Economic Assessment Report for the Supplemental Generic Environmental Impact Statement on New York State's Oil, Gas, and Solution Mining Regulatory Program

August 2011

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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List of Abbreviations and Acronyms

BCIDA	Broome County Industrial Development Agency
Btu	British thermal unit
CDP	census-designated place
EIA	Energy Information Administration
EMT	emergency medical technician
FTE	full-time equivalent
FY	fiscal year
GDP	gross domestic product
IOGA-NY	Independent Oil & Gas Association of New York
MCF	1,000 cubic feet
MSA	Metropolitan Statistical Area
NYSDAM	New York State Department of agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation
NYSDOL	New York State Department of Labor
NYSDTF	New York State Department of Taxation and Finance
ORPTS	Office of Real Property Tax Service
QCEW	quarterly census of employment and wages
RIMS II	Regional Input-Output Modeling System II
SEQRA	State Environmental Quality Review Act
SGEIS	Supplemental Generic Environmental Impact Statement
USBEA	U.S. Bureau of Economic Analysis
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USDOC	U.S. Department of Commerce
VSB	Valuation Services Bureau

1 Introduction

The *Economic Assessment Report* was prepared to support the New York State Department of Environmental Conservation's ("Department" or "NYSDEC") Supplemental Generic Environmental Impact Statement (SGEIS) on the Oil, Gas and Solution Mining Regulatory Program.

The Department is preparing an SGEIS to evaluate the potential impacts associated with the development and production of natural gas resources in the Marcellus Shale and other low-permeability gas reservoirs in New York State using horizontal and vertical high-volume hydraulic-fracturing techniques. The Department's evaluation supplements the original GEIS on the Oil, Gas, and Solution Mining Regulatory Program, which was prepared in 1992, prior to the advent of high-volume hydraulic-fracturing techniques. The development and production of natural gas resources using high-volume hydraulic-fracturing is distinct from other types of well development that were evaluated in the 1992 GEIS due to the much larger volumes of water and additives used to conduct hydraulic fracturing operations. The supplement to the 1992 SGEIS is needed in order to identify measures to protect the environment specifically for this new type of well development. The SGEIS, together with the 1992 GEIS, will be used to direct programmatic actions undertaken by NYSDEC.

A draft of the SGEIS was released for public review and comment consistent with the State Environmental Quality Review Act (SEQRA) in September 2009. Commenters raised a number of concerns about high-volume hydraulic-fracturing and the impacts of well development and production on the natural and socioeconomic environment that required NYSDEC to conduct additional research and analysis. This technical report provides additional analysis of the potential impacts on the socioeconomic environment from development and production of the natural gas resources of the Marcellus Shale and other low-permeability reservoirs in the state. Information from this technical report will support the Department's preparation of a revised draft SGEIS.

As an SGEIS, NYSDEC is evaluating the environmental effects of a program having wide application. The Marcellus and Utica Shales are the most prominent shale formations in New York State. The prospective region for the extraction of natural gas from these formations generally extends from Chautauqua County eastward to Greene, Ulster, and Sullivan counties, and from the Pennsylvania border north to the approximate location of the east-west portion of the New York

State Thruway between Schenectady and Auburn (see Figure 1-1). This region covers all or parts of 30 counties. Fourteen Counties are entirely within the Marcellus and Utica Shale area, and 16 counties are partially within the area.

Due to the broad extent of the prospective region for the extraction of natural gas from the Marcellus and Utica Shales, the socioeconomic analysis in this report is based on an evaluation of potential impacts at the state level and for three distinct representative regions (see Figures 1-2a, 1-2b, and 1-2c). As described in more detail below, the three regions were selected to evaluate differences between areas with a high, average, and low production potential; areas that have experienced gas development in the past and areas that have not experienced gas development in the past; and differences in land use patterns. Selection of these three regions is intended to provide a range of potential impacts at the local and regional level since no specific proposals or permit applications are being analyzed in this SGEIS. The three representative regions and the respective counties within each region are:

- Region A: Broome County, Chemung County, and Tioga County
- Region B: Delaware County, Otsego County, and Sullivan County
- Region C: Cattaraugus County and Chautauqua County

Region A is defined as a high-potential production area. Wells in Broome, Chemung, and Tioga counties are expected to yield some of the highest production of shale gas, based on the geology, thermal maturity of the organic matter, and other geochemical factors of the Marcellus and Utica Shale formations. Due to the proximity to active gas drilling in these counties, and neighboring counties in Pennsylvania, the associated infrastructure (pipelines) has already been developed. With the associated infrastructure in place, developers are expected to begin development of wells in this area if development in New York State is approved. Region A encompasses urban/suburban land uses associated with the larger cities of Binghamton and Elmira, as well as rural settings. In addition, conventional natural gas development has occurred in this area.

Region B is defined as an average-potential production area. High-volume hydraulic-fracturing development is expected to occur, but the production of shale gas is not anticipated to reach the levels expected in Region A. Region B is largely rural and encompasses part of the Catskill Mountains. To date, no conventional natural gas development has occurred in this region. Development in this region would be limited by the moratorium on drilling in the New York City watershed and state-owned lands in the Catskill Mountains (i.e., the Forest Preserve). To date, only exploratory natural gas well development has occurred in this region.

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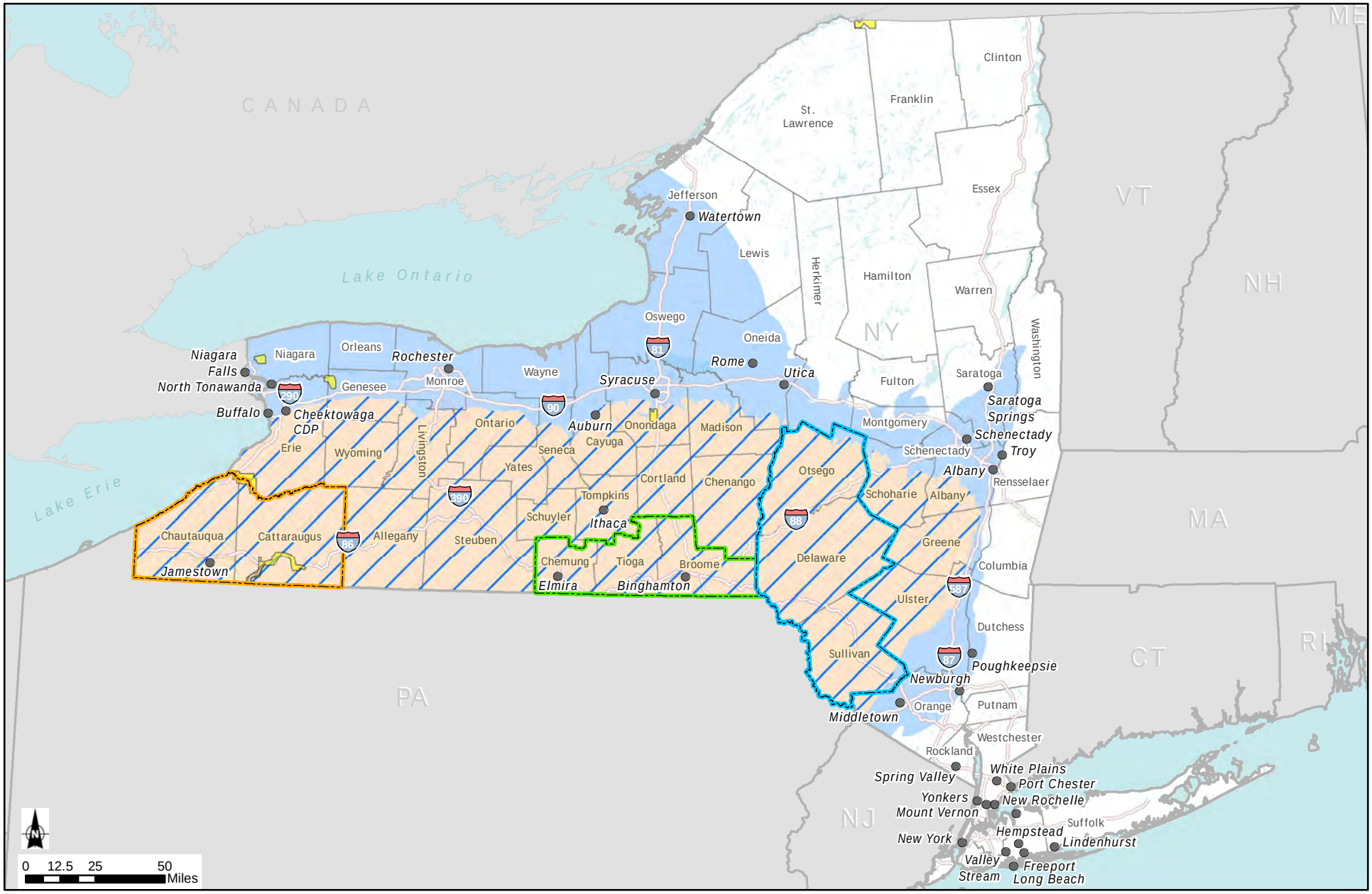

Representative Regions
- Region A
- Region B
- Region C

CDP = Census Designated Place

- Place with Year 2010 Population Greater than 25,000
- Major Water Bodies
- County Boundary
- State Boundary
- Tribal Lands Boundary
- Marcellus Shale Extent in New York State
- Utica Shale Extent in New York State
- Marcellus and Utica Shales in New York State

Figure 1-1: Representative Regions within the Marcellus and Utica Shale Extent in New York

Source: ESRI, 2010; USGS, 2002

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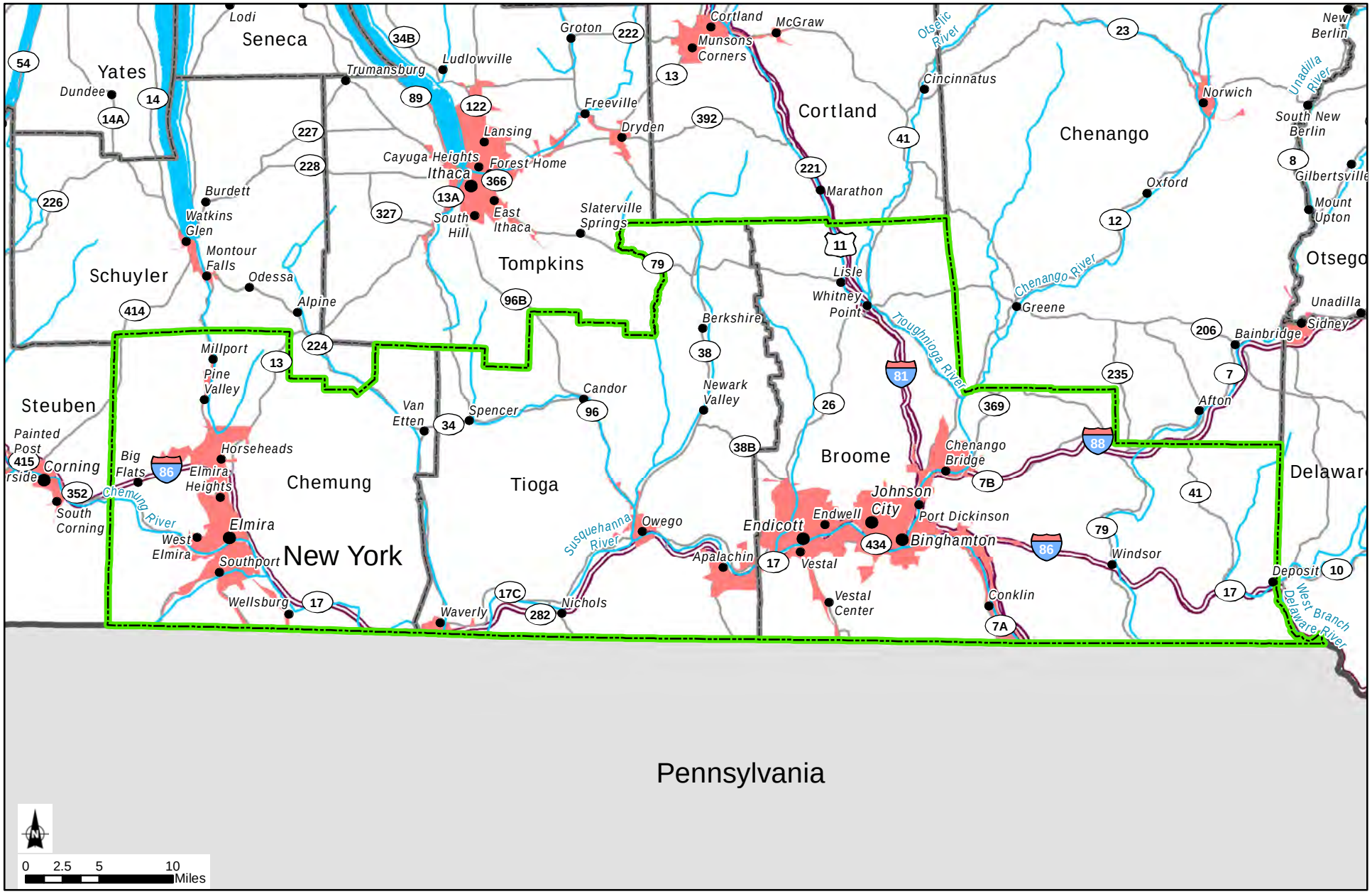

Representative Region A
County Boundary
State Boundary
Urban Area
River/Stream
Highway/Major Road
Secondary Road

Figure 1-2a: Representative Region A

Source: ESRI, 2010; USGS, 2002

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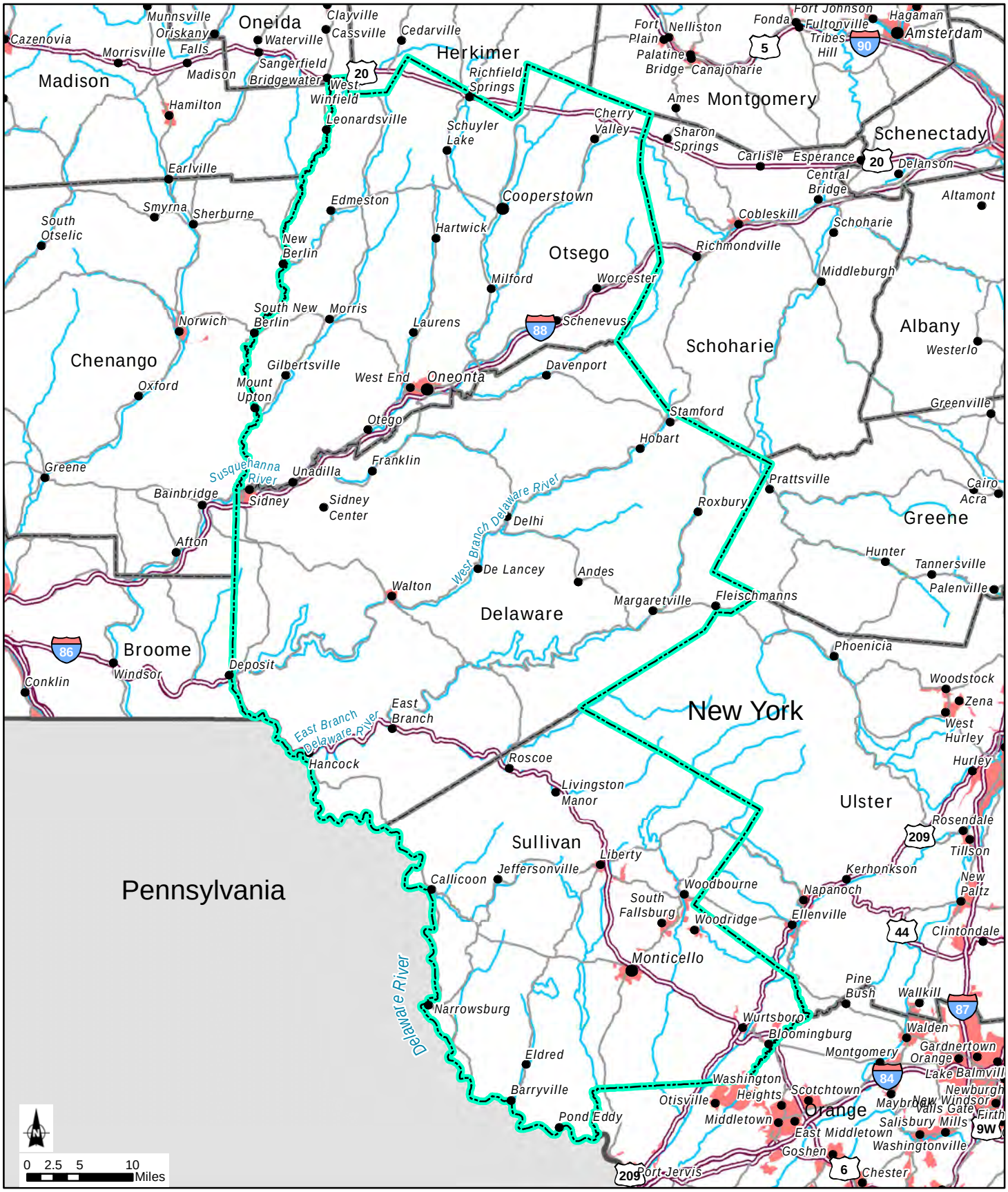

Representative Region B
County Boundary
State Boundary
Urban Area
River/Stream
Highway/Major Road
Secondary Road

Figure 1-2b: Representative Region B

Source: NESRI, 2010; USGS, 2002

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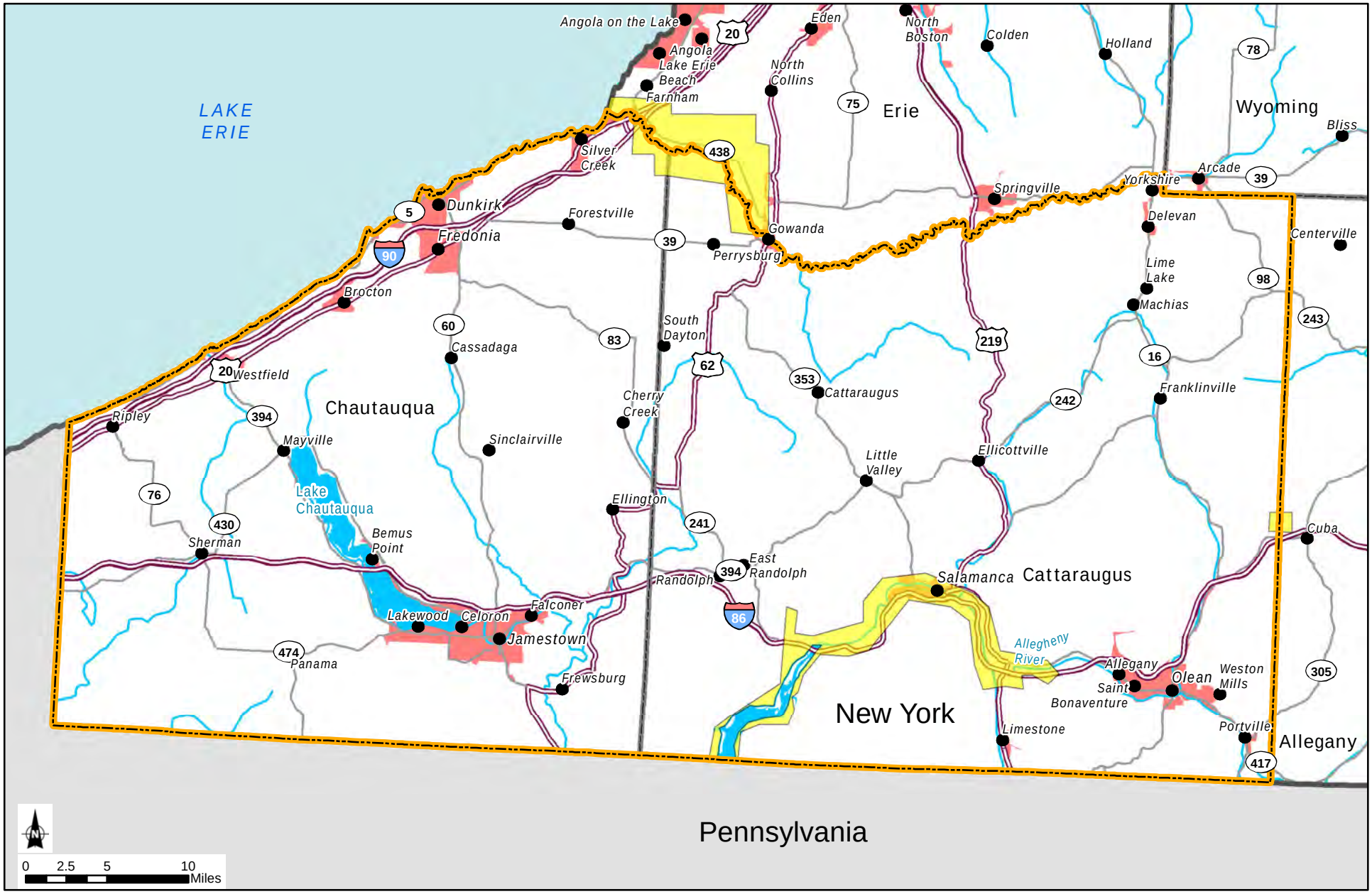

Representative Region C
County Boundary
State Boundary
Urban Area
River/Stream
Highway/Major Road
Secondary Road
Tribal Lands Boundary

Figure 1-2c: Representative Region C

Source: NESRI, 2010; USGS, 2002

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Region C is defined as a low-potential production area. Although Chautauqua and Cattaraugus counties are within the footprints of both the Utica and Marcellus Shales, they are outside of the fairways for both shales; thus, horizontal wells in this region would not be expected to yield enough gas to be economically feasible. However, thousands of vertical gas wells exist in conventional formations, and additional vertical wells would likely be constructed. If the price of gas increases or drilling technology advances, gas production in the Utica or other formations in this region may became more feasible. Region C is largely rural, and conventional natural gas development has been occurring in this area for many years.

While these regions are being analyzed as a way to assess the impacts on representative local communities, actual development would not be limited to these regions, and impacts similar to those described could occur anywhere where high-volume hydraulic-fracturing wells are developed.

This technical report is organized into four sections. Section 1 is the introduction, which provides the background rationale for the preparation of this report. Section 2 presents some background information on the natural gas industry and how this background defines the approach used in this analysis. Section 3 presents a description of the baseline socioeconomic environment for the study area, including the state and regional economies, population, housing, and government finances and expenditures. Section 4 presents a detailed description of the methodology used, and the results of the analysis of the potential impacts associated with well development and production under the proposed development scenarios.

2 Background

Socioeconomic impacts associated with well development and production in the Marcellus and Utica Shales are based on assumptions regarding the expected number of wells that would be developed, the amount of natural gas produced by each well, and the number of years the wells would remain in production. All of these assumptions are influenced by a number of factors that singularly and collectively affect the reliability of these estimates.

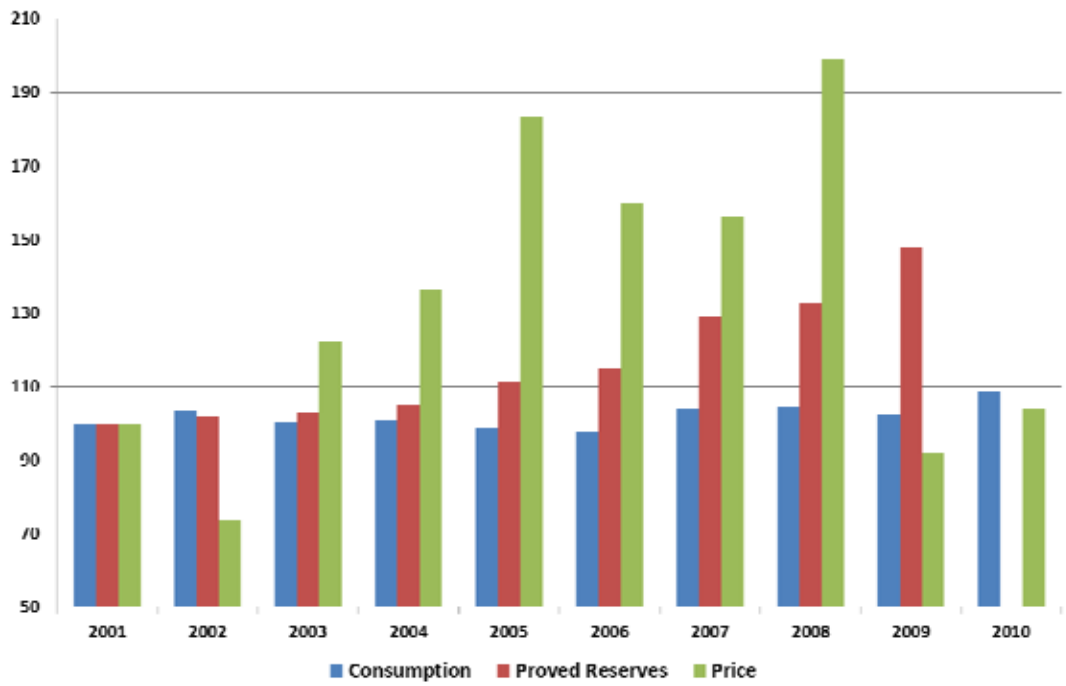
Uncertainty in the National Gas Market Overall

Shale gas development in New York State will depend upon future developments in the national market for natural gas. The amount of natural gas produced and consumed and the price at which natural gas sells in the future will depend upon future developments on the demand and supply sides of the national natural gas market.

Projections of the level of activity in the natural gas extraction industry within New York State are subject to considerable uncertainty due to the uncertain nature of future development in the national natural gas market. The national natural gas market has experienced significant unforeseen developments on both the demand and supply side within the last two decades. On the demand side, the deregulation of the electric generating industry in certain states during the 1990s led to the increasing use of natural gas to generate electricity, primarily to accommodate peak demand loads. More recently, and also on the demand side, the market was impacted by the overall downturn in the economy, beginning in late 2008. On the supply side, the combination of horizontal drilling and hydraulic fracturing of shale gas deposits greatly increased national proved reserves in the 2000s.

To provide a sense of the fluctuations in the national natural gas market in recent years, Figure 2-1 shows national-level indices relating to natural gas consumption, average wellhead price, and proved reserves of wet natural gas[1] in the 2000s.

[1] The Energy Information Administration (EIA) defines proved reserves as "… those volumes of oil and natural gas that geologic and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions…" (EIA 2011a).

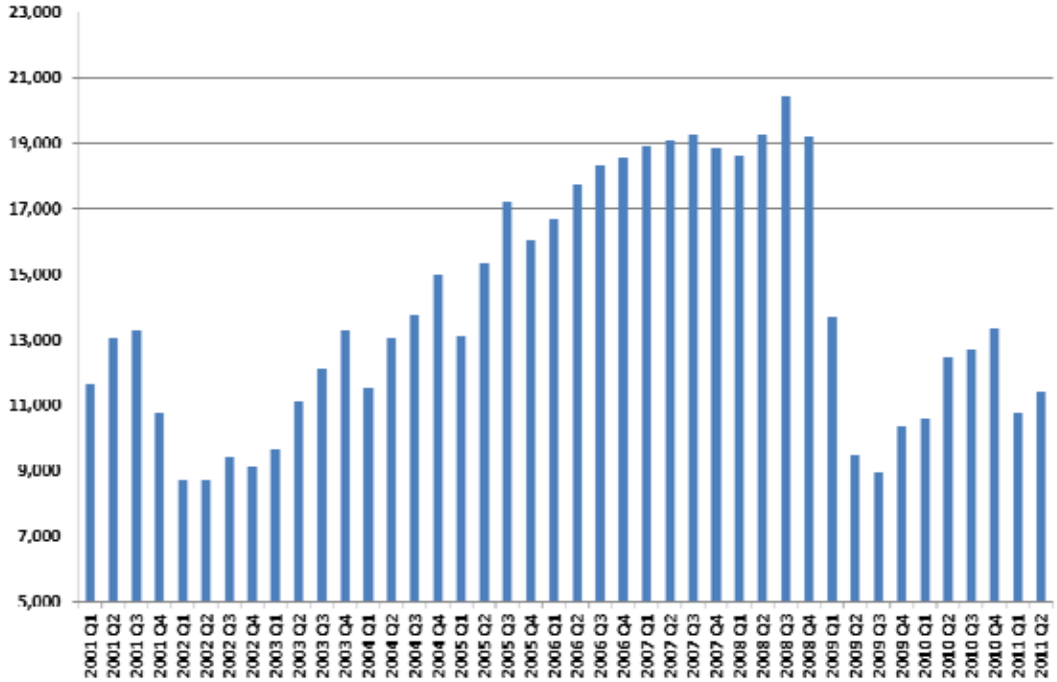


Source: EIA 2011a, b, and c.

Figure 2-1 Indices of National Natural Gas Consumption, Proved Reserves and Price (2001=100)

As seen from the data in Figure 2-1, consumption varied relatively little over the decade; the ratio of consumption in the year with the highest level to the year with the lowest level was 1:11. However, the average wellhead price of natural gas fluctuated substantially over the decade; and the ratio of the price in the highest year to the price in the lowest year was 2.70. Proved reserves increased substantially over the decade, particularly from 2004 onwards, and in 2009 were at almost 150% of their 2001 value.

The level of natural gas drilling activity, as measured by the number of active gas drilling rigs, also fluctuated substantially in the past decade (2001-2011) in response to changes in the price of natural gas (see Figure 2-2). For example, when comparing Figures 2-1 and 2-2, when the price of natural gas was low (e.g., 2002 [see Figure 2-1]), the number of active gas drilling rigs in the United States was similarly low (see Figure 2-2). Conversely, when the price of natural gas was high (e.g., 2008 [see Figure 2-1]), the number of active gas drilling rigs in the United States was similarly high. The number of active gas drilling rigs fluctuated substantially over the decade, with the number of rigs in the most active quarter being 2.35 times the number in the least active quarter.



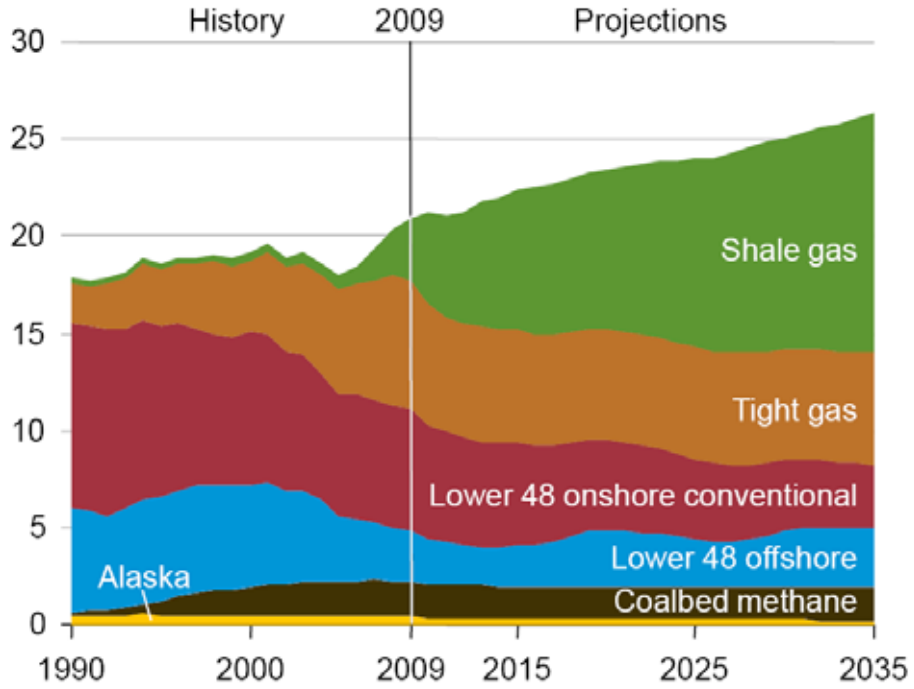
Source: Baker Hughes, Inc. 2011 (Note: Baker Hughes Inc. is an oilfield service company that has kept a count of the number of active drilling rigs since 1944.)

Figure 2-2 Baker Hughes, Inc., Count of Active Gas Drilling Rigs, by Quarter (2001 Q1 to 2011 Q2)

The Energy Information Administration (EIA) presents projections of natural gas production and prices through 2035 in its *Annual Energy Outlook 2011* (EIA 2011d). One significant trend highlighted in this report is the growing demand for natural gas from the electric supply industry.

Uncertainty in the Source of Supply of Natural Gas

Figure 2-3 shows a trend in the source of supply of natural gas. From 1990 to 2000, the largest source of natural gas was conventional onshore wells. From 2000 to 2009, tight gas grew as a source of natural gas, and in 2007-2008, the growth in shale gas development began. The EIA projects a massive increase in the production of natural gas from shale, with shale gas becoming the single largest source of natural gas supply within the next five years and remaining so for the remainder of the projection period.



Source: EIA 2011d.

Figure 2-3 U.S. Natural Gas Production, 1990-2035 (trillion cubic feet per year)

The EIA emphasizes that there is considerable uncertainty surrounding their projection of the future supply of shale gas. They point out that this uncertainty derives in large part from the fact that shale formations have only recently become a major source of gas production and that, consequently, there are limited existing data upon which to base projections.

Reflecting the uncertainty surrounding their projection, the EIA also developed additional projections that differ in their assumptions concerning the ultimate recovery of natural gas per well and the area of shale gas plays that contain recoverable natural gas. In the resulting projections, the production of natural gas in 2035 ranges from 22.4 to 30.1 trillion cubic feet, and the projected price of natural gas ranges from $9.26 to $5.35 per million British thermal units (Btus).

Uncertainty in the Development Potential of the Marcellus Shale

The geology and gas production potential of the Marcellus Shale in New York has yet to be determined. In addition, the developers of wells in the Marcellus Shale in New York will have to compete with shale gas developers in Pennsylvania, Texas, and Michigan for investment dollars, available equipment, and skilled workers.

Summary

Given the large uncertainties associated with the future natural gas market, the economic and demographic disparities between different parts of New York State, and other unknown factors that would influence the development of the natural

gas reserves in low-permeability shale in the state, specific economic forecasts have not been developed for this report. Instead a range of potential economic impacts have been identified and analyzed.

As discussed in Section 1, three representative regions were selected to analysis a range of potential regional economic impacts. In addition, three development scenarios were assessed—a low, medium, and high level of development. These development scenarios attempt to address economic impacts associated with the full spectrum of potential levels of development. A detailed description of these development scenarios is presented in Section 4.1.2.

The impacts associated with both the construction and the operation of the natural gas wells are analyzed in this report. Actual well construction and drilling activities are assumed to occur for 30 years. It is assumed that once a well begins production the well would remain operational for another 30 years. Therefore, wells that are constructed in Year 1 are assumed to be in operation until Year 30; wells that are constructed in Year 15 are assumed to be in operation until Year 45; and wells that area constructed in Year 30 are assumed to be in operation until Year 60. See Section 4 for a detailed description of the assumed timing of development.

3 Existing Conditions

3.1 Economy, Employment, and Income

The following section discusses the existing economy, employment, and income of New York State and the local areas within each of the three representative regions (Regions A, B and C), focusing on the agriculture and tourism industries, as well as existing natural gas development.

Natural gas development is expected to benefit other industries as equipment, material, and supplies are purchased by the natural gas industry and workers spend their wages in the local economy. These positive impacts are discussed in more detail in Section 4. However, as agriculture and tourism relate to uses of the land that may be impacted by natural gas development, those industries are discussed in more detail herein, and potential impacts from both a land use and an economic perspective are discussed in Section 4.

Several data sources were used to describe the baseline economy, employment, and income for New York State and the local areas, including the U.S. Census Bureau (USCB) and the New York State Department of Labor (NYSDOL). Data from the 2010 Census of Population and Housing were used to identify major employment sectors for the state and the representative regions. Data from the census is self-reported by individuals and is aggregated to provide general information about the labor force from very small to large geographic areas on a cross-sectional or one-time basis.

Detailed data on employment and wages, by industry, was obtained from the NYSDOL's quarterly census of employment and wages (QCEW). The NYSDOL collects employment and wage data for all employers liable for unemployment insurance. These data were used to provide information on wages and for more detailed information on employment in the travel and tourism and oil and gas sectors. All of the labor statistics from the NYSDOL and USCB are based on the North American Industry Classification System, which is the standard system used by government agencies to classify businesses, although the data may be grouped differently for reporting purposes. Data on agricultural workers is taken from the U.S. Census of Agriculture, which is collected every 5 years, and provides information on the value of farm production and agricultural employment in the state and local areas. Although the data referenced within this section were collected by government agencies using different methodologies, all data were used to support an overall portrait of the statewide and local economies.

3.1.1 New York State

Table 3-1 presents total employment, by industry, within New York State. As shown by the table, New York State has a large and diverse economy. The largest employment sector in the state is educational, health, and social services, which accounts for approximately 26.2% of the state's total employed labor force (USCB 2009a). Other large sectors are professional, scientific, management, administrative, and waste management services (10.8%); and retail trade (10.5%). Several of the largest private employers in New York State include New York Presbyterian Healthcare System (29,000 employees), Wal-Mart (28,000 employees), Citigroup (27,000 employees), IBM Corporation (21,000 employees), and JP Morgan Chase (21,000 employees).

Table 3-1 New York State: Area Employment, by Industry (2009)

Sector	Number of Jobs	% of Total
Agriculture, forestry, fishing, hunting, and mining	54,900	0.6
Construction	548,018	6.0
Manufacturing	672,481	7.4
Wholesale trade	266,946	2.9
Retail trade	959,414	10.5
Transportation and warehousing, utilities	482,768	5.3
Information	299,378	3.3
Finance, insurance, real estate, and renting/leasing	789,372	8.7
Professional, scientific, management, administrative, and waste management services	981,317	10.8
Educational, health, and social services	2,385,864	26.2
Arts, entertainment, recreation, accommodation, and food services	764,553	8.4
Other services (except public administration)	449,940	4.9
Public administration	447,645	4.9
Total	**9,102,596**	

Source: USCB 2009a.

In 2010 New York State had a total gross domestic product (GDP, i.e., the value of the output of goods and services produced by labor and property located in New York State) of approximately $1.16 trillion (USDOC 2010). If the state were an independent nation, it would rank as the 13th largest economy in the world, just behind Spain (World Bank 2010).

Each region of the state contributes to the state's GDP in different ways. New York City is the leading center of banking, finance, and communications in the United States, and thus has a large number of workers employed in these industrial sectors. In contrast, the economies of large portions of western and central New York are based on agriculture. Manufacturing also plays a significant role in the overall economy of New York State; most manufacturing occurs in the upstate regions, predominantly in the cities of Albany, Buffalo, Rochester, and Syracuse.

Table 3-2 provides total and average wages, by industry, as reported by NYSDOL for 2009.

Table 3-2 New York State: Wages by Industry (2009)

Industry	Total Wages ($ millions)	Average Wage
Total, all industries	$481,690.6	$57,794
Agriculture, forestry, fishing, hunting	640.4	$28,275
Mining	265.5	$55,819
Construction	19,336.0	$59,834
Manufacturing	27,098.4	$57,144
Wholesale trade	22,797.7	$69,282
Retail trade	25,130.8	$29,202
Transportation and warehousing	9,302.9	$42,477
Utilities	3,633.7	$92,469
Information	22,124.3	$87,970
Finance and insurance	86,303.4	$173,899
Real estate and renting/leasing	9,360.2	$52,417
Professional and technical services	48,815.9	$87,136
Management of companies and enterprises	15,648.4	$119,804
Administrative and waste services	16,354.4	$40,546
Educational services	13,606.9	$46,772
Health, and social assistance	55,486.7	$44,104
Arts, entertainment, and recreation	6,154.3	$44,246
Accommodation, and food services	12,178.7	$21,369
Other services (except public administration)	10,732.4	$33,602
Public administration	75,828.4	$52,594

Source: NYSDOL 2009a.

In 2010 the total labor force in New York State was approximately 9,630,900 workers, and the annual average unemployment rate across the state was 8.6% (see Table 3-3). Between 2000 and 2010, the size of the labor force increased by 5.1%, while the unemployment rate nearly doubled.

Table 3-3 New York State: Labor Force Statistics (2000 and 2010)

	2000	2010	% Change
Labor Force	9,167,000	9,630,900	5.1
Employed Workers	8,751,400	8,806,800	0.6
Unemployed Workers	415,500	824,100	98.3
Unemployment Rate (%)	4.5	8.6	91.1

Source: NYSDOL 2010a.

In 2009 the per capita income for New York State was $30,634, and 13.9% of the population lived below the poverty level (see Table 3-4). Over the past decade,

per capita income has increased by 31.0%, and the percentage of individuals living below the poverty level has decreased by 0.7%.

Table 3-4 New York State: Income Statistics (1999 and 2009)

	1999	2009	% Change
Per capita income	$23,389	$30,634	31.0
% Below the poverty level[1]	14.6	13.9	-0.7

Source: USCB 2000a, 2009b.

Note:
[1] If the total income for an individual falls below relevant poverty thresholds, which are updated annually relative to the Consumer Price Index for All Urban Consumers, then the individual is classified as being below the poverty level.

The Empire State Development Corporation has identified 16 industry clusters for New York State. Industry clusters define a set of interdependent and connected companies and businesses that help to support a local economy, such as automobile manufacturing in Detroit, Michigan, and information technology in the Silicon Valley of California. Industry clusters for the state include: back office and outsourcing; biomedical; communications, software, and media services; distribution; electronics and imaging; fashion, apparel, and textiles; financial services; food processing; forest products; front office and producer services; industrial machinery and services; information technology services; materials processing; miscellaneous manufacturing; transportation equipment; and travel and tourism.

Travel and tourism is a large industry in New York State, ranking third in employment of the 16 industry clusters in the state. New York State has many notable attractions, including natural areas (Niagara Falls, the Finger Lakes, and the Adirondack and Catskill Mountains); cultural attractions (museums, arts, theatre); and historic sites. The travel and tourism sector draws from several industries, as shown in Tables 3-5 and 3-6. Approximately 351,130 persons were employed in the travel and tourism sector in New York State in 2009, including food service (96,990 jobs); culture, recreation, and amusements (84,550 jobs); accommodations (81,780 jobs); passenger transportation (73,180 jobs); and travel retail (14,630 jobs) (see Table 3-5). In 2009, wages earned by persons employed in the travel and tourism sector was approximately $12.9 billion dollars, or approximately 2.7% of all wages earned in New York State (NYSDOL 2009b) (see Table 3-4). In 2009 visitors to New York State spent approximately $4.5 billion in the state (Tourism Economics 2010).

Table 3-5 New York State: Employment in Travel and Tourism (2009)

Industry Group	Number of Jobs	% of Total
Accommodations	81,780	23.3
Culture, recreation, and amusements	84,550	24.1
Food service	96,990	27.6
Passenger transportation	73,180	20.8
Travel retail	14,630	4.2
Total	**351,130**	**100**

Source: NYSDOL 2009b.

Table 3-6 New York State: Wages in Travel and Tourism (2009)

Industry Group	Total Wages ($ Millions)	Average Wage
Accommodations	$2,928.3	$35,800
Culture, recreation, and amusements	$4,355.5	$51,500
Food service	$1,840.9	$18,980
Passenger transportation	$3,478.4	$47,532
Travel retail	$324.1	$22,153
Total	**$12,927.3**	**$36,800**

Source: NYSDOL 2009b.

Agriculture is also an important industry for New York State. Table 3-7 provides agricultural statistics for New York State. Approximately 36,352 farms are located in New York State, encompassing 7.2 million acres of land, or 23% of the total land area of the state.

The value of agricultural production in 2009 was $4.4 billion dollars. New York State is a leading producer of milk, fruits (apples, grapes, cherries, pears), and fresh vegetables (sweet corn, onions, and cabbage). Most of the state's field crops (corn, soybeans, and wheat) support its dairy industry (USDA 2007).

Most counties in New York State have placed agricultural land in state-certified agricultural districts, which are managed by the New York State Department of Agriculture and Markets. Farmlands within agricultural districts are provided legal protection, and farmers benefit from preferential real property tax assessment and protection from restrictive local laws, government-funded acquisition or construction projects, and private nuisance suits involving agricultural practices. Article 25-AA of Agriculture and Markets Law authorizes the creation of local agricultural districts pursuant to landowner initiative, preliminary county review, state certification, and county adoption.

The acreage of land in agricultural districts in New York State is provided in Table 3-7

Table 3-7 New York State: Agricultural Data (2007)

Number of farms	36,352
Land in farms	7,174,743 acres
Average size of farm	197 acres
Market value of products sold	$4,418.6 million
Principal operator by primary occupation	
Farming	19,624
Other	16,728
Hired farm labor	59,683
Land in state-designated agricultural districts	8,873,157 acres

Source: USDA 2007; NYSDAM 2011.

The oil and gas extraction industry is a relatively small part of the economy of New York State. According to data provided by the U.S. Department of Commerce (USDOC), Bureau of Economic Analysis (USBEA), the oil and gas extraction industry accounted for only 0.004% of New York State's GDP in 2009. For comparison purposes, at the national level, the oil and gas extraction industry's 2009 share of the U.S. GDP was 1.01% (USDOC 2010). Thus, the oil and gas extraction industry is of less relative economic importance in New York State than it is at the national level.

The natural gas extraction industry is linked to other industries in New York State through its purchases of their output of goods and services. As a natural gas extraction company increases the number of wells it drills, it needs additional supplies and materials (e.g., concrete) from other industries to complete the wells. The other industries, in turn, need additional goods and services from their suppliers to meet the additional demand. The interrelations between various industries are known as linkages in the economy.

To provide a sense of the direction and magnitude of the linkages for the oil and gas extraction industry, Table 3-8 shows the impact of a $1 million increase in the final demand in the oil and gas extraction industry on the value of the output of other industries in New York State. The data used to construct the table were drawn from the estimates contained in the BEA's Regional Input-Output Modeling System II (RIMS II). In constructing the table, the initial $1 million increase in the final demand for the output of the oil and gas extraction industry was deducted from the change in its output value to leave just the increase in its output value caused by its purchases of goods and services from other companies in the mining industry, of which it forms a part.

Table 3-8 New York: Impact of a $1 Million Dollar Increase in the Final Demand in the Output of the Oil and Gas Extraction Industry on the Value of the Output of Other Industries

Industry	Change in the Value of Output
Real estate and rental and leasing	$47,100
Professional, scientific, and technical services	$30,500
Management of companies and enterprises	$27,600
Construction	$24,300
Manufacturing	$21,000
Finance and insurance	$15,700
Utilities	$12,300
Wholesale trade	$10,800
Information	$7,700
Administrative and waste management services	$5,900
Transportation and warehousing	$3,900
Retail trade	$3,100
Other services	$2,600
Arts, entertainment, and recreation	$1,600

Table 3-8 New York: Impact of a $1 Million Dollar Increase in the Final Demand in the Output of the Oil and Gas Extraction Industry on the Value of the Output of Other Industries

Industry	Change in the Value of Output
Mining	$1,500
Food services and drinking places	$700
Accommodation	$600
Health care and social assistance	$300
Educational services	$200

Source: US BEA 2011a.

As shown in the table above, the oil and gas extraction industry is linked through its purchases of inputs to 18 other major industries (out of a total of 20 industries used by the Regional Input-Output Modeling System II). The largest linkages are to real estate and rental and leasing; professional, scientific, and technical services; management of companies and enterprises; and construction. In total, a $1 million increase in the final demand for the output of the mining industry is estimated to lead to an increase of an additional $217,400 in final output across all industries.

The oil and gas extraction industry accounts for a very small proportion of total employment in New York State. According to the NYSDOL, the oil and gas extraction industry employed 362 people in the state (i.e., less than 0.01% of the state's total employment) (NYSDOL 2009a). Although the number of people employed in the oil and gas extraction industry in New York State is relatively small, the industry has experienced sustained growth in employment during the last few years. Employment in the oil and gas extraction industry in New York State for 2000 through 2010 is shown in Table 3-9. As shown, employment in the industry more than doubled from 2003 to 2010, with the addition of 252 employees during that period.

Table 3-9 New York State: Employment in the Oil and Gas Extraction Industry (2000-2010)

Year	Employment
2000	165
2001	188
2002	193
2003	196
2004	137
2005	163
2006	236
2007	281
2008	341
2009	362
2010	448

Source: NYSDOL 2000-2008, 2009a, 2010b.
Note: 2010 data are provisional.

A general indication of the types of jobs held by those working in the natural gas extraction industry is provided by looking at the occupational distribution of employment within the oil and gas extraction industry at the national level. Table 3-10 presents employment data on the 20 occupations that accounted for the largest shares of employment in the oil and gas extraction industry at the national level in 2008 (BLS 2011).

Table 3-10 Most Common Occupations in the U.S. Oil and Gas Extraction Industry (2008)

Occupation	% of Industry Employment
Roustabouts, oil and gas	7.45
Petroleum pump system operators, refinery operators, and gaugers	6.07
Petroleum engineers	5.43
Wellhead pumpers	5.41
Accountants and auditors	4.88
General and operations managers	4.18
Geoscientists, except hydrologists and geographers	3.88
Geological and petroleum technicians	3.27
Office clerks, general	3.03
Bookkeeping, accounting, and auditing clerks	2.93
Executive secretaries and administrative assistants	2.77
Secretaries, except legal, medical, and executive	2.49
Service unit operators, oil, gas, and mining	2.50
First-line supervisors/managers of construction trades and extraction workers	2.27
All other engineers	1.74
Business operation specialists, all others	1.72
Financial analysts	1.56
Maintenance and repair workers, general	1.43
Real estate sales agents	1.35
Rotary drill operators, oil and gas	1.33

Source: BLS 2011.

The oil and gas extraction industry is a relatively high wage industry. In 2009 the average annual wage paid to employees in the industry was $83,606, which is almost 45% above the average annual wages of $57,794 paid to employees across all industries in the state (NYSDOL 2009a). However, national data show that workers in the mining, quarrying, and oil and gas extraction industry have the longest work week among all of the nonagricultural industries. The average work week for all workers aged over 16 in the nonagricultural industries was 38.1 hours long, while the average work week for those in the mining, quarrying, and oil and gas extraction industry was 49.4 hours long (i.e., an almost 30% longer average work week) (BLS 2010).

Table 3-11 presents total and average wages in New York State. Average wages for persons employed across all industries rose from $55,478 in 2006 to $57,794 in 2009, an increase of approximately 4.2%. The oil and gas industry was a marginal contributor to total wages in New York State, accounting for $30 million in 2009, or less than 1/100th of a percentage point of total wages across all industries (NYSDOL 2009a).

Table 3-11 New York State: Wages (2006 and 2009)

	2006		2009		% Change	
	Total Wages ($ billion)	Average Wages	Total Wages ($ billion)	Average Wages	Total Wages	Average Wages
New York State						
Total, all industries	$467.7	$55,478	$481.7	$57,794	3.0	4.2
Oil and Gas	$17.2	$72,700	$30.3	$83,606	76.4	15.0

Source: NYSDOL 2009a.

Compared to other parts of the country, New York State currently is a relatively minor natural gas producer. Based on data on natural gas gross withdrawals and production published by the Energy Information Administration (EIA), New York State accounted for 0.2% of the United States' total marketed natural gas production in 2009. During the same period, New York ranked 23rd out of 34 gas-producing areas in the U.S., which included states and the federal Offshore Gulf of Mexico (EIA 2011a).

New York State is, however, a major natural gas consumer. Based on data on natural gas consumption by end-use published by the EIA, New York State accounted for 5% of the United States' total consumption of natural gas in 2009. During the same period, New York State was ranked as the 4th largest natural gas consumer among the nation's states (EIA 2011b).

By combining the EIA's data on the total consumption and marketed production of natural gas in 2009, the difference between New York State's total consumption and marketed production of natural gas is approximately 1.1 trillion cubic feet. In 2009, New York State's marketed production was equal to 3.9% of its total consumption.

Table 3-12 presents natural gas production in New York State between 1985 and 2009.

Table 3-12 New York State: Natural Gas Production (1985-2009)

Year	Natural Gas Production (billions of cubic feet)
1985	33.1
1986	34.8
1987	29.5
1988	28.1
1989	25.7
1990	25.1
1991	23.4
1992	23.6
1993	22.1
1994	20.5
1995	18.7
1996	18.3
1997	16.2
1998	16.7
1999	16.1
2000	17.7
2001	28.0
2002	36.8
2003	36.0
2004	46.9
2005	55.2
2006	55.3
2007	54.9
2008	50.3
2009	44.9

Source: NYSDEC 1994-2006, 2007a, 2008, 2009.

As shown in the table, natural gas production in New York State generally declined between 1986 and 1999, increased steeply between 2000 and 2005, and then declined toward the end of that decade.

Other indicators of the level of activity in the natural gas extraction industry in New York State are the number of permits granted for gas wells, the number of gas wells completed, and the number of active gas wells in each year. These data are shown in Table 3-13 from 1994 to 2009.

Table 3-13 New York State: Number of Well Permits Granted, the Number of Wells Completed, and the Number of Active Wells (1994-2009)

Year	Permits for Gas Wells	Gas Wells Completed	Active Gas Wells
1994	58	97	6,019
1995	38	31	6,216
1996	45	31	5,869
1997	53	22	5,741
1998	68	41	5,903
1999	74	28	5,756
2000	78	112	5,775
2001	127	103	5,949
2002	97	43	5,773
2003	81	31	5,906
2004	133	70	6,076
2005	180	104	5,957
2006	353	191	6,213
2007	386	271	6,683
2008	429	270	6,675
2009	246	134	6,628

Source: NYSDEC 1994-2006, 2007a, 2008, 2009.

As with natural gas production, well permits and completions experienced a considerable increase in the 2000s compared to the 1990s, before declining in the late 2000s. This trend most likely reflects the discovery and development of commercial natural gas reserves in the Black River formation in the southern Finger Lakes area and the impact of higher natural gas prices in the 2000s compared to the 1990s (see Table 3-14). As shown in Table 3-13, the number of active natural gas wells over this period was at a low point in 1997 when only 5,741 wells were active. By 2007, this figure had reached a peak of 6,683 wells.

The level of activity in the natural gas extraction industry is related to the price of natural gas. Table 3-14 shows the average wellhead price for New York State's natural gas for the same time period (1994 to 2009).

Table 3-14 New York State: Average Natural Gas Wellhead Price (1994-2009)

Year	Price per 1,000 Cubic Feet
1994	$2.35
1995	$2.30
1996	$2.21
1997	$2.56
1998	$2.46
1999	$2.19

Table 3-14 New York State: Average Natural Gas Wellhead Price (1994-2009)

Year	Price per 1,000 Cubic Feet
2000	$3.75
2001	$4.85
2002	$3.03
2003	$5.78
2004	$6.98
2005	$7.78
2006	$7.13
2007	$8.85
2008	$8.94
2009	$4.25

Source: NYSDEC 1994-2006, 2007a, 2008, 2009.

As shown in the table, the average wellhead price for natural gas remained at relatively low levels in the 1990s, generally increased thereafter, reaching a peak in 2008, and then fell sharply in 2009.

Table 3-15 shows the market value from 1994 to 2009 of New York State's natural gas production, which is the price multiplied by the total production.

Table 3-15 New York State: Market Value of Natural Gas Production (1994-2009)

Year	Millions of Dollars
1994	$48.1
1995	$43.0
1996	$40.6
1997	$41.5
1998	$41.1
1999	$34.7
2000	$66.4
2001	$135.5
2002	$111.7
2003	$207.4
2004	$327.7
2005	$429.5
2006	$394.6
2007	$486.0
2008	$450.0
2009	$188.8

Source: NYSDEC 1994-2006, 2007a, 2008, 2009.

The combination of generally rising natural gas production and increasing average wellhead prices for much of the 2000s resulted in a substantial increase in the market value of New York State's natural gas production in the 2000s compared to the 1990s. The peak value of $486 million in 2007 was approximately 12 times larger than the average value for the years 1994 to 1999 inclusive (i.e., $41.5 million). However, between 2008 and 2009 the combination of a 10.7% decline in natural gas production and a 52.5% decline in the average wellhead price of natural gas resulted in a 58% decline in the market value of New York State's natural gas production.

3.1.2 Representative Regions

3.1.2.1 Region A

Table 3-16 presents employment, by industry, within all of Region A and for Broome, Chemung, and Tioga counties. The labor force statistics for the region are shown in Table 3-17.

Table 3-16 Region A: Area Employment by Industry (2009)

Sector	Region A		Broome County		Chemung County		Tioga County	
	Number of Jobs	% of Total	Number of Jobs	% of Total	Number of Jobs	% of Total	Number of Jobs	% of Total
Agriculture, Forestry, Fishing, Hunting, and Mining	1,464	1.0	558	0.6	335	0.9	571	2.3
Construction	8,572	5.6	4,846	5.3	2,054	5.4	1,672	6.8
Manufacturing	22,522	14.6	11,957	13.1	6,030	15.8	4,535	18.5
Wholesale Trade	4,749	3.1	3,123	3.4	959	2.5	667	2.7
Retail Trade	18,358	11.9	10,721	11.8	4,599	12.1	3,038	12.4
Transportation and Warehousing, Utilities	5,808	3.8	3,840	4.2	1,228	3.2	740	3.0
Information	3,096	2.0	2,016	2.2	706	1.9	374	1.5
Finance, Insurance, Real Estate, and Renting/Leasing	7,554	4.9	5,022	5.5	1,719	4.5	813	3.3
Professional, Scientific, Management, Administrative, and Waste Management Services	11,847	7.7	7,140	7.8	2,575	6.8	2,132	8.7
Educational, Health, and Social Services	44,084	28.7	26,764	29.3	10,869	28.5	6,451	26.4
Arts, Entertainment, Recreation, Accommodation, and Food Services	11,723	7.6	7,198	7.9	2,928	7.7	1,597	6.5
Other Services (except Public Administration)	6,620	4.3	3,898	4.3	1,786	4.7	936	3.8
Public Administration	7,435	4.8	4,154	4.6	2,348	6.2	933	3.8
Total	**153,832**		**91,237**	**38,136**		**24,459**		

Source: USCB 2009a.

Table 3-17 Region A: Labor Force Statistics (2000 and 2010)

	2000	2010	Percent Change
Region A			
Total labor force	167,700	162,000	-3.4
Employed workers	161,400	148,000	-8.3
Unemployed workers	6,300	14,000	55.8
Unemployment rate (%)	3.8	8.6	126.3
Broome County			
Total labor force	98,300	95,700	-2.6
Employed workers	94,800	87,200	-8.0
Unemployed workers	3,600	8,500	136
Unemployment rate (%)	3.6	8.9	147.2
Chemung County			
Total labor force	42,800	40,700	-4.9
Employed workers	41,000	37,300	-9.0
Unemployed workers	1,800	3,400	88.9
Unemployment rate (%)	4.3	8.4	95.3
Tioga County			
Total labor force	26,600	25,600	-3.8
Employed workers	25,600	23,500	-8.2
Unemployed workers	900	2,100	133.3
Unemployment rate (%)	3.4	8.2	141.2

Source: NYSDOL 2010a.
Note: Totals may not equal sum of components due to rounding.

The total labor force for Region A is approximately 162,000 workers, of which 60% are in Broome County, 25% are in Chemung County, and 15% are in Tioga County. The economic center for Broome and Tioga counties is the tri-city area of Binghamton, Endicott, and Johnson City, within the Binghamton Metropolitan Statistical Area (MSA). For Chemung County, the economic center is the city of Elmira.

The largest employment sector in Region A is the educational, health, and social services sector, with approximately 28.7% of total employment in Region A (USCB 2009a). Manufacturing was the next largest employment sector, accounting for approximately 14.6% of total employment within the region.

In 2010, the total labor force in Region A was approximately 162,000, or nearly 1.7% of the total labor force in New York State. The annual average unemployment rate in Region A in 2010 was consistent with the overall state average unemployment rate of approximately 8.6%. The rate of unemployment in 2010 was slightly higher in Broome County than in Chemung or Tioga counties.

Table 3-18 presents total and average wages across all industries, for Region A and New York State as a whole. The average wages for persons employed across

all industries in Region A rose from $34,773 in 2006 to $37,875 in 2010, an increase of approximately 8.9%. Average wages in Region A grew faster than in New York State as a whole, which experienced an approximately 4.2% gain during the same period.

