

Appendix A

Health Opportunity Index (HOI)

Indicators

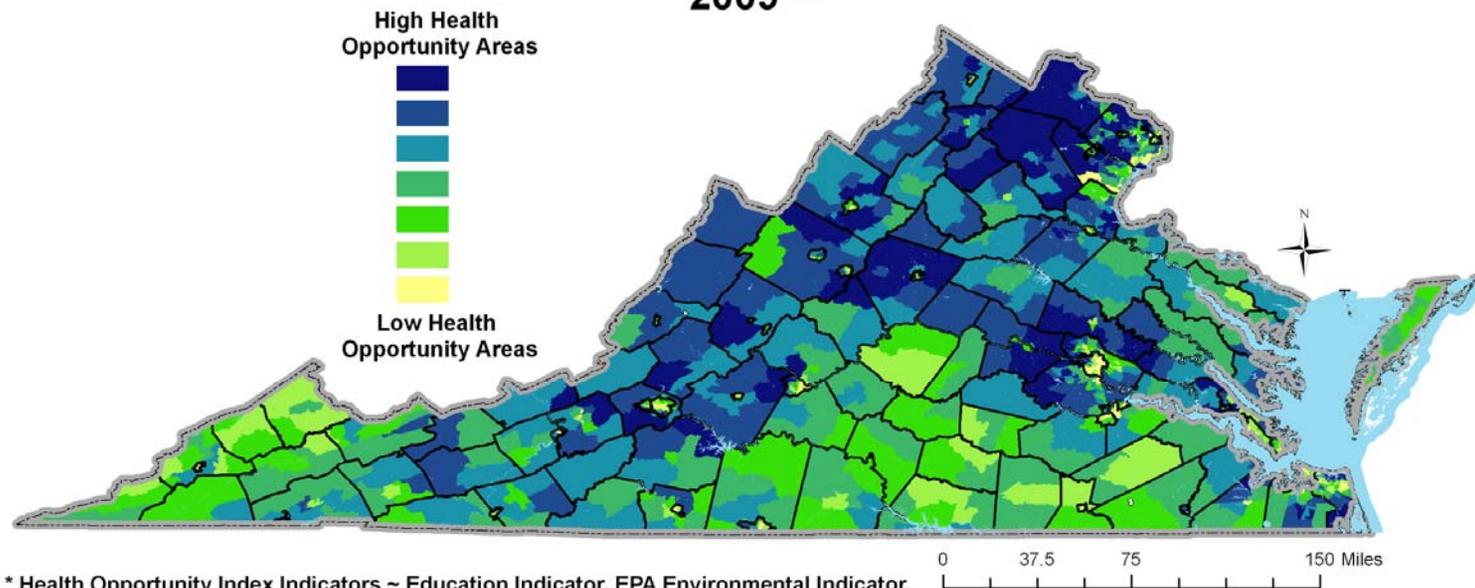
The Health Opportunity Index is a multi-dimensional measure that gives a true picture of the presence of healthy promoting opportunity and the need for policies to create opportunities that are currently absent. The HOI is computed to assess the health landscape of an area been studied. These indicators were analyzed using Principal Component Analysis (PCA) to identify factors that explain the pattern of correlation with the variables. **The darker color areas are indicated to have high health opportunity while, the yellow color areas have low health opportunity.**

Virginia

Health Opportunity Index (HOI) *

By Census Tracts

2009 **



* Health Opportunity Index Indicators ~ Education Indicator, EPA Environmental Indicator, Affordability Indicator, Townsend Material Deprivation Indicator, Job Participation Indicator, Population Churning Indicator, Local Commute of Workers Indicator, Racial Diversity Indicator, Population density Indicator & Household Income Indicator

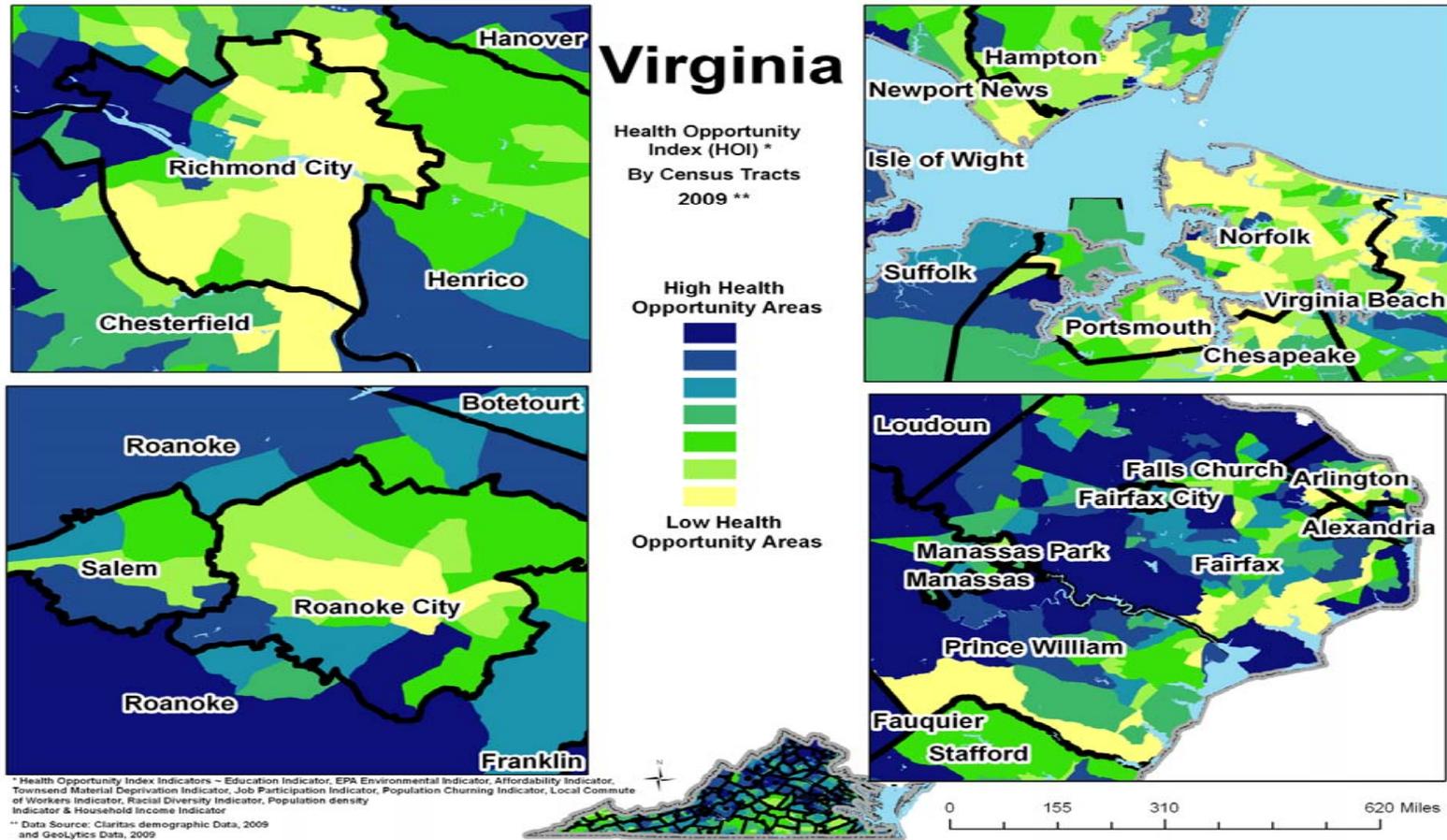
** Data Source: Claritas demographic Data, 2009 and GeoLytics Data, 2009

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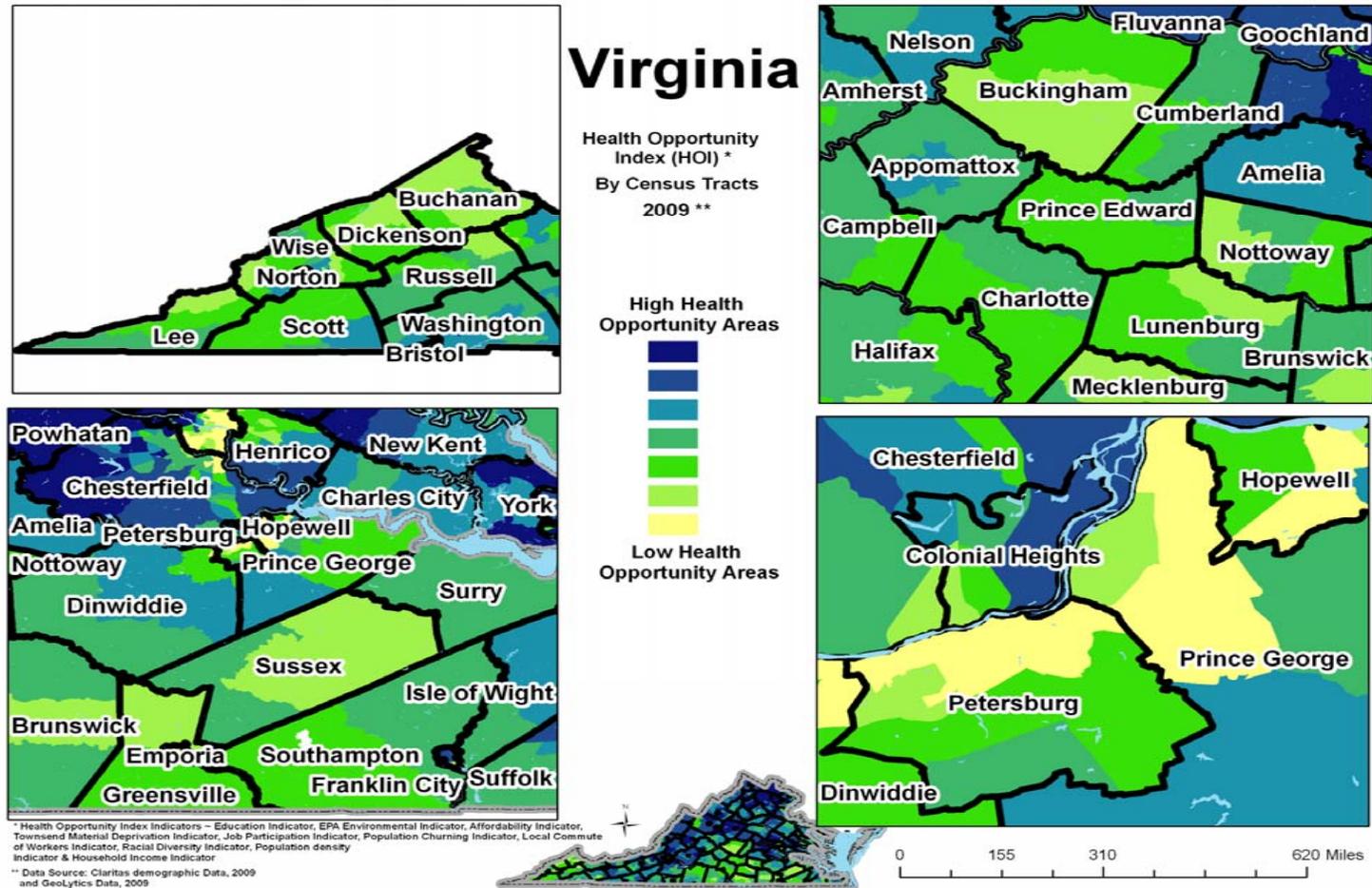


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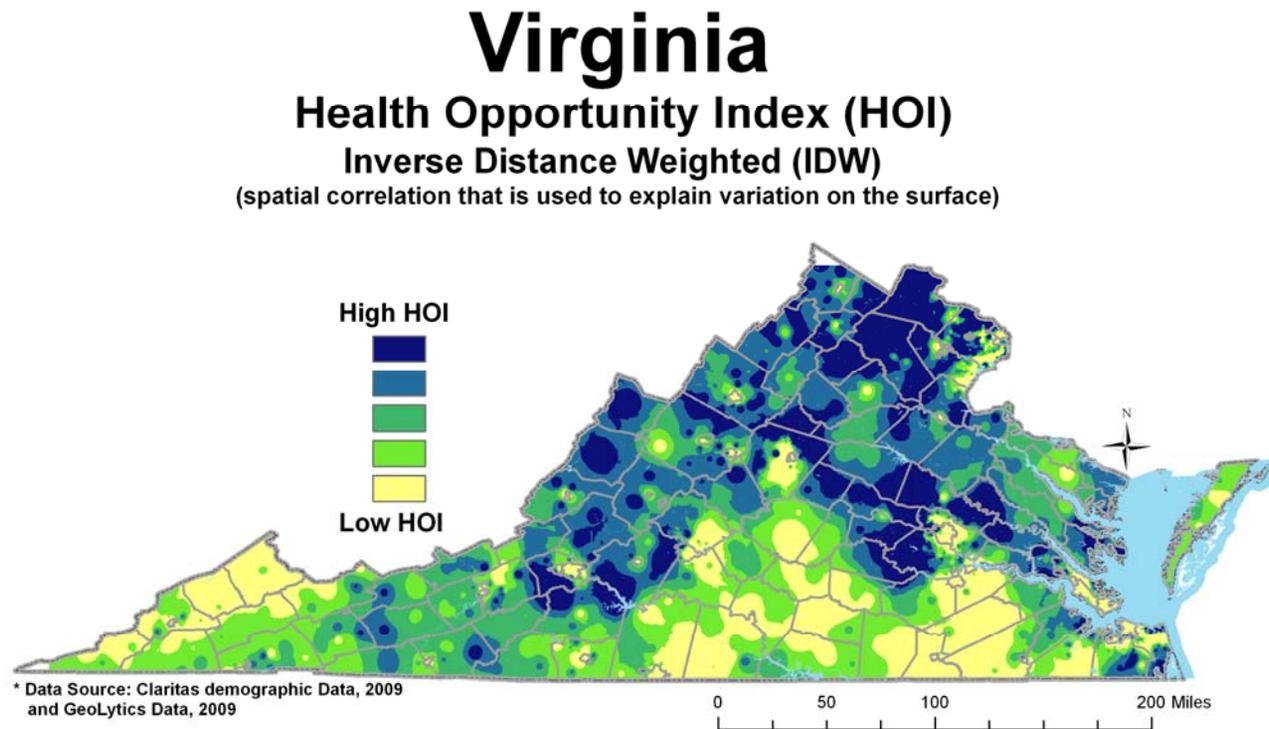


The inverse distance weighted techniques helps to smooth out the surface and shows the directionality of the HOI. The assumption is that, closer things are more related than distanced things (spatial dependency).

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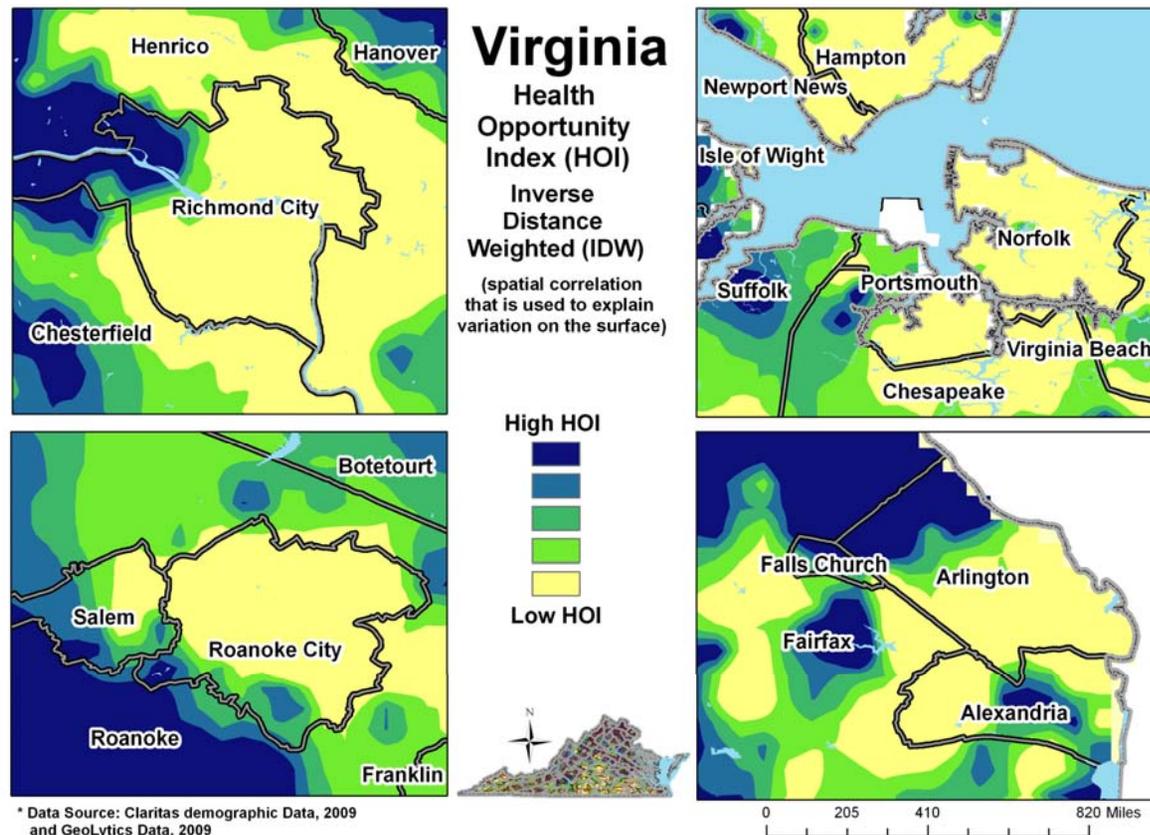
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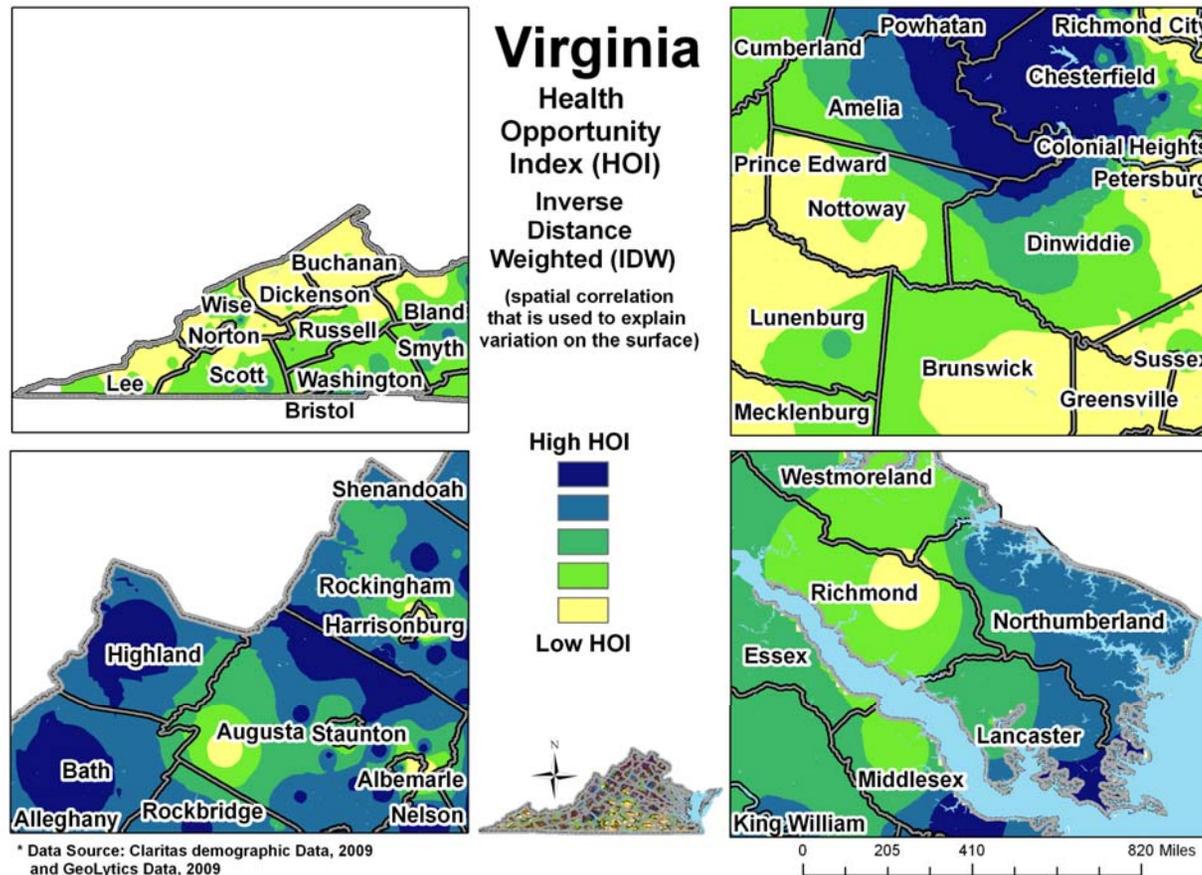
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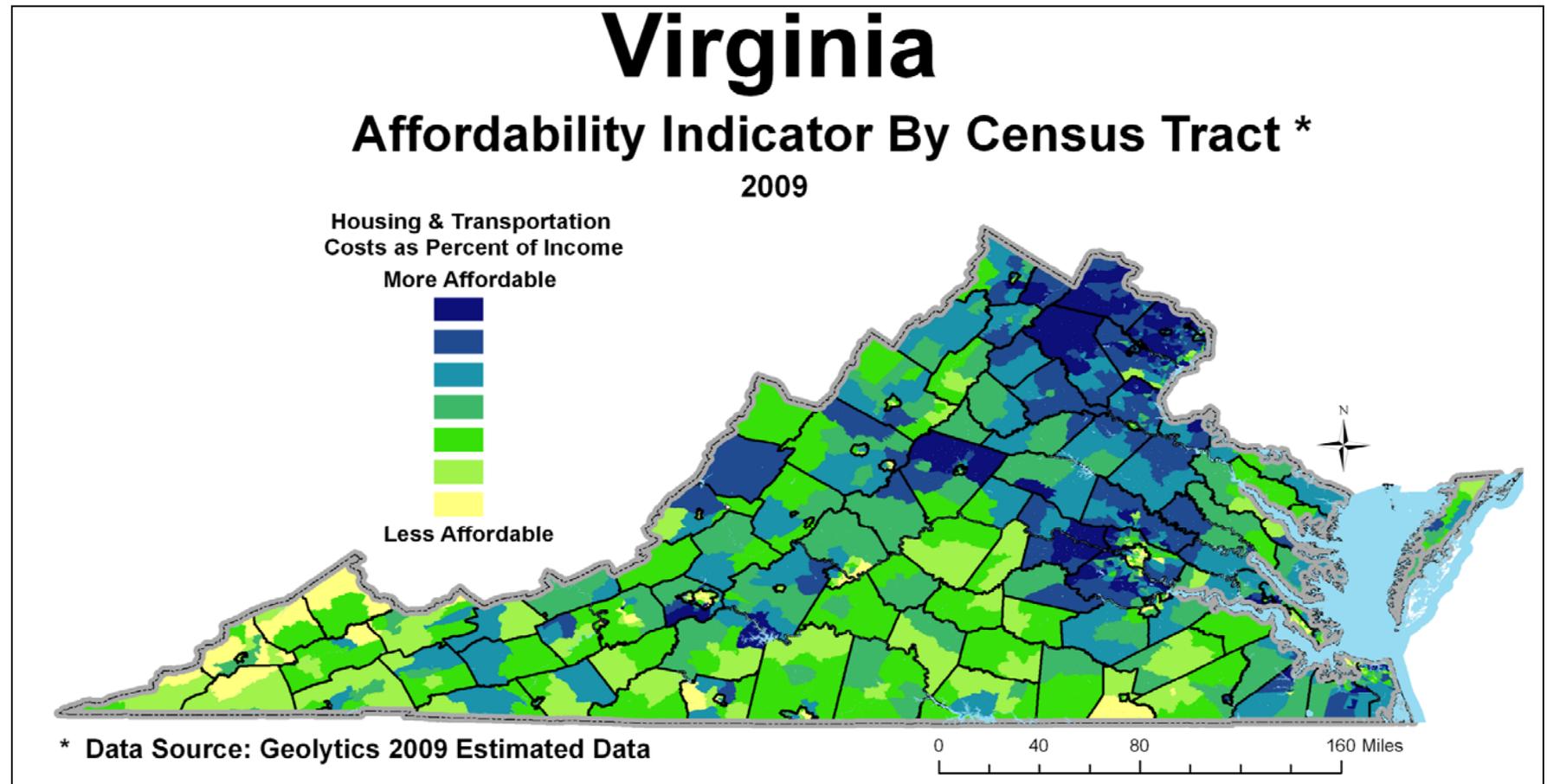


Indicator: *Affordability*

The indicator of affordability is calculated by combining housing and transportation costs in a neighborhood and dividing that number by income. The indicator shows that housing and transportation costs vary significantly across Virginia. Affordability indicator is composed of three variables. (1). Housing cost, (2) transportation cost and (3) total income. ***The indicator measures housing and transportation as a percent of the total income and so the higher the index, the higher the percent of income spent on housing and transportation.***

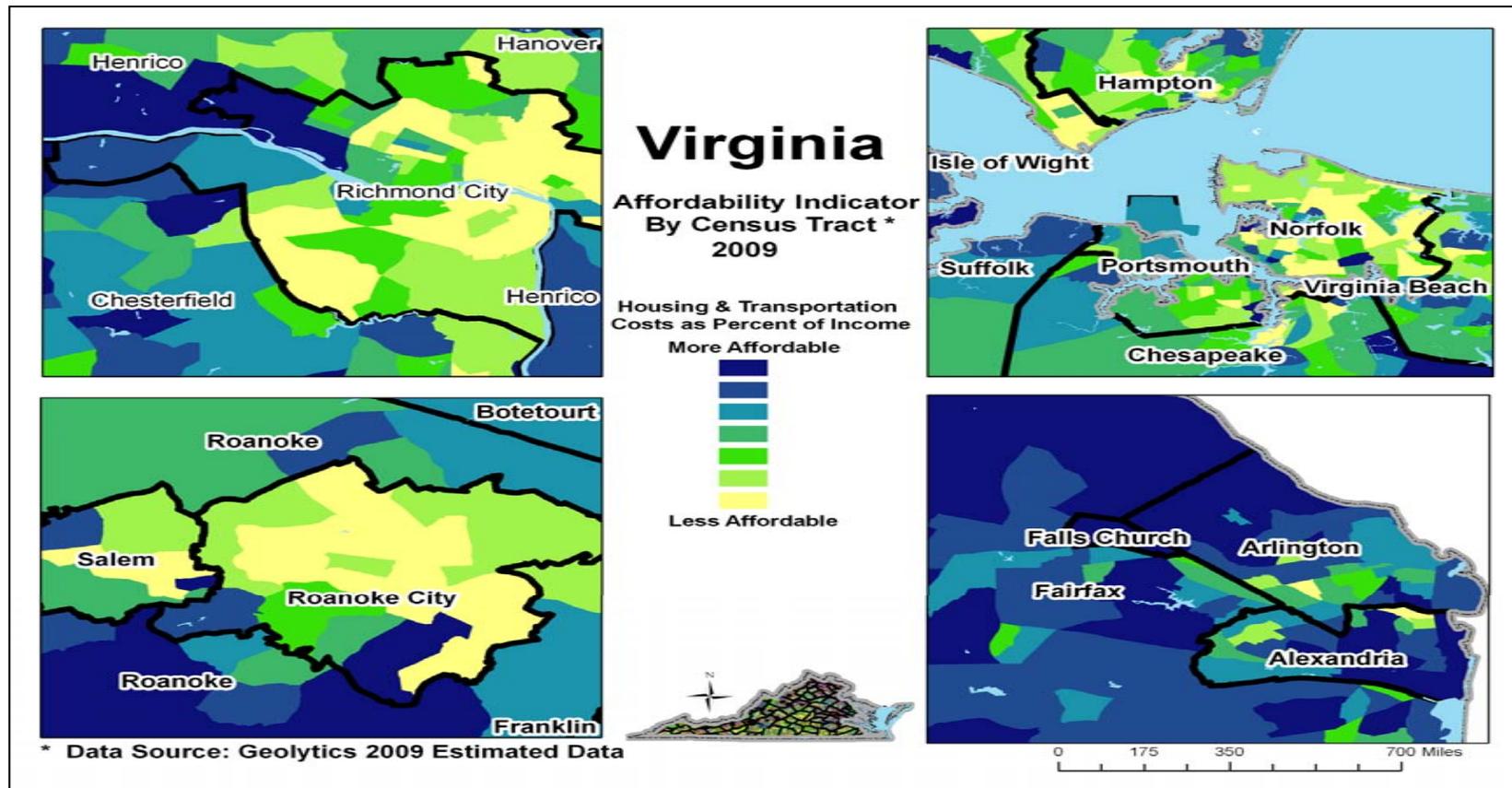
For example the yellow areas means, persons in these areas spend more of their total income on transportation and housing. The dark areas mean that persons in these areas spend less of their total income on housing and transportation. This map shows the Richmond metro area (upper left corner), Hampton Roads area (Upper right corner), Roanoke metro (Lower left corner) and Northern Virginia (lower right corner).

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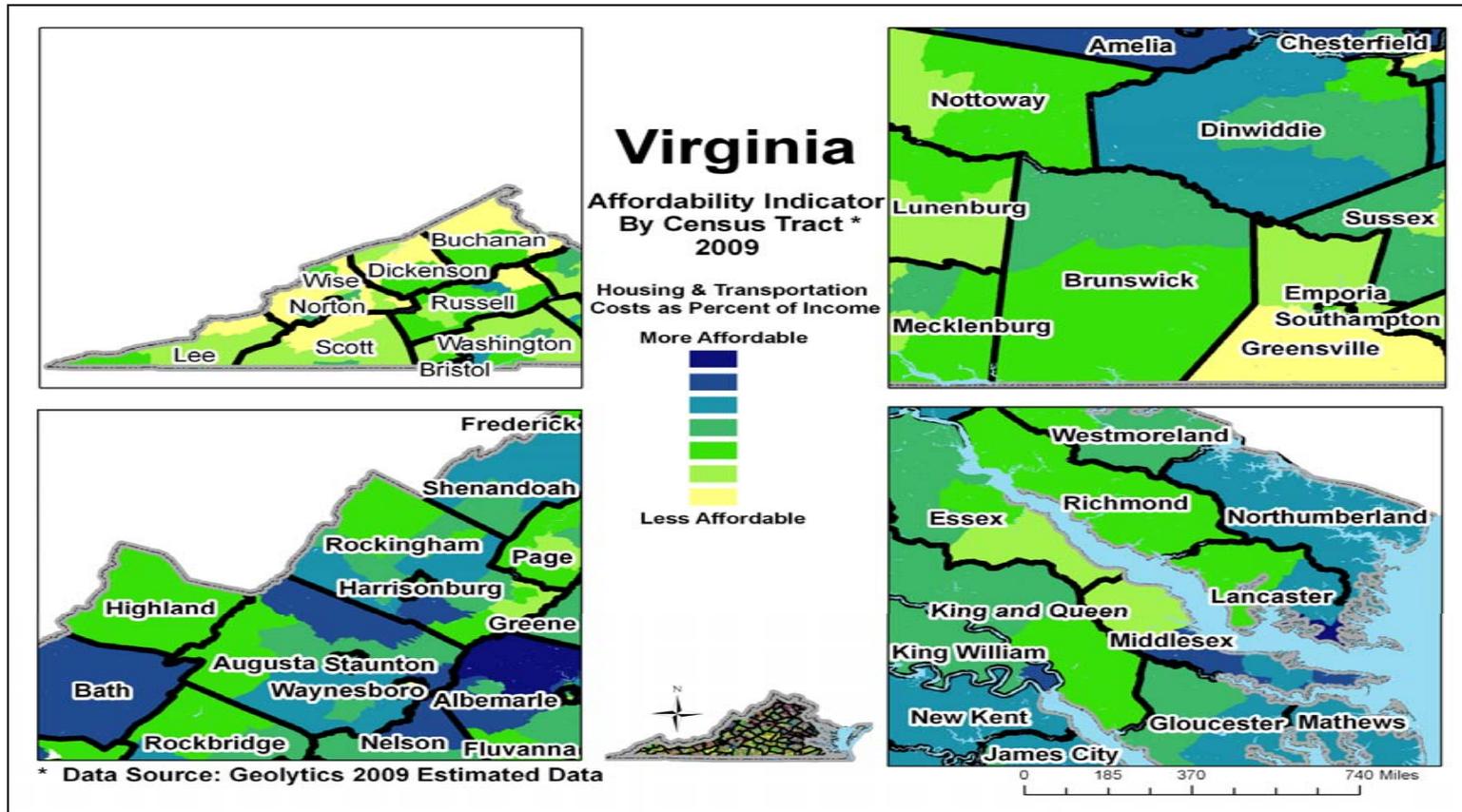
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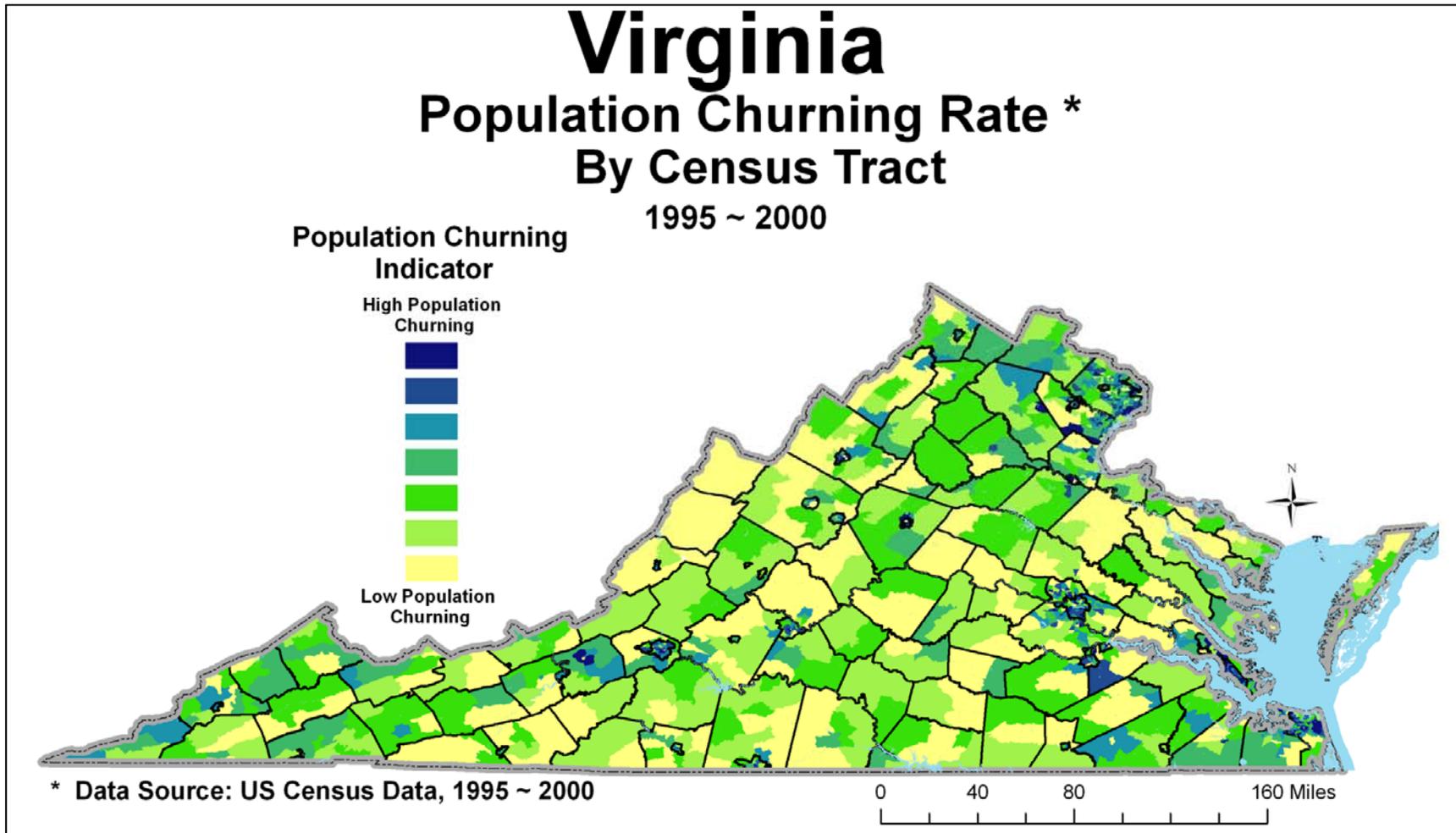
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Indicator: Population Churning Rate

Population churning rates relate the combined inflow and outflow for an area to the resident population and help to quantify the stability of a population in an area. The indicator uses the census mobility data that shows the mobility for 5 years by census tract.

