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Incorporating Environmental Justice Communities in Environmental Policy Recommendations for the City of Huntsville

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Incorporating Environmental Justice Communities in Environmental Policy Recommendations for the City of Huntsville

by

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Dedication:

This project is dedicated to the many people who made it possible. First and foremost, I'd like to thank my Project Director, Dr. Shuang Zhao, Assistant Professor of Political Science, for guiding me with her environmental justice expertise throughout the entire project timeline. Second, Dr. Nicholaos Jones, Department Chair of Philosophy and Political Science, for his support of the project. Following that, I'd like to thank my friend Ankur Shah for his advice on how to format geospatial data and for directing me to the best land surface temperature dataset. Next, Marie Bostick, Executive Director of the Land Trust of North Alabama, for keeping concerned Huntsville citizens like myself up to date on the city's efforts toward sustainability. Also, thanks to Daniel Tait, Executive Director of Energy Alabama, for his insights on local energy policy and Huntsville Utilities. Finally, I'd like to thank Dr. Noelle Hunter, Clinical Assistant Professor of Political Science, for reminding me of the liminal nature of cities and the fact that we can design the futures we want to live in. Thank you to the UAH Honors College for providing me with the opportunity to turn my passions into a project.

Abstract

Huntsville, Alabama, is on the verge of falling behind its peer cities in terms of sustainable progress, and the city's underserved neighborhoods, particularly those with low-income residents of color, are bearing the brunt of the burden. While the city seeks sustainability solutions through reports, committees, and commissions, neither Huntsville nor the state of Alabama has an official government definition of what constitutes an environmental justice (EJ) community, where these communities are located in Huntsville, and how they perform in various sustainability-related sectors. This study seeks to fill a knowledge gap by identifying and mapping environmental justice communities in Huntsville, analyzing their sustainability performance data in sectors aligned with new city goals, and developing a list of recommendations for best practices that incorporate these communities. This study used a combination of local and federal map data to identify Huntsville census tracts that met certain income, racial, and environmental criteria to be designated as EJ communities, as well as data on their performance in the natural environment, built environment, energy, transportation, and food security sectors. This study found that 23 census tracts in Huntsville qualify as environmental justice communities, accounting for more than 35 percent of the city's population. When compared to Huntsville as a whole, EJ tracts had lower average performances in sustainability sectors, but specific tracts were identified as extremely poor performers that should be prioritized for improvement projects using federal funding. The local government must ensure that these communities are included in the city's new sustainability institutions. In addition to hiring full-time city staff members dedicated to sustainability, Huntsville must formally define what an EJ community is and where they are located, as well as map sustainability performance for all city census tracts, to ensure that all parts of the city are included in this sustainable future.

Introduction

Huntsville, Alabama, earning the name of the "Rocket City" after experiencing major growth during its leading role in the space race of the 1960s, is now experiencing another period of tremendous population and economic growth. While this growth and economic development has arguably been beneficial to the reputation and general standard of living of the metro region as a whole, this progress has not been true for all neighborhoods in Huntsville. Little policy progress was made before 2023 to ensure that Huntsville develops and grows in a way that is environmentally sustainable and resilient to the effects of climate change, which disproportionately harms diverse, low-income communities.

In 2010, Huntsville published the "Green 13" report, a 101-page, $75,000 plan to make the city one of the nation's most sustainable.[1] The plan was never fully implemented despite the cost, and the accompanying report cannot be located online. Operation Green Team, which primarily focuses on recycling, litter, waste, and landscaping, is the only permanent environmental program administered by the city government as of April 2023. At the time of writing, the City of Huntsville does not have an official department, office, or full-time employee dedicated to the study and implementation of sustainability initiatives, particularly in climate impacts, energy burden, and environmental justice.

However, through ongoing citizen engagement beginning in early 2022, Huntsville Mayor Tommy Battle established the Huntsville Environmental Sustainability Committee (HESC), a group of 19 experts to review and update sustainability goals outlined in the 2010

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[1] Steve Doyle, "Move over Portland: "Green 13" Provides Blueprint for Making Huntsville One of Nation's Most Sustainable Cities," Al, last modified February 27, 2010, https://www.al.com/breaking/2010/02/move_over_portland_green_13_ta.htm

report and "provide an actionable program for moving forward."[2] In October 2022, HESC conducted a public open house survey and an online survey to collect Huntsville residents' opinions and priorities on six sustainability sectors: natural environment, built environment, energy, transportation, food security, and environmental justice.[3] Feedback from 80 participants revealed that top sector priorities were the natural environment, transportation, and the built environment.[3] Out of 56 participants who wrote their zip codes on comment cards, only one response was received from zip code 35801, which encompasses much of North Huntsville, and two responses were received from zip code 35805, which encompasses much of West Huntsville; the online responses for these regions were also expectedly low.[4] North Huntsville and West Huntsville are the primary communities in Huntsville with a high proportion of low-income residents of color.[5]

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[2] "Huntsville Environmental Sustainability Committee," City of Huntsville, last modified April 20, 2023, https://www.huntsvilleal.gov/environment/green-team/education-awareness/sustainability-energy-initiatives/huntsville-environmental-sustainability-committee/.

[3] Laura McPhail, "Community Weighs in on Huntsville's Environmental Priorities," City of Huntsville Blog, last modified December 16, 2022, https://cityblog.huntsvilleal.gov/community-weighs-in-on-huntsvilles-environmental-priorities/.

[4]"Huntsville Environmental Sustainability Committee Report to the Mayor," last modified 2023, file:///Users/jaxontolbert/Downloads/HuntsvilleEnvironmentalSustainabilityReport2023%20(1).pdf

[5] "Justice Map - Visualize Race and Income Data for Your Community," Justice Map, accessed December 1, 2022, https://www.justicemap.org/2020/.

On April 20, 2023, the Huntsville Environmental Sustainability Committee issued a comprehensive 80-page report with policies and recommendations for the mayor concerning the natural environment, the built environment, energy, transportation, and food security, with an environmental justice perspective integrated into each sector. On page 34, the committee recommends establishing a City Sustainability Commission with mayor-appointed experts to advise the city government on policy issues and a Sustainability Officer within the mayor's office to coordinate sustainability initiatives across city departments.[4] Additionally, Mayor Battle confirmed that the Sustainability Commission will be established and codified by city ordinance in the coming months.[6] It is currently unknown how many commissioners the mayor will appoint, what sectors they will represent, and whether the Sustainability Officer will be a full-time city staff member, though this is assumed.

While the 2023 sustainability report contains countless excellent recommendations, they are only suggestions, and both Mayor Battle and the Huntsville City Council will get to decide what policy is made a reality. The lack of response data from North and West Huntsville which helped create the report, suggests Huntsville's low-income communities and communities of color are at risk of being omitted from the conversation and eventual policy solutions. In addition, the report does not include any geospatial data mapping or ranking of environmental problems in specific city areas. Although the report contains perspectives on environmental justice, it does not provide a standard definition of what an environmental justice community is, nor does it map where these communities are located in the city. While this was not the original intent of the study, it would be useful in prioritizing policies, given that each Huntsville

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[6] "Creating a More Sustainable Huntsville," City of Huntsville, last modified April 20, 2023, https://www.huntsvilleal.gov/creating-a-more-sustainable-huntsville/.

neighborhood is unique and may perform differently in sustainability-related sectors. In addition, determining which neighborhoods perform the worst can assist the Commission and Sustainability Officer in determining where policies and tax dollars can have the greatest impact. In light of this, the purpose of this study is to fill the existing knowledge gap by identifying where environmental justice communities are located in Huntsville, collecting existing data relevant to the performance of these communities in sustainability sectors, and analyzing this performance to determine what measures the City of Huntsville should take to ensure that these communities enjoy an equal level of environmental protection and participation in the public policy process.