Table 3-18 Region A: Wages (2006, 2009)

	2006		2009		% Change	
	Total Wages ($ millions)	Average Wages	Total Wages ($millions)	Average Wages	Total Wages	Average Wages
New York State						
Total, all industries	$467,687.53	$55,478	$481,690.58	$57,794	3.0	4.2
Region A						
Total, all industries	$5,106.61	$34,773	$5,435.03	$37,875	6.4	8.9
Broome County						
Total, all industries	$3,179.48	$33,804	$3,390.12	$36,802	6.6	8.9
Chemung County						
Total, all industries	$1,302.50	$33,950	$1,379.61	$36,979	5.9	8.9
Tioga County						
Total, all industries	$624.62	$43,277	$665.30	$47,268	6.5	9.2

Source: NYSDOL 2009a.

Table 3-19 presents per capita income for Region A. Per capita income rose approximately 28.7% between 1999 and 2009. The percentage of individuals living below the poverty level in Region A increased from 12.2% in 1999 to 14.4% in 2009. During the same period, the percentage of individuals living below the poverty level in New York State as a whole decreased from 14.6% to 13.9% (USCB 2000a, 2009b).

Table 3-19 Region A: Income Statistics (1999 and 2009)

	1999	2009	% Change
Region A			
Per capita income	$18,854	$23,912	26.8
% Below the poverty level[1]	12.2	14.4	2.2
Broome County			
Per capita income	$19,168	$24,432	27.5
% Below the poverty level[1]	12.8	15.0	2.2
Chemung County			
Per capita income	$18,264	$22,691	24.2
% Below the poverty level[1]	13.0	15.8	2.8
Tioga County			
Per capita income	$18,673	$24,034	28.7
% Below the poverty level[1]	8.4	10.0	1.6

Source: USCB 2000a, 2009b.

Note:

[1] If the total income for an individual falls below relevant poverty thresholds, which are updated annually relative to the Consumer Price Index for All Urban Consumers, then the individual is classified as being below the poverty level.

The five largest employers in the Binghamton MSA, which includes Broome and Tioga Counties are United Health Services (3,300 employees); Lockheed Martin (3,000 employees); Broome County (2,500 employees); the State University of New York, Binghamton (2,300 employees); and Lourdes Hospital (2,300 employees) (BCIDA 2010). The largest employer in Chemung County is St. Joseph's Hospital (1,000-1,200 employees) (STC Planning 2009).

The Empire State Development Corporation has identified 16 industry clusters for the Southern Tier Region of the state, which encompasses Region A (Broome, Chemung, and Tioga counties) as well as Chenango, Delaware, Schuyler, Steuben, and Tompkins counties. The industry clusters that support the largest number of jobs are industrial machinery and services, travel and tourism, financial services, front office and producer services, and electronics and imaging.

Travel and tourism is a large industry for the Southern Tier Region (which includes Region A), ranking second in employment of the 16 industry clusters in the Southern Tier Region. Broome and Tioga counties are part of the Susquehanna Heritage Area, and Chemung County considers itself the gateway to the Finger Lakes Region. Various attractions and natural areas are described in more detail under Visual Resources and Community Character in the SGEIS. The travel and tourism industry employs approximately 4,590 persons throughout Region A (NYSDOL 2009b), primarily in food service (2,000 workers) and accommodations (1,190 workers) (see Table 3-20). This figure represents a decline of about 3% since 2007 (see Table 3-21. In 2009, wages earned by persons employed in the travel and tourism sector was approximately $78.6 million, or about 1.5% of all wages earned in Region A (NYSDOL 2009b).

Table 3-20 Region A: Employment in Travel and Tourism (2009)

Industry Group	Region A		Broome County		Chemung County		Tioga County	
	Number of Jobs	% of Total	Number of Jobs	% of Total	Number of Jobs	% of Total	Number of Jobs	% of Total
Accommodations	1,190	25.9	830	27.8	210	18.3	150	33.3
Culture, recreation, and amusements	530	11.5	320	10.7	100	8.7	110	24.4
Food service	2,000	43.6	1,340	44.8	530	46.1	130	28.9
Passenger transportation	540	11.8	330	11.0	210	18.3	0	-
Travel retail	330	7.2	170	5.7	100	8.7	60	13.3
Total	**4,590**		**2,990**		**1,150**		**450**	

Source: NYSDOL 2009b.

Table 3-21 Region A: Wages in Travel and Tourism (2007, 2009)

	2007	2009	% Change
Region A			
Employment	4,740	4,600	(3.0)
Total wages ($ million)	78.1	78.6	0.6
Average annual wage ($)	16,500	17,100	3.6
Broome County			
Employment	3,150	2,980	(5.4)
Total wages ($ million)	51.2	50.3	(1.8)
Average annual wage ($)	16,300	16,800	3.1
Chemung County			
Employment	1,120	1,160	3.6
Total wages ($ million)	19.2	20.9	8.9
Average annual wage ($)	17,100	18,100	5.8
Tioga County			
Employment	470	460	(2.1)
Total wages ($ million)	7.7	7.4	(3.9)
Average annual wage ($)	16,200	16,100	0.6

Source: NYSDOL 2009b.

Agriculture is also an important industry within Region A. Table 3-22 provides agricultural statistics for Broome, Chemung, and Tioga counties. Approximately 1,518 farms are located in Region A, encompassing 258,571 acres of land. The value of agricultural production in 2009 was $83.2 million dollars (USDA 2007). The principal source of farm income is dairy products, which accounts for 70% of the agricultural sales in Broome County and 75% of the sales in Tioga County (USDA 2007).

Table 3-22 Region A: Agricultural Data (2007)

	Region A	Broome County	Chemung County	Tioga County
Number of farms	1,518	580	373	565
Land in farms (acres)	258,571	86,613	65,124	106,834
Average size of farm (acres)	170	149	175	189
Market value of products sold ($ millions)	83.2	29.9	16.6	36.7
Principal operator by primary occupation				
Farming	681	252	183	246
Other	837	328	190	319
Hired farm labor	971	340	238	393
Land in state-designated agricultural districts	278,935	153,233	41,966	83,736

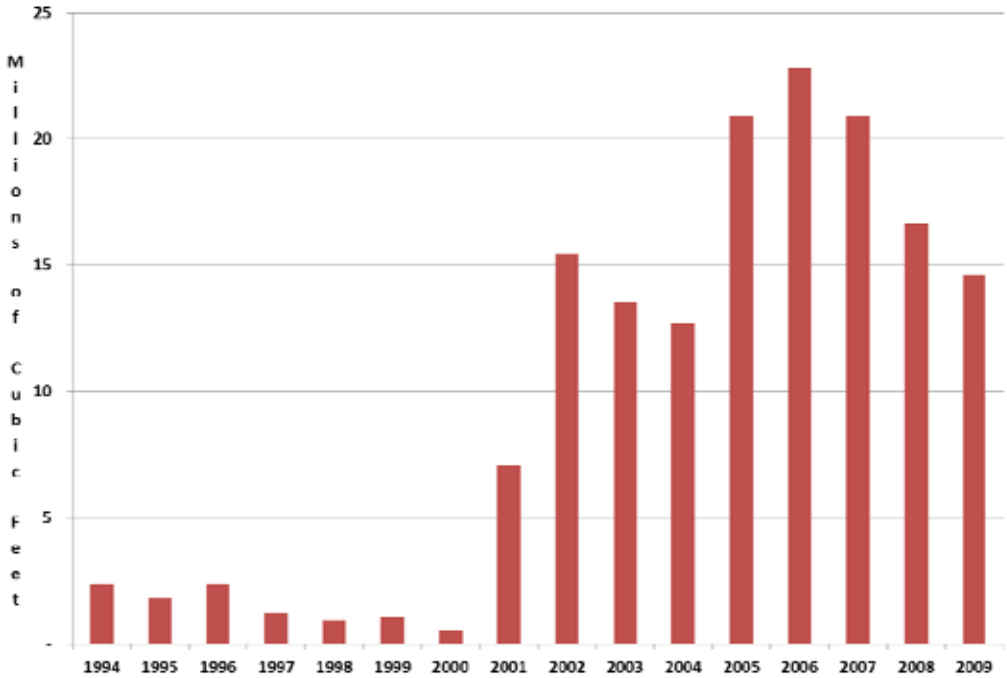
Source: USDA 2007; NYSDAM 2011.

Approximately 125 persons are employed in the oil and gas industry in Region A, or about 34.5% of persons working in the oil and gas industry in New York State (NYSDOL 2009a, 2010b). These workers are primarily employed in Chemung County, as the data on oil and gas industry employment in Broome and Tioga counties is so low as to not be reported due to business confidentiality reasons.

The oil and gas industry was a marginal contributor to total wages in Region A in 2009. Total wages for persons employed in the oil and gas industry in Chemung County were $12.5 million, or about 0.2% of total wages across all industries (NYSDOL 2009a, 2010b). The average annual wage for workers employed in the oil and gas sector in Chemung County was $99,600 in 2009.

In the 1990s Region A was a minor contributor to New York State's natural gas production. However, starting in 2001, Region A, experienced a substantial increase in its gas production, reaching a peak in 2006 before declining in each of the following three years (see Figure 3-1).

Table 3-23 shows the number of active natural gas wells operating in Region A from 1994 to 2009. As shown on the table, the number of active wells in Region A has been steadily increasing since 1995.



Source: NYSDEC 1994-2006, 2007a, 2008, 2009.

Figure 3-1 Region A: Natural Gas Production (1994 to 2009)

Table 3-23 Region A: Number of Active Natural Gas Wells (1994-2009)

Year	No. of Gas Wells
1994	15
1995	12
1996	15
1997	16
1998	17
1999	20
2000	19
2001	25
2002	29
2003	30
2004	36
2005	38
2006	37
2007	40
2008	41
2009	46

Source: NYSDEC 1994-2006, 2007a, 2008, 2009.

In 2009 the average annual output per well in Region A was 317.9 million cubic feet of natural gas. The average production per well in Region A was greater (by a factor of 47) than the statewide average of 6.8 million cubic feet (NYSDEC 2009).

Table 3-24 shows the production of natural gas and the number of active wells, by town, within each county in Region A for 2009. As shown in the table, Chemung County accounted for nearly all of the natural gas production and active wells in Region A. There were no active natural gas wells in Broome County in 2009.

Table 3-24 Region A: Production of Natural Gas and the Number of Active Wells (2009)

Region	Natural Gas Production (thousands of cubic feet)	Number of Gas Wells
New York State	**44,848,895**	**6,625**
Region A	14,623,232	46
Chemung County	**13,890,161**	**45**
Baldwin	327,738	1
Big Flats	2,095,184	4
Catlin	1,441,322	9
Elmira City	2,685	1
Erin	4,037,072	6
Horseheads	4,910	0
Southport	1,752,131	5

Table 3-24 Region A: Production of Natural Gas and the Number of Active Wells (2009)

Region	Natural Gas Production (thousands of cubic feet)	Number of Gas Wells
Van Etten	3,048,850	12
Veteran	1,180,269	7
Tioga County	**733,071**	**1**
Spencer	733,071	1

Source: NYSDEC 2009.

3.1.2.2 Region B

Table 3-25 presents employment, by industry, for all of Region B and within Delaware, Otsego, and Sullivan counties. The labor force statistics for the region are shown in Table 3-26.

Table 3-25 Region B: Area Employment, by Industry (2009)

Industry Sector	Region B		Sullivan County		Delaware County		Otsego County	
	Number of Jobs	% of Total	Number of Jobs	% of Total	Number of Jobs	% of Total	Number of Jobs	% of Total
Agriculture, forestry, fishing, hunting, and mining	2,498	2.9	591	1.7	1,102	5.2	805	2.7
Construction	7,276	8.5	3,178	9.2	2,051	9.7	2,047	6.8
Manufacturing	6,442	7.5	1,504	4.4	2,565	12.2	2,373	7.9
Wholesale trade	2,134	2.5	924	2.7	432	2.0	778	2.6
Retail trade	9,900	11.6	3,740	10.9	2,362	11.2	3,798	12.6
Transportation and warehousing, utilities	3,626	4.2	1,710	5.0	897	4.2	1,019	3.4
Information	1,493	1.7	696	2.0	323	1.5	474	1.6
Finance, insurance, real estate, and renting/leasing	4,373	5.1	2,034	5.9	737	3.5	1,602	5.3
Professional, scientific, management, administrative, and waste management services	4,618	5.4	2,006	5.8	1,113	5.3	1,499	5.0
Educational, health, and social services	25,788	30.1	10,368	30.1	5,564	26.4	9,856	32.8
Arts, entertainment, recreation, accommodation, and food services	8,630	10.1	3,494	10.1	1,845	8.7	3,291	11.0
Other services (except public administration)	4,248	5.0	1,818	5.3	1,069	5.1	1,361	4.5
Public administration	4,571	5.3	2,377	6.9	1,051	5.0	1,143	3.8
Total	**85,597**		**34,440**		**21,111**		**30,046**	

Source: USCB 2009a.

The total labor force for Region B is approximately 88,500 workers, of which 40% are in Sullivan County, 35% are in Otsego County, and 25% are in Delaware County. The largest employment sectors are educational, health, and social services (30.1% of workers); retail trade (11.6%); arts, entertainment, recreation, ac-

commodation, and food services (10.1%). This region also has a comparatively high level of employment in the agriculture, forestry, fishing, hunting, and mining sector (2.9%), particularly Delaware County (5.2%), compared to New York State as a whole (0.6%) (USCB 2009a).

As shown in Table 3-26, the 2010 annual average unemployment rate in Region B was approximately 8.5%, similar to New York State as a whole. Among the counties that comprise Region B, Sullivan County had the highest average unemployment rate, approximately 9.2% (NYSDOL 2010a).

Table 3-26 Region B: Labor Force Statistics (2000 and 2010)

	2000	2010	Percent Change
Region B			
Total labor force	85,200	88,500	3.9
Employed workers	81,500	81,000	-0.6
Unemployed workers	3,600	7,500	108.3
Unemployment rate (%)	4.2	8.5	102.3
Delaware County			
Total labor force	22,200	22,000	-0.9
Employed workers	21,300	20,100	-5.6
Unemployed workers	900	1,900	111.1
Unemployment rate (%)	4.2	8.7	107.1
Otsego County			
Total labor force	29,800	31,500	5.7
Employed workers	28,500	29,100	2.1
Unemployed workers	1,300	2,400	84.6
Unemployment rate (%)	4.2	7.7	83.3
Sullivan County			
Total labor force	33,200	35,000	5.4
Employed workers	31,700	31,800	0.3
Unemployed workers	1,400	3,200	128.6
Unemployment rate (%)	4.3	9.2	114.0

Source: NYSDOL 2010a.

Table 3-27 presents total and average wages for Region B and New York State as a whole. Average wages for persons employed across all industries in Region B rose from $31,824 in 2006 to $35,190 in 2009, an increase of approximately 10.6%. Average wages grew faster in Region C than in New York State as a whole, which experienced an approximately 4.2% gain during the same period.

Table 3-27 Region B: Wages (2006, 2009)

	2006		2009		% Change	
	Total Wages ($ millions)	Average Wages	Total Wages ($ millions)	Average Wages	Total Wages	Average Wages
New York State						
Total, all industries	$467,687.53	$55,478	$481,690.58	$57,794	3.0	4.2
Region B						
Total, all industries	$2,144.14	$31,824	$2,266.66	$35,190	5.7	10.6
Delaware County						
Total, all industries	$567.80	$32,720	$544.78	$34,655	(4.1)	5.9
Otsego County						
Total, all industries	$754.75	$30,950	$830.49	$35,310	10.0	14.1
Sullivan County						
Total, all industries	$821.59	$32,050	$891.39	$35,412	8.5	10.5

Source: NYSDOL 2009a.

Table 3-28 presents per capita income data for Region B. From 1999 to 2009, Otsego County experienced the greatest increase in per capita income among the three counties that comprise Region B. The percentage of individuals living below the poverty level in Region B increased from 14.9% in 1999 to 15.0% in 2009 (USCB 2000a, 2009b).

Table 3-28 Region B: Income Statistics (1999 and 2009)

	1999	2009	% Change
Region B			
Per capita income	$17,790	$22,750	27.9
% Below the poverty level[1]	14.9	15.0	0.1
Delaware County			
Per capita income	$17,357	$22,199	27.9
% Below the poverty level[1]	12.9	15.1	2.2
Orange County			
Per capita income	$16,806	$22,255	32.4
% Below the poverty level[1]	14.9	15.2	0.3
Sullivan County			
Per capita income	$18,892	$23,491	24.3
% Below the poverty level[1]	16.3	14.7	(1.6)

Source: USCB 2000a, 2009b.

Note:

[1] If the total income for an individual falls below relevant poverty thresholds, which are updated annually relative to the Consumer Price Index for All Urban Consumers, then the individual is classified as being below the poverty level.

In 2010, the five largest employers, by total number of employees, in Delaware and Otsego counties were: Bassett Healthcare (3,200+ employees), Amphenol Corporation (1,400 employees), State University of New York College Oneonta (1,181 employees); New York Central Mutual Fire Insurance Company (1,000 employees) and A.O. Fox Hospital (1,000 employees) (Bassett Healthcare 2011; Delaware County Economic Development 2010; Otsego County 2010). Data on

the number of employees per employer in Sullivan County were not available at the time of this report.

The counties within Region B are part of three economic development regions, as defined by the Empire State Development Corporation, including the Southern Tier Region (Delaware County), Mid-Hudson Region (Sullivan County), and Mohawk Valley Region (Otsego County). Ranked by employment, travel and tourism is the lead employment industry cluster for the Mid-Hudson Region, and the second largest employment industry cluster in the Southern Tier and Mohawk Valley Regions. The tourism industry is an important economic driver in Region B, particularly in Otsego and Sullivan counties, with the Catskill Mountains and other popular destinations such as the Baseball Hall of Fame in the village of Cooperstown (Otsego County) and the Monticello Raceway in the village of Monticello (Sullivan County). Approximately 4,560 persons were employed in the travel and tourism sector in Region B in 2009, including accommodations (1,820 jobs); culture, recreation, and amusements (960 jobs); food service (930 jobs); passenger transportation (250 jobs); and travel retail (600 jobs) (see Table 3-29). In 2009 wages earned by persons employed in the travel and tourism sector was approximately $72.3 million, or about 3.4% of all wages earned in Region B (NYSDOL 2009b) (see Table 3-30).

Table 3-29 Region B: Employment in Travel and Tourism (2009)

Industry Group	Region B		Delaware County		Otsego County		Sullivan County	
	Number of Jobs	% of Total	Number of Jobs	% of Total	Number of Jobs	% of Total	Number of Jobs	% of Total
Accommodations	1,820	39.9	150	11.7	530	35.3	1,140	64.0
Culture, recreation, and amusements	960	21.1	100	7.8	500	33.3	360	20.2
Food service	930	20.4	360	28.1	360	24.0	210	11.8
Passenger transportation	250	5.5	150	11.7	60	4.0	40	2.2
Travel retail	600	13.2	520	40.6	50	3.3	30	1.7
Total	**4,590**		**1,280**		**1,500**		**1,780**	

Source: NYSDOL 2009b.

Table 3-30 Region B: Employment and Wages Statistics for the Tourism Industry (2007, 2009)

	2007	2009	% Change
Region B			
Employment	3,750	3,690	(1.6)
Total wages ($ million)	70	72.3	3.3
Average annual wage ($)	18,700	19,500	4.3
Delaware County			
Employment	410	420	2.4
Total wages ($ million)	6.2	6.5	4.8
Average annual wage ($)	14,900	15,400	3.4

Table 3-30 Region B: Employment and Wages Statistics for the Tourism Industry (2007, 2009)

	2007	2009	% Change
Otsego County			
Employment	1,510	1,490	(1.3)
Total wages ($ million)	29.0	28.6	(1.4)
Average annual wage ($)	19,100	19,200	0.5
Sullivan County			
Employment	1,830	1,780	(2.7)
Total wages ($ million)	34.8	37.2	6.9
Average annual wage ($)	19,000	20,900	10.0

Source: NYSDOL 2009b.

Agriculture also is an important industry within Region B. Table 3-31 provides agricultural statistics for Delaware, Otsego, and Sullivan counties. Approximately 2,050 farms are located in Region B, encompassing 392,496 acres of land. The value of agricultural production in 2009 was $148.7 million dollars (USDA 2007). The principal sources of farm income in the region are dairy products (particularly in Otsego and Delaware Counties, where dairy products accounted for 70% and 62% of the agricultural sales in the county, respectively) and poultry and eggs (particularly in Sullivan County, where poultry and eggs accounted for 65% of the sales in the county) (USDA 2007).
Source: USDA 2007; NYSDAM 2011.

Table 3-31 Region B: Agricultural Data (2007)

	Region B	Delaware County	Otsego County	Sullivan County
Number of farms	2,050	747	980	323
Land in farms (acres)	392,496	165,572	176,481	50,443
Average size of farm (acres)	191	222	180	156
Market value of products sold ($ millions)	$148.7	$55.1	$51.4	$42.1
Principal operator by primary occupation				
Farming	1,139	437	538	164
Other	911	310	442	159
Hired farm labor	1,746	760	574	412
Land in state-designated agricultural districts	588,443	237,385	189,291	161,767

Source: USDA 2007; NYSDAM 2011.

Currently there are no producing natural gas wells in Region B, although some exploratory well activity occurred in 2007 and 2009.

3.1.2.3 Region C

Table 3-32 presents employment, by industry, in all of Region C and in Cattaraugus and Chautauqua counties. The labor force statistics for the region are shown in Table 3-33.

The largest employment sectors in Region C are education, health, and social services (26.7% of total employment), manufacturing (16.5% of total employment), and retail trade (11.6% of total employment). The agriculture, forestry, fishing, hunting, and mining sector accounted for about 2.9% of total employment in the region, which is relatively high compared to New York State as a whole, which had 0.6% of its workforce employed in this sector (USCB 2009a).

Table 3-32 Region C: Area Employment, by Industry (2009)

Industry Sector	Region C		Cattaraugus County		Chautauqua County	
	Number of Jobs	% of Total	Number of Jobs	% of Total	Number of Jobs	% of Total
Agriculture, forestry, fishing, hunting, and mining	2,813	2.9	1,136	3.1	1,677	2.8
Construction	6,042	6.2	2,825	7.6	3,217	5.3
Manufacturing	16,194	16.5	5,752	15.5	10,442	17.2
Wholesale trade	2,260	2.3	879	2.4	1,741	2.9
Retail trade	11,392	11.6	4,432	11.9	6,960	11.5
Transportation and warehousing, utilities	4,116	4.2	1,398	3.8	2,718	4.5
information	1,578	1.6	525	1.4	1,053	1.7
Finance, insurance, real estate, and renting/leasing	3,486	3.6	1,289	3.5	2,197	3.6
Professional, scientific, management, administrative, and waste management services	4,816	4.9	1,898	5.1	2,918	4.8
Educational, health, and social services	26,161	26.7	9,575	25.7	16,586	27.3
Arts, entertainment, recreation, accommodation, and food services	9,581	9.8	3,893	10.5	5,688	9.4
Other services (except public administration)	4,225	4.3	1,468	3.9	2,757	4.5
public administration	4,960	5.1	2,150	5.8	2,810	4.6
Total	97,984		37,220		60,764	

Source: USCB 2009a.

The total labor force for Region C is approximately 105,800 workers, or nearly 1.1% of the total labor force in New York Stat. Approximately 61% of the total labor force in Region C is in Chautauqua County, and 39% is in Cattaraugus County. As shown in Table 3-33, the 2010 annual average unemployment rate in Region C was approximately 8.9%.

Table 3-33 Region C: Labor Force Statistics (2000 and 2010)

	2000	2010	% Change
Region C			
Total labor force	109,200	105,800	(3.1)
Employed workers	104,700	96,400	(7.9)
Unemployed workers	4,600	9,400	104.3
Unemployment rate (%)	4.2	8.9	111.9
Cattaraugus County			
Total labor force	41,100	41,200	0.2
Employed workers	39,300	37,400	(4.8)
Unemployed workers	1,900	3,800	100.0
Unemployment rate (%)	4.5	9.2	104.4
Chautauqua County			
Total labor force	68,100	64,600	(5.1)
Employed workers	65,400	59,000	(9.8)
Unemployed workers	2,700	5,600	107.4
Unemployment rate (%)	4.0	8.7	117.5

Source: NYSDOL 2010a.

Table 3-34 presents total and average wages for Region C and New York State as a whole. Average wages for persons employed across all industries in Region C rose from $30,146 in 2006 to $32,971 in 2009, an increase of approximately 9.4%. Average wages grew faster in Region C than in New York State as a whole, which experienced an approximately 4.2% gain during the same period.

Table 3-34 Region C: Wages (2006, 2009)

	2006		2009		% Change	
	Total Wages ($ millions)	Average Wages	Total Wages ($ millions)	Average Wages	Total Wages	Average Wages
New York State						
Total, all industries	$467,687.53	$55,478	$481,690.58	$57,794	3.0	4.2
Region C						
Total, all industries	$2,587.04	$30,146	$2,732.72	$32,971	5.6	9.4
Cattaraugus County						
Total, all industries	$955.83	$30,465	$1,046.92	$34,428	9.5	13.0
Chautauqua County						
Total, all industries	$1,631.21	$29,962	$1,685.80	$32,127	3.3	7.2

Source: NYSDOL 2009a.

Table 3-35 presents per capita income data for Region C. Per capita income in Region C rose approximately 26.2% between 1999 and 2009. The percentage of individuals living below the poverty level in Region C increased from 13.8% in 1999 to 16.1% in 2009.

Table 3-35 Region C: Income Statistics (1999 and 2009)

	1999	2009	% Change
Region C			
Per capita income	$16,509	$20,830	26.2
% Below the poverty level[1]	13.8	16.1	2.3
Cattaraugus County			
Per capita income	$15,959	$20,508	28.5
% Below the poverty level[1]	13.7	15.7	2
Chautauqua County			
Per capita income	$16,840	$21,023	24.8
% Below the poverty level[1]	13.8	16.3	2.5

Source: USCB 2000a, 2009b.

Note:

[1] If the total income for an individual falls below relevant poverty thresholds, which are updated annually relative to the Consumer Price Index for All Urban Consumers, then the individual is classified as being below the poverty level.

The five largest employers in Region C, by total number of employees, are Dresser-Rand Company, Cattaraugus County (3,300 employees); the Resource Center, Chautauqua County (1,748 employees); Chautauqua County (1,366 employees); Cummins Engine, Chautauqua County (1,300 employees); and Cattaraugus County (1,180 employees) (Buffalo Business First 2011).

The Empire State Development Corporation has identified 16 industry clusters for the Western New York Region of the state, which encompasses Cattaraugus and Chautauqua counties, as well as Erie (City of Buffalo), Niagara (City of Niagara Falls), and Allegany counties. The industry clusters that support the largest number of jobs are front office and producer services, financial services, travel and tourism, industrial machinery and services, and distribution. Travel and tourism is the third largest industry cluster in terms of employment in the Western New York Region.

Tourism is a significant component of the economy in Region C. Cattaraugus County, known as the Enchanted Mountains Region, boasts abundant recreational opportunities that primarily center on its natural resources. Popular tourist destinations include Allegany State Park, the Amish Trail, Holiday Valley Ski Resort, Rock City Park, Griffis Sculpture Park, and the Seneca-Allegany Casino. Chautauqua County is also recognized for its natural resources and unique learning destinations associated with the Chautauqua Institute. Approximately 4,040 persons were employed in the travel and tourism sector in Region C in 2009, including accommodations (1,110 jobs); culture, recreation, and amusements (1,220 jobs); food service (1,210 jobs); passenger transportation (280 jobs); and travel retail (220 jobs) (See Table 3-36). In 2009 wages earned by persons employed in the travel and tourism sector were approximately $77.5 million, or about 3.0% of all wages earned in Region C (NYSDOL 2009b) (see Table 3-37).

Table 3-36 Region C: Travel and Tourism, by Industrial Group (2009)

Industry Group	Region C		Cattaraugus County		Chautauqua County	
	Number of Jobs	% of Total	Number of Jobs	% of Total	Number of Jobs	% of Total
Accommodations	1,110	27.5	180	10.5	930	40.1
Culture, recreation and amusements	1,220	30.2	1,050	61.0	170	7.3
Food service	1,210	30.0	380	22.1	830	35.8
Passenger transportation	280	6.9	30	1.7	250	10.8
Travel retail	220	5.4	80	4.7	140	6.0
Total	**4,040**		**1,720**		**2,320**	

Source: NYSDOL 2009b.

Table 3-37 Region C: Employment and Wages Statistics for the Tourism Industry (2007, 2009)

	2007	2009	% Change
Region C			
Employment	4,880	4,030	(17.4)
Total wages ($ million)	89.1	77.5	(13.0)
Average annual wage ($)	18,300	19,200	4.9
Cattaraugus County			
Employment	2,150	1,710	(20.5)
Total wages ($ million)	45.0	39.7	(11.8)
Average annual wage ($)	21,000	23,300	11.0
Chautauqua County			
Employment	2,730	2,320	(15.0)
Total wages ($ million)	44.1	37.8	(14.3)
Average annual wage ($)	16,100	16,300	1.2

Source: NYSDOL 2009b.

Table 3-38 presents per capita and median household income data for New York State, Region C, and the counties in Region C. From 1999 to 2009, Cattaraugus County experienced a greater increase in per capita and median household income than Chautauqua County. Per capita income in Cattaraugus County rose approximately 28.5%, while median household income grew roughly 24.2%. The percentage of individuals living below the poverty level in Region C increased from 13.8% in 1999 to 16.1% in 2009. During the same period, the percentage of individuals living below the poverty level in New York State declined 0.7% to 13.9% of all individuals (USCB 2000a, 2009b).

Table 3-38 Region C: Income Statistics (1999, 2009)

	1999	2009	% Change
New York State			
Per capita income	$23,389	$30,634	31.0
Median household income	$43,393	$55,233	27.3
% Below the poverty level[1]	14.6	13.9	(0.7)
Region C			
Per capita income	$16,509	$20,830	26.2
Median household income	-	-	-
% Below the poverty level[1]	13.8	16.1	2.3
Cattaraugus County			
Per capita income	$15,959	$20,508	28.5
Median household income	$33,404	$41,482	24.2
% Below the poverty level[1]	13.7	15.7	2
Chautauqua County			
Per capita income	$16,840	$21,023	24.8
Median household income	$33,458	$40,179	20.1
% Below the poverty level[1]	13.8	16.3	2.5

Source: USCB 2000a, 2009b.

Note:
[1] If the total income for an individual falls below relevant poverty thresholds, which are updated annually relative to the Consumer Price Index for All Urban Consumers, then the individual is classified as being below the poverty level.

Agriculture is also an important industry within Region C. Table 3-39 provides agricultural statistics for Cattaraugus and Chautauqua Counties. Approximately 2,770 farms are located in Region C, encompassing 419,297 acres of land. The value of agricultural production in 2009 was $213.7 million dollars (USDA 2007). Dairy products account for approximately 68% of agricultural sales in Cattaraugus County. In Chautauqua County, the principal sources of farm income are grapes and dairy products (USDA 2007). Grapes and grape products account for approximately 30% of agricultural sales in Chautauqua County, and dairy products account for approximately 51% of agricultural sales (USDA 2007).

Table 3-39 Region C: Agricultural Data (2007)

	Region C	Cattaraugus County	Chautauqua County
Number of farms	2,770	1,112	1,658
Land in farms (acres)	419,297	183,439	235,858
Average size of farm (acres)	151	163	142
Market value of products sold ($ millions)	$213.7	$75.2	$138.6
Principal operator by primary occupation			
Farming	1,437	550	887
Other	1,343	572	771

Table 3-39 Region C: Agricultural Data (2007)

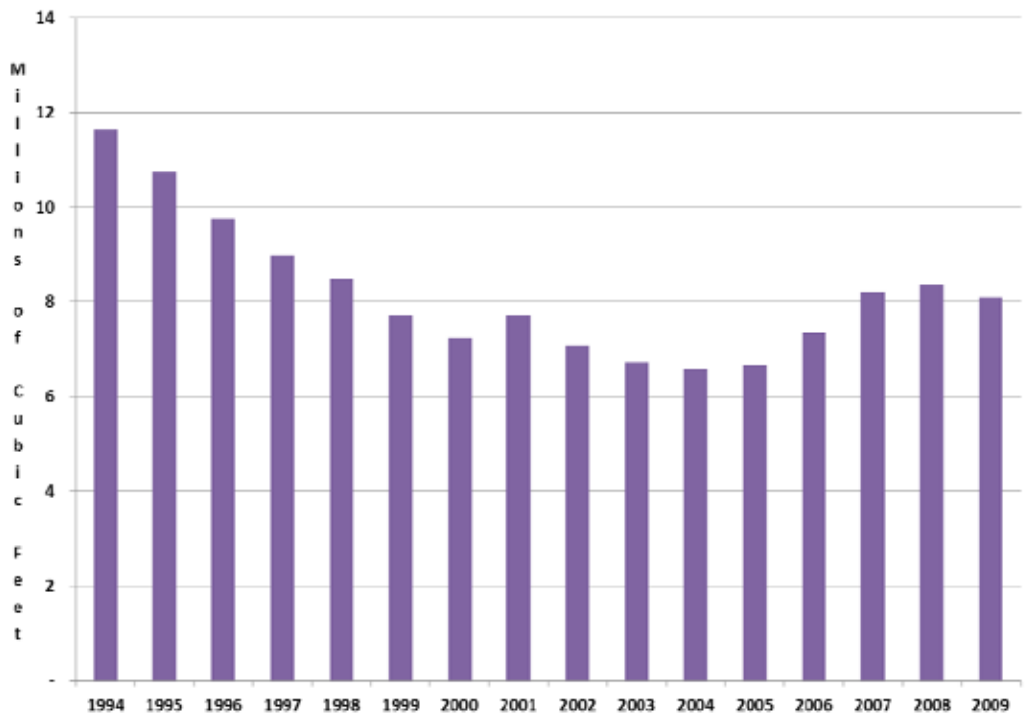
	Region C	Cattaraugus County	Chautauqua County
Hired farm labor	4,341	994	3,347
Land in state-designated agricultural districts	631,686	239,641	392,045

Source: USDA 2007; NYSDAM 2011.

Approximately 157 persons are employed in the oil and gas industry in Region C, or approximately 43.4% of all persons working in the oil and gas industry in New York State in 2009 (NYSDOL 2009a, 2010b).

The oil and gas industry was a marginal contributor to total wages in Region C in 2009. The total wages for persons employed in the oil and gas industry in the region were $10.8 million or about 0.4% of the total wages across all industries (NYSDOL 2009a). The average annual wages for workers employed in the oil and gas sector varied greatly between the counties in Region C. The average annual wage for oil and gas workers in Cattaraugus County was $44,978 in 2009, whereas the average annual wage for oil and gas workers in Chautauqua County was $76,970 during the same time period (NYSDOL 2009a).

Natural gas production in Region C is shown on Figure 3-2. In the mid-1990s Region C produced nearly 12 million cubic feet of natural gas per year. Production has declined from that level over the last 15 years, and the region is now producing slightly more than 8 million cubic feet of natural gas per year.



Source: NYSDEC 1994-2006, 2007a, 2008, 2009.

Figure 3-2 Region C: Natural Gas Production (1994-2009)

The total number of active natural gas wells in Region C over the period 1994 to 2009 is shown in Table 3-40. As shown in the table, the number of active natural gas wells in Region C has increased by nearly 400 wells since 1994, to a total of 3,917 wells.

Table 3-40 Region C: Number of Active Natural Gas Wells (1994-2009)

Year	No. of Gas Wells
1994	3,523
1995	3,759
1996	3,512
1997	3,427
1998	3,585
1999	3,590
2000	3,545
2001	3,579
2002	3,350
2003	3,470
2004	3,645
2005	3,629
2006	3,740
2007	3,935
2008	3,984
2009	3,917

Source: NYSDEC 1994-2006, 2007a, 2008, 2009.

In 2009 the average annual output per well in Region C was only 2.1 million cubic feet of natural gas. Production per well was significantly less than the average annual output per well in Region A (317.9 million cubic feet) or the statewide average per well (6.8 million cubic feet) (NYSDEC 2009). Because of this low productivity per well, Region C is currently a minor contributor to New York State's natural gas production, even though it accounts for the largest number of active wells in the state (NYSDEC 2009).

Table 3-41 shows the production of natural gas and the number of active wells, by town, within each county in Region C in 2009. As shown in the table, in 2009 there were 530 active gas wells in Cattaraugus County and 3,387 active gas wells in Chautauqua County (NYSDEC 2009).

Table 3-41 Region C: Production of Natural Gas and the Number of Active Wells (2009)

Region	Natural Gas Production (thousands of cubic feet)	No. of Gas Wells
Region C	**8,088,651**	**3,917**
Cattaraugus County	**1,615,243**	**530**
Allegany	255,057	6
Ashford	10,416	11
Carrollton	89,633	3
Conewango	154,745	76
Dayton	113,159	59
East Otto	96,897	15
Ellicottville	737	3
Farmersville	214	2
Freedom	3,845	4
Leon	249,247	88
Machias	100	1
Napoli	1,187	2
New Albion	7,220	9
Olean	7,163	5
Otto	69,647	70
Perrysburg	343,006	42
Persia	99,100	43
Randolph	72,434	72
South Valley	892	2
Yorkshire	40,544	17
Chautauqua County	**6,473,408**	**3,387**
Arkwright	106,655	122
Busti	321,152	121
Carroll	181,427	70
Charlotte	230,836	127
Chautauqua	469,915	314
Cherry Creek	179,037	123
Clymer	159,828	101
Dunkirk	69,003	36
Dunkirk City	10,169	6
Ellery	180,187	82
Ellicott	204,129	66
Ellington	264,581	180
French Creek	26,003	40
Gerry	437,202	152
Hanover	450,439	152
Harmony	231,897	116
Jamestown	4,183	3
Kiantone	425,027	84

Table 3-41 Region C: Production of Natural Gas and the Number of Active Wells (2009)

Region	Natural Gas Production (thousands of cubic feet)	No. of Gas Wells
Mina	53,986	71
North Harmony	352,930	159
Poland	554,983	159
Pomfret	189,905	174
Portland	235,705	149
Ripley	185,487	182
Sheridan	142,294	86
Sherman	106,236	84
Stockton	169,836	118
Villanova	141,171	57
Westfield	389,205	253

Source: NYSDEC 2009.

3.2 Population

This section discusses the past, current, and projected population of New York State and the local areas within each of the three representative regions (Regions A, B and C).

3.2.1 New York State

New York State is the third most populous state in the country, with a 2010 population of approximately 19.38 million (USCB 2010a; see Table 3-42. The population density of the state is 410 persons per square mile. However, nearly half of the state's population (8.1 million persons) is located within New York City. Subtracting out the population of New York City, the average population density of the rest of New York State is 237.3 persons per square mile. New York State's population has continually increased during the past 20 years, though the rate of growth was faster from 1990 to 2000 than it was from 2000 to 2010 (see Table 3-42).

Table 3-42 New York State: Historical and Current Population Levels (1990, 2000, 2010)

Year	Total Population	Percent Change	Average Annual Growth Rate	Average Population Density
2010	19,378,102	2.1	0.2%	410.4
2000	18,976,457	5.5	0.5%	401.9
1990	17,990,455	--	--	381.0

Sources: USCB 1990a, 2000b, and 2010a.

According to the *2010 Census of Population and Housing* (USCB 2010a), approximately 97.0% of the residents of New York identify themselves as being of a single race: 65.8% of the population of New York State self-identify as White, 15.9% as Black or African American, 0.6% as American Indian and Alaska Na-

tive, 7.3% as Asian, less than (<) 0.1% as Native Hawaiian and Other Pacific Island, and 7.4% percent as some other race (USCB 2010a). The remaining 3.0% of the population self-identifies as two or more races (see Table 3-43).

Persons of Hispanic or Latino origin are defined as individuals who identified themselves as Hispanic or Latino on the 2010 Census, regardless of race. In New York State, 17.6% of the population self-identifies as being Hispanic or Latino.

Table 3-43 presents a summary of the total population of New York State by the race/ethnicity categories defined by the USCB.

Table 3-43 New York State: Racial and Ethnicity Characteristics (2010)

Population Category	Population	Percentage of Total 2010 Population
Total 2010 Population	19,378,102	100.0
White Only	12,740,940	65.8
Black or African American Only	3,073,800	15.9
American Indian and Alaska Native Only	106,906	0.6
Asian Only	1,420,244	7.3
Native Hawaiian and Other Pacific Islander Only	8,766	< 0.1
Some Other Race Only	1,441,563	7.4
Total Population of One Race	18,792,219	97.0
Two or more races	585,849	3.0
Hispanic or Latino	3,416,922	17.6

Source: USCB 2010a.

Note:
The categories presented in this table are defined by the USCB. A person falls into a category if, and only if, they self-identify with a category on the *2010 Census of Population and Housing*.

In 2010 New York State had five cities with a population exceeding 100,000 persons. According to the USCB, a place is a concentration of population, of which there are two types: one that is legally bounded as an incorporated place, and one that is delineated for statistical purposes as a census-designated place (CDP). USCB-defined places were used to identify population centers in New York State. The cities with populations exceeding 100, 000 persons in New York State are New York City, Buffalo, Rochester, Yonkers, and Syracuse. Albany, the state's capital, had a 2010 population of 97,856 persons. Table 3-44 identifies the most populated cities in New York State in 2010 (USCB 2010b). New York City had a 2010 population of approximately 8.18 million persons and accounted for more than 42.2% of the state's total population (see Table 3-44).

Table 3-44 New York State: Ten Largest Population Centers (2010)

Population Center	2010 Population	Percentage of Total New York State 2010 Population
New York City	8,175,133	42.2
City of Buffalo	261,310	1.4
City of Rochester	210,565	1.1
City of Yonkers	195,976	1.0
City of Syracuse	145,170	0.8
City of Albany	97,856	0.5
City of New Rochelle	77,062	0.4
Cheektowaga CDP	75,178	0.4
City of Mount Vernon	67,292	0.4
City of Schenectady	66,135	0.3

Source: USCB 2010b.

Key:
CDP = Census-designated place.

Large population centers in New York State are geographically spread across the state, with New York City located in the southeastern portion of the state, the City of Buffalo and the Cheektowaga CDP located in the northwestern portion of the state, and the cities of Syracuse and Rochester located in the north-central portion of the state. There are no large population centers north of the Capital Region (cities of Albany and Schenectady). The Cities of Yonkers, New Rochelle, and Mount Vernon are part of the New York City MSA and are located immediately north of New York City. The 10 largest population centers in New York State (see Table 3-44) account for 48.5% of the total population of the state.

New York State's population has continually increased during the past 20 years, though the rate of growth was faster from 1990 to 2000 than it was from 2000 to 2010 (see Table 3-42). The New York State Department of Labor compiles statewide and county population data, including population projections. Population projections developed at Cornell University (Cornell University 2009) are posted by the New York State Department of Labor (see Table 3-45). The state's 2005 population was projected using 2000 Census data for the state as a whole and each county within the state. The modeling formula was then adjusted so that the population projection matched the 2005 American Community Survey population estimates. The modified formula was then used to project state and county populations from 2005 to 2035 in 5-year increments (Cornell University 2009).

Table 3-45 includes the state's total 2010 population and population projections for 2015 to 2030. As shown, the population in New York State is projected to continue to grow through 2030. The state's population is projected to grow at an average annual rate of 0.2% between 2015 and 2030, and by 2030 New York State's population is projected to reach 20,415,446 persons.

Table 3-45 New York State: Projected Population (2015 to 2030)

Population 2010[a] (actual)	Population 2015[b] (projected)	Population 2020[b] (projected)	Population 2025[b] (projected)	Population 2030[b] (projected)	Average Annual Growth Rate 2015-2030
19,378,102	19,876,073	20,112,402	20,299,512	20,415,446	0.2%

Sources:
[a] USCB 2010a.
[b] Cornell University 2009.

3.2.2 Representative Regions

3.2.2.1 Region A

Table 3-46 provides the 1990, 2000, and 2010 population for Region A and for each of the three counties within this region. The population of Region A is 340,555 persons (USCB 2010a) with an average population density of 209 persons per square mile. Since 1990, all three counties within Region A have lost population. Between 1990 and 2000, the region lost population at a rate of approximately 0.5% per year, and between 2000 and 2010, the region lost population at a rate of approximately 0.1% per year.

Table 3-46 Region A: Historical and Current Population (1990, 2000, 2010)

Year	1990	2000	2010
Region A			
Total Population	359,692	343,390	340,555
Percent Change	--	-4.5	-0.8
Average Annual Growth Rate	--	-0.5%	-0.1%
Average Population Density	220.1	210.2	208.5
Broome County			
Population	212,160	200,536	200,600
Percent Change	--	-5.5	<0.1
Average Annual Growth Rate	--	-0.6%	< 0.1%
Average Population Density	300.2	283.7	283.8
Chemung County			
Population	95,195	91,070	88,830
Percent Change	--	-4.3	-2.5
Average Annual Growth Rate	--	-0.4%	-0.3%
Average Population Density	233.2	223.1	217.6
Tioga County			
Population	52,337	51,784	51,125
Percent Change	--	-1.1	-1.3
Average Annual Growth Rate	--	-0.1%	-0.1%
Average Population Density	100.9	99.8	98.6

Sources: USCB 1990a, 2000b, 2010a.

According to the *2010 Census of Population and Housing* (USCB 2010a), approximately 97.6% of the individuals in Region A identify themselves as being of a single race: 89.5% of the population of Region A self-identifies as White, 4.6% as Black or African American, 0.2% as American Indian and Alaska Native, 2.5% as Asian, less than (<) 0.1% as Native Hawaiian and Other Pacific Island, and

0.8% percent as some other race (USCB 2010a). The remaining 2.4% self-identifies as two or more races.

In Region A, 1.8% of the population self-identifies as being Hispanic or Latino. Table 3-47 presents a summary of the total population of Region A by the race/ethnicity categories defined by the USCB.

Table 3-47 Region A: Racial and Ethnicity Characteristics (2010)

Population Category	Population	Percentage of Total 2010 Population
Chemung County		
Total 2010 Population	88,830	100.0
White Only	78,771	88.7
Black or African American Only	5,828	6.6
American Indian and Alaska Native Only	233	0.3
Asian Only	1,057	1.2
Native Hawaiian and Other Pacific Islander Only	20	< 0.1
Some Other Race Only	539	0.6
Total Population of One Race	86,448	97.4
Two or More Races	2,372	2.7
Hispanic or Latino	1,436	1.6
Tioga County		
Total 2010 Population	51,125	100.0
White Only	49,556	96.9
Black or African American Only	375	0.7
American Indian and Alaska Native Only	86	0.2
Asian Only	372	0.7
Native Hawaiian and Other Pacific Islander Only	15	<0.1
Some Other Race Only	146	0.3
Total Population of One Race	50,550	98.9
Two or More Races	575	1.1
Hispanic or Latino	412	0.8
Broome County		
Total 2010 Population	200,600	100.0
White Only	176,444	88.0
Black or African American Only	9,614	4.8
American Indian and Alaska Native Only	396	0.2
Asian Only	7,065	3.5
Native Hawaiian and Other Pacific Islander Only	82	<0.1
Some Other Race Only	1,912	1.0
Total Population of One Race	195,513	97.5
Two or More Races	5,087	2.5
Hispanic or Latino	4,334	2.2

Table 3-47 Region A: Racial and Ethnicity Characteristics (2010)

Population Category	Population	Percentage of Total 2010 Population
Region A Total		
Total 2010 Population	340,555	100.0
White Only	304,771	89.5
Black or African American Only	15,817	4.6
American Indian and Alaska Native Only	715	0.2
Asian Only	8,494	2.5
Native Hawaiian and Other Pacific Islander Only	117	< 0.1
Some Other Race Only	2,597	0.8
Total Population of One Race	332,511	97.6
Two or More Races	8,034	2.4
Hispanic or Latino	6,182	1.8

Source: USCB 2010a.

Note:
The categories displayed in this table are defined by the USCB. A person falls into a category if, and only if, they self-identify with a category on the 2010 Census of Population and Housing.

In 2010, Region A had five population centers with a population over 10,000. USCB-defined places were used to identify population centers in Region A, including legally bounded areas and CDPs. The five population centers with a population over 10,000 in Region A are: the cities of Binghamton and Johnson, the village of Endicott, and the Endwell CDP (Broome County); and the city of Elmira (Chemung County) (see Table 3-48).

Table 3-48 lists the 10 largest population centers in Region A according to the 2010 Census (USCB 2010b). The city of Binghamton has the largest population in the region, with a population of 47,376 (see Table 3-48); this is 13.9% of Region A's population as a whole. The 10 largest population centers in the region are located across all of the three counties in the region. The 10 largest population centers in Region A account for 43.2% of the region's total population.

Table 3-48 Region A: Ten Largest Population Centers

Population Center	County	2010 Population	Percentage of Total Region A 2010 Population
City of Binghamton	Broome	47,376	13.9
City of Elmira	Chemung	29,200	8.6
Village of Johnson City	Broome	15,174	4.5
Village of Endicott	Broome	13,392	3.9
Endwell CDP	Broome	11,446	3.4
Southport CDP	Chemung	7,238	2.1
Village of Horseheads	Chemung	6,461	1.9
Binghamton University CDP	Broome	6,177	1.8

Table 3-48 Region A: Ten Largest Population Centers

Population Center	County	2010 Population	Percentage of Total Region A 2010 Population
Big Flats CDP	Chemung	5,277	1.6
West Elmira CDP	Chemung	4,967	1.5

Source: USCB 2010b.

Key:
CDP = Census-designated place.

Region A's population has continually decreased during the past 20 years, though the rate of decline was faster from 1990 to 2000 than it was from 2000 to 2010 (see Table 3-49). Table 3-49 shows Region A's total 2010 population and presents population projections for 2015 to 2030 (Cornell University 2009). As shown in Table 3-49, the population of Region A is projected to continue to decrease through 2030. The population of the region is projected to decrease at an average annual rate of 0.7% between 2015 and 2030, and by 2030 Region A's population is projected to be 279,675, which would be a decrease of 19% from the 2010 census population.

Table 3-49 Region A: Population Projections (2015 to 2030)

County/ Region	Population 2010a (actual)	Population 2015b (projected)	Population 2020b (projected)	Population 2025b (projected)	Population 2030b (projected)	Average Annual Growth Rate 2015-2030
Broome	200,600	183,115	176,715	169,968	162,750	-0.7%
Chemung	88,830	83,282	80,643	77,773	74,614	-0.7%
Tioga	51,125	48,089	46,412	44,481	42,311	-0.8%
Region A Total	**340,555**	**314,486**	**303,770**	**292,222**	**279,675**	**-0.7%**

Sources:
a USCB 2010a.
b Cornell University 2009.

3.2.2.2 Region B

Table 3-50 provides the 1990, 2000, and 2010 populations for Region B and for Delaware, Otsego and Sullivan counties. The population of Region B is 187,786 (USCB 2010a) with an average population density of 59.6 persons per square mile. The region has gained population over the last 20 years, primarily in Sullivan County. Between 1990 and 2000, the population grew at a rate of approximately 0.4% per year, and between 2000 and 2010, population increased at a rate of approximately 0.2% per year. Since 1990 the population of Region B has increased by 10,767, which is an increase of approximately 6.1%.

Table 3-50 Region B: Historical and Current Population (1990, 2000, 2010)

Year	1990	2000	2010
Region B			
Total Population	177,019	183,697	187,786
Percent Change	--	3.8	2.2
Average Annual Growth Rate	--	0.4%	0.2%
Average Population Density	56.2	58.3	59.6

Table 3-50 Region B: Historical and Current Population (1990, 2000, 2010)

Year	1990	2000	2010
Delaware County			
Population	47,225	48,055	47,980
Percent Change	--	1.8	-0.2
Average Annual Growth Rate	--	0.2%	< 0.0%
Average Population Density	32.7	33.2	33.2
Otsego County			
Population	60,517	61,676	62,259
Percent Change	--	1.9	1.0
Average Annual Growth Rate	--	0.2%	0.1%
Average Population Density	60.4	61.5	62.1
Sullivan County			
Population	69,277	73,966	77,547
Percent Change	--	6.8	4.8
Average Annual Growth Rate	--	0.7%	0.5%
Average Population Density	71.4	76.3	80.0

Sources: USCB 1990a, 2000b, 2010a.

According to the *2010 Census of Population and Housing* (USCB 2010a), approximately 97.9% of the individuals in Region B identify themselves as being of a single race: 89.6% of the population of Region B self-identifies as White, 4.7% as Black or African American, 0.3% as American Indian and Alaska Native, 1.1% as Asian, less than (<) 0.01% as Native Hawaiian and Other Pacific Island, and 2.1% percent as some other race (USCB 2010a). The remaining 2.1% self-identify as being of two or more races.

Persons of Hispanic or Latino origin are defined as individuals who identified themselves as a Hispanic or Latino on the 2010 Census, regardless of race. In Region B, 5.0% of the population self-identifies as being Hispanic or Latino.

Table 3-51 presents a summary of the total population of Region B by the race/ethnicity categories defined by the USCB.

Table 3-51 Region B: Racial and Ethnicity Characteristics (2010)

Population Category	Population	Percentage of Total 2010 Population
Delaware County		
Total 2010 Population	47,980	100.0
White Only	45,675	95.2
Black or African American Only	779	1.6
American Indian and Alaska Native Only	131	0.3
Asian Only	367	0.8
Native Hawaiian and Other Pacific Islander Only	12	< 0.1
Some Other Race Only	394	0.8
Total Population of One Race	47,358	98.7

Table 3-51 Region B: Racial and Ethnicity Characteristics (2010)

Population Category	Population	Percentage of Total 2010 Population
Two or More Races	622	1.3
Hispanic or Latino	1,058	2.2
Otsego County		
Total 2010 Population	62,259	100.0
White Only	58,935	94.7
Black or African American Only	1,066	1.7
American Indian and Alaska Native Only	121	0.2
Asian Only	674	1.1
Native Hawaiian and Other Pacific Islander Only	18	< 0.1
Some Other Race Only	413	0.7
Total Population of One Race	61,227	98.4
Two or More Races	1,032	1.7
Hispanic or Latino	1,391	2.2
Sullivan County		
Total 2010 Population	77,547	100.0
White Only	63,560	82.0
Black or African American Only	7,039	9.1
American Indian and Alaska Native Only	354	0.5
Asian Only	1,075	1.4
Native Hawaiian and Other Pacific Islander Only	24	< 0.1
Some Other Race Only	3,229	4.2
Total Population of One Race	75,281	97.2
Two or More Races	2,266	2.9
Hispanic or Latino	6,986	9.0
Region B Total		
Total 2010 Population	187,786	100.0
White Only	168,170	89.6
Black or African American Only	8,884	4.7
American Indian and Alaska Native Only	606	0.3
Asian Only	2,116	1.1
Native Hawaiian and Other Pacific Islander Only	54	< 0.1
Some Other Race Only	4,036	2.1
Total Population of One Race	183,866	97.9
Two or More Races	3,920	2.1
Hispanic or Latino	9,435	5.0

Source: USCB 2010a.

Note:
The categories displayed in this table are defined by the USCB. A person falls into a category if, and only if, they self-identify with a category on the 2010 Census of Population and Housing.

In 2010 Region B had one population center with a population exceeding 5,000 (the village of Monticello in Sullivan County, with 6,726 persons) and one population center with a population exceeding 10,000 (the city of Oneonta in Otsego County, with 13,901 persons). These are the two largest population centers in Region B (see Table 3-52). USCB-defined places were used to identify population centers in Region B, including legally bounded areas and CDPs.

Table 3-52 identifies the most populated areas in Region B according to the 2010 Census. The city of Oneonta constitutes 7.4% of the Region's population as a whole (USCB 2010b). The 10 largest population centers in Region B are located throughout the three counties and account for 23.0% of the total population of Region B.

Table 3-52 Region B: Ten Largest Population Centers

Population Center	County	2010 Population	Percentage of Total Region B 2010 Population
City of Oneonta	Otsego	13,901	7.4
Village of Monticello	Sullivan	6,726	3.6
Village of Liberty	Sullivan	4,392	2.3
Village of Sidney	Delaware	3,900	2.1
Village of Walton	Delaware	3,088	1.6
Village of Delhi	Delaware	3,087	1.6
South Fallsburg CDP	Sullivan	2,870	1.5
West End CDP	Otsego	1,940	1.0
Village of Cooperstown	Otsego	1,852	1.0
Rock Hill CDP	Sullivan	1,742	0.9

Source: USCB 2010b.

Key:
CDP = Census-designated place.

Region B's population has continually increased during the past 20 years, though the rate of growth between decades declined from the 1990-2000 period to the 2000-2010 period (see Table 3-50). Table 3-53 presents Region B's total 2010 population and population projections for 2015 to 2030 (Cornell University 2009). As shown in Table 3-53, the population in Region B is overall is projected to decrease through 2030, although the population in Otsego County will increase slightly through 2025, then decline in 2030. By 2030, Region B's population is projected to be 183,031 which would be a decrease of 2.5% from the 2010 census population.

Table 3-53 Region B: Population Projections (2015 to 2030)

County/ Region	Population 2010a (actual)	Population 2015b (projected)	Population 2020b (projected)	Population 2025b (projected)	Population 2030b (projected)	Average Annual Growth Rate 2050-2030
Delaware	47,980	44,644	42,995	40,980	38,631	-0.9%
Otsego	62,259	63,820	64,344	64,597	64,508	0.1%
Sullivan	77,547	78,329	79,322	79,845	79,892	0.1%
Region B Total	**187,786**	**186,793**	**186,661**	**185,422**	**183,031**	**-0.1%**

Sources:
a USCB 2010a.
b Cornell University 2009.

3.2.2.3 Region C

Table 3-54 provides the 1990, 2000, and 2010 populations for Region C and for Cattaraugus and Chautauqua counties. The population in Region C is 215,222 (USCB 2010a) with an average population density of 90.7 persons per square mile. Between 2000 and 2010, the region lost population at an average annual rate of 0.4%. This rate was higher than the rate at which the region lost population between 1990 and 2000 (0.1% per year). Since 1990 the population of Region C has decreased by 10,907, or 4.8%.

Table 3-54 Region C: Historical and Current Population (1990, 2000, 2010)

Year	1990	2000	2010
Region C			
Total Population	226,129	223,705	215,222
Percent Change	--	-1.1	-3.8
Average Annual Growth Rate	--	-0.1%	-0.4%
Average Population Density	95.3	94.3	90.7
Cattaraugus County			
Population	84,234	83,955	80,317
Percent Change	--	-0.3	-4.3
Average Annual Growth Rate	--	< 0.0%	-0.4
Average Population Density	64.3	64.1	61.3
Chautauqua County			
Population	141,895	139,750	134,905
Percent Change	--	-1.5	-3.5
Average Annual Growth Rate	--	-0.2%	-0.4%
Average Population Density	133.6	131.6	127.0

Sources: USCB 1990a, 2000b, 2010a.

According to the *2010 Census of Population and Housing* (USCB 2010a), 98.2% of the individuals in Region C identifies themselves as being of a single race: 92.7% of the population of Region C self-identifies as White, 2.0% as Black or African American, 1.5% as American Indian and Alaska Native, 0.6% as Asian, less than 0.1% as Native Hawaiian and Other Pacific Island, and 1.4% percent as some other race (USCB 2010a). The remaining 1.9% self-identify as being of two or more races.

Person of Hispanic or Latino origin are defined as individuals who identified themselves as Hispanic or Latino on the 2010 Census, regardless of race. In Region C, 2.7% of the population self-identifies as being Hispanic or Latino.

Table 3-55 presents a summary of the total population of Region C by the race/ethnicity categories defined by the USCB.

