



MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

MiEJScreen

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Background

- Environmental Justice Work Group Report (March 2018)
Recommendation:

“Develop an environmental justice screening tool in Michigan and include cumulative impacts in the decision-making processes”

- Assessing the State of Environmental Justice in Michigan (Grier, Mayor, Zeuner) May 2019
- Environmental Justice Tools for the 21st Century (Blondell, Kobayashi, Redden, Zrzavy) May 2020
- Identified as a priority of the Interagency Environmental Justice Response Team and Office of Environmental Justice Public Advocate
- Data and Research Workgroup (first meeting December 2019)

Purpose

- Develop a Michigan specific mapping tool
- Assess cumulative factors (environmental, socioeconomic, health) that communities in Michigan may face
- Help inform decisions, allocate resources, and address community specific issues/concerns
- Able to be used by multiple stakeholders

Process



REVIEW EXISTING
TOOLS/METHODOLOGY



COLLABORATION FROM
VARIOUS STATE DEPARTMENTS



STAKEHOLDER INVOLVEMENT

Methodology

- Based on California's CalEnviroScreen
- Spatial analysis of relative burdens in Michigan communities at the census tract level
- Uses both national and statewide indicators
- Uses percentiles to assign scores for each indicator
- Uses a scoring system in which the percentiles are averaged for the set of indicators in each of the four components
- Combines the component scores to produce cumulative score for a given place relative to other places in the state

Categories	Environmental Exposure	Environmental Effects	Sensitive Populations	Socioeconomic Factor
	<p>NATA Air Toxics Cancer Risk</p> <p>NATA Respiratory Hazard Index</p> <p>NATA Diesel Particulate Matter</p> <p>Particulate Matter (PM_{2.5})</p> <p>Ozone</p> <p>Traffic Density</p>	<p>Proximity to Cleanup Sites</p> <p>Proximity to Hazardous Waste Facilities</p> <p>Impaired Water Bodies</p> <p>Proximity to Solid waste Sites and Facilities</p> <p>Lead Paint Indicator</p> <p>Proximity to RMP Sites</p> <p>Wastewater Discharge Indicator</p>	<p>Asthma</p> <p>Cardiovascular Disease</p> <p>Low Birth Weight Infants</p> <p>Blood Lead Level</p> <p>Life Expectancy</p>	<p>Low Income Population</p> <p>Black, Indigenous, People of Color Population</p> <p>Educational Attainment</p> <p>Linguistic Isolation</p> <p>Population Under Age 5</p> <p>Population Over Age 64</p> <p>Unemployment</p> <p>Housing Burden</p>
Indicators	<p>Environmental Conditions</p> <p>(Average percentile of Environmental Exposure indicators + 0.5 x average percentile of Environmental Effects indicators)</p> $\frac{\quad}{2}$		<p>Population Characteristics</p> <p>(Average percentile of Sensitive Population indicators x average percentile of Socioeconomic Factor indicators)</p> $\frac{\quad}{2}$	
Score	<p>Final Composite Score = Environmental Conditions score x Population Characteristics score</p> <p>MiEJScreen Score</p>			

Indicator	Details	Source	Data Year
Environmental Conditions: Environmental Exposure Indicators			
NATA Air Toxics Cancer Risk	Lifetime cancer risk from inhalation of air toxics	EPA EJSCREEN, retrieved 2020	2014
NATA Respiratory Hazard Index	Air toxics respiratory hazard index (ratio of exposure concentration to health-based reference concentration)	EPA EJSCREEN, retrieved 2020	2014
NATA Diesel PM	Diesel particulate matter level in air, $\mu\text{g}/\text{m}^3$	EPA EJSCREEN, retrieved 2020	2014
Ozone	Ozone summer seasonal average of daily maximum 8-hour concentration in air in parts per billion	EPA EJSCREEN, retrieved 2020	2017
Particulate Matter (PM_{2.5})	PM _{2.5} levels in air, $\mu\text{g}/\text{m}^3$ annual average	EPA EJSCREEN, retrieved 2020	2017
Traffic Density	Traffic density within a buffered (150 meters) census tract, normalized vehicles per day/adjusted length-based road (miles)	Michigan Department of Transportation, Annual average daily traffic (AADT) volumes and National functional classification (NFC) data files	2019

