

Heat Island/Overburdened Communities Analysis

Date Create: 02/17/2022

Description: This dataset approximates the location of potential heat island impacts by analyzing the amount of canopy cover to impervious cover within each Census Block Group in New Jersey. Areas with a higher ratio of impervious cover area to canopy cover area are determined to be at higher risk of heat island effects. Additionally, data from the New Jersey Department of Environmental Protection (NJDEP) Environmental Justice - Overburdened Communities analysis is joined to the Census Block Groups to determine where vulnerable populations at risk from potential heat island effects may exist.

Data Sources:

- *Census Block Groups 2020, Hosted, 3424*
 - Downloaded from NJGIN Open Data Portal
 - <https://njogis-newjersey.opendata.arcgis.com/datasets/newjersey::census-block-groups-2020-hosted-3424/about>
 - Metadata
 - <https://rutgers.maps.arcgis.com/sharing/rest/content/items/746df9058d9e48d49996a7c7e8e2e6a5/info/metadata/metadata.xml?format=default&output=html>
 - Associated Fields (see metadata for details):
 - STATEFP20
 - COUNTYFP20
 - TRACTCE20
 - BLKGRPCE20
 - GEOID20
 - NAMELSAD20
 - MTFCC20
 - FUNCSTAT20
 - ALAND20
 - AWATER20
 - INTPTLAT20
 - INTPTLON20
 - Shape__Are
 - Shape__Len
- *Municipal Boundaries of NJ*
 - Downloaded from NJGIN Open Data Portal
 - <https://njogis-newjersey.opendata.arcgis.com/datasets/newjersey::municipal-boundaries-of-nj/about>
 - Metadata
 - <https://rutgers.maps.arcgis.com/sharing/rest/content/items/3d5d1db8a1b34b418c331f4ce1fd0fef/info/metadata/metadata.xml?format=default&output=html>
 - Associated Fields (see metadata for details):
 - MUN
 - COUNTY

- MUN_LABEL
 - MUN_TYPE
 - NAME
 - GNIS_NAME
 - GNIS
 - SSN
 - MUN_CODE
- *Overburdened Communities Under the New Jersey Environmental Justice Law*
 - Downloaded from NJGIN Open Data Portal
 - <https://njogis-newjersey.opendata.arcgis.com/datasets/njdep::overburdened-communities-under-the-new-jersey-environmental-justice-law/about>
 - Metadata
 - <https://rutgers.maps.arcgis.com/sharing/rest/content/items/59918e97854d4cae5d0c3120d7e56ca/info/metadata/metadata.xml?format=default&output=html>
 - Associated Fields (see metadata for details):
 - GEOID10 (renamed: GEOID)
 - POVUNIVERSE (renamed: POVUNIVERS)
 - POPUNDER2XPOV (renamed: POPUNDER2X)
 - LOW_INCOME_PCT (renamed: LOW_INCOME)
 - TOTALPOP
 - NONHISPWHITE (renamed: NONHISPWHI)
 - TOTALMINORITY (renamed: TOTALMINOR)
 - MINORITY_PCT (renamed: MINORITY_P)
 - TOTHH
 - TOTLANGUAGEISO (renamed: TOTLANGUAG)
 - LIMITED_ENGLISH_PROFICIENCY_PC (renamed: PCTLANGUAGE)
 - OVERBURDENED_COMMUNITY_CRITERI (renamed: OVERBURDEN)
 - BG_TRIBAL
 - GEOID_COUNTYSUBDIVISION (renamed: GEOID_COUN)
 - SPLIT_BG
 - SPLIT_MUN
- *NLCD 2016 USFS Tree Canopy Cover (CONUS)*
 - Downloaded from the Multi-Resolution Land Characteristics Consortium (MRLC)
 - <https://www.mrlc.gov/data/nlcd-2016-usfs-tree-canopy-cover-conus>
 - Metadata
 - https://www.mrlc.gov/downloads/sciweb1/shared/mrlc/metadata/nlcd_2016_treecanopy_2019_08_31.img.xml
 - Raster Dataset representing percent of canopy cover within a cell area
- *NLCD 2019 Percent Developed Imperviousness (CONUS)*
 - Downloaded from the Multi-Resolution Land Characteristics Consortium (MRLC)
 - <https://www.mrlc.gov/data/nlcd-2019-percent-developed-imperviousness-conus>
 - Metadata

- https://www.mrlc.gov/downloads/sciweb1/shared/mrlc/metadata/nlcd_2019_impervious_l48_20210604.xml
- Raster Dataset representing percent of impervious cover within a cell area

Methodology: The creation of this dataset consisted of a multi-step process outlined below and was conducted by the Rutgers NJAES Office of Research Analytics.

1. New Jersey Municipal Boundary data was spatially joined to the NJ Census Block Groups 2020 data utilizing the 'Largest overlap' Match Option to assign a municipality to each Census Block Group. This was done to allow extraction of data by municipality by users.
2. NJDEP Overburdened Communities data was spatially joined to the NJ Census Block Groups 2020 data utilizing the 'Largest overlap' Match option to join the Overburdened Communities fields to the 2020 Census Block Groups as the Overburdened Communities dataset was developed using 2010 Census Block Groups and this allowed joining of the data in areas where boundaries may have changed.
3. Zonal Statistics was used to calculate the area and weighted mean of impervious cover and canopy cover within each Census Block Group. The ratio of canopy cover to impervious cover within each Census Block Group was calculated using the following equation:
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$$\frac{(\$feature.Can_AREA * \$feature.Can_MEAN) - (\$feature.Imp_AREA * \$feature.Imp_MEAN)}{(\$feature.Can_AREA * \$feature.Can_MEAN) + (\$feature.Imp_AREA * \$feature.Imp_MEAN)}$$
4. The resulting field 'Can_Imp' provides a ratio value from -1 to +1 where -1 corresponds with 100 percent of the combined canopy cover and impervious cover being impervious cover, and +1 corresponding with 100 percent being canopy cover. A value of 0 represents an even 50% split between canopy cover and impervious cover within the Census Block Group.

Contact:

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