



**RUTGERS**

Edward J. Bloustein School  
of Planning and Public Policy

# **Planning for Healthy, Just, Resilient, and CO2-Neutral Mobility in New Jersey**

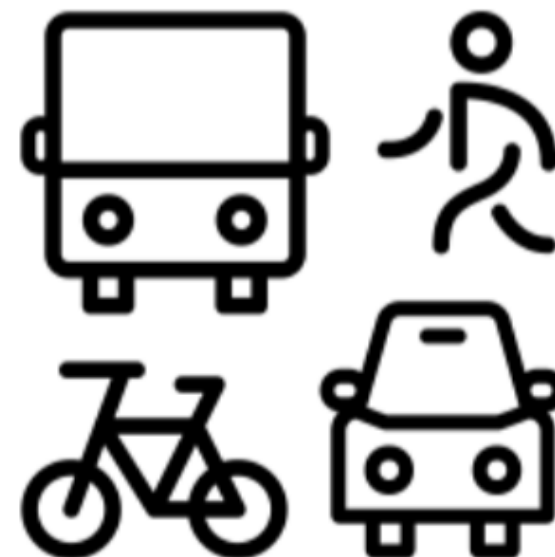
Project Update  
February 2022

### Existing Work Groups

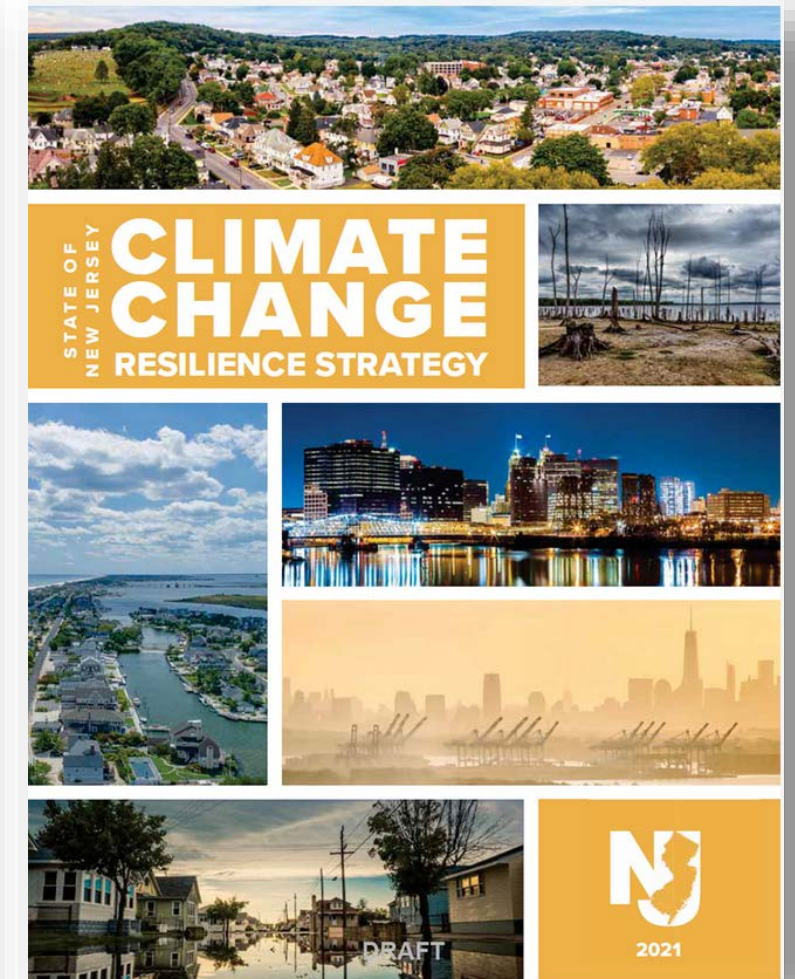
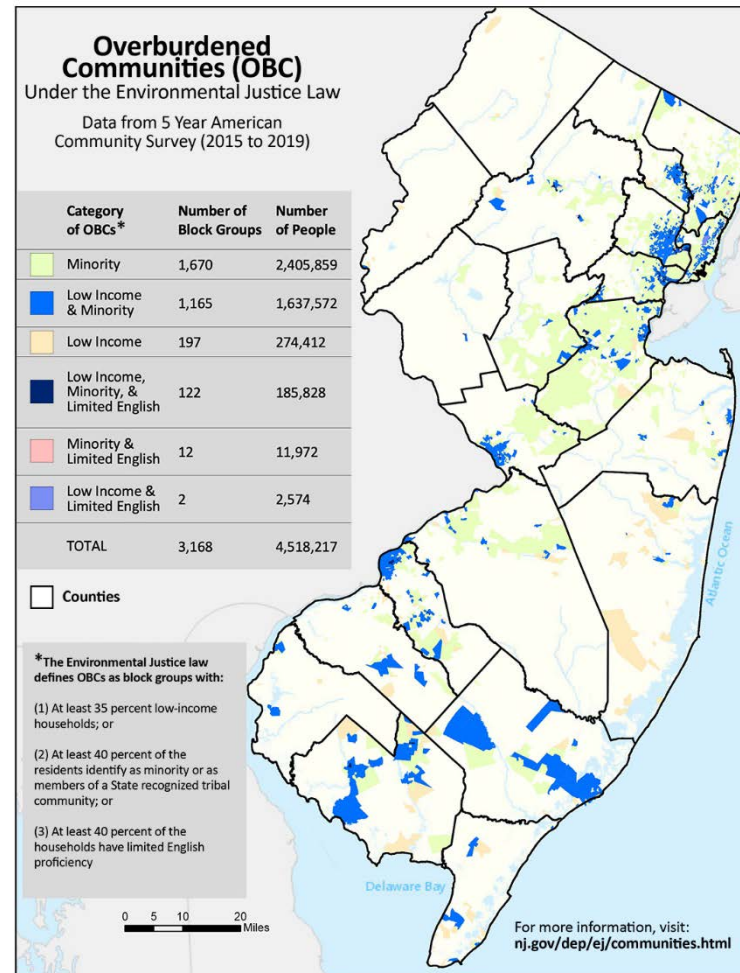
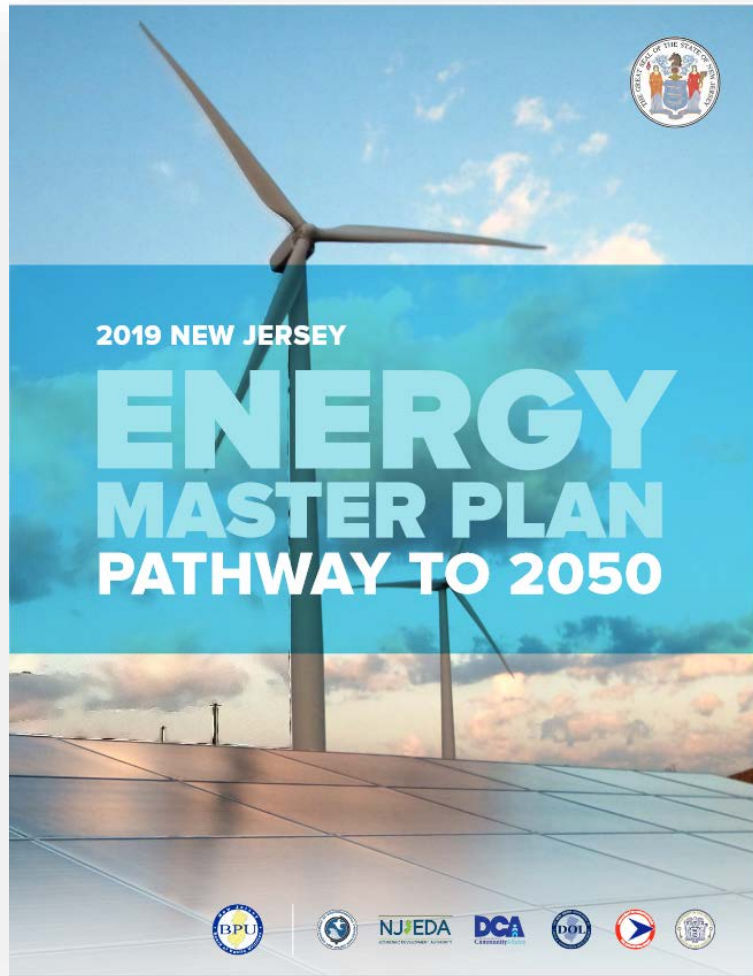
- Long-term Statewide Planning for Climate Change Workgroup
- Natural and Working Lands Workgroup
- Offshore Wind Ecological Monitoring Workgroup
- Public Health Workgroup
- Sustainable Organic Materials Management Workgroup

**(NEW)**

### Transportation Workgroup



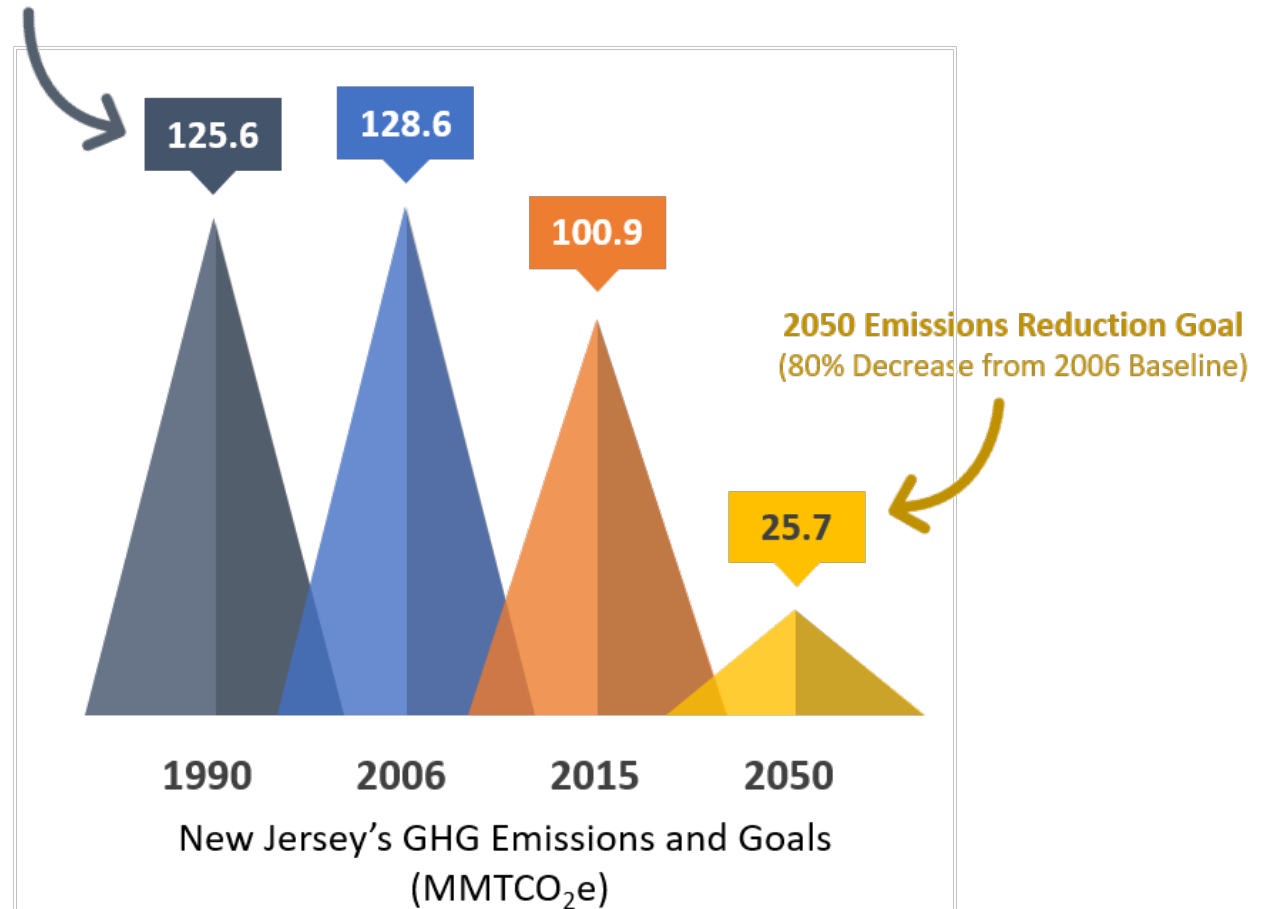
# Changing policy dynamics at the State and national levels



# New Jersey Emissions Targets



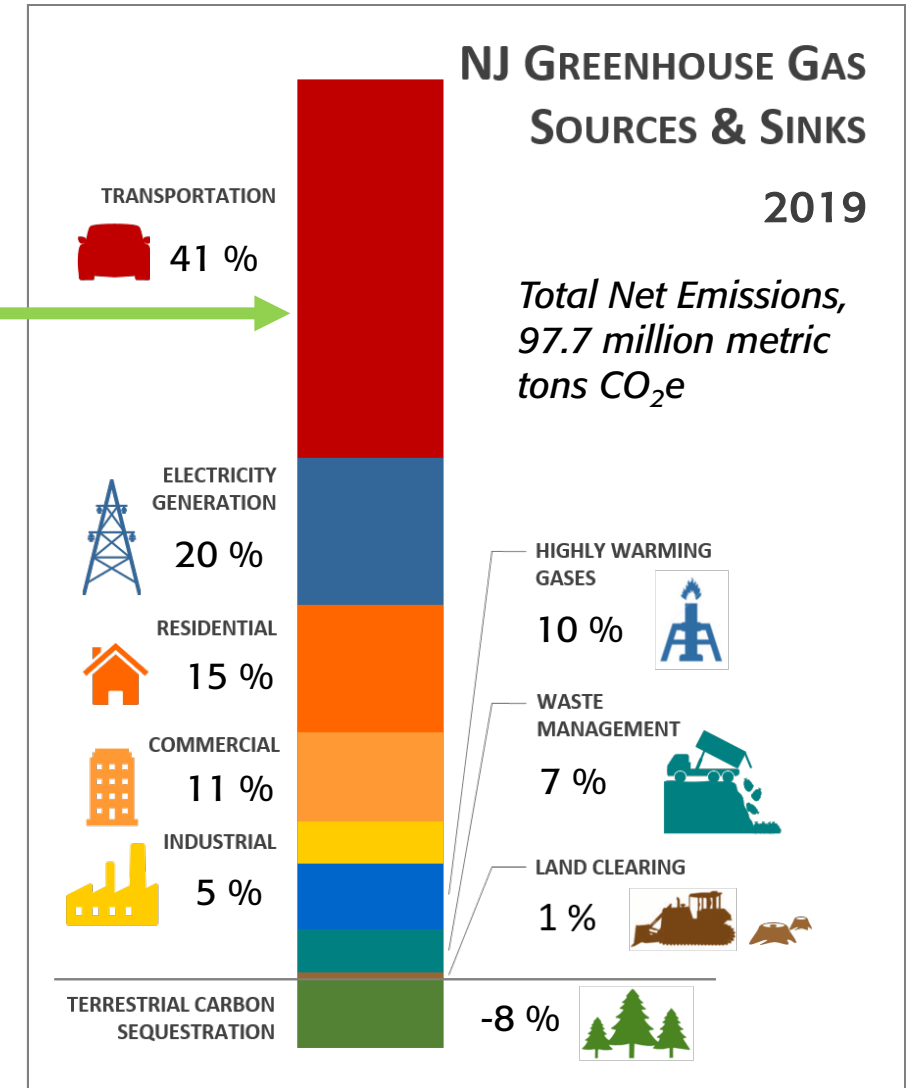
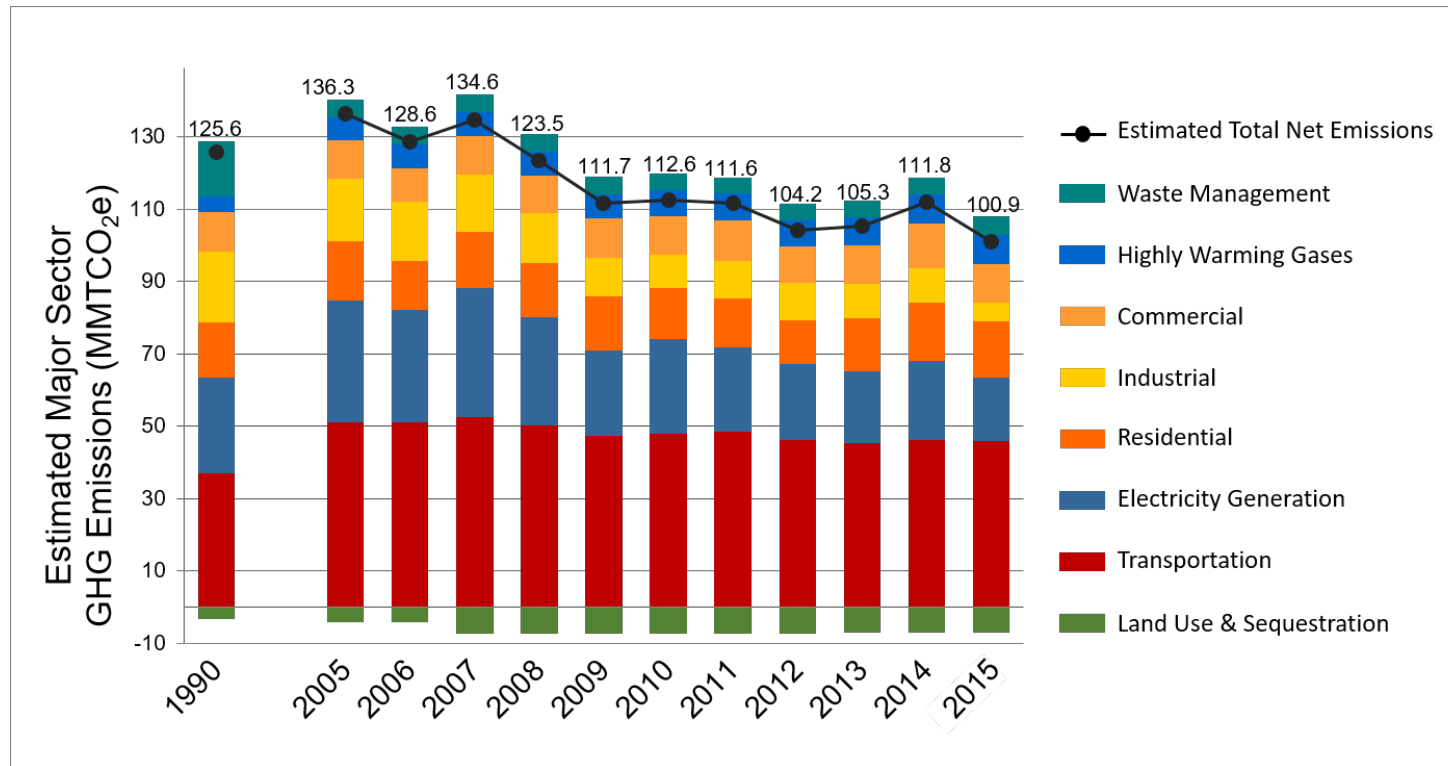
**2020 Emissions Reduction Goal**  
(Equivalent to 1990 GHG Emissions)





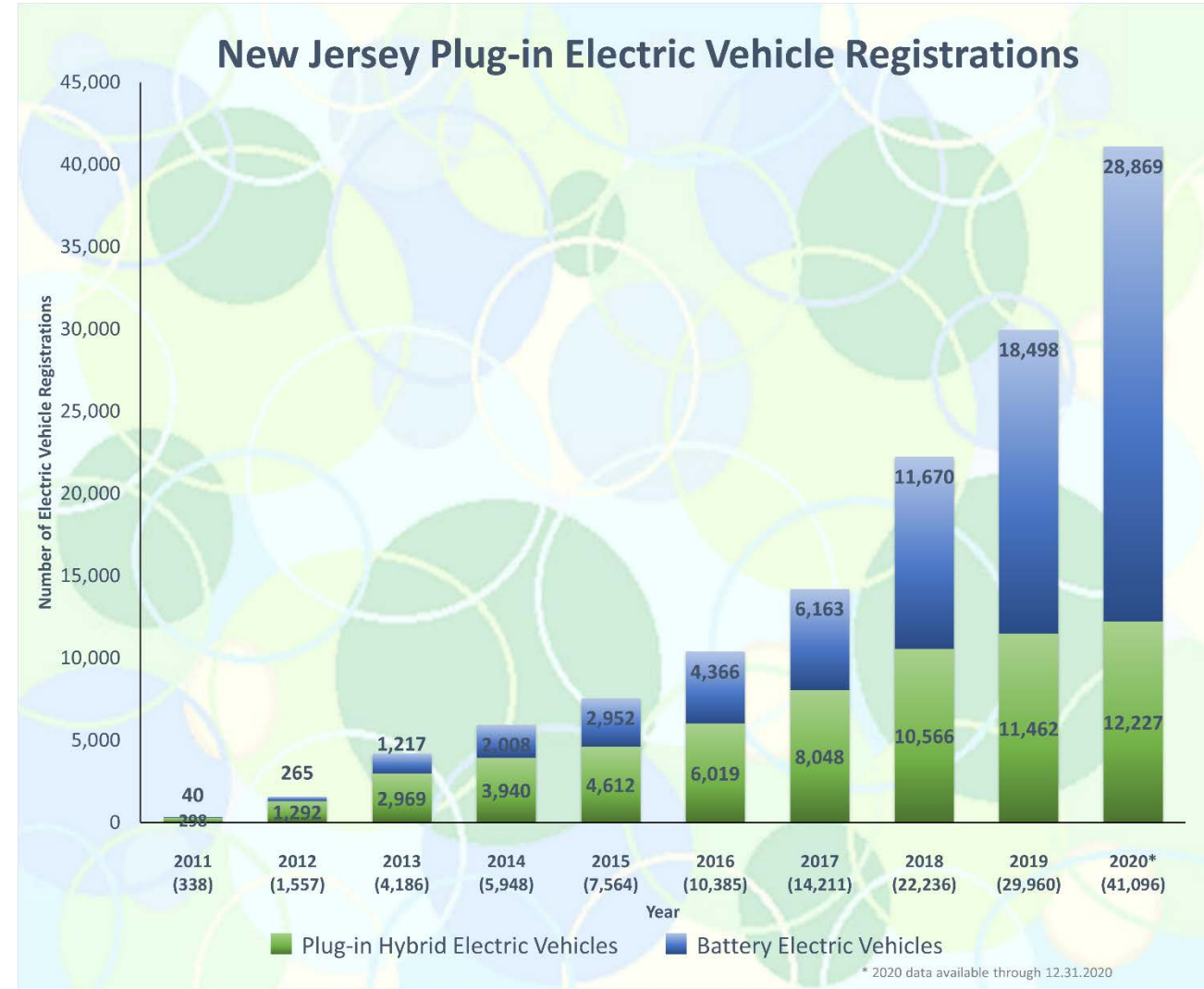
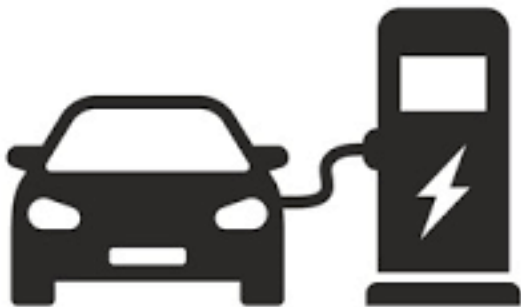
# GHG Emissions in New Jersey

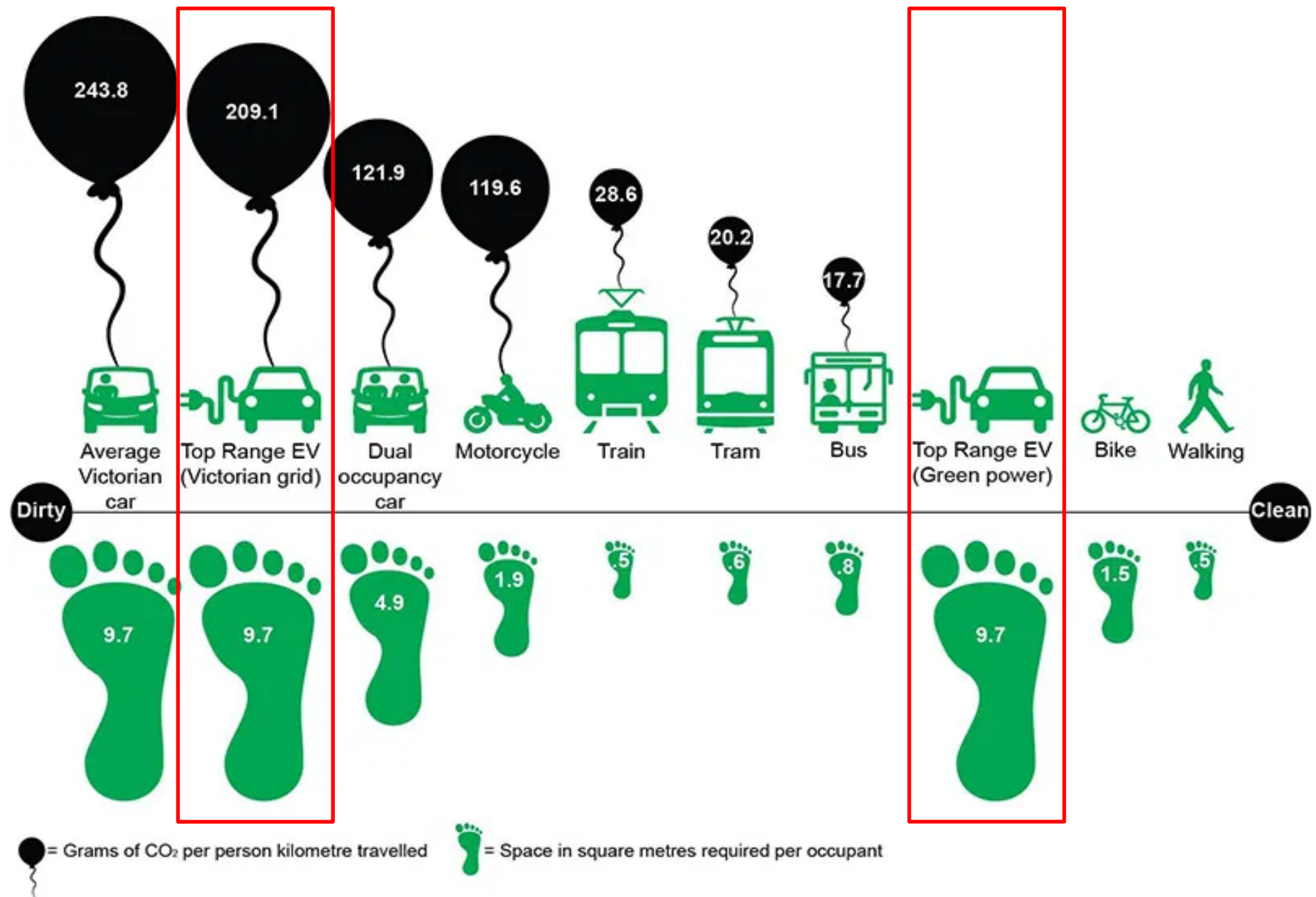
Reductions in the transportation sector will be critical to achieving NJ's emissions target



# Significant attention being paid to vehicle electrification

- Charging infrastructure investments
- Rebates and tax credits to encourage EV purchases
- EVs can use HOV lanes





This infographic compares emissions and space consumption for different transport modes. Source: Institute for Sensible Transport

# What can the working group do?

## Multi-Goal Framework



**Healthy.** Improve health outcomes for people and communities by improving air quality and making it easier and safer to walk and bike.



