NJTPA NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY
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Regional Performance Measures

Development of Other Regional Performance Indicators:

Methodology and Data Summary Report

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Contents

1. Introduction

The NJTPA is developing performance measures for the region that address important goals and issues for Northern New Jersey. These measures go beyond those that must be reported under Federal requirements and address topics that either are not addressed in the national measures or could be measured in different ways to help support investment decision making. These supplemental performance measures can help to support measuring progress toward the goals and objectives of the Regional Transportation Plan (RTP), supporting investment decision making, and communicating with regional stakeholders and the public. In addition to the supplemental performance measures, the NJTPA wants to track other general regional indicators that relate to regional goals and provide context to the other measures, but are not directly tied to transportation.

2. General Methodology

During the process of identifying regional performance measures for the NJTPA region, the project team reviewed federally required performance measures, performed a review of the NJTPA's goals and existing state and regional plans and programs and reviewed the best practices among other MPOs. The project team also engaged the TAC members during the TAC meetings and as a follow-up to the TAC meeting discussion the team organized five separate focus group discussions (web meetings) with subject matter experts from partner agencies to explore potential measures. In addition to the regional transportation performance measures, stakeholders expressed interest in presenting regional indicators that are not directly tied to transportation, such as indicators of public health and the economy, which can be used to reflect on the overall strength of the NJTPA region and provide context to the other measures.

3. Recommended Other Performance Indicators

The project team developed a list of "Other Regional Indicators" and collected data on these indicators in four key areas: Economy, Natural Environment, Health, and Land Use, as shown below.

Table 1: Summary of the Recommended Other Regional Indicators

Goal Topic Area	Recommended Performance Measure	Data Period	Desired Direction
Economy	Regional unemployment rate	Annual	Decrease
	Regional Gross Domestic Product (GDP)	Annual	Increase
	Employment in major NJTPA cities	Annual	Increase
	Poverty Rate	Annual	Decrease
	Percent of households spending more than 30% income on housing	Annual	Decrease
Natural Environment	Percentage of monitored waterbodies and watersheds impaired for aquatic life	Biennial	Decrease
Health	Asthma rate	Annual	Decrease
	Obesity rate	Annual	Decrease
	Percent of population reporting leisure-time physical activity	Annual	Increase

Land Use	Acreage of agricultural land, forest land, and wetlands	Periodic (every ~5 years)	Maintain

ECONOMY

Regional unemployment rate

Overview

The regional unemployment rate is an indicator of socio-economic health for the entire region. However, employment data is difficult to collect and maintain as there are many ways to measure employment and reporting may use inconsistent metrics across an entire region. The data used in analyzing this measure was provided at the county level by the Bureau of Labor Statistics and aggregated for the thirteen-county NJTPA region.

Coverage

NJTPA Region

Data Period

Annual; CY 2011 to CY 2017 currently available

Geographic Scale

County Level

Source of Data

The Local Area Unemployment Statistics (LAUS) program is a federal-state cooperative effort to estimate monthly total employment and unemployment for approximately 7,000 areas: census regions and divisions, states, MSAs and Metro NECTAS (New England and Town Areas), counties, cities, and towns. The estimates of unemployment and employment indicate local economic conditions and are used by federal, state, local, and private stakeholders. (Adapted from *Overview, LAUS, https://www.bls.gov/lau/lauov.htm)*

The BLS publishes pre-generated data files (.csv) on Local Area Unemployment Statistics (LAUS) by county.

Data file collected: “Labor force data by county, [year] annual averages”

Alternative Source of Data

N/A

Data Collection Method

The Current Population Survey (CPS) is a household survey that provides the national unemployment rate. State monthly model-based estimates are controlled (in “real time”) to sum the national monthly unemployment and employment estimates from the CPS. The models combine current and historical data from the CPS, the Current Employment Statistics (CES) survey, and state unemployment insurance (UI) systems. Estimates for counties are produced through a building-block approach known as the “Handbook method,” which also uses the Census Bureau’s American Community Survey (ACS) in addition to the data sources listed above. These county estimates are adjusted to the statewide measures of employment and unemployment.

Calculation Methodology

The analysis was performed at the county level. Data for the 13 county NJTPA region was selected from the labor force data for all counties in New Jersey. For each year, aggregate real values of the number of employed and unemployed people and total labor force (columns “Labor Force”, “Employed”, “Unemployed”) were provided for all counties in NJ. ICF’s analysis calculated unemployment rate for NJ by dividing the total number of “Unemployed” by the total “Labor Force” for each year. Then, the selected data for just the 13 counties of the NJTPA region was aggregated for the real values of number of employed, unemployed, and labor force in the NJTPA region and the unemployment rate was calculated based on these aggregated numbers for the NJTPA region.

Results

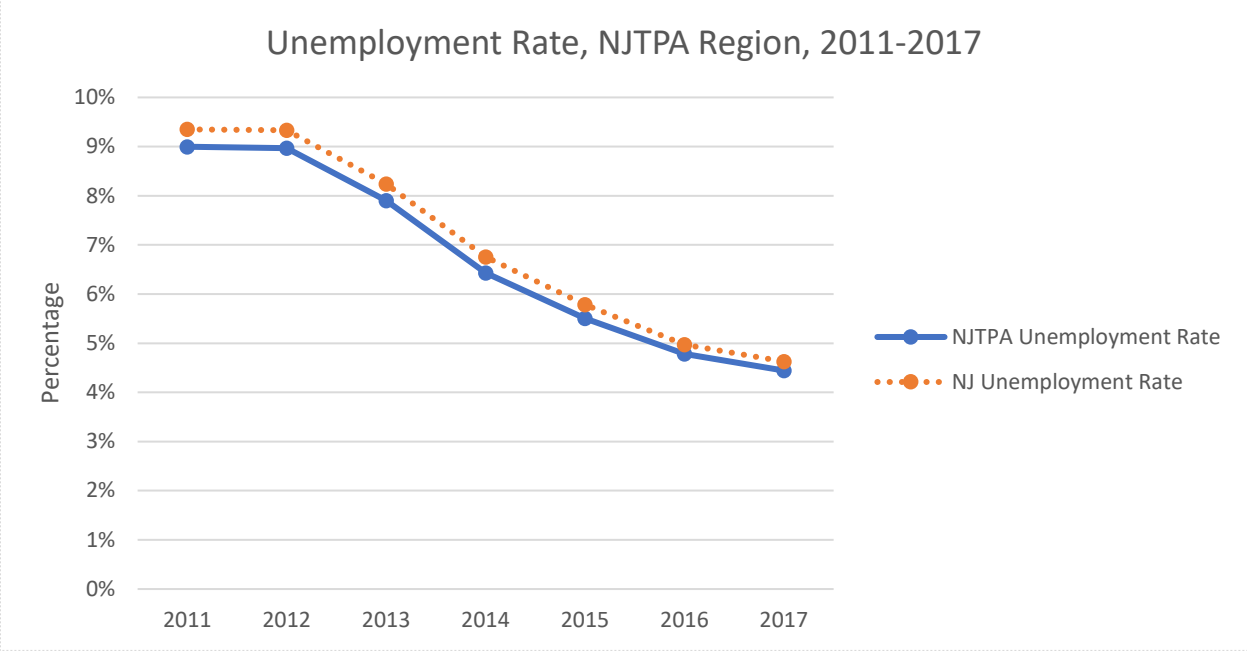

Figure 1: Unemployment Rate, for NJTPA Region and Statewide

Regional gross domestic product

Overview

Gross Domestic Product is the value of the goods and service produced in the United States. The growth rate (or shrinkage) from one period to another is an important gauge of economic health. The Bureau of Economic Analysis also estimates the GDP for states, metropolitan areas, most US territories, and is in the process of producing statistics for each county. The prototype statistics at the county level can be aggregated to produce a regional GDP for the NJTPA region to assess the value of goods and services produced in the region.