Table 3-55 Region C: Racial and Ethnicity Characteristics (2010)

Population Category	Population	Percentage of Total 2010 Population
Cattaraugus County		
Total 2010 Population	80,317	100.0
White Only	74,639	92.9
Black or African American Only	1,024	1.3
American Indian and Alaska Native Only	2,443	3.0
Asian Only	528	0.7
Native Hawaiian and Other Pacific Islander Only	15	< 0.1
Some Other Race Only	305	0.4
Total Population of One Race	78,954	98.3
Two or More Races	1,363	1.7
Hispanic or Latino	786	1.0
Chautauqua County		
Total 2010 Population	134,905	100.0
White Only	124,875	92.6
Black or African American Only	3,197	2.4
American Indian and Alaska Native Only	689	0.5
Asian Only	688	0.5
Native Hawaiian and Other Pacific Islander Only	36	< 0.1
Some Other Race Only	2,669	2.0
Total Population of One Race	132,154	98.0
Two or More Races	2,751	2.0
Hispanic or Latino	4,991	3.7
Region C Total		
Total 2010 Population	215,222	100.0
White Only	199,514	92.7
Black or African American Only	4,221	2.0
American Indian and Alaska Native Only	3,132	1.5
Asian Only	1,216	0.6
Native Hawaiian and Other Pacific Islander Only	51	< 0.1
Some Other Race Only	2,974	1.4

Table 3-55 Region C: Racial and Ethnicity Characteristics (2010)

Population Category	Population	Percentage of Total 2010 Population
Total Population of One Race	211,108	98.2
Two or More Races	4,114	1.9
Hispanic or Latino	5,777	2.7

Source: USCB 2010a.

Note:
The categories displayed in this table are defined by the USCB. A person falls into a category if, and only if, they self-identify with a category on the 2010 Census of Population and Housing.

In 2010 Region C had four population centers with population over 10,000. USCB-defined places were used to identify population centers in Region C, including legally bounded areas and CDPs. The four places with a population over 10,000 are the cities of Jamestown and Dunkirk and the village of Fredonia in Chautauqua County, and the city of Olean in Cattaraugus County.

Table 3-56 identifies the 10 most populated areas in Region C according to the 2010 Census (USCB 2010b). The largest population center in Region C is Jamestown, with a population of 31,146, which is 14.5% of the entire region's population. A majority of the largest population centers are located in Chautauqua County, with only three of the 10 largest being located in Cattaraugus County. The 10 largest population centers in Region C account for 41.4% of the region's total population.

Table 3-56 Region C: Ten Largest Population Centers

Population Center	County	2010 Population	Percentage of Total Region C 2010 Population
City of Jamestown	Chautauqua	31,146	14.5
City of Olean	Cattaraugus	14,452	6.7
City of Dunkirk	Chautauqua	12,563	5.8
Village of Fredonia	Chautauqua	11,230	5.2
City of Salamanca	Cattaraugus	5,815	2.7
Village of Westfield	Chautauqua	3,224	1.5
Village of Lakewood	Chautauqua	3,002	1.4
Village of Gowanda	Cattaraugus	2,709	1.3
Village of Silver Creek	Chautauqua	2,656	1.2
Village of Falconer	Chautauqua	2,420	1.1

Source: USCB 2010b.

Region C's population has continually decreased during the past 20 years, though the rate of decline was faster from 2000 to 2010 than it was from 1990 to 2000. Table 3-57 presents Region C's total 2010 population and presents population projections for 2015 to 2030 (Cornell University 2009). As shown in Table 3-57, the population of Region C is projected to continue to decrease through 2030. The population of Region C is projected to decrease at an average annual rate of 0.6% between 2015 and 2030 and by 2030, Region C's population is projected to

be 188,752 people, which would be a decrease of 12% from the 2010 census population.

Table 3-57 Region C: Population Projections (2015 to 2030)

County/ Region	Population 2010a (actual)	Population 2015b (projected)	Population 2020b (projected)	Population 2025b (projected)	Population 2030b (projected)	Average Annual Growth Rate 2015-2030
Cattaraugus	80,317	77,870	75,651	73,048	70,075	-0.7%
Chautauqua	134,905	129,596	126,521	122,906	118,677	-0.6%
Region C Total	**215,222**	**207,466**	**202,172**	**195,954**	**188,752**	**-0.6%**

Sources:
a USCB 2010a.
b Cornell University 2009.

3.3 Housing

3.3.1 New York State

The total number of housing units in New York State in 2010 was 8.1 million. The total number of housing units has been growing over the past two decades; however, with the advent of the recent housing market crisis and recession, the rate of growth has slowed in the past few years. According to the USCB, in 1990 there were a total of 7.2 million housing units in New York State By 2000, the total number of housing units had increased by 6.3% to approximately 7.7 million housing units. Between 2000 and 2010, the total number of housing units increased by 5.6% (see Table 3-58) (USCB 1990b, 2000c, 2010a).

Table 3-58 New York State: Total Housing Units (1990, 2000, 2010)

Year	Total Housing Units	Percent Change
2010	8,108,103	5.6
2000	7,679,307	6.3
1990	7,226,891	--

Source: USCB 1990b, 2000c, and 2010a.

Nearly half of all housing units in New York State are single-family units. In 2009 an estimated 3.7 million units, or 47.0% of all housing units in the state, were single-family units. Multi-family units, i.e., structures that have three or more units in them, accounted for 39.5% of the total housing units (see Table 3-59) (USCB 2009c).

Table 3-59 New York State: Type of Housing Units (2009[1])

Type of Structure	Total Number of Units	% of Total
Single Family	3,735,364	47.0
Duplex	866,157	10.9
Multi-family	3,142,770	39.5
Mobile Home	202,773	2.6

Table 3-59 New York State: Type of Housing Units (2009[1])

Type of Structure	Total Number of Units	% of Total
Other	2,971	<0.1
Total	**7,905,035**	**100**

Source: USCB 2009c.

[1] Data from the *2010 Census of Population and Housing* on housing units by type of structure had not been released at time of this report; therefore, estimated 2009 data from the 2005-2009 *American Community Survey* estimates is included herein.

Table 3-60 provides the number of sales and annual median sale price of single family homes sold in New York State over the past three years. The number of annual sales has declined over the past three years, while the median sales price has fluctuated. In 2008 the median sales price for single-family homes was $210,000. During the height of the housing market crisis in 2009, the median sales price fell to $195,000. By 2010 prices in the statewide housing market had recovered, and median sales prices rose to $215,000 (NYS Association of Realtors 2011a, 2011b). Although the statewide housing market statistics have improved over the last year, housing is intrinsically a local or regional market; many areas of New York State are still experiencing downward pressures on house prices.

Table 3-60 New York State: Number of Sales and Annual Median Sale Price of Single-Family Homes Sold (2008-2010)

	2008	2009	2010
Number of Sales	80,521	78,327	74,718
Median Sale Price	$210,000	$195,000	$215,000

Source: NYS Association of Realtors 2011a, 2011b.

In 2010, New York State had approximately 3.9 million owner-occupied housing units and 3.4 million renter-occupied housing units (USCB 2010a). The homeowner vacancy rate was 1.9%, and the rental vacancy rate was 5.5% (USCB 2010a) (see Table 3-61).

Table 3-61 New York State: Housing Characteristics (2010)

	Housing Units
Occupied	7,317,755
Owner Occupied	3,897,837
Renter Occupied	3,419,918
Vacant	790,348
For Rent	200,039
Rented, Not Occupied	12,786
For Sale Only	77,225
Sold, Not Occupied	21,027
For Seasonal, Recreational, or	289,301

Table 3-61 New York State: Housing Characteristics (2010)

	Housing Units
Occasional Use	
All Other Vacant	189,970
Total	**8,108,103**
Homeowner Vacancy Rate	1.9%
Rental Vacancy Rate	5.5%

Source: USCB 2010a.

3.3.2 Representative Regions

3.3.2.1 Region A

According to the USCB, the housing market in Region A has experienced little growth over the past two decades. As shown in Table 3-62, the region experienced an increase of 1.7% in the total number of housing units from 1990 to 2000, and a 2.1% increase from 2000 to 2010 (USCB 1990b, 2000c, 2010a).

Table 3-62 Region A: Total Housing Units (1990, 2000, 2010)

	Total Housing Units (1990)	Total Housing Units (2000)	Total Housing Units (2010)	Percent Change (1990-2000)	Percent Change (2000-2010)
Region A	145,513	147,972	151,135	1.7%	2.1%
Broome County	87,969	88,817	90,563	1.0%	2.0%
Chemung County	37,290	37,745	38,369	1.2%	1.7%
Tioga County	20,254	21,410	22,203	5.7%	3.7%

Source: USCB 1990b, 2000c, 2010a.

A majority of housing units in Region A are single-family units. In 2009 an estimated 96,056 units, or 65.0% of all housing units in the region, were single-family units. Multi-family units, i.e., structures that contained three or more housing units, accounted for 17.0% of the total housing units (see Table 3-63).

Table 3-63 Region A: Total Housing Units by Type of Structure (2009[1])

	Number of Units	% of Total
Region A		
Single Family	96,956	65.0
Duplex	15,901	10.8
Multi-family	25,389	17.0
Mobile Home	10,756	7.2
Other	64	<0.1
Total	**149,066**	**100**
Broome County		
Single Family	56,225	63.1
Duplex	10,436	11.7
Multi-family	17,646	19.8
Mobile Home	4,795	5.4

Table 3-63 Region A: Total Housing Units by Type of Structure (2009[1])

	Number of Units	% of Total
Other	15	<0.1
Total	**89,117**	**100**
Chemung County		
Single Family	25,739	67.5
Duplex	4,291	11.3
Multi-family	5,749	15.1
Mobile Home	2,325	6.1
Other	12	<0.1
Total	**38,116**	**100**
Tioga County		
Single Family	14,992	68.7
Duplex	1,174	5.4
Multi-family	1,994	9.1
Mobile Home	3,636	16.7
Other	37	0.1
Total	**21,833**	**100**

Source: USCB 2009c.

[1] Data from the *2010 Census of Population and Housing* on housing units by type of structure had not been released at time of this report; therefore, estimated 2009 data from the 2005-2009 *American Community Survey* are provided herein.

Table 3-64 provides the number of sales and annual median sale price of single family homes sold in Region A over the past three years (New York State Association of Realtors 2011a, 2011b).

Table 3-64 Region A: Number of Sales and Annual Median Sale Price of Single-Family Homes Sold (2008-2010)

	2008		2009		2010	
	Number of Sales	Median Sale Price	Number of Sales	Median Sales Price	Number of Sales	Median Sales Price
Broome County	1,412	$109,438	1,287	$115,000	1,193	$106,000
Chemung County	629	$85,000	593	$86,000	638	$100,000
Tioga County	275	$136,170	304	$120,000	227	$122,500
Region A	2,316	NA	2,184	NA	2,058	NA

Source: NYS Association of Realtors 2011a, 2011b.

Key:

NA = Not available.

In 2010, Region A had approximately 93,074 owner-occupied housing units and 44,905 renter-occupied housing units. The homeowner vacancy rate was 1.1%, and the rental vacancy rate was 7.8% (USCB 2010a) (see Table 3-65).

Table 3-65 Region A: Housing Characteristics (2010)

	Housing Units			
	Region A	Broome County	Chemung County	Tioga County
Occupied	137,979	82,167	35,462	20,350
Owner Occupied	93,074	53,260	24,011	15,803
Renter Occupied	44,905	28,907	11,451	4,547
Vacant	13,156	8,396	2,907	1,853
For Rent	3,824	2,522	917	385
Rented, Not Occupied	226	143	56	27
For Sale Only	1,516	956	377	183
Sold, Not Occupied	471	226	151	94
For Seasonal, Recreational, or Occasional Use	2,774	1,843	376	555
All Other Vacant	4,345	2,706	1,030	609
Total	**151,135**	**90,563**	**38,369**	**22,203**
Homeowner Vacancy Rate	1.1%	1.8%	1.5%	1.1%
Rental Vacancy Rate	7.8%	8.0%	7.4%	7.8%

Source: USCB 2010a.

A majority (67.5%) of occupied housing units Region A in 2010 were owner-occupied. The remaining 32.5% of the occupied housing units were rented. In keeping with its rural nature, Tioga County had relatively fewer renter-occupied units, while Broome County had relatively more renter-occupied units than the region average (see Table 3-65) (USCB 2010a).

The *2010 Census of Population and Housing* identified 2,774 housing units in Region A that are considered seasonal, recreational, or occasional use.

In addition to the permanent housing discussed above, there are also numerous short-term accommodations including hotels, motels, inns, and campgrounds available in the area. Table 3-66 lists the number of hotels/motels available in Region A that was registered with the I Love New York Tourism Agency. As of 2011 there were 40 hotels/motels with approximately 3,110 rooms in Region A.

Table 3-66 Region A: Short-Term Accommodations (Hotels/Motels) (2011)

	Total Hotels/Motels	Total Rooms
Broome County	27	2,202
Chemung County	9	676
Tioga County	4	232
Region A	40	3,110

Source: Official New York State Tourism Site (ILOVENY) 2011.

3.2.2.2 Region B

According to the USCB, the rate of growth of the housing supply in Region B has increased slightly since 1990. The total number of housing units in the region grew from 95,560 in 1990 and increased 6.9%. Between 2000 and 2010, the total number of housing units increased to 111,185, and increase of 8.8% (see Table 3-67) (USCB 1990b, 2000c, 2010a).

Table 3-67 Region B: Total Housing Units (1990, 2000, 2010)

	Total Housing Units (1990)	Total Housing Units (2000)	Total Housing Units (2010)	Percent Change (1990-2000)	Percent Change (2000-2010)
Delaware County	27,361	28,952	31,222	5.8%	7.8%
Otsego County	26,385	28,481	30,777	7.9%	8.1%
Sullivan County	41,814	44,730	49,186	7.0%	10.0%
Region B	95,560	102,163	111,185	6.9%	8.8%

Source: USCB 1990b, 2000c, 2010a.

A majority of housing units in Region B are single-family units. In 2009 an estimated 76,883 units, or 70.7% of all housing units in the region, were single-family units. Mobile homes accounted for 12.7% of the total housing units (see Table 3-68).

Table 3-68 Region B: Total Housing Units by Type of Structure (2009[1])

	Number of Units	% of Total
Region B		
Single Family	76,883	70.7
Duplex	6,025	5.5
Multi-family	12,097	11.1
Mobile Home	13,731	12.7
Other	6	<0.1
Total	**108,742**	**100**
Delaware		
Single Family	21,876	73.6
Duplex	1,502	5.0
Multi-family	2,400	8.1
Mobile Home	3,949	13.3
Other	0	0
Total	**29,727**	**100**
Otsego		
Single Family	20,576	67.1
Duplex	1,791	5.9
Multi-family	3,868	12.6
Mobile Home	4,405	14.4
Other	6	<0.1
Total	**30,646**	**100**

Table 3-68 Region B: Total Housing Units by Type of Structure (2009[1])

	Number of Units	% of Total
Sullivan		
Single Family	34,431	71.2
Duplex	2,732	5.6
Multi-family	5,829	12.1
Mobile Home	5,377	11.1
Other	0	0
Total	**48,369**	**100**

Source: USCB 2009c.

[1] Data from the *2010 Census of Population and Housing* on housing units by type of structure had not been released at time of this report; therefore, estimated 2009 data from the 2005-2009 *American Community Survey* are provided herein.

As shown in Table 3-69, the housing market in Region B experienced a general decline in total sales and price in the single-family home market from 2008 to 2010. In the region as a whole, the number of single-family homes sold each year from 2008 to 2010 declined by 8.7%, from 785 homes in 2008 to 717 homes in 2010.

Median sale prices in the region experienced similar trends. From 2008 to 2010, the median sale price of single-family homes in Sullivan and Otsego counties decreased by 16.4% and 8.8%, respectively. In contrast, the median sale price of homes in Delaware County remained relatively constant from 2008 to 2010 (see Table 3-69).

Table 3-69 Region B: Number of Sales and Annual Median Sale Price of Single-Family Homes Sold (2008-2010)

	2008		2009		2010	
	Number of Sales	Median Sale Price	Number of Sales	Median Sales Price	Number of Sales	Median Sales Price
Delaware County	160	$109,250	171	$110,000	149	$110,000
Otsego County	309	$131,000	304	$126,523	319	$119,500
Sullivan County	316	$149,450	269	$125,000	249	$125,000
Region B	785	NA	744	NA	717	NA

Source: NYS Association of Realtors 2011a, 2011b.

Key:
NA = Not available.

According to the USCB, in 2010 there were 36,528 vacant units out of a total of 111,185 housing units in Region B. Therefore, the average total vacancy rate for the region as a whole was 32.9% (see Table 3-70) (USCB 2010a).

The 2010 homeowner vacancy rates were 4.8% in Sullivan County, 2.9% in Delaware County, and 2.8% in Otsego County; and the 2010 rental vacancy rates were 12.5% in Sullivan County, 9.9% in Delaware County, and 8.3% in Otsego County (see Table 3-70). In 2010 Region B had approximately 52,860 owner-

occupied housing units and 21,797 renter-occupied housing units. The homeowner vacancy rate was 2.6%, and the rental vacancy rate was 10.6% (USCB 2010a).

There were 2,604 units for rent, 1,989 units for sale, and 27,240 units for seasonal, recreational, or occasional use in the area. The percentage of vacant seasonal, recreational, or occasional use units was very high, largely due to the region's proximity to the Catskill Mountains (USCB 2010a).

Table 3-70 Region B: Housing Characteristics (2010)

	Housing Units			
	Region B	Delaware County	Otsego County	Sullivan County
Occupied	74,657	19,898	24,620	30,139
Owner Occupied	52,860	14,768	17,885	20,207
Renter Occupied	21,797	5,130	6,735	9,932
Vacant	36,528	11,324	6,157	19,047
For Rent	2,604	565	615	1,424
Rented, Not Occupied	157	36	45	76
For Sale Only	1,989	446	514	1,029
Sold, Not Occupied	461	117	127	217
For Seasonal, Recreational, or Occasional Use	27,240	9,276	3,621	14,343
All Other Vacant	4,077	884	1,235	1,958
Total	**111,185**	**31,222**	**30,777**	**49,186**
Homeowner Vacancy Rate	2.6%	2.9%	2.8%	4.8%
Rental Vacancy Rate	10.6%	9.9%	8.3%	12.5%

Source: USCB 2010a.

In addition to the permanent housing discussed above, there are also numerous short-term accommodations including hotels, motels, inns, and campgrounds available in the area. Table 3-71 lists the number of hotels/motels available in Region B that was registered with the I Love New York Tourism Agency. As of 2011 there were 78 hotels/motels with approximately 3,705 rooms in Region B (see Table 3-71).

Table 3-71 Region B: Short-Term Accommodations (Hotels/Motels)

	Total Hotels/Motels	Total Rooms
Delaware County	27	1,123
Otsego County	34	1,373
Sullivan County	17	1,209
Region B	78	3,705

Source: Official New York State Tourism Site (ILOVENY) 2011.

3.3.2.3 Region C

In 2010 Region C had a total of 108,031 housing units. The total number of housing units increased by 8.1% between 1990 and 2000 and by 3.2% between 2000 and 2010 (see Table 3-72) (USCB 1990b, 2000c, 2010a). Approximately 62% of the housing units are located in Chautauqua County and 38% are in Cattaraugus County.

Table 3-72 Region C: Total Housing Units (1990, 2000, 2010)

	Total Housing Units (1990)	Total Housing Units (2000)	Total Housing Units (2010)	Percent Change (1990-2000)	Percent Change (2000-2010)
Cattaraugus County	36,839	39,839	41,111	8.1%	3.2%
Chautauqua County	62,682	64,900	66,920	3.5%	3.1%
Region C	99,521	104,739	108,031	5.2%	3.1%

Source: USCB 1990b, 2000c, 2010a.

Most of the housing units in Region C are single-family units. In 2009 an estimated 106,519 units, or 68.7% of all housing units in the region, were single-family units. Multi-family units, i.e., structures that contain three or more housing units, accounted for 11.7% of the total housing units (see Table 3-73)

Table 3-73 Region C: Total Housing Units by Type of Structure (2009[1])

	Number of Units	% of Total
Region C		
Single Family	73,183	68.7
Duplex	10,802	10.1
Multi-family	12,432	11.7
Mobile Home	10,090	9.5
Other	12	<0.1
Total	**106,519**	**100**
Cattaraugus		
Single Family	28,451	70.1
Duplex	2,850	7.0
Multi-family	3,797	9.3
Mobile Home	5,502	13.6
Other	12	<0.1
Total	**40,612**	**100**
Chautauqua		
Single Family	44,732	67.9
Duplex	7,952	12.0
Multi-family	8,635	13.1

Table 3-73 Region C: Total Housing Units by Type of Structure (2009[1])

	Number of Units	% of Total
Mobile Home	4,588	7.0
Other	0	0
Total	**65,907**	**100**

Source: USCB 2009c.

[1] Data from the *2010 Census of Population and Housing* on housing units by type of structure had not been released at time of this report; therefore, estimated 2009 data from the 2005-2009 *American Community Survey* are provided herein.

As shown on Table 3-74, the market for single-family homes in Region C declined over the past three years. In the region as a whole, the number of single-family homes sold each year from 2008 to 2010 declined by 14.1%, from 1,492 homes in 2008 to 1,281 homes in 2010 (NYS Association of Realtors 2011a, 2011b).

Table 3-74 Region C: Number of Sales and Annual Median Sale Price of Single-Family Homes Sold (2008-2010)

	2008		2009		2010	
	Number of Sales	Median Sale Price	Number of Sales	Median Sales Price	Number of Sales	Median Sales Price
Cattaraugus County	577	$69,000	501	$70,000	434	$73,000
Chautauqua County	915	$75,000	843	$74,521	847	$80,000
Region C	1,492	NA	1,344	NA	1,281	NA

Source: NYS Association of Realtors 2011a, 2011b.

Key:

NA = Not available.

In 2010 Region C had approximately 60,182 owner-occupied housing units and 26,324 renter-occupied housing units. The homeowner vacancy rate was 1.4%, and the rental vacancy rate was 9.0% (see Table 3-75) (USCB 2010a).

Table 3-75 Region C: Vacancy Rate (2010)

	Region C	Cattaraugus County	Chautauqua County
Occupied	86,507	32,263	54,244
Owner Occupied	60,182	23,306	36,876
Renter Occupied	26,325	8,857	17,368
Vacant	21,524	8,848	12,676
For Rent	2,624	748	1,876
Rented, Not Occupied	178	82	96
For Sale Only	1,278	483	795
Sold, Not Occupied	426	157	269

Table 3-75 Region C: Vacancy Rate (2010)

	Region C	Cattaraugus County	Chautauqua County
For Seasonal, Recreational, or Occasional Use	13,308	6,035	7,573
All Other Vacant	3,410	1,343	2,067
Total	108,031	41,111	66,920
Homeowner Vacancy Rate	1.4%	2.0%	2.1%
Rental Vacancy Rate	9.0%	7.6%	9.7%

Source: USCB 2010a.

There were 2,624 units for rent, 1,278 units for sale, and 13,608 units for seasonal, recreational, or occasional use in the area. The percentage of vacant seasonal, recreational, or occasional use units was very high, largely due to the cottages around Chautauqua Lake, in the Chautauqua Institute, and other natural areas in these counties (USCB 2010a).

In addition to the permanent housing discussed above, there are also numerous short-term accommodations including hotels, motels, inns, and campgrounds available in the area. Table 3-76 lists the number of hotels/motels available in Region A that was registered with the I Love New York Tourism Agency. As of 2011 there were 41 hotels/motels with approximately 1,987 rooms in Region C (see Table 3-76).

Table 3-76 Region C: Short-Term Accommodations (Hotels/Motels)

	Total Hotels/Motels	Total Rooms
Cattaraugus County	17	634
Chautauqua County	24	1,353
Region C	**41**	**1,987**

Source: Official New York State Tourism Site (ILOVENY) 2011.

3.4 Government Revenues and Expenditures

3.4.1 New York State

Table 3-77 lists the main sources of tax revenues for New York State. For fiscal year (FY) ending March 31, 2010, revenues collected in New York State totaled approximately $55 billion. Revenue from personal income taxes is the largest source of tax revenue for the state, accounting for approximately 63% of the total revenue (NYSDTF 2010a, 2010b).

Table 3-77 New York State: Revenues Collected for FY Ending March 31, 2010

	Personal Income Taxes	Corporation and Business Taxes	Sales and Excise Taxes and User Fees	Property Transfers	Other Taxes and Fees	Total Revenues
Total Revenues ($ billions)	$34.8	$6.6	$12.2	$1.4	$0.2	$55.2
Percent of Total	63.0	12.0	22.1	2.5	0.4	100.0

Source: NYSDTF 2010a.

Notes:
Totals may not equal sum of components due to rounding.

Currently, no specific state tax is levied on the extraction of natural gas in New York State; however, the state government receives revenues from the natural gas industry and from natural gas development through a variety of ways. The state collects personal income tax from wages earned in the industry. In addition, royalty payments and lease payments are considered personal income and are, therefore, taxable. Corporate and business taxes are assessed on the corporate income generated through natural gas development. Sales taxes are also assessed on the purchase of materials and equipment needed to construct and operate natural gas wells.

In addition, New York State receives revenues from leases for oil and natural gas development on state lands. Lease revenues are acquired through delay rentals, bonus bids, royalties, and storage fees. Delay rentals are the annual fees that oil and natural gas developers pay to hold a leased property before development occurs. Bonus bids are the amount companies offer the state above the delay rental fee for a specific tract. All bonus bids are subject to a sealed competitive bidding process. Once the gas well is developed, the delay rental payments are waived and the developer is assessed royalty fees of 12.5% of gross revenues. Storage fees are fees that are levied on the operators of underground natural gas storage facilities. A summary of the acreage and number of leases on state lands is provided in Table 3-78. Table 3-79 provides a summary of state revenues received from 2000 through 2010 from oil and gas lease payments.

Table 3-78 New York State: Number of Leases and Acreage of State Land Leased for

County	Acreage of State Land Leased				Number of Leases			
	Rental	Royalty	Storage	Total	Rental	Royalty	Storage	Total
Allegany		126		126		1		1
Broome	512			512	1			1
Cattaraugus		62	9,981	10,043		2	8	10
Cayuga		62		62		4		4
Chautauqua		15,715		15,715		29		29
Chemung	730	667		1,397	3	10		13
Cortland	7,791			7,791	4			4
Erie		10	255	265		2	2	4
Ontario			55	55			1	1
Schuyler	2,416	10,019	1	12,436	1	6	1	8
Seneca		17		17		1		1

Table 3-78 New York State: Number of Leases and Acreage of State Land Leased for Oil and Natural Gas Development (2010)

County	Acreage of State Land Leased				Number of Leases			
	Rental	Royalty	Storage	Total	Rental	Royalty	Storage	Total
Steuben	685	5,859	1,620	8,164	1	8	2	11
Tioga	6,179			6,179	6			6
Tompkins	915			915	1			1
Total	**19,228**	**32,537**	**11,912**	**63,677**	**17**	**63**	**14**	**94**

Source: NYSDEC 2010.

Table 3-79 New York State: Leasing Revenue by Payment Type (2000-2010)

Year	Bonus Bids	Delay Rentals	Royalties	Storage Fees	Yearly Total
2000	-	$42,280	$75,327	$9,781	$127,388
2001	-	$118,732	$150,922	$178,128	$447,782
2002	-	$79,435	$96,620	$73,617	$249,672
2003	$4,583,239	$16,486	$609,821	$117,381	$5,326,927
2004	-	$130,746	$525,050	$109,986	$765,782
2005	-	$80,534	$3,235,206	$123,930	$3,439,670
2006	-	$75,305	$3,096,620	$125,007	$3,296,932
2007	$9,001,335	$166,868	$2,466,312	$133,298	$11,767,813
2008	-	$97,269	$1,866,519	$211,927	$2,175,715
2009	-	$96,136	$637,254	$50,960	$784,350
2010	$2,922	$96,377	$581,824	$65,010	$746,133

Source: NYSDEC 2010.

In New York State, local government entities have taxing authority over natural gas development in their jurisdiction for ad valorem real property tax purposes. There are a total of 4,173 local government entities in New York State. The entities with the authority to impose mill levies (i.e., property taxes) include 57 counties, 62 cities, 932 towns, and 555 villages (NYS Office of the Comptroller 2010a). Table 3-80 provides a summary of local government entities by type in New York State.

Table 3-80 New York State: Summary of Local Government Entities

Local Government Entity	Statewide Total
Counties[1]	57
Cities	62
Towns	932
Villages	555
School Districts	697
Fire Districts	872
Industrial Development Agencies	114
Housing Authorities	140
Police Authorities	124

Table 3-80 New York State: Summary of Local Government Entities

Local Government Entity	Statewide Total
Other Miscellaneous Authorities	9
Off-track Betting	6
Libraries	422
BOCES	37
Community Colleges	36
Consolidated Health Districts	52
Soil and Water Conservation Districts	58
Grand Total	**4,173**

Source: NYS Office of the Comptroller 2010a.

Notes:
[1] Total number of counties does not include the five boroughs of New York City.

The New York State Department of Taxation and Finance (NYSDTF) provides a uniform, statewide method of valuing natural-gas-producing properties for real property tax purposes. Valuations of natural-gas-producing properties are based on "unit of production" value—a dollar amount per 1,000 cubic feet (MCF) of gas produced. Therefore, the assessed value of an operating natural gas well is based on its production multiplied by the unit of production value.

Each year the NYSDTF updates the unit of production values for each natural gas producing region in the state. To facilitate the valuation process, the state has been divided into four natural gas producing regions. In order to determine the assessed value of a natural gas producing property, the unit of production is multiplied by the amount of gas produced, and the annual New York State equalization rate is applied to the product. The resulting assessed value of this property is then taxed as a rate equal to any other real property taxed in a given locality.

Spending on community services is generally divided between the state and local governments (i.e., counties, municipalities, fire districts, and school districts). For public safety, New York State funds state troopers, counties fund county sheriffs, and municipalities commonly fund local police services. Emergency services such as fire protection and emergency medical technician (EMT) services are largely volunteer efforts in smaller towns, with some financial support received from smaller cities, suburban and rural towns, and villages. Major cities generally support their own fire departments, which generally have their own EMT operation.

Roadways are also supported by various levels of government. New York State provides funding for state and local highways, the operation of which is the responsibility of the New York State Department of Transportation as well as the New York State Thruway Authority. Counties finance county highways, while municipalities generally provide the funds to administer and maintain local roadways.

In regards to education, New York State financially supports the State University of New York, a system of higher education institutions. Funding for K-12 education is generally provided by local school districts, which in turn receive revenues from a variety of sources, including federal aid, state aid, and real property taxes, among others.

Recreation services, including public parks, are another expenditure in which both state and local governments contribute. New York State provides funding to the New York State Office of Parks, Recreation, and Historic Preservation, which operates recreational facilities at the state level, including the state park system. County governments generally provide funds for recreational facilities in towns and villages, while cities and larger suburban areas generally support their own recreational services.

Health, including Medicaid, is an expenditure that is largely carried by the state. Medicaid is a joint federal-state program. However, counties and major cities in New York State also contribute funds. Counties and local governments also have miscellaneous health care costs, including public health administration, public health services, mental health services, environmental services, and public health facilities, among others.

Expenditures for water and waste water treatment are generally made by counties and local municipalities.

3.4.2 Representative Regions

3.4.2.1 Region A

Table 3-81 lists the main sources of public revenues for Region A. Revenues collected in Region A totaled approximately $736 million for the FY ending December 31, 2009. The majority of revenues were derived from local sources. Local revenue, including ad valorem (real and personal property) tax receipts and services, accounted for approximately 67.5% of total revenues in Region A (NYS Office of the Comptroller 2010b).

Table 3-81 Region A: Total Revenue for FY Ending December 31, 2009 ($ millions)

	Taxes[1] (% of total)	Services[2] (% of total)	Total Local Revenue (% of total)	State and Federal Aid (% of total)	Other Sources[3] (% of total)	Total Revenue[4]
Broome County	$169.4 (37.0)	$139.6 (30.4)	$309.0 (67.4)	$127.5 (27.8)	$22.1 (4.8)	$458.6
Chemung County	$80.6 (42.0)	$47.3 (24.7)	$127.9 (66.7)	$54.8 (28.6)	$9.1 (4.7)	$191.8
Tioga County	$39.4 (46.2)	$20.6 (24.1)	$60.0 (70.2)	$20.4 (23.9)	$5.1 (6.0)	$85.5
Region A	$289.4 (39.4)	$207.5 (28.2)	$496.9 (67.5)	$202.7 (27.5)	$36.3 (4.9)	$735.9

Source: NYS Office of the Comptroller 2010b.

Table 3-81 Region A: Total Revenue for FY Ending December 31, 2009 ($ millions)

	Taxes[1] (% of total)	Services[2] (% of total)	Total Local Revenue (% of total)	State and Federal Aid (% of total)	Other Sources[3] (% of total)	Total Revenue[4]

Notes:
1 Taxes include real property taxes and assessments, other real property tax items, sales and use taxes, and other non-property taxes.
2 Services include charges for services, charges to other governments, use and sale of property, and other local revenues.
3 Other revenues include proceeds of debt and all other sources of revenue.
4 Totals may not equal sum of components due to rounding.

As shown in Table 3-82, the total local tax revenue collected in Region A during the FY ending on December 31, 2009, was approximately $289.4 million. Of the total tax collected, 59.8% was derived from sales tax and distribution. Real property taxes, special assessments, and other real property tax items accounted for about 39.1% of the total local revenue (NYS Office of the Comptroller 2010b).

Table 3-82 Region A: Local Tax Revenue for FY Ending December 31, 2009 ($ millions)

	Real Property Taxes (% of total)	Special Assessments (% of total)	Other Real Property Tax Items[1] (% of total)	Sales Tax and Distribution (% of total)	Miscellaneous Use Taxes (% of total)	Other Non-Property Taxes[2] (% of total)	Total Tax Collection[3]
Broome County	$59.1 (34.9)	$0 (0)	$4.0 (2.4)	$104.1 (61.4)	$1.5 (0.9)	$0.7 (0.4)	$169.4
Chemung County	$26.8 (33.3)	$0 (0)	$1.9 (2.4)	$51.2 (63.5)	$0.6 (0.7)	$0.1 (0.1)	$80.6
Tioga County	$19.2 (48.7)	$0 (0)	$2.2 (5.6)	$17.7 (44.9)	$0.1 (0.3)	$0.2 (0.5)	$39.4
Region A	$105.1 (36.3)	$0 (0)	$8.1 (2.8)	$173.0 (59.8)	$2.2 (0.7)	$1.0 (0.4)	$289.4

Source: NYS Office of the Comptroller 2010b.

Notes:
1 Other real property tax items include STAR payments, payments in lieu of taxes, interest penalties, gain from sale of tax acquired property, and miscellaneous tax items.
2 Other non-property taxes include franchises, emergency telephone system surcharges, city income taxes, and other miscellaneous non-property taxes.
3 Totals may not equal sum of components due to rounding.

The production value (i.e., gas economic profile), state equalization rate, and millage rate for gas-producing properties in Region A are shown in Table 3-83. Broome, Chemung, and Tioga counties are within the Medina Region 3 natural-gas-producing region designated by New York State. In 2010 the final gas unit of production value for gas-producing properties within Medina Region 3 was $11.19 (NYSDTF 2011a). The overall full-value millage rates for Broome, Chemung, and Tioga counties were 35.50, 34.30, and 30.80, respectively. These rates have already been equalized and include the rates of all taxing districts in the county, including county, town, village, school district, and other special district rates (NYSDTF 2010b).

Table 3-83 Region A: Gas Economic Profile for Medina Region 3 and State Equalization and Millage Rates (2010)

	2010 Final Gas Unit of Production Value[a]	State Equalization Rate[b]	Millage Rate[c]
Broome County	$11.19	55.47	35.50
Chemung County	$11.19	95.20	34.30
Tioga County	$11.19	54.75	30.80

Source:
[a] NYSDTF 2011a.
[b] NYSDTF 2010b.
[c] NYS Office of the Comptroller 2010c. Millage rates represent the "overall full-value tax rate" and include the rates of all taxing districts in the county, including county, town, village, school district, and special districts rates.

Table 3-84 presents local government expenditures for Region A during the FY ending December 31, 2009. Social services combined to create the largest single expenditure in each of the counties of Region A. Approximately 28.7% of the counties' collective operating and capital budgets were spent on social services during the FY ending December 31, 2009. Expenditure categories within social services include social service administration, financial assistance, Medicaid, non-Medicaid medical assistance, housing assistance, employment services, youth services, public facilities, and miscellaneous social services. Other major expenditures in Region A included general government (20.5%), employee benefits (15.3%), and health (9.9%). Public safety accounted for approximately 7.0% of total expenditures in Region A, including $15,299,556 for police and $118,376 for fire protection. No county in Region A spent any monies on emergency response. Broome and Chemung counties did not financially support any fire protection services (NYS Office of the Comptroller 2010b).

Table 3-84 Region A: Expenditures for FY Ending December 31, 2009 ($ millions)

	Broome County		Chemung County		Tioga County		Region A	
	Total $	% of Total	Total $	% of Total	Total $	% of Total	Total $	% of Total[1]
General Government	$91.82	20.4	$33.09	17.8	$21.68	27.0	$146.59	20.5
Education	$20.41	4.5	$4.41	2.4	$5.19	6.5	$30.01	4.2
Public Safety	$30.48	6.8	$12.94	7.0	$6.47	8.1	$49.90	7.0
Health	$39.15	8.7	$24.03	12.9	$7.40	9.2	$70.58	9.9
Transportation	$22.69	5.1	$14.63	7.9	$6.18	7.7	$43.49	6.1
Social Services	$122.93	27.4	$61.99	33.4	$20.35	25.4	$205.27	28.7
Economic Development	$6.01	1.3	$0.06	<0.1	$0.64	0.8	$6.70	0.9
Culture and Recreation	$10.19	2.3	$2.35	1.3	$0.23	0.3	$12.77	1.8
Community Services	$6.77	1.5	$2.98	1.6	$0.57	0.7	$10.32	1.4
Utilities	$0.00	0.0	$0.00	0.0	$0.00	0.0	$0.00	0.0
Sanitation	$0.95	0.2	$5.78	3.1	$1.18	1.5	$7.91	1.1

Table 3-84 Region A: Expenditures for FY Ending December 31, 2009 ($ millions)

	Broome County		Chemung County		Tioga County		Region A	
	Total $	% of Total	Total $	% of Total	Total $	% of Total	Total $	% of Total[1]
Employee Benefits	$82.23	18.3	$17.93	9.6	$9.46	11.8	$109.62	15.3
Debt Service	$15.41	3.4	$5.62	3.0	$0.86	1.1	$21.89	3.1
Total Expenditures	**$449.03**	**100.0**	**$185.81**	**100.0**	**$80.20**	**100.0**	**$715.04**	**100.0**

Source: NYS Office of the Comptroller 2010b.

3.4.2.2 Region B

Table 3-85 lists the main sources of county government revenues for Region B. Revenues collected in Region B totaled approximately $429.0 million for the fiscal year ending December 31, 2009. Most of the revenues were derived from local sources. Local revenue, including ad valorem (real and personal property) tax receipts and services, accounted for approximately 65.6% of total revenues in Region B (NYS Office of the Comptroller 2010b).

Table 3-85 Region B: Total Revenue for FY Ending December 31, 2009 ($ millions)

	Taxes[1] (% of total)	Services[2] (% of total)	Total Local Revenue (% of total)	State and Federal Aid (% of total)	Other Sources[3] (% of total)	Total Revenue[4]
Delaware County	$43.1 (37.6)	$21.1 (18.4)	$64.2 (56.0)	$33.0 (28.8)	$17.4 (15.2)	$114.5
Otsego County	$44.7 (41.6)	$30.7 (28.5)	$75.4 (70.1)	$25.2 (23.4)	$7.0 (6.5)	$107.6
Sullivan County	$84.2 (40.7)	$57.5 (27.8)	$141.7 (68.5)	$44.2 (21.4)	$20.9 (10.1)	$206.9
Region B	$172.0 (40.1)	$109.3 (25.5)	$281.3 (65.6)	$102.4 (23.9)	$45.3 (10.6)	$429.0

Source: NYS Office of the Comptroller 2010b.

Notes:
1 Taxes include real property taxes and assessments, other real property tax items, sales and use taxes, and other non-property taxes.
2 Services include charges for services, charges to other governments, use and sale of property, and other local revenues.
3 Other revenues include proceeds of debt and all other sources of revenue.
4 Totals may not equal sum of components due to rounding.

As shown in Table 3-86, the total local tax revenue in Region B during the fiscal year ending on December 31, 2009, was approximately $173.7 million. Of the total tax collected, 49.2% was derived from taxes levied on real property, special assessments, and other real property tax items. Sales tax and distribution accounted for approximately 48.4% of the total (NYS Office of the Comptroller 2010b).

Table 3-86 Region B: Local Tax Revenue for FY Ending December 31, 2009 ($ millions)

	Real Property Taxes (% of total)	Special Assessments (% of total)	Other Real Property Tax Items[1] (% of total)	Sales Tax and Distribution (% of total)	Miscellaneous Use Taxes (% of total)	Other Non-Property Taxes[2] (% of total)	Total Tax Collection[3]
Delaware County	$23.4 (54.2)	$0 (0)	$1.7 (3.9)	$17.9 (41.4)	$0 (0)	$0.2 (0.5)	$43.2
Otsego County	$9.5 (20.5)	$1.1 (2.4)	$1.4 (3.0)	$33.1 (71.3)	$1.1 (2.4)	$0.2 (0.4)	$46.4
Sullivan County	$42.1 (50.1)	$0 (0)	$6.3 (7.5)	$33.1 (39.4)	$1.1 (1.3)	$1.5 (1.8)	$84.1
Region B	$75.0 (43.2)	$1.1 (0.6)	$9.4 (5.4)	$84.1 (48.4)	$2.2 (1.3)	$1.9 (1.1)	$173.7

Source: NYS Office of the Comptroller 2010b.

Notes:
1 Other real property tax items include STAR payments, payments in lieu of taxes, interest penalties, gain from sale of tax acquired property, and miscellaneous tax items.
2 Other non-property taxes include franchises, emergency telephone system surcharges, city income taxes, and other miscellaneous non-property taxes.
3 Totals may not equal sum of components due to rounding.

The production value (i.e., gas economic profile), state equalization rate, and millage rate for gas-producing properties in Region B are shown in Table 3-87. Delaware, Otsego, and Sullivan counties are within Medina Region 4 natural-gas-producing region designated by New York State. The final gas unit of production value for gas-producing properties within the Medina Region 4 was $11.19 in 2010; the 2011 tentative gas unit of production value is $11.32 (NYSDTF 2011a).

The 2010 overall full-value millage rates for Delaware, Otsego, and Sullivan counties were 21.20, 19.60 and 26.20, respectively. These rates have already been equalized and include the rates of all taxing districts in the county, including county, town, village, school district, and other special district rates (NYSDTF 2010b).

Table 3-87 Region B: Gas Economic Profile for Medina Region 3 and State Equalization and Millage Rates (2010)

	2010 Final Gas Unit of Production Value[a]	State Equalization Rate[b]	Millage Rate[c]
Delaware County	$11.19	45.12	21.20
Otsego County	$11.19	73.83	19.60
Sullivan County	$11.19	55.85	26.20

Source:
a NYSDTF 2011a.
b NYSDTF 2010b.
c NYS Office of the Comptroller 2010c. Millage rates represent the "overall full-value tax rate" and include the rates of all taxing districts in the county, including county, town, village, school district, and special districts rates.

Table 3-88 presents local government expenditures for Region B during the FY ending December 31, 2009. Social services combined to create the largest single expenditure in each of the counties in Region B. Approximately 30% of the counties' collective operating and capital budgets were spent on social services during the FY ending December 31, 2009. Expenditure categories within social services include social service administration, financial assistance, Medicaid, non-Medicaid medical assistance, housing assistance, employment services, youth services, public facilities, and miscellaneous social services. Other major expenditures in Region B included employee benefits (14.5%), general government (12.4%), and transportation (12.3%). Public safety accounted for approximately 7.7% of total expenditures in Region B, including $9,103,208 for police and $70,719 for fire protection. No county in Region B spent any monies on emergency response. Delaware and Otsego counties did not financially support any fire protection services (NYS Office of the Comptroller 2010b).

Table 3-88 Region B: Expenditures for FY Ending December 31, 2009 ($ millions)

	Delaware County		Otsego County		Sullivan County		Region B	
	Total $	% of Total	Total $	% of Total	Total $	% of Total	Total $	% of Total[1]
General Government	$8.96	9.7	$18.66	17.9	$20.99	10.7	$48.61	12.4
Education	$0.62	0.7	$2.55	2.4	$6.34	3.2	$9.51	2.4
Public Safety	$5.54	6.0	$6.88	6.6	$17.90	9.1	$30.33	7.7
Health	$8.41	9.1	$5.56	5.3	$30.00	15.3	$43.96	11.2
Transportation	$18.08	19.5	$11.59	11.1	$18.47	9.4	$48.14	12.3
Social Services	$28.78	31.1	$37.22	35.6	$51.66	26.4	$117.65	30.0
Economic Development	$0.61	0.7	$1.07	1.0	$2.39	1.2	$4.07	1.0
Culture and Recreation	$0.70	0.8	$0.28	0.3	$2.80	1.4	$3.78	1.0
Community Services	$3.17	3.4	$2.05	2.0	$1.09	0.6	$6.31	1.6
Utilities	$0.00	0.0	$0.00	0.0	$0.00	0.0	$0.00	0.0
Sanitation	$3.91	4.2	$1.07	1.0	$4.31	2.2	$9.28	2.4
Employee Benefits	$10.97	11.9	$15.98	15.3	$30.05	15.4	$57.00	14.5
Debt Service	$2.83	3.1	$1.61	1.5	$9.74	5.0	$14.17	3.6
Total Expenditures	**$92.58**	**100.0**	**$104.50**	**100.0**	**$195.74**	**100.0**	**$392.82**	**100.0**

Source: NYS Office of the Comptroller 2010b.

3.4.2.3 Region C

Table 3-89 lists the main sources of county government revenues for Region C. Revenues collected in Region C totaled approximately $501.4 million for the fiscal year ending December 31, 2009. Most of the revenues were derived from local sources. Local revenue, including ad valorem (real and personal property) tax receipts and services, accounted for approximately 70.8% of total revenues in Region C (NYS Office of the Comptroller 2010b).

Table 3-89 Region C: Total Revenue for FY Ending December 31, 2009 ($ millions)

	Taxes[1] (% of total)	Services[2] (% of total)	Total Local Revenue (% of total)	State and Federal Aid (% of total)	Other Sources[3] (% of total)	Total Revenue[4]
Cattaraugus County	$78.1 (36.4)	$73.6 (34.3)	$151.7 (70.6)	$42.7 (19.9)	$20.4 (9.5)	$214.8
Chautauqua County	$114.8 (40.1)	$88.5 (30.9)	$203.3 (70.9)	$65.0 (22.7)	$18.3 (6.4)	$286.6
Region C	$192.9 (38.5)	$162.1 (32.3)	$355.0 (70.8)	$107.7 (21.5)	$38.7 (7.7)	$501.4

Source: NYS Office of the Comptroller 2010b.

Notes:
1 Taxes include real property taxes and assessments, other real property tax items, sales and use taxes, and other non-property taxes.
2 Services include charges for services, charges to other governments, use and sale of property, and other local revenues.
3 Other revenues include proceeds of debt and all other sources of revenue.
4 Totals may not equal sum of components due to rounding.

As shown in Table 3-90, the total local tax revenue in Region C during the fiscal year ending on December 31, 2009, was approximately $192.8 million. Of the total receipts, 53.2% was derived from taxes levied on real property, special assessments, and other real property tax items. Sales tax and distribution accounted for approximately 45.1% of the total (NYS Office of the Comptroller 2010b).

Table 3-90 Region C: Local Tax Revenue for FY Ending December 31, 2009 ($ millions)

	Real Property Taxes (% of total)	Special Assessments (% of total)	Other Real Property Tax Items[1] (% of total)	Sales Tax and Distribution (% of total)	Miscellaneous Use Taxes (% of total)	Other Non-Property Taxes[2] (% of total)	Total Tax Collection[3]
Cattaraugus County	$42.0 (53.8%)	$0 (0%)	$2.6 (3.3%)	$33.1 (42.4%)	$0 (0%)	$0.3 (0.4%)	$78.0
Chautauqua County	$54.2 (47.2%)	$0 (0%)	$3.7 (3.2%)	$53.8 (46.9%)	$1.2 (1.0%)	$1.9 (1.7%)	$114.8
Region C	$96.2 (49.9%)	$0 (0%)	$6.3 (3.3%)	$86.9 (45.1%)	$1.2 (0.6%)	$2.2 (1.1%)	$192.8

Source: NYS Office of the Comptroller 2010b.

Notes:
1 Other real property tax items include STAR payments, payments in lieu of taxes, interest penalties, gain from sale of tax acquired property, and miscellaneous tax items.
2 Other non-property taxes include franchises, emergency telephone system surcharges, city income taxes, and other miscellaneous non-property taxes.
3 Totals may not equal sum of components due to rounding.

The production value (i.e., gas economic profile), state equalization rate, and millage rate for gas-producing properties in Region C are shown in Table 3-91. Cattaraugus and Chautauqua counties are both split between Medina Region 2 and Medina Region 3, natural-gas-producing regions designated by New York State. The final gas unit of production value for Medina Region 2 and Medina Region 3

was $11.19 in 2010; the 2011 tentative gas unit of production value is $11.32 (NYSDTF 2011a). The 2010 overall full-value millage rates for Cattaraugus and Chautauqua counties were 35.50 and 32.10, respectively. These rates have already been equalized and include the rates of all taxing districts in the county, including county, town, village, school district, and other special district rates (NYSDTF 2010b).

Table 3-91 Region C: Gas Economic Profile for Medina Region 2 and State Equalization and Millage Rates (2010)

	Final Gas Unit of Production Value[a]	State Equalization Rate[b]	Millage Rate[c]
Cattaraugus County	$11.19	79.22	35.50
Chautauqua County	$11.19	86.05	32.10

Source:
[a] NYSDTF 2011a.
[b] NYSDTF 2010b.
[c] NYS Office of the Comptroller 2010c. Millage rates represent the "overall full-value tax rate" and include the rates of all taxing districts in the county, including county, town, village, school district, and special districts rates.

Table 3-92 presents local government expenditures for Region C during the FY ending December 31, 2009. Social services combined to create the largest single expenditure in both Cattaraugus and Chautauqua counties, and thus in Region C. Approximately 30% of the counties' collective operating and capital budgets were spent on social services during the FY ending December 31, 2009. Expenditure categories within social services include social service administration, financial assistance, Medicaid, non-Medicaid medical assistance, housing assistance, employment services, youth services, public facilities, and miscellaneous social services. Other major expenditures in Region C included general government (19.7%), employee benefits (13.4%), and transportation (10.2%). Public safety accounted for approximately 7.2% of total expenditures in Region C, including $12,866,430 for police, $260,959 for fire protection, and $100,667 for emergency response (NYS Office of the Comptroller 2010b).

Table 3-92 Region C: Expenditures for FY Ending December 31, 2009 ($ millions)

	Cattaraugus County		Chautauqua County		Region C	
	Total $	% of Total	Total $	% of Total	Total $	% of Total
General Government	$38.55	20.2	$51.75	19.4	$90.30	19.7
Education	$6.78	3.5	$10.12	3.8	$16.90	3.7
Public Safety	$13.35	7.0	$19.81	7.4	$33.15	7.2
Health	$23.23	12.2	$14.16	5.3	$37.40	8.2
Transportation	$20.35	10.7	$26.49	9.9	$46.84	10.2
Social Services	$49.83	26.1	$87.55	32.8	$137.38	30.0
Economic Development	$1.28	0.7	$3.40	1.3	$4.67	1.0
Culture and Recreation	$1.49	0.8	$0.69	0.3	$2.18	0.5
Community Services	$2.88	1.5	$3.75	1.4	$6.63	1.4

Table 3-92 Region C: Expenditures for FY Ending December 31, 2009 ($ millions)

	Cattaraugus County		Chautauqua County		Region C	
	Total $	% of Total	Total $	% of Total	Total $	% of Total
Utilities	$0.00	0.0	$0.02	<0.1	$0.02	<0.1
Sanitation	$2.00	1.0	$7.29	2.7	$9.29	2.0
Employee Benefits	$23.12	12.1	$38.27	14.4	$61.39	13.4
Debt Service	$8.14	4.3	$3.37	1.3	$11.51	2.5
Total Expenditures	**$191.00**	**100.0**	**$266.67**	**100.0**	**$457.68**	**100.0**

Source: NYS Office of the Comptroller 2010b

4 Socioeconomic Impacts

Section 4.1 provides a description of the assumptions used to evaluate the potential socioeconomic impacts. The remainder of Section 4 provides the results of the analysis of the potential impacts on the economy, employment, and income (Section 4.2), population (Section 4.3), housing (Section 4.4), and government revenues and expenditures (Section 4.5) based on the assumptions described in Section 4.1.

4.1 Assumptions

The following is a brief description of the assumptions used to evaluate the potential socioeconomic impacts that may occur with the development and production of natural gas resources from high-volume hydraulic-fracturing of the Marcellus Shale and other low-permeability gas reservoirs in New York State under NYSDEC's regulatory program. This description focuses on three key components of the analysis: the study area, the development scenarios, and the production projections.

4.1.1 Study Area

As discussed in Section 1, socioeconomic impacts will be evaluated at the state, regional and local levels. Given the number of regional and local jurisdictions that could be impacted by development of the Marcellus Shale and other low-permeability gas reservoirs, three representative regions were selected for this analysis. Selection of these three regions is intended to provide a range of potential impacts at the local and regional level. The three representative regions and the respective counties within the region are:

- Region A: Broome County, Chemung County, and Tioga County;
- Region B: Delaware County, Otsego County, and Sullivan County; and
- Region C: Cattaraugus County and Chautauqua County.

The basis for the selection of these regions is described in Section 1. Section 3 provides the existing socioeconomic conditions for these three regions as a basis of comparison for the projected impacts.

4.1.2 Development Scenarios

New York State

Due to the uncertainties associated with future development of natural gas reserves in low-permeability shale as described in Section 2, three possible development scenarios were assessed – low, average and high rates of development. Each development scenario is defined by the number of vertical and horizontal wells drilled annually. These development scenarios are shown on Table 4-1.

Table 4-1 Major Development Scenarios

	Scenarios		
	Low	Average	High
Total Wells Constructed (Year 1 to Year 30)			
Horizontal	9,461	37,842	56,508
Vertical	1,071	4,284	6,273
Total	**10,532**	**42,126**	**62,781**
Maximum Number of New Wells Developed per Year (Year 10 to Year 30)			
Horizontal	371	1,484	2,216
Vertical	42	168	246
Total	**413**	**1,652**	**2,462**

All development scenarios assume a consistent timeline for development and production. Development is projected to occur for a period of 30 years, starting with a 10-year "ramp-up" period, and followed by a 20-year sustained maximum development period. As shown on Figure 4-1, the ramp-up period for each scenario has a gradual increase in the number of wells developed annually between Years 1 and 10. At Year 10, the maximum number of wells developed annually under each scenario is reached, and that maximum number of wells developed annually is sustained through Year 30. In actuality, well development would more likely gradually ramp up, reach a peak, and then gradually ramp down as fewer and fewer wells were completed. This assumption, which does not significantly impact affect the socioeconomic impact analysis, was used to remain consistent with other resource areas of the SGEIS.

Figure 4-1 shows the annual number of total new wells constructed for Year 1 to Year 30. As shown, at Year 10, the maximum number of wells developed annually is reached under each development scenario. The maximum number of wells developed annually is also shown on Table 4-1 for each scenario. Figure 4-2 shows the cumulative number of wells that will have been developed in 5-year increments from Year 1 to Year 30 under each development scenario.

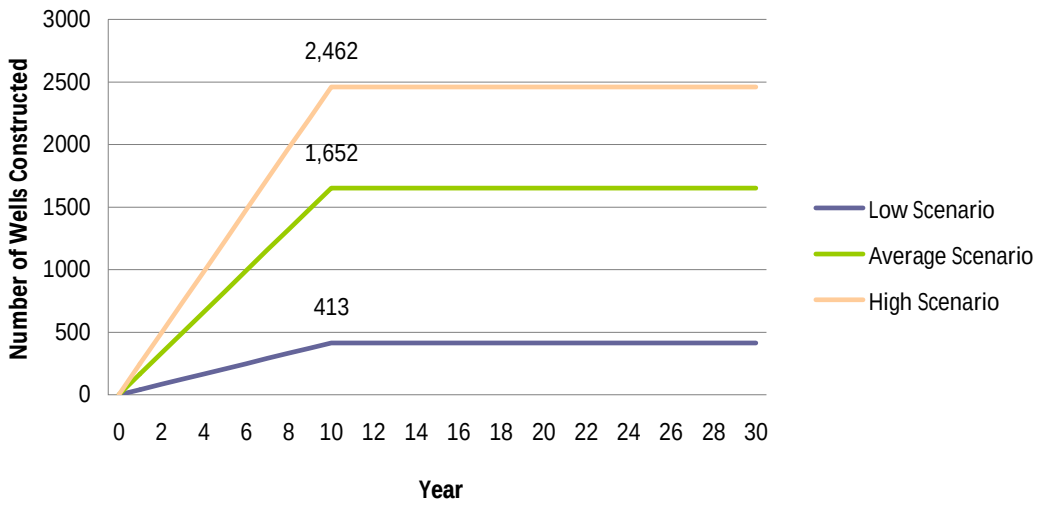


Figure 4-1 Annual Number of Wells Completed in New York State Under Each Development Scenario

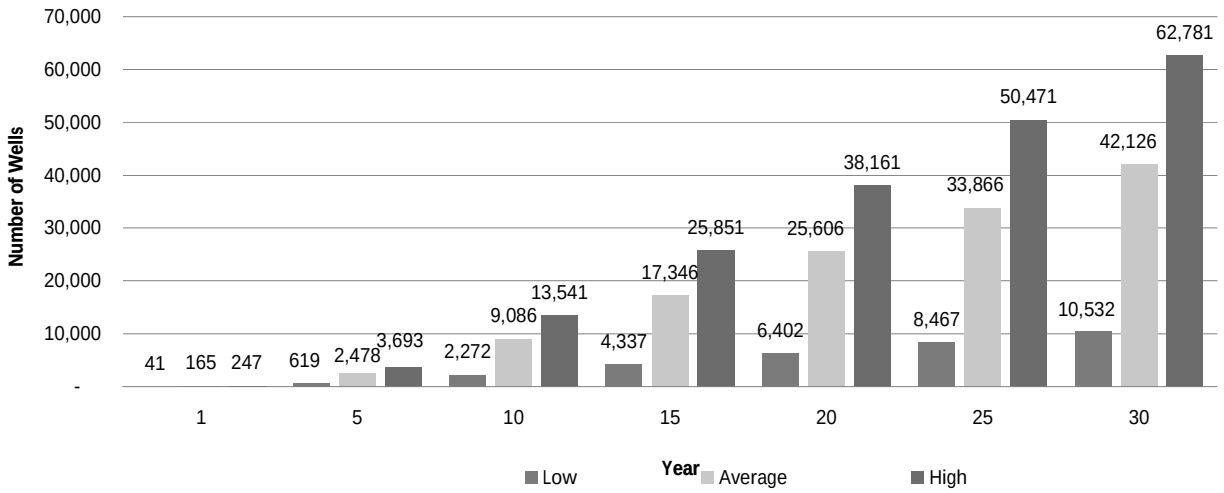


Figure 4-2 Cumulative Number of Wells Drilled Under Each Development Scenario

These three development scenarios were provided by NYSDEC based on information the Department had requested of the Independent Oil & Gas Association of New York (IOGA-NY). IOGA-NY started with an estimated average rate of development, based on the following assumptions:

- Approximately 67% of the area covered by the Marcellus and Utica shales is developable;
- Approximately 90% of wells would be horizontal wells with an average of 160 acres per well;
- Approximately 10% of wells would be vertical wells with an average of 40 acres per well.

For a high rate of development, IOGA assumed that the average rate of development would be exceeded by a factor of 1.5. NYSDEC assumed a low rate of development, considering the potential effect on natural gas development of a decline in the price of natural gas and/or additional time needed for NYSDEC to review and issue permits. For the low rate of development, NYSDEC assumed a rate of 25% of IOGA's estimated average rate of development. The total number of wells developed over the 30 years of development, and the maximum number of wells developed from Year 10 through Year 30 are shown on Table 4-1 for each development scenario.

