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Tunnel vision?: Assessing residents' perspectives of urban flooding and Chicago's 'Deep Tunnel' project

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Abstract

Urban flooding caused by an antiquated mixed sewage-stormwater drainage system affects about 172,000 buildings in Chicago and suburban Cook County, Illinois, incurring billion-dollar costs in property damage, environmental contamination, and personal distress each decade. Though the disproportionate burden of urban flooding in communities of color is well-documented, it is unclear whether large urban flood mitigation projects—such as Chicago's under-construction Tunnel and Reservoir Plan (TARP)—effectively and equitably rectify the situation. Using a mixed-methods approach, this study developed a population-weighted urban flood susceptibility model and utilized that model to recruit residents from high- and low-susceptibility zones and near-reservoir areas. Eighteen semi-structured resident interviews were then thematically analyzed to compare flooding trends and TARP's perceived impacts. Interviewees' experiences illustrate how the uneven burden of urban flooding persists even after TARP's implementation. Better understanding residents' perceptions of their own flood risk under the TARP project helps advance more inclusive and effective stormwater governance, both in Chicago and in other cities building 'deep tunnel' systems.

Author's Note

The interviewer and primary researcher for this project is a long-time Chicago resident, a recent Columbia alum studying sustainable urban development, and a first-time qualitative researcher. Growing up, his parents frequently dealt with sewage backlogs in their basement and driveway. He also leans heavily on the expertise and guidance of his research mentor, advisor, peers, and other professors. They guided him through the complexities of qualitative research, offering valuable insights on ethics, methodology, and interpreting diverse viewpoints. Together, this team's set of (in)experiences played an impactful role in the development of research questions, recruitment of interviewees, and interpretation of their responses.

Keywords: Urban flooding, Urbanization, Floods, Adaptation, Stormwater management

Introduction

Within the past ten years, inland flooding caused $72.6 billion in property damage and 234 deaths in the United States (NCEI 2025). Additionally, increased storm severity and more impermeable urban surfaces place a greater strain on a city's existing stormwater infrastructure. If urban stormwater investment remains stagnant, residents' vulnerability to urban flooding and sewage backups rise. Partly operational since 1991, Chicago's Tunnel and Reservoir Plan (TARP, also referred to as the 'Chicago Deep Tunnel') is a large-scale public works project to build large intercepting sewers to hold sewage in contained reservoirs. This increases the city's vertical sewer capacity to handle larger storms and reduce sewer overflows and urban flooding. Other cities with combined sewer systems have turned to Chicago's TARP as inspiration for their own sewer expansion projects, yet TARP's actual effects on Chicago urban flooding remain understudied (Water Env Fed 2018). As the most fully built-out and comprehensive 'deep tunnel' project globally, Chicago's TARP serves as an informative case study to investigate the efficacy and equity implications of the dozens of 'deep tunnel' systems planned or under construction globally.

Literature Review

Urban flooding imposes significant financial burdens on U.S. communities, with damages averaging $4.5 billion annually between 1980 and 2024 (NCEI 2025). Flood impacts and losses are a product of sudden hazardous changes to natural systems, but the question of who suffers what losses is also dictated by the human-built environment and its embedded social and economic order (Tierney 2019).

Scholarly definitions of flood vulnerability are difficult to pinpoint partly because of the term's vague use across many academic disciplines. This study defines flood vulnerability as the extent to which people are susceptible to harm from floods (Madajewicz 2020; Cutter 2022). This depends on the physical characteristics of the land that person inhabits, like its elevation and slope. But social, economic, and environmental factors—like one's age, native language, or race—also significantly factor into a person's flood vulnerability. This study opts to evaluate communities' flood vulnerability holistically, developing both a quantitative model of urban flood vulnerability for the Chicago area and a qualitative synthesis of resident interviews.

Certain processes associated with urbanization also increase local vulnerability to flood events. As a place urbanizes, minor changes in local elevation and the growth in impermeable surface areas (such as asphalt roads or tile building roofs) alter natural drainage patterns. Cumulatively, small changes in land cover and slope can significantly degrade entire hydrological landscapes; this phenomenon is called 'urban stream syndrome' (Walsh et al 2005; Konrad and Booth 2002).

