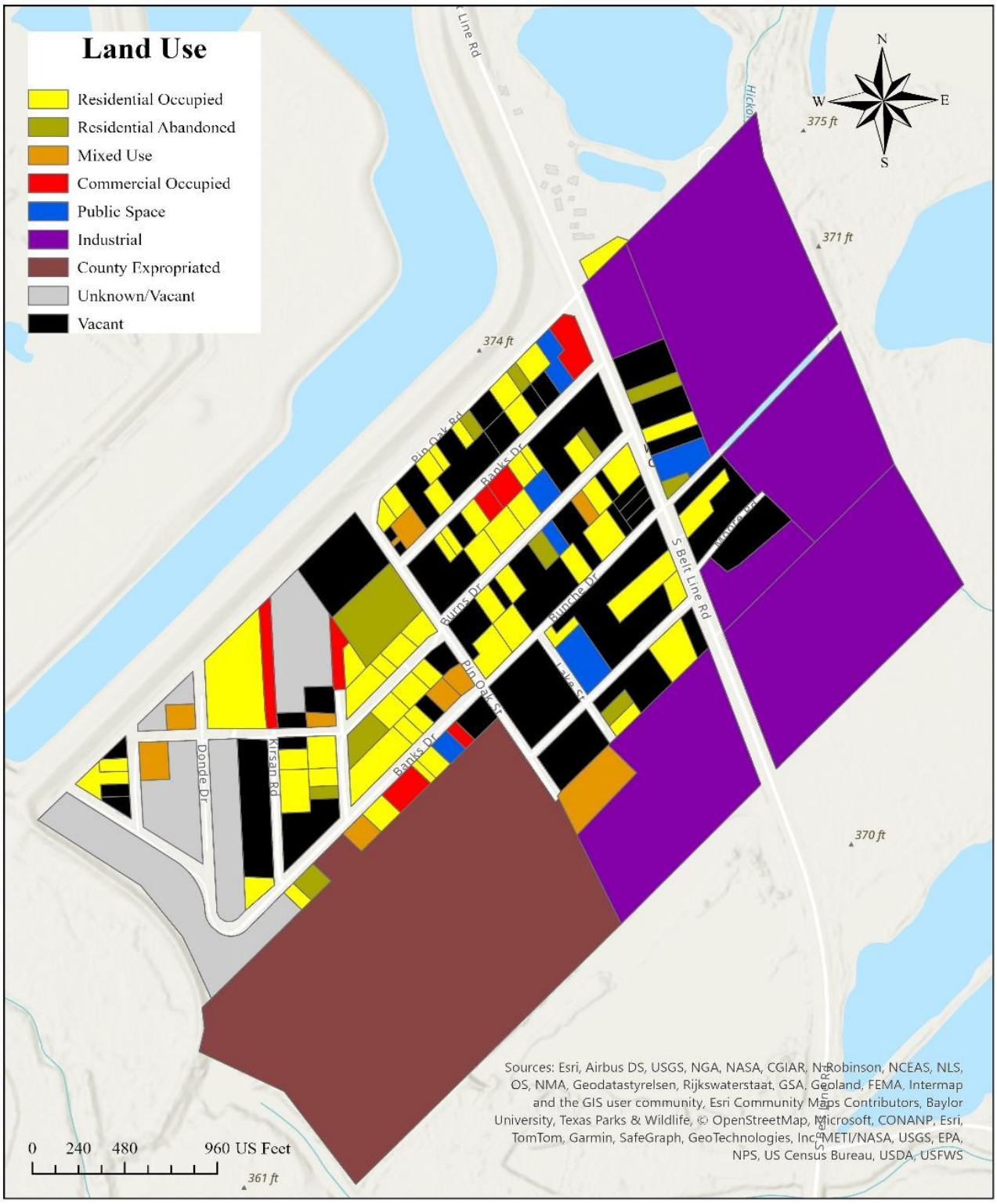

Figure 14. *Research team's bottom-up map of Springville land use.*

The bottom-up map generated from our research reveals many fewer vacancies than the county map and quite a number of abandoned structures. Likewise, it shows more public spaces,

including a neighborhood park on Pecan Street, an abandoned community center on Water Street, a social gathering place on Ralph Street, and an unused community garden across from the First Baptist Church. There are also substantially more commercial and industrial land uses than the county indicates. Our observations of land use revealed t a total of 182 single and multi-parcel lots: 22% are vacant, while 31% have occupied residential structures.

4.2 Housing: Types and Quality

Four housing types are prevalent among our survey participants: 49% report that they live in an RV, followed by 27% in a single-family home, 14% in a mobile home, and 10% living in a makeshift shed.

Figure *15.* Recreational vehicles are the predominant housing type in the Springville community.

Housing quality is a pressing environmental issue since the nature of enforcement of floodplain regulations prevents residents from building on their properties and residents with single-dwelling homes from making renovations. Residents reported fires in the community, their severity exacerbated by the lack of water infrastructure; yet they are prevented from rebuilding their homes. These conditions mean many residents resort to living in RVs. Because residents have few rebuilding options, they often live alongside the rubble of destroyed structures. One

resident's childhood home burned down; he continues living in the lot beside his burnt home because he cannot remove that structure because of floodplain restrictions and lack of funds. Another long-term resident whose ceiling collapsed had no choice but to cover the holes in her roof with a blue tarp to prevent leaking when it rains.

Figure 16. *Picture taken by resident illustrating roof deficiencies.*

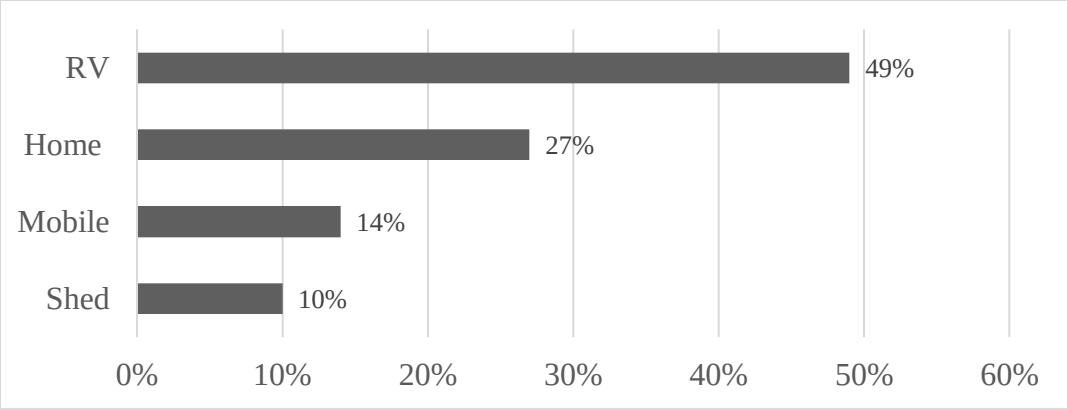

Figure 17. *Springville housing types*

Figure 18*. A Springville residential lot with RV, water tank, refrigerator, and solid waste.*

5. ENVIRONMENTAL INJUSTICE

5.1 Water Resources

5.1.1 Access to Water for General Use

Figure 19. *A well in Springville.*

The community survey showcases a range of water sources. For irrigation, cleaning, and other non-potable uses, 61% of residents rely primarily on well water; 30% use water tanks and 12% use hydropanel technology. This technology was introduced in early 2023 as a sustainable way of extracting moisture from the air to produce water. Hydropanels have yet to be widely adopted

because they are not affordable for most residents. The panels in a few lots were donated by the company that produces the technology. Some residents report Hydropanel technology as cumbersome, taking up too much space compared to the little water produced.