Indicator	Details	Source	Data Year
<i>Environmental Conditions: Environmental Effects Indicators</i>			
Impaired Water Bodies	Summed number of pollutants across all water bodies designated as impaired within the area.	EGLE, Water Resources Division 303(d) List of Impaired Water Bodies	2020
Solid Waste Sites and Facilities	Proximity to licensed landfills, old dumpsite, and scrap tire sites	EGLE, Material Management Division	2020
Hazardous Waste Generators and Facilities	Proximity to hazardous waste facilities (TSDFs and LQGs).	EPA EJSCREEN (retrieved 2020) and EGLE, Material Management Division	2020
Cleanup Sites	Proximity to Part 201 cleanup sites, Part 213 leaking underground storage tank sites, and Superfund sites (EPA NPL).	EGLE, Remediation and Redevelopment Division and EPA EJSCREEN (retrieved 2020)	2020
Lead Paint	Percent of housing built before 1960	American Community Survey (ACS) through ESRI Living Atlas of the World	5 year estimate, 2015-2019
RMP	Proximity to facilities with Risk Management Plans	EPA EJSCREEN (retrieved 2021)	2020
Wastewater Discharge	Risk-Screening Environmental Indicator Model (RSEI) toxic concentrations at stream segments within the area	EPA EJSCREEN (retrieved 2021)	2020

Indicator	Details	Source	Data Year
<i>Population Characteristics: Sensitive Populations Indicators</i>			
Asthma	Spatially modeled, age-adjusted rate of emergency department visits for asthma per 10,000	Michigan Hospital and Health Association. Division for Vital Records and Health Statistics, MDHHS	2016-2019
Heart Disease	Spatially modeled, age-adjusted rate of hospitalization for cardiovascular disease per 10,000	Michigan Hospital and Health Association. Division for Vital Records and Health Statistics, MDHHS	2016-2019
Low Birth Weight	Percent low birth weight averaged over 2014-2019	Michigan Birth Files. Division for Vital Records and Health Statistics, MDHHS	2014-2019
Life Expectancy	Average number of years a person can expect to live	United State Small-area Life Expectancy Estimates Project	2010-2015
Blood Lead Level	Percent of tested children with elevated (≥ 5 $\mu\text{g/dL}$) blood lead levels	MDHHS	2018-2019

Indicator	Details	Source	Data Year
<i>Population Characteristics: Socioeconomic Factor Indicators</i>			
Educational Attainment	Percent of population over age of 25 with less than a high school education	American Community Survey (ACS) through ESRI Living Atlas of the World	5 year estimate, 2015-2019
Linguistic Isolation	Percent limited English-speaking households	ACS through ESRI Living Atlas of the World	5 year estimate, 2015-2019
Poverty	Percent of population living below two times the federal poverty level	ACS through ESRI Living Atlas of the World	5 year estimate, 2015-2019
Unemployment	Percent of the population over the age of 16 that is unemployed and eligible for the labor force. Excludes retirees, students, homemakers, and institutionalized persons	ACS through ESRI Living Atlas of the World	5 year estimate, 2015-2019
People of Color	The sum of all race/ethnicity categories except White/Non-Hispanic. It includes Black, American Indian/Alaskan Native, Asian, Native Hawaiian-Other Pacific Islander and two or more races	ACS through ESRI Living Atlas of the World	5 year estimate, 2015-2019
Housing Burden	Percent of households spending over 30% of income on housing costs	ACS	5 year estimate, 2014-2018
Population Under 5	Percent of population under age 5	ACS through ESRI Living Atlas of the World	5 year estimate, 2015-2019
Population Over 64	Percent of population over 64	ACS through ESRI Living Atlas of the World	5 year estimate, 2015-2019