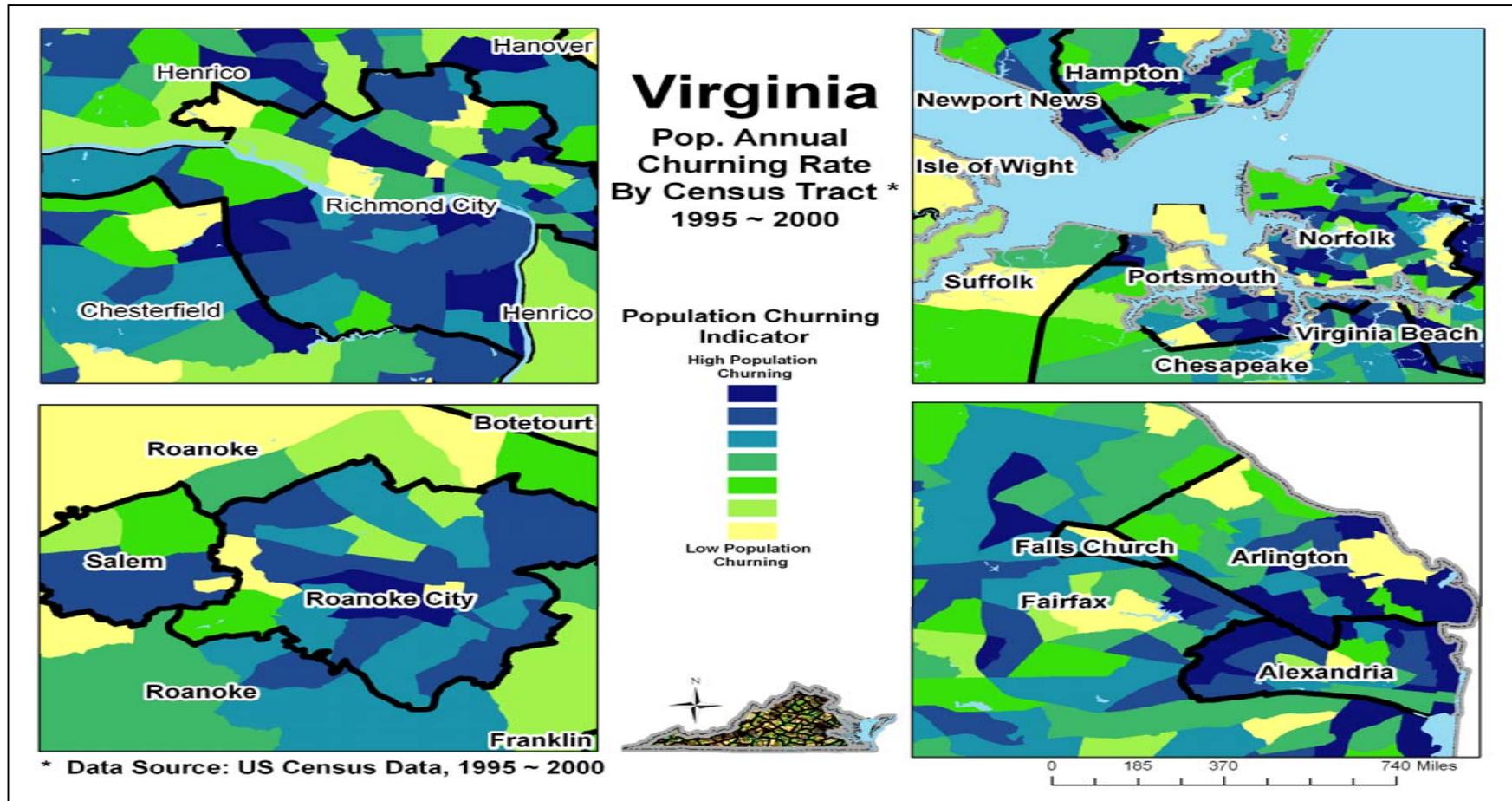
The scale shows an annual churning rate by census tract. The darker areas indicate that such areas experienced more population turn-over compared to the yellow areas



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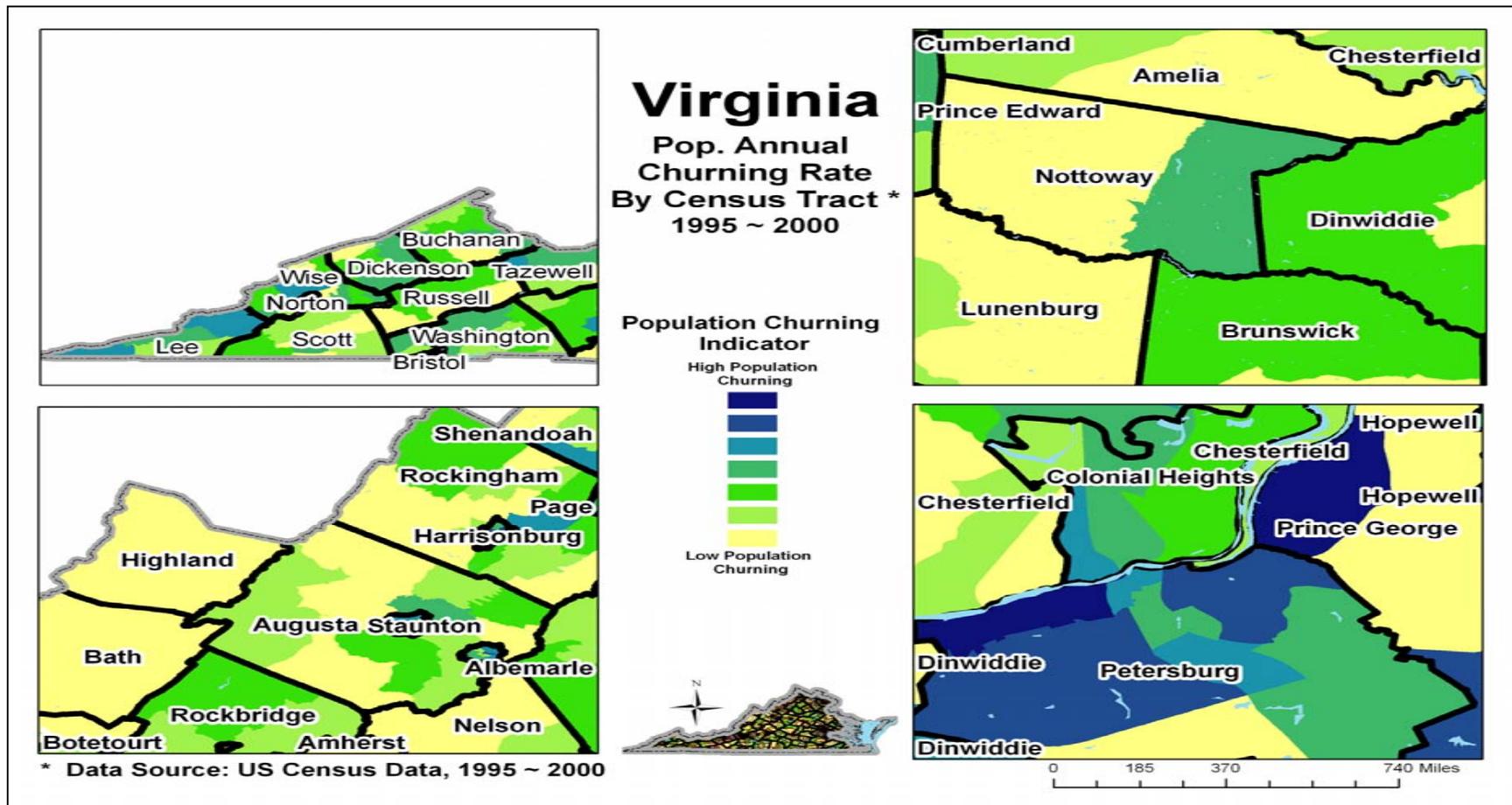
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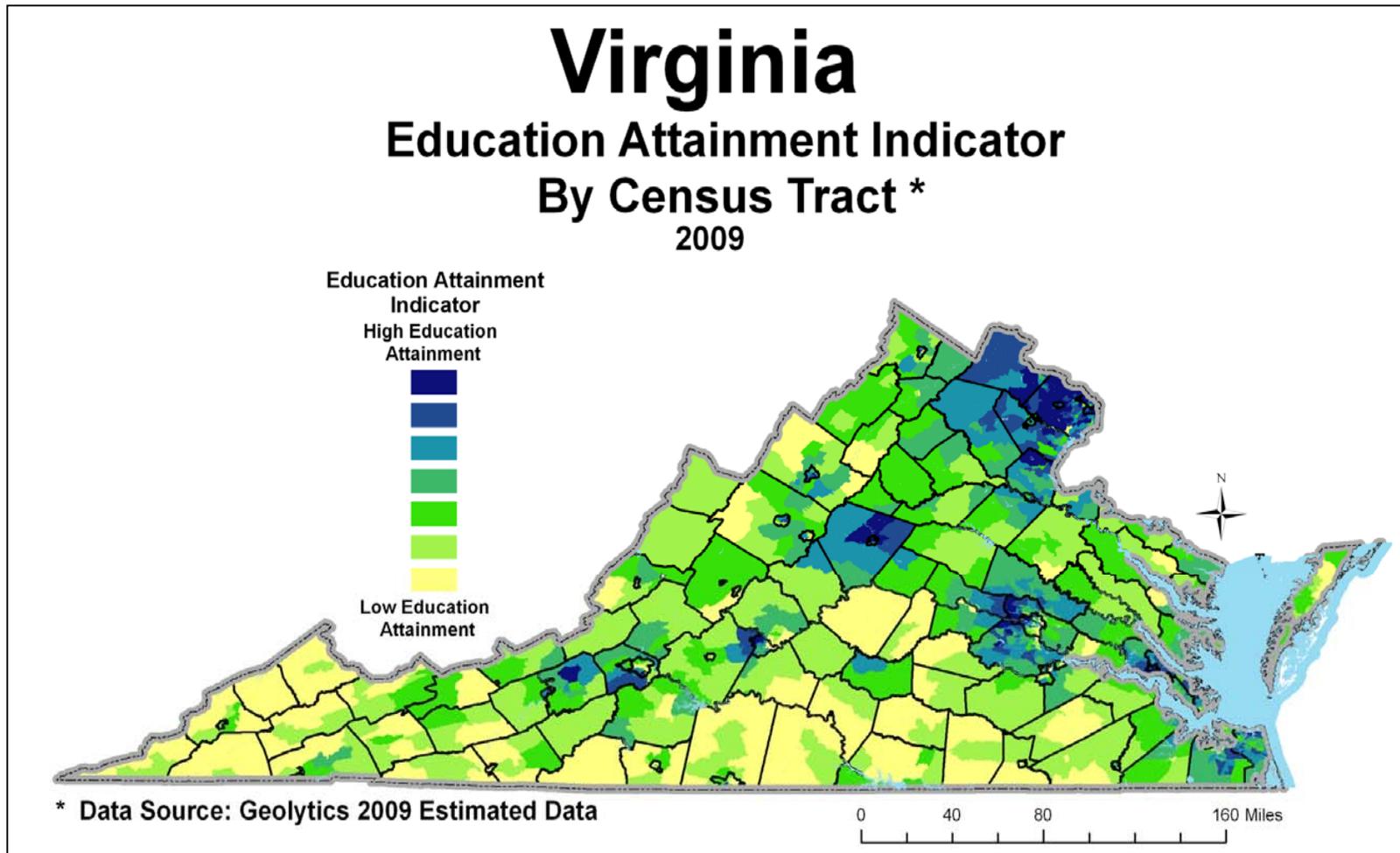


Indicator: Education Attainment

This indicator is composed of literacy rate (ability of read and write) and gross enrollment ratio (from kindergarten to postgraduate education).

These two sub-indices are weighted (Attainment is weighted 2/3 while Enrollment is weighted 1/3) and sum together to get a composite education indicator.

This indicator is scale-less and therefore darker areas indicate perfect education attainment while the yellow areas indicate less education attainment.



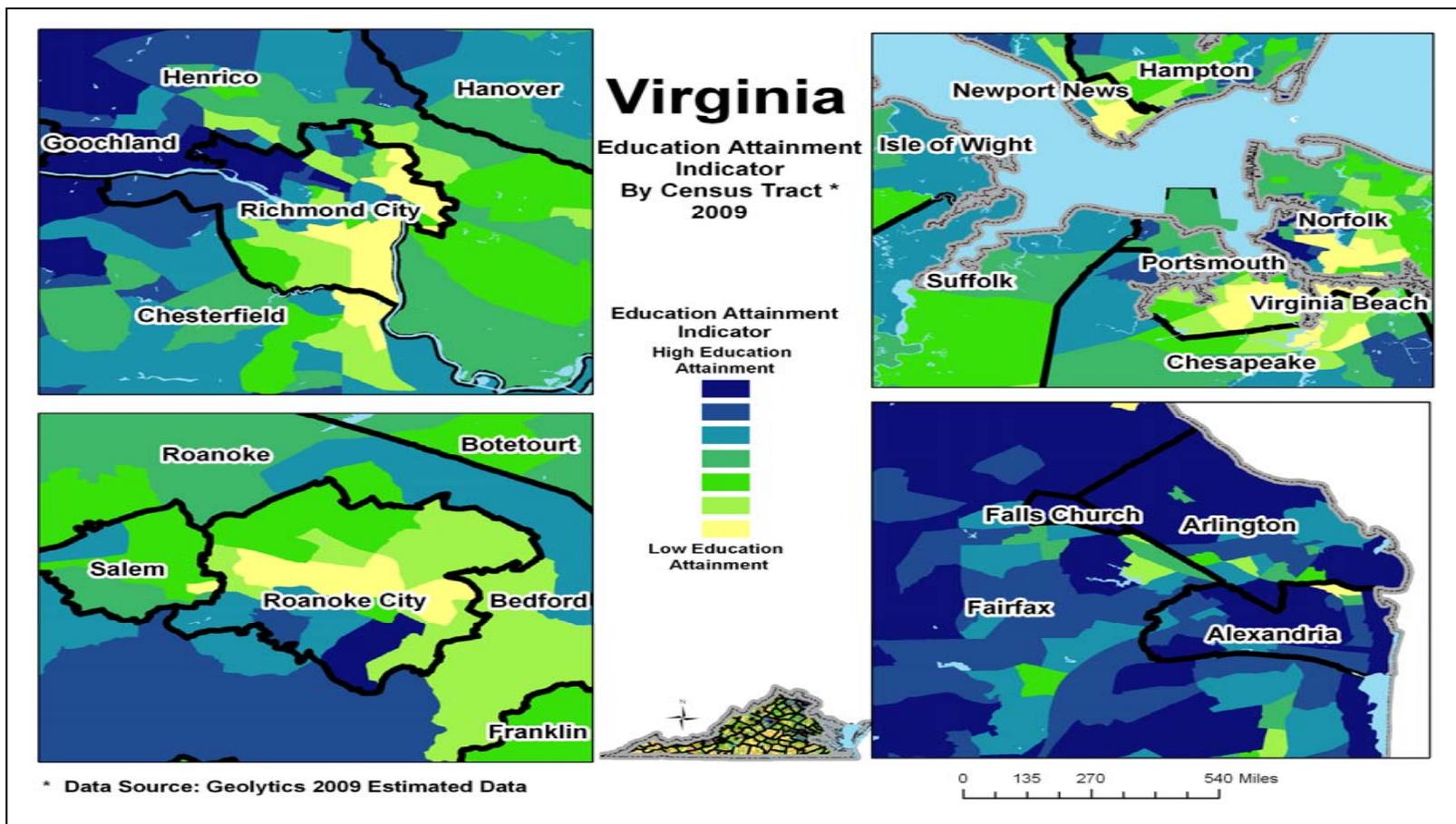
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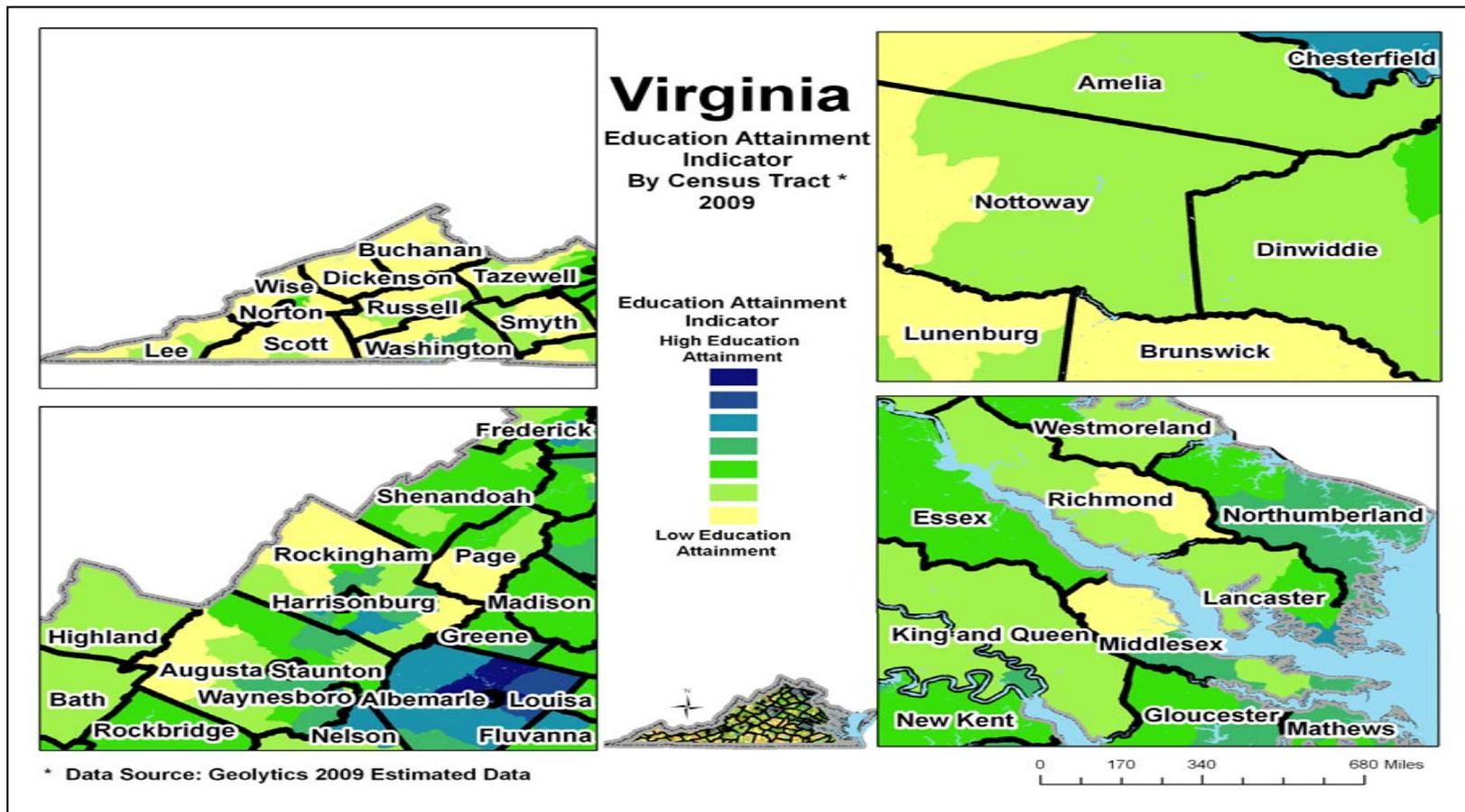


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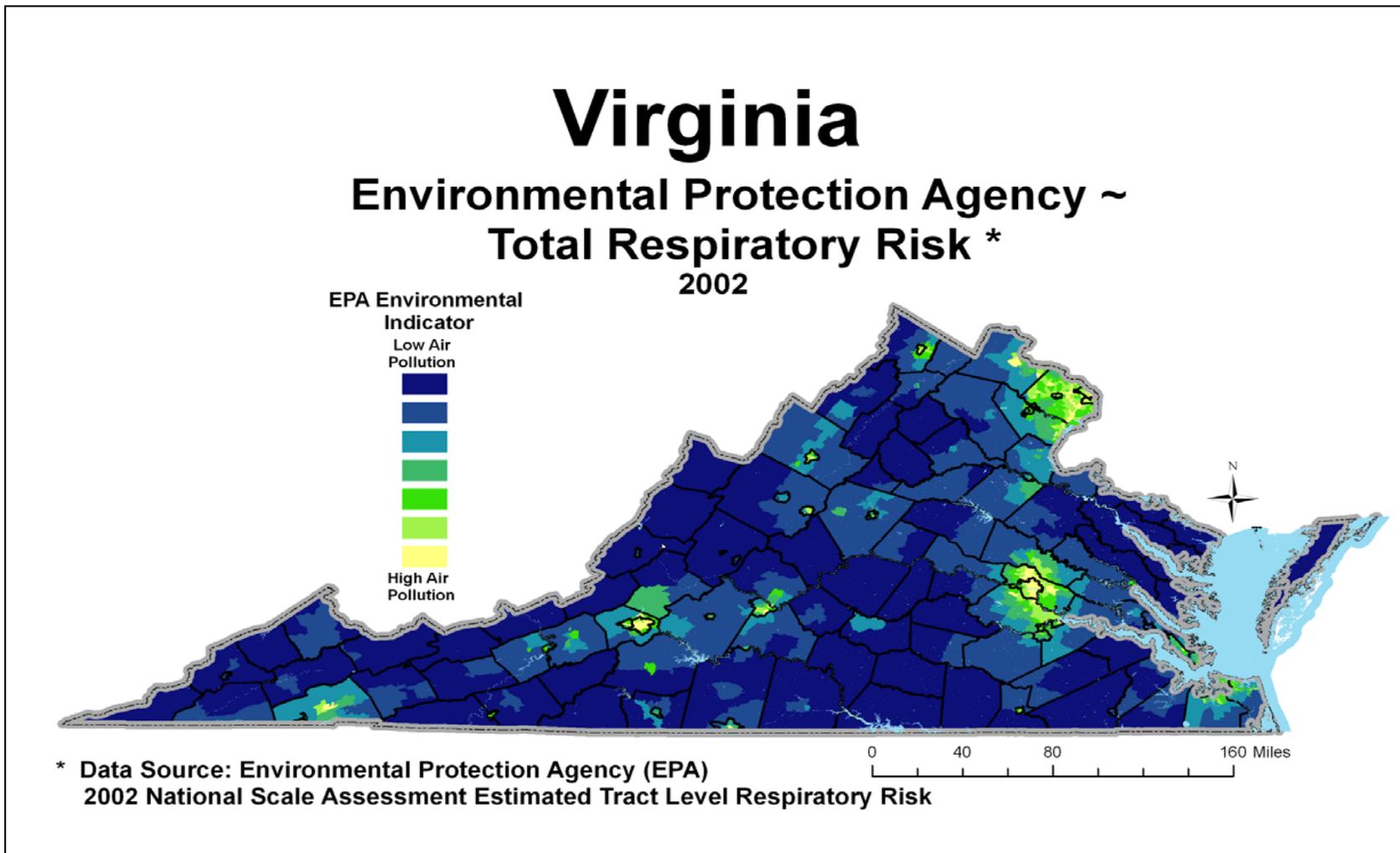
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Indicator: Environmental Risks

The environmental indicator was computed using EPA NATA Environmental Data to evaluate the magnitude of air pollution by census tract. This Database contains, three risk variables, namely cancer risk, respiratory risk and neurological risk. All these variables were standardized to Z-Score and summed up to construct the hazard quotients of the air toxics compounds that affect the respiratory or nervous system.

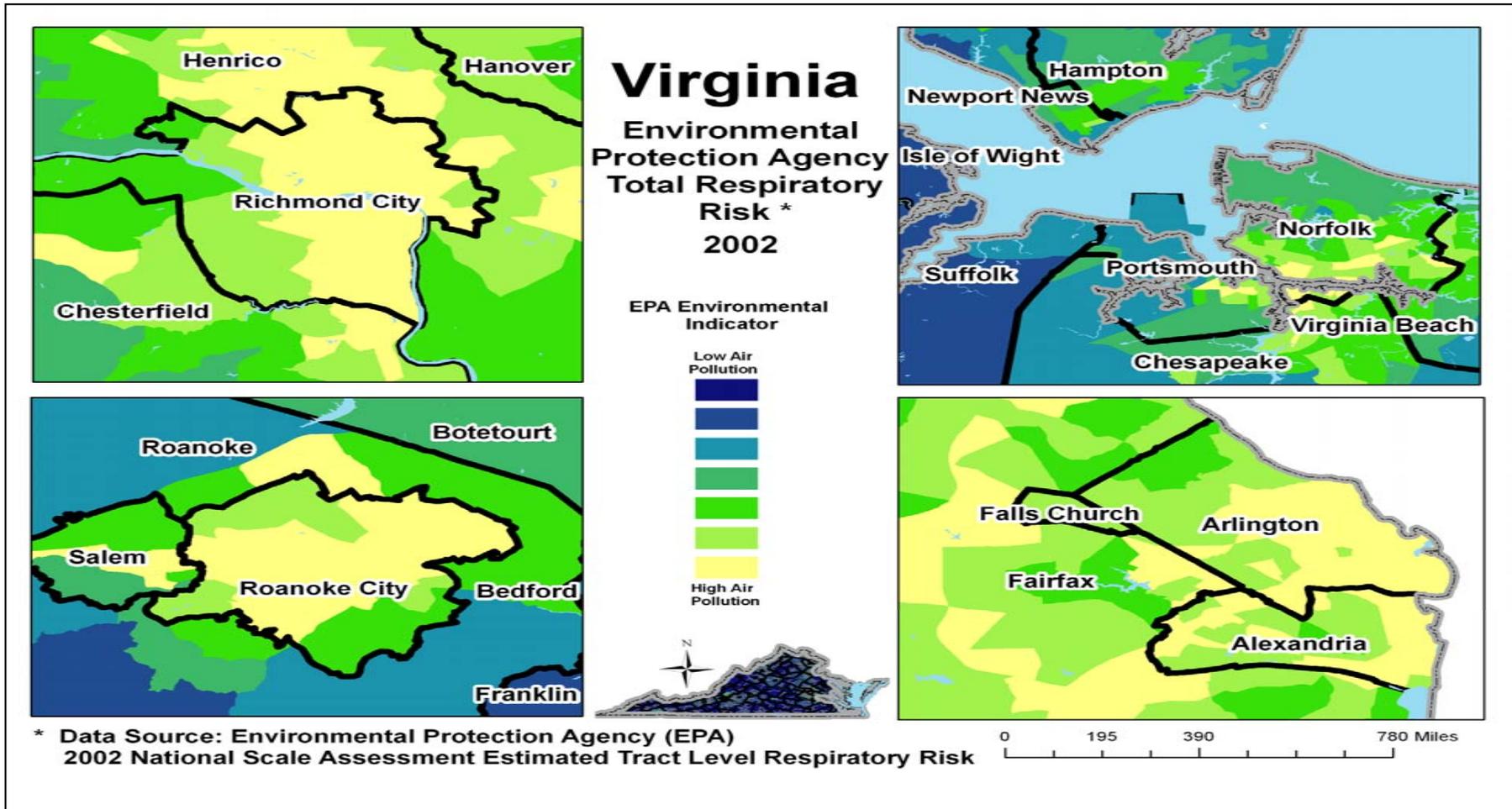
The dark areas are least environmental polluted while the yellow areas are more environmental polluted area.



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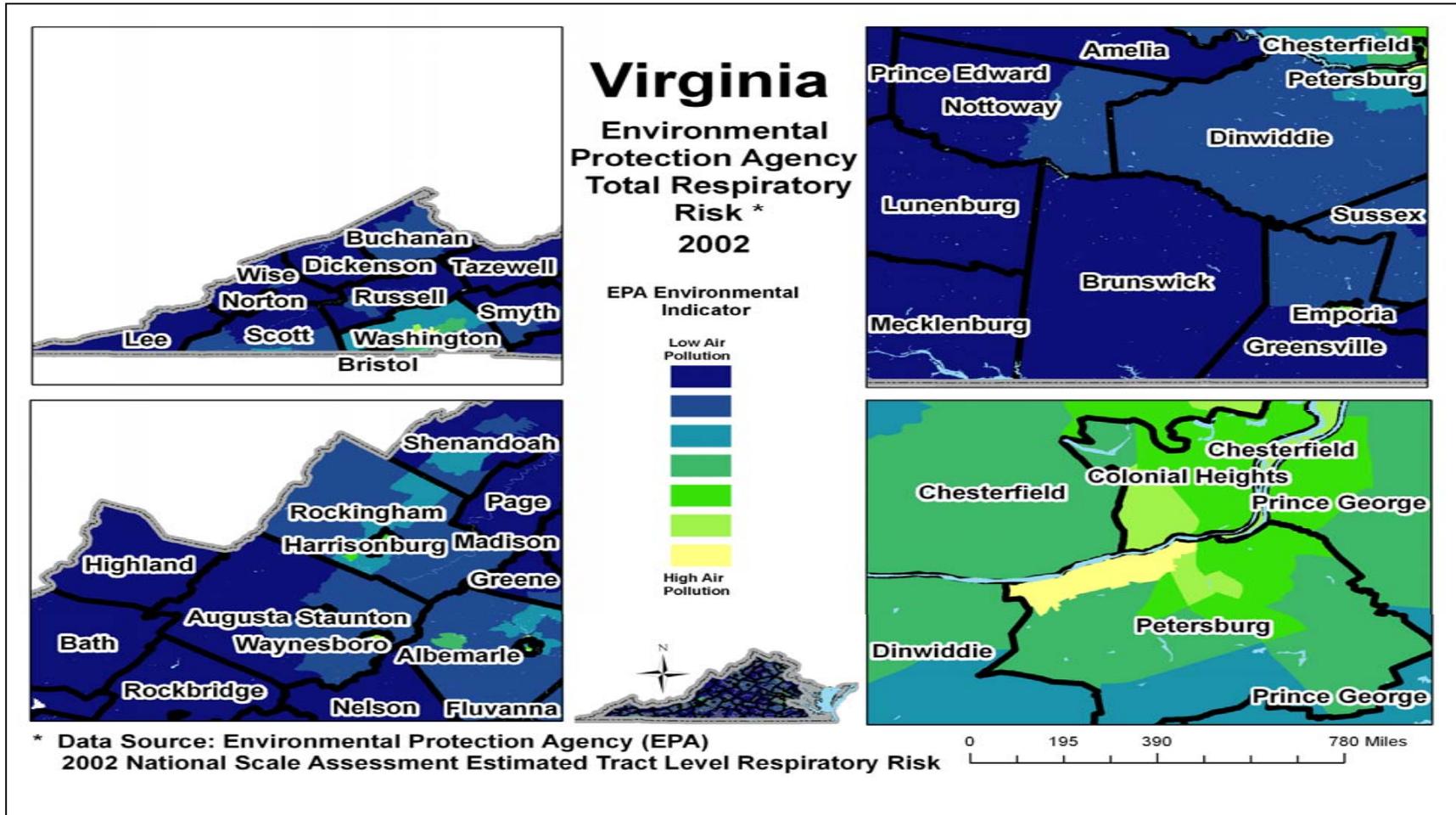
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Indicator: Household Income Diversity

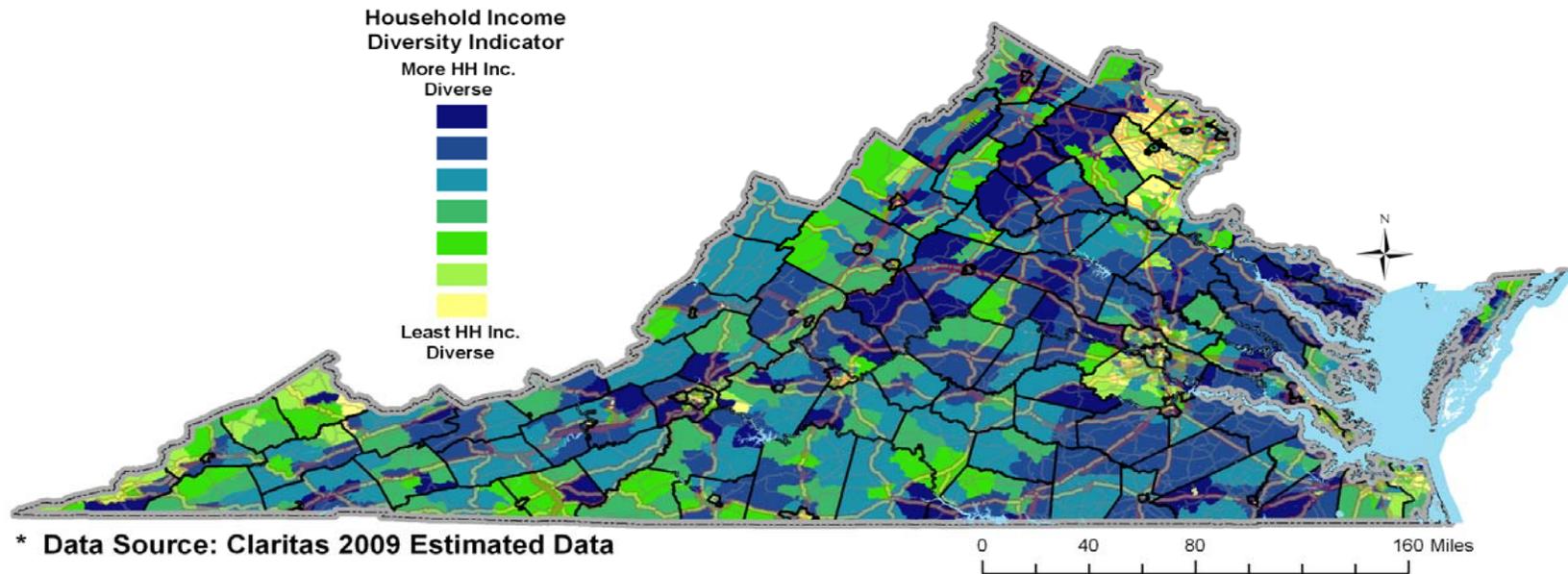
This aspect of diversity refers to a variance in household economic status within the same census tract. The indicator was measured by using all the 10 income ranges in census data comprising households with annual incomes of less than \$15,000, \$15,000 to \$24,999, \$25,000 to \$34,999, \$35,000 to \$49,999, \$50,000 to \$74,999, \$75,000 to \$99,999, \$100,000 to \$149,999, \$150,000 to \$249,999, \$250,000 to \$499,999, and \$500,000 or more. *A yellow color indicates that the area is more homogeneous in terms of household income and vice versa. What this means is that, if you select two houses at random, the probability (chance) that both houses will belong to different income levels is less*

