

Find address or place



MD EJSCREEN v2.0: A Tool for Mapping Environmental Justice in Maryland

Jan-Michael Archer, M.S.
Sacoby Wilson, Ph.D.

2/25/2020 – CEJSC Meeting

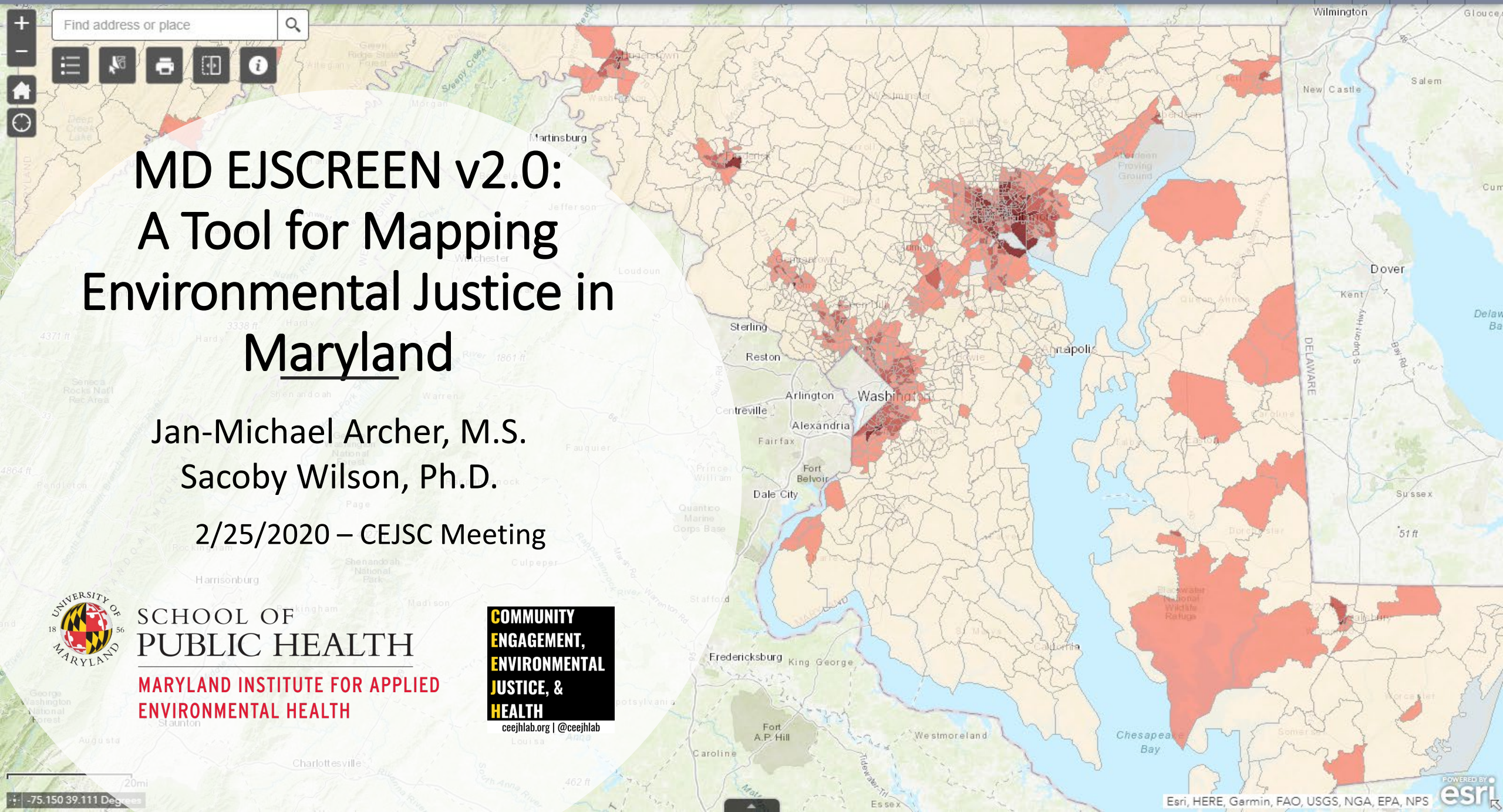


SCHOOL OF
PUBLIC HEALTH


MARYLAND INSTITUTE FOR APPLIED
ENVIRONMENTAL HEALTH

**COMMUNITY
ENGAGEMENT,
ENVIRONMENTAL
JUSTICE, &
HEALTH**


ceejhlab.org | [@ceejhlab](https://twitter.com/ceejhlab)




EPA EJSCREEN exists-- Why not just use that?



Utilize local data



Customize to local community concerns (E.g. California highlights pesticide use)



Make a tool that is useful for STATE, COUNTY, AND MUNICIPAL policymaking



EPA United States Environmental Protection Agency

Environmental Topics | Laws & Regulations | About EPA | Search EPA.gov

EJSCREEN: Environmental Justice Screening and Mapping Tool

CONTACT US | SHARE | Facebook | Twitter | Email

Launch the EJSCREEN Tool
Explore EPA's environmental justice screening and mapping tool

Links

- Environmental Justice at EPA
- Grants and Other Funding Opportunities
- EPA's Environmental Justice in Action Blog
- Sign Up to Receive Updates on EJSCREEN and Other EJ Issues

