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Chloe Devecsery

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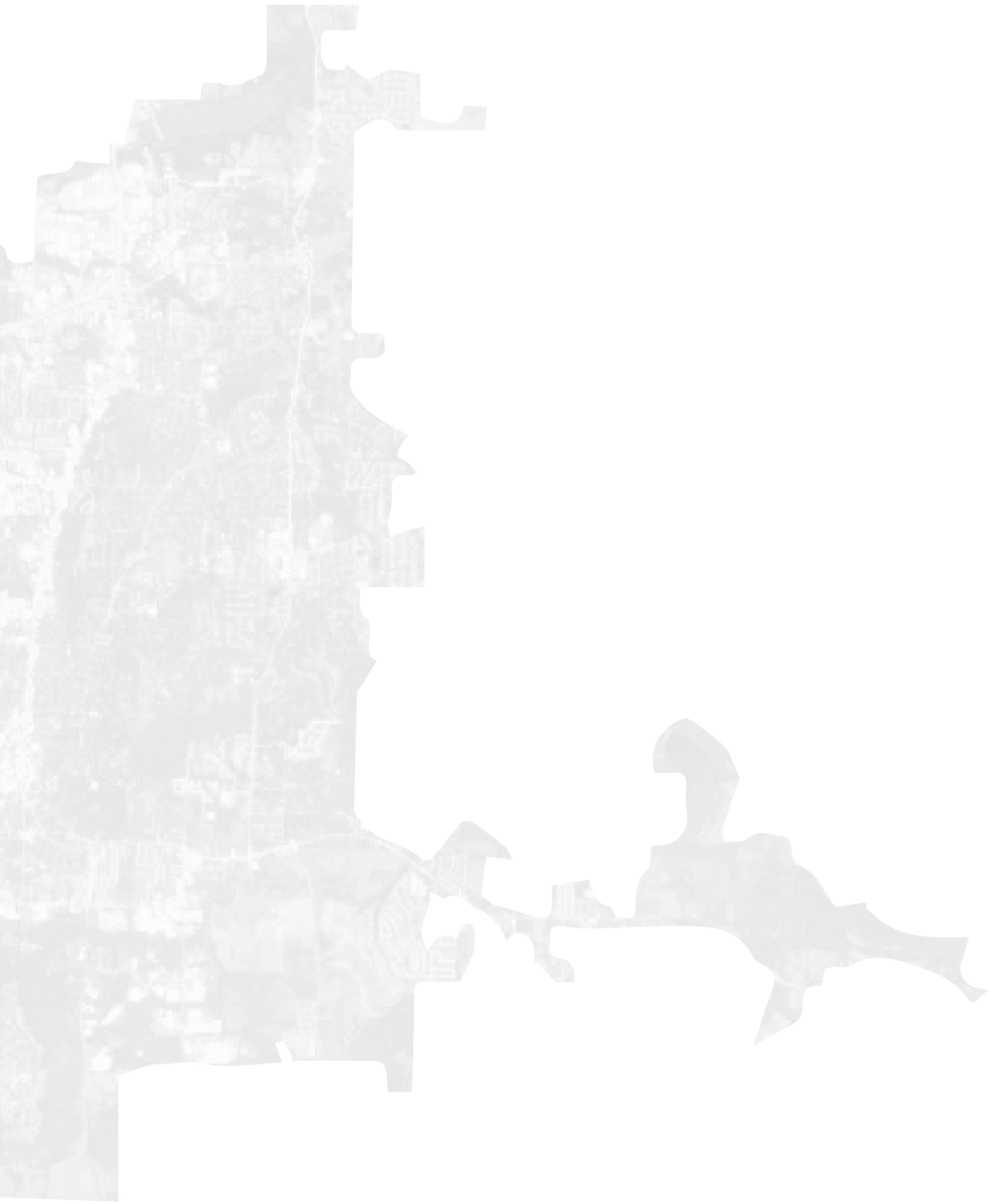
Environmental Injustice Remediation in Fayetteville, Arkansas:

Investigating Unjust and Racist Relationships in Fayetteville's Industrial Park

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May 10th, 2023





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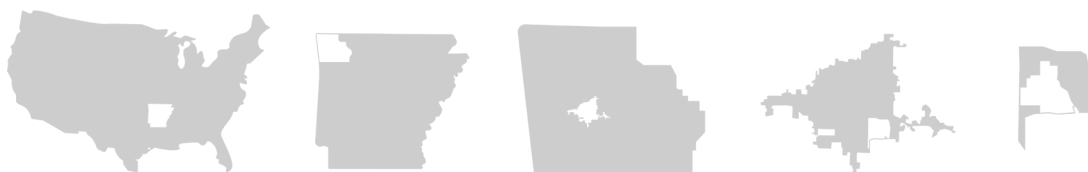
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Abstract:

Environmental racism refers to how minority neighborhoods are burdened with a disproportionate number of environmental hazards and pollutions that lower the quality of life and create health disparities.¹ Despite the growing awareness of the national and global problem, environmental injustice and racism can be found in nearly every place. There is little being done regarding policy, public awareness, and government action. The fight for environmental justice is still needed across America, in Arkansas, and in our community. This disciplinary oriented capstone gives a brief overview of the environmental justice movement and uses publicly available maps and statistics from government and academic agencies to show the correlation between environmental hazards and minority populations at multiple scales. It will present findings that prove people of color are more likely to be exposed to environmental and health hazards in the United States, Arkansas, Northwest Arkansas metropolitan area, and the city of Fayetteville. After presenting this data, the area with the most environmental risk in Fayetteville is determined for further investigation. Lastly, environmentally conscious urbanization and reclamation principles are visualized in Fayetteville's most polluted area to see how it could be transformed into a healthy community.

¹ "The Complicated History of Environmental Racism." UNM Newsroom, last modified August 4, 2020. <http://news.unm.edu/news/the-complicated-history-of-environmental-racism>

Introduction:

People of color in America are more likely to live in neighborhoods where they're subject to environmental hazards like pollution.² The solution is 'Environmental Justice,' which is achieved when all people have the same protection from environmental and health hazards. Environmental justice also ensures that all people have access to healthy living, learning, and working conditions.³ Environmental injustice is widespread throughout America, people of color consistently experience more pollution than white Americans. Environmental injustice is even present in the city of Fayetteville, Arkansas. Fayetteville has been in the top 10 "Best Places to Live in the U.S." for six years in a row⁴ but there are still parts of Fayetteville subject to environmental and health hazards. In this disciplinary oriented capstone, I will give a brief overview of the environmental justice movement, examine environmental injustice from national to local, analyze racist and unjust conditions in Fayetteville, and develop a visualization of principles to remediate and reclaim space in Fayetteville's Industrial Park.

Questions

1. How has the environmental justice movement evolved since the 80s?
2. How prevalent is environmental injustice throughout the United States, Arkansas, and our community?
3. Is there an area in Fayetteville that is affected by environmental injustice?

² "Fighting for Justice as We Combat the Climate Crisis." Warren for Senate, June 12, 2020. <https://elizabethwarren.com/plans/environmental-justice>.

³ "Environmental Justice" EPA. Environmental Protection Agency. <https://www.epa.gov/environmentaljustice>

⁴ Thurber, Lisa. "Fayetteville Ranks Fourth among Best Places to Live." Fayetteville, AR - Official Website, July 13, 2021. <https://www.fayetteville-ar.gov/CivicSend/ViewMessage/message/147760#:~:text=Fayetteville%20Ranks%20Fourth%20Among%20Best%20Places%20to%20Live&text=FAYETTEVILLE%2C%20Ark.,4>.

Project Steps:

1. Literature + Event Timeline (abbreviated) – how a grassroots protest sparked national change.
2. Environmental Injustice at Multiple Scales – national to local.
3. Analyzing Fayetteville, Arkansas – investigating racist and unjust relationships.
4. Remediation + Reclamation – visualizing spatial principles to reclaim space in Fayetteville's Industrial Park.

Methods:

Step One – The abbreviated literature and event timeline is a compilation of 10 defining moments in the environmental justice movement. These moments are events, studies, or government policies. They were chosen because of the impact each moment had on society or because of the importance each piece of literature had in pushing the movement forward.

Step Two – “Environmental Justice at Multiple Scales” uses publicly available maps to communicate the correlation between pollution and minority populations. The 2021 EPA toxic releases map and 2020 Census Race and Ethnicity GIS map are layered to show the correlation of polluted areas and communities of color. People of color percentages of each population demonstrate that the amount of pollution is disproportionate to the amount of people of color.

Step Three – “Analyzing Fayetteville, Arkansas” uses publicly available mappings of social, racial, economic, pollution, and environmental injustice indicators to better understand contextual conditions in Fayetteville that create unjust and racist conditions. There are a series of four maps, each dedicated to a different topic – socioeconomic factors, environmental risks, land use, and housing. The four maps help to identify where the most vulnerable communities in Fayetteville are located. The maps also help to define an area with the most risk factors to further investigate – “South Fayetteville’s Environmental Sink.”