**Just.** Promote **equity** by making travel by transit more reliable and convenient and by enhancing access to opportunity for marginalized groups.



**Efficient.** Increase transportation system efficiency and effectiveness by integrating advanced and emerging transportation technologies and modes.



**Resilient.** Enhance the resilience of transportation systems by adapting infrastructure to climate hazards.



**Carbon Neutral.** Reduce energy use and emissions of all kinds by facilitating a transition to CO2-neutral transportation.



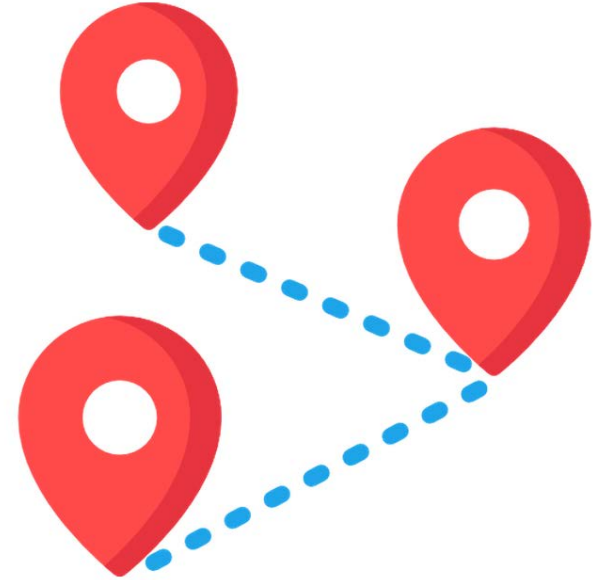
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Toward a healthier, more equitable, and cleaner transport future in New Jersey

# **HEALTHY, JUST, RESILIENT, AND CO2-NEUTRAL MOBILITY FOR ALL**

# What is healthy mobility?

- Access
- Safety
- Physical activity
- Mental health
- Air quality
- Noise



# What is equitable and just mobility?

An equitable and **just transportation system** provides safe and clean transportation options that are affordable, convenient, and easy to use.

**Equitable mobility** provides the same opportunity for everyone to move around reliably and sustainably in ways that meet their needs.



Graphic courtesy of Shared-Use Mobility Center

# What is resilient mobility?

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Robustness

Redundancy

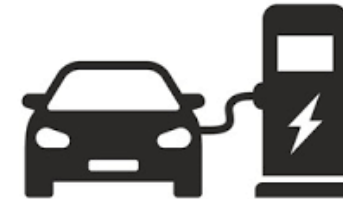
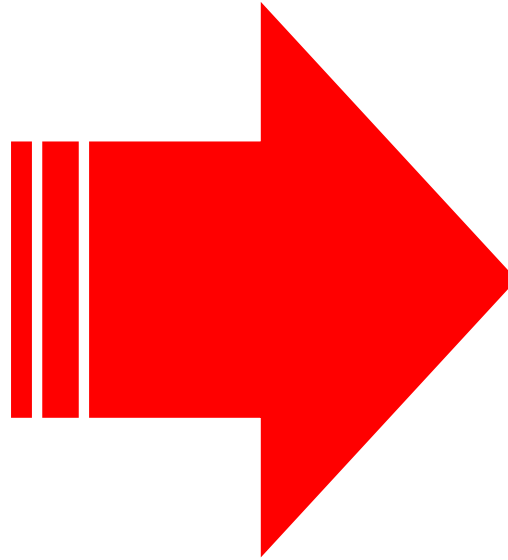
Flexibility

Responsiveness

Coordination



# What is carbon-neutral mobility?



# Guiding concepts

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- **Decarbonize** the transportation sector
- Empower people to **drive less**
- Create a network of **diverse and inclusive neighborhoods that** are well connected to each other
- Think of **mobility as a service** and **reimagine** public transportation
- Embrace **new technologies** but ensure they are affordable and accessible to all
- Make **social justice** a key indicator of transportation performance

# Potential Organizing Framework

## “15-minute” City/Neighborhood

### Leading Practice Examples

- Singapore
- Paris
- Portland
- Melbourne
- Ottawa
- Barcelona



© Shutterstock, Getty | Aerial views of Glasgow, Paris and Melbourne



# What is a “15-minute” city/neighborhood?

## 5 MINUTE WALK

(3 MPH AVG)



RADIUS - 1/4 MILE

ACRES - ~126

DWELLING UNITS - 1,000 @ 8/AC

POPULATION - 2,600 @ 2.6/UNIT

## 15 MINUTE WALK

(3 MPH AVG)



RADIUS - 3/4 MILE

ACRES - ~1,130

DWELLING UNITS - 9,040 @ 8/AC

POPULATION - 23,500 @ 2.6/UNIT

## 5 MINUTE BIKE

(12 MPH AVG)



RADIUS - 1 MILE

ACRES - ~2,010

DWELLING UNITS - 16,100 @ 8/AC

POPULATION - 41,860 @ 2.6/UNIT

## 5 MINUTE ELEC. VEHICLE

(20 MPH AVG)



RADIUS - 1 2/3 MILE

ACRES - ~5,580

DWELLING UNITS - 44,700 @ 8/AC

POPULATION - 116,200 @ 2.6/UNIT

## 15 MINUTE BIKE

(12 MPH AVG)

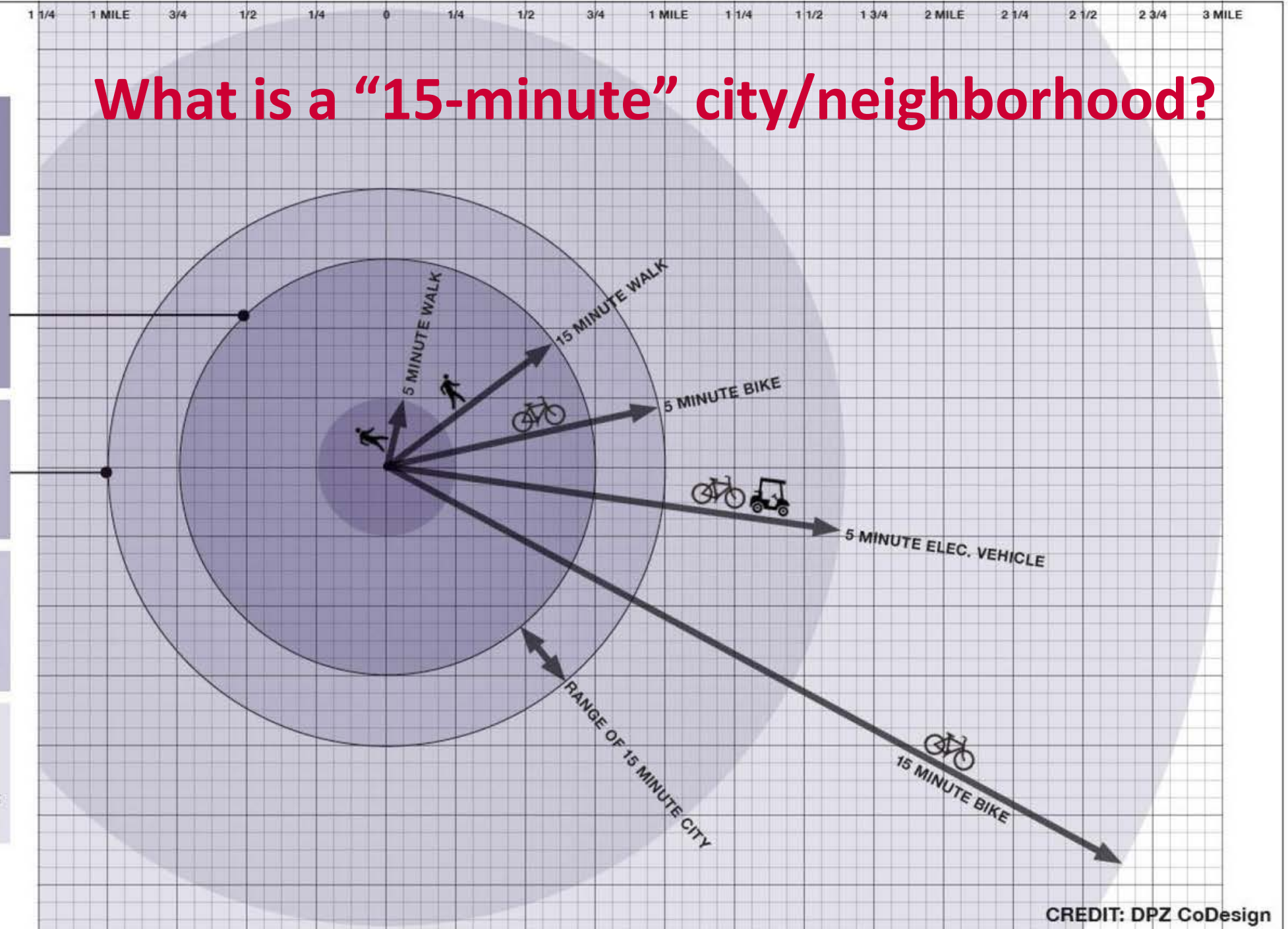


RADIUS - 3 MILE

ACRES - ~18,100

DWELLING UNITS - 144,800 @ 8/AC

POPULATION - 376,480 @ 2.6/UNIT





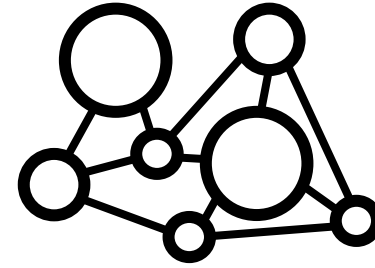
# Key relationships



People



Places



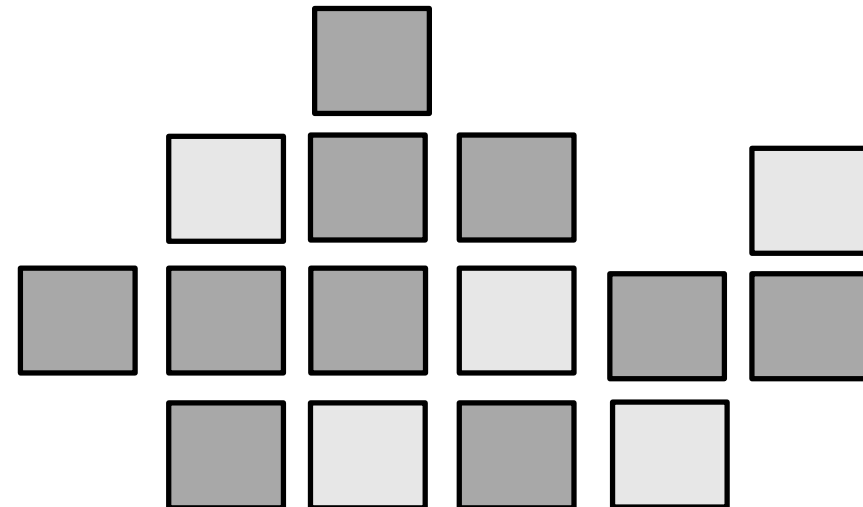
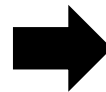
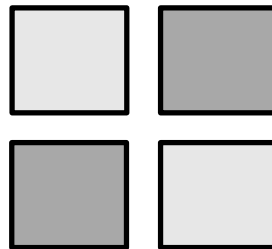
Connections

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Neighborhood

Community

Region

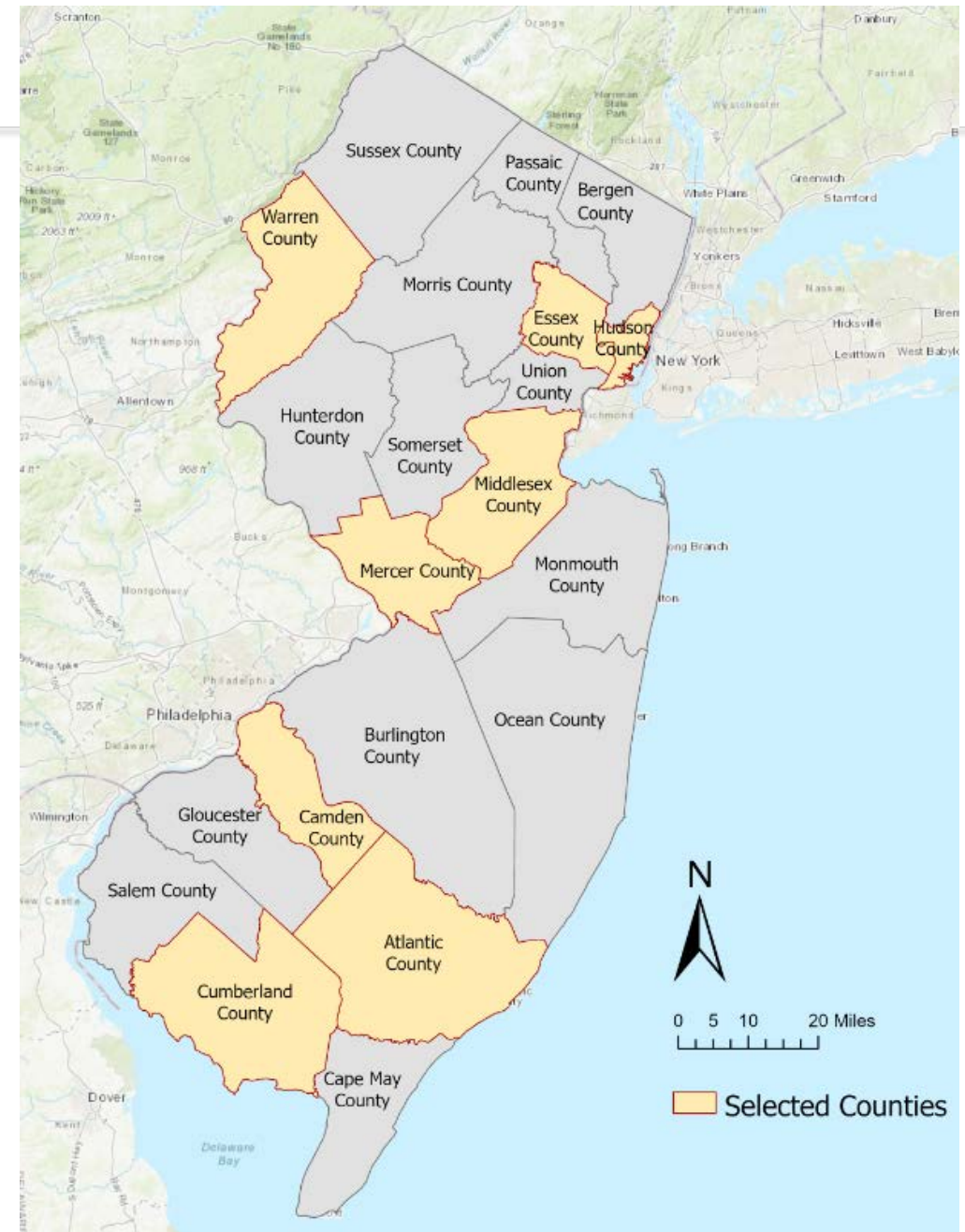


# Work Plan

<b>PHASE 1 – Exploring key concepts, desktop analysis, looking toward the future (Mar 2021 to Feb 2022)</b>	<u>Activities:</u> <ul style="list-style-type: none"><li>• Conduct leading practice research</li><li>• Collect, analyze, and map data</li><li>• Identify of potential community and equity partners</li><li>• Convene “Thought Leaders” webinar and visioning workshops</li><li>• Identify vision components</li><li>• Select locations for neighborhood-scale analysis</li></ul>
<b>PHASE 2 – Field work, community engagement, and developing recommendations (Mar 2022 to Sep 2022)</b>	<u>Activities:</u> <ul style="list-style-type: none"><li>• Conduct field visits and interviews to get to know the neighborhoods</li><li>• Develop and implement community engagement plan</li><li>• Identify local mobility and other community needs and concerns</li><li>• Prepare concept plans for retrofitting existing neighborhoods</li><li>• Identify infrastructure needs</li><li>• Develop planning and policy recommendations</li><li>• Prepare comprehensive final report</li><li>• Convene “Thought Leaders” Forum #2 – How do we get there?</li></ul>

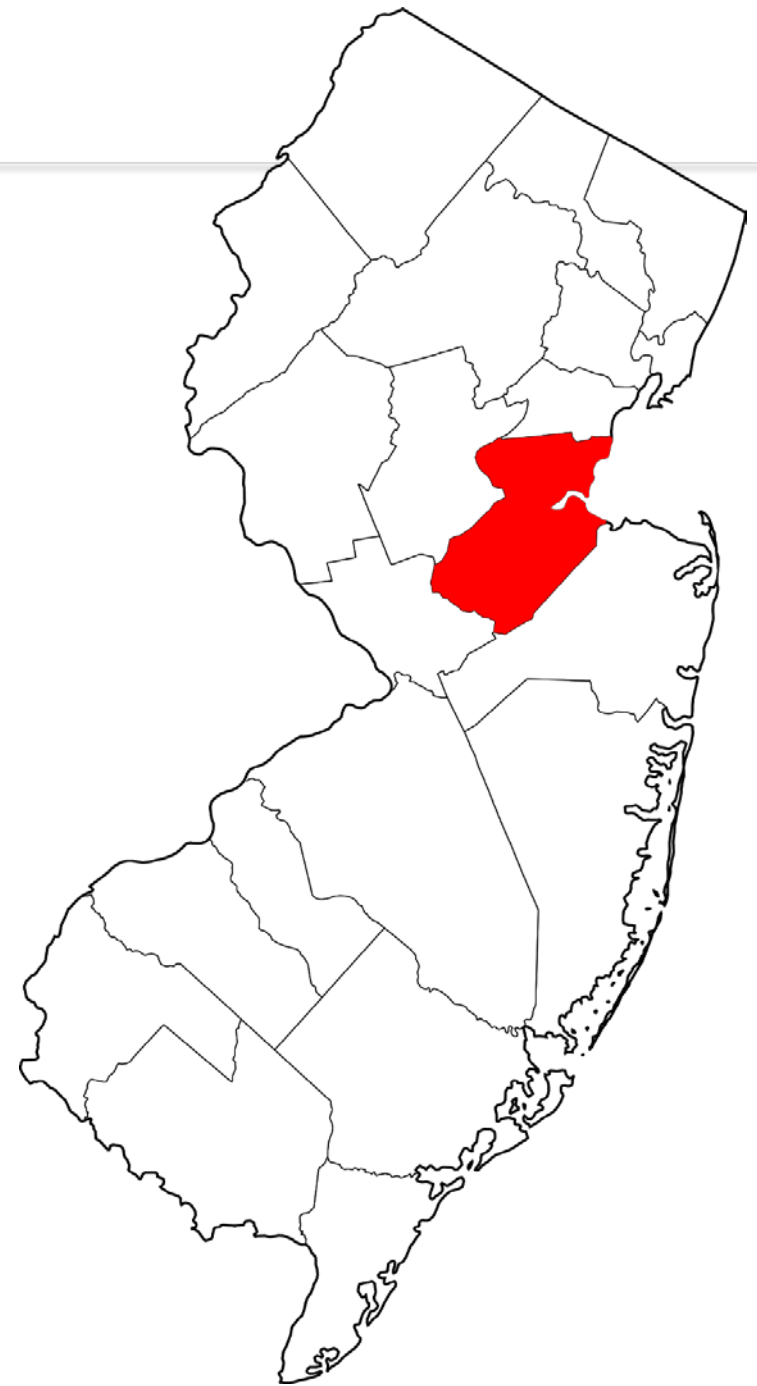
# Phase 1 Case Study Locations

1. Atlantic
2. Camden
3. Cumberland
4. Essex
5. Hudson
6. Mercer
7. Middlesex
8. Warren



Exploring the Geography of People, Place, and Connections

# MIDDLESEX COUNTY





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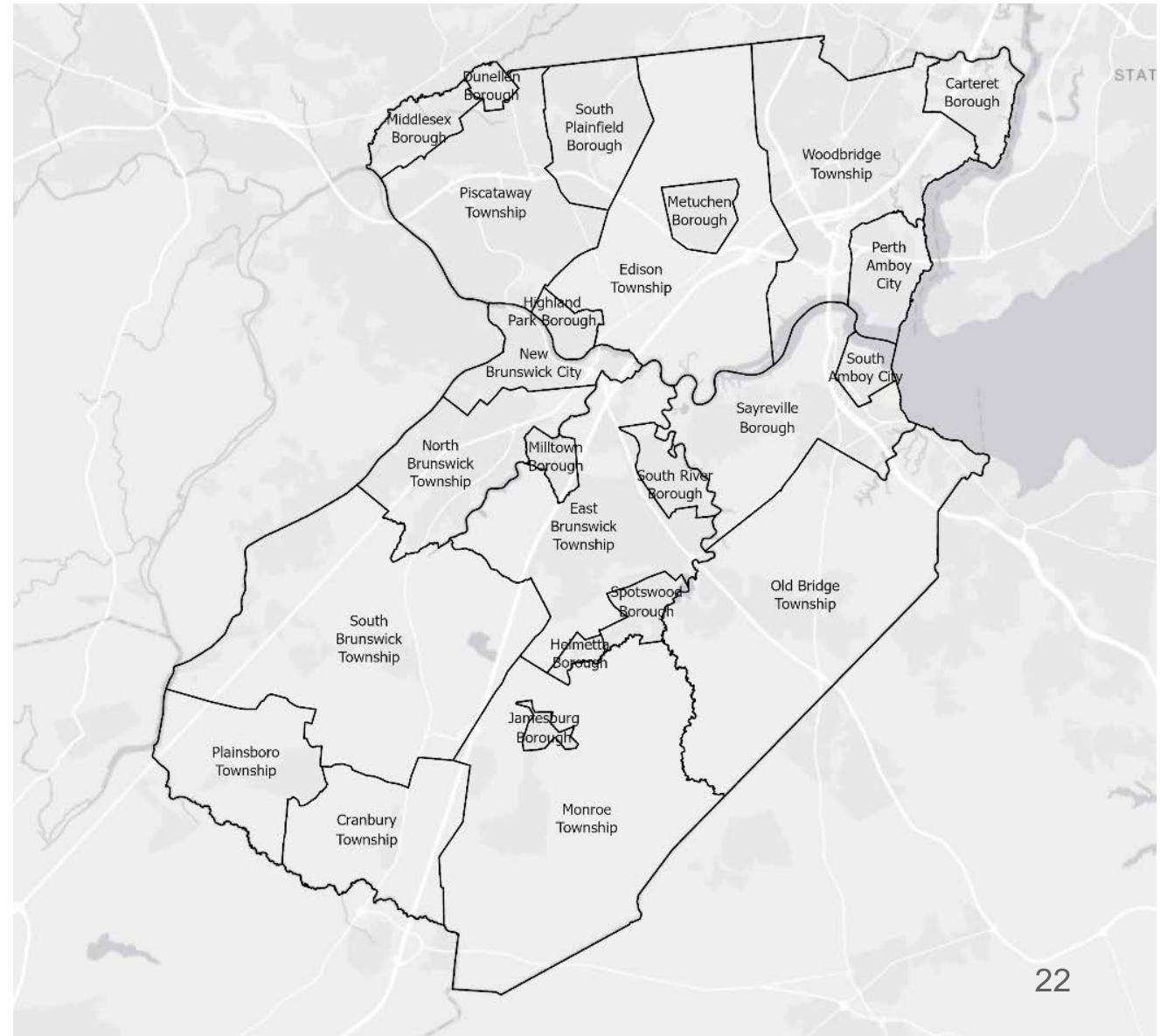
Healthy, Just and CO2-neutral Mobility for All