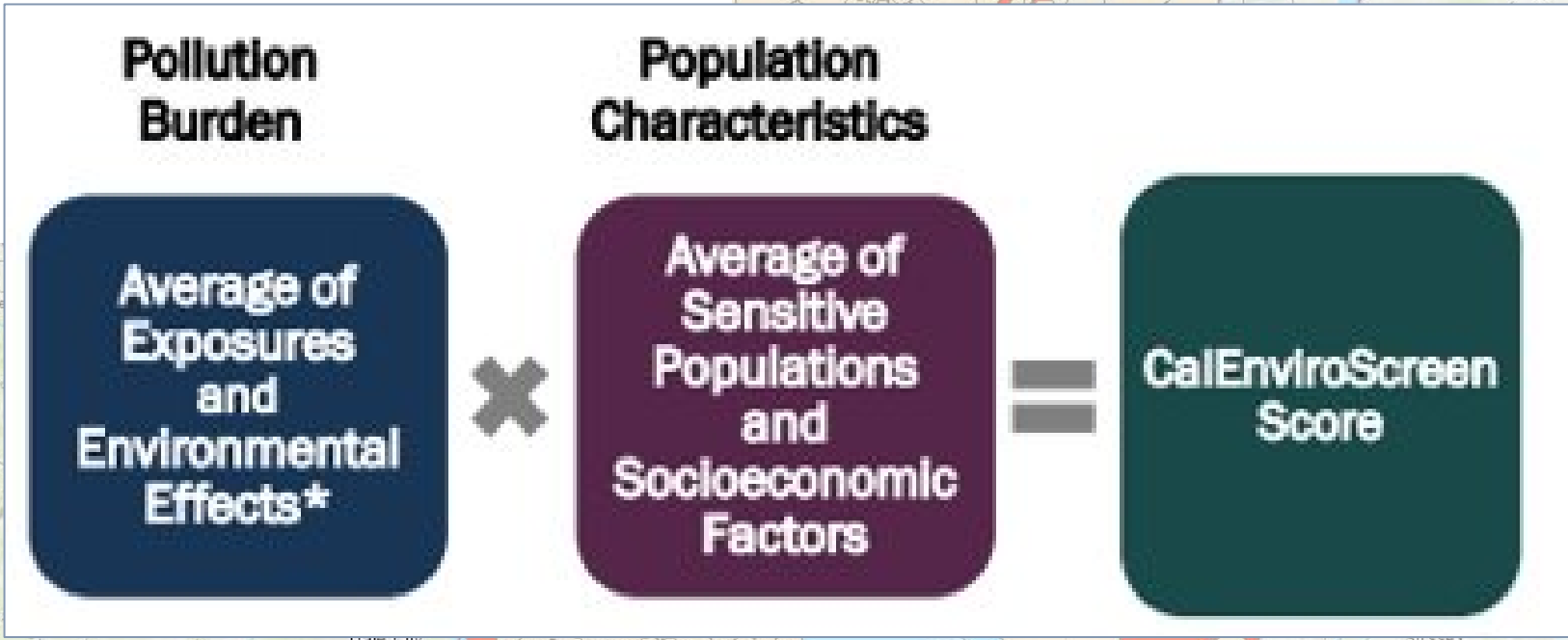
Find address or place

State mapping tools allow users to:

- Explore factors of environmental justice concern and community relevant scales,
- Determine/Compare ‘Score’ of different census tracts in the state, and
- View additional context layers relevant to their area of concern or the story they would like to tell.

20mi
-75.150 39.111 Degrees
POWERED BY
esri

Scoring Methodology Borrowed from CalEnviroScreen



Pollution Burden: Exposure
 Pollution Burden: Environmental Effects

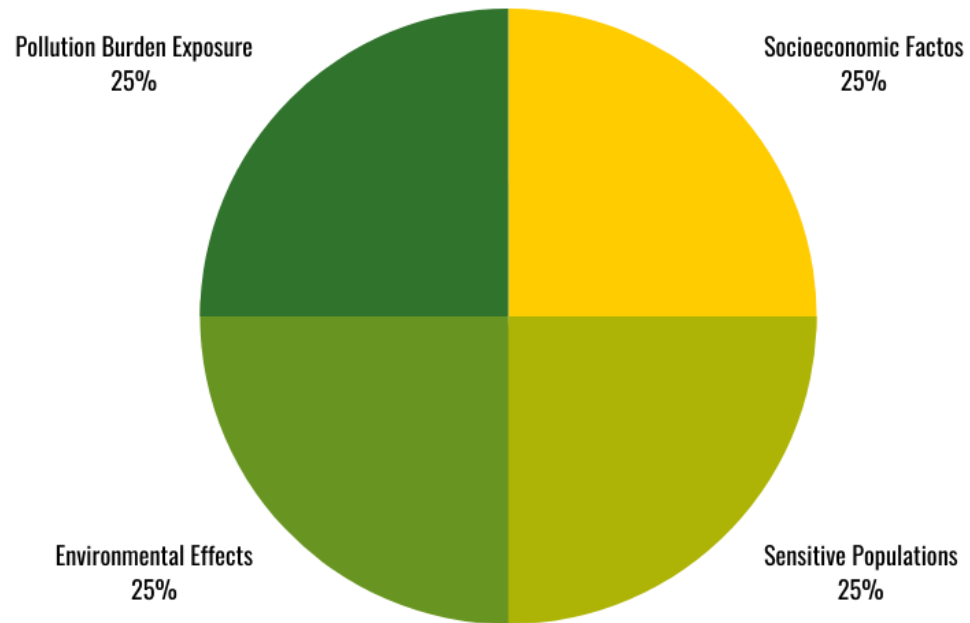
Environmental

- Population Characteristics: Sensitive Populations
- Population Characteristics: Socioeconomic Factors