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Step Four – “Remediation + Reclamation” takes a closer look at “South Fayetteville’s Environmental Sink.” In this step, publicly available government mappings and imagery are used to investigate spatial conditions, pollution sources, context, history, stakeholders, and unjust conditions in Fayetteville’s Industrial Park. Remediation is the first step, pollution cleanup of EPA regulated facilities would be necessary before making the space livable. Reclamation is the second step. Environmentally conscious urbanization and reclamation principles are implemented, specifically – mixed land uses, phasing out non-compatible land use, providing a range of housing opportunities, increasing walkability, fostering a community with a strong sense of place, creation of “third places,” preserving nature, and providing green spaces. All these principles are visualized through diagrams to show how Fayetteville’s Industrial Park could be transformed into a connected and thriving community, which utilizes and protects the adjacent White River and Town Branch Creek.

Terminology:

“Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies... This goal will be achieved when everyone enjoys the same degree of protection from environmental and health hazards, and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.”⁵

Environmental racism refers to how minority neighborhoods are burdened with a disproportionate number of environmental hazards and pollutions that lower the quality of life and create health disparities.⁶

Environmental risk is the chance of harmful effects to human health or the environment due to exposure from an environmental stressor - any physical, chemical, or biological entity that can have an adverse effect.⁷

An environmental sink is when the environment absorbs, stores, redistributes, or processes human-made waste. The environment can house human-made pollution through three ways - air, soil, and bodies of water. ⁸

⁵ EPA, “Environmental Justice.”

⁶ UNM Newsroom, “The Complicated History of Environmental Racism.”

⁷ “Learn about Risk Assessment.” EPA. Environmental Protection Agency. Accessed May 4, 2023. <https://www.epa.gov/risk/about-risk-assessment>.

⁸ “Environmental Sink Services.” NASA. The National Aeronautics and Space Administration. https://www.hq.nasa.gov/iwgsdi/Environmental_Sink_Service.html#:~:text=Definition%3A%20The%20redistribution%2C%20storage%2C,under%20Human%2DMade%20Capital).

Literature + Event Timeline (abbreviated):

1982 – PCB landfill protests in Warren County, North Carolina ⁹

Robert Burns, the owner of a New York trucking company, illegally dumped toxic soil and sprayed toxic oil in rural farming areas in 14 counties of North Carolina. PCBs can cause birth defects, cancer, and other disorders in multiple human organs. The government of North Carolina oversaw cleaning up the pollution. Governor James B. Hunt Jr. decided to create a landfill on a rural soybean farm near a poor, Black community in Warren County. Protests erupted over this decision to endanger the lives of the surrounding community. The protests ultimately failed, and 22-acres of farmland was turned into a toxic landfill that would be filled with 10,000 truckloads of PCB contaminated soil. Sadly, Warren County was not declared clean until 20 years later in 2004. North Carolina and the federal government spent more than \$17 million on cleaning up the landfill.

The protests in Warren County were a pivotal moment in the environmental justice movement. For the first time, a Black-led environmental protest was getting national attention. The protests were covered by well-known television stations and newspapers. Black voices were at the center of environmentalism for one of the first times.

⁹ "This Is Environmental Racism." The Washington Post. WP Company, last modified April 6, 2021. <https://www.washingtonpost.com/climate-environment/interactive/2021/environmental-justice-race/>.

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1983 – General Accounting Office, Federal Report “Siting of Hazardous Waste Landfills and Their Correlation with Racial and Economic Status of Surrounding Communities”¹⁰

The GAO study “showed that 3 out of 4 major landfills in the South were surrounded by Black communities.”¹¹ The GAO report was the first federal report to show a correlation between the location of hazardous waste landfills and the racial and economic status communities in four southern states. The states studied were Alabama, Mississippi, North Carolina, and South Carolina. Conditions of environmental racism in the south were proved to be present due to this pivotal GAO report.

1987 – “Toxic Wastes and Race in the United States” Report from the Commission for Racial Justice, United Church of Christ¹²

The UCC was a national study that found that nationwide “communities with greater minority percentages of the population are more likely to be the sites of commercial hazardous waste facilities.” This study was the first major, nationwide study of the environmental justice era in the United States. “Toxic Wastes and Race in the United States” became a standard text in the field and cemented that environmental racism and injustice was a national problem. Despite the report never using the terms “environmental justice” or “environmental racism.”

¹⁰ “Siting of Hazardous Waste Landfills and Their Correlation with Racial and Economic Status of Surrounding Communities.” U.S. GAO published June 14, 1983. <https://www.gao.gov/products/rced-83-168>.

¹¹ The Washington Post, “This Is Environmental Racism.”

¹² “Toxic Wastes and Race in the United States: A National Report on the Racial and Socio-Economic Characteristics of Communities with Hazardous Waste Sites.” United Church of Christ, Commission for Racial Justice. New York, New York: Public Data Access, Inc., 1987.

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1990 – “Dumping in Dixie: Race, Class, and Environmental Quality” by Dr. Robert Bullard ¹³

Bullard's book is considered “a standard text in the environmental justice field,”¹⁴ it provides new insights into the nature of the Black grassroots movement against toxics in the South. The book also encourages those that are a part of fields that overlap with environmental justice – civil rights and environmentalist – to consider the living conditions of the nation's most vulnerable residents, the poor and minority communities. This book was a pivotal piece of literature because it highlighted voices within the black communities fighting environmental injustice.

1991 – First National People of Color Environmental Leadership Summit / “The 17 Principles of Environmental Justice”

In response to the national report “Toxic Wastes and Race in the United States,” a coalition of minority leaders and community members gathered in Washington D.C. for the first “National People of Color Environmental Leadership Summit.” Over 1,000 people showed, more than expected. This summit was an important moment because people from disadvantaged communities around the nation came together to share their experiences with pollution. At the summit, “The 17 Principles of Environmental Justice” were created as a guide for disadvantaged communities and polluting industries. These principles help to cement the term “environmental justice” and define the movement's purpose and beliefs.¹⁵

¹³ “Review of Robert Bullard: Dumping in Dixie: Race, Class and Environmental Quality, by Robert D. Bullard.” *Ecology Law Quarterly* 19, no. 3 (1992): 591–609. <http://www.jstor.org/stable/24113114>

¹⁴ “Biography”. Dr Robert Bullard. Accessed May 1, 2023. <https://drrobertbullard.com/biography/>.

¹⁵ The Washington Post, “This Is Environmental Racism.”

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Of the 17 principles, eight and twelve most closely relate to this research. Principle eight stresses the right to safe and healthy working and living conditions, safe from environmental hazards. Principle twelve acknowledges the role that the built environment plays in the creation of unjust spaces within cities, rural areas, nature, communities, and access to resources.¹⁶

(See all 17 Principles of Environmental Justice on [page 14](#))

1992 – President George H.W Bush founds the “Office of Environmental Justice” inside the EPA ¹⁷

The Office of Environmental Justice was created to provide guidance to other federal agencies using specific criteria for identifying high and adverse human health or environmental effects on disadvantaged populations. This federal action was in direct response to the First National People of Color Environmental Leadership Summit. This was an important moment in the environmental justice movement because it was the first federal action made to address environmental justice.

¹⁶ Delegates to the First National People of Color Environmental Leadership Summit. “Principles of Environmental Justice.” October 27, 1991. <https://www.ejnet.org/ej/principles.html>

¹⁷ Senate. Environmental Justice Renewal Act. Washington, DC: U.S. Congress, last modified 2008

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1994 – President Bill Clinton signs Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.”¹⁸

This executive order focused federal attention on how environmental and health federal actions have hurt disadvantaged communities and set the goal of achieving environmental protection for all communities. The executive order also develops a strategy for implementing environmental justice into federal actions and creates an Interagency Working Group on environmental justice. This executive order is important because it placed environmental justice as an important issue within the White House, not just the EPA.

2007 - “Toxic Wastes and Race at Twenty” Report from the United Church of Christ and Witness Ministries ¹⁹

This UCC report was published twenty years after the original “Toxic Wastes and Race” report. It shows that disadvantaged communities face the same problems as twenty years ago but also face more policy-related problems than before. The report, same as the original report, signals clear evidence of racism where toxic waste sites are located, and evidence of racism in how the government responds. This report is important because it addresses the lack of progress that has been made in the twenty years since the first report was published.

¹⁸ “Summary of Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” EPA. Environmental Protection Agency, February 16, 1994. <https://www.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice>.

¹⁹ “Toxic Wastes and Race at Twenty: A Report Prepared for the United Church of Christ Justice & Witness Ministries.” Cleveland, OH: United Church of Christ, 2007.

2021 – President Joe Biden's "Justice40 Initiative" ²⁰

The "Justice40 Initiative" promises that 40% of benefits of certain Federal investments will go to "disadvantaged communities that are marginalized, underserved, and overburdened by pollution." President Biden made this historic commitment when he signed Executive Order 14008 within days of taking office. This was an important moment in history because it is the largest federal monetary commitment made to fighting environmental justice. President Biden's dedication to the issue has helped the environmental justice movement take center-stage as an issue of top priority in the United States.

²⁰ "Justice40 Initiative - Environmental Justice." The White House. The United States Government, April 21, 2023. <https://www.whitehouse.gov/environmentaljustice/justice40/>.