Virginia

Household Income Diversity Indicator *

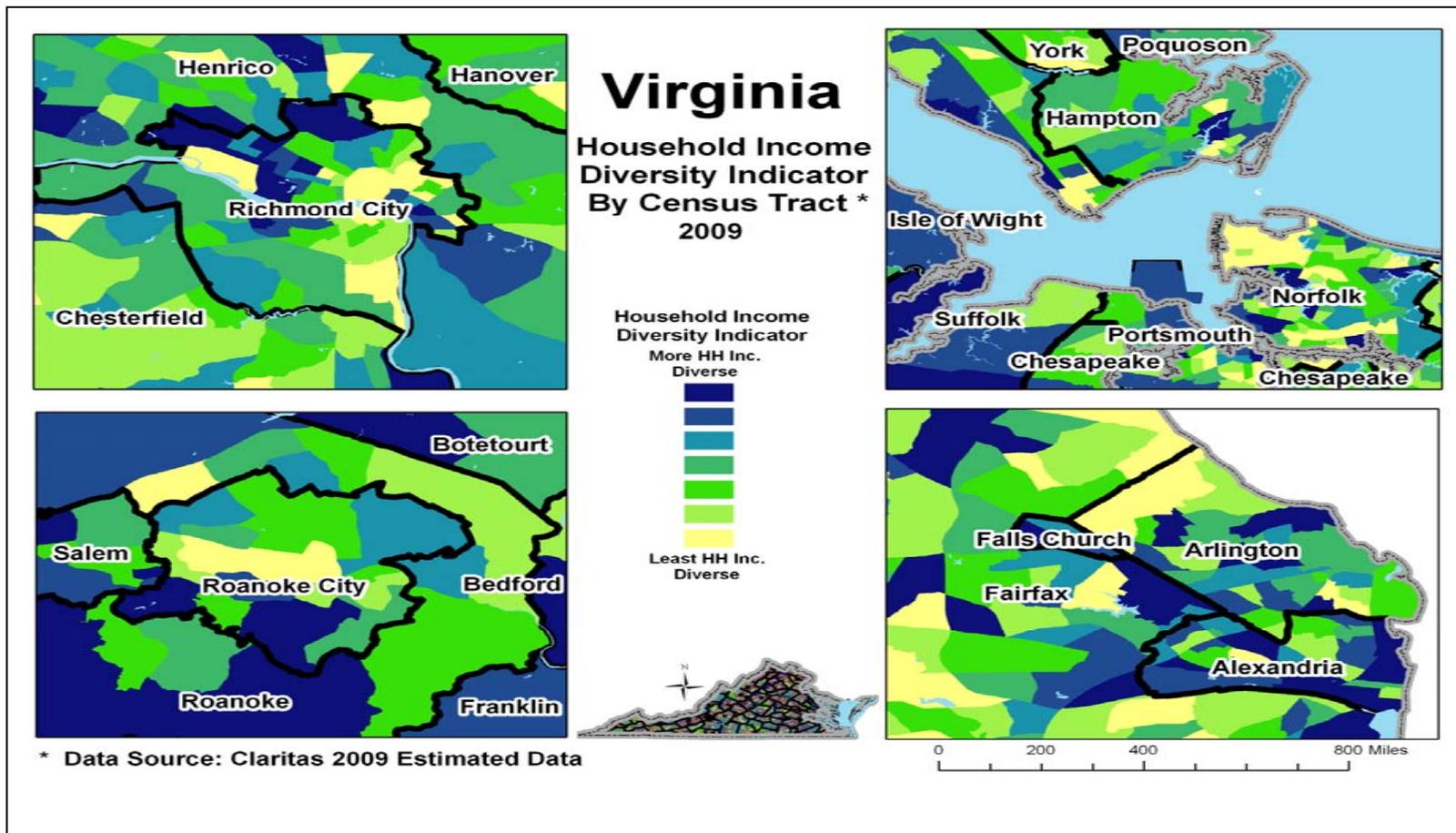
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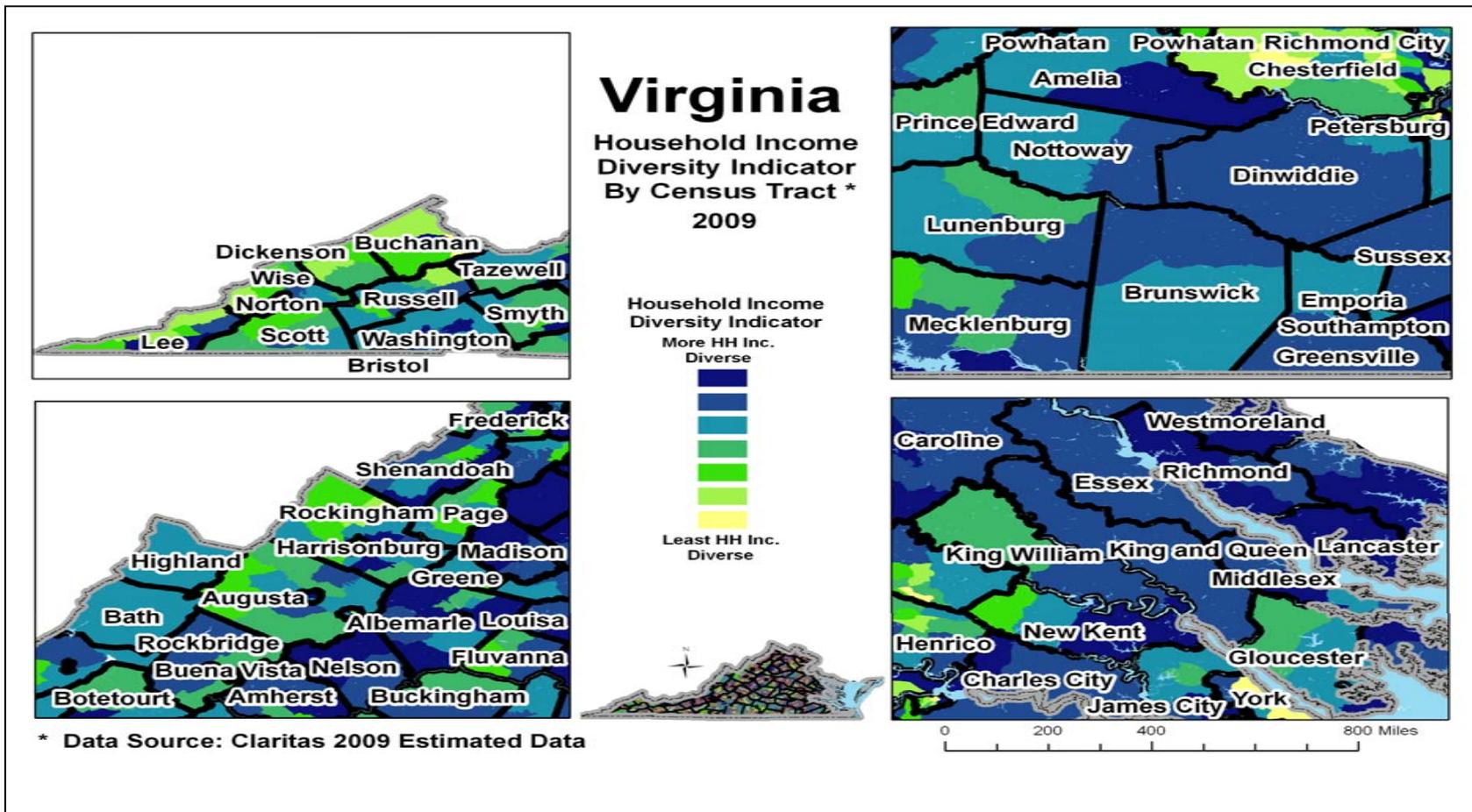
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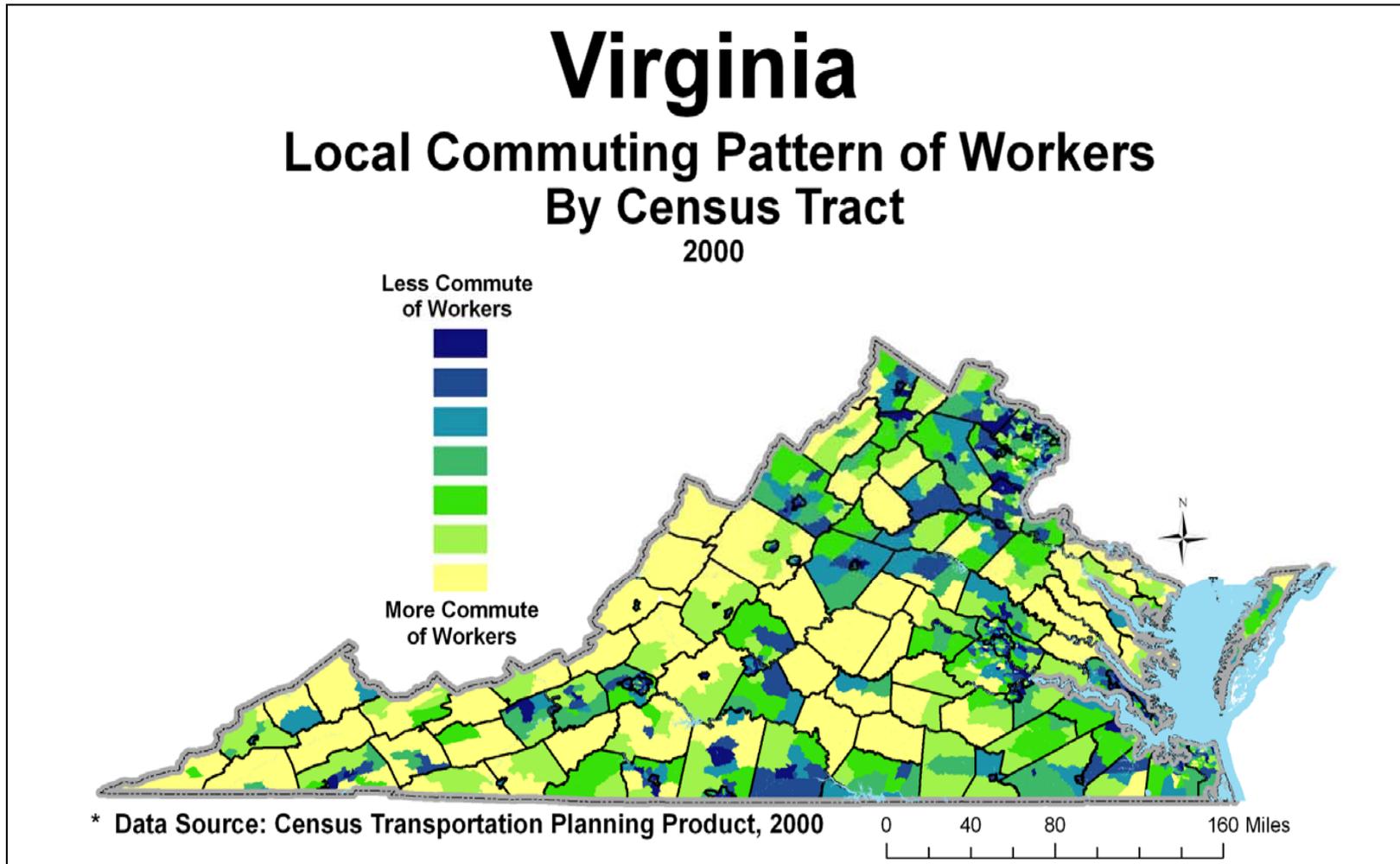
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Indicator: Local Commuting Patterns of Workers

Commuting pattern based on Census Transportation Planning Package (CTPP) data can be used to indicate in flow and outflow of workers of an area. This is the ratio of inflow plus outflow divided by total resident work force in the area in question. This is an indicator of the mismatch between the labor force and employment opportunity inside an area and outside an area. This mismatch between labor force and employment can increase commuting cost for individuals.

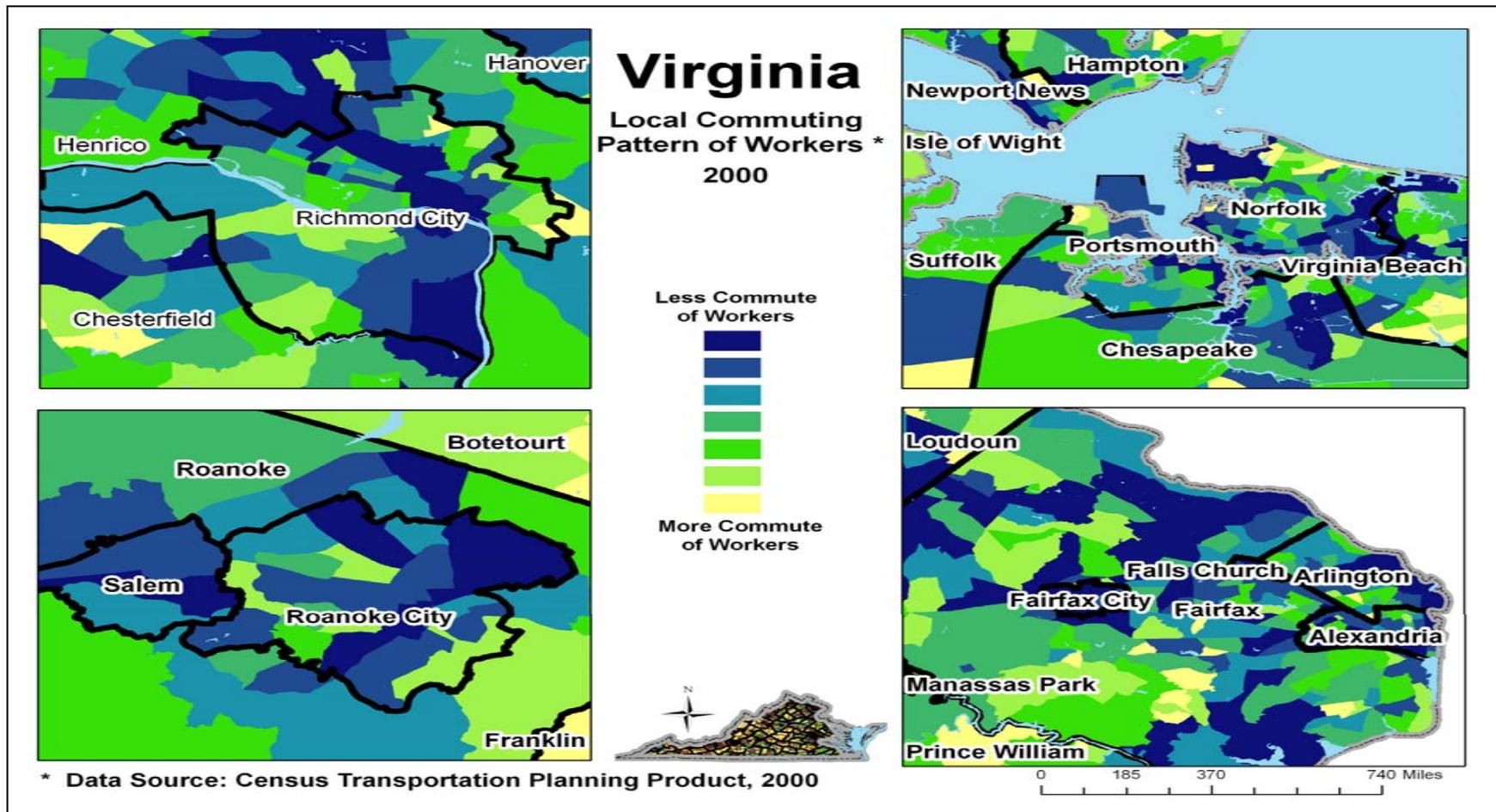
The darker areas indicator the more job rich the area and therefore less commute while the yellow areas indicate majority of persons in these areas commute to work in other census tracts.



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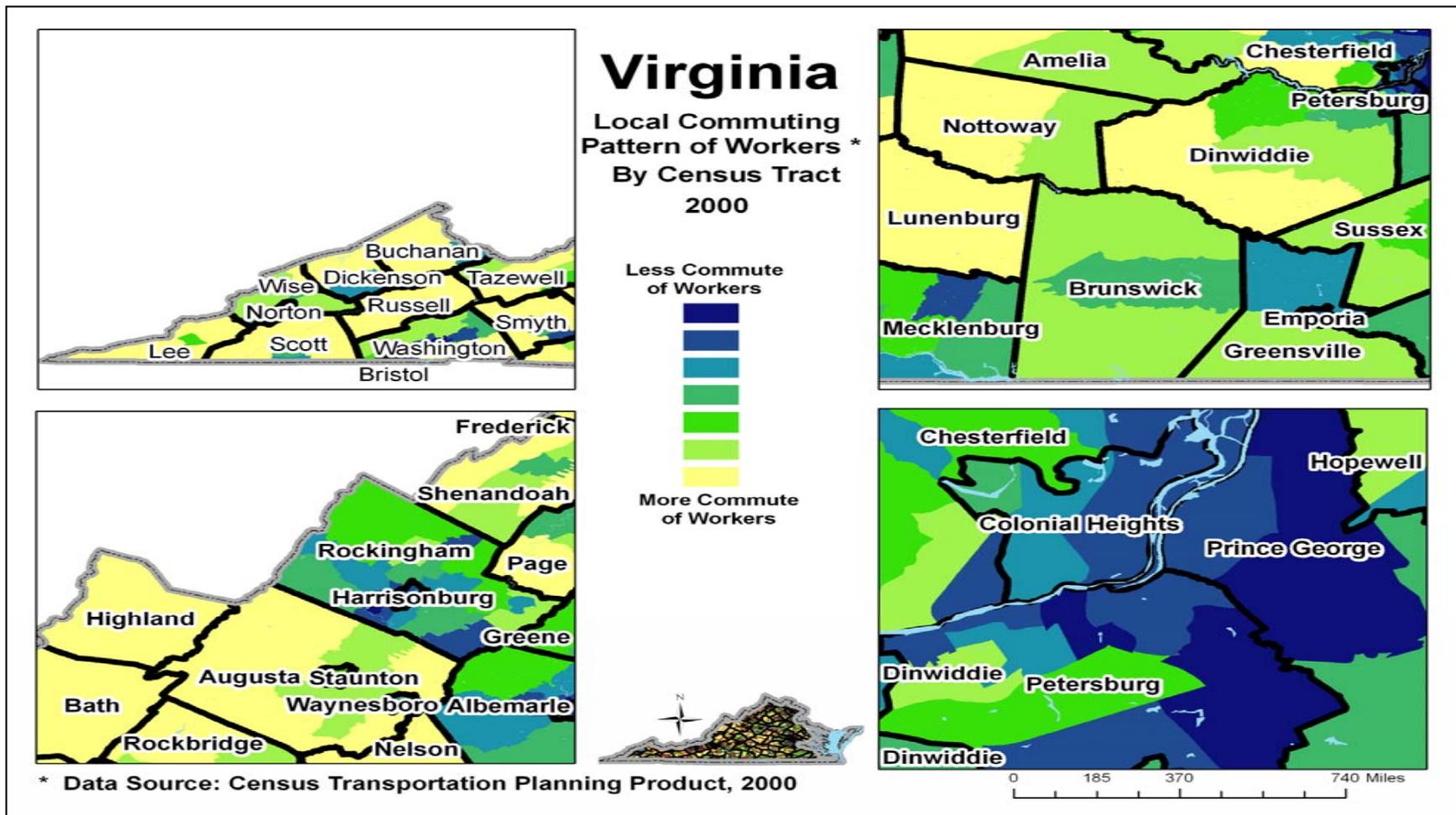
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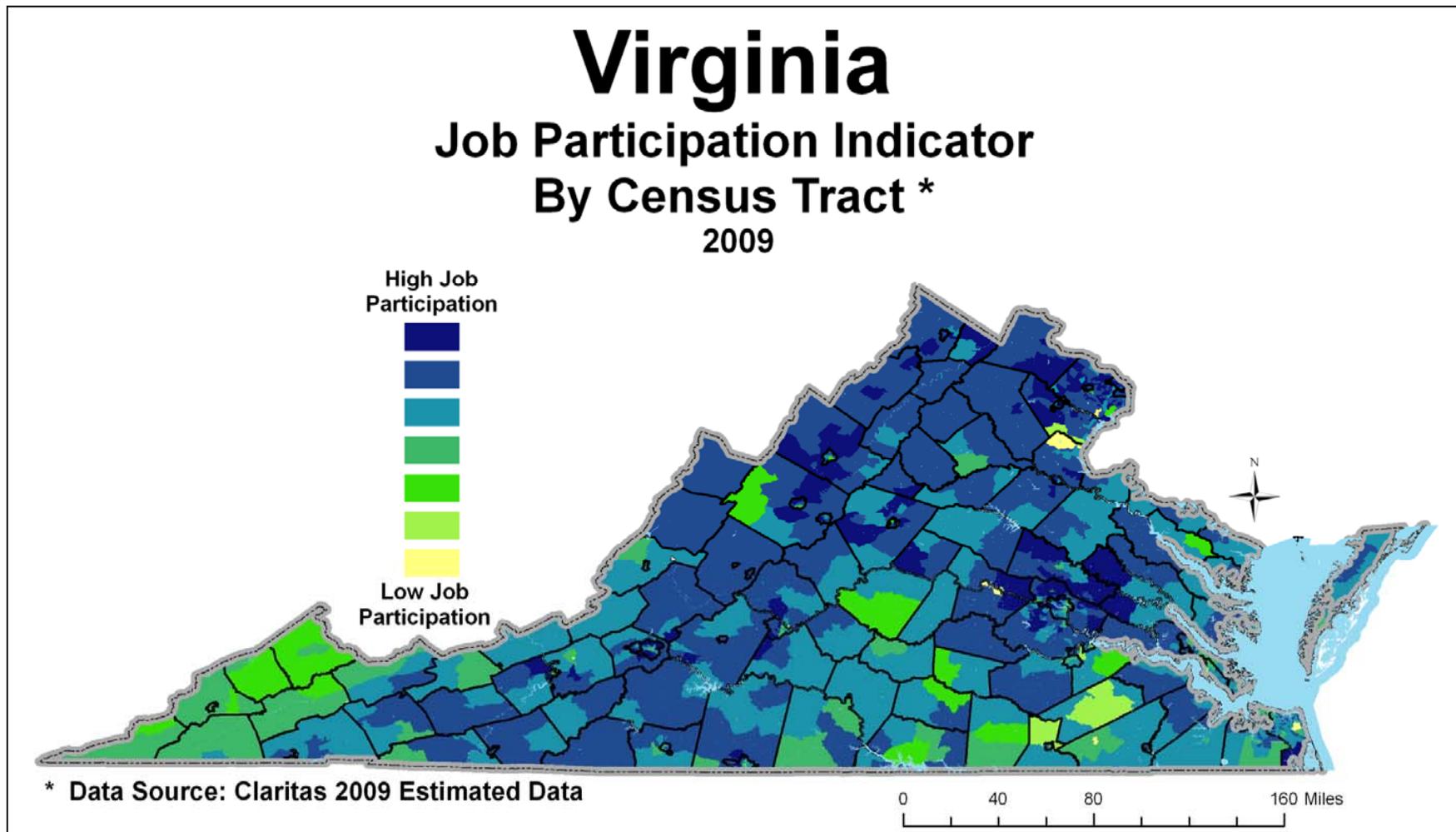
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Indicator: Job Participation

Job participation rates measure the percent of population over 16 years of age to 64 who are either employed or unemployed and seeking work. Because job participation rates are sensitive to a number of local community attributes, e.g., educational attainment, disability, household composition, car ownership, the measure can provide a sensitive indicator to the unique employment profile of a community. Job participation rate is often used by economists as an indicator for economic development and growth.

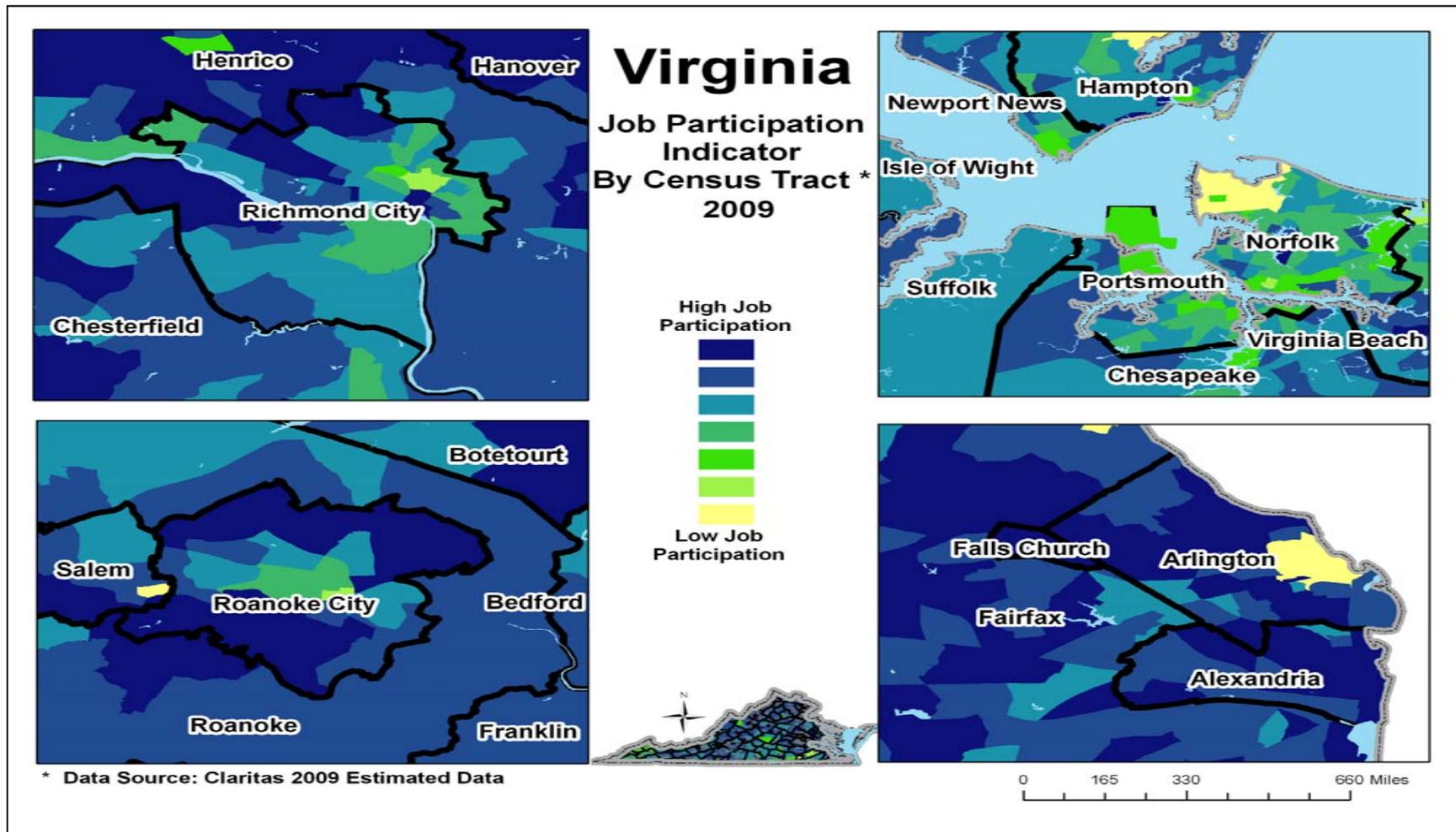
The darker area means that, there is high percentage of active labor force of the area.



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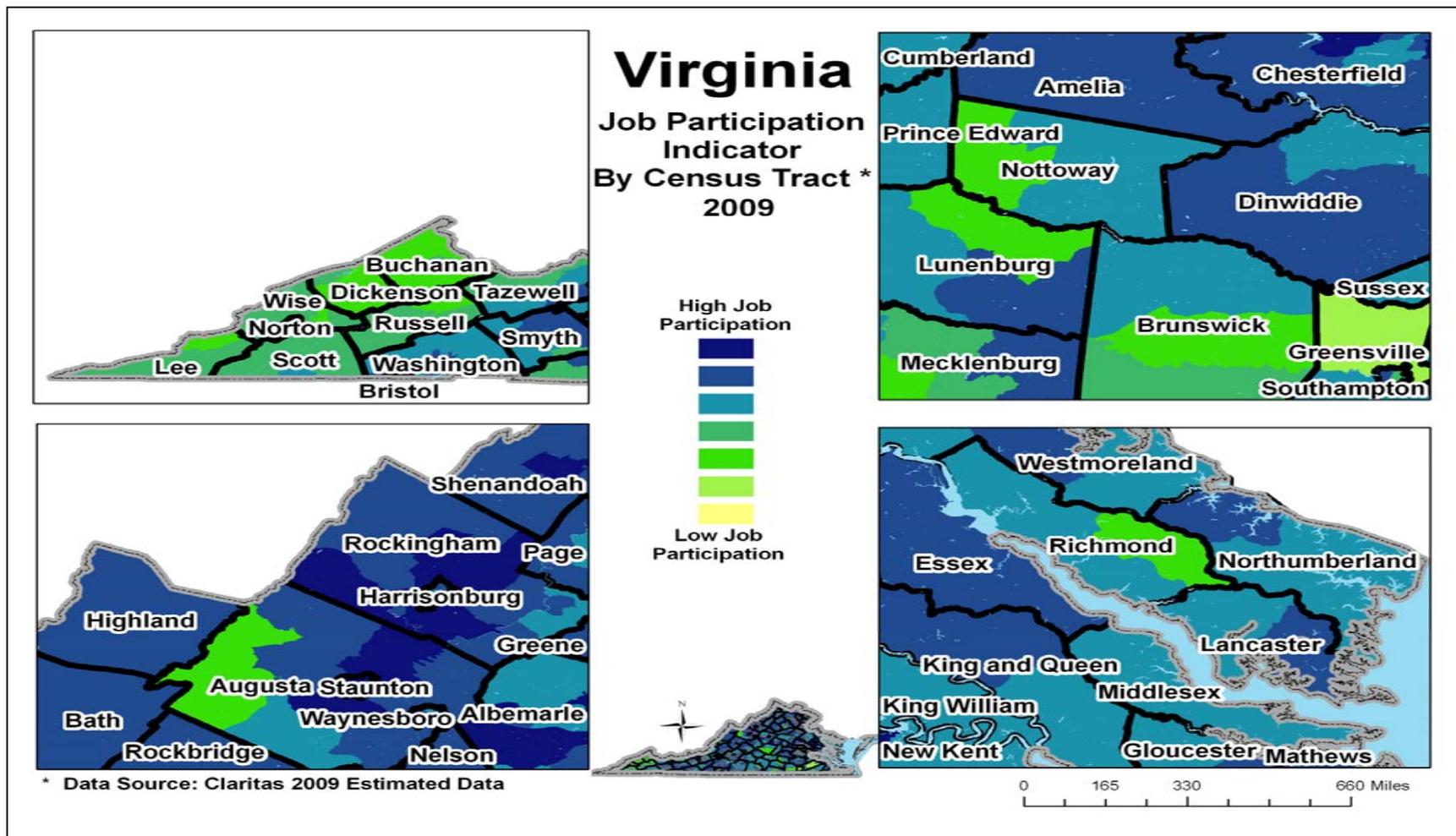
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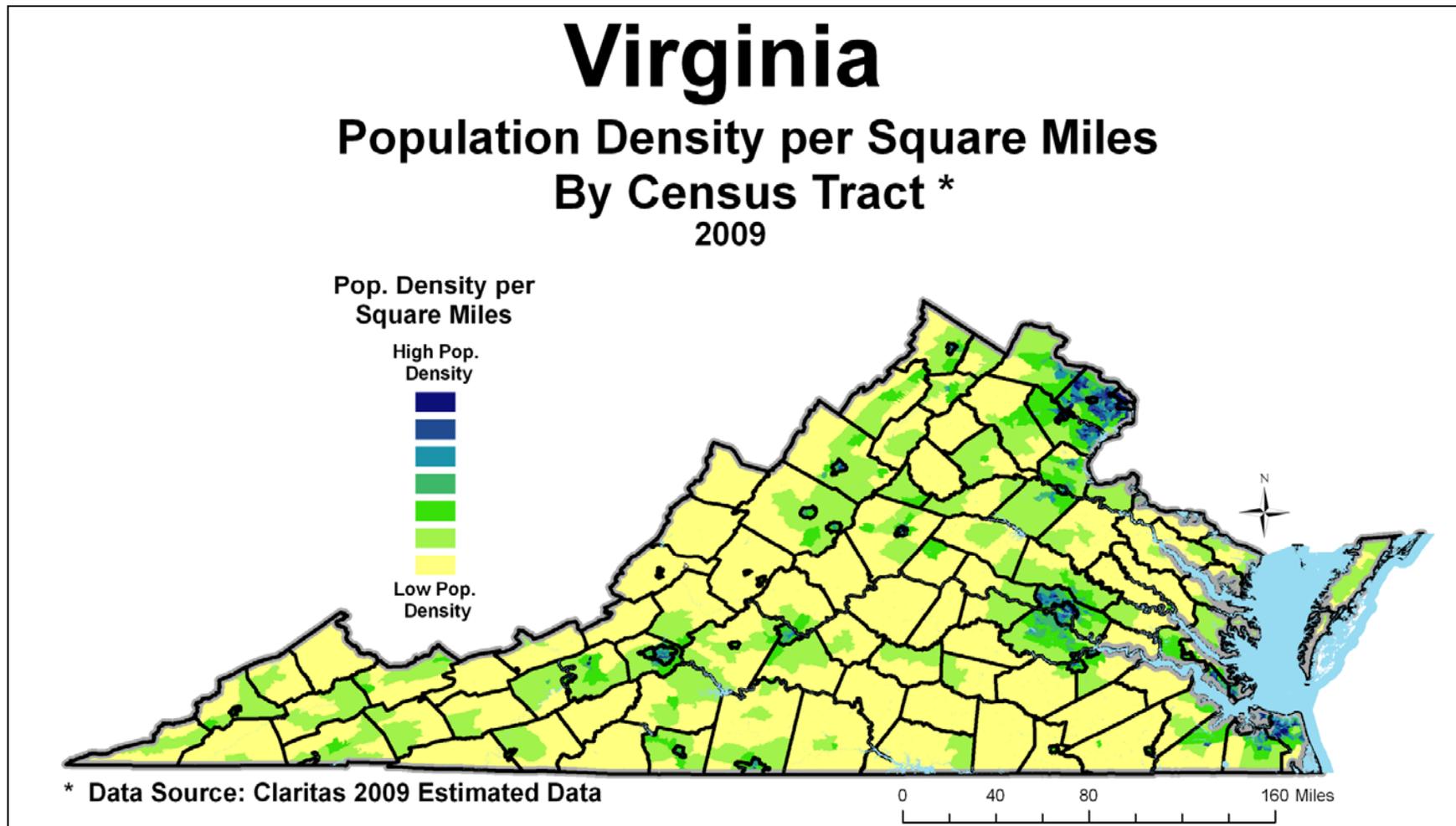
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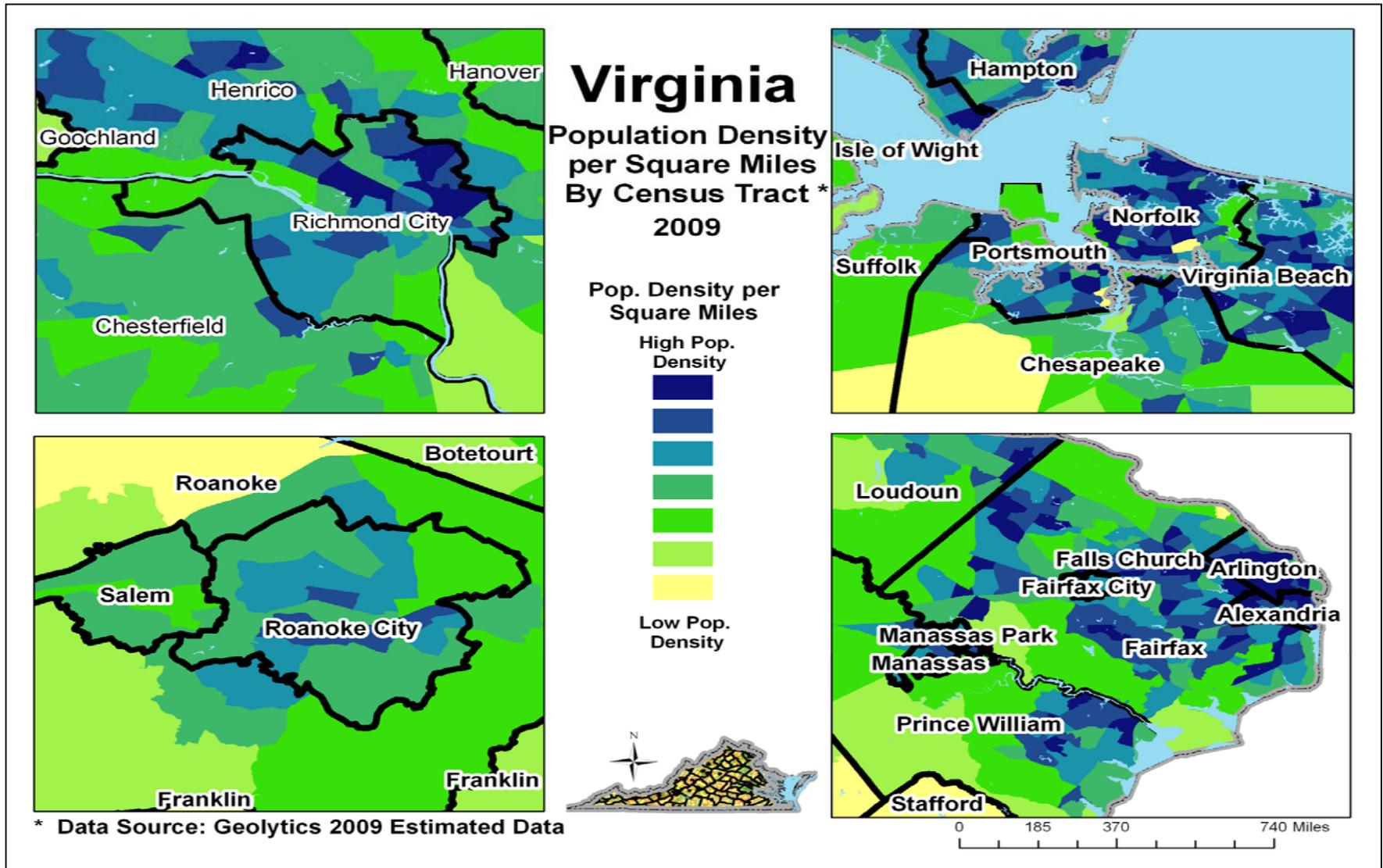
Indicator: Population Density