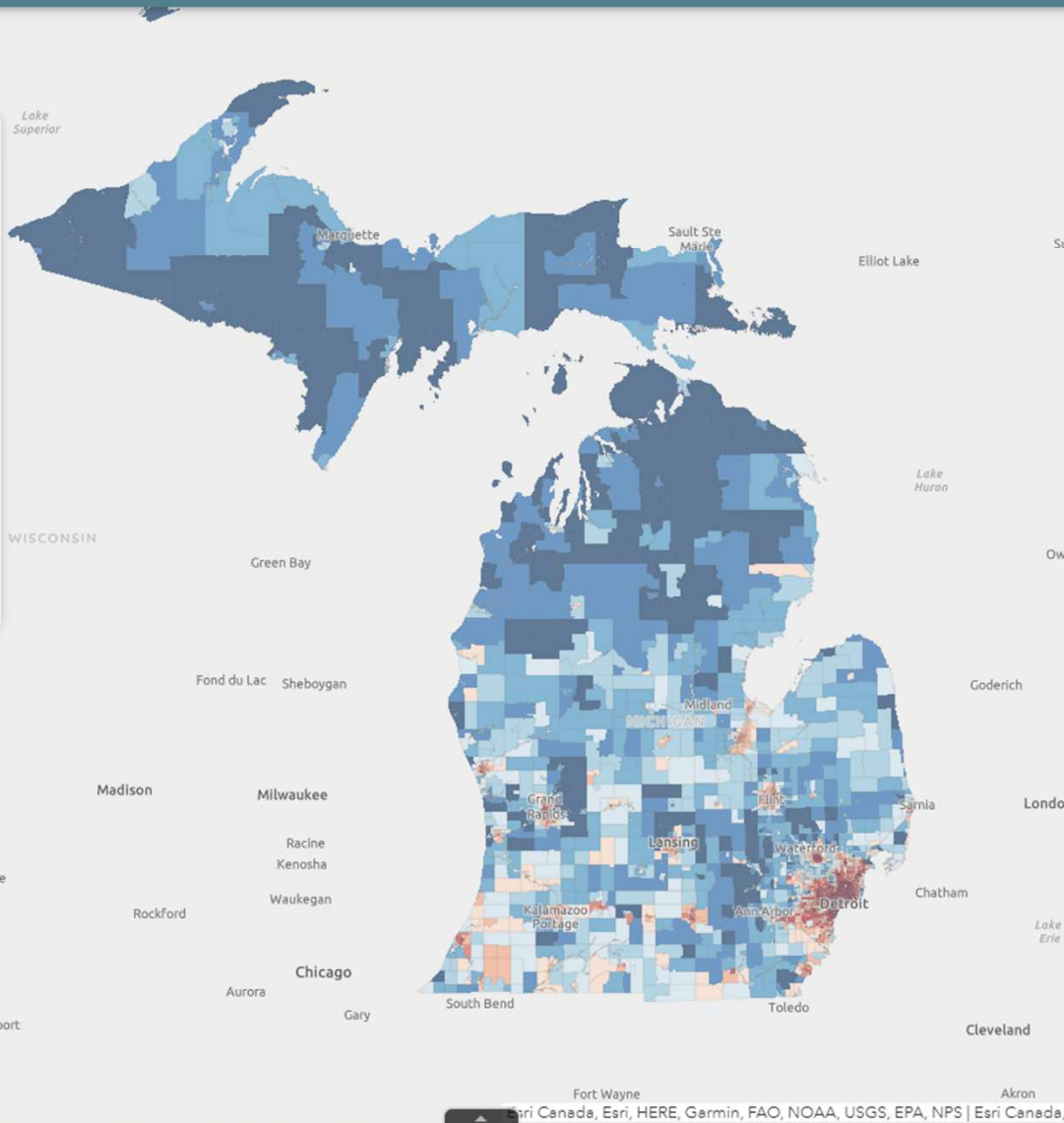
Esri World Geocoder

Legend

MiEJscreen Score Percentile

MiEJScorePL

- 91 - 100
- 81 - 90
- 71 - 80
- 61 - 70
- 51 - 60
- 41 - 50
- 31 - 40
- 21 - 30
- 11 - 20
- 0 - 10



Layer List

Layers

- MiEJscreen Score Percentile
- Environmental Conditions Percentile
- Population Characteristics Score Percentile
- 1) Environmental Conditions: Exposure
- a) NATA Air Toxics Cancer Risks
- b) NATA Respiratory Hazard Index
- c) NATA Diesel Particulate Matter
- d) Particulate Matter 2.5 (PM2.5)
- e) Ozone
- f) Traffic Proximity and Volume
- 2) Environmental Conditions: Environmental Effects
- a) Cleanup Sites Proximity
- b) Treatment and Disposal Facilities Proximity
- c) Impaired Waters
- d) Solid Waste Proximity
- e) Lead Paint Indicator
- f) RMP Proximity
- g) Wastewater Discharge Indicator
- 3) Population Characteristics: Sensitive Populations
- a) Asthma Emergency Room Discharges



Context Layers

- Michigan PFAS Sites
- Ozone/SO2 Non Attainment Areas
- Schools, hospitals, places of worship
- Roads and railroads
- Boundaries (zip code, cities, counties, tribal areas, etc.)
- Redlining maps
- Sites reporting to EPA
- Impaired water boundaries
- Population density
- Public housing
- Prisons
- EJ Grants

Next Steps

- Draft version available for public comment soon
- Review and incorporate public comment
- Final version available 2022
- Update tool as new data and methodologies are developed