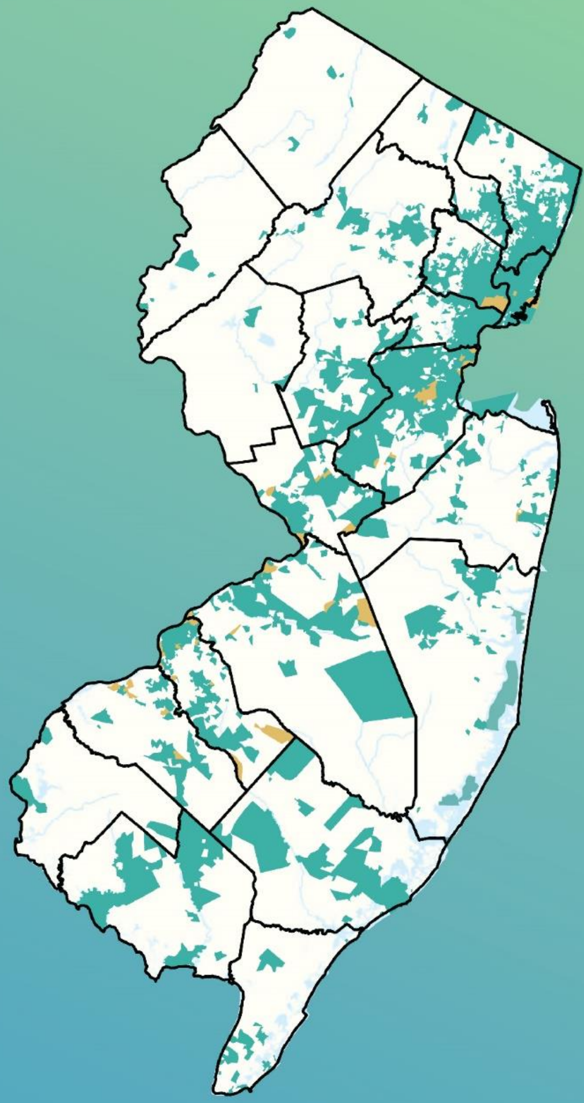
New Jersey Department of Environmental Protection



Environmental Justice Mapping, Assessment, and Protection (EJMAP): Data and Methodology Documentation

January 31, 2024

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Stressors: Data and Methodology

The following discusses the data sources and methodologies used to calculate each stressor value, starting with the January 31, 2024, Environmental Justice Mapping, Assessment, and Protection (EJMAP) data update. While the calculation methodologies are similar, if not identical, to those used for previous iterations of EJMAP, users should refer to the original EJMAP: Technical Guidance document for pre-January 31, 2024, methodology discussions, as well as general descriptions of each stressor and the scientific rationale for their inclusion in the baseline analysis. Stressor values are standardized to three decimal places for calculation and display purposes.

Ground-Level Ozone

- Obtained daily ozone monitoring results for all New Jersey air monitoring sites as well as nearby monitors in Connecticut, Delaware, Pennsylvania, and New York from the EPA's Daily Summary Data Site for the years 2020 to 2022. See Appendix A of this document for the coordinates of all the air quality monitors used in this analysis.
- Created separate GIS files from the monitoring sites' latitude and longitude data for each applicable year.
- Applied ArcGIS' Inverse Distance Weighting (IDW) interpolation tool to each year's monitoring results to estimate daily grid level concentrations of ozone in parts per million (ppm). The IDW interpolation tool determines cell values using a linearly weighted combination of a set of sample points. The weight is a function of inverse distance. The surface being interpolated is the locationally dependent variable (e.g., the monitor locations). The following specific parameters were used:
    - Grid cell size of 0.05 degrees
    - Power: of 5
    - Search Radius: Variable 10
- Summarized the daily results for each grid to determine the number of days the estimated concentration was above the Air Quality Index (AQI) level of 100 (which equals 0.070 ppm for ozone (averaged over 8-hours)), and then averaged those summarized results to create one 3-year value for each grid.
- Downloaded the 2022 NJ block groups and applicable tribal areas file and in ArcMap and added a new field (field type = double) named "BGAcres".
- Used ArcGIS' Calculate Geometry tool to calculate the total acres found in each census block.
- Ran a Spatial Intersect between the NJ 2022 census block group file and the grid file. Then, used the methods listed above to calculate the total acres (field type = double, name = "SIAcres") within the output created from the Spatial Intersect.
- Divided the acres "SIAcres" from the spatial intersect output by the Acres calculated from the Census block group file "BGAcres" to develop the Area Ratio.
- With the ArcGIS field calculator, multiplied the Area Ratio from the previous step by the daily concentrations of ozone in micrograms per cubic meter (µg/m3).
- Ran the ArcGIS Frequency tool using the Spatial Intersect shapefile as the input table, the Department's IDNum field in the frequency field, and the multiplied values from in the previous step in the Summary field to get the weighted sum of ozone in parts per million (ppm) for each block group.
- Developed block group ozone data using a join feature to associate fields in the output weighted sum of ozone from the previous step with the original 2022 NJ block groups and applicable tribal areas.