Justice

MARYLAND'S EJ SCREEN

EJ SCREEN DATA LAYERS LAYERS & WEIGHTING OF MODEL



POLLUTION BURDEN EXPOSURE

GEOGRAPHIC PROXIMITY
EX. AIR TOXINS HAZARDS



POLLUTION BURDEN ENVIRONMENTAL EFFECTS

EFFECTS THAT COULD
BE MITIGATED
EX. PROXIMITY TO
WATER DISCHARGE,
LEAD PAINT



SENSITIVE POPULATIONS

POPULATION
CHARACTERISTICS WITH
HEALTH DISPARITIES



SOCIOECONOMIC FACTORS

POPULATION
CHARACTERISTICS



Pollution Burden: Exposure

Indicators	Description
Pollution Burden: Exposure	
National Scale Air Toxics Air (ATA) Toxics Cancer Risk	<u>Lifetime risk of developing cancer from inhalation of air toxins. Reported as risk per lifetime per million people.</u>
ATA Respiratory Hazard Index	<u>Air toxics respiratory hazard index. This is the sum of hazard indices for those air toxics with reference concentrations based on respiratory endpoints, where each hazard index is the ratio of exposure concentration in the air to the health-based reference.</u>
ATA Diesel Particulate Matter (DPM)	Levels of diesel particulate matter in air. Reported as micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).
Particulate Matter (PM2.5)	Levels of particulate matter with a diameter of 2.5 micrometers or smaller in air. Reported as micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).
Ozone	Summer seasonal average of the maximum daily 8-hour concentration of ozone in air in parts per billion.
Traffic Proximity and Volume	Count of vehicles (average annual daily traffic) at major roads within 500 meters or close to 500 meters, divided by distance in meters.



Pollution Burden: Environmental Effects

Pollution Burden: Environmental Effects

Lead Paint Indicator

Percent of houses built before 1960, which likely contain lead paint.

Proximity to Risk Management Plan (RMP) Sites

Count of RMP (potential chemical accident management plans) facilities within 5 kilometers or close to 5 kilometers, divided by distance in kilometers.

Proximity to Treatment Storage and Disposal Facilities (TSDF)

Count of TSDF (hazardous waste management facilities) within 5 kilometers or closest to 5 kilometers, divided by distance in kilometers.

Proximity to National Priorities List (NPL) Sites

Count of NPL/Superfund sites (polluted sites that pose a risk to human health and/or the environment) within 5 kilometers or close to 5 kilometers, divided by distance in kilometers.

Proximity to Major Direct Water Discharges

Toxic concentrations in stream segments within 500 meters, divided by distance in kilometers (km). Standards modeled after Risk-Screening Environmental Indicators (RSEI).

Watershed Failure

Percent of each census tract's watershed that exceeds levels of phosphorus and/or nitrogen.

Population Characteristics: Sensitive Populations

Population Characteristics: Sensitive Populations	
Asthma Emergency Discharges	<u>Count of patients released from the hospital after being admitted for asthma or asthma-related distress.</u>
Myocardial Infarction Discharges	<u>Patients released from the hospital after being admitted for a heart attack or heart attack symptoms.</u>
Low Birth Weight Infants	<u>Babies born weighing less than 5.5 pounds.</u>
Asthma Emergency Visits	<u>Patients admitted to the emergency room for asthma or asthma-related distress.</u>

- Health effects data at the zip code level was scaled down to the census tract level using geographically weighted scaling.

Population Characteristics: Socio-Economic Factors

Population Characteristics: Socioeconomic Factors

Percent Non-White

Percentage of individuals who define themselves as any race/ethnicity besides non-Hispanic White.

Percent Low-Income

Percentage of individuals whose household income in the past 12 months is less than two times below the federal poverty level.

Less than high school education

Percentage of individuals 25 and older who lack a high school diploma.

Linguistic Isolation

Percentage of households in which no one 14 years old and older speaks English "very well", or households which speak only English.

Individuals under age 5

[Percentage of people under the age of 5.](#)

Individuals over age 64

[Percentage of people over the age of 64.](#)

Unemployment

[Percentage of the population over the age of 16 that is unemployed and eligible for the labor force. Excludes retirees, students, homemakers, institutionalized persons except prisoners, those not looking for work, and military personnel on active duty.](#)