Coverage

NJTPA region

Data Period

Annual; currently available at the county level for CY 2012- CY 2015

Geographic Scale

County Level

Source of Data

Bureau of Economic Analysis Website https://www.bea.gov/data/gdp/gdp-county

The Bureau of Economic Analysis (BEA) began producing prototype GDP data by county with their first release of 2012-2015 data in 2018.

Alternative Source of Data

N/A

Data Collection Method

Prototype county GDP statistics are based on county earnings by industry, which builds on the established methodology of GDP by metropolitan area. The next release of data is expected on December 12, 2019.

Calculation Methodology

The prototype GDP statistics at the county level for 2012-2015 are provided in chained (2012) dollars. ICF aggregated the data at the county level for the 13 NJTPA counties to produce the NJTPA regional GDP for each year 2012-2015.

Results

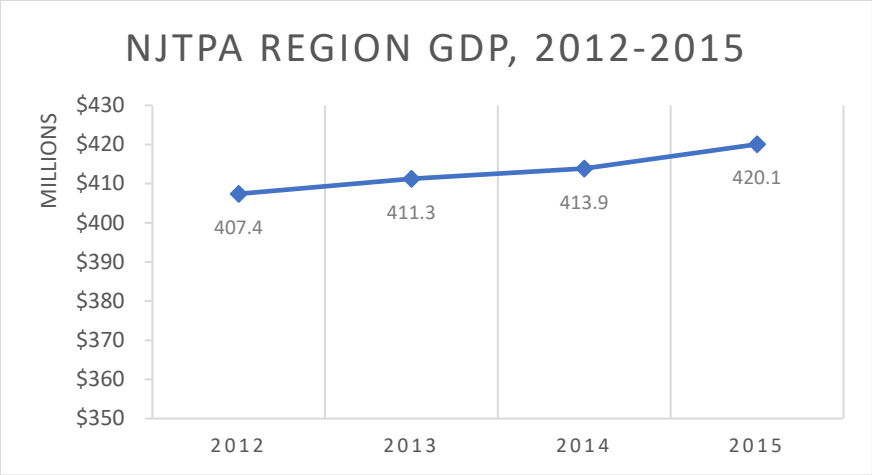

Figure 2: GDP for NJTPA Region

Employment in major NJTPA cities

Overview

Employment in major regional cities is an indicator of socio-economic health for the entire region. While the unemployment rate is calculated based on residents (how many residents of the NJTPA region are employed), the employment figures are based on the location of jobs. An increase in employment within the region may reflect an increase in job opportunities closer to home, and looking at major cities reflects jobs that generally are clustered in locations that have access via transit and other options.

Employment data is difficult to collect and maintain as there are many ways to measure employment and reporting may use inconsistent metrics across an entire region.

The NJTPA already produces employment forecast data based upon its Demographic and Employment forecast Model (DEFM) but the forecasts published in November 2017 did not provide historic data of employment. Consequently, the analysis used to collect historic employment data relied upon data products built from analysis of US Census Longitudinal Employer-Household Dynamics (LEHD) data.

LEHD Origin-Destination Employment Statistics (LODES) are state-based employment statistics that are used to research and characterize workforce dynamics for specific groups. They are organized into three types: Origin-Destination (OD), Residence Area Characteristics (RAC), and Workplace Area Characteristics (WAC). Data is available for most states for the years 2002–2015. Version 7, used in ICF's analysis, of LODES was enumerated by 2010 census blocks.

Coverage

NJTPA region

Data Period

Annual; available currently for period CY 2011- CY 2015

Geographic Scale

Census block for the LODES data and TAZ (Traffic Analysis Zone) level for NJTPA Employment Forecasts

Source of Data

U.S. Census Bureau. (2019). LEHD Origin-Destination Employment Statistics Data (2002-2015) [computer file]. Washington, DC: U.S. Census Bureau, Longitudinal-Employer Household Dynamics Program [distributor], accessed on January 29, 2019 at https://lehd.ces.census.gov/data/#lodes. LODES 7.3

NJTPA Demographic Forecast Data: https://www.njtpa.org/data-maps/demographics/forecasts

New Jersey Municipalities shapefile: https://www.state.nj.us/dep/gis/stateshp.html#MUNCOAST

2011-2015 data enumerated with 2010 Census block data.

Alternative Source of Data

N/A

Data Collection Method

Quarterly Workforce Indicators, including the LEHD Origin-Destination Employment Statistics Data (LODES) uses many data sources, including: administrative records, demographic surveys and censuses and economic surveys and censuses. The Census Bureau receives UI wage records and ES-202 establishment records from each state participating in the LED program. The Bureau then uses these products to integrate information about the individuals (place of residence, sex, birth date, place of birth, race, education) with information about the employer (place of work, industry, employment, sales). Not all of the integration methods are exact one-to-one matches based on stable identifiers. In some cases, statistical matching techniques are used, and in other cases critical linking values are

imputed. Throughout the process, critical imputations are done multiple times, improving the precision of the final estimates and permitting an assessment of the additional variability due to the imputations.[1]

The NJTPA's forecasts are updated every four years as part of updating the Regional Transportation Plan (RTP). The forecasts are developed in coordination with other regional agencies to ensure consistent forecasts for the NY/NJ metropolitan region.

Calculation Methodology

The analysis to collect historical employment data for major cities in the NJTPA region began by creating a shapefile with the LODES data for the NJTPA region, which was provided at the Census block level. ICF's analysis used this shapefile of LODES data for the NJTPA region was overlaid with the shapefile of New Jersey municipalities. The data was aggregated by municipality resulting in the 2011-2015 employment data for each municipality. The ranking of municipalities was based upon the ranking of the top ten NJTPA region municipalities by the NJTPA's record of 2015 data, and so 2011-2015 data were provided for those top ten municipalities, listed below in the results. In addition to the top 10 municipalities in the NJTPA region, municipalities with the top employment for each county not represented in the top 10 list were also included in the analysis. [These are compared to the NJTPA forecasts numbers, which were calculated by the NJTPA using their Demographic and Employment forecast Model (DEFM).]

