

Delaware River Watershed Initiative (DRWI) Cluster Demographics Analysis- Final Report

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ArcGIS Online Story Map Link: <https://arcg.is/1jbDmu>



**Center for Land Use
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1.0 Introduction

The Appalachian Trail (A.T.) is the world's longest hiking only foot trail, stretching from Georgia to Maine. The full extent of the trail traverses through lands owned and managed by federal agencies, state agencies, local municipalities, and non-profit groups. Much of the A.T. corridor includes lands that are vital for the protection of natural resources and watershed quality.

The Appalachian Trail Conservancy (ATC), a non-profit group whose mission is to preserve and manage the trail, seeks to educate and engage community leaders and residents in implementation of conservation practices that protect the Appalachian Trail Corridor.

The William Penn Foundation¹ sponsors the Delaware Watershed Initiative (DRWI), which works across four states to protect the source of clean water for the Delaware River. Both groups' missions are served by conservation strategies on lands proximal to the A.T. corridor and within the Delaware Watershed.

With financial support through William Penn Foundation, the ATC seeks to develop an outreach campaign to facilitate conservation practices that protect forest cover and riparian buffers along the A.T. corridor. The ATC's outreach model will focus on 28 municipalities within the following four DRWI clusters: Poconos and Kittatinny, Upper New Jersey Highlands, Upper Lehigh, and Middle Schuylkill (Figures 1A and 1B, Table 1).

¹ Grantee wishes to acknowledge the William Penn Foundation for supporting this project.

The William Penn Foundation, founded in 1945 by Otto and Phoebe Haas, is dedicated to improving the quality of life in the Greater Philadelphia region through efforts that increase educational opportunities for children from low-income families, ensure a sustainable environment, foster creativity that enhances civic life, and advance philanthropy in the Philadelphia region. In partnership with others, the Foundation works to advance opportunity, ensure sustainability, and enable effective solutions. Since inception, the Foundation has made nearly 10,000 grants totaling over \$1.6 billion.

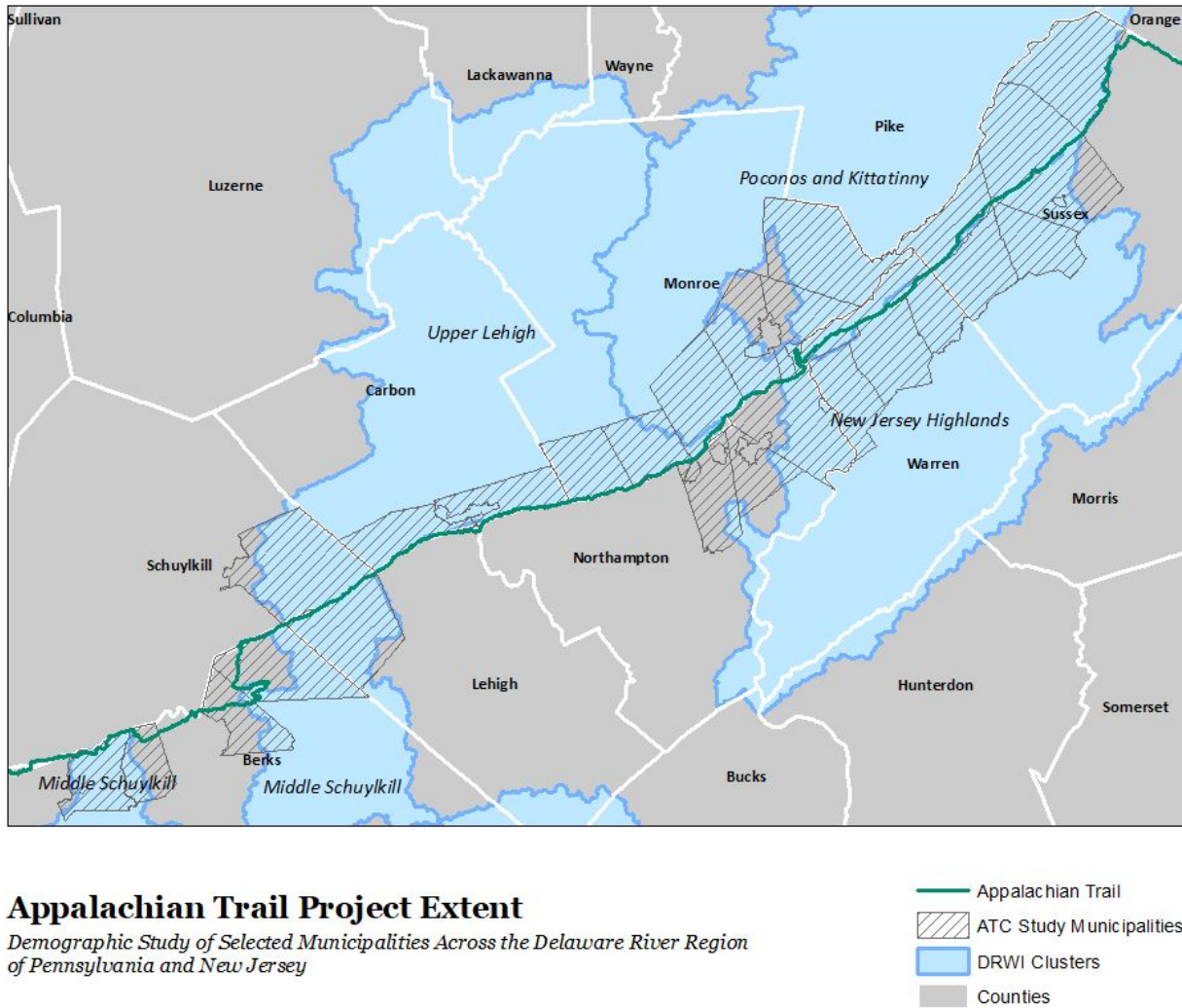
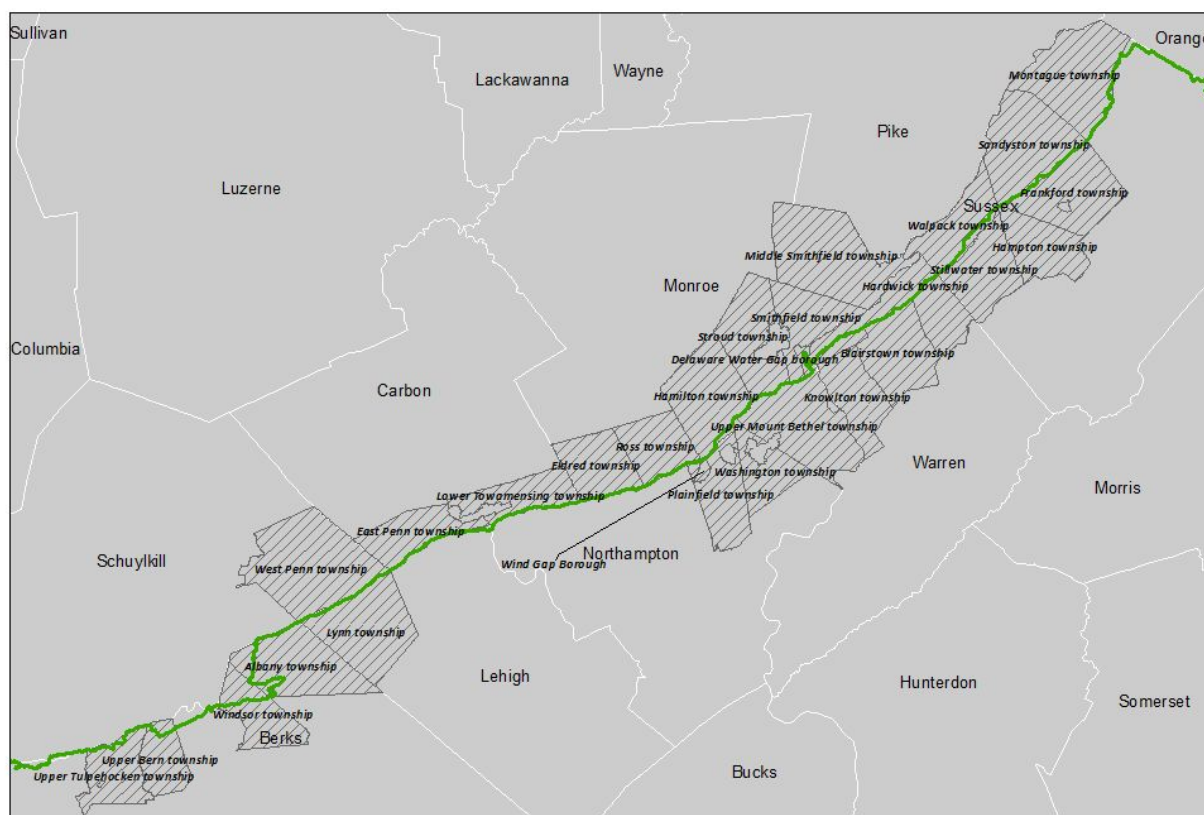


Figure 1A: Map of the study area, showing the DRWI cluster boundaries, counties, and the 28 municipalities.



ATC Study Municipalities

Municipalities within the extent of the Appalachian Trail Project

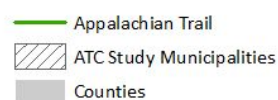


Figure 1B: Map of the study area, showing the 28 municipalities.

Table 1: Municipalities in the study area

FIPS County Code	Municipality Name	County	State
4210783792	West Penn Township	Schuylkill	PA
4201178752	Upper Bern Township	Berks	PA
4201179328	Upper Tulpehocken Township	Berks	PA
4201185720	Windsor Township	Berks	PA
4201100588	Albany Township	Berks	PA
4209581296	Washington Township	Northampton	PA
4209561088	Plainfield Township	Northampton	PA
4209579184	Upper Mount Bethel Township	Northampton	PA

FIPS County Code	Municipality Name	County	State
4209585664	Wind Gap Borough	Northampton	PA
3403729490	Hampton Township	Sussex	NJ
3403747430	Montague Township	Sussex	NJ
3403765700	Sandyston Township	Sussex	NJ
3403770890	Stillwater Township	Sussex	NJ
3403776640	Walpack Township	Sussex	NJ
3403724810	Frankford Township	Sussex	NJ
4202545128	Lower Towamensing Township	Carbon	PA
4202521664	East Penn Township	Carbon	PA
3404137320	Knowlton Township	Warren	NJ
3404106160	Blairstown Township	Warren	NJ
3404129820	Hardwick Township	Warren	NJ
4207745656	Lynn Township	Lehigh	PA
4208929820	Eldred Township	Monroe	PA
4208971344	Smithfield Township	Monroe	PA
4208974880	Stroud Township	Monroe	PA
4208966280	Ross Township	Monroe	PA
4208918736	Delaware Water Gap Borough	Monroe	PA
4208932176	Hamilton Township	Monroe	PA
4208949080	Middle Smithfield Township	Monroe	PA

Effective outreach starts with understanding community conservation values, recreational interests, politics and other socio-economic factors. ATC contracted Center for Land Use and Sustainability (CLUS) at Shippensburg University (SU) to create demographic profiles for the outreach model municipalities.

CLUS focused on developing demographic, social, economic, electoral and recreational profiles for a total of 28 municipalities within the targeted DRWI clusters. The profiles were created by assembling the following data:

- Municipal demographic profiles (2010 and 2015)
 - Reported variables include population, population density, age, gender, ethnicity and race, number of family members in household, marital status, income, educational attainment, poverty and occupation by trade.

