Appendix D: Environmental Justice and Racial Equity Impact Analysis

This appendix provides more detailed information on the following aspects of racial equity impact analysis and equity-focused community engagement, including:

1) An overview of the proposed project;

2) Identification of Environmental Justice Census Tracts within / near the project area;

3) Identification of specific project elements that support or impact the Environmental Justice (EJ) populations;

4) Community Outreach and Public Engagement; and,

5) Summarized findings of this Analysis

Equitable Project Analysis

The Paducah Riverport and their partners have prepared the following analysis of the Bulk Commodity Infrastructure Revitalization and Expansion Project (the Project) to evaluate equitable distribution of project benefits and to identify any inequities that can be mitigated with the project.

This analysis presents a review of the socioeconomic characteristics in the study area (indicated in the map on next page) for the Paducah-McCracken County Riverport, Kentucky located in McCracken County, USA.

Data from the U.S. Census Bureau 2014 - 2018 American Community Survey (ACS) 5-year estimates has been utilized for the analysis of the study area. Please see the ACS website for more information, data limitations, and an explanation of the methodology used to obtain the data (https://www.census.gov/acs/www/).

This analysis is intended to be used as a first look study into the socioeconomic characteristics that exist within the study area. If, at a later time specific projects and project locations are identified, a more in-depth analysis of the socioeconomic characteristics may be warranted.

The information and results are intended to assist the Port in making informed and prudent transportation decisions in the Project area, especially with regard to the requirements of Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (signed February 11, 1994). Executive Order 12898 states:

"…each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…"

This report outlines 2014 - 2018 ACS 5-year estimates (ACS) for the project area using tables and maps from multiple US Agencies include EPA.

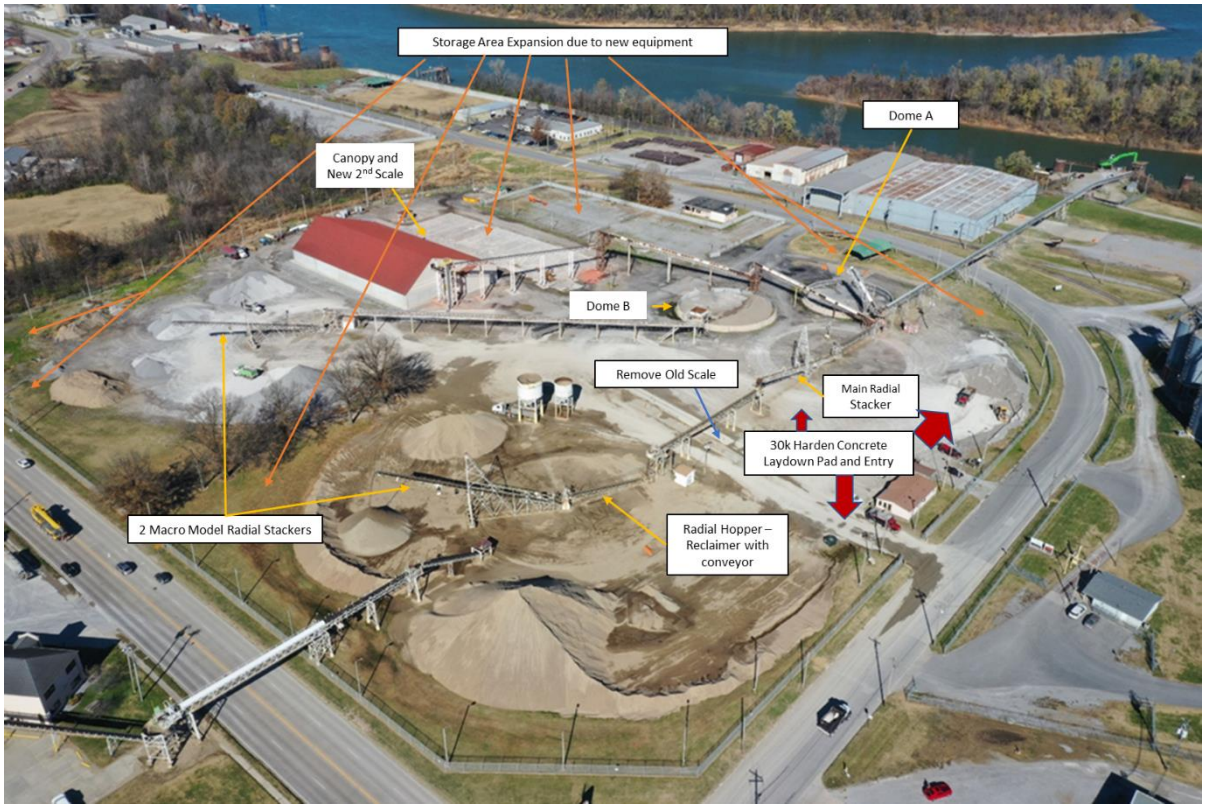
Statistics are provided on minority, low-income, elderly, and disabled populations for the census tracts and block groups near the project area, McCracken County, Kentucky and the United States.

This analysis focuses on identifying any past inequities as well as addressing Climate Change and Environmental Justice for the planning, design and construction/implementation of the projects. The project sponsors have used environmental justice tools such as EJSCREEN and other mapping programs and reports to identify Environmental Justice (EJ) populations adjacent to the Project and to evaluate any disproportionate effects on such populations and neighborhoods.

The project team also aligned these projects with Ky Conservation Committee Initiatives and KY Climate Resiliency Action Plan which both give guidance on lowering greenhouse gas emissions. The planning and selection of the components align directly with these Climate Action Plans. The analysis looks to identify any inequities in the community that extends to climate impacts and pollution risks.

1. Project Overview

The Riverport is working toward completing the Bulk Commodity Infrastructure Revitalization and Expansion Project.



The Project will:

- Modernize the bulk commodity facility by replacing 40 – 50-year-old equipment with new, more efficient models.

- Replace unusable scale to increase efficiency and reliability of bulk movements.
- Replace two storage dome roofs to allow for more thruput, expand capacity and free-up warehouse space.
- Pave laydown area to mitigate hazardous material runoff and increase efficiency of bulk commodity movements.

Benefits of the proposed Project are anticipated to:

- prevent delays and potential reroutes due to outages of old equipment. The Equipment modernization will provide redundant operational capabilities and increase efficiency of bulk commodity movements from barge to destination.
- ensure continued support for multiple industries & jobs within the road, commercial & residential construction industries, agriculture, concrete industry, block manufacturer and fuel for a manufacturing facility in Hopkinsville.
- ensure a dependable supply chain for bulk commodities for infrastructure projects resulting from increased federal investments taking trucks off the roads while providing economic stability for rural areas.