2023 – East Palestine, Ohio Freight Train Derailment ²¹

On February 3rd a freight train, operated by the company Norfolk Southern, carrying hazardous waste derailed outside of East Palestine, Ohio. The train was carrying vinyl chloride, “a highly flammable chemical linked to an increased risk of cancer.” East Palestine has around 5000 residents that had to put under a mandatory “shelter-in-place” while the residents closest to the derailment were put under mandatory evacuation. Three days later the EPA conducted a controlled detonation to prevent explosions. Two streams, Sulfur Run and Leslie Run, are near the derailment. Following the disaster, “3500 fish across 12 species have died in Ohio waterways.” 5 days following the derailment, the evacuation order is lifted. Residents begin to complain of rashes, nausea, bloody noses, and trouble breathing. But the EPA and state officials insist that all tests say the air and water are safe. Months after the derailment, residents still struggle to return to normal life in East Palestine.

The East Palestine derailment is an important moment because it is the most recent documentation of environmental injustice to date. Big media outlets and social platforms have followed the story. The events and experiences of residents have fueled mistrust of the government. The community of East Palestine will never be the same.

Question

How has the environmental justice movement evolved since the 80s? The United States has made progress since the 80s, but environmental injustice and racism is still present throughout the country. Environmental justice-based federal government policy has been made but has not been effective in stopping unjust conditions in the United States.

²¹ “It’s Been More than a Month since a Freight Train Carrying Hazardous Chemicals Derailed in Ohio. Here’s What’s Happened Since.” CNN, March 23, 2023. <https://www.cnn.com/2023/02/23/us/east-palestine-ohio-train-derailment-timeline/index.html>.

The 17 Principles of Environmental Justice: 22

1. "Environmental Justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction."
2. "Environmental Justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias."
3. "Environmental Justice mandates the right to ethical, balanced, and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things."
4. "Environmental Justice calls for universal protection from nuclear testing, extraction, production and disposal of toxic/hazardous wastes and poisons and nuclear testing that threatens the fundamental right to clean air, land, water, and food."
5. "Environmental Justice affirms the fundamental right to political, economic, cultural, and environmental self-determination of all peoples."
6. "Environmental Justice demands the cessation of the production of all toxins, hazardous wastes, and radioactive materials, and that all past and current producers be held strictly accountable to the people for detoxification and the containment at the point of production."
7. "Environmental Justice demands the right to participate as equal partners at every level of decision-making, including needs assessment, planning, implementation, enforcement, and evaluation."
8. "Environmental Justice affirms the right of all workers to a safe and healthy work environment without being forced to choose between an unsafe livelihood and unemployment. It also affirms the right of those who work at home to be free from environmental hazards."

9. "Environmental Justice protects the right of victims of environmental injustice to receive full compensation and reparations for damages as well as quality health care."
10. "Environmental Justice considers governmental acts of environmental injustice a violation of international law, the Universal Declaration on Human Rights, and the United Nations Convention on Genocide."
11. "Environmental Justice must recognize a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants affirming sovereignty and self-determination."
- 12. "Environmental Justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities, and provided fair access for all to the full range of resources."**
13. "Environmental Justice calls for the strict enforcement of principles of informed consent, and a halt to the testing of experimental reproductive and medical procedures and vaccinations on people of color."
14. "Environmental Justice opposes the destructive operations of multi-national corporations."
15. "Environmental Justice opposes military occupation, repression and exploitation of lands, peoples and cultures, and other life forms."
16. "Environmental Justice calls for the education of present and future generations which emphasizes social and environmental issues, based on our experience and an appreciation of our diverse cultural perspectives."
17. "Environmental Justice requires that we, as individuals, make personal and consumer choices to consume as little of Mother Earth's resources and to produce as little waste as possible; and make the conscious decision to challenge and reprioritize our lifestyles to ensure the health of the natural world for present and future generations."

Environmental Injustice at Multiple Scales:

The following series of maps and diagrams show that “people of color are more likely to live in neighborhoods where they’re subject to environmental hazards like pollution.” Using EPA Toxic Release maps and Census race and ethnicity maps are used to show this correlation. Population percentages are also considered to show that the amount of pollution is not proportionate to the amount of people of color present.

Factors –

1. Pollution measured with TRI (Toxic Release Inventory) data that tracks the management of toxic chemicals that are dangerous to human health and the environment. Industrial facilities must report annually how much toxins are released into the environment, via air, water, or land disposal.²³
2. Locations of communities of color measured with Census data.
3. Total population compared to the percentage of people of color measured with Census data.

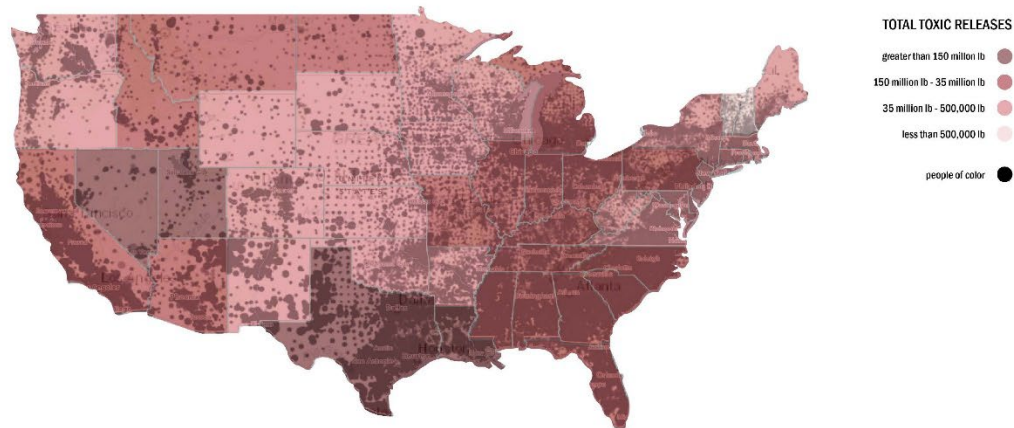
²³ United States Environmental Protection Agency. “What Is the Toxics Release Inventory?” EPA. Environmental Protection Agency, January 25, 2023. <https://www.epa.gov/toxics-release-inventory-tri-program/what-toxics-release-inventory>.

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National –

United States

SOURCES
ArcGIS Map / Race and Ethnicity in the US by Dot Density (Census 2020)
EPA TRI National Analysis / "Where You Live" Map (2021)



The map above shows a direct correlation between communities of color and areas with higher toxic release levels in the United States. The areas exhibiting the most environmentally unjust conditions are in California, New Mexico, the southeastern, and northeastern regions of the US.

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US Population –

The total population of the United States is around 300 million.²⁴ The US is majority white (62%) and minority people of color (38%).²⁵ But people of color neighborhoods are majority (56%) in proximity to a TRI facility.²⁶ Despite being the minority of the population, people of color more likely to live near toxic facilities and pollution.

Additional Statistics ²⁷ –

- White Americans are exposed to 17% less pollution than they produce.
- Black Americans are exposed to 56% more pollution than they produce.
- Latinx Americans are exposed to 63% more pollution than they produce.

²⁴ US Census. "U.S. and World Population Clock." United States Census Bureau. Accessed May 12, 2023. <https://www.census.gov/popclock/>.

²⁵ "2020 Census Illuminates Racial and Ethnic Composition of the Country." Census.gov. United States Census, June 10, 2022. <https://www.census.gov/library/stories/2021/08/improved-race-ethnicity-measures-reveal-united-states-population-much-more-multiracial>.

²⁶ Center for Sustainable Systems, University of Michigan. 2021. "Environmental Justice Factsheet." Pub. No. CSS17-16.

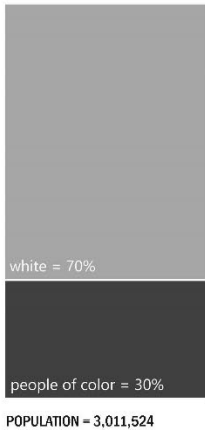
²⁷ "Inequity in Consumption of Goods and Services Adds to Racial–Ethnic Disparities in Air Pollution Exposure." PNAS, March 11, 2019.