- County level demographic forecasts (2010 through 2040)
 - Reported variables included population, age, sex
- Electoral profiles (2004 through 2016)
 - Reported variables: number of registered Democrats, Republicans, and others (third parties and non-affiliated when possible), election results for presidential elections (last four cycles when possible), and election results for municipal officials (last four cycles when possible).
- Outdoor recreation profiles (2011 through 2018)
 - Reported variables include hunting and fishing licensing data, current and historic trends, at the zip code, watershed and county level.

This report is accompanied by an ArcGIS Online story map, where users can interact with many of these data sets within a geographic context. The story map is available at this URL:

<https://arcg.is/1jbDmu>.

1.1 A Note about Census Data

We relied heavily on the U.S. Census for municipal demographic characteristics. The U.S. Census Bureau conducts a complete census of the population every ten years. This is the Decennial Census, and is intended to count all residents living in the United States. Because it is theoretically a 100% count, the Decennial Census is often viewed as the authoritative source for population and demographic information. The 2010 Decennial Census collected a limited number of variables for each household member: sex, age, date of birth, race, ethnicity, relationship, and housing tenure. For these variables and their derivatives, we report the 2010 Decennial Data in the text of this report.

The U.S. Census Bureau also conducts the American Community Survey (ACS), which was launched in 2005. The ACS surveys a random sample of U.S. households (about 1 in 6 households) every year, and collects the same variables collected in the Decennial Census, along with a number of more detailed socioeconomic information. These annual samples are then compiled into three-year and five-year estimates. In the appendices for this report, we include the 2015 ACS data and a calculation of change between 2010 and 2015. It is important to keep in mind that the 2015 data represent an estimate that is compiled from five years of sampling within each municipality.

2.0 Population, Age, Diversity

2.1 Population²

The 2010 population within the 28 targeted municipalities ranges from 16 to 19,213 individuals, with population densities ranging from 0.7 to 2,029.9 people per square mile. The highest population occurs in the Pennsylvania municipalities of Stroud Township (19,213), Middle Smithfield Township (15,997) and Hamilton Township (9,083), municipalities that are proximate to the towns of Stroudsburg and East Stroudsburg. Highest population densities occur in Wind Gap Borough, PA (2,029.9 people per mi²), Delaware Water Gap Borough, PA (386.5 people per mi²), and Middle Smithfield Township, PA (300.9 people per mi²).

The least populated municipalities include Walpack Township, NJ (16), Delaware Water Gap Borough, PA (746), Upper Tulphocken Township, PA (1,575), Hardwick Township, NJ (1,696), and Albany Township, PA (1,726). Those with the lowest population density include Walpack Township, NJ (0.7 people per mi²), Albany Township, PA (43.4 people per mi²), Hardwick Township, NJ (46.3 people per mi²), and Sandyton Township, NJ (48.2 people per mi²). Walpack Township, NJ's extremely low population and low population density is likely due to the high proportion of federally conserved lands (Delaware Water Gap Recreation Area) within this municipality. The low population in Walpack Township, NJ yields outlier demographic profile data throughout this study; therefore, Walpack Township, NJ is not representative of most of the targeted municipalities. Although not as extensive as Walpack Township, NJ, Hardwick Township, NJ and Sandyston, NJ also have relatively high proportions of federally conserved lands within their boundaries. The high population density reported at Delaware Water Gap Borough is reflective of the small borough size.

Figure 2 compares municipal population density to their respective county's density for 2010. Municipalities that fall below the dashed line at 100% have a population density that is lower than their county's, while those above have a higher density. For example, the population density in Wind Gap Borough is nearly 250%, or 2.5 times, higher than the density of Northampton County. With the exceptions of Wind Gap Borough, PA, Stroud Township, PA, Delaware Water Gap Borough, PA, Smithfield Township, PA and Middle Smithfield Township, PA, population density is lower in the municipalities than their respective county, indicating the largely rural character of the study municipalities.

² See Appendix 1 for complete data tables for population & age. Here in the text we report the data from the 2010 Decennial Census, however Appendix 1 also include estimates from the 2015 American Community Survey and an estimate of the change between 2010 and 2015.

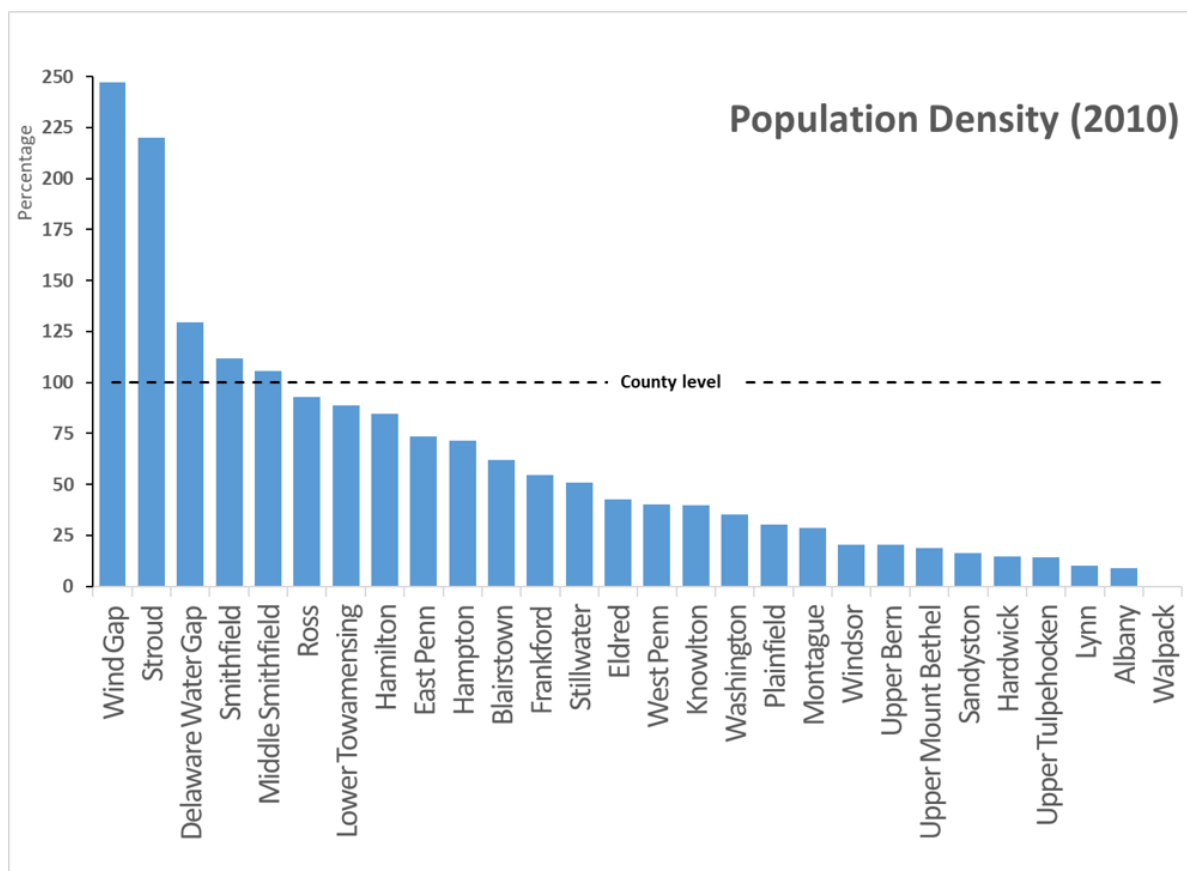


Figure 2: 2010 population density of the study municipalities as a percentage of their respective county's density.

2.2 Age³

Relative to the 2010 median ages of Pennsylvania (40.4) and New Jersey (39.0), the oldest populations are found in Walpack Township, NJ (58.5), West Penn Township, PA (47) and Frankford Township, NJ (46) and the youngest populations are found in Smithfield Township, PA (38.8) and Middle Smithfield Township, PA (39.7) - these populations are likely influenced by larger proportions of college-age individuals attending East Stroudsburg University (Figure 3). The median age in most study municipalities is at or above their state's median age (Figure 4).

³ See Appendix 2 for graphs that illustrate the age and sex structure of each municipality.

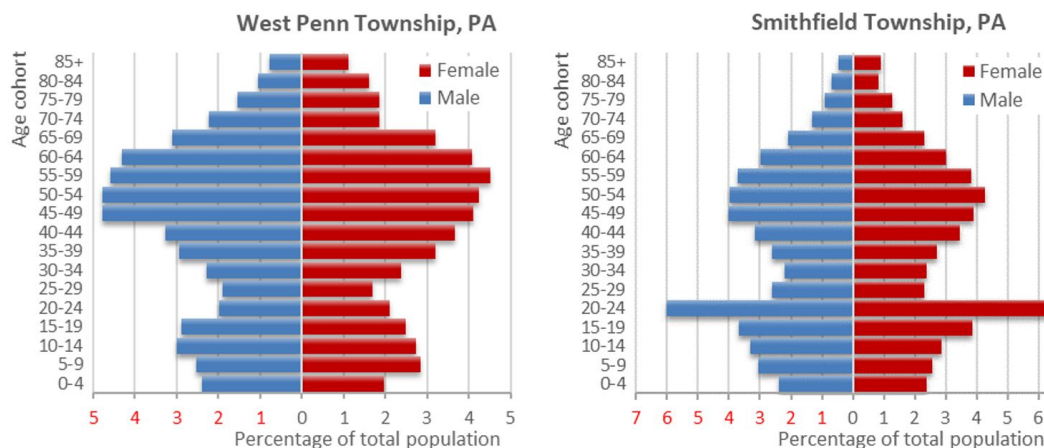


Figure 3: A comparison of the age-sex diagrams, or population pyramids, for the township with the oldest median age of 47 (West Penn Township, PA) and the township with the lowest median age of 38.8 (Smithfield Township, PA). See Appendix 2 for population pyramids for all municipalities.