Find address or place

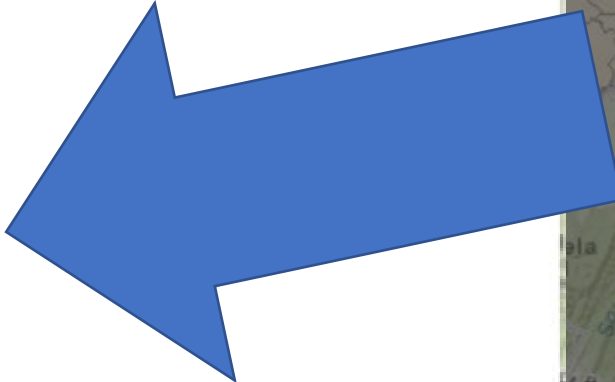


Legend ✕

EJScore

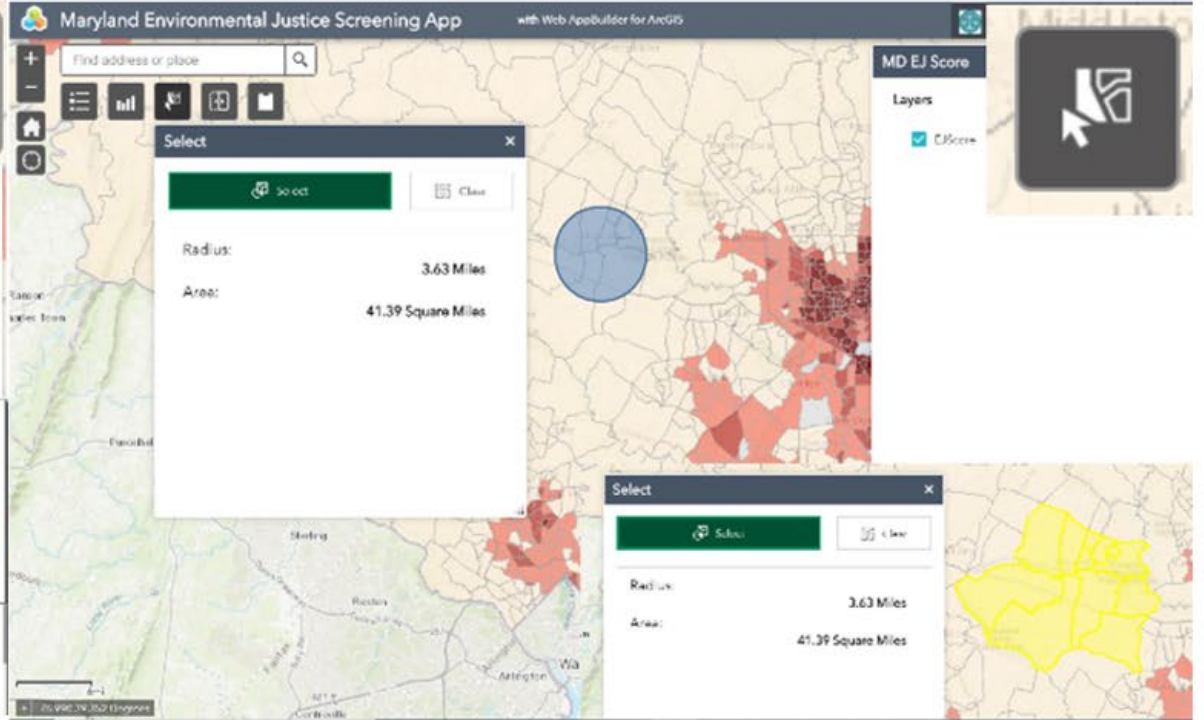
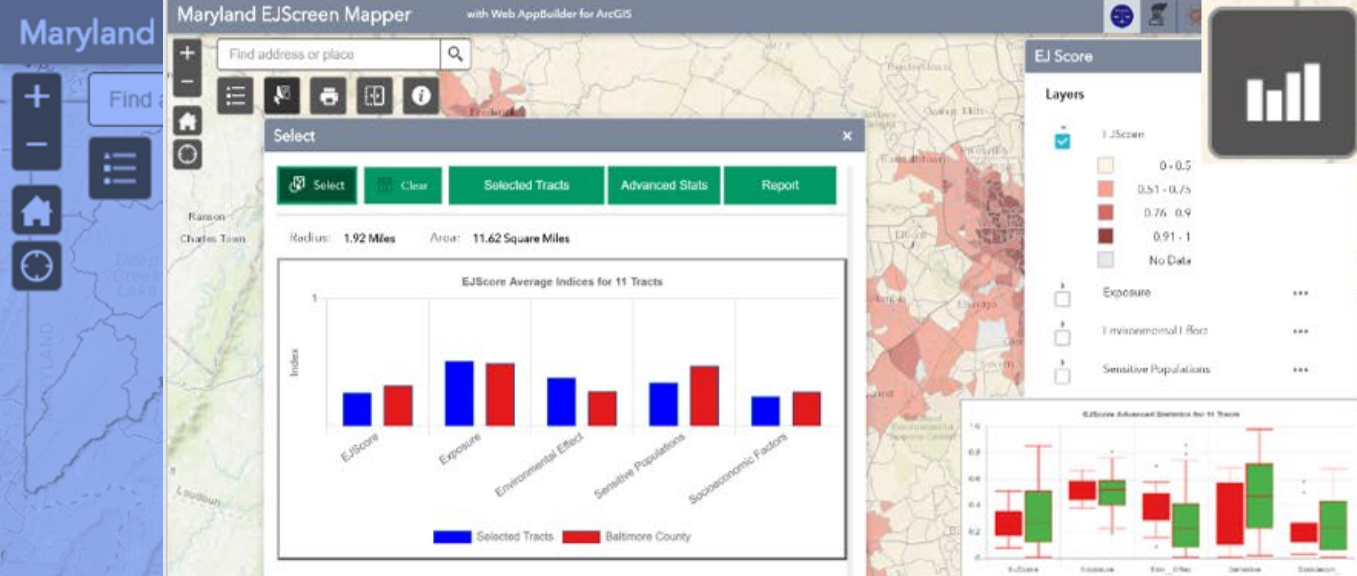
EJScore