Planning efforts to date have determined that this project will be more energy efficient both in the fuel used by the cargo handling equipment but also reduction of reroutes to other river facilities when the equipment is out of service due to its age and condition.

2. Environmental Justice Analysis

Equity around the Project Area

Using the Kentucky Transportation Cabinet(KYTC) - Division of Planning's Environmental Methodology for Assessing Potential Environmental Justice Concerns for KYTC Planning Studies as a basis and then enhancing the analysis with additional resources, the Planning Team reviewed Equity in the distribution of benefits and the impacts on the neighboring census blocks to ensure that state and federal funds programmed in for this Project avoids disproportionate negative impacts or denial of benefits to disadvantaged populations.

This finding is made on the Project as a whole, and with the understanding that individual improvement elements may result in negative impacts to disadvantaged populations given additional review. If such negative impacts are identified in further study, the National Environmental Policy Act (NEPA) process can identify methods or options to avoid and / or mitigate any negative environmental impacts identified.

The Project Planning Team's Equity methodology is to review the project against the following matrix:

- IMPACTS +	
Negative Impacts Have Proportionate Impact at Community or Regional Scale	Direct Benefits to Disadvantaged Populations
Disproportionate Negative Impacts to Disadvantaged Populations	Benefits Limited to Non-Disadvantaged Populations

\+

BENEFITS

\-

In order to evaluate the overall result of the Project through an environmental justice framework, the project was evaluated individually against the following parameters used by other planning organizations within Kentucky.

Among the broad range of investment categories and transportation improvements, four specific categories of projects are automatically considered equitable based on the following types:

- Preservation & Maintenance projects that are prioritized based on empirical data that maximizes the lifespan of the transportation system as a whole.
- Safety improvements that are prioritized by empirical data that maximizes the reduction of risk factors and potential for injury or fatality on the transportation system as a whole, and at locations with a high frequency or severity of crashes.
- Accessibility improvements that are necessary for regulatory compliance and not in locations based on open discretion.
- Public Transportation formula funding utilized to sustain operations and asset management on a systemwide basis.

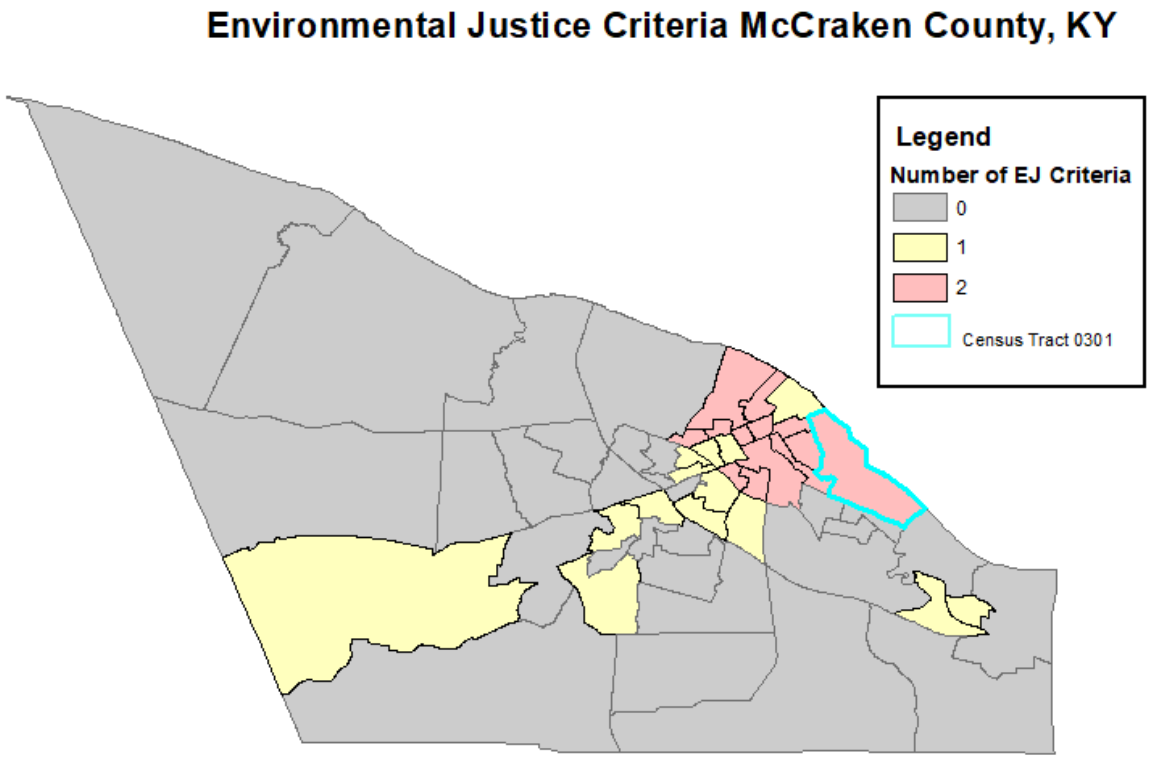
If the project does not meet the criteria for automatically being deemed equitable it is to be further reviewed. The project is then evaluated on its individual merits according to the following equity considerations:

- ✓ Project directly benefits disadvantaged populations
- ✓ Project indirectly benefits disadvantaged populations
- ✓ Project benefits and/or impacts are proportionately distributed across the community or region.
- ✘ Project benefits are limited to non-disadvantaged populations
- ✘ Project results in disproportionate negative impacts to disadvantaged populations.

The following map represents the Project plotted on a map indicating Potential Disadvantaged Populations by Census Tract Block Group.

The 2010 EJ dataset was used at the block group (BG) level to ensure that environmental planning and decision-making is done at the appropriate geographic scale. The EJ BGs and statistics for each of these communities: the number of EJ BGs, the EJ criteria, the percentages of the BGs classified as EJ and the population living in these EJ BGs provides an indication of the diversity of the municipality's EJ population and the intensity of EJ criteria found in the community.

The indicator scale suggests the presence of a potentially disadvantaged group is indicated by the block group containing more than 25% low income, 25% or more minority or indicated as an area of Language Isolation with more than 25% of the population not able to speak English well.