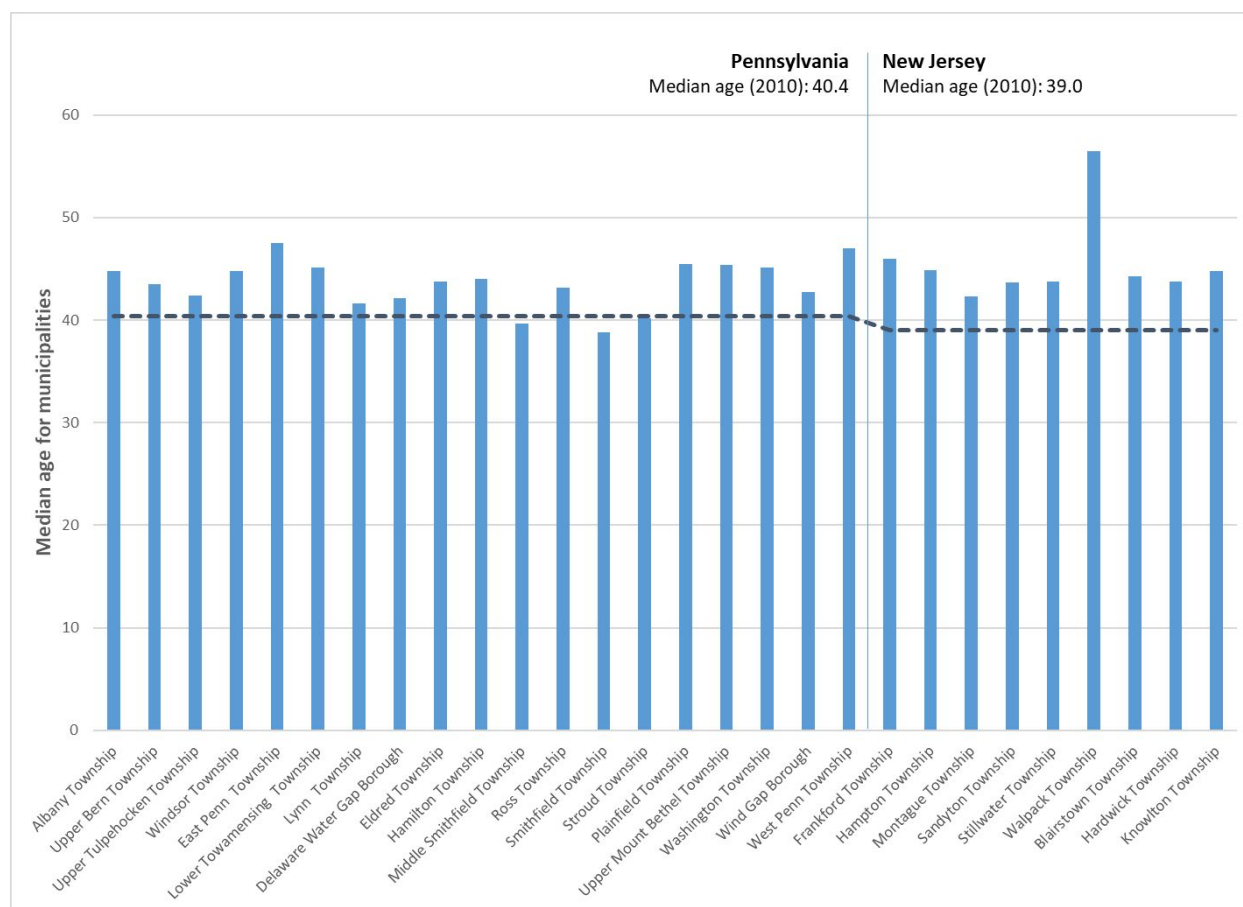


Figure 4: 2010 median age (years) for study municipalities. Pennsylvania municipalities are to the left of the vertical black line and New Jersey municipalities are to the right. The horizontal black lines indicate each state's median age.

2.3 Diversity⁴

Based on 2010 U.S. Census data, we created five broad categories of race: White, Black, Asian, other race, or mixed race. The "other race" class is an aggregation of people who self identified as single race, but not White, Black, or Asian (i.e. Hawaiian, Native American, etc.) The "mixed race" category indicates individuals who identify themselves as more than one race (i.e. Black & White or Black & Asian). Except for Stroud Township, PA (5.54%), individuals of some other race comprised less than 5% of the municipal population individuals, and in 20 of the municipalities the other race category was less than 1%. In 27 of the 28 municipalities, individuals of mixed race made up less than 1% of the municipal population; the one exception was Walpack Township, NJ, where 6.25% of the municipal population of 16 individuals (1 person) identified as mixed race.

In the U.S. Census, Hispanic or Latino is considered a category related to origin or ethnicity rather than race, and we report Hispanic or Latino data as a variable that is separate from the racial categories. In other words, an individual may identify themselves as White, Black, Asian, some other race, or multiracial, and also consider themselves Hispanic in terms of their origin/ancestry or ethnicity (i.e. White Hispanic, Black Hispanic, etc.).

With the exception of the Pennsylvania municipalities of Middle Smithfield, Smithfield, and Stroud Townships and Delaware Water Gap Borough, all municipalities have non-white populations of less than 10% and most are below 5% (Figure 5). Only Middle Smithfield, Smithfield, and Stroud Townships have Hispanic or Latino populations above 10%. These municipalities also have higher populations and population densities and/or are proximate to the towns of Stroudsburg and East Stroudsburg. For reference, in the 2010 Decennial Census, 18.1% of the population in the Commonwealth of Pennsylvania is non-white, and 5.7% identify as Hispanic or Latino, while in New Jersey, 31.4% of the population is non-white and 17.7% are Hispanic or Latino. Nationally, 27.6% of the population is non-white and 16.3% are Hispanic or Latino.

⁴ See Appendix 3 for diversity variables. Here in the text we report the data from the 2010 Decennial Census, however Appendix 3 also include estimates from the 2015 American Community Survey and an estimate of the change between 2010 and 2015.

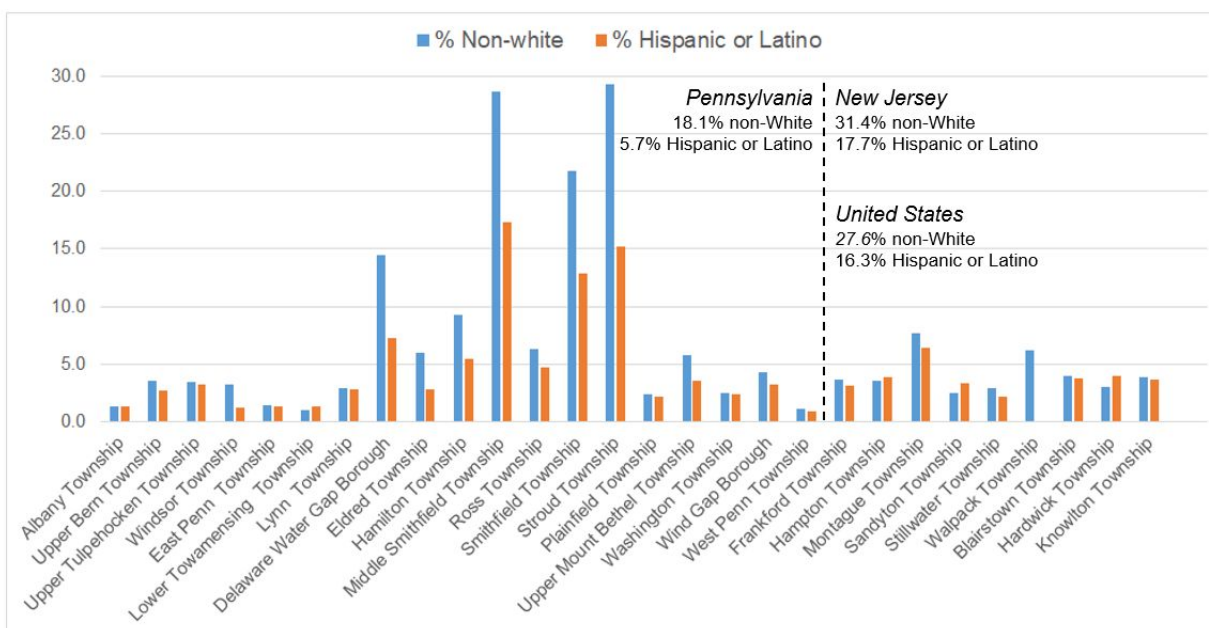


Figure 5: The percentage of individuals who identify themselves as non-white in terms of race and Hispanic or Latino for each municipality.

2.4 Summary of demographic characteristics

Although the New York City metropolitan area exists to the east of the study area and Berks, Lehigh, and Northampton counties are classified as urban counties by the U.S. Census, the municipalities targeted in this study consist of low density, predominantly white communities. The Pennsylvania municipalities of Stroud, Smithfield and Middle Smithfield Townships provide a demographic profile of a relatively younger, more diverse population that is likely influenced by their proximity to Stroudsburg and East Stroudsburg. Walpack Township, NJ's unique population profile is due to the high proportion of conservation lands within the township boundary.

3.0 County Population Projections

3.1 Projected Population Trends⁵

Population projections for the study area are available only at the county scale, and include only total population by age and sex; no other demographic variables are projected. Projections from 2010 to 2040 for Pennsylvania were generated by the Center for Rural Pennsylvania, and

⁵ See Appendix 4 for complete data tables of county-level population forecast data, broken down by sex and age. See Appendix 5 for population forecasts graphs and population pyramids.

projections from 2010 to 2034 for New Jersey were generated by the New Jersey Department of Labor and Workforce Development.

Overall annual estimated growth rate for the eight counties within the study area is 0.32% of the 2010 population which is slightly lower than state estimates of 0.37% in Pennsylvania and 0.36% in New Jersey. These long term forecasts are significantly higher than the estimated annual growth of 0.11% in Pennsylvania between 2010-2017, leading us to interpret these forecasts with caution.

As shown in the Figure 6, the projections forecast population increases in Pennsylvania's Berks, Lehigh, Schuylkill, Northampton and Monroe counties. Forecasts indicate population decreases in Warren, NJ, Sussex, NJ and Carbon, PA counties.

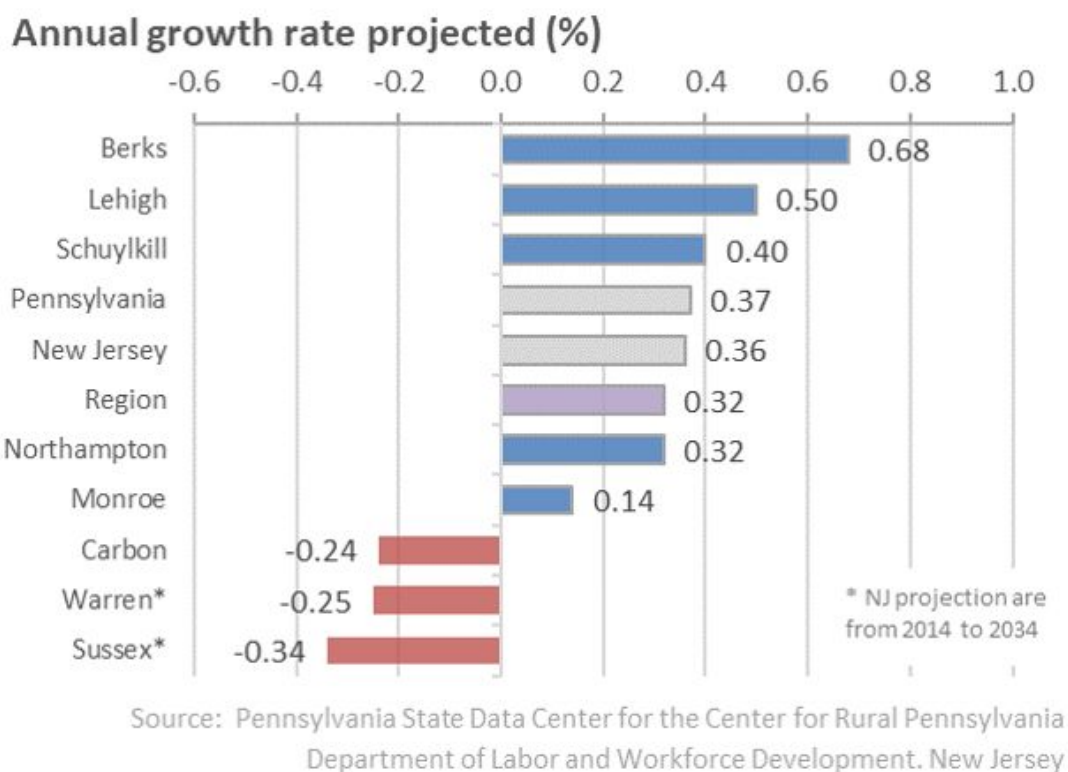


Figure 6: Projected growth rates for counties in the study area for 2034 in New Jersey counties and 2040 in Pennsylvania counties.