# GEOGRAPHY OF PEOPLE

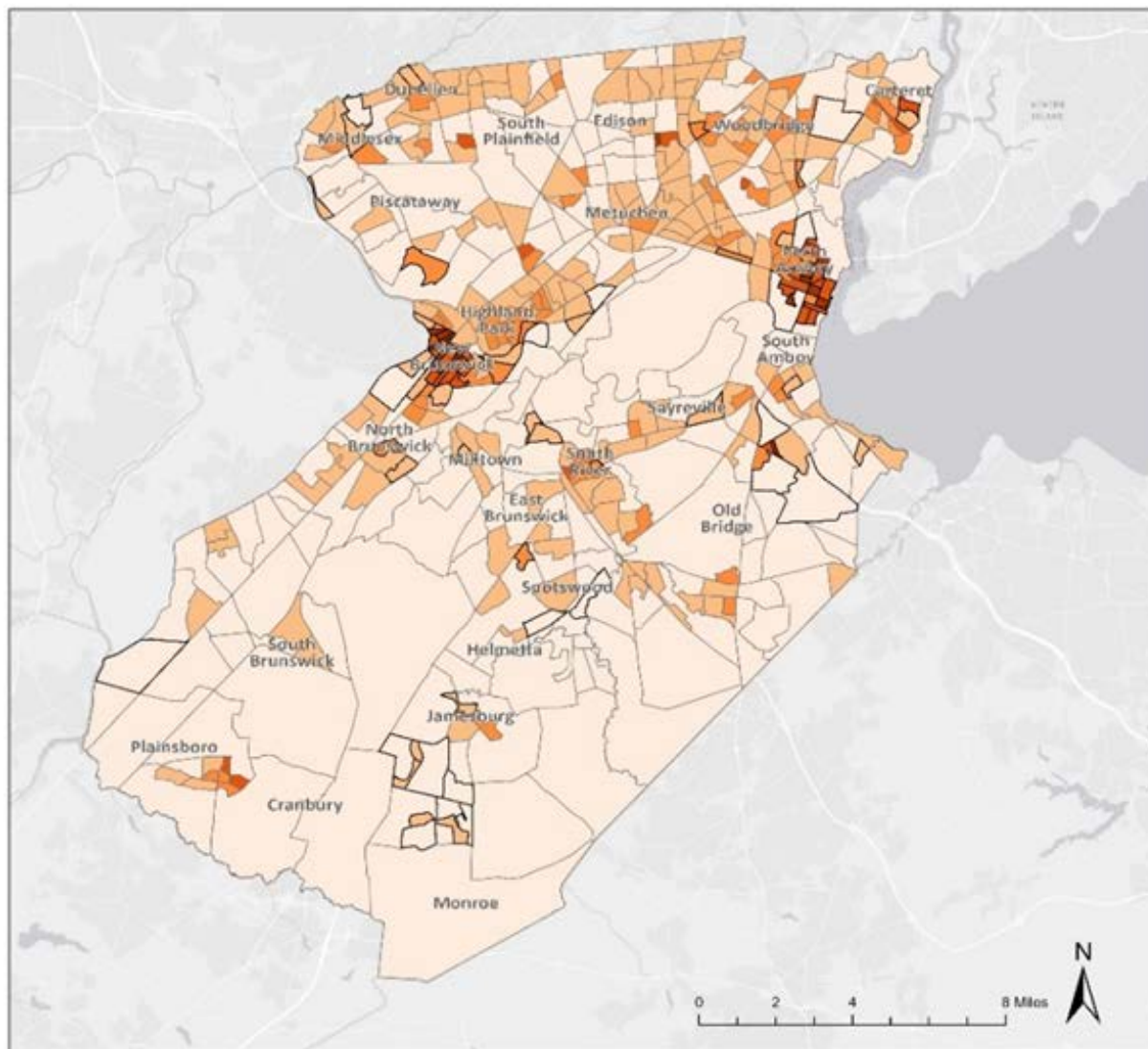
# County at a glance

A mix of small towns, urban centers and rural communities

- 309 square miles
- 25 Municipalities
- Over 830,000 residents
- County Seat: New Brunswick



# Population



## Population Density

Population per sq mile by block group

151 - 3,837

3,838 - 7,982

7,983 - 14,655

14,656 - 24,407

24,408 - 40,637

Low income block group

Data Source: NJGIN, ESRI base map, ACS 2015-2019 5-year estimate

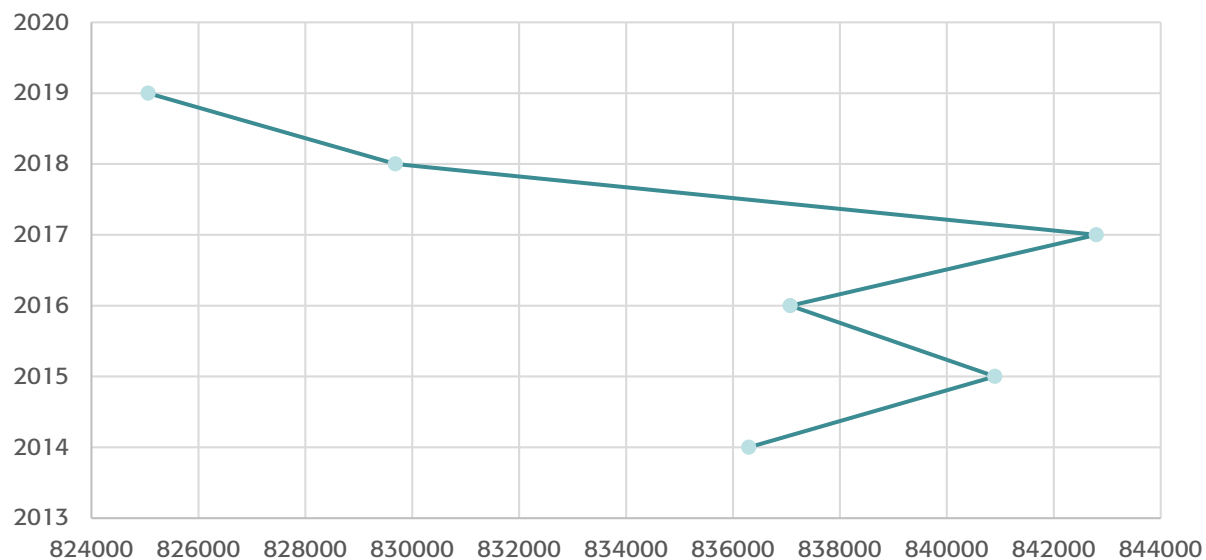
**Planning for Healthy, Just, Resilient, and CO2-Neutral Mobility in New Jersey**

Prepared : June 10, 2021  
by Alan M. Voorhees Transportation Center

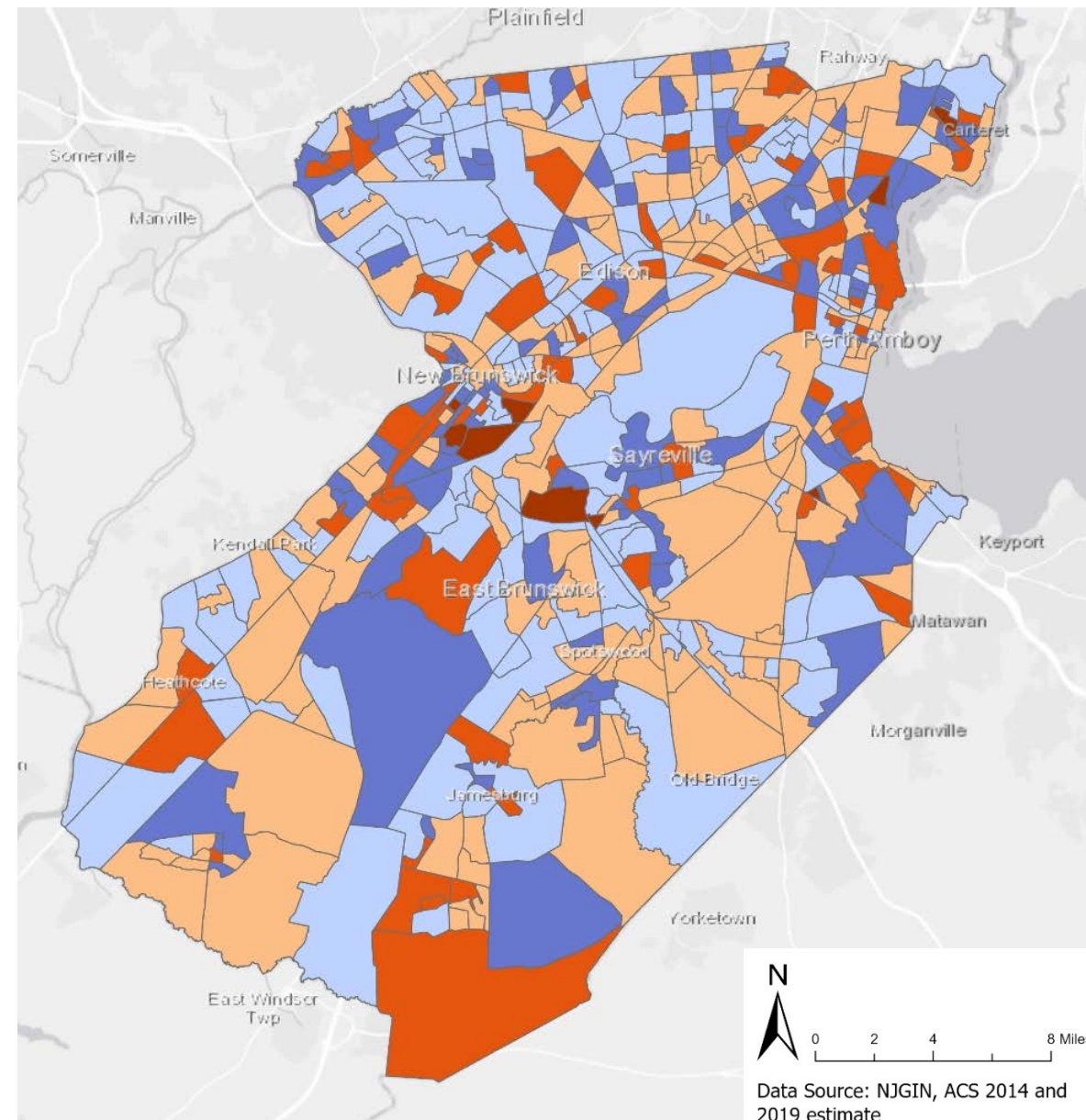


# Change in Population : 2014-2019

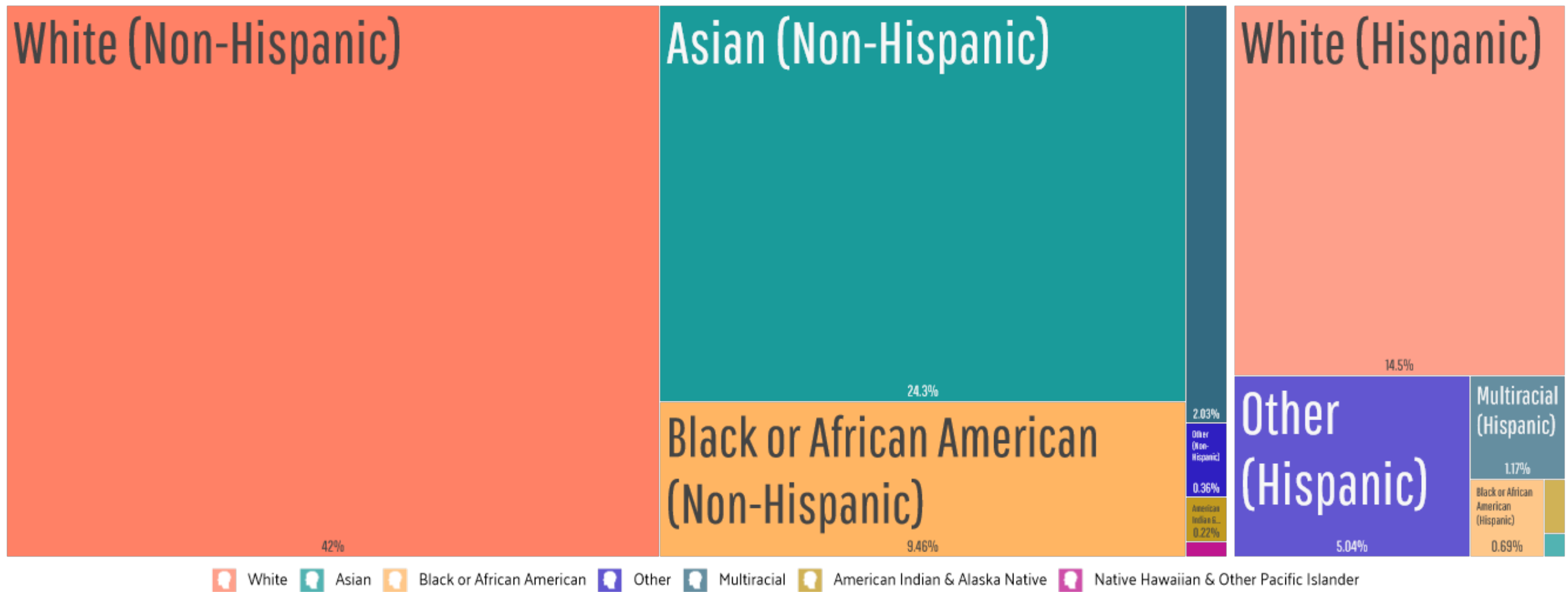
Population Change (2014-2019)



Percent population change, 2014-2019

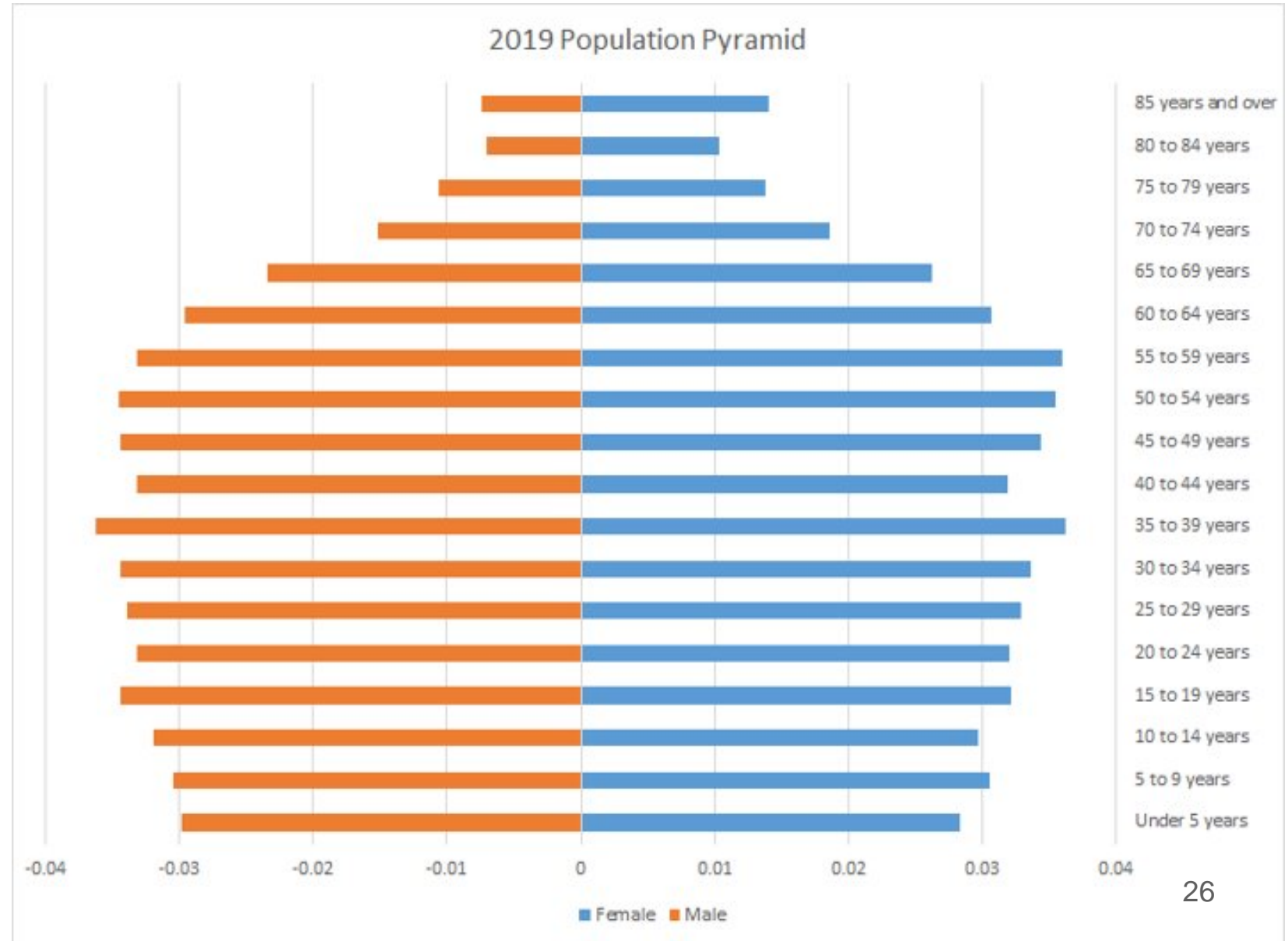


# Race and Ethnicity - 2018





# Age & Gender



Median Age: 38.7 years old



# Household Income

County Average Median Household Income: \$95,000


**AHPNJ Region 3:  
2020 Affordable  
Housing Income  
Limits. Region 3:  
Hunterdon,  
Middlesex and  
Somerset**

## Income Limit (4 person Household)


<b>Very Low</b>	<b>\$35,850</b>
<b>Low</b>	<b>\$52,755</b>
<b>Moderate</b>	<b>\$95,600</b>
<b>Median</b>	<b>\$119,500</b>


 Low income block group


Median household income by block group

 11,396 - 52,368

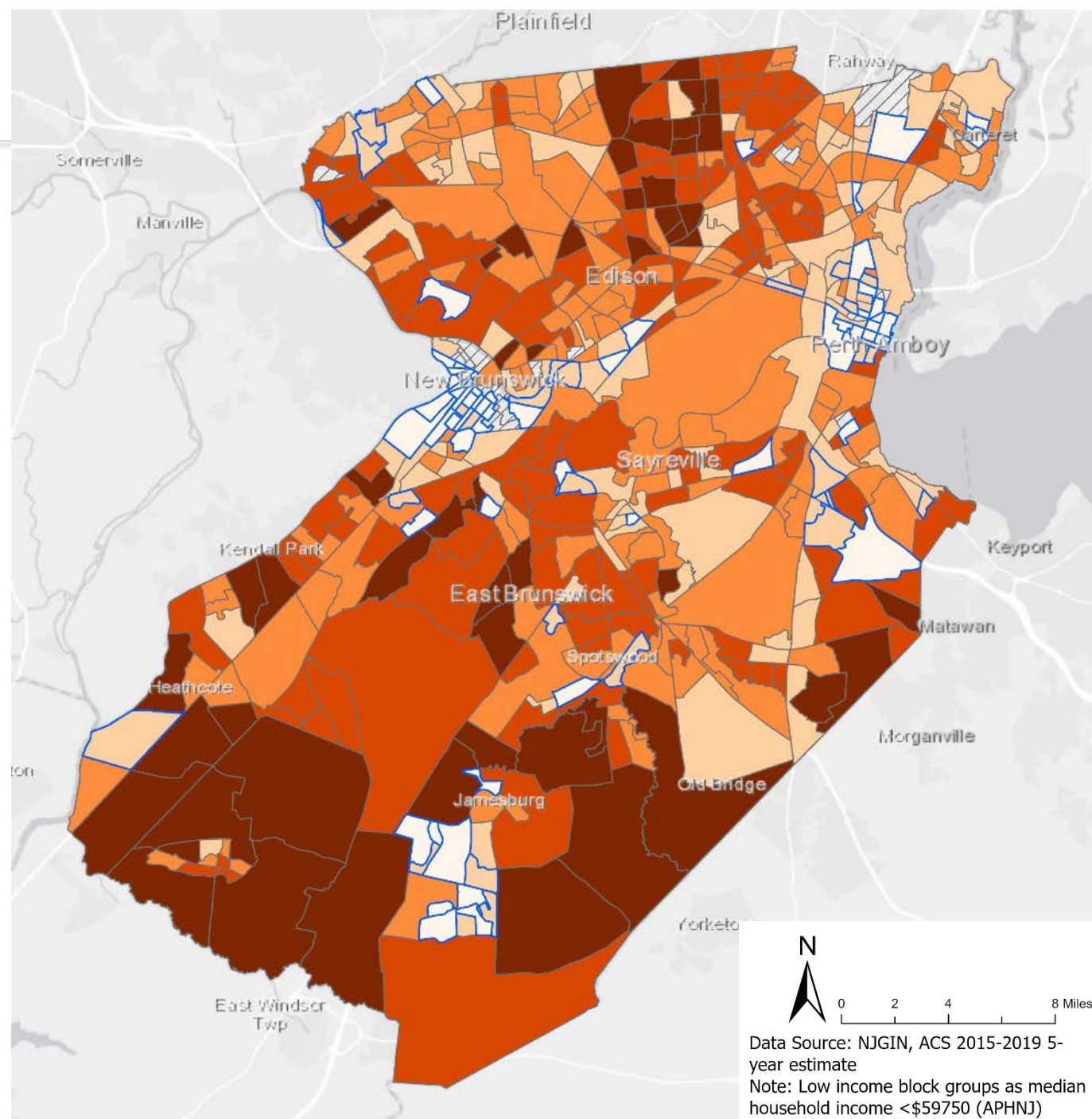
 52,369 - 80,625

 80,626 - 110,625

 110,626 - 148,315

 148,316 - 239,219

 No data



Data Source: NJGIN, ACS 2015-2019 5-year estimate  
Note: Low income block groups as median household income <\$9750 (APHNJ)