This indicator is calculated by dividing the total population by the square miles in the area under study. *The darker areas indicate high population concentration per square miles, while the yellow areas indicate low population concentration.*



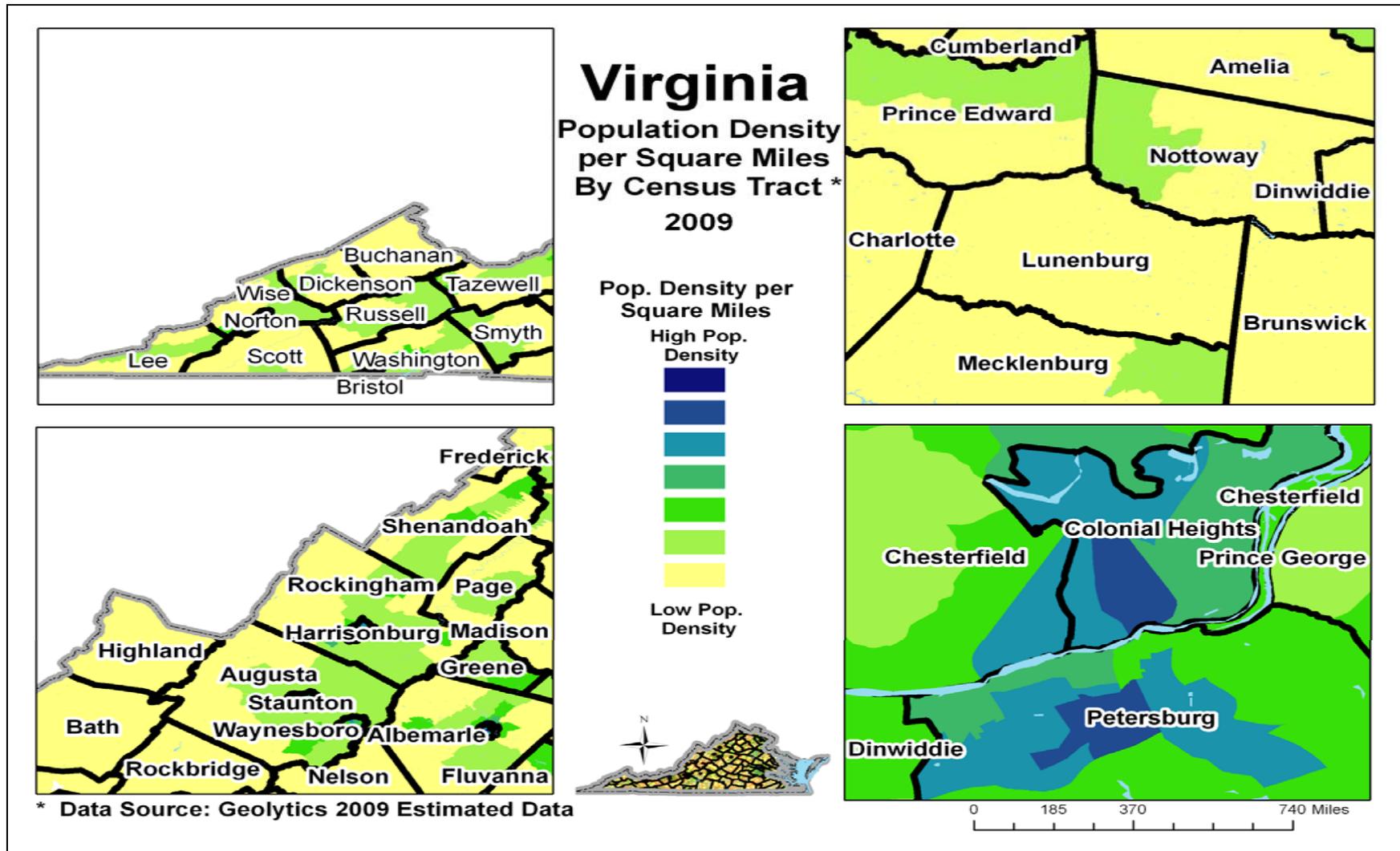
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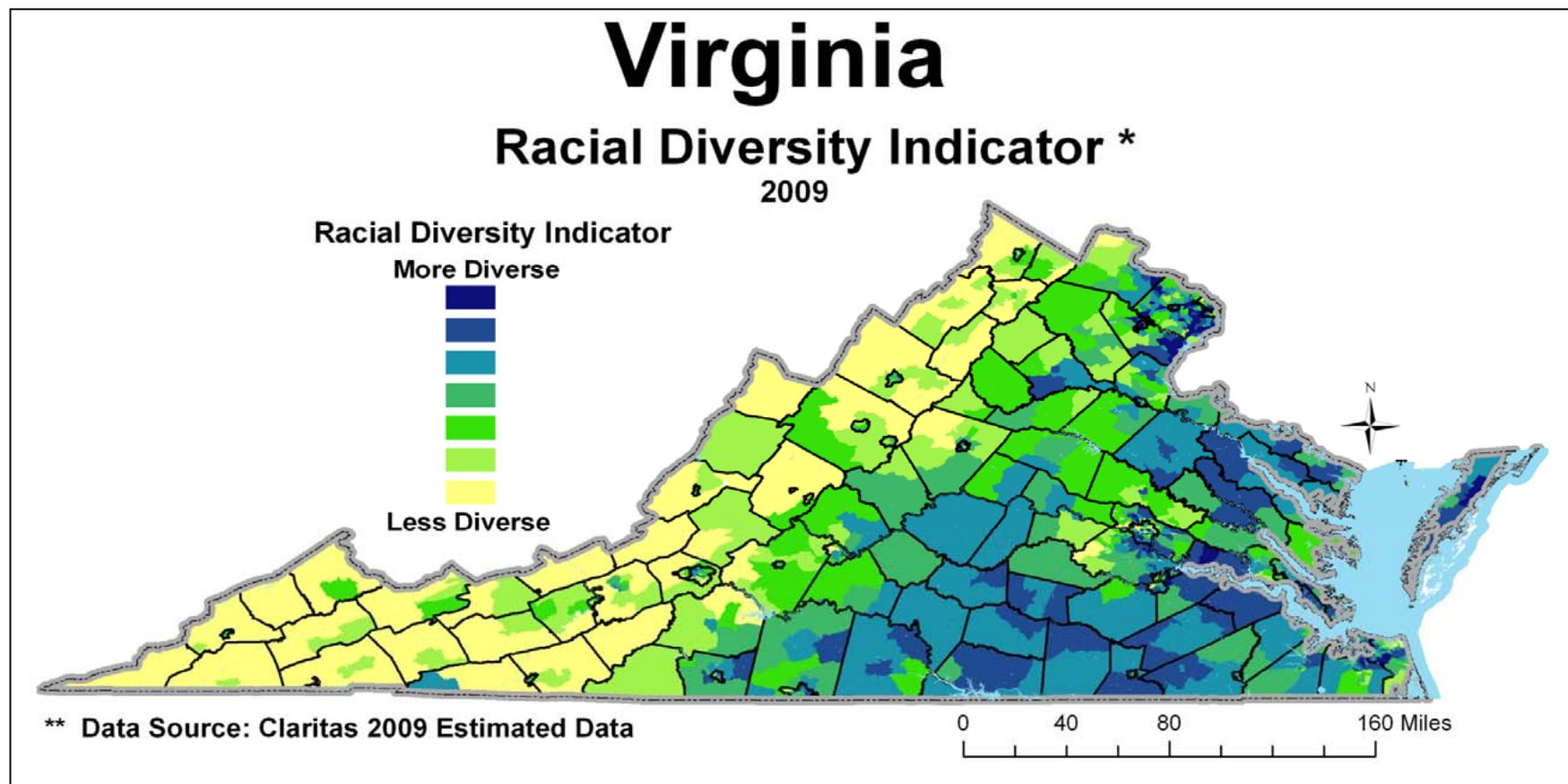


Indicator: Racial Diversity

The Diversity Indicator identifies the probability that two persons, chosen at random from the street will belong to different race or ethnic groups. The calculation of this index accommodates up to seven race groups: six single-race groups (White, Black, American Indian, Asian, Pacific Islander, Some Other Race) and one multiple-race group (two or more races). The Diversity Indicator is bounded and ranges from 0 to 1. Zero indicates no diversity (homogeneous population) while 1 signifies that there is complete diversity (heterogeneous population). *If an area's entire population belongs to one race group, then an area has zero diversity. An area's diversity index increases to 1 when the population is evenly divided into two or more race/ethnic groups.*

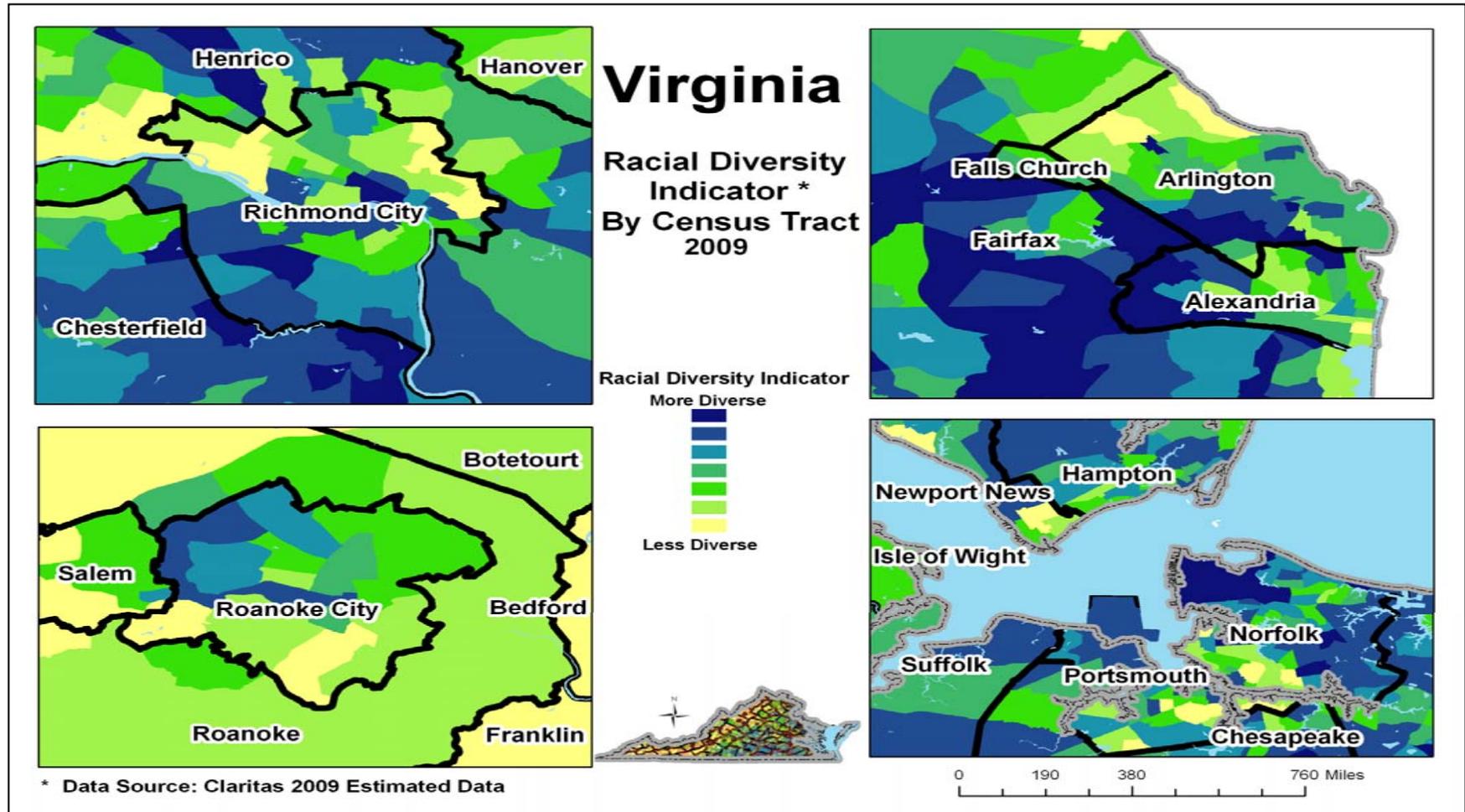
This is probabilistic model and the yellow areas means that, if two persons are selected at random on the street, there is less probability that these persons will belong to different racial groups. Meanwhile, the darker areas indicate that there is high probability that, these two persons will belong to different racial groups.

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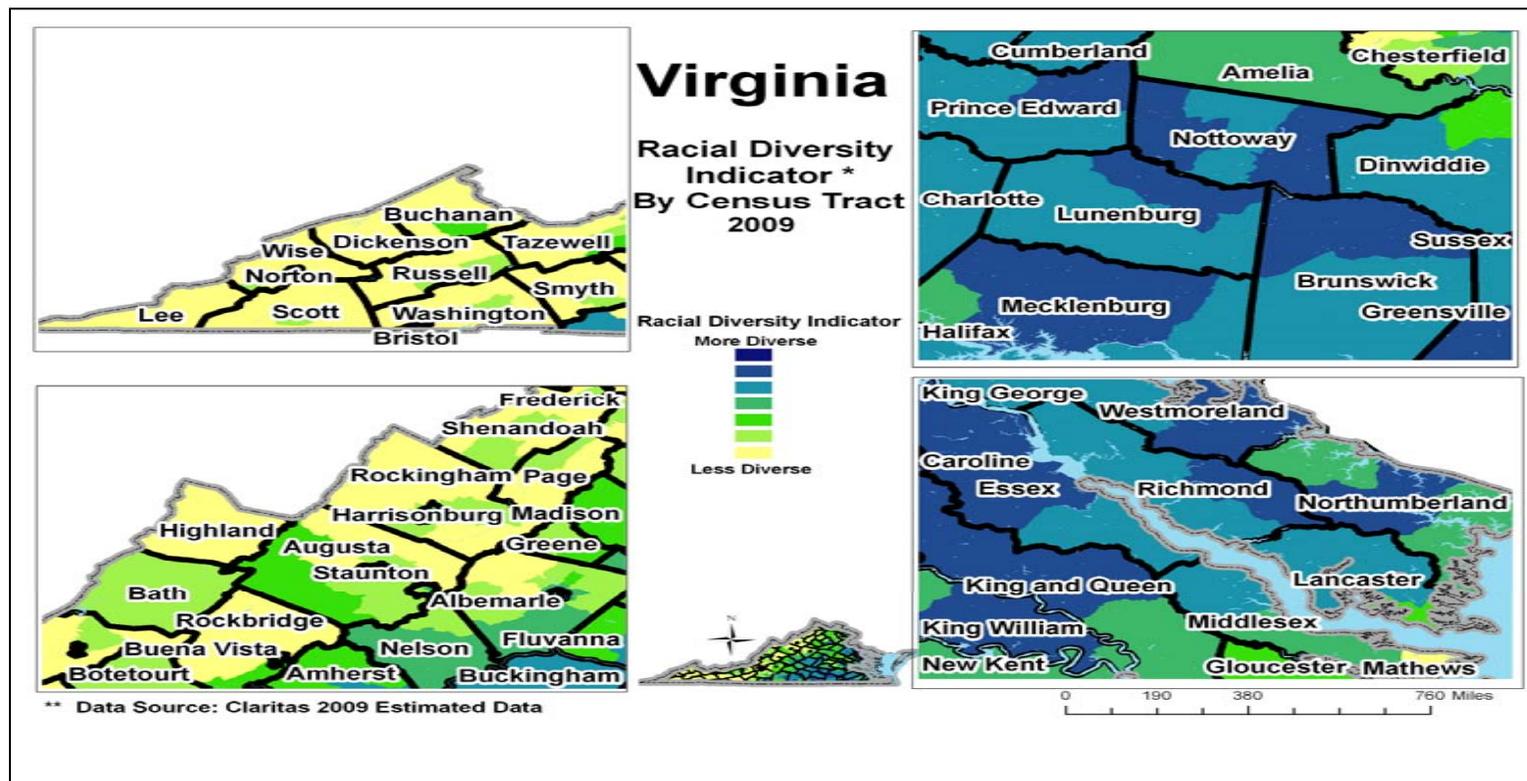
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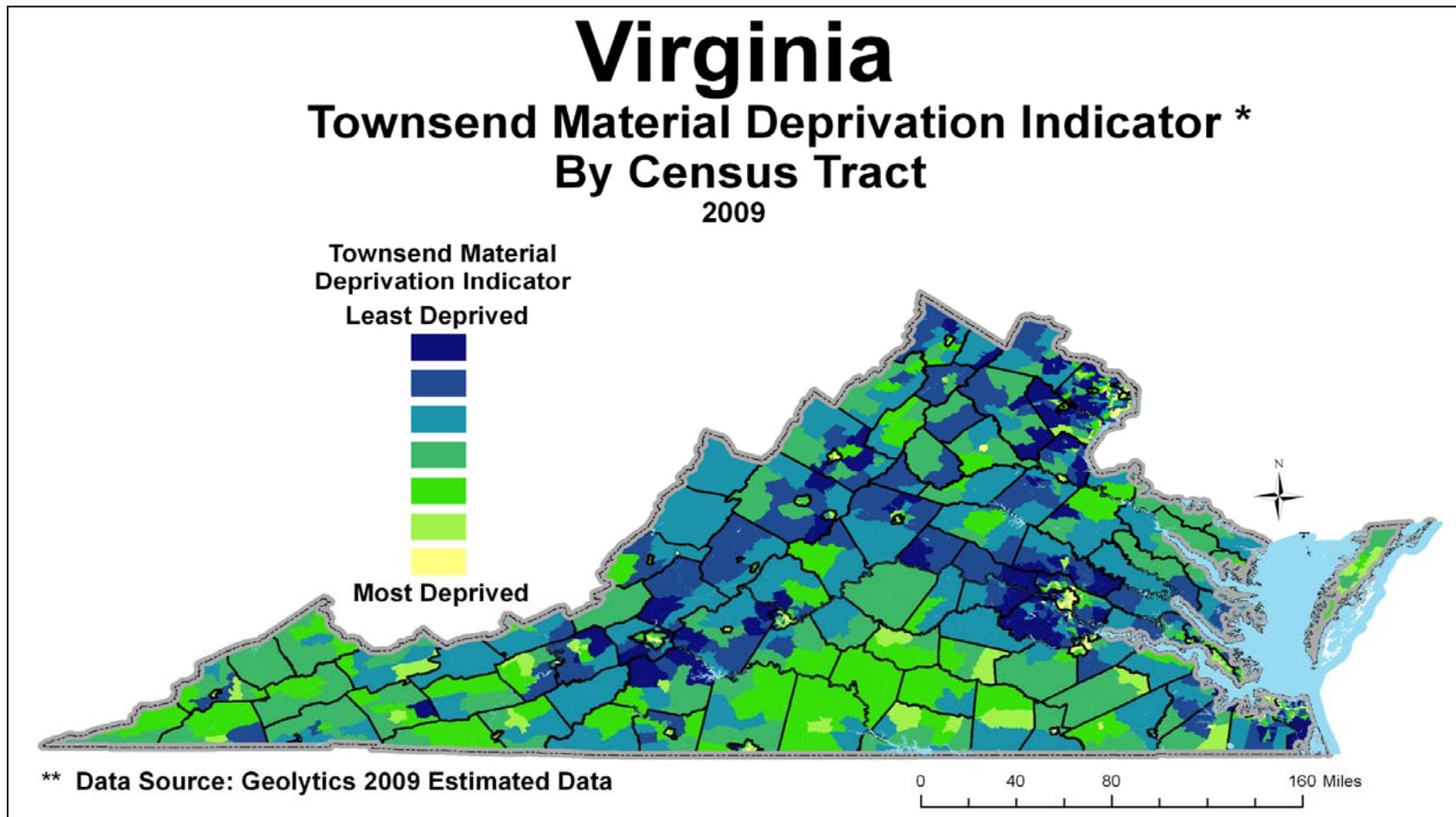
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Indicator: Townsend Material Deprivation

Townsend deprivation index is a measure of material deprivation. The index uses four equally weighted variables to calculate the score. These four variables are: (1) percent of economically active residents aged 16-59/64 who are unemployed, (2) percent of private households who do not possess a car or van, (3) percent of private households not owner occupied and (4) percent of private households overcrowded (more than one person). In calculating this index, first, percent unemployment and percent private household overcrowded are log transformed and after that, a Z score is calculated for the four variables and they are summed up to get composite index for deprivation. *The higher the Townsend Index score, the more deprived and disadvantaged an area is thought to be.*

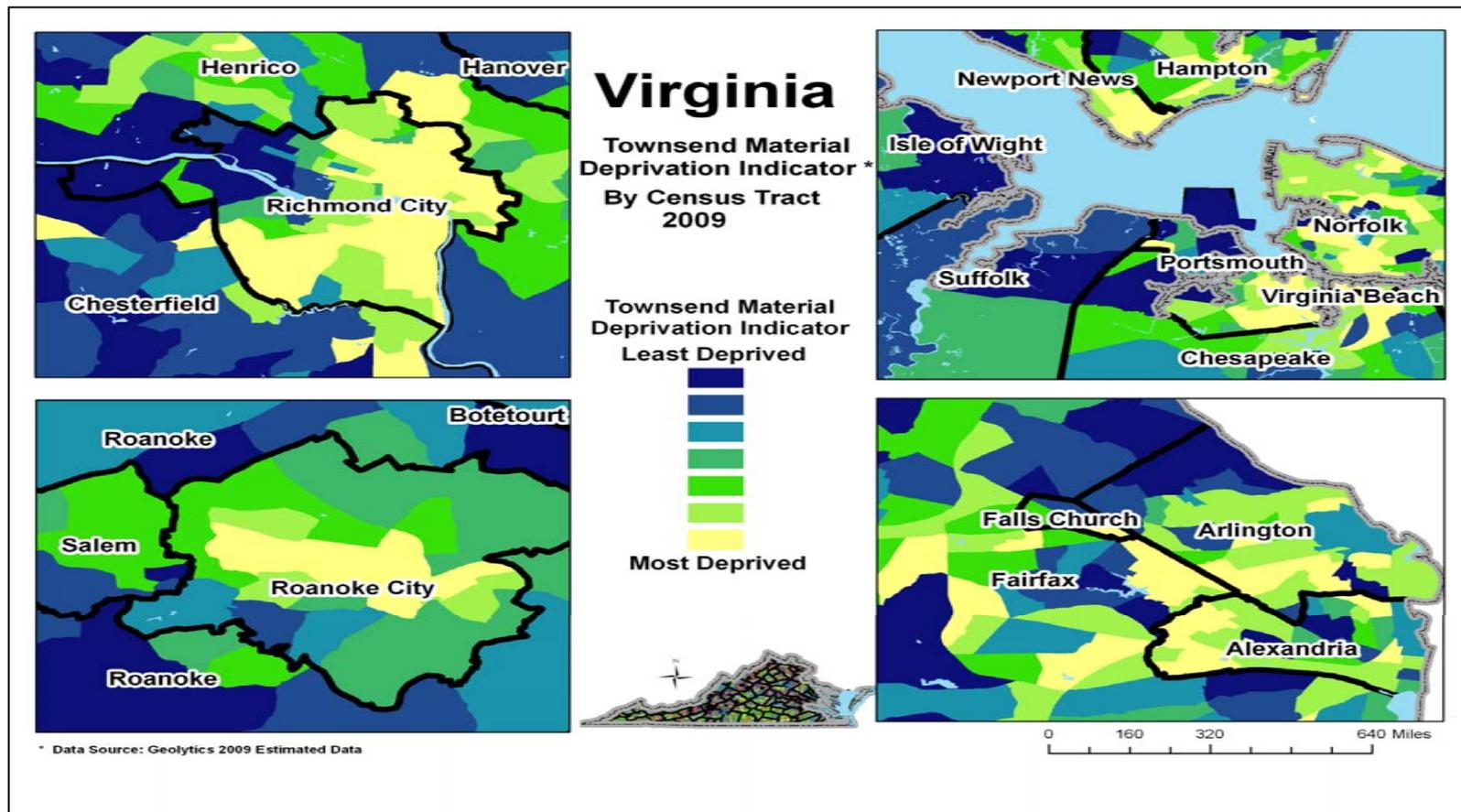
The Dark areas are least deprived while the yellow areas are more deprived



This map shows the Richmond metro area (upper left corner), Hampton Roads area (Upper right corner), Roanoke metro (Lower left corner) and Northern Virginia (lower right corner).

Townsend deprivation index is a measure of material deprivation. The index uses four equally weighted variables to calculate the score. These four variables are: (1) percent economically active residents aged 16-59/64 who are unemployed, (2) percent private households who do not possess a car or van, (3) percent private households not owner occupied and (4) percent private households overcrowded (more than one person per room). In calculating this index, first, percent unemployment and percent private household overcrowded are log transformed and after that, a Z score is calculated for the four variables and they are summed up to get composite index for deprivation. *The higher the Townsend Index score, the more deprived and disadvantaged an area is thought to be.*

The dark areas are least deprived while the yellow areas are more deprived.

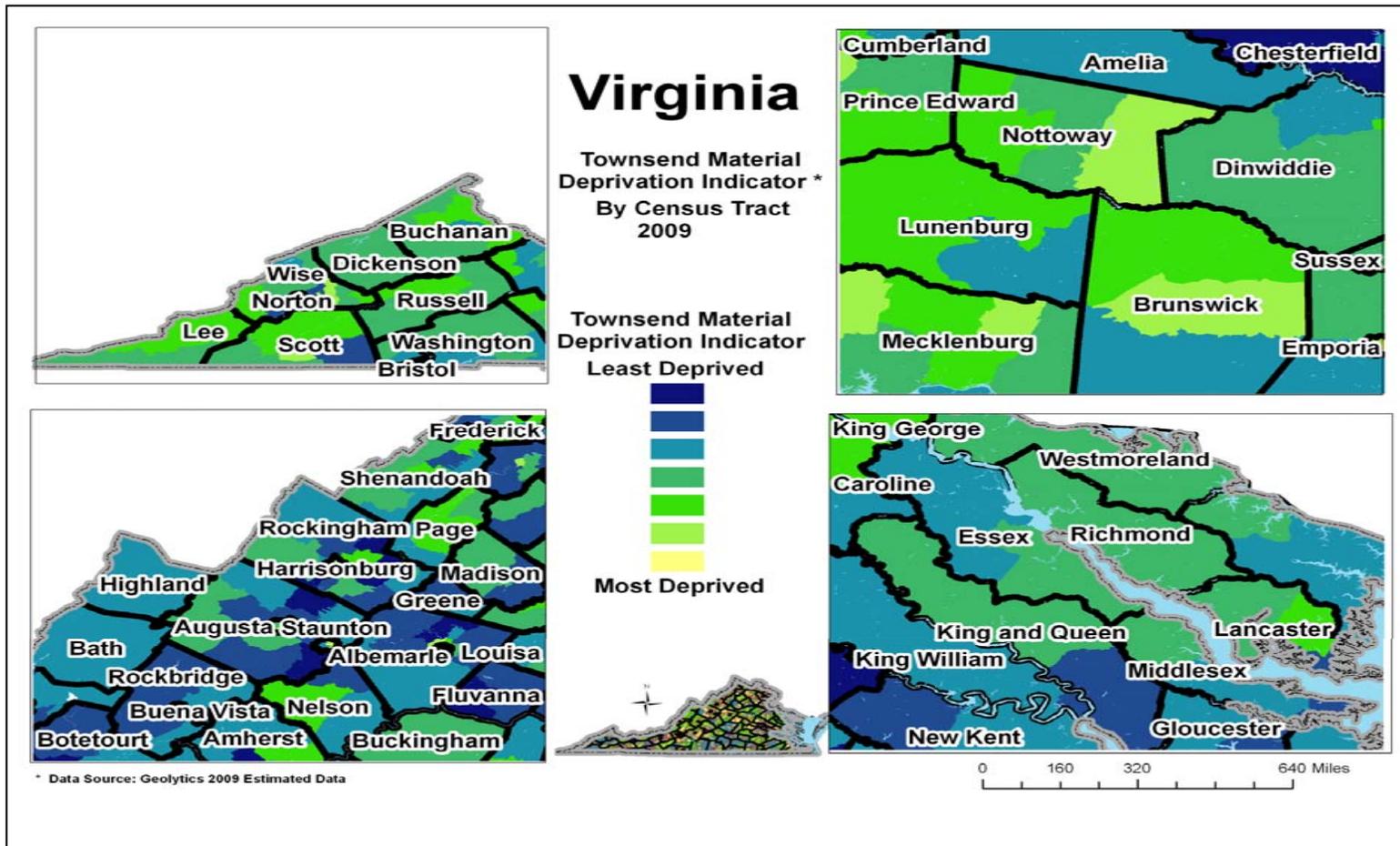


This

map shows the Southwest Virginia (upper left corner), Southside Virginia (Upper right corner), Bath~Rockingham counties area (Lower left corner) and Northern Neck (lower right corner).

Townsend deprivation index is a measure of material deprivation. The index uses four equally weighted variables to calculate the score. These four variables are: (1) percent economically active residents aged 16-64 who are unemployed, (2) percent private households who do not possess a car or van, (3) percent private households not owner occupied and (4) percent private households overcrowded (more than one person per room). In calculating this index, first, percent unemployment and percent private household overcrowded are log transformed and after that, a Z score is calculated for the four variables and they are summed up to get composite index for deprivation. *The higher the Townsend Index score, the more deprived and disadvantaged an area is thought to be*

The dark areas are least deprived while the yellow areas are more deprived.



Appendix B

Life Expectancy & HOI Relationship

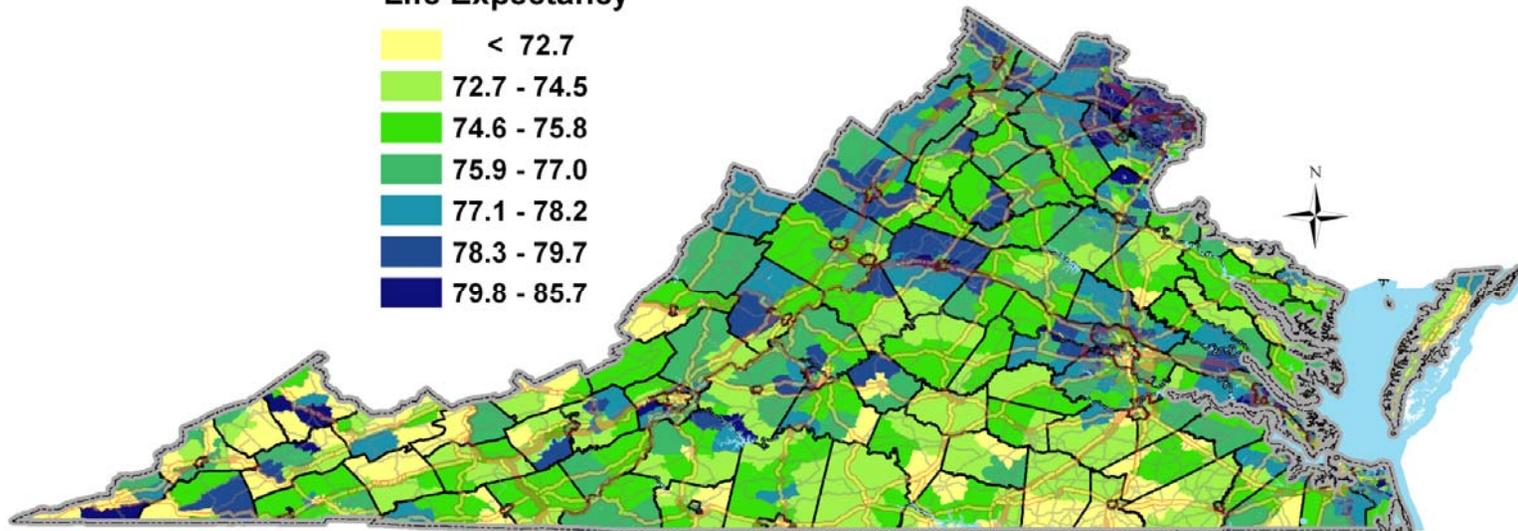
This map shows life expectancy at birth by census tract. It is an average number of years that a person can expect to live after birth. The yellow color areas indicate that a person born is expected to live less than 72.7 years which is six years below the State average. Meanwhile, the darker color areas indicate that persons born in these areas are expected to live up to 79.8 to 85.7 years before they die. Compare to the State average, these areas have life expectancy above the State average.