Figure 7 illustrates projected changes in indicators of population structure across the study area counties between 2010 and 2035, all of which point to an aging population. In Figure 7, the youth category refers to individuals ages 15 to 64, while old age refers to 65+. While the 15-64 population increases only slightly between 2010 and 2035, the 65+ population increases

dramatically. This is reflected in the increase in the dependency ratio, which is an age-population ratio of those typically not in the labor force (ages 0 to 14 and 65+) and those typically in the labor force (the productive part, ages 15 to 64). It is an indicator of the pressure on the productive population. The child-woman ratio, a ratio calculated by dividing the number of children in the age group 0-4 (of both sexes) by the number of women of reproductive age (15-49 years), is projected to remain stable and relatively low, indicating low fertility and small family sizes. The sex ratio shows a slight increase, which is related to the aging population and the longer life span of women.

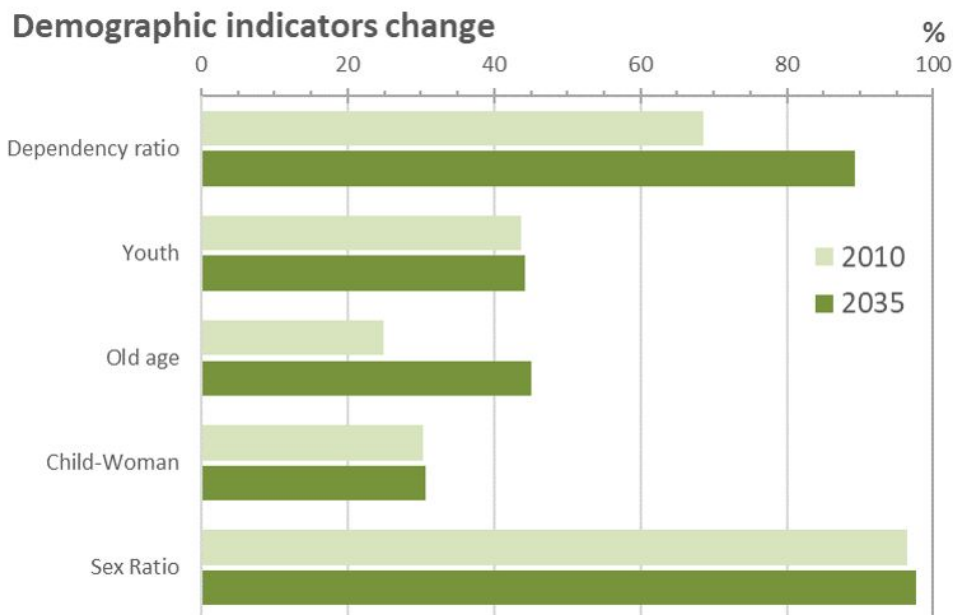


Figure 7: Indicators of future demographic change, 2010 to 2035, across all counties in the study area.

4.0 Income and Poverty⁶

4.1 Income

At the county level, the 2010 median household income in most study area counties is higher than the state or national values (Figure 8). New Jersey's median income (\$69,811) is higher than Pennsylvania (\$50,398). Two Pennsylvania counties, Carbon and Schuylkill have median incomes below the state or national value. Additionally, the municipalities generally have higher incomes relative to their county.

⁶ See Appendix 6 for complete data tables for income and poverty variables. Here in the text we report the data from the 2010 Decennial Census, however Appendix 6 also includes estimates from the 2015 American Community Survey and an estimate of the change between 2010 and 2015.

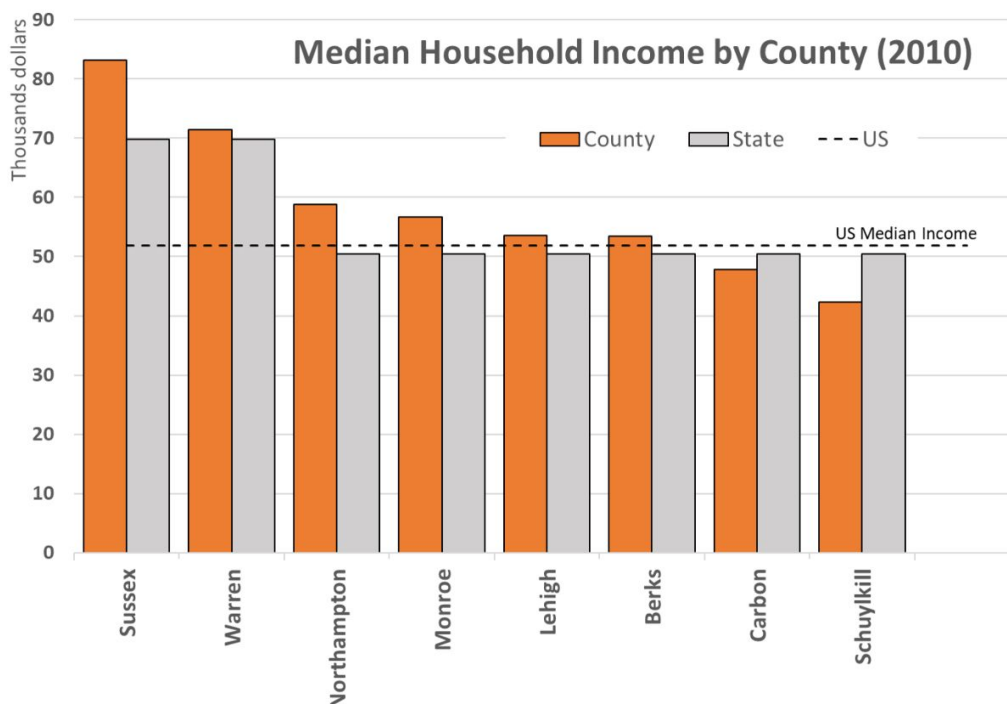


Figure 8: Median household income by county for the counties in the study area. The orange bars represent each county's median household income and the gray bars represent their respective state's median household income (Sussex and Warren counties are in New Jersey, and the remaining counties are in Pennsylvania). The dashed line is the national median income.

Even though most of the study area counties have median incomes higher than the state and national average, most municipalities have median incomes that are higher than that of their respective county's. Figure 9 shows the median household income of each study municipality as a percentage of its county's median income; for example Lynn Township's median income is 140%, or 1.4 times, higher than the median income in Lehigh County, PA. Even in Carbon and Schuylkill counties, where county income levels are lowest, the municipalities within these counties (Lower Towamensing Township, PA; East Penn Township, PA and West Penn Township, PA) have higher median incomes relative to county, state, or national values. Of the eight townships that have a lower median income than their county, four (Montague Township, Sandyton Township, Hampton Township, Stillwater Township) are located in the wealthiest county in the region, Sussex County, NJ; three more (Delaware Water Gap Borough, Eldred Township, and Smithfield Township) are located in the regionally wealthiest Pennsylvania county of Monroe.

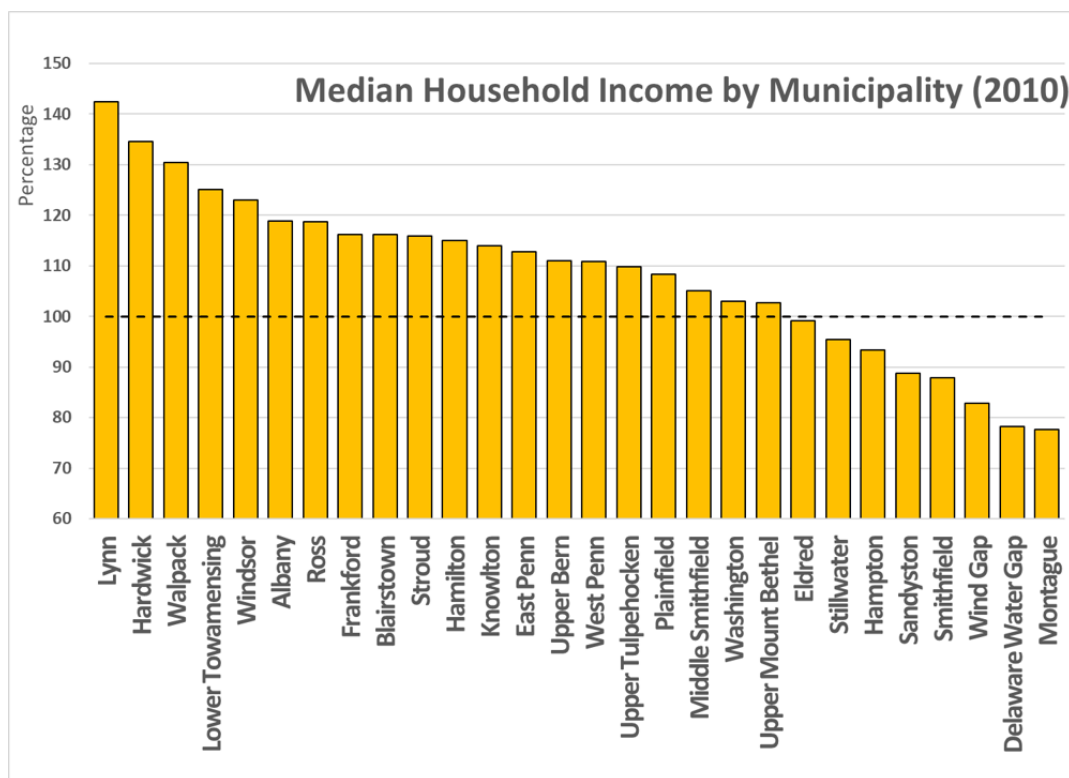


Figure 9: 2010 median household income of the study municipalities as a percentage of their respective county's median income.

4.2 Poverty

In 2010, poverty levels for the total population in all municipalities was lower than the national rate (15.1%) (Figure 10). One municipality, Lower Towamensing Township, PA, reported a total poverty rate of 14.8%, higher than Pennsylvania's statewide poverty rate (13.45%). Poverty rates above 10% were observed in Montague Township, NJ (13.0%), Stroud Township, PA (11.5%) and Smithfield Township, PA (11.6%). A few municipalities exhibit high (>20%) youth and child poverty rates (for populations younger than 18): Lower Towemensing Township, PA, Upper Bern Township, PA, and Montague Township, NJ. Delaware Water Gap Borough, PA has the highest rate of individuals older than 65 in poverty (18.4%).

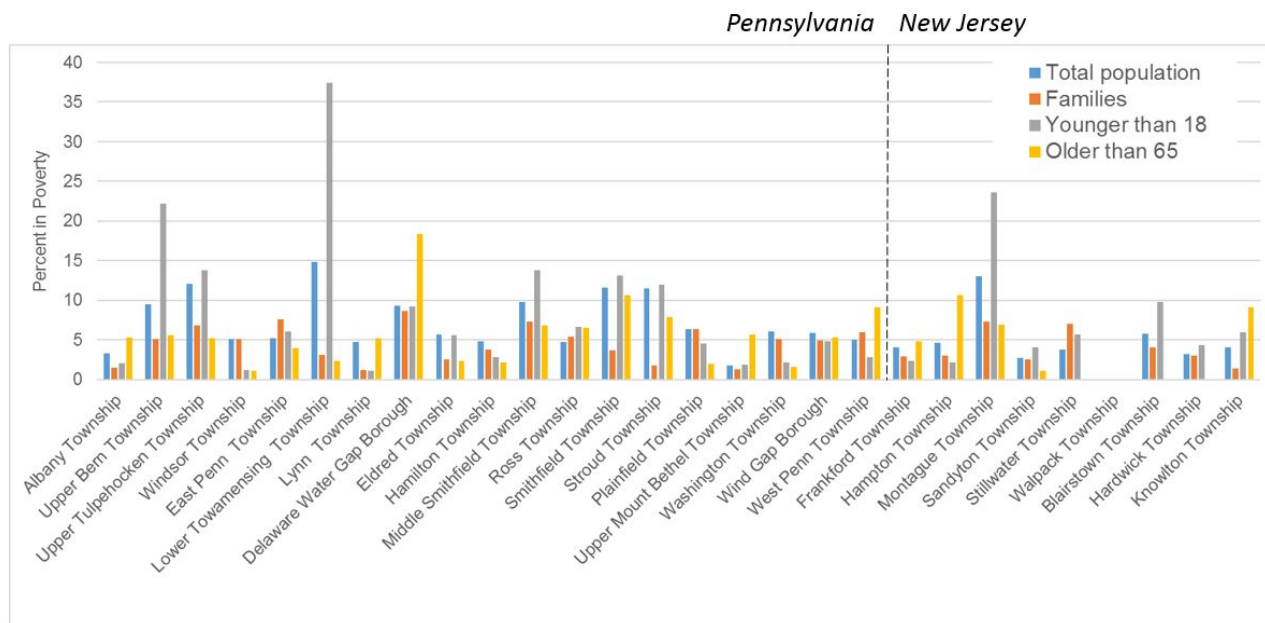


Figure 10: The percentage of municipal populations in poverty for the total population, for families, for individuals younger than 18, and for individuals older than 65.