Urban stormwater infrastructure aims to mitigate these effects. The earliest urban sewer systems, first built in Chicago and Brooklyn in the late 1850s, were designed to drain away the water that accumulated on paved surfaces, but also carried human waste in the same pipes to be treated at a water treatment plant (Burian et al 2000). While these early systems improved urban sanitation and public health, they

occasionally posed significant risks to city residents. When storms overwhelm local sewer capacity, an untreated sewage-stormwater mixture backs up into streets and buildings, or is discharged into rivers to limit human property damage. Today, nearly 860 communities in the United States have legacy combined sewer systems, resulting in an annual discharge of 850 billion gallons of raw sewage into local waterways (EPA 2017).

Deep tunnels, which increase the vertical capacity of combined sewer systems, are designed to mitigate urban flooding by storing stormwater and sewage until treatment plants can process them. This strategy has been adopted in several cities, including Atlanta, Milwaukee, and Washington, D.C., as well as internationally in London and Osaka (Pluth et al. 2021). These systems reduce the amount of untreated sewage discharged into local waterways and provide a temporary solution for managing overflow during storms.

Case Study: Chicago's Tunnel and Reservoir Plan (TARP)

TARP provides a valuable case study for evaluating the impacts of deep tunnel systems. Fueled by growing suburbanization, paved surface acreage doubled in the Chicago region between 1945 and 1965 (Platt 2020). Water landing on this pavement was channeled into an increasingly inadequate combined sewer system.

In the late 1970s, the Metropolitan Water Reclamation District of Greater Chicago (MWRD) proposed a regional solution to reduce river pollution and increase sewer capacity. Tunnels to intercept raw sewage would be burrowed far below ground level, limiting environmental impacts to most of the region, including all of the north and west suburbs. The only above-ground environmental impacts of the new system would be three open-air sewage reservoirs. Two reservoirs, McCook and Thornton Reservoirs, would be constructed in decommissioned limestone quarries adjacent to two low-income communities, while a third smaller reservoir would be built on O'Hare Airport property.

Now mostly operational, the system of tunnels and reservoirs have had a markedly positive impact on regional river quality and biodiversity. The phased implementation of TARP coincided with decreases in fecal coliform, suspended solids, and ammonium nitrogen observed in the Chicago, Calumet, and Des Plaines rivers between 1975 and 2012 (Pluth et al 2021). Likewise, TARP's construction correlates with greater aquatic biodiversity. In 1985, a half-hour fishing trip in the Chicago River caught fewer than 3 native fish species on average; by 2018, that number increased to 13–16 native fish species (Happel and Gallagher 2020).

Still, quantitative approaches to evaluating TARP are limited by the lack of data that is both comprehensive in time and specific in geography. To properly assess TARP's effectiveness, flood data should cover a substantial period and offer enough detail to capture neighborhood-level variations. Unfortunately, no such datasets exist. While the MWRD and third-party organizations collect some relevant data, such as annual totals of combined sewer overflows into local rivers, these figures are reported as region-wide sums and lack the necessary geographic detail. On the other hand,

proxies like 311 calls and insurance claims provide geographic specificity but do not extend far enough back to capture flooding conditions before TARP's implementation. As shown in Figure 1, this gap in data makes it difficult to determine whether the deep tunnels have effectively reduced flood risk in the most vulnerable communities.

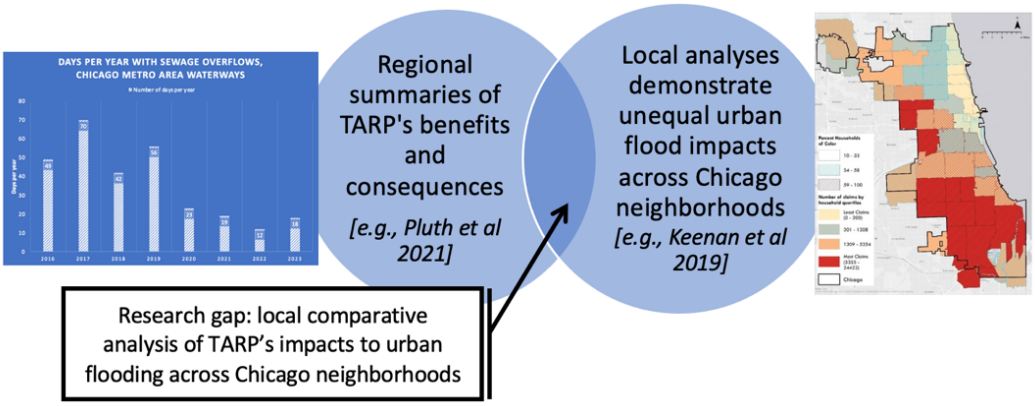

Figure 1. Two research approaches to flooding in Chicago. On one hand, studies such as Pluth et al. (2021) sum up TARP's effects at a regional scale without neighborhood-level detail. On the other hand, studies such as Keenan et al. (2019) highlight neighborhood-level flood risk variation, but without a thematic focus on TARP. Darker regions in the accompanying map from Keenan et al. represent neighborhoods with higher-than-average flood insurance claims per household.