The area around the Paducah-McCracken Riverport (Census Tract 0301) has 2 indicators, based upon the block group having a minority population with in the Block group of 40%, the population described as low-income population is 60% within the Block group. Thus, it will be important to ensure that these underserved populations are not harmed by the proposed project. If it is determined through the analysis that the disadvantaged populations are impacted disproportionately by the Project benefits being limited to non-disadvantaged populations or Project results in disproportionate negative impacts to disadvantaged populations, mitigation will be required.

Methodology used in the Paducah Riverport Project Analysis

The Project was analyzed for the Affected Environment using multiple mapping websites as well as generic mapping software such as ARCGIS On-line that can display data such as the map below that

shows counts of households within the highest and lowest income ranges. Dot density is used to fill in census tracts to show where the richest and poorest households live in the U.S. The highest income range covers households which make $200,000 or more a year. The lowest income range shows households making less than $25,000 a year.

Map of Household income extremes

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All of these tools are very helpful in understanding the demographics and community elements.

The two Environmental Justice Mapping Tools reviewed for this analysis include:

- EJSCREEN
- *Neighborhoods at Risk*

The following is a summary of the comparable data found using the *Neighborhoods at Risk* Tool. This tool appears to provide the best downloadable reports for the project area.

Summary of Mapping Tools:

EJSCREEN - EPA

EJSCREEN provides the same data as the other tools with different downloadable standard reports based upon how the user describes the investment using the drawing tool on the map. For example, the Project location can be drawn on the EJSCREEN mapping tool and a buffer around the location can be added. For this report, the location of the Project was added to the map. The standard reports were run for a buffer of 1 mile around the center of the Project area.

EJSCREEN uses maps and reports to present three kinds of information: Environmental indicators, demographic indicators and EJ Indexes. An EJ Index summarizes how an environmental indicator and demographics come together in the same location.

An EJSCREEN map can display one indicator at a time. An EJSCREEN standard report which is attached to this narrative, presents all of the indicators in a single, printable report that covers any area you have selected. To understand EJSCREEN's reports and maps, it is helpful to learn more about the EJ Indexes, environmental indicators, demographic indicators as well as how they are presented in the standard report.

Purposes and Uses of EJSCREEN

EJSCREEN allows users to access high-resolution environmental and demographic information for locations in the United States, and compare their selected locations to the rest of the state, the applicable EPA region, or the nation. The tool may help users identify areas with:

- Minority and/or low-income populations
- Potential environmental quality issues
- A combination of environmental and demographic indicators that is greater than usual
- Other factors that may be of interest

The EJ index is a combination of environmental and demographic information. There are eleven EJ Indexes in EJSCREEN reflecting the 11 environmental indicators. The 11 EJ Index names are[1]:

1. National Scale Air Toxics Assessment Air Toxics Cancer Risk
2. National Scale Air Toxics Assessment Respiratory Hazard Index
3. National Scale Air Toxics Assessment Diesel PM (DPM)
4. Particulate Matter (PM2.5)
5. Ozone
6. Lead Paint Indicator
7. Traffic Proximity and Volume
8. Proximity to Risk Management Plan Sites
9. Proximity to Treatment Storage and Disposal Facilities
10. Proximity to National Priorities List Sites
11. Wastewater Discharge Indicator

To calculate a single EJ Index, EJSCREEN uses a formula to combine a single environmental factor with the demographic indicator. It considers how much the local demographics are above the national average. It does this by looking at the difference between the demographic composition of the block group, as measured by the Demographic Index, and the national average (which is approximately 35%). It also considers the population size of the block group, although most block groups are similar in population size.

[1] Environmental Justice Indexes in EJSCREEN | EJSCREEN: Environmental Justice Screening and Mapping Tool | US EPA

EJSCREEN calculates the EJ Index by multiplying together three items:

EJ Index =

(The Environmental Indicator)

X (Demographic Index for Block Group – Demographic Index for US)

X (Population count for Block Group)

Demographics in the EJ Index

The demographic portions of the EJ Index can be thought of as the additional number of susceptible individuals in the block group, beyond what you would expect for a block group with this size total population. The terms "susceptible" or "potentially susceptible individuals" are used informally in these examples, as a way to think of the Demographic Index times the population count in a block group. This is essentially the average of the count of minorities and count of low-income individuals1. It is easiest to think of the average of these counts as "the susceptible individuals" in these examples.

The number of potentially susceptible individuals (Demographic Index times population count) of course is typically less than the actual number who are minority, low-income or both. The demographic breakdown is not reported by block group –the ACS does not provide that level of resolution on the overlaps.

Overview of Demographic Indicators in EJSCREEN

EJSCREEN uses demographic factors as very general indicators of a community's potential susceptibility to the types of environmental factors included in this screening tool, as explained further in the EJSCREEN Technical Documentation[2]. EJSCREEN has been designed in the context of EPA's EJ policies, including EPA's Final Guidance on Considering Environmental Justice During the Development of an Action (U.S. EPA, 2010). That guidance document explained EPA's focus on demographics as an indicator of potential susceptibility to environmental pollution.

There are six demographic indicators:

Percent Low-Income:

The percent of a block group's population in households where the household income is less than or equal to twice the federal "poverty level."

Percent People of Color:

The percent of individuals in a block group who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. That is, all people other than non-Hispanic white-alone individuals. The word "alone" in this case indicates that the person is of a single race, not multiracial.

[2] Technical Documentation for EJSCREEN | EJSCREEN: Environmental Justice Screening and Mapping Tool | US EPA

Less than high school education:

Percent of people age 25 or older in a block group whose education is short of a high school diploma.

Linguistic isolation:

Percent of people in a block group living in linguistically isolated households. A household in which all members age 14 years and over speak a non-English language and also speak English less than "very well" (have difficulty with English) is linguistically isolated.

Individuals under age 5:

Percent of people in a block group under the age of 5.

Individuals over age 64:

Percent of people in a block group over the age of 64.

EJSCREEN includes an index that is based on the above demographic indicators:

A Demographic Index is based on the average of two demographic indicators; Percent Low-Income and Percent Minority.

Excess Risk

The EJ Index uses the concept of "excess risk" by looking at how far above the national average the block group's demographics are. For example, assume a block group with 1000 people in it. In that block group, one would expect 350 potentially susceptible individuals (1000 people here x US average of 35%). However, if the Demographic Index for that block group is 75%, well above the US average, then there are the equivalent of 750 potentially susceptible people in that block group, or 400 more than expected for a block group with a population of 1000.