5.0 Education and Occupation⁷

5.1 Education

Within the targeted municipalities, an average of 11.1% of the population did not graduate from high school (No Degree), although this rate varies significantly across municipalities (Figure 11). Most (40%) of the population within the study area earned a high school diploma, while 32% of the population were college graduates (associate, bachelor's or graduate). Of the municipalities, Blairstown Township, NJ had the highest proportion of college graduates (45%) and Walpack Township, NJ township had the lowest proportion of college graduates (11%). Census data regarding vocational education, licensing or certification are not collected at a county or municipal scale. As expected, income and education level, especially with respect to individuals who earn a college degree, are correlated (Figure 12).

⁷ See Appendix 7 for complete data tables for education and occupation variables. Here in the text we report the data from the 2010 Decennial Census, however Appendix 7 also includes estimates from the 2015 American Community Survey and an estimate of the change between 2010 and 2015.

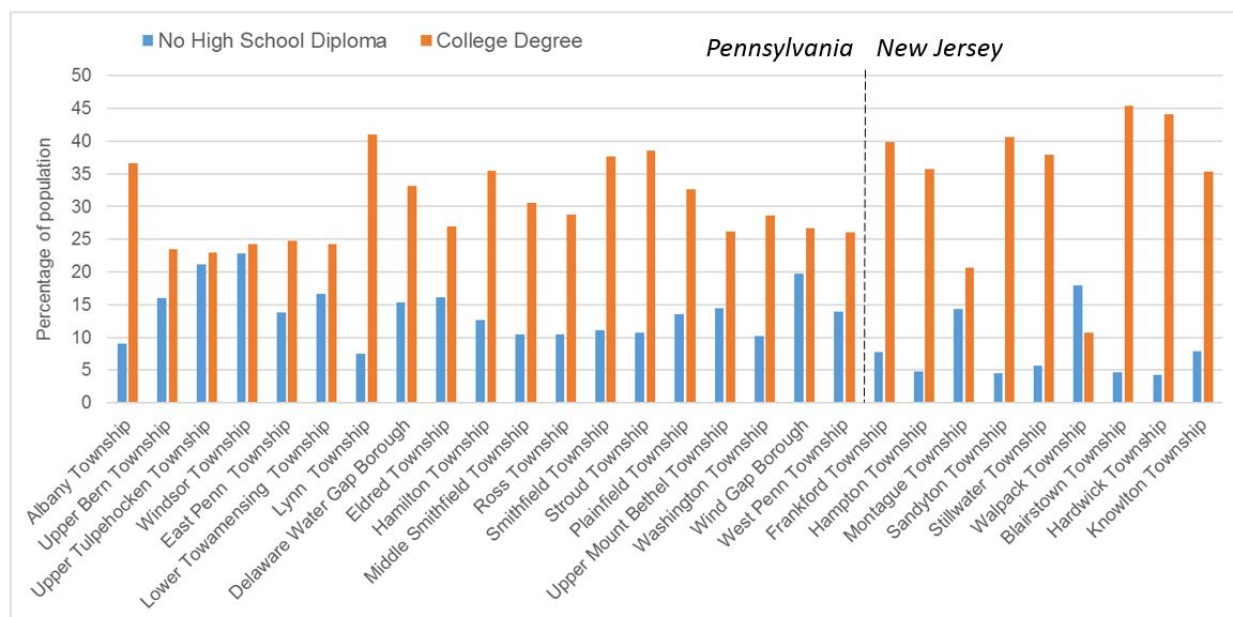


Figure 11: The percentage of municipal population with no high school diploma and with a college degree.

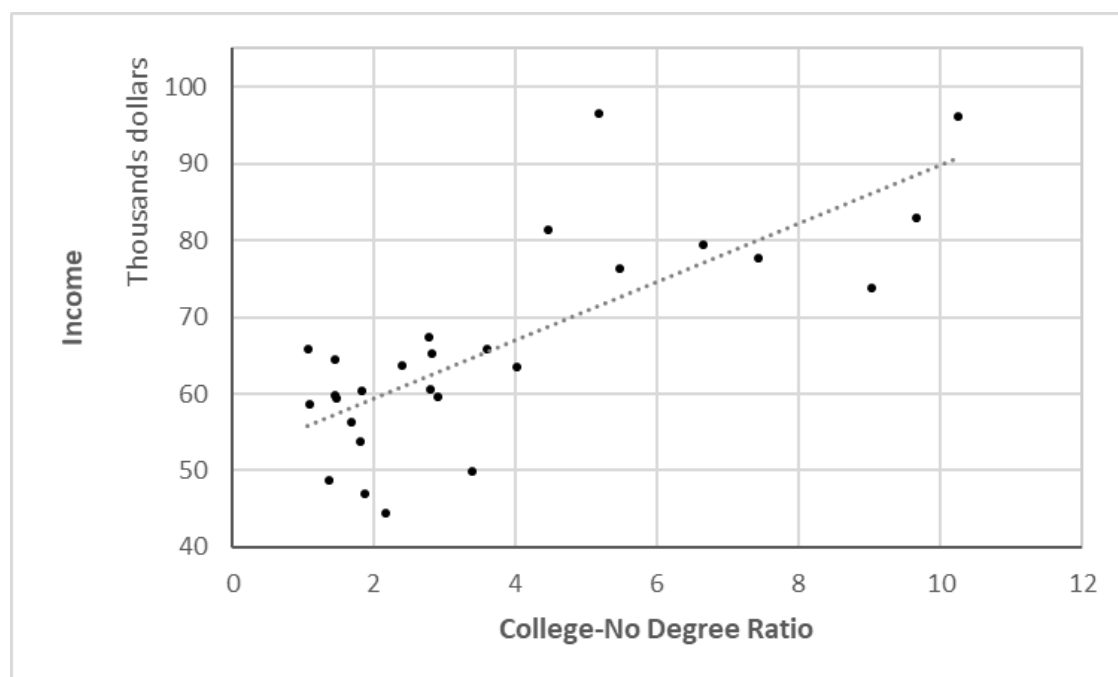


Figure 12: The relationship between education and income. As the ratio of individuals with a college degree to individuals without a college degree increases, income increases.

5.2 Occupation

The Census data reports various occupations within broad categories: management, business, sciences and arts; construction and natural resources; sales and office workers; service workers; and transportation and production. In 2010, the dominant occupations within the study area are in management, business, science, and arts (34%). The majority of workers in the region (74%) would be considered “white collar” workers (e.g. with occupations in management, business, science, and arts; sales and office workers; and service workers) (Figure 13), although there is considerable variable by municipality (Figure 14).

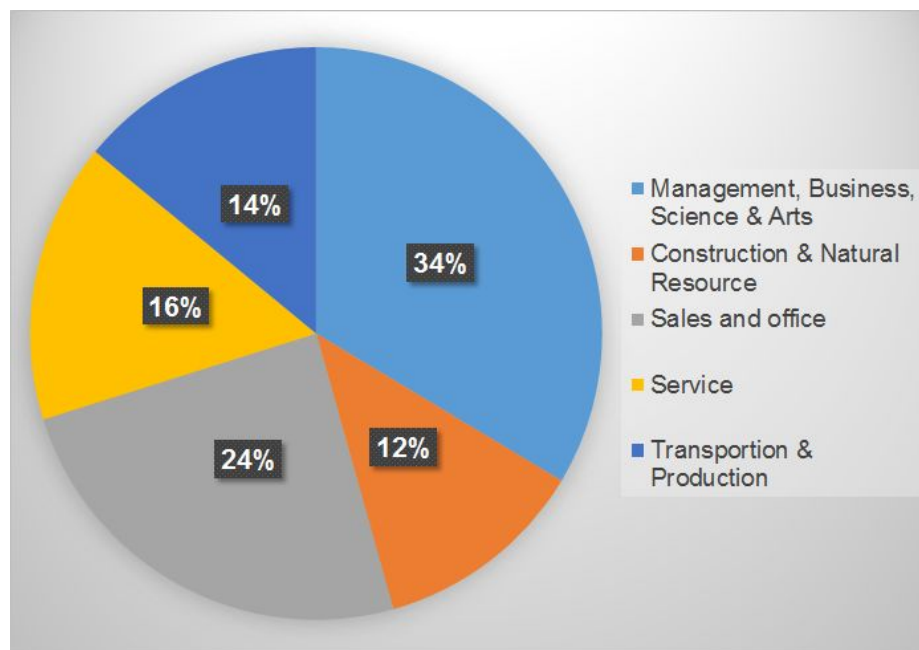


Figure 13: Distribution of occupations within the study area.

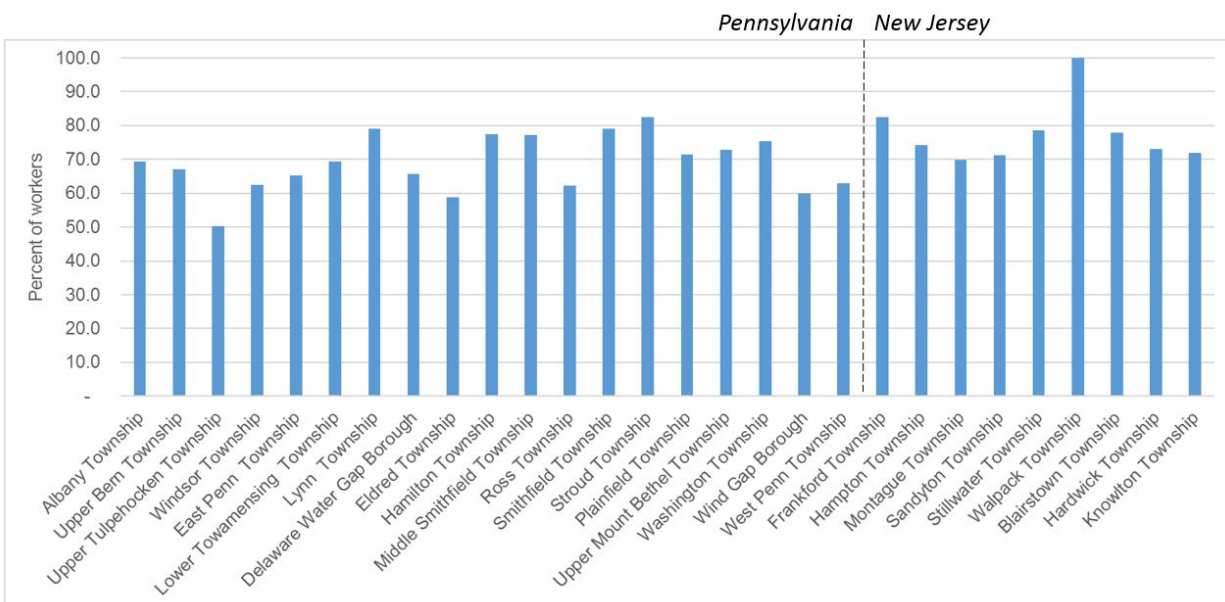


Figure 14: The percentage of “white collar” workers (e.g. with occupations in management, business, science, and arts; sales and office workers; and service workers) by municipality.