# Households living in poverty

□ Low income block group

1 Dot = 10

• households under poverty

Percent of Households under Poverty by Block Group

0% - 4.29%

4.3% - 8.61%

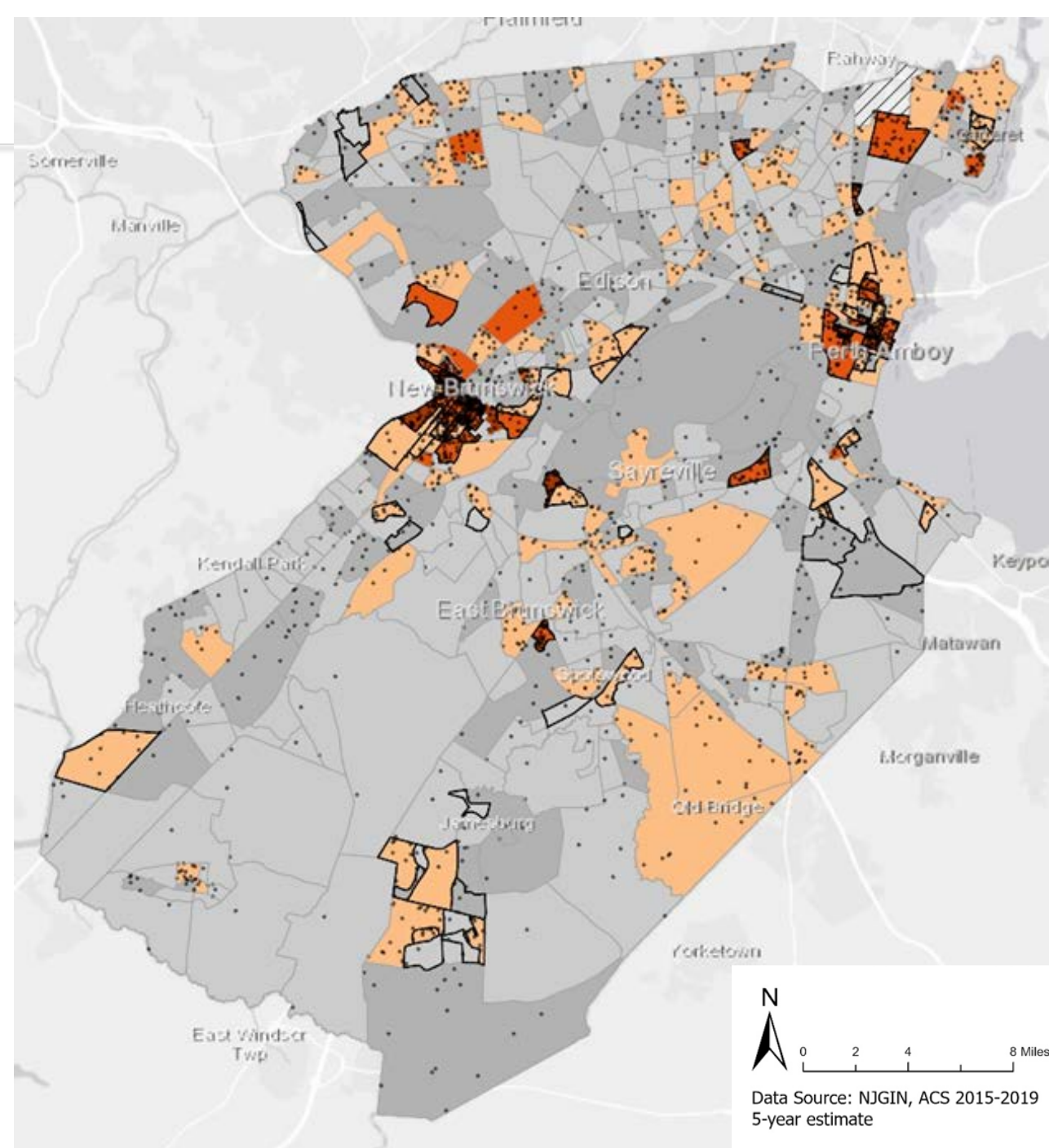
8.62% - 22.94%

22.95% - 41.85%

41.86% - 74.07%

▨ no data

County average: 22.94%



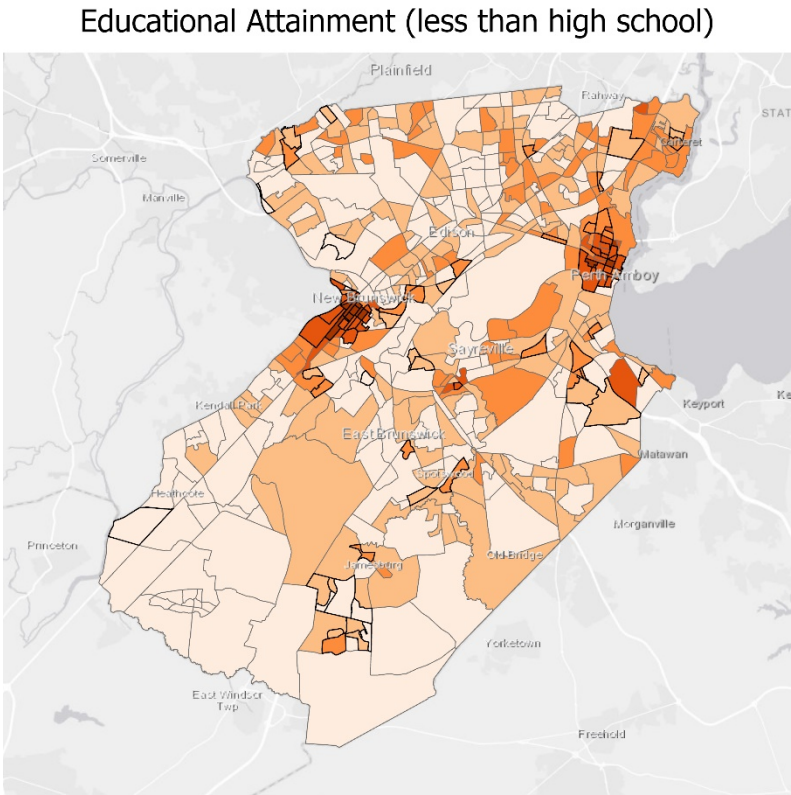


# Educational Attainment

25 years and older w/ less than Bachelor's Degree
56.44%

25 years and older w/ Bachelor's Degree or higher
43.56%

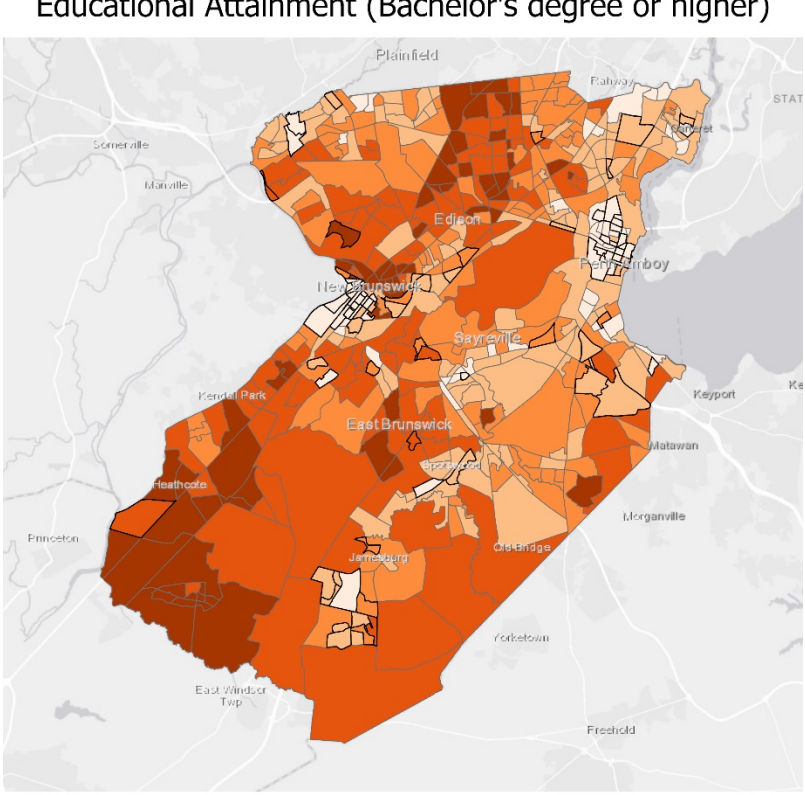
Educational Attainment	Percentage
Less than H.S Diploma	10.18%
H.S Diploma or equivalent	25.29%
Some College	20.96%
Professional School Degree	2.21%
Bachelor's Degree or higher	41.35%



Low income block group  
Percent of population with less than a high school degree

- 0% - 5.7%
- 5.71% - 12.47%
- 12.48% - 23.53%
- 23.54% - 46.13%
- 46.14% - 71.18%

0 2 4 8 Miles  
Data Source: NJGIN, ACS 2015-2019  
5-year estimate



Low income block group  
Percent of population with a bachelor's degree or higher

- 0% - 20.16%
- 20.17% - 34.85%
- 34.86% - 50.91%
- 50.92% - 68.2%
- 68.21% - 95.43%

0 2 4 8 Miles  
Data Source: NJGIN, ACS 2015-2019  
5-year estimate

# Employment Status

□ Low income block group

Percent of unemployed population by block group

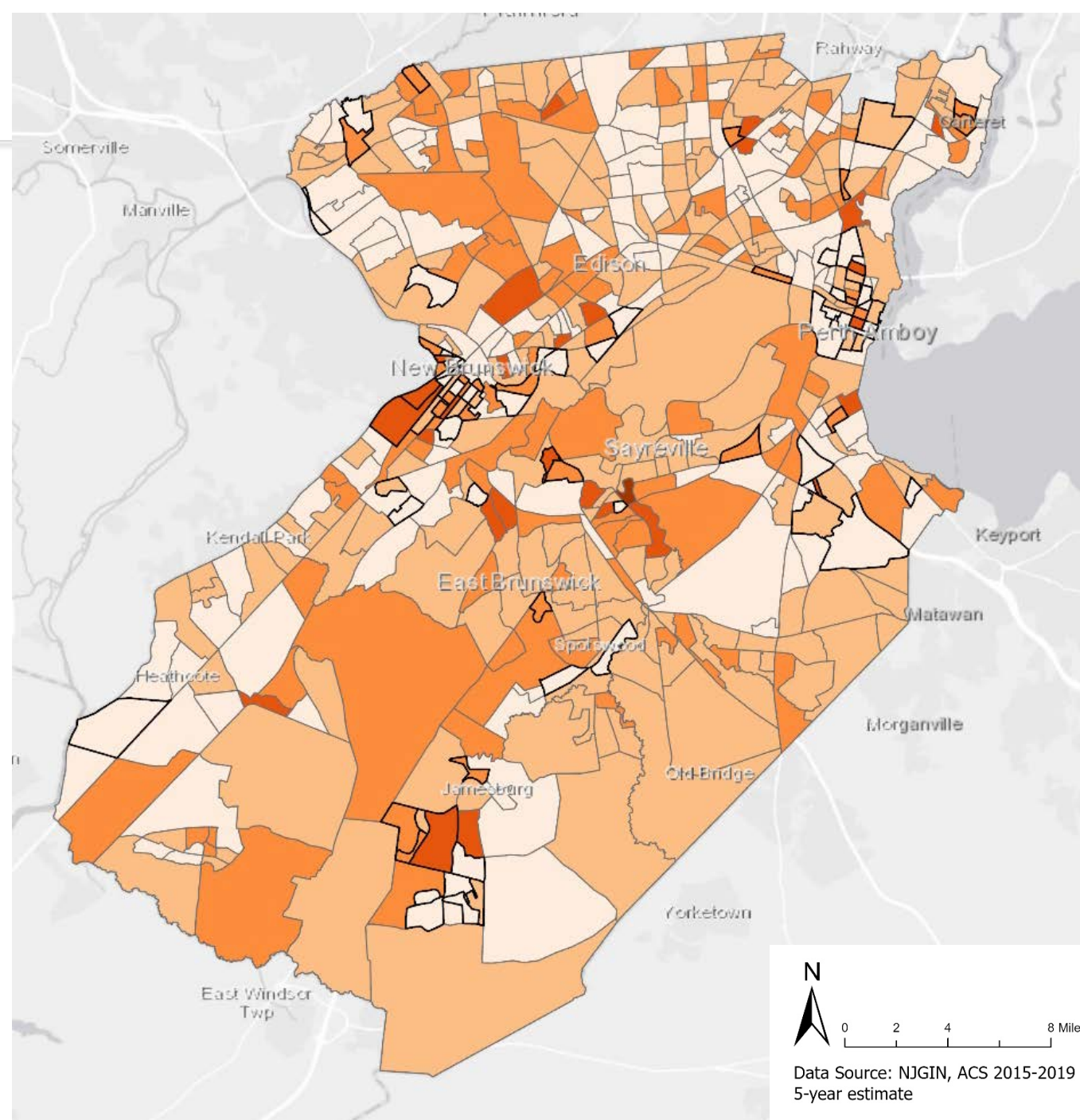
0% - 3.13%

3.13% - 6.72%

6.73% - 12.09%

12.1% - 27.92%

27.93% - 47.65%



# Indicators of Potential Disadvantage

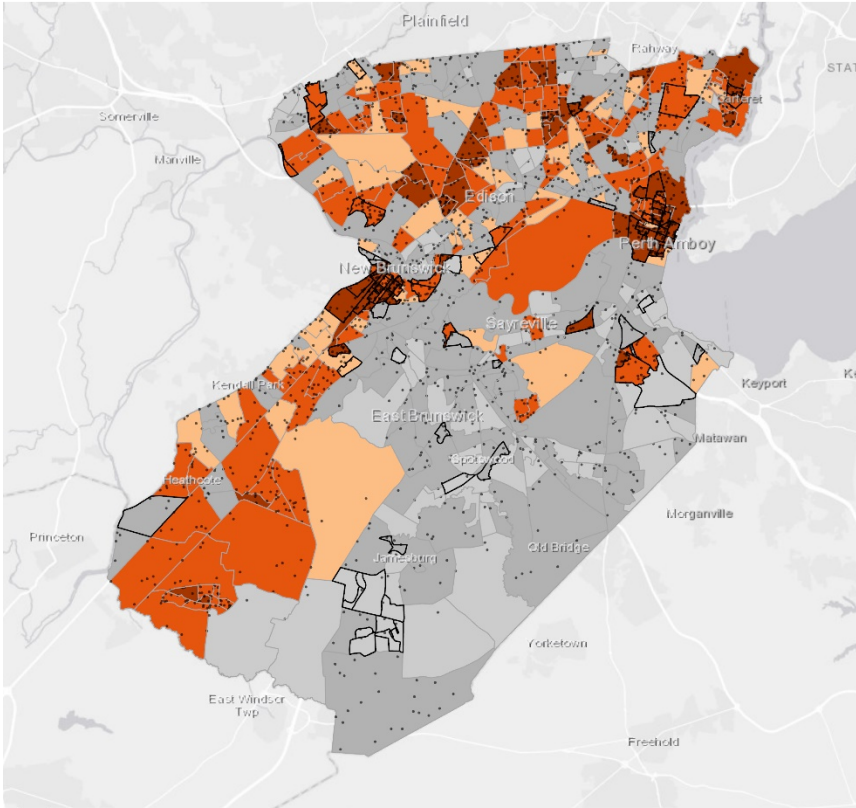
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- Racial Minority
- Foreign Born status
- Limited English Proficiency
- Disability status
- Older Adults (75+)
- Single Parent households

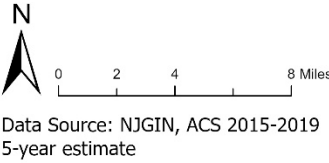


# Indicators of Potential Disadvantage

Racial Minority

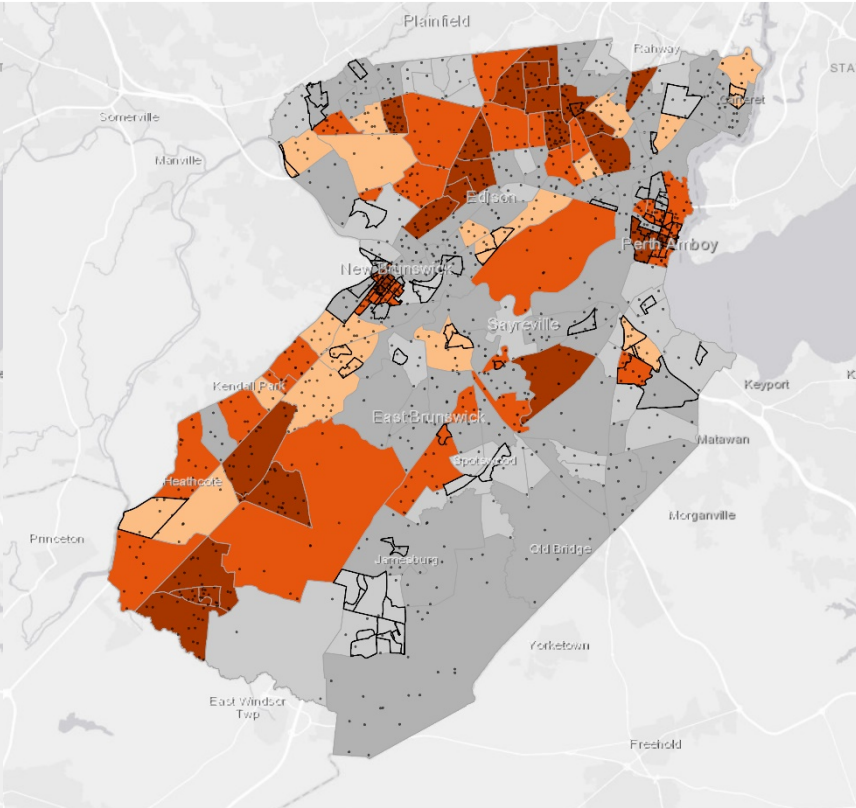


Low income block group  
1 Dot = 200  
persons of racial minority  
Percent of Racial Minority Population by Block Group  
0% - 28.92%  
28.93% - 56.94% County average: 56.94%  
56.95% - 64.31%  
64.32% - 80.57%  
80.58% - 100%

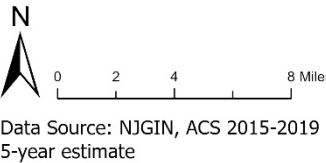


Data Source: NJGIN, ACS 2015-2019  
5-year estimate

Foreign-born Population

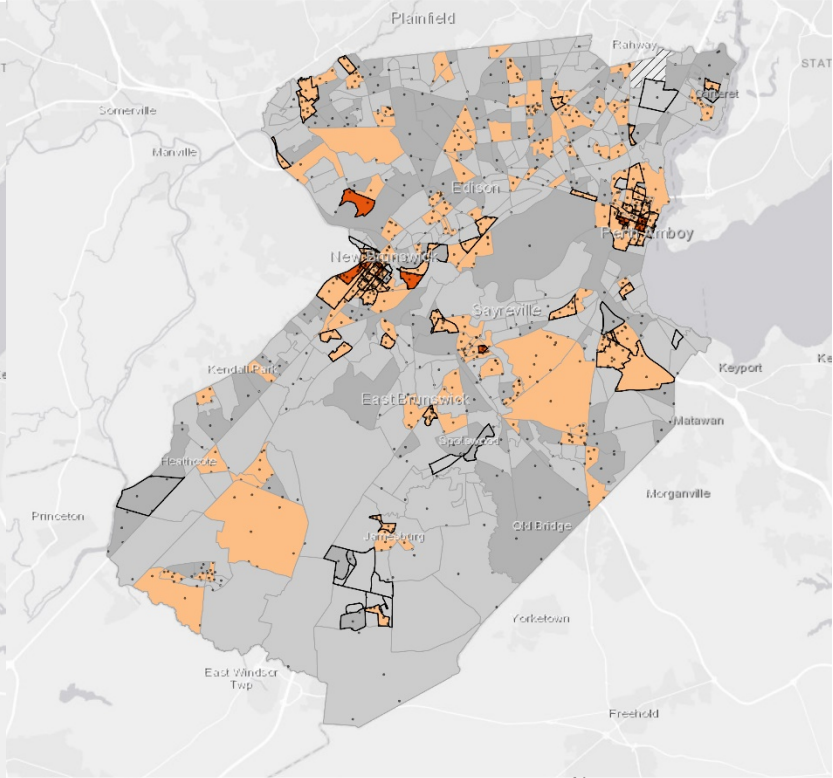


Low income block group  
1 Dot = 200  
foreign born persons  
Percent of Foreign-born Population by Census Tract  
9.97% - 19.01%  
19.02% - 32.84% County average: 32.84%  
32.85% - 36.15%  
36.16% - 48.28%  
48.29% - 77.51%

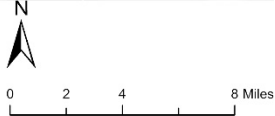


Data Source: NJGIN, ACS 2015-2019  
5-year estimate

Limited English Proficiency



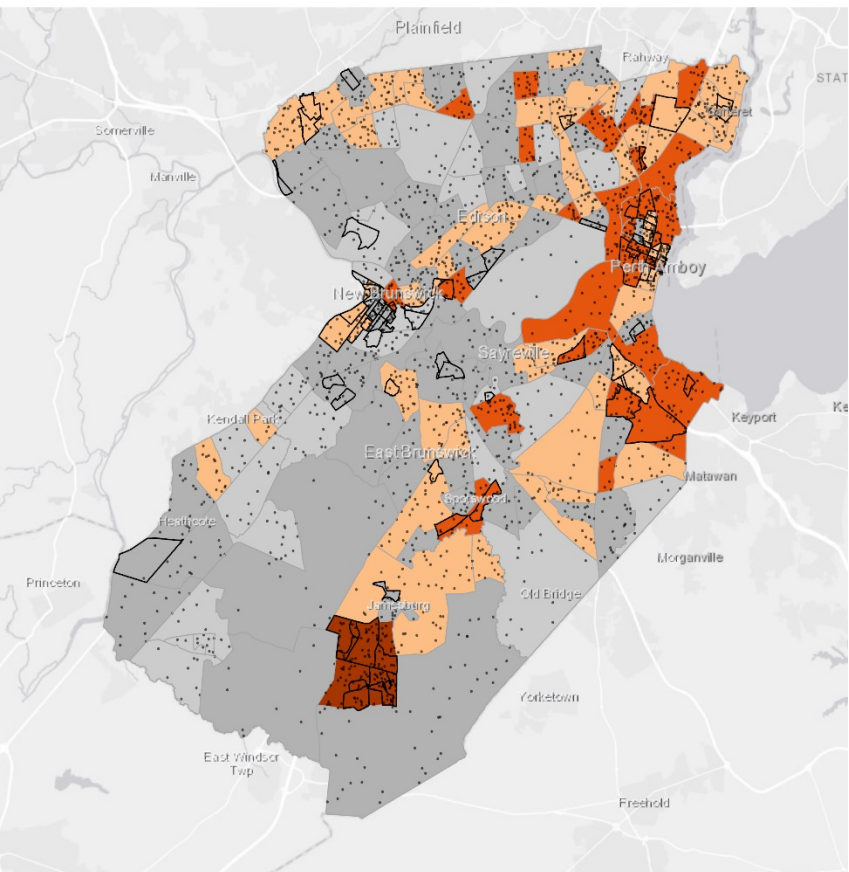
Low income block group  
1 Dot = 20  
households with limited English proficiency  
Percent of Limited English Proficiency Households by Block Group  
0% - 4.59%  
4.6% - 8.33% County average: 8.33%  
8.34% - 36.51%  
36.52% - 55.72%  
55.73% - 83.3%  
no data



Data Source: NJGIN, ACS 2015-2019  
5-year estimate

# Indicators of Potential Disadvantage

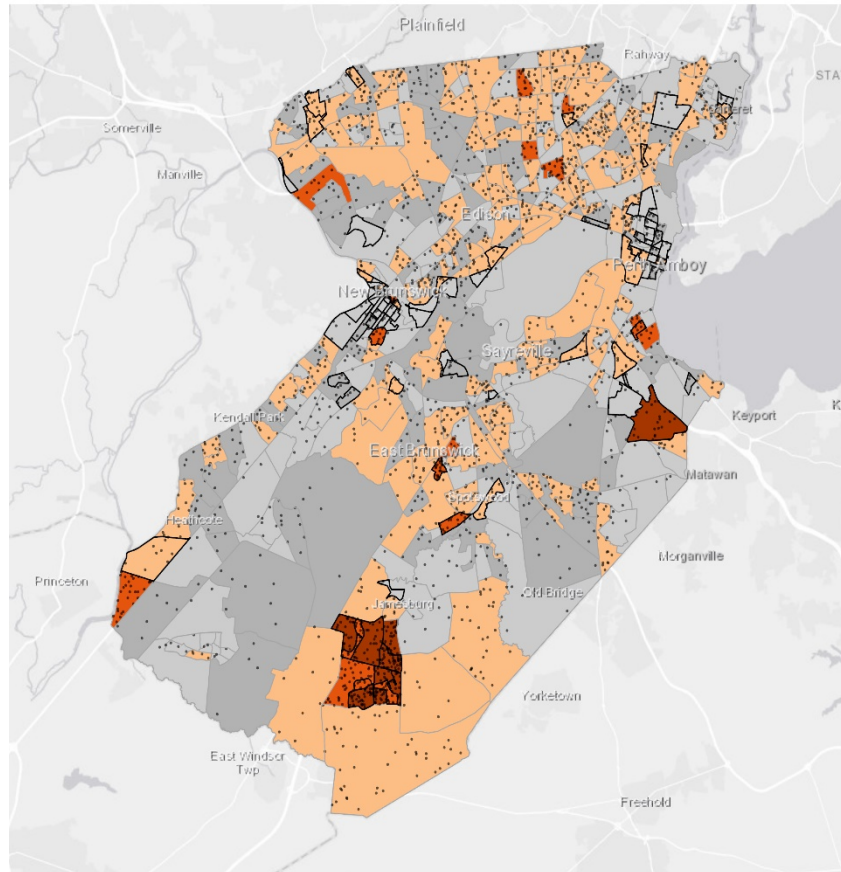
Persons with Disability



Low income block group  
1 Dot = 30  
person with disability  
Percent of Persons with Disability by Census Tract  
1.8% - 6.3%  
6.31% - 9.31% County average: 9.31%  
9.32% - 12.2%  
12.21% - 15.8%  
15.81% - 34.5%