- 0 - 0.5
- 0.51 - 0.75
- 0.76 - 0.9
- 0.91 - 1
- No Data



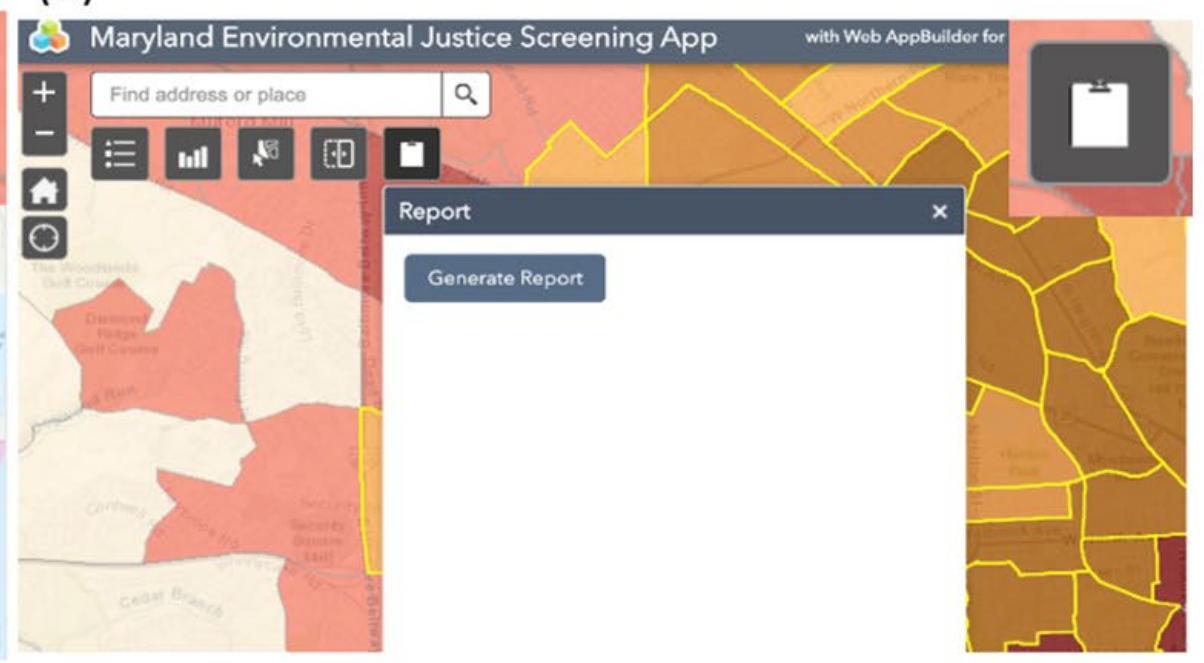
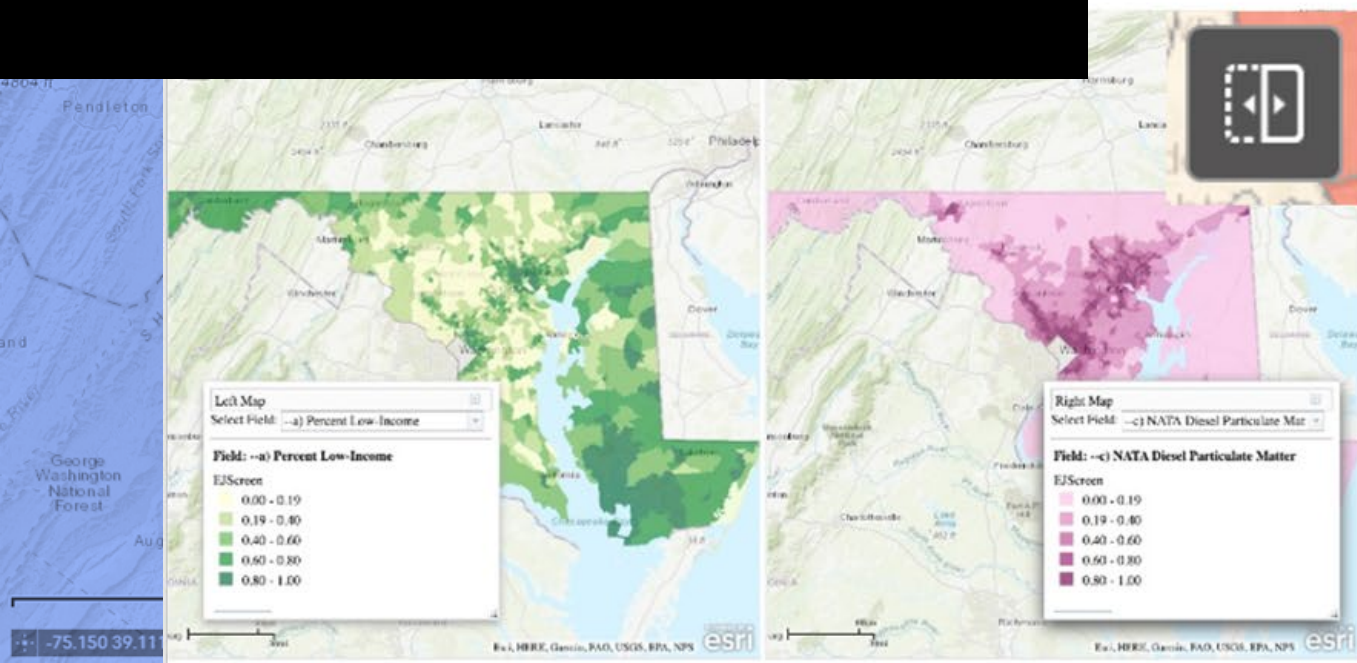
Legend (and layer drawers) provide scores in PERCENTILES