Literature Review

Before moving forward, it is necessary to define environmental justice and gain a deeper understanding of the movement's history and the field. As the effects of the climate crisis become more and more tangible with each passing day, the topic of environmental justice has taken a front seat in the rhetorical and policy discussions of today's political landscape. Environmental justice, often abbreviated as EJ, is defined as "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."[7] With grassroots origins dating back to civil rights demonstrations in the 1960s, the modern environmental justice movement is regarded as having officially begun with high-profile hazardous waste protests of the 1980s and the first National People of Color Environmental Leadership Summit in 1991.[8]

Founded primarily by people of color, the environmental justice movement seeks equal protection and participation in the environmental policy process for low-income and communities of color, which disproportionately bear the burden of environmental impacts.[7] Many of these disproportionate outcomes, such as an increased risk of cancer from toxic air exposure, are evident at the neighborhood level, adversely impacting the health and well-being

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[7] "Environmental Justice," US EPA, last modified September 30, 2022, https://www.epa.gov/environmentaljustice.

[8] Robert D. Bullard and Glenn S. Johnson, "Environmentalism and Public Policy: Environmental Justice: Grassroots Activism and Its Impact on Public Policy Decision Making," *Journal of Social Issues* 56, no. 3 (2000): xx, doi:10.1111/0022-4537.00184.

of people of color, particularly African-Americans living in highly segregated urban communities.[9]

The EPA describes these regions as "overburdened communities" which are "minority, low-income, tribal, or indigenous populations or geographic locations in the United States that potentially experience disproportionate environmental harms and risks."[10] President Biden's Justice40 executive order identifies a community as "disadvantaged" if it is above a certain threshold for specific environmental and socioeconomic burdens, surrounded by other disadvantaged communities, or meets at least the 50th percentile for low income.[11]. Furthermore, 2022's landmark Inflation Reduction Act (IRA), which contains key environmental justice funding provisions, classifies these communities as "low-income", making them eligible for certain funding opportunities.[12] Despite the fact that all of these names appear to refer to the same places, there appears to be no unified term for describing these communities, and there is no federal use of the term "environmental justice community" either. However, Justice40 and the

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[9] Rachel Morello-Frosch and Bill M. Jesdale, "Separate and Unequal: Residential Segregation and Estimated Cancer Risks Associated with Ambient Air Toxics in U.S. Metropolitan Areas," *Environmental Health Perspectives* 114, no. 3 (2006): xx, doi:10.1289/ehp.8500.

[10] "EJ 2020 Glossary," US EPA, last modified August 18, 2022, https://www.epa.gov/environmentaljustice/ej-2020-glossary.

[11] "Methodology and Data," Climate and Economic Justice Screening Tool., accessed December 1, 2022, https://screeningtool.geoplatform.gov/en/methodology#3.31/33.87/-90.93.

[12] "Environmental Justice (EJ) Provisions of the 2022 Inflation Reduction Act," Harvard Law School, accessed December 1, 2022, https://eelp.law.harvard.edu/wp-content/uploads/EELP-IRA-EJ-Provisions-Table.pdf.

Inflation Reduction Act are two major initiatives using census tracts as the base geographic boundary to identify EJ communities. These tracts are "small, relatively permanent statistical subdivisions of a county" that contain detailed socioeconomic data of that specific area.[13]

At the state level, Alabama lacks an official definition for an environmental justice community or a methodology for identifying them; as of the summer of 2022, only thirteen states nationwide had official definitions.[14] The closest possible equivalent that Alabama has recognized are Opportunity Zones created out of the Tax Cuts and Jobs Act to foster private development in underserved communities: these zones are census tracts "with a poverty rate of at least 20 percent and a median family income of less than 80 percent of the statewide or area median income."[15] Unlike Justice40, the Opportunity Zones definition only takes into account income and disregards environmental and other socioeconomic factors. The zones came with political barriers as well, as Alabama Governor Kay Ivey only authorized 158 of the 629 Alabama tracts that qualified as Opportunity Zones in 2018.[15] There were 10 of these tracts authorized in Huntsville, which are recognized by the City of Huntsville and included as a map layer in a public interactive mapping tool built by the Huntsville Geographic Information System

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[13] US Census Bureau, "Glossary," Census.gov, last modified April 11, 2022, https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_13.

[14] Marisa Sotolongo, "Appendix A: Methodology for Calculating Populations Living in EJ Communities in U.S. States," Initiative for Energy Justice, last modified June 2022, https://iejusa.org/wp-content/uploads/2022/06/Justice40-Blog-Post-Appendix_Methodology-1.pdf.

[15] "Opportunity Zones Program," ADECA, accessed April 22, 2023, https://adeca.alabama.gov/opportunityzones/.

(GIS) office.[16] This map and its numerous data layers were used extensively in this study. At the time of this writing, the Justice40 tracts are not listed in Huntsville's GIS database.

Overall, there appears to be a disconnect between different levels of government's definitions of an environmental justice community. While some progressive states and cities have definitions in place, this does not appear to be the case in more conservative states like Alabama, nor do they appear to be quick to adopt federal definitions. While the Justice40 definition appears to be the most inclusive mass solution thus far, it does not appear to have been adopted by all federal departments. This general patchwork of EJ community definitions emphasizes the importance of cities creating their own definitions through existing or new methodologies, especially in states without a definition, to fill in these gaps

[16] "Interactive Maps," City of Huntsville, accessed April 22, 2023, https://maps.huntsvilleal.gov/public/.

Methodology

The methodology for this study is divided into two parts: first, identifying environmental justice communities in Huntsville using income, demographic, and environmental risk data, and second, identifying sustainability performance in these communities based on existing data in the natural environment, built environment, energy, transportation, and food security sectors.

Methodology for Identifying Huntsville Environmental Justice Communities

Because neither the state of Alabama nor the City of Huntsville government has an officially published definition of what an environmental justice community is, a new methodology based on the most recent statistical data was developed to identify these communities in Huntsville. 2020 census tracts were used for community boundaries for two reasons: they are widely used subdivisions in publicly available federal and state mapping tools, and they can frequently be linked to federal funding programs.

To qualify as an environmental justice community, a Huntsville census tract had to be identified as qualifying for at least two of the following three categories: a low-income community, a community of color, or an environmentally at-risk community.

To determine low-income status, This study uses the U.S. Treasury's definition of low-income from Title 26 of the US tax code, which defines a "low-income community" as a census tract where "the poverty rate for such tract is at least 20 percent [or] in the case of a tract located within a metropolitan area, the median family income for such tract does not exceed 80 percent of the greater of statewide median family income or the metropolitan area median family income."[17]

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[17] "Low-income Community," Legal Information Institute, accessed April 22, 2023, https://www.law.cornell.edu/definitions/uscode.php?width=840&height=800&iframe=true&def_

In order for a Huntsville census tract to qualify as a community of color, this study defines the tract as needing to have a minority population greater than or equal to twice the statewide percentage. This was based on Maryland's definition which is a "community with a low-income or minority population greater than twice the statewide average."[18] Maryland was chosen as a framework because African-Americans make up nearly an equal portion of the population in each state.[19] Statewide, Alabama's minority population is estimated at 35 percent as of 2021.[20] This means that in order for a Huntsville census tract to qualify as a community of color for this project, the minority population must be greater than or equal to 70 percent of the tract population. The racial categories included the percentage of the following eight groups for each tract: White, Black, Asian, Hispanic, Two or More Races, Indigenous, Pacific Islander, and Some Other Race.

To ensure the most up-to-date demographics, poverty, median income, and race statistics for all locations were all pulled from Census Reporter's public map, an online interactive census

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id=26-USC-1923830901-332395025&term_occur=999&term_src=title:26:subtitle:A:chapter:1:subchapter:A:part:IV:subpart:D:section:45D.

[18] Maryland Department of the Environment, accessed April 22, 2023, https://mde.maryland.gov/Documents/MDE_EJ_Env%20Justice%20Policy_Final_Dec2020.pdf

[19] "Census Profile: Maryland," Census Reporter, accessed April 22, 2023, https://censusreporter.org/profiles/04000US24-maryland/.