On the precipice of the Chicago Deep Tunnel's construction, Northwestern urban planning professor Stanley Hallett observed that while TARP's environmental impact assessments adequately outlined the "regional benefits and cost of TARP," analyzing the project "merely on the basis of its contribution to regional water quality represents a gross failing of public policy" (Marino 1978). Hallett's words remain relevant today. The tunnels have been built and stormwater has been diverted, but a nuanced understanding of TARP's benefits and impacts on individual communities has yet to be fully developed.

Methods

This study employs a mixed-methods approach, reliant on residents' knowledge of past urban flooding to fill in the gaps in existing data collection. First, a population-weighted version of the Chicago Metropolitan Agency for Planning's Urban Flooding Susceptibility Index (CMAP UFSI) identifies zip codes with the highest and lowest modeled flood exposure. This step helps identify where interviewing residents would most effectively highlight the range of flood vulnerabilities faced by Chicagoans. Secondly, eighteen semi-structured interviews were conducted with residents based on UFSI data and proximity to McCook Reservoir. Finally, transcripts were thematically analyzed to find similarities and differences in the views expressed by low-UFSI, high-UFSI, and near-reservoir residents.

In order to learn how TARP differently affects communities with varying degrees of flood risk, it is important to understand the existing geography of flood risk in the Chicago region. To predict where urban floods occur across the Chicago region, the Chicago Metropolitan Agency for Planning created an open-access roster dataset based entirely on physical land characteristics. These land-based inputs include: relative elevation and topography, water flow accumulation, the historical development of sewer infrastructure, imperviousness of land cover, and relative precipitation trends. Unlike other proxies of urban flood vulnerability such as flood insurance claims, the UFSI uses available data about physical land characteristics. This reduces the chance that flooding in well-resourced communities, which are more likely to have flood insurance, are over-represented. UFSI data was initially collected in 2017 and last updated in 2020.

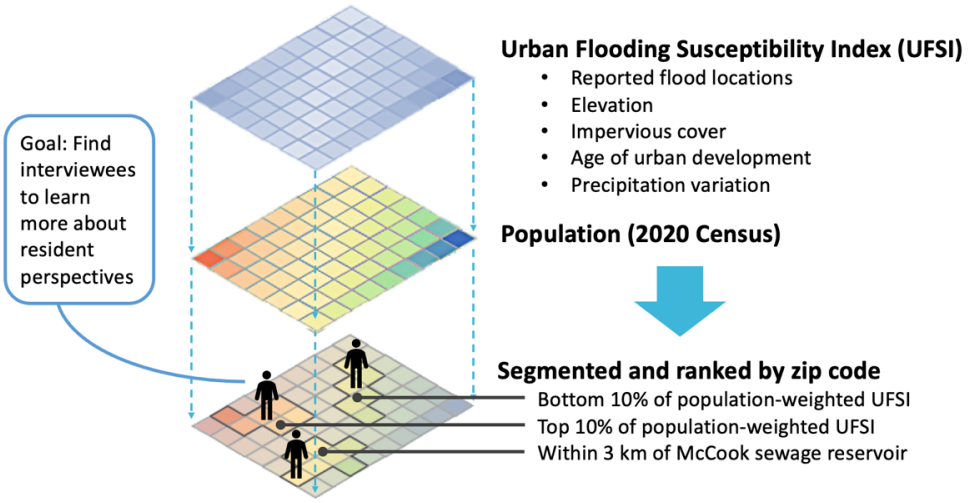

Figure 2. Illustration of methodology using population-weighted UFSI to select interviewees.

To transform the UFSI model into something that more closely resembles *human* flood vulnerability, as opposed to the exposure of a unit of *land*, rasterized population data was incorporated into a modified UFSI. In the case where two pieces of land have the same expected chance to chronically flood, the more densely populated piece of land exposes more people to that flood, which results in an overall greater flood vulnerability. Thus, the following formula was used to calculate the average population-weighted UFSI for a given zip code:

$$Average = \frac{\sum_{cells\ at\ least\ 50\%\ within\ \ zip\ code\ boundary} (population_{cell} \times UFSI_{cell})}{\sum\ population_{cell}}$$

Semi-structured resident interviews

Using information gained from the population-weighted UFSI, Chicago area residents were recruited who met one of three geographical criteria:

a) A zip code within 3 kilometers of the McCook Reservoir

b) Low-flood-susceptibility zones, defined to be the bottom 10% of Cook County zip codes ranked by a population-weighted average of the CMAP UFSI

c) High-flood-susceptibility zones, defined to be the top 10% of Cook County zip codes ranked by a population-weighted average of the CMAP UFSI

Ultimately, of the twenty-three residents recruited, eighteen proceeded to the interview stage. Five residents were excluded for not meeting the geographical criteria for eligibility.