Results

Table 2: Employment in major NJTPA cities

				Number of Employees					
Sr. No	**Ranking***	**Municipality Name**	**County**	**2011****	**2012****	**2013****	**2014****	**2015****	**2015 NJTPA*****
1	1	Newark City	Essex	151,080	145,261	147,066	144,618	145,897	*157,852*
2	2	Jersey City	Hudson	111,566	115,641	116,964	117,503	123,585	*130,189*
3	3	Edison township	Middlesex	80,475	81,172	82,540	82,589	84,193	*72,621*
4	4	Parsippany-Troy Hills township	Morris	56,861	58,319	61,180	61,234	64,314	*57,586*
5	5	Elizabeth City	Union	53,321	54,325	53,486	53,718	48,756	*54,406*
6	6	Woodbridge Township	Middlesex	59,389	60,274	61,918	63,697	65,974	*53,900*
7	7	Paterson City	Passaic	39,349	44,795	40,078	45,613	46,541	*47,402*
8	8	Toms River Township	Ocean	40,045	39,484	40,464	39,758	41,123	*44,714*
9	9	Secaucus Town	Hudson	36,397	37,322	38,876	38,652	39,726	*42,859*
10	10	Hackensack City	Bergen	48,053	46,423	47,398	48,953	48,746	*42,488*

[1] Abowd, John, et al. (2005). The LEHD Infrastructure Files and the Creation of the Quarterly Workforce Indicators. US Census Bureau. Retrieved from: https://lehd.ces.census.gov/doc/technical_paper/tp-2006-01.pdf

				Number of Employees					
Sr. No	**Ranking***	**Municipality Name**	**County**	**2011****	**2012****	**2013****	**2014****	**2015****	**2015 NJTPA*****
11	20	Freehold Township	Monmouth	28,946	26,264	26,479	27,197	26,716	*27,997*
12	55	Warren Township	Warren	15,607	16,453	16,271	15,880	15,799	*14,170*
13	94	Raritan Township	Hunterdon	9,103	13,878	14,322	14,476	14,141	*9,681*
14	129	Vernon Township	Sussex	3,795	3,956	4,065	4,155	4,448	*6,494*
			Total	**733,987**	**743,567**	**751,107**	**758,043**	**769,959**	***762,360***

*Ranking based off of NJTPA 2015 employment forecasts, created using the NJTPA's Demographic and Employment forecast Model (DEFM)

** 2011-2015 Employment data based on LODES

*** 2015 Employment Forecast data reported by the NJTPA as part of their regional forecasts publication, which was approved by the NJTPA board on November 13, 2017

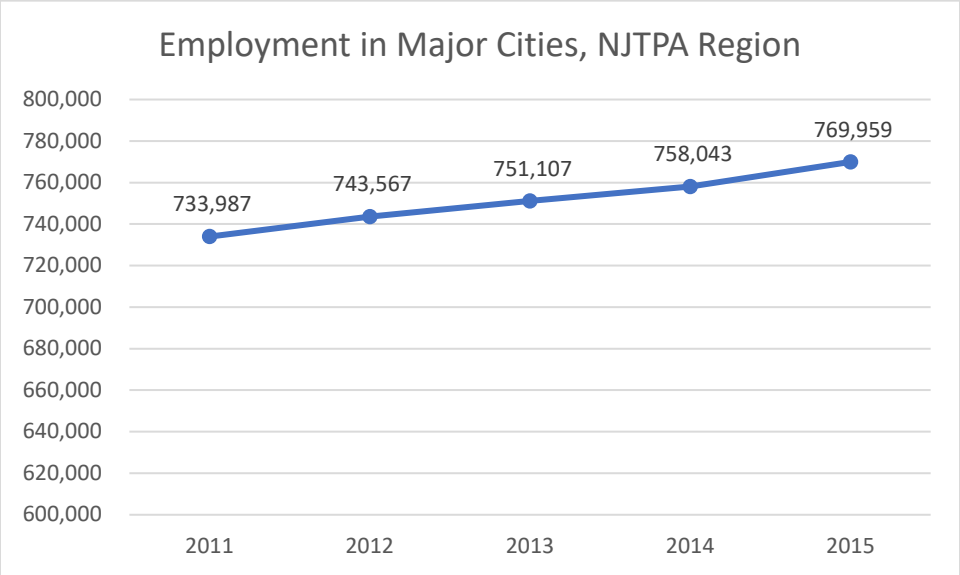

Figure 3: Employment in major cities, NJTPA Region

Poverty rate

Overview

The poverty rate is the ratio of the number of people (in a given age group) whose income falls below the poverty line. For determining the poverty line, the Census Bureau uses a set of income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the threshold for the family size and composition, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but they are updated for inflation using the Consumer Price Index (CPI-U). The official poverty definition uses income before

taxes and does not include capital gains or noncash benefits (such as public housing, Medicaid, and food stamps).[2]

Coverage

NJTPA region

Data Period

Annual; collected for CY 2011- CY 2017.

Geographic Scale

County level

Source of Data

United States Census Bureau, American Community Survey 5-Year Estimates

"Poverty Status in the Past 12 Months" (ID S1701)

https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_S1701&prodType=table

Alternative Source of Data

N/A

Data Collection Method

Data was collected through the Census Bureau's American Community Survey, the premier source of detailed population and housing information about the United States. Data is collected each year, throughout the year, from over 3.5 million households to provide up to date statistics. ACS data over a period of time (five years) is used to create yearly estimates. Data is updated each year based on estimates created from the most recent five years of real data responses.

The Census Bureau collects poverty data by different age groups within each county. This analysis involved collecting the estimate number of total individuals having poverty status in the last 12 months for each county, not broken down by any age categories. The data collected from the table for each county of New Jersey included:

- Total; Estimate; Population for whom poverty status is determined (HC01_EST_VC01)
- Below poverty level; Estimate; Population for whom poverty status is determined (HC02_EST_VC01)

Calculation Methodology

The Census Bureau collects poverty data by age within each county. ICF's analysis aggregated all estimates of the number of individuals having experienced poverty status in the last 12 months for the 13 counties in the NJTPA region for the years 2011-2017.

[2] https://www.census.gov/topics/income-poverty/poverty/guidance/poverty-measures.html

Results

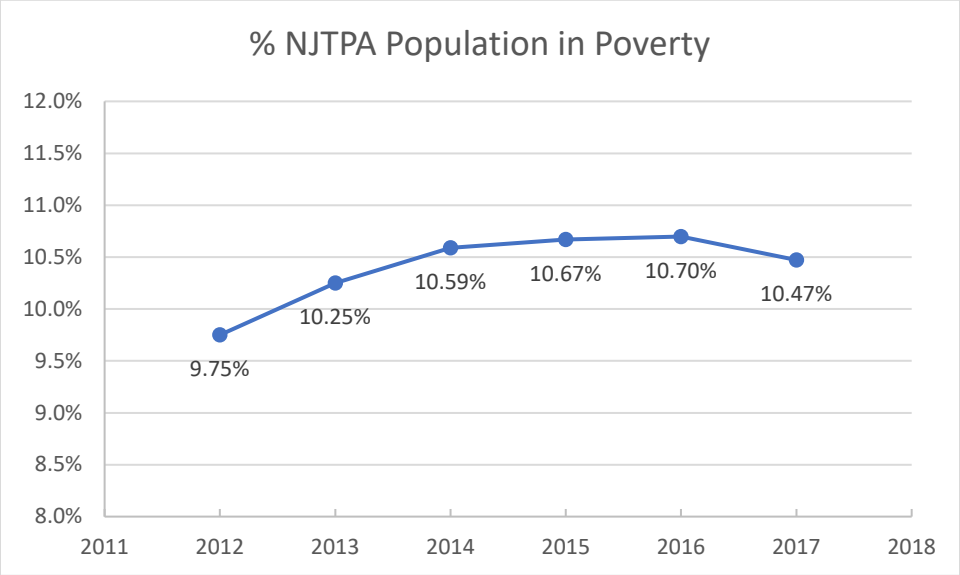

Figure 4: Percent of population below poverty line, NJTPA Region

Percent of households spending more than 30% income on housing

Overview

The percent of household income spent on housing is an indicator of financial stress and overall housing affordability. Households that spend more than thirty percent of their income on housing are considered by the federal government as "cost-burdened". Household income as a percentage spent on housing reflects living costs as a factor of one's financial situation rather than income or employment alone.