[20] Census Profile: Alabama," Census Reporter, accessed April 22, 2023, https://censusreporter.org/profiles/04000US01-alabama/.

tool that pulls from the results of the 2021 American Community Survey.[21] The American Community Survey (ACS) is a program of the U.S. Census Bureau that pulls annual data that "helps local officials, community leaders, and businesses understand the changes taking place in their communities."[22]

Huntsville census tracts facing disproportionate environmental risks were found using EJScreen, a free and public environmental justice screening tool from the Environmental Protection Agency.[23] This was done by utilizing the threshold map tool, which uses either an EJ or supplemental index to highlight census block groups, which are smaller subdivisions of census tracts, that are above a certain percentile for up to 12 of the following environmental factors: particulate matter 2.5, ozone, diesel particulate matter, air toxics cancer risk, air toxics respiratory hazard index, traffic proximity, lead paint, rmp facility proximity, hazardous waste proximity, superfund proximity, underground storage tanks, and wastewater discharge.

Due to the environmental justice-related nature of this project, the EJ Index was chosen, which "combines [the low-income and people of color populations] with a single environmental factor."[24] EJScreen provides the option to compare index values with U.S. or state values; for this project, the indexes were compared with the rest of Alabama to provide context for how

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[21] Census Reporter: Making Census Data Easy to Use, accessed April 22, 2023, https://censusreporter.org/.

[22] US Census Bureau, "American Community Survey (ACS)," Census.gov, last modified July 18, 2022, https://www.census.gov/programs-surveys/acs.

[23] "EJScreen," accessed April 22, 2023, https://ejscreen.epa.gov/mapper/.

[24] "EJ and Supplemental Indexes in EJScreen," US EPA, last modified March 3, 2023, https://www.epa.gov/ejscreen/ej-and-supplemental-indexes-ejscreen.

Huntsville may be performing relative to other Alabama cities. This project utilized the threshold tool to identify all census block groups within the city limits of Huntsville that had at least one environmental indicator with an EJ index greater than or equal to the standard 80th to 100th percentile range. This indicates that the block group was at a greater risk for any of the 12 environmental indicators than 80 percent of all other block groups in Alabama. Because EJScreen's primary mapping shape is census block groups (subdivisions of tracts), results cannot be displayed directly as census tracts. Fortunately, the software allows the user to overlay a census tract on top of the highlighted block groups, which was used for this project. As a result, in order for a census tract to be considered environmentally at-risk, all of the tract's census block groups must have been highlighted.

Huntsville tracts were examined for their income/poverty, race, and environmental risks status using Census Reporter and EJScreen, as well as Huntsville GIS's interactive map as a reference. This study utilized a Google Form spreadsheet with many columns, including one for the census tract number and separate columns for the TRUE/FALSE status of whether the tract qualified as a low-income community, a community of color, or an environmentally at-risk community.

Income and race were examined first, and any Huntsville tract that met the criteria for either category had its tract number, poverty rate, median family income, population, and racial percentage breakdown recorded in separate columns in the spreadsheet. Each tract's Census Reporter link was also linked in a column. Based on their data, tracts were assigned TRUE/FALSE status as a low-income community or a community of color. Following that, tracts that qualified as environmentally at-risk in EJScreen had their tract numbers recorded, as well as their racial and income data. Based on the newly imported environmental data, all tracts were

assigned a TRUE/FALSE status of being environmentally at-risk, and any new tracts were assigned a TRUE/FALSE status based on whether or not they were a low-income and/or community of color. Tracts that met at least two of three statuses were identified as environmental justice communities or EJ tracts.

Methodology for Identifying Performance Data of Huntsville EJ Tracts

Built Performance Data

In addition to identifying environmental justice communities in Huntsville, this study examined sustainability data of each census tract pertaining to the five categories identified by the Huntsville Environmental Sustainability Committee: natural environment, built environment, energy, transportation, and food security.

Natural Environment Data

In the natural environment category, this study examined the mean summer land surface temperature of EJ tracts between 2010 and 2022. The dataset used for this was Terra Moderate Resolution Imaging Spectroradiometer (MODIS) Land Surface Temperature/Emissivity Daily public dataset, which maps land surface temperatures using pixels.[25] This dataset was imported into Google Earth Engine, a free GIS tool, filtered for mean summer temperatures (May to October) between 2010 and 2022, and was layered with Huntsville's 2020 census tract shapefiles from the city's public GIS Depot.[26] Temperature data in Celsius was exported for each census

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[25] "LP DAAC - MOD11A1," United States Geological Survey, accessed April 22, 2023, https://lpdaac.usgs.gov/products/mod11a1v061/.

[26] City of Huntsville GIS Department, "Data Depot," City of Huntsville, accessed April 22, 2023, https://maps.huntsvilleal.gov/datadepot/?path=GIS_data_depot_census.

tract and recorded in a spreadsheet column. Temperatures were then converted to Farenthite, rounded to the nearest tenth, and recorded in another spreadsheet column.

Additionally, this study examined the number of parks in each EJ census tract, the presence of a greenway (a trail for recreation), and whether or not there are plans for a greenway to exist in the census tract in the City of Huntsville's 2022 Greenway Master Plan. Park data was taken from the City of Huntville's Interactive GIS mapping tool, which includes an overlay for 2020 census tracts and many additional visual tools, including a layer mapping all parks in the region. Greenway data was collected using this same map, which includes a visual tool displaying current greenways and greenways included in the 2022 Greenway Master Plan. EJ tracts were examined for park presence, and the number of parks in each tract was added to a park column on the second page of the spreadsheet. Tracts with existing greenways were assigned a TRUE/FALSE status in a spreadsheet, and tracts included in the greenway master plan were assigned a TRUE/FALSE status.

Build Environment Performance Data

In the built environment category, this study examined existing data surrounding the buildings and structures within the EJ tracts, including the homeownership rate, multi-family unit housing percentage, and the presence of Huntsville Housing Authority (HHA) properties, which are subsidized by the Department of Housing and Urban Development. Homeownership rates and multi-family housing data were pulled from Census Reporter, and percentages for homeownership and multifamily unit housing for each EJ tract were also added in separate columns to the spreadsheet. Subsequent data for both the entire city of Huntsville and the state of

Alabama were also recorded in a separate row for reference. Tracts with a Huntsville Housing Authority property were found using the property map on the HHA website.[27]

Energy Performance Data

For the energy category, this study examined the energy burden of EJ census tracts in Huntsville using the Department of Energy's Low-Income Energy Affordability Data (LEAD) Tool, a free public mapping tool that can display the cost of energy for households in states, counties, census tracts, and cities as both an average percent of income and an annual dollar number.[28] Average energy burden as a percentage of income and annual energy costs were recorded for all EJ census tracts in two separate columns. Subsequent data for all of Huntsville City and Alabama were also recorded in separate rows for reference.

Transportation Performance Data

This study examined existing data on the presence of public electric vehicle charging stations, bike lanes, and Huntsville transit line service in EJ census tracts. Additionally, percentage rates of adult asthma were examined, as well as the means of transportation to work for each tract's population. Public electric vehicle charging stations, bike lanes, and Huntsville transit service were all identified through the Electric Vehicle Charging Stations, Bike Lanes, and Huntsville Transit layers in the City of Huntsville's Interactive GIS mapping tool.[16] Tracts were assigned a TRUE/FALSE status in three additional spreadsheet columns based on the presence of any of the three services in the tract. Charging stations at car dealerships were not counted as

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[27] "HHA Properties," accessed April 22, 2023, https://hsvha.org/index.php/directory-category/hha-properties/.

[28] "LEAD Tool," Department of Energy, accessed April 22, 2023, https://www.energy.gov/scep/slsc/lead-tool.

public chargers because they are primarily used to charge inventory. An EJ tract was considered to have bike lanes if the lanes ran through or parallel to the tract's border. An EJ tract was considered to be served by Huntsville Transit if the transit line ran through or parallel to the tract's border.

Adult asthma data was gathered for each EJ tract using the Center for Disease Control's PLACES: Local Data for Better Health public mapping tool, which provides detailed health information for counties and census tracts nationally.[29] All EJ tracts had the percentage of its adult population with asthma recorded in a spreadsheet column. The adult asthma rate for Madison County was also recorded in a separate row for reference since Huntsville city data was unavailable.