This formula for the EJ Index is useful because for each environmental factor it finds the block groups that contribute the most toward the national disparity in that environmental factor. It can highlight which locations are driving the overall net disparity. By "disparity" in this case we mean the difference between the environmental indicator's average value among certain demographic groups and the average in the rest of the US population.

Minority and low-income individuals live in older housing more often than the rest of the US population, for example. The EJ Index for lead paint (pre-1960 housing) tells us how much each block group contributes toward this "excess population risk" or "excess number" of people in older housing, for potentially susceptible individuals. "Excess" here simply means the number of potentially susceptible individuals in older housing is above what it would be if they were in older housing at the same rate as the rest of the U.S. population.

It should be noted that the EJ Index raw value itself is not reported in EJSCREEN reports– it is reported in percentile terms, to make the results easier to interpret. If one is calculating the actual raw values using the formula, it is clear that the EJ Index value can be a positive or negative number.

A positive number occurs where the local Demographic Index is above the US average, and this means the location adds to any excess in environmental indicator values among the specified populations (minority and low-income) nationwide.

A negative value occurs where the local Demographic Index is below the US average, and it means the location offsets the other locations, reducing any excess in nationwide average environmental indicator values among minority and low-income populations relative to others.

Most EJSCREEN users will not work directly with EJ Index raw values, however, and positive raw values for an EJ Index will be presented as higher percentiles and negative raw values will appear as lower percentiles.

How to Interpret a Standard Report in EJSCREEN

Block Groups

One key output from EJSCREEN is a standard printed report that describes a selected location. Sometimes the report might focus on a single Census "block group." A block group is an area defined by the Census Bureau that usually has in the range of 600-3,000 people living in it. The US is divided into more than 200,000 block groups.

Buffers

More typically, though, an EJSCREEN report will cover a "buffer" area, an area on the map that includes everyone who lives within a certain distance of a point, line or polygon. A point might be a factory seeking an emissions permit, for example, and the report could focus on the demographics and environmental conditions within approximately 1 mile of that factory.

In EJSCREEN, buffers can be drawn up to 10 miles around a point, line or polygon. If you have selected a geographic point, the tool will apply a buffer around that point. The buffer ring will aggregate appropriate portions of the intersecting block groups, weighted by population, to create a representative set of data for the entire ring area, honoring variation and dispersion of the population in the block groups within it. For each indicator, the result is a population-weighted average, which equals the block group indicator values averaged over all residents who are estimated to be inside the buffer.

EJSCREEN's report shows:

All 11 of the EJ Indexes

All 11 of the environmental indicators

The Demographic Index

All six of the demographic indicators

The first page of EJSCREEN’s report shows the state, regional and national EJ Indexes for the selected area in tabular form and in a bar chart. "Percentiles" are an important part of EJSCREEN. Every indicator in EJSCREEN is put into perspective by showing its associated percentiles.

The second page shows a map of the selected area and the third page shows:

- 11 environmental indicators

- Demographic Index
- six demographic indicators

The report includes the state, regional and national percentiles for each of the environmental and demographic indicators and for the demographic index. The state, regional and national averages for each of the environmental indicators and demographic indicators are also included as a reference point.

11 Environmental Indicators

As can be seen in the EJScreen report below, the area in the 1-mile buffer around the center of the Project when compared to the 11 EJ Environmental Indexes exceeds all USA Percentiles, and exceeds the State Percentile in all categories except Wastewater Discharge Indicator

Demographic Index

The area within the 1-mile buffer with an Demographic Index of 54% is in the 93rd percentile[3] of the State of KY and in the 76th percentile in the EPA Region and the 77th percentile of the US. For low income, this area of 66% is in the 90th percentile of the State of KY and in the 91st percentile in the EPA Region and the 82nd percentile of the US.

People of Color Index at 42% (which is almost 3 times the State demographic mix,) is in the 91st percentile for the State, 60th percentile for the EPA Region and 60th percentile for the US.

Based upon these observations, it will be important to consider any elements of the Project that will have an undue impact on the area's minority or low-income population. Modernizing the cargo equipment will improve air quality which will benefit everyone in the area. Increasing the cargo volumes through the Riverport should create additional jobs in the area. Many of these new jobs could provide opportunities for the neighboring community which has a higher-than-average population with less than a high school education.

The chart below compares the Project Area to the State EJ Profile

Comparison	Census Block Data		Area within 1 mile Buffer	
	211450030100	State Percentile		State Percentile
Demographic Index	50%	92	54%	93
% minority	40%	90	42%	91
% low income	60%	84	66%	90
% linguistic isolation	3%	86	2%	81
% less than high school	26%	86	28%	90
% under age 5	18%	69	7%	65
% over age 64	10%	19	12%	31

[3] A percentile of 80 means that you scored equal to or better than 80% of people who took the test. In EJSCREEN, if your results indicate that an area is 48% minority and is at the 69th national percentile, this means that 48% of the area's population is minority, and that is an equal or higher % minority than where 69% of the US population lives. For more information: How to Interpret a Standard Report in EJSCREEN | EJSCREEN: Environmental Justice Screening and Mapping Tool | US EPA

EPA United States Environmental Protection Agency

EJSCREEN Report (Version 2020)

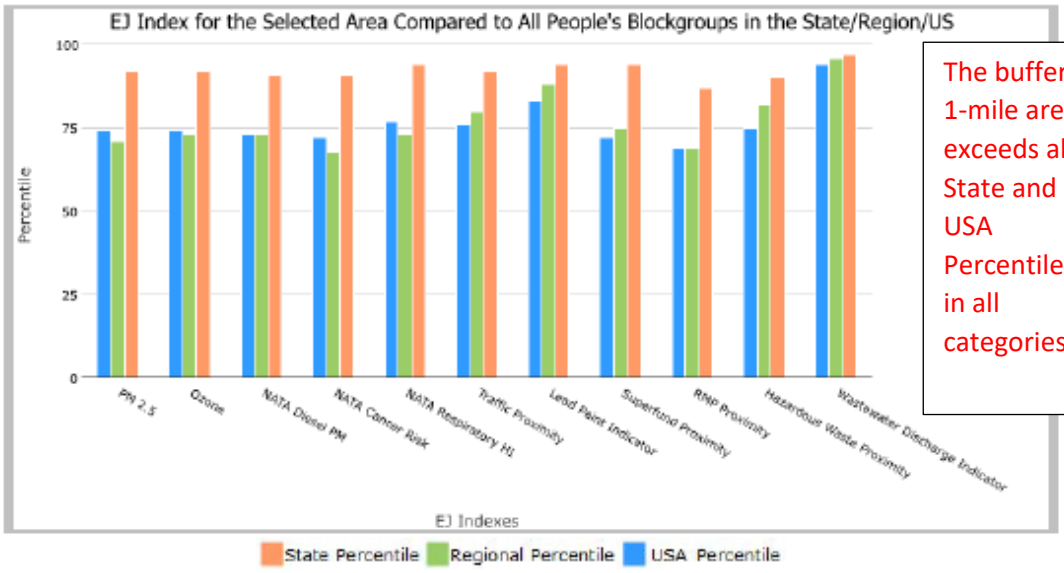
1 mile Ring Centered at 37.063631,-88.577112, KENTUCKY, EPA Region 4