Coverage

NJTPA Region

Data Period

Annual; collected for CY 2011- CY 2017.

Geographic Scale

County level

Source of Data

United States Census Bureau, American Community Survey 5-Year Estimates

"Tenure by Housing Costs as a Percentage of Household Income in the Past 12 Months" (ID B25106)

https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B25106&prodType=table

Alternative Source of Data

N/A

Data Collection Method

Data was collected through the Census Bureau's American Community Survey, the premier source of detailed population and housing information about the United States. Data is collected each year, throughout the year, from over 3.5 million households to provide up to date statistics. ACS data over a period of time (five years) is used to create yearly estimates. Data is updated each year based on estimates created from the most recent five years of real data responses.

The Census Bureau collects data separately of owner-occupied housing units and renter-occupied housing units and further breaks down households by income level and percent of household income spent on housing. ICF's analysis collected the estimate number of households of the following categories:

- Total housing units (HD01_VD01)
- Owner-occupied housing units: - Less than $20,000: - 30 percent or more (HD01_VD06)
- Owner-occupied housing units: - $20,000 to $34,999: - 30 percent or more (HD01_VD10)
- Owner-occupied housing units: - $35,000 to $49,999: - 30 percent or more (HD01_VD14)
- Owner-occupied housing units: - $50,000 to $74,999: - 30 percent or more (HD01_VD18)
- Owner-occupied housing units: - $75,000 or more: - 30 percent or more (HD01_VD22)
- Renter-occupied housing units: - Less than $20,000: - 30 percent or more (HD01_VD28)
- Renter-occupied housing units: - $20,000 to $34,999: - 30 percent or more (HD01_VD32)
- Renter-occupied housing units: - $35,000 to $49,999: - 30 percent or more (HD01_VD36)
- Renter-occupied housing units: - $50,000 to $74,999: - 30 percent or more (HD01_VD40)
- Renter-occupied housing units: - $75,000 or more: - 30 percent or more (HD01_VD44)

Calculation Methodology

The Census Bureau reports data separately for owner-occupied housing units and renter-occupied housing units and further breaks down households by income level and percent of household income spent on housing. This analysis aggregated all estimates of the owner-occupied and renter-occupied households spending more than 30% of their income on housing, for the 13 county NJTPA region, for the years 2011-2017.

Results

The trends since 2011 generally show a small reduction in the share of households spending more than 30% of income on housing costs; it should be noted, however, that the figures for 2012 and 2017 look unusually low in comparison to the remainder of the time series; these figures may reflect methodological issues or differences based on many households near the threshold of 30 percent.

Table 3: Percent of households spending more than 30% income on housing, NJTPA Region

	NJTPA Total Households	NJTPA units paying 30% or more of income on housing costs	% housing units spending greater than 30% income on housing costs
2011	2,369,231	1,064,067	44.91%
2012	2,377,799	839,902	35.32%
2013	2,379,517	1,061,667	44.62%

2014	2,383,432	1,043,937	43.80%
2015	2,386,967	1,022,306	42.83%
2016	2,393,649	992,161	41.45%
2017	2,398,184	764,123	31.86%

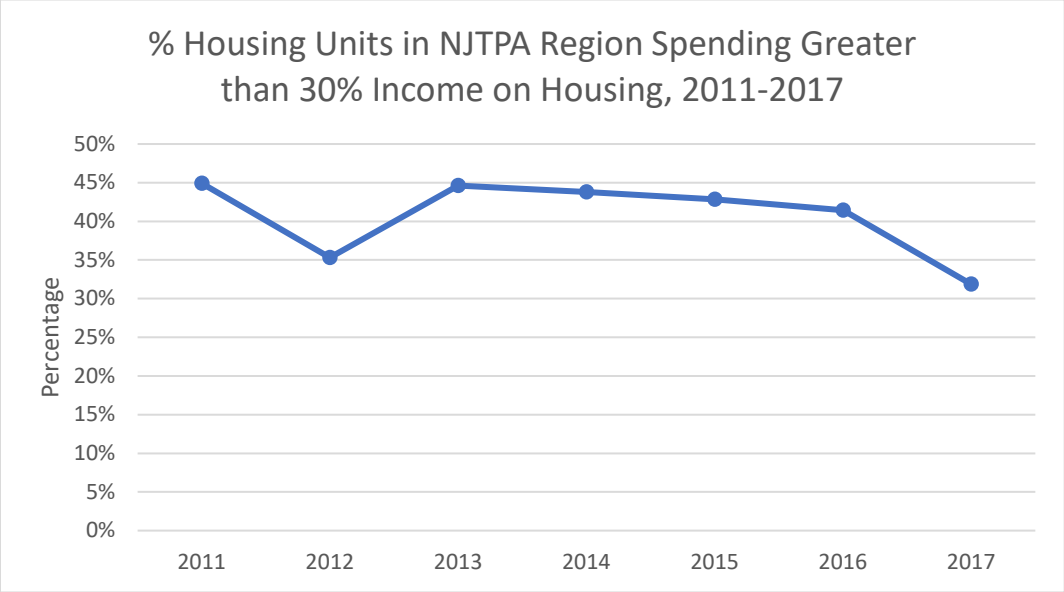

Figure 5: Percent of households spending more than 30% income on housing, NJTPA Region

NATURAL ENVIRONMENT

Percentage of monitored waterbodies and watersheds impaired for aquatic life

Overview

Water quality is important element in the health of aquatic life ecosystems. Waterbodies and watersheds are monitored to determine whether aquatic life is supported or is not supported. The ability for waterbodies and watersheds to support aquatic life is a successful gauge of the overall health of the waterbody or watershed because the quality of water that aquatic life requires for survival is of a level that would be healthy for surrounding areas, including those that humans inhabit. The health of aquatic life ecosystems affects many of the region's other ecosystems as well as has human health implications.

Coverage

NJTPA region

Data Period

Biennial; collected 2010-2014

Geographic Scale

NJ Subwatershed (HUC-14) level (assessment units (AU)), 952 total subwatersheds

Source of Data

The Integrated Water Quality Monitoring and Assessment Report is a biennial report that identifies the waters of the State attaining water quality standards, and waters that are impaired and need Total Maximum Daily Loads (TMDLs) as required under the Federal Clean Water Act. The associated GIS files provide the spatial component of the report and include the water quality and use assessment results for waterbodies of the State at a HUC 14 subwatershed scale.

New Jersey Department of Environmental Protection https://www.nj.gov/dep/gis/irshp.html

Integrated Water Quality Monitoring and Assessment Reports 2014, 2012, and 2010 New Jersey Integrated List of Waters (Integrated List), Data used for ICF's analysis was collected from attribute: "AquaticLife_General."

NJ County Shapefile http://njogis-newjersey.opendata.arcgis.com/datasets/5f45e1ece6e14ef5866974a7b57d3b95_1

Data Collection Method

The Integrated List of Waters ("Integrated List", "305(b) Report", or "Water Quality Inventory") is required under Section 305(b) of the federal Clean Water Act which mandates that states submit to USEPA on a biennial basis, a Statewide Water Quality Inventory Report or "305(b) Report" that describes the status of principal waters in terms of overall water quality and support of designated uses, as well as strategies to maintain and improve water quality. New Jersey's Integrated List identifies the use assessment results for all waters of the State, grouped into subwatershed or other hydrologically-based assessment units. Use assessment results are shown as "fully supporting", "not supporting", or "insufficient information".