Means of transit data for each EJ tract was gathered using Census Reporter and included the percentage of each census tract's population that: drove alone, used public transit, bicycled, or walked to work. The percentages were recorded in four separate columns for each EJ tract.

Food Security Performance Data

To map an estimate of food security, this study utilized the U.S. Department of Agriculture's Food Access Research Atlas, a public mapping tool measuring supermarket accessibility, to identify tracts that qualified as food deserts.[30] Huntsville EJ tracts were assigned a TRUE/FALSE status on whether they qualified as a food desert in a separate column.

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[29] "PLACES: Local Data for Better Health," Centers for Disease Control and Prevention, accessed April 22, 2023, https://experience.arcgis.com/experience/22c7182a162d45788dd52a2362f8ed65

[30] "Go to the Atlas," USDA ERS, last modified April 27, 2021, https://www.ers.usda.gov/data-products/food-access-research-atlas/go-to-the-atlas/.

City Council Districts/Justice40 Tracts/Opportunity Zones

This study also recorded the Huntsville City Council District(s) in which each EJ tract was located in a separate spreadsheet column, using the district layer in the Huntsville GIS map.[16] Using the Climate and Economic Justice Screening Tool (CEJST) map, EJ Tracts were also assigned a TRUE/FALSE status based on whether they were a Justice40 tract; the tool provides a breakdown of performance data for multiple sustainability categories using the federal methodology.[31] Furthermore, EJ tracts were assigned a TRUE/FALSE status based on whether Governor Ivey designated them as an Opportunity Zone in 2018 using ADECA's Opportunity Zone map.[15]

Totals/Averages

All totals and averages in the results section were calculated using the sum and average functions on columns in Google Forms. All averages were rounded to the nearest tenth. Separate rows for any averages, rounded averages, and sums were also added to the spreadsheet.

Mapping

Figure 1, a map of Huntsville's environmental justice communities was created with EJScreen's select tract feature, and individual tract numbers were added to the map with Google Slides.

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[31] "Explore the map," Climate and Economic Justice Screening Tool, accessed April 22, 2023, https://screeningtool.geoplatform.gov/en/.

Results

Mapping Huntsville Environmental Justice (EJ) Tracts

This study identified 23 census tracts in Huntsville that are qualified as environmental justice communities. This means that these census tracts qualify as at least two of the following: a low-income community, a community of color, or an environmentally at-risk community. Out of the 23 tracts, only two did not qualify as a low-income community: tracts 4.03 and 5.02. Only seven tracts did not qualify as communities of color: tracts 14.03, 14.04, 15, 22, 24, 25.02, and 30. All of the EJ tracts qualified as having at least one environmental risk factor with an index above the 80th percentile. Below is a map of Huntsville tracts that qualified as environmental justice communities:

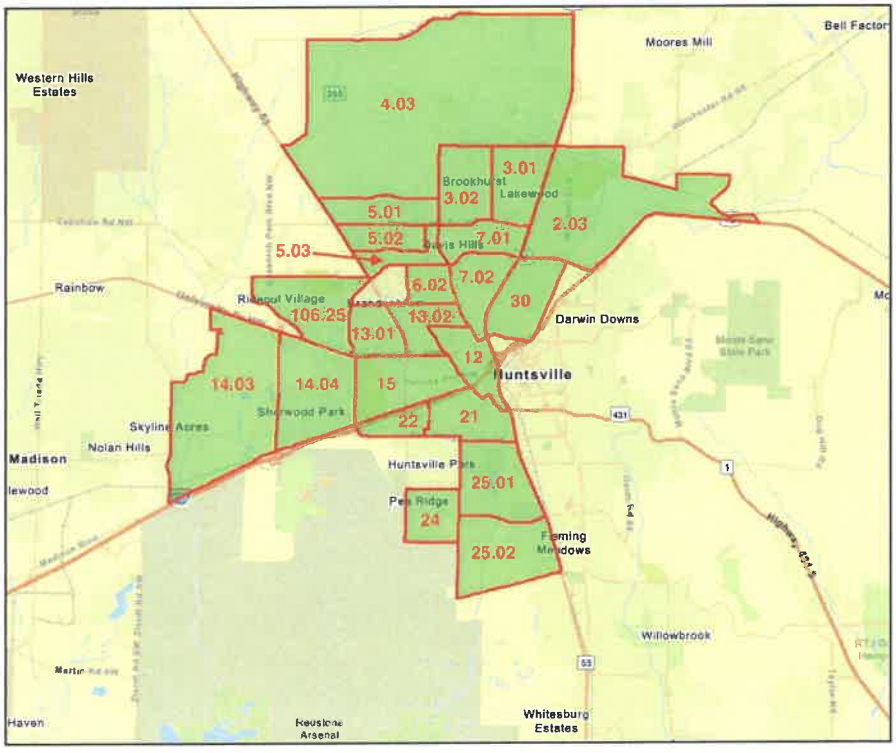

Figure 1: Huntsville census tracts identified as environmental justice communities (EJ tracts).

10 tracts, 2.03, 3.01, 3.02, 4.03, 5.01, 5.02, 5.03, 6.02, 7.02, and 13.02 were located entirely within Huntsville City Council District 1, represented by councilmember Devyn Keith at the time of this writing, which encompasses much of North Huntsville. Six EJ tracts were located entirely in Bill Kling's City Council District 4, which includes portions of South and West Huntsville: tracts 7.01, 21, 22, 24, 25.01, and 25.02. Three tracts were located entirely within City Council District 5, which is represented by City Council President John Meredith and includes the extreme western outskirts of Huntsville: tracts 13.01, 14.03, and 106.25. Four EJ tracts overlap City Council Districts 1, 2, 4, and 5: tracts 12, 14.04, 15, and 30. Tracts 15 and 30 overlap the service area of City Council District 2.

The total estimated population of Huntsville's EJ tracts is 75,812; this means that assuming a 2020 Census-reported Huntsville population of 215,482, approximately 35.2 percent of Huntsvillians live in an environmental justice community. On average, the median family income for Huntsville EJ tracts averaged $34,305, compared to the metro median family income of $76,963 and statewide median family income of $53,913. The average median age of Huntsville EJ tracts is 33.0 years, compared to 38.0 years for Huntsville overall, and 39.8 years statewide. The poverty rate of Huntsville EJ tracts averaged 27.6 percent, compared to the city poverty rate of 9.6 percent.

Huntsville EJ tracts averaged a racial composition that is 24.5 percent White, 60.1 percent Black, 1.4 percent Asian, 10.3 percent Hispanic, 2.8 percent Two or More Races, zero percent Native, 0.3 percent Pacific Islander, and 0.2 percent Some Other Race. This is compared to Huntsville's 2020 overall racial composition which was 57 percent White, 31 percent Black, two percent Asian, six percent Hispanic, three percent Two or More Races, and zero percent Indigenous, Pacific Islander, and Some Other Race, according to Census Reporter. Please note

that zero percent does not mean that a racial group was not present in the census tract; rather, it indicates that the population was too small for Census Reporter to count as a percentage.

Natural Environment Performance Results

Huntsville EJ tracts had an average summer land surface temperature of 92.8 degrees Fahrenheit from 2010 to 2022. Twelve EJ tracts averaged a mean summer land surface temperature higher than the EJ average: tracts 6.02, 7.02, 12, 13.01, 13.02, 14.04, 15, 21, 22, 25.01, 30, and 106.25, with the highest being tract 21 at 96.6 degrees.

Only four EJ tracts had greenways at the time of this study: tracts 4.03, 14.03, 22, and 25.01. The greenway master plan for Huntsville calls for the expansion of greenways to nine additional EJ tracts: tracts 2.03, 3.01, 12, 14.04, 15, 21, 24, 25.02, and 30. If the current master plan is implemented, ten EJ tracts will remain without access to greenways: tracts 3.02, 5.01, 5.02, 5.03, 6.02, 7.01, 7.02, 13.01, 13.02, and 106.25. Seven of these 10 tracts lacking access are in City Council District 1 in North Huntsville.