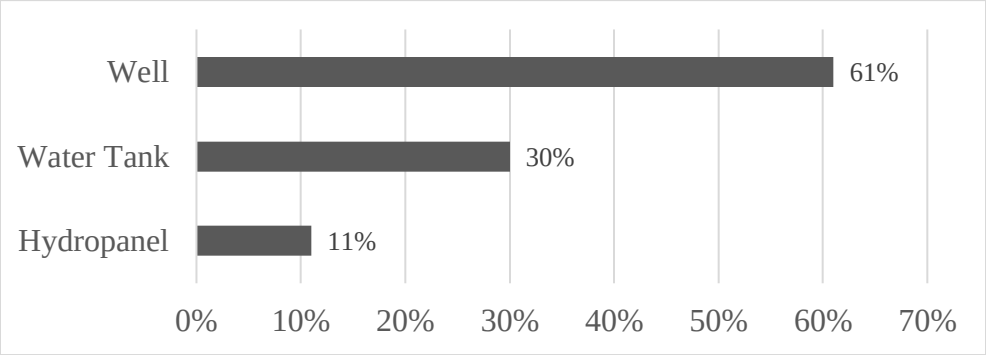

Figure 20. *Sources of water for general use in Springville*

Figure 21. *Residents purchase water tanks to store water for cleaning, washing, and other daily purposes.*

A significant number of lots lack access to well water for general use. Upon inquiry about a well, a Latinx family member, newly settled on a vacant lot, reported, "Not yet. They say there is one old [well] on the property but we don't know where it is. We are still looking….[T]he boy piled up all the earth for us. Well, now we have to put all the earth back again and see if there is one.[2]" Some residents store significant amounts of water for their animals and plants. Pedro, a Latino resident, notes that he uses water tanks as a matter of practicality: "I store water in these tanks, this is the most practical and efficient way to manage water in my lot." Describing his

[2] The authors have translated some resident comments from Spanish.

routine, he says, “Well, I go get water and it stays inside the tanks, about one thousand liters or so. The water provides for myself, the animals, the trees, and the plants. That’s how I do it. I need to do that about two times per day. And if I can’t, well, the plants dry up.”

Hard circumstances, however, sometimes preclude the most practical solution. Vicky, a white female resident who moved in recently, says the shortage of jugs limits the amount of water she can store, “I fill jugs up and bring it back in here. And that’s what they’re stored inside the house until we use it. I haven’t got that many jugs. So we have to go back and forth a lot. If I’m going to wash dishes and bathe and all that, then we have to go back and forth a lot. And it was costing us a lot in gas. Cost can determine water use. Mr. Oliver, a long-term African American resident, expresses this worry: “Me, myself, I have a freshwater tank under my house. And, now and then, I pump it in. But I will not run well water through my house because it’s a little too expensive to replace that stuff in there. I have to go straight to the dealer to get it. So I rely on bottled water, gallon water—that’s what I rely on.”

5.1.2 Access to Drinking Water

Springville residents experience the unavailability of safe, drinkable water from conventional sources. A significant majority, 85% of survey respondents, rely on donated bottled water. Another 41% buy drinking water. As a Latinx family member stated, “For our water bottles, we go to the Dollar Store,” noting that their weekly expenditure is about $21. Water tanks with stored rainwater or transported water plays a role in meeting the drinking water needs of 17% of the participants. Lastly, 7% of the residents consume drinking water from hydropanels. Rose, a white female who has lived in Springville for five years, described her hydropanel experience: “They’re great. That water comes out of there so cold and so pure. Yeah, we drink it. No, I don’t use it to bathe in.”

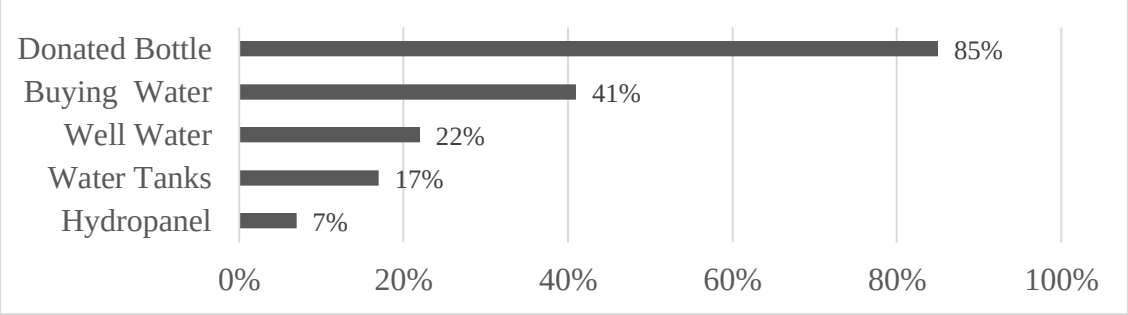

Figure 22. *Sources of Drinking Water in Springville.*

The community’s two churches host water and food drives that provide donated bottled water every week so community members have enough water to sustain themselves. People stand in lines stretching for at least a mile, waiting to get two 24-packs of bottled water. The weight of the water pack means most residents use their vehicles to transport the water home, one more cost of the lack of water infrastructure.

5.1.3 Water Heating Methods

Roughly 37% of the community relies on traditional home water heaters,. Stoves and hotplates are used by 24% and 22% of the community, respectively, and 15% use electric resistance heaters. These methods all highlight reliance on electricity which suggests a community need for updated water heating systems to save time and heat more efficiently. A small fraction, 4%, use wood to boil water, relying on a more traditional, perhaps less efficient, heat source.

Latinx residents within the community employ a variety of water heating methods. One family residing in an empty lot without electricity or running water uses their outdoor charcoal grill, explaining, "We heat it up on the stove, the wood stove. Currently that's our setup." Another resident, Gerardo, when asked about his water-heating process, initially responds, "Yes. That's a secret, I can't tell you how" and later discloses his use of electrical resistance to heat bath water. He goes on to describe how he showers without access to a shower head, which he refers to as “Mexican style.” Others use buckets of water that they heat in the wood stove. Some white residents use their grills similarly. Rose describes her approach. “I have big pots— metal pots, stew pots are what they call it. And we put it on the grill. You put one on the grill and then we put it on there and then get the grill going and that. And we warm up our water. We take it in the house— we’ve got two of them. We’ve got one real big; I can’t lift. And the other one, I can. So me and Randy sit there. We fill it up again. We put it in there. And we fill the bathtub up and we take a bath. It’s really neat.”

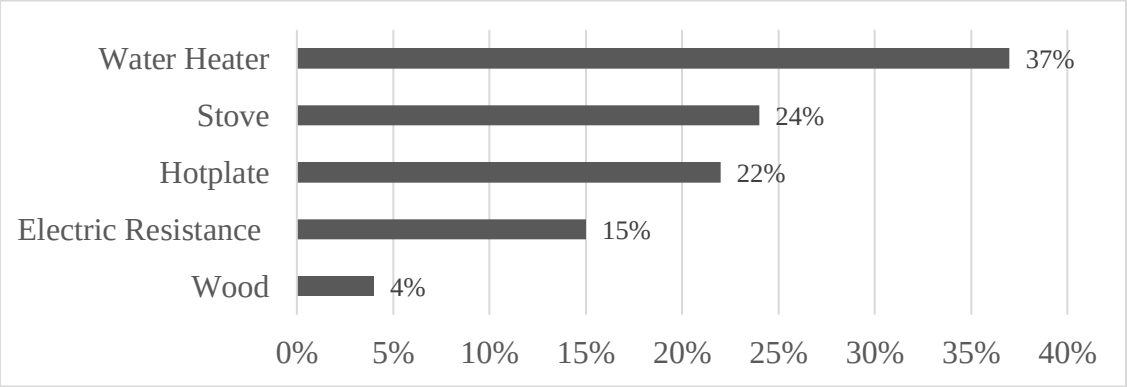

Figure 23. *Water heating methods in Springville.*

5.1.4 Water-Saving Practices

Survey data tells us that 63% of the community engage in water-saving, demonstrating a strong resident awareness of and proactive approach to water conservation and sustainable use. For example, 43% take short showers in a conscious effort to minimize daily water use. Nearly half of the community, 48%, take a resourceful approach to water conservation. Rather than discarding greywater, the use it for gardening or other non-potable purposes. Collecting rainwater is another method embraced by 26% of participants, showing a commitment to alternative water sources and reduced reliance on treated water supplies. Water sharing, which can indicate community cooperation in water conservation, is less common; only 11% of Springville residents engage in this practice.