Approximate Population: 2,299

Input Area (sq. miles): 3.14

Paducah McCracken Co Riverport

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	92	71	74
EJ Index for Ozone	92	73	74
EJ Index for NATA* Diesel PM	91	73	73
EJ Index for NATA* Air Toxics Cancer Risk	91	68	72
EJ Index for NATA* Respiratory Hazard Index	94	73	77
EJ Index for Traffic Proximity and Volume	92	80	76
EJ Index for Lead Paint Indicator	94	88	83
EJ Index for Superfund Proximity	94	75	72
EJ Index for RMP Proximity	87	69	69
EJ Index for Hazardous Waste Proximity	90	82	75
EJ Index for Wastewater Discharge Indicator	97	96	94



The buffered 1-mile area exceeds all State and USA Percentiles in all categories

This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

June 04, 2021 1/3

EPA United States Environmental Protection Agency

EJSCREEN Report (Version 2020)

1 mile Ring Centered at 37.063631,-88.577112, KENTUCKY, EPA Region 4

Approximate Population: 2,299

Input Area (sq. miles): 3.14

Paducah McCracken Co Riverport

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	1

EPA United States Environmental Protection Agency

EJSCREEN Report (Version 2020)

1 mile Ring Centered at 37.063631,-88.577112, KENTUCKY, EPA Region 4

Approximate Population: 2,299

Input Area (sq. miles): 3.14

Paducah McCracken Co Riverport

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	9.29	8.7	85	8.57	83	8.55	74
Ozone (ppb)	45.4	43.5	78	38	95	42.9	73
NATA* Diesel PM (µg/m³)	0.414	0.383	62	0.417	50-60th	0.478	50-60th
NATA* Cancer Risk (lifetime risk per million)	32	31	62	36	<50th	32	50-60th
NATA* Respiratory Hazard Index	0.65	0.44	98	0.52	90-95th	0.44	90-95th
Traffic Proximity and Volume (daily traffic count/distance to road)	390	300	78	350	76	750	62
Lead Paint Indicator (% Pre-1960 Housing)	0.37	0.24	81	0.15	88	0.28	68
Superfund Proximity (site count/km distance)	0.048	0.039	76	0.083	58	0.13	41
RMP Proximity (facility count/km distance)	0.2	0.67	45	0.6	44	0.74	38
Hazardous Waste Proximity (facility count/km distance)	1.4	1.3	69	0.91	80	5	57
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0.087	3.7	83	0.65	93	9.4	88
Demographic Indicators							
Demographic Index	54%	26%	93	37%	76	36%	77
People of Color Population	42%	15%	91	39%	60	39%	60
Low Income Population	66%	38%	90	36%	91	33%	92
Linguistically Isolated Population	2%	1%	81	3%	62	4%	55
Population With Less Than High School Education	28%	14%	90	13%	90	13%	88
Population Under 5 years of age	7%	6%	65	6%	68	6%	66
Population over 64 years of age	12%	16%	31	17%	37	15%	41

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

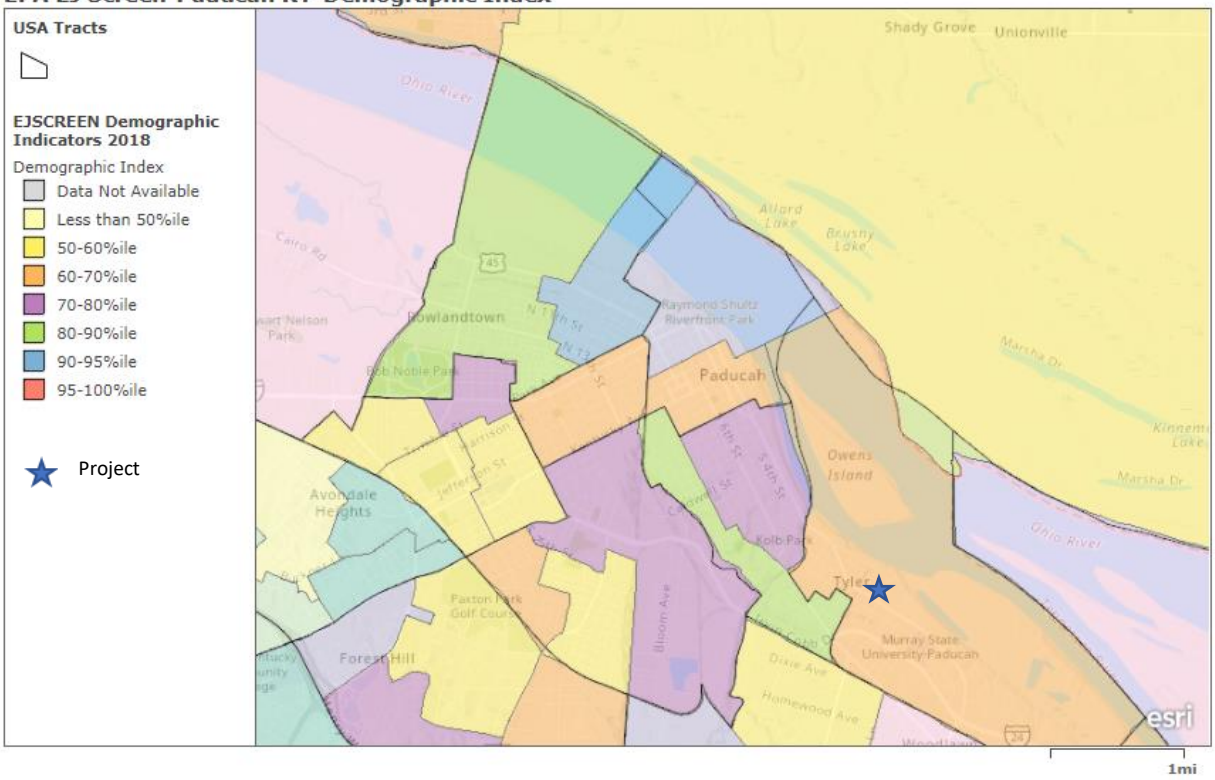
For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