Fine Particulate Matter ($PM_{2.5}$)

- Obtained $PM_{2.5}$ FRM/FEM Mass daily monitoring results for all NJ air monitoring sites as well as nearby monitors in Connecticut, Delaware, Pennsylvania, and New York from the EPA's Daily Summary Data Site for the years 2020 to 2022. See Appendix A of this document for the coordinates of all the air quality monitors used in this analysis.
- Created separate GIS files from the monitoring sites' latitude and longitude data for each applicable year.
- Applied ArcMap's Inverse Distance Weighting (IDW) interpolation tool to these monitoring results to estimate daily grid level concentrations of $PM_{2.5}$ in micrograms per cubic meter ($\mu g/m^3$). The IDW interpolation tool determined cell values using a linearly weighted combination of a set of sample points. The weight is a function of inverse distance. The surface being interpolated is the locationally dependent variable (e.g., the monitor locations). The following specific parameters were used:
    - Grid cell size of 0.05 degrees
    - Power: of 5
    - Search Radius: Variable 10
- Summarized the daily results for each grid to determine the number of days the estimated concentration was above the Air Quality Index (AQI) level of 100 (which equals 35 $\mu g/m^3$ for $PM_{2.5}$ (averaged over 24-hours)) and then averaged those summarized results to create one 3-year value for each grid.
- Downloaded the 2022 NJ block groups and applicable tribal areas file and in ArcMap, added a new field (field type = double) named "BGAcres".
- Used ArcGIS' Calculate Geometry tool to calculate the total Acres found in each census block group.
- Ran a Spatial Intersect between the 2022 NJ block groups and applicable tribal areas file and the grid file. Then, using the methods listed above to calculate the total acres (field type = double, name = "SIAcres") within the output created from the Spatial Intersect.
- Divided the acres "SIAcres from the spatial intersect output by the acres calculated from the Census block group file ("BGAcres") to develop the Area Ratio.
- With the ArcGIS field calculator, multiplied the Area Ratio from the previous step by the daily concentrations of $PM_{2.5}$ in µg/m3.
- Ran the Frequency tool using the Spatial Intersect shapefile as the input table, the Department's IDNum field in the frequency field, and the multiplied values from the previous step in the Summary field to get the weighted sum of $PM_{2.5}$ in µg/m3 for each block group.
- Developed block group $PM_{2.5}$ data using a join feature to associate fields in the output weighted sum of $PM_{2.5}$ from the previous step with the original 2022 NJ block groups and applicable tribal areas.

Cancer Risk from Diesel Particulate Matter

- Obtained New Jersey's 2019 state summary file from AirToxScreen's State Summary Files dropdown menu, and isolated the Diesel PM concentrations from the Ambient Concentration.
- Applied the Diesel exhaust particulate Unit Risk Factor (URF) from NJ's Toxicity Values for Inhalation Exposure (0.0003 (ug/m3)-1) to the Diesel PM concentrations to determine the estimate potential cancer risk in risk per million.
- Summed the potential cancer risk from each pollutant for each census tract to estimate total potential cancer risk in risk per million.
- Download the 2022 NJ block groups and applicable tribal areas file and in ArcMap, add a new field (field type = double) named "BGAcres".
- Used ArcGIS' Calculate Geometry tool to calculate the total Acres found in each census block group.
- Ran a Spatial Intersect between the 2022 NJ block groups and applicable tribal areas file and the census tract file. Then, used the methods listed above to calculate the total acres (field type = double, name = "SIAcres") within the output created from the Spatial Intersect.