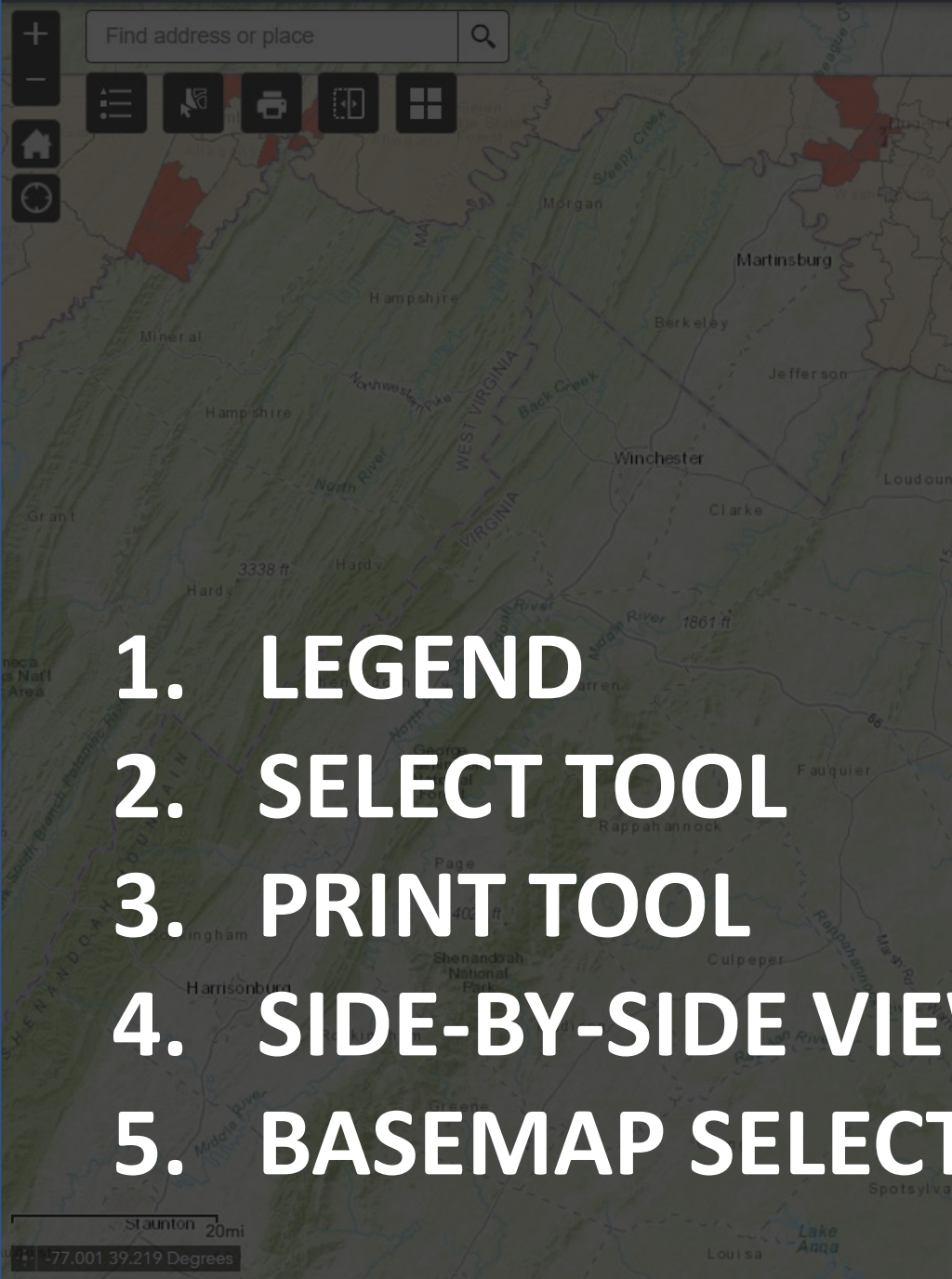
- .91 = 91st percentile = higher than 91% of the state
- The lightest areas show least environmental justice concern (not “no concern at all”)
- Why not use natural breaks?



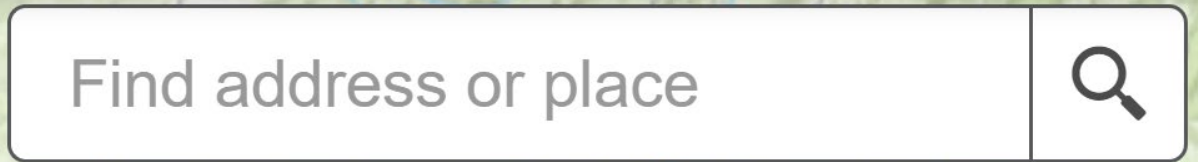
New Additions in v2.0

(b)





Maryland EJScreen Mapper



①



②



③



④



⑤

1. LEGEND
2. SELECT TOOL
3. PRINT TOOL
4. SIDE-BY-SIDE VIEWER
5. BASEMAP SELECTOR



1

2

3

4

5

6

7

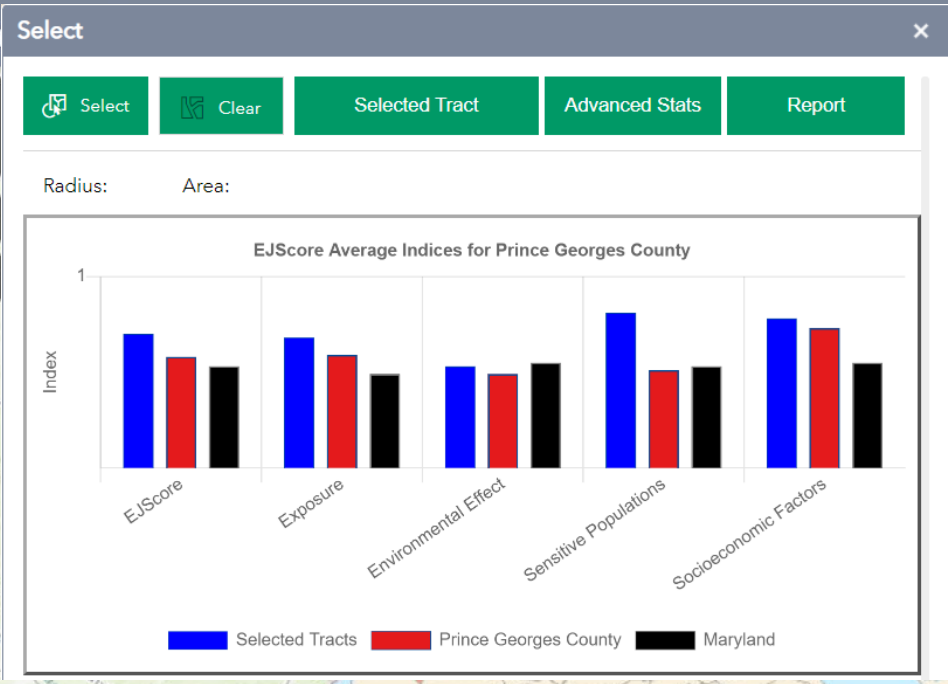
8

- 1. MD EJSCREEN EJ Score
- 2. Pollution Burden: Exposure
- 3. Pollution Burden: Env. Effects
- 4. Population Characteristics: Sensitive Pop.