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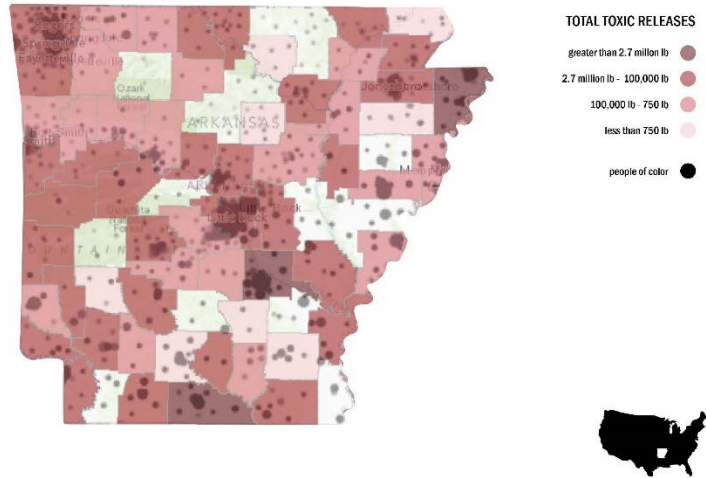
State –

Arkansas

TOTAL AR POPULATION



SOURCES
ArcGIS Map / Race and Ethnicity in the US by Dot Density (Census 2020)
EPA TRI National Analysis / "Where You Live" Map (2021)



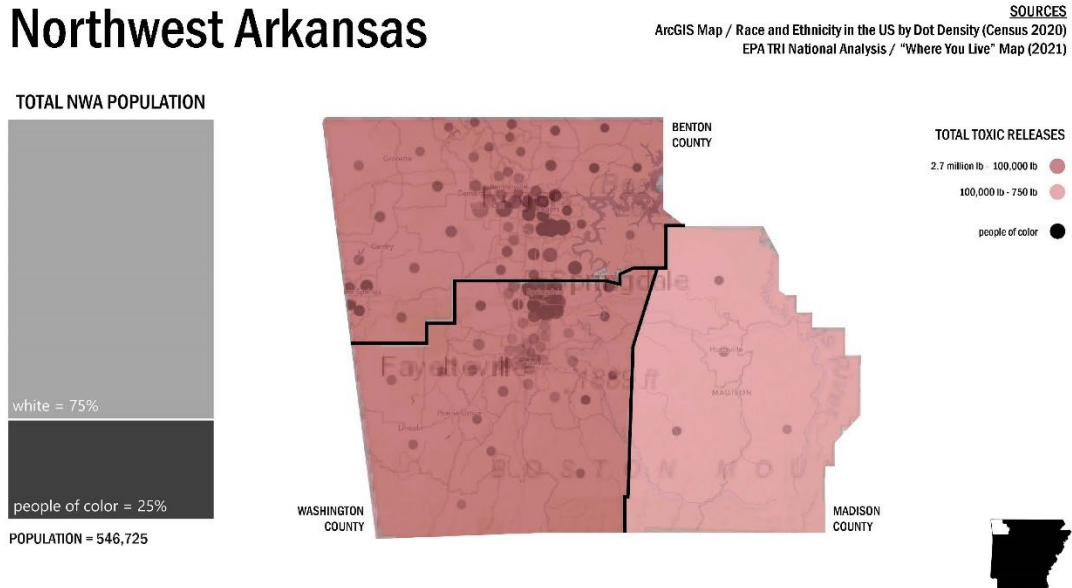
The map above shows a direct correlation between communities of color and areas with higher toxic release levels in Arkansas, the same correlation found in the map of the United States. The darkest red areas have the most toxic releases and large communities of people of color present. Arkansas's total population is 3,011,524 but only 30% of the population are people of color.²⁸ Despite being a small percentage of the population, people of color are more likely to be burdened with environmental and health hazards in Arkansas.

²⁸ US Census "Story Map Series." GIS. Accessed May 1, 2023. <https://mtgis-portal.geo.census.gov/arcgis/apps/MapSeries/index.html?appid=2566121a73de463995ed2b2fd7ff6eb7>

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Metropolitan Area –

Northwest Arkansas



The map above shows a direct correlation between communities of color and areas with higher toxic release levels in Northwest Arkansas, the same correlation found in the map of the United States and Arkansas. NWA is composed of three counties – Benton, Washington, and Madison. Madison county is the most rural of the three and has a low number of toxic releases and less people of color present. The darkest red areas are in Benton and Washington county, they have the most toxic releases and large communities of people of color present. NWA's total population is 546,725 but only 25% of the population are people of color.²⁹ Despite being a small percentage of the population, people of color are more likely to be burdened with environmental and health hazards in NWA.

²⁹ US Census "Story Map Series." GIS.

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Question

How prevalent is environmental injustice throughout the United States, Arkansas, and our community? Environmental injustice conditions are found throughout the United States, Arkansas, and our community of NWA. Across all scales, environmental injustice is still a problem.

Analyzing Fayetteville, Arkansas:

The following series of maps takes a closer look at racist and unjust conditions in the city of Fayetteville, Arkansas. There are four maps, each focused on different indicators of environmental injustice – socioeconomic factors, environmental risks, land use, and housing. The data is from publicly available sources including the EPA and the City of Fayetteville. These maps clearly show where the most at-risk, disadvantaged communities are in Fayetteville.

Fayetteville Population –

Fayetteville's total population is 95,230 of that population, people of color only make up 23% of the population.³⁰

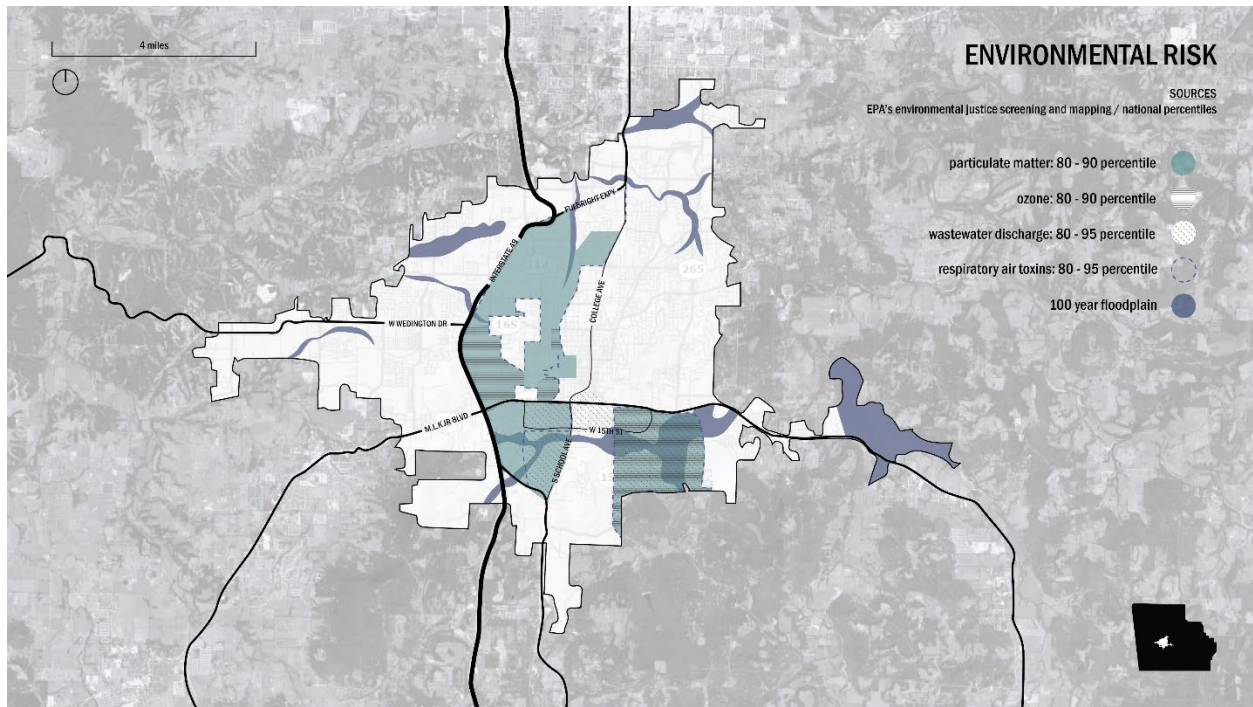
Factors –

1. Environmental = air pollution, water pollution, flooding, land use, parks and trails, and walkability.
2. Socioeconomic = low income, people of color, education, proximity to schools, public and subsidized housing, housing affordability, and renters vs owners.

³⁰ "Fayetteville Demographics and Statistics." Niche, December 13, 2022. <https://www.niche.com/places-to-live/fayetteville-washington-ar/residents/>.