N  
0 2 4 8 Miles  
Data Source: NJGIN, ACS 2015-2019  
5-year estimate

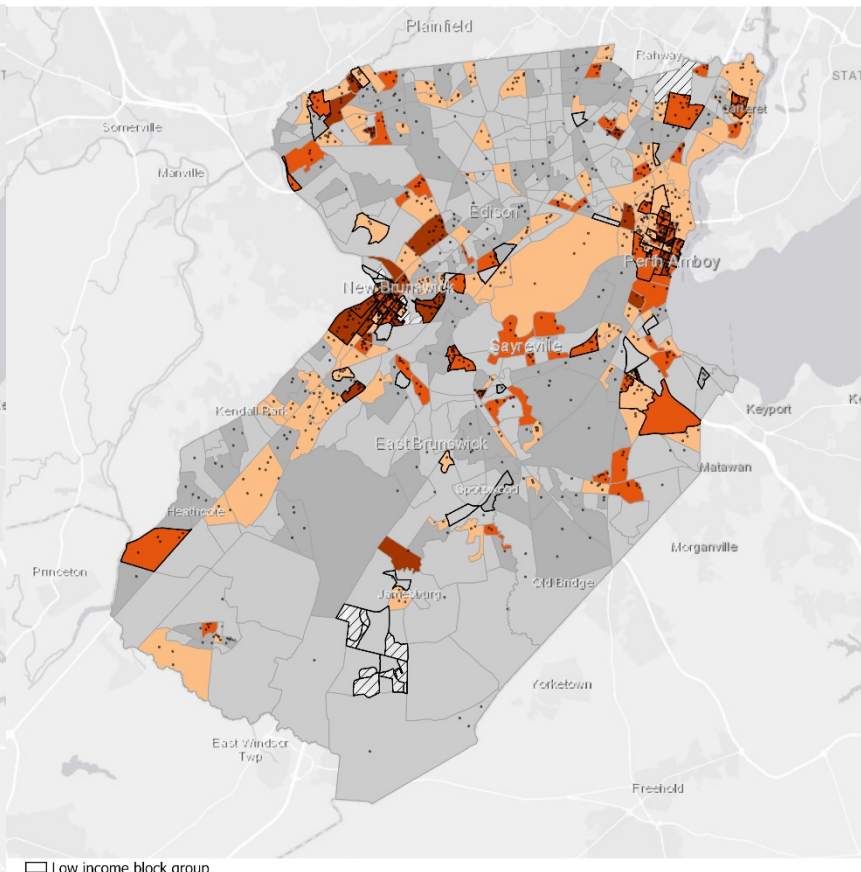
Older Adults (75+)



Low income block group  
1 Dot = 20  
older adults(75+)  
Percent of Older Adults(75+) by Block Group  
0% - 4.1%  
4.11% - 6.33% County average: 6.33%  
6.34% - 15.38%  
15.39% - 33.86%  
33.87% - 65.67%

N  
0 2 4 8 Miles  
Data Source: NJGIN, ACS 2015-2019  
5-year estimate

Single Parent Family



Low income block group  
1 Dot = 30  
single parent family  
Percent of Single Parent Families by Block Group  
0% - 7.76%  
7.77% - 21.83%  
21.84% - 41.08%  
41.09% - 64.58% County average: 41.08%  
64.59% - 100%  
no data

N  
0 2 4 8 Miles  
Data Source: NJGIN, ACS 2015-2019  
5-year estimate



# Health Behaviors

Middlesex is ranked among the healthiest counties in New Jersey (Highest 75%-100%)



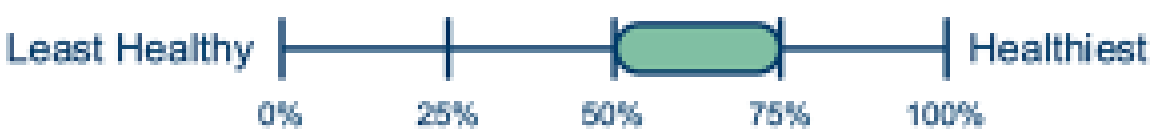
Source: 2020 NJ County Health rankings

Health Behaviors	Middlesex County	NJ
Adult Smoking	11%	14%
Adult obesity	26%	26%
Food environment index	8.8	9.3
Physical inactivity	26%	26%
Access to exercise opportunities	97%	95%
Excessive drinking	16%	18%
Alcohol-impaired driving deaths	24%	22%

Physical Environment	Middlesex County	NJ
Air pollution-particulate matter	9.7	9.9
Drinking water problems	Yes	-
Severe housing problems	21%	22%
Driving alone to work	73%	71%
Long commute-driving alone	46%	43%

# Health Outcomes

Middlesex is ranked in the higher middle range of counties in New Jersey (Higher 50%-75%) regarding Health outcomes



Source: 2020 NJ County Health rankings

Quality of Life	Middlesex County	NJ
Poor or fair health	14%	18%
Poor physical health days	3.2	3.7
Poor mental health days	3.6	3.9
Low birthweight	8%	8%
Life Expectancy	81.5 years	80.4 years
Diabetes prevalence	11%	10%
Frequent physical distress	9%	11%

Leading Causes of Death Under age 75 in Middlesex County	Deaths
Malignant neoplasms	2053
Diseases of heart	1391
Accidents	791
Diabetes mellitus	230
Cerebrovascular diseases	226

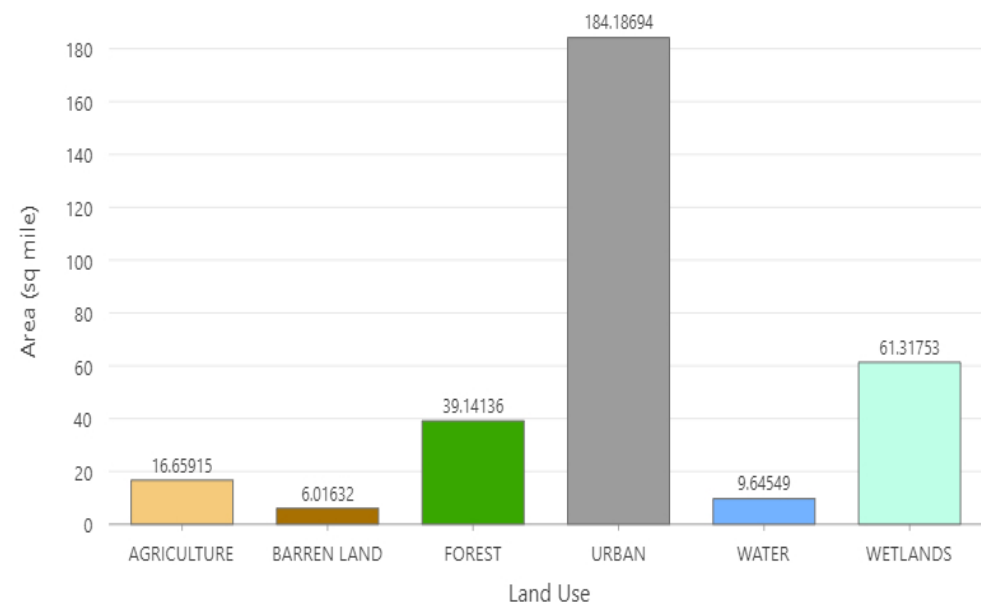
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Healthy, Just and CO2-neutral Mobility for All

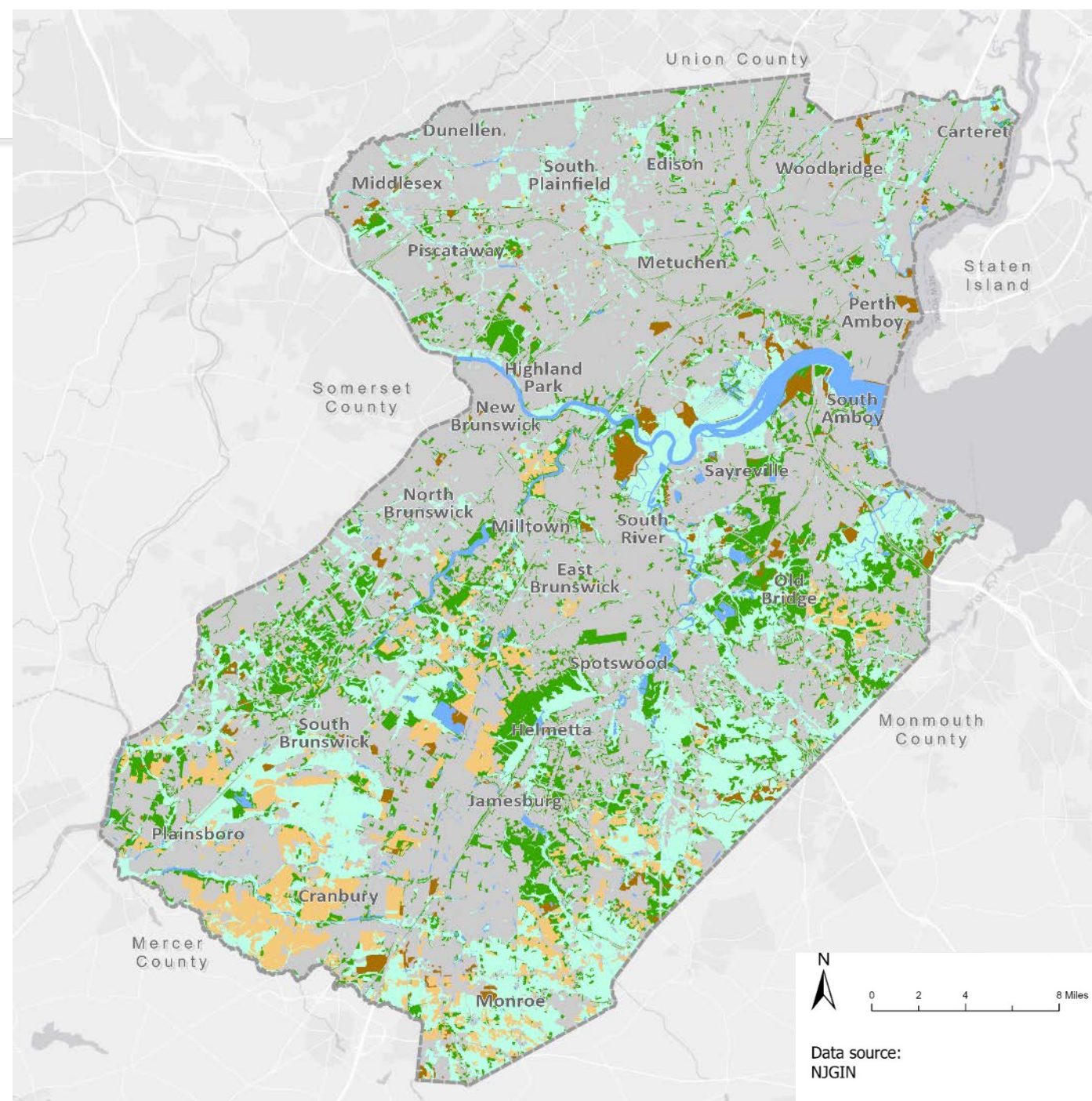
# **GEOGRAPHY OF PLACE**



# Natural Land Use



## Land Use





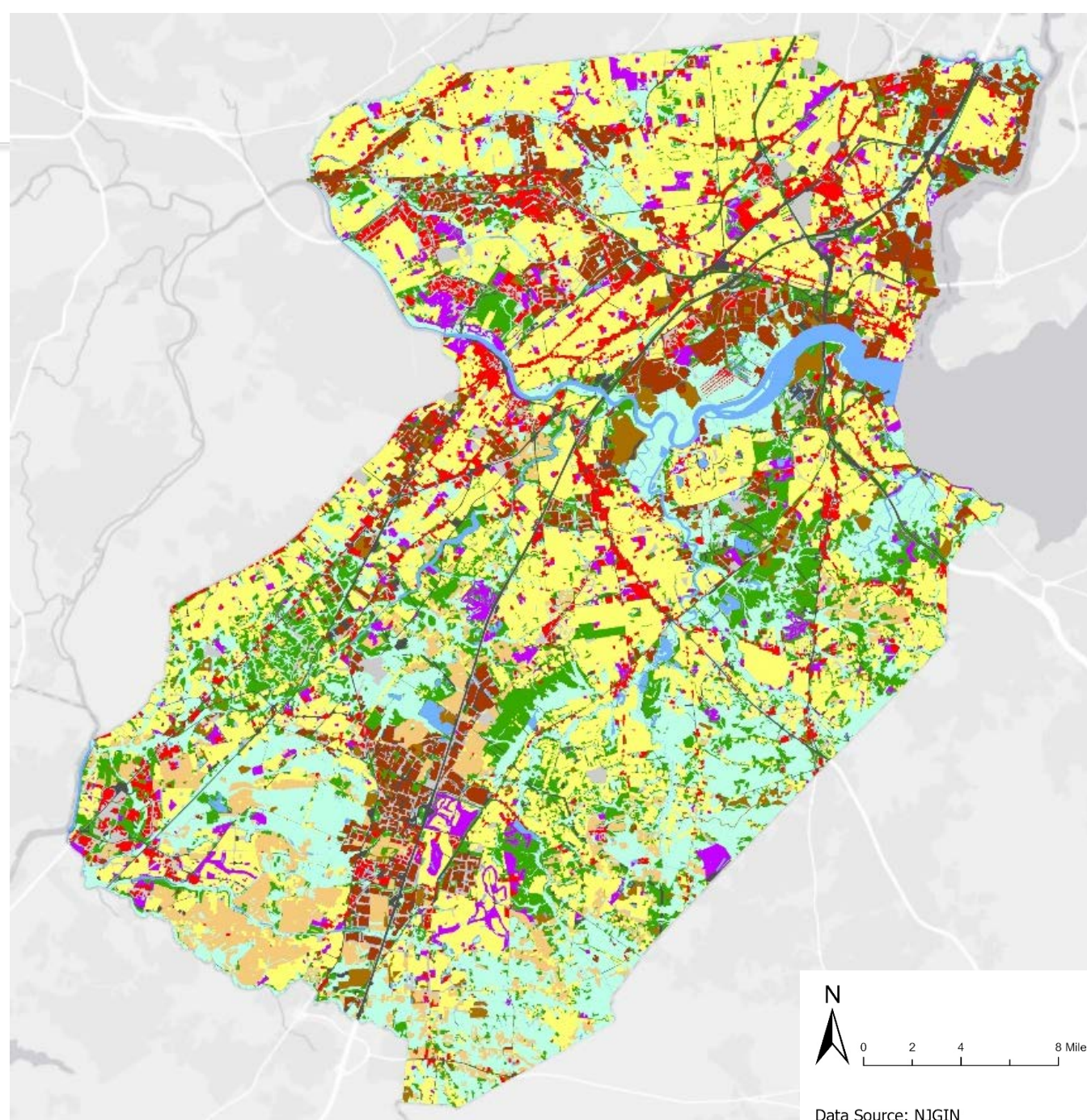
# Urban Land Use

## Urban Land Use

- Residential
- Commercial and Service
- Industrial
- Transportation/Communication/Utilities
- Recreational Land
- Other Urban Land

## Other Land Uses

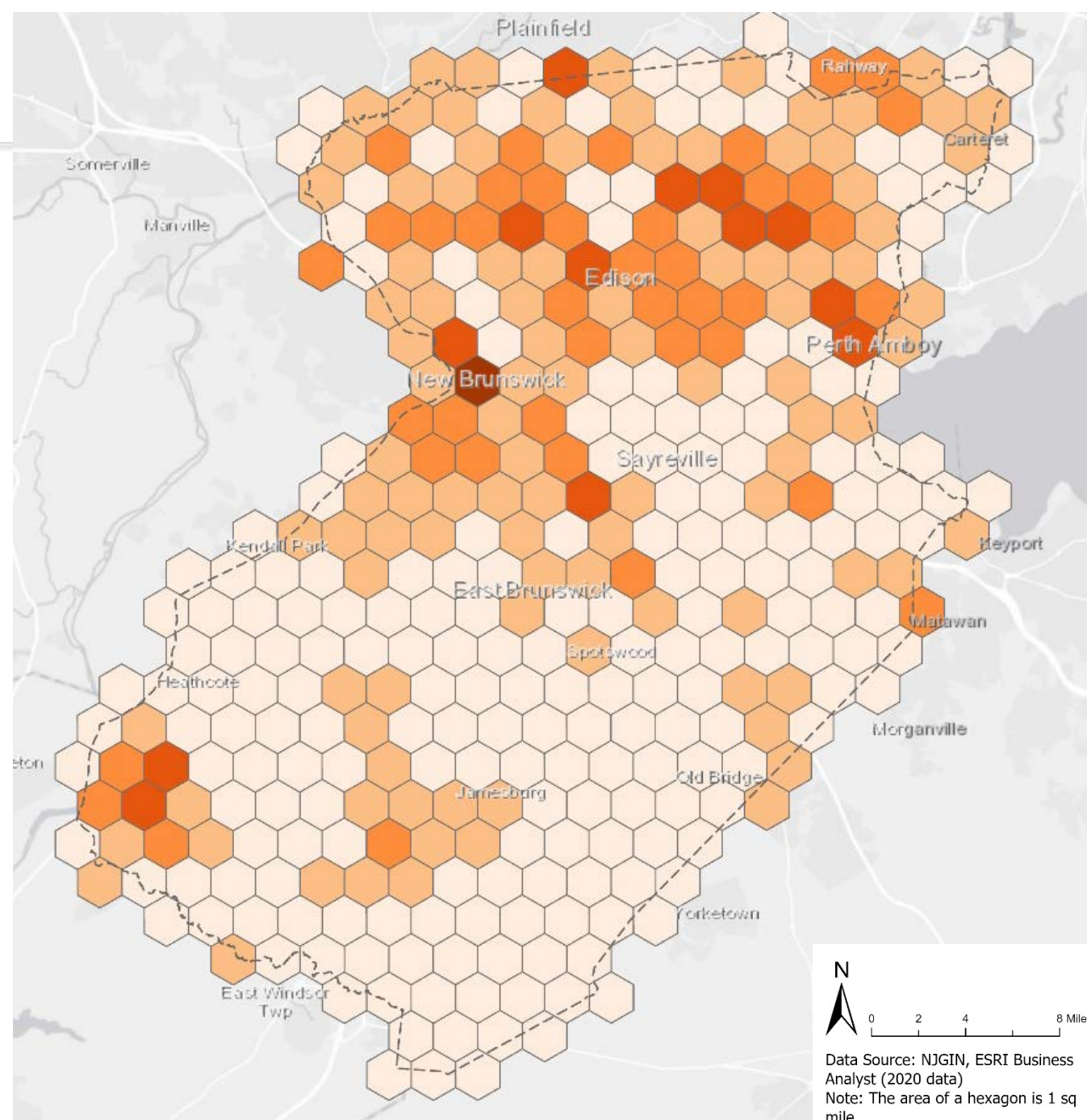
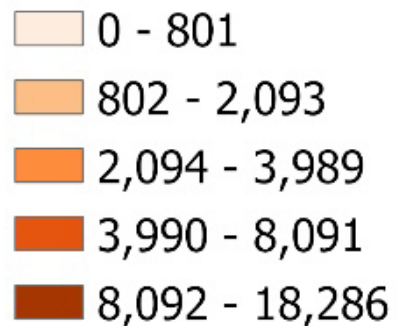
- Agriculture
- Barren Land
- Forest
- Water
- Wetlands



Data Source: NJGIN

# Employment Density

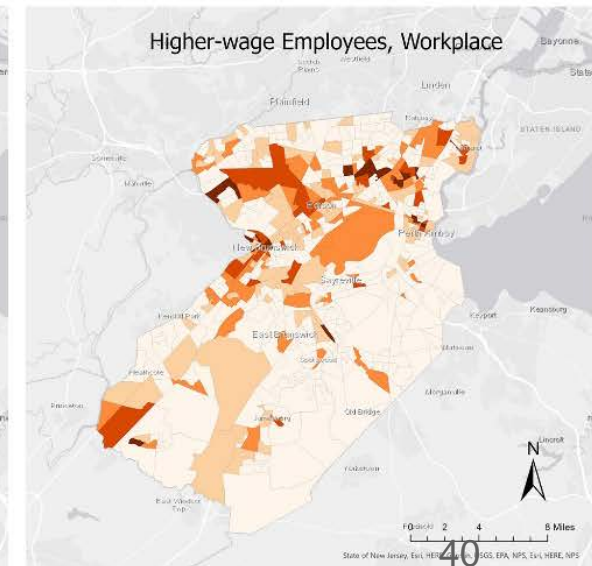
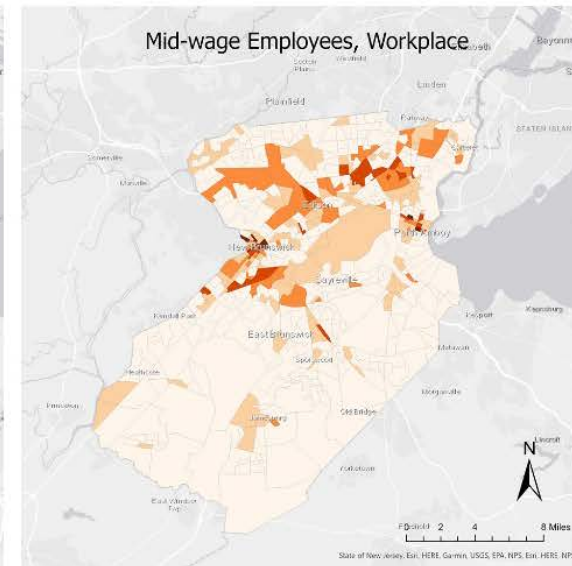
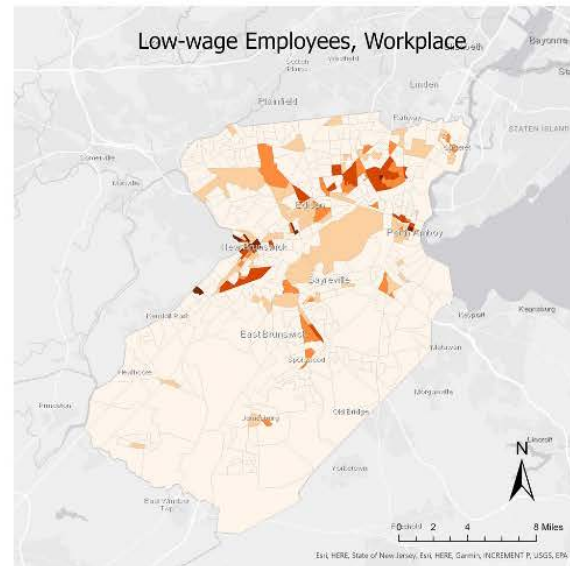
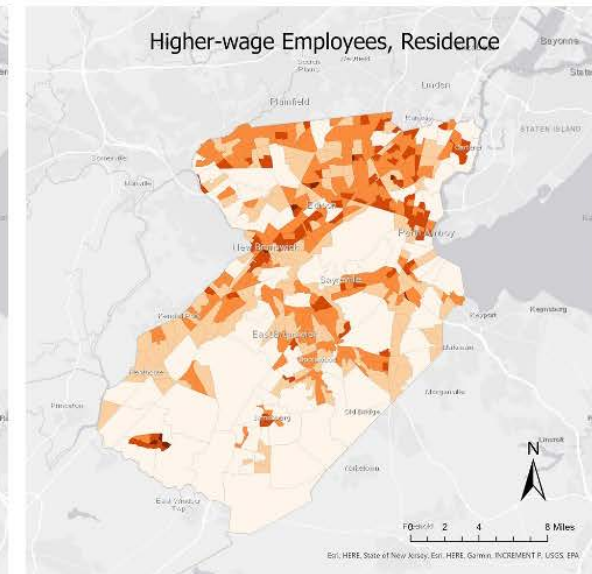
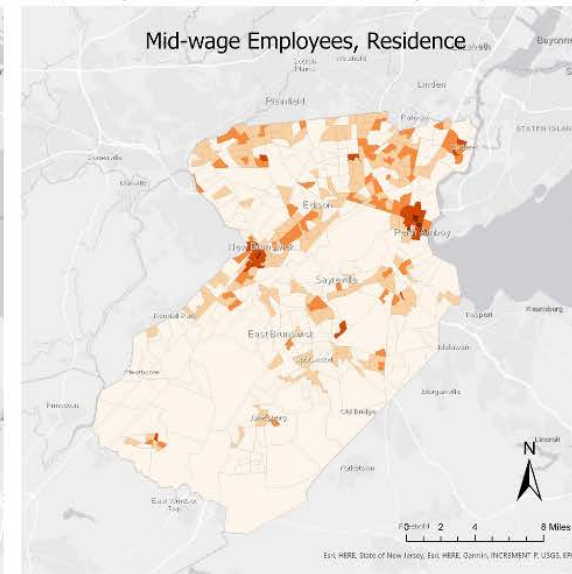
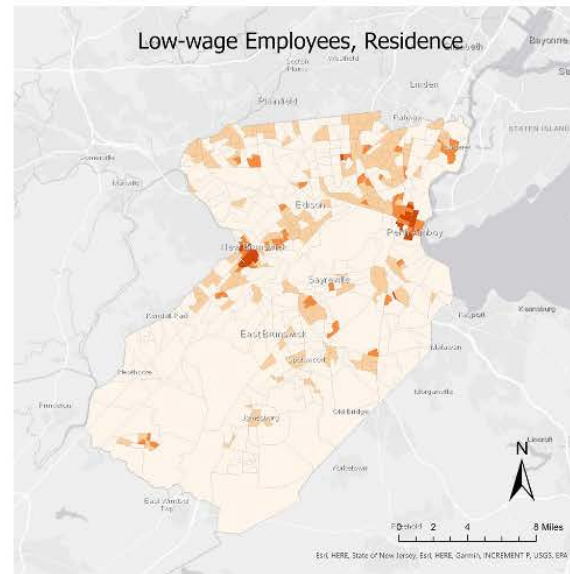
Number of employees per sq mile