- Divided the acres "SIAcres" from the spatial intersect output by the acres calculated from the Census block group file ("BGAcres") to develop the Area Ratio.
- With the ArcGIS field calculator, multiplied the Area Ratio from the previous step by the estimated potential cancer risk.
- Ran the ArcGIS Frequency tool using the Spatial Intersect shapefile as the input table, the Department's IDNum field in the frequency field, and the multiplied values from in the previous step in the Summary field to get the weighted sum of estimated potential cancer risk for each block group.
- Developed block group cancer risk from diesel PM data using a join feature to associate fields in the output weighted sum of estimated potential cancer risk from the previous step with the original 2022 NJ block groups and applicable tribal areas.

Cancer Risk from Air Toxics Excluding Diesel Particulate Matter

- Obtained New Jersey's 2019 state summary file from AirToxScreen's State Summary Files dropdown menu.
- Applied the corresponding Unit Risk Factor (URF) from NJ's Toxicity Values for Inhalation Exposure to each applicable pollutant's estimated ambient concentration, excluding Diesel PM to estimate each individual pollutant's potential cancer risk in risk per million. If there was not a corresponding URF, that pollutant only has non-carcinogenic impacts, and was excluded from this analysis.
- Summed the potential cancer risk from each pollutant for each census tract to estimate total potential cancer risk in risk per million.
- Download the 2022 NJ block groups and applicable tribal areas file and in ArcMap, add a new field (field type = double) named "BGAcres".
- Used the ArcGIS Calculate Geometry tool to calculate the total acres found in each census block group.
- Ran a Spatial Intersect between the NJ census block group file and the census tract file. Then, used the methods listed above to calculate the total acres (field type = double, name = "SIAcres") within the output created from the Spatial Intersect.
- Divided the acres "SIAcres" from the spatial intersect output by the acres calculated from the Census block group file ("BGAcres") to develop the Area Ratio.
- With the ArcGIS field calculator, multiplied the Area Ratio from the previous step by the estimated potential cancer risk.
- Ran the ArcGIS Frequency tool using the Spatial Intersect shapefile as the input table, the Department's IDNum field in the frequency field, and the multiplied values from in the previous step in the Summary field to get the weighted sum of estimated potential cancer risk for each block group.
- Developed block group cancer risk excluding diesel PM data using a join feature to associate fields in the output weighted sum of estimated potential cancer risk from the previous step with the original 2022 NJ block groups and applicable tribal areas.

Non-Cancer Risk from Air Toxics

- Obtained New Jersey's 2019 state summary file from AirToxScreen's State Summary Files dropdown menu.
- Applied the corresponding Reference Concentration (RfC) from NJ's Toxicity Values for Inhalation Exposure to each applicable pollutant's estimated ambient concentration to estimate each individual pollutant's potential noncancer HQ. If there was not a corresponding RfC, that pollutant only has carcinogenic impacts, and was excluded from this analysis.
- Summed all pollutant HQs for each census tract to estimate the total HI.

- Download the 2022 NJ block groups and applicable tribal areas file and in ArcMap, add a new field (field type = double) named "BGAcres".
- Used ArcGIS' Calculate Geometry tool to calculate the total acres found in each census block group.
- Ran a Spatial Intersect between the NJ census block group file and the census tract file. Then, using the methods listed above to calculate the total acres (field type = double, name = "SIAcres") within the output created from the Spatial Intersect.
- Divided the acres "SIAcres" from the spatial intersect output by the acres calculated from the Census block group file ("BGAcres") to develop the Area Ratio.
- With ArcGIS field calculator, multiplied the Area Ratio from the previous step by the estimated potential HI.
- Ran ArcGIS Frequency tool using the Spatial Intersect shapefile as the input table, the Department's IDNum field in the frequency field, and the multiplied values from in the previous step in the Summary field to get the weighted sum of estimated HI for each block group.
- Developed block group non-cancer risk data using a join feature to associate fields in the output weighted sum of estimated HI risk from the previous step with the original 2022 NJ block groups and applicable tribal areas.