- 5. Population Characteristics: Sociodemographic Factors
- 6. Context Layers
- 7. User Guide
- 8. Other Mappers

“SELECT/CHART” Tool: Simple Stats Toggle

- Shows **bar graphs** that compare scores of select tract(s) to county and state scores
- NOTE: When a selection crosses multiple counties, averages for each county are shown for comparison

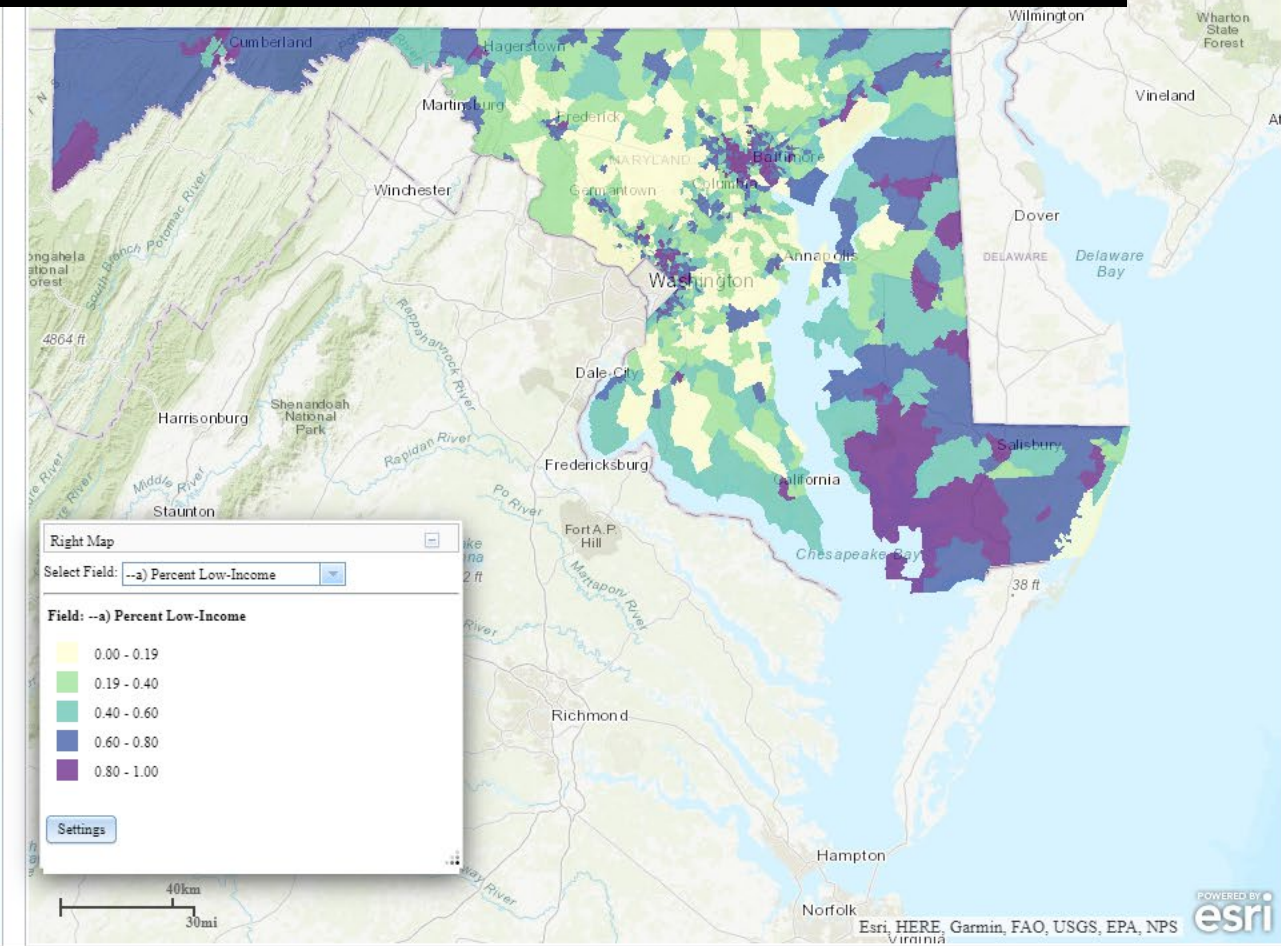
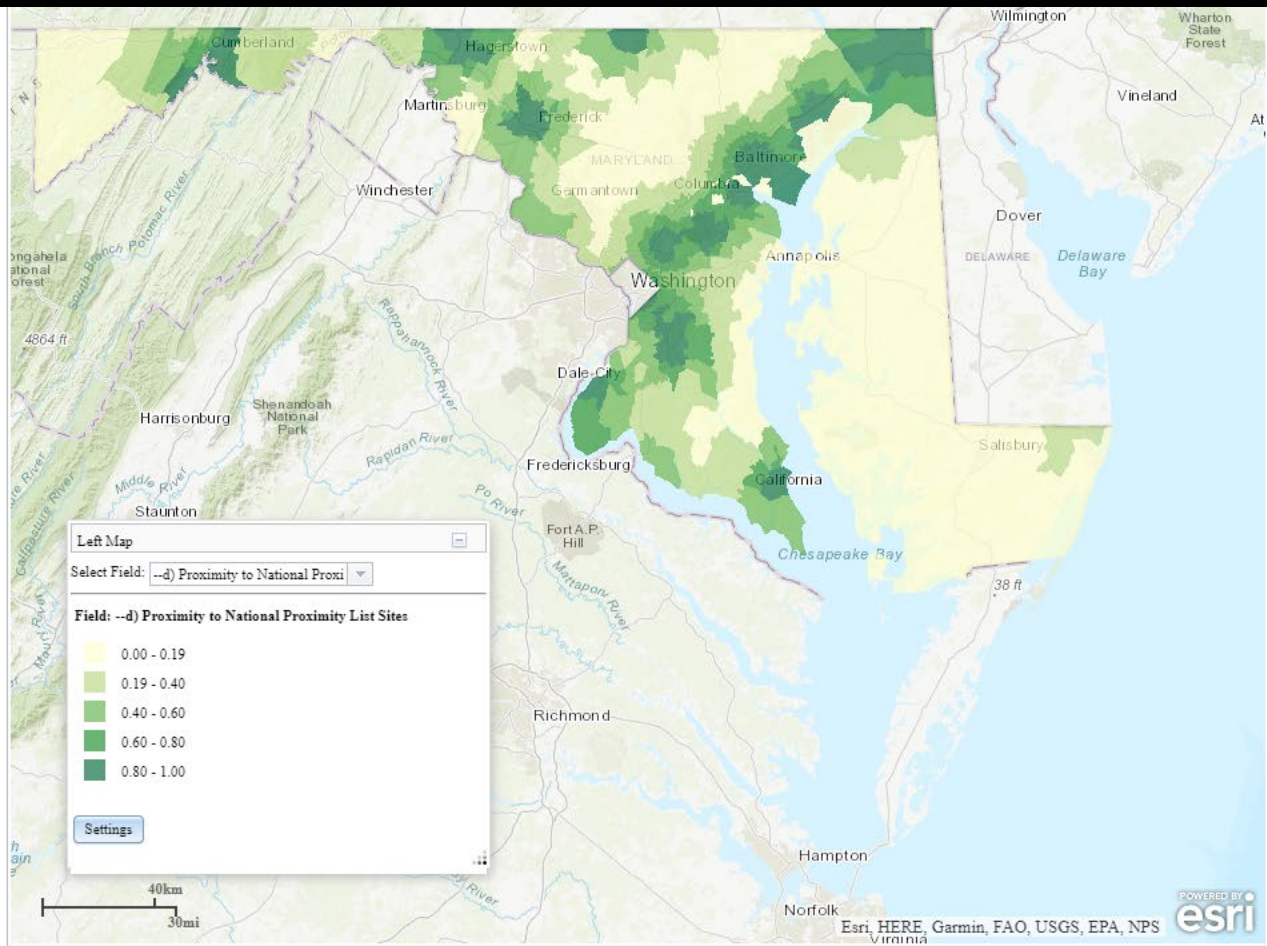