# Employment Density by Wage

Number of employees per sq. mile by wage category by place of residence and place of work



Data source: NJGIN, Longitudinal Employer-Household Dynamics (LEHD)  
2014-2018 5-year estimate

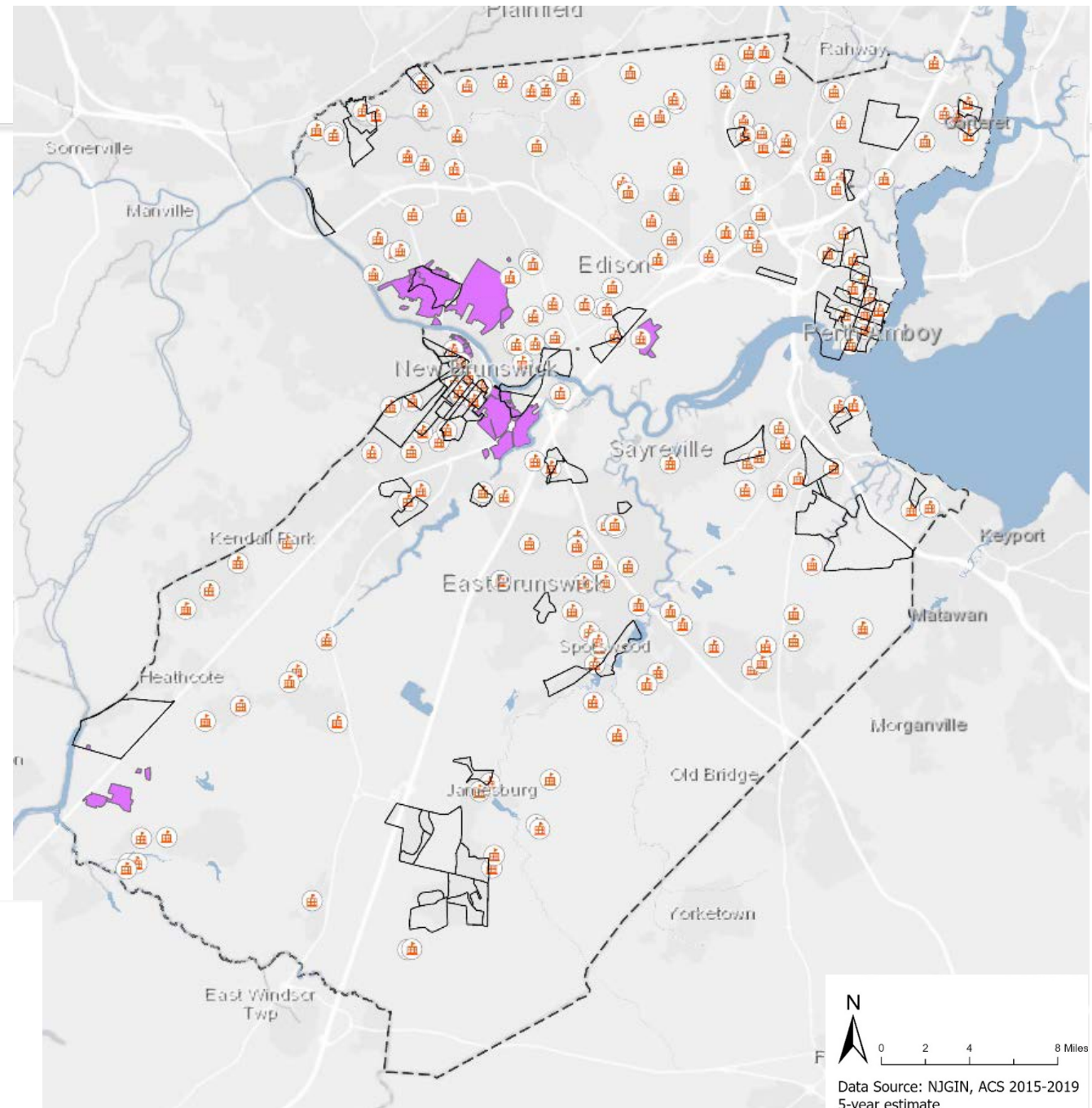
Note: low-wage: earnings \$1250/month or less; mid-wage: earnings \$1251/month to \$3333/month; higher-wage: earnings greater than \$3333/month

# Education Services

Type 1: Colleges and universities

Type 2: K-12 public schools

- Low income block group
- College and university
- K-12 public school






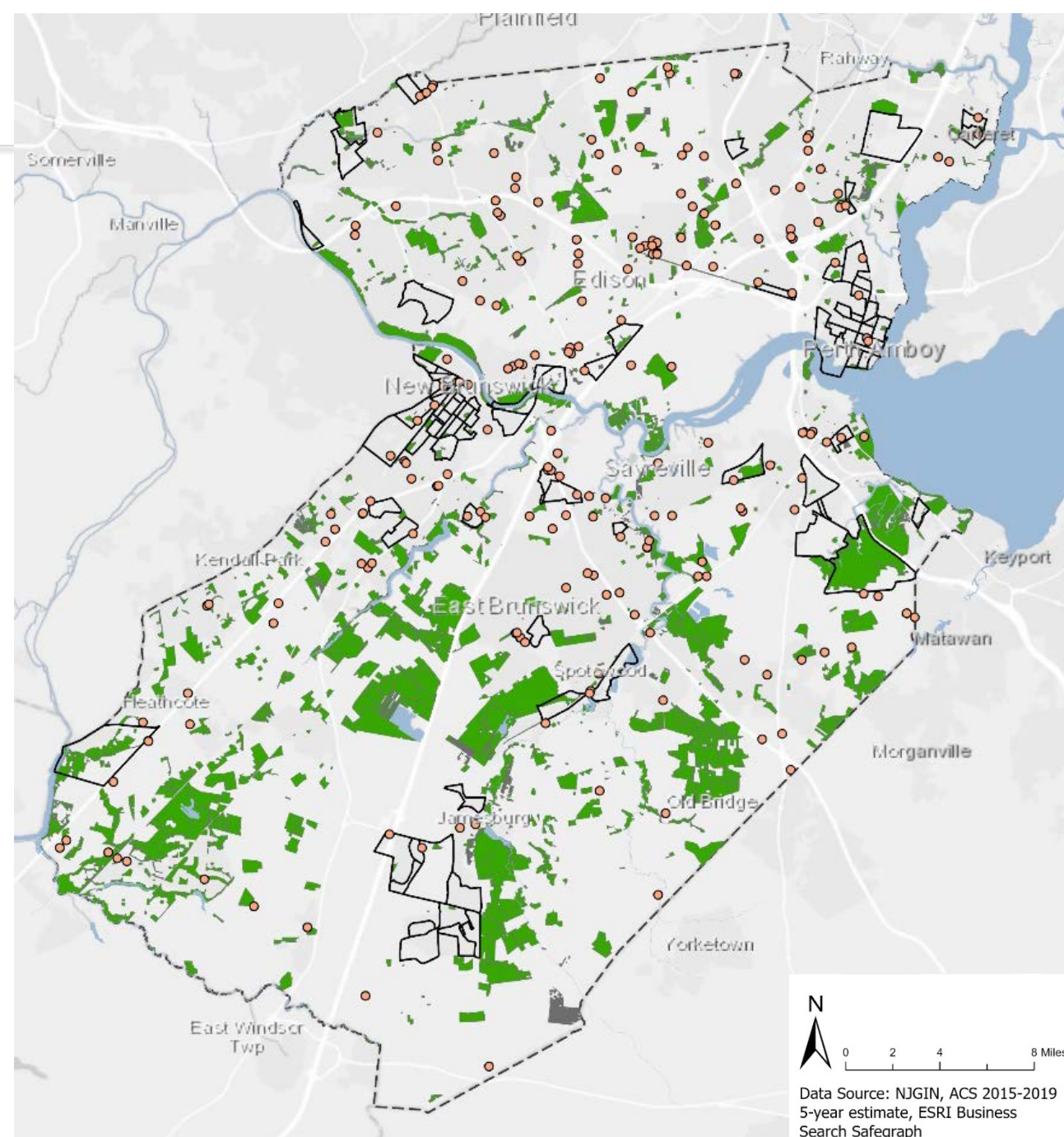


# Recreation

Type 1: State, local and nonprofit Open Space

Type 2: Fitness centers




-  Low income block group
-  State, local and nonprofit open space
-  Fitness center

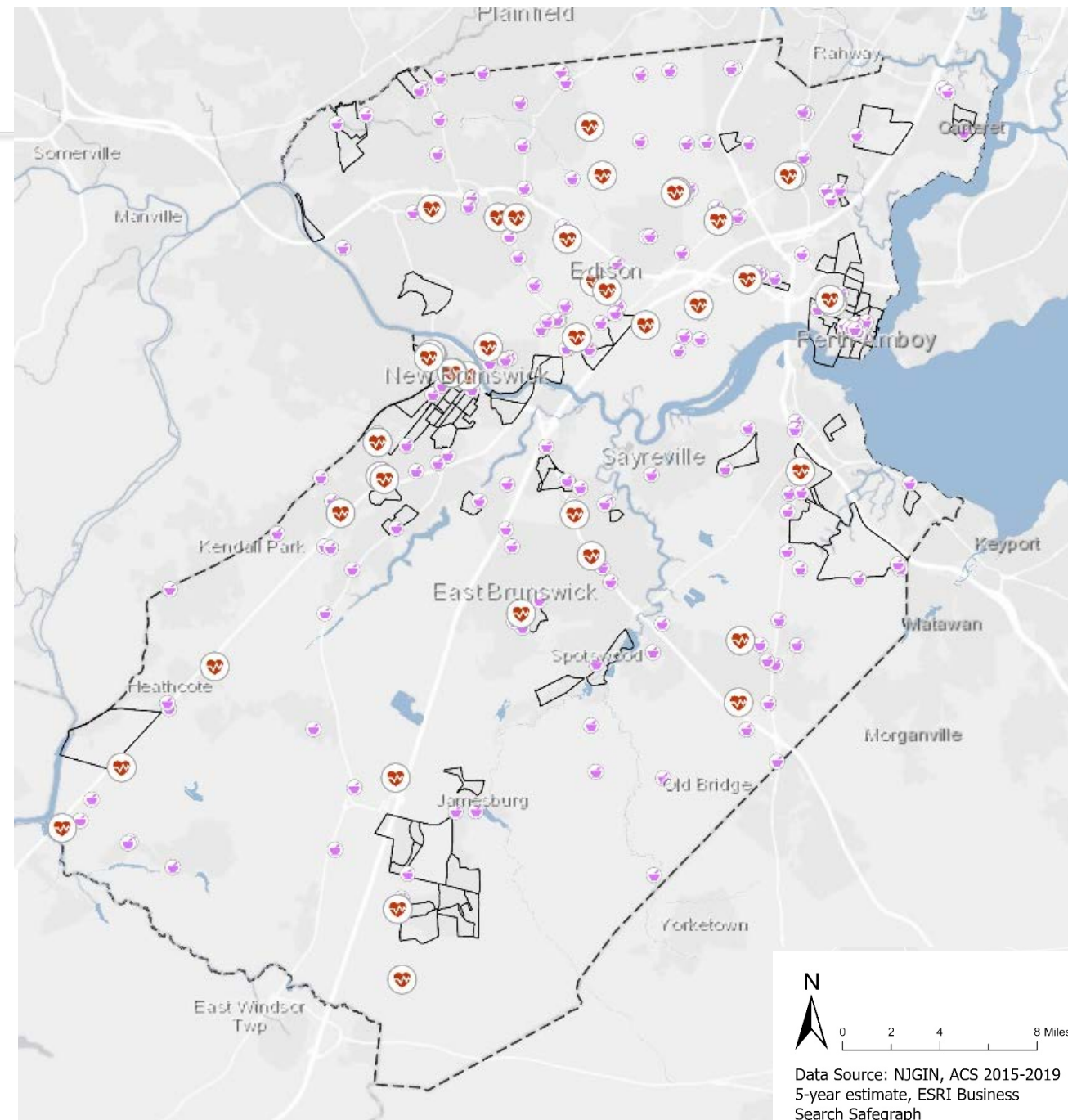


# Medical Services

Type 1: Hospitals and emergency centers

Type 2: Pharmacies

-  Low income block group
-  Hospital and emergency center
-  Pharmacy and drug store










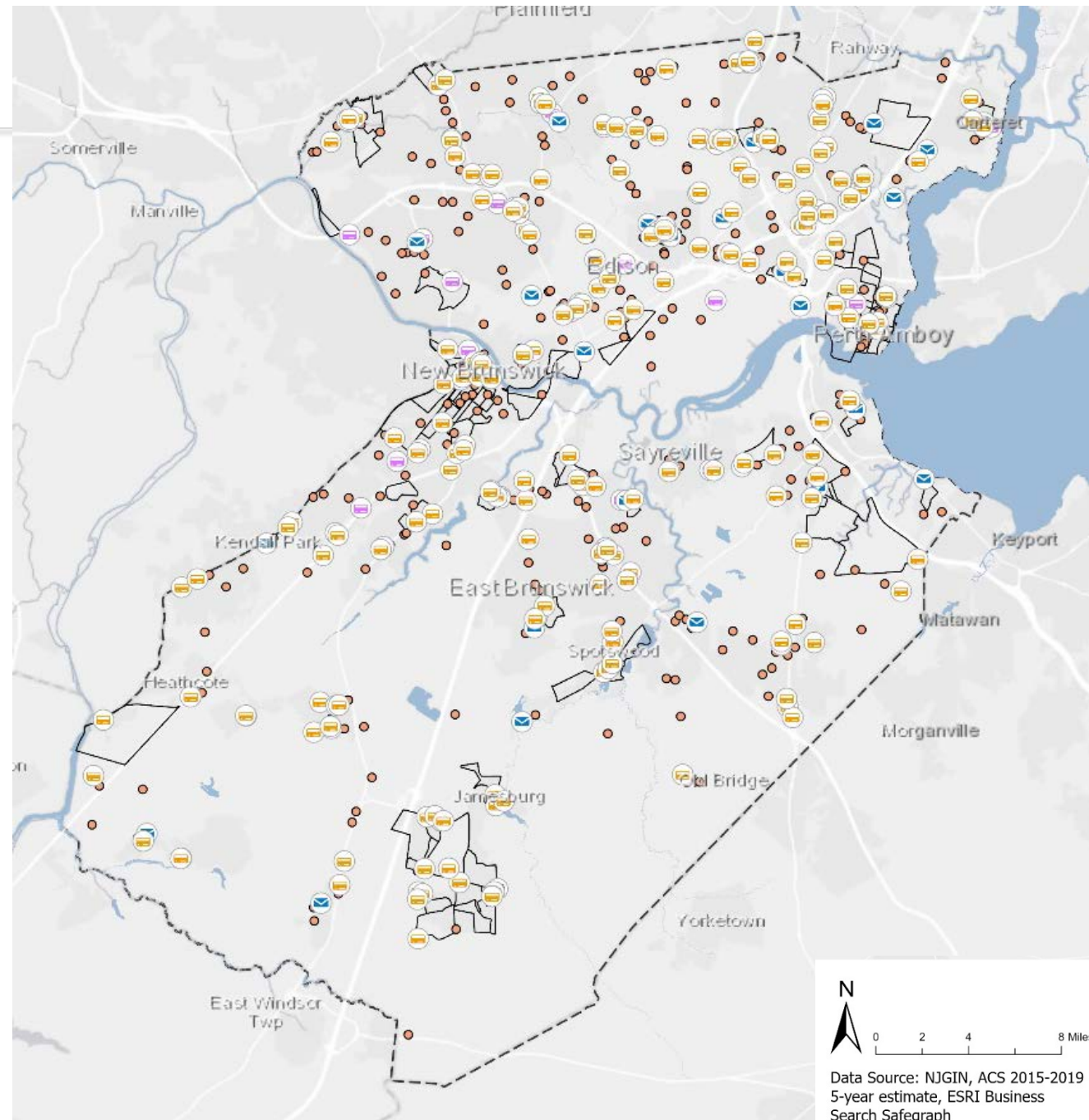
# Other Essential Services

Type 1: Commercial Banks  
and Credit Unions

Type 2: Postal Services

Type 3: Childcare Centers

-  Low income block group
-  Postal service
-  Commercial banking
-  Credit unions
-  Childcare center







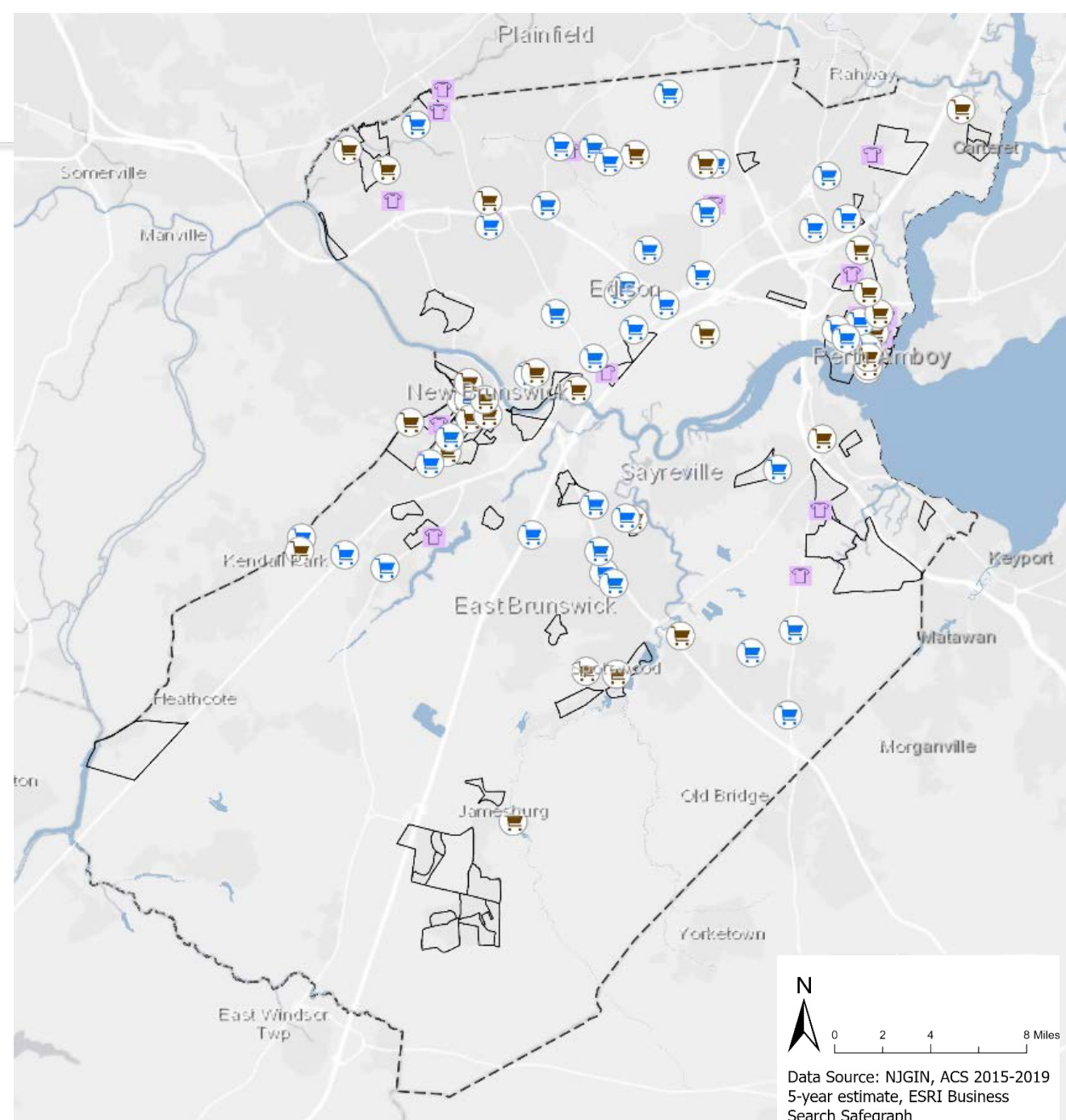
# Commercial Amenities

Type 1: Full-service grocery stores

Type 2: Convenience/Specialty stores

Type 3: Laundromats

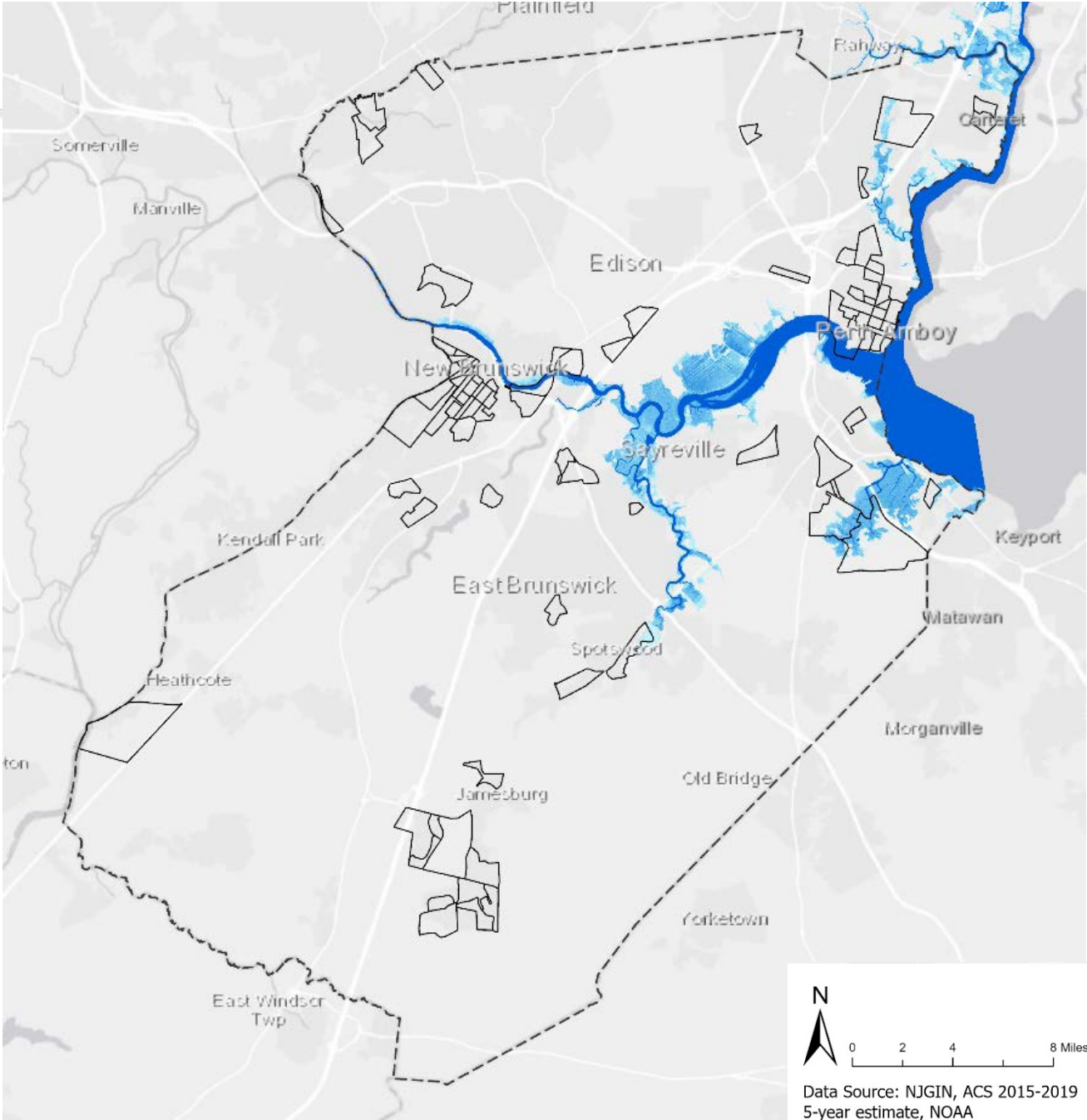
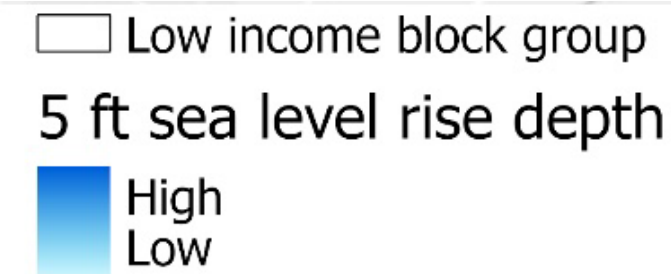
-  Low income block group
-  Convenience/ Specialty Store
-  Full-service Grocery Store
-  Laundromats