Traffic – Cars and Light- and Medium-Duty Trucks

- Obtained NJ's 2021 HPMS GIS file data.
- Summed the single unit (attribute field labeled aadt_single_unit) and combined truck (attribute field labeled aadt_combination) AADT values for each road segment in New Jersey to determine the total AADT Truck values representing all heavy-duty trucks classes 4 through 13 (i.e., buses, singe-unit trucks, single- and multi-trailer trucks) for each road segment.
- Subtracted the calculated AADT Truck values from the total AADT (attribute field labeled aadt) values for each road segment for New Jersey, to calculate the AADT for cars, and light- and medium-duty trucks only for each road segment.
- Applied ArcGIS' line density function to the calculated AADT for cars and light-duty trucks using the following parameters:
    - Grid cell size 100 ft.
    - Search radius of 1000 ft.
    - AADT for cars and light-duty trucks used as population field.

  This created a raster surface file.
- Applied Zonal Statistics as Table function in ArcMap Spatial Analyst using the created raster surface file as the input to determine the spatially weighted average AADT for each 2022 NJ census block group and applicable tribal areas as the indicator for light-duty traffic on major roads.

Traffic – Heavy-Duty Trucks

- Obtained NJ's 2021 HPMS GIS file data.
- Combined the single unit (attribute field labeled aadt_single_unit) and combined truck (attribute field labeled aadt_combination) AADT values for each road segment in New Jersey to calculate total AADT Truck values representing all heavy-duty trucks classes 4 through 13 (i.e., buses, singe-unit trucks, single- and multi-trailer trucks) for each road segment.
- Applied ArcGIS' line density function to the calculated total AADT for Truck values using the following parameters:
    - Grid cell size 100 ft.
    - Search radius of 1000 ft.
    - Total AADT for Truck used as population field

  This creates a raster surface file.

- Apply Zonal Statistics as Table function in ArcMap Spatial Analyst using the created raster surface file as the input to determine the spatially weighted average AADT for 2022 NJ census block group and applicable tribal areas as the indicator for heavy-duty traffic on major roads.

Railways

- Obtained NJDOT ArcGIS REST Railroad Network layer.
- Applied the ArcGIS line density function using the following parameters:
  - Grid cell size 100 ft.
  - Search radius of 1000 ft.

  This created a raster surface file.
- Applied Zonal Statistics as Table function in ArcMap Spatial Analyst using the created raster surface file as the input to determine the spatially weighted average rail length for each 2021 NJ census block group and applicable tribal areas as the indicator for proximity to railroads.

Known Contaminated Sites

- Obtained NJ's Known Contaminated Sites List (KCSL) GIS file data. This publicly available dataset now includes an attribute field (labeled CATEGORY) with a weighted ranking for each site based on environmental concerns. Sites in the Immediate Environmental Concern (IEC) GIS layer with a receptor status of in-progress, and those sites on the NPL were given the highest stressor score (3). Licensed Site Remediation Professional (LSRP) program cases with 10 or fewer contaminated Areas of Concern, and Pending sites, were given the lowest weighted stressor score (1). All other sites were given a weighted stressor score of 2. Unregulated Heating Oil USTs (UHOT) sites and sites with a restricted or limited restricted Remedial Action Outcome (RAO) were not included in the stressor evaluation and are assigned a weighted stressor score of 0. RAO sites are identified as Remedial Action Permit (RAP) sites in the Lead field in the KCSL layer. Unregulated heating oil underground storage tank sites were assigned a weighted stressor score of zero because they are considered low risk since they discharge smaller quantities which do not typically impact ground water or travel off site from the discharge location. Also, any discharges from an unregulated heating oil underground storage tank that cannot be remediated by a simple excavation are elevated to a higher rank, and not listed as an unregulated heating oil underground storage tank site. Sites with a restricted or limited restricted RAO are included in the “Soil Contamination Deed Restriction” and/or the “Ground Water Classification Exception/Currently Known Extent Restrictions” stressor evaluations and are therefore also assigned a weighted stressor score of zero for this evaluation. Finally, all sites where remediation has been completed were assigned a weighted stressor score of zero.
- Applied ArcGIS’ Kernel Density function using the weighted list as input with the following parameters:
  - Search radius of 1 mile, which is consistent with the distance requirements in Department’s Hazardous Waste rules.
  - Used field CATEGORY as population to weight sites.
  - Grid size of 100 ft.

  This calculated the raster density file.
- Applied Zonal Statistics as Table function in ArcMap Spatial Analyst using the created raster surface file as the input to determine the spatially weighted average number of sites for each 20221 NJ block groups and applicable tribal areas as the indicator for proximity to each site.