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Map One –



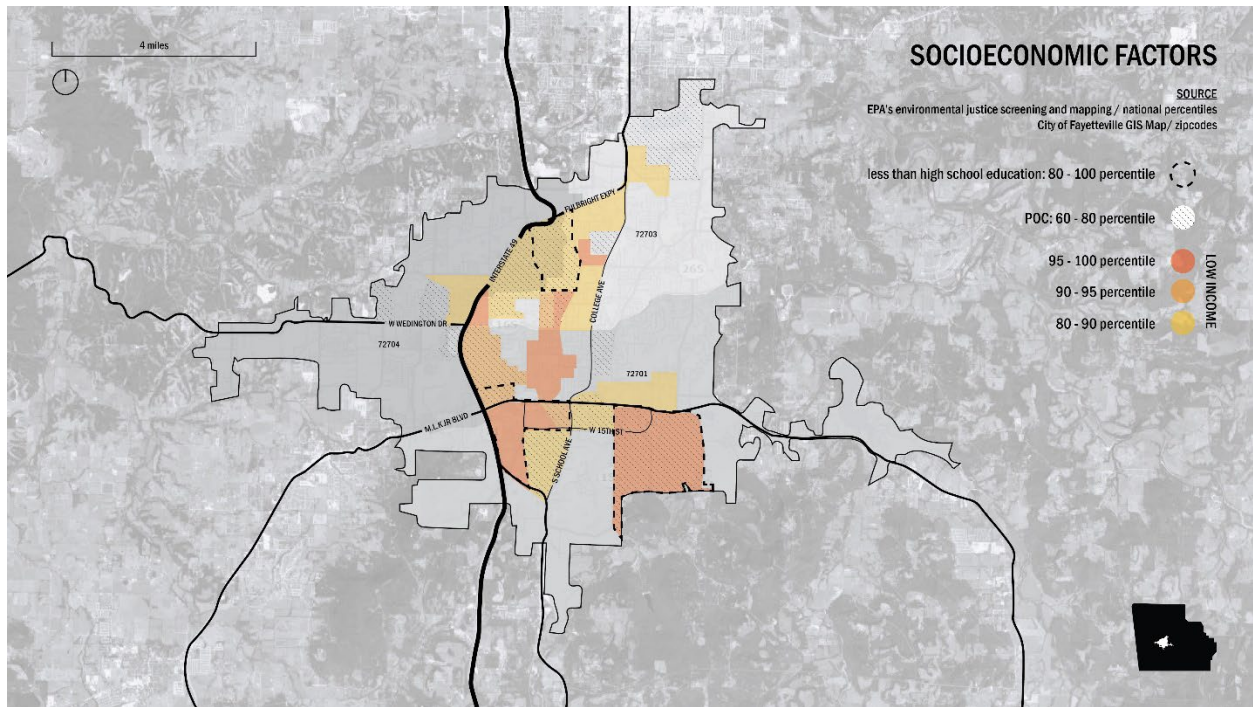
The above map documents environmental risks in Fayetteville, Arkansas. Air pollution via particulate matter, ozone, and respiratory air toxins are shown. Water pollution via wastewater discharge is shown and the 100-year floodplain is also shown. The data is taken from EPA's Environmental Justice Screening and Mapping resource.³¹ This map identifies the areas in Fayetteville subject to the most environmental and health hazards. The 100-year flood plain takes up a large portion of the polluted area in south Fayetteville, below M.L.K Jr. Blvd. Environmental risks are an issue because “negative environmental factors can compound social and economic conditions and lead to higher levels of chronic health problems such as asthma, diabetes, and hypertension.”³² The communities in these areas are more disadvantaged than those living and working in other areas of Fayetteville.

³¹ “EPA's Environmental Justice Screening and Mapping Tool.” EPA. Environmental Protection Agency. <https://ejscreen.epa.gov/mapper/>.

³² University of Michigan, "Environmental Justice Factsheet."

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Map Two –



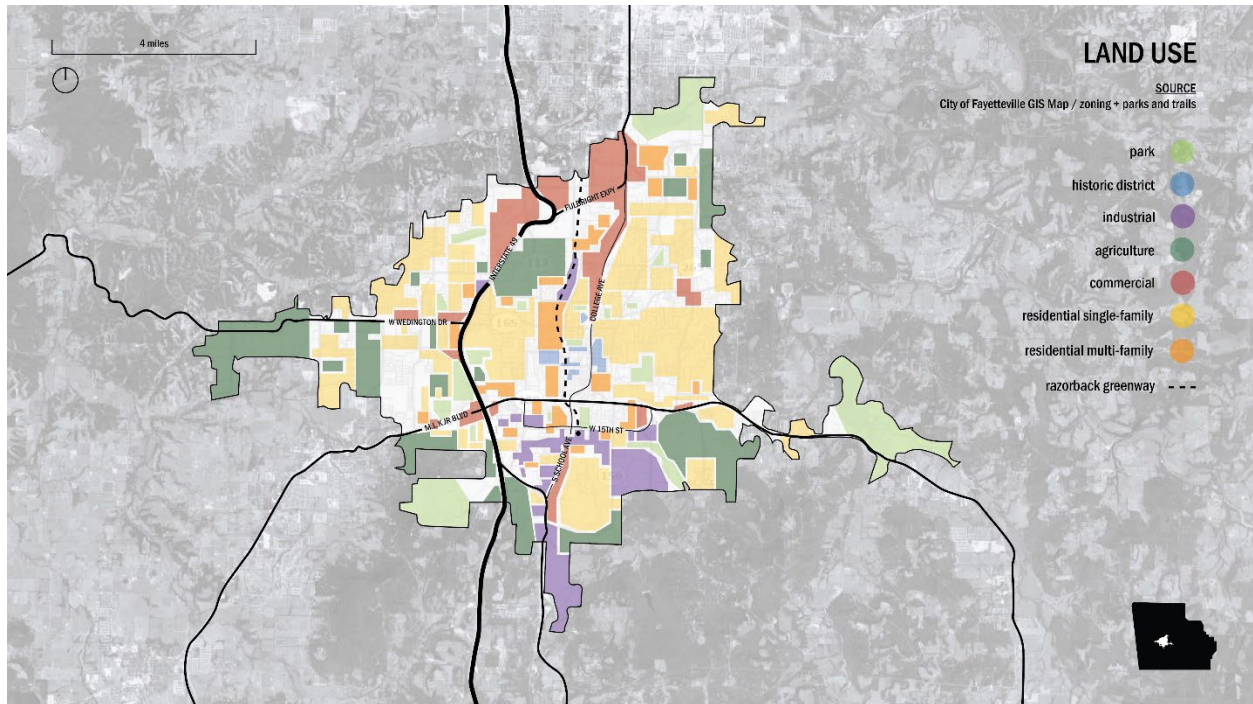
The map above documents where the most disadvantaged communities in Fayetteville are located. Fayetteville’s population with less than high school education, people of color, and low income are shown. This data is from EPA’s Environmental Justice Screening and Mapping resource.³³ The zip codes of Fayetteville are also shown. This data is from the City of Fayetteville GIS Map.³⁴ There are three zip codes in Fayetteville – 72701, 72703, and 72704. Those living in 72704 are less disadvantaged and are burdened with significantly less environmental risks than those in the other two zip codes. The disadvantaged areas above are virtually the same areas shown to have the most environmental risk in map one. There is a direct correlation between where people of color and low-income residents and where there are higher amounts of air and water pollution in Fayetteville.

³³ EPA, “EPA’s Environmental Justice Screening and Mapping Tool.”

³⁴ “City of Fayetteville, Arkansas.” GIS, City of Fayetteville Arkansas. <https://www.fayetteville-ar.gov/384/GIS-Interactive-Maps>.

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Map Three –



The above map documents the parks, trails, and zoning in Fayetteville. This data is from the City of Fayetteville GIS Map.³⁵ City zoning has created conditions of incompatible land use and put Fayetteville's most disadvantaged closest to industry and pollution without providing any sort of buffer zone. Incompatible land uses result in "residential and industrial buildings to be built side by side, leading to a higher population density in areas closer to environmental hazards."³⁶ It is also important to consider the role that greenspace plays in human health. Green spaces improve the social and economic well-being of a community and promote physical and mental health.³⁷ Industrial zoning and the residential areas on the right side of I49 experience the most pollution and are the most disadvantaged in Fayetteville.

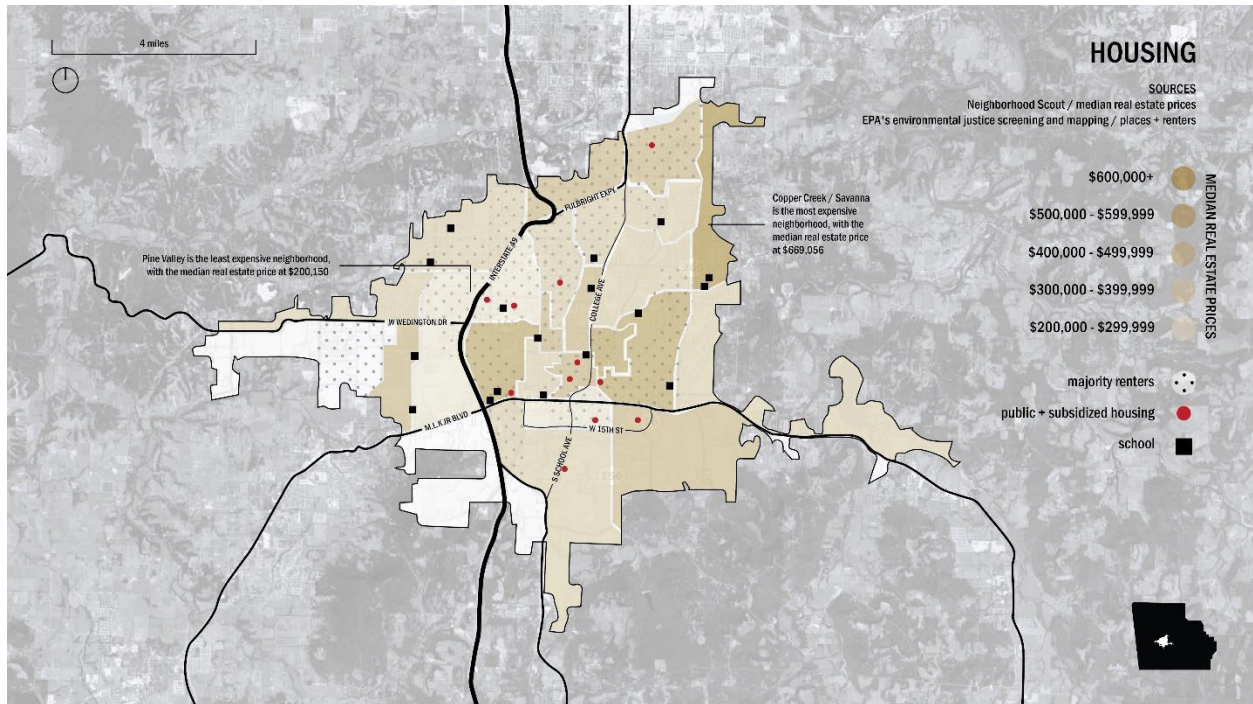
³⁵ GIS, City of Fayetteville Arkansas, "City of Fayetteville, Arkansas."