As shown on Table 4-1, the maximum number of new wells developed in a year (Year 10 to Year 30) under the low development scenario is 371 horizontal and 42 vertical wells. Likewise, the maximum number of new wells developed in a year under the average development scenario is 1,484 horizontal and 168 vertical wells and under the high development scenario it is 2,216 horizontal and 246 vertical wells. Under the low development scenario, a total of 9,461 horizontal wells and 1,071 vertical wells are assumed to be constructed at maximum build-out (i.e., Year 30). Under the average development scenario a total 37,842 horizontal wells and 4,284 vertical wells are assumed to be constructed at maximum build-out (i.e., Year 30). Finally, under the high development scenario a total of 56,508 horizontal and 6,273 vertical wells are assumed to be constructed at maximum build-out (i.e., Year 30).

These development scenarios are designed to provide order-of-magnitude estimates for the following socioeconomic analysis and are in no way meant to forecast actual well development levels in the Marcellus Shale or Utica Shale reserves in New York State. The high development scenario should be viewed as the upper boundary of possible development, while the low development scenario should be viewed as the likely lower boundary of possible development. These scenarios should be viewed as a "best-estimate" of the range of possible amounts of development that could occur in New York State.

In addition, it is unlikely that new well construction would occur under a steady, constant rate. Economic factors such as the price of natural gas, input costs, the price of other energy sources, changes in technology, and the general economic conditions of the state and nation would all affect the yearly rate of well construction and the overall level of development of the gas reserves. The actual track of well construction would likely be much more cyclical in nature than as described in the following sections.

Regional

The following tables and graphs apply the development scenarios described above to each of the three representative regions.

For the purposes of this analysis, new well construction was apportioned to the three regions as follows:

- **Region A**: 50% of all new well construction would occur in Region A (Broome, Chemung, and Tioga counties);

- **Region B:** 23% of all new well construction would occur in Region B (Delaware, Otsego, and Sullivan counties);

- **Region C**: 5% of all new well construction would occur in Region C (Cattaraugus and Chautauqua counties); and

- **Remainder of the State:** 22% of new well construction would occur in other locations throughout the area covered by the Marcellus Shale and other low-permeability formations in New York State.

These proportions were derived from an evaluation of the drilling potential for natural gas for the two most prominent shale formations in New York State, the Utica Shale and the Marcellus Formation (Marcellus Shale). The assumptions in this evaluation focused on the location of the "fairway" for each of these formations, as well as other factors discussed below.

- **Region A:** Broome, Chemung, and Tioga counties are in the western and central portions of the Utica Shale fairway and Marcellus Shale fairway, which are the portions of the formation with the most potential to produce gas. Thus, wells in these counties are expected to yield some of the highest production of shale gas. Due to their proximity to active gas drilling in neighboring counties in Pennsylvania, associated infrastructure (e.g., natural gas transmission pipelines) is extant, and Region A is likely to be developed before any of the other regions, and may contain 50% or greater of the wells to be drilled.

- **Region B:** Delaware, Otsego, and Sullivan counties are in the east-central portion of the Utica Shale fairway and Marcellus Shale fairway. Due to the restriction on development in the New York City watershed which covers most of Delaware County and part of Sullivan County, drilling in these areas will be much less than in Region A. In addition, Delaware and Sullivan counties are within the Delaware River Basin, so natural gas development will not occur in these areas until the Delaware River Basin Commission finalizes water use/withdrawal regulations. Therefore, the total for this region is estimated to be 23% of the new well construction.

- **Region C:** Although Chautauqua and Cattaraugus counties are within the footprint of both the Utica and Marcellus shales, they are outside of the fairways for both the Utica and Marcellus, thus horizontal wells in this region are not expected to yield enough gas to be economically feasible. However, if the price of gas increases or drilling technology advances, gas production in the Utica or other formations in this region may became more feasible. Therefore, only 5% of the new well construction is assumed to occur in Region C.

However, for purposes of this analysis, each of these regions is assumed to develop at the same rate of development – the low, average and high rate of development scenarios discussed above. This analysis does not otherwise consider that some regions may be developed faster than others, either because of the availability of natural gas transmission lines, labor, proximity to markets, or other factors.

Table 4-2 provides the low, average and high development scenarios for each representative region. In all cases, total development is assumed to be reached at Year 30. The analysis of Region A is designed to show the upper bound of potential regional economic impacts. Under the low development scenario, a total of 5,281 new wells would be constructed in Region A, and under the high development scenario, a total of 31,395 new wells would be constructed in this region.

The projected maximum number of new wells developed per year in Region A would range from 207 to 1,231 wells, depending on the development scenario. The projected maximum number of new wells developed per year in Region B would range from 95 to 567 wells, depending on the development scenario (see Table 4-2).

In contrast, Region C is assumed to experience a much smaller level of well development than either Region A or Region B. The analysis of Region C is designed to show the lower bound of potential regional economic impacts. Under the low development scenario, a total of 534 new wells would be constructed in Region C, and under the high development scenario, a total of 3,137 new wells would be constructed in this region. The maximum number of new wells constructed each year in Region C is assumed to be 21 wells under the low development scenario and 123 wells under the high development scenario (see Table 4-2).

Table 4-2 Major Development Scenario Assumptions for Each Representative Region

	Scenarios		
	Low	Average	High
Region A			
Total Wells Constructed (Year 1 to Year 30)			
Horizontal	4,743	18,923	28,256
Vertical	538	2,144	3,139
Total	**5,281**	**21,067**	**31,395**
Maximum Number of New Wells Developed per Year (Year 10 to Year 30)			
Horizontal	186	742	1,108
Vertical	21	84	123
Total	**207**	**826**	**1,231**
Region B			
Total Wells Constructed (Year 1 to Year 30)			
Horizontal	2,170	8,697	13,005
Vertical	255	993	1,452
Total	**2,425**	**9,690**	**14,457**

Table 4-2 Major Development Scenario Assumptions for Each Representative Region

	Scenarios		
	Low	Average	High
Maximum Number of New Wells Developed per Year			
Horizontal	85	341	510
Vertical	10	39	57
Total	**95**	**380**	**567**
Region C			
Total Wells Constructed (Year 1 to Year 30)			
Horizontal	483	1,888	2,830
Vertical	51	207	307
Total	**534**	**2,095**	**3,137**
Maximum Number of New Wells Developed per Year			
Horizontal	19	74	111
Vertical	2	8	12
Total	**21**	**82**	**123**
Remainder of the State			
Total Wells Constructed (Year 1 to Year 30)			
Horizontal	2,065	8,334	12,417
Vertical	227	940	1,375
Total	**2,292**	**9,274**	**13,792**
Maximum Number of New Wells Developed per Year			
Horizontal	81	327	487
Vertical	9	37	54
Total	**90**	**364**	**541**

Figures 4-3 to 4-8 show the annual number of wells drilled each year and the cumulative number of wells constructed in five-year increments for each region. As shown on the figures, well construction is assumed to be complete by Year 30.

Each newly constructed well is assumed to have an average productive life of 30 years. For example, wells constructed in Year 1 are assumed to still be operating in Year 30, and wells constructed in Year 10 are assumed to operate until Year 40. Because of the assumption of a 30-year development period, wells constructed in Year 30 are assumed to operate until Year 60. Assuming a 30-year development period and a 30-year production life for each well, the number of operating wells in New York State would be expected to grow until Year 30, at which point, the number of operating wells would peak. After Year 30, with no new wells being constructed, the number of operating wells would begin to decline. Because the number of annual wells approved and developed each year is different for each of the development scenarios, the peak number of operating wells at Year 30 also differs for each scenario.

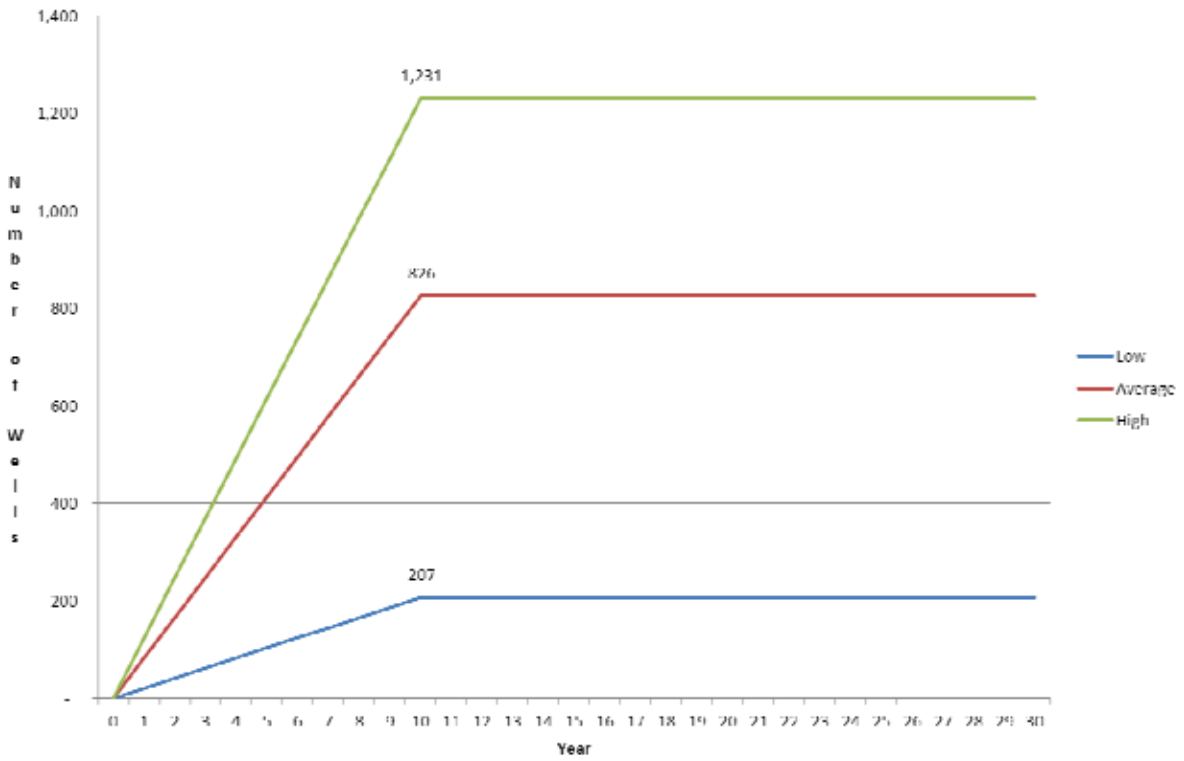


Figure 4-3 Annual Number of New Wells Constructed in Region A Under Each Development Scenario

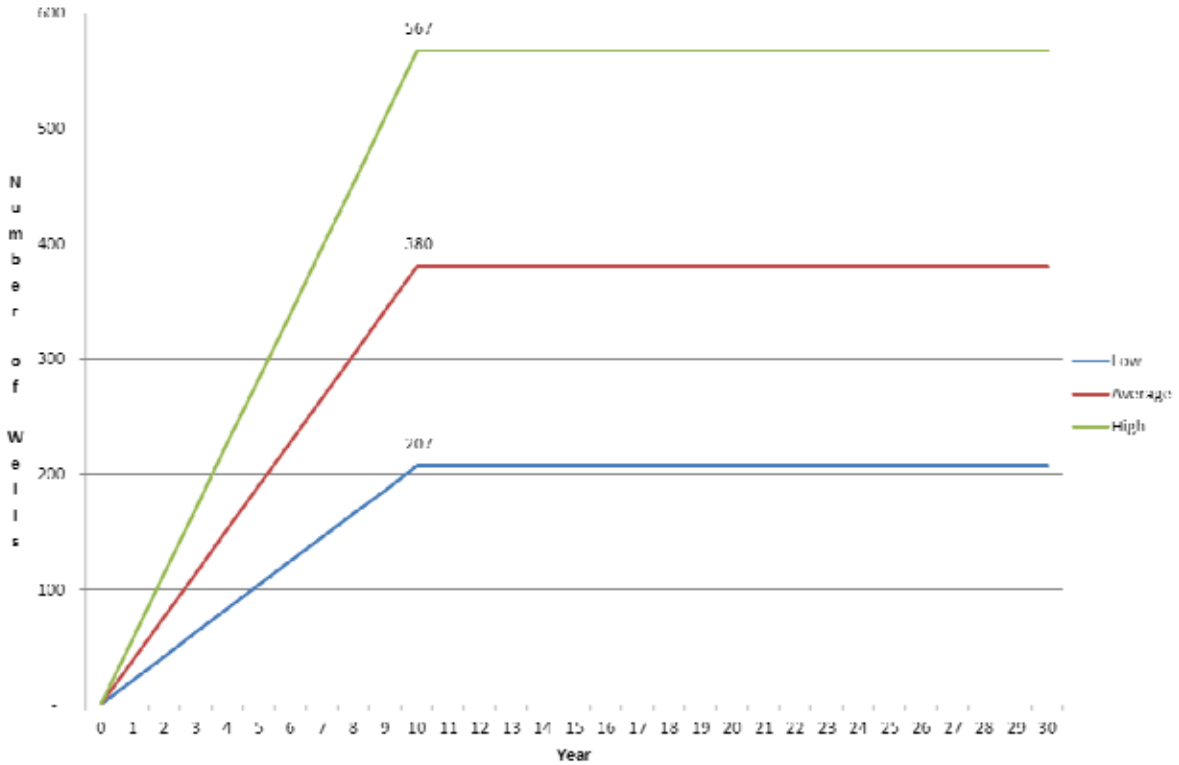


Figure 4-4 Annual Number of New Wells Constructed in Region B Under Each Development Scenario

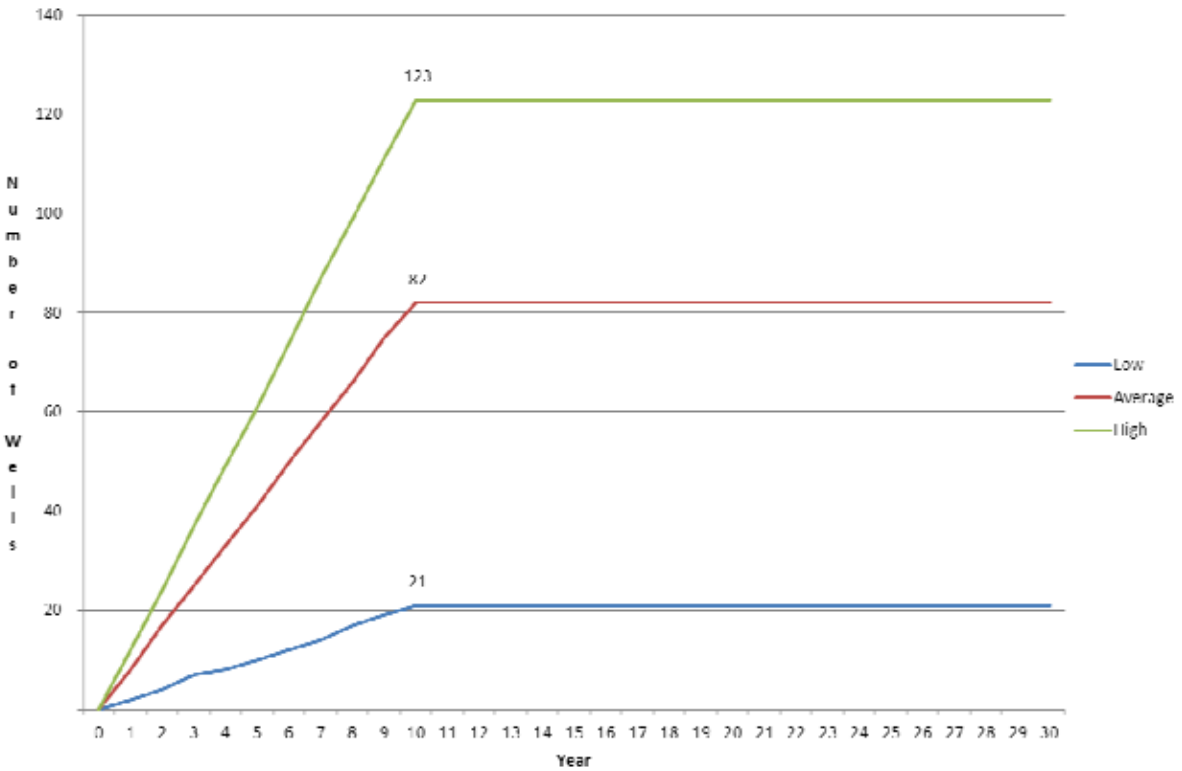


Figure 4-5 Annual Number of New Wells Constructed in Region C Under Each Development Scenario

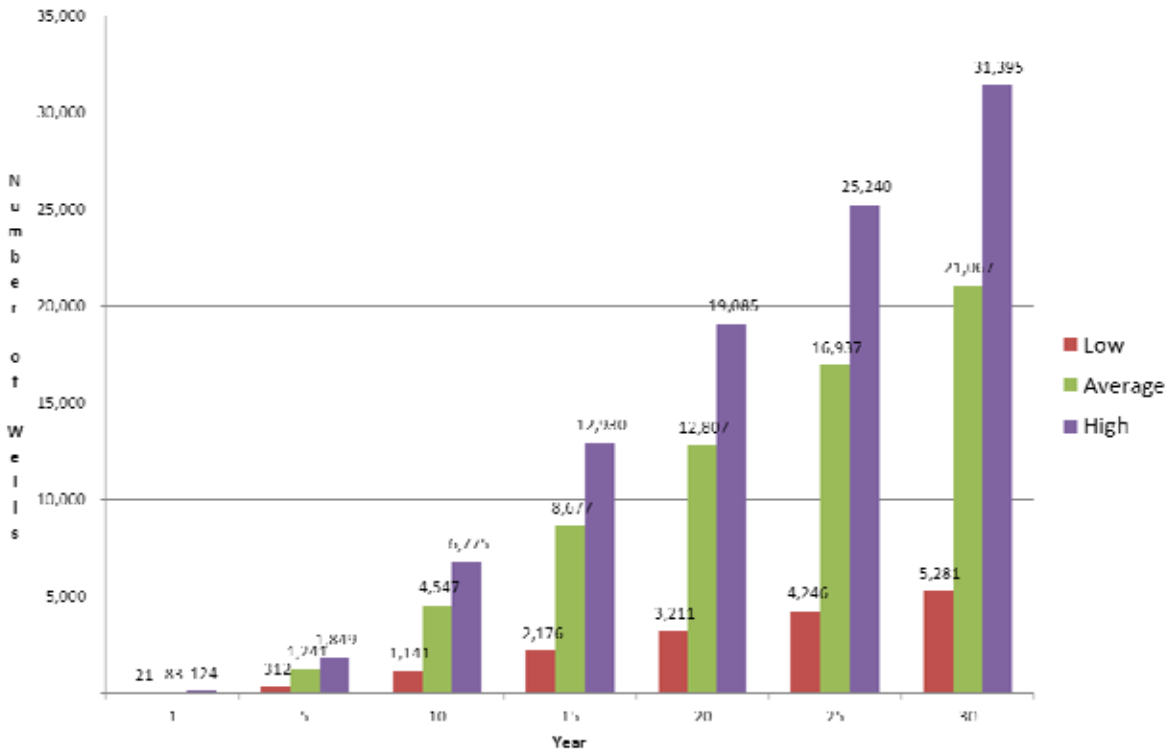


Figure 4-6 Cumulative Number of Wells Drilled in Region A Under Each Development Scenario

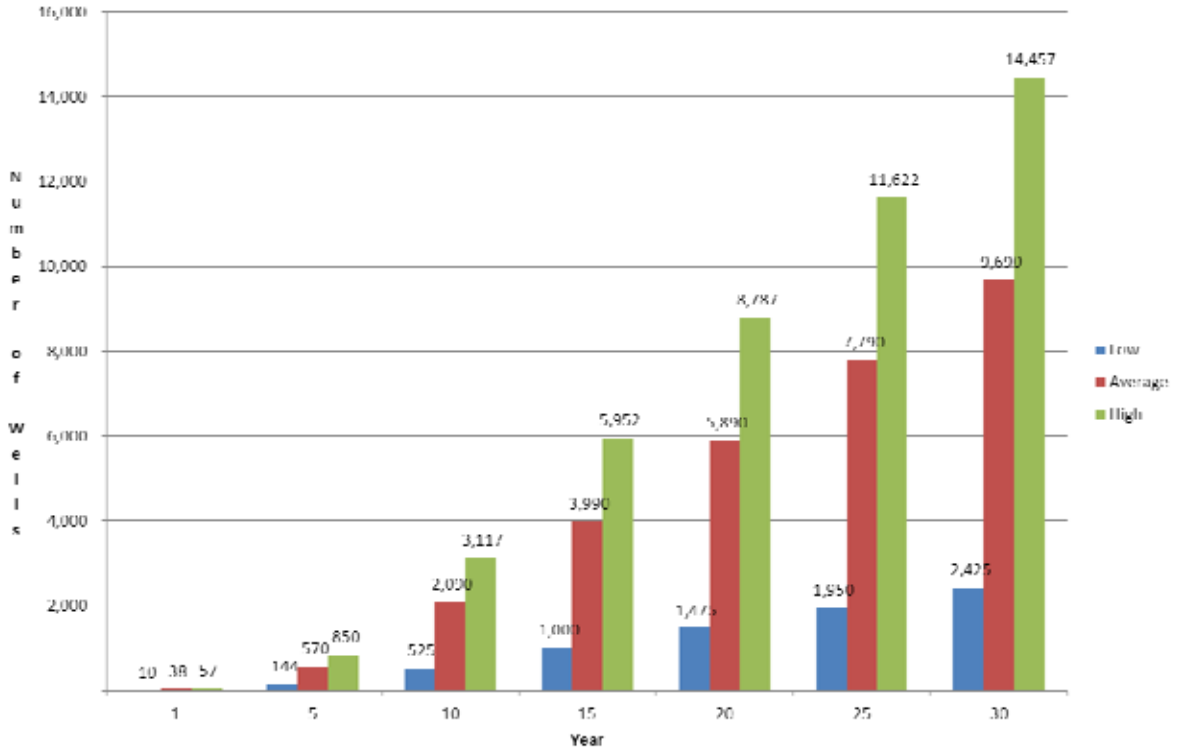


Figure 4-7 Cumulative Number of Wells Drilled in Region B Under Each Development Scenario

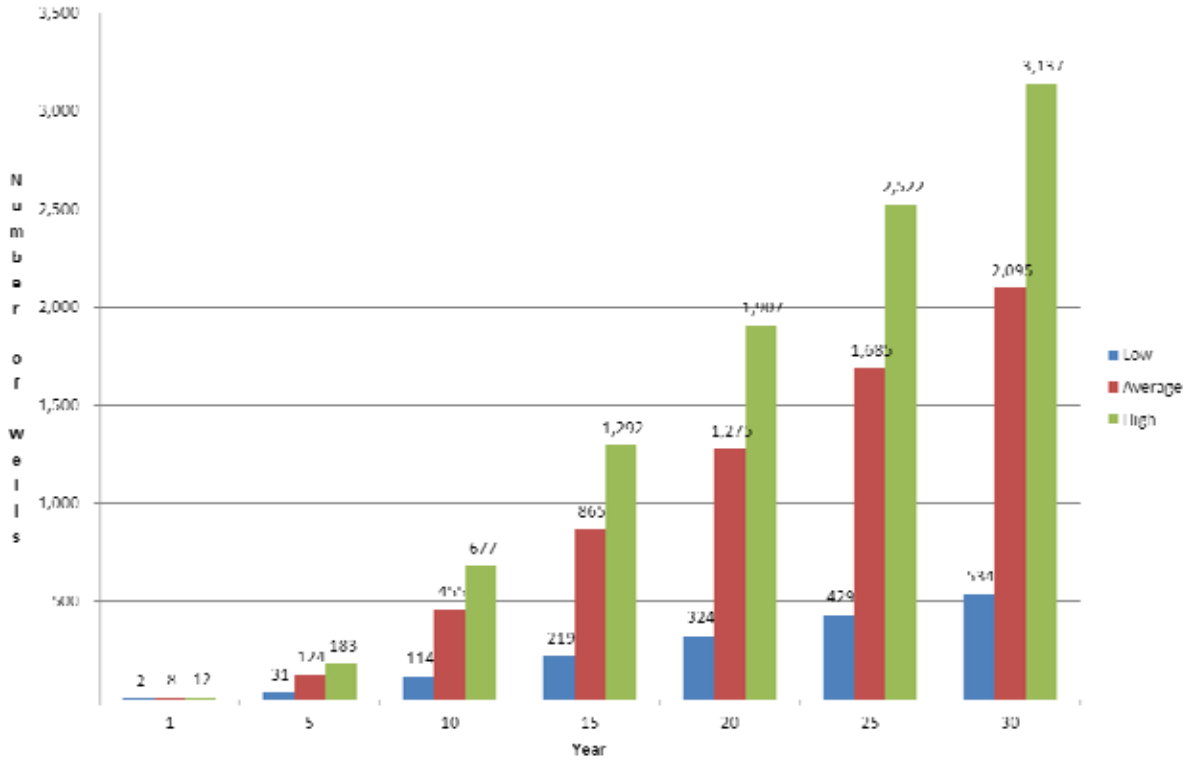


Figure 4-8 Cumulative Number of Wells Drilled in Region C Under Each Development Scenario

Under all three scenarios, natural gas production in New York State would occur from Year 1 until Year 60, with Year 30 having the maximum number of wells in production. After Year 30, producing wells would gradually decline until Year 60, at which time it is assumed that production stops. Figure 4-9 shows the total number of wells in production each year under each development scenario.

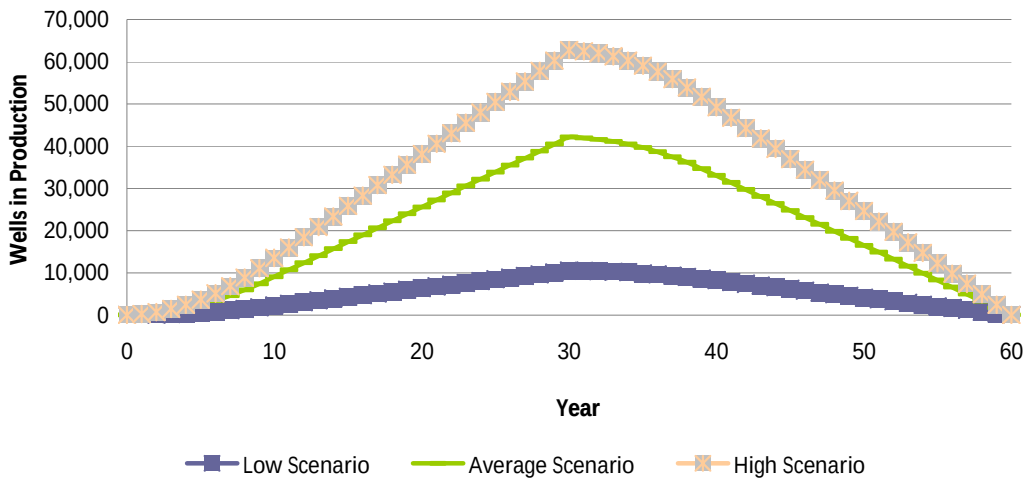


Figure 4-9 Total Number of Wells in Production

4.1.3 Production Projections

The total volume of natural gas produced from each high-volume hydraulic-fracturing horizontal well was derived using long-term estimates of individual well production provided by IOGA-NY to NYSDEC. IOGA-NY provided a high and a low estimate.

High Estimate

- Year 1: initial production rate of 8.72 million cubic feet per day, declining to 3.49 million cubic feet per day.
- Years 2 to 4: initial production rate of 3.49 million cubic feet per day, declining to 1.25 million cubic feet per day.
- Years 5 to 10: initial production rate of 1.25 million cubic feet per day, declining to 0.55 million cubic feet per day.
- Years 11 and after: initial production rate of 0.55 million cubic feet per day, declining at 5% per annum.

Low Estimate

- Year 1: initial production rate of 3.26 million cubic feet per day, declining to 1.14 million cubic feet per day.
- Years 2 to 4: initial production rate of 1.14 million cubic feet per day, declining to 0.49 million cubic feet per day.
- Years 5 to 10: initial production rate of 0.49 million cubic feet per day, declining to 0.29 million cubic feet per day.
- Years 11 and after: initial production rate of 0.29 million cubic feet per day, declining at 5% per annum.

The lower of the two production estimates for horizontal wells was utilized throughout this report. Since the estimates provided by IOGA-NY do not include values for production in Years 3, 4, 6, 7, 8, and 9 of a well's operation, these values were extrapolated using the provided data. The resulting annual production profile for high-volume hydraulic-fracturing horizontal wells is shown on Figure 4-10.

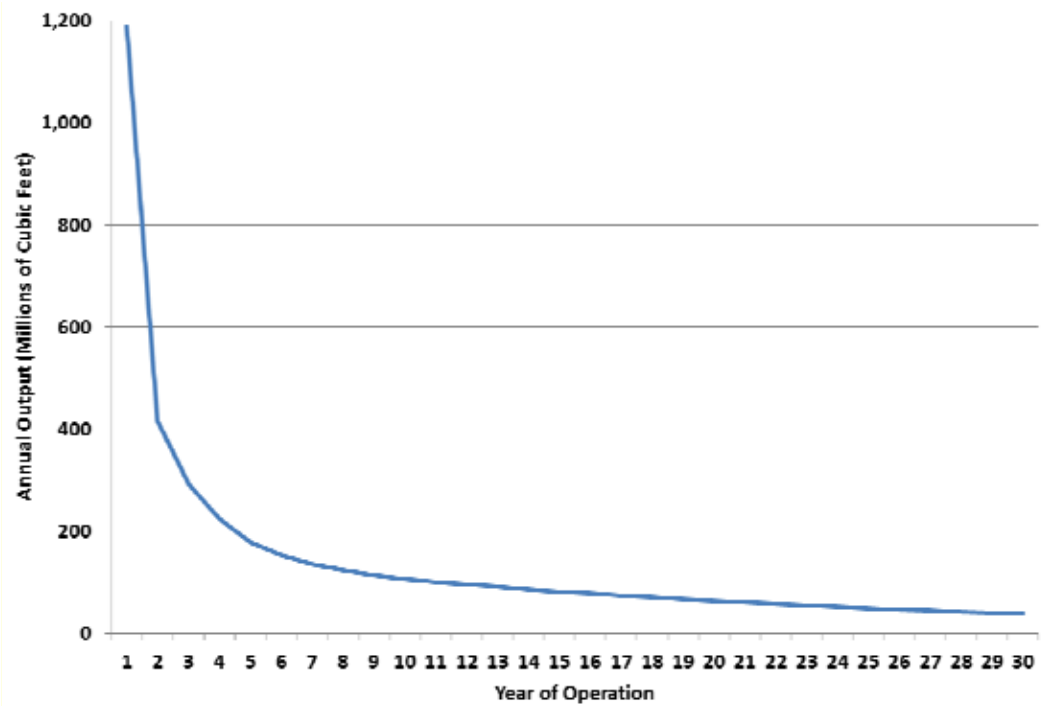


Figure 4-10 Production Profile Based on IOGANY's "Low Estimate"

In estimating production of a typical vertical high-volume hydraulic fracturing wells, it was initially assumed that each well would produce at the same average level of production as existing wells (in 2009) in the region. However, the average annual production for existing wells For Region A, this amount was approximately 317.9 million cubic feet per year. This figure was deemed to be too opti-

mistic, so a figure of 90 million cubic feet per year was used instead for Region A's production. The 90 million cubic feet per year corresponds to production levels of vertical wells currently operating in the Marcellus formation in Pennsylvania. Region B currently has no producing natural gas wells, and its Marcellus Shale and Utica Shale formations are similar to those found in Region A. Therefore, a production level of 90 million cubic feet per year was also used for Region B. In contrast, due to the geological characteristics of Region C, production of high-volume hydraulic fracturing vertical wells are not anticipated to have the same level of production as in Region A or Region B. High-volume, hydraulic fracturing vertical wells in Region C are anticipated to have production levels similar to other vertical wells currently operating in the region. Therefore, in Region C it is assumed that each well would produce at the same average level of production as existing wells (in 2009) in the region.

Based on the projected levels of natural gas production, an average production value per well was applied to the number of new horizontal and vertical high-volume hydraulic-fracturing wells constructed each year under the low, average, and high development scenarios.

The resulting production estimates for Regions A, B, and C are shown in Tables 4-3 to 4-5. Since the last well is assumed to be drilled in the beginning of Year 30 and produce for 30 years (including Year 30), there is no production in Year 60.

Table 4-3 Projected Natural Gas Production in Region A

Year	Development Scenario		
	Low	Average	High
	(millions of cubic feet)		
1	15,437	60,232	90,303
2	36,978	148,187	220,986
3	64,140	255,504	381,386
4	94,602	378,442	564,422
5	128,902	514,321	767,494
6	166,259	661,667	987,782
7	205,541	820,135	1,223,637
8	247,763	987,666	1,473,906
9	291,580	1,164,034	1,736,675
10	338,066	1,348,693	2,012,443
11	371,307	1,481,144	2,210,068
12	399,683	1,594,261	2,378,798
13	424,900	1,694,814	2,528,753
14	447,930	1,786,666	2,665,708
15	469,357	1,872,136	2,793,129
16	489,506	1,952,516	2,912,947
17	508,578	2,028,600	3,026,348
18	526,709	2,100,936	3,134,151
19	544,004	2,169,942	3,236,982
20	560,530	2,235,877	3,335,224

Table 4-3 Projected Natural Gas Production in Region A

Year	Development Scenario		
	Low	Average	High
	(millions of cubic feet)		
21	576,323	2,298,892	3,429,108
22	591,422	2,359,135	3,518,851
23	605,860	2,416,743	3,604,660
24	619,670	2,471,849	3,686,733
25	632,885	2,524,578	3,765,255
26	645,533	2,575,049	3,840,405
27	657,643	2,623,373	3,912,350
28	669,243	2,669,660	3,981,252
29	680,357	2,714,010	4,047,263
30	691,009	2,756,521	4,110,526
31	549,128	2,190,487	3,265,314
32	489,556	1,952,689	2,910,274
33	446,580	1,781,516	2,654,700
34	413,031	1,647,786	2,455,185
35	385,002	1,536,136	2,288,529
36	359,919	1,436,210	2,139,491
37	336,571	1,343,094	2,000,652
38	314,313	1,254,385	1,868,283
39	292,860	1,168,719	1,740,602
40	271,774	1,084,581	1,615,183
41	251,648	1,004,273	1,495,480
42	232,434	927,602	1,381,210
43	214,086	854,387	1,272,099
44	196,561	784,454	1,167,890
45	179,817	717,640	1,068,339
46	163,817	653,789	973,211
47	148,521	592,752	882,287
48	133,896	534,389	795,355
49	119,908	478,567	712,216
50	106,525	425,157	632,680
51	93,716	374,040	556,568
52	81,454	325,101	483,708
53	69,709	278,231	413,938
54	58,458	233,326	347,102
55	47,675	190,288	283,055
56	37,336	149,025	221,656
57	27,420	109,446	162,774
58	17,905	71,469	106,283
59	8,771	35,012	52,063
60	0	0	0

Table 4-4 Projected Natural Gas Production in Region B

Year	Development Scenario		
	Low	Average	High
	(millions of cubic feet)		
1	7,317	27,662	41,493
2	17,107	67,722	101,493
3	29,759	116,913	175,190
4	43,606	174,027	259,700
5	59,542	236,692	353,123
6	76,197	304,535	454,455
7	94,640	377,101	562,957
8	113,586	454,037	677,977
9	134,149	535,050	799,145
10	155,084	619,917	926,115
11	170,218	680,804	1,017,133
12	183,165	732,812	1,094,844
13	194,686	779,049	1,163,910
14	205,220	821,291	1,226,990
15	215,028	860,601	1,285,681
16	224,256	897,573	1,340,872
17	232,994	932,572	1,393,108
18	241,304	965,847	1,442,767
19	249,233	997,593	1,490,137
20	256,811	1,027,927	1,535,395
21	264,055	1,056,920	1,578,647
22	270,982	1,084,639	1,619,993
23	277,607	1,111,148	1,659,527
24	283,946	1,136,506	1,697,342
25	290,014	1,160,772	1,733,522
26	295,823	1,184,000	1,768,150
27	301,386	1,206,242	1,801,303
28	306,716	1,227,548	1,833,055
29	311,825	1,247,964	1,863,476
30	316,723	1,267,535	1,892,632
31	251,860	1,007,414	1,503,594
32	224,613	898,128	1,340,227
33	204,972	819,431	1,222,603
34	189,641	758,008	1,130,726
35	176,814	706,705	1,054,065
36	165,350	660,803	985,475
37	154,644	618,019	921,538
38	144,454	577,232	860,671
39	134,596	537,855	801,906
40	124,924	499,153	744,143
41	115,690	462,210	689,010
42	106,873	426,939	636,378

Table 4-4 Projected Natural Gas Production in Region B

Year	Development Scenario		
	Low	Average	High
	(millions of cubic feet)		
43	98,452	393,256	586,121
44	90,407	361,081	538,121
45	82,719	330,340	492,263
46	75,370	300,960	448,443
47	68,344	272,874	406,556
48	61,625	246,017	366,508
49	55,196	220,327	328,206
50	49,044	195,746	291,562
51	43,154	172,218	256,493
52	37,514	149,691	222,922
53	32,111	128,116	190,773
54	26,932	107,443	159,975
55	21,968	87,629	130,460
56	17,207	68,630	102,164
57	12,640	50,405	75,027
58	8,255	32,916	48,990
59	4,045	16,126	23,999
60	0	0	0

Table 4-5 Projected Natural Gas Production in Region C

Year	Development Scenario		
	Low	Average	High
	(millions of cubic feet)		
1	1,606	5,623	8,835
2	3,920	14,530	21,567
3	6,752	24,795	37,141
4	9,184	37,178	54,932
5	12,397	50,218	74,551
6	15,995	64,944	96,564
7	19,909	80,054	119,563
8	24,099	95,854	143,776
9	28,531	113,139	169,145
10	33,183	130,639	195,615
11	36,436	143,069	214,309
12	39,177	153,587	230,118
13	41,585	162,860	244,052
14	43,764	171,272	256,686
15	45,775	179,050	268,366
16	47,654	186,323	279,287
17	49,421	193,168	289,565
18	51,092	199,640	299,282

Table 4-5 Projected Natural Gas Production in Region C

Year	Development Scenario		
	Low	Average	High
	(millions of cubic feet)		
19	52,676	205,781	308,502
20	54,182	211,615	317,261
21	55,613	217,158	325,584
22	56,972	222,426	333,492
23	58,264	227,430	341,006
24	59,491	232,185	348,146
25	60,657	236,704	354,929
26	61,765	240,997	361,375
27	62,817	245,076	367,500
28	63,818	248,953	373,320
29	64,768	252,636	378,850
30	65,671	256,136	384,104
31	51,198	199,775	299,551
32	45,146	176,200	264,213
33	40,812	159,353	238,948
34	37,489	146,299	219,405
35	34,746	135,531	203,273
36	32,318	125,989	188,980
37	30,080	117,214	175,818
38	27,967	108,963	163,423
39	25,948	101,071	151,606
40	23,983	93,417	140,125
41	22,116	86,145	129,218
42	20,342	79,236	118,854
43	18,657	72,672	109,008
44	17,056	66,435	99,652
45	15,534	60,509	90,763
46	14,089	54,878	82,318
47	12,715	49,529	74,293
48	11,410	44,446	66,668
49	10,170	39,616	59,424
50	8,992	35,027	52,540
51	7,873	30,666	45,999
52	6,809	26,523	39,784
53	5,798	22,586	33,879
54	4,838	18,845	28,268
55	3,925	15,290	22,935
56	3,058	11,913	17,869
57	2,234	8,703	13,054
58	1,451	5,653	8,479
59	707	2,754	4,131
60	0	0	0

4.2 Economy, Employment, and Income

The following discusses the potential impacts on the economy, employment, and income for New York State and the local areas within each of the three regions (Regions A, B, and C).

4.2.1 New York State

4.2.1.1 Employment

High-volume hydraulic fracturing operations would likely have a significant, positive impact on the economy of New York State. Construction and operation of the new natural gas wells are expected to increase employment, earnings, and economic output throughout the state.

Data from the Marcellus Shale Education and Training Center, a workforce think tank in Pennsylvania made up of members of the Penn State Cooperative Extension and the Pennsylvania College of Technology and which receives funding from the Pennsylvania Department of Labor and Industry, was used to develop the impact estimations.

According to statistics collected and calculations made by the Marcellus Shale Education and Training Center, an average natural gas well using the high-volume hydraulic-fracturing technique requires 410 individuals working in 150 different occupations. The manpower requirements to drill a single well were calculated to be 11.53 full-time equivalent (FTE) construction workers (Marcellus Shale Education and Training Center 2009).

A full-time equivalent worker is defined as one worker working eight hours a day for 260 days a year, or several workers working a total of 2,080 hours in a year. While the Center found that up to 410 individuals are required to construct one well, only 11.53 FTE workers were needed. Typically, a high-volume hydraulic-fracturing well is constructed over a 3- to 4-month period, and many of the individuals and occupations are needed for only a very short time. Therefore, to accurately assess the economic impacts of constructing a high-volume hydraulic-fracturing well, the FTE workforce was considered.

The Center also calculated the work force requirements for operating a well to be 0.17 FTE workers, or approximately 354 person hours per year (Marcellus Shale Employment and Training Center 2009). In other words, approximately 1 FTE worker is required to operate and maintain every 6 wells in production. Unlike the construction workforce that drills the well within a few months and is finished, the production workforce is required for the productive life of the well. For the purposes of this analysis, a 30-year productive life has been assumed for each well drilled. Therefore, for every new well drilled, 0.17 FTE workers are employed for 30 years.

In an effort to quantify and estimate the expanding natural gas workforce in Pennsylvania, the Center interviewed 53 respondents from the natural gas industry to

gather information on the labor requirements of high-volume hydraulic fracturing operations. The data collected included information on the occupations and skills required; manpower requirements; and educational needs (Marcellus Shale Education and Training Center 2009).

In this study the Center's did not differentiate between the labor requirements needed to drill a horizontal well versus a vertical well. Typically, it is much more costly and labor-intensive to drill a high-volume hydraulic-fracturing horizontal well than it is to drill a high-volume hydraulic-fracturing vertical well. Therefore, in an effort to be conservative and not overstate the positive economic impacts, a factor was applied to the 11.53 FTE figure for vertical wells in the estimates used for this analysis. This factor was calculated to using the average depth of a vertical well compared to the average depth of a high-volume hydraulic-fracturing horizontal well. The resulting ratio of 0.2777 was applied to the 11.53 labor requirements to estimate the overall labor requirements of a vertical well.

Using the labor requirements described above and the three development scenarios, direct employment impacts were projected for the state and three representative regions. Indirect employment impacts were estimated using multipliers from the USBEA's Regional Input-Output Modeling System (RIMS II). Type I, direct-effect employment multipliers for the oil and gas extraction industry were used. Separate multipliers were used for each region and the state as a whole.

Each of these multipliers represents the number of new jobs (both direct and indirect) that would be generated by a new job in the oil and gas extraction industry. Since these multipliers include both the direct change and indirect change to employment, one (1) must be subtracted from the multiplier to calculate the indirect impacts by themselves.

As anticipated, the direct effect employment multiplier for the State of New York (2.1766) was substantially larger than the multipliers for the individual regions, which had direct-effect employment multipliers of 1.4977 in Region A, 1.3272 in Region B, and 1.4357 in Region C (USBEA 2011a, 2011b, 2011c, 2011d). This disparity underscores the fact that currently there is not a well-developed supply chain for oil and gas projects in the representative regions. Therefore, if drilling were to start today, many of the industry's suppliers would be located outside of the representative regions and many of the positive indirect economic impacts would accrue to other areas of the state or country. As the natural gas industry grows, more of the suppliers would locate to the representative regions and less of the indirect and induced economic impacts would leave the regions.

As shown in Table 4-6, annual direct construction employment is directly related to the number of wells drilled in a given year. At the maximum well construction rate assumed for each development scenario, total direct construction employment is predicted to range from 4,408 FTE workers under the low development scenario to 26,316 FTE workers under the high development scenario. These employment figures correspond to the annual construction of 413 horizontal and ver-

tical wells under the low development scenario and 2,462 horizontal and vertical wells under the high development scenario. In order to reach the full build-out potential used in the scenarios, it is assumed that construction employment and new well construction would remain at these levels for 20 years, starting in Year 10 (see Table 4-6).

The maximum direct production employment under each development scenario is also shown in Table 4-6. These figures represent the peak year (Year 30), when the maximum build-out potential has been reached before any of the wells have stopped producing. The preceding and the following years all would have fewer production workers. At the peak, production employment is expected to range from 1,790 FTE workers under the low development scenario to 10,673 FTE workers under the high development scenario (see Table 4-6).

Table 4-6 Maximum Direct and Indirect Employment Impacts on New York State under Each Development Scenario

Scenario	Total Employment (in number of FTE jobs)		
	Low	Average	High
Direct Employment Impacts			
Construction Employment[1]	4,408	17,634	26,316
Production Employment[2]	1,790	7,161	10,673
Indirect Employment[2,3]	7,293	29,174	43,521
Total Employment Impacts	13,491	53,969	80,510
Total Employment as a Percent of New York State 2010 Labor Force	0.1%	0.6%	0.8%

Source: USBEA 2011a; NYSDOL 2010a.

[1] These figures represent the maximum annual construction employment under each scenario and correspond to construction employment in Years 10 through 30.

[2] These figures represent the maximum annual production employment and indirect employment under each scenario. These figures correspond to production employment in Year 30.

[3] Type I direct employment multipliers for the oil and gas extraction industry from the USBEA, Regional Input-Output Modeling System (RIMS II) were used to estimate the indirect employment impacts.

Figure 4-11 illustrates the projected direct employment in New York State that would result from implementation of each development scenario over the 60-year time frame. The figure shows how construction and production employment levels are expected to vary, with peak direct employment occurring in Year 30. Table 4-7 also displays the projected construction and production workforces in New York State from Year 1 to Year 60 under each development scenario.

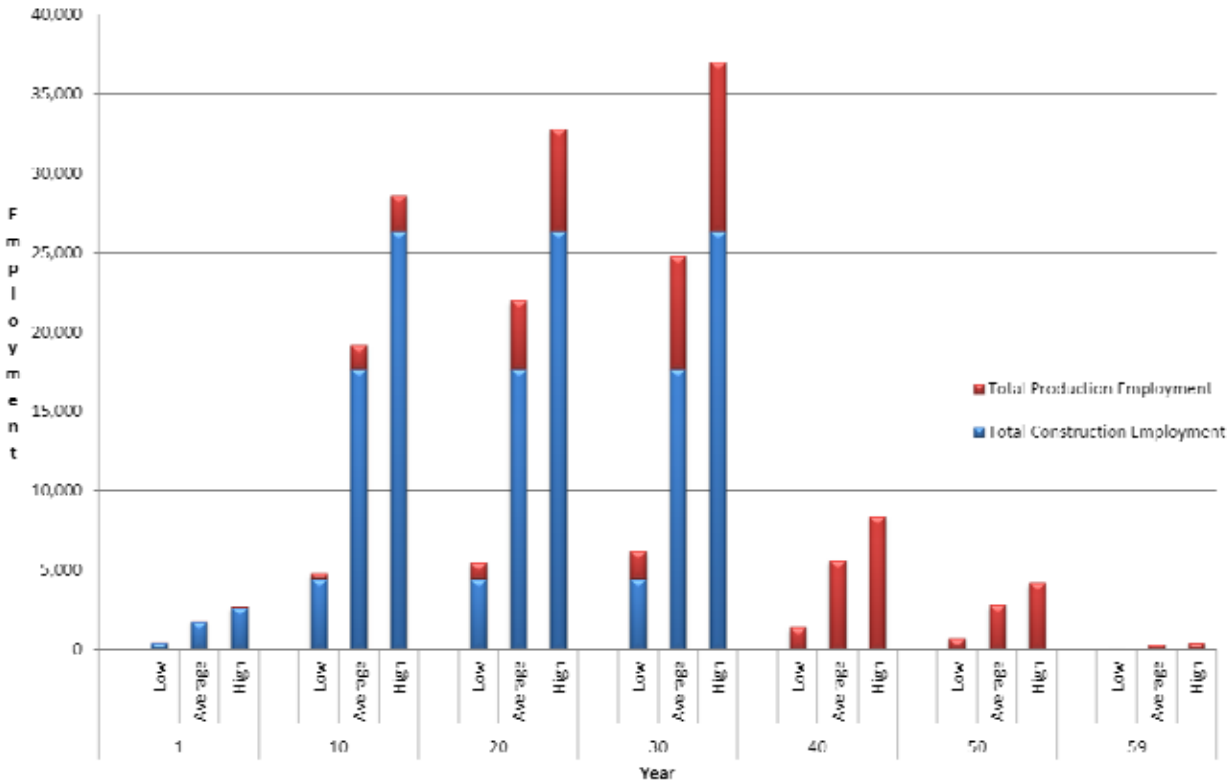


Figure 4-11 Projected Direct Employment in New York State Resulting from Each Development Scenario

Table 4-7 Total Direct Construction and Production Employment in New York State Under Each Development Scenario for Years 1 to 60

	Direct Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Productions
1	439	7	1,759	28	2,638	42
2	878	21	3,530	84	5,261	126
3	1,320	42	5,287	168	7,897	251
4	1,759	70	7,058	281	10,521	419
5	2,210	105	8,817	421	13,158	628
6	2,649	147	10,576	590	15,796	879
7	3,088	197	12,347	786	18,418	1,172
8	3,530	253	14,103	1,011	21,056	1,507
9	3,969	316	15,874	1,264	23,679	1,883
10	4,408	386	17,634	1,545	26,316	2,302
11	4,408	456	17,634	1,825	26,316	2,721
12	4,408	527	17,634	2,106	26,316	3,139
13	4,408	597	17,634	2,387	26,316	3,558
14	4,408	667	17,634	2,668	26,316	3,976
15	4,408	737	17,634	2,949	26,316	4,395
16	4,408	808	17,634	3,230	26,316	4,813

Table 4-7 Total Direct Construction and Production Employment in New York State Under Each Development Scenario for Years 1 to 60

	Direct Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Productions
17	4,408	878	17,634	3,511	26,316	5,232
18	4,408	948	17,634	3,791	26,316	5,650
19	4,408	1,018	17,634	4,072	26,316	6,069
20	4,408	1,088	17,634	4,353	26,316	6,487
21	4,408	1,159	17,634	4,634	26,316	6,906
22	4,408	1,229	17,634	4,915	26,316	7,324
23	4,408	1,299	17,634	5,196	26,316	7,743
24	4,408	1,369	17,634	5,476	26,316	8,162
25	4,408	1,439	17,634	5,757	26,316	8,580
26	4,408	1,510	17,634	6,038	26,316	8,999
27	4,408	1,580	17,634	6,319	26,316	9,417
28	4,408	1,650	17,634	6,600	26,316	9,836
29	4,408	1,720	17,634	6,881	26,316	10,254
30	4,408	1,790	17,634	7,161	26,316	10,673
31	-	1,783	-	7,133	-	10,631
32	-	1,770	-	7,077	-	10,547
33	-	1,748	-	6,993	-	10,422
34	-	1,720	-	6,881	-	10,254
35	-	1,685	-	6,740	-	10,045
36	-	1,643	-	6,572	-	9,794
37	-	1,594	-	6,375	-	9,501
38	-	1,538	-	6,150	-	9,166
39	-	1,474	-	5,898	-	8,789
40	-	1,404	-	5,617	-	8,371
41	-	1,334	-	5,336	-	7,952
42	-	1,264	-	5,055	-	7,534
43	-	1,194	-	4,774	-	7,115
44	-	1,123	-	4,493	-	6,697
45	-	1,053	-	4,213	-	6,278
46	-	983	-	3,932	-	5,860
47	-	913	-	3,651	-	5,441
48	-	843	-	3,370	-	5,022
49	-	772	-	3,089	-	4,604
50	-	702	-	2,808	-	4,185
51	-	632	-	2,528	-	3,767
52	-	562	-	2,247	-	3,348
53	-	491	-	1,966	-	2,930
54	-	421	-	1,685	-	2,511
55	-	351	-	1,404	-	2,093
56	-	281	-	1,123	-	1,674
57	-	211	-	843	-	1,256

Table 4-7 Total Direct Construction and Production Employment in New York State Under Each Development Scenario for Years 1 to 60

	Direct Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Productions
58	-	140	-	562	-	837
59	-	70	-	281	-	419
60	-	-	-	-	-	-

In addition to the direct employment impacts described above, the proposed drilling would also indirectly generate additional employment in other sectors of the economy. As the new construction and production workers spend a portion of their payroll in the local area, and as the natural gas companies purchase materials from suppliers in New York State, the overall demand for goods and services in the state would expand. Revenues at the wholesale and retail outlets and service providers within the state would increase. As these merchants respond to this increase in demand, they may, in turn, increase employment at their operations and/or purchase more goods and services from their providers. These providers may then increase employment in their establishments and/or spend a portion of their income in the state, thus "multiplying" the positive economic impacts of the original increase in construction/operation spending. These "multiplier" effects would continue on until all of the original funds have left New York State's economy through either taxes or savings, or through purchases made of goods or services from outside the state.

Indirect employment impacts are expected to range from an additional 7,293 FTE workers under the low development scenario to an additional 43,521 FTE workers under the high development scenario in the year with the maximum employment (Year 30). The years before and after this date would have less direct and indirect employment. See Table 4-8 for total indirect employment levels for Year 1 to Year 60. This table also shows the total employment (direct and indirect) expected to occur for each year under each development scenario.

Table 4-8 Indirect and Total Employment in New York State Under Each Development Scenario for Years 1 to 60

	Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect
1	525	971	2,103	3,890	3,153	5,833
2	1,058	1,957	4,252	7,866	6,338	11,725
3	1,603	2,965	6,418	11,873	9,587	17,735
4	2,152	3,981	8,635	15,974	12,872	23,812
5	2,724	5,039	10,869	20,107	16,221	30,007
6	3,290	6,086	13,138	24,304	19,620	36,295
7	3,865	7,150	15,452	28,585	23,050	42,640
8	4,451	8,234	17,783	32,897	26,548	49,111
9	5,042	9,327	20,165	37,303	30,076	55,638

Table 4-8 Indirect and Total Employment in New York State Under Each Development Scenario for Years 1 to 60

	Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect
10	5,641	10,435	22,566	41,745	33,672	62,290
11	5,723	10,587	22,895	42,354	34,165	63,202
12	5,807	10,742	23,226	42,966	34,657	64,112
13	5,889	10,894	23,557	43,578	35,150	65,024
14	5,971	11,046	23,887	44,189	35,642	65,934
15	6,054	11,199	24,218	44,801	36,135	66,846
16	6,137	11,353	24,549	45,413	36,626	67,755
17	6,220	11,506	24,879	46,024	37,119	68,667
18	6,302	11,658	25,209	46,634	37,611	69,577
19	6,384	11,810	25,539	47,245	38,104	70,489
20	6,467	11,963	25,870	47,857	38,596	71,399
21	6,550	12,117	26,201	48,469	39,089	72,311
22	6,632	12,269	26,531	49,080	39,581	73,221
23	6,715	12,422	26,862	49,692	40,074	74,133
24	6,797	12,574	27,191	50,301	40,567	75,045
25	6,880	12,727	27,522	50,913	41,059	75,955
26	6,963	12,881	27,852	51,524	41,552	76,867
27	7,045	13,033	28,183	52,136	42,043	77,776
28	7,128	13,186	28,514	52,748	42,536	78,688
29	7,210	13,338	28,844	53,359	43,028	79,598
30	7,293	13,491	29,174	53,969	43,521	80,510
31	2,098	3,881	8,393	15,526	12,508	23,139
32	2,083	3,853	8,327	15,404	12,410	22,957
33	2,057	3,805	8,228	15,221	12,263	22,685
34	2,024	3,744	8,096	14,977	12,065	22,319
35	1,983	3,668	7,930	14,670	11,819	21,864
36	1,933	3,576	7,733	14,305	11,524	21,318
37	1,876	3,470	7,501	13,876	11,179	20,680
38	1,810	3,348	7,236	13,386	10,785	19,951
39	1,734	3,208	6,940	12,838	10,341	19,130
40	1,652	3,056	6,609	12,226	9,849	18,220
41	1,570	2,904	6,278	11,614	9,356	17,308
42	1,487	2,751	5,948	11,003	8,865	16,399
43	1,405	2,599	5,617	10,391	8,372	15,487
44	1,321	2,444	5,286	9,779	7,880	14,577
45	1,239	2,292	4,957	9,170	7,387	13,665
46	1,157	2,140	4,626	8,558	6,895	12,755
47	1,074	1,987	4,296	7,947	6,402	11,843
48	992	1,835	3,965	7,335	5,909	10,931
49	908	1,680	3,635	6,724	5,417	10,021

Table 4-8 Indirect and Total Employment in New York State Under Each Development Scenario for Years 1 to 60

	Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect
50	826	1,528	3,304	6,112	4,924	9,109
51	744	1,376	2,974	5,502	4,432	8,199
52	661	1,223	2,644	4,891	3,939	7,287
53	578	1,069	2,313	4,279	3,447	6,377
54	495	916	1,983	3,668	2,954	5,465
55	413	764	1,652	3,056	2,463	4,556
56	331	612	1,321	2,444	1,970	3,644
57	248	459	992	1,835	1,478	2,734
58	165	305	661	1,223	985	1,822
59	82	152	331	612	493	912
60	-	-	-	-	-	-

In total, at the peak employment year, high-volume hydraulic fracturing operations would be expected to generate between 13,491and 80,510 direct and indirect jobs, which equates to 0.1% and 0.8%, respectively, of New York State's 2010 total labor force, depending on the level and intensity of development that occurs (see Table 4-6). Figure 4-12 graphically illustrates the projected total employment in New York State that would result from each development scenario. As shown on the figure, total employment levels would be highest in Year 10 through Year 30. Once new well construction ends in Year 31, the direct and indirect employment would be greatly reduced.

4.2.1.2 Income

The increase in direct and indirect employment would have a positive impact on income levels in New York State. Table 4-9 provides estimates of the maximum direct and indirect employee earnings that would be generated under each development scenario. When well construction reaches its maximum levels (Years 10 through 30), total annual construction earnings are projected to range from $298.4 million under the low development scenario to nearly $1.8 billion under the high development scenario. Employee earnings from production employment are expected to range from $121.2 million under the low development scenario to $722.5 million under the high development scenario in Year 30, the year that the maximum number of production workers are assumed to be employed.