Advanced Stats Toggle

- Shows **box plots (and desc. stats)** that compare the spread of the data so users can identify whether outliers are present.

Side-by-Side Map Viewer

- Allows user to view two map layers at once in order to compare overlaps
- Can change color ramp to display natural breaks.
- Here we see older adults vs walkability.



Find address or place



Future Additions

- Inclusion of environmental health permitting and policy data:
 - Facilities holding Clean Water Act/National Pollution Discharge Elimination System/ Clean Air Act permits,
 - facilities with permits in progress,
 - facilities found to have violated previous or existing permits.
- EPA-funded restoration projects:
 - Brownfields and Land Revitalization program,
 - Supplemental Environmental Projects program,
- §319(h) Grants program at the Maryland state level
- Integration of MD Environmental Public Health Tracking Data
- Integration with AirNow.gov and PurpleAir for hyperlocal monitoring
- Public participation interface

Live: <https://p1.cgis.umd.edu/mdejscreen/>

Maryland EJScreen Mapper

Find address or place

Select

Select Clear Selected Tract Advanced Stats Report

Radius: Area:

EJScore Average Indices for Prince Georges County

Index	EJScore	Exposure	Environmental Effect	Sensitive Populations	Socioeconomic Factors
Blue	0.60	0.74	0.56	0.39	0.72
Red	0.60	0.74	0.56	0.39	0.72
Black	0.60	0.74	0.56	0.39	0.72

EJ Score

Layers

- EJScore
- EJScore (Census Tract)
- EJScore (County) Natural Breaks
- EJScore (County)
- Exposure
- Environmental Effect
- Sensitive Populations
- Socioeconomic Factors

Census Tract: 24033805909

EJScore: 0.60
Exposure: 0.74
Environmental Effect: 0.56
Sensitive Populations: 0.39
Socioeconomic Factors: 0.72

Zoom to

Legend:

- 0 - 0.5
- 0.51 - 0.75
- 0.76 - 0.9
- 0.91 - 1
- No Data

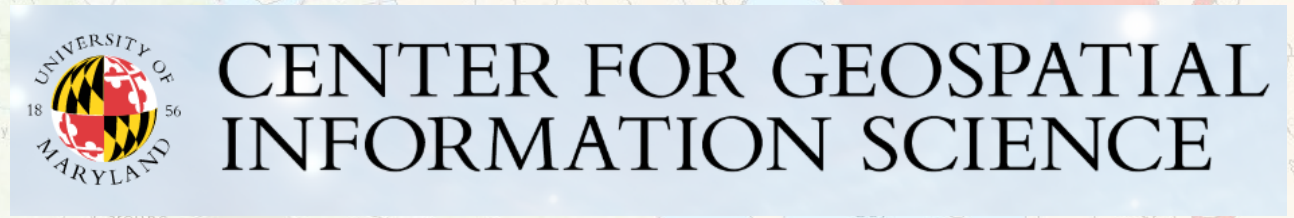
• Data layers available via GitHub - <https://github.com/gisumd/EJScreen>

Find address or place



Partners

- Many thanks to our collaborators at the National Center for Smart Growth, Maryland Department of Natural Resources, and UMD CGIS.
- *This work funded by grant #306-10B 14-19-2531 CZM 153 from the Maryland Department of Natural Resources and National Oceanic and Atmospheric Administration*



**COMMUNITY
ENGAGEMENT,
ENVIRONMENTAL
JUSTICE, &
HEALTH**

ceejhlab.org | @ceejhlab



UNIVERSITY OF
MARYLAND

Jan-Michael Archer

4200 Valley Drive, MIAEH Ste, College Park, MD 20742

352.283.6254 | jarcher3@terpmail.umd.edu