In order to explore residents' personal experiences with urban flooding and TARP's implementation, 40-minute-long semi-structured interviews were conducted with residents individually over Zoom. Each interview was audio-recorded. Participants' answers were transcribed for later thematic analysis after the interview using a transcription computer program. Interview transcripts were verified by relistening and cross-referencing with the recording.

To draw systematized comparisons between the views of Low-UFSI, High-UFSI, and near-reservoir interviewees, Braun and Clarke (2006)'s approach to thematic analysis was used to distill and compare common patterns and meanings within the qualitative data. This approach involves a six-phase process: data familiarization, initial coding, theme generation, theme review, theme definition and naming, and the production of a final report. Initially, transcripts were thoroughly read thrice to ensure immersion in the data, with initial codes generated inductively. Following this, the codes were examined for patterns across the different groups—Low-UFSI, High-UFSI, and near-reservoir—allowing for the identification of both shared and divergent themes. Themes were iteratively refined through discussion and comparison, ensuring they accurately reflected the data while maintaining coherence within each group. Finally, a thematic map was created to visualize the relationships between themes, facilitating the comparison of views across interviewee groups. This process ensured that the analysis was both systematic and transparent, with particular attention paid to the context-specific nature of the themes that emerged.

Results

Urban flood exposure model

When adjusted for population, the UFSI model amplifies the difference between densely-populated, flood-exposed areas from areas that are either not as exposed to floods or not as densely populated. Within Chicago city limits, UFSI values

are more variable within zip codes, reflecting the block-to-block variability in population. While pockets of flood-exposed neighborhoods remain on Chicago's west and southwest sides, the population-weighted UFSI estimates that the densely-populated north lakefront is the most exposed to urban flooding.

Averaging this population-weighted UFSI model by zip code confirms the trends described above. Ranked by their average UFSI, the bottom 10% of zip codes ("Low-UFSI") lie along the periphery of Cook County in more recently-developed suburbs. The top 10% of zip codes ("High-UFSI"), on the other hand, are either immediately north of the city center or on the west/south sides of the city.