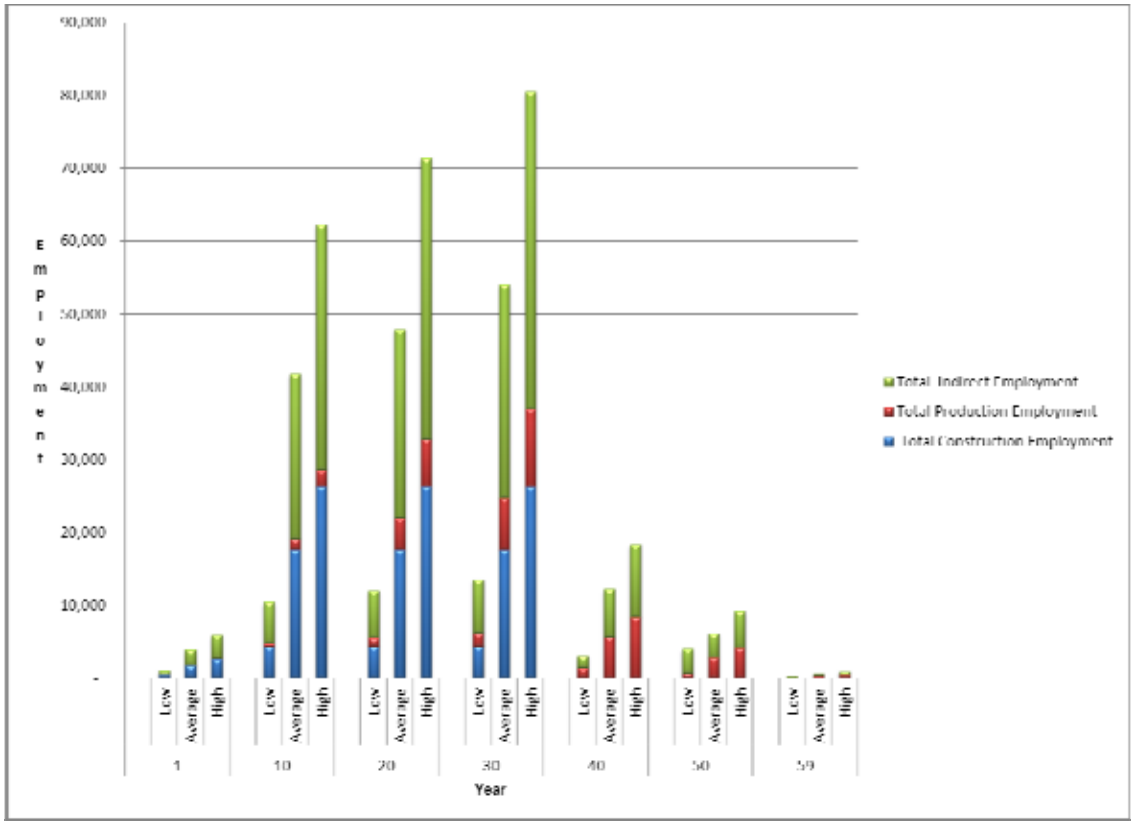


Figure 4-12 Projected Total Employment in New York State Resulting from Each Development Scenario

Table 4-9 Maximum Direct and Indirect Annual Employee Earnings Impacts on New York State under Each Development Scenario

Scenario	Total Employee Earnings ($ millions)		
	Low	Average	High
Direct Earnings Impacts			
Construction Earnings[1]	$298.4	$1,193.8	$1,781.5
Production Earnings[2]	$121.2	$484.8	$722.5
Indirect Employee Earnings Impacts[2,3]	$202.3	$809.2	$1,207.2
Total Employee Earnings Impacts	$621.9	$2,487.8	$3,711.3
Total Employee Earnings as a Percent of New York State's 2009 Total Wages	0.1%	0.5%	0.8%

Source: USBEA 2011a; NYDOL 2009a.

[1] These figures represent the maximum annual change in construction earnings under each scenario and correspond to construction earnings in Years 10 through 30.

[2] These figures represent the maximum annual production earnings and indirect employee earnings under each development scenario. These figures correspond to production earnings in Year 30.

[3] Type I direct earnings multipliers for the oil and gas extraction industry from the USBEA Regional Input-Output Modeling System (RIMS II) were used to estimate the indirect employment impacts.

Note: Totals may not add correctly due to rounding.

Total direct employee earnings were estimated using existing 2009 New York State annual average wage rates for the oil and gas industry from the New York State Department of Labor. Data on the average number of hours worked in the industry from the U.S. Bureau of Labor statistics were then utilized to pro rate the annual wage to determine the estimated wage an FTE worker would receive per year. Estimated direct construction and production earnings in New York State under each development scenario are shown for Years 1 to 60 on Table 4-10.

Table 4-10 Total Direct Construction and Production Earnings in New York State Under Each Development Scenario for Years 1 to 60

	Direct Earnings ($ millions)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
1	$29.7	$0.5	$119.1	$1.9	$178.6	$2.8
2	$59.4	$1.4	$239.0	$5.7	$356.2	$8.5
3	$89.4	$2.8	$358.0	$11.4	$534.6	$17.0
4	$119.1	$4.7	$477.8	$19.0	$712.2	$28.4
5	$149.6	$7.1	$596.9,	$28.5	$890.8	$42.5
6	$179.3	$10.0	$716.08	$39.9	$1,069.3	$59.5
7	$209.0	$13.3	$835.9	$53.2	$1,246.8	$79.3
8	$239.0	$17.1	$954.7	$68.4	$1,425.4	$102.0
9	$268.7	$21.4	$1,074.6	$85.6	$1,603.0	$127.5
10	$298.4	$26.1	$1,193.7	$104.6	$1,781.5	$155.8
11	$298.4	$30.9	$1,193.7	$123.5	$1,781.5	$184.2
12	$298.4	$35.7	$1,193.7	$142.6	$1,781.5	$212.5
13	$298.4	$40.4	$1,193.7	$161.6	$1,781.5	$240.9
14	$298.4	$45.2	$1,193.7	$180.6	$1,781.5	$269.2
15	$298.4	$49.9	$1,193.7	$199.6	$1,781.5	$297.5
16	$298.4	$54.7	$1,193.7	$218.7	$1,781.5	$325.8
17	$298.4	$59.4	$1,193.7	$237.7	$1,781.5	$354.2
18	$298.4	$64.2	$1,193.7	$256.6	$1,781.5	$382.5
19	$298.4	$68.9	$1,193.7	$275.6	$1,781.5	$410.9
20	$298.4	$73.7	$1,193.7	$294.7	$1,781.5	$439.2
21	$298.4	$78.5	$1,193.7	$313.7	$1,781.5	$467.5
22	$298.4	$83.2	$1,193.7	$332.7	$1,781.5	$495.8
23	$298.4	$87.9	$1,193.7	$351.8	$1,781.5	$524.2
24	$298.4	$92.7	$1,193.7	$370.7	$1,781.5	$552.5
25	$298.4	$97.4	$1,193.7	$389.7	$1,781.5	$580.8
26	$298.4	$102.2	$1,193.7	$408.8	$1,781.5	$609.2
27	$298.4	$107.0	$1,193.7	$427.8	$1,781.5	$637.5
28	$298.4	$111.7	$1,193.7	$446.8	$1,781.5	$665.9
29	$298.4	$116.4	$1,193.7	$465.8	$1,781.5	$694.2
30	$298.4	$121.2	$1,193.7	$484.8	$1,781.5	$722.5
31	-	$120.7	-	$482.9	-	$719.7
32	-	$119.8	-	$479.1	-	$714.0
33	-	$118.3	-	$473.4	-	$705.5

Table 4-10 Total Direct Construction and Production Earnings in New York State Under Each Development Scenario for Years 1 to 60

	Direct Earnings ($ millions)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
34	-	$116.4	-	$465.8	-	$694.2
35	-	$114.1	-	$456.3	-	$680.0
36	-	$111.2	-	$444.9	-	$663.0
37	-	$107.9	-	$431.6	-	$643.2
38	-	$104.1	-	$416.3	-	$620.5
39	-	$99.8	-	$399.3	-	$595.0
40	-	$95.0	-	$380.3	-	$566.7
41	-	$90.3	-	$361.2	-	$538.3
42	-	$85.6	-	$342.2	-	$510.0
43	-	$80.8	-	$323.2	-	$481.7
44	-	$76.0	-	$304.2	-	$453.4
45	-	$71.2	-	$285.2	-	$425.0
46	-	$66.5	-	$266.2	-	$396.7
47	-	$61.8	-	$247.2	-	$368.3
48	-	$57.1	-	$228.1	-	$340.0
49	-	$52.3	-	$209.1	-	$311.7
50	-	$47.5	-	$190.1	-	$283.3
51	-	$42.8	-	$171.1	-	$255.0
52	-	$38.0	-	$152.1	-	$226.7
53	-	$33.2	-	$133.1	-	$198.4
54	-	$28.5	-	$114.1	-	$170.0
55	-	$23.8	-	$95.0	-	$141.7
56	-	$19.0	-	$76.0	-	$113.3
57	-	$14.3	-	$57.1	-	$85.0
58	-	$9.5	-	$38.0	-	$56.7
59	-	$4.7	-	$19.0	-	$28.4
60	-	$0	-	-	-	-

Source: NYSDOL 2010b; BLS 2011.

As described above, construction and production activities would also generate significant indirect economic impacts. Indirect employee earnings are anticipated to range from $202.3 million under the low development scenario to $1.2 billion under the high development scenario in Year 30. The total direct and indirect impacts on employee earnings are projected to range from $621.9 million to $3.7 billion per year at the peak construction and production levels in Year 30. These figures equate to increases of between 0.1% and 0.8% of the total wages and salaries earned in New York State in 2009 (see Table 4-10).

Indirect employee earnings were estimated using USBEA Regional Input-Output multipliers. Type I, direct-effect, earnings multipliers for the oil and gas extraction industry were utilized to estimate the statewide and regional impacts associ-

ated with the high-volume hydraulic fracturing operations. Indirect and total earnings projected to occur in Years 1 to 60 are shown in Table 4-11.

Table 4-11 Total Indirect Construction and Production Earnings in New York State Under Each Development Scenario for Years 1 to 60

	Earnings ($ millions)					
	Low		Average		High	
Year	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect
1	$14.6	$44.7	$58.3	$179.3	$87.5	$268.9
2	$29.3	$90.2	$117.9	$362.6	$175.8	$540.5
3	$44.5	$136.7	$178.0	$547.3	$265.9	$817.5
4	$59.7	$183.5	$239.5	$736.4	$357.0	$1,097.7
5	$75.6	$232.3	$301.5	$926.9	$449.9	$1,383.2
6	$91.3	$280.5	$364.4	$1,120.3	$544.2	$1,673.1
7	$107.2	$329.6	$428.6	$1,317.7	$639.4	$1,965.5
8	$123.5	$379.6	$493.3	$1,516.4	$736.4	$2,263.8
9	$139.8	$429.9	$559.3	$1,719.5	$834.3	$2,564.7
10	$156.5	$481.0	$625.9	$1,924.3	$934.0	$2,871.4
11	$158.7	$488.0	$635.1	$1,952.4	$947.7	$2,913.4
12	$161.1	$495.1	$644.3	$1,980.6	$961.3	$2,955.3
13	$163.3	$502.2	$653.4	$2,008.8	$975.0	$2,997.4
14	$165.6	$509.2	$662.6	$2,037.0	$988.6	$3,039.3
15	$167.9	$516.2	$671.8	$2,065.2	$1,002.3	$3,081.4
16	$170.2	$523.3	$680.9	$2,093.4	$1,016.0	$3,123.3
17	$172.5	$530.4	$690.1	$2,121.6	$1,029.6	$3,165.3
18	$174.8	$537.4	$699.2	$2,149.7	$1,043.3	$3,207.3
19	$177.1	$544.4	$708.4	$2,177.8	$1,056.9	$3,249.3
20	$179.4	$551.4	$717.6	$2,206.0	$1,070.6	$3,291.3
21	$181.7	$558.6	$726.8	$2,234.2	$1,084.3	$3,333.3
22	$184.0	$565.6	$735.9	$2,262.4	$1,097.9	$3,375.2
23	$186.3	$572.6	$745.1	$2,290.6	$1,111.6	$3,417.3
24	$188.5	$579.6	$754.2	$2,318.7	$1,125.3	$3,459.3
25	$190.8	$586.7	$763.4	$2,346.9	$1,138.9	$3,501.3
26	$193.1	$593.8	$772.6	$2,375.1	$1,152.6	$3,543.3
27	$195.4	$600.8	$781.7	$2,403.3	$1,166.2	$3,585.2
28	$197.7	$607.8	$790.9	$2,431.5	$1,179.9	$3,627.3
29	$200.0	$614.8	$800.1	$2,459.7	$1,193.5	$3,669.2
30	$202.3	$621.9	$809.2	$2,487.8	$1,207.2	$3,711.3
31	$58.2	$178.9	$232.8	$715.7	$347.0	$1,066.7
32	$57.8	$177.6	$231.0	$710.1	$344.2	$1,058.2
33	$57.0	$175.4	$228.2	$701.6	$340.1	$1,045.7
34	$56.1	$172.6	$224.6	$690.4	$334.7	$1,028.8
35	$55.0	$169.1	$220.0	$676.3	$327.8	$1,007.9
36	$53.6	$164.8	$214.5	$659.4	$319.6	$982.7
37	$52.0	$159.9	$208.1	$639.6	$310.1	$953.3

Table 4-11 Total Indirect Construction and Production Earnings in New York State Under Each Development Scenario for Years 1 to 60

	Earnings ($ millions)					
	Low		Average		High	
Year	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect
38	$50.2	$154.3	$200.7	$617.1	$299.1	$919.7
39	$48.1	$147.9	$192.5	$591.8	$286.8	$881.8
40	$45.8	$140.9	$183.3	$563.6	$273.2	$839.9
41	$43.5	$133.8	$174.1	$535.4	$259.5	$797.9
42	$41.3	$126.8	$165.0	$507.2	$245.9	$755.9
43	$39.0	$119.8	$155.8	$479.0	$232.2	$713.9
44	$36.7	$112.7	$146.6	$450.8	$218.6	$671.9
45	$34.4	$105.7	$137.5	$422.7	$204.9	$629.9
46	$32.1	$98.6	$128.3	$394.5	$191.3	$588.0
47	$29.8	$91.6	$119.2	$366.3	$177.6	$545.9
48	$27.5	$84.6	$110.0	$338.1	$163.9	$503.9
49	$25.2	$77.5	$100.8	$309.9	$150.3	$461.9
50	$22.9	$70.4	$91.6	$281.7	$136.6	$419.9
51	$20.6	$63.4	$82.5	$253.6	$122.9	$378.0
52	$18.3	$56.4	$73.3	$225.5	$109.3	$335.9
53	$16.0	$49.3	$64.2	$197.3	$95.6	$294.0
54	$13.7	$42.2	$55.0	$169.1	$82.0	$251.9
55	$11.5	$35.2	$45.8	$140.9	$68.3	$210.0
56	$9.2	$28.2	$36.7	$112.7	$54.6	$168.0
57	$6.9	$21.2	$27.5	$84.6	$41.0	$126.0
58	$4.6	$14.0	$18.3	$56.4	$27.3	$84.0
59	$2.3	$7.0	$9.2	$28.2	$13.7	$42.0
60	-	-	-	-	-	-

Source: USBEA 2011a.

Owners of the subsurface mineral rights where wells are drilled would also experience a significant increase in income and wealth. Royalty payments to property owners typically amount to 12.5% or more, of the annual value of production of the well (NYSDEC 2007b). These royalty payments, particularly in the initial stages of well production when natural gas production is at its peak, can result in significant increases in income. Signing bonuses/bonus bids also can provide significant additional income to property owners.

4.2.2 Representative Regions

4.2.2.1 Employment

The high-volume hydraulic-fracturing operations would have a significant positive economic impact on the representative regions. Using the same methodology described above for the statewide analysis, the FTE labor requirements needed to construct and operate these wells were estimated for each region. Table 4-12 provides the maximum direct and indirect employment impacts that are predicted to occur under each development scenario for each region.

Table 4-12 Maximum Direct and Indirect Employment Impacts on Each Representative Region Under Each Development Scenario

	Total Employment (in number of FTE jobs)		
	Low	Average	High
Region A			
Direct Employment Impacts			
Construction Employment[1]	2,204	8,818	13,158
Production Employment[2]	895	3,581	5,337
Indirect Employment Impacts[3]	650	2,600	3,878
Total Employment Impacts	3,749	14,999	22,373
Total Employment as a Percentage of Region A's 2010 Total Labor Force	2.3%	9.3%	13.8%
Region B			
Direct Employment Impacts			
Construction Employment[1]	1,014	4,056	6,053
Production Employment[2]	412	1,647	2,455
Indirect Employment Impacts[3]	191	762	1,138
Total Employment Impacts	1,617	6,465	9,646
Total Employment as a Percentage of Region B's 2010 Total Labor Force	1.8%	7.3%	10.9%
Region C			
Direct Employment Impacts			
Construction Employment[1]	221	882	1,316
Production Employment$_2$	90	358	534
Indirect Employment Impacts[3]	66	263	393
Total Employment Impacts	377	1,503	2,243
Total Employment as a Percentage of Region C's 2010 Total Labor Force	0.4%	1.4%	2.1%

Source: USBEA 2011a; NYSDOL 2010a.

[1] These figures represent the maximum annual construction employment under each scenario and correspond to construction employment in Years 10 through 30.

[2] These figures represent the maximum annual production employment under each scenario. These figures correspond to production employment in Year 30.

[3] Separate type I direct employment multipliers for the oil and gas extraction industry from the USBEA Regional Input-Output Modeling System (RIMS II) were used to estimate the indirect employment impacts.

In Region A, which is used to define an upper boundary of the regional socioeconomic impacts, it is projected that direct construction employment would range from 2,204 FTE construction workers at the maximum employment levels under the low development scenario to 13,158 FTE construction workers at the maximum employment levels under the high development scenario. The new maximum production employment in the region is expected to range from 895 to 5,337 FTE production workers per year.

In contrast, employment impacts are not anticipated to be as large in Region C, which is used to define a lower boundary for the regional socioeconomic impacts. At the maximum employment levels under the low development scenario, an estimated 221 new FTE constructions workers and 90 new FTE production workers would be needed for drilling and maintaining the new natural gas wells. These figures would increase to 1,316 new FTE construction workers and 534 new FTE production workers under the high development scenario (see Table 4-12).

Figures 4-13, 4-14, and 4-15 illustrate the projected direct employment in each representative region that would result from implementation of each development scenario over the 60-year time frame. Tables 4-13, 4-14, and 4-15 show the projected direct employment for each representative region for each development scenario from Year 1 to 60. The figures and tables show how construction and production employment levels are expected to vary, with the peak direct employment occurring in Year 30.

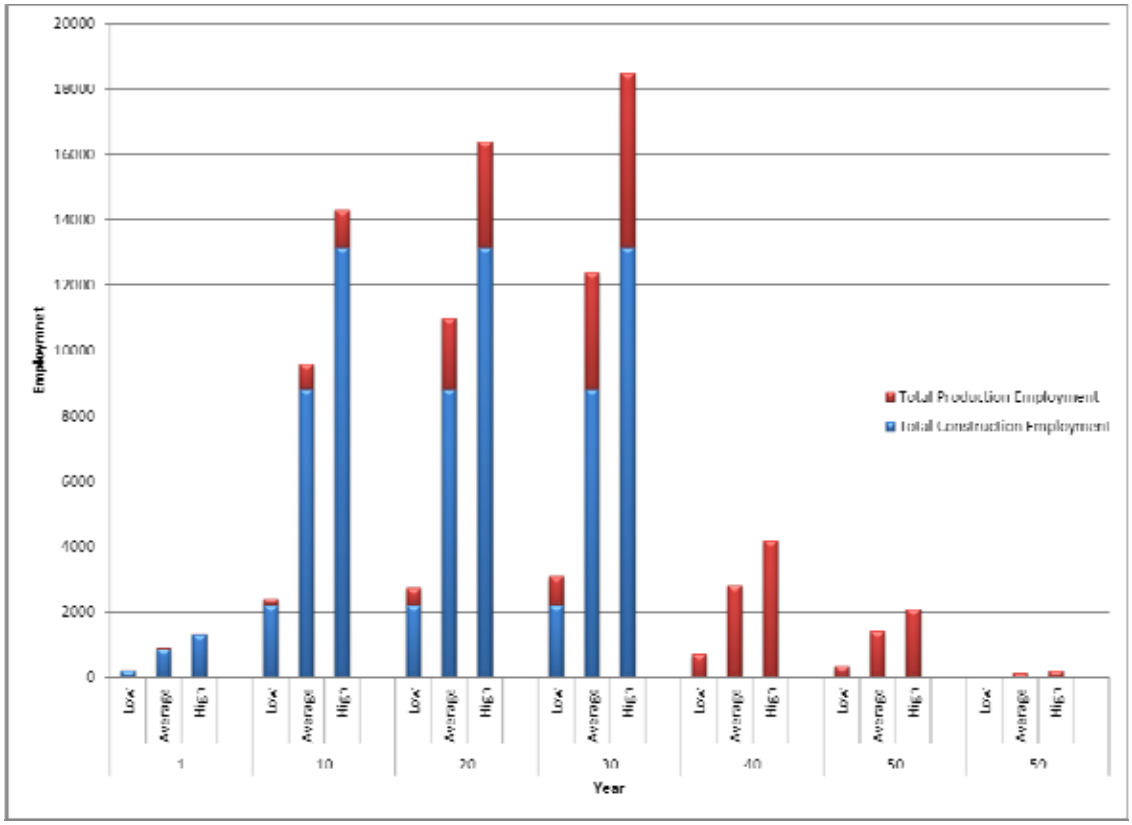


Figure 4-13 Projected Direct Employment in Region A Resulting from Each Development Scenario

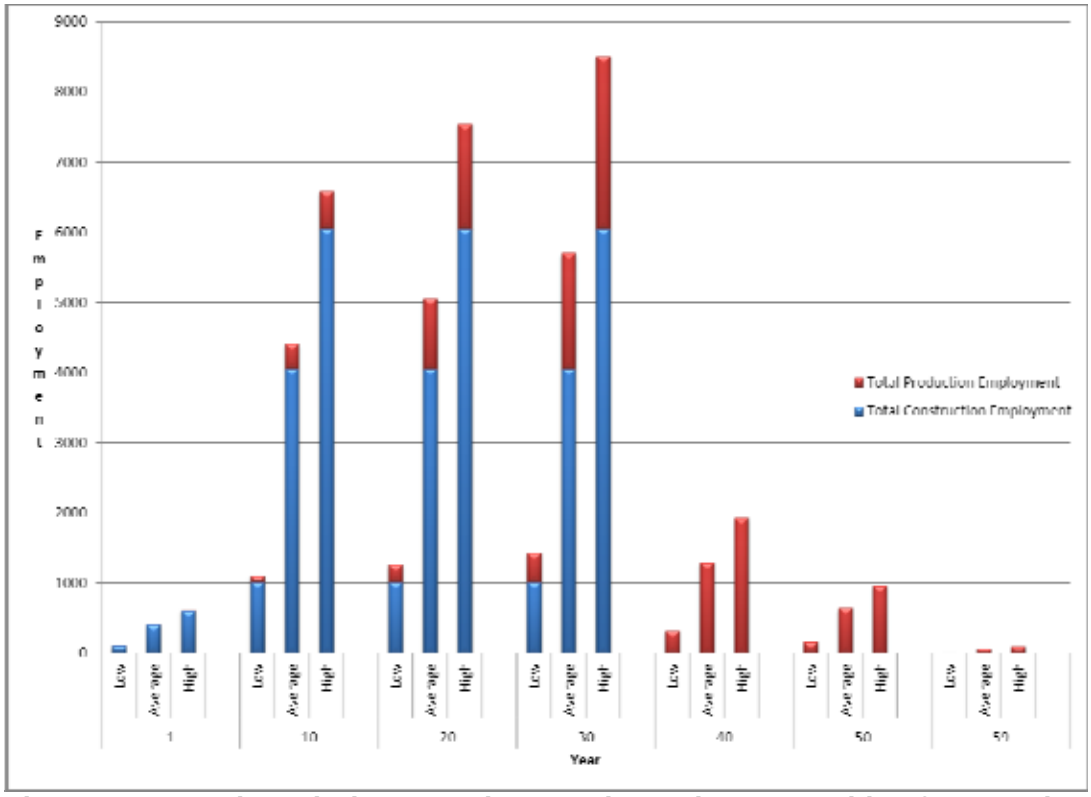


Figure 4-14 Projected Direct Employment in Region B Resulting from Each Development Scenario

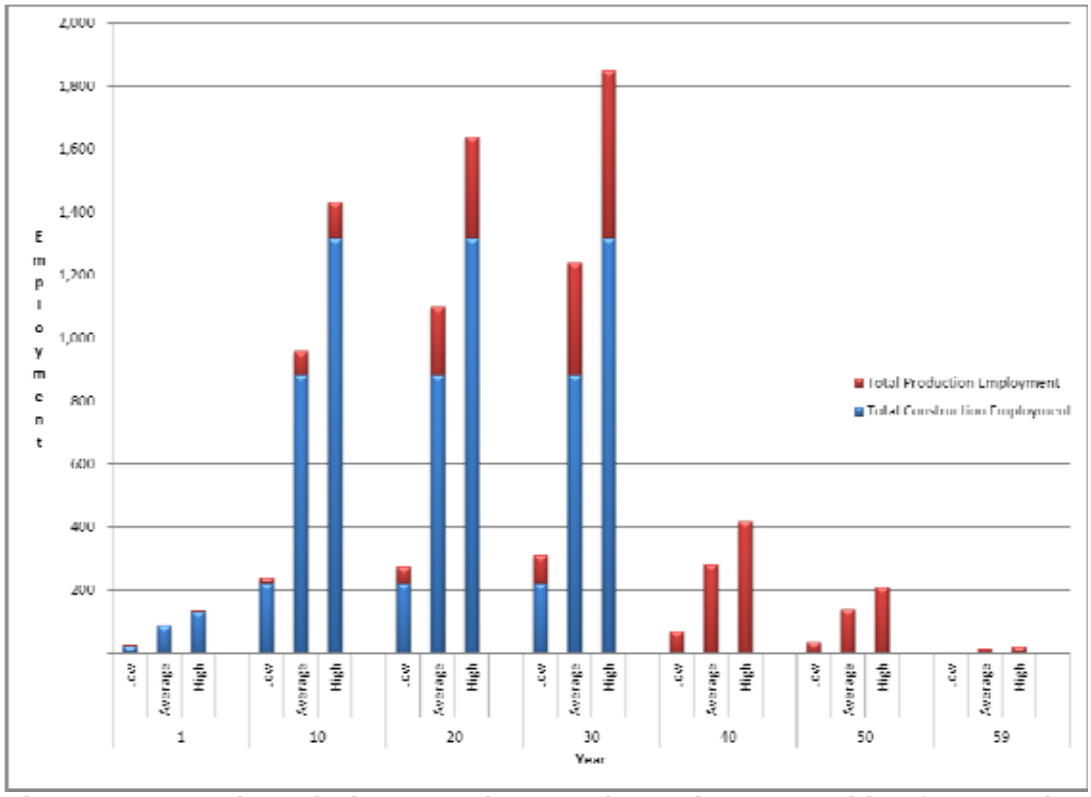


Figure 4-15 Projected Direct Employment in Region C Resulting from Each Development Scenario

Table 4-13 Total Direct Construction and Production Employment in Region A Under Each Development Scenario for Years 1 to 60

	Direct Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
1	219	4	880	14	1,319	21
2	439	11	1,765	42	2,631	63
3	660	21	2,644	84	3,949	126
4	879	35	3,530	141	5,261	210
5	1,105	53	4,409	211	6,580	314
6	1,325	74	5,288	295	7,899	440
7	1,544	99	6,174	393	9,210	586
8	1,765	127	7,052	506	10,529	754
9	1,985	158	7,937	632	11,840	942
10	2,204	193	8,818	773	13,158	1,151
11	2,204	228	8,818	913	13,158	1,361
12	2,204	264	8,818	1,053	13,158	1,570
13	2,204	299	8,818	1,194	13,158	1,779
14	2,204	334	8,818	1,334	13,158	1,988
15	2,204	369	8,818	1,475	13,158	2,198
16	2,204	404	8,818	1,615	13,158	2,407
17	2,204	439	8,818	1,756	13,158	2,616
18	2,204	474	8,818	1,896	13,158	2,825
19	2,204	509	8,818	2,036	13,158	3,035
20	2,204	544	8,818	2,177	13,158	3,244
21	2,204	580	8,818	2,317	13,158	3,453
22	2,204	615	8,818	2,458	13,158	3,662
23	2,204	650	8,818	2,598	13,158	3,872
24	2,204	685	8,818	2,738	13,158	4,081
25	2,204	720	8,818	2,879	13,158	4,290
26	2,204	755	8,818	3,019	13,158	4,500
27	2,204	790	8,818	3,160	13,158	4,709
28	2,204	825	8,818	3,300	13,158	4,918
29	2,204	860	8,818	3,441	13,158	5,127
30	2,204	895	8,818	3,581	13,158	5,337
31	-	892	-	3,567	-	5,316
32	-	885	-	3,539	-	5,274
33	-	874	-	3,497	-	5,211
34	-	860	-	3,441	-	5,127
35	-	843	-	3,370	-	5,023
36	-	822	-	3,286	-	4,897
37	-	797	-	3,188	-	4,751
38	-	769	-	3,075	-	4,583
39	-	737	-	2,949	-	4,395

Table 4-13 Total Direct Construction and Production Employment in Region A Under Each Development Scenario for Years 1 to 60

	Direct Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
40	-	702	-	2,809	-	4,186
41	-	667	-	2,668	-	3,976
42	-	632	-	2,528	-	3,767
43	-	597	-	2,387	-	3,558
44	-	562	-	2,247	-	3,349
45	-	527	-	2,107	-	3,139
46	-	492	-	1,966	-	2,930
47	-	457	-	1,826	-	2,721
48	-	422	-	1,685	-	2,511
49	-	386	-	1,545	-	2,302
50	-	351	-	1,404	-	2,093
51	-	316	-	1,264	-	1,884
52	-	281	-	1,124	-	1,674
53	-	246	-	983	-	1,465
54	-	211	-	843	-	1,256
55	-	176	-	702	-	1,047
56	-	141	-	562	-	837
57	-	106	-	422	-	628
58	-	70	-	281	-	419
59	-	35	-	141	-	210
60	-	-	-	-	-	-

Source: NYSDOL 2010a; BLS 2011.

Table 4-14 Total Direct Construction and Production Employment in Region B Under Each Development Scenario for Years 1 to 60

	Direct Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
1	101	2	404	6	607	10
2	202	5	812	19	1,210	29
3	303	10	1,216	39	1,816	58
4	404	16	1,623	65	2,420	96
5	508	24	2,028	97	3,026	144
6	609	34	2,432	136	3,633	202
7	710	45	2,839	181	4,236	270
8	812	58	3,244	233	4,843	347
9	913	73	3,651	291	5,446	433
10	1,014	89	4,056	355	6,053	529
11	1,014	105	4,056	420	6,053	626
12	1,014	121	4,056	484	6,053	722
13	1,014	137	4,056	549	6,053	818

Table 4-14 Total Direct Construction and Production Employment in Region B Under Each Development Scenario for Years 1 to 60

	Direct Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
14	1,014	153	4,056	614	6,053	914
15	1,014	170	4,056	678	6,053	1,011
16	1,014	186	4,056	743	6,053	1,107
17	1,014	202	4,056	808	6,053	1,203
18	1,014	218	4,056	872	6,053	1,300
19	1,014	234	4,056	937	6,053	1,396
20	1,014	250	4,056	1,001	6,053	1,492
21	1,014	267	4,056	1,066	6,053	1,588
22	1,014	283	4,056	1,130	6,053	1,685
23	1,014	299	4,056	1,195	6,053	1,781
24	1,014	315	4,056	1,259	6,053	1,877
25	1,014	331	4,056	1,324	6,053	1,973
26	1,014	347	4,056	1,389	6,053	2,070
27	1,014	363	4,056	1,453	6,053	2,166
28	1,014	380	4,056	1,518	6,053	2,262
29	1,014	396	4,056	1,583	6,053	2,358
30	1,014	412	4,056	1,647	6,053	2,455
31	-	410	-	1,641	-	2,445
32	-	407	-	1,628	-	2,426
33	-	402	-	1,608	-	2,397
34	-	396	-	1,583	-	2,358
35	-	388	-	1,550	-	2,310
36	-	378	-	1,512	-	2,253
37	-	367	-	1,466	-	2,185
38	-	354	-	1,415	-	2,108
39	-	339	-	1,357	-	2,021
40	-	323	-	1,292	-	1,925
41	-	307	-	1,227	-	1,829
42	-	291	-	1,163	-	1,733
43	-	275	-	1,098	-	1,636
44	-	258	-	1,033	-	1,540
45	-	242	-	969	-	1,444
46	-	226	-	904	-	1,348
47	-	210	-	840	-	1,251
48	-	194	-	775	-	1,155
49	-	178	-	710	-	1,059
50	-	161	-	646	-	963
51	-	145	-	581	-	866
52	-	129	-	517	-	770
53	-	113	-	452	-	674
54	-	97	-	388	-	578

Table 4-14 Total Direct Construction and Production Employment in Region B Under Each Development Scenario for Years 1 to 60

	Direct Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
55	-	81	-	323	-	481
56	-	65	-	258	-	385
57	-	49	-	194	-	289
58	-	32	-	129	-	193
59	-	16	-	65	-	96
60	-	-	-	-	-	-

Table 4-15 Total Direct Construction and Production Employment in Region C Under Each Development Scenario for Years 1 to 60

	Direct Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
1	22	-	88	1	132	2
2	44	1	176	4	263	6
3	66	2	265	8	395	13
4	88	4	352	14	526	21
5	110	5	441	21	658	31
6	133	7	529	30	790	44
7	155	10	617	39	921	59
8	176	13	705	51	1,053	75
9	199	16	794	63	1,184	94
10	221	19	882	77	1,316	115
11	221	23	882	91	1,316	136
12	221	26	882	105	1,316	157
13	221	30	882	119	1,316	178
14	221	33	882	133	1,316	199
15	221	37	882	147	1,316	220
16	221	40	882	162	1,316	241
17	221	44	882	176	1,316	262
18	221	47	882	190	1,316	283
19	221	51	882	204	1,316	303
20	221	54	882	218	1,316	324
21	221	58	882	232	1,316	345
22	221	61	882	246	1,316	366
23	221	65	882	260	1,316	387
24	221	68	882	274	1,316	408
25	221	72	882	288	1,316	429
26	221	76	882	302	1,316	450
27	221	79	882	316	1,316	471
28	221	83	882	330	1,316	492

Table 4-15 Total Direct Construction and Production Employment in Region C Under Each Development Scenario for Years 1 to 60

	Direct Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
29	221	86	882	344	1,316	513
30	221	90	882	358	1,316	534
31	-	89	-	357	-	532
32	-	89	-	354	-	527
33	-	87	-	350	-	521
34	-	86	-	344	-	513
35	-	84	-	337	-	502
36	-	82	-	329	-	490
37	-	80	-	319	-	475
38	-	77	-	308	-	458
39	-	74	-	295	-	439
40	-	70	-	281	-	419
41	-	67	-	267	-	398
42	-	63	-	253	-	377
43	-	60	-	239	-	356
44	-	56	-	225	-	335
45	-	53	-	211	-	314
46	-	49	-	197	-	293
47	-	46	-	183	-	272
48	-	42	-	169	-	251
49	-	39	-	154	-	230
50	-	35	-	140	-	209
51	-	32	-	126	-	188
52	-	28	-	112	-	167
53	-	25	-	98	-	147
54	-	21	-	84	-	126
55	-	18	-	70	-	105
56	-	14	-	56	-	84
57	-	11	-	42	-	63
58	-	7	-	28	-	42
59	-	4	-	14	-	21
60	-	-	-	-	-	-

As described previously for the statewide impacts, in addition to the direct employment impacts, the proposed drilling would also indirectly generate additional employment in other sectors of the economy. As the new construction and production workers spend a portion of their payroll in the local area, and as the natural gas companies purchase materials from regional suppliers, the overall demand for goods and services in the region would expand. Revenues at the region's wholesale and retail outlets and service providers would increase. As these merchants respond to this increase in demand, they may, in turn, increase employment at their operations and/or purchase more goods and services from their providers. These providers may then increase employment in their establishments and/or spend a portion of their income in the region, thus "multiplying" the positive economic impacts of the original increase in construction/operation spending. These "multiplier" effects would continue on until all of the original funds have left the region's economy through either taxes or savings, or through purchases made of goods or services from outside the region.

Indirect employment impacts are expected to range from a high of 650 to 3,878 indirect workers in Region A to a low of 66 to 393 indirect workers in Region C, depending on the development scenario at maximum build-out (Year 30). The employment and earnings multipliers in these regions are much smaller than in New York State as a whole, underscoring the fact that portions of these study areas do not have as well-developed, diverse economies as the state as a whole. In particular, the low multipliers reflect the fact that much of the goods and services that would be needed to construct and operate the new wells would be purchased outside the regions.

However, it can be expected that as the natural gas industry matures in these regions, more local suppliers and service providers would enter the market and be able to respond to the natural gas industry's needs. As time goes by, a larger portion of the indirect economic impacts would remain in the region, further stimulating the local economies.

Figures 4-16, 4-17, and 4-18 graphically show the projected total employment in Region A, Region B, and Region C, respectively, that would result from each development scenario. Tables 4-16, 4-17, and 4-18 show the projected indirect and total employment for every year from Year 1 to Year 60 for each representative region under each development scenario. As shown on the figures and tables, total employment levels would be greatest in Year 10 through Year 30. Once new well construction ends in Year 31, the direct and indirect employment would be greatly reduced.

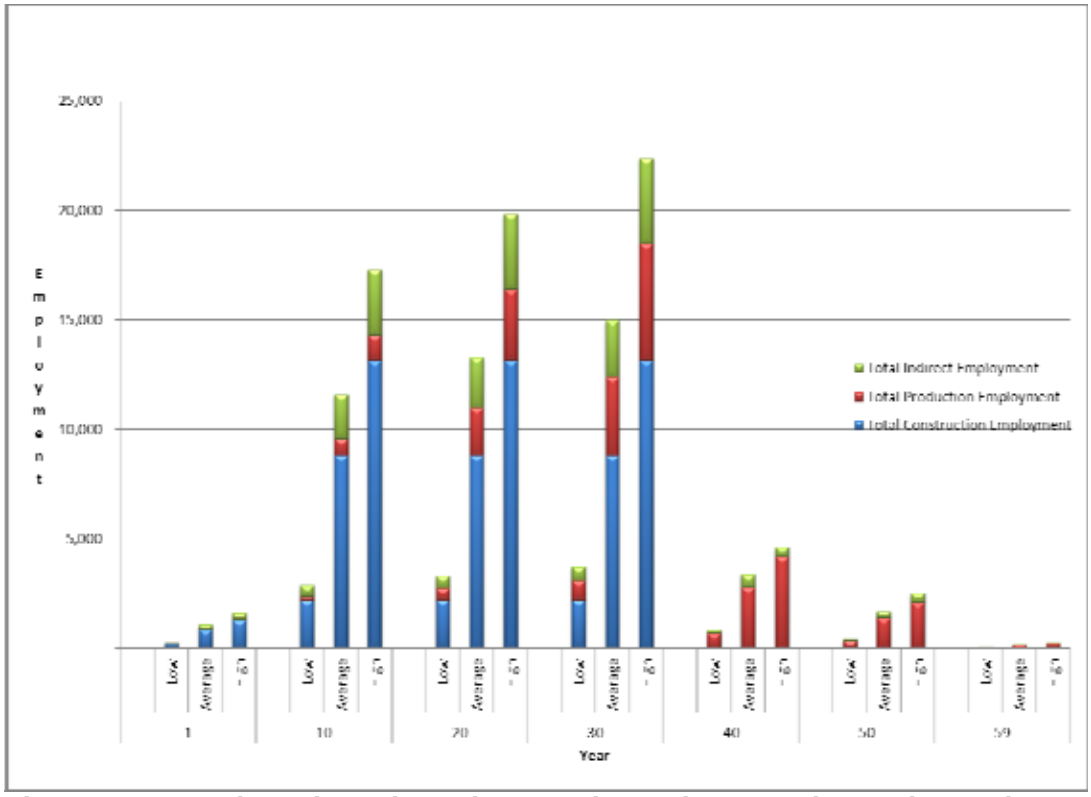


Figure 4-16 Projected Total Employment in Region A Under Each Development Scenario

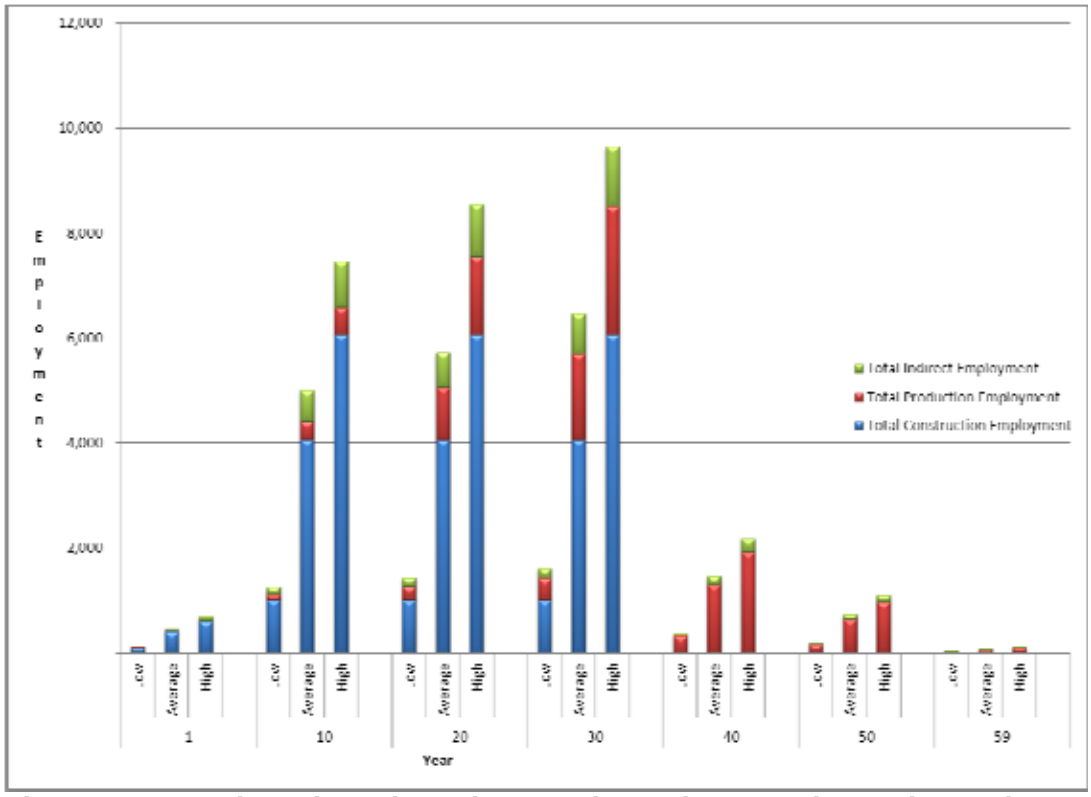


Figure 4-17 Projected Total Employment in Region B Under Each Development Scenario

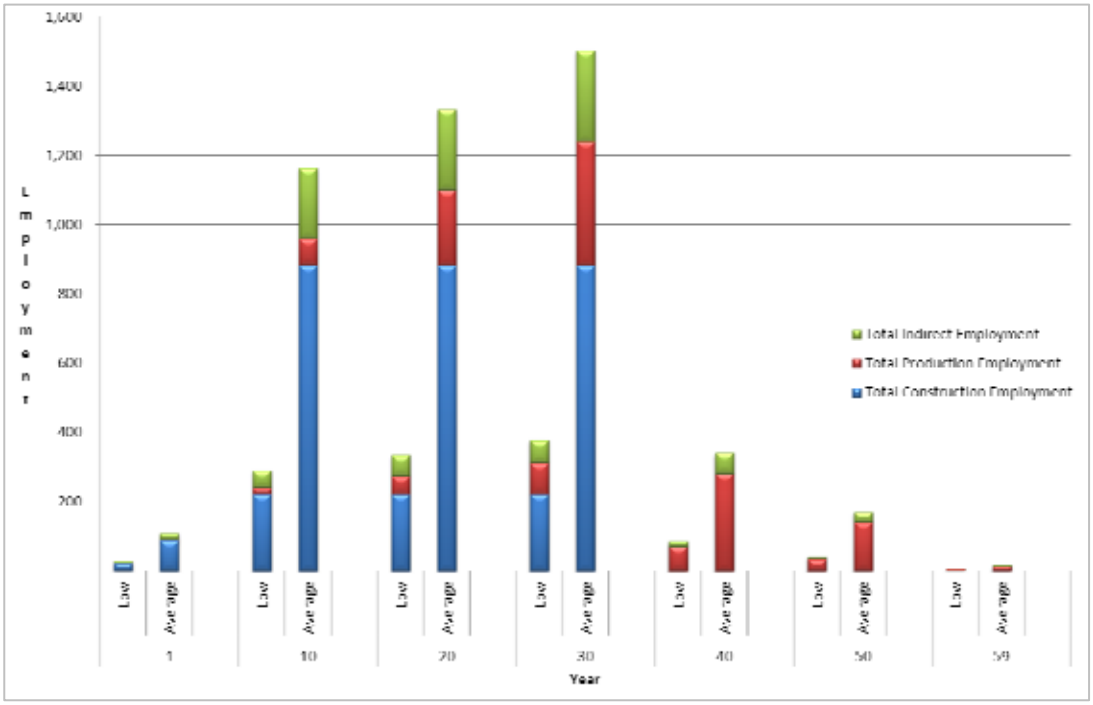


Figure 4-18 Projected Total Employment in Region C Under Each Development Scenario

Table 4-16 Indirect and Total Employment in Region A Under Each Development Scenario for Years 1 to 60

	Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect
1	47	270	187	1,081	281	1,621
2	94	544	379	2,186	565	3,259
3	143	824	572	3,300	855	4,930
4	192	1,106	770	4,441	1,147	6,618
5	243	1,401	969	5,589	1,446	8,340
6	293	1,692	1,171	6,754	1,749	10,088
7	345	1,988	1,377	7,944	2,054	11,850
8	397	2,289	1,585	9,143	2,366	13,649
9	449	2,592	1,797	10,366	2,680	15,462
10	503	2,900	2,011	11,602	3,001	17,310
11	510	2,942	2,041	11,772	3,045	17,564
12	518	2,986	2,070	11,941	3,088	17,816
13	525	3,028	2,100	12,112	3,132	18,069
14	532	3,070	2,129	12,281	3,176	18,322
15	540	3,113	2,158	12,451	3,220	18,576
16	547	3,155	2,188	12,621	3,264	18,829
17	554	3,197	2,217	12,791	3,308	19,082
18	562	3,240	2,247	12,961	3,352	19,335
19	569	3,282	2,276	13,130	3,396	19,589

Table 4-16 Indirect and Total Employment in Region A Under Each Development Scenario for Years 1 to 60

	Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect
20	576	3,324	2,306	13,301	3,439	19,841
21	584	3,368	2,335	13,470	3,483	20,094
22	591	3,410	2,365	13,641	3,527	20,347
23	598	3,452	2,394	13,810	3,571	20,601
24	606	3,495	2,423	13,979	3,615	20,854
25	613	3,537	2,453	14,150	3,659	21,107
26	621	3,580	2,482	14,319	3,703	21,361
27	628	3,622	2,512	14,490	3,747	21,614
28	635	3,664	2,541	14,659	3,791	21,867
29	643	3,707	2,571	14,830	3,834	22,119
30	650	3,749	2,600	14,999	3,878	22,373
31	187	1,079	748	4,315	1,115	6,431
32	186	1,071	742	4,281	1,106	6,380
33	183	1,057	733	4,230	1,093	6,304
34	180	1,040	722	4,163	1,075	6,202
35	177	1,020	707	4,077	1,053	6,076
36	172	994	689	3,975	1,027	5,924
37	167	964	669	3,857	996	5,747
38	161	930	645	3,720	961	5,544
39	155	892	618	3,567	922	5,317
40	147	849	589	3,398	878	5,064
41	140	807	559	3,227	834	4,810
42	133	765	530	3,058	790	4,557
43	125	722	501	2,888	746	4,304
44	118	680	471	2,718	702	4,051
45	111	638	442	2,549	658	3,797
46	103	595	412	2,378	614	3,544
47	96	553	383	2,209	571	3,292
48	88	510	353	2,038	527	3,038
49	81	467	324	1,869	483	2,785
50	74	425	294	1,698	439	2,532
51	66	382	265	1,529	395	2,279
52	59	340	236	1,360	351	2,025
53	52	298	206	1,189	307	1,772
54	44	255	177	1,020	263	1,519
55	37	213	147	849	220	1,267
56	30	171	118	680	176	1,013
57	22	128	88	510	132	760
58	15	85	59	340	88	507
59	7	42	30	171	44	254
60	-	-	-	-	-	-

Table 4-17 Indirect and Total Employment in Region B Under Each Development Scenario for Years 1 to 60

	Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect
1	14	117	55	465	82	699
2	28	235	111	942	166	1,405
3	42	355	168	1,423	251	2,125
4	56	476	226	1,914	336	2,852
5	71	603	284	2,409	424	3,594
6	86	729	343	2,911	513	4,348
7	101	856	404	3,424	602	5,108
8	116	986	465	3,942	694	5,884
9	132	1,118	527	4,469	786	6,665
10	147	1,250	590	5,001	880	7,462
11	150	1,269	598	5,074	893	7,572
12	152	1,287	607	5,147	906	7,681
13	154	1,305	616	5,221	919	7,790
14	156	1,323	624	5,294	931	7,898
15	158	1,342	633	5,367	944	8,008
16	160	1,360	642	5,441	957	8,117
17	163	1,379	650	5,514	970	8,226
18	165	1,397	659	5,587	983	8,336
19	167	1,415	668	5,661	996	8,445
20	169	1,433	676	5,733	1,009	8,554
21	171	1,452	685	5,807	1,022	8,663
22	173	1,470	693	5,879	1,035	8,773
23	176	1,489	702	5,953	1,047	8,881
24	178	1,507	711	6,026	1,060	8,990
25	180	1,525	719	6,099	1,073	9,099
26	182	1,543	728	6,173	1,086	9,209
27	184	1,561	737	6,246	1,099	9,318
28	186	1,580	745	6,319	1,112	9,427
29	189	1,599	754	6,393	1,125	9,536
30	191	1,617	762	6,465	1,138	9,646
31	55	465	219	1,860	327	2,772
32	54	461	218	1,846	324	2,750
33	54	456	215	1,823	320	2,717
34	53	449	212	1,795	315	2,673
35	52	440	207	1,757	309	2,619
36	51	429	202	1,714	301	2,554
37	49	416	196	1,662	292	2,477
38	47	401	189	1,604	282	2,390
39	45	384	181	1,538	270	2,291
40	43	366	173	1,465	257	2,182
41	41	348	164	1,391	245	2,074
42	39	330	155	1,318	232	1,965
43	37	312	147	1,245	219	1,855
44	34	292	138	1,171	206	1,746

Table 4-17 Indirect and Total Employment in Region B Under Each Development Scenario for Years 1 to 60

	Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect
45	32	274	130	1,099	193	1,637
46	30	256	121	1,025	180	1,528
47	28	238	112	952	167	1,418
48	26	220	104	879	154	1,309
49	24	202	95	805	142	1,201
50	22	183	86	732	129	1,092
51	19	164	78	659	116	982
52	17	146	69	586	103	873
53	15	128	60	512	90	764
54	13	110	52	440	77	655
55	11	92	43	366	64	545
56	9	74	34	292	51	436
57	7	56	26	220	39	328
58	4	36	17	146	26	219
59	2	18	9	74	13	109
60	-	-	-	-	-	-

Table 4-18 Indirect and Total Employment in Region C Under Each Development Scenario for Years 1 to 60

	Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect
1	5	27	19	108	28	162
2	10	55	38	218	57	326
3	14	82	58	331	87	495
4	20	112	78	444	116	663
5	24	139	98	560	146	835
6	30	170	119	678	177	1,011
7	35	200	139	795	208	1,188
8	40	229	160	916	239	1,367
9	46	261	182	1,039	271	1,549
10	51	291	203	1,162	304	1,735
11	52	296	206	1,179	308	1,760
12	52	299	209	1,196	313	1,786
13	53	304	212	1,213	317	1,811
14	54	308	215	1,230	321	1,836
15	55	313	218	1,247	326	1,862
16	55	316	222	1,266	330	1,887
17	56	321	225	1,283	335	1,913
18	57	325	227	1,299	339	1,938
19	58	330	230	1,316	344	1,963
20	58	333	233	1,333	348	1,988

Table 4-18 Indirect and Total Employment in Region C Under Each Development Scenario for Years 1 to 60

	Employment (expressed in FTE jobs)					
	Low		Average		High	
Year	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect	Total Indirect	Total Direct and Indirect
21	59	338	236	1,350	352	2,013
22	60	342	239	1,367	357	2,039
23	61	347	242	1,384	361	2,064
24	61	350	245	1,401	366	2,090
25	62	355	248	1,418	370	2,115
26	63	360	251	1,435	375	2,141
27	64	364	254	1,452	379	2,166
28	65	369	257	1,469	384	2,192
29	65	372	260	1,486	388	2,217
30	66	377	263	1,503	393	2,243
31	19	108	76	433	113	645
32	19	108	75	429	112	639
33	18	105	74	424	111	632
34	18	104	73	417	109	622
35	18	102	72	409	107	609
36	17	99	70	399	104	594
37	17	97	68	387	101	576
38	16	93	65	373	97	555
39	16	90	63	358	93	532
40	15	85	60	341	89	508
41	14	81	57	324	84	482
42	13	76	54	307	80	457
43	13	73	51	290	76	432
44	12	68	48	273	71	406
45	11	64	45	256	67	381
46	10	59	42	239	62	355
47	10	56	39	222	58	330
48	9	51	36	205	53	304
49	8	47	33	187	49	279
50	7	42	30	170	44	253
51	7	39	27	153	40	228
52	6	34	24	136	35	202
53	5	30	21	119	31	178
54	4	25	18	102	27	153
55	4	22	15	85	22	127
56	3	17	12	68	18	102
57	2	13	9	51	13	76
58	1	8	6	34	9	51
59	1	5	3	17	4	25
60	-	-	-	-	-	-

The proposed use of high-volume hydraulic fracturing would have a significant, positive impact on employment in New York State as a whole and in the affected communities. However, the distribution of these positive employment impacts would not be evenly distributed throughout the state or even throughout the areas where low-permeability shale is located. Many geological and economic factors would interact to determine the exact locations where wells would be drilled. The location of productive wells would determine the distribution of impacts.

In some regions of the state where drilling would most likely occur, the increases in employment may be so large that these regions may experience some short-term labor shortages. The increase in direct and indirect employment related to the natural gas extraction industry could drive wage rates up in such areas in the short term and make it more difficult for existing industries to recruit and retain qualified workers. In addition, the increase in wage rates could have a short-term negative impact on existing industries, as it would increase their labor costs. These potential short-term labor impacts would less severe because the use of specialized labor from outside the region would likely be required for certain jobs, and the existence of employment opportunities would cause the migration of workers into the region. In addition, the positive employment impacts from well construction and development—and the related economic impacts derived from that employment—would generate more in-migration to the region. In time, the additional new residents to the areas would expand the regional labor force and reduce the pressure on labor costs.

In contrast, other regions of the state may experience only minor or moderate employment impacts. In areas where only a few wells are drilled or where development occurs at a slower rate, the employment impacts would be less significant but still beneficial. Moderate well development would lead to moderate employment gains in these regions. This moderate increase in the demand for workers would have a positive impact on these regions' economies without having the likelihood of creating labor shortages.

4.2.2.2 Income

The increase in direct and indirect employment would have a positive impact on income levels in regions where natural gas development occurs. Table 4-19 provides estimates of the maximum direct and indirect employee earnings that would be generated under each development scenario. When well construction reaches its maximum levels (Year 10 to Year 30), total annual construction earnings in a region could range from a low of $15.0 million in Region C under the low development scenario to nearly $890.8 million under the high development scenario in Region A. In Year 30, the year that the maximum number of production workers are assumed to be employed, regional employee earnings from production employment could range from a low of $4.5 million in Region C under the low development scenario to a high of $262.6 million in Region A under the high development scenario (see Table 4-19).

Table 4-19 Maximum Direct and Indirect Earnings Impacts on Each Representative Region Under Each Development Scenario

	Employee Earnings ($ millions)		
	Low	Average	High
Region A			
Direct Employment Impacts			
Construction Earnings[1]	$149.2	$597.0	$890.8
Production Earnings[2]	$60.6	$242.4	$361.3
Indirect Earnings Impacts[3]	$44.0	$176.0	$262.6
Total Earnings Impacts	$253.8	$1,015.4	$1,514.7
Total Earnings as a Percentage of Region A's 2009 Total Wages	4.7%	18.7%	27.9%
Region B			
Direct Earnings Impacts			
Construction Earnings[1]	$68.6	$274.6	$409.8
Production Earnings[2]	$27.9	$111.5	$166.2
Indirect Earnings Impacts[3]	$12.9	$51.6	$77.0
Total Earnings Impacts	$109.4	$437.7	$653.0
Total Earnings as a Percentage of Region B's 2009 Total Wages	4.8%	19.3%	28.8%
Region C			
Direct Earnings Impacts			
Construction Earnings[1]	$15.0	$59.7	$89.1
Production Earnings[2]	$6.1	$24.2	$36.2
Indirect Earnings Impacts[3]	$4.5	$17.8	$26.6
Total Earnings Impacts	$25.6	$101.7	$151.9
Total Earnings as a Percent of Region C's 2009 Total Wages	0.9%	3.7%	5.6%

Source: USBEA 2011b, 2011c, 2011d; NYSDOL 2009a.

[1] These figures represent the maximum annual construction earnings under each scenario and correspond to construction earnings in Years 10 through 30.

[2] These figures represent the maximum annual production earnings and indirect employee earnings under each development scenario. These figures correspond to production earnings and indirect employee earnings in Year 30.

[3] Separate Type I direct earnings multipliers for the oil and gas extraction industry from the US Bureau of Economic Analysis, Regional Input- Output Modeling System (RIMS II) for each region were used to estimate the indirect employment impacts.

Total employee earnings in all of the regions are expected to increase significantly. Region A would experience annual increases in employee earnings of approximately $254 million to $1.5 billion, or 4.7% to 27.9% of the 2009 total wages and salaries for the region at maximum build-out. Similarly, Region B would experience annual increases in employee earnings of approximately $109 million to $653 million, or 4.8% to 28.8% of 2009 total wages and salaries for the region in Year 30. Region C would also experience a significant impact in its annual employee earnings. Employee earnings in this region would increase from

approximately $26 million to $152 million, or 0.9% to 5.6% of the 2009 total wages and salaries for the region during the same time period (see Table 4-19).

As described previously, total direct employee earnings were estimated using existing 2009 New York State annual average wage rates for the oil and gas industry from the New York State Department of Labor. Data on the average number of hours worked in the industry from the U.S. Bureau of Labor statistics were then used to pro rate the annual wage to determine the estimated wage an FTE worker would receive per year. Estimated direct construction and production earnings in Regions A, B, and C under each development scenario are shown for Years 1 to 60 in Tables 4-20, 4-21, and 4-22.