June 04, 2021 3/3

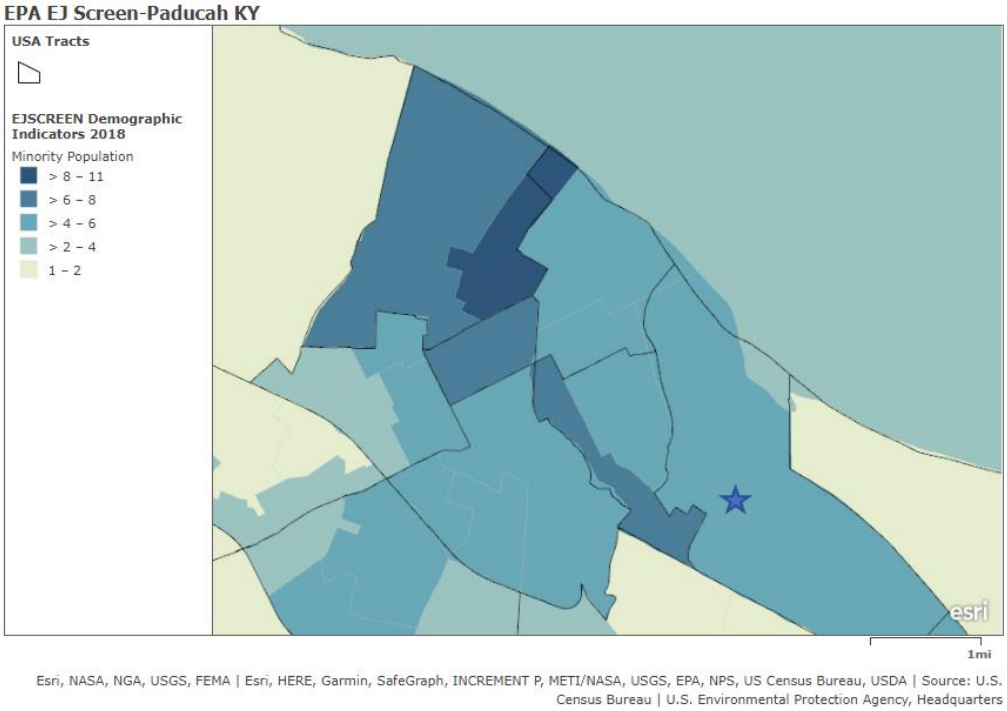
Demographic Index 2018

The Demographic Index in EJSCREEN is created using the two demographic indicators that were explicitly named in EO12898, low-income and minority. For each Census block group, these two indicators are simply averaged together: Demographic Index = (% minority + % low-income) / 2



This map shows that the Project is in a census tract that is considered in the 60-70 percentile. Adjacent tracts are shown to be high in the 70-80 percentile and another tract in the 80-90 percentile.

EJ Minority Population Factor



Neighborhoods at Risk Tool

Neighborhoods at Risk is a tool designed to meet community planning needs to protect people and property from the impacts of climate change. A free, web-based tool, *Neighborhoods at Risk* generates customized, interactive maps and reports that describe characteristics of potentially vulnerable neighborhoods (by census tract). Additionally, *Neighborhoods at Risk* provides community-level climate projections for temperature and precipitation.

The Analysis below is divided into People and Climate Exposure:

Neighborhoods at Risk	Area		
	Tract 301	Paducah, KY	U.S.
# Selected Tracts	1		
Total Area Population (2019)	1,211	24,894	324,697,795
People			
People of color and Hispanics	35.2%	28.6%	39.3%
Households with no car	5.3%	11.8%	8.6%
People who don't speak English well	3.2%	0.5%	4.3%
Families in poverty	28.9%	15.3%	9.5%
People with Disabilities	12.5%	18.3%	12.6%
Housing units that are rentals	61.3%	46.8%	36.0%
People under 5	6.3%	6.5%	6.1%
People over 65 years	10.2%	19.5%	15.6%
Educational Attainment- No High School Degree	18.2%	11.4%	12.0%
Climate Exposure			
Area lacking tree canopy	85.5%	84.4%	
Area of impervious surface	14.4%	12.2%	
Area in 500-yr floodplain	44.7%	30.4%	

Source: U.S. Department of Commerce. 2019. Census Bureau, American Community Survey Office, Washington, D.C., as reported by Headwaters Economics' *Neighborhoods at Risk*. Retrieved March 2021 from https://headwaterseconomics.org/apps/neighborhoods-at-risk/

Legend

	Below US Average
	Above US Average
	Double or more than the US Average

Neighborhoods at Risk can be used to prioritize capital improvements, conduct vulnerability assessments, inform land use and policy decisions, and support FEMA Hazard Mitigation Plans and Carbon Disclosure Project reporting.

Neighborhoods at Risk reports are based on data from the U.S. Census Bureau, FEMA, Multi-Resolution Land Characteristics Consortium, First Street Foundation, and the Northeast Regional Climate Center's Applied Climate Information System.

The following is a summary of the comparable data found using the *Neighborhoods at Risk* Tool. This tool appears to provide the best downloadable reports for each of the project areas.

"**People**" in *Neighborhoods at Risk* are indicators of populations that are potentially more vulnerable to climate risk and climate-related disasters. Not all people who fit these criteria are more vulnerable, but research shows that these populations are, on average, more likely to experience difficulty during all phases of climate-related disasters including:

- Mitigation: reducing the potential risk
- Preparedness: getting plans and resources ready
- Response: protecting and rescuing
- Recovery: rebuilding

The downloadable *Neighborhoods at Risk* report provides detailed information and references documenting how each variable is associated with potentially higher risk to climate change.

The four characteristics and filters included under "**Climate Exposure**" in *Neighborhoods at Risk* are indicators of land area that may experience more significant impacts from climate change. These variables (hurricane flood zones, floodplains, impervious surface, and lack of tree canopy) represent characteristics of our physical environment that make us more or less vulnerable to climate change by affecting the likelihood of extreme heat and flood events.

Why is this measure important?