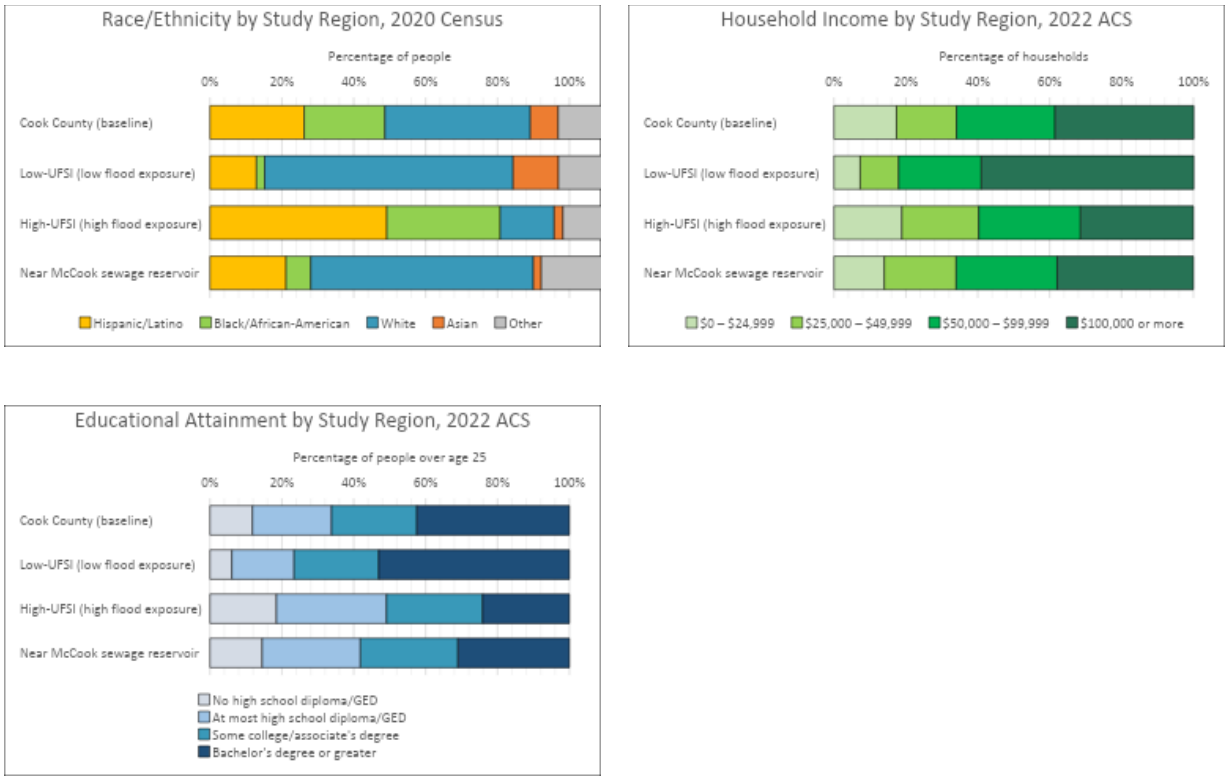

Figure 3. Demographic comparison of three study regions, by race/ethnicity, household income, and educational attainment. Data obtained from 2020 Census and 2022 American Community Survey. Income brackets are in inflation-adjusted 2022 US dollars.

Perceived flood frequency and impacts

Residents near McCook and in High-UFSI areas recalled flooding more frequently than residents in Low-UFSI zones. Residents were also asked to give a subjective stance on whether flooding in their home and community has improved or worsened with time. 66% of High-UFSI interviewees believed that floods had become more frequent over time in their community, while only 16% of Low-UFSI interviewees believed the same.

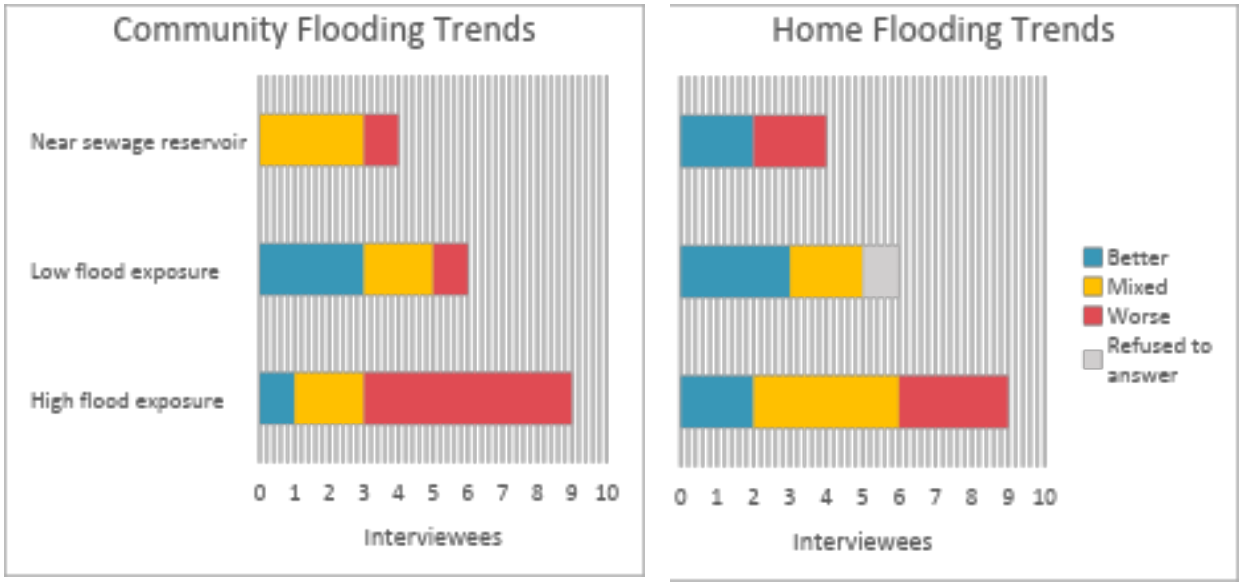

Figure 4. Interviewees' responses to the questions: "How has flooding in your neighborhood/on your property changed over the past 20 years?"