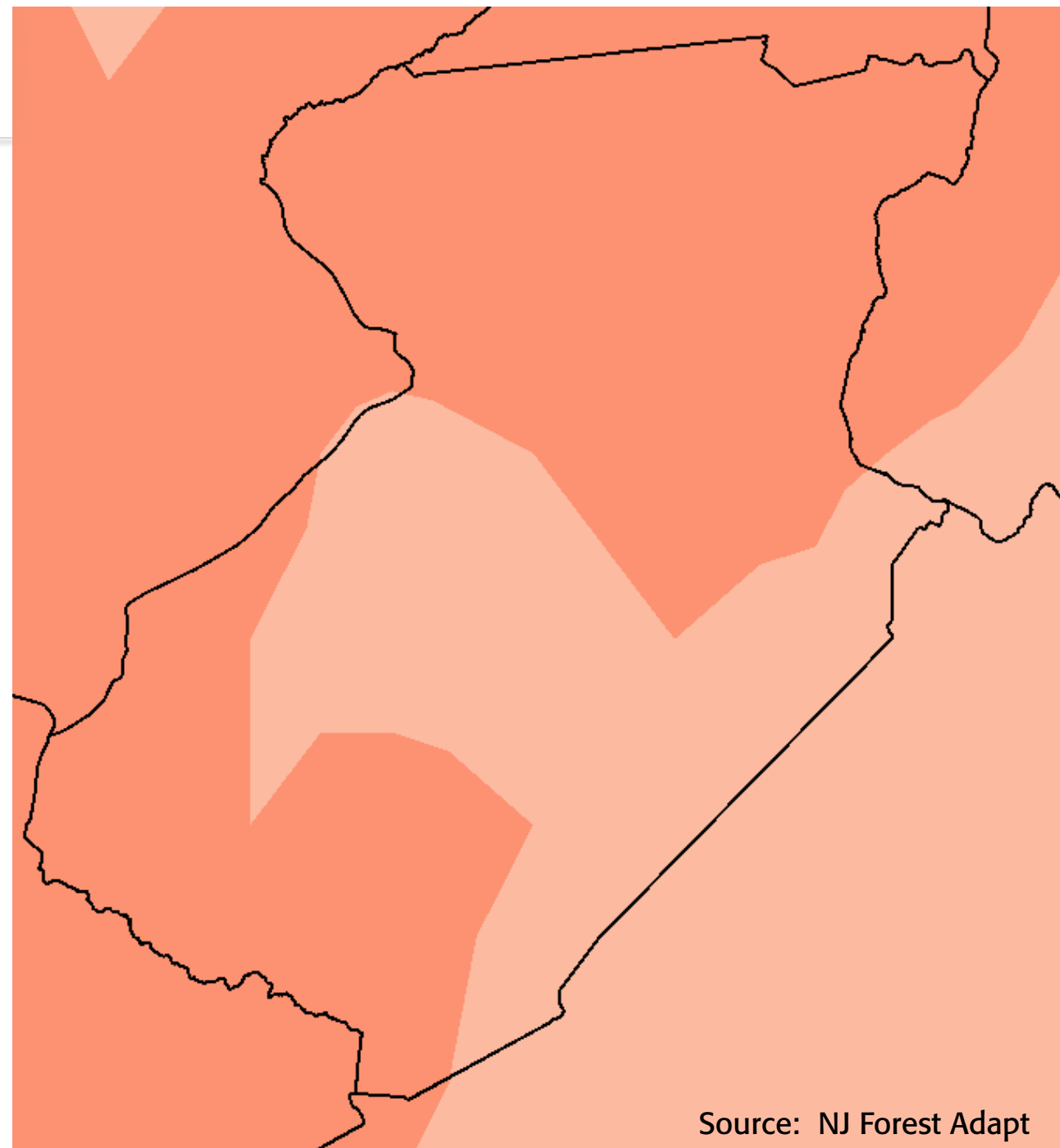
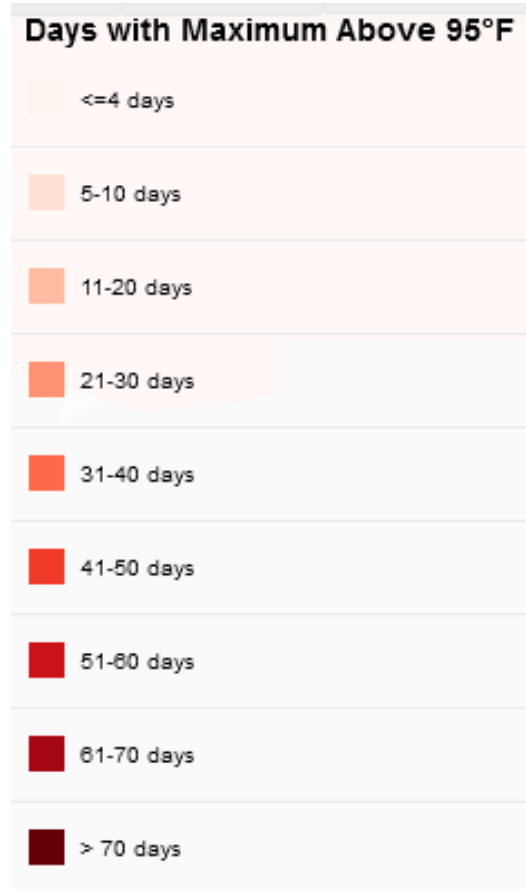
# Climate Vulnerability

## Sea-level rise



# Climate Vulnerability

## Exposure to extreme heat (High-emissions scenario)



---

Healthy, Just and CO2-neutral Mobility for All

# **GEOGRAPHY OF MOBILITY AND CONNECTIONS**

# Road Network

## Type

— Interstate/US/State highway

— County Route

— Local Road

■ Low income block group

Data Source: NJGIN, ESRI base map

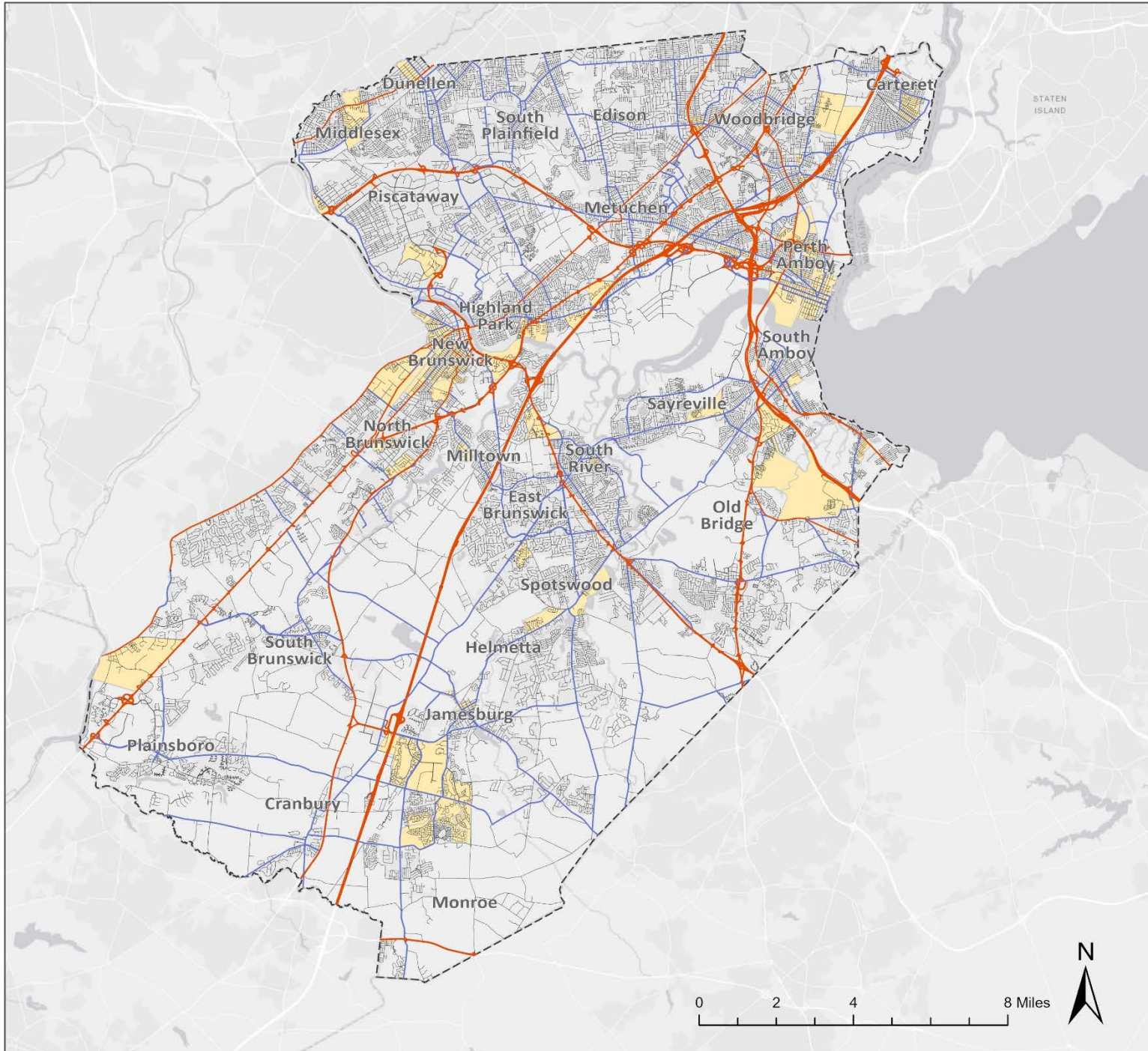
## Planning for Healthy, Just, Resilient, and CO2-Neutral Mobility in New Jersey

Prepared : June 10, 2021  
by Alan M. Voorhees Transportation Center



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# Intersection Density

Number of intersections  
per acre

3 - 39

40 - 79

80 - 127

128 - 198

199 - 436

□ Low income block group

Data Source: NJGIN, ESRI base map, EPA  
National Walkability Index

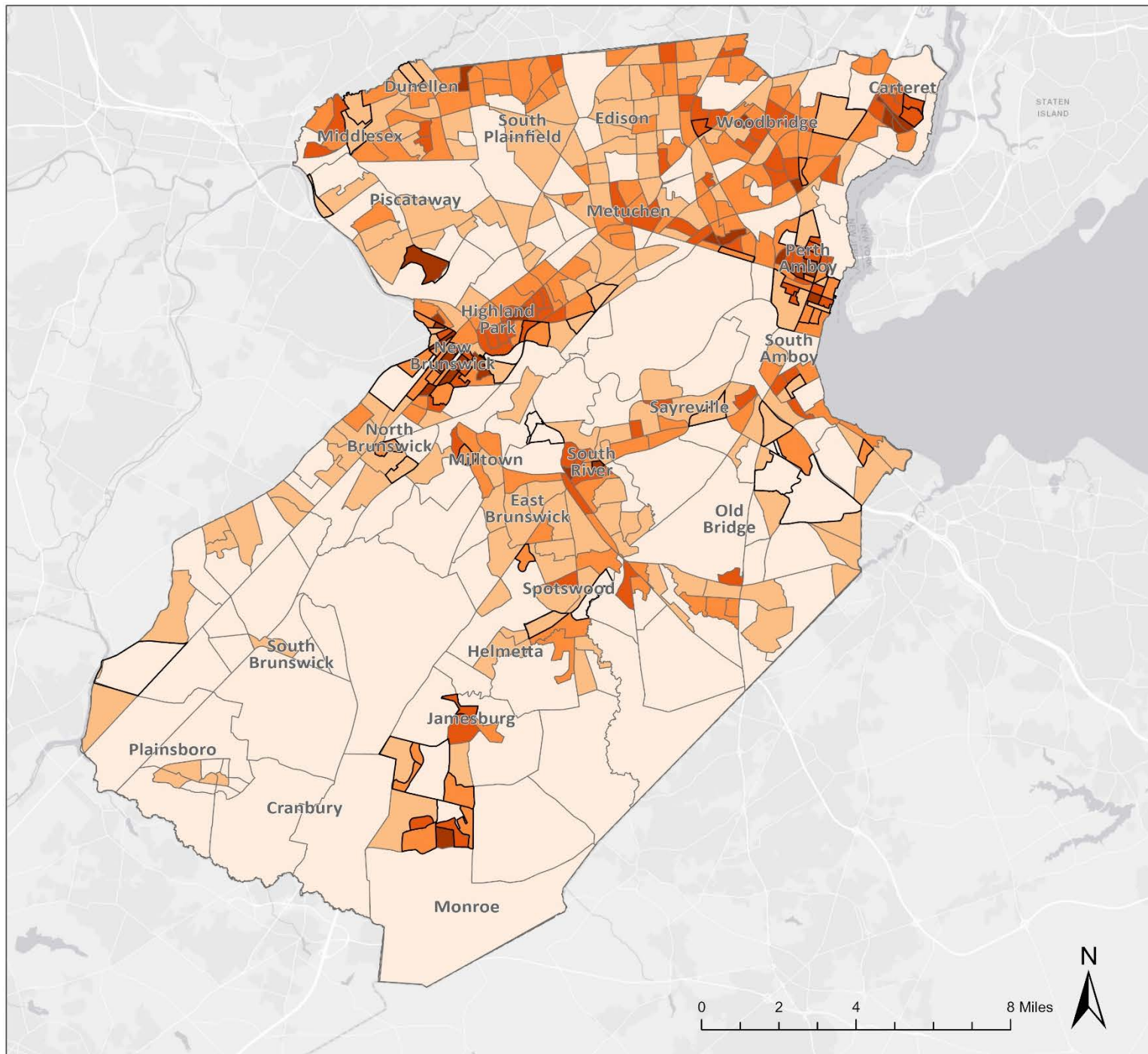
## Planning for Healthy, Just, Resilient, and CO2-Neutral Mobility in New Jersey

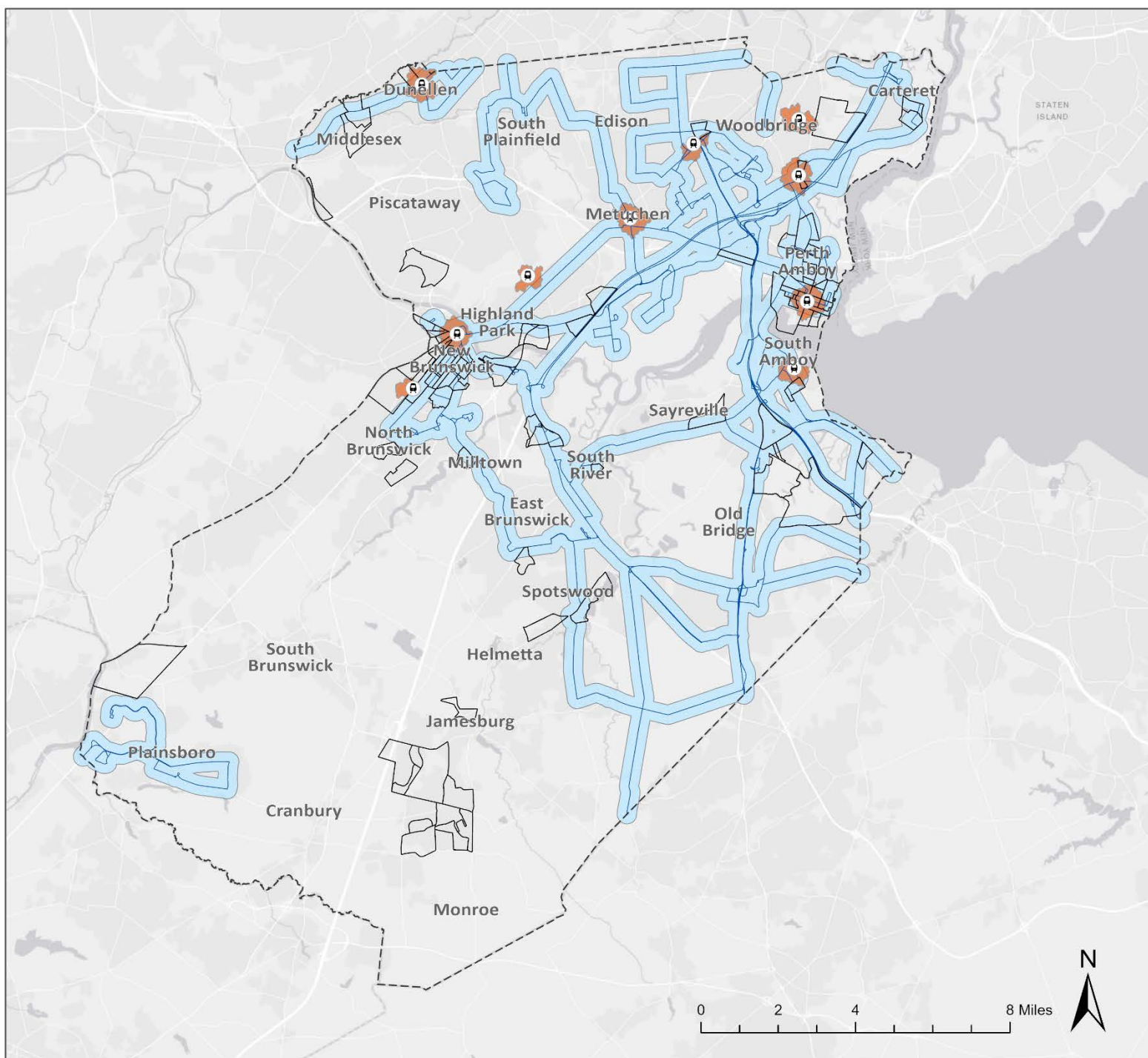
Prepared : June 10, 2021  
by Alan M. Voorhees Transportation Center








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## Transit Service Area

-  Rail station
-  Rail Station Service Area
-  Bus service area
-  Bus route
-  Low income block group

Data Source: NJGIN, ESRI base map, NJT Transit GTFS data

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# Bus Stop Density

number of bus stops per  
sq mile

0 - 3

4 - 11

12 - 24

25 - 46

47 - 90

Data Source: NJGIN, ESRI base map

## Planning for Healthy, Just, Resilient, and CO<sub>2</sub>-Neutral Mobility in New Jersey

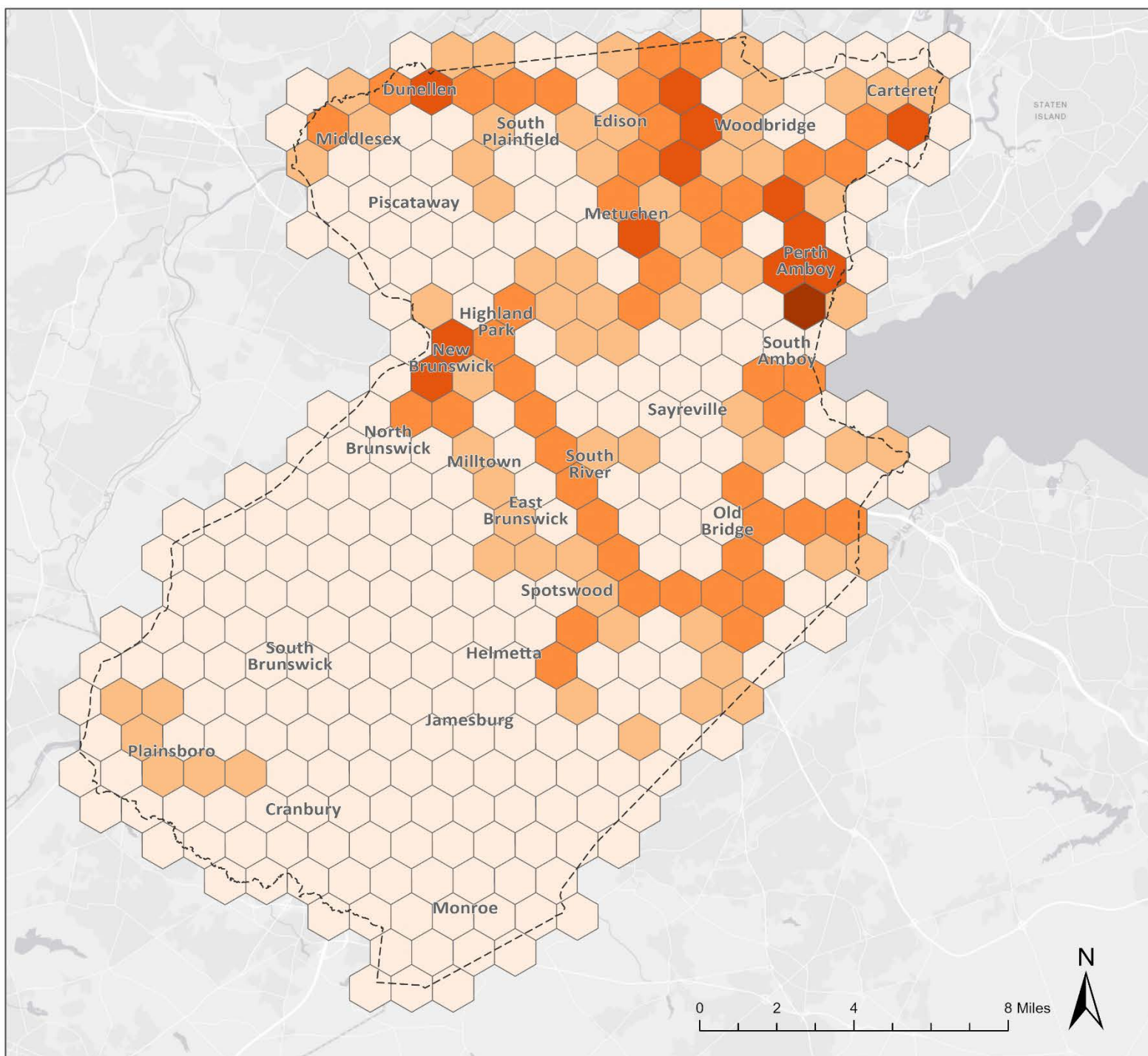
Prepared : June 10, 2021

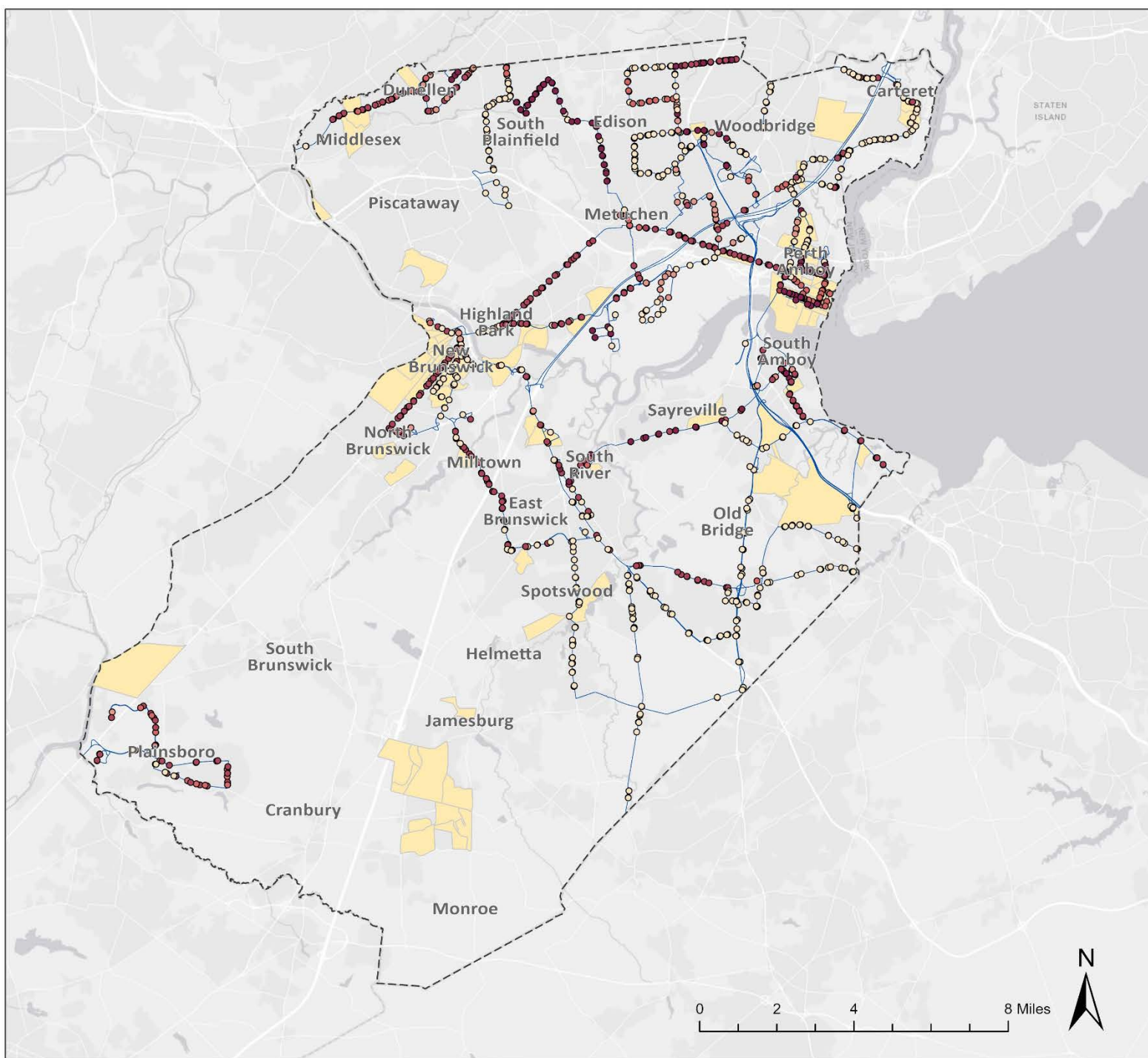
by Alan M. Voorhees Transportation Center