Soil Contamination Deed Restrictions

- Obtained Deed Notice Area GIS file and calculated the percent Deed Notice areas in each block group or applicable tribal area.
- Applied ArcGIS' Intersect geoprocessing tool to calculate the geometric intersection between the 2022 NJ block groups and applicable tribal areas file and the Deed Notice Percent Area data file such that only the common features are represented in the output coverage.
- Applied ArcGIS' Dissolve geoprocessing tool to the output coverage to aggregate features based on the IDNum field.
- Calculated the total soil restricted area and divided this value by the total acres of the block group to determine the percentage of each block group that is soil restricted.

Groundwater Classification Exception Area/Currently Known Extent Restrictions

- Obtained CEA and CKE GIS file and calculated the percent CEA/CKE areas in each block group or applicable tribal area.
- Applied ArcGIS' Intersect geoprocessing tool to determine the geometric intersection between the 2022 NJ block groups and applicable tribal areas file and the Groundwater Contamination (CEA/CKA) Percent Area data file such that only the common features are represented in the output coverage.
- Applied ArcGIS' Dissolve geoprocessing tool to the output coverage to aggregate features based on the IDNum field.
- Calculated the total groundwater restricted area and divided this value by the total acres of the block group to determine the percentage of each block group that is groundwater restricted.

Solid Waste Facilities

- Obtained NJ's Solid & Hazardous Waste facilities GIS file data.
- Applied ArcGIS' Kernel Density function using the GIS file data as input with the following parameters:
  - Search radius of 1 mile, which is consistent with the distance requirements in Department's Environmental and Health Impact Statement requirements in the Solid Waste rules.
  - Grid size of 100 ft.
    This calculated a raster density file.
- Applied Zonal Statistics as Table function in ArcMap Spatial Analyst using the created raster surface file as the input to determine the spatially weighted average number of sites for each 2022 NJ block groups and applicable tribal areas as the indicator for proximity to each site.

Scrap Metal Facilities

- Obtained Scrap Metal Facilities in New Jersey GIS file.
- Applied ArcGIS' Kernel Density function using the scrap metal facility GIS file data as the input with the following parameters:
  - Search radius of 1 mile to be consistent with the Solid Waste Facilities stressor.
  - Grid size of 100 ft.
    This calculated the raster density file.
- Applied Zonal Statistics as Table function in ArcMap Spatial Analyst using the created raster surface file as the input to determine the spatially weighted average number of sites for each 2022 NJ block groups and applicable tribal areas as the indicator for proximity to each site.

Surface Water

- Obtained NJ's Surface Water Nonattainment GIS file.
- Calculated the percent of impaired designated uses for each HUC 14 by dividing the number of impaired designated uses by the total number of assessed designated uses applicable. If a designated use did not apply to a waterbody or there were insufficient data to complete an assessment, it was eliminated from the calculations (e.g., shellfish harvesting is limited to saline waters, so this designated use does not apply to freshwater bodies, and thereby eliminated from freshwater body calculations). The higher the percentage, the worse the overall water quality. The results are a short-term ‘snapshot’ of water quality conditions. The last 5 years of available data was used to determine if waterbodies supported their designated uses.
- Applied ArcMap’s Polygon to Raster tool to convert the HUC percent impaired data into 100 ft. raster data using percent uses not in attainment as pixel value.
- Applied Zonal Statistics as Table function in ArcMap Spatial Analyst using the created raster surface file as the input to determine the spatially weighted average of nonattainment surface waters for each 2022 NJ block groups and applicable tribal areas as the indicator for percent impaired.

Combined Sewer Overflows

- Obtained New Jersey's CSO GIS file.
- Applied ArcMap’s Intersect geoprocessing tool to identify the number of CSOs within a given block group.
- Applied ArcMap’s Dissolve geoprocessing tool to find the count of CSOs in each block group
- Any block group with at least one CSO outfall is above the Geographic Point of Comparison.

Drinking Water

- Obtained the appropriate source data:
  - 3-year (2020-2022) sum of Maximum Contaminant Level (MCL) and/or Treatment Techniques (TT) violations and/or Action Level Exceedances from annual drinking water violation Public Drinking Water reports.
  - All private wells tested conducted under the Private Well Testing Act Data from Sept. 2002 to Dec. 2022 (census block tab) with at least one exceedance of a primary standard (arsenic, mercury, radionuclides (gross alpha indicator), e. coli, and VOCs).