(Retrieved from https://www.nj.gov/dep/wms/bears/generalinfo.htm)

Alternative Source of Data

N/A

Calculation Methodology

The analysis was performed at a subbasin level. The vector data for the assessment of waterbodies' degree of support for aquatic life was retrieved from New Jersey's Department of Environmental Protection.

Data for the 2010 subbasins were identified as fully supporting, insufficient information, not supporting, or not available. The data for 2012 and 2014 reflected which of five sublists each assessment/designated use combination was assigned:

Sublist	Category	Description
1	Fully Supporting (Unimpaired)	All applicable designated uses were assessed and attained
2		The applicable designated use was attained.
3	Insufficient Information	Insufficient data was available to assess use attainment.
4	Not Supporting (Impaired)	The designated use was not attained but a TMDL or other measures are being implemented to improve water quality.
5		The designated use was not attained and a TMDL is required.

The analysis considered areas identified as Sublist 1 and 2 as unimpaired ("fully supporting"), Sublist 3 as insufficient information, and Sublist 4 and 5 as impaired for aquatic life ("not supporting").

The subbasin shapefile for each year was clipped by a shapefile for the NJTPA counties (which was created by selecting the 13 NJTPA counties from a NJ county shapefile). The polygon area was recalculated in acres, and using an exported excel file, the SUMIF function calculated total area of acres that were "fully supporting", "insufficient information, and "not supporting" aquatic life.

Results

Table 4: Percentage of monitored waterbodies and watersheds impaired for aquatic life

	Fully supported (acres)	Insufficient information (acres)	Not supported (acres)	Percentage of acres impaired for aquatic life
2010	595,882	316,376	1,907,777	**67.65%**
2012	695,505	394,799	1,729,732	**61.34%**
2014	530,574	381,894	1,907,910	**67.65%**

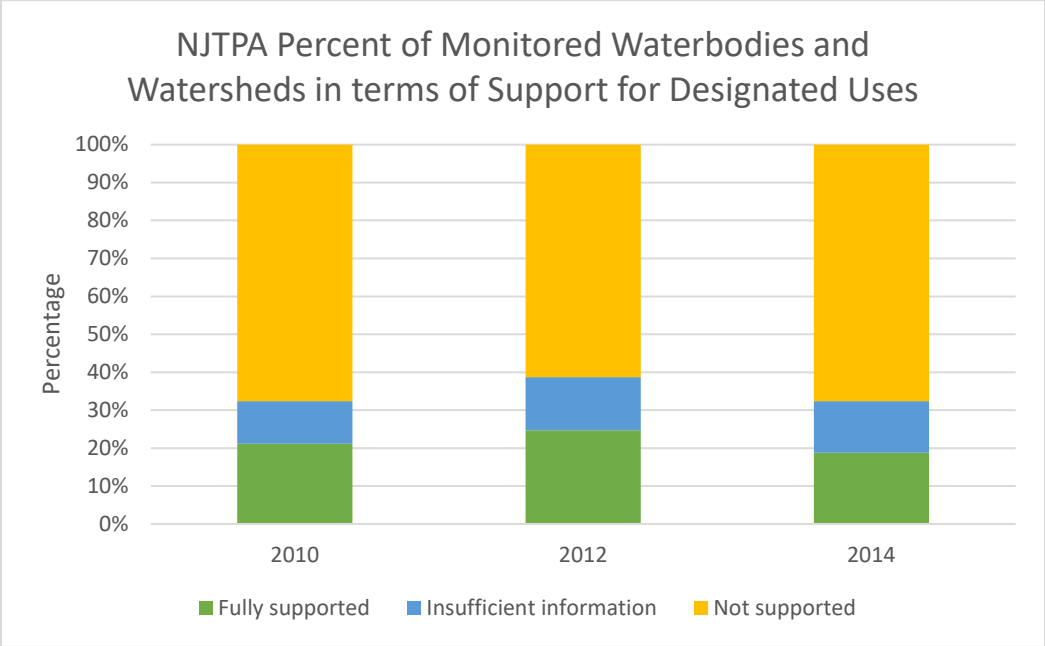

Figure 6: Percent of monitored waterbodies and watersheds in terms of support for designated uses, NJTPA Region

HEALTH

Public health indicators provide a view into the quality of life for residents of the region. The health data for asthma rates, obesity, and physical activity were collected from the New Jersey Behavioral Risk Factor Survey, provided by New Jersey State Health Assessment Data (NJSHAD). The data were provided at the state and county level but were weighted using design weighting and iterative proportional fitting. This weighting process takes into the account the number of phones (since the survey was conducted over the phone) and number of adults in each household, as well as density of certain geographic strata. BRFSS's new weighting protocols have ensured that data are representative of the population on a number of demographic characteristics including sex, age, race, education, marital status, home ownership, phone ownership (landline telephone, cellular telephone or both) and sub-state region. The weighting process is further explained in Appendix A.

This complicated analysis performed by NJSHAD could not be replicated by ICF for the NJTPA region separately and so the NJTPA region statistics were calculated by using the weighted rates for each indicator for each county in a given year and multiplying by the total population for that county in that year. These estimates were used to create an estimate for the NJTPA region, while the New Jersey state total and county level statistics for each of the health indicators below are reported as NJSHAD provided them.

Asthma rate

Overview

Chronic obstructive pulmonary disease (COPD) or chronic lower respiratory disease (CLRD) is a group of diseases that cause airflow blockage and breathing-related problems. It includes emphysema, chronic bronchitis, and asthma. Asthma causes repeated episodes of wheezing, breathlessness, chest tightness, and nighttime or early morning coughing. Current asthma rates for the NJTPA counties are a health statistic that could indicate air quality.

Coverage

NJTPA Region, entire State of New Jersey

Data Period

Annual; available CY 2011- CY 2016.

Geographic Scale

County level

Source of Data

https://www-doh.state.nj.us/doh-shad/query/builder/njbrfs/DXAsthmaNow/DXAsthmaNowCrude11_.html

Select "Currently have Asthma" in Step 1: INDICATOR: Current Asthma

Annual Estimates of the Resident Population (PEPANNRES) estimates were used on a county level and were downloaded from the Census Factfinder Website

Alternative Source of Data

N/A

Data Collection Method

The survey question collected from the New Jersey Behavioral Risk Factor Survey asked:

1. Have you ever been told by a doctor, nurse, or other health professional that you had asthma?
2. Do you still have asthma?

For the purpose of computing the Asthma rates, only the respondents who currently have Asthma were considered

Calculation Methodology

The data was reported for the entire State of New Jersey and each county. The results below are a selection of this data for the counties in the NJTPA region. The aggregate NJTPA Region Asthma rate was calculated by multiplying the weighted percentage of the asthma rate for each county and year within the NJTPA region by the total population of that county in that year. The population data was prepared by collecting census data for 2011-2016 for New Jersey County Population. The analysis then summed the product for each of the 13 counties in the NJTPA region for a given year and divided that sum by the total population for the NJTPA region for the given year. This resulted in an estimate of the NJTPA Region Asthma rate for each year between 2011-2016.