Figure 24. *Hydropanels in Springville produce nearly two gallons of drinkable water.*

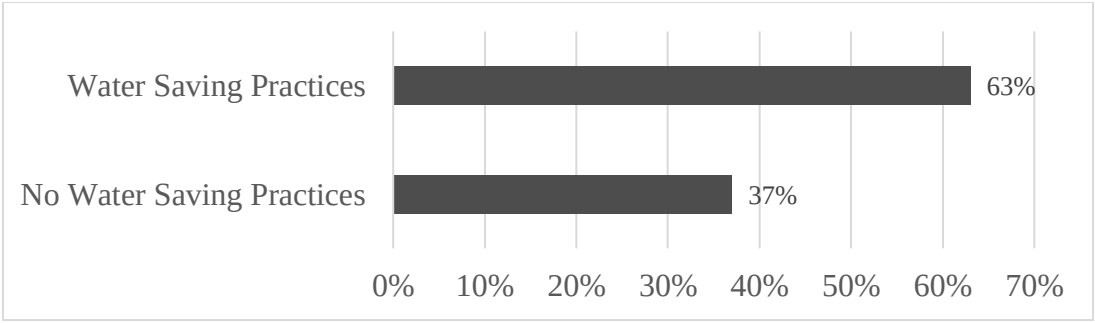

Figure 25*. Percent of residents who engage in water saving practices in Springville.*

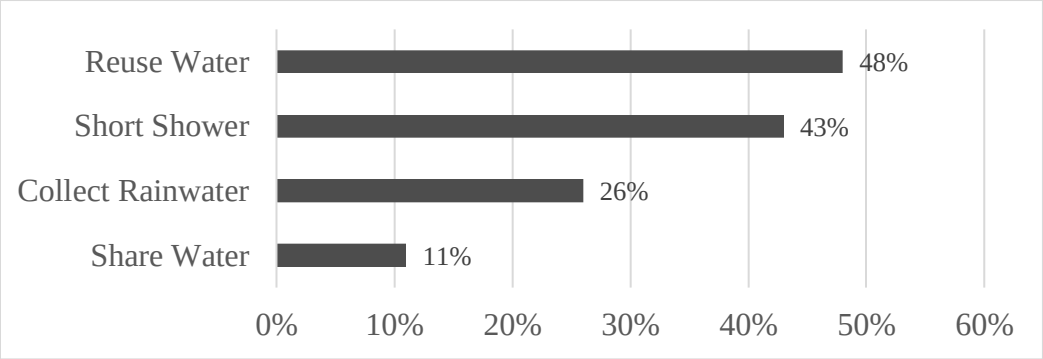

Figure 26*. Water saving practices in Springville.*

The lack of adequate water infrastructure ultimately forces residents to restrict their water use and make critical decisions about what they will use their supply water for. Since water saving is a necessity, many residents report that they often have to prioritize washing dishes, bathing, and using the bathroom.. “This is the last—lack of water that—that’s a big thing,” says Vicky, a white female resident, “That’s with your sanitary and health issues. You’ve got to be able to clean stuff and wash dishes. And my dishes are sitting in there because I opted to take a bath instead of washing the dishes. We shouldn’t have to have those types of choices.” Vicky thinks about simply using water as needed for dishes, bathing, and bathroom as luxury. “I would love to be able to go in and run a bathwater or go in and use the bathroom and just flush the commode with a little handle. I'd love to be able to do that. I’d be able to run water in the kitchen to wash dishes. That would be nice. But I'm not afforded those luxuries. And they are luxuries. People ought to be thankful for what they’ve got.”

5.2 Waste Disposal

5.2.1 Wastewater

Many residents, 58%, use septic tanks, a reliance that underscores the community's adaptation to being without centralized sewage treatment facilities. Research data also reveals a concerning sanitation issue: 28% of the community reports no drainage system on their lots. Some survey respondents report digging holes, essentially cesspits, in the rear of their lots to dispose of their grey water. The lack of drainage infrastructure poses significant environmental and health risks, as untreated or inadequately treated sewage can contaminate groundwater and surface water and potentially spread waterborne diseases.

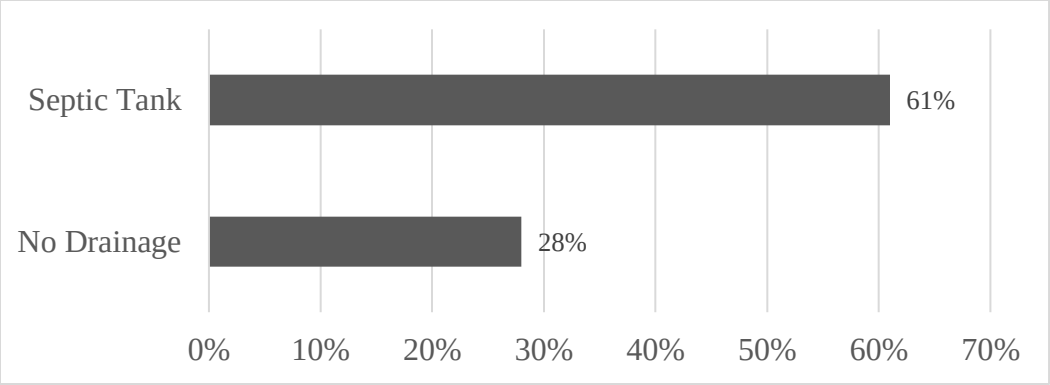

Figure 27. *Access to sewage/sanitation facilities in Springville.*

Residents describe the absence of a wastewater disposal system as one of the most distressing aspects of everyday living. Without a wastewater infrastructure, many resort to searching for bathroom access outside the neighborhood. As a Latinx family member responds to our survey question, “For bathrooms, we head to the gas station.” Yet others, like Hispanic resident Genaro, responding to an inquiry about a wastewater disposal system in his trailer, respond, "No, we handle it the Mexican way. Meaning, we dug a latrine, really deep, over ten meters." Another Latino resident, Jaime, aged 69, shares his method for heating water for showers and how he takes advantage of summer heat, saying, “Right now, in the summertime, we’ve got to do a side – we call it a tarp. And I got in there, and one of them bottles. No, I just pour it in a pitcher. You leave it out in the sun, and it’s hot. Like right now, it’s out in the sun, and by tonight, it’s still going to be hot.”

5.3.2 Solid Waste

Trash disposal data for the community underscores the need for improved waste management services. The most common method of trash disposal is burning. Sixty-seven percent of survey respondents engaging in this practice. While burning trash is less than ideal, Chuck, a longtime African American resident, explains that “If we do not burn the trash, we have accumulated waste, which leads to vermin and animals like bobcats and rats.” Some, like Alfred, a recently arrived white resident, burn their bathroom waste. He describes it in this way: “Well, your pee and everything go right into the garden. You know, it goes out. When you poop, you poop in a bag and burn it because, you know, you burn it, and it goes right into the ashes, except we have a porta-potty, too. The porta-potty— the guy comes out for $40 and he pumps it out. But if you’re at night and you don’t want to go out of your trailer at night, you just put a bag over your toilet, poop in it, tie it shut, and burn it with the trash.