Virginia

Life Expectancy at Birth * in Years By Census Tract

2005~2009

Life Expectancy **



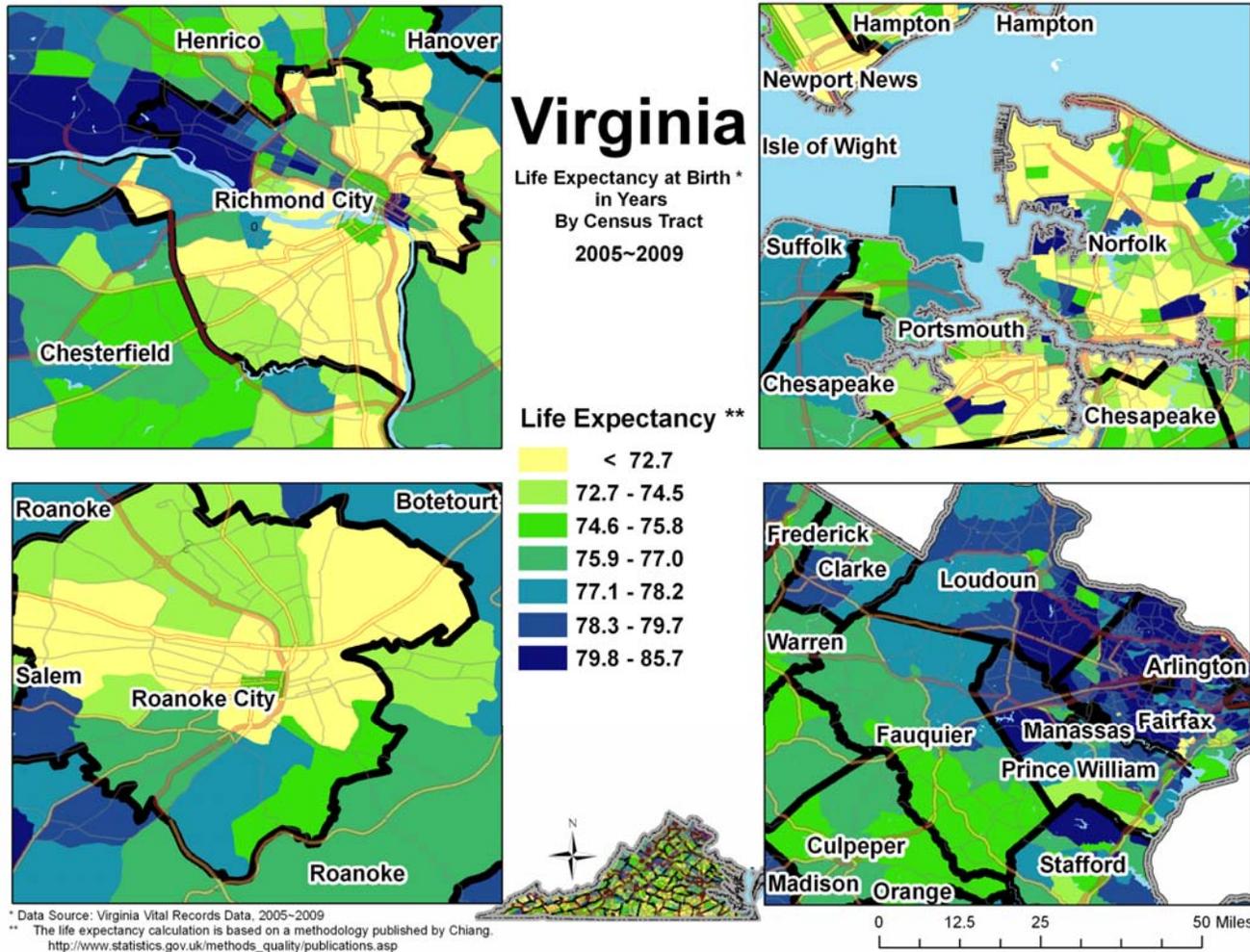
* Data Source: Virginia Vital Records Data, 2005~2009

** The life expectancy calculation is based on a methodology published by Chiang.
http://www.statistics.gov.uk/methods_quality/publications.asp

0 0.5 1 2 Miles

This map shows the Richmond metro area (upper left corner), Hampton Roads area (Upper right corner), Roanoke metro (Lower left corner) and Northern Virginia (lower right corner).

This map shows life expectancy at birth by census tract. It is an average number of years that a person can expect to live after birth. The yellow color areas indicate that a person born is expected to live less than 72.7 years which is six years below the State average. Meanwhile, the darker color areas indicate that persons born in those areas are expected to live up to 79.8 to 85.7 years before they die. Compare to the State average, these areas have life expectancy above the State average.

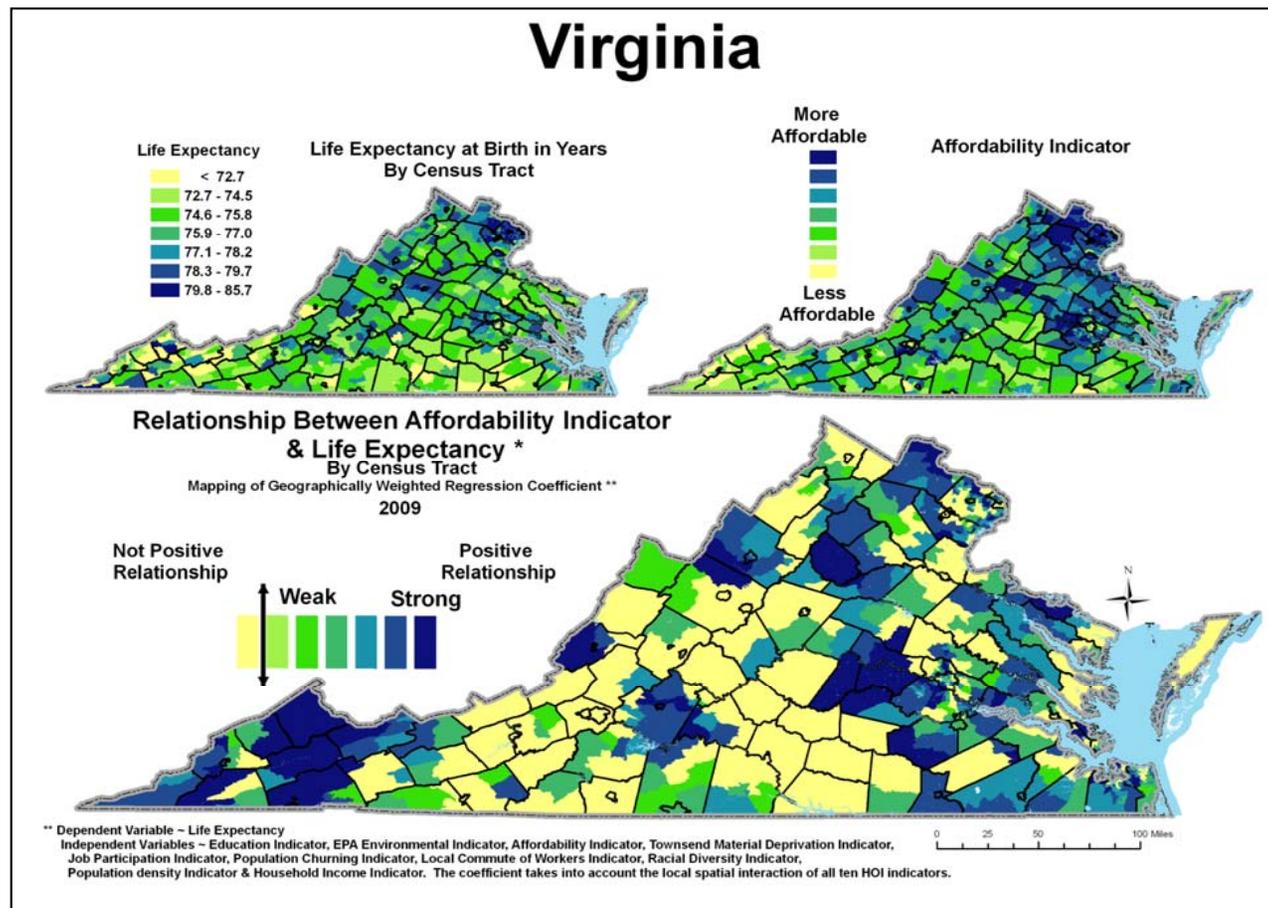


The right corner map shows the Affordability Indicator and the indicator of affordability is calculated by combining housing and transportation costs in a neighborhood and dividing that number by income. The indicator shows that housing and transportation costs vary significantly across Virginia. Affordability indicator is composed of three variables. (1). Housing cost, (2) transportation cost and (3) total income. ***The indicator measures housing and transportation as a percent of the total income and so the higher the index, the higher the percent of income spent on housing and transportation.***

For example the yellow areas means, persons in these areas spend more of their total income on transportation and housing. The dark areas means that persons in these areas spend less of their total income on housing and transportation the darker areas indicate that, persons in these areas spend less proportion of their total

The left corner map shows the life expectancy at birth between 2005~2009

The base map shows the coefficient of the interaction between life expectancy and affordability indicator and the dark areas show positive relationship while the yellow

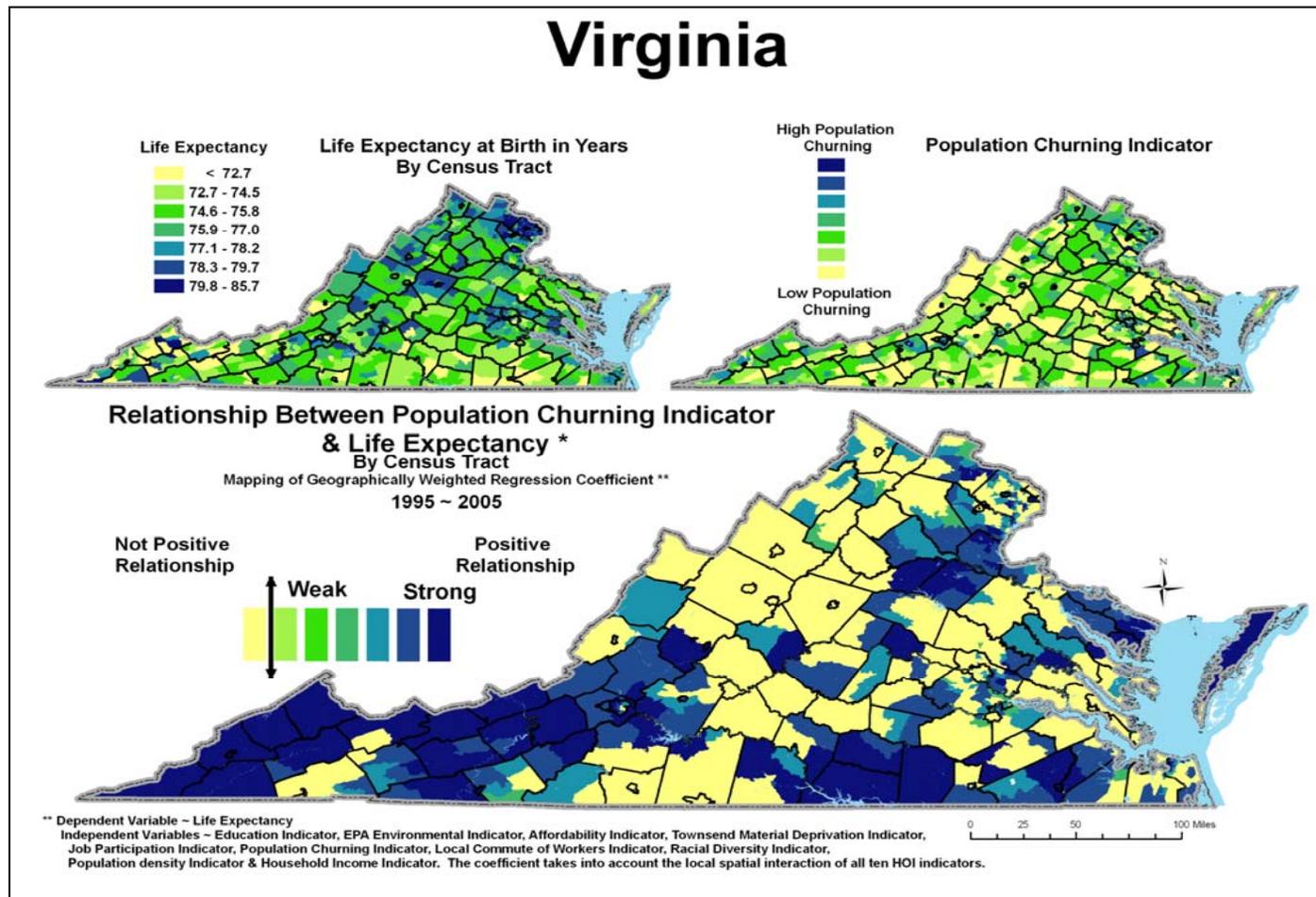


The right corner map shows the Population churning rates which relate the combined inflow and outflow for an area to the resident population and help to quantify the stability of a population in an area. The indicator uses the census mobility data that shows the mobility for 5 years by census tract.

The scale shows an annual churning rate by census tract. The darker areas indicate that such areas experienced more population turn-over compared to the yellow areas

The left corner map shows the life expectancy at birth between 2005~2009

The base map shows the coefficient of the interaction between life expectancy and population churning and the dark areas show positive relationship while the yellow areas show no positive relationship.



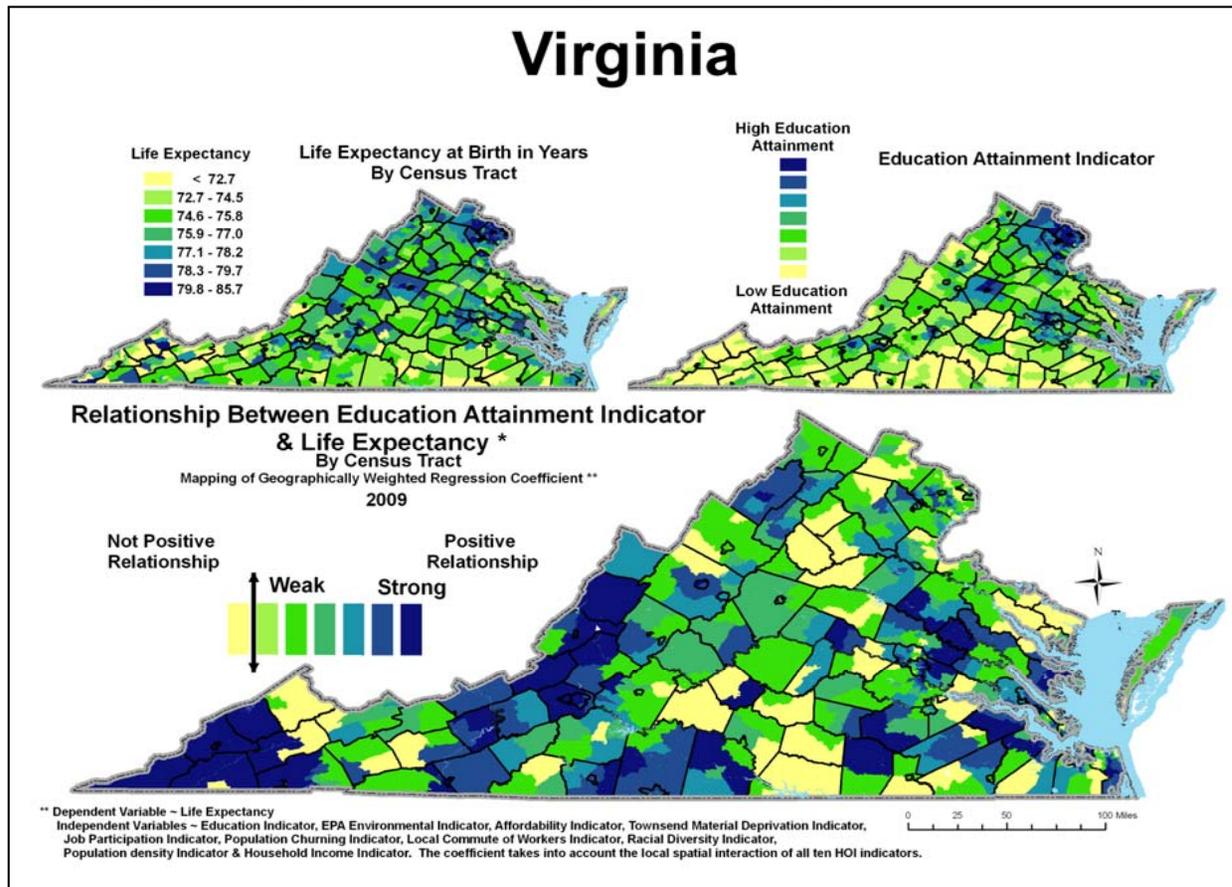
The right corner map shows the Education Attainment indicator which is composed of literacy rate (ability of read and write) and gross enrollment ratio (from kindergarten to postgraduate education).

These two sub-indices are weighted (Attainment is weighted 2/3 while Enrollment is weighted 1/3) and sum together to get a composite education indicator.

This indicator is scale-less and therefore darker areas indicate perfect education attainment while the yellow areas indicate less education attainment.

The left corner map shows the life expectancy at birth between 2005~2009

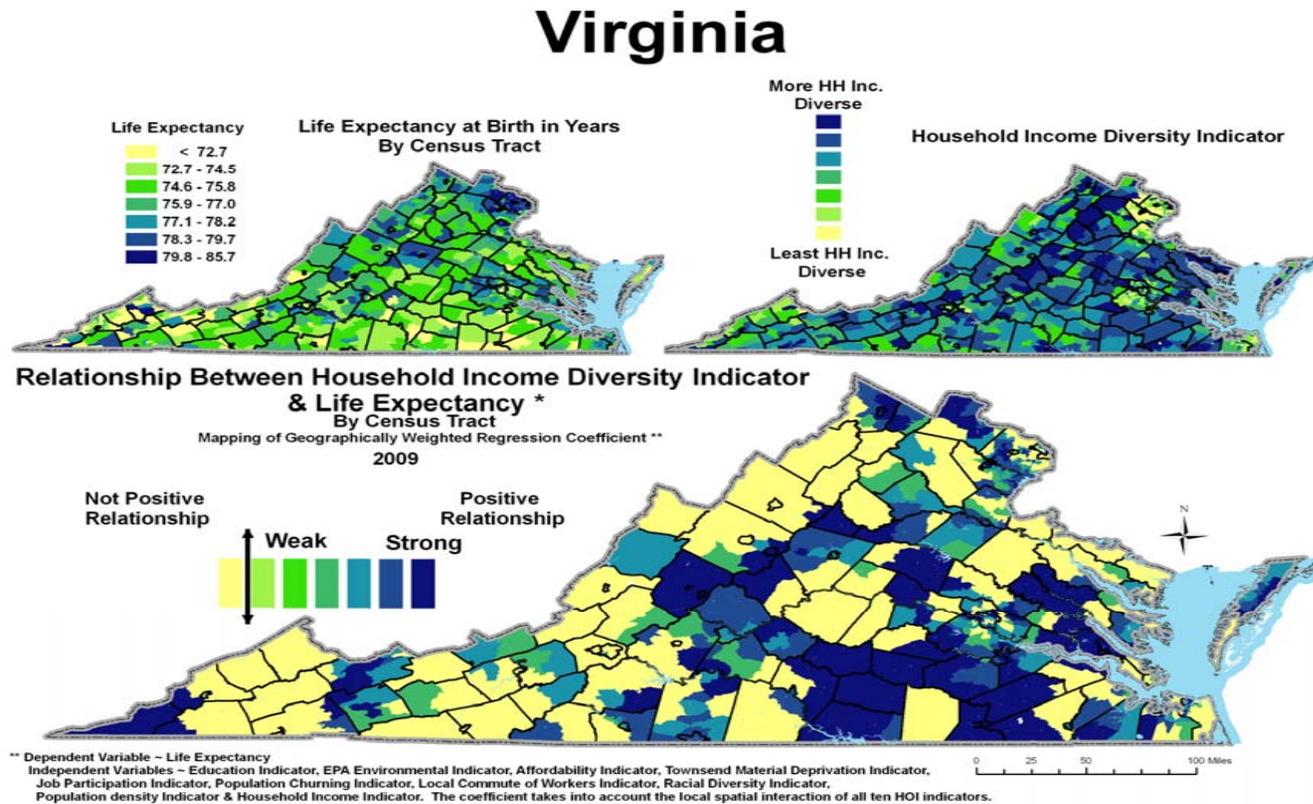
The base map shows the coefficient of the interaction between life expectancy and Education Attainment indicator and the dark areas show positive relationship while the yellow areas show no positive relationship.



The right corner map shows the Household Income Diversity. This aspect of diversity refers to a variance in household economic status within the same census tract. The indicator was measured by using all the 10 income ranges in census data comprising households with annual incomes of less than \$15,000, \$15,000 to \$24,999, \$25,000 to \$34,999, \$35,000 to \$49,999, \$50,000 to \$74,999, \$75,000 to \$99,999, \$100,000 to \$149,999, \$150,000 to \$249,999, \$250,000 to \$499,999, and \$500,000 or more. **A yellow color indicates that the area is more homogeneous in terms of household income and vice versa. What this means is that, if you select two houses at random, the probability (chance) that both houses will belong to different income levels is less.**

The left corner map shows the life expectancy at birth by census tract from 2005~2009

The base map shows the coefficient of the interaction between life expectancy and Household Income Diversity and the dark areas show positive relationship while the yellow areas show no positive relationship.

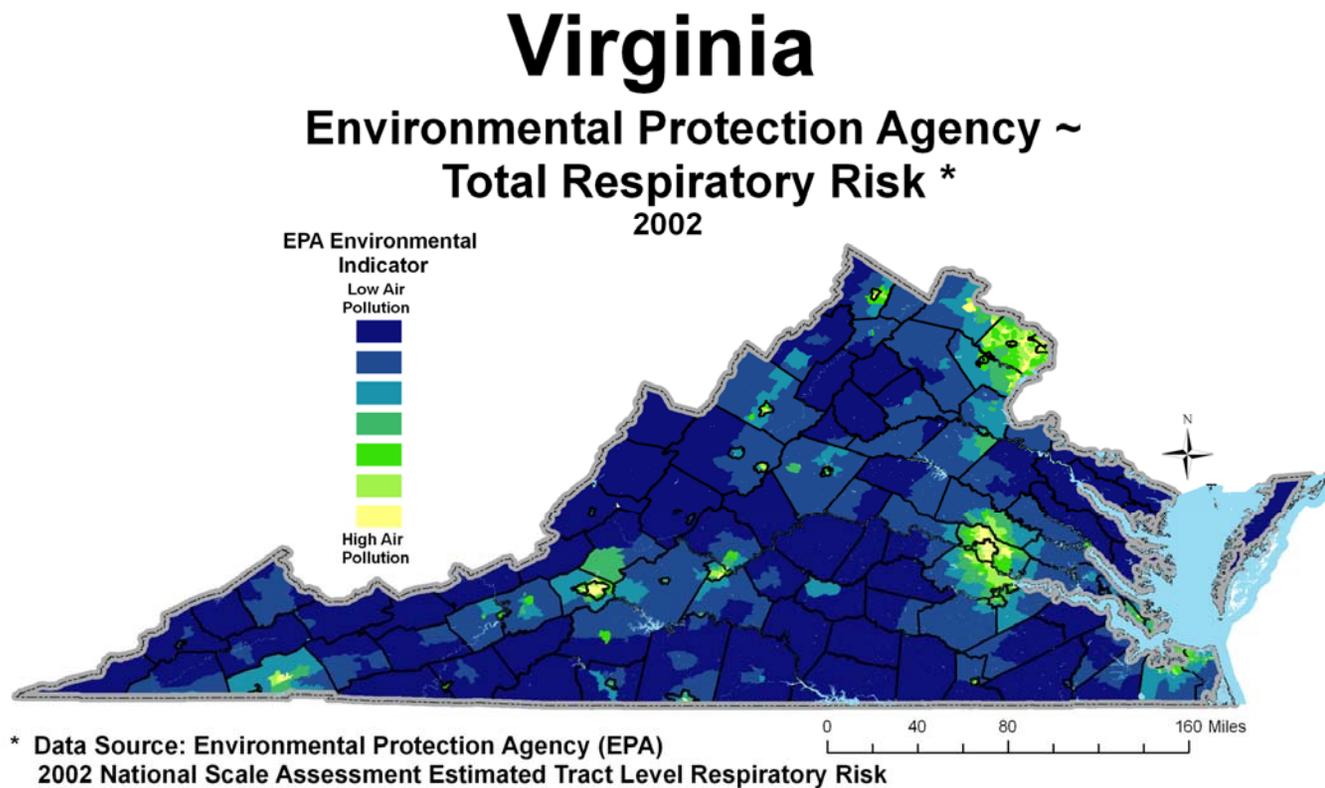


The right corner map shows the environmental indicator which was computed using EPA NATA Environmental Data to evaluate the magnitude of air pollution by census tract. This Database contains, three risk variables, namely cancer risk, respiratory risk and neurological risk. All these variables were standardized to Z-Score and summed up to construct the hazard quotients of the air toxics compounds that affect the respiratory or nervous system.

The dark areas are least environmental polluted while the yellow areas are more environmental polluted area

The left corner map shows the life expectancy at birth by census tract from 2005~2009

The base map shows the coefficient of the interaction between life expectancy and EPA environmental indicator and the dark areas show positive relationship while the yellow areas show no positive relationship.

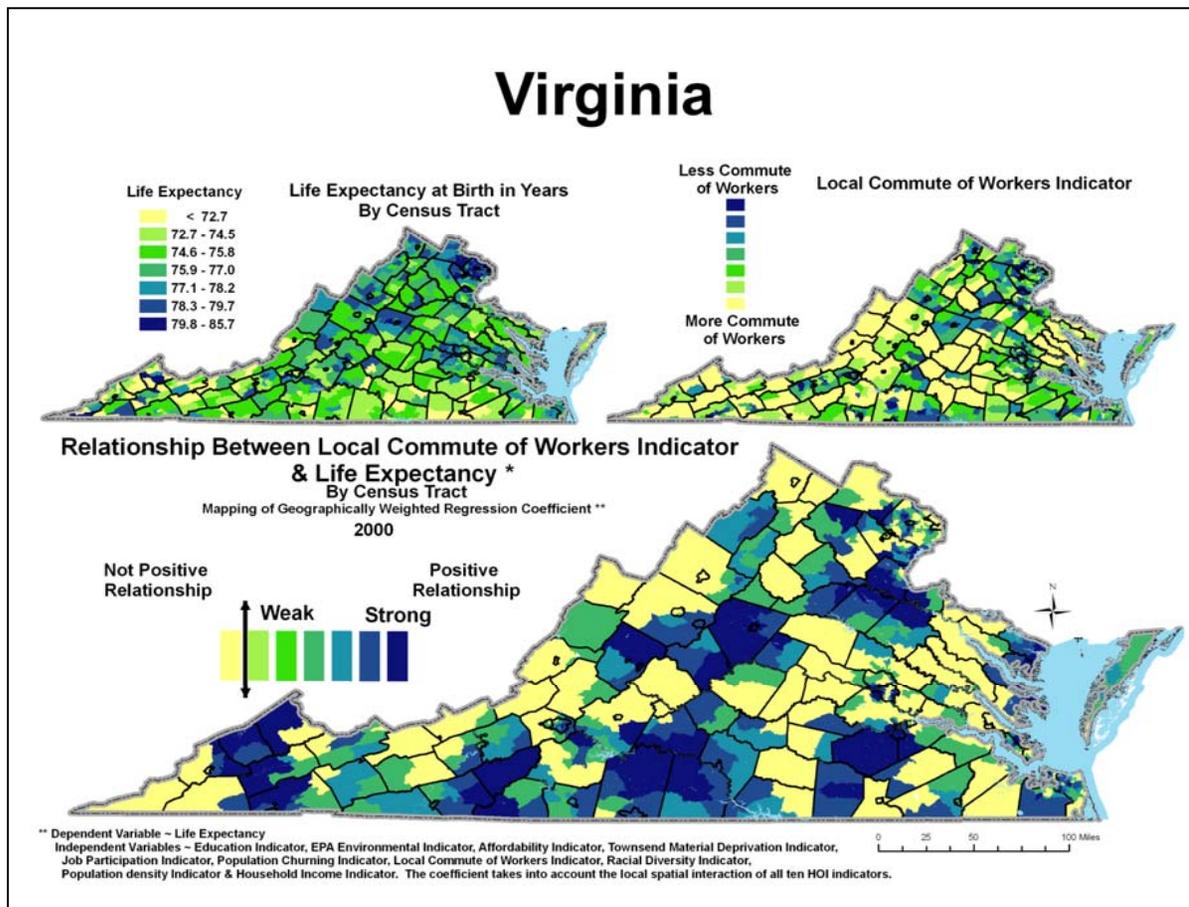


The right corner map shows the Commuting pattern based on Census Transportation Planning Package (CTPP) data which is used to indicate in flow and outflow of workers of an area. This is the ratio of inflow plus outflow divided by total resident work force in the area in question. This is an indicator of the mismatch between the labor force and employment opportunity inside an area and outside an area. This mismatch between labor force and employment can increase commuting cost for individuals.

Interpretation: The darker areas indicate the more job rich the area and therefore less commute while the yellow areas indicate majority of persons in these areas commute to work in other census tracts.

The left corner map shows the life expectancy at birth by census tract from 2005~2009

The base map shows the coefficient of the interaction between life expectancy and Commuting pattern and the dark areas show positive relationship while the yellow areas show no positive relationship.



The right corner map shows Job Participation Rate which measures the percent of population over 16 years of age to 64 who are either employed or unemployed and seeking work. Because job participation rates are sensitive to a number of local community attributes, e.g., educational attainment, disability, household composition, car ownership, the measure can provide a sensitive indicator to the unique employment profile of a community. Job participation rate is often used by economists as an indicator for economic development and growth.

The darker area means that, there is high percentage of active labor force of the area.

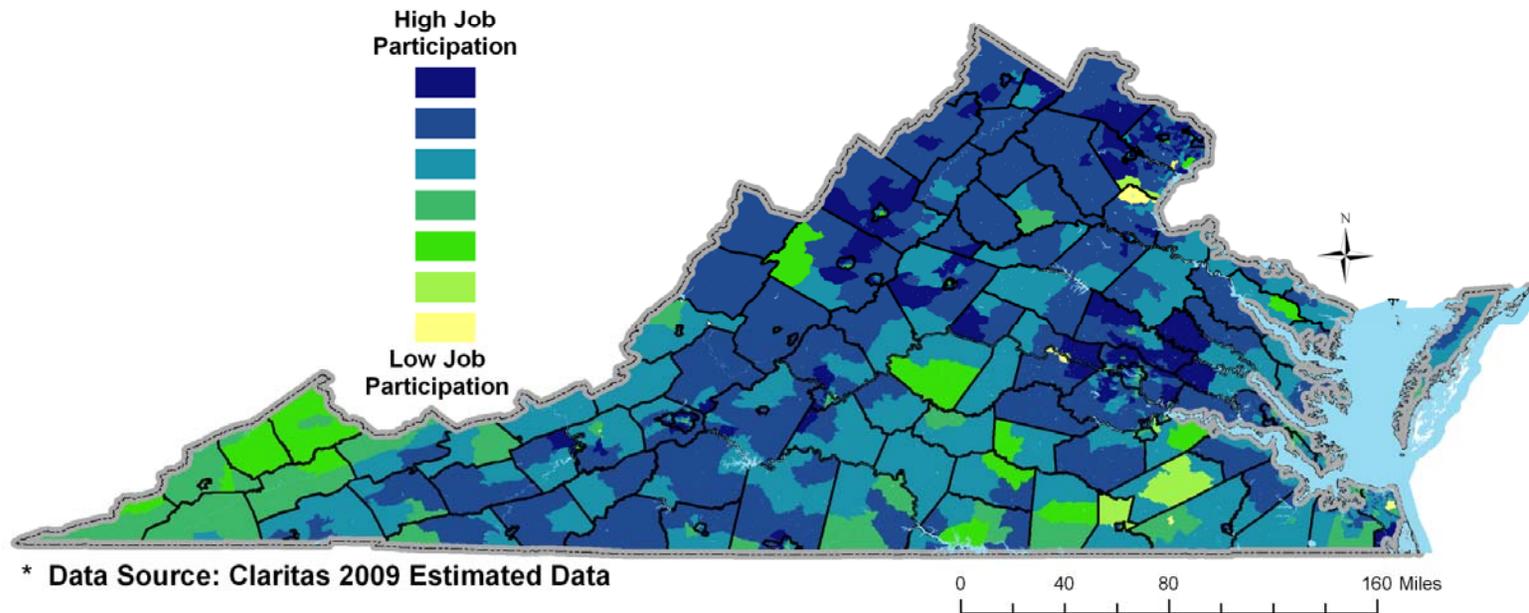
The left corner map shows the life expectancy at birth by census tract from 2005~2009

The base map shows the coefficient of the interaction between life expectancy and job participation rate and the dark areas show positive relationship while the yellow areas show no positive relationship.

Virginia

Job Participation Indicator By Census Tract *

2009



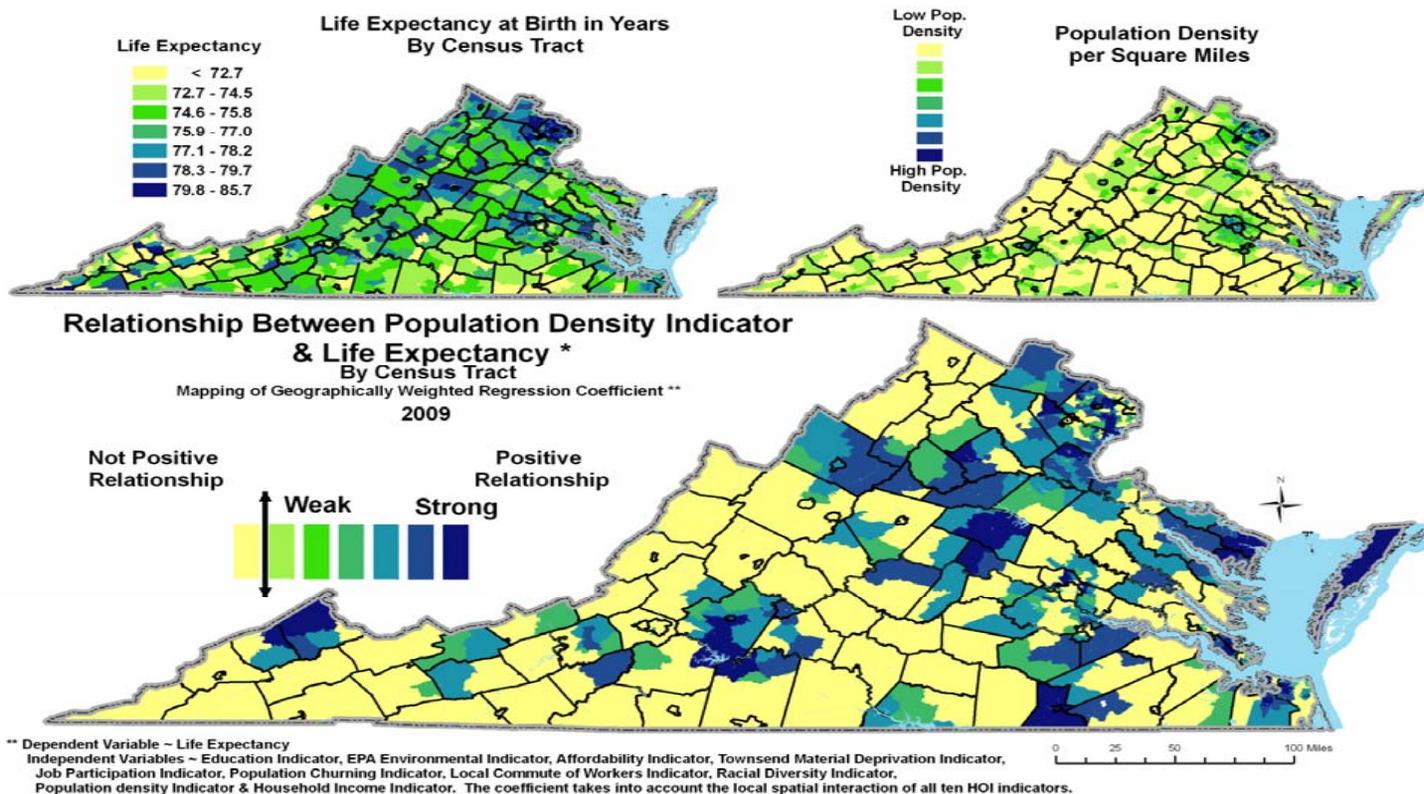
* Data Source: Claritas 2009 Estimated Data

The right corner map shows population density indicator and this indicator is calculated by dividing the total population by the square miles in the area under study. *The darker areas indicate that, high population concentration per square miles. While the yellow areas indicate low population concentration*

The left corner map shows the life expectancy at birth by census tract from 2005~2009

The base map shows the coefficient of the interaction between life expectancy and population density and the dark areas show positive relationship while the yellow areas show no positive relationship. This indicator differentiates the urban from rural areas as well as land use.