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## Bus Service Frequency

### Max wait time

- 0 - 12 min
- 13 - 41 min
- 42 - 55 min
- 56 - 68 min
- 69 - 119 min

— Bus route

■ Low income block group

Data Source: NJGIN, ESRI base map, NJT Transit GTFS data

### Planning for Healthy, Just, Resilient, and CO<sub>2</sub>-Neutral Mobility in New Jersey

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# Alt. Fueling Station

## Fuel Type

- Biodiesel
- Ethanol
- Electric
- Liquefied Petroleum Gas

Data Source: NJGIN, ESRI base map, US Department of Energy

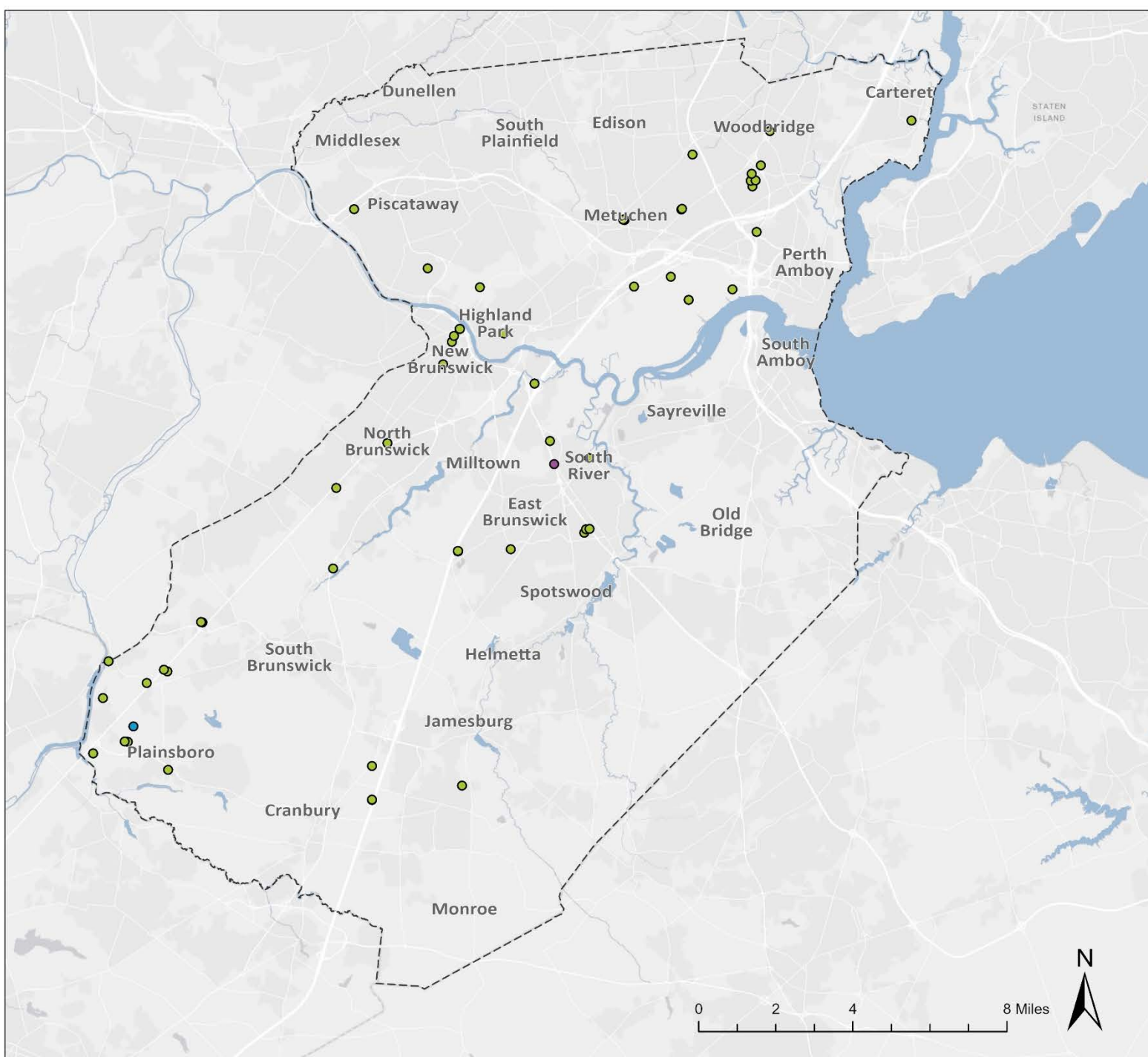
## Planning for Healthy, Just, Resilient, and CO<sub>2</sub>-Neutral Mobility in New Jersey

Prepared : June 10, 2021  
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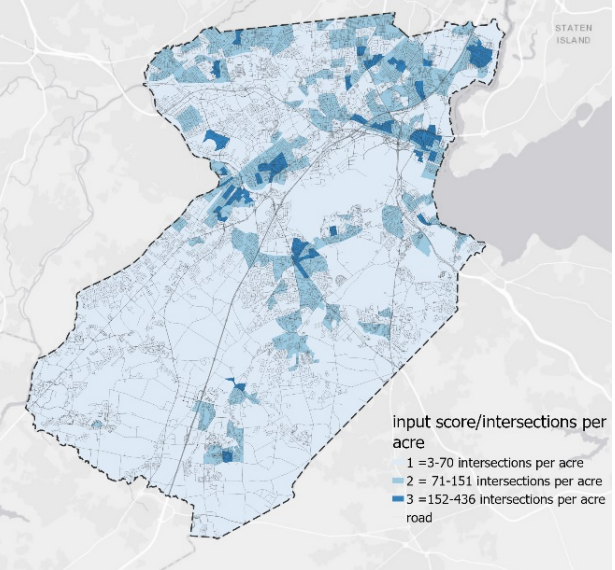
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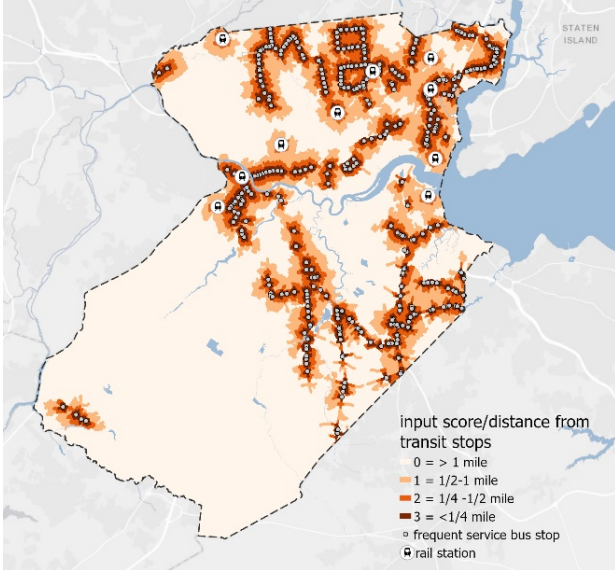


# Measured Accessibility Analysis

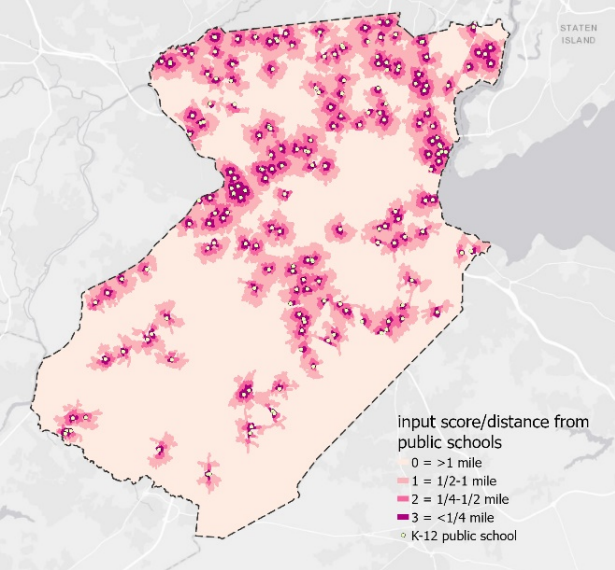
## Connectivity (street intersections)



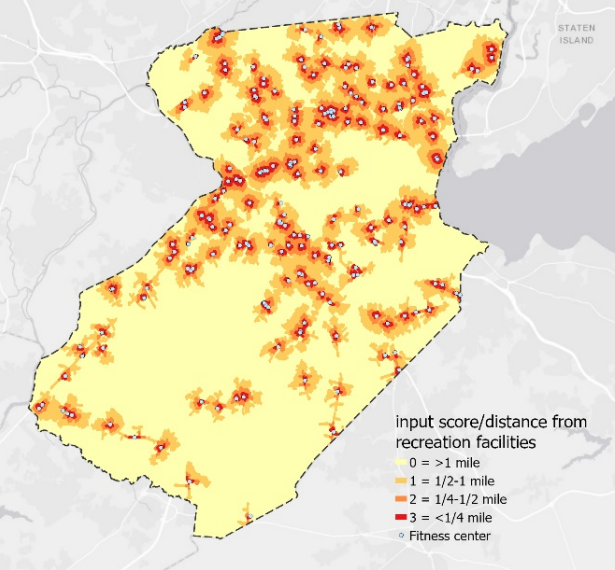
## Frequent Service Transit



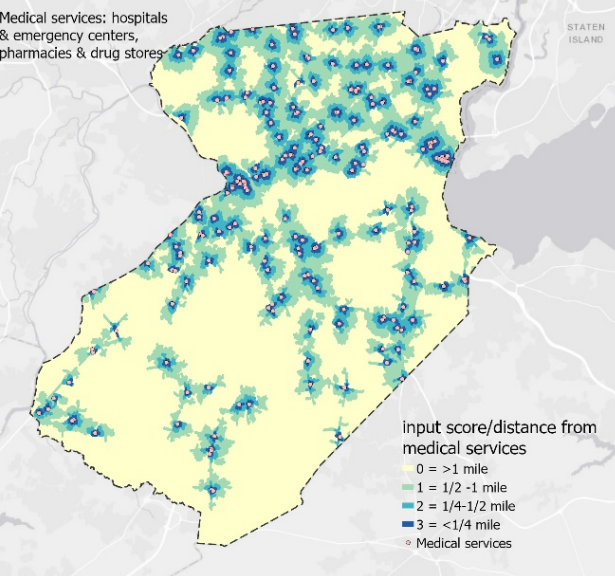
## Public Schools



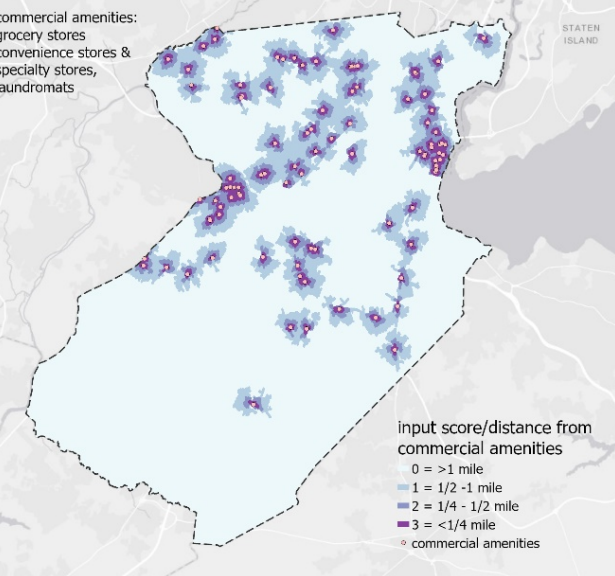
## Recreation Facilities



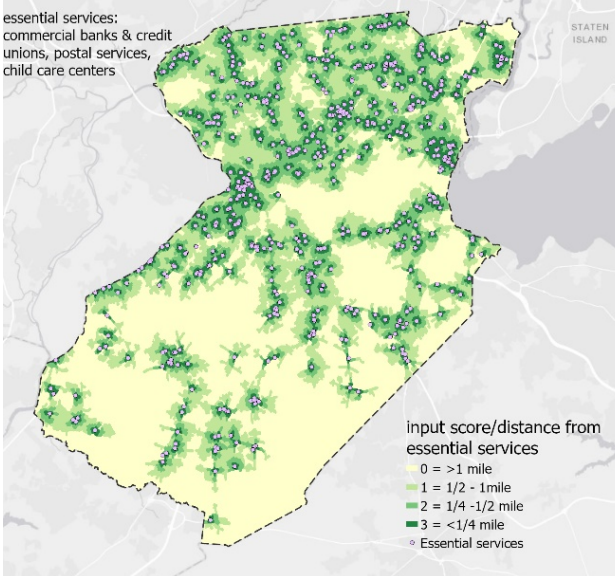
## Medical Services



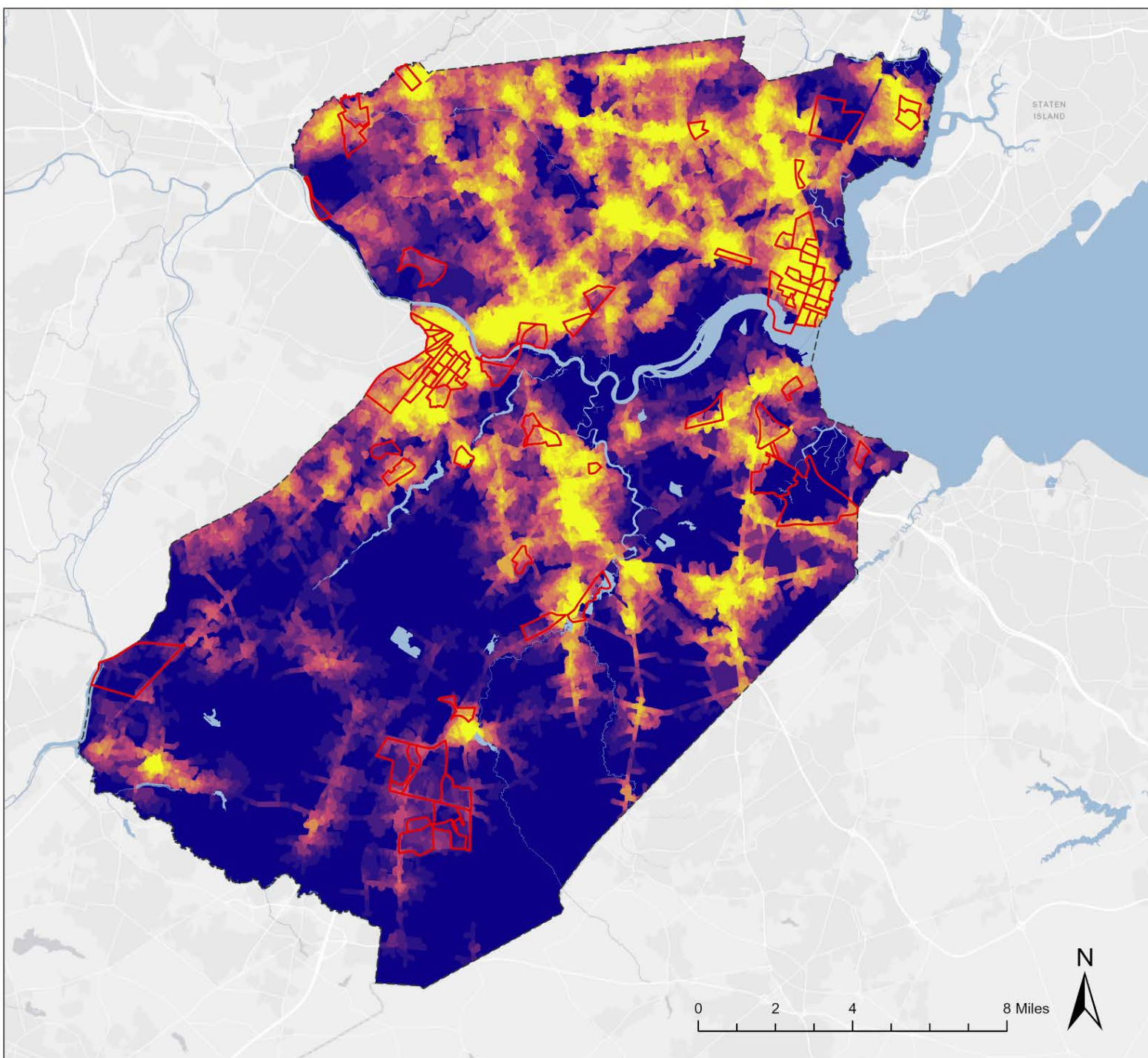
## Commercial Amenities



## Essential Services







## "15-min." Accessibility

### Accessibility

- Best access
- Moderate access
- Limited access
- Low income block group

Data Source: NJGIN, ESRI base map, ESRI Business Analyst, NJ Transit GTFS data

### Planning for Healthy, Just, Resilient, and CO<sub>2</sub>-Neutral Mobility in New Jersey

Prepared : June 10, 2021  
by Alan M. Voorhees Transportation Center



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# Next Steps – By Mid-August

- Finalize concept paper
  - Annotated bibliography complete
- Complete Phase 1 case-study reports
  - Summary narrative
  - Map atlas
  - Preliminary observations, issues, concerns
- Plan Issues Forum #1
  - Convene an event planning committee with representatives from case-study counties and equity partners





# Issues Forum #1

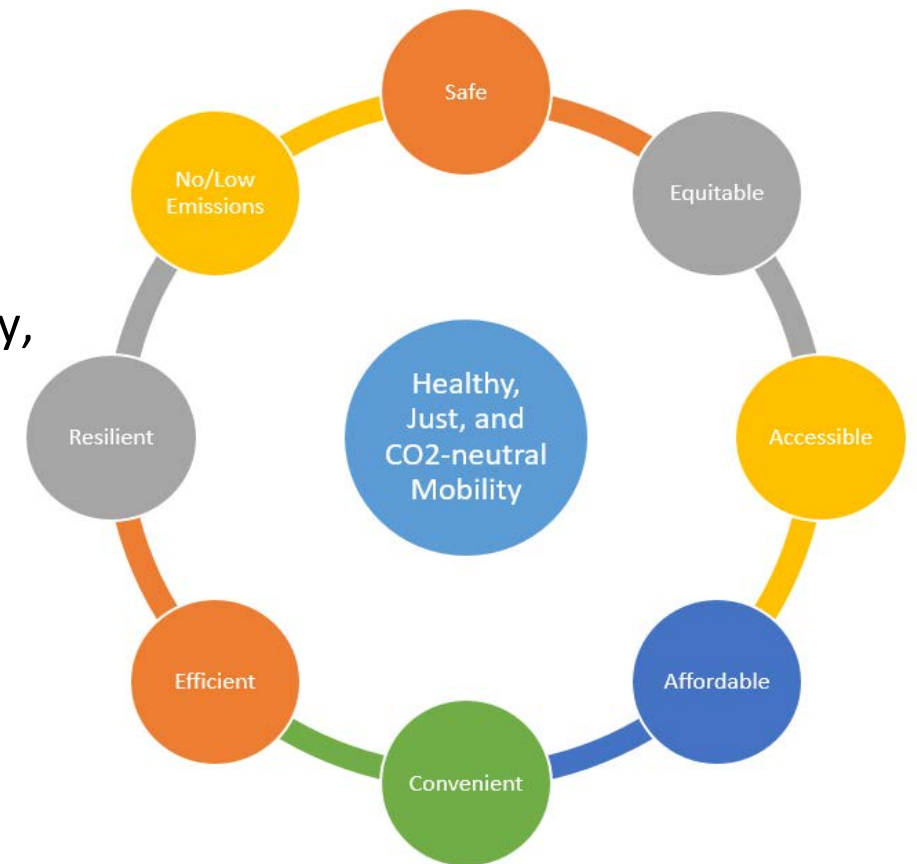
- **Objectives**

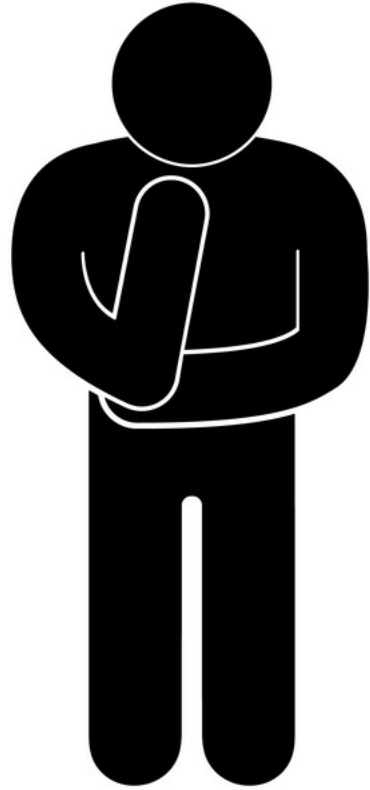
- Explore the components of the multi-goal framework
- Identify
  - Needs, concerns, and desired long-term outcomes
  - Performance measures
  - What needs to change
  - Potential obstacles and impediments to achieving healthy, just, resilient, and carbon-neutral mobility for all

- **Format**

- Plenary + breakouts
- Virtual or in-person depending on conditions

- **Timing** – Sept-Oct 2021





Thoughts?  
Questions?  
Discussion?