Figure 28. *A trash burning scene in Springville.*

Some residents, like Pedro, burn trash to avoid being ticketed for illegal dumping. “And so not to be bothered, I better burn it here quickly. Although they [the fire department] also don't give me permission, whatever they come and bother me with. And that's why I accumulate too much garbage. If they don’t stop in my place to fine me, then could burn it. I have water, I have everything for any problem or fire, and I am aware—I am cautious.” Similarly, Francisco, a Latino who moved to the community ten years ago, describes fire department policing. “Because they come and keenly aware of what I'm burning, and I keep an eye on it. I have clean water where I burn. And I am caring. And the other time, a man told me that the firefighter is the boss here, that he came on Monday because they spoke to him.” But Francisco voices dissatisfaction about inconsistent policing of trash dumping into the Springville’s creek by individuals outside the community, “No, but the water in those streams has tires, which is bad. That's bad.”

Figure 29. *Picture taken by a resident burning trash.*

Most of the residents in Springville use trash burning practices to dispose of their waste, practiced by 67% of respondents. A common method of burning practiced throughout the community utilizes a metal bin to burn general trash. Respondents state they burn paper, wood, Styrofoam, and some, even plastics. Purchased dumpsters are the second most common solid waste disposal method, practiced by 33% of the community. This costly method is most typical of respondents who own single-family dwellings. Only 15% of the community has access to regular waste pickup, indicating a need for comprehensive waste management services. Lastly, 9% of the community disposes of waste by unspecified methods, which can include various

informal, less common practices. The failure of the city of provide trash pickup to the community as a whole means trash accumulates in some residents' lots.

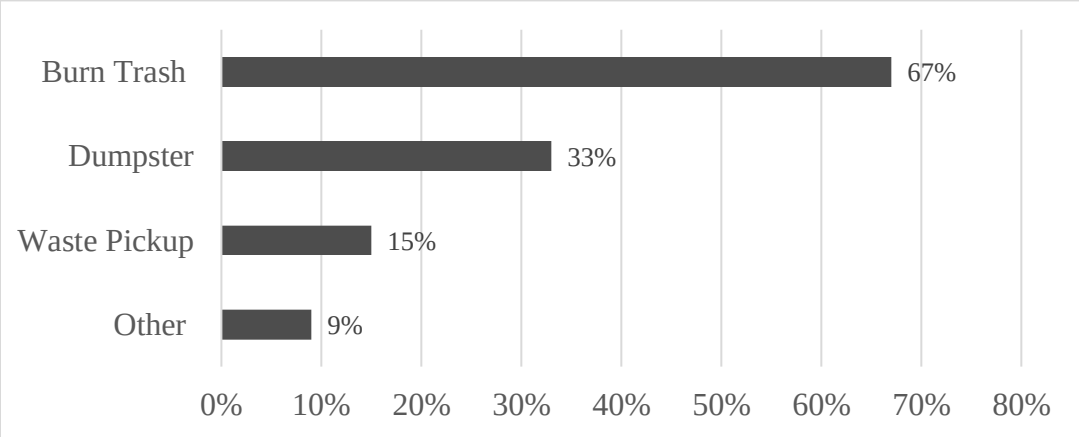

Figure 30. *Solid waste disposal practices in Springville.*

Figure 31. *Waste accumulates in resident lots.*

Figure 32. *Trash in a resident's lot.*

Compounding the problem is that a major source of solid waste comes from outside Springville. "Look," Francisco explains, "a lot of people come to throw garbage. I have caught a lot of people. Trash. They throw garbage. I haven't seen them disposing tires. At night they do it." Commenting on this illegal dumping, Gerardo says, "They throw away the tires, yes, indeed. What happens is that there is no security here. But yes, but those from here are not [dumping]. They are people from outside." Several residents expressed similar frustration. "But over at a resident's house, I do know that someone's been taking tires over there and dumping them illegally, without his permission. He's trying to catch the person, so he's got cameras there."

Figure 33. *Vacant lots and creeks in Springville are targets for illegal dumping of tires by non-residents.*

5.3 Energy

5.3.1 Electricity

A significant majority of the community, 89%, have access to electricity. While availability of power is relatively widespread, 11% of the community may still be without reliable access, which can impact their quality of life and ability to use essential appliances.

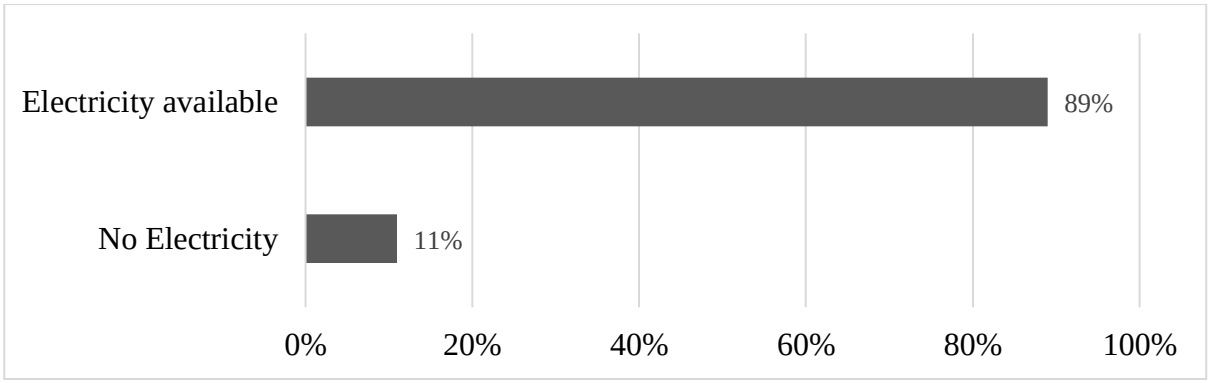

Figure 34. *Access to electricity in Springville.*

Figure 35. *Residents who lack electricity use generators to power appliances*

A Latinx family member explained how they cope with absence of electricity in their lot. “With the generator right now we are using it for everything that is electrical. We use it for everything, more than anything at night, and the light is here. Also, the [RVs] heater.” Keeping the generator running is costly, “about $180 a week” they noted. Gerardo, also lacking electricity, chooses not to heat his food. “Well, the simple truth is that we already eat food like this [refrigerated]. Only in wintertime I heat it up.”

Figure 36*. Picture taken by a resident illustrating their lack of easy access to electricity and lighting.*

5.3.2 Air Cooling Methods

Most survey respondents, 63%, have access to some form of air conditioning. Fans are the most widely used cooling method, with 74% of these respondents reporting their use, and many relying on multiple fans within one household to tolerate the Texas heat. Window air conditioners are also popular for 70% of respondents and are the primary cooling solution for many of them. Portable air conditioners are present in 17% of households; they are a flexible cooling option since they can be easily moved as needed to target specific areas. Nine percent use industrial units, which offer a better solution for cooling larger spaces and circulating air more effectively. Only 4% of households have HVAC systems, indicating a low penetration of

centralized air conditioning systems, which are typically more efficient but also more costly to install and maintain.