Interviews revealed diverse experiences and concerns regarding personal safety and health risks associated with sewage backflows during flooding events. While no interviewees residing near McCook reported experiencing sewage backflows, 67% of High-UFSI interviewees and 50% of Low-UFSI interviewees recounted instances of sewage intrusion into their basements or driveways. One notable anecdote emerged during an interview with a High-UFSI resident. Following a recent flooding event, the interviewee discovered her basement infested with maggots, which she attributed to sewage intrusion. This incident underscores the potential health hazards and sanitation issues associated with sewage backflows.

Flooding also caused widespread property damage, affecting residents across all study areas. Many spoke of water damage to basements, electrical systems, and personal belongings, with thorough cleanup efforts becoming routine. Public service disruptions were another major concern, particularly among High-UFSI and near-reservoir residents. Flooded streets often halted transportation, making it difficult for residents to access essential services like grocery stores or schools.

TARP awareness and reception

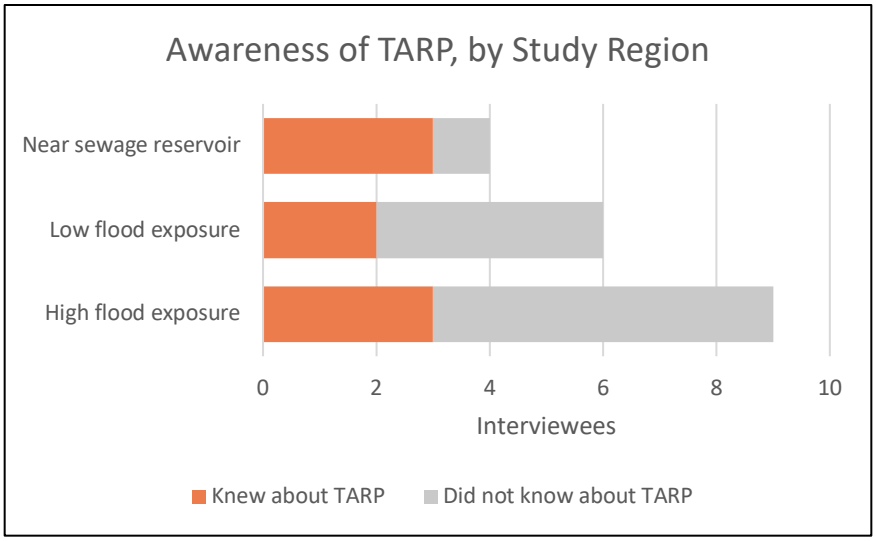

Figure 5. Interviewees' responses to the question: "Have you heard of the Tunnel and Reservoir Plan, or 'Deep Tunnel' project, here in Chicago?"

In both Low-UFSI and High-UFSI zones, residents demonstrated limited knowledge about TARP. One interviewee highlighted the inadequacy of the term "Deep Tunnel" in conveying the project's purpose. Additionally, all but one resident were unfamiliar with the MWRD, the agency responsible for implementing TARP.

Conversely, a majority of residents in the vicinity of McCook sewage reservoir demonstrated awareness of TARP, albeit with differing perspectives on the project's accountability and community engagement practices. Perceptions about TARP were mixed. Two residents suggested that, as a decades-long project, the agency was now mostly unaccountable to their communities. One resident approved of the MWRD's community outreach initiatives to address some of the environmental impacts pertaining to the reservoir.

All 4 interviewees who lived near McCook Reservoir agreed that the number of days with noxious odors had increased over the past ten years. One resident commented that the smells "just become part of the landscape around here, I guess." Compared to the impacts of flooding whose impacts escalated suddenly, sewage odors were more consistent and had a smaller direct impact.

Residents' expectations for regional flood governance

Residents' views on flooding and TARP were part of a broader indirect discussion on what they expect, if anything, from flood adaptation projects and coordinating government agencies. Their responses coalesced around four main expectations: projects should create no new risks, reduce flooding, facilitate strong agency-stakeholder communication, and address social inequities.

The most common expectation among residents from all three study regions was that flood adaptation projects should visibly reduce flooding. Notably, nearly all residents who expressed this expectation framed it within their broader frustration with existing systems. Some wanted fewer floods overall, while others sought reductions in specific impacts like transportation disruptions or property damage. Curiously, one-third of interviewees used figurative language at some point to describe the need for flood projects to visibly reduce flooding. For example, one Low-UFSI resident, a former civil engineer, compared their ideal flood mitigation to a "fortress," reflecting a desire for large-scale, robust protection. Many residents placed a high value on seeing clear, tangible improvements.