For Community Drinking Water data:

- Created a drinking water purveyor polygon file using attribute join to link the Public Drinking Water data to the Public Drinking Water Purveyor GIS file using purveyor ID number.
- Applied ArcGIS’ Intersect geoprocessing tool to determine the geometric intersection between the file and the drinking water purveyor polygon file such that only the common features are represented in the output coverage.
- Applied ArcGIS’ Dissolve geoprocessing tool to the output coverage to select the drinking water area with the maximum size area in the each block group.
- Used attribute join to link the violation records to the maximum area data.
- For a block group served by a public drinking water system, any drinking water violation or exceedance is above the Geographic Point of Comparison.

For PWTA violations:

- Summarized the Private Well Testing Act data at the block group or applicable tribal area. Note that individual well tested data points are confidential and not shared publicly. In addition, any block group or applicable tribal area with less than 5 wells tested has their data suppressed to further protect the data and were not considered adversely impacted for this portion of the Drinking Water stressor.
- Before data suppression, calculated the 50^{th} percentile of all block groups and applicable tribal areas in the state and each county to determine the geographic point of comparison.

For those block groups served by both a public water system and 5 or more private wells, if both the public water and PWTA stressors are above the GPC, the values were not summed, but instead the block group was given an overall value of 1 (yes) for combined drinking water stressor.

Potential Lead Exposure

- Identified the variables for total housing units (B25034_001, housing units built between 1940 to 1949 (B25034_010) and housing units built in 1939 or earlier (B25034_011) from Census American Community Survey (ACS) summary data table B25034.
- Applied those variables to the Census Bureau's API URL as follows: https://api.census.gov/data/2022/acs/acs5?get=NAME,VARIABLES&for=block%20group:*&in=state:34&in=county:*&in=tract:*
- Indicator calculated as:
  - Built before 1950 = Built1940to1949 + Built1939orearlier
  - Percent calculated as (Built before 1950/Total Housing) *100

Lack of Recreational Open Space

- Obtained New Jersey's Open Space polygon GIS files.
- Determined residential land use areas in each block group by selecting residential land use from Land Use/Land Cover 2020 and applied the Intersect geoprocessing tool to determine the geometric intersection between that data and the 2022 NJ block groups and applicable tribal areas file such that only the common features are represented in the output coverage.
- Used the ArcMap buffer tool to add ¼ mile buffers to the residential land use areas for each block group.
- Applied ArcGIS' Dissolve geoprocessing tool to the output coverage to aggregate features based on number of acres of open space within ¼ mile of the block group.
- Used this information to calculate population density by dividing the population in the block group by the number of open space acres within ¼ mile.

Lack of Tree Canopy

- Obtained the 2021 US Forest Service "Analytical" Tree Canopy Cover (TCC) Dataset (file name CONUS 2016 – zip) which is already a raster file.
- Created a mirror image raster file by subtracting this file from 100 to represent Lack of Tree Canopy Cover.
- Erased water and salt marsh land uses in Land Use/Land Cover 2020 from 2022 NJ block groups and applicable tribal areas.
- Applied Zonal Statistics as Table function in ArcMap Spatial Analyst using the Lack of Tree Canopy

raster file as the input raster and the block groups with water and salt marshes removed as the feature zone to determine the spatially weighted average for each block group as the indicator for percent of lack of tree cover.

Impervious Surface

Due to the size of the impervious surface files, obtained each county file separately off DEP's Open Data site and then combine into a complete state file. Searched for "Impervious Surface" to find the county files.

- Erased water and salt marsh land uses in the Land Use/Land Cover 2020 from 2022 NJ block groups and applicable tribal areas.
- Applied ArcGIS' Intersect geoprocessing tool to determine the geometric intersection between the block groups with water and salt marsh land uses removed and impervious cover data file to link the amount of impervious surface to each block group.
- Applied ArcGIS' Dissolve geoprocessing tool to aggregate features to calculate acres of impervious surface each block group.
- Calculated the percent impervious surface as acres of impervious surface/acres in block group excluding water and salt marshes.