Table 4-22 Total Direct Construction and Production Earnings in Region A Under Each Development Scenario for Years 1 to 60

	Direct Earnings ($ millions)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
1	$14.8	$0.3	$59.6	$0.9	$89.3	$1.4
2	$29.7	$0.7	$119.5	$2.8	$178.1	$4.3
3	$44.7	$1.4	$179.0	$5.7	$267.3	$8.5
4	$59.5	$2.4	$239.0	$9.5	$356.2	$14.2
5	$74.8	$3.6	$298.5	$14.3	$445.4	$21.3
6	$89.7	$5.0	$358.0	$20.0	$534.7	$29.8
7	$104.5	$6.7	$418.0	$26.6	$623.5	$39.7
8	$119.5	$8.6	$477.4	$34.3	$712.8	$51.0
9	$134.4	$10.7	$537.3	$42.8	$801.5	$63.8
10	$149.2	$13.1	$597.0	$52.3	$890.8	$77.9
11	$149.2	$15.4	$597.0	$61.8	$890.8	$92.1
12	$149.2	$17.9	$597.0	$71.3	$890.8	$106.3
13	$149.2	$20.2	$597.0	$80.8	$890.8	$120.4
14	$149.2	$22.6	$597.0	$90.3	$890.8	$134.6
15	$149.2	$25.0	$597.0	$99.9	$890.8	$148.8
16	$149.2	$27.3	$597.0	$109.3	$890.8	$162.9
17	$149.2	$29.7	$597.0	$118.9	$890.8	$177.1
18	$149.2	$32.1	$597.0	$128.4	$890.8	$191.2
19	$149.2	$34.5	$597.0	$137.8	$890.8	$205.5
20	$149.2	$36.8	$597.0	$147.4	$890.8	$219.6
21	$149.2	$39.3	$597.0	$156.9	$890.8	$233.8
22	$149.2	$41.6	$597.0	$166.4	$890.8	$247.9
23	$149.2	$44.0	$597.0	$175.9	$890.8	$262.1
24	$149.2	$46.4	$597.0	$185.4	$890.8	$276.3
25	$149.2	$48.7	$597.0	$194.9	$890.8	$290.4
26	$149.2	$51.1	$597.0	$204.4	$890.8	$304.6
27	$149.2	$53.5	$597.0	$213.9	$890.8	$318.8
28	$149.2	$55.9	$597.0	$223.4	$890.8	$332.9
29	$149.2	$58.2	$597.0	$232.9	$890.8	$347.1

Table 4-22 Total Direct Construction and Production Earnings in Region A Under Each Development Scenario for Years 1 to 60

	Direct Earnings ($ millions)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
30	$149.2	$60.6	$597.0	$242.4	$890.8	$361.3
31	-	$60.4	-	$241.5	-	$359.9
32	-	$59.9	-	$239.6	-	$357.0
33	-	$59.2	-	$236.7	-	$352.8
34	-	$58.2	-	$232.9	-	$347.1
35	-	$57.1	-	$228.1	-	$340.0
36	-	$55.6	-	$222.5	-	$331.5
37	-	$54.0	-	$215.8	-	$321.6
38	-	$52.1	-	$208.2	-	$310.3
39	-	$49.9	-	$199.6	-	$297.5
40	-	$47.5	-	$190.2	-	$283.4
41	-	$45.2	-	$180.6	-	$269.2
42	-	$42.8	-	$171.1	-	$255.0
43	-	$40.4	-	$161.6	-	$240.9
44	-	$38.0	-	$152.1	-	$226.7
45	-	$35.7	-	$142.6	-	$212.5
46	-	$33.3	-	$133.1	-	$198.4
47	-	$30.9	-	$123.6	-	$184.2
48	-	$28.6	-	$114.1	-	$170.0
49	-	$26.1	-	$104.6	-	$155.8
50	-	$23.8	-	$95.0	-	$141.7
51	-	$21.4	-	$85.6	-	$127.5
52	-	$19.0	-	$76.1	-	$113.3
53	-	$16.7	-	$66.5	-	$99.2
54	-	$14.3	-	$57.1	-	$85.0
55	-	$11.9	-	$47.5	-	$70.9
56	-	$9.5	-	$38.0	-	$56.7
57	-	$7.2	-	$28.6	-	$42.5
58	-	$4.7	-	$19.0	-	$28.4
59	-	$2.4	-	$9.5	-	$14.2
60	-	-	-	-	-	-

Source: NYSDOL 2010b; BLS 2011.

Table 4-21 Total Direct Construction and Production Earnings in Region B Under Each Development Scenario for Years 1 to 60

	Direct Earnings ($ millions)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
1	$6.8	$0.1	$27.3	$0.4	$41.1	$0.7
2	$13.7	$0.3	$55.0	$1.3	$81.9	$2.0
3	$20.5	$0.7	$82.3	$2.6	$122.9	$3.9
4	$27.3	$1.1	$109.9	$4.4	$163.8	$6.5
5	$34.4	$1.6	$137.3	$6.6	$204.9	$9.7
6	$41.2	$2.3	$164.6	$9.2	$245.9	$13.7
7	$48.1	$3.0	$192.2	$12.3	$286.8	$18.3
8	$55.0	$3.9	$219.6	$15.8	$327.9	$23.5
9	$61.8	$4.9	$247.2	$19.7	$368.7	$29.3
10	$68.6	$6.0	$274.6	$24.0	$409.8	$35.8
11	$68.6	$7.1	$274.6	$28.4	$409.8	$42.4
12	$68.6	$8.2	$274.6	$32.8	$409.8	$48.9
13	$68.6	$9.3	$274.6	$37.2	$409.8	$55.4
14	$68.6	$10.4	$274.6	$41.6	$409.8	$61.9
15	$68.6	$11.5	$274.6	$45.9	$409.8	$68.4
16	$68.6	$12.6	$274.6	$50.3	$409.8	$74.9
17	$68.6	$13.7	$274.6	$54.7	$409.8	$81.4
18	$68.6	$14.8	$274.6	$59.0	$409.8	$88.0
19	$68.6	$15.8	$274.6	$63.4	$409.8	$94.5
20	$68.6	$16.9	$274.6	$67.8	$409.8	$101.0
21	$68.6	$18.1	$274.6	$72.2	$409.8	$107.5
22	$68.6	$19.2	$274.6	$76.5	$409.8	$114.1
23	$68.6	$20.2	$274.6	$80.9	$409.8	$120.6
24	$68.6	$21.3	$274.6	$85.2	$409.8	$127.1
25	$68.6	$22.4	$274.6	$89.6	$409.8	$133.6
26	$68.6	$23.5	$274.6	$94.0	$409.8	$140.1
27	$68.6	$24.6	$274.6	$98.4	$409.8	$146.6
28	$68.6	$25.7	$274.6	$102.8	$409.8	$153.1
29	$68.6	$26.8	$274.6	$107.2	$409.8	$159.6
30	$68.6	$27.9	$274.6	$111.5	$409.8	$166.2
31	-	$27.8	-	$111.1	-	$165.5
32	-	$27.6	-	$110.2	-	$164.2
33	-	$27.2	-	$108.9	-	$162.3
34	-	$26.8	-	$107.2	-	$159.6
35	-	$26.3	-	$104.9	-	$156.4
36	-	$25.6	-	$102.4	-	$152.5
37	-	$24.8	-	$99.2	-	$147.9
38	-	$24.0	-	$95.8	-	$142.7
39	-	$22.9	-	$91.9	-	$136.8
40	-	$21.9	-	$87.5	-	$130.3
41	-	$20.8	-	$83.1	-	$123.8

Table 4-21 Total Direct Construction and Production Earnings in Region B Under Each Development Scenario for Years 1 to 60

	Direct Earnings ($ millions)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
42	-	$19.7	-	$78.7	-	$117.3
43	-	$18.6	-	$74.3	-	$110.8
44	-	$17.5	-	$69.9	-	$104.3
45	-	$16.4	-	$65.6	-	$97.8
46	-	$15.3	-	$61.2	-	$91.3
47	-	$14.2	-	$56.9	-	$84.7
48	-	$13.1	-	$52.5	-	$78.2
49	-	$12.1	-	$48.1	-	$71.7
50	-	$10.9	-	$43.7	-	$65.2
51	-	$9.8	-	$39.3	-	$58.6
52	-	$8.7	-	$35.0	-	$52.1
53	-	$7.6	-	$30.6	-	$45.6
54	-	$6.6	-	$26.3	-	$39.1
55	-	$5.5	-	$21.9	-	$32.6
56	-	$4.4	-	$17.5	-	$26.1
57	-	$3.3	-	$13.1	-	$19.6
58	-	$2.2	-	$8.7	-	$13.1
59	-	$1.1	-	$4.4	-	$6.5
60	-	-	-	-	-	-

Source: NYSDOL 2010b; BLS 2011.

Table 4-22 Total Direct Construction and Production Earnings in Region C Under Each Development Scenario for Years 1 to 60

	Direct Earnings ($ millions)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
1	$1.5	>$0.1	$6.0	$0.1	$8.9	$0.1
2	$3.0	$0.1	$11.9	$0.3	$17.8	$0.4
3	$4.5	$0.1	$17.9	$0.5	$26.7	$0.9
4	$6.0	$0.3	$23.8	$0.9	$35.6	$1.4
5	$7.4	$0.3	$29.9	$1.4	$44.5	$2.1
6	$9.0	$0.5	$35.8	$2.0	$53.5	$3.0
7	$10.5	$0.7	$41.8	$2.6	$62.3	$4.0
8	$11.9	$0.9	$47.7	$3.5	$71.3	$5.1
9	$13.5	$1.1	$53.8	$4.3	$80.2	$6.4
10	$15.0	$1.3	$59.7	$5.2	$89.1	$7.8
11	$15.0	$1.6	$59.7	$6.2	$89.1	$9.2
12	$15.0	$1.8	$59.7	$7.1	$89.1	$10.6
13	$15.0	$2.0	$59.7	$8.1	$89.1	$12.1
14	$15.0	$2.2	$59.7	$9.0	$89.1	$13.5
15	$15.0	$2.5	$59.7	$10.0	$89.1	$14.9

Table 4-22 Total Direct Construction and Production Earnings in Region C Under Each Development Scenario for Years 1 to 60

	Direct Earnings ($ millions)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
16	$15.0	$2.7	$59.7	$11.0	$89.1	$16.3
17	$15.0	$3.0	$59.7	$11.9	$89.1	$17.7
18	$15.0	$3.2	$59.7	$12.9	$89.1	$19.2
19	$15.0	$3.5	$59.7	$13.8	$89.1	$20.5
20	$15.0	$3.7	$59.7	$14.8	$89.1	$21.9
21	$15.0	$3.9	$59.7	$15.7	$89.1	$23.4
22	$15.0	$4.1	$59.7	$16.7	$89.1	$24.8
23	$15.0	$4.4	$59.7	$17.6	$89.1	$26.2
24	$15.0	$4.6	$59.7	$18.5	$89.1	$27.6
25	$15.0	$4.9	$59.7	$19.5	$89.1	$29.0
26	$15.0	$5.1	$59.7	$20.4	$89.1	$30.5
27	$15.0	$5.3	$59.7	$21.4	$89.1	$31.9
28	$15.0	$5.6	$59.7	$22.3	$89.1	$33.3
29	$15.0	$5.8	$59.7	$23.3	$89.1	$34.7
30	$15.0	$6.1	$59.7	$24.2	$89.1	$36.2
31	-	$6.0	-	$24.2	-	$36.0
32	-	$6.0	-	$24.0	-	$35.7
33	-	$5.9	-	$23.7	-	$35.3
34	-	$5.8	-	$23.3	-	$34.7
35	-	$5.7	-	$22.8	-	$34.0
36	-	$5.6	-	$22.3	-	$33.2
37	-	$5.4	-	$21.6	-	$32.2
38	-	$5.2	-	$20.9	-	$31.0
39	-	$5.0	-	$20.0	-	$29.7
40	-	$4.7	-	$19.0	-	$28.4
41	-	$4.5	-	$18.1	-	$26.9
42	-	$4.3	-	$17.1	-	$25.5
43	-	$4.1	-	$16.2	-	$24.1
44	-	$3.8	-	$15.2	-	$22.7
45	-	$3.6	-	$14.3	-	$21.3
46	-	$3.3	-	$13.3	-	$19.8
47	-	$3.1	-	$12.4	-	$18.4
48	-	$2.8	-	$11.4	-	$17.0
49	-	$2.6	-	$10.4	-	$15.6
50	-	$2.4	-	$9.5	-	$14.1
51	-	$2.2	-	$8.5	-	$12.7
52	-	$1.9	-	$7.6	-	$11.3
53	-	$1.7	-	$6.6	-	$10.0
54	-	$1.4	-	$5.7	-	$8.5
55	-	$1.2	-	$4.7	-	$7.1
56	-	$0.9	-	$3.8	-	$5.7

Table 4-22 Total Direct Construction and Production Earnings in Region C Under Each Development Scenario for Years 1 to 60

	Direct Earnings ($ millions)					
	Low		Average		High	
Year	Construction	Production	Construction	Production	Construction	Production
57	-	$0.7	-	$2.8	-	$4.3
58	-	$0.5	-	$1.9	-	$2.8
59	-	$0.3	-	$0.9	-	$1.4
60	-	-	-	-	-	-

Source: NYSDOL 2010b; BLS 2011.

Indirect employee earnings were estimated using USBEA Regional Input-Output multipliers. Type I, direct-effect l, earnings multipliers from the oil and gas extraction industry for each specific region were used to estimate the impacts associated with the proposed development of natural gas reserves in low-permeability shale. These multipliers were 1.2097 in Region A, 1.1337 in Region B, and 1.2122 in Region C (USBEA 2011b; 2011c; 2011d). Indirect and total earnings projected to occur in Years 1 to 60 are shown in Tables 4-23, 4-24, and 4-25.

Table 4-23 Indirect and Total Construction and Production Earnings in Region A Under Each Development Scenario for Years 1 to 60

	Earnings ($ millions)					
	Low		Average		High	
Year	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)
1	$3.2	$18.3	$12.7	$73.2	$19.0	$109.7
2	$6.4	$36.9	$25.7	$148.0	$38.2	$220.6
3	$9.7	$55.8	$38.7	$223.4	$57.8	$333.7
4	$13.0	$74.9	$52.1	$300.6	$77.7	$448.0
5	$16.4	$94.8	$65.6	$378.3	$97.9	$564.6
6	$19.9	$114.6	$79.3	$457.2	$118.4	$682.9
7	$23.3	$134.6	$93.2	$537.8	$139.1	$802.2
8	$26.9	$154.9	$107.3	$618.9	$160.2	$924.0
9	$30.4	$175.5	$121.6	$701.7	$181.5	$1,046.8
10	$34.0	$196.3	$136.2	$785.4	$203.1	$1,171.8
11	$34.5	$199.2	$138.1	$796.9	$206.1	$1,189.0
12	$35.0	$202.1	$140.1	$808.4	$209.1	$1,206.1
13	$35.5	$205.0	$142.1	$819.9	$212.0	$1,223.2
14	$36.0	$207.8	$144.1	$831.4	$215.0	$1,240.4
15	$36.5	$210.7	$146.1	$842.9	$218.0	$1,257.6
16	$37.0	$213.6	$148.1	$854.4	$221.0	$1,274.7
17	$37.5	$216.4	$150.1	$865.9	$223.9	$1,291.8
18	$38.0	$219.3	$152.1	$877.4	$226.9	$1,308.9
19	$38.5	$222.2	$154.1	$888.9	$229.9	$1,326.1
20	$39.0	$225.0	$156.1	$900.4	$232.8	$1,343.2
21	$39.5	$228.0	$158.1	$911.9	$235.8	$1,360.3
22	$40.0	$230.9	$160.1	$923.4	$238.8	$1,377.4
23	$40.5	$233.7	$162.1	$934.9	$241.8	$1,394.6

Table 4-23 Indirect and Total Construction and Production Earnings in Region A Under Each Development Scenario for Years 1 to 60

	Earnings ($ millions)					
	Low		Average		High	
Year	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)
24	$41.0	$236.6	$164.1	$946.4	$244.7	$1,411.8
25	$41.5	$239.5	$166.1	$957.9	$247.7	$1,428.9
26	$42.0	$242.3	$168.0	$969.4	$250.7	$1,446.1
27	$42.5	$245.2	$170.0	$980.9	$253.6	$1,463.2
28	$43.0	$248.1	$172.0	$992.4	$256.6	$1,480.3
29	$43.5	$250.9	$174.0	$1,003.9	$259.6	$1,497.4
30	$44.0	$253.8	$176.0	$1,015.4	$262.6	$1,514.6
31	$12.7	$73.0	$50.6	$292.1	$75.5	$435.3
32	$12.6	$72.5	$50.2	$289.8	$74.9	$431.9
33	$12.4	$71.6	$49.6	$286.4	$74.0	$426.7
34	$12.2	$70.4	$48.8	$281.8	$72.8	$419.9
35	$12.0	$69.0	$47.8	$276.0	$71.3	$411.4
36	$11.7	$67.3	$46.6	$269.1	$69.5	$401.0
37	$11.3	$65.3	$45.3	$261.1	$67.4	$389.1
38	$10.9	$63.0	$43.7	$251.8	$65.1	$375.3
39	$10.5	$60.4	$41.9	$241.5	$62.4	$359.9
40	$10.0	$57.5	$39.9	$230.0	$59.4	$342.8
41	$9.5	$54.6	$37.9	$218.5	$56.4	$325.6
42	$9.0	$51.8	$35.9	$207.0	$53.5	$308.5
43	$8.5	$48.9	$33.9	$195.5	$50.5	$291.4
44	$8.0	$46.0	$31.9	$184.0	$47.5	$274.3
45	$7.5	$43.2	$29.9	$172.5	$44.6	$257.1
46	$7.0	$40.3	$27.9	$161.0	$41.6	$239.9
47	$6.5	$37.4	$25.9	$149.5	$38.6	$222.8
48	$6.0	$34.6	$23.9	$138.0	$35.6	$205.6
49	$5.5	$31.6	$21.9	$126.5	$32.7	$188.5
50	$5.0	$28.7	$19.9	$115.0	$29.7	$171.4
51	$4.5	$25.9	$17.9	$103.5	$26.7	$154.3
52	$4.0	$23.0	$16.0	$92.0	$23.8	$137.1
53	$3.5	$20.1	$14.0	$80.5	$20.8	$120.0
54	$3.0	$17.3	$12.0	$69.0	$17.8	$102.9
55	$2.5	$14.4	$10.0	$57.5	$14.9	$85.7
56	$2.0	$11.5	$8.0	$46.0	$11.9	$68.5
57	$1.5	$8.7	$6.0	$34.6	$8.9	$51.4
58	$1.0	$5.7	$4.0	$23.0	$5.9	$34.3
59	$0.5	$2.9	$2.0	$11.5	$3.0	$17.2
60	-	-	-	-	-	-

Source: USBEA 2011b.

Table 4-24 Indirect and Total Construction and Production Earnings in Region B Under Each Development Scenario for Years 1 to 60

	Earnings ($ millions)					
	Low		Average		High	
Year	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)
1	$0.9	$7.9	$3.7	$31.5	$5.6	$47.4
2	$1.9	$15.9	$7.5	$63.8	$11.2	$95.1
3	$2.8	$24.0	$11.4	$96.3	$17.0	$143.8
4	$3.8	$32.2	$15.3	$129.6	$22.8	$193.1
5	$4.8	$40.8	$19.2	$163.1	$28.7	$243.3
6	$5.8	$49.3	$23.2	$197.1	$34.7	$294.3
7	$6.8	$57.9	$27.3	$231.8	$40.8	$345.8
8	$7.9	$66.8	$31.5	$266.9	$47.0	$398.3
9	$8.9	$75.7	$35.7	$302.5	$53.2	$451.2
10	$10.0	$84.7	$39.9	$338.5	$59.6	$505.2
11	$10.1	$85.9	$40.5	$343.5	$60.5	$512.6
12	$10.3	$87.1	$41.1	$348.4	$61.3	$520.0
13	$10.4	$88.3	$41.7	$353.4	$62.2	$527.3
14	$10.6	$89.6	$42.3	$358.4	$63.1	$534.7
15	$10.7	$90.9	$42.8	$363.3	$63.9	$542.2
16	$10.9	$92.1	$43.4	$368.3	$64.8	$549.5
17	$11.0	$93.3	$44.0	$373.3	$65.7	$556.9
18	$11.2	$94.6	$44.6	$378.2	$66.6	$564.3
19	$11.3	$95.8	$45.2	$383.2	$67.4	$571.7
20	$11.4	$97.0	$45.8	$388.1	$68.3	$579.1
21	$11.6	$98.3	$46.4	$393.1	$69.2	$586.4
22	$11.7	$99.5	$46.9	$398.0	$70.0	$593.9
23	$11.9	$100.8	$47.5	$403.0	$70.9	$601.2
24	$12.0	$102.0	$48.1	$407.9	$71.8	$608.6
25	$12.2	$103.2	$48.7	$412.9	$72.6	$616.0
26	$12.3	$104.5	$49.3	$417.9	$73.5	$623.4
27	$12.5	$105.7	$49.9	$422.8	$74.4	$630.8
28	$12.6	$107.0	$50.5	$427.8	$75.3	$638.2
29	$12.8	$108.2	$51.0	$432.8	$76.1	$645.5
30	$12.9	$109.4	$51.6	$437.7	$77.0	$653.0
31	$3.7	$31.5	$14.9	$125.9	$22.1	$187.7
32	$3.7	$31.2	$14.7	$124.9	$22.0	$186.2
33	$3.6	$30.9	$14.6	$123.4	$21.7	$184.0
34	$3.6	$30.4	$14.3	$121.5	$21.3	$181.0
35	$3.5	$29.8	$14.0	$119.0	$20.9	$177.3
36	$3.4	$29.0	$13.7	$116.0	$20.4	$172.9
37	$3.3	$28.2	$13.3	$112.5	$19.8	$167.7
38	$3.2	$27.2	$12.8	$108.6	$19.1	$161.8
39	$3.1	$26.0	$12.3	$104.1	$18.3	$155.1
40	$2.9	$24.8	$11.7	$99.2	$17.4	$147.7
41	$2.8	$23.6	$11.1	$94.2	$16.6	$140.4
42	$2.6	$22.3	$10.5	$89.3	$15.7	$133.0
43	$2.5	$21.1	$9.9	$84.3	$14.8	$125.6

Table 4-24 Indirect and Total Construction and Production Earnings in Region B Under Each Development Scenario for Years 1 to 60

	Earnings ($ millions)					
	Low		Average		High	
Year	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)
44	$2.3	$19.8	$9.4	$79.3	$13.9	$118.2
45	$2.2	$18.6	$8.8	$74.4	$13.1	$110.8
46	$2.0	$17.3	$8.2	$69.4	$12.2	$103.5
47	$1.9	$16.1	$7.6	$64.5	$11.3	$96.0
48	$1.8	$14.9	$7.0	$59.5	$10.5	$88.6
49	$1.6	$13.7	$6.4	$54.5	$9.6	$81.3
50	$1.5	$12.4	$5.8	$49.6	$8.7	$73.9
51	$1.3	$11.1	$5.3	$44.6	$7.8	$66.5
52	$1.2	$9.9	$4.7	$39.7	$7.0	$59.1
53	$1.0	$8.7	$4.1	$34.7	$6.1	$51.7
54	$0.9	$7.4	$3.5	$29.8	$5.2	$44.4
55	$0.7	$6.2	$2.9	$24.8	$4.4	$36.9
56	$0.6	$5.0	$2.3	$19.8	$3.5	$29.5
57	$0.4	$3.8	$1.8	$14.9	$2.6	$22.2
58	$0.3	$2.5	$1.2	$9.9	$1.7	$14.8
59	$0.1	$1.2	$0.6	$5.0	$0.9	$7.4
60	-	-	-	-	-	-

Source: USBEA 2011c.

Table 4-25 Indirect and Total Construction and Production Earnings in Region C Under Each Development Scenario for Years 1 to 60

	Earnings ($ millions)					
	Low		Average		High	
Year	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)
1	$0.3	$1.8	$1.3	$7.3	$1.9	$11.0
2	$0.6	$3.7	$2.6	$14.8	$3.9	$22.1
3	$1.0	$5.6	$3.9	$22.4	$5.9	$33.5
4	$1.3	$7.6	$5.3	$30.0	$7.9	$44.9
5	$1.7	$9.4	$6.6	$37.9	$9.9	$56.5
6	$2.0	$11.5	$8.0	$45.9	$12.0	$68.4
7	$2.4	$13.5	$9.4	$53.8	$14.1	$80.4
8	$2.7	$15.5	$10.9	$62.0	$16.2	$92.6
9	$3.1	$17.6	$12.3	$70.3	$18.4	$104.9
10	$3.4	$19.7	$13.8	$78.7	$20.6	$117.4
11	$3.5	$20.0	$14.0	$79.8	$20.9	$119.2
12	$3.5	$20.3	$14.2	$81.0	$21.2	$120.9
13	$3.6	$20.6	$14.4	$82.1	$21.5	$122.6
14	$3.6	$20.8	$14.6	$83.3	$21.8	$124.3
15	$3.7	$21.2	$14.8	$84.4	$22.1	$126.0
16	$3.7	$21.4	$15.0	$85.7	$22.4	$127.8
17	$3.8	$21.7	$15.2	$86.8	$22.7	$129.5
18	$3.9	$22.0	$15.4	$88.0	$23.0	$131.2

Table 4-25 Indirect and Total Construction and Production Earnings in Region C Under Each Development Scenario for Years 1 to 60

	Earnings ($ millions)					
	Low		Average		High	
Year	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)	Indirect	Total (Direct and Indirect)
19	$3.9	$22.3	$15.6	$89.1	$23.3	$132.9
20	$4.0	$22.6	$15.8	$90.3	$23.6	$134.6
21	$4.0	$22.9	$16.0	$91.4	$23.9	$136.3
22	$4.1	$23.1	$16.2	$92.6	$24.2	$138.0
23	$4.1	$23.5	$16.4	$93.7	$24.5	$139.8
24	$4.2	$23.7	$16.6	$94.9	$24.8	$141.5
25	$4.2	$24.0	$16.8	$96.0	$25.1	$143.2
26	$4.3	$24.4	$17.0	$97.2	$25.4	$144.9
27	$4.3	$24.6	$17.2	$98.3	$25.7	$146.6
28	$4.4	$24.9	$17.4	$99.5	$26.0	$148.4
29	$4.4	$25.2	$17.6	$100.6	$26.3	$150.1
30	$4.5	$25.5	$17.8	$101.8	$26.6	$151.8
31	$1.3	$7.3	$5.1	$29.3	$7.6	$43.7
32	$1.3	$7.3	$5.1	$29.1	$7.6	$43.2
33	$1.3	$7.1	$5.0	$28.7	$7.5	$42.8
34	$1.2	$7.1	$4.9	$28.2	$7.4	$42.1
35	$1.2	$6.9	$4.8	$27.7	$7.2	$41.2
36	$1.2	$6.7	$4.7	$27.0	$7.0	$40.2
37	$1.1	$6.6	$4.6	$26.2	$6.8	$39.0
38	$1.1	$6.3	$4.4	$25.3	$6.6	$37.6
39	$1.1	$6.1	$4.2	$24.2	$6.3	$36.0
40	$1.0	$5.7	$4.0	$23.1	$6.0	$34.4
41	$1.0	$5.5	$3.8	$21.9	$5.7	$32.7
42	$0.9	$5.2	$3.6	$20.8	$5.4	$30.9
43	$0.9	$4.9	$3.4	$19.6	$5.1	$29.2
44	$0.8	$4.6	$3.2	$18.5	$4.8	$27.5
45	$0.8	$4.3	$3.0	$17.3	$4.5	$25.8
46	$0.7	$4.0	$2.8	$16.2	$4.2	$24.0
47	$0.7	$3.8	$2.6	$15.0	$3.9	$22.3
48	$0.6	$3.4	$2.4	$13.9	$3.6	$20.6
49	$0.6	$3.2	$2.2	$12.6	$3.3	$18.9
50	$0.5	$2.9	$2.0	$11.5	$3.0	$17.2
51	$0.5	$2.6	$1.8	$10.3	$2.7	$15.4
52	$0.4	$2.3	$1.6	$9.2	$2.4	$13.7
53	$0.4	$2.1	$1.4	$8.0	$2.1	$12.1
54	$0.3	$1.7	$1.2	$6.9	$1.8	$10.3
55	$0.3	$1.5	$1.0	$5.7	$1.5	$8.6
56	$0.2	$1.1	$0.8	$4.6	$1.2	$6.9
57	$0.2	$0.9	$0.6	$3.4	$0.9	$5.2
58	$0.1	$0.6	$0.4	$2.3	$0.6	$3.4
59	$0.1	$0.3	$0.2	$1.1	$0.3	$1.7
60	$-	$-	$-	$-	$-	$-

Source: USBEA 2011d.

Owners of the subsurface mineral rights where wells are drilled would also experience a significant increase in income and wealth. Royalty payments to property owners typically amount to 12.5% or greater of the annual value of production of the well (NYSDEC 2007b). These royalty payments, particularly in the initial stages of well production when natural gas production is at its peak, could result in significant increases in income. In addition, mineral rights owners often receive large signing bonuses/bonus bids as part of the lease agreements.

Impacts on Other Industries

The proposed high-volume hydraulic-fracturing operations would affect not only the size of the regional economies as described above, but would also have an impact on other industries in the economy.

As previously described, suppliers of the natural gas extraction industry would experience significant increases in demand for their goods and services. Over time, these industries would expand, and their importance in the regional economies would likewise increase. As shown in Table 3-8, the industries expected to experience the greatest indirect, or secondary, growth due to expansion of the natural gas extraction industry would be real estate; the professional, scientific, and technical industries; the management of companies and enterprises; construction; and manufacturing industries. For every $1 million change in the final demand generated in the natural gas extraction industry, a corresponding significant level of output would be generated in these industries. Typically, a change in final demand in an industry is defined as the change in output of that industry multiplied by the value or price of its output. In this case, Table 3-8 shows that a $1 million increase in the value of output from the natural gas extraction industry would generate $47,100 in the real estate and rental and leasing industry; $30,500 in the professional, scientific, and technical services industry; and $27,600 in the management of companies and enterprises industry.

Each of these secondary industries would experience increases in their output, employment, income, and value added. As a result, industries that supply these secondary industries would also experience a positive economic impact, and they would expand as demand for their goods and services increases. Secondary, and eventually even tertiary, suppliers would start to tailor their products to meet the needs of the natural gas extraction industry.

Conversely, some industries in the regional economies may contract as a result of the proposed natural gas development. Negative externalities associated with the natural gas drilling and production could have a negative impact on some industries such as tourism and agriculture. Negative changes to the amenities and aesthetics in an area could have some affect the number of tourist that visit a region, thereby impacting the tourism industry. However, as shown by the tourism statistics provided for Region C, Cattaraugus and Chautauqua counties still have healthy tourism sectors despite having more than 3,900 active natural gas wells in the region.

Similarly, agricultural production in the heavily developed regions may experience some decline as productive agricultural land is taken out of use and is developed by the natural gas industry. Property values also may experience some increase as a result of the natural gas development and the resulting increase in economic activity. The potential increase in land prices, which is one of the main factors of production for agriculture, could impact the industry's input costs in areas experiencing the most intense development.

4.3 Population

This section describes the expected population impacts on New York State and the three representative regions that would likely occur as a result of high-volume hydraulic fracturing operations in New York.

As described previously, three representative regions were selected to assess the range of potential socioeconomic impacts that could occur at the local and regional levels. The designation of these areas as representative regions does not mean that the impacts would necessarily be limited to those areas. Until the production potential of low-permeability reservoirs is proven, it is not possible to predict where every potential high-volume hydraulically fractured well may be sited. The wells could be developed anywhere there is low-permeability shale. The local and regional impacts presented here are intended only to provide order-of-magnitude estimates for the range of potential impacts.

To assess the maximum potential population impacts, the discussion below is based on a hypothetical situation in which (1) all workers hired for the construction and production phases of the natural gas wells migrate into the regions from other areas or (2) workers migrate into the regions from other areas to fill positions that local construction and production workers vacate to work on the natural gas wells. Although this hypothetical situation is used to examine the maximum potential population impacts, it is more likely that the actual outcome would be less than described. Not all workers employed during the construction and production phases would necessarily live in New York State or one of the representative regions. Particularly in the case of well development and production in the Southern Tier, existing natural gas workers currently residing in Pennsylvania, for example, may simply choose to maintain their residency in Pennsylvania and commute to work in New York.

In addition, actual population impacts may also be less than what is described in the following section because currently unemployed or underemployed local workers could be hired to fill some of the construction and production positions, thereby, reducing the total in-migration to the region.

The hiring of currently employed local workers (i.e., those workers that leave existing jobs to work in the natural gas industry) is not expected to reduce total in-migration to the regions as it is assumed that the jobs these local workers are leaving would need to be filled. Given the finite number of workers in the regional labor force, any growth in the total number of jobs available in regional econo-

mies not filled by currently unemployed or underemployed persons would lead to in-migration to the areas.

- The following additional assumptions were used to project population impacts:

- A majority of construction jobs and related population migration to the regions would be temporary and transient in nature in the beginning of the well development phase. As well construction continues, these jobs would gradually be filled by permanent residents.

- Transient construction workers are assumed to temporarily relocate to the region for a short duration and are assumed to not be accompanied by their households. Permanent construction workers are assumed to relocate to the region for the duration of the well development phase and would be accompanied by their entire households.

- Production jobs and related population migration to the regions would be permanent and entire households would relocate to the regions.

- Natural gas development and production would not "crowd out" employment in other, unrelated industrial sectors, and employment in these sectors would remain unchanged.

- Job vacancies created when local employees leave existing industries to take jobs in the natural gas extraction industry would be filled.

- The 2010 average household sizes in New York State (2.64 persons per household), Region A (2.47 persons per household), Region B (2.52 persons per household), and Region C (2.49 persons per household) were used in estimating the population impacts associated with permanent construction and production jobs (USCB 2010a).

- There would be no involuntary displacement of persons due to construction of the natural gas wells, as no buildings would be demolished to make way for wells and wells need to be drilled at least 500 feet away from private wells and 100 feet from inhabited dwellings.

4.3.1 New York State

Both transient and permanent population impacts are expected to occur as a result of natural gas well construction. Given the highly specialized nature of natural gas construction, workers with the skills required to complete a high-volume hydraulic fracturing operation would not be currently available in New York State or in the representative regions. If high-volume hydraulic fracturing operations were to begin in New York State, most of the skilled workers would initially need to be recruited from outside the state and would be both temporary and transient in nature.

As the industry matures and as more natural gas development occurs in the state and representative regions, more local persons would acquire the requisite skills needed for these jobs, and recruitment from within the existing labor force would therefore increase. In addition, as the industry expands and development becomes more assured, the incentive for previously transient workers to become permanent residents within the state or representative regions would also increase. Therefore, it would be expected that eventually there would be a decline in the number of transient construction workers and an increase in the number of permanent construction workers.

In an effort to estimate the mix of transient and permanent construction workers, data collected by the Marcellus Shale Education and Training Center on the occupational composition of the natural gas workforce and data from the USBEA's 2008 National Employment Matrix were used to help forecast the amount of local labor that would be employed in natural gas well development (Marcellus Shale Education and Training Center 2009; USBEA 2011e). Initially, no more than 23% of the construction workforce would be expected to be hired locally. Due to New York State's small existing natural gas industry, the remaining 77% of the workforce would have specialized skills that would most likely be unavailable among New York's labor force in Year 1. Given the newness of the industry, it is assumed that, in Year 1, 77% of the total workforce would be transient workers from outside the state.

As the natural gas industry matures, the number of qualified workers in the state and representative regions would increase. This pool of qualified workers would expand as existing local residents gain the requisite skills and/or formerly transient workers permanently relocate to the state or representative regions. The total number of transient construction workers would gradually increase as the rate of well development increased until Year 10, when the maximum number of transient construction workers under both development scenarios is reached. From Years 11 to 30, the transient population would gradually decrease as a proportion of the total construction workforce. By Year 30, it is assumed that the natural gas industry would be sufficiently mature that 90% of all workers could be hired locally. Figure 4-19 is a logistics curve that shows the expected relationship between time and the percentage of construction jobs that would be held by permanent residents. A logistics curve is an s-shaped curve that is often used by economists to model the spread of innovations or, in this case, new skills.

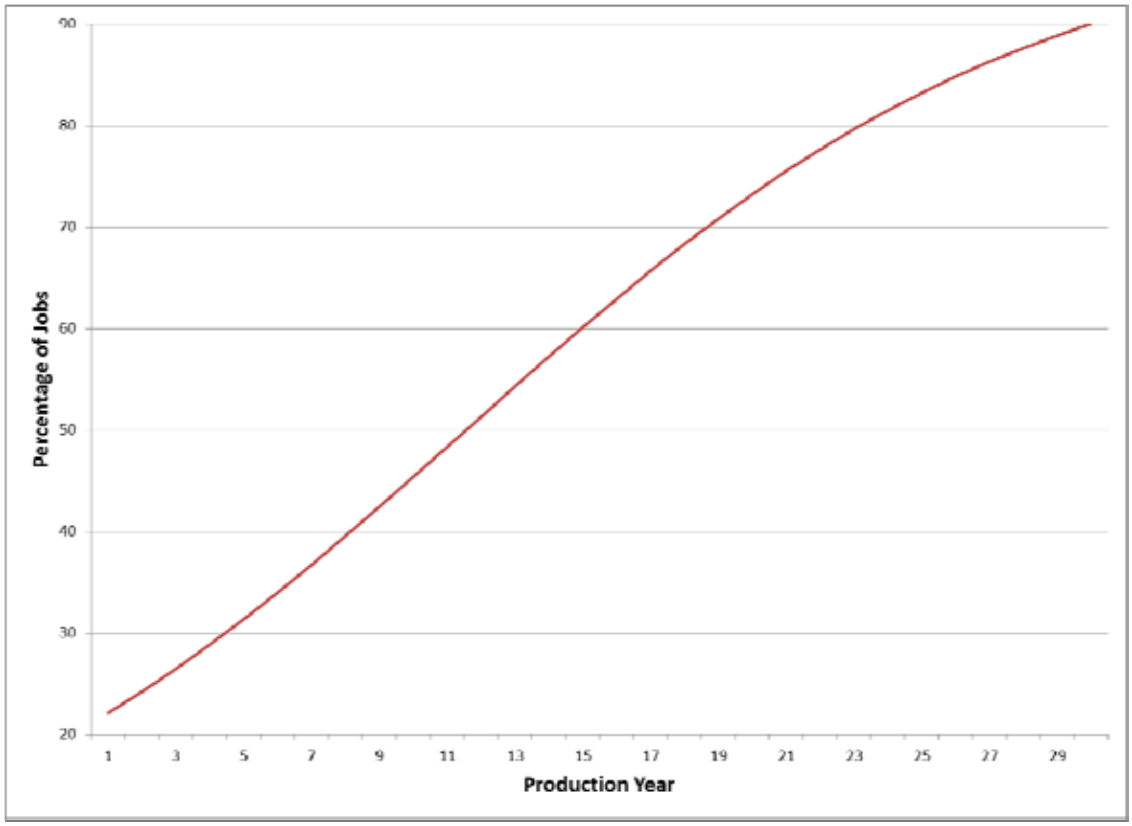


Figure 4-19 Percentage of Construction Jobs Assumed to be Held by Permanent Workers

Tables 4-26, 4-27, and 4-28 show the transient, permanent, and total construction employment for years 1 to 30 under the low, average, and high development scenarios.

Table 4-26 Transient, Permanent and Total Construction Employment Under the Low Development Scenario: New York State

Production Year	Transient	Permanent	Total Construction Employment
1	342	97	439
2	665	213	878
3	971	349	1,320
4	1,251	508	1,759
5	1,517	693	2,210
6	1,749	900	2,649
7	1,954	1,134	3,088
8	2,135	1,395	3,530
9	2,286	1,683	3,969
10	2,409	1,999	4,408
11	2,279	2,129	4,408
12	2,147	2,261	4,408
13	2,016	2,392	4,408

Table 4-26 Transient, Permanent and Total Construction Employment Under the Low Development Scenario: New York State

Production Year	Transient	Permanent	Total Construction Employment
14	1,887	2,521	4,408
15	1,759	2,649	4,408
16	1,635	2,773	4,408
17	1,514	2,894	4,408
18	1,398	3,010	4,408
19	1,287	3,121	4,408
20	1,181	3,227	4,408
21	1,081	3,327	4,408
22	987	3,421	4,408
23	898	3,510	4,408
24	816	3,592	4,408
25	740	3,668	4,408
26	669	3,739	4,408
27	604	3,804	4,408
28	545	3,863	4,408
29	490	3,918	4,408
30	441	3,967	4,408

Table 4-27 Transient, Permanent, and Total Construction Employment Under the Average Development Scenario: New York State

Production Year	Transient	Permanent	Total Construction Employment
1	1,370	389	1,759
2	2,675	855	3,530
3	3,887	1,400	5,287
4	5,021	2,037	7,058
5	6,051	2,766	8,817
6	6,981	3,595	10,576
7	7,814	4,533	12,347
8	8,529	5,574	14,103
9	9,143	6,731	15,874
10	9,639	7,995	17,634
11	9,116	8,518	17,634
12	8,590	9,044	17,634
13	8,066	9,568	17,634
14	7,548	10,086	17,634
15	7,038	10,596	17,634
16	6,541	11,093	17,634
17	6,058	11,576	17,634
18	5,593	12,041	17,634

Table 4-27 Transient, Permanent, and Total Construction Employment Under the Average Development Scenario: New York State

Production Year	Transient	Permanent	Total Construction Employment
19	5,148	12,486	17,634
20	4,725	12,909	17,634
21	4,324	13,310	17,634
22	3,947	13,687	17,634
23	3,594	14,040	17,634
24	3,265	14,369	17,634
25	2,959	14,675	17,634
26	2,677	14,957	17,634
27	2,418	15,216	17,634
28	2,179	15,455	17,634
29	1,962	15,672	17,634
30	1,763	15,871	17,634

Table 4-28 Transient, Permanent, and Total Construction Employment Under the High Development Scenario: New York State

Production Year	Transient	Permanent	Total Construction Employment
1	2,055	583	2,638
2	3,987	1,274	5,261
3	5,806	2,091	7,897
4	7,485	3,036	10,521
5	9,031	4,127	13,158
6	10,427	5,369	15,796
7	11,656	6,762	18,418
8	12,734	8,322	21,056
9	13,638	10,041	23,679
10	14,384	11,932	26,316
11	13,604	12,712	26,316
12	12,820	13,496	26,316
13	12,038	14,278	26,316
14	11,264	15,052	26,316
15	10,504	15,812	26,316
16	9,761	16,555	26,316
17	9,041	17,275	26,316
18	8,347	17,969	26,316
19	7,683	18,633	26,316
20	7,051	19,265	26,316
21	6,453	19,863	26,316
22	5,890	20,426	26,316
23	5,363	20,953	26,316

Table 4-28 Transient, Permanent, and Total Construction Employment Under the High Development Scenario: New York State

Production Year	Transient	Permanent	Total Construction Employment
24	4,872	21,444	26,316
25	4,416	21,900	26,316
26	3,995	22,321	26,316
27	3,608	22,708	26,316
28	3,253	23,063	26,316
29	2,928	23,388	26,316
30	2,632	23,684	26,316

Since the natural gas wells are expected to stay in operation for 30 years, production workers are assumed to be permanent workers who would reside close to where the wells are located. Thus, these workers would live in or relocate their families to the area. Wells drilled in Year 1 are expected to remain in production until Year 30, and wells drilled in Year 30 would remain in production until Year 60.

It is assumed that the households of permanent construction workers and production workers would, on average, be the same size as the current average New York State household (i.e., 2.64 persons, including the worker). Therefore, in projecting population impacts, it is anticipated that transient construction workers would be temporary residents unaccompanied by family members, and permanent construction workers and all production workers would be permanent residents accompanied by an average of 1.64 family members.

Based on the above assumptions, Tables 4-29 and 4-30 present, for New York State as a whole and for each development scenario, the estimated transient and permanent populations resulting from construction of the natural gas wells and production of natural gas for years 1 to 60. Population impacts reach zero in Year 60 because all natural gas production is assumed to end in that year. Tables 4-29 and 4-30 also show, by year, the expected temporary and permanent population changes that are expected to occur. This table also shows the relative size of these impacts compared to New York State's existing population.

Table 4-29 Estimated Population Associated with Transient Employment: New York State

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
1	Low	342	342	< 0.1%
	Average	1,370	1,370	< 0.1%
	High	2,055	2,055	< 0.1%
2	Low	665	665	< 0.1%
	Average	2,675	2,675	< 0.1%

Table 4-29 Estimated Population Associated with Transient Employment: New York State

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
	High	3,987	3,987	< 0.1%
3	Low	971	971	< 0.1%
	Average	3,887	3,887	< 0.1%
	High	5,806	5,806	< 0.1%
4	Low	1,251	1,251	< 0.1%
	Average	5,021	5,021	< 0.1%
	High	7,485	7,485	< 0.1%
5	Low	1,517	1,517	< 0.1%
	Average	6,051	6,051	< 0.1%
	High	9,031	9,031	< 0.1%
6	Low	1,749	1,749	< 0.1%
	Average	6,981	6,981	< 0.1%
	High	10,427	10,427	0.1%
7	Low	1,954	1,954	< 0.1%
	Average	7,814	7,814	< 0.1%
	High	11,656	11,656	0.1%
8	Low	2,135	2,135	< 0.1%
	Average	8,529	8,529	< 0.1%
	High	12,734	12,734	0.1%
9	Low	2,286	2,286	< 0.1%
	Average	9,143	9,143	< 0.1%
	High	13,638	13,638	0.1%
10	Low	2,409	2,409	< 0.1%
	Average	9,639	9,639	< 0.1%
	High	14,384	14,384	0.1%
11	Low	2,279	2,279	< 0.1%
	Average	9,116	9,116	< 0.1%
	High	13,604	13,604	0.1%
12	Low	2,147	2,147	< 0.1%
	Average	8,590	8,590	< 0.1%
	High	12,820	12,820	0.1%
13	Low	2,016	2,016	< 0.1%
	Average	8,066	8,066	< 0.1%
	High	12,038	12,038	0.1%
14	Low	1,887	1,887	< 0.1%
	Average	7,548	7,548	< 0.1%
	High	11,264	11,264	0.1%
15	Low	1,759	1,759	< 0.1%
	Average	7,038	7,038	< 0.1%
	High	10,504	10,504	0.1%
16	Low	1,635	1,635	< 0.1%

Table 4-29 Estimated Population Associated with Transient Employment: New York State

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
	Average	6,541	6,541	< 0.1%
	High	9,761	9,761	0.1%
17	Low	1,514	1,514	< 0.1%
	Average	6,058	6,058	< 0.1%
	High	9,041	9,041	< 0.1%
18	Low	1,398	1,398	< 0.1%
	Average	5,593	5,593	< 0.1%
	High	8,347	8,347	< 0.1%
19	Low	1,287	1,287	< 0.1%
	Average	5,148	5,148	< 0.1%
	High	7,683	7,683	< 0.1%
20	Low	1,181	1,181	< 0.1%
	Average	4,725	4,725	< 0.1%
	High	7,051	7,051	< 0.1%
21	Low	1,081	1,081	< 0.1%
	Average	4,324	4,324	< 0.1%
	High	6,453	6,453	< 0.1%
22	Low	987	987	< 0.1%
	Average	3,947	3,947	< 0.1%
	High	5,890	5,890	< 0.1%
23	Low	898	898	< 0.1%
	Average	3,594	3,594	< 0.1%
	High	5,363	5,363	< 0.1%
24	Low	816	816	< 0.1%
	Average	3,265	3,265	< 0.1%
	High	4,872	4,872	< 0.1%
25	Low	740	740	< 0.1%
	Average	2,959	2,959	< 0.1%
	High	4,416	4,416	< 0.1%
26	Low	669	669	< 0.1%
	Average	2,677	2,677	< 0.1%
	High	3,995	3,995	< 0.1%
27	Low	604	604	< 0.1%
	Average	2,418	2,418	< 0.1%
	High	3,608	3,608	< 0.1%
28	Low	545	545	< 0.1%
	Average	2,179	2,179	< 0.1%
	High	3,253	3,253	< 0.1%
29	Low	490	490	< 0.1%
	Average	1,962	1,962	< 0.1%
	High	2,928	2,928	< 0.1%

Table 4-29 Estimated Population Associated with Transient Employment: New York State

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
30	Low	441	441	< 0.1%
	Average	1,763	1,763	< 0.1%
	High	2,632	2,632	< 0.1%

Table 4-30 Estimated Population Associated with Permanent Employment: New York State

Production Year	Development Scenario	Permanent Production Employment	Permanent Construction Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
1	Low	7	97	104	275	< 0.1%
	Average	28	389	417	1,100	< 0.1%
	High	42	583	625	1,650	< 0.1%
2	Low	21	213	234	618	< 0.1%
	Average	84	855	939	2,479	< 0.1%
	High	126	1,274	1,400	3,697	< 0.1%
3	Low	42	349	391	1,032	< 0.1%
	Average	168	1,400	1,568	4,139	< 0.1%
	High	251	2,091	2,342	6,182	< 0.1%
4	Low	70	508	578	1,526	< 0.1%
	Average	281	2,037	2,318	6,119	< 0.1%
	High	419	3,036	3,455	9,122	< 0.1%
5	Low	105	693	798	2,107	< 0.1%
	Average	421	2,766	3,187	8,413	< 0.1%
	High	628	4,127	4,755	12,554	0.1%
6	Low	147	900	1,047	2,764	< 0.1%
	Average	590	3,595	4,185	11,047	0.1%
	High	879	5,369	6,248	16,494	0.1%
7	Low	197	1,134	1,331	3,514	< 0.1%
	Average	786	4,533	5,319	14,042	0.1%
	High	1,172	6,762	7,934	20,945	0.1%
8	Low	253	1,395	1,648	4,351	< 0.1%
	Average	1,011	5,574	6,585	17,384	0.1%
	High	1,507	8,322	9,829	25,948	0.1%
9	Low	316	1,683	1,999	5,277	< 0.1%
	Average	1,264	6,731	7,995	21,108	0.1%
	High	1,883	10,041	11,924	31,480	0.2%
10	Low	386	1,999	2,385	6,296	< 0.1%
	Average	1,545	7,995	9,540	25,186	0.1%
	High	2,302	11,932	14,234	37,577	0.2%
11	Low	456	2,129	2,585	6,824	< 0.1%
	Average	1,825	8,518	10,343	27,307	0.1%
	High	2,721	12,712	15,433	40,744	0.2%
12	Low	527	2,261	2,788	7,360	< 0.1%

Table 4-30 Estimated Population Associated with Permanent Employment: New York State

Production Year	Development Scenario	Permanent Production Employment	Permanent Construction Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
	Average	2,106	9,044	11,150	29,435	0.2%
	High	3,139	13,496	16,635	43,918	0.2%
13	Low	597	2,392	2,989	7,891	0.0%
	Average	2,387	9,568	11,955	31,560	0.2%
	High	3,558	14,278	17,836	47,087	0.2%
14	Low	667	2,521	3,188	8,416	< 0.1%
	Average	2,668	10,086	12,754	33,671	0.2%
	High	3,976	15,052	19,028	50,234	0.3%
15	Low	737	2,649	3,386	8,939	< 0.1%
	Average	2,949	10,596	13,545	35,758	0.2%
	High	4,395	15,812	20,207	53,348	0.3%
16	Low	808	2,773	3,581	9,454	< 0.1%
	Average	3,230	11,093	14,323	37,814	0.2%
	High	4,813	16,555	21,368	56,412	0.3%
17	Low	878	2,894	3,772	9,958	0.1%
	Average	3,511	11,576	15,087	39,829	0.2%
	High	5,232	17,275	22,507	59,419	0.3%
18	Low	948	3,010	3,958	10,449	0.1%
	Average	3,791	12,041	15,832	41,796	0.2%
	High	5,650	17,969	23,619	62,354	0.3%
19	Low	1,018	3,121	4,139	10,927	0.1%
	Average	4,072	12,486	16,558	43,712	0.2%
	High	6,069	18,633	24,702	65,213	0.3%
20	Low	1,088	3,227	4,315	11,392	0.1%
	Average	4,353	12,909	17,262	45,572	0.2%
	High	6,487	19,265	25,752	67,985	0.4%
21	Low	1,159	3,327	4,486	11,843	0.1%
	Average	4,634	13,310	17,944	47,372	0.2%
	High	6,906	19,863	26,769	70,671	0.4%
22	Low	1,229	3,421	4,650	12,276	0.1%
	Average	4,915	13,687	18,602	49,110	0.3%
	High	7,324	20,426	27,750	73,260	0.4%
23	Low	1,299	3,510	4,809	12,696	0.1%
	Average	5,196	14,040	19,236	50,784	0.3%
	High	7,743	20,953	28,696	75,758	0.4%
24	Low	1,369	3,592	4,961	13,097	0.1%
	Average	5,476	14,369	19,845	52,392	0.3%
	High	8,162	21,444	29,606	78,160	0.4%
25	Low	1,439	3,668	5,107	13,482	0.1%
	Average	5,757	14,675	20,432	53,940	0.3%
	High	8,580	21,900	30,480	80,467	0.4%
26	Low	1,510	3,739	5,249	13,857	0.1%
	Average	6,038	14,957	20,995	55,426	0.3%
	High	8,999	22,321	31,320	82,684	0.4%

Table 4-30 Estimated Population Associated with Permanent Employment: New York State

Production Year	Development Scenario	Permanent Production Employment	Permanent Construction Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
27	Low	1,580	3,804	5,384	14,214	0.1%
	Average	6,319	15,216	21,535	56,853	0.3%
	High	9,417	22,708	32,125	84,810	0.4%
28	Low	1,650	3,863	5,513	14,554	0.1%
	Average	6,600	15,455	22,055	58,224	0.3%
	High	9,836	23,063	32,899	86,855	0.4%
29	Low	1,720	3,918	5,638	14,884	0.1%
	Average	6,881	15,672	22,553	59,540	0.3%
	High	10,254	23,388	33,642	88,816	0.5%
30	Low	1,790	3,967	5,757	15,198	0.1%
	Average	7,161	15,871	23,032	60,803	0.3%
	High	10,673	23,684	34,357	90,704	0.5%
31	Low	1,783	0	1,783	4,707	< 0.1%
	Average	7,133	0	7,133	18,831	0.1%
	High	10,631	0	10,631	28,066	0.1%
32	Low	1,770	0	1,770	4,673	< 0.1%
	Average	7,077	0	7,077	18,683	0.1%
	High	10,547	0	10,547	27,844	0.1%
33	Low	1,748	0	1,748	4,615	< 0.1%
	Average	6,993	0	6,993	18,462	0.1%
	High	10,422	0	10,422	27,514	0.1%
34	Low	1,720	0	1,720	4,541	< 0.1%
	Average	6,881	0	6,881	18,166	0.1%
	High	10,254	0	10,254	27,071	0.1%
35	Low	1,685	0	1,685	4,448	< 0.1%
	Average	6,740	0	6,740	17,794	0.1%
	High	10,045	0	10,045	26,519	0.1%
36	Low	1,643	0	1,643	4,338	< 0.1%
	Average	6,572	0	6,572	17,350	0.1%
	High	9,794	0	9,794	25,856	0.1%
37	Low	1,594	0	1,594	4,208	0.0%
	Average	6,375	0	6,375	16,830	0.1%
	High	9,501	0	9,501	25,083	0.1%
38	Low	1,538	0	1,538	4,060	< 0.1%
	Average	6,150	0	6,150	16,236	0.1%
	High	9,166	0	9,166	24,198	0.1%
39	Low	1,474	0	1,474	3,891	< 0.1%
	Average	5,898	0	5,898	15,571	0.1%
	High	8,789	0	8,789	23,203	0.1%
40	Low	1,404	0	1,404	3,707	< 0.1%
	Average	5,617	0	5,617	14,829	0.1%
	High	8,371	0	8,371	22,099	0.1%
41	Low	1,334	0	1,334	3,522	< 0.1%
	Average	5,336	0	5,336	14,087	0.1%

Table 4-30 Estimated Population Associated with Permanent Employment: New York State

Production Year	Development Scenario	Permanent Production Employment	Permanent Construction Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
	High	7,952	0	7,952	20,993	0.1%
42	Low	1,264	0	1,264	3,337	< 0.1%
	Average	5,055	0	5,055	13,345	0.1%
	High	7,534	0	7,534	19,890	0.1%
43	Low	1,194	0	1,194	3,152	< 0.1%
	Average	4,774	0	4,774	12,603	0.1%
	High	7,115	0	7,115	18,784	0.1%
44	Low	1,123	0	1,123	2,965	< 0.1%
	Average	4,493	0	4,493	11,862	0.1%
	High	6,697	0	6,697	17,680	0.1%
45	Low	1,053	0	1,053	2,780	< 0.1%
	Average	4,213	0	4,213	11,122	0.1%
	High	6,278	0	6,278	16,574	0.1%
46	Low	983	0	983	2,595	< 0.1%
	Average	3,932	0	3,932	10,380	0.1%
	High	5,860	0	5,860	15,470	0.1%
47	Low	913	0	913	2,410	< 0.1%
	Average	3,651	0	3,651	9,639	< 0.1%
	High	5,441	0	5,441	14,364	0.1%
48	Low	843	0	843	2,226	< 0.1%
	Average	3,370	0	3,370	8,897	< 0.1%
	High	5,022	0	5,022	13,258	0.1%
49	Low	772	0	772	2,038	< 0.1%
	Average	3,089	0	3,089	8,155	< 0.1%
	High	4,604	0	4,604	12,155	0.1%
50	Low	702	0	702	1,853	< 0.1%
	Average	2,808	0	2,808	7,413	< 0.1%
	High	4,185	0	4,185	11,048	0.1%
51	Low	632	0	632	1,668	< 0.1%
	Average	2,528	0	2,528	6,674	< 0.1%
	High	3,767	0	3,767	9,945	0.1%
52	Low	562	0	562	1,484	< 0.1%
	Average	2,247	0	2,247	5,932	< 0.1%
	High	3,348	0	3,348	8,839	< 0.1%
53	Low	491	0	491	1,296	< 0.1%
	Average	1,966	0	1,966	5,190	< 0.1%
	High	2,930	0	2,930	7,735	< 0.1%
54	Low	421	0	421	1,111	< 0.1%
	Average	1,685	0	1,685	4,448	< 0.1%
	High	2,511	0	2,511	6,629	< 0.1%
55	Low	351	0	351	927	< 0.1%
	Average	1,404	0	1,404	3,707	< 0.1%
	High	2,093	0	2,093	5,526	< 0.1%
56	Low	281	0	281	742	< 0.1%

Table 4-30 Estimated Population Associated with Permanent Employment: New York State

Production Year	Development Scenario	Permanent Production Employment	Permanent Construction Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
	Average	1,123	0	1,123	2,965	< 0.1%
	High	1,674	0	1,674	4,419	< 0.1%
57	Low	211	0	211	557	< 0.1%
	Average	843	0	843	2,226	< 0.1%
	High	1,256	0	1,256	3,316	< 0.1%
58	Low	140	0	140	370	< 0.1%
	Average	562	0	562	1,484	< 0.1%
	High	837	0	837	2,210	< 0.1%
59	Low	70	0	70	185	< 0.1%
	Average	281	0	281	742	< 0.1%
	High	419	0	419	1,106	< 0.1%
60	Low	0	0	0	0	0.0%
	Average	0	0	0	0	0.0%
	High	0	0	0	0	0.0%

Under the low development scenario, between Years 10 and 30, it is projected that a maximum of 4,408 construction workers would temporarily or permanently migrate into the areas. The maximum transient construction workforce would occur in Year 10, with an estimated 2,409 transient workers. (During this same year, there would be 1,999 permanent workers relocating to the area.) Under the high development scenarios, between Years 10 and 30, it is projected that a maximum of 26,316 construction workers would temporarily or permanently migrate to the well construction areas, respectively. The maximum transient workforce would occur in Year 10, with an estimated 14,384 transient workers under the high scenario. (During this same time period, there would be 11,932 permanent workers relocating to the area.) The population impact of the maximum number of transient workers (i.e., 14,384) represents approximately 0.1% of the total present population of New York State, indicating that transient workers would have only a minor short-term population impact at the state level.

Under the low development scenario, the number of persons permanently migrating to the impacted areas to construct and operate the wells is projected to reach its maximum of 15,198 persons during Year 30 (see Table 4-31). Under the high development scenario during Year 30, it is projected that 90,704 persons would permanently migrate to the impacted areas. Since it is assumed that permanent construction and production workers would relocate with their households, these population estimates include the permanent construction and production workers and members of their households. The maximum impact on the permanent population under the high development scenario is 90,704 persons in Year 30. This figure represents approximately 0.5% of the total present population of New York State, indicating that some long-term population impact could occur at the state level as a result of the operation of the new natural gas wells.

Table 4-31 Maximum Temporary and Permanent Impacts Associated with Well Construction and Production: New York State

Region	Total 2010 Existing Population[1]	Development Scenario	Maximum Transient Impacts[2]	% Increase from Total Existing 2010 Population	Maximum Permanent Impacts[3]	% Increase from Total Existing 2010 Population
New York State	19,378,102	Low	2,409	>0.1%	15,198	>0.1%
		Average	9,639	>0.1%	60,803	0.3%
		High	14,384	0.1%	90,704	0.5%

Notes:
1 Existing population from U.S. Census Bureau's *2010 Census of Population* (USCB 2010a).
2 Maximum transient impacts occur during Year 10.
3 Maximum permanent impacts occur during Year 30.

Although the maximum population impacts would be relatively minor at the state level, natural gas wells would not be spread evenly across the state; they would be concentrated in particular areas where the influx of construction and production workers and their families may have more significant population impacts. Similarly, because new wells would not be developed evenly over time due to swings in well development activity, the population impacts would be greater in some years than in others.