Results

Table 5: Asthma rate, NJTPA Region and counties

	2011	2012	2013	2014	2015	2016
New Jersey Total	9.0%	8.7%	9.0%	8.3%	7.2%	8.2%
NJTPA Region*	***8.6%***	***8.0%***	***8.7%***	***7.7%***	***6.9%***	***7.9%***
NJTPA County of Residence	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Bergen	7.9%	6.4%	8.1%	7.2%	4.1%	9.6%
Essex	9.0%	11.0%	10.0%	7.8%	7.0%	9.1%
Hudson	10.4%	8.0%	10.2%	9.4%	8.0%	7.2%
Hunterdon	6.9%	8.2%	7.9%	7.5%	6.3%	3.9%
Middlesex	8.6%	7.7%	6.8%	6.8%	8.0%	7.1%
Monmouth	8.7%	9.4%	10.8%	4.5%	5.6%	5.9%
Morris	5.9%	6.8%	6.2%	6.0%	3.9%	7.0%
Ocean	8.7%	6.2%	10.1%	11.2%	8.7%	8.6%
Passaic	9.5%	7.0%	11.1%	8.8%	9.4%	10.4%
Somerset	6.8%	7.9%	6.8%	10.7%	4.3%	6.6%
Sussex	9.5%	9.4%	11.7%	7.1%	5.6%	8.5%
Union	9.6%	7.6%	5.3%	7.0%	10.3%	6.4%
Warren	8.5%	11.5%	8.7%	7.6%	6.2%	7.9%

*NJTPA region rate was calculated by multiplying the weighted percentage of asthma sufferers for each county by the total population of that county. The sum of the product for the 13 counties in the NJTPA region was then divided by the total population for the NJTPA region for the given year, to achieve the rate for the NJTPA Region.

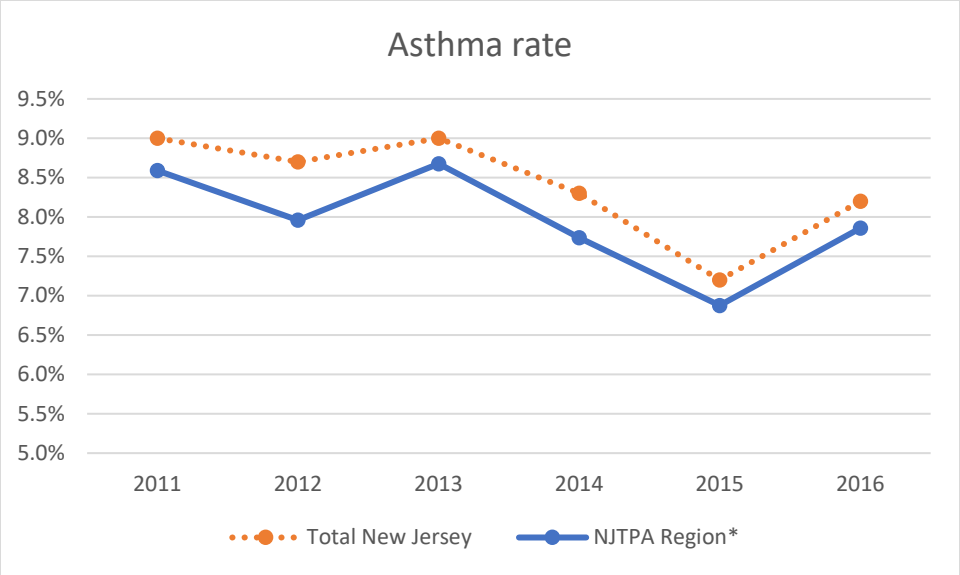

*Figure 7: Asthma rate, New Jersey and NJTPA Region (*estimate)*

Obesity rate

Overview

Obese youth are more likely to have prediabetes and risk factors for cardiovascular disease and are at greater risk for bone and joint problems, sleep apnea, and social and psychological problems such as stigmatization and poor self-esteem. Adults who are obese are at increased risk of morbidity from hypertension, high LDL cholesterol, type 2 diabetes, coronary heart disease, stroke, and osteoarthritis. ICF's analysis only included adult individuals (18+).

Coverage

NJTPA region.

Data Period

Annual; available CY 2011- CY 2016.

Geographic Scale

County Level

Source of Data

New Jersey Behavioral Risk Factor Survey Data: 2011-2016

https://www-doh.state.nj.us/doh-shad/query/builder/njbrfs/BMIObese/BMIObeseCrude11_.html

Select "Obese" in Step 1: INDICATOR: OBESE

Select "2011" in Step 2: INDICATOR: YEAR (repeat for years 2012-2016)

Annual Estimates of the Resident Population (PEPANNRES) estimates were used on a county level and were downloaded from the Census Factfinder Website

Alternative Source of Data

Data are also provided for children (0-18 years old) for further analysis.

Data Collection Method

The New Jersey Behavioral Risk Factor Survey is a survey of non-institutionalized New Jersey adults aged 18 and over conducted using scientific telephone survey methods. Excluded are adults living in group quarters such as college dormitories, nursing homes, military barracks, and prisons. Individuals who cannot conduct the survey in Spanish or English have been excluded since the survey began in 1991. Cell phone interviewing began in 2011.

The survey question collected from the New Jersey Behavioral Risk Factor Survey asked:

"1. About how much do you weigh without shoes?

2. About how tall are you without shoes?"

Body Mass Index (BMI) is defined as body weight (in kilograms) divided by heights squared (in meters) based on the responses to the above questions. "Obese" is defined as a BMI 30 or more.

Calculation Methodology

Obesity data was reported for the entire State of New Jersey and each county. The results below are a selection of this data for the counties in the NJTPA region. The aggregate NJTPA Region Adult Obesity rate was calculated by multiplying the weighted percentage of the obesity rate for each county and year within the NJTPA region by the total population of that county in that year. The population data was prepared by collecting census data for 2011-2016 for New Jersey County Population. The analysis then summed the product for each of the 13 counties in the NJTPA region for a given year and divided that sum by the total population for the NJTPA region for the given year. This resulted in an estimate of the NJTPA Region Obesity rate for adults for each year between 2011-2016.

Results

Table 6: Obesity rate, NJTPA Region

	2011	2012	2013	2014	2015	2016
New Jersey Total	23.7%	24.6%	26.4%	26.9%	25.6%	27.4%
NJTPA Region*	23.1%	23.3%	25.4%	26.1%	24.8%	26.0%
Atlantic	23.4%	26.2%	28.7%	25.6%	24.5%	27.7%
Bergen	17.7%	17.9%	22.3%	23.6%	20.8%	22.1%
Burlington	24.6%	28.9%	27.6%	26.7%	26.3%	29.6%
Camden	23.4%	30.9%	31.8%	31.9%	29.5%	35.6%
Cape May	24.9%	29.9%	27.4%	31.2%	30.4%	22.1%
Cumberland	35.7%	33.7%	34.4%	38.3%	34.2%	39.8%
Essex	24.8%	29.5%	27.8%	31.5%	28.1%	26.8%
Gloucester	30.6%	26.2%	27.9%	31.6%	31.2%	26.7%
Hudson	27.4%	23.0%	25.2%	24.6%	19.8%	31.2%
Hunterdon	16.0%	23.7%	22.1%	19.9%	19.3%	19.5%

Mercer	23.6%	24.1%	25.4%	23.4%	24.3%	33.7%
Middlesex	21.3%	23.6%	29.1%	26.2%	25.8%	27.6%
Monmouth	21.7%	23.5%	21.2%	24.5%	23.5%	25.4%
Morris	20.6%	17.9%	18.1%	21.6%	21.4%	19.0%

*NJTPA region rate was calculated by multiplying the weighted percentage of obese 18+ for each county by the total population of that county. The sum of the product for the 13 counties in the NJTPA region was then divided by the total population for the NJTPA region for the given year, to achieve the rate for the NJTPA Region.