People

People of color and Hispanics

- Race and ethnicity are strongly correlated with disparities in health, exposure to environmental pollution, and vulnerability to natural hazards.
- Research consistently has found race-based environmental inequities, including the tendency for minority populations to live closer to noxious facilities and Superfund sites, and to be exposed to pollution at greater rates than predominantly white populations.
- Many health outcomes are closely related to the local environment. Minority communities often have less access to parks and nutritious food, and are more likely to live in substandard housing.
- Minorities tend to be particularly vulnerable to disasters and extreme heat events. This is due to language skills, housing patterns, quality of housing, community isolation, and cultural barriers.
- Blacks and Hispanics, two segments of the population that are currently experiencing poorer health outcomes, are an increasing percentage of the US population.

- Research has identified measurable disparities in health outcomes between various minority and ethnic communities.
- Across races, the rates of preventable hospitalizations are highest among black and Hispanic populations. Preventable hospital visits often reflect inadequate access to primary care. These types of hospital visits are also costly and inefficient for the health care system.
- Relative to other ethnicities and races, Hispanics and blacks are less likely to have health insurance, but rates of uninsured are dropping for both groups.
- Compared to other races, blacks have higher rates of infant mortality, homicide, heart disease, stroke, and heat-related deaths.
- Hispanics have higher rates of diabetes and asthma.
- American Indians have a distinct pattern of health effects different from blacks and Hispanics. Native populations are less likely to have electricity than the general population. They have high rates of infant mortality, suicide and homicide, and nearly twice the rate of motor vehicle deaths than the U.S. average.

Households with no car

Access to a car is linked with higher wages and more financial stability, and can help families relocate or evacuate in the event of emergencies.

- People who own cars are more likely to be employed, work longer hours, and earn more than those who do not.
- Access to a car has measurable benefits for those receiving public assistance. Welfare recipients with access to a car were more likely to work more hours and get higher-paying jobs, and had a greater chance of leaving welfare.
- During emergencies, natural disasters, and extreme weather events, people who do not have a car are less likely to evacuate or have access to emergency response centers.
- During heat waves, people without a car are less able to go to community cooling centers or cooler areas.
- Pedestrian fatalities are more than twice as likely in poor urban neighborhoods than in wealthier parts of cities.

People who don’t speak English well

- Many aspects of life in the US assume basic fluency in English. Thus, people with limited language skills are at risk for inadequate access to health care, social services, or emergency services.
- A person’s ability to take action during an emergency is compromised by language and cultural barriers.
- Poor English skills can make it harder to follow directions or interact with agencies.
- Lack of language skills can also instill lack of trust for government agencies.
- In many industries, poor English skills can make it harder for people to get higher wage jobs.
- Language barriers make it harder to obtain medical or social services; and make it more difficult to interact with caregivers.
- Limited English skills may result in isolation from other segments of the U.S. population, and social isolation is a health risk.

- However, some minority communities can be very tightly-knit and not isolated, so this risk factor cannot be generalized across all populations.

Families in poverty

Families in poverty may lack the resources to meet their basic needs. Their challenges cross the spectrum of food, housing, healthcare, education, vulnerability to natural disasters, and emotional stress.

- To save money, families with low incomes often have to make lifestyle compromises such as unhealthy foods, less food, substandard housing, or delayed medical care.
- Lack of financial resources makes families in poverty more vulnerable to natural disasters. This is due to inadequate housing, social exclusion, and an inability to re-locate or evacuate.
- Inadequate shelter exposes occupants to increased risk from storms, floods, fire, and temperature extremes. Households with low incomes are more likely to have unhealthy housing conditions such as leaks, mold, or rodents.
- The expense of running fans, air conditioners, and heaters makes low-income people hesitant to mitigate the temperature of their living spaces. Furthermore, those in high-crime areas may not want to open their windows.
- Families in poverty are disproportionately affected by higher food prices, which are expected to rise in response to climate change.
- Children in poor families, on average, receive fewer years of education compared to children in wealthier families.
- Low-income residents are less likely to have adequate property insurance, so they may bear an even greater burden from property damage due to natural hazards.
- Living in poverty can lead to a lack of personal control over potentially hazardous situations such as increased air pollution or flooding. Impoverished families may be less likely to take proactive measures to prevent harm.

People with Disabilities

Disabled people are subject to health complications that make environmental risks more consequential.

- Disabled people are less likely to have health insurance, compared to the non-disabled population.
- Being confined to a bed raises heat mortality.
- Extreme weather events or natural disasters may result in limited access to medical care. This is particularly consequential for those who already have compromised health.

People younger than 5 or over 65 years

Young children and older adults both are vulnerable segments of the population. Understanding the age profile of a community can help users determine the types of services likely to be needed.

Older adults also are at increased risk of compromised health related to environmental hazards and climate change.

- Age is the single greatest risk factor related to illness or death from extreme heat.

- The elderly are more likely to have pre-existing medical conditions or compromised mobility, which reduces their ability to respond to natural disasters.
- The likelihood of chronic disease increases with age.
- Older adults are more susceptible to air pollution such as ground level ozone, particulate matter, or dust. Increased dust is associated with drought, wildfires, and high wind events.

Educational Attainment- No High School Degree

High school completion is used as a proxy for overall socioeconomic circumstances. Lack of education is strongly correlated with poverty and poor health.

- People without a high school degree are more than twice as likely to live in inadequate housing compared to those with some college education.
- A study in California[4] found the lack of a high school degree was the factor most closely related to social vulnerability to climate change.
- Thirty-eight percent of Americans without a high school degree do not have health insurance, compared to 10 percent with a college degree.
- The rate of diabetes is much greater for those without a high school degree. Incidence of this disease is more than double the rate of those who attended education beyond high school.
- Binge drinking is most severe among those without a high school degree. This demographic group had the highest risk of binge drinking across all measured categories (such as income, race, ethnicity, or disability status).[5]

Climate Exposure

These three categories for the project area represent characteristics of the physical environment that make the population within the area more or less vulnerable to climate change by affecting the likelihood of extreme heat and flood events.