In addition to direct employment (employment impacts from construction and production), there are projected indirect employment impacts from the development of hydraulic fracturing operations in the Marcellus and Utica Shale areas (see Section 4.2). Given the relatively high unemployment rates currently being experienced in these regions, it is likely that some of these new, indirectly created jobs (e.g., gas station clerks, hotel lobby personnel, etc.) would be filled by local, previously unemployed or underemployed persons. These indirect employment impacts would reduce local unemployment and help stimulate the local economies. The impacts associated with the influx of construction workers, both transient and permanent, would last as long as wells are being developed in an area, whereas the impacts associated with the production phase would last up to Year 60.

4.3.2 Representative Regions

Tables 4-32 to 4-40 show the estimated transient, permanent, and total construction employment for Regions A, B, and C under the low, average and high development scenarios.

Table 4-32 Transient, Permanent, and Total Construction Employment Under the Low Development Scenario: Region A

Production Year	Transient	Permanent	Total Construction Employment
1	171	48	219
2	333	106	439

Table 4-32 Transient, Permanent, and Total Construction Employment Under the Low Development Scenario: Region A

Production Year	Transient	Permanent	Total Construction Employment
3	485	175	660
4	625	254	879
5	758	347	1,105
6	875	450	1,325
7	977	567	1,544
8	1,067	698	1,765
9	1,143	842	1,985
10	1,205	999	2,204
11	1,139	1,065	2,204
12	1,074	1,130	2,204
13	1,008	1,196	2,204
14	943	1,261	2,204
15	880	1,324	2,204
16	817	1,387	2,204
17	757	1,447	2,204
18	699	1,505	2,204
19	643	1,561	2,204
20	591	1,613	2,204
21	540	1,664	2,204
22	493	1,711	2,204
23	449	1,755	2,204
24	408	1,796	2,204
25	370	1,834	2,204
26	335	1,869	2,204
27	302	1,902	2,204
28	272	1,932	2,204
29	245	1,959	2,204
30	220	1,984	2,204

Table 4-33 Transient, Permanent, and Total Construction Employment Under the Average Development Scenario: Region A

Production Year	Transient	Permanent	Total Construction Employment
1	686	194	880
2	1,338	427	1,765
3	1,944	700	2,644
4	2,511	1,019	3,530
5	3,026	1,383	4,409
6	3,491	1,797	5,288
7	3,907	2,267	6,174

Table 4-33 Transient, Permanent, and Total Construction Employment Under the Average Development Scenario: Region A

Production Year	Transient	Permanent	Total Construction Employment
8	4,265	2,787	7,052
9	4,571	3,366	7,937
10	4,820	3,998	8,818
11	4,558	4,260	8,818
12	4,296	4,522	8,818
13	4,034	4,784	8,818
14	3,774	5,044	8,818
15	3,520	5,298	8,818
16	3,271	5,547	8,818
17	3,029	5,789	8,818
18	2,797	6,021	8,818
19	2,574	6,244	8,818
20	2,363	6,455	8,818
21	2,162	6,656	8,818
22	1,974	6,844	8,818
23	1,797	7,021	8,818
24	1,632	7,186	8,818
25	1,480	7,338	8,818
26	1,339	7,479	8,818
27	1,209	7,609	8,818
28	1,090	7,728	8,818
29	981	7,837	8,818
30	882	7,936	8,818

Table 4-34 Transient, Permanent, and Total Construction Employment Under the High Development Scenario: Region A

Production Year	Transient	Permanent	Total Construction Employment
1	1,028	291	1,319
2	1,994	637	2,631
3	2,904	1,045	3,949
4	3,743	1,518	5,261
5	4,516	2,064	6,580
6	5,214	2,685	7,899
7	5,829	3,381	9,210
8	6,368	4,161	10,529
9	6,819	5,021	11,840
10	7,192	5,966	13,158
11	6,802	6,356	13,158
12	6,410	6,748	13,158

Table 4-34 Transient, Permanent, and Total Construction Employment Under the High Development Scenario: Region A

Production Year	Transient	Permanent	Total Construction Employment
13	6,019	7,139	13,158
14	5,632	7,526	13,158
15	5,252	7,906	13,158
16	4,880	8,278	13,158
17	4,520	8,638	13,158
18	4,174	8,984	13,158
19	3,841	9,317	13,158
20	3,525	9,633	13,158
21	3,226	9,932	13,158
22	2,945	10,213	13,158
23	2,681	10,477	13,158
24	2,436	10,722	13,158
25	2,208	10,950	13,158
26	1,998	11,160	13,158
27	1,804	11,354	13,158
28	1,626	11,532	13,158
29	1,464	11,694	13,158
30	1,316	11,842	13,158

Table 4-35 Transient, Permanent, and Total Construction Employment Under the Low Development Scenario: Region B

Production Year	Transient	Permanent	Total Construction Employment
1	79	22	101
2	153	49	202
3	223	80	303
4	287	117	404
5	349	159	508
6	402	207	609
7	449	261	710
8	491	321	812
9	526	387	913
10	554	460	1,014
11	524	490	1,014
12	494	520	1,014
13	464	550	1,014
14	434	580	1,014
15	405	609	1,014
16	376	638	1,014
17	348	666	1,014

Table 4-35 Transient, Permanent, and Total Construction Employment Under the Low Development Scenario: Region B

Production Year	Transient	Permanent	Total Construction Employment
18	322	692	1,014
19	296	718	1,014
20	272	742	1,014
21	249	765	1,014
22	227	787	1,014
23	207	807	1,014
24	188	826	1,014
25	170	844	1,014
26	154	860	1,014
27	139	875	1,014
28	125	889	1,014
29	113	901	1,014
30	101	913	1,014

Table 4-36 Transient, Permanent, and Total Construction Employment Under the Average Development Scenario: Region B

Production Year	Transient	Permanent	Total Construction Employment
1	315	89	404
2	615	197	812
3	894	322	1,216
4	1,155	468	1,623
5	1,392	636	2,028
6	1,605	827	2,432
7	1,797	1,042	2,839
8	1,962	1,282	3,244
9	2,103	1,548	3,651
10	2,217	1,839	4,056
11	2,097	1,959	4,056
12	1,976	2,080	4,056
13	1,855	2,201	4,056
14	1,736	2,320	4,056
15	1,619	2,437	4,056
16	1,504	2,552	4,056
17	1,393	2,663	4,056
18	1,287	2,769	4,056
19	1,184	2,872	4,056
20	1,087	2,969	4,056
21	995	3,061	4,056
22	908	3,148	4,056

Table 4-36 Transient, Permanent, and Total Construction Employment Under the Average Development Scenario: Region B

Production Year	Transient	Permanent	Total Construction Employment
23	827	3,229	4,056
24	751	3,305	4,056
25	681	3,375	4,056
26	616	3,440	4,056
27	556	3,500	4,056
28	501	3,555	4,056
29	451	3,605	4,056
30	406	3,650	4,056

Table 4-37 Transient, Permanent, and Total Construction Employment Under the High Development Scenario: Region B

Production Year	Transient	Permanent	Total Construction Employment
1	473	134	607
2	917	293	1,210
3	1,335	481	1,816
4	1,722	698	2,420
5	2,077	949	3,026
6	2,398	1,235	3,633
7	2,681	1,555	4,236
8	2,929	1,914	4,843
9	3,137	2,309	5,446
10	3,309	2,744	6,053
11	3,129	2,924	6,053
12	2,949	3,104	6,053
13	2,769	3,284	6,053
14	2,591	3,462	6,053
15	2,416	3,637	6,053
16	2,245	3,808	6,053
17	2,080	3,973	6,053
18	1,920	4,133	6,053
19	1,767	4,286	6,053
20	1,622	4,431	6,053
21	1,484	4,569	6,053
22	1,355	4,698	6,053
23	1,234	4,819	6,053
24	1,121	4,932	6,053
25	1,016	5,037	6,053
26	919	5,134	6,053
27	830	5,223	6,053

Table 4-37 Transient, Permanent, and Total Construction Employment Under the High Development Scenario: Region B

Production Year	Transient	Permanent	Total Construction Employment
28	748	5,305	6,053
29	673	5,380	6,053
30	605	5,448	6,053

Table 4-38 Transient, Permanent, and Total Construction Employment Under the Low Development Scenario: Region C

Production Year	Transient	Permanent	Total Construction Employment
1	17	5	22
2	33	11	44
3	49	17	66
4	63	25	88
5	75	35	110
6	88	45	133
7	98	57	155
8	106	70	176
9	115	84	199
10	121	100	221
11	114	107	221
12	108	113	221
13	101	120	221
14	95	126	221
15	88	133	221
16	82	139	221
17	76	145	221
18	70	151	221
19	65	156	221
20	59	162	221
21	54	167	221
22	49	172	221
23	45	176	221
24	41	180	221
25	37	184	221
26	34	187	221
27	30	191	221
28	27	194	221
29	25	196	221
30	22	199	221

Table 4-39 Transient, Permanent, and Total Construction Employment Under the Average Development Scenario: Region C

Production Year	Transient	Permanent	Total Construction Employment
1	69	19	88
2	133	43	176
3	195	70	265
4	250	102	352
5	303	138	441
6	349	180	529
7	390	227	617
8	426	279	705
9	457	337	794
10	482	400	882
11	456	426	882
12	430	452	882
13	403	479	882
14	378	504	882
15	352	530	882
16	327	555	882
17	303	579	882
18	280	602	882
19	258	624	882
20	236	646	882
21	216	666	882
22	197	685	882
23	180	702	882
24	163	719	882
25	148	734	882
26	134	748	882
27	121	761	882
28	109	773	882
29	98	784	882
30	88	794	882

Table 4-40 Transient, Permanent, and Total Construction Employment Under the High Development Scenario: Region C

Production Year	Transient	Permanent	Total Construction Employment
1	103	29	132
2	199	64	263
3	290	105	395
4	374	152	526
5	452	206	658
6	521	269	790
7	583	338	921
8	637	416	1,053
9	682	502	1,184
10	719	597	1,316
11	680	636	1,316
12	641	675	1,316
13	602	714	1,316
14	563	753	1,316
15	525	791	1,316
16	488	828	1,316
17	452	864	1,316
18	417	899	1,316
19	384	932	1,316
20	353	963	1,316
21	323	993	1,316
22	295	1,021	1,316
23	268	1,048	1,316
24	244	1,072	1,316
25	221	1,095	1,316
26	200	1,116	1,316
27	180	1,136	1,316
28	163	1,153	1,316
29	146	1,170	1,316
30	132	1,184	1,316

Table 4-41 shows the maximum population impacts associated with transient and permanent construction workers and permanent production workers for the three representative regions. As noted above, the three representative regions were selected to assess the range of potential socioeconomic impacts that could occur at the local and regional levels, and the projected local and regional impacts presented here are intended to provide order-of-magnitude estimates for the range of potential impacts. In constructing Table 4-41 it was assumed, as discussed above, that a portion of the construction workers would be temporary, transient residents in an area and would not be accompanied by members of their households. The remainder of the construction workers would be permanent residents. The pro-

portion of permanent workers to transient workers would gradually increase over time. All production workers are assumed to be permanent residents and would relocate their families to the area. Since the households of permanent construction and production workers are assumed to be the same size as average households in the respective regions, permanent workers are assumed to be accompanied by an average of 1.47 family members in Region A, 1.52 family members in Region B, and 1.49 family members in Region C.

Table 4-41 Maximum Temporary and Permanent Impacts Associated with Well Construction and Production

Region	Total 2010 Existing Population[1]	Development Scenario	Maximum Transient Impacts[2]	% Increase from Total Existing 2010 Population	Maximum Permanent Impacts[3]	% Increase from Total Existing 2010 Population
A	340,555	Low	1,205	0.4%	7,111	2.1%
		Average	4,820	1.4%	28,447	8.4%
		High	7,192	2.1%	42,432	12.5%
B	187,786	Low	554	0.3%	3,339	1.8%
		Average	2,217	1.2%	13,348	7.1%
		High	3,309	1.8%	19,916	10.6%
C	215,222	Low	121	<0.1%	720	0.3%
		Average	482	0.2%	2,868	1.3%
		High	719	0.3%	4,278	2.0%

Notes:

1 Existing population from US Census Bureau's *2010 Census of Population* (USCB 2010a).
2 Maximum transient impacts occur during Year 10.
3 Maximum permanent impacts occur in Year 30.

4.3.2.1 Region A

The upper bound of the potential impacts from transient workers, which occurs in Region A under the high development scenario in Year 10, is 7,192 unaccompanied transient workers, representing 2.1% of the region's total population. The upper bound of the potential impacts from permanent population changes, which is found in Region A under the high development scenario in Year 30, is 42,432 permanent construction and production workers and their household members. This figure represents 12.5% of the existing population in Region A. According to the population projections presented in Section 3.2.2.1, in the absence of gas well development, Region A is expected to experience a future population decrease and to have a 2030 population of 279,675 persons, a decrease of 60,880 persons, equal to 17.9% of the total existing population. The influx of workers and their family members associated with gas well development, which totals 42,432 persons in Year 30 under the high development scenario, would offset approximately 70% of the projected population decline in Region A and would, therefore, have a beneficial impact.

Table 4-42 shows the expected transient population impacts, by year, for Region A and the relative size of these impacts compared to the region's 2010 population.

Table 4-43 shows the permanent population impacts and the relative size of these impacts compared to the region's 2010 population.

Table 4-42 Estimated Population Impacts Associated with Transient Employment: Region A

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
1	Low	171	171	0.1%
	Average	686	686	0.2%
	High	1,028	1,028	0.3%
2	Low	333	333	0.1%
	Average	1,338	1,338	0.4%
	High	1,994	1,994	0.6%
3	Low	485	485	0.1%
	Average	1,944	1,944	0.6%
	High	2,904	2,904	0.9%
4	Low	625	625	0.2%
	Average	2,511	2,511	0.7%
	High	3,743	3,743	1.1%
5	Low	758	758	0.2%
	Average	3,026	3,026	0.9%
	High	4,516	4,516	1.3%
6	Low	875	875	0.3%
	Average	3,491	3,491	1.0%
	High	5,214	5,214	1.5%
7	Low	977	977	0.3%
	Average	3,907	3,907	1.1%
	High	5,829	5,829	1.7%
8	Low	1,067	1,067	0.3%
	Average	4,265	4,265	1.3%
	High	6,368	6,368	1.9%
9	Low	1,143	1,143	0.3%
	Average	4,571	4,571	1.3%
	High	6,819	6,819	2.0%
10	Low	1,205	1,205	0.4%
	Average	4,820	4,820	1.4%
	High	7,192	7,192	2.1%
11	Low	1,139	1,139	0.3%
	Average	4,558	4,558	1.3%
	High	6,802	6,802	2.0%
12	Low	1,074	1,074	0.3%
	Average	4,296	4,296	1.3%
	High	6,410	6,410	1.9%

Table 4-42 Estimated Population Impacts Associated with Transient Employment: Region A

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
13	Low	1,008	1,008	0.3%
	Average	4,034	4,034	1.2%
	High	6,019	6,019	1.8%
14	Low	943	943	0.3%
	Average	3,774	3,774	1.1%
	High	5,632	5,632	1.7%
15	Low	880	880	0.3%
	Average	3,520	3,520	1.0%
	High	5,252	5,252	1.5%
16	Low	817	817	0.2%
	Average	3,271	3,271	1.0%
	High	4,880	4,880	1.4%
17	Low	757	757	0.2%
	Average	3,029	3,029	0.9%
	High	4,520	4,520	1.3%
18	Low	699	699	0.2%
	Average	2,797	2,797	0.8%
	High	4,174	4,174	1.2%
19	Low	643	643	0.2%
	Average	2,574	2,574	0.8%
	High	3,841	3,841	1.1%
20	Low	591	591	0.2%
	Average	2,363	2,363	0.7%
	High	3,525	3,525	1.0%
21	Low	540	540	0.2%
	Average	2,162	2,162	0.6%
	High	3,226	3,226	0.9%
22	Low	493	493	0.1%
	Average	1,974	1,974	0.6%
	High	2,945	2,945	0.9%
23	Low	449	449	0.1%
	Average	1,797	1,797	0.5%
	High	2,681	2,681	0.8%
24	Low	408	408	0.1%
	Average	1,632	1,632	0.5%
	High	2,436	2,436	0.7%
25	Low	370	370	0.1%
	Average	1,480	1,480	0.4%
	High	2,208	2,208	0.6%

Table 4-42 Estimated Population Impacts Associated with Transient Employment: Region A

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
26	Low	335	335	0.1%
	Average	1,339	1,339	0.4%
	High	1,998	1,998	0.6%
27	Low	302	302	0.1%
	Average	1,209	1,209	0.4%
	High	1,804	1,804	0.5%
28	Low	272	272	0.1%
	Average	1,090	1,090	0.3%
	High	1,626	1,626	0.5%
29	Low	245	245	0.1%
	Average	981	981	0.3%
	High	1,464	1,464	0.4%
30	Low	220	220	0.1%
	Average	882	882	0.3%
	High	1,316	1,316	0.4%

Table 4-43 Estimated Population Impacts Associated with Permanent Employment: Region A

Production Year	Development Scenario	Permanent Production Employment	Permanent Construction Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
1	Low	4	48	52	128	< 0.1%
	Average	14	194	208	514	0.2%
	High	21	291	312	771	0.2%
2	Low	11	106	117	289	0.1%
	Average	42	427	469	1,158	0.3%
	High	63	637	700	1,729	0.5%
3	Low	21	175	196	484	0.1%
	Average	84	700	784	1,936	0.6%
	High	126	1,045	1,171	2,892	0.8%
4	Low	35	254	289	714	0.2%
	Average	141	1,019	1,160	2,865	0.8%
	High	210	1,518	1,728	4,268	1.3%
5	Low	53	347	400	988	0.3%
	Average	211	1,383	1,594	3,937	1.2%
	High	314	2,064	2,378	5,874	1.7%
6	Low	74	450	524	1,294	0.4%
	Average	295	1,797	2,092	5,167	1.5%
	High	440	2,685	3,125	7,719	2.3%
7	Low	99	567	666	1,645	0.5%
	Average	393	2,267	2,660	6,570	1.9%
	High	586	3,381	3,967	9,798	2.9%

Table 4-43 Estimated Population Impacts Associated with Permanent Employment: Region A

Production Year	Development Scenario	Permanent Production Employment	Permanent Construction Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
8	Low	127	698	825	2,038	0.6%
	Average	506	2,787	3,293	8,134	2.4%
	High	754	4,161	4,915	12,140	3.6%
9	Low	158	842	1,000	2,470	0.7%
	Average	632	3,366	3,998	9,875	2.9%
	High	942	5,021	5,963	14,729	4.3%
10	Low	193	999	1,192	2,944	0.9%
	Average	773	3,998	4,771	11,784	3.5%
	High	1,151	5,966	7,117	17,579	5.2%
11	Low	228	1,065	1,293	3,194	0.9%
	Average	913	4,260	5,173	12,777	3.8%
	High	1,361	6,356	7,717	19,061	5.6%
12	Low	264	1,130	1,394	3,443	1.0%
	Average	1,053	4,522	5,575	13,770	4.0%
	High	1,570	6,748	8,318	20,545	6.0%
13	Low	299	1,196	1,495	3,693	1.1%
	Average	1,194	4,784	5,978	14,766	4.3%
	High	1,779	7,139	8,918	22,027	6.5%
14	Low	334	1,261	1,595	3,940	1.2%
	Average	1,334	5,044	6,378	15,754	4.6%
	High	1,988	7,526	9,514	23,500	6.9%
15	Low	369	1,324	1,693	4,182	1.2%
	Average	1,475	5,298	6,773	16,729	4.9%
	High	2,198	7,906	10,104	24,957	7.3%
16	Low	404	1,387	1,791	4,424	1.3%
	Average	1,615	5,547	7,162	17,690	5.2%
	High	2,407	8,278	10,685	26,392	7.7%
17	Low	439	1,447	1,886	4,658	1.4%
	Average	1,756	5,789	7,545	18,636	5.5%
	High	2,616	8,638	11,254	27,797	8.2%
18	Low	474	1,505	1,979	4,888	1.4%
	Average	1,896	6,021	7,917	19,555	5.7%
	High	2,825	8,984	11,809	29,168	8.6%
19	Low	509	1,561	2,070	5,113	1.5%
	Average	2,036	6,244	8,280	20,452	6.0%
	High	3,035	9,317	12,352	30,509	9.0%
20	Low	544	1,613	2,157	5,328	1.6%
	Average	2,177	6,455	8,632	21,321	6.3%
	High	3,244	9,633	12,877	31,806	9.3%
21	Low	580	1,664	2,244	5,543	1.6%
	Average	2,317	6,656	8,973	22,163	6.5%
	High	3,453	9,932	13,385	33,061	9.7%

Table 4-43 Estimated Population Impacts Associated with Permanent Employment: Region A

Production Year	Development Scenario	Permanent Production Employment	Permanent Construction Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
22	Low	615	1,711	2,326	5,745	1.7%
	Average	2,458	6,844	9,302	22,976	6.7%
	High	3,662	10,213	13,875	34,271	10.1%
23	Low	650	1,755	2,405	5,940	1.7%
	Average	2,598	7,021	9,619	23,759	7.0%
	High	3,872	10,477	14,349	35,442	10.4%
24	Low	685	1,796	2,481	6,128	1.8%
	Average	2,738	7,186	9,924	24,512	7.2%
	High	4,081	10,722	14,803	36,563	10.7%
25	Low	720	1,834	2,554	6,308	1.9%
	Average	2,879	7,338	10,217	25,236	7.4%
	High	4,290	10,950	15,240	37,643	11.1%
26	Low	755	1,869	2,624	6,481	1.9%
	Average	3,019	7,479	10,498	25,930	7.6%
	High	4,500	11,160	15,660	38,680	11.4%
27	Low	790	1,902	2,692	6,649	2.0%
	Average	3,160	7,609	10,769	26,599	7.8%
	High	4,709	11,354	16,063	39,676	11.7%
28	Low	825	1,932	2,757	6,810	2.0%
	Average	3,300	7,728	11,028	27,239	8.0%
	High	4,918	11,532	16,450	40,632	11.9%
29	Low	860	1,959	2,819	6,963	2.0%
	Average	3,441	7,837	11,278	27,857	8.2%
	High	5,127	11,694	16,821	41,548	12.2%
30	Low	895	1,984	2,879	7,111	2.1%
	Average	3,581	7,936	11,517	28,447	8.4%
	High	5,337	11,842	17,179	42,432	12.5%
31	Low	892	0	892	2,203	0.6%
	Average	3,567	0	3,567	8,810	2.6%
	High	5,316	0	5,316	13,131	3.9%
32	Low	885	0	885	2,186	0.6%
	Average	3,539	0	3,539	8,741	2.6%
	High	5,274	0	5,274	13,027	3.8%
33	Low	874	0	874	2,159	0.6%
	Average	3,497	0	3,497	8,638	2.5%
	High	5,211	0	5,211	12,871	3.8%
34	Low	860	0	860	2,124	0.6%
	Average	3,441	0	3,441	8,499	2.5%
	High	5,127	0	5,127	12,664	3.7%
35	Low	843	0	843	2,082	0.6%
	Average	3,370	0	3,370	8,324	2.4%
	High	5,023	0	5,023	12,407	3.6%

Table 4-43 Estimated Population Impacts Associated with Permanent Employment: Region A

Production Year	Development Scenario	Permanent Production Employment	Permanent Construction Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
36	Low	822	0	822	2,030	0.6%
	Average	3,286	0	3,286	8,116	2.4%
	High	4,897	0	4,897	12,096	3.6%
37	Low	797	0	797	1,969	0.6%
	Average	3,188	0	3,188	7,874	2.3%
	High	4,751	0	4,751	11,735	3.4%
38	Low	769	0	769	1,899	0.6%
	Average	3,075	0	3,075	7,595	2.2%
	High	4,583	0	4,583	11,320	3.3%
39	Low	737	0	737	1,820	0.5%
	Average	2,949	0	2,949	7,284	2.1%
	High	4,395	0	4,395	10,856	3.2%
40	Low	702	0	702	1,734	0.5%
	Average	2,809	0	2,809	6,938	2.0%
	High	4,186	0	4,186	10,339	3.0%
41	Low	667	0	667	1,647	0.5%
	Average	2,668	0	2,668	6,590	1.9%
	High	3,976	0	3,976	9,821	2.9%
42	Low	632	0	632	1,561	0.5%
	Average	2,528	0	2,528	6,244	1.8%
	High	3,767	0	3,767	9,304	2.7%
43	Low	597	0	597	1,475	0.4%
	Average	2,387	0	2,387	5,896	1.7%
	High	3,558	0	3,558	8,788	2.6%
44	Low	562	0	562	1,388	0.4%
	Average	2,247	0	2,247	5,550	1.6%
	High	3,349	0	3,349	8,272	2.4%
45	Low	527	0	527	1,302	0.4%
	Average	2,107	0	2,107	5,204	1.5%
	High	3,139	0	3,139	7,753	2.3%
46	Low	492	0	492	1,215	0.4%
	Average	1,966	0	1,966	4,856	1.4%
	High	2,930	0	2,930	7,237	2.1%
47	Low	457	0	457	1,129	0.3%
	Average	1,826	0	1,826	4,510	1.3%
	High	2,721	0	2,721	6,721	2.0%
48	Low	422	0	422	1,042	0.3%
	Average	1,685	0	1,685	4,162	1.2%
	High	2,511	0	2,511	6,202	1.8%
49	Low	386	0	386	953	0.3%
	Average	1,545	0	1,545	3,816	1.1%
	High	2,302	0	2,302	5,686	1.7%

Table 4-43 Estimated Population Impacts Associated with Permanent Employment: Region A

Production Year	Development Scenario	Permanent Production Employment	Permanent Construction Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
50	Low	351	0	351	867	0.3%
	Average	1,404	0	1,404	3,468	1.0%
	High	2,093	0	2,093	5,170	1.5%
51	Low	316	0	316	781	0.2%
	Average	1,264	0	1,264	3,122	0.9%
	High	1,884	0	1,884	4,653	1.4%
52	Low	281	0	281	694	0.2%
	Average	1,124	0	1,124	2,776	0.8%
	High	1,674	0	1,674	4,135	1.2%
53	Low	246	0	246	608	0.2%
	Average	983	0	983	2,428	0.7%
	High	1,465	0	1,465	3,619	1.1%
54	Low	211	0	211	521	0.2%
	Average	843	0	843	2,082	0.6%
	High	1,256	0	1,256	3,102	0.9%
55	Low	176	0	176	435	0.1%
	Average	702	0	702	1,734	0.5%
	High	1,047	0	1,047	2,586	0.8%
56	Low	141	0	141	348	0.1%
	Average	562	0	562	1,388	0.4%
	High	837	0	837	2,067	0.6%
57	Low	106	0	106	262	0.1%
	Average	422	0	422	1,042	0.3%
	High	628	0	628	1,551	0.5%
58	Low	70	0	70	173	0.1%
	Average	281	0	281	694	0.2%
	High	419	0	419	1,035	0.3%
59	Low	35	0	35	86	< 0.1%
	Average	141	0	141	348	0.1%
	High	210	0	210	519	0.2%
60	Low	0	0	0	0	0.0%
	Average	0	0	0	0	0.0%
	High	0	0	0	0	0.0%

4.3.2.2 Region B

Under the high development scenario in Year 10, Region B is projected to have a maximum 3,309 unaccompanied, transient construction workers and 19,916 permanent construction and production workers and their family members residing in the region. Note that the maximum transient population impacts occur in Year 10, while the maximum permanent population impacts occur in Year 30. The maximum transient population would account for 1.8% of the existing population in Region B, and the maximum permanent population would account for 10.6% of the existing population. According to population projection figures presented in

Section 3.2.2.2, in the absence of the proposed natural gas development, Region B is expected to experience a future population decrease and to have a 2030 population of 183,031 persons, a decrease of 4,755 persons, equal to 2.5% of the total existing population. The influx of workers and their family members associated with gas well development, which totals 19,916 persons in Year 30 under the high development scenario, would more than offset the projected population decline in Region B but would not add significantly to the existing population. Table 4-44 shows the expected transient population impacts, by year, for Region B and the relative size of this impact compared to the region's 2010 existing population. Table 4-45 shows the permanent population impacts and the relative size of the impacts compared to Region B's 2010 total population.

Table 4-44 Estimated Population Associated with Transient Employment: Region B

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
1	Low	79	79	< 0.1%
	Average	315	315	0.2%
	High	473	473	0.3%
2	Low	153	153	0.1%
	Average	615	615	0.3%
	High	917	917	0.5%
3	Low	223	223	0.1%
	Average	894	894	0.5%
	High	1,335	1,335	0.7%
4	Low	287	287	0.2%
	Average	1,155	1,155	0.6%
	High	1,722	1,722	0.9%
5	Low	349	349	0.2%
	Average	1,392	1,392	0.7%
	High	2,077	2,077	1.1%
6	Low	402	402	0.2%
	Average	1,605	1,605	0.9%
	High	2,398	2,398	1.3%
7	Low	449	449	0.2%
	Average	1,797	1,797	1.0%
	High	2,681	2,681	1.4%
8	Low	491	491	0.3%
	Average	1,962	1,962	1.0%
	High	2,929	2,929	1.6%
9	Low	526	526	0.3%
	Average	2,103	2,103	1.1%
	High	3,137	3,137	1.7%

Table 4-44 Estimated Population Associated with Transient Employment: Region B

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
10	Low	554	554	0.3%
	Average	2,217	2,217	1.2%
	High	3,309	3,309	1.8%
11	Low	524	524	0.3%
	Average	2,097	2,097	1.1%
	High	3,129	3,129	1.7%
12	Low	494	494	0.3%
	Average	1,976	1,976	1.1%
	High	2,949	2,949	1.6%
13	Low	464	464	0.2%
	Average	1,855	1,855	1.0%
	High	2,769	2,769	1.5%
14	Low	434	434	0.2%
	Average	1,736	1,736	0.9%
	High	2,591	2,591	1.4%
15	Low	405	405	0.2%
	Average	1,619	1,619	0.9%
	High	2,416	2,416	1.3%
16	Low	376	376	0.2%
	Average	1,504	1,504	0.8%
	High	2,245	2,245	1.2%
17	Low	348	348	0.2%
	Average	1,393	1,393	0.7%
	High	2,080	2,080	1.1%
18	Low	322	322	0.2%
	Average	1,287	1,287	0.7%
	High	1,920	1,920	1.0%
19	Low	296	296	0.2%
	Average	1,184	1,184	0.6%
	High	1,767	1,767	0.9%
20	Low	272	272	0.1%
	Average	1,087	1,087	0.6%
	High	1,622	1,622	0.9%
21	Low	249	249	0.1%
	Average	995	995	0.5%
	High	1,484	1,484	0.8%
22	Low	227	227	0.1%
	Average	908	908	0.5%
	High	1,355	1,355	0.7%

Table 4-44 Estimated Population Associated with Transient Employment: Region B

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
23	Low	207	207	0.1%
	Average	827	827	0.4%
	High	1,234	1,234	0.7%
24	Low	188	188	0.1%
	Average	751	751	0.4%
	High	1,121	1,121	0.6%
25	Low	170	170	0.1%
	Average	681	681	0.4%
	High	1,016	1,016	0.5%
26	Low	154	154	0.1%
	Average	616	616	0.3%
	High	919	919	0.5%
27	Low	139	139	0.1%
	Average	556	556	0.3%
	High	830	830	0.4%
28	Low	125	125	0.1%
	Average	501	501	0.3%
	High	748	748	0.4%
29	Low	113	113	0.1%
	Average	451	451	0.2%
	High	673	673	0.4%
30	Low	101	101	0.1%
	Average	406	406	0.2%
	High	605	605	0.3%

Table 4-45 Estimated Population Associated with Permanent Employment: Region B

Production Year	Development Scenario	Permanent Construction Employment	Permanent Production Employment	Total Permanent Employment	Total Permanent Population Impacts	% of Existing 2010 Population
1	Low	22	2	24	60	< 0.1%
	Average	89	6	95	239	0.1%
	High	134	10	144	363	0.2%
2	Low	49	5	54	136	0.1%
	Average	197	19	216	544	0.3%
	High	293	29	322	811	0.4%
3	Low	80	10	90	227	0.1%
	Average	322	39	361	910	0.5%
	High	481	58	539	1,358	0.7%
4	Low	117	16	133	335	0.2%
	Average	468	65	533	1,343	0.7%
	High	698	96	794	2,001	1.1%

Table 4-45 Estimated Population Associated with Permanent Employment: Region B

Production Year	Development Scenario	Permanent Construction Employment	Permanent Production Employment	Total Permanent Employment	Total Permanent Population Impacts	% of Existing 2010 Population
5	Low	159	24	183	461	0.2%
	Average	636	97	733	1,847	1.0%
	High	949	144	1,093	2,754	1.5%
6	Low	207	34	241	607	0.3%
	Average	827	136	963	2,427	1.3%
	High	1,235	202	1,437	3,621	1.9%
7	Low	261	45	306	771	0.4%
	Average	1,042	181	1,223	3,082	1.6%
	High	1,555	270	1,825	4,599	2.4%
8	Low	321	58	379	955	0.5%
	Average	1,282	233	1,515	3,818	2.0%
	High	1,914	347	2,261	5,698	3.0%
9	Low	387	73	460	1,159	0.6%
	Average	1,548	291	1,839	4,634	2.5%
	High	2,309	433	2,742	6,910	3.7%
10	Low	460	89	549	1,383	0.7%
	Average	1,839	355	2,194	5,529	2.9%
	High	2,744	529	3,273	8,248	4.4%
11	Low	490	105	595	1,499	0.8%
	Average	1,959	420	2,379	5,995	3.2%
	High	2,924	626	3,550	8,946	4.8%
12	Low	520	121	641	1,615	0.9%
	Average	2,080	484	2,564	6,461	3.4%
	High	3,104	722	3,826	9,642	5.1%
13	Low	550	137	687	1,731	0.9%
	Average	2,201	549	2,750	6,930	3.7%
	High	3,284	818	4,102	10,337	5.5%
14	Low	580	153	733	1,847	1.0%
	Average	2,320	614	2,934	7,394	3.9%
	High	3,462	914	4,376	11,028	5.9%
15	Low	609	170	779	1,963	1.0%
	Average	2,437	678	3,115	7,850	4.2%
	High	3,637	1,011	4,648	11,713	6.2%
16	Low	638	186	824	2,076	1.1%
	Average	2,552	743	3,295	8,303	4.4%
	High	3,808	1,107	4,915	12,386	6.6%
17	Low	666	202	868	2,187	1.2%
	Average	2,663	808	3,471	8,747	4.7%
	High	3,973	1,203	5,176	13,044	6.9%
18	Low	692	218	910	2,293	1.2%
	Average	2,769	872	3,641	9,175	4.9%
	High	4,133	1,300	5,433	13,691	7.3%
19	Low	718	234	952	2,399	1.3%
	Average	2,872	937	3,809	9,599	5.1%
	High	4,286	1,396	5,682	14,319	7.6%

Table 4-45 Estimated Population Associated with Permanent Employment: Region B

Production Year	Development Scenario	Permanent Construction Employment	Permanent Production Employment	Total Permanent Employment	Total Permanent Population Impacts	% of Existing 2010 Population
20	Low	742	250	992	2,500	1.3%
	Average	2,969	1,001	3,970	10,004	5.3%
	High	4,431	1,492	5,923	14,926	7.9%
21	Low	765	267	1,032	2,601	1.4%
	Average	3,061	1,066	4,127	10,400	5.5%
	High	4,569	1,588	6,157	15,516	8.3%
22	Low	787	283	1,070	2,696	1.4%
	Average	3,148	1,130	4,278	10,781	5.7%
	High	4,698	1,685	6,383	16,085	8.6%
23	Low	807	299	1,106	2,787	1.5%
	Average	3,229	1,195	4,424	11,148	5.9%
	High	4,819	1,781	6,600	16,632	8.9%
24	Low	826	315	1,141	2,875	1.5%
	Average	3,305	1,259	4,564	11,501	6.1%
	High	4,932	1,877	6,809	17,159	9.1%
25	Low	844	331	1,175	2,961	1.6%
	Average	3,375	1,324	4,699	11,841	6.3%
	High	5,037	1,973	7,010	17,665	9.4%
26	Low	860	347	1,207	3,042	1.6%
	Average	3,440	1,389	4,829	12,169	6.5%
	High	5,134	2,070	7,204	18,154	9.7%
27	Low	875	363	1,238	3,120	1.7%
	Average	3,500	1,453	4,953	12,482	6.6%
	High	5,223	2,166	7,389	18,620	9.9%
28	Low	889	380	1,269	3,198	1.7%
	Average	3,555	1,518	5,073	12,784	6.8%
	High	5,305	2,262	7,567	19,069	10.2%
29	Low	901	396	1,297	3,268	1.7%
	Average	3,605	1,583	5,188	13,074	7.0%
	High	5,380	2,358	7,738	19,500	10.4%
30	Low	913	412	1,325	3,339	1.8%
	Average	3,650	1,647	5,297	13,348	7.1%
	High	5,448	2,455	7,903	19,916	10.6%
31	Low	0	410	410	1,033	0.6%
	Average	0	1,641	1,641	4,135	2.2%
	High	0	2,445	2,445	6,161	3.3%
32	Low	0	407	407	1,026	0.5%
	Average	0	1,628	1,628	4,103	2.2%
	High	0	2,426	2,426	6,114	3.3%
33	Low	0	402	402	1,013	0.5%
	Average	0	1,608	1,608	4,052	2.2%
	High	0	2,397	2,397	6,040	3.2%
34	Low	0	396	396	998	0.5%
	Average	0	1,583	1,583	3,989	2.1%
	High	0	2,358	2,358	5,942	3.2%

Table 4-45 Estimated Population Associated with Permanent Employment: Region B

Production Year	Development Scenario	Permanent Construction Employment	Permanent Production Employment	Total Permanent Employment	Total Permanent Population Impacts	% of Existing 2010 Population
35	Low	0	388	388	978	0.5%
	Average	0	1,550	1,550	3,906	2.1%
	High	0	2,310	2,310	5,821	3.1%
36	Low	0	378	378	953	0.5%
	Average	0	1,512	1,512	3,810	2.0%
	High	0	2,253	2,253	5,678	3.0%
37	Low	0	367	367	925	0.5%
	Average	0	1,466	1,466	3,694	2.0%
	High	0	2,185	2,185	5,506	2.9%
38	Low	0	354	354	892	0.5%
	Average	0	1,415	1,415	3,566	1.9%
	High	0	2,108	2,108	5,312	2.8%
39	Low	0	339	339	854	0.5%
	Average	0	1,357	1,357	3,420	1.8%
	High	0	2,021	2,021	5,093	2.7%
40	Low	0	323	323	814	0.4%
	Average	0	1,292	1,292	3,256	1.7%
	High	0	1,925	1,925	4,851	2.6%
41	Low	0	307	307	774	0.4%
	Average	0	1,227	1,227	3,092	1.6%
	High	0	1,829	1,829	4,609	2.5%
42	Low	0	291	291	733	0.4%
	Average	0	1,163	1,163	2,931	1.6%
	High	0	1,733	1,733	4,367	2.3%
43	Low	0	275	275	693	0.4%
	Average	0	1,098	1,098	2,767	1.5%
	High	0	1,636	1,636	4,123	2.2%
44	Low	0	258	258	650	0.3%
	Average	0	1,033	1,033	2,603	1.4%
	High	0	1,540	1,540	3,881	2.1%
45	Low	0	242	242	610	0.3%
	Average	0	969	969	2,442	1.3%
	High	0	1,444	1,444	3,639	1.9%
46	Low	0	226	226	570	0.3%
	Average	0	904	904	2,278	1.2%
	High	0	1,348	1,348	3,397	1.8%
47	Low	0	210	210	529	0.3%
	Average	0	840	840	2,117	1.1%
	High	0	1,251	1,251	3,153	1.7%
48	Low	0	194	194	489	0.3%
	Average	0	775	775	1,953	1.0%
	High	0	1,155	1,155	2,911	1.5%
49	Low	0	178	178	449	0.2%
	Average	0	710	710	1,789	1.0%
	High	0	1,059	1,059	2,669	1.4%

Table 4-45 Estimated Population Associated with Permanent Employment: Region B

Production Year	Development Scenario	Permanent Construction Employment	Permanent Production Employment	Total Permanent Employment	Total Permanent Population Impacts	% of Existing 2010 Population
50	Low	0	161	161	406	0.2%
	Average	0	646	646	1,628	0.9%
	High	0	963	963	2,427	1.3%
51	Low	0	145	145	365	0.2%
	Average	0	581	581	1,464	0.8%
	High	0	866	866	2,182	1.2%
52	Low	0	129	129	325	0.2%
	Average	0	517	517	1,303	0.7%
	High	0	770	770	1,940	1.0%
53	Low	0	113	113	285	0.2%
	Average	0	452	452	1,139	0.6%
	High	0	674	674	1,698	0.9%
54	Low	0	97	97	244	0.1%
	Average	0	388	388	978	0.5%
	High	0	578	578	1,457	0.8%
55	Low	0	81	81	204	0.1%
	Average	0	323	323	814	0.4%
	High	0	481	481	1,212	0.6%
56	Low	0	65	65	164	0.1%
	Average	0	258	258	650	0.3%
	High	0	385	385	970	0.5%
57	Low	0	49	49	123	0.1%
	Average	0	194	194	489	0.3%
	High	0	289	289	728	0.4%
58	Low	0	32	32	81	< 0.1%
	Average	0	129	129	325	0.2%
	High	0	193	193	486	0.3%
59	Low	0	16	16	40	< 0.1%
	Average	0	65	65	164	0.1%
	High	0	96	96	242	0.1%
60	Low	0	0	0	0	0.0%
	Average	0	0	0	0	0.0%
	High	0	0	0	0	0.0%

4.3.2.3 Region C

The smallest maximum potential population impact would occur in Region C under the low development scenario when, in Year 10, only 121 unaccompanied transient construction workers are expected to reside in the region. Under the same development scenario in Year 30, 720 permanent construction and production workers and their families would reside in Region C, representing a total of approximately 0.1% of the existing population. Note that the maximum transient population impacts occur in Year 10, while the maximum permanent population impacts occur in Year 30.

In contrast, under the high development scenario in Year 30, Region C is projected to have a maximum of 719 unaccompanied transient construction workers and a maximum of 4,278 permanent construction and production workers and household members in the region. The maximum transient population represents 0.3% of the existing population, and the maximum permanent population represents 2.0% of the existing population.

According to population projection figures presented in Section 3.2.2.3, in the absence of natural gas development, Region C is expected to experience a future population decrease and to have a 2030 population of 188,752 persons, a decrease of 26,470 persons, equal to 12.3% of the total existing population. The influx of workers and their family members associated with gas well development, totaling 4,278 persons in Year 30 under the high development scenario, would offset more than 16% of the projected population decline in Region C and would have a small-scale beneficial impact. Table 4-46 shows the expected transient population impacts, by year, for Region C and the size of the impacts relative to the region's existing 2010 population. Table 4-47 shows expected permanent population impacts, by year, for Region C and the size of the population impacts relative to the region's 2010 existing population.

Table 4-46 Estimated Population Associated with Transient Employment: Region C

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
1	Low	17	17	< 0.1%
	Average	69	69	< 0.1%
	High	103	103	< 0.1%
2	Low	33	33	< 0.1%
	Average	133	133	0.1%
	High	199	199	0.1%
3	Low	49	49	< 0.1%
	Average	195	195	0.1%
	High	290	290	0.1%
4	Low	63	63	< 0.1%
	Average	250	250	0.1%
	High	374	374	0.2%
5	Low	75	75	< 0.1%
	Average	303	303	0.1%
	High	452	452	0.2%
6	Low	88	88	< 0.1%
	Average	349	349	0.2%
	High	521	521	0.2%
7	Low	98	98	< 0.1%
	Average	390	390	0.2%
	High	583	583	0.3%

Table 4-46 Estimated Population Associated with Transient Employment: Region C

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
8	Low	106	106	< 0.1%
	Average	426	426	0.2%
	High	637	637	0.3%
9	Low	115	115	0.1%
	Average	457	457	0.2%
	High	682	682	0.3%
10	Low	121	121	0.1%
	Average	482	482	0.2%
	High	719	719	0.3%
11	Low	114	114	0.1%
	Average	456	456	0.2%
	High	680	680	0.3%
12	Low	108	108	0.1%
	Average	430	430	0.2%
	High	641	641	0.3%
13	Low	101	101	< 0.1%
	Average	403	403	0.2%
	High	602	602	0.3%
14	Low	95	95	< 0.1%
	Average	378	378	0.2%
	High	563	563	0.3%
15	Low	88	88	< 0.1%
	Average	352	352	0.2%
	High	525	525	0.2%
16	Low	82	82	< 0.1%
	Average	327	327	0.2%
	High	488	488	0.2%
17	Low	76	76	< 0.1%
	Average	303	303	0.1%
	High	452	452	0.2%
18	Low	70	70	< 0.1%
	Average	280	280	0.1%
	High	417	417	0.2%
19	Low	65	65	< 0.1%
	Average	258	258	0.1%
	High	384	384	0.2%
20	Low	59	59	< 0.1%
	Average	236	236	0.1%
	High	353	353	0.2%

Table 4-46 Estimated Population Associated with Transient Employment: Region C

Production Year	Development Scenario	Transient Employment Impacts	Transient Population Impacts	% of 2010 Existing Population
21	Low	54	54	< 0.1%
	Average	216	216	0.1%
	High	323	323	0.2%
22	Low	49	49	< 0.1%
	Average	197	197	0.1%
	High	295	295	0.1%
23	Low	45	45	< 0.1%
	Average	180	180	0.1%
	High	268	268	0.1%
24	Low	41	41	< 0.1%
	Average	163	163	0.1%
	High	244	244	0.1%
25	Low	37	37	< 0.1%
	Average	148	148	0.1%
	High	221	221	0.1%
26	Low	34	34	< 0.1%
	Average	134	134	0.1%
	High	200	200	0.1%
27	Low	30	30	< 0.1%
	Average	121	121	0.1%
	High	180	180	0.1%
28	Low	27	27	< 0.1%
	Average	109	109	0.1%
	High	163	163	0.1%
29	Low	25	25	< 0.1%
	Average	98	98	< 0.1%
	High	146	146	0.1%
30	Low	22	22	< 0.1%
	Average	88	88	< 0.1%
	High	132	132	0.1%

Table 4-47 Estimated Population Impacts Associated with Permanent Employment: Region C

Production Year	Development Scenario	Permanent Construction Employment	Permanent Production Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
1	Low	5	0	5	12	< 0.1%
	Average	19	1	20	50	< 0.1%
	High	29	2	31	77	< 0.1%
2	Low	11	1	12	30	< 0.1%
	Average	43	4	47	117	0.1%
	High	64	6	70	174	0.1%
3	Low	17	2	19	47	< 0.1%
	Average	70	8	78	194	0.1%
	High	105	13	118	294	0.1%
4	Low	25	4	29	72	< 0.1%
	Average	102	14	116	289	0.1%
	High	152	21	173	431	0.2%
5	Low	35	5	40	100	< 0.1%
	Average	138	21	159	396	0.2%
	High	206	31	237	590	0.3%
6	Low	45	7	52	129	0.1%
	Average	180	30	210	523	0.2%
	High	269	44	313	779	0.4%
7	Low	57	10	67	167	0.1%
	Average	227	39	266	662	0.3%
	High	338	59	397	989	0.5%
8	Low	70	13	83	207	0.1%
	Average	279	51	330	822	0.4%
	High	416	75	491	1,223	0.6%
9	Low	84	16	100	249	0.1%
	Average	337	63	400	996	0.5%
	High	502	94	596	1,484	0.7%
10	Low	100	19	119	296	0.1%
	Average	400	77	477	1,188	0.6%
	High	597	115	712	1,773	0.8%
11	Low	107	23	130	324	0.2%
	Average	426	91	517	1,287	0.6%
	High	636	136	772	1,922	0.9%
12	Low	113	26	139	346	0.2%
	Average	452	105	557	1,387	0.6%
	High	675	157	832	2,072	1.0%
13	Low	120	30	150	374	0.2%
	Average	479	119	598	1,489	0.7%
	High	714	178	892	2,221	1.0%
14	Low	126	33	159	396	0.2%
	Average	504	133	637	1,586	0.7%
	High	753	199	952	2,370	1.1%

Table 4-47 Estimated Population Impacts Associated with Permanent Employment: Region C

Production Year	Development Scenario	Permanent Construction Employment	Permanent Production Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
15	Low	133	37	170	423	0.2%
	Average	530	147	677	1,686	0.8%
	High	791	220	1,011	2,517	1.2%
16	Low	139	40	179	446	0.2%
	Average	555	162	717	1,785	0.8%
	High	828	241	1,069	2,662	1.2%
17	Low	145	44	189	471	0.2%
	Average	579	176	755	1,880	0.9%
	High	864	262	1,126	2,804	1.3%
18	Low	151	47	198	493	0.2%
	Average	602	190	792	1,972	0.9%
	High	899	283	1,182	2,943	1.4%
19	Low	156	51	207	515	0.2%
	Average	624	204	828	2,062	1.0%
	High	932	303	1,235	3,075	1.4%
20	Low	162	54	216	538	0.2%
	Average	646	218	864	2,151	1.0%
	High	963	324	1,287	3,205	1.5%
21	Low	167	58	225	560	0.3%
	Average	666	232	898	2,236	1.0%
	High	993	345	1,338	3,332	1.5%
22	Low	172	61	233	580	0.3%
	Average	685	246	931	2,318	1.1%
	High	1,021	366	1,387	3,454	1.6%
23	Low	176	65	241	600	0.3%
	Average	702	260	962	2,395	1.1%
	High	1,048	387	1,435	3,573	1.7%
24	Low	180	68	248	618	0.3%
	Average	719	274	993	2,473	1.1%
	High	1,072	408	1,480	3,685	1.7%
25	Low	184	72	256	637	0.3%
	Average	734	288	1,022	2,545	1.2%
	High	1,095	429	1,524	3,795	1.8%
26	Low	187	76	263	655	0.3%
	Average	748	302	1,050	2,615	1.2%
	High	1,116	450	1,566	3,899	1.8%
27	Low	191	79	270	672	0.3%
	Average	761	316	1,077	2,682	1.2%
	High	1,136	471	1,607	4,001	1.9%
28	Low	194	83	277	690	0.3%
	Average	773	330	1,103	2,746	1.3%
	High	1,153	492	1,645	4,096	1.9%

Table 4-47 Estimated Population Impacts Associated with Permanent Employment: Region C

Production Year	Development Scenario	Permanent Construction Employment	Permanent Production Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
29	Low	196	86	282	702	0.3%
	Average	784	344	1,128	2,809	1.3%
	High	1,170	513	1,683	4,191	1.9%
30	Low	199	90	289	720	0.3%
	Average	794	358	1,152	2,868	1.3%
	High	1,184	534	1,718	4,278	2.0%
31	Low	0	89	89	222	0.1%
	Average	0	357	357	889	0.4%
	High	0	532	532	1,325	0.6%
32	Low	0	89	89	222	0.1%
	Average	0	354	354	881	0.4%
	High	0	527	527	1,312	0.6%
33	Low	0	87	87	217	0.1%
	Average	0	350	350	872	0.4%
	High	0	521	521	1,297	0.6%
34	Low	0	86	86	214	0.1%
	Average	0	344	344	857	0.4%
	High	0	513	513	1,277	0.6%
35	Low	0	84	84	209	0.1%
	Average	0	337	337	839	0.4%
	High	0	502	502	1,250	0.6%
36	Low	0	82	82	204	0.1%
	Average	0	329	329	819	0.4%
	High	0	490	490	1,220	0.6%
37	Low	0	80	80	199	0.1%
	Average	0	319	319	794	0.4%
	High	0	475	475	1,183	0.5%
38	Low	0	77	77	192	0.1%
	Average	0	308	308	767	0.4%
	High	0	458	458	1,140	0.5%
39	Low	0	74	74	184	0.1%
	Average	0	295	295	735	0.3%
	High	0	439	439	1,093	0.5%
40	Low	0	70	70	174	0.1%
	Average	0	281	281	700	0.3%
	High	0	419	419	1,043	0.5%
41	Low	0	67	67	167	0.1%
	Average	0	267	267	665	0.3%
	High	0	398	398	991	0.5%
42	Low	0	63	63	157	0.1%
	Average	0	253	253	630	0.3%
	High	0	377	377	939	0.4%

Table 4-47 Estimated Population Impacts Associated with Permanent Employment: Region C

Production Year	Development Scenario	Permanent Construction Employment	Permanent Production Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
43	Low	0	60	60	149	0.1%
	Average	0	239	239	595	0.3%
	High	0	356	356	886	0.4%
44	Low	0	56	56	139	0.1%
	Average	0	225	225	560	0.3%
	High	0	335	335	834	0.4%
45	Low	0	53	53	132	0.1%
	Average	0	211	211	525	0.2%
	High	0	314	314	782	0.4%
46	Low	0	49	49	122	0.1%
	Average	0	197	197	491	0.2%
	High	0	293	293	730	0.3%
47	Low	0	46	46	115	0.1%
	Average	0	183	183	456	0.2%
	High	0	272	272	677	0.3%
48	Low	0	42	42	105	< 0.1%
	Average	0	169	169	421	0.2%
	High	0	251	251	625	0.3%
49	Low	0	39	39	97	< 0.1%
	Average	0	154	154	383	0.2%
	High	0	230	230	573	0.3%
50	Low	0	35	35	87	< 0.1%
	Average	0	140	140	349	0.2%
	High	0	209	209	520	0.2%
51	Low	0	32	32	80	< 0.1%
	Average	0	126	126	314	0.1%
	High	0	188	188	468	0.2%
52	Low	0	28	28	70	< 0.1%
	Average	0	112	112	279	0.1%
	High	0	167	167	416	0.2%
53	Low	0	25	25	62	0.0%
	Average	0	98	98	244	0.1%
	High	0	147	147	366	0.2%
54	Low	0	21	21	52	< 0.1%
	Average	0	84	84	209	0.1%
	High	0	126	126	314	0.1%
55	Low	0	18	18	45	< 0.1%
	Average	0	70	70	174	0.1%
	High	0	105	105	261	0.1%
56	Low	0	14	14	35	< 0.1%
	Average	0	56	56	139	0.1%
	High	0	84	84	209	0.1%

Table 4-47 Estimated Population Impacts Associated with Permanent Employment: Region C

Production Year	Development Scenario	Permanent Construction Employment	Permanent Production Employment	Total Permanent Employment	Total Permanent Population Impacts	% of 2010 Existing Population
57	Low	0	11	11	27	< 0.1%
	Average	0	42	42	105	0.0%
	High	0	63	63	157	0.1%
58	Low	0	7	7	17	< 0.1%
	Average	0	28	28	70	< 0.1%
	High	0	42	42	105	< 0.1%
59	Low	0	4	4	10	< 0.1%
	Average	0	14	14	35	< 0.1%
	High	0	21	21	52	< 0.1%
60	Low	0	0	0	0	0.0%
	Average	0	0	0	0	0.0%
	High	0	0	0	0	0.0%

The impacts and analysis described above were developed on a regional basis. In some cases, the above analysis may minimize the expected local impacts. Because the natural gas wells would not be evenly distributed across the regions, there may be more significant localized population impacts. Depending on the distribution of the wells and the phasing of well development, which depends in part on the price of natural gas, shale gas production may create localized growth in individual small towns that is larger than the regional impacts. In addition, because the development of new wells would not be distributed evenly over time due to swings in well development activity, downswings may cause periods of smaller-than-projected population impacts, while upswings may cause larger-than-projected population impacts.

4.4 Housing

This section describes the potential impacts on housing resources and property values that could result from high-volume hydraulic fracturing in New York State. Statewide and regional impacts are discussed separately below. For the purposes of this analysis, three representative regions were selected to examine the range of potential regional impacts. This analysis in no way is meant to imply that impacts would occur only in these three regions. Local- and regional-level impacts would occur wherever high-volume hydraulic-fracturing wells are constructed. Currently, the actual locations of these wells have not yet been determined, and wells could be sited anywhere there is low-permeability shale.

4.4.1 New York State

As previously described in Section 4.2 (Economy, Employment, and Income), at Year 30 the total construction employment in New York State that would result from high-volume hydraulic fracturing is projected to range from 4,408 new workers under the low development scenario to 26,316 new workers under the high development scenario. Initially, the majority of the construction workers are

assumed to be temporary, transient workers. As the natural gas fields are developed over time, it is assumed that an increasing number of these workers would become permanent residents. Production employment is projected to range from 1,790 workers under the low development scenario to 10,673 workers under the high development scenario.

Table 4-48 presents estimates of the maximum temporary, transient employment that would occur in Year 10 and the maximum permanent employment that would occur in Year 30. Transient employment includes those construction workers who would only temporarily relocate to the area during well construction. Permanent employment includes permanent construction workers and permanent production workers, as discussed more fully in Section 4.3 (Population).

Table 4-48 Estimated Employment, by Development Scenario, for New York State for Year 30

Development Scenario	Transient Employment[1]	Permanent Employment[2]
Low	2,409	15,198
Average	9,639	60,803
High	14,384	90,704

[1] Maximum transient employment occurs in Year 10, while maximum permanent employment occurs in Year 30.

[2] Permanent employment includes both permanent construction and production employment.

Note: Maximum transient employment and maximum permanent employment are reached in two different years. Therefore, the figures for transient employment and permanent employment in this table cannot be added to equal total employment.

4.4.1.1 Temporary Housing

The construction phase is expected to have a short-term impact on temporary housing resources in New York State. New York State is currently not a major oil or gas producing state and, therefore, does not have a large work force skilled in oil and natural gas extraction. Thus, it is anticipated that workers specialized in gas exploration and drilling would travel into New York from other states where gas exploration and drilling are more significant. In the beginning, much of the workforce would need to be imported from other states. Over time, an experienced workforce would be created within New York, and the need for out-of-state workers would decline.

Typically, construction of a high-volume hydraulic-fracturing well is completed in 3 to 4 months. Therefore, the transient workers needed to drill these wells would likely only temporarily relocate to a specific area, and once that well was completed they would move on to another site. The influx of workers who would move from one well development site to another would increase the demand for transient housing such as rental properties and hotel/motel rooms, thereby decreasing the rental and hotel/motel vacancy rates within the state. Decreased rental and hotel/motel vacancy rates would provide short-term economic benefits to some owners of rental housing and hotels/motels within the state and, in some areas, may increase prices charged for these temporary housing units.

Tables 4-26 to 4-28 in Section 4.3 (Population) show the estimated number of transient construction workers, by year and scenario, for New York State as a whole. If it is assumed that each transient construction worker would require one temporary housing unit or motel/hotel room, then these figures would also represent the total increase in demand for temporary housing in the state. For brevity sake, this table has not been repeated here. As shown in the table, the increase in the demand for temporary housing units would be at its highest in Year 10.

Table 4-49 identifies the total stock of rental housing units, the existing supply of vacant housing units for rent, and the rental vacancy rate in New York State as a whole. Assuming a worst-case scenario where each projected construction worker would require one rental-housing unit, New York State could easily supply rental housing to construction workers under all development scenarios with existing vacant units in Year 10. Therefore, the impact on the supply of rental housing resources from transient workers would be negligible at the statewide level. Impacts at the regional and local levels are discussed below.

Table 4-49 New York State Rental Housing Stock (2010)

Total Rental Inventory	For Rent	Rental Vacancy Rate (%)
3,632,743	200,039	5.5

Source: USCB 2010a.

4.4.1.2 Permanent Housing

Some migration of workers into New York State would be expected to occur as a result of the construction and production phases of the high-volume hydraulic fracturing operations. Initially, there would not be enough workers specialized in gas production to meet the demand. Therefore, it would be expected that these workers would move into New York State from states where the natural gas extraction industry is more developed. However, over time, an experienced workforce would be created within the state, and the need for out-of-state workers would decline.

Table 4-30 in Section 4.3 (Population) shows the estimated number of permanent construction and production workers, by year, for New York State as a whole. If it is assumed that each permanent worker would require one housing unit, then these figures would also represent the total increase in demand for housing units in the state.