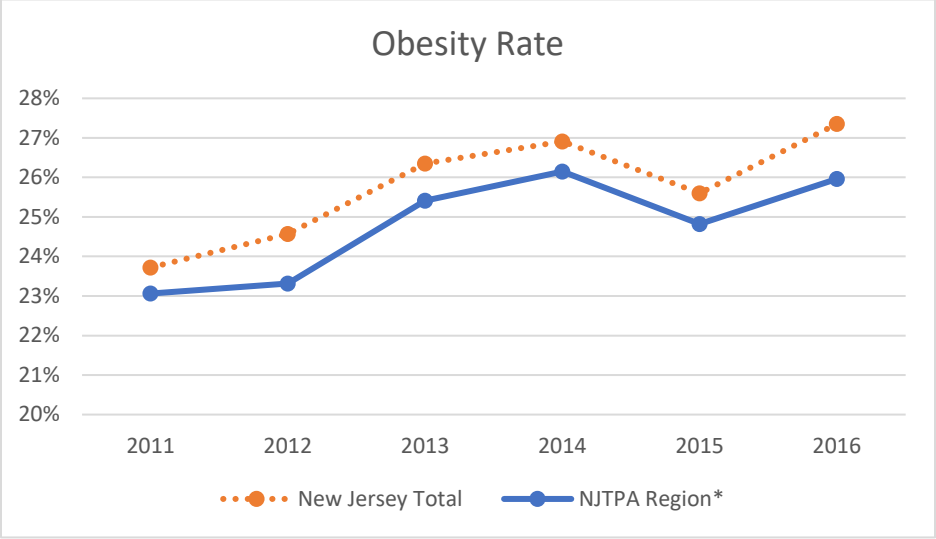

*Figure 8: Adult Obesity Rate, New Jersey and NJTPA Region (*estimate)*

Percent of population reporting leisure-time physical activity

Overview

Physical activity can help reduce overweight/obesity and the risk of several chronic diseases including asthma and diabetes. Research has shown that physical activity also increases life expectancy.

Coverage

Physical activity rates provided for all counties in the NJTPA region.

Data Period

Annual; available CY 2011- CY 2016.

Geographic Scale

County Level

Source of Data

New Jersey Behavioral Risk Factor Survey Data: 2011-2016

https://www-doh.state.nj.us/doh-shad/query/builder/njbrfs/PhysInact/PhysInactCrude11_.html

Annual Estimates of the Resident Population (PEPANNRES) estimates were used on a county level and were downloaded from the Census Factfinder Website

Alternative Source of Data

N/A

Data Collection Method

The survey question collected from the New Jersey Behavioral Risk Factor Survey asked:

1. "During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?"

Calculation Methodology

Physical activity was reported for the entire State of New Jersey and each county. The results below are a selection of this data for the counties in the NJTPA region. The query criteria for the 2016 leisure time physical activity was measured by "some activity" while 2011-2015 were measured by "no activity", even though the question was worded the same. This required ICF's analysis to adjust each year by providing the inverse percentage than what was provided by the data query. This was done by subtracting the 95% Certainty Interval (CI) Upper Limit (UL) from the 2011-2015 (which reported "no activity" statistics) from 100% to obtain the 95% Certainty Interval (CI) Lower Limit (LL) for 2011-2015 "some activity" statistics. The inverse statistic relies on the inverse of the confidence interval limit (from upper to lower). ICF's analysis used these adjusted rates for the years 2011-2015 and the reported NJSHAD rates from 2016.

The aggregate NJTPA Region Physical Activity rate was calculated by multiplying the weighted percentage of the physical activity rate for each county and year within the NJTPA region by the total population of that county in that year. The population data was prepared by collecting census data for 2011-2016 for New Jersey County Population. The analysis then summed the product for each of the 13 counties in the NJTPA region for a given year and divided that sum by the total population for the NJTPA region for the given year. This resulted in an estimate of the NJTPA Region Physical Activity rate for adults for each year between 2011-2016.

Results

Table 7: Percent of population reporting leisure-time physical activity, NJTPA Region

	2011	**2012**	**2013**	**2014**	**2015**	**2016**
New Jersey Total	73.6%	75.1%	73.2%	76.7%	72.8%	70.2%
NJTPA Region**	***73.4%***	***75.5%***	***73.1%***	***77.2%***	***73.0%***	***70.5%***
NJTPA Counties	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Bergen	76.3%	76.1%	72.6%	80.4%	71.5%	74.3%
Essex	71.4%	72.3%	71.7%	73.1%	72.0%	67.4%
Hudson	71.5%	70.4%	69.7%	73.0%	69.8%	64.0%
Hunterdon	78.4%	82.8%	82.8%	81.6%	77.4%	75.6%
Middlesex	70.6%	79.8%	72.2%	73.8%	73.6%	70.5%
Monmouth	78.3%	80.5%	78.0%	83.6%	76.4%	70.6%
Morris	82.2%	78.8%	76.6%	84.2%	77.9%	74.4%

	2011	2012	2013	2014	2015	2016
Ocean	72.6%	70.7%	71.3%	74.5%	72.2%	65.2%
Passaic	67.0%	73.8%	66.2%	73.6%	66.8%	70.2%
Somerset	72.2%	80.6%	78.9%	84.2%	81.6%	76.4%
Sussex	73.4%	76.4%	73.9%	80.6%	73.2%	76.8%
Union	70.7%	71.0%	75.2%	73.4%	73.0%	73.1%
Warren	72.3%	76.6%	74.0%	82.5%	70.4%	67.8%

2016 Rate was reported for "some physical activity", while 2011-2015 rate was reported for "no physical activity". 2011-2015 figures were calculated by subtracting the "no physical activity" rate from 1.00.

**NJTPA region rate was calculated by multiplying the weighted percentage of physical activity for each county by the total population of that county. The sum of the product for the 13 counties in the NJTPA region was then divided by the total population for the NJTPA region for the given year, to achieve the rate for the NJTPA Region.

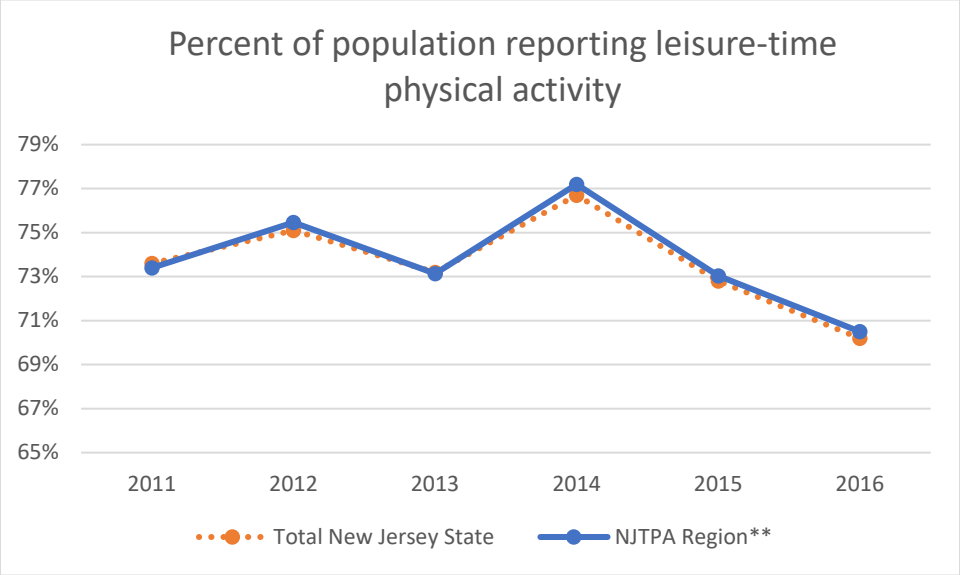

Figure 9: Percent of population reporting leisure-time physical activity, New Jersey and NJTPA Region

LAND USE

Acreage of agricultural land, forest land, and wetlands

Overview

Land Use and Land Cover (LULC) data describes the vegetation, water, natural surface, and cultural features on the land surface. It is created using Landsat data and high-resolution photography. Land cover and land use data may differ in the degree of resolution and categories of land use and land cover identified.