Virginia

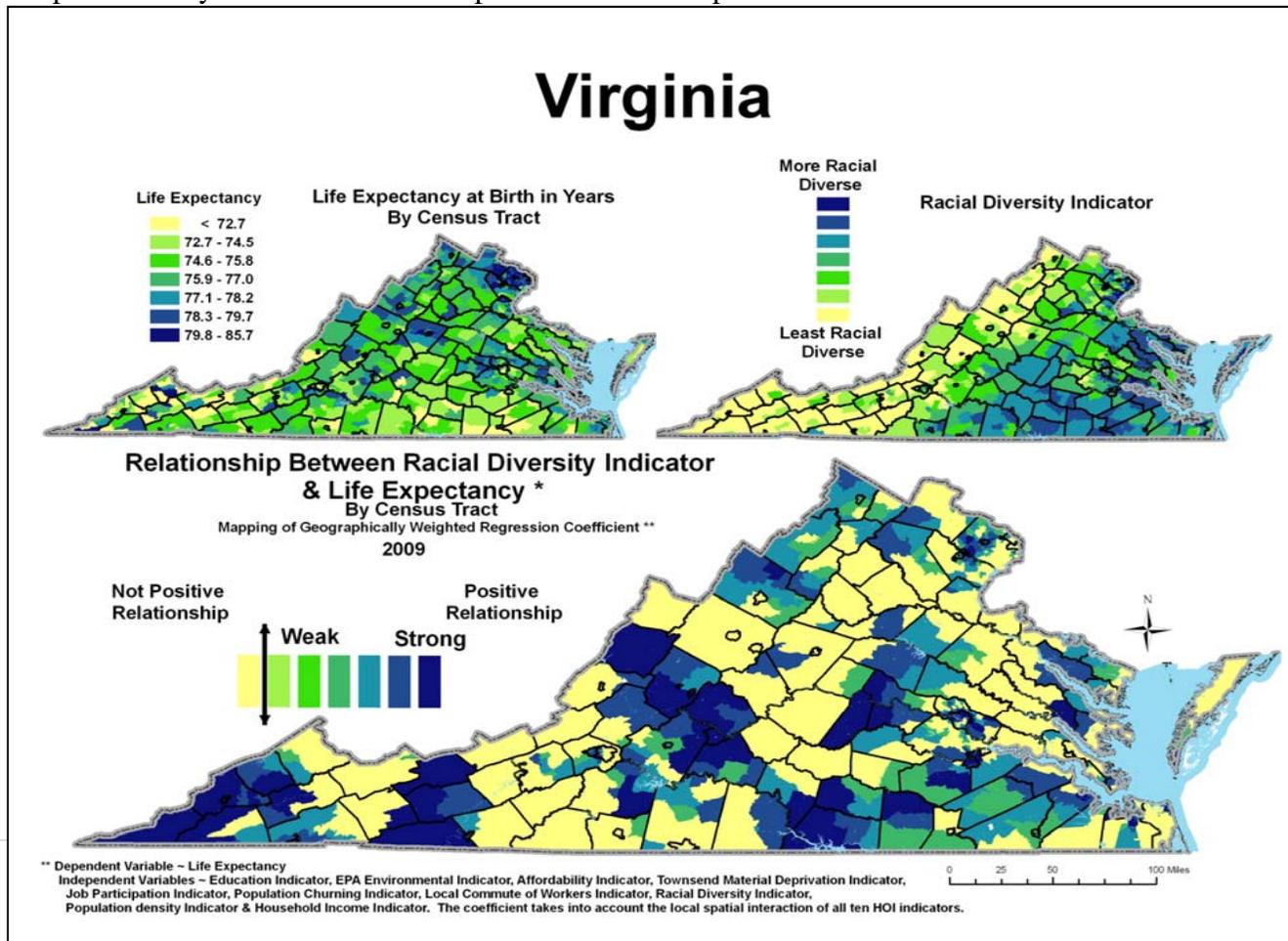


The right corner map shows the Racial Diversity Indicator which identifies the probability that two persons, chosen at random from the street will belong to different race or ethnic groups. The calculation of this index accommodates up to seven race groups: six single-race groups (White, Black, American Indian, Asian, Pacific Islander, Some Other Race) and one multiple-race group (two or more races). The Diversity Indicator is bounded and ranges from 0 to 1. Zero indicates no diversity (homogeneous population) while 1 signifies that there is complete diversity (heterogeneous population). *If an area's entire population belongs to one race group, then an area has zero diversity. An area's diversity index increases to 1 when the population is evenly divided into two or more race/ethnic groups.*

This is probabilistic model and the yellow areas means that, if two persons are selected at random on the street, there is less probability that these persons will belong to different racial groups. Meanwhile, the darker areas indicate that there is high probability that, these two persons will belong to different racial groups

The left corner map shows the life expectancy at birth by census tract from 2005~2009

The base map shows the coefficient of the interaction between life expectancy and racial diversity indicator and the dark areas show positive relationship while the yellow areas show no positive relationship.



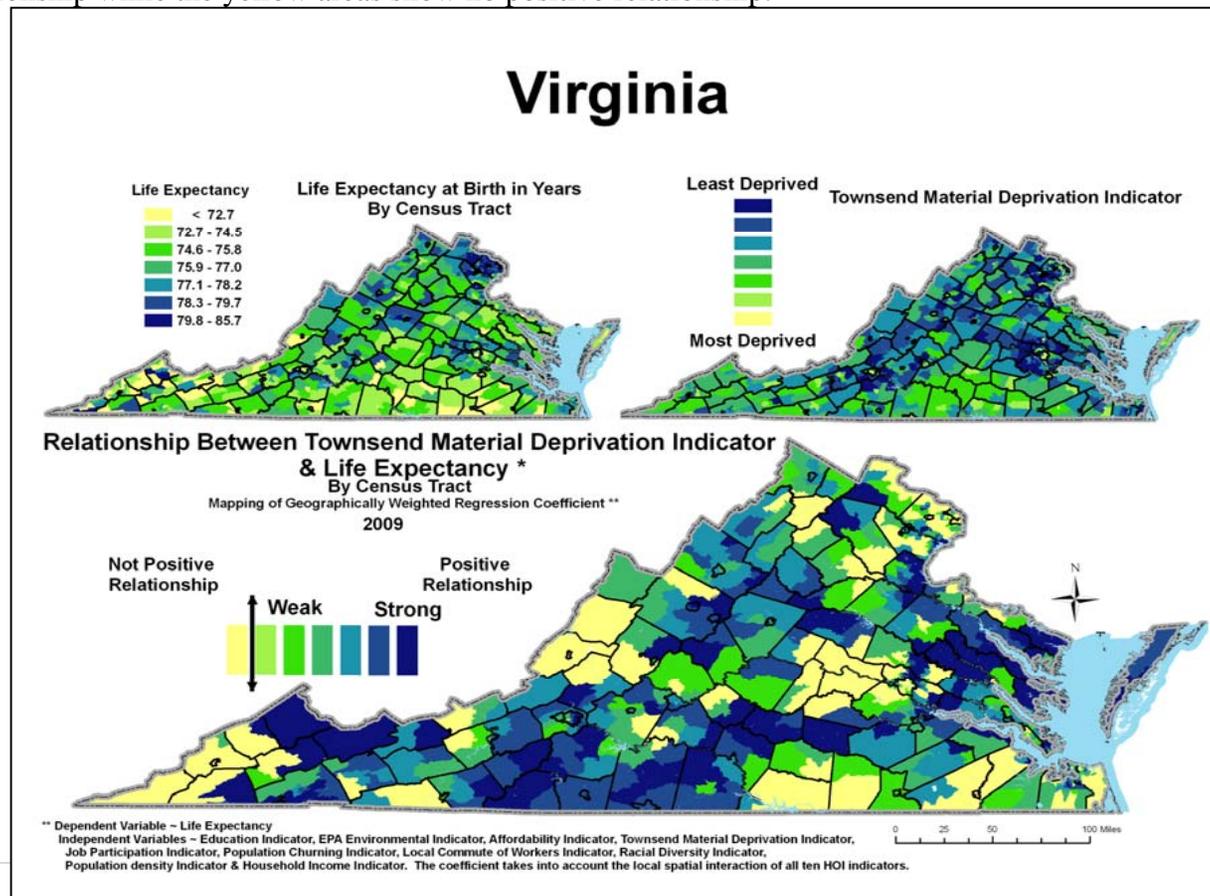
The right corner map shows Townsend deprivation index which is a measure of material deprivation. The index uses four equally weighted variables to calculate the score. These four variables are: (1) percent economically active residents aged 16-59/64 who are unemployed, (2) percent private households who do not possess a car or van, (3) percent private households not owner occupied and (4) percent private households overcrowded (more than one person per room). In calculating this index, first, percent unemployment and percent private household overcrowded are log transformed and after that, a Z score is calculated for the four variables and they are summed up to get composite index for deprivation. ***The higher the Townsend Index score, the more deprived and disadvantaged an area is thought to be.***

The Dark areas are least deprived while the yellow areas are more deprived.

In the Health Opportunity Index it can be seen that, Southwest and Southside Virginia, have low health opportunity (green areas) compared to the darker areas.

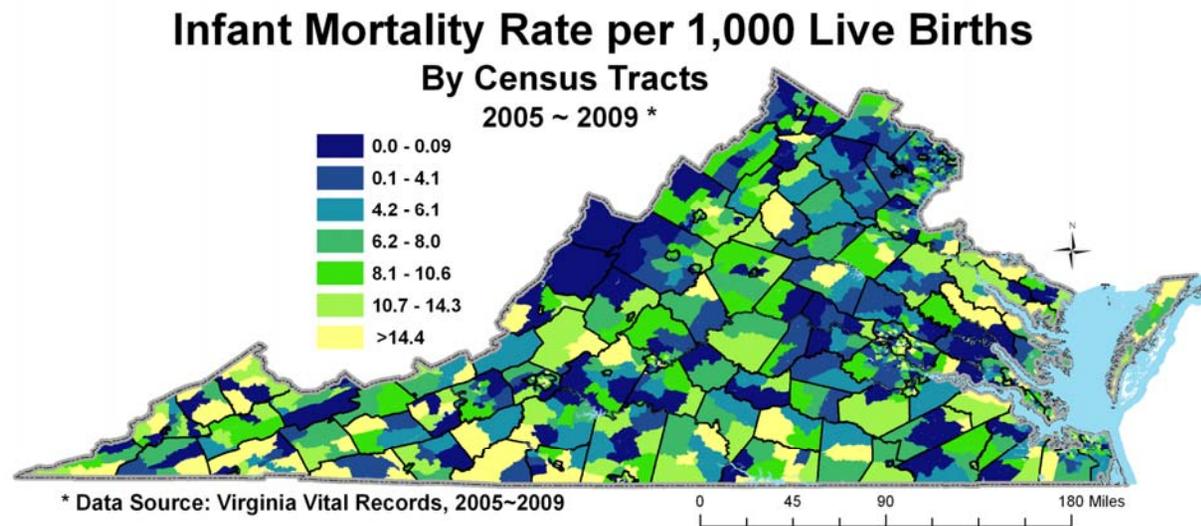
The left corner map shows the life expectancy at birth by census tract from 2005~2009

The base map shows the coefficient of the interaction between life expectancy and Townsend deprivation indicator and the dark areas show positive relationship while the yellow areas show no positive relationship.



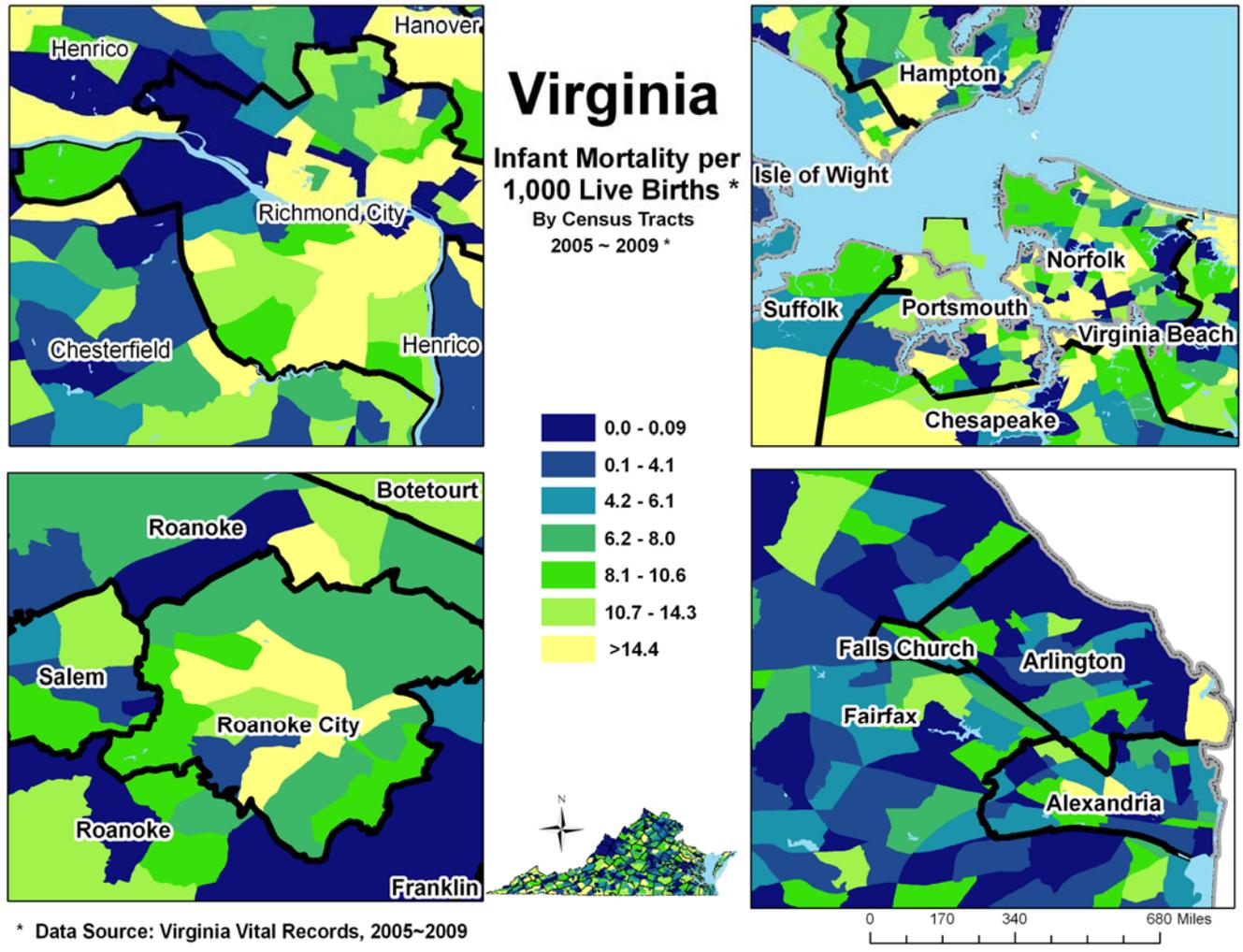
Appendix C

The map shows Infant Mortality Rate per 1000 live births by census tract for a period between 2005~2009 in Virginia. The darker areas show low rate per 1000 live births while the light areas show high infant mortality rate per 1000 live births. It can be seen that the high rates are found in the Southwest, Hampton Roads, Northern Neck and Southside areas of the State. Low rates are found in parts of Northern Virginia, Highland~Bath~Augusta Counties and Gloucester~Middlesex areas.



This map shows the Richmond metro area (upper left corner), Hampton Roads area (Upper right corner), Roanoke metro (Lower left corner) and Northern Virginia (lower right corner).

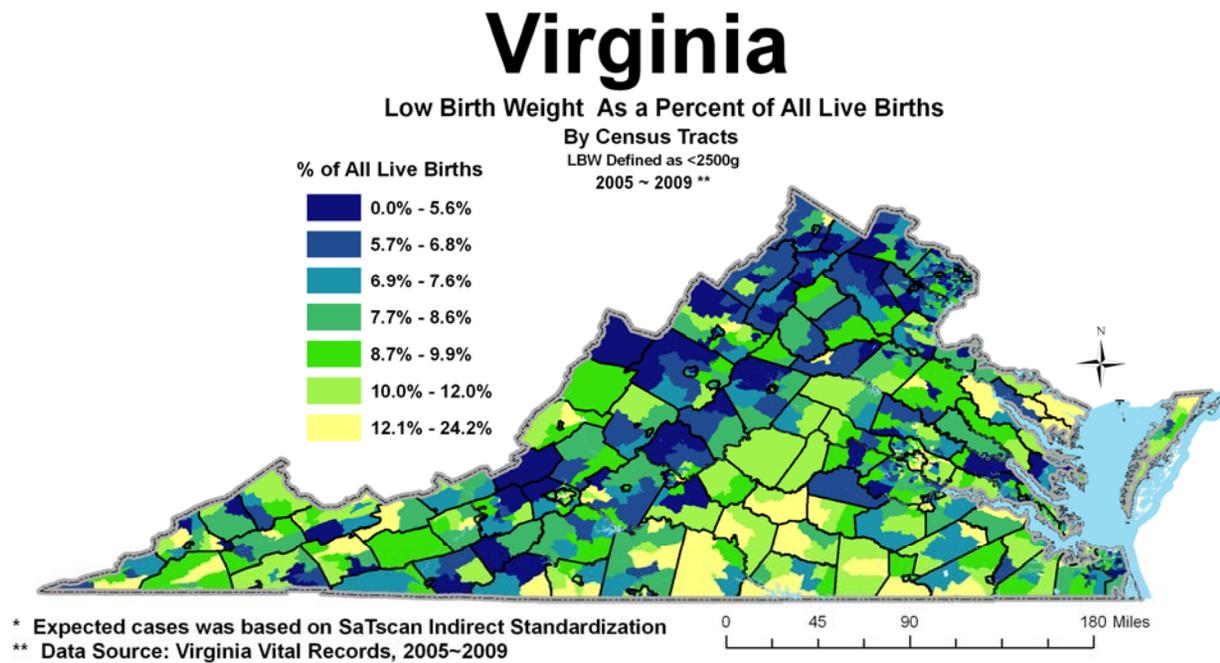
The map shows Infant Mortality Rate per 1000 live births by census tract for a period between 2005~2009 in Virginia. The darker areas show low rate per 1000 live births while the light areas show high infant mortality rate per 1000 live births. High rate of infant mortality are concentrated in Richmond area, Roanoke City, Hampton Roads and part of Arlington in Northern Virginia.



Appendix D

Low Birth Weight (LBW)

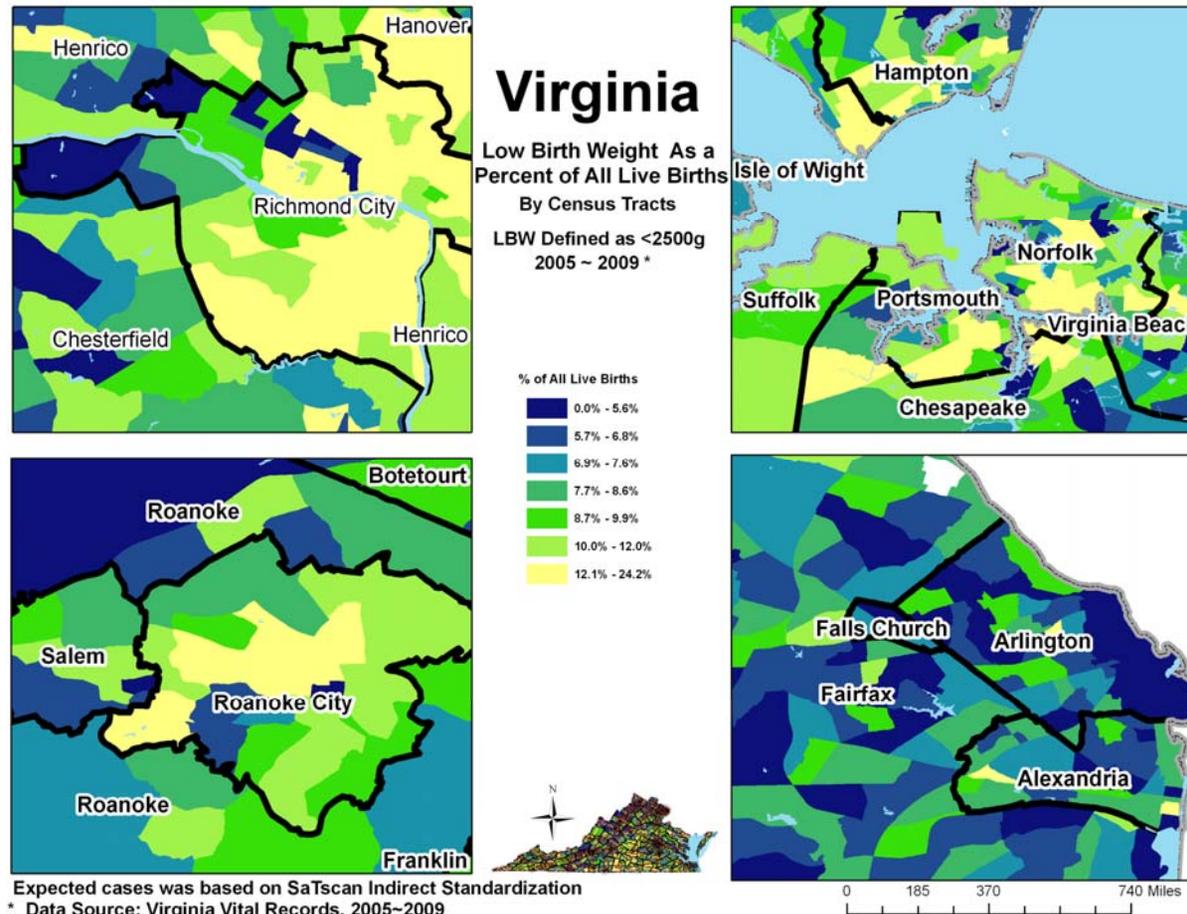
The map shows the Low Birth Weight as a percent of all live births by census tract for a period between 2005~2009 in Virginia. The darker areas show low percent of all live births while the light areas show high percent of all live births. High rates are found in the Southwest, Northern Neck and Southside areas of the State. Low rates are found in Northern Virginia, Highland Counties and Shenandoah areas.



This map shows the Richmond metro area (upper left corner), Hampton Roads area (Upper right corner), Roanoke metro (Lower left corner) and Northern Virginia (lower right corner).

The map shows the Low Birth Weight as a percent of all live births by census tract for a period between 2005~2009 in Virginia. The darker areas show low percent of all live births while the light areas show high percent of all live births.

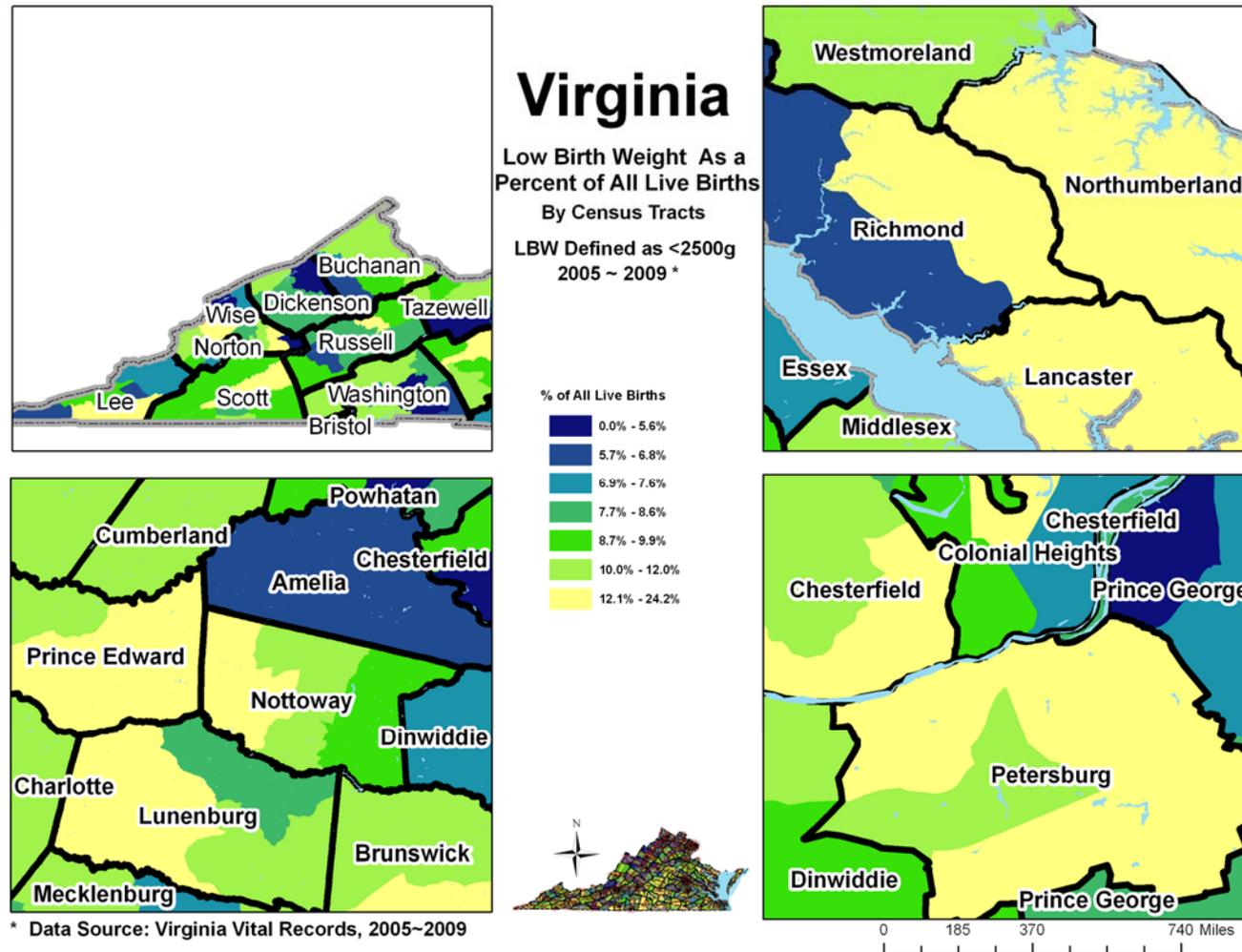
High rate of Low Birth weight are concentrated in Richmond City, Roanoke City and Hampton Roads areas.



This map shows the Southwest Virginia (upper left corner), Southside Virginia (Upper right corner), Northern Neck counties area (Lower left corner) and Colonial Heights~Petersburg (lower right corner).

The map shows the Low Birth Weight as a percent of all live births by census tract for a period between 2005~2009 in Virginia. The darker areas show low percent of all live births while the light areas show high percent of all live births.

High rate of Low Birth Weight are found in Northern Neck, Petersburg City, and part of Prince Edward~Lunenburg Counties.

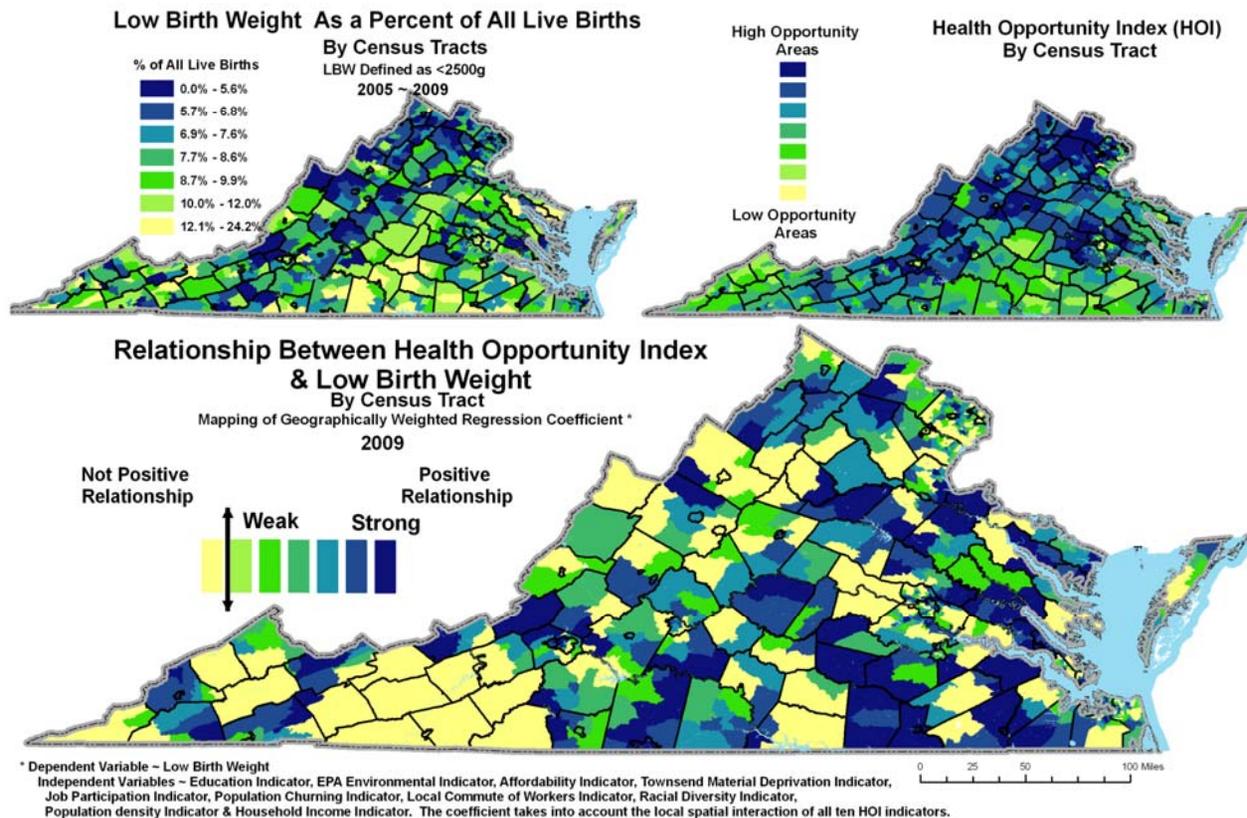


The right corner map shows the Health Opportunity Index and it can be seen that, Southwest and Southside Virginia, have low health opportunity (green areas) compared to the darker areas.

The left corner map shows the low birth weight as a percent of all live births by census tract and again it can be seen that Southwest and Southside Virginia area have high percent of low birth weight.

The base map shows the coefficient of the interaction between the low birth weight and HOI and the dark areas show positive relationship while the yellow areas show no positive relationship.

Virginia

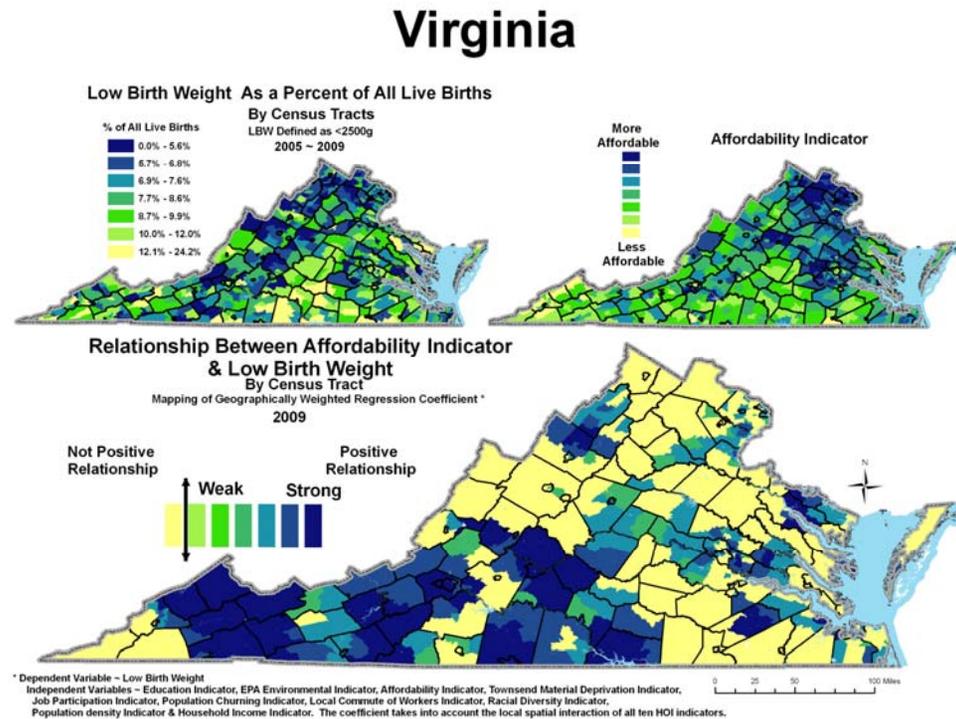


The right corner map shows the Affordability Indicator and the indicator of affordability is calculated by combining housing and transportation costs in a neighborhood and dividing that number by income. The indicator shows that housing and transportation costs vary significantly across Virginia. Affordability indicator is composed of three variables. (1). Housing cost, (2) transportation cost and (3) total income. ***The indicator measures housing and transportation as a percent of the total income and so the higher the index, the higher the percent of income spent on housing and transportation.***

For example the yellow areas means, persons in these areas spend more of their total income on transportation and housing. The dark areas means that persons in these areas spend less of their total income on housing and transportation the darker areas indicate that, persons in these areas spend less proportion of their total

The left corner map shows the low birth weight as a percent of all live births by census tract and low birth weight is defined as children born with weight less than 2500g.

The base map shows the coefficient of the interaction between the low birth weight and affordability indicator and the dark areas show positive relationship while the yellow areas show no positive relationship.



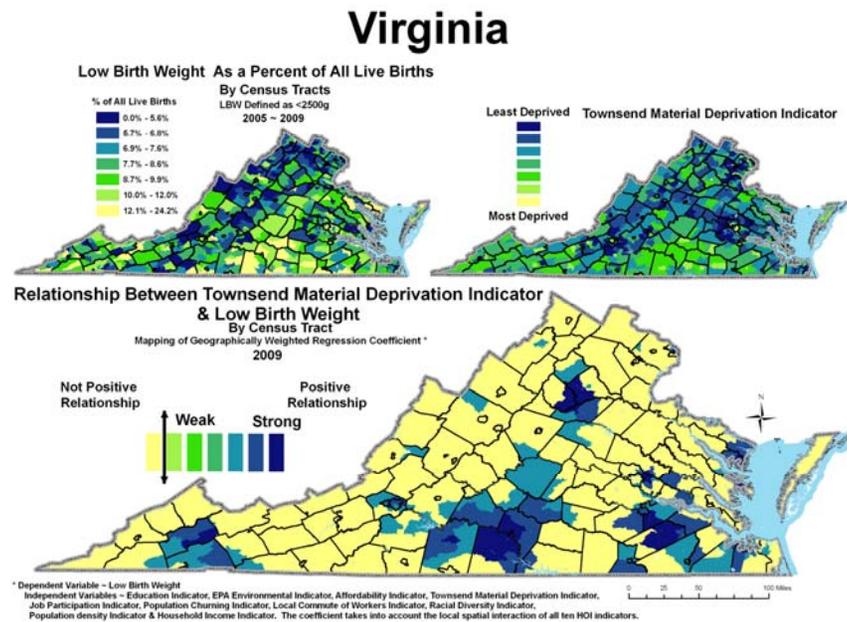
The right corner map shows Townsend deprivation index which is a measure of material deprivation. The index uses four equally weighted variables to calculate the score. These four variables are: (1) percent economically active residents aged 16-59/64 who are unemployed, (2) percent private households who do not possess a car or van, (3) percent private households not owner occupied and (4) percent private households overcrowded (more than one person per room). In calculating this index, first, percent unemployment and percent private household overcrowded are log transformed and after that, a Z score is calculated for the four variables and they are summed up to get composite index for deprivation. ***The higher the Townsend Index score, the more deprived and disadvantaged an area is thought to be.***

The Dark areas are least deprived while the yellow areas are more deprived.