Built Environment Performance Results

Huntsville EJ tracts averaged a homeownership rate of 40.8 percent, compared to the general Huntsville rate of 61 percent. Five EJ tracts had homeownership rates higher than the city average: tracts 4.03, 5.01, 5.02, 5.03, 6.02, with the highest being tract 5.03 at 81 percent. All of these tracts are located in District 1 in North Huntsville, and the Black population is the racial largest group. For comparison, the five tracts with the lowest homeownership were tracts 13.01, 14.03, 21, 25.01, and 25.02, with the lowest being tract 25.01 at nine percent homeownership.

Huntsville EJ tracts averaged 40.9 percent multi-unit housing, compared to the citywide rate of 29 percent. 12 of the 23 tracts had a greater percentage of multi-unit housing than the EJ

average: 7.02, 12, 13.01, 13.02, 14.03, 14.04, 21, 22, 24, 25.01, 25.02, and 106.25, with the highest being tract 25.02 at 85 percent multi-unit housing. Of these 12 tracts, 7 of them were located fully or partially in City Council District 4.

Four HUD-assisted HHA properties were found in three EJ tracts: Northwoods Housing Development in tract 12 (City Council Districts 1 and 4), Johnson Tower & Brookside and Butler Terrace in tract 21 (City Council District 4), and Lincoln Park in tract 30 (City Council Districts 1 and 2).

Energy Performance Results

The average energy burden as a percentage of income in Huntsville EJ tracts was 4.3 percent, compared to two percent for all of Huntsville. Eight EJ tracts had a higher energy burden than the EJ average: tracts 2.03, 3.02, 6.02, 7.01, 12, 21, 24, and 30, with tract 12 having the highest energy burden at nine percent. Five of these tracts were located entirely or partially in City Council District 1, while three were located in District 4. Tract 12, along with the tracts with the second and third highest energy burdens, tracts 21 and 30, also are the only three EJ tracts that contained HHA properties. The average annual energy costs for EJ tracts in Huntsville were $1,748 compared to $1,848 for the city as a whole. Nine tracts, including tracts 2.03, 3.01, 3.02, 4.03, 5.01, 5.02, 5.03, 6.02, and 7.01, had annual energy costs above the EJ average, with tract 5.02 having the highest annual energy costs at $2,193.

Transportation Performance Results

On average, Huntsville EJ tracts averaged an adult asthma rate of 11.6 percent, compared to 9.6 percent of Madison County as a whole. 10 tracts averaged an asthma rate higher than the EJ average: tracts 2.03, 3.01, 3.02, 5.01, 7.01, 12, 13.01, 21, 25.01, and 30, with the highest being tract 12 where 15.3 percent of adults have asthma.

A total of 16 public electric vehicle charging stations were located across six EJ tracts, with half of them concentrated in tract 14.03, which encompasses Research Park. Tract 21 in City Council District 4, which includes Stovehouse and Campus 805, had the second-highest concentration of three chargers. There were no active public chargers in City Council District 1 (North Huntsville). A Tesla Supercharging station was also installed in the MidCity District in tract 14.04 in 2021, but it was not included in the Huntsville GIS database.[32]

Only seven EJ tracts were found to contain bike lanes: tracts 7.02, 12, 14.03, 21, 22, 30, and 106.25. Only one EJ tract lacked direct access to the Huntsville Orbit transit system, tract 5.02 in North Huntsville, but the adjacent tracts 5.01 and 5.03 did have access to Line 10.

81.4 percent of Huntsville EJ tract residents drove alone to work while 1.8 percent walked. Only one percent of EJ tract residents reported using the public transit system to get to work, while only 0.3 percent of residents rode a bicycle. 14 EJ tracts reported residents driving alone to work at a rate above the EJ average: tracts 3.01, 3.02, 4.03, 5.01, 5.02, 6.02, 12, 13.02, 14.03, 14.04, 22, 24, 25.01, and 106.25, with the highest in tract 5.02 at 94 percent. Contrastingly, only four EJ tracts had a reported public transit usage rate greater than the EJ average: tracts 3.01, 7.02, 12, and 21, with the highest in tract 21 at 11 percent. Seven EJ tracts had a reported rate of residents walking to work that was higher than the EJ average: tracts 2.03, 5.03, 13.01, 15, 21, 25.01, and 106.25, with the highest being tract 2.03 at 13 percent. Three

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[32] Lucy DeButy, "MidCity District, City of Huntsville Going Electric with Tesla Partnership," City of Huntsville Blog, last modified October 1, 2021, https://cityblog.huntsvilleal.gov/city-of-huntsville-midcity-district-going-electric-with-tesla-partnership/.

tracts reported a bicycle as a means of transit above zero percent: tracts 6.02, 13.01, and 30, with the highest being tract 13.01 at four percent.

Food Security Results

15 EJ tracts were found to be qualified as a food desert: tracts 2.03, 3.01, 3.02, 4.03, 5.01, 5.02, 12, 13.02, 14.03, 14.04, 15, 24, 25.01, 25.02, and 106.25, with nine of these tracts being located fully or partially in City Council District 1 in North Huntsville.

Justice40 Tracts and Opportunity Zones.

Nine of the EJ tracts were found to be qualified as Opportunity Zones: tracts 2.03, 13.01, 14.03, 14.04, 15, 21, 25.01, 30, 106.25. 16 tracts were found to qualify for Justice40 status: tracts 2.03, 3.01, 3.02, 5.01, 5.02, 6.02, 7.02, 12, 13.01, 13.02, 21, 22, 24, 25.01, 25.02, and 30. Four tracts that were identified as Opportunity Zones but did not qualify for Justice40 status were 14.03, 14.04, 15, and 106.25; these tracts encompass much of Research Park and all of the University of Alabama in Huntsville campus. Tracts 4.03, 5.03, and 7.01 were identified as EJ tracts but were excluded from both Justice 40 and Opportunity Zones status.

Discussion and Recommendations

Looking at the results of this study, particularly the averages, it is clear that Huntsville's environmental justice communities are significantly poorer and have a higher representation of people of color, particularly Black and Hispanic people, than the city as a whole. Additionally, residents of these census tracts are also significantly more likely to be exposed to environmental hazards than people living outside of these census tracts. This was expected going into this study, as well as the higher concentration of Black residents in North Huntsville (City Council District 1) and Hispanic residents in West Huntsville (City Council District 4). This was not surprising, along with the generally poor performance of the EJ tracts in almost every category, and the general socioeconomic layout of the city can be easily seen by viewing a variety of public equity, income, and racial mapping tools.

However, even among the tracts designated as EJ communities, certain tracts stand out as having exceedingly poor performance and should be prioritized by the city as low-hanging fruit for improving overall city performance. Because the 2023 HESC report lacks maps, it is unclear whether the city of Huntsville knows where the worst-performing census tracts are or if they qualify as environmental justice communities. It is also unclear how the city views these communities in terms of future involvement and civic participation in the upcoming Sustainability Commission. Furthermore, massive federal funding opportunities from the Inflation Reduction Act are on the way for cities that were not included in the HESC report. Incorporating all of these elements, this study has identified ten recommendations for the city government that seek to highlight the existence of environmental justice communities in Huntsville, ensure their civic participation in the Sustainability Commission, and improve their sustainability performance statistics while being as fiscally efficient as possible.

Recommendation 1: Huntsville city officials should become familiar with federal funding opportunities in the Inflation Reduction Act.