Coverage

Land Use data covers all of New Jersey and was selected for the 13 county NJTPA region for ICF's analysis.

Data Period

Land use data was analyzed from 2007 and 2012.

Geographic Scales

Land Use data from 2007 was already aggregated at the county level for all counties in New Jersey. Land Use data for 2012 was provided for each subbasin (HU8) in New Jersey. The data was provided as tiles based on Landsat imagery (which is accurate up to 4 feet). Resolution data is as follows:

- Horizontal Coordinate System definition, Planar Coordinate Encoding Method
  - Abcissa Resolution: 0.000410
  - Ordinate Resolution: 0.000410
- Vertical Coordinate System definition, Altitude System Definition
  - Altitude Resolution: 1.000000

Source of Data

New Jersey Department of Environmental Protection (NJDEP), Bureau of GIS

NJDEP 2007 Land Use/Land Cover Update,

2007: https://www.nj.gov/dep/gis/lulc07cshp.html

Statistics tables were available by county:
https://www.nj.gov/dep/gis/digidownload/metadata/lulc07/lulc2007stattablescounty.htm

NJDEP 2012 Land Use/Land Cover Update

2012: https://www.nj.gov/dep/gis/lulc12c.html#02040302_303

NJ County Shapefile

http://njogis-newjersey.opendata.arcgis.com/datasets/5f45e1ece6e14ef5866974a7b57d3b95_1

Alternative Source of Data

There are many sources of land cover and land use data. The United States Geological Survey (USGS) provides Land Use and Land Cover (LULC) data sets as part of its National Mapping Program. These data sets are created for the entire United States. USGS is also a member of the Multi-Resolution Land Characteristics (MRLC) consortium of federal agencies that coordinated and generate consistent,

relevant land cover information, referred to as the National Land Cover Database (NLCD), from decadal Landsat satellite imagery.

Data Collection Method

Statistics of 2007 land use/land cover data were provided at the county level, which minimized the amount of additional work to calculate land use within the NJTPA region. The same statistics were not provided at the county level for 2012, so ICF's analysis included collecting the land use and land cover shapefile for each of the subbasins that overlapped with the NJTPA 13 county region. These subbasins included:

- Rondout
- Lower Hudson
- Hackensack-Passaic
- Sandy Hook-Staten Island
- Raritan
- Middle Delaware-Mongaup-Brodhead
- Middle Delaware-Musconetcong
- Crosswicks-Neshaminy (minimal overlap)
- Lower Delaware (minimal overlap)

Calculation Methodology

2007 Data: ICF aggregated the acres of agriculture use, forest, and wetlands for each of the 13 counties in the NJTPA region that was provided in the statistics table.

2012 Data: ICF first created a shapefile of the NJTPA 13 county region by selecting the 13 counties (Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren) from a shapefile of New Jersey counties and exporting. ICF then joined the shapefiles for Subbasins Rondout, Lower Hudson, Hackensack-Passaic, Sandy Hook-Staten Island, Raritan, Middle Delaware-Mongaup-Brodhead, Middle Delaware-Musconetcong, Crosswicks-Neshaminy, and Lower Delaware to create a single land use shapefile for the NJTPA area. Since some portions of a few of the subbasins were not contained in the NJTPA 13 county region, ICF clipped the joined subbasin shapefile by the NJTPA county shapefile to create a NJTPA region land use shapefile. ICF then recalculated the acreage of each polygon in the NJTPA region land use shapefile and calculated the sum of acres of each polygon categorized as "agriculture", "forest", and "wetlands", respectively. ICF then calculated the absolute change in acreage and the rate of change for each land use type between 2007 and 2012.

Results

Table 8: Acreage of agricultural land, forest land, and wetlands, NJTPA Region

Type of Land Cover	2007	2012	Change 2007-2012	Percent Change
	Acres	Acres	Acres	
Agriculture	268,042	266,143	-1,899	-0.07%
Forest	921,771	949,474	27,703	+3.0%
Wetlands	395,549	396,808	1,259	+0.3%

Appendix A: Explanation of NJSHAD Health Indicator Data Weighting Process for Asthma, Obesity, and Physical Activity Indicators

The BRFSS weighting process includes two steps: design weighting and iterative proportional fitting (also known as "raking" weighting). Because raking does not require demographic information for small geographic areas, it allows for the introduction of more demographic variables than were used by the BRFSS in the past. Since 2011, telephone ownership, education level, marital status, and home ownership were added to age, sex, race, ethnicity and region, which were the variables used in prior years. Moreover, since state level demographic characteristics of cellular telephone-only households are not available, weighting with the previous method of post stratification was no longer feasible.

Design Weighting takes into account the number of phones and the number of adults in each household. It also takes into account the number of available records (NRECSTR) and the number of records selected (NRECSEL) within each geographic strata (_GEOSTR) and density strata (_DENSTR). The first step is to calculate the stratum weight (_STRWT) from the number of records in the strata and the number of records selected. The design weight is calculated in the following way within each _GEOSTR*_DENSTR combination:

_STRWT=NRECSTR/NRECSEL

Once the stratum weight is calculated, the number of adults within the household and the number of phones are used to calculate the design weight:

DesignWeight = STRWT $*$ (1/Number of Phones $*$ Number of adults in the household

Questions on the number of adults and the number of telephones in each household are asked during the screening process of each landline telephone interview. For cellular telephone respondents, the number of adults and the number of telephones in the household are set to 1, and cellular telephone respondents are treated as one adult/one phone households in the design weighting process.

Since 2011, BRFSS's new weighting protocols have ensured that data are representative of the population on a number of demographic characteristics including sex, age, race, education, marital status, home ownership, phone ownership (landline telephone, cellular telephone or both) and sub-state region. Because raking considers each of the weighting variables separately, there is less likelihood that categories of age and/or race would be collapsed than under previous weighting methods (see the Fact Sheet on Weighting Changes). Design weights continue to be used with the new weighting protocols, with the exception that for cellular telephone respondents, the number of telephones and the number of adults in the household are set to 1. The final weight is based on the following formula:

DesignWeight*RakingAdjustment.

Raking weighting incorporates the known characteristics of the population into the sample. If the sample is disproportionately female, raking will adjust the responses of females in the sample to accurately represent the proportion of females in the population. This is done in an iterative process, with each demographic factor introduced in a sequence. The sequence of factors may be multiple times before the sample is found to accurately represent the population on all factors under consideration. BRFSS raking variables include race and ethnicity in detailed categories, sex, age, home ownership, education, marital status, phone ownership and region.