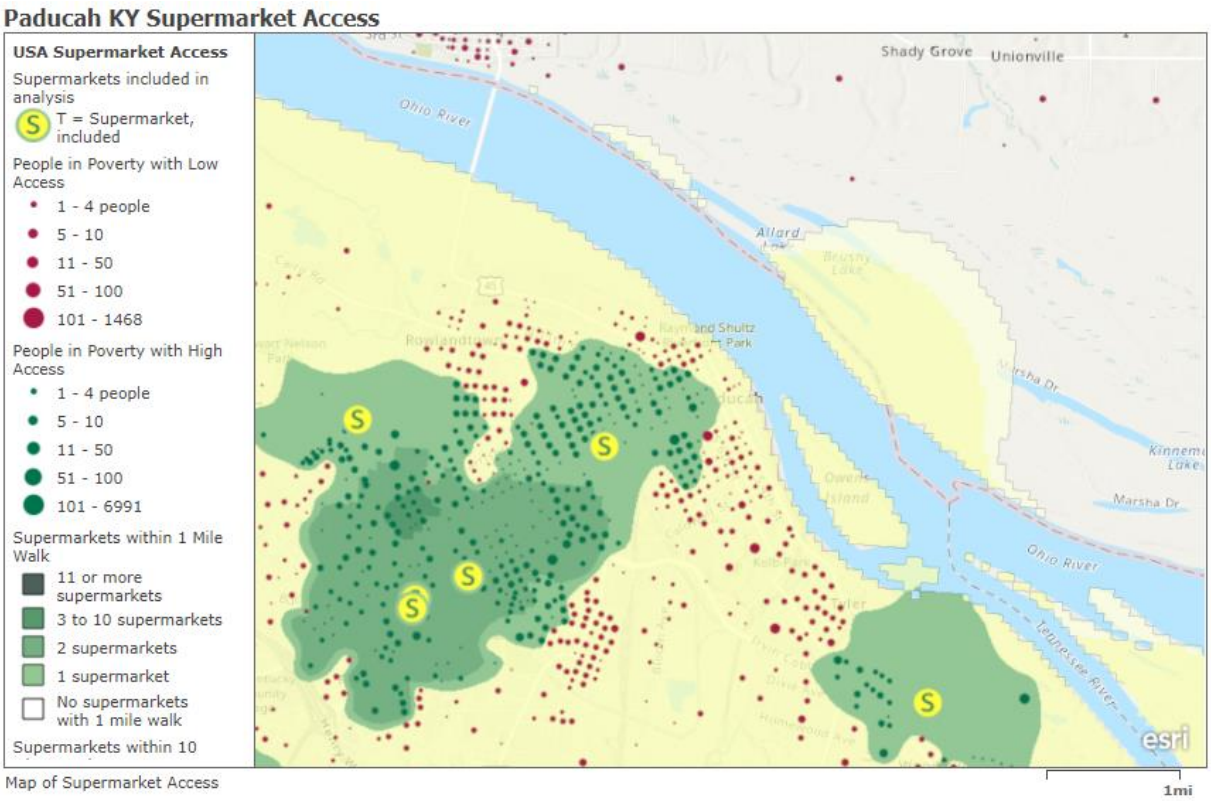
- Area lacking tree canopy-
- Area of impervious surface
- Area in 500-yr floodplain

[4] Heather Cooley, Eli Moore, Matthew Heberger, and Lucy Allen, Social Vulnerability to Climate Change in California (California Energy Commission Pub. # CEC-500-2012-013, 2012).

[5] Centers for Disease Control and Prevention, "CDC Health Disparities and Inequalities Report — United States, 2011," Morbidity and Mortality Weekly Report 60 Suppl. (January 14, 2011). http://www.cdc.gov/mmwr/pdf/other/su6001.pdf

3. Specific Project Elements that support our Environmental Justice (EJ) populations

Environmental injustice and climate change are about the fact that in many communities it is far easier to find a bag of Cheetos than a carton of strawberries and this only stands to get worse as drought and flooding impact the availability and affordability of nutritious food. This can be the case for EJ populations in Paducah, fresh fruits and other nutritious items are only found in local grocery stores. For Census Tract 301, there is supermarket a little over a 1 mile walk from the project area. The map below shows the limited access people in poverty have to a supermarket. Although this project will not provide any direct transportation options to improve this vulnerability. It is important that the Riverport be aware of the characteristics of the area and make sure that their development plans improves the Quality of Life of their citizens versus disadvantages the underserved portion of the population even further.



Map of Supermarket Access

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4. Community Outreach and Public Engagement

Community Outreach

The Riverport and their partners began working with and providing ongoing outreach to agencies, tribes, businesses, and other community members in the early planning phases of the Project.

The Riverport will continue to engage interested parties through the following:

- Presentations at local community group meetings
- Meetings with interested parties and stakeholders
- Mailings and email updates at key Project milestones
- Media updates via radio and print ads for Project events

The Riverport will solicit feedback on the Project through the engagement types outlined above and will meaningfully engage the community through a participation process that is inclusive, effective, and accessible to all. -The Riverport plans to continue to take community and stakeholder feedback into consideration as the Project advances.

5. Conclusions and Next Steps

As can be seen from the results of the various EJ mapping tools and data collected, it is important to understand the Project and the potential impacts it may have on specific sections of the population. Using multiple lenses through the different Environmental Justice data tools, helps refine the characteristics of the surrounding area. Fine tuning the scope of the analysis from the County level, the Census Tract to the Census Block and finally a 1-mile radius around the project area, helps to inform planners in the developing their public outreach efforts. Using the characteristics of the populations near the project and evaluating project elements that could impact these underserved populations will help planners ensure negative impacts are identified and accounted for through mitigation efforts.

Once those impacts are identified, then specific outreach can be designed to inform the affected populations and develop mitigation options as appropriate.

As noted above Public Engagement and Outreach is a continuous process that will continue throughout the planning, design and implementation of this project. The Public Engagement will continue to informed the planning design, implementation, procurement and/or construction and will enable the project to address any past inequities identified relating to access and barriers to opportunity, and climate change.

Although, current analysis indicates that the proposed project will improve multi-modal and non-motorized access to the adjacent EJ neighborhoods, at this point of the team's analysis it is believed that the same EJ population will not be disproportionately negatively impacted by the Project. Analysis and monitoring will continue as the Riverport and its partners move through the phases of the project. All mitigation measures identified in the design and environmental review process will be implemented and monitored post-construction for compliance and community enhancement.

Attachments:

Appendix A: Methodology for Assessing Potential Environmental Justice Concerns for KYTC Planning Studies

EJSCREEN Reports

The following EJSCREEN reports were run for the Paducah Riverport Project with a 1 mile buffer as well as Census Tract 2114530100

- Standard Reports
  - EJSCREEN Report
  - ACS 2018 Report
  - Census 2010 sf Report

Neighborhoods at Risk Tool Summary Reports

- Paducah and Census Tract 301