The Inflation Reduction Act (IRA), which was signed into law in August of 2022, is the most comprehensive bill in U.S. history to accelerate clean energy, lower energy costs, and boost energy security, and it could potentially bring up to $490 million in energy provisions to Alabama statewide.[33] The bill includes everything from extended tax credits for solar and electric vehicles to new federal programs for environmental justice projects or programs to improve city walkability or upgrade building codes. Many programs are in development as of April 2023, but most federal guidance will be released in 2023, and most programs will be available until 2032. There is a historic amount of funding incoming that competitor cities will take advantage of, and the City of Huntsville should be prepared to take advantage of as much funding as possible to achieve its goals listed in the Sustainability Report while being the most efficient with taxpayer dollars. One place to start is with the Inflation Reduction Act Guidebook, which is the most comprehensive federal resource on IRA programs to date.[34]

Recommendation 2: The City of Huntsville should prioritize tree planting and heat-reducing smart surfaces in tracts 6.02, 7.02, 12, 13.01, 13.02, 14.04, 15, 21, 22, 25.01, 30, and 106.25.

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[33] "Breaking Down the Inflation Reduction Act," Energy Alabama, last modified February 2023, https://energyalabama.org/ira/.

[34] "Inflation Reduction Act Guidebook," The White House, accessed April 23, 2023, https://www.whitehouse.gov/wp-content/uploads/2022/12/Inflation-Reduction-Act-Guidebook.pdf.

These census tracts are particularly vulnerable to the urban heat island effect, which can have serious economic and health consequences during the summer months. As part of the Inflation Reduction Act, the USDA's Forest Service Urban and Community Forestry Program will be providing cities with urban forest grants for canopy projects (minimum of $100,000). Huntsville should utilize this program for projects in these tracts to achieve a more equitable tree canopy. Furthermore, Huntsville should prioritize the use of smart surfaces in these tracts, such as green roofs or reflective pavements, and the Smart Surface Coalition can be a great resource for exploring how to implement these technologies. [35]

Recommendation 3: The City of Huntsville and Huntsville Utilities should prioritize energy efficiency and weatherization upgrades in tracts 2.03, 3.02, 6.02, 7.01, 12, 21, 24, and 30.

These tracts have an extremely high energy burden that is greater than the already high EJ average. One of the easiest ways to decrease the energy burden of these areas is through basic energy efficiency and weatherization upgrades and retrofits to old structures. Huntsville Utilities should monitor energy consumption and prioritize energy-saving projects in these tracts. Because HHA properties are in tracts with the highest energy budgets, Huntsville Utilities should prioritize energy upgrades for these buildings, which will save the city and customers money in wasted energy. Additionally, the Huntsville Housing Authority should be aware of the incoming Green and Resilient Retrofit Program, which is another IRA program (page 116 of the guidebook). This program will provide grants to HUD-assisted housing owners for a variety of retrofits such as energy and water efficiency upgrades, energy storage, low-carbon building materials, and air quality improvements.[33]

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[35] Smart Surfaces Coalition, accessed April 23, 2023, https://smartsurfacescoalition.org/.

Recommendation 4: The City of Huntsville should work to install multiple charging stations at the North Huntsville Public Library (tract 7.02) and the Oakwood Farms Market (tract 106.25).

There are currently no public charging stations in North Huntsville. Dealership chargers do not count because they are only used to charge the dealership's EV inventory and there is no guarantee that an EV driver will be allowed to use them. Chargers should be placed in areas where people spend a significant amount of time. Huntsville should start expanding charging stations in North Huntsville with the North Huntsville Library (tract 7.02) and Oakwood Farms Market (tract 106.25), both of which are relatively new locations with both community and education components. The city should collaborate with the library and Oakwood University to install multiple level 2 chargers at these locations as soon as possible. Huntsville GIS should also ensure that its database is kept up to date with all new charging locations.

Recommendation 5: Huntsville should begin converting passenger and light-duty city vehicles to electric alternatives, and at least one electric transit bus should be purchased.

While page 10 of the 2023 sustainability report recommends that Huntsville "implement [a] plan to reduce idling for City of Huntsville vehicles," it does not provide plan specifics.[4] The best way to reduce idling is to switch to an electric vehicle. At this point, passenger fleet vehicles and light-duty pickup trucks are the best candidates for electrification. The Chevrolet Bolt and Ford F-150 Lightning EVs are two of the most popular electric substitutes. The IRA's Clean Vehicle Credit (page 52 of the guidebook) provides a $7,500 credit for light-duty vehicles purchased by eligible entities, including cities.[33] Furthermore, the EPA's upcoming Clean Heavy Duty Vehicles program (page 88 of the guidebook) may cover the costs of Huntsville purchasing one electric transit bus, as well as the costs of infrastructure and planning.[33] As federal guidelines

evolve, the city should keep an eye on this program. This electric bus could be placed on a Huntsville Orbit line that runs through the EJ tracts with the highest asthma rates.

Recommendation 6: Huntsville Mayor Tommy Battle should appoint a minimum of two environmental justice experts to the City Sustainability Commission.

While page 32 of the HESC report indicates that commissioners "would serve a specified term and represent a thematic area of environmental sustainability," it does not specify which themes will be represented or how many will be appointed.[4] To ensure that Hutnsville's major environmental justice communities are adequately represented on the commission, Mayor Battle should appoint at least two environmental justice experts, preferably with diverse backgrounds, one familiar with City Council District 1 and the other with District 4.

Recommendation 7: The City of Huntsville should hire a full-time Sustainability Officer as soon as possible after the Sustainability Commission is formally established, before the end of 2023, and prior to the start of major projects.

While establishing a Sustainability Officer within Mayor Battle's office is a key recommendation in the report, the city should ensure that this full-time city staff member is hired as soon as possible after the commission is formally established, and before major projects begin, so that the city administration, departments, and the general public have a central point of contact for policy coordination and city efforts from day one.

Recommendation 8: The City of Huntsville should hire a full-time Sustainability Educator to educate and engage with the Huntsville public on sustainability issues and city efforts.

As seen in both the sustainability report and this study, sustainability issues, and there is a massive amount of information to work with in order to determine best practices. It is important for the Huntsville public to be informed of these practices as well. As a result, the City of

Huntsville should consider hiring a full-time Sustainability Educator to work alongside the Sustainability Officer in the mayor's office, focusing on sustainability education outreach and events with the Huntsville public, particularly in environmental justice communities. This position was also created in the Sustainability Office of Little Rock, Arkansas, where Sustainability Educator Brittany Nichols reports to Sustainability Officer Lennie Massanelli.[36]

Recommendation 9: The City of Huntsville, the Sustainability Commission, and the Geographic Information Systems (GIS) Office should develop their own definition of an environmental justice community.

The results of this study indicate that both the Opportunity Zones and Justice40 formulas exclude many census tracts that are severely struggling in the five sustainability categories examined by HESC; while both of these formulas provide a foundation for identifying EJ communities, they are federal formulas that are not specifically designed to address the needs of each city. While Opportunity Zones are currently included in the Huntsville GIS mapping tool, they are out-of-date and only account for income, omitting the environmental justice communities listed in this study containing 42,121 and counting Huntsville residents. While more Huntsville communities were included in the Justice40 definition, many census tracts, including some Opportunity Zones, containing 25,772 or more Huntsville residents were excluded relative to EJ tracts identified in this study.

Due to the lack of a state definition, the City of Huntsville, the Sustainability Commission, and the GIS office would benefit from establishing their own definition of an environmental justice community, with a focus on the input of environmental justice experts

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[36] "Staff," City of Little Rock, Arkansas - Capital City - Pulaski County | City of Little Rock, accessed April 23, 2023, https://www.littlerock.gov/residents/sustainability-office/staff/.

appointed to the commission. It is recommended that the city continue to use census tracts as the foundational shapes for communities, as these shapes already exist in the city's data system and can be directly linked to existing and new federal funding opportunities, such as those in the Inflation Reduction Act. One of the best places to start would be examining the Justice40 tracts and methodology using the White House Environmental Council's Climate and Economic Justice Screening Tool (CEJST). CEJST also makes Justice40 files available for download, and the Huntsville GIS Office could easily incorporate the Justic40 tracts into its own public mapping tool so they can be overlaid along with the existing Opportunity Zone layer.

Recommendation 10: The City of Huntsville should conduct a study on the sustainability performance of all city census tracts to map environmental justice communities and prioritize project locations.