The Health Opportunity Index can show that Southwest and Southside Virginia have low health opportunity (green areas) compared to the darker areas.

The left corner map shows the low birth weight as a percent of all live births by census tract and low birth weight is defined as children born with weight less than 2500g.

The base map shows the coefficient of the interaction between the low birth weight and Townsend deprivation indicator and the dark areas show positive relationship while the yellow areas show no positive relationship.

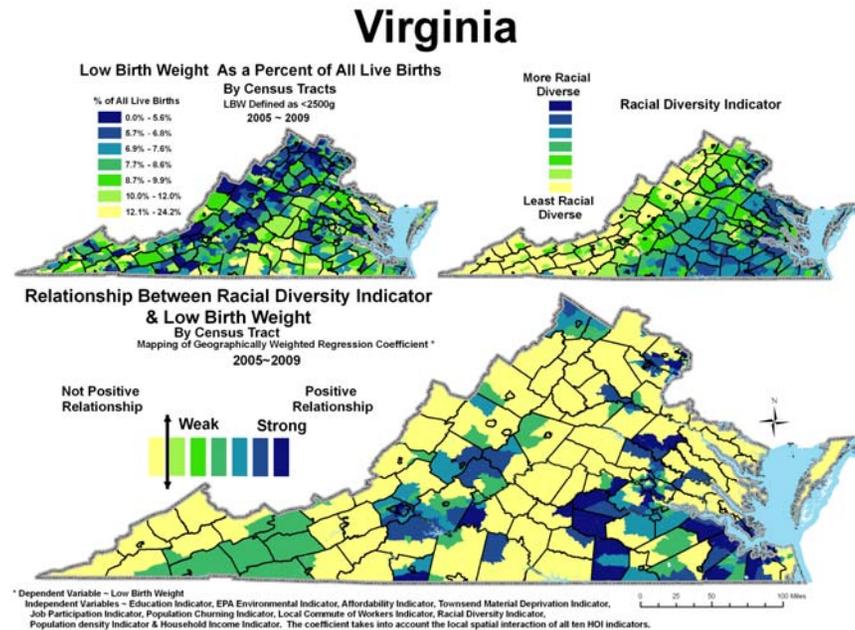


The right corner map shows the Racial Diversity Indicator which identifies the probability that two persons, chosen at random from the street will belong to a different race or ethnic group. The calculation of this index accommodates up to seven race groups: six single-race groups (White, Black, American Indian, Asian, Pacific Islander, Some Other Race) and one multiple-race group (two or more races). The Diversity Indicator is bounded and ranges from 0 to 1. Zero indicates no diversity (homogeneous population) while 1 signifies that there is complete diversity (heterogeneous population). *If an area's entire population belongs to one race group, then an area has zero diversity. An area's diversity index increases to 1 when the population is evenly divided into two or more race/ethnic groups.*

This is probabilistic model and the yellow areas means that, if two persons are selected at random on the street, there is less probability that these persons will belong to different racial groups. Meanwhile, the darker areas indicate that there is high probability that, these two persons will belong to different racial groups

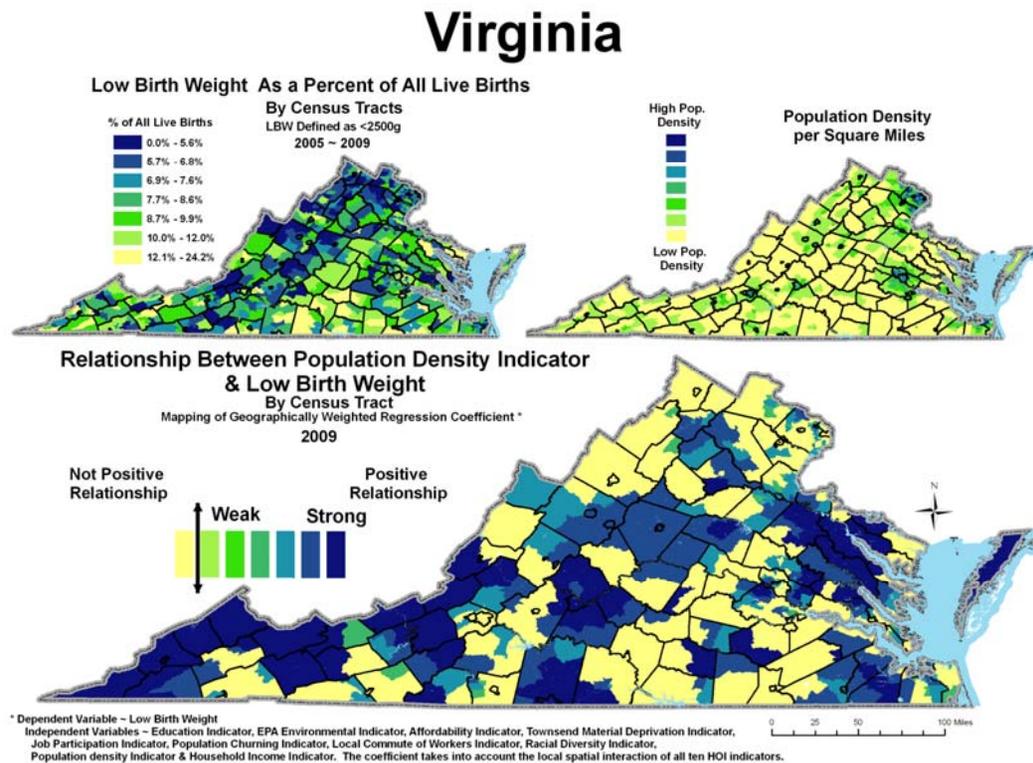
The left corner map shows the low birth weight as a percent of all live births by census tract and low birth weight is defined as children born with weight less than 2500g.

The base map shows the coefficient of the interaction between the low birth weight and racial diversity indicator and the dark areas show positive relationship while the yellow areas show no positive relationship.



The right corner map shows this indicator is calculated by dividing the total population by the square miles in the area under study. *The darker areas indicate that, high population concentration per square miles. While the yellow areas indicate low population concentration*

The left corner map shows the low birth weight as a percent of all live births by census tract and low birth weight is defined as children born with weight less than 2500g. The base map shows the coefficient of the interaction between the low birth weight and population density and the dark areas show positive relationship while the yellow areas show no positive relationship. This indicator differentiates the urban from rural areas as well as land use.

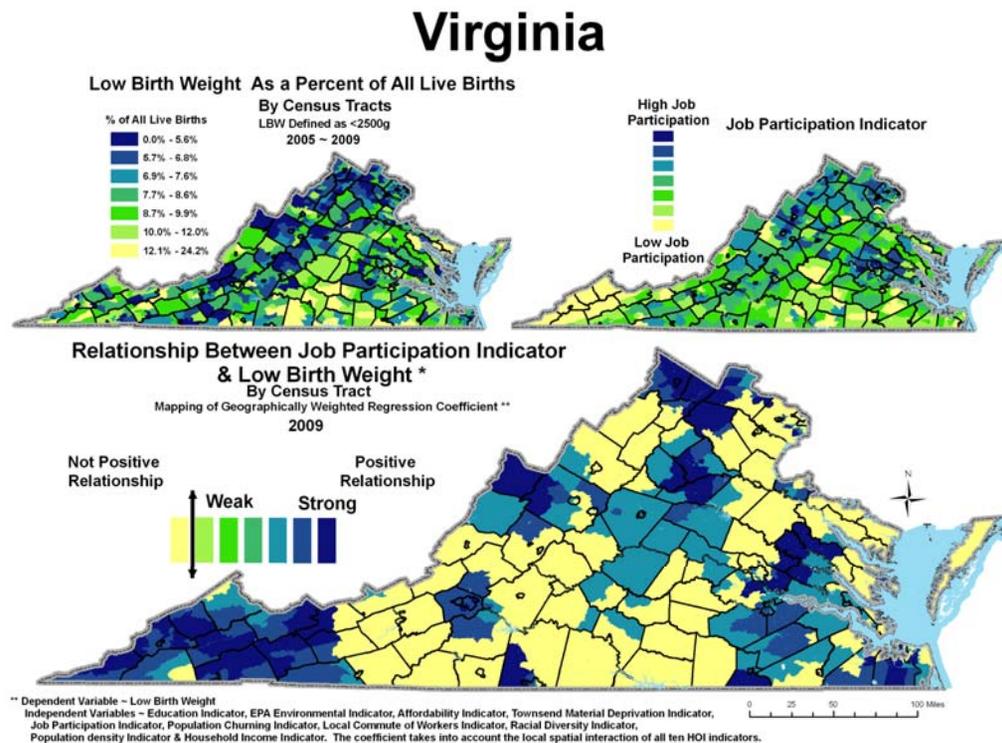


The right corner map shows Job Participation Rate which measures the percent of population over 16 years of age to 64 who are either employed or unemployed and seeking work. Because job participation rates are sensitive to a number of local community attributes, e.g., educational attainment, disability, household composition, car ownership, the measure can provide a sensitive indicator to the unique employment profile of a community. Job participation rate is often used by economists as an indicator for economic development and growth.

The darker area means that, there is high percentage of active labor force of the area.

The left corner map shows the low birth weight as a percent of all live births by census tract and low birth weight is defined as children born with weight less than 2500g.

The base map shows the coefficient of the interaction between the low birth weight and job participation rate and the dark areas show positive relationship while the yellow areas show no positive relationship.

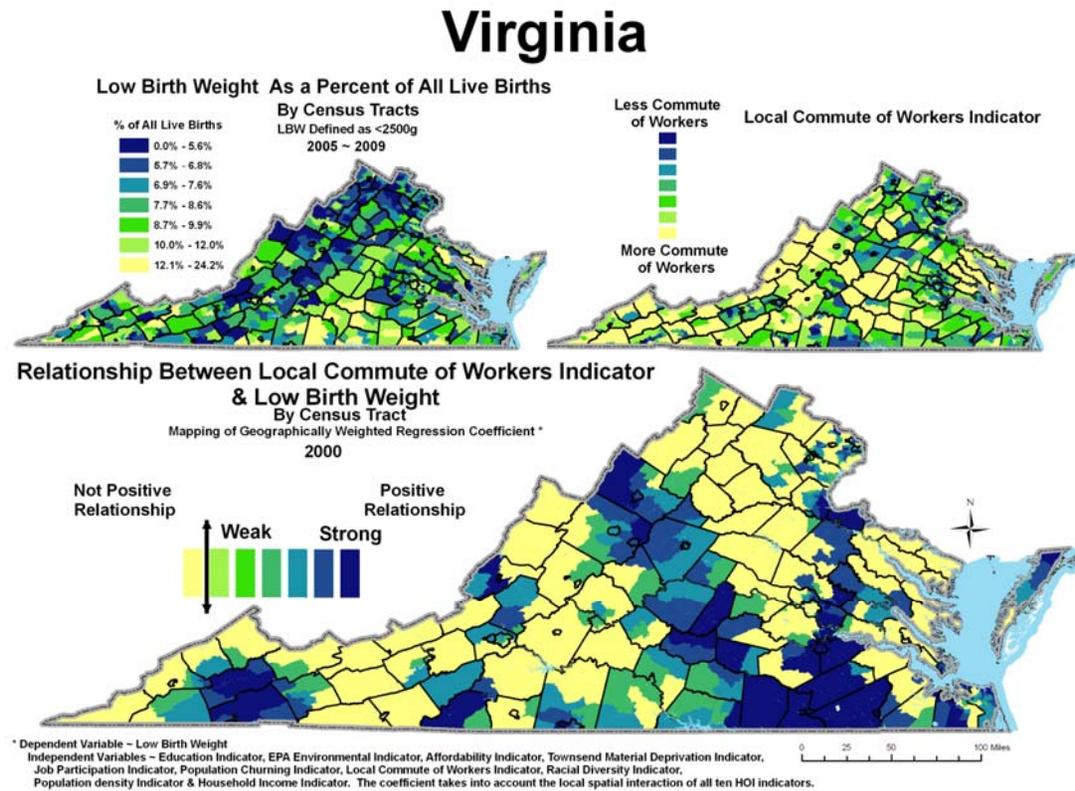


The right corner map shows the Commuting pattern based on Census Transportation Planning Package (CTPP) data which is used to indicate in flow and outflow of workers of an area. This is the ratio of inflow plus outflow divided by total resident work force in the area in question. This is an indicator of the mismatch between the labor force and employment opportunity inside an area and outside an area. This mismatch between labor force and employment can increase commuting cost for individuals.

Interpretation: The darker areas indicator the more job rich the area and therefore less commute while the yellow areas indicate majority of persons in these areas commute to work in other census tracts.

The left corner map shows the low birth weight as a percent of all live births by census tract and low birth weight is defined as children born with weight less than 2500g.

The base map shows the coefficient of the interaction between the low birth weight and Commuting pattern and the dark areas show positive relationship while the yellow areas show no positive relationship.

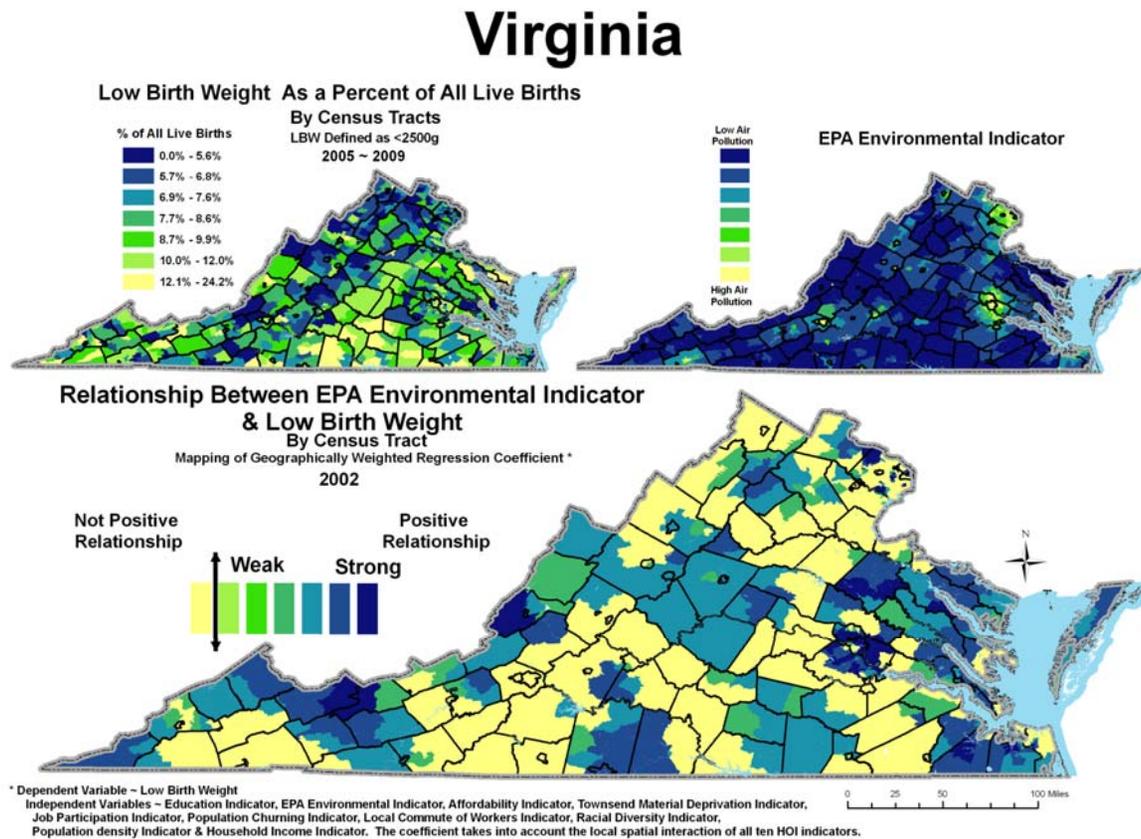


The right corner map shows the environmental indicator which was computed using EPA NATA Environmental Data to evaluate the magnitude of air pollution by census tract. This Database contains, three risk variables, namely cancer risk, respiratory risk and neurological risk. All these variables were standardized to Z-Score and summed up to construct the hazard quotients of the air toxics compounds that affect the respiratory or nervous system.

The dark areas are least environmental polluted while the yellow areas are more environmental polluted area

The left corner map shows the low birth weight as a percent of all live births by census tract and low birth weight is defined as children born with weight less than 2500g.

The base map shows the coefficient of the interaction between the low birth weight and EPA environmental indicator, and the dark areas show positive relationship while the yellow areas show no positive relationship.



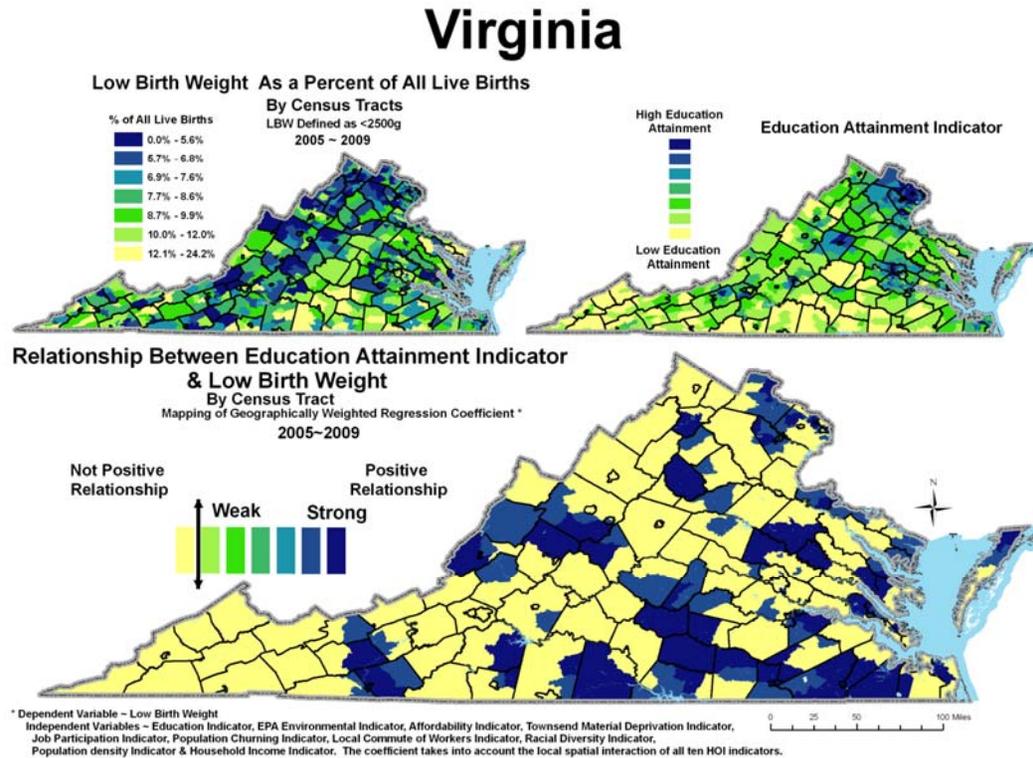
The right corner map shows the Education Attainment indicator which is composed of literacy rate (ability of read and write) and gross enrollment ratio (from kindergarten to postgraduate education).

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This indicator is scale-less and therefore darker areas indicate perfect education attainment while the yellow areas indicate less education attainment.

The left corner map shows the low birth weight as a percent of all live births by census tract and low birth weight is defined as children born with weight less than 2500g.

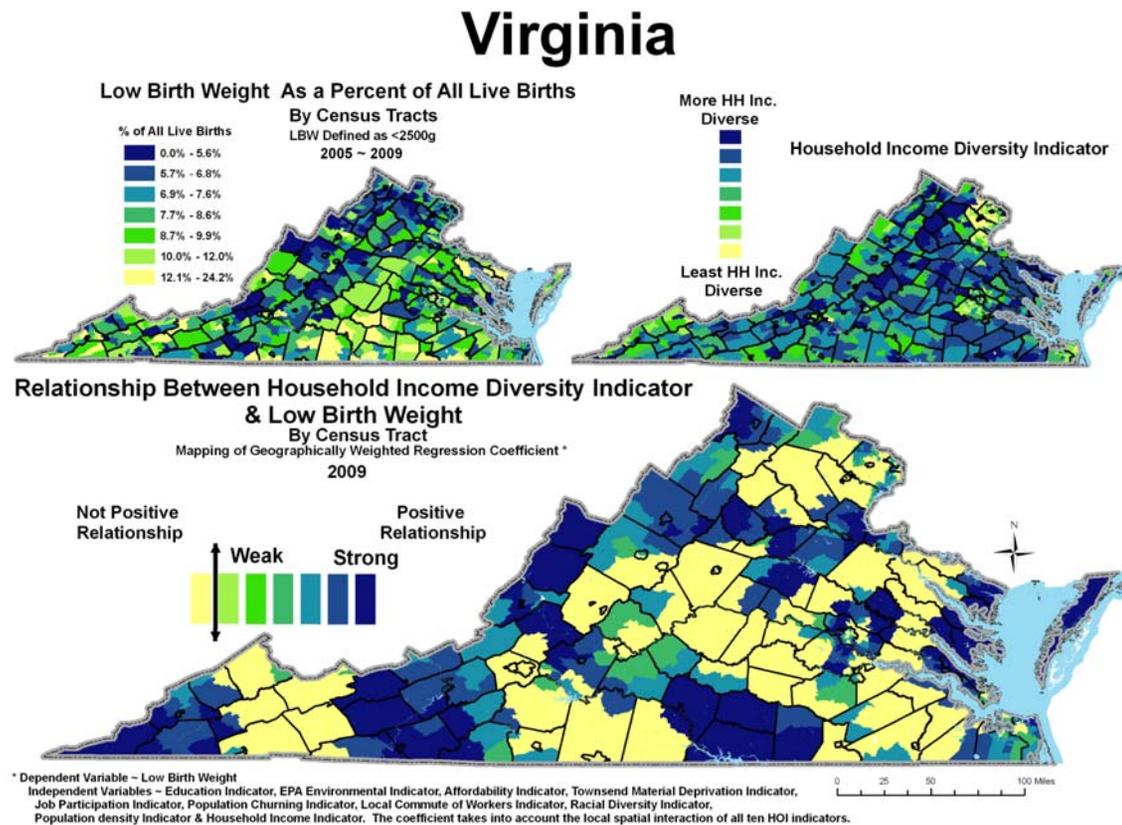
The base map shows the coefficient of the interaction between the low birth weight and Education Attainment indicator and the dark areas show positive relationship while the yellow areas show no positive relationship.



The right corner map shows the Household Income Diversity. This aspect of diversity refers to a variance in household economic status within the same census tract. The indicator was measured by using all the 10 income ranges in census data comprising households with annual incomes of less than \$15,000, \$15,000 to \$24,999, \$25,000 to \$34,999, \$35,000 to \$49,999, \$50,000 to \$74,999, \$75,000 to \$99,999, \$100,000 to \$149,999, \$150,000 to \$249,999, \$250,000 to \$499,999, and \$500,000 or more. ***A yellow color indicates that the area is more homogeneous in terms of household income and vice versa. What this means is that, if you select two houses at random, the probability (chance) that both houses will belong to different income levels is less.***

The left corner map shows the low birth weight as a percent of all live births by census tract and low birth weight is defined as children born with weight less than 2500g.

The base map shows the coefficient of the interaction between the low birth weight and Household Income Diversity and the dark areas show positive relationship while the yellow areas show no positive relationship.



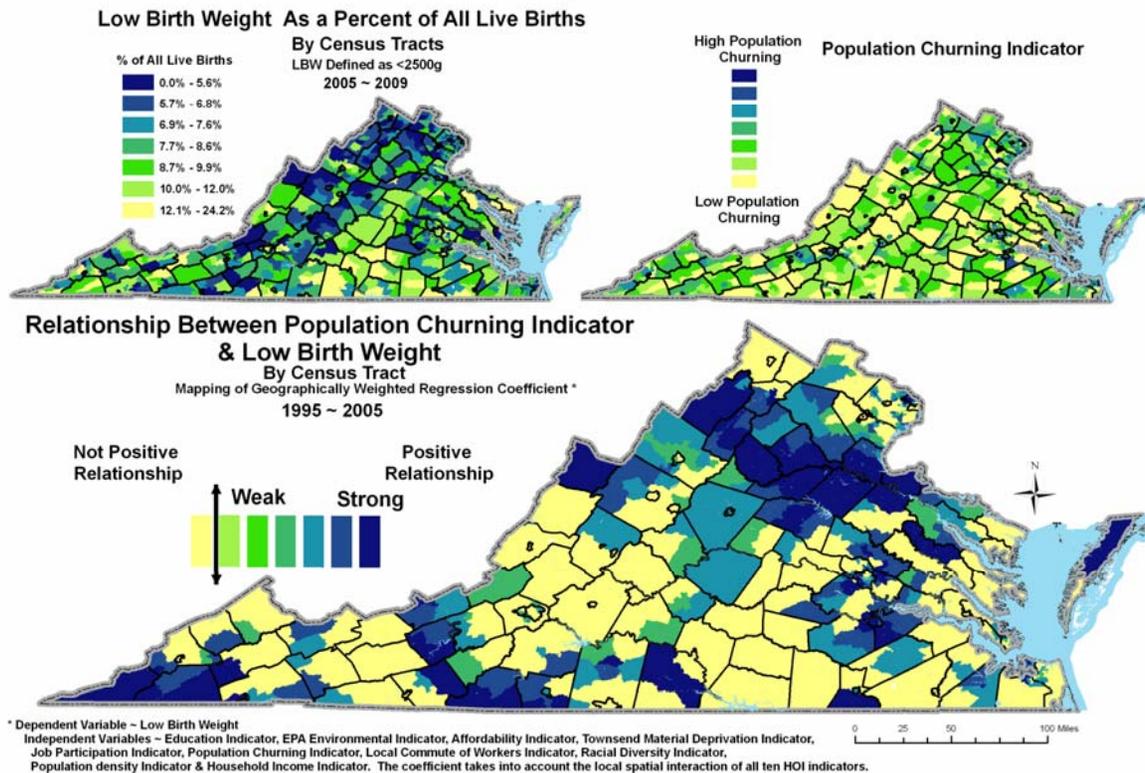
The right corner map shows the Population churning rates which relate the combined inflow and outflow for an area to the resident population and help to quantify the stability of a population in an area. The indicator uses the census mobility data that shows the mobility for 5 years by census tract.

The scale shows an annual churning rate by census tract. The darker areas indicate that such areas experienced more population turn-over compared to the yellow areas

The left corner map shows the low birth weight as a percent of all live births by census tract and low birth weight is defined as children born with weight less than 2500g.

The base map shows the coefficient of the interaction between the low birth weight and population churning and the dark areas show positive relationship while the yellow areas show no positive relationship.

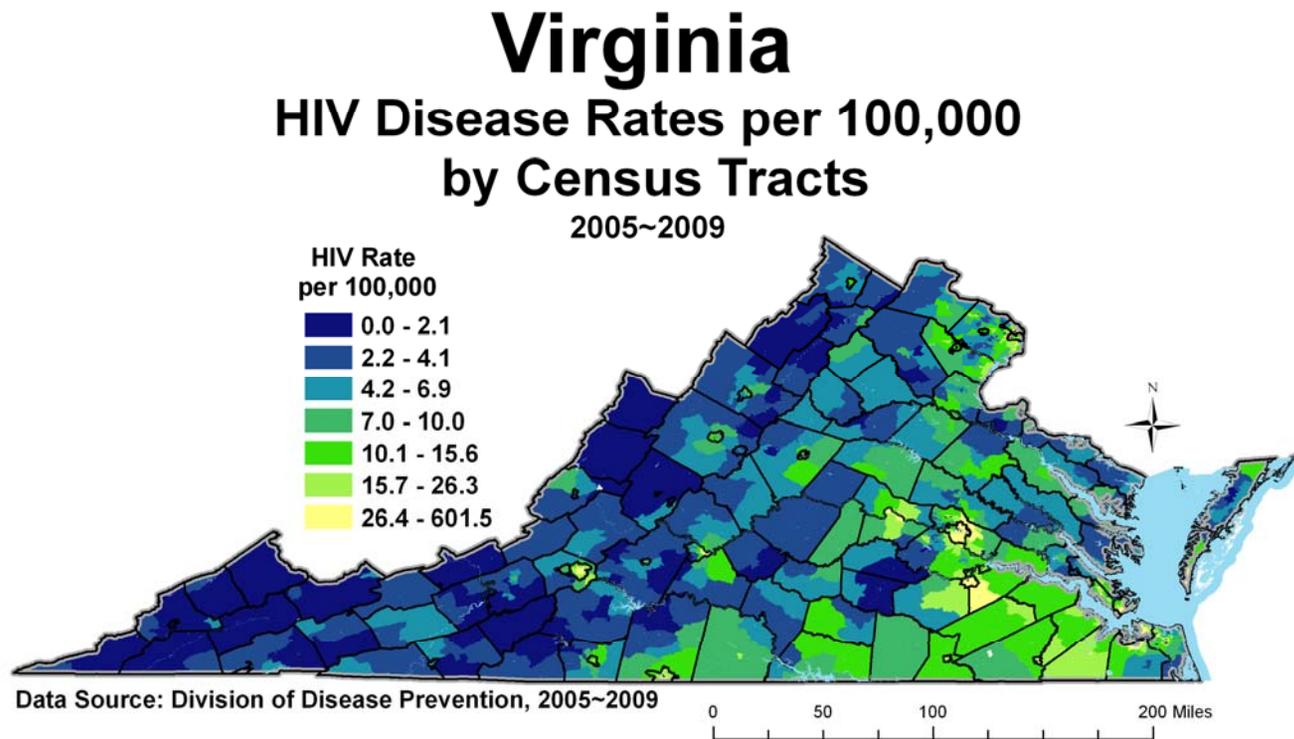
Virginia



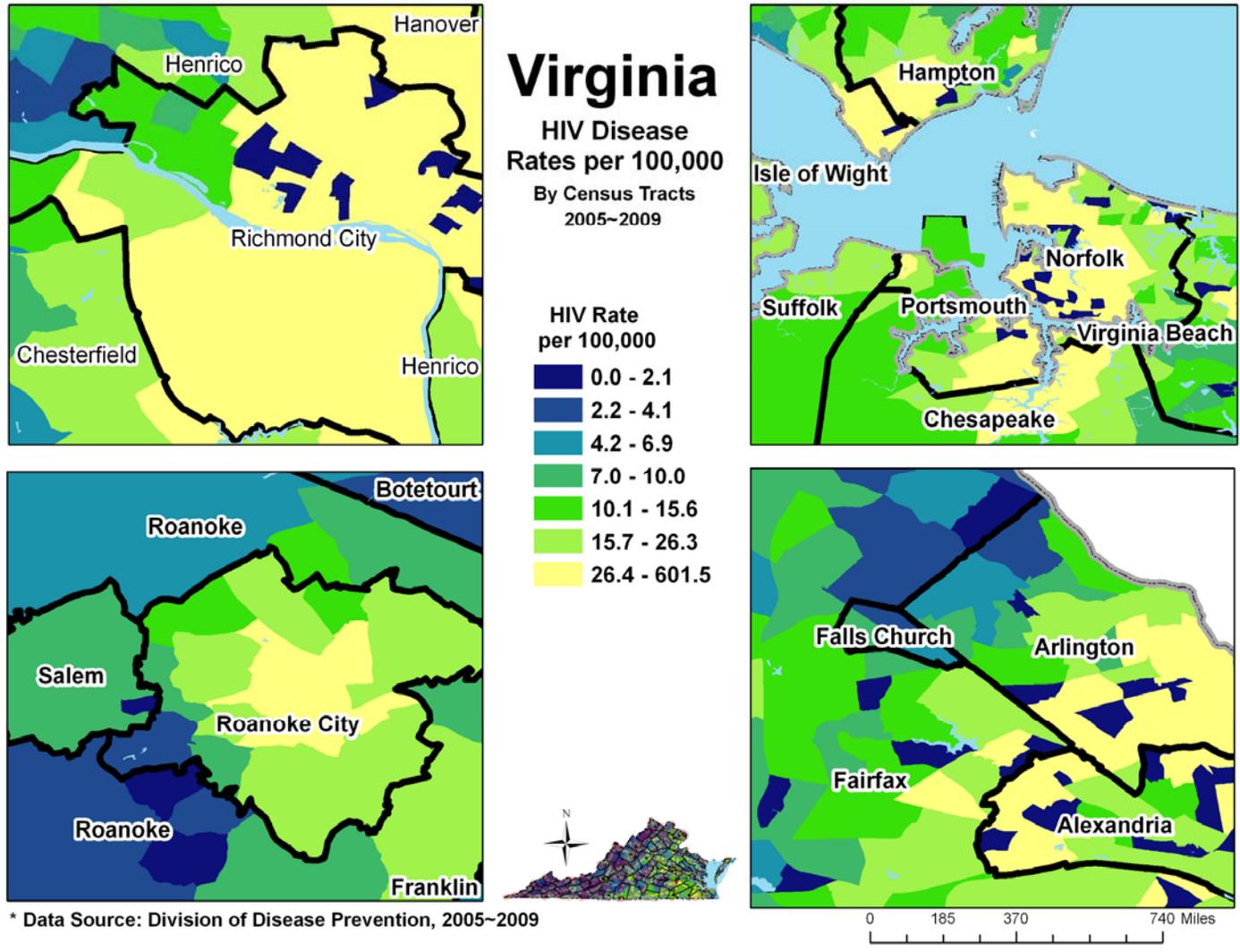
Appendix D

HIV/AIDS

The map shows HIV rate per 100,000 by census tract. The darker areas show low rate of HIV while the green areas show high rate of HIV.
There is high concentration of high HIV rate in the Southside Virginia, Eastern Shore, and Northern Virginia

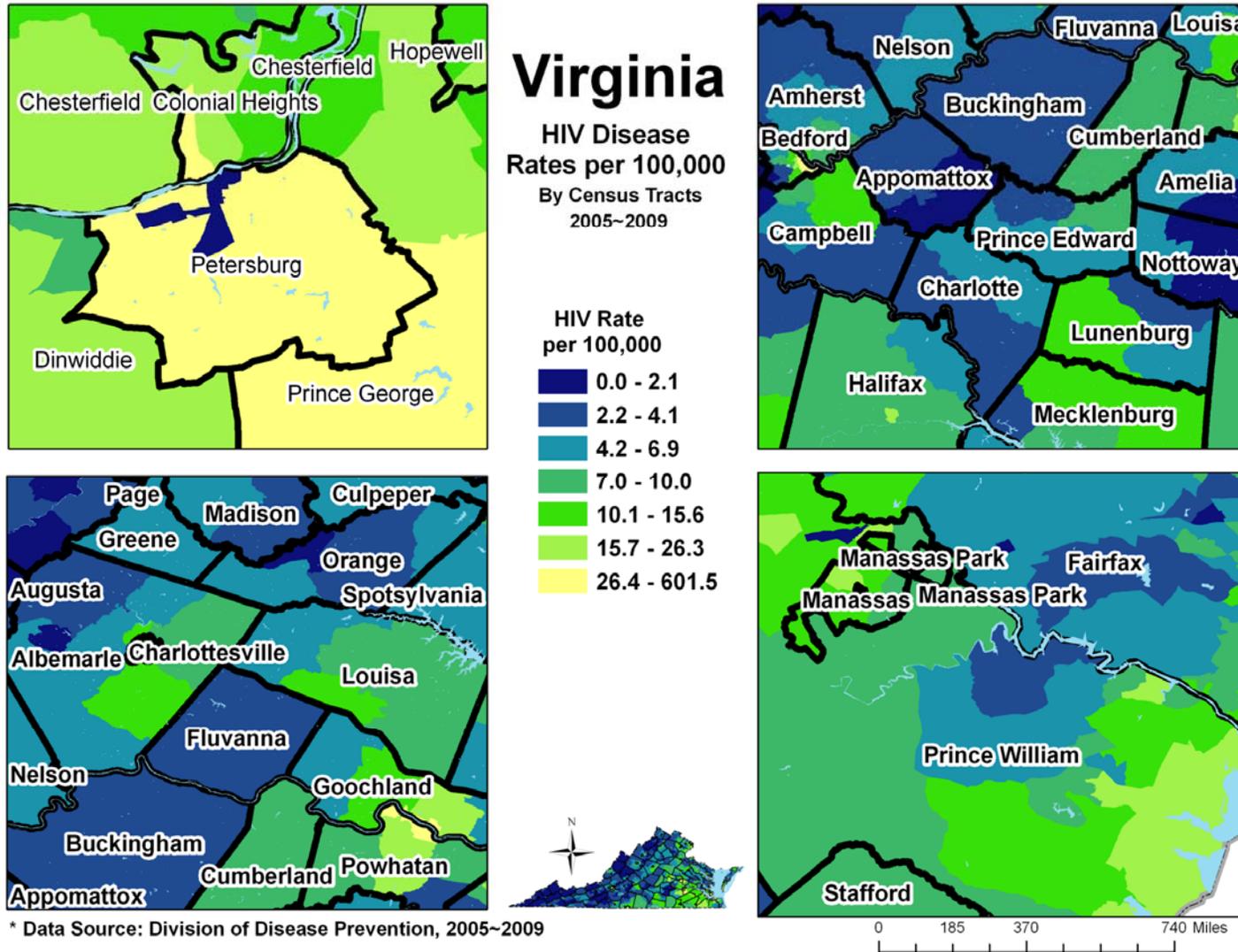


This map shows the Richmond metro area (upper left corner), Hampton Roads area (Upper right corner), Roanoke metro (Lower left corner) and Northern Virginia (lower right corner). There is high concentration of high HIV rate in the Richmond City, Eastern shore, Roanoke City and Northern Virginia.