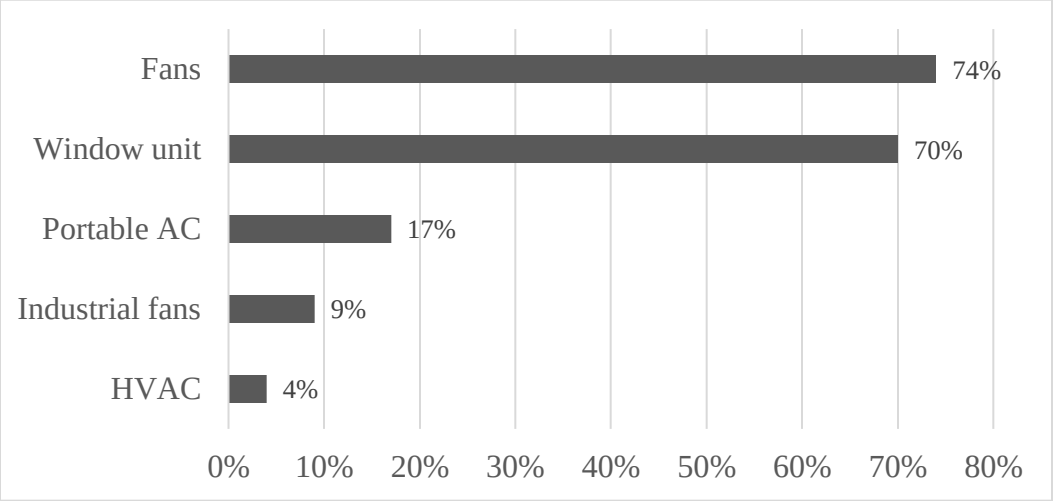

Figure 37*. Air cooling methods used in Springville.*

Figure 38. *Picture taken by a resident illustrating deficiencies in the roof, and the use of window units in structures that lack insulation.*

Figure 39. *A Springville resident's photograph showing a window air conditioner.*

Figure 40. *A residence with multiple portable air conditioning units.*

5.3.3 Thermal Comfort in Summer

A substantial 43% of respondents reported feeling hot in summer, while 26% described feeling warm. This indicates that nearly 70% of the community experiences some heat-related discomfort. Conversely, a smaller segment, 24%, found the temperatures comfortable, suggesting some variance in individual perceptions, habits, or access to cooling resources. For example, Pedro, who has lived in the community for more than ten years and grows most of his food says, “The heat that happened was tremendous because it burned everything, my peaches, everything that I planted with vegetables, everything, everything burned. And even more so, I also began to feel bad due to the heat.” Although feeling cold **is** unexpected during summer, a small percentage of the population reported feeling cold (4%) or very cold (2%). This may reflect unique personal circumstances or microclimates within the area.

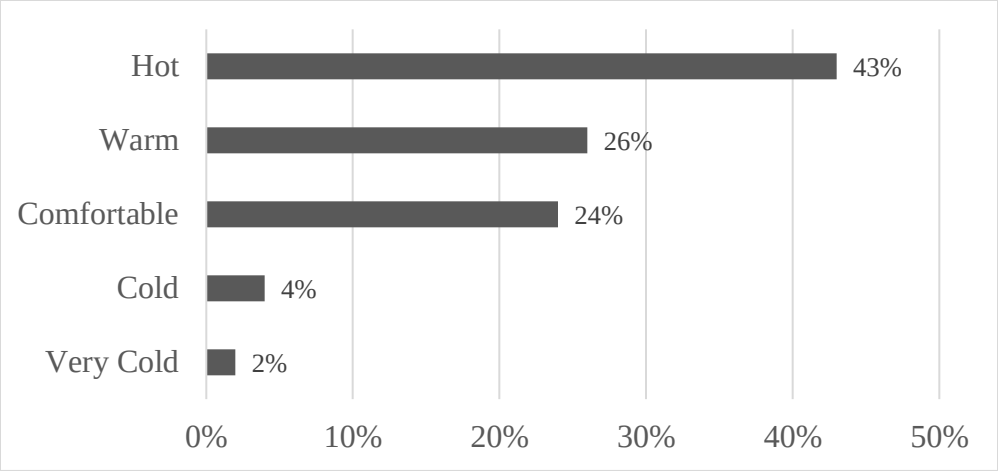

Figure 41*. Residents' reported thermal comfort in summer.*

5.3.4 Heating Methods

A significant majority of community members, 59%, have access to some form of heating. Most of them, 57%, use portable heaters as their primary technology, likely due to the flexibility and ease of use they offer. However, only 11% of the community has an installed heating system. This implies that more permanent, integrated home heating solutions are uncommon, likely because of infrastructural challenges or cost barriers. Notably, no residents reported having an energy efficient heater, indicating a complete absence of energy-efficient heating solutions, which means many residents must incur higher energy costs and a larger environmental footprint. Lastly, 17% of the community reported having access to non-standard forms of heating, which often include using their stove to heat the home.

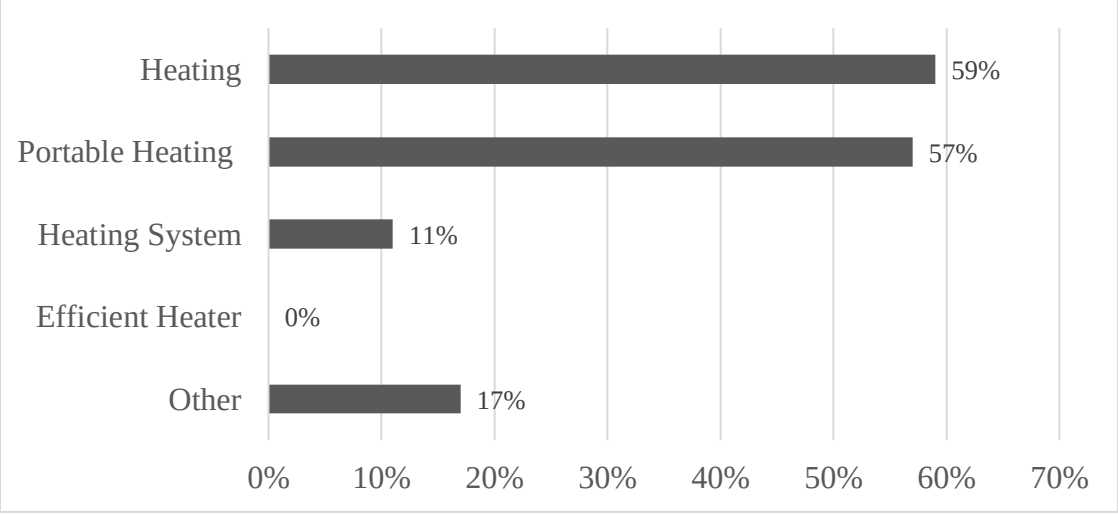

Figure 42. *Heating methods used in Springville.*

5.3.5 Thermal Comfort in Winter

Our data shows that only a small percentage of respondents feel hot (2%) or warm (9%) during the winter months. The majority of the community find winter conditions cold: 35% feel cold

and 33% report feeling very cold. Nearly 70% of the community, then, struggles when temperatures are low, suggesting issues such as inadequate heating and insulation. Meanwhile, 22% of respondents feel comfortable, indicating adequate heating or personal adaptation to colder temperatures.

A Latinx family member was asked how cold the RV feels during the winter. “ [The RV] is very cold, everything freezes. Right now in the cold, when the generator turns off is when everything gets really cold. Gasoline runs out and you can imagine how cold it gets.” During a 2021 winter storm, long-term African American resident Betty experienced roof damage caused by a falling branch. She expressed her worry to us about the approaching winter, citing this concern, “It is rotten and will likely fall down. I am most concerned about the winter and how I will survive cold temperatures."