The City of Huntsville has established resources in its GIS, under the direction of GIS Manager Amy Kenum, and should conduct a significantly more comprehensive study than this one to identify environmental justice communities and their performance in areas that align with the sustainability report. This report may resemble the 2022 Huntsville Development Review, which maps property development in all city census tracts; this report may take the same approach but map energy performance, carbon emissions, and sustainability projects.[37] These mapped results should be published for the public to see, imported into the city's GIS database, and used by the Sustainability Commission to prioritize policies and projects.

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[37] "The Huntsville Development Review 2022," City of Huntsville, accessed April 23, 2023, https://www.huntsvilleal.gov/wp-content/uploads/2023/01/HDR-Final-2022-C.pdf.

Conclusion

While the City of Huntsville's publication of the 2023 Huntsville Environmental Sustainability Report to the Mayor is a fantastic step in the right direction for city sustainability, its goals can only be achieved through policy action. Similarly, a Sustainability Commission, if codified through an ordinance, is a welcome addition to the city, but it is the Huntsville City Council, Mayor Battle, and Huntsville Utilities who will decide which policies and programs are implemented and which are not. When it comes to sustainability, Huntsville is already years behind its peer cities, which already have entire departments dedicated to the task, highlighting the importance of hiring full-time city staff members to do this work. In all of this, it is critical for the city to have its own definition of what an environmental justice community is and to map where these communities are in order to inform best practices in order for the city to meet its goal of incorporating social equity and justice into every sector of sustainability.

More than 35 percent of Huntsville residents live in these environmental justice communities, and they deserve to be included and represented in all city institutions dedicated to sustainability moving forward. Each of these communities is distinct and performs differently in sustainability sectors, and it is critical for the city to use its wealth of resources to identify and store performance data. It is also clear that certain EJ communities should be prioritized for sustainability improvements, and Huntsville city officials should be aware of and consider taking advantage of federal funding for sustainability projects, as many of these programs have been specifically created to support ground-up improvements in these poorly performing regions. The City of Huntsville can improve the lives of its citizens, save money, and boost economic activity by taking this comprehensive approach, while also demonstrating to its peer cities that it deserves to keep its status as a regional and national hub of forward-thinking innovations.

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Appendix

Raw Data for Huntsville EJ Tracts

The Google Forms spreadsheet used to track income, racial, environmental, and all sustainability performance data for all Huntsville EJ tracts is available beginning on the following page. The original spreadsheet is landscape orientation, so horizontal scrolling is needed to view all columns on a computer. As a result, this appendix will display the chart in vertical sections that will fit on this page. The spreadsheet is also available at this link: https://docs.google.com/spreadsheets/d/1YCHjl13iK4ZvJ3QVyTKQRPwRhKuUmfApWSBl6-hOllg/edit?usp=sharing.

Census Tract #	Low-Income?	Community of Color?	Environmental Risk?
Alabama (Reference)	-	-	-
Huntsville (Reference)	-	-	-
2.03	TRUE	TRUE	TRUE
3.01	TRUE	TRUE	TRUE
3.02	TRUE	TRUE	TRUE
4.03	FALSE	TRUE	TRUE
5.01	TRUE	TRUE	TRUE
5.02	FALSE	TRUE	TRUE
5.03	TRUE	TRUE	TRUE
6.02	TRUE	TRUE	TRUE
7.01	TRUE	TRUE	TRUE
7.02	TRUE	TRUE	TRUE
12	TRUE	TRUE	TRUE
13.01	TRUE	TRUE	TRUE
13.02	TRUE	TRUE	TRUE
14.03	TRUE	FALSE	TRUE
14.04	TRUE	FALSE	TRUE
15	TRUE	FALSE	TRUE
21	TRUE	TRUE	TRUE
22	TRUE	FALSE	TRUE
24	TRUE	FALSE	TRUE
25.01	TRUE	TRUE	TRUE
25.02	TRUE	FALSE	TRUE
30	TRUE	FALSE	TRUE
106.25	TRUE	TRUE	TRUE

Average			
Rounded Average			
Sum			

Census Tract #	EJ Community Status	Census Reporter Link	Median Family Income
Alabama (Reference)	-	https://censusreporter.org	$53,913 (Statewide)
Huntsville (Reference)	-	https://censusreporter.org	$76,963 (Metro)
2.03	TRUE	https://censusreporter.org	$22,258
3.01	TRUE	https://censusreporter.org	$35,435
3.02	TRUE	https://censusreporter.org	$31,996
4.03	TRUE	https://censusreporter.org	$53,561
5.01	TRUE	https://censusreporter.org	$46,842
5.02	TRUE	https://censusreporter.org	$53,188
5.03	TRUE	https://censusreporter.org	$36,831
6.02	TRUE	https://censusreporter.org	$38,824
7.01	TRUE	https://censusreporter.org	$30,806
7.02	TRUE	https://censusreporter.org	$35,349
12	TRUE	https://censusreporter.org	$18,266
13.01	TRUE	https://censusreporter.org	$25,769
13.02	TRUE	https://censusreporter.org	$39,144
14.03	TRUE	https://censusreporter.org	$42,073
14.04	TRUE	https://censusreporter.org	$42,729
15	TRUE	https://censusreporter.org	$41,184
21	TRUE	https://censusreporter.org	$21,755
22	TRUE	https://censusreporter.org	$32,542
24	TRUE	https://censusreporter.org	$29,139
25.01	TRUE	https://censusreporter.org	$23,022
25.02	TRUE	https://censusreporter.org	$33,832
30	TRUE	https://censusreporter.org	$25,313
106.25	TRUE	https://censusreporter.org	29,168

Average			$34,539
Rounded Average			
Sum			

Census Tract #	% Pop. in Poverty	Total Population	Median Age	Percent White
Alabama (Reference)	16.1	5,039,877	39.8	64
Huntsville (Reference)	9.6 (Metro)	215,482	38	57
2.03	40.1	5,132	21.4	22
3.01	32.3	4,160	32.8	15
3.02	25.9	4,322	28.6	5
4.03	7.1	5,147	47	23
5.01	26	2,466	27	10
5.02	13.8	2,365	36	13
5.03	10.5	1,856	39.2	11
6.02	23	1,977	38.3	24
7.01	33.4	2,617	41.1	25
7.02	11.6	2,682	53.8	24
12	46.1	2,919	30.5	2
13.01	37.9	3,454	31	17
13.02	16.4	2389	24.8	17
14.03	27.7	2,098	29.9	47
14.04	16.7	3,517	36.1	52
15	25.2	5,368	24.5	47
21	42.4	3,074	27.2	19
22	33.4	1,833	33.8	44
24	34.3	4,100	33.1	35
25.01	43.5	2,837	30.4	25
25.02	16.9	3,288	37.4	35
30	40.2	3,042	26.9	36
106.25	29.7	5,169	27.6	16

Average	27.47272727		33.43913043	26.30434783
Rounded Average	27.6		33	24.5
Sum		286,125		

Census Tract #	Percent Black	Percent Asian	Percent Hispanic	Percent Multiracial
Alabama (Reference)	26	1	5	3
Huntsville (Reference)	31	2	6	3
2.03	73	0	2	2
3.01	75	0	6	4
3.02	89	2	3	1
4.03	72	0	3	1
5.01	77	1	5	4
5.02	71	2	2	4
5.03	68	4	13	4
6.02	49	0	23	1
7.01	68	0	5	2
7.02	74	0	0	2
12	84	0	11	2
13.01	69	5	8	2
13.02	66	2	8	6
14.03	45	2	6	0
14.04	32	5	9	2
15	39	2	10	3
21	55	0	21	4
22	27	1	26	3
24	41	0	14	7
25.01	42	0	32	1
25.02	46	1	14	5
30	50	1	10	3
106.25	71	4	7	1

Average	58.39130435	1.304347826	10.30434783	2.869565217
Rounded Average	60.1	1.4	10.3	2.8
Sum				