Near-reservoir residents were especially concerned about new environmental risks associated with flood mitigation projects. One resident voiced concern, saying, "Let's make sure we aren't creating new sewage problems to replace the old ones." On the other hand, for many Low-UFSI and High-UFSI residents, it was difficult to imagine the extant possibility of other environmental risks until the interviewer more clearly explained the role of the McCook sewage reservoirs in the TARP project.

Beyond residents' expectations for project *outcomes*—including reducing flood risk and limiting other environmental risks—there was also a fairly substantial conversation on what they expected of the planning *process* for these projects. To that end, residents from all three study regions called for more transparent communication between government agencies and residents. The most common context in which residents would voice this expectation of the process was in pointing out existing (non-)communication between the MWRD and residents. One High-UFSI resident remarked, "I'm glad you're talking to us [residents] because our views shouldn't be treated as expendable." Many residents signaled that feeling 'heard' in the planning process was a necessary goal for agencies to consider in their regional flood adaptation projects. Still, not all residents who talked about increasing community engagement did so in an aspirational manner. One recalled her experience with a land-use project unrelated to stormwater management, attributing the "disorienting" community engagement process to an imbalance in expertise between agency members and residents.

The final main expectation residents expressed was that flood adaptation projects should account for existing social inequities. All interviewees agreed that flood exposure and risk varied across the city and tended to disproportionately affect marginalized communities. Low-UFSI residents generally trusted that TARP was designed to benefit flood-prone areas, particularly communities of color. One resident expressed optimism, saying, "My intuition is that these kinds of projects are targeting the flooded parts from the get-go. You kind of have to trust the government to be held responsible." In contrast, High-UFSI residents were more skeptical, with many believing that wealthier or politically connected neighborhoods would benefit more from TARP than their own.

Occasionally, interviewees expressed concern for the large capital cost of the TARP project. Some interviewees were concerned about the high costs of projects like TARP, prioritizing fiscal responsibility, while others, especially in flood-prone areas,

valued the potential for flood risk reduction more than the project's capital costs, favoring expensive, robust flood protection.

Discussion

Residents offered a comprehensive picture of Chicago's urban flooding and its regional flood governance. Their voices moved beyond a binary evaluation of TARP as either a success or a failure. Rather, their perspectives included well-defined ideas about the role that equity, expertise, community engagement, and other environmental impacts should have in evaluating TARP's neighborhood-level effects. Using their perspectives, four cross-cutting themes were created to partly explain how residents with different flood susceptibilities evaluate TARP.

Historical Continuity of Local Flooding Challenges

Residents' anecdotal experiences with urban flooding align with Chicago's broader history of water management problems. From the installation of combined sewer systems to the reversal of the Chicago River, local leaders have long regarded water both as a commodity and a nuisance (Platt 2020). TARP is the latest in a tradition of large-scale infrastructure projects aimed at addressing the region's water-related problems, like sanitation and urban flooding.

This uneasy relationship between the city and its water is a recent development. Native American Chicagoans, for example, share parables which emphasize a deep interconnection between local water and land-based urban ecological systems: "Muskrat is an earth diver. He finds home in shadowy wetlands—relational dynamisms between land and water—amongst the plant medicines that grow here" (Bang et al 2014).

Their view contrasts with the notion expressed by all interviewees: that water in urban areas must be controlled. One Low-UFSI resident argued that the MWRD ought to "build a fortress against floods." While this statement reflects a common perception that large infrastructure projects offer absolute security, it is also the product of a cultural divergence in understanding water's role in urban spaces. Still, the persistence of flooding has reinforced the demand for such projects. About 70% of interviewees agreed that urban flooding had worsened for them over the past 20 years.

Idealized, Competing Visions for Regional Flood Governance

Residents shared multiple criteria by which they evaluate a flood mitigation project. Most often, residents stressed the need for projects to visibly reduce flooding. This urgency was reflected in all 18 interviews, where the idea of flood impact reduction was mentioned 89 times.

The emphasis on other goals varied across study regions. Near-reservoir residents, for example, prioritized avoiding new risks, such as those posed by sewage reservoirs. High-UFSI residents, likeliest of the three populations to be Black or

Brown, emphasized social equity. This variation highlights how residents' experiences with environmental injustice shape their flood governance priorities. Interestingly, some residents projected their own imagined realities onto other regions. Those in Low-UFSI regions assumed TARP primarily benefited High-UFSI areas, despite the skepticism from High-UFSI residents. Such disparities illustrate the complex, sometimes contradictory expectations that residents hold for flood governance.