Figure 43. *Structural deficiencies in the roofs of aging housing.*

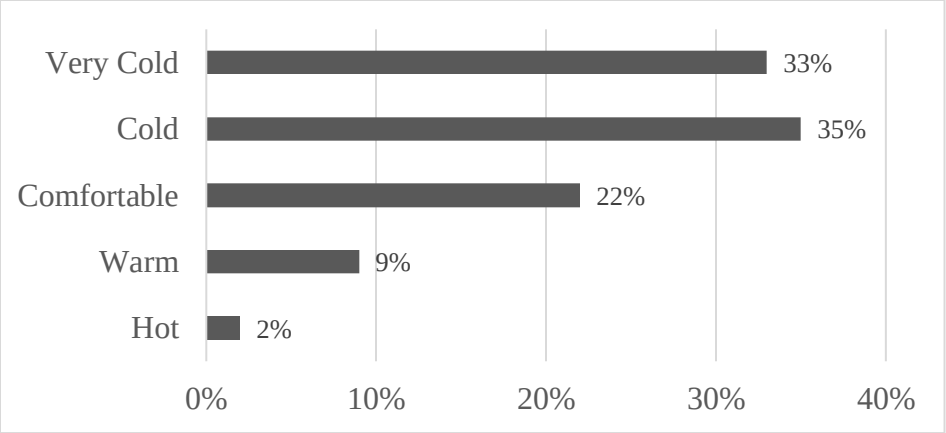

Figure 44*. Residents' reported indoor thermal comfort in winter,*

5.4 Appliances and Technologies

Refrigerators are the most commonly owned appliance among survey respondents: 85% of households report ownership. Following closely, 74% of households own a microwave and 72% have a flat-screen TV, indicating significant presence of convenience and entertainment technologies. Relatively high ownership levels for hot plates (61%) and ovens (48%) may indicate the community's lack of traditional stoves and reliance on RV appliances. The complete absence of dishwashers (0%) reflects the lack of water access that supports using such appliances. Solar appliances in only 4% of households may imply limited adoption of renewable energy technologies due to financial constraints. At 15%, internet access is notably low. This represents a significant digital deficit that likely impacts resident access to information, services, and opportunities.

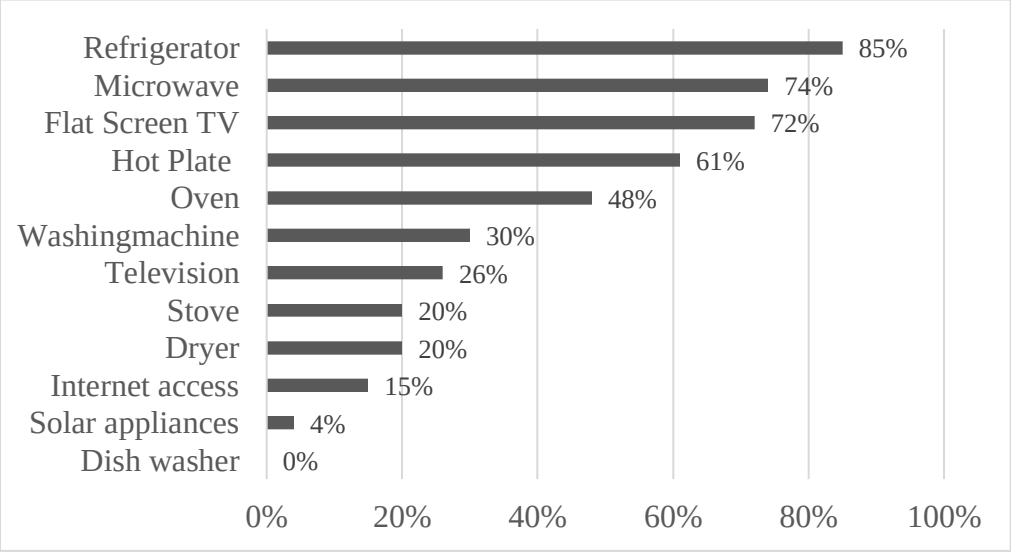

Figure 45. *Range of appliances and technologies Springville residents use.*

Figure 46. *Hot plate as an alternative cooking appliance.*

Figure 47. *A resident's photograph of a flat screen TV, a popular technology in Springville.*

6. COPING TO CLIMATE INJUSTICE.

Surveys explored participants' exposure to extreme climate events like flooding, wildfires, or tornados. Only 21% reported experiencing a flooding event in their tenure as residents. 22% experienced a wildfire, and 9% a tornado. It is essential to mention that most survey participants needed clarification on the meaning of the term extreme climate event or climate change event. This required researchers to explain the meaning of extreme climate events further and provide some examples, such as the winter storm in 2021 or the wildfire in the summer of 2022. This may reveal the deficiencies of survey questions in exploring extreme climate event exposure or the lack of familiarity with these concepts to Springville residents. Surveys provided a general panorama of residents who experienced extreme climate events. On the other hand, in-depth interviews and oral histories were more effective research instruments for exploring past experiences of extreme climate vulnerability that residents of this unincorporated community faced.

Springville residents endure severe environmental justices that require them to cope daily with a lack of running water, sewers, and trash disposal. They have developed coping solutions to address these limitations that may have prepared some residents to cope with an extreme event. For instance, the 2021 winter storm for Pedro made no difference from other cold winter days. Pedro is a resourceful resident who can endure severe winters with rudimentary appliances in precarious living conditions. For instance, he knows how to start a fire with the wood he usually collects and protect himself from the extremely low temperatures of the crude winter of January. This is not to say that all residents were not affected by the winter storm; their coping skills depend on their capacities and resilience levels to endure these challenges.

Flooding

Although Dallas County's floodplain designation is among the reasons Springville currently denies municipal water, all survey participants, especially long-term residents, concurred that they had not experienced the impact of severe flooding. On August 22, 2022, torrential rain affected many communities of the Dallas-Fort Worth metroplex. "No. That's what they say —," Rose explains, "there's supposed to be flooding out here. I've lived here four years. There is no flooding." Mr. Charlie, a Black resident of old age who has lived in Springville since his teenage years, said, "I ain't never seen no flood. It's down at the Trinity River. And that got up high. But it never [flooded]. Like, I said, they trying to take Springville." One resident helped us document flooding in some low-elevation areas of Springville where there were high accumulations of waste. In contrast to surrounding communities, however, Springville land dried out quickly the day after the flood, which may be an effect of large green areas throughout the community that allow rainwater infiltration. In light of this, there seems to be little empirical justification for the floodplain designation, particularly since it adversely affects residents' ability to improve their homes.

Figure 48. *Picture taken by a resident illustrating the flooding after the torrential rain of August 22, 2022.*

Wildfires

In community meetings, Springville residents specifically described illegal dumping as a longstanding problem associated with environmental racism. People who do not live in Springville regularly and illegally dump tires, dirt, and waste, some of it toxic, increasing communal exposure to risks of pollution and fires, pointing to disproportionate vulnerability to extreme climate events. This parallels the experience of other unincorporated communities of color and freedmen's towns in the southern US (Purifoy 2021).

During our time in the field, there were at least two summer heatwaves and one wildfire. Residents agreed that both are threatening and devastating to the community. Toxic waste from illegal dumping exacerbates fires, especially during heat waves, and the inability to access municipal water makes fires especially difficult to extinguish. Despite some racial tensions, however, the 2022 wildfire brought most Springville residents together; those with wells shared their water to help protect homes and lives. This response bred greater community solidarity among residents of all races. While our research does not allow us to provide a conclusive answer, this suggests a potential experiential point of entry for building a stronger grassroots environmental justice movement.

One wildfire resulted in a community member's home burning. Randy recalls, "Most of us knew Sean's and grandma's property. We were hitting the back with water hoses as much as we could, but there was barely any pressure." Randy also brought in three fire extinguishers, using all of them to keep the chickens alive. "My uncle had the chickens up by the back fence."