Census Tract #	Percent Indigenou	Percent Islander	Percent Other	City Council Distr
Alabama (Reference)	0	0	0	-
Huntsville (Reference)	0	0	0	-
2.03	0	0	0	1
3.01	0	0	0	1
3.02	0	0	0	1
4.03	0	0	1	1
5.01	0	3	0	1
5.02	0	0	0	1
5.03	0	0	0	1
6.02	0	0	3	1
7.01	0	0	0	4
7.02	0	0	0	1
12	0	1	0	1, 4
13.01	0	0	0	5
13.02	1	0	0	1
14.03	0	0	0	5
14.04	0	0	0	4, 5
15	0	0	0	1, 2
21	0	0	0	4
22	0	0	0	4
24	0	2	0	4
25.01	0	0	0	4
25.02	0	0	0	4
30	0	0	0	1, 2
106.25	0	0	0	5

Average	0.04347826087	0.2608695652	0.1739130435	
Rounded Average	0	0.3	0.2	
Sum				

Census Tract #	Notable Location	Opportunity Zone?	Justice40 Status	LST (°C)
Alabama (Reference)	-	-	-	-
Huntsville (Reference)	-	-	-	-
2.03	A&M	YES	TRUE	32.23
3.01		NO	TRUE	32.45
3.02		NO	TRUE	31.94
4.03		NO	FALSE	29.92
5.01		NO	TRUE	32.22
5.02		NO	TRUE	32.48
5.03		NO	FALSE	33.03
6.02		NO	TRUE	33.93
7.01		NO	FALSE	33.76
7.02		NO	TRUE	34.23
12		NO	TRUE	35.51
13.01		YES	TRUE	35.66
13.02		NO	TRUE	35.06
14.03	Research Park	YES	FALSE	32.94
14.04		YES	FALSE	35.3
15	UAH	YES	FALSE	35.81
21	Stovehouse, Campus 805	YES	TRUE	35.87
22		NO	TRUE	34.93
24		NO	TRUE	32.68
25.01	Brahan Spring Park	YES	TRUE	35.12
25.02		NO	TRUE	32.63
30		YES	TRUE	35.25
106.25		YES	FALSE	34.27

Average				$34
Rounded Average				
Sum				

Census Tract #	LST (°F)	# of Parks	Presence of Greenways
Alabama (Reference)	-	-	-
Huntsville (Reference)	-	-	-
2.03	90	1	FALSE
3.01	90.4	3	FALSE
3.02	89.5	0	FALSE
4.03	85.9	3	TRUE
5.01	90	1	FALSE
5.02	90.5	1	FALSE
5.03	91.5	1	FALSE
6.02	93.1	1	FALSE
7.01	92.8	0	FALSE
7.02	93.6	1	FALSE
12	95.9	3	FALSE
13.01	96.2	0	FALSE
13.02	95.1	0	FALSE
14.03	91.3	0	TRUE
14.04	95.5	2	FALSE
15	96.5	2	FALSE
21	96.6	1	FALSE
22	94.9	1	TRUE
24	90.8	1	FALSE
25.01	95.2	2	TRUE
25.02	90.7	3	FALSE
30	95.5	1	FALSE
106.25	93.7	0	FALSE

Average	$93		
Rounded Average	92.8		
Sum			

Census Tract #	In Greenway Plan?	Home Ownership Rate	Percent Multi-Unit Housing
Alabama (Reference)	-	70	16
Huntsville (Reference)	-	61	29
2.03	TRUE	27	38
3.01	TRUE	55	1
3.02	FALSE	52	8
4.03	TRUE	80	1
5.01	FALSE	66	6
5.02	FALSE	71	5
5.03	FALSE	81	4
6.02	FALSE	71	2
7.01	FALSE	48	24
7.02	FALSE	35	49
12	TRUE	35	44
13.01	FALSE	15	84
13.02	FALSE	41	43
14.03	TRUE	10	84
14.04	TRUE	33	55
15	TRUE	39	36
21	TRUE	18	61
22	TRUE	40	46
24	TRUE	26	65
25.01	TRUE	9	80
25.02	TRUE	18	85
30	TRUE	29	40
106.25	FALSE	40	80

Average		41.73913043	38.69565217
Rounded Average		40.8	40.9
Sum			

Census Tract #	HHA Properties	Energy Burden % Income	Avg. Annual Energy Costs
Alabama (Reference)	-	4	$2,443
Huntsville (Reference)	-	2	$1,848
2.03		5.5	$2,040
3.01		4	$2,022
3.02		5	$1,941
4.03		3	$2,186
5.01		4	$1,987
5.02		4	$2,193
5.03		4	$2,004
6.02		5	$2,149
7.01		5	$2,040
7.02		4	$1,810
12	(1) Northwoods:	9	$1,618
13.01		4	$1,399
13.02		3	1,633
14.03		2	$1,290
14.04		2	$1,290
15		4	$1,726
21	(2) Johnson Towe	7	$1,813
22		4	$1,577
24		5	$1,770
25.01		4	$1,172
25.02		4	$1,442
30	(1) Lincoln Park:	6	$1,694
106.25		2	$1,409

Average		4.326086957	$1,795
Rounded Average		4.3	
Sum			

Census Tract #	% adults with Asthma	Public EV Charg	Bike Lanes	HSV Transit Access
Alabama (Reference)	-	-	-	-
Huntsville (Reference)	9.2 (MadCo)	-	-	-
2.03	13.4	(Coming Soon) A Huntsville, AL 35	FALSE	TRUE
3.01	12.1	FALSE	FALSE	TRUE
3.02	13.1	FALSE	FALSE	TRUE
4.03	10.8	FALSE	FALSE	TRUE
5.01	11.7	FALSE	FALSE	TRUE
5.02	11.2	FALSE	FALSE	FALSE
5.03	10.5	FALSE	FALSE	TRUE
6.02	11.6	FALSE	FALSE	TRUE
7.01	12.1	FALSE	FALSE	TRUE
7.02	10.9	FALSE	TRUE	TRUE
12	15.3	FALSE	TRUE	TRUE
13.01	11.8	FALSE	FALSE	TRUE
13.02	11	FALSE	FALSE	TRUE
14.03	9.8	8	TRUE	TRUE
14.04	9.8	(1) Clarion Inn	FALSE	TRUE
15	10.4	(1) Shelby Cente	FALSE	TRUE
21	12.5	(3) Stovehouse,	TRUE	TRUE
22	11	(2) Holiday Inn E	TRUE	TRUE
24	11.6	FALSE	FALSE	TRUE
25.01	11.8	FALSE	FALSE	TRUE
25.02	11	(1) Maximum Tec	FALSE	TRUE
30	12.4	FALSE	TRUE	TRUE
106.25	10.5	FALSE	TRUE	TRUE

Average	11.62727273			
Rounded Average				
Sum				

Census Tract #	% Drove Alone	% Public Transit	% Bicycle	% Walked	Food Desert Status
Alabama (Reference)	-	-	-	-	-
Huntsville (Reference)	82	0	0	1	-
2.03	71	0	0	13	TRUE
3.01	86	2	0	0	TRUE
3.02	87	0	0	0	TRUE
4.03	88	0	0	1	TRUE
5.01	92	0	0	1	TRUE
5.02	94	0	0	0	TRUE
5.03	78	0	0	2	FALSE
6.02	86	0	1	0	FALSE
7.01	77	0	0	0	FALSE
7.02	77	4	0	0	FALSE
12	84	2	0	1	TRUE
13.01	69	1	4	6	FALSE
13.02	92	0	0	0	TRUE
14.03	88	0	0	1	TRUE
14.04	89	0	0	0	TRUE
15	68	0	0	7	TRUE
21	60	11	0	4	FALSE
22	87	0	0	0	FALSE
24	83	1	0	0	TRUE
25.01	86	1	0	2	TRUE
25.02	72	1	0	0	TRUE
30	77	0	1	0	FALSE
106.25	87	0	0	4	TRUE

Average	81.43478261	1	0.26086956	1.69565217	
Rounded Average	81.7	1	0.3	1.8	
Sum					