³⁶ University of Michigan, "Environmental Justice Factsheet."

³⁷ "National Environmental Public Health Tracking Network." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, May 31, 2022. <https://ephracking.cdc.gov/>.

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Map Four -



The above map documents median real estate prices, locations of renters, public and subsidized housing, and locations of schools. This data is from Neighborhood Scout³⁸ and the EPA's Environmental Justice Screening and Mapping resource.³⁹ Schools are often closer to neighborhoods with higher real estate prices. There is a direct correlation between neighborhoods with low real estate prices and less environmental and health hazards. Housing is an important environmental justice issue because “decades of racist housing policy and officially sanctioned segregation have denied people of color the opportunity to build wealth and the opportunity to choose the best neighborhood for their families.”⁴⁰

³⁸ “Fayetteville, AR Real Estate & Demographic Data.” Neighborhood Scout. <https://www.neighborhoodscout.com/ar/fayetteville>.

³⁹ EPA, “EPA's Environmental Justice Screening and Mapping Tool.”

⁴⁰ Warren for Senate, “Fighting for Justice as We Combat the Climate Crisis.”

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Question

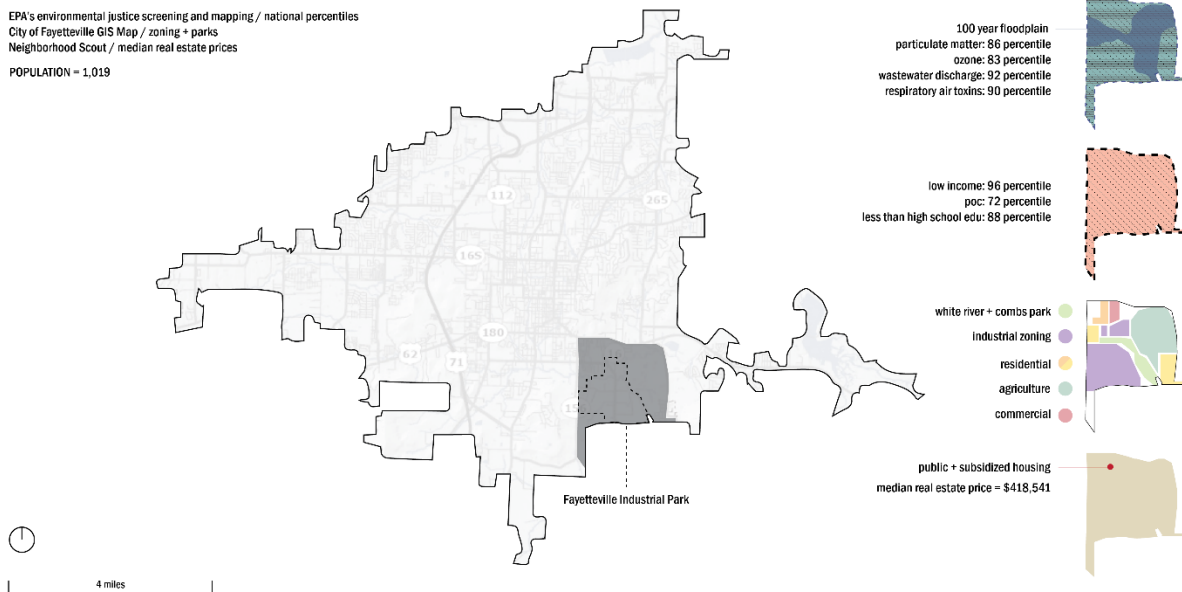
Is there an area in Fayetteville that is affected by environmental injustice? The areas in Fayetteville most affected by environmental injustice are the tract surrounding Fayetteville's industrial park and the land in-between College Ave and I 49.

South Fayetteville's Environmental Sink:

Based on the findings from the four maps in the previous section, I decided to investigate the tract surrounding Fayetteville's Industrial Park, as shown below. This area was consistently shown on all four maps as an area of interest. This tract has a population of 1,019 people. It has high percentiles of air and water pollution, low income, people of color, and less than high school education. It is mostly industrially zoned, putting the surrounding park and residential area at risk of hazards. There is public and subsidized housing on the tract as well. Due to these conditions, I have named the area "South Fayetteville's Environmental Sink."

SOUTH FAYETTEVILLE'S ENVIRONMENTAL SINK

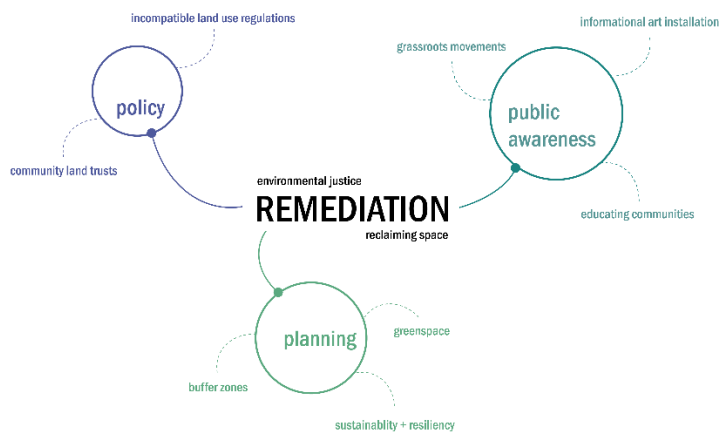
EPA's environmental justice screening and mapping / national percentiles
City of Fayetteville GIS Map / zoning + parks
Neighborhood Scout / median real estate prices
POPULATION = 1,019



Results – Remediation + Reclamation:

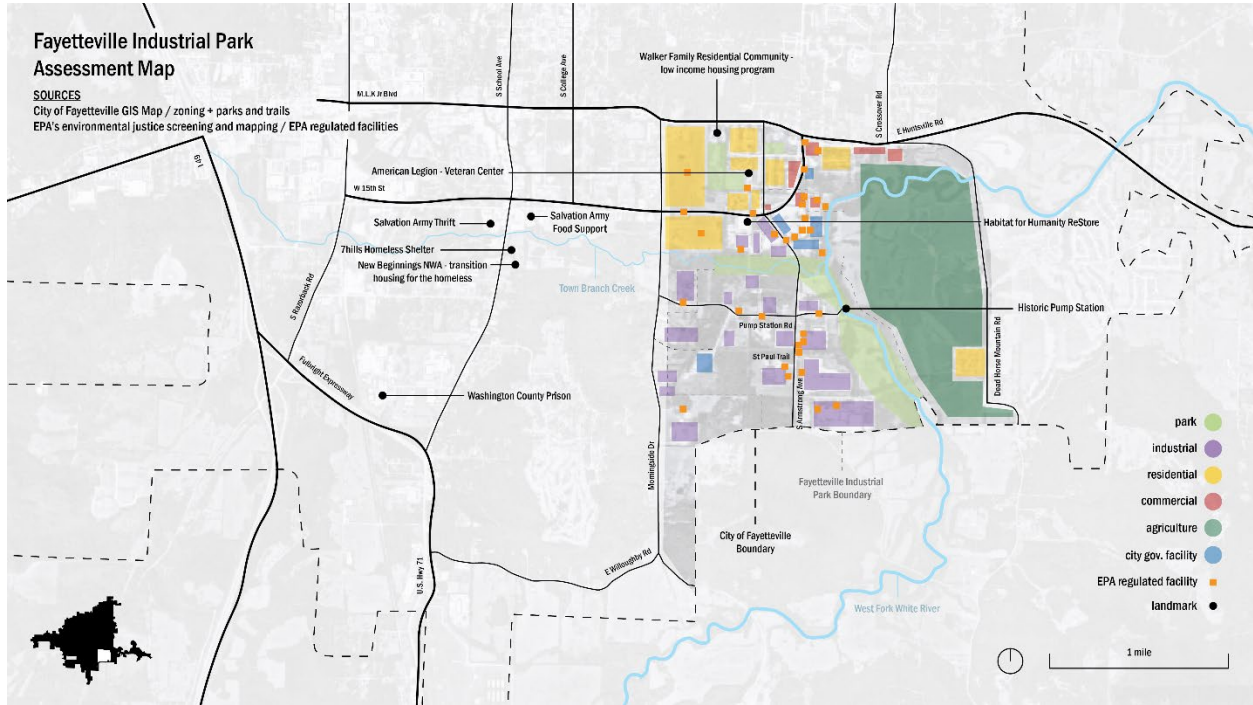
In this section I will take a closer look at “South Fayetteville’s Environmental Sink.” Publicly available government mappings and imagery are used to investigate spatial conditions, pollution sources, context, history, stakeholders, and unjust conditions in Fayetteville’s Industrial Park. Remediation is the first step, A contextual map of “South Fayetteville’s Environmental Sink” is shown to better understand the conditions surrounding Fayetteville’s Industrial Park.