Other fires have been caused by trash burning. “Some guy didn’t know it was on his lot, and the ground caught fire,” Randy says that black smoke rose from a pile of tires, and although the fire department eventually put it out, it had already spread across the field and past nearby houses. “We were out there with barrels and water pumps, and they were on the roof, watering everything down with a hose,” Randy explained.

Figure 49. A picture taken by a resident illustrating a wildfire in the summer of 2022.

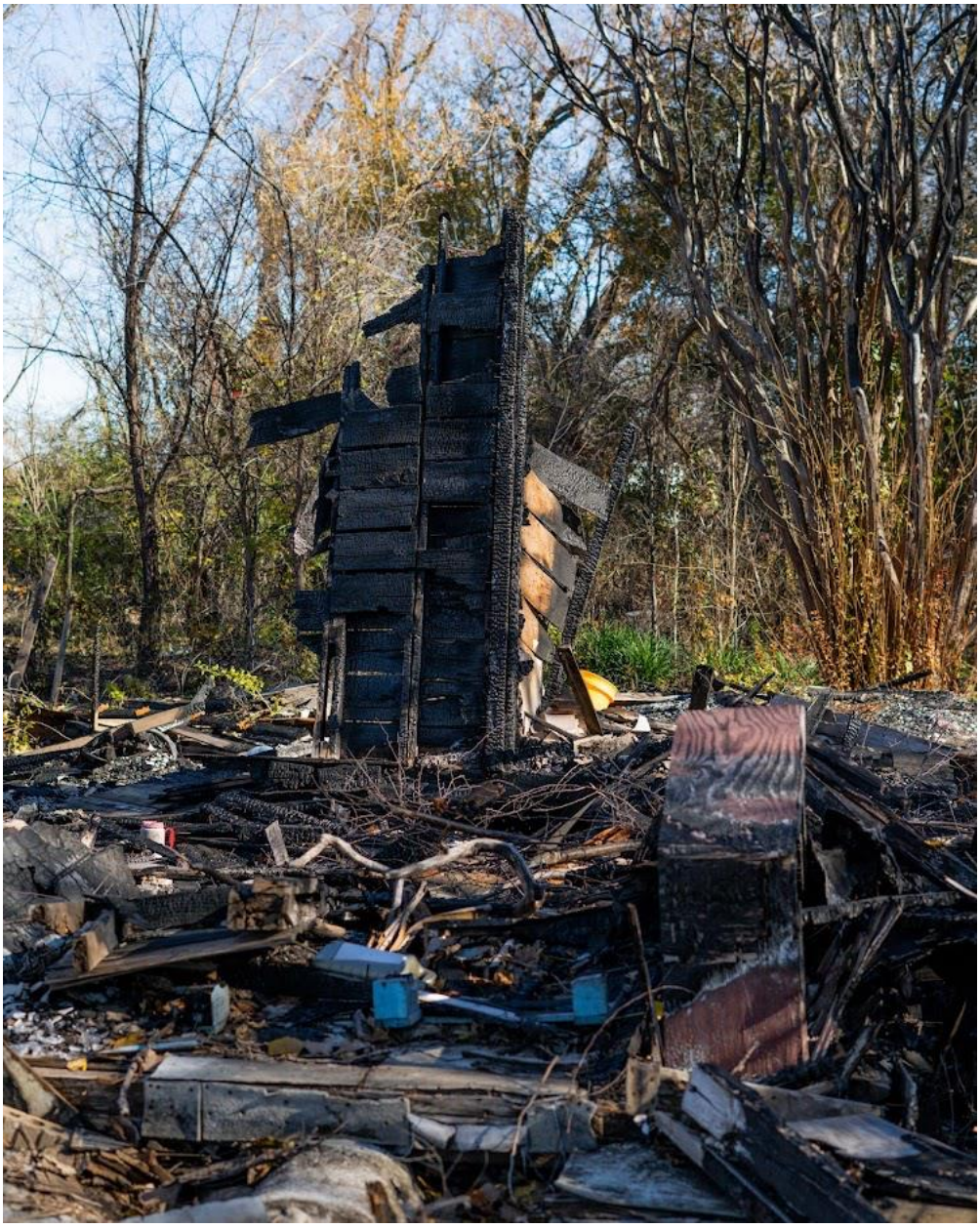

Figure 50. *Debris after the fire of an aging residential structure*

Heatwaves

The heatwaves in the summer make it particularly difficult for residents to grow their fruits and vegetables. “The heat that happened was tremendous because it burned everything,” Mr. Puente explains, “Peaches, everything that I planted with vegetables, everything, everything burned. This [summer's] heat, I did feel a little more, stronger than other years, and, but well, thank God, well, we are having a good time.” However, damage to his produce is not the only thing the heat affects, “Well, I hurt a lot from the heat because it hurts me because of my age. And in the other place when I was unloading [things] I got sunburnt, and I didn’t have enough herbs to cure myself.”

Winter Storm

Winter storms also cause severe danger and damage to residents. Francisco explains his harsh experience, “It was really ugly the last time, the storm knocked this tree down, look.” Another Latino family who lives in an RV experiences extreme cold; when asked how their RV felt during the winter and those storms, they replied, “Very cold, everything freezes,” as a generator powers their heating unit. “Right now, in the cold, when the generator turns off, everything gets really freezes. Gasoline runs out, and you see,” a middle-aged Latina woman explains. Due to the lack of infrastructure in Texas’s power grid, residents also experience power outages that can last several days a week. During one of those power outages, Mr. Ollie was forced to leave his home , “Yeah, I left. Because this is like—it was out. They kept telling us it was going to come back on. I said, “Well, we got to go.” When asked where he found shelter, he responded, “We went up to my job.”

7. REFERENCES

Durst, Noah J., Meng Cai, Jada Tillison-Love, Huiqing Huang, and Wisdom Henry. 2023. "The Gerrymandering of Cities and the Politics of Racial Exclusion: Evidence from a Spatial Typology of Municipal Boundary Changes." *Journal of Urban Affairs* 45 (9): 1586–1607. https://doi.org/10.1080/07352166.2021.1974303.

Olmedo, Carlos, and Peter M. Ward. 2016. "Model Subdivisions: The New Face of Developer Lot Sales for Low-Income Colonia-Type Housing in Texas." *Land Use Policy* 52 (March): 181–94. https://doi.org/10.1016/j.landusepol.2015.12.003.

Purifoy, Danielle M. 2021. "North Carolina [Un]Incorporated: Place, Race, and Local Environmental Inequity." *American Behavioral Scientist* 65 (8): 1072–1103. https://doi.org/10.1177/0002764219859645.

Seamster, Louise, and Danielle Purifoy. 2020. "What Is Environmental Racism for? Place-Based Harm and Relational Development." *Environmental Sociology* 7 (2): 1–12. https://doi.org/10.1080/23251042.2020.1790331.

Ward, Peter M., Flavio de Souza, and Cecilia Giusti. 2004. "'Colonia' Land and Housing Market Performance and the Impact of Lot Title Regularisation in Texas." *Urban Studies* 41 (13): 2621–46. https://doi.org/10.1080/0042098042000294592.

Way, Heather. 2010. "Informal Homeownership in the United States and the Law." *St. Louis University Public Law Review* 29 (1): 113–92.

8. APPENDIX FOR SURVEY

Housing, environmental injustice and participation survey

Household/Survey Number _____ Lot Number ID _____
Structure Type (House = 1; Mobile Home = 2; RV = 3; Shed = 4; Tent = 5)
Race/Ethnicity _____ (Black = 1; Latino = 2; White = 3; Other = 4)
Gender _____ (Male = M; Female = F)
Age _____ (Young = 1; Middle-Aged = 2; Old = 3)

COMMUINITY ATTACHMENT/HISTORY

1. When did you move to the community? Enter the year when the family moved.

2. What motivated you to move to this community?

3. Where did you live before moving to the community? Write a place.

BUILDINGS ON THE LOT

4. How many residences (residential buildings, like housing units, mobile homes or trailers, RVs, and other additions) are in the lot? **RESEARCHER'S OBSERVATIONS**

Building ID	Type of structure	Quality (very low, low, medium, high, very high).	Improvements or consolidation.	Use (residential, business, etc.)