6.0 Housing⁸

6.1 Housing Ownership

As Figure 15 demonstrates, owners occupy approximately 73% and renters occupy 17% of housing in 2010. Approximately 10% of housing is vacant. We note that vacant housing includes seasonal housing, housing units under construction, vacant housing units for sale, vacant housing units for rent, and a number of other categories of vacancy. Relative to the study area, the highest proportions of rental housing are observed in Delaware Water Gap Borough, PA and Wind Gap Borough, PA. A higher proportion of vacant housing is observed in Walpack Township, NJ and Smithfield Township, PA.

⁸ See Appendix 8 for complete data tables for housing variables. Here in the text we report the data from the 2010 Decennial Census, however Appendix 1 also includes estimates from the 2015 American Community Survey and an estimate of the change between 2010 and 2015.

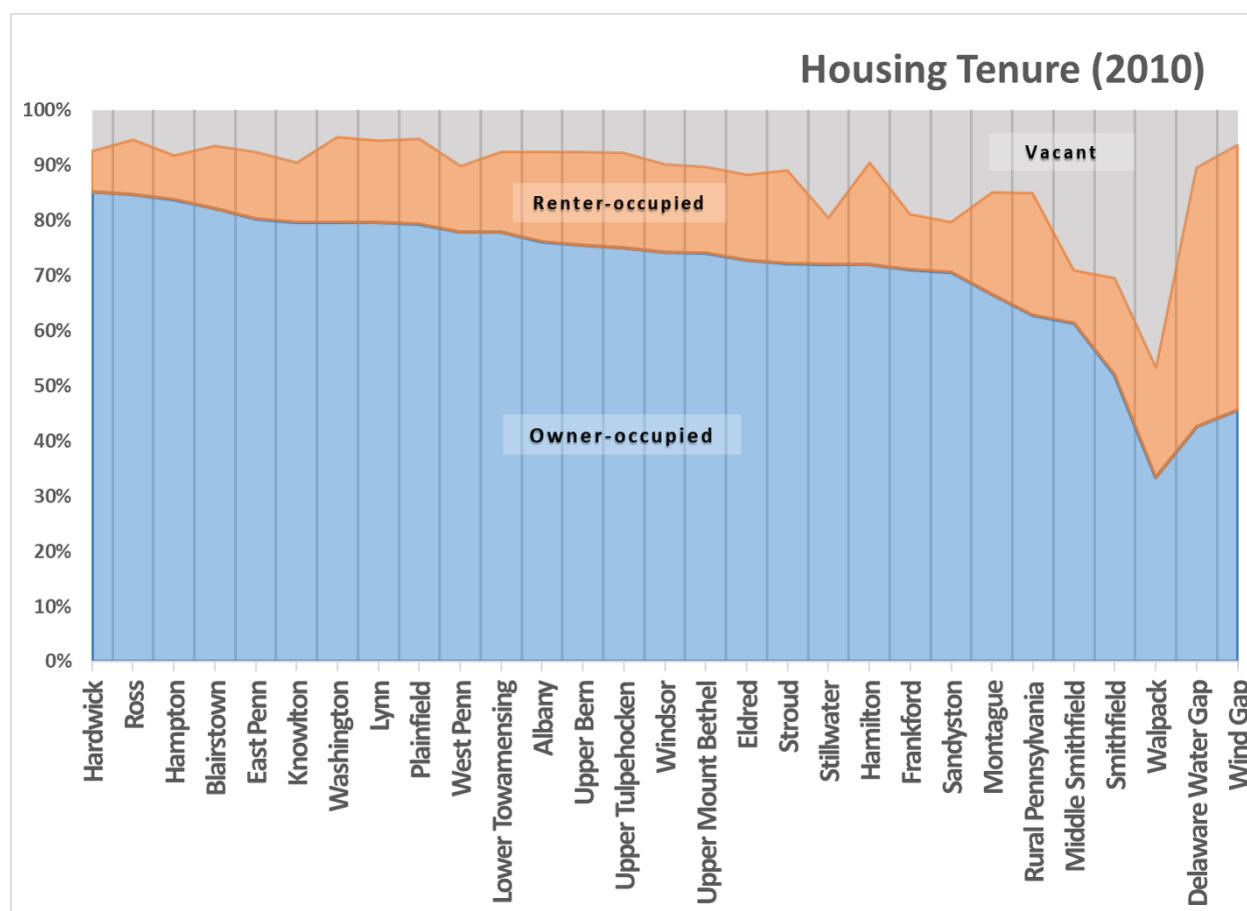


Figure 15: Housing tenure by municipality.

7.0 Marital Status⁹

Approximately 61% of individuals are married. Delaware Water Gap Borough, PA reports the lowest proportion of married individuals (47%) and the highest number of individuals who never married (35%). Montague Township, NJ represents the highest number of married individuals (74%). The highest proportion of widowed individuals is reported at Walpack Township, NJ.

⁹ See Appendix 9 for complete data tables for marital status. Here in the text we report the data from the 2010 Decennial Census, however Appendix 9 also includes estimates from the 2015 American Community Survey and an estimate of the change between 2010 and 2015.

8.0 The Electorate

8.1 County-level Party Registration¹⁰

Political party registration in 2017 at the county level indicates a Democratic majority for 5 out of 6 counties in Pennsylvania and a Republican majority for both counties in New Jersey (Figure 16). It is notable that third party registrations equal Republican registrations in the New Jersey counties.

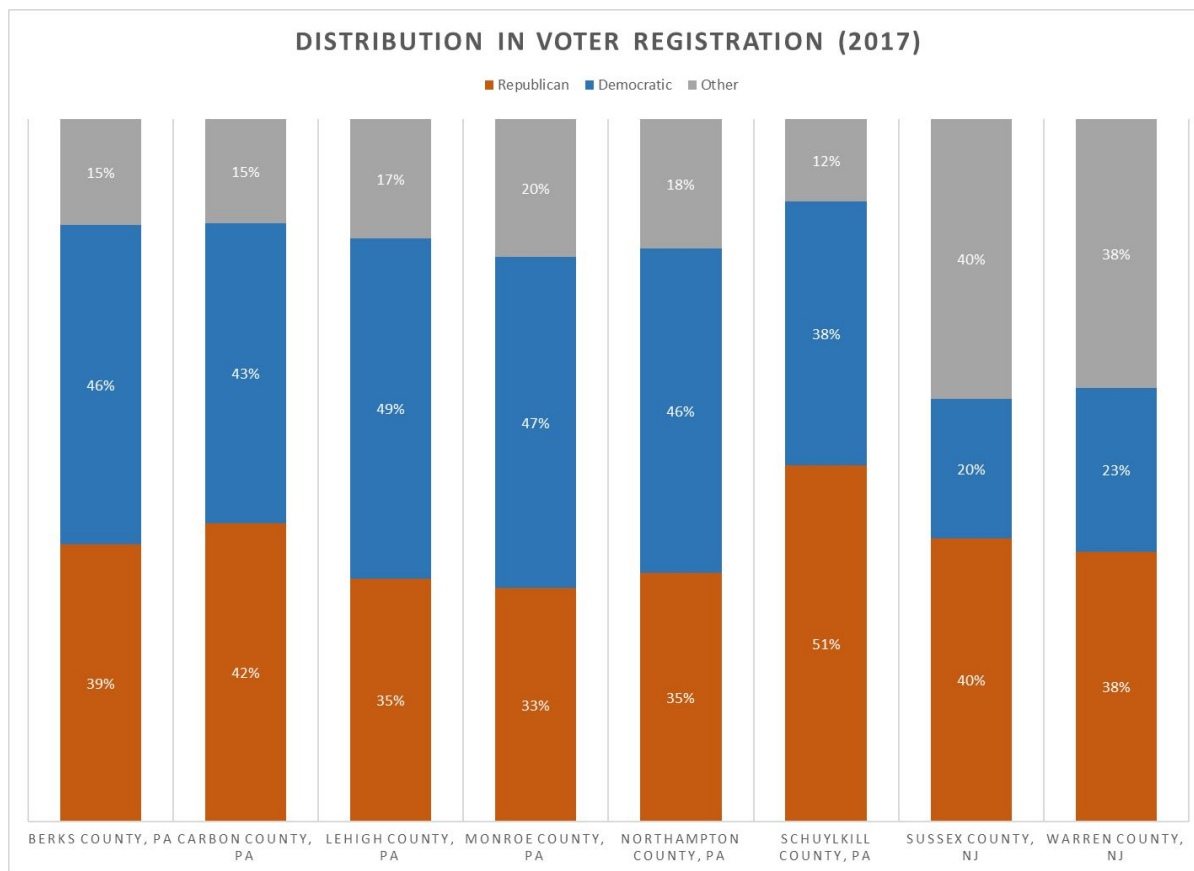


Figure 16: Distribution of county-level voter registration in 2017.

Trends in county-level voter registration between 2004 and 2017 reveal interesting patterns (Figures 17 A, B, and C). In 2004, third party registration in Sussex and Warren counties in New Jersey made up roughly 55% of registered voters, but those numbers dropped significantly in subsequent years, with a commensurate increase in both Democratic and Republican registered voters in those counties. Another notable trend is the so-called “Obama bump,” or an increase in registered Democrats during Obama’s tenure as President. Many counties show a decrease in Democratic registered voters and an increase in Republican registered voters in 2016.

¹⁰ See Appendix 10 for detailed tables of county-level voter registration records for 2004-2017.

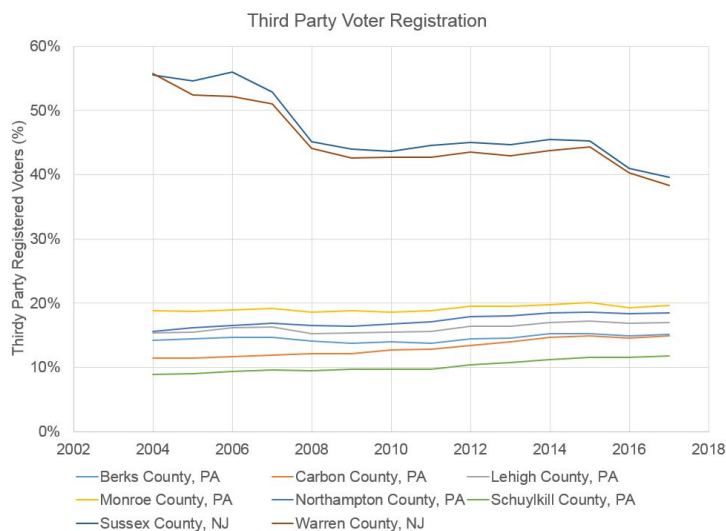


Figure 17A: Trends in third party voter registration 2004-2017.