Flooding (Urban Land Cover)

- Obtained the Flooding (Urban Land Cover) Layer. This is a unique new GIS file that includes the acres of urban land use flooded in each block group by combining aspects of three existing GIS data sources (NJ Land Use 2015 (Urban type) Source Data, Total Climate Adjusted Flood Elevation, and FEMA 0.2% (500 Year) Flood Hazard Areas Source Data) as follows:
    - Combined two FEMA flooding data layers to determine a Future Coastal and Inland Flooding Potential Layer.
    - Intersected the Future Coastal and Inland Flooding Potential Layer with 2022 NJ block groups and applicable tribal areas to create Urban Flooding Layer.

The Flooding (Urban Land Cover) Layer is not designed to inform obligations and requirements under the DEP's DLRP rules.

- Determined acres of urban land use in each block group using NJ Land Use 2015 (Urban type) Source Data.
- Joined the Flooding (Urban Land Cover) Layer with urban land use to determine flooded urban land use in each block group.
- Calculated percent of urban flooding by dividing the flooded urban area by the total urban area in the block group.

Proximity Stressors

- Obtained the appropriate data source GIS file for each proximity stressor:
    - EJ Air Facilities
    - EJ Major Water Facilities
    - EJ Sludge Facilities
    - EJ TCPA Facilities
    - EJ DPCC Facilities
    - EJ CRTK Facilities

- Combined the EJ Major Water and EJ Sludge Facilities files to get one water sites file for analysis.
- Combined the EJ TCPA, DPCC, and CRTK Facilities files to get one Emergency Planning file for analysis.
- Where applicable, applied ArcGIS' Delete Identical data management tool to the output coverage to remove duplicates in the data based on either the PI Number (Pref ID Number) or Facility ID fields.
- Applied ArcGIS' Kernel Density function using the each proximity data source file (EJ Air Facilities, EJ Combined Water file and EJ Combined Emergency Planning) separately as the input with the following parameters:
  - Search radius of 5 kilometer (approximately 3 miles), which is consistent with the distance requirements in EPA's EJSCREEN User Guide.
  - Grid size of 100 ft.

    This calculated a raster density file for each proximity stressor.
- Applied Zonal Statistics as Table function in ArcMap Spatial Analyst using each separate raster density file as the input to determine the spatially weighted average density for each 2022 NJ block groups and applicable tribal areas as the indicator for proximity to each site.

Unemployment

- Identified the 2022 American Community Survey (ACS) summary data variables for civilian labor force (B23025_003) and unemployed population (B23025_005) from Census table B23025.
- Applied those variables to the Census Bureau's API URL as follows: https://api.census.gov/data/2022/acs/acs5?get=NAME,VARIABLES&for=block%20group:*&in=state:34&in=county:*&in=tract:*
- Calculated Unemployment as ([unemployed]/[civilian labor force])*100.
-

Education

- Identified the following American Community Survey (ACS) summary data variables:
  - B15003_001 Total Population 25 years and over
  - B15003_017 Regular high school diploma
  - B15003_018 GED or alternative credential
  - B15003_019 Some college, less than 1 year
  - B15003_020 Some college, 1 or more years, no degree
  - B15003_021 Associate degree
  - B15003_022 Bachelor's degree
  - B15003_023 Master's degree
  - B15003_023 Master's degree
  - B15003_024 Professional school degree
  - B15003_025 Doctorate degree
- Applied those variables to the Census Bureau's API URL as follows: https://api.census.gov/data/2022/acs/acs5?get=NAME,VARIABLES&for=block%20group:*&in=state:34&in=county:*&in=tract:*
- Calculated Population below high school diploma
  - Total Population 25 and over – (sum of fields B15003_017 to B15003_025)
- Calculated Percent Unemployment
  - ([Population below high school diploma]/[Total Population 25 years and over])*100.

Appendix A: Air Quality Monitoring Coordinates

Coordinates for all Air Quality Monitors Included in the Ozone and PM Stressor Calculations