RESIDENTS ON THE LOT

5. Describe the residents of the housing units in the lot.

Housing Unit ID	Female Adults	Male Adults	Children

6. Are you a homeowner, renter, or other?

Housing Unit ID	Homeowner	Renter	Other

OCCUPATION AND EDUCATION OF THE WORKERS OF THE FAMILY

7. What is the occupation/job of the workers of the family?

Worker	Occupation

8. What is the highest level of education of the workers of the family?

Worker	Elementary	High school	Technical career	College	Graduate

ENVIRONMENTAL JUSTICE

COMMUNITY LEVEL

9. What types of environmental issues occur in your community?

a. Air (Smoke or burning smell)	b. Water pollution (bad smell or color in the water)	c. Illegal dumping	d. Other

a. **If yes to air:** Have you ever had problems breathing while outside? Have you ever had problems breathing inside your home? What is causing these issues?

b. **If yes to water:** Is well water polluted? What do you think is causing the pollution? Are there other water issues in the community (lakes, streams, etc.)?

c. **If yes to dumping:** What types of items have you seen dumped in the neighborhood? How does this affect you?

d. **If yes to other:** What other environmental issue have you seen? How does it affect you?

10. Can you please describe the places in the community where these environmental injustices concentrate?

11. What environmental issues are impacting you? If so, please describe which ones and how they affect you?

12. Have you or any of the members of the family experienced health issues associated with environmental issues? If so, please describe.

HOUSEHOLD LEVEL

Solid Waste Generation

Now let's talk about the generation of garbage in the home.

13. How do you dispose household waste?

a. Pay for Private Pickup	b. Neighbor's or Church's Dumpster	c. Burn Trash in a Pit/Barrel	d. Other

a. **If yes to private pick up:** How much do you pay per month?

b. **If yes to taking it somewhere:** Where do you take your trash?

c. **If yes to burning:** Does the smoke affect your breathing?

d. **If other:** Please describe the strategies/solutions to dispose waste.

14. How many garbage bags do you throw out (or burn) in a week?
    a. Plastic grocery bags _____
    b. Regular kitchen trash bags _____
    c. Large black yard trash bags _____

15. Do you usually separate recyclable items from garbage? Yes ( )No ( )
    a. What types of recyclables?

16. Do you take the waste you separate to a nearby recycling center or landfill? Yes ( )No ( )
    a. How much money do you make from recycling in a month?

17. Do you compost your organic waste, vegetables, and fruits?

18. Do you sell scrap material? Yes ( )No ( )
    a. How much do you make from scrapping in a month?

Water Use

19. Which of the following sources of water do you use?
    a. Well
    b. Water tanks
    c. Bottled water (jugs, bottles, etc.)
    d. Source hydropanel
    e. Rainwater harvesting
    f. Other _____

20. **If yes to tanks/bottled:** How much did you pay last month for water?

21. Where do you get your water?
    a. From your lot
    b. From neighbors
    c. From donations
    d. Buy from store.
    e. Other _____

22. What sources of water do you use for drinking?
    a. Well
    b. Water tanks
    c. Bottled water (jugs, bottles, etc.)
    d. Source hydropanel
    e. Rainwater harvesting
    f. Other _____

23. What sources of water do you use for non-drinking purposes (bathing, cooking, plants, animals, etc.)?
    a. Well
    b. Water tanks
    c. Bottled water (jugs, bottles, etc.)
    d. Source hydropanel
    e. Rainwater harvesting
    f. Other _____

24. Do you have plumbing (shower or bath and toilet)? ( )Yes ( )No

25. How do you heat water for cooking or bathing?
    a. Water heater
    b. Electric resistance water heater (resistencia electrica)
    c. Boiling
    d. Other _____

26. **If yes to boiling:** What do you use to boil water?
    a. Wood
    b. Stove (propane)
    c. Stove (electric)
    d. Hot plate
    e. Other _____

27. Do you ever save water? Yes ( )No ( )

28. What water saving habits do you have?
    a. Take short showers.
    b. Reuse water
    c. Collect rainwater.
    d. Share water
    e. Other:_____

29. How is sewage disposed of in the house?

Septic tank	No Drainage	Other

30. How frequently do you perform maintenance on the septic tank?
31. How much does that maintenance cost?

32. Please carefully describe how the family disposes greywater?

<u>Energy Injustice</u>

33. Do you have electricity? Yes ( ) No ( )

34. Do you have an electricity provider? **If no, skip to 42.**
Yes ( ) No ( )

35. How much do you usually pay for electricity in the summer in a month?

36. How much do you usually pay for electricity in the winter in a month?

37. Do you have an air conditioning system in your housing units?
Yes ( ) No ( )

38. Can you please describe the type of air conditioning system, appliance, or technology that you have in your housing unit?

System	#
Fans	
Industrial Fans	
Portable AC unit	
Window unit	
HVAC	
Energy-efficient (energy star) HVAC	

39. Do you have any heating system in your housing unit? **If no, skip to 42.**
Yes ( ) No ( )

40. What type of heating system?

System	#
Portable heater	
Heating system	
Energy-efficient heater (energy star)	
Other	

41. How many of the following appliances do you have in the home? Are any of these appliances eco-friendly to help save electricity or gas? For example, let us know if it has an Energy Star label.

Appliance	# of appliances	Energy-efficient?
Washing machine		
Dryer		
Dishwasher		
Stove		
Hot Plate		
Oven		
Microwave		
Television (old and square)		
Flat Screen TV		
Internet access		
Other		

42. Please indicate if you have an appliance that uses solar energy in the housing unit.

43. Do you have a refrigerator? Yes ( ) No ( )

a. If yes, what is its size? _____

b. Approximately how old (old) is the refrigerator? _____

44. Do you use energy-saving practices? Yes ( ) No ( )

45. If yes, please describe:

Thermal Comfort in the House

46. Would you say that the internal temperature inside the house in winter, for example in January, is?

( ) Very cold ( ) Cold ( ) Comfortable ( ) Warm ( ) Hot

47. Would you say that the internal temperature inside the house in the summer, for example in July or August, is?

( ) Very cold ( ) Cold ( ) Comfortable ( ) Warm ( ) Hot

48. How would you rate the natural (sun) lighting inside the house?

( ) Very good ( ) Good ( )Acceptable ( )Bad ( )Very bad

Gas Consumption

49. Do you use gas for cooking and water heating? **If no, skip to 57.**

Yes ( ) No ( )

50. What type of gas does the household use for cooking and water heating?

- Natural gas (pipeline)
- Stationary propane tank(s)
- Portable propane tank(s)
- Other:

51. How much do you usually pay for gas in a week?

House Issues

52. Have you noticed mold anywhere in your home?

53. Do you have any leaks causing mold?

54. Are there any other issues in your house that make you concerned about your health?

CLIMATE INJUSTICE

55. Have you ever experienced an extreme climate event in the community? If so, what type of event?

Tornado	Flood	Drought	Wildfires	Other

56. How frequently do each of these occur?

57. Do you remember when these events occurred (specific months and years)?

58. What do you think was the worst event?

59. Are the events getting worse?

60. How did these events affect your family and your home? (if they are unsure give some examples)

61. How did you deal with the events when they were occurring?

62. How did you and your family recover from the events? (ask about the time and costs if needed)