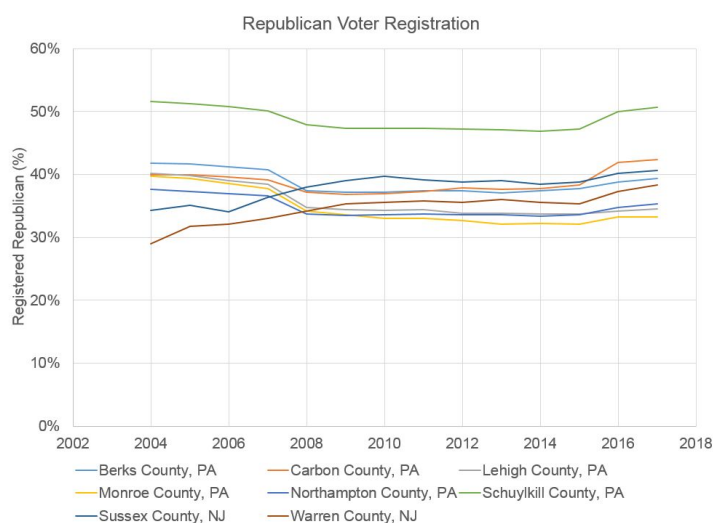


Figure 17B: Trends in Republican party voter registration 2004-2017.

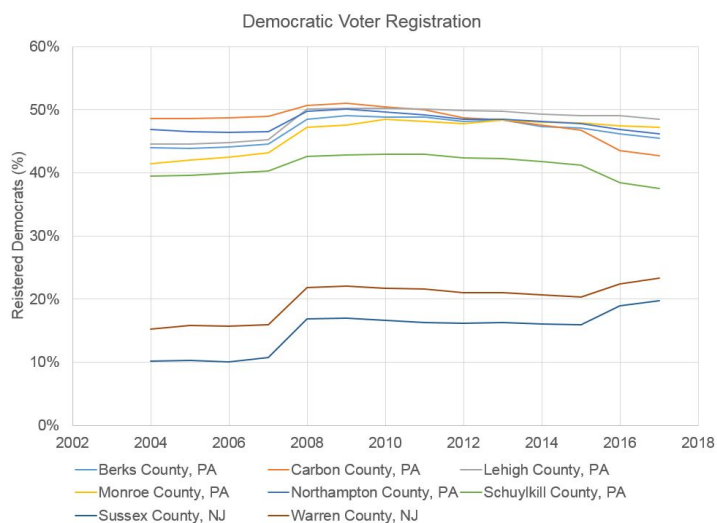


Figure 17C: Trends in Democratic party voter registration 2004-2017.

8.2 Municipal Election Results¹¹

The municipal election results, although partisan, do not shed much light on partisan leanings beyond what can be learned from voter registration data. In general, municipal elections tend to trend republican. What is potentially of great value, however, is that the municipal election data tracks the individual elected officials between 2011 and 2017. Many elected officials have served continuously in various capacities over this time period, and are long standing and likely influential community leaders.

8.3 Presidential Elections Results, 2004 - 2016¹²

For the nine New Jersey municipalities and eighteen Pennsylvania municipalities included in this analysis, presidential election outcomes trend heavily toward the Republican Party.

8.3.1 2004 Presidential Election

In the 2004 presidential election, incumbent Republican George W. Bush defeated Democrat John Kerry. Bush received at least sixty-three percent of the vote in these nine townships. In the 2004 presidential election, incumbent Republican George W. Bush defeated Democrat John Kerry in the majority of Pennsylvania municipalities included in this analysis, with the exceptions of three municipalities in Monroe County: Delaware Water Gap Borough, Middle Smithfield Township, and Stroud Township. The outcome of the 2004 presidential election in Carbon County was a virtual dead heat with only 286 votes separating the two candidates at the county level.

8.3.2 2008 Presidential Election

In New Jersey, Democrat Barack Obama made inroads but was defeated in the nine townships by Republican John McCain. The Republican margin of victory was reduced by two to six percentage points. In Pennsylvania, the municipalities in Monroe County leaned more toward Democrat Barack Obama than they had toward Democrat John Kerry four years earlier. The only municipality in Monroe County where Republican John McCain won a majority was Eldred Township, PA. Democrat Barack Obama won a majority of the vote in Carbon County, improving the party's position from the 2004 election.

8.3.3 2012 Presidential Election

In New Jersey, Republican challenger Mitt Romney defeated incumbent Democrat Barack Obama, but the Republican victory margin was unchanged, except for Walpack Township in Sussex County.

¹¹ See Appendix 11 for detailed tables of municipal election results (2011-2017).

¹² See Appendix 12 for detailed tables of presidential election results (2004-2016).

As discussed in the population tab, the number of people who reside in Walpack Township is small, fewer than 20 people. The same is true of the number of people who vote, so a small increase in the number of voters changes the percentages disproportionately.

In Pennsylvania, Republican challenger Mitt Romney took areas won by Democrat Barack Obama in his victory in 2008. Republicans improved their positions in all municipalities, with a very small increase in Stroud Township. Republicans won a majority of the vote in Carbon County for the first time in two presidential election cycles.

8.3.4 2016 Presidential Election

In New Jersey, the presidential election was characterized by increased margins of victory for Republican Donald Trump over Democrat Hillary Clinton in eight of these nine New Jersey municipalities. The lone exception again is Walpack Township in Sussex County.

In Pennsylvania, the 2016 presidential election was characterized by increased margins of victory for Republican Donald Trump over Democrat Hillary Clinton in all municipalities except Albany Township in Berks County. When compared to the Republican margins of victory in the 2004 presidential contest, Republicans increased their margin of victory in all but three municipalities in Monroe County (Middle Smithfield Township, Smithfield Township, and Stroud Township).

9.0 Recreation Demand

Outdoor recreation is estimated from a combination of sources including fishing and hunting license sales and recreation demand models. Based upon the data source, these data are available at variable scales, ranging from zip code to watershed level.

9.1 Modeled Recreation Demand by HUC 10 Watersheds¹³

Recreation demand data were acquired from the Environmental Protection Agency's (EPA) EnviroAtlas data set, which reflects 2011 data. Recreation Demand represents a modeled estimate of the number of day trips per year demanded by individuals over the age of 18. One of the primary inputs to these modeled estimates is the local and regional population, so recreation demand days are correlated with population. Recreation demand data for four activities, big game hunting (ex. deer, bear), migratory bird hunting, freshwater fishing and bird watching were reported. Estimates of hiking activities are not available at a scale that would be meaningful for the study area.

¹³ See Appendix 12 for detailed tables related to modeled recreation demand by HUC 10 watersheds, grouped DRWI by clusters.

Across all watersheds within the study area, big game hunting recorded the highest recreation demand followed by fresh water fishing, bird watching and migratory bird hunting. Recreation demand by watershed range from 22,065 (Bertsch Creek watershed, PA) to 252,153 days (Headwaters Paulins Kill watershed, NJ). While there is correlation with local population density, the watersheds with the highest recreation demand days border the southeastern edge of the Delaware Water Gap National Recreation Area.

9.2 Hunting and Fishing License Sales Data¹⁴

Hunting and fishing license data were used as a proxy for those activities. Hunting and fishing license sales data are not consistently available across the study area. New Jersey provided combined hunting and fishing license sales data for zip codes from 2011 - 2018. Pennsylvania only provided the most recent year for hunting license sales and while historic data are available for fishing license sales, it is only by county. These differences made valid comparisons between the two states difficult.

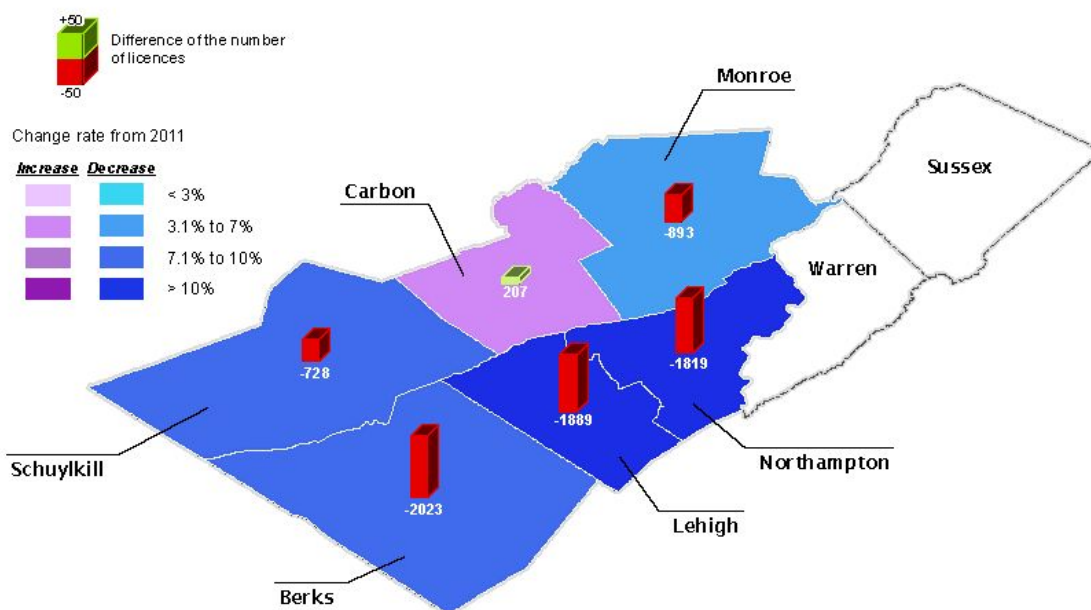
For Pennsylvania counties in the study area, fishing license sales show a decrease between 2011 and 2017, with the exception of Carbon County, although it is notable that Berks County is among the top 10 counties statewide for fishing license sales throughout this time period. While the overall number of fishing licenses in Pennsylvania counties fell, when local license sales are normalized by the local population, the observed decrease in per capita license sales is negligible, and occasionally reflects an increase, due to an apparent decline in population between 2011 and 2017 (Figure 18). Hunting licenses for Pennsylvania zip codes are only available for 2017 (Figure 19), and per capita trends show a slight west to east declining trend.

For zip codes in New Jersey, combined hunting and fishing license sales also show a slight decline between 2010 and 2017 (Figure 20). However, the per capita trend is similar to what was observed in Pennsylvania, where a decline in overall population ameliorates the trend in overall license sales.

Note that population data to calculate the per capita license sales were sourced from 2011 and 2017 the American Community Survey estimates.

¹⁴ See Appendices 14 and 15 for detailed license data for Pennsylvania and New Jersey, respectively.

Change of Fishing Licenses from 2011 to 2017 in PA Counties



Fishing Licenses Normalized by Population in PA Counties

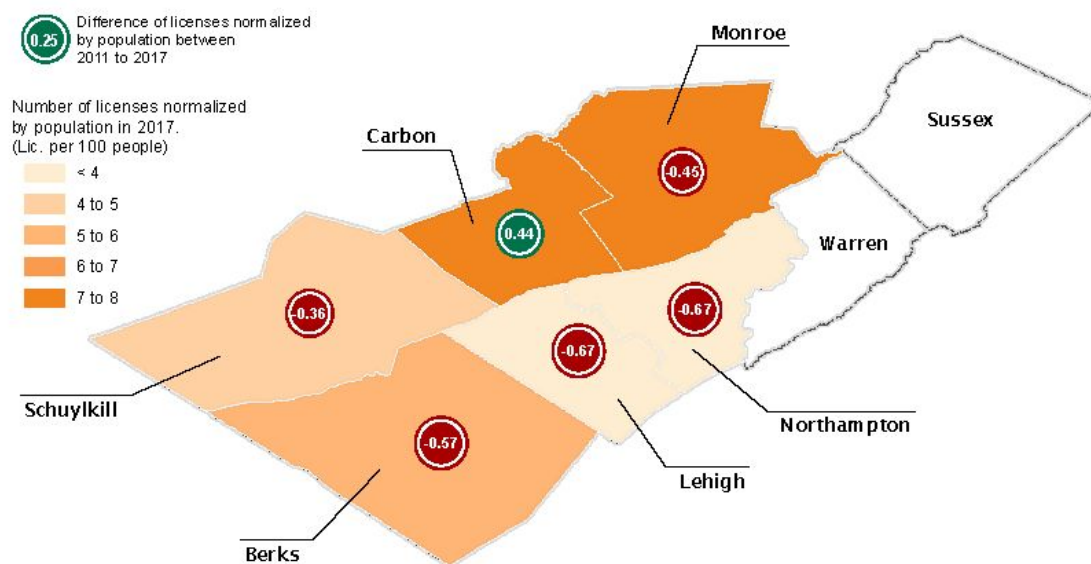


Figure 18: Fishing license sales in Pennsylvania counties, 2011-2017. The upper map shows the increase or decrease in the number of licenses sold (bars) and the rate of change (shades of pink or blue). The lower map shows the change in per capita license sales (circles) and the per capita license sales in 2017 (shades of orange).