State_Code	County_Cod	Site_Num	Parameter_	POC	Latitude	Longitude	State_Name
09	001	0017	44201	1	41.003611	-73.585	Connecticut
09	001	0017	44201	1	41.004657	-73.585128	Connecticut
09	001	1123	44201	1	41.399167	-73.443056	Connecticut
09	001	3007	44201	1	41.1525	-73.103056	Connecticut
09	001	9003	44201	1	41.118333	-73.336667	Connecticut
09	005	0005	44201	1	41.821342	-73.297257	Connecticut
10	001	0002	44201	1	38.986672	-75.5568	Delaware
10	003	1007	44201	1	39.5513	-75.732	Delaware
10	003	1010	44201	1	39.817222	-75.563889	Delaware
10	003	1013	44201	1	39.773889	-75.496389	Delaware
10	003	2004	44201	1	39.739444	-75.558056	Delaware
10	005	1002	44201	1	38.6539	-75.6106	Delaware
10	005	1003	44201	1	38.7791	-75.16323	Delaware
34	001	0006	44201	1	39.464872	-74.448736	New Jersey
34	003	0006	44201	1	40.870436	-73.991994	New Jersey
34	007	0002	44201	1	39.934446	-75.125291	New Jersey
34	007	1001	44201	1	39.68425	-74.861491	New Jersey
34	011	0007	44201	1	39.422273	-75.025204	New Jersey
34	013	0003	44201	1	40.720989	-74.192892	New Jersey
34	015	0002	44201	1	39.800339	-75.212119	New Jersey
34	017	0006	44201	1	40.67025	-74.126081	New Jersey
34	019	0001	44201	1	40.515262	-74.806671	New Jersey
34	021	0005	44201	1	40.283092	-74.742644	New Jersey
34	021	9991	44201	1	40.3125	-74.8729	New Jersey
34	023	0011	44201	1	40.462182	-74.429439	New Jersey
34	025	0005	44201	1	40.277647	-74.0051	New Jersey
34	027	3001	44201	1	40.787628	-74.676301	New Jersey
34	029	0006	44201	1	40.06483	-74.44405	New Jersey
34	031	5001	44201	1	41.058617	-74.255544	New Jersey
34	041	0007	44201	1	40.92458	-75.067815	New Jersey
36	005	0110	44201	1	40.816	-73.902	New York
36	005	0110	44201	1	40.81618	-73.902	New York
36	005	0133	44201	1	40.8679	-73.87809	New York
36	027	0007	44201	1	41.78555	-73.74136	New York
36	061	0135	44201	1	40.81976	-73.94825	New York
36	071	5001	44201	1	41.52375	-74.21534	New York
36	079	0005	44201	1	41.45589	-73.70977	New York
36	081	0124	44201	1	40.73614	-73.82153	New York
36	085	0067	44201	1	40.59664	-74.12525	New York
36	087	0005	44201	1	41.18208	-74.02819	New York

State_Code	County_Cod	Site_Num	Parameter_	POC	Latitude	Longitude	State_Name
36	103	0002	44201	1	40.74529	-73.41919	New York
36	103	0009	44201	1	40.82799	-73.05754	New York
36	103	0009	44201	2	40.82799	-73.05754	New York
36	111	1005	44201	1	42.14403	-74.49431	New York
36	119	2004	44201	1	41.05192	-73.76366	New York
42	011	0006	44201	1	40.51408	-75.789721	Pennsylvania
42	011	0011	44201	1	40.38335	-75.9686	Pennsylvania
42	017	0012	44201	1	40.107222	-74.882222	Pennsylvania
42	029	0100	44201	1	39.834461	-75.768242	Pennsylvania
42	045	0002	44201	1	39.835556	-75.3725	Pennsylvania
42	069	0101	44201	1	41.479116	-75.578186	Pennsylvania
42	069	2006	44201	1	41.442778	-75.623056	Pennsylvania
42	077	0004	44201	1	40.611944	-75.4325	Pennsylvania
42	079	1100	44201	1	41.209167	-76.003333	Pennsylvania
42	079	1101	44201	1	41.265556	-75.846389	Pennsylvania
42	089	0002	44201	1	41.08306	-75.32328	Pennsylvania
42	091	0013	44201	1	40.112222	-75.309167	Pennsylvania
42	095	0025	44201	1	40.628056	-75.341111	Pennsylvania
42	095	8000	44201	1	40.692224	-75.237156	Pennsylvania
42	101	0004	44201	1	40.008889	-75.09778	Pennsylvania
42	101	0024	44201	1	40.0764	-75.011549	Pennsylvania
42	101	0048	44201	1	39.991389	-75.080833	Pennsylvania
42	101	1002	44201	1	40.035985	-75.002405	Pennsylvania
36	085	0111	44201	2	40.58027	-74.19832	New York
42	101	0004	44201	2	40.008889	-75.09778	Pennsylvania