Initial Ideas –



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ONE, Remediation –



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Remediation of the industrial park means there would be pollution cleanup of the EPA regulated facilities. There are 34 EPA regulated facilities that are all either water dischargers, air pollution, or hazardous waste facilities.⁴¹ Some of these facilities include the Fayetteville Recycling and Trash Service, Fayetteville Sewer Maintenance, auto wrecking and salvage yard, carpentry and wood suppliers, manufacturing and distribution, and commercial metal fabrication. There are several ways to remediate the different types of pollution created by these various industries. Examples that would work best in the industrial park are shown below –

1. Wastewater – chlorination or UV radiation ⁴²
2. Particulate matter – proper air ventilation systems in homes ⁴³
3. Ozone – planting trees and vegetation ⁴⁴
4. Respiratory air toxins – providing public transportation ⁴⁵
5. Hazardous waste – removal and disposal to an approved hazardous waste facility ⁴⁶

⁴¹ EPA, "EPA's Environmental Justice Screening and Mapping Tool."

⁴² "Wastewater Technology fact sheet". U.S. environmental protection agency.
https://www.epa.gov/sites/default/files/2015-06/documents/disinfection_small.pdf.

⁴³ "Particulate Matter Indoors." American Lung Association. <https://www.lung.org/clean-air/at-home/indoor-air-pollutants/particulate-matter>.

⁴⁴ "Removal of Ozone Air Pollution by Terrestrial Ecosystems." Eos, December 22, 2021.
<https://eos.org/editors-vox/removal-of-ozone-air-pollution-by-terrestrial-ecosystems>.

⁴⁵ "Actions You Can Take to Reduce Air Pollution | Ground-Level Ozone | New England | US EPA."
<https://www3.epa.gov/region1/airquality/reducepollution.html>.

⁴⁶ "6 Proven Environmental Cleanup Methods." Hazardous Waste Experts, January 20, 2020.
<https://www.hazardouswasteexperts.com/6-proven-environmental-cleanup-methods/>.

Flooding is also an issue in "South Fayetteville's Environmental Sink" because the White River and Town Branch Creek run through the area. A large portion is part of the "estimated 100-year flood plain." According to the EPA, this data helps to identify "socially and economically vulnerable communities located within the estimated 100-year floodplains."⁴⁷ Designing to prevent flooding in the areas around the river and creek would help reduce the risk of damage to buildings during a flooding event. Further investigation of specific flooding mitigation in "South Fayetteville's Environmental Sink" was one of the limitations of my research. But there are several rules are often followed when building in a flood plain, examples are shown below –

1. "The lowest building floor elevation is at or higher than the floodplain elevation."⁴⁸
2. "Design the foundation (and any other portions subject to flooding) to withstand flooding loads and conditions."⁴⁹
3. "Use flood-damage-resistant materials to create portions of the home below the design flood level."⁵⁰
4. "Lower the elevation of land along the river and raise the elevation of pads for buildings."⁵¹
5. Use soil from on-site to build up pads for infrastructure and buildings.⁵²

⁴⁷ "EJ Screen Map Descriptions." EPA. Accessed May 10, 2023. <https://www.epa.gov/ejscreen/ejscreen-map-descriptions>.

⁴⁸ "Best Practices for Home Building on Floodplains." 2-10 Blog, January 2, 2020. <https://www.2-10.com/blog/best-practices-for-home-building-and-floodplains/>.

⁴⁹ 2-10 Blog, "Best Practices for Home Building on Floodplains."

⁵⁰ 2-10 Blog, "Best Practices for Home Building on Floodplains."

⁵¹ "Building Smart in the Floodplain." U.S. Climate Resilience Toolkit, August 9, 2021. <https://toolkit.climate.gov/case-studies/building-smart-floodplain>.

⁵² U.S. Climate Resilience Toolkit, "Building Smart in the Floodplain."

TWO, Reclamation –

Reclamation of “South Fayetteville’s Environmental Sink” would mean turning industrial space into social, community driven space. Architecture is a driver of the built environment. It participates and perpetuates environmental unfreedoms in multiple ways.⁵³ There United Nation’s 17 Sustainable Development Goals define how societies should progress to become sustainable, equitable, safe, healthy, and educated. Goals 9, 10, and 11 most closely align with the goals of this capstone. These three goals begin to provide a general framework for reclamation. Each of these goals are listed below⁵⁴ –

9 = “Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.”

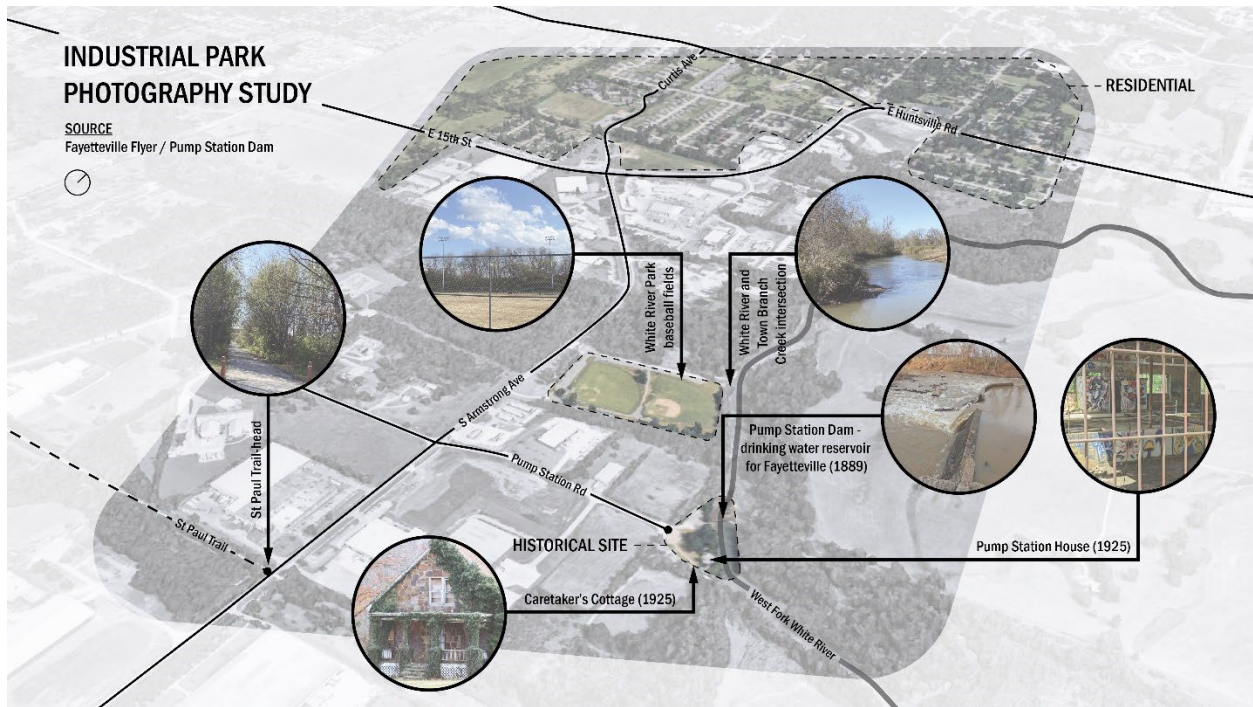
10 = “Reduce inequality within and among countries.”

11 = “Make cities and human settlements inclusive, safe, resilient, and sustainable.”

⁵³ “Environmental Justice and the Built Environment, a Teach-In.” CMU School of Architecture, last modified October 16, 2020. <https://soa.cmu.edu/reeducate>

⁵⁴ “The 17 Goals | Sustainable Development.” United Nations. United Nations. Accessed May 1, 2023. <https://sdgs.un.org/goals>.

Site History and Photography Study –



There are three historical landmarks located in “South Fayetteville’s Environmental Sink,” including Pump Station Dam, Pump Station House, and Caretaker’s Cottage. The dam was built in 1889, the “small reservoir served as Fayetteville’s first municipal drinking water source. Water was pumped from here to Mt. Sequoyah, where it was filtered and stored before being gravity-fed to Fayetteville homes and businesses.”⁵⁵ Pump Station House and Caretaker’s Cottage were built in 1925 and were the management headquarters and living facilities for the workers of the dam. All these structures are important to the history of Fayetteville and deserve recognition and restoration. The landmarks also define “South Fayetteville’s Environmental Sink” as a unique place with its own history and importance. When reclaiming this area, the historical structures should be celebrated.