ZIP Codes included in ATC municipalities in Pennsylvania



**2017 Hunting Licenses
in PA ZIP Codes**

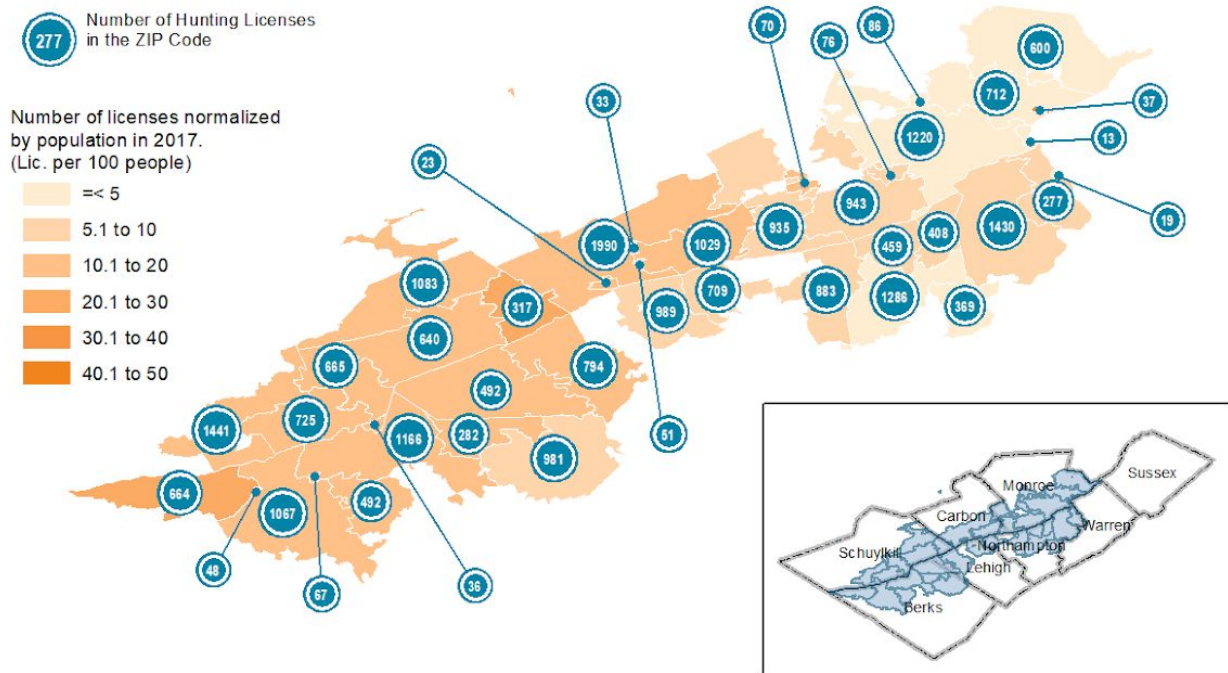
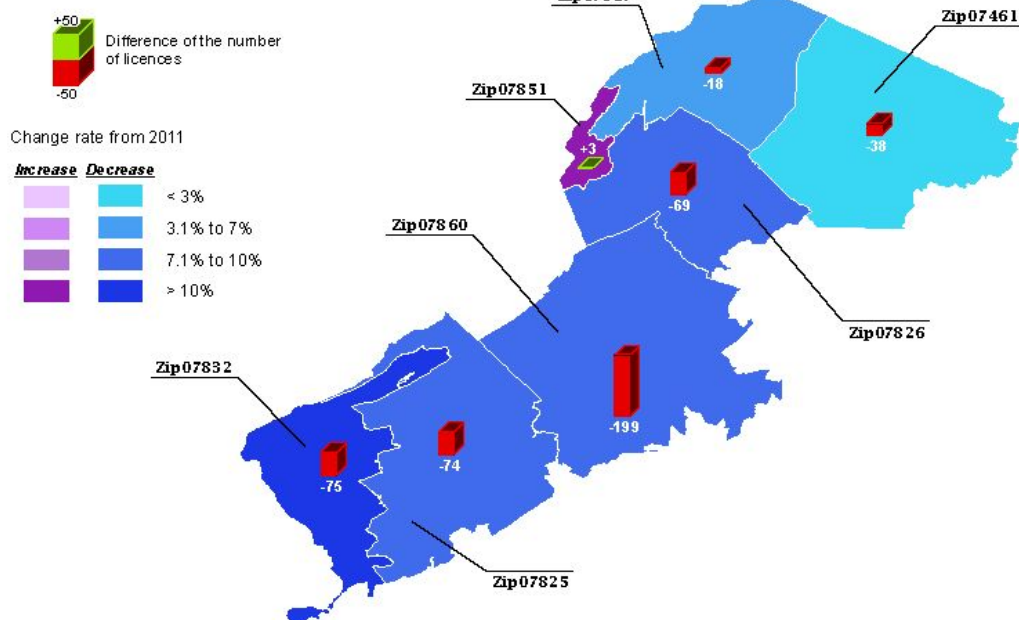


Figure 19: Hunting license sales by zip code in Pennsylvania. Circles show the number of licenses sold and the shades of orange show the per capita license sales.

Change of Hunting and Fishing Licenses from 2011 to 2017 in NJ ZIP Codes



Hunting and Fishing Licenses Normalized by Population in NJ ZIP Codes

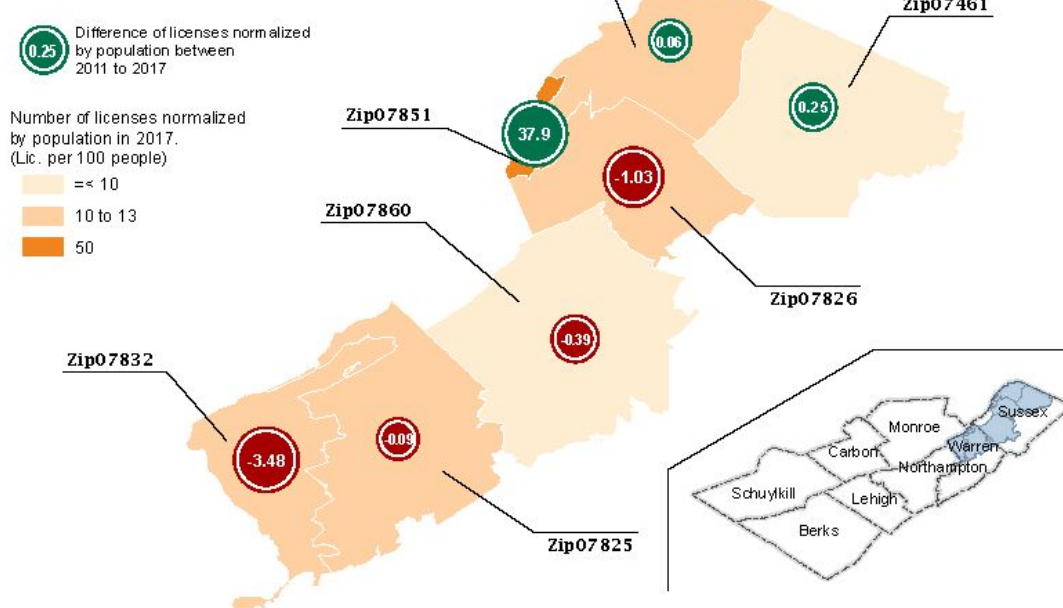


Figure 20: Combined hunting and fishing license sales in New Jersey counties, 2011-2017. The upper map shows the increase or decrease in the number of licenses sold (bars) and the rate of change (shades of pink or blue). The lower map shows the change in per capita license sales (circles) and the per capita license sales in 2017 (shades of orange).

10.0 Summary

The 28 municipalities targeted in this study can be summarized with the following observations:

10.1 Demographic Profile

Population represents a low density, rural landscape with the exception of five Pennsylvania municipalities: Wind Gap Borough, Stroud, Delaware Water Gap, Smithfield and Middle Smithfield townships.

Municipalities surrounding local urban centers of East Stroudsburg and Stroudsburg (Smithfield Township, PA, Middle Smithfield Township, PA, Stroud Township, PA) represent more densely populated, more diversified, and younger populations.

In general, population characteristic of the study area indicate an aging population with an increasing age-dependency ratio. State forecasts also indicate an overall population increase of almost 10% across the eight counties, although three counties are forecasted to experience population decline: Carbon County in Pennsylvania, Sussex County and Warren County in New Jersey. We note, however, that the state forecasts of a relatively high population growth exceed the current rate of growth and should be considered with caution given that context.

At the county level, the median household income in most study area counties is higher than the state or national values with the exception of Pennsylvania's Carbon and Schuylkill Counties. Additionally, the municipalities generally have higher incomes relative to their county.

In general, owners occupy approximately 73% and renters occupy 17% of housing. Approximately 10% of housing is vacant. Relative to the study area, a highest proportions of rental housing are observed in Delaware Water Gap Borough, PA and Wind Gap Borough, PA. A higher proportion of vacant housing is observed in Walpack Township, NJ and Smithfield Townships, PA.

In general, most (40%) of the population within the study area earned a high school diploma, while 32% of the population were college graduates (associate, bachelor's or graduate).

10.2 The Electorate

Political party registration at the county level indicates a Democratic majority for 5 out of 6 counties in Pennsylvania and a Republican majority for both counties in New Jersey. A notable historic trend in registered voters is the so-called "Obama bump," or an increase in registered

Democrats during Obama's tenure as President. Many counties show a decrease in Democratic registered voters and an increase in Republican registered voters in 2016.

The municipal election results, although partisan, do not shed much light on partisan leanings beyond what can be learned from voter registration data. In general, municipal elections tend to trend republican. What is potentially of great value, however, is that the municipal election data tracks the individual elected officials between 2011 and 2017. Many elected officials have served continuously in various capacities over this time period, and are long standing and likely influential community leaders.

10.3 Recreational Profile

When reviewing modeled recreational demand days at the watershed level in 2011, big game hunting emerged as the highest recreation demand followed by fresh water fishing, bird watching and migratory bird hunting.

In terms of hunting and fishing license sales, Pennsylvania counties show a decrease in fishing licence sales between 2011 and 2017, although Berks County is among the top 10 counties statewide for fishing sales throughout this time period. New Jersey combined hunting and fishing license sales show a slight decline between 2010 and 2017. While the overall number of local license sales often declined, when local license sales are normalized by the local population, the per capita license sales reflect a less dramatic decline and occasionally show an increase.

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