Outcome Gaps: Spatial Inequities in Environmental Risk

Flood risks varied significantly across the three study regions, with High-UFSI residents reporting more frequent and severe flooding compared to Low-UFSI areas. High-UFSI residents also recounted sewage backups during storms, which Low-UFSI and near-reservoir residents did not experience. These differences underscore a broader pattern of environmental inequity, where Chicago's Black and Latino neighborhoods bear disproportionate flood-related burdens (Keenan et al 2019; Sinha 2023).

McCook Reservoir also represented a major concern for near-reservoir residents, who described it as a "locally unwanted land use." Complaints about foul odors, groundwater contamination, and local economic impacts reflect the historical environmental injustices these communities have faced, such as the repurposing of former limestone quarries into sewage reservoirs. These patterns mirror broader trends of siting environmentally hazardous infrastructure in low-resistance communities, exacerbating existing inequalities (Bullard 1993).

Process Gaps: Lapses in Public Engagement

Across all regions, most residents expressed dissatisfaction with the MWRD's public engagement efforts, regardless of their neighborhood's flood susceptibility. Public awareness of TARP was low, particularly in Low-UFSI and High-UFSI areas, where only 33% of interviewees had heard of the project before their interview. Residents near McCook were more familiar with TARP, though they were largely unaware of mitigation efforts intended to reduce odors from the reservoir.

The desire for better agency communication was expressed across all regions. Some residents were frustrated with the lack of transparent dialogue about TARP's goals and trade-offs. While some residents expressed hope that improved communication might lead to more co-creative flood resilience planning, others feared that increased public involvement could undermine the expertise of engineers and planners.

Research Limitations

Several limitations exist across the modeling, screening, and interviewing phases of this study. The primary confounding factor for the results is the presence of other smaller, local stormwater management projects that were implemented concurrently with TARP. In some neighborhoods, green infrastructure and low-impact development strategies also helped to manage flooding locally, meaning that

observed variations in flood-related outcomes could have resulted from a combination of these efforts rather than TARP alone.

The population-weighted index developed during the modeling stage of the study is an incomplete measure of vulnerability to urban flooding. The UFSI relies on a set of physical and human factors that are typically associated with flood exposure. But other social and infrastructural factors, like race/ethnicity, socioeconomic status, homeownership, access to transportation, and English proficiency, were not included and ought to be considered in a full assessment of flood vulnerability (Madajewicz 2020).

Interviewees were solicited via community organizations through convenience sampling; the opinions of the selected interviewees do not constitute a representative sample of Chicago-area residents. Interview responses should not be regarded as totally objective interpretations of flooding events and government actions, but given the lack of quantitative data locally on urban flooding, they represent a valuable source of information about the county's urban flood governance. Future research could benefit from a longitudinal approach that tracks residents' perceptions of flooding over time, which might give deeper insights into the long-term impacts of TARP.

Conclusion

Chicago's TARP is the world's first example of a large-scale 'deep tunnel' project meant to address local waterway pollution, urban flooding, and the compounding effects of climate change in urban areas. Many cities are now designing or building similar deep-bored systems that aim to increase a sewer system's vertical capacity (Water Env Fed 2018). But research on the effects of these 'deep tunnels' remains limited, necessitating this case study on TARP to guide the future stormwater governance of Chicago and other cities.

Through eighteen semi-structured interviews, residents across Low-UFSI, High-UFSI, and near-reservoir areas assessed their neighborhood's flooding trends as they coincided with TARP's implementation. Their nuanced views of large-scale flood adaptation projects like TARP often extended on their personal experiences with flooding. Residents also evaluated TARP with a few implicit criteria that could be considered 'benchmarks' for a successful urban flood mitigation project: projects should reduce flooding, projects should create no new risks, agencies should communicate with residents, and agencies should account for inequity. Knowledge about other technical and political aspects of the TARP proposal was low among residents, and did not seem to heavily factor into residents' evaluations.

The earliest proponents of 'deep tunnels' claimed these systems would "eliminate" environmental risks like urban flooding and pollution (MWRD 1966). However, residents' varied flooding experiences suggest that deep tunnels are modifiers—not eliminators—of existing "social topographies of risk" (Taylor 2015). Under TARP, urban flood risk still disproportionately affects Cook County's High-UFSI neighborhoods, which are poorer, less educated, and more Black/Latino/Hispanic than the county average. While it is difficult to directly link

TARP to these inequitable outcomes directly, the evidence indicates a need for more equitable and effective flood management strategies going forward to address current disparities.

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