* Data Source: Division of Disease Prevention, 2005-2009

This map shows the Petersburg~Prince George area (upper left corner), Southside Virginia (Upper right corner), Cumberland~Goochland areas (Lower left corner) and Manassas in Prince William County (lower right corner). There is high concentration of high HIV rate in the Petersburg~Prince George area compared to the other areas on the slide.



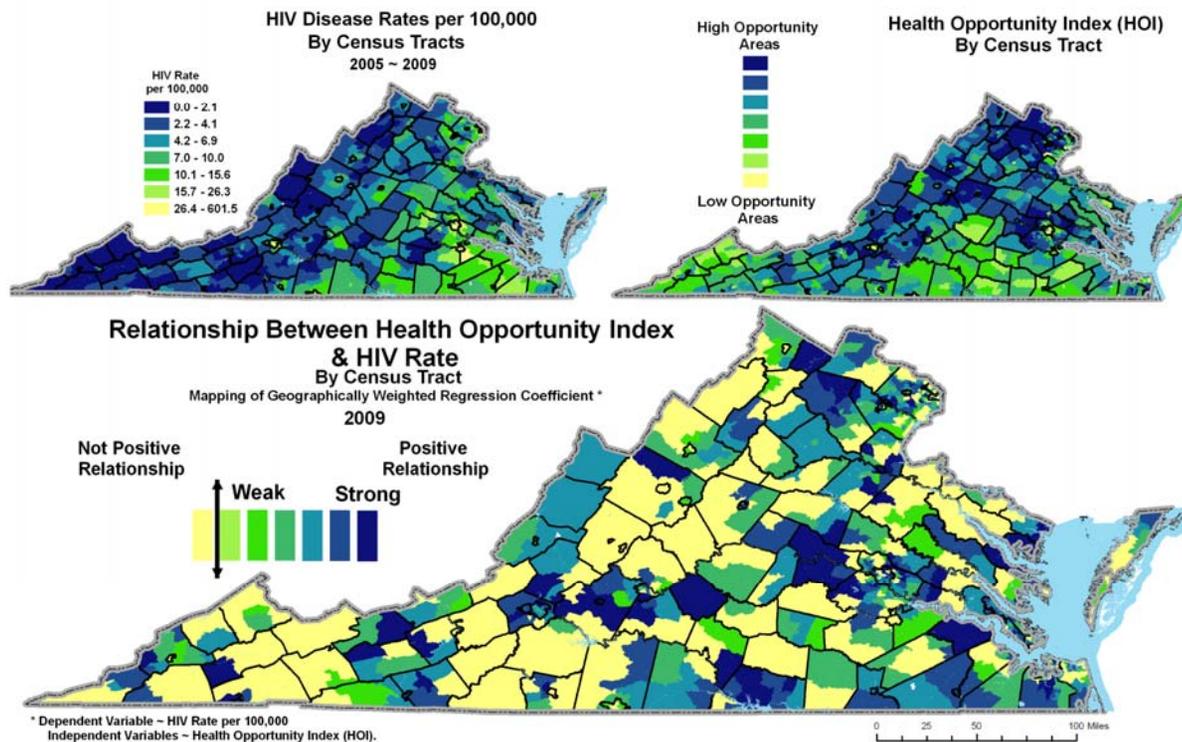
The right corner map shows the Health Opportunity Index and it can be seen that, Southwest and Southside Virginia, have low health opportunity (green areas) compared to the darker areas.

The left corner map shows the HIV Rate by census tract and again it can be seen that Southside Virginia area have high rate of HIV compared to the Southwest Virginia.

The base map shows the coefficient of the interaction between the HIV rate and HOI and the dark areas show positive relationship while the yellow areas show no positive relationship.

Again, it is seen that, there is strong positive relationship between HOI and High HIV rate Southside area of the State.

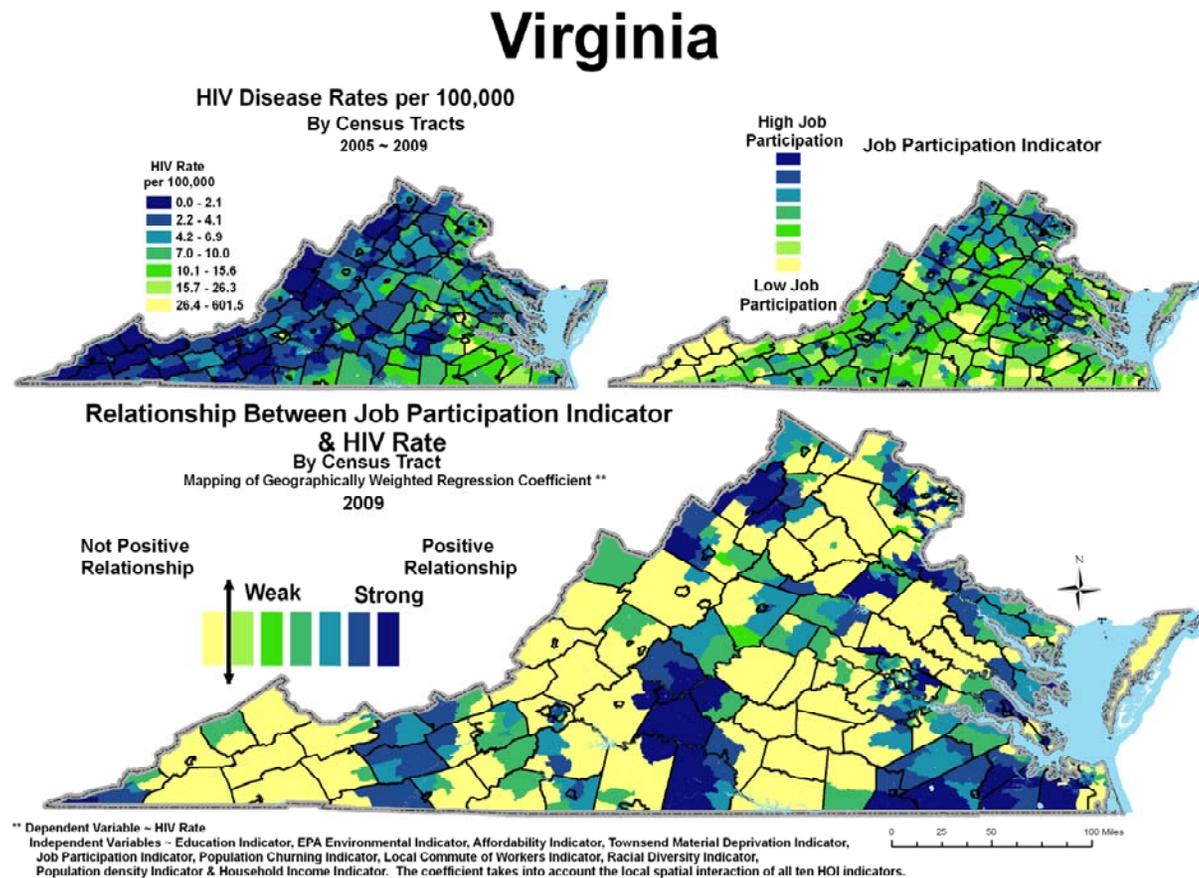
Virginia



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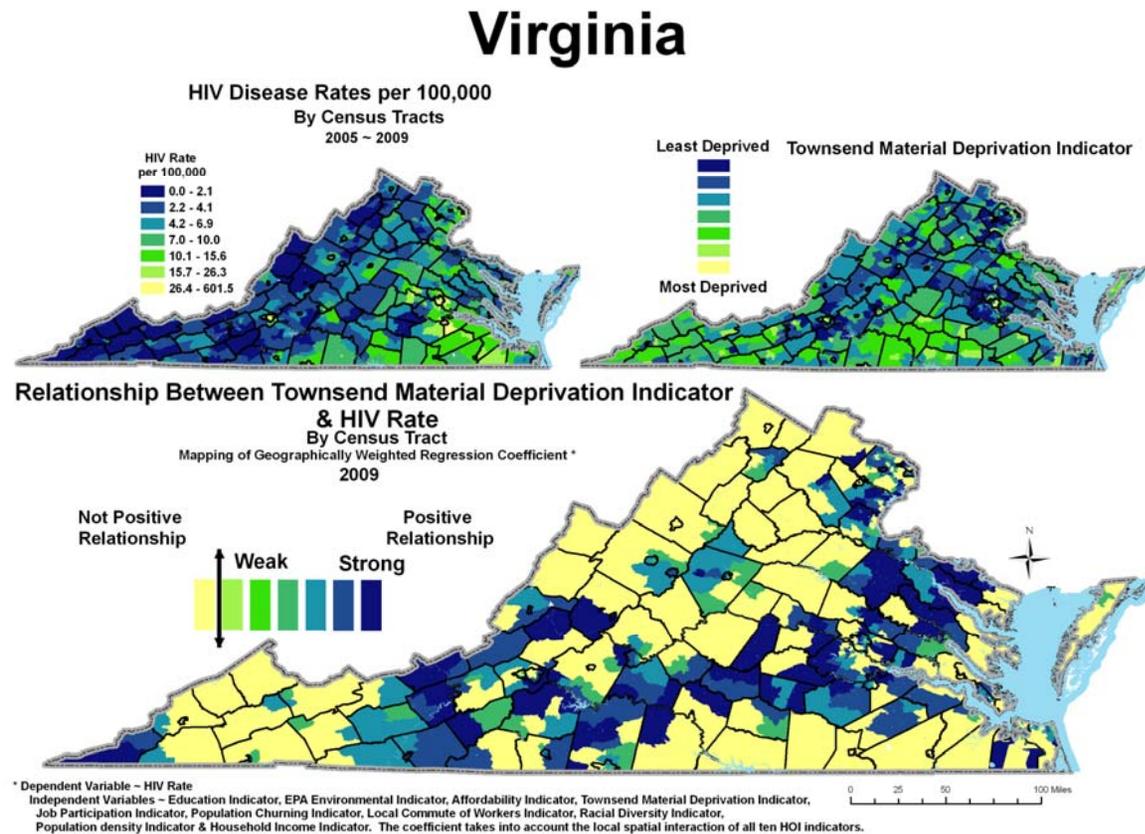
The base map shows the coefficient of the interaction between the HIV rate and Job Participation and the dark areas show positive relationship while the yellow areas show no positive relationship.



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The base map shows the coefficient of the interaction between the HIV rate and Townsend Material Deprivation and the dark areas show positive relationship while the yellow areas show no positive relationship.

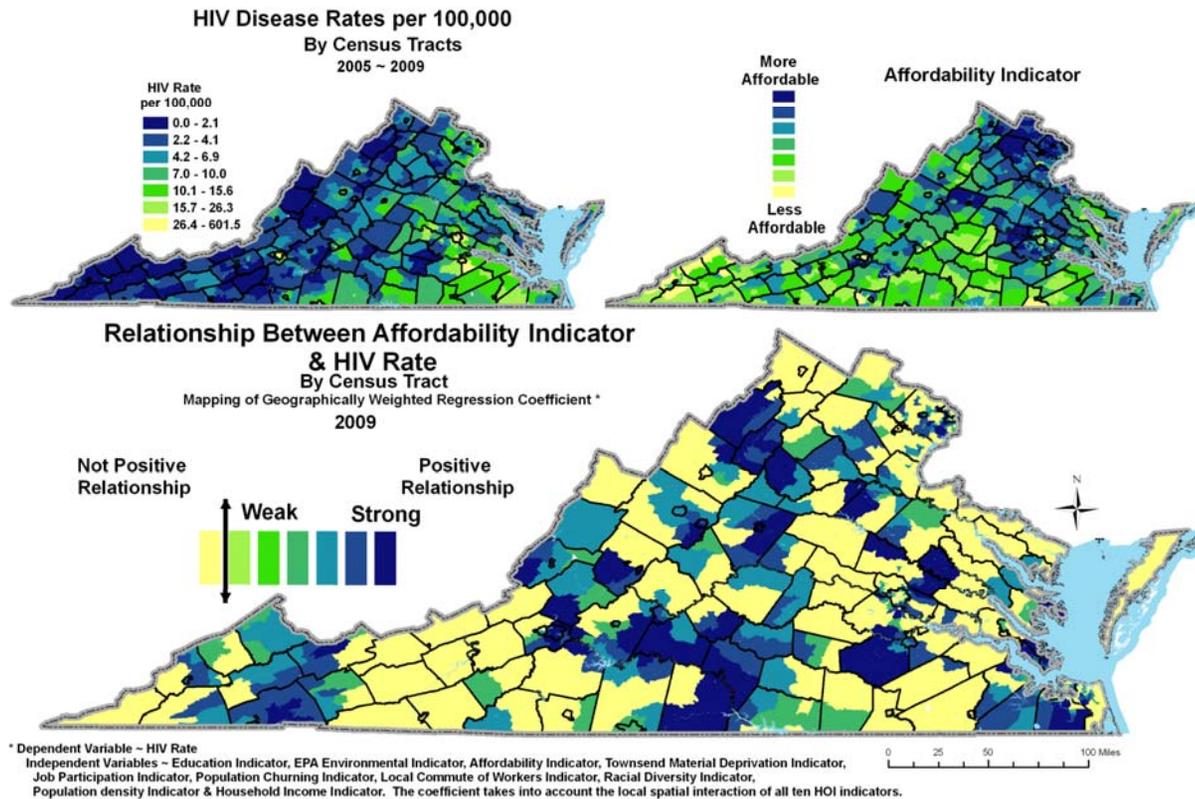


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The base map shows the coefficient of the interaction between the HIV rate and Affordability, and the dark areas show positive relationship while the yellow areas show no positive relationship.

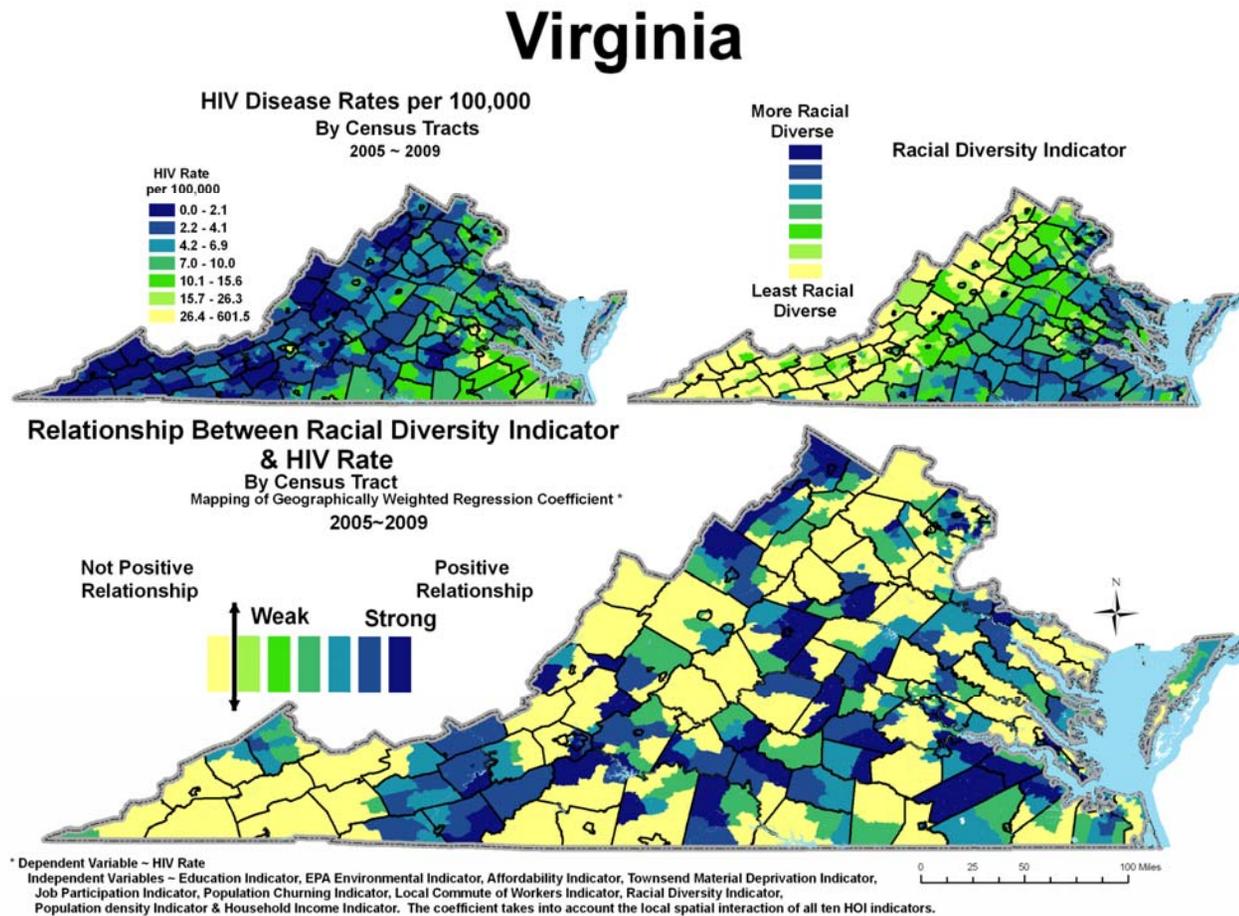
Virginia



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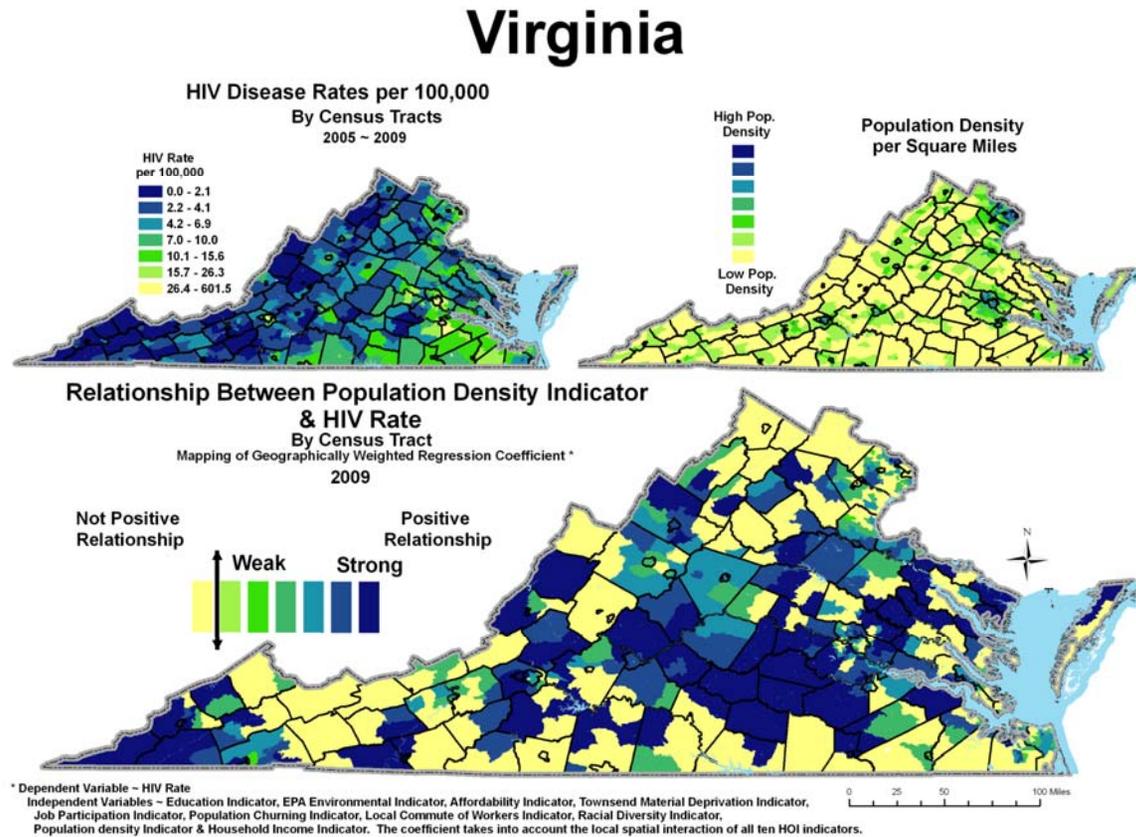
The base map shows the coefficient of the interaction between the HIV rate and Racial Diversity and the dark areas show positive relationship while the yellow areas show no positive relationship.



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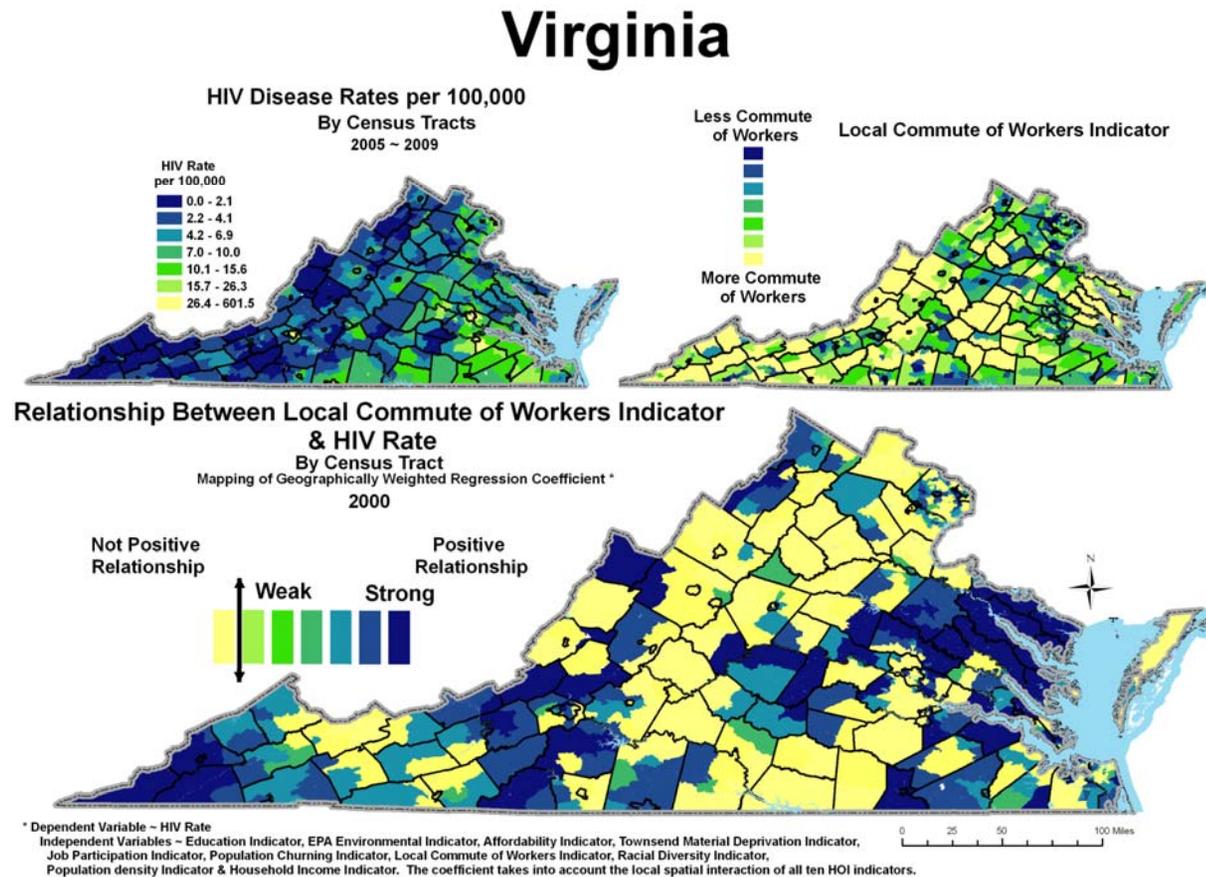
The base map shows the coefficient of the interaction between the HIV rate and Population Density and the dark areas show positive relationship while the yellow areas show no positive relationship.



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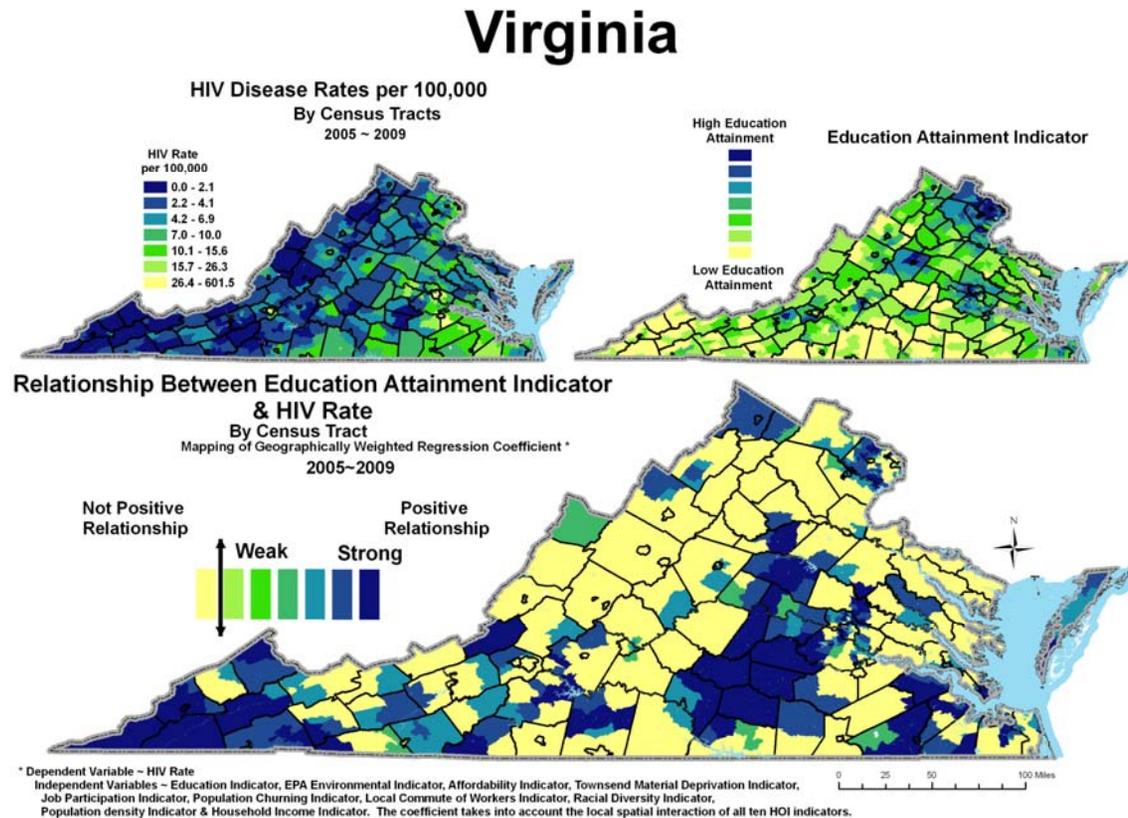
The base map shows the coefficient of the interaction between the HIV rate and Local Commute of Workers and the dark areas show positive relationship while the yellow areas show no positive relationship.



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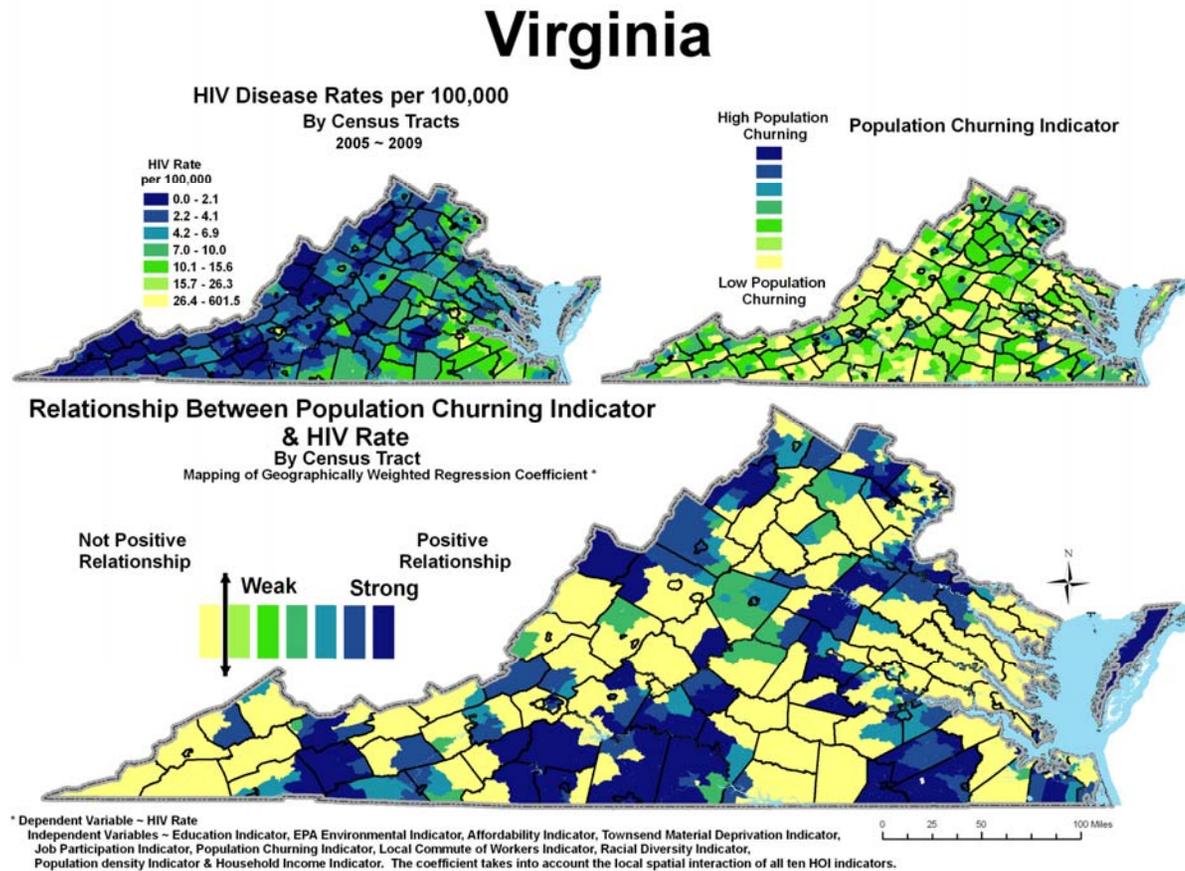
The base map shows the coefficient of the interaction between the HIV rate and Education Attainment and the dark areas show positive relationship while the yellow areas show no positive relationship.



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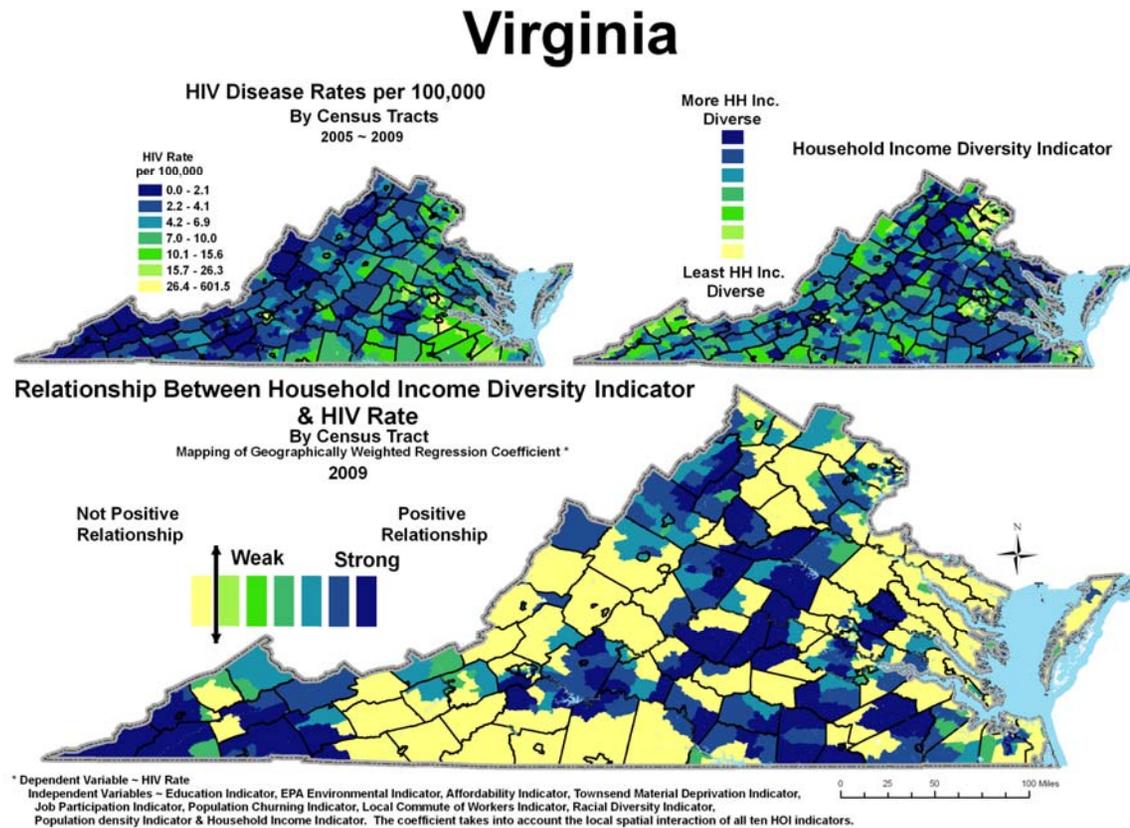
The base map shows the coefficient of the interaction between the HIV rate and Population Churning and the dark areas show positive relationship while the yellow areas show no positive relationship.



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The left corner map shows the HIV Rate by census tract and again it can be seen that Southside Virginia area have high rate of HIV compared to the Southwest Virginia.

The base map shows the coefficient of the interaction between the HIV rate and Household Income Diversity and the dark areas show positive relationship while the yellow areas show no positive relationship.



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The left corner map shows the HIV Rate by census tract and again it can be seen that Southside Virginia area have high rate of HIV compared to the Southwest Virginia.

The base map shows the coefficient of the interaction between the HIV rate and EPA Environmental Risk and the dark areas show positive relationship while the yellow areas show no positive relationship.