⁵⁵ “Have a Look at the Pump Station Dam Area.” Fayetteville Flyer, January 30, 2013. <https://www.fayettevilleflyer.com/2013/01/30/have-a-look-at-the-pump-station-dam/>.

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Guiding Principles of Reclamation –

EPA Smart Growth Principles ⁵⁶

1. Mix land uses.
2. Create a range of housing opportunities and choices.
3. Create walkable neighborhoods.
4. Foster distinctive, attractive communities with a strong sense of place.
5. Preserve open space, farmland, natural beauty, and critical environmental areas.

Other Principles

1. Create a “third place” – community space for residents that is separate from work and home.⁵⁷
2. Incompatible land use policy – “land uses inherently incompatible with industrial activities, private investment structures, etc. should be minimized because of the greater economic value of the land and its improvements for the community.” ⁵⁸

All these principles are visualized through diagrams to show how “South Fayetteville’s Environmental Sink” could be transformed into a connected and thriving community, which utilizes and protects the adjacent White River and Town Branch Creek. The diagrams are shown on the following pages.

⁵⁶ “This Is Smart Growth.” EPA Washington, D.C. U.S. Environmental Protection Agency, 2014.

⁵⁷ “Project for Public Spaces.” Ray Oldenburg. RSS, December 31, 2008.
<https://www.pps.org/article/roldenburg>.

⁵⁸ “Equitable Development and Environmental Justice.” EPA. Environmental Protection Agency, November 14, 2022. <https://www.epa.gov/environmentaljustice/equitable-development-and-environmental-justice#examples>

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Before + After –



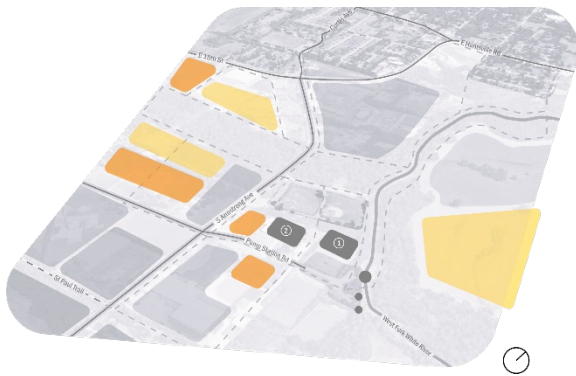
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Principles in Action –

1. Implementing mixed land uses with green buffer zones / phasing out non-compatible land uses (i.e., industrial zones adjacent to residential zones).



6. Providing a range of housing opportunities with new multi-family and single-family housing.

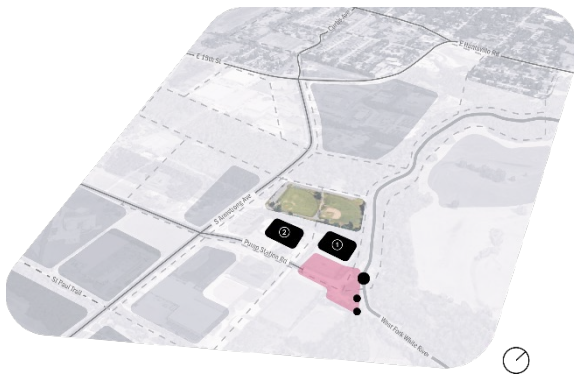


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7. Increasing walkability with new trails to connect neighborhoods with greenspaces.

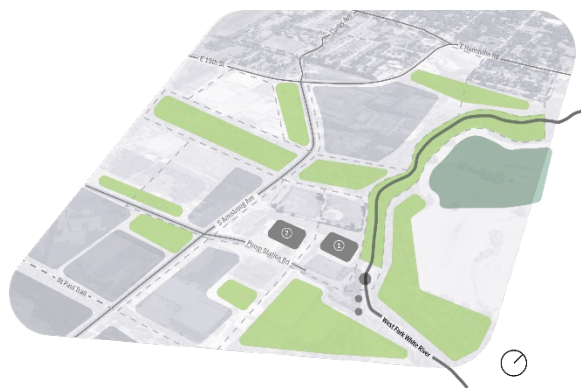


8. Fostering a community with a strong sense of place with a new public square to highlight the white river, historical dam, and surrounding historical structures. Creating “third places” with a new community center and outdoor center to celebrate and protect the river and creek.



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9. Preserving nature by creating green infrastructure surrounding the river and creek to protect the areas from industrial activities. Creating "third places" with new green spaces and parks that provide outdoor spaces for residents, which improve physical and mental health.



Limitations:

There were limitations to my research that were not addressed due to time. The topics of environmental injustice and racism are inherently broad. It covers nearly all aspects of life from the planet, people, economics, social conditions, civil rights, climate change, racism, poverty, and more. The environmental justice movement has a large history that began decades before the 1980s, which is where I began my brief timeline. There are many voices, studies, and writings that were not addressed. Expanding on the history of the movement would entail a larger timeline that documents important leaders and past impactful communities, such as the infamous "Cancer Alley" in New Orleans.

I was also limited in my remediation and reclamation research. The necessary groundwork on the community level to make reclamation a reality is missing because the data I used is based on publicly available maps. Groundwork would include working with community stakeholders and defining a site and site-specific constraints. More in-depth research of the existing pollution would also need to be conducted, specifically how the trucking industry in "South Fayetteville's Environmental Sink" affects the levels of air pollution. The issue of gentrification also would need to be considered as part of the plan for reclamation. Community land trusts are an option to combat gentrification. Engagement with the current community surrounding the industrial park is necessary to make reclamation possible.

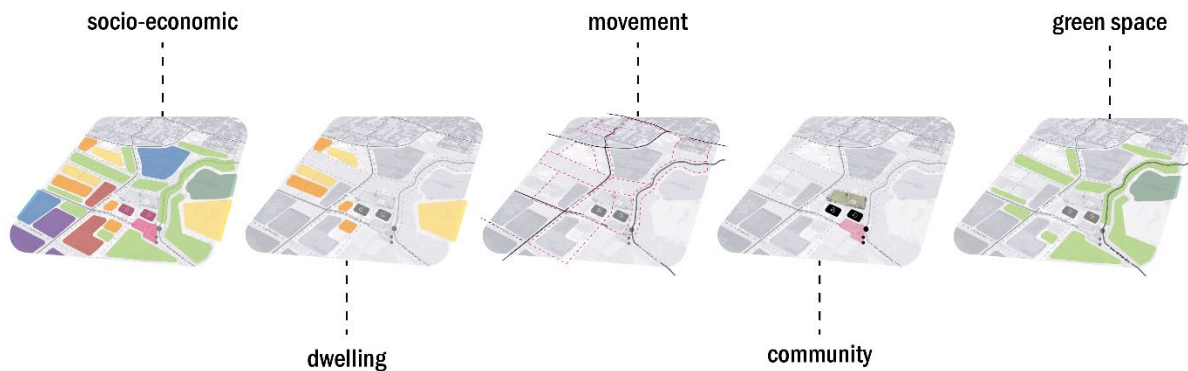
Discussion:

This capstone is valuable because it provides a new perspective on living conditions in Fayetteville, Arkansas. Fayetteville is known for its strong-knit community, excellent schools, recreational culture, and as a "Top 10 Places to Live in the US."⁵⁹ But not all residents are privileged to experience Fayetteville in this manner. Many residents of Fayetteville experience unjust, racist, polluted spaces. Residents of south Fayetteville, surrounding the industrial park, lack the decision-making ability to choose safe, healthy environments to live, work, and learn. Industrial pollution in "South Fayetteville's Environmental Sink" drastically affects community development and the current conditions within the community. The community in this area is impacted by these unjust spatial conditions socially, economically, physically, and mentally. Due to these conditions, disadvantaged residents experience health, education, economic, housing disparities and more. Fayetteville is not a great place to live for all its residents, but efforts can and should be made to combat these unjust and racist spatial conditions.

⁵⁹ Fayetteville, AR - Official Website, "Fayetteville Ranks Fourth among Best Places to Live."

Conclusion + Recommendations:

As shown earlier, the problems found in Fayetteville's industrial park are not unique. Environmental injustice and racism are global problems that can be found in nearly every place. The fight for environmental justice is still needed across America, in Arkansas, and in our community. My research brings visibility to Fayetteville's Industrial Park that is faced with environmental injustice. The city of Fayetteville has the facilities to improve conditions in this small area of our town, but the leaders of Fayetteville must first recognize the spatial inequalities that have resulted from their government zoning policies.



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In conclusion, recommendations to reduce inequalities and improve quality of life in "South Fayetteville's Environmental Sink" include implementing mixed land uses with green buffer zones and phasing out non-compatible land uses to improve socioeconomic opportunities. Other recommendations include providing more housing options, increasing walkability, and providing community spaces and green spaces.

Next steps, following the above recommendations, would be to improve accessibility by connecting the new trail system to the larger Fayetteville greenway and public transportation systems. Other steps include employing urban food gardens, community land trusts, protective government policies, and a public awareness campaign. Public awareness is needed to educate the communities and families within "South Fayetteville's Environmental Sink," and the citizens, leaders, and lawmakers of Fayetteville before this area can be transformed into a healthy, thriving community that is free of environmental and health hazards.

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