Table 4-50 identifies the existing supply of vacant housing units for sale or rent in New York State. Seasonal, recreational, and occasional use units and units rented or sold but not occupied were not included in these totals. Assuming a worst-case scenario at Year 30, it is anticipated that each projected permanent construction and production worker would require one permanent housing unit. Given that assumption, New York State has more than enough houses for sale to provide

permanent housing units to the new permanent workers. Therefore, the impact on the supply of permanent housing units would be negligible at the statewide level during the production phase.

Table 4-50 Availability of Owner-Occupied Housing Units (2010)

Total Number of Housing Units	For Sale	For Rent
8,108,103	77,225	200,039

Source: U.S. Census 2010a.

Based on the above discussion, it can be concluded that at the statewide level, New York State as a whole has a more than sufficient supply of rental properties and housing units to cope with the additional workers employed under each of the development scenarios at maximum build-out in Year 30.

4.4.2 Representative Regions

Table 4-51 identifies the maximum transient and permanent employment in Regions A, B, and C at Year 30. See Tables 4-32 to 4-40, 4-43, 4-45, and 4-47 in Section 4.3 (Population) for transient and permanent employment, by year and by development scenario, for each representative region. Table 4-51 below shows the maximum expected change in transient and permanent employment levels over all years of the project.

Table 4-51 Maximum Transient and Permanent Employment by Development Scenario and Region

Region	Transient Employment (in FTE)[1]	Permanent Employment[2]
Region A		
Low	1,205	2,879
Average	4,820	11,517
High	7,192	17,179
Region B		
Low	554	1,325
Average	2,217	5,297
High	3,309	7,903
Region C		
Low	121	289
Average	482	1,152
High	719	1,718

1 Maximum transient employment occurs in Year 10.

2 Maximum permanent employment occurs in Year 30 and includes both permanent construction and production employment.

Note: Maximum transient employment and maximum permanent employment are reached in two different years. Therefore, the figures for transient employment and permanent employment in this table cannot be added to equal total employment.

4.4.2.1 Temporary Housing

The construction phase would be expected to have a short-term, mixed impact on the rental housing stock in the representative regions. As described above, given the short-term nature of well construction, it is unlikely that many of the construction workers would initially permanently relocate to the region. However, as the natural gas industry developed in the region and long-term employment became more likely, more construction workers would choose to permanently relocate to the regions.

In most cases, construction workers would temporarily reside in nearby population centers and commute to the development sites. Once the well is completed, they would move on to another area. The influx of a large number of transient construction workers into these regions would be expected to increase the demand for temporary housing such as rental properties, hotel/motel rooms, and RV camp sites, thereby decreasing rental and hotel/motel vacancy rates throughout the region. Decreased rental and hotel/motel vacancy rates are expected to provide short-term economic benefits to some owners of rental housing and hotels/motels in these regions, but it could also cause a shortage of temporary housing in the most affected areas. The increase in demand may also increase the price charged for these units.

In areas of Pennsylvania where Marcellus shale drilling activity is occurring, it has been difficult at times to accommodate the influx of new workers (Kelsey 2011). There have been reports of large increases in rent in Bradford County, Pennsylvania, as a result of the influx of out-of-area workers (Lowenstein 2010). There have also been "frequent reports" of landlords not renewing leases with existing tenants in anticipation of leasing at higher rates to incoming workers, and reports of an increased demand for motel and hotel rooms, increased demand at RV camp sites, and increases in home sales (Kelsey 2011). Such localized increases in the demand for housing have raised concerns about the difficulties caused for existing local, low-income residents to afford housing (Kelsey 2011).

The impacts on temporary housing described above for Bradford County, while acute in the short term, may decrease in the long term as more workers establish permanent residences in the area and as the market has time to respond to the shortage in temporary housing. As more hotel/motel rooms are constructed and more rental properties become available, the shortages of existing units would decline and subsequently rental prices would also decline.

As with the situation in areas in Pennsylvania undergoing early Marcellus shale development, it is likely that most of the workers employed during the construction phase would relocate from outside of Regions A, B, and C, as natural gas well exploration and drilling require specialized skilled workers (Marcellus Shale Education and Training Center 2009).

Table 4-52 identifies the total rental inventory, the existing supply of vacant housing units for rent, the rental vacancy rate, and the number of hotel/motel rooms in

Regions A, B, and C. Assuming a worst-case scenario, where each incoming transient worker would require one rental housing unit or hotel/motel room during peak construction (Year 10), Regions B and C both have more vacant rental units than incoming workers under all three scenarios. However, Region A has only enough rental units to cope with the number of incoming workers under the low and average development scenarios. In Regions B and C under all three scenarios and in Regions A under the low and average development scenario, the existing stock of rental housing is sufficient to meet the needs of incoming workers; thus, no additional rental housing would need to be constructed. However, rent increases caused by the increased demand for rental housing could make such housing unaffordable for existing low-income tenants, and increased demand for hotel/motel rooms would be likely to cause price increases in these sectors.

Table 4-52 Availability of Rental Housing Units

Region	Total Rental Inventory	For Rent	Rental Vacancy Rate (%)	Hotel/Motel Rooms
Region A	48,955	3,824	7.8	3,110
Region B	24,558	2,604	10.6	3,705
Region C	29,127	2,624	9.0	1,987

Source: USCB 2009c.

Under the high development scenarios, shortages of rental housing would likely occur in Region A. The use of seasonal, recreational, or occasional use housing units as rental properties could potentially reduce the impact of increased demand on rental housing in these regions. However, it is likely that rents and hotel/motel room rates would remain elevated until the rental housing and motels/hotels were constructed to meet the higher level of demand. The higher rents would negatively impact existing low-income residents, who may not be able to find affordable rental housing within the regions. The higher motel/hotel rates and/or the few available rooms may discourage some visitors from coming to these regions and thereby has the potential to reduce tourism in these areas.

The above analysis was completed on a regional level and included all rental units in a two- or three-county area. However, temporary housing impacts may occur and be more severe at an even more local level. If several well pads were developed at the same the time in the same area, there would be an even larger concentration of workers and a greater demand for temporary housing in that immediate area and in the population centers located near the general vicinity of the development. Although data on commuting patterns by occupation show that temporary construction workers typically are willing to commute further than other workers, there still could be a significant increase in local housing demand. Therefore, the localized impacts in areas where there is a high concentration of natural gas wells may be greater than those described above.

See Tables 4-32 to 4-40 in Section 4.3 (Population) for yearly estimates of the transient construction workforce and, therefore, yearly estimates of the expected

increase in the demand for temporary housing units for each region under each development scenario.

4.4.2.2 Permanent Housing

The permanent construction and production workers are expected to have a long-term, mixed impact on the permanent housing stock in the representative regions. Given the need to have natural gas operators with specialized skills, many of the production workers would relocate from areas outside the representative regions. New production workers recruited from outside the region would typically be offered permanent employment and would likely require permanent housing. In addition, as the natural gas industry expands in the representative regions and the long-term construction employment becomes more permanent in the region, more construction workers would choose to live permanently in the regions and simply commute between well sites. These additional construction and production workers would increase the demand for permanent housing. In addition, the increased economic activity that would take place in these regions as a result of natural gas development would further increase the demand for permanent housing and reduce homeowner vacancy rates in the region.

Table 4-53 identifies the number of vacant permanent housing units for sale or rent in Regions A, B, and C. Seasonal, recreational, and occasional-use units and units rented or sold but not occupied were not included in this table. The following analysis assumes a worst-case scenario where all new permanent workers would relocate to the region and require one permanent housing unit each at maximum build-out (Year 30) to purchase or rent. However, in actuality this may overstate the regional impacts. Many of the permanent worker positions could be filled by currently unemployed or underemployed workers from the local areas, thus reducing the overall change in the demand for permanent housing.

Table 4-53 Availability of Housing Units

Region	Total Number of Housing Units	For Sale	For Rent
Region A	151,135	1,516	3,824
Region B	111,185	1,989	2,604
Region C	108,031	1,278	2,624

Source: USCB 2010a.

Given this worse-case assumption, Regions A, B, and C would be able to absorb the additional demand for permanent housing units under the low development scenario. Region C would also be able to meet increased demand for permanent housing units under the average and high development scenario, whereas Region A and Region B would not be able to meet the increased demand for permanent housing units under the average development scenario. Neither Region A nor B would be able to meet demand under the high development scenario. Region C would be able to absorb the additional demand for permanent housing units under the high development scenario

No additions to the permanent housing stock would be required under the low development scenarios in which regions could absorb additional demand for permanent housing. However, it is expected that housing prices would rise initially in response to the increased demand for permanent housing, resulting in difficulties for low-income residents seeking to buy a home and capital gains for owners of existing homes. In the long term, additional housing construction would take place and prices would level off as the supply of housing units caught up with the demand for these units.

Under the scenarios in which regions do not have enough homes for sale to meet the potential demand from incoming permanent workers, the incoming permanent workers and existing residents would compete for the existing stock of permanent housing units, resulting in an increase in housing prices. Over time, builders and landowners would respond to the higher prices by constructing more permanent housing units. However, before such homes are constructed, a period of particularly high prices would be expected. Low-income residents that do not already own property or currently rent might face difficulties in finding affordable homes to buy, and owners of existing homes would experience capital gains.

See Tables 4-43, 4-45, and 4-47 in Section 4.3 (Population) for yearly estimates of the permanent workforce and, therefore, yearly estimates of the expected increase in the demand for permanent housing units for each region under each development scenario.

The above analysis was completed on a regional level and included all permanent housing units in a two- or three-county area. Permanent housing impacts may occur and be more severe on a more local level. If for example, the production workers are expected to report to only a few centralized facilities, the demand for permanent housing near those facilities would be greater than for the region as a whole. This may place a strain on the permanent housing stock in such areas, and the impacts may be even greater than those described above.

4.4.3 Cyclical Nature of the Natural Gas Industry

The demand for housing, both temporary and permanent, would be expected to change over time. The demand for housing would be the greatest in the period during which the wells in an areas are being developed, and demand would decline thereafter. This would create the possibility of an excess supply of such housing after the well development period (Kelsey 2011). If well development in a region occurs in some areas earlier than in others, then housing shortages and surpluses may occur at the same time in different areas within the same region.

The natural gas market can be volatile, with large swings in well development activity. Downswings may cause periods of temporary housing surplus, while upswings may exacerbate housing shortages within the regions.

4.4.4 Property Values

At this level of analysis, it is impossible to predict the actual impacts of developing the Marcellus and Utica Shale natural gas reserves on individual property values. However, some predictions can be made with regard to the general impact of mineral rights on property values and the impact of well development on adjacent properties.

Significant increases in property value are expected where the subsurface mineral rights and land are held jointly with land ownership and the exploitation of the subsurface resources is not limited in some way. Because the owners of subsurface mineral rights typically receive royalty payments equal to or greater than 12.5% of the total value of production, the development of natural gas reserves would be expected to substantially increase the value of their property. Properties where the mineral rights are not held jointly with land ownership, or where there is some restriction on drilling, would not experience this increase in value.

Property values could also be affected by the impacts associated with developing natural gas resources. Gas well development could impact local environmental resources and cause noise and vibration impacts, and trucks servicing the well development could also impact the surrounding areas. Once wells are in place, the local impacts would be less and there would be much less traffic moving to and from the wells. Pipelines would be constructed to carry the natural gas from the wells. Construction of the pipelines would have an impact on the landscape and would result in the maintenance of cleared rights-of-way once the pipeline is in place. Gas compressor stations would also be constructed to maintain the pressure of the gas in the pipelines, and there would be noise and air emissions associated with their operation.

It is possible that these various impacts, particularly those associated with the construction phase, could reduce the value of properties close to the wells relative to similar properties not located close to wells. In order to assess the potential impact these negative externalities would have on property values in the affected regions, a review of economic literature was undertaken. A number of studies have been conducted to provide quantitative estimates of the impact of wells on property values. These studies are reviewed and discussed below. As with much economic and econometric literature, the following studies are based on data gathered for specific geographic locations at specific times. While the findings of these studies are analogous to the current situation discussed in this report, the findings should be used only as an indication of the direction and magnitude of potential impacts on property values. Characteristics of individual housing markets and the nature of the gas development activities would vary dramatically from site to site; thus, the findings in the following reports should not be viewed as an actual estimate of impacts.

BBC Research and Consulting (2001) examined the impact of coal bed methane wells on property values in La Plata County, Colorado, between 1989 and the first half of 2000. The authors used a hedonic approach (i.e., an approach that links

property values to their attributes and the attributes of surrounding areas) to estimate the impact of having a well on a property and having a well near to, but not on, a property. The authors found that having a well on a property was associated with a 22% reduction in the value of the property; that having a well within 550 feet of a property increased its value; and that having a well located between 551 feet and 2,600 feet from a property had a negative impact on a property's value. The authors attributed the positive impact on property values of having a well located within 550 feet of a property to the prevention of further gas well development in that area due to a spacing order and setback conditions that prevented well drilling close to existing wells (BBC Research and Consulting 2001).

Boxall, Chan, and McMillan (2005) examined the impact of small- to medium-size oil and gas production facilities on rural residential property values using data from central Alberta, Canada. In this study, the authors found a statistically significant negative relationship between property values and the presence of oil and gas facilities within approximately of 2.5 miles of rural residential properties. The presence of oil and gas facilities within 2.5 miles of rural residential properties was estimated to reduce property values between 4% and 8%, with the potential to double the impact, depending on the level and composition of the nearby industry activities (Boxall et al. 2005).

Integra Realty Resources (2011) conducted a study of the impact of natural gas wells on property values in and around Flower Mound, a community approximately 28 miles northwest of downtown Dallas, Texas, where gas drilling is a recent development. The authors used four methods to estimate the impact of wells on property values: (1) examining the relationship between distance to a well site and property values; (2) comparing the sales prices of properties close to a well and comparable properties not close to a well; (3) a statistical analysis of the relationship between property attributes, including proximity to a well and values; and (4) surveying market participants (principally realty agents). With regard to the relationship between the distance between properties and well sites, they found that within Flower Mound itself there was a negative impact on property values when houses are immediately adjacent to well sites; however, this negative impact diminishes quickly with increasing distance from the well. The impact was found to be between -2% and -7% of property values. The results of the comparable sales analysis indicated that, in most cases, there was little correlation between proximity to a well site and property values. However, within Flower Mound itself and for properties in excess of $250,000 in selling price, proximity to a well had a negative impact of between -3% and -14% on property values. The statistical analysis found no statistically significant relationship between property values and proximity to a well site. Finally, market participants reported that proximity to a well site had an impact on the time required to sell a property; however, this impact was most pronounced during the actual process of well development and diminished thereafter (Integra Realty Resources 2011).

Fruits (2008) studied the impact of the South Mist Pipeline Extension on residential property values in Clackamas and Washington counties, Oregon. In his

analysis, Fruits performed three statistical tests using the hedonic housing price approach and found no statistically significant impact from natural gas pipeline development on residential property values (Fruits 2008).

Palmer (2008) also looked at the impact of the South Mist Pipeline Extension on residential property values in Clackamas and Washington counties, Oregon. Palmer, working on behalf of Palomar Gas Transmission LLC, conducted a market study using data from 2004 to 2008 that compared sales of properties along pipeline corridors with comparable sales of non-affected properties. Palmer found no measurable impact on property values resulting from the construction and operation of natural gas pipelines (Palmer 2008).

In conclusion, the above literature review suggests that being in proximity to a well could reduce the value of a property, but that proximity to a gas pipeline might not reduce the value of a property. The proposed natural gas development would have an overall regional effect of increasing property values due to the expected in-migration of construction and production workers and the increased economic activity that would occur in the area. Likewise, properties that still included unexploited sub-surface mineral rights would increase in value due to the potential of receiving royalty payments. However, not all properties in the region would increase in value, as residential properties located in close proximity to the new gas wells would likely see some downward pressure on price. This downward pressure would be particularly acute for residential properties that do not own the subsurface mineral rights.

4.5 Government Revenues and Expenditures

This section discusses the potential fiscal impacts on state and local government entities that would occur as a result high-volume hydraulic fracturing operations. Impacts on major revenue sources for the state and local governments are discussed, as are expected changes in state and local government expenditures that could occur as a result high-volume hydraulic fracturing operations.

Given the uncertainty associated with the actual level of future development of these reserves, the rate of extraction that would occur, and the actual geographic location where development would take place, it is impossible to definitively quantify the fiscal impacts of this action. However, some estimates have been made. These estimates should be viewed only as order-of-magnitude estimates and not as actual revenue or cost projections.

4.5.1 New York State

The proposed high-volume hydraulic fracturing operations would have a significant positive impact on revenues collected by New York State. Revenues in the state would increase directly as a result of lease payments for natural gas development that would occur under state-owned land and indirectly from an increase in tax revenues generated by the natural gas development and the resulting increase in economic activity throughout the state. No surface access would be granted for high-volume hydraulic fracturing operations on state-owned lands.

However, the subsurface natural gas deposits under state-owned lands could be accessed by surface operations located on privately owned lands. If the subsurface natural gas deposit under state-owned lands were extracted, New York State would receive lease payments and royalties for the mineral rights

Currently, New York State receives lease payments for any existing or planned natural gas development on state-owned lands that are leased. These payments would also be received for any new subsurface mineral rights that are leased and/or any new wells drilled in the low-permeability shale that would access subsurface natural gas reserves under state-owned lands. Delay rentals (i.e., rental payments that are provided to the owner of the mineral right before drilling and production occurs) and bonus bid payments would accrue to the state when developers first purchase the right to exploit the subsurface minerals under state-owned lands. Royalty payments of 12.5% or more of gross revenues would also be provided to the state for any natural gas reserves extracted from under state-owned lands.

At this point in the planning processes it is impossible to accurately assess the exact location where these wells would be drilled and whether or not these wells would be located on private lands that could access underground reserves under state-owned lands. Therefore, it is impossible to estimate the total royalty and lease payments that would accrue to the state. However, these payments are not expected to be large relative to the total New York State budget. Currently, New York State receives approximately $746,000 in lease payments per year for all oil and natural gas developments on state-owned lands.

The state would indirectly receive a significant increase in its revenue streams from high-volume hydraulic fracturing operations. As described in Section 4.2 (Economy, Employment, and Income) the development of high-volume hydraulic fracturing operations would increase employment and income throughout the state. Depending on the development scenario, $621.9 million to $3.7 billion in employee earnings would be directly and indirectly generated per year at maximum build-out (Year 30).

As a result, New York State would experience a large increase in its personal income tax receipts. In 2008 the effective personal income tax rate for all taxpayers in New York State was 5.0%. If this tax rate were used for estimation purposes, at maximum build-out (Year 30) the state could receive between $31 million and $185 million a year in personal income tax receipts, depending on the level of development assumed.

In addition to the personal income tax, the state would also experience some increase in its corporate tax receipts. Corporate income in the state would increase both directly, as the natural gas developers profit from the extraction of the gas in the low-permeability shale, and indirectly due to the resulting increase in economic activity in the state. However, given the many benefits in the New York State tax code for energy companies, such as expensing, depletion, and deprecia-

tion deductions, the taxable income from the natural gas industry would be greatly reduced. In addition, New York State offers an investment tax credit (ITC) that could substantially reduce most, if not, all of the net income generated by these energy development companies. Also, the sale of the natural gas generated by these companies may not take place in New York and, therefore, may not be subject to New York State corporate tax (NYSDTF 2011a). Other tax receipts would also increase. Revenues generated from sales and use taxes would also register an increase as industry purchased the materials needed to develop these natural gas reserves that are not exempt from state and local sales tax. However, many of the materials needed to construct these wells would be tax-exempt, including such things as piping, drill rigs, service rigs, vehicles, tools and supplies, pollution control equipment, and services to real property (NYSDTF 2011a).

The direct, indirect, and induced economic activity associated with the high-volume hydraulic fracturing would further expand sales tax receipts as the new workers spend a portion of the increased earnings in the state.

High-volume hydraulic fracturing operations would also result in some significant negative fiscal impacts on the state. The increased truck traffic required to deliver equipment, supplies, and water and sand to the well sites would increase the rate of deterioration of the state's road system. Additional capital outlays would be required to maintain the same level of service on these roads for their projected useful life. Depending on the exact location of well pads, the state may also be required to upgrade roads and interchanges under its jurisdiction in order to handle the additional truck traffic. The potential increase in accidents and potential additional hazardous materials spills resulting from the increased truck traffic also would require additional expenditures. Finally, approval of transportation plans/permits would place additional administrative costs on the New York State Department of Transportation.

Additional environmental monitoring, oversight, and permitting costs would also accrue to the state. In order to protect human health and the environment, New York State would be required to spend substantial funds to review permit applications; to ensure that permit requirements were met, safe drilling techniques were used, and the best available management plans were followed; and to provide enforcement against violations. In addition, the state would experience administrative costs associated with the review of well permit applications and leasing requirements and enforcement of regulations and permit restrictions. All of these factors could result in significant added costs for the New York State government.

The New York State Department of Health would also incur additional costs due to the need to provide additional technical support and oversight services to local governments that would monitor water quality in local drinking water wells.

4.5.2 Representative Regions

Development of the natural gas reserves would have significant positive and negative fiscals impact on local governments wherever drilling would take place.

As described above, local government entities who take part in sales tax revenue sharing schemes would experience a substantial increase in sales tax receipts as a result of the additional economic activity that would occur within their jurisdictions. Local government entities that receive proceeds from ad valorem property taxes would see significant increases to their tax rolls and property tax receipts.

As described previously in Section 3.4 (Government Revenue and Expenditures), producing natural gas wells are taxable for ad valorem real property tax purposes in New York State. Therefore, every new natural gas well operating in a local government's jurisdiction would increase that government's tax base and the total assessed value of property.

In New York State, producing natural gas wells are taxed based on the value of their production for ad valorem property tax purposes. Each year the New York State Office of Real Property Tax Service (ORPTS) determines the "unit of production value" for a region to assist in the valuation of a producing natural gas well. This unit value is then multiplied by the total amount of natural gas produced, and the state equalization rate is then applied to determine the total assessed value of the natural gas well. Applicable property tax rates are then applied to this assessed value to determine the ad valorem property tax levy.

In order to predict the change in property tax revenues that would result from the proposed high-volume hydraulic fracturing operations, annual production of the wells were forecasted. Many factors affect the annual production of a natural gas well. Typically, production initially starts out at a maximum level and then declines quickly until it reaches a relatively slower rate of decline. Production then continues at this lower level for approximately 30 years. Horizontal high-volume hydraulic-fracturing wells produce more natural gas than vertical high-volume hydraulic-fracturing wells. This discrepancy has been accounted for in the analysis. For a more detailed description of projected production levels, see Section 4.1.

The estimation of the real property tax payments for a typical horizontal well in each production year was done in the following steps:

Step One: Estimating the Assessed Value of Production

The assessed value of production was estimated by multiplying its annual production described in Section 4.1 by the unit of production value presented in Section 3.4. The production estimates shown in Section 4.1 are expressed in millions of cubic feet per year in the table. Therefore, total production was multiplied by one thousand to calculate the multiples of thousands of cubic feet produced by the well in each year. This calculation was completed because the gas unit of production value is applied to each thousand cubic feet of output to estimate a well's market value. As explained in the ORPTS guide to the valuation and assessment of oil and gas producing property in the state:

"Oil and gas economic profiles are developed by ORPTS' Valuation Services Bureau (VSB) from economic data submitted by oil and gas producing companies, and the NYSDEC. VSB staff analyzes the data and determines unit of production values for each economic profile. Assessors use the unit of production values to calculate assessed values for oil and gas properties." (NYSDTF 2011b)

The gas unit of production value is set for a year and differs between "profiles," which are defined according to both the area they cover and the gas-containing formation to which they relate. Since there are no gas unit of production values for Marcellus Shale gas wells, the gas unit of production value for the Medina Regions (which include Regions A, B, and C) of $11.19 per thousand cubic feet from 2010 was used. (NYSDTF 2011a).

When the Marcellus Shale, Utica Shale, or other low-permeability shale reserves are developed in New York State, specific unit of production values would be developed for that specific formation and the specific drilling techniques used in that formation. Depending on the results of that analysis, the unit of production value could vary substantially from the Medina values utilized in this report

Step Two: Estimating the Property Tax Payment

The annual property tax payment was calculated by multiplying the assessed value by the overall full-value tax rate for the county divided by one thousand. The overall full-value tax rate for each county was calculated by ORPTS and takes into account all local taxes on real property from all local taxing entities including county, town, village, school district, and other special districts, and the 2010 Medina formation unit of production value. As described previously, once Marcellus Shale or Utica Shale formations become developed in New York State, specific unit of production values would be developed for that specific formation and the specific drilling techniques used in that formation. Depending on the results of that analysis, the unit of production value could vary substantially from the Medina values utilized in this report (NYSDTF 2011c, 2011d).

Tables 4-54, 4-55, and 4-56 show the estimated annual real property tax payments for a typical high-volume hydraulic-fracturing horizontal well in Broome County in Region A, in Delaware County in Region B, and in Cattaraugus County in Region C for each year of its productive life.

Table 4-54 Region A: Example of the Real Property Tax Payments From a Typical Horizontal Well

County:			Broome
2010 Final Gas Unit of Production Value			$11.19
2010 Overall Full-Value Tax Rate[1]			35.5
Production Year	Annual Production (millions of cubic feet)	Assessed Value of Production[2]	Property Tax Payment[3]
1	803.00	$8,985,570	$318,988
2	354.05	$3,961,820	$140,645
3	258.00	$2,887,020	$102,489
4	201.43	$2,253,946	$80,015
5	165.93	$1,856,701	$65,913
6	144.50	$1,616,955	$57,402
7	130.00	$1,454,700	$51,642
8	119.00	$1,331,610	$47,272
9	109.93	$1,230,061	$43,667
10	103.20	$1,154,850	$40,997
11	98.04	$1,097,107	$38,947
12	93.14	$1,042,252	$37,000
13	88.48	$990,139	$35,150
14	84.06	$940,633	$33,392
15	79.86	$893,601	$31,723
16	75.86	$848,921	$30,137
17	72.07	$806,475	$28,630
18	68.47	$766,151	$27,198
19	65.04	$727,844	$25,838
20	61.79	$691,451	$24,547
21	58.70	$656,879	$23,319
22	55.77	$624,035	$22,153
23	52.98	$592,833	$21,046
24	50.33	$563,191	$19,993
25	47.81	$535,032	$18,994
26	45.42	$508,280	$18,044
27	43.15	$482,866	$17,142
28	40.99	$458,723	$16,285

Table 4-54 Region A: Example of the Real Property Tax Payments From a Typical Horizontal Well

County:			Broome
2010 Final Gas Unit of Production Value			$11.19
2010 Overall Full-Value Tax Rate[1]			35.5
Production Year	Annual Production (millions of cubic feet)	Assessed Value of Production[2]	Property Tax Payment[3]
29	38.94	$435,787	$15,470
30	37.00	$413,997	$14,697
Total Property Tax Payments for the Productive Life of the Well			$1,448,735

Sources: NYSDTF 2011a, 2011b, 2011c, 2011d; All Consulting 2011.

Notes:

1 Full-value tax rates are tax rates that have already been equalized. Therefore, these numbers should not be multiplied by the state equalization rate.

2 Calculated as Annual Production multiplied by 1,000 (to calculate the number of 1,000s of cubic feet) multiplied by the 2010 Final Gas Unit of Production Value (applied to each 1,000 cubic feet).

3 Calculated as Assessed Value of Production multiplied by the Overall Full-Value Tax Rate divided by 1,000.

Table 4-55 Region B: Example of the Real Property Tax Payments From a Typical Horizontal Well

County:			Delaware
2010 Final Gas Unit of Production Value			$11.19
2010 Overall Full-Value Tax Rate[1]			21.1
Production Year	Annual Production (millions of cubic feet)	Assessed Value of Production[2]	Property Tax Payment[3]
1	803.00	$8,985,570	$189,596
2	354.05	$3,961,820	$83,594
3	258.00	$2,887,020	$60,916
4	201.43	$2,253,946	$47,558
5	165.93	$1,856,701	$39,176
6	144.50	$1,616,955	$34,118
7	130.00	$1,454,700	$30,694
8	119.00	$1,331,610	$28,097
9	109.93	$1,230,061	$25,954
10	103.20	$1,154,850	$24,367
11	98.04	$1,097,107	$23,149
12	93.14	$1,042,252	$21,992
13	88.48	$990,139	$20,892
14	84.06	$940,633	$19,847
15	79.86	$893,601	$18,855
16	75.86	$848,921	$17,912
17	72.07	$806,475	$17,017
18	68.47	$766,151	$16,166

Table 4-55 Region B: Example of the Real Property Tax Payments From a Typical Horizontal Well

County:			Delaware
2010 Final Gas Unit of Production Value			$11.19
2010 Overall Full-Value Tax Rate[1]			21.1
Production Year	Annual Production (millions of cubic feet)	Assessed Value of Production[2]	Property Tax Payment[3]
19	65.04	$727,844	$15,357
20	61.79	$691,451	$14,590
21	58.70	$656,879	$13,860
22	55.77	$624,035	$13,167
23	52.98	$592,833	$12,509
24	50.33	$563,191	$11,883
25	47.81	$535,032	$11,289
26	45.42	$508,280	$10,725
27	43.15	$482,866	$10,188
28	40.99	$458,723	$9,679
29	38.94	$435,787	$9,195
30	37.00	$413,997	$8,735
Total Property Tax Payments for the Productive Life of the Well			$861,079

Notes:

1 Full-value tax rates are tax rates that have already been equalized. Therefore, these numbers should not be multiplied by the state equalization rate.

2 Calculated as Annual Production multiplied by 1,000 (to calculate the number of 1,000s of cubic feet) multiplied by the 2010 Final Gas Unit of Production Value (applied to each 1,000 cubic feet).

3 Calculated as Assessed Value of Production multiplied by the Overall Full-Value Tax Rate divided by 1,000.

Table 4-56 Region C: Example of the Real Property Tax Payments From a Typical Horizontal Well

County:			Cattaraugus
2010 Final Gas Unit of Production Value			$11.19
2010 Overall Full-Value Tax Rate[1]			35.5
Production Year	Annual Production (millions of cubic feet)	Assessed Value of Production[2]	Property Tax Payment[3]
1	803.00	$8,985,570	$318,988
2	354.05	$3,961,820	$140,645
3	258.00	$2,887,020	$102,489
4	201.43	$2,253,946	$80,015
5	165.93	$1,856,701	$65,913
6	144.50	$1,616,955	$57,402
7	130.00	$1,454,700	$51,642
8	119.00	$1,331,610	$47,272
9	109.93	$1,230,061	$43,667
10	103.20	$1,154,850	$40,997
11	98.04	$1,097,107	$38,947

Table 4-56 Region C: Example of the Real Property Tax Payments From a Typical Horizontal Well

County:			Cattaraugus
2010 Final Gas Unit of Production Value			$11.19
2010 Overall Full-Value Tax Rate[1]			35.5
Production Year	**Annual Production (millions of cubic feet)**	**Assessed Value of Production[2]**	**Property Tax Payment[3]**
12	93.14	$1,042,252	$37,000
13	88.48	$990,139	$35,150
14	84.06	$940,633	$33,392
15	79.86	$893,601	$31,723
16	75.86	$848,921	$30,137
17	72.07	$806,475	$28,630
18	68.47	$766,151	$27,198
19	65.04	$727,844	$25,838
20	61.79	$691,451	$24,547
21	58.70	$656,879	$23,319
22	55.77	$624,035	$22,153
23	52.98	$592,833	$21,046
24	50.33	$563,191	$19,993
25	47.81	$535,032	$18,994
26	45.42	$508,280	$18,044
27	43.15	$482,866	$17,142
28	40.99	$458,723	$16,285
29	38.94	$435,787	$15,470
30	37.00	$413,997	$14,697
Total Property Tax Payments for the Productive Life of the Well			$1,448,735

Notes:

1 Full-value tax rates are tax rates that have already been equalized. Therefore, these numbers should not be multiplied by the state equalization rate.

2 Calculated as Annual Production multiplied by 1,000 (to calculate the number of 1,000s of cubic feet) multiplied by the 2010 Final Gas Unit of Production Value (applied to each 1,000 cubic feet).

3 Calculated as Assessed Value of Production multiplied by the Overall Full-Value Tax Rate divided by 1,000.

In estimating real property payments of a typical vertical high-volume hydraulic fracturing wells, it was initially assumed that each well would produce at the same average level of production as existing wells (in 2009) in the region. However, the average annual production for existing wells in Region A is approximately 317.9 million cubic feet per year. This figure was deemed to be too optimistic, so a figure of 90 million cubic feet per year was used instead for Region A's production. The 90 million cubic feet per year corresponds to production levels of vertical wells currently operating in the Marcellus formation in Pennsylvania. Region B currently has no producing natural gas wells, and its Marcellus Shale and Utica Shale formations are similar to those found in Region A. Therefore, a production level of 90 million cubic feet per year was also used for Region B. In contrast,

due to the geological characteristics of Region C, production of high-volume hydraulic fracturing vertical wells are not anticipated to have the same level of production as in Region A or Region B. High-volume, hydraulic fracturing vertical wells in Region C are anticipated to have production levels similar to other vertical wells currently operating in the region. Therefore, in Region C it is assumed that each well would produce at the same average level of production as existing wells (in 2009) in the region.

Tables 4-57, 4-58, and 4-59 show the estimated annual real property tax payment from a typical vertical well in a county in each representative region. The examples use the overall full-value tax rate, which averages the property tax levies in the county from all taxing jurisdictions, including county, town, village, school district, and other taxing districts, and the 2010 Medina formation unit of production value. As described previously, once Marcellus Shale or Utica Shale formations become developed in New York State, specific unit of production values would be developed for that specific formation and the specific drilling techniques used in that formation. Depending on the results of that analysis, the unit of production value could vary substantially from the Medina values utilized in this report.

Table 4-57 Region A: Example of the Real Property Tax Payments From a Typical Vertical Well

County:	Broome
2010 Final Gas Unit of Production Value	$11.19
2010 Overall Full-Value Tax Rate[1]	35.5
Annual Production (millions of cubic feet)	90.0
Assessed Value of Production[2]	$1,007,100
Annual Property Tax Payment[3]	$35,752
Total Property Tax Payments for the Productive Life of the Well[4]	$1,072,562

Source: NYSDTF 2011a, 2011b, 2011c, 2011d; NYSDEC 1994-2006, 2007a, 2008, 2009.

Notes:
1 Full-value tax rates are tax rates that have already been equalized. Therefore, these numbers should not be multiplied by the state equalization rate.
2 Calculated as Annual Production multiplied by 1,000 (to calculate the number of 1,000s of cubic feet) multiplied by the Final Gas Unit of Production Value (applied to each 1,000 cubic feet).
3 Calculated as Assessed Value of Production multiplied by the Overall Full-Value Tax Rate divided by 1,000.
4 Total property tax payments for the productive life of the well assumes the well would produce for 30 years.

Table 4-58 Region B: Example of the Real Property Tax Payments From a Typical Vertical Well

County:	Delaware
2010 Final Gas Unit of Production Value	$11.19
2010 Overall Full-Value Tax Rate[1]	21.1
Annual Production (millions of cubic feet)	90.0
Assessed Value of Production[2]	$1,007,100
Annual Property Tax Payment[3]	$21,250
Total Property Tax Payments for the Productive Life of the Well[4]	$637,494

Source: NYSDTF 2011a, 2011b, 2011c, 2011d; NYSDEC 1994-2006, 2007a, 2008, 2009.

Notes:
1 Full-value tax rates are tax rates that have already been equalized. Therefore, these numbers should not be multiplied by the state equalization rate.
2 Calculated as Annual Production multiplied by 1,000 (to calculate the number of 1,000s of cubic feet) multiplied by the Final Gas Unit of Production Value (applied to each 1,000 cubic feet).
3 Calculated as Assessed Value of Production multiplied by the Overall Full-Value Tax Rate divided by 1,000.
4 Total property tax payments for the productive life of the well assumes the well would produce for 30 years.

Table 4-59 Region C: Example of the Real Property Tax Payments From a Typical Vertical Well

County:	Cattaraugus
2010 Final Gas Unit of Production Value	$11.19
2010 Overall Full-Value Tax Rate[1]	35.5
Annual Production (millions of cubic feet)	2.065
Assessed Value of Production[2]	$23,107
Annual Property Tax Payment[3]	$820
Total Property Tax Payments for the Productive Life of the Well[4]	$24,609

Source: NYSDTF 2011a, 2011b, 2011c, 2011d; NYSDEC 1994-2006, 2007a, 2008, 2009.

Notes:
1 Full-value tax rates are tax rates that have already been equalized. Therefore, these numbers should not be multiplied by the state equalization rate.
2 Calculated as Annual Production multiplied by 1,000 (to calculate the number of 1,000s of cubic feet) multiplied by the Final Gas Unit of Production Value (applied to each 1,000 cubic feet).
3 Calculated as Assessed Value of Production multiplied by the Overall Full-Value Tax Rate divided by 1,000.
4 Total property tax payments for the productive life of the well assumes the well would produce for 30 years.

Using the above-mentioned formula, an estimate of local property tax revenues can be generated and extrapolated for each development scenario. Using industry estimates for the productivity of horizontal and vertical high-volume hydraulic-fracturing wells described in Section 4.1 (Assumptions), the following property tax analysis has been completed for Year 30, the year of maximum impact.

As shown in Table 4-60 the projected change in total assessed value and property tax receipts that would result under any of the development scenarios would be significant. Under the low development scenario, annual property tax receipts at the peak production year (Year 30) would range from $11 million in Chautauqua County to $119 million in Broome County. Under the average development scenario, annual property tax receipts for Year 30 would range from $41 million in Chautauqua County to $474 million in Broome County. Under the high development scenario, annual property tax receipts for Year 30 would range from $62 million to $706 million (see Table 4-60).

Table 4-60 Projected Change in Total Assessed Value and Property Tax Receipts[1] at Peak Production (Year 30), by Region

	Low Development Scenario		Average Development Scenario		High Development Scenario	
	Change in Assessed Value ($ million)	Total Property Tax Receipts ($ million)	Change in Assessed Value ($ million)	Total Property Tax Receipts ($ million)	Change in Assessed Value ($ million)	Total Property Tax Receipts ($ million)
Region A						
Broome County	$3,345	$119	$13,342	$474	$19,895	$706
Chemung County	$1,930	$66	$7,700	$264	$11,483	$394
Tioga County	$2,458	$76	$9,803	$302	$14,619	$450
Total Region A	**$7,732**	**$261**	**$30,845**	**$1,040**	**$45,997**	**$1,550**
Region B						
Delaware County	$1,498	$32	$5,996	$127	$8,953.	$189
Otsego County	$1,040	$20	$4,164	$82	$6,217	$122
Sullivan County	$1,006	$26	$4,024$	$105	$6,009	$157
Total Region B	**$3,544**	**$78**	**$14,184**	**$314**	**$21,179**	**$468**
Region C						
Cattaraugus County	$406	$14	$1,583	$56	$2,374	$84
Chautauqua County	$329	$11	$1,283	$41	$1,924	$62
Total Region C	**$735**	**$25**	**$2,866**	**$97**	**$4,298**	**$146**

Source: NYSDTF 2011a, 2011b, 2011c, 2011d.

[1] Property tax receipts are calculated using the overall full-value tax rate for each county which has already been equalized. Therefore, the property tax receipts figure estimates property taxes collected from all levels of government, including county, town, village, school district, and other special taxing districts.

Note: Totals may not sum due to rounding.

Tables 4-61 to 4-68 show estimates of the annual property tax impact, by county and year, for each development scenario.

Table 4-61 Projected Property Tax Receipts Under Each Development Scenario: Broome County

Year	Low	Average	High
1	$2,652,399	$10,349,117	$15,515,943
2	$6,353,585	$25,461,573	$37,969,937
3	$11,020,567	$43,901,005	$65,530,104
4	$16,254,580	$65,024,177	$96,979,468
5	$22,148,058	$88,371,034	$131,871,542
6	$28,566,802	$113,688,247	$169,721,608
7	$35,316,300	$140,916,379	$210,246,337
8	$42,570,944	$169,701,647	$253,247,778
9	$50,099,479	$200,005,364	$298,396,998
10	$58,086,770	$231,733,722	$345,779,729
11	$63,798,311	$254,491,483	$379,735,839

Table 4-61 Projected Property Tax Receipts Under Each Development Scenario: Broome County

Year	Low	Average	High
12	$68,673,938	$273,927,290	$408,727,149
13	$73,006,753	$291,204,413	$434,492,690
14	$76,963,677	$306,986,581	$458,024,402
15	$80,645,277	$321,672,098	$479,917,950
16	$84,107,376	$335,483,052	$500,505,158
17	$87,384,253	$348,555,881	$519,989,858
18	$90,499,532	$360,984,708	$538,512,672
19	$93,471,285	$372,841,466	$556,181,085
20	$96,310,688	$384,170,334	$573,061,180
21	$99,024,358	$394,997,708	$589,192,373
22	$101,618,581	$405,348,661	$604,612,110
23	$104,099,330	$415,247,014	$619,355,963
24	$106,472,279	$424,715,398	$633,457,725
25	$108,742,817	$433,775,312	$646,949,503
26	$110,916,065	$442,447,178	$659,861,795
27	$112,996,889	$450,750,399	$672,223,574
28	$114,989,908	$458,703,407	$684,062,368
29	$116,899,513	$466,323,713	$695,404,325
30	$118,729,875	$473,627,952	$706,274,287
31	$94,351,719	$376,371,537	$561,049,253
32	$84,116,005	$335,512,712	$500,045,866
33	$76,731,735	$306,101,693	$456,133,026
34	$70,967,431	$283,124,007	$421,852,100
35	$66,151,383	$263,940,257	$393,217,034
36	$61,841,542	$246,770,957	$367,609,304
37	$57,830,009	$230,771,547	$343,753,842
38	$54,005,601	$215,529,601	$321,009,995
39	$50,319,509	$200,810,294	$299,071,864
40	$46,696,511	$186,353,768	$277,522,128
41	$43,238,426	$172,555,119	$256,954,777
42	$39,937,008	$159,381,455	$237,320,690
43	$36,784,424	$146,801,525	$218,573,204
44	$33,773,232	$134,785,644	$200,667,990
45	$30,896,362	$123,305,608	$183,562,934
46	$28,147,099	$112,334,626	$167,218,028
47	$25,519,062	$101,847,244	$151,595,264
48	$23,006,190	$91,819,284	$136,658,535
49	$20,602,724	$82,227,773	$122,373,540
50	$18,303,195	$73,050,889	$108,707,692
51	$16,102,405	$64,267,902	$95,630,034
52	$13,995,417	$55,859,115	$83,111,155
53	$11,977,542	$47,805,819	$71,123,118
54	$10,044,323	$40,090,240	$59,639,379

Table 4-61 Projected Property Tax Receipts Under Each Development Scenario: Broome County

Year	Low	Average	High
55	$8,191,528	$32,695,492	$48,634,725
56	$6,415,136	$25,605,532	$38,085,201
57	$4,711,327	$18,805,123	$27,968,049
58	$3,076,470	$12,279,785	$18,261,653
59	$1,507,120	$6,015,766	$8,945,473
60	$0	$0	$0

Table 4-62 Projected Property Tax Receipts Under Each Development Scenario: Chemung County

Year	Low	Average	High
1	$1,479,140	$5,771,299	$8,652,637
2	$3,543,147	$14,198,927	$21,174,354
3	$6,145,741	$24,481,880	$36,543,585
4	$9,064,546	$36,261,450	$54,081,669
5	$12,351,109	$49,281,082	$73,539,620
6	$15,930,592	$63,399,505	$94,647,126
7	$19,694,524	$78,583,573	$117,246,188
8	$23,740,156	$94,635,994	$141,226,416
9	$27,938,527	$111,535,197	$166,404,376
10	$32,392,728	$129,228,865	$192,827,878
11	$35,577,832	$141,919,982	$211,763,878
12	$38,296,779	$152,758,573	$227,931,202
13	$40,713,021	$162,393,352	$242,299,640
14	$42,919,643	$171,194,452	$255,422,358
15	$44,972,728	$179,383,993	$267,631,536
16	$46,903,406	$187,085,823	$279,112,220
17	$48,730,792	$194,376,030	$289,978,078
18	$50,468,062	$201,307,103	$300,307,529
19	$52,125,293	$207,919,155	$310,160,515
20	$53,708,717	$214,236,823	$319,573,886
21	$55,222,025	$220,274,827	$328,569,624
22	$56,668,722	$226,047,150	$337,168,610
23	$58,052,139	$231,567,076	$345,390,682
24	$59,375,440	$236,847,225	$353,254,685
25	$60,641,631	$241,899,586	$360,778,524
26	$61,853,567	$246,735,547	$367,979,206
27	$63,013,961	$251,365,930	$374,872,888
28	$64,125,390	$255,801,013	$381,474,922
29	$65,190,302	$260,050,560	$387,799,890
30	$66,211,024	$264,123,850	$393,861,644
31	$52,616,276	$209,887,738	$312,875,302
32	$46,908,218	$187,102,363	$278,856,091

Table 4-62 Projected Property Tax Receipts Under Each Development Scenario: Chemung County

Year	Low	Average	High
33	$42,790,298	$170,700,985	$254,367,611
34	$39,575,770	$157,887,225	$235,250,475
35	$36,890,048	$147,189,195	$219,281,815
36	$34,486,618	$137,614,545	$205,001,382
37	$32,249,542	$128,692,298	$191,698,120
38	$30,116,819	$120,192,458	$179,014,763
39	$28,061,229	$111,984,075	$166,780,723
40	$26,040,824	$103,922,233	$154,763,275
41	$24,112,385	$96,227,265	$143,293,664
42	$22,271,313	$88,880,826	$132,344,499
43	$20,513,240	$81,865,489	$121,889,757
44	$18,834,015	$75,164,700	$111,904,717
45	$17,229,697	$68,762,732	$102,365,894
46	$15,696,540	$62,644,643	$93,250,977
47	$14,230,986	$56,796,239	$84,538,770
48	$12,829,656	$51,204,036	$76,209,139
49	$11,489,336	$45,855,224	$68,242,954
50	$10,206,978	$40,737,634	$60,622,043
51	$8,979,684	$35,839,704	$53,329,143
52	$7,804,699	$31,150,451	$46,347,852
53	$6,679,408	$26,659,442	$39,662,591
54	$5,601,328	$22,356,765	$33,258,558
55	$4,568,096	$18,233,001	$27,121,691
56	$3,577,471	$14,279,207	$21,238,632
57	$2,627,323	$10,486,884	$15,596,691
58	$1,715,628	$6,847,958	$10,183,812
59	$840,462	$3,354,758	$4,988,542
60	$0	$0	$0

Table 4-63 Projected Property Tax Receipts Under Each Development Scenario: Tioga County

Year	Low	Average	High
1	$1,690,949	$6,597,736	$9,891,675
2	$4,050,517	$16,232,182	$24,206,475
3	$7,025,797	$27,987,632	$41,776,547
4	$10,362,569	$41,454,010	$61,826,047
5	$14,119,761	$56,338,025	$84,070,333
6	$18,211,818	$72,478,176	$108,200,388
7	$22,514,737	$89,836,569	$134,035,587
8	$27,139,695	$108,187,663	$161,449,731
9	$31,939,263	$127,506,794	$190,233,120
10	$37,031,296	$147,734,158	$220,440,411

Table 4-63 Projected Property Tax Receipts Under Each Development Scenario: Tioga County

Year	Low	Average	High
11	$40,672,500	$162,242,614	$242,088,004
12	$43,780,794	$174,633,268	$260,570,453
13	$46,543,037	$185,647,726	$276,996,420
14	$49,065,643	$195,709,125	$291,998,283
15	$51,412,725	$205,071,390	$305,955,789
16	$53,619,871	$213,876,106	$319,080,482
17	$55,708,935	$222,210,255	$331,502,307
18	$57,694,978	$230,133,841	$343,310,913
19	$59,589,521	$237,692,725	$354,574,825
20	$61,399,688	$244,915,069	$365,336,170
21	$63,129,699	$251,817,702	$375,620,078
22	$64,783,560	$258,416,610	$385,450,420
23	$66,365,079	$264,726,977	$394,849,875
24	$67,877,874	$270,763,232	$403,839,987
25	$69,325,380	$276,539,079	$412,441,223
26	$70,710,863	$282,067,540	$420,673,026
27	$72,037,423	$287,360,984	$428,553,869
28	$73,308,006	$292,431,160	$436,101,300
29	$74,525,412	$297,289,234	$443,331,989
30	$75,692,298	$301,945,810	$450,261,773
31	$60,150,812	$239,943,204	$357,678,364
32	$53,625,372	$213,895,014	$318,787,676
33	$48,917,775	$195,144,994	$290,792,499
34	$45,242,934	$180,496,331	$268,937,831
35	$42,172,623	$168,266,367	$250,682,493
36	$39,425,026	$157,320,648	$234,357,133
37	$36,867,607	$147,120,755	$219,148,874
38	$34,429,482	$137,403,757	$204,649,287
39	$32,079,536	$128,019,950	$190,663,359
40	$29,769,814	$118,803,671	$176,925,039
41	$27,565,226	$110,006,799	$163,813,005
42	$25,460,516	$101,608,366	$151,295,943
43	$23,450,691	$93,588,449	$139,344,105
44	$21,531,005	$85,928,122	$127,929,229
45	$19,696,952	$78,609,405	$117,024,467
46	$17,944,251	$71,615,219	$106,604,314
47	$16,268,833	$64,929,337	$96,644,538
48	$14,666,834	$58,536,342	$87,122,122
49	$13,134,584	$52,421,593	$78,015,197
50	$11,668,596	$46,571,174	$69,302,988
51	$10,265,555	$40,971,872	$60,965,760
52	$8,922,315	$35,611,128	$52,984,764
53	$7,635,885	$30,477,016	$45,342,188

Table 4-63 Projected Property Tax Receipts Under Each Development Scenario: Tioga County

Year	Low	Average	High
54	$6,403,425	$25,558,205	$38,021,111
55	$5,222,238	$20,843,928	$31,005,458
56	$4,089,758	$16,323,959	$24,279,958
57	$3,003,550	$11,988,583	$17,830,103
58	$1,961,302	$7,828,570	$11,642,112
59	$960,814	$3,835,152	$5,702,890
60	$0	$0	$0

Table 4-64 Projected Property Tax Receipts Under Each Development Scenario: Delaware County

Year	Low	Average	High
1	$730,298	$2,760,899	$4,141,348
2	$1,707,466	$6,759,192	$10,129,805
3	$2,970,182	$11,668,934	$17,485,436
4	$4,352,256	$17,369,304	$25,920,263
5	$5,942,814	$23,623,860	$35,244,599
6	$7,605,140	$30,395,118	$45,358,370
7	$9,445,818	$37,637,814	$56,187,766
8	$11,336,805	$45,316,722	$67,667,814
9	$13,389,209	$53,402,452	$79,761,300
10	$15,478,638	$61,872,886	$92,434,014
11	$16,989,185	$67,949,963	$101,518,340
12	$18,281,362	$73,140,745	$109,274,582
13	$19,431,310	$77,755,608	$116,167,951
14	$20,482,708	$81,971,679	$122,463,906
15	$21,461,631	$85,895,192	$128,321,756
16	$22,382,654	$89,585,325	$133,830,234
17	$23,254,738	$93,078,435	$139,043,841
18	$24,084,113	$96,399,645	$144,000,226
19	$24,875,533	$99,568,154	$148,728,157
20	$25,631,874	$102,595,753	$153,245,292
21	$26,354,888	$105,489,489	$157,562,171
22	$27,046,244	$108,256,054	$161,688,807
23	$27,707,523	$110,901,808	$165,634,713
24	$28,340,229	$113,432,790	$169,408,923
25	$28,945,792	$115,854,740	$173,020,024
26	$29,525,567	$118,173,108	$176,476,171
27	$30,080,846	$120,393,074	$179,785,112
28	$30,612,852	$122,519,559	$182,954,206
29	$31,122,748	$124,557,235	$185,990,446
30	$31,611,642	$126,510,544	$188,900,475
31	$25,137,780	$100,548,350	$150,071,266

Table 4-64 Projected Property Tax Receipts Under Each Development Scenario: Delaware County

Year	Low	Average	High
32	$22,418,257	$89,640,632	$133,765,846
33	$20,457,934	$81,786,034	$122,026,018
34	$18,927,760	$75,655,511	$112,855,899
35	$17,647,473	$70,535,033	$105,204,515
36	$16,503,289	$65,953,676	$98,358,603
37	$15,434,783	$61,683,455	$91,977,227
38	$14,417,689	$57,612,572	$85,902,192
39	$13,433,813	$53,682,466	$80,036,964
40	$12,468,435	$49,819,635	$74,271,643
41	$11,546,834	$46,132,430	$68,768,987
42	$10,666,822	$42,612,068	$63,515,863
43	$9,826,319	$39,250,208	$58,499,794
44	$9,023,350	$36,038,925	$53,708,928
45	$8,256,038	$32,970,689	$49,132,005
46	$7,522,600	$30,038,349	$44,758,326
47	$6,821,343	$27,235,109	$40,577,731
48	$6,150,657	$24,554,515	$36,580,565
49	$5,509,014	$21,990,435	$32,757,656
50	$4,894,962	$19,537,042	$29,100,291
51	$4,307,121	$17,188,802	$25,600,195
52	$3,744,181	$14,940,458	$22,249,502
53	$3,204,897	$12,787,015	$19,040,743
54	$2,688,085	$10,723,727	$15,966,821
55	$2,192,623	$8,746,088	$13,020,994
56	$1,717,442	$6,849,814	$10,196,858
57	$1,261,529	$5,030,838	$7,488,327
58	$823,920	$3,285,294	$4,889,623
59	$403,700	$1,609,510	$2,395,253
60	$0	$0	$0

Table 4-65 Projected Property Tax Receipts Under Each Development Scenario: Otsego County

Year	Low	Average	High
1	$471,100	$1,781,000	$2,671,501
2	$1,101,452	$4,360,219	$6,534,534
3	$1,916,005	$7,527,395	$11,279,504
4	$2,807,553	$11,204,590	$16,720,642
5	$3,833,590	$15,239,278	$22,735,584
6	$4,905,923	$19,607,281	$29,259,774
7	$6,093,308	$24,279,399	$36,245,601
8	$7,313,145	$29,232,908	$43,651,149
9	$8,637,110	$34,448,850	$51,452,414

Table 4-65 Projected Property Tax Receipts Under Each Development Scenario: Otsego County

Year	Low	Average	High
10	$9,984,959	$39,912,957	$59,627,328
11	$10,959,382	$43,833,158	$65,487,444
12	$11,792,939	$47,181,627	$70,490,840
13	$12,534,748	$50,158,582	$74,937,614
14	$13,212,984	$52,878,286	$78,999,008
15	$13,844,468	$55,409,265	$82,777,790
16	$14,438,601	$57,789,695	$86,331,199
17	$15,001,165	$60,043,031	$89,694,392
18	$15,536,178	$62,185,477	$92,891,656
19	$16,046,707	$64,229,418	$95,941,550
20	$16,534,607	$66,182,462	$98,855,463
21	$17,001,010	$68,049,153	$101,640,195
22	$17,446,989	$69,833,808	$104,302,205
23	$17,873,567	$71,540,531	$106,847,629
24	$18,281,713	$73,173,217	$109,282,297
25	$18,672,349	$74,735,568	$111,611,746
26	$19,046,351	$76,231,101	$113,841,237
27	$19,404,550	$77,663,157	$115,975,768
28	$19,747,736	$79,034,909	$118,020,087
29	$20,076,661	$80,349,373	$119,978,705
30	$20,392,036	$81,609,414	$121,855,906
31	$16,215,878	$64,861,723	$96,807,962
32	$14,461,568	$57,825,373	$86,289,663
33	$13,197,003	$52,758,529	$78,716,536
34	$12,209,918	$48,803,852	$72,801,076
35	$11,384,031	$45,500,734	$67,865,321
36	$10,645,940	$42,545,393	$63,449,161
37	$9,956,669	$39,790,759	$59,332,663
38	$9,300,562	$37,164,714	$55,413,781
39	$8,665,883	$34,629,482	$51,630,240
40	$8,043,137	$32,137,647	$47,911,147
41	$7,448,631	$29,759,105	$44,361,494
42	$6,880,953	$27,488,190	$40,972,809
43	$6,338,761	$25,319,522	$37,737,043
44	$5,820,782	$23,247,987	$34,646,552
45	$5,325,804	$21,268,730	$31,694,070
46	$4,852,678	$19,377,136	$28,872,698
47	$4,400,312	$17,568,822	$26,175,880
48	$3,967,666	$15,839,625	$23,597,388
49	$3,553,755	$14,185,588	$21,131,306
50	$3,157,642	$12,602,954	$18,772,014
51	$2,778,438	$11,088,151	$16,514,172
52	$2,415,296	$9,637,790	$14,352,707

Table 4-65 Projected Property Tax Receipts Under Each Development Scenario: Otsego County

Year	Low	Average	High
53	$2,067,415	$8,248,647	$12,282,801
54	$1,734,030	$6,917,661	$10,299,876
55	$1,414,417	$5,641,926	$8,399,582
56	$1,107,887	$4,418,678	$6,577,788
57	$813,787	$3,245,292	$4,830,570
58	$531,494	$2,119,277	$3,154,198
59	$260,419	$1,038,263	$1,545,129
60	$0	$0	$0

Table 4-66 Projected Property Tax Receipts Under Each Development Scenario: Sullivan County

Year	Low	Average	High
1	$608,632	$2,300,940	$3,451,410
2	$1,423,007	$5,633,127	$8,442,204
3	$2,475,357	$9,724,918	$14,572,405
4	$3,627,180	$14,475,620	$21,602,010
5	$4,952,756	$19,688,182	$29,372,934
6	$6,338,142	$25,331,365	$37,801,775
7	$7,872,168	$31,367,445	$46,827,020
8	$9,448,120	$37,767,066	$56,394,520
9	$11,158,599	$44,505,733	$66,473,261
10	$12,899,934	$51,565,013	$77,034,731
11	$14,158,828	$56,629,664	$84,605,630
12	$15,235,731	$60,955,674	$91,069,701
13	$16,194,101	$64,801,712	$96,814,652
14	$17,070,338	$68,315,396	$102,061,716
15	$17,886,176	$71,585,261	$106,943,662
16	$18,653,758	$74,660,627	$111,534,441
17	$19,380,554	$77,571,793	$115,879,474
18	$20,071,758	$80,339,697	$120,010,137
19	$20,731,329	$82,980,340	$123,950,406
20	$21,361,665	$85,503,549	$127,714,997
21	$21,964,228	$87,915,195	$131,312,695
22	$22,540,405	$90,220,858	$134,751,843
23	$23,091,516	$92,425,835	$138,040,370
24	$23,618,816	$94,535,162	$141,185,807
25	$24,123,493	$96,553,620	$144,195,307
26	$24,606,679	$98,485,754	$147,075,668
27	$25,069,450	$100,335,880	$149,833,347
28	$25,512,825	$102,108,097	$152,474,478
29	$25,937,774	$103,806,301	$155,004,888
30	$26,345,219	$105,434,194	$157,430,113

Table 4-66 Projected Property Tax Receipts Under Each Development Scenario: Sullivan County

Year	Low	Average	High
31	$20,949,887	$83,797,239	$125,069,756
32	$18,683,430	$74,706,720	$111,480,780
33	$17,049,692	$68,160,678	$101,696,779
34	$15,774,441	$63,051,486	$94,054,379
35	$14,707,447	$58,784,067	$87,677,697
36	$13,753,881	$54,965,953	$81,972,298
37	$12,863,385	$51,407,141	$76,654,043
38	$12,015,737	$48,014,457	$71,591,095
39	$11,195,772	$44,739,097	$66,703,000
40	$10,391,224	$41,519,805	$61,898,167
41	$9,623,159	$38,446,879	$57,312,240
42	$8,889,755	$35,513,001	$52,934,274
43	$8,189,278	$32,711,218	$48,753,870
44	$7,520,082	$30,034,927	$44,761,151
45	$6,880,602	$27,477,852	$40,946,731
46	$6,269,353	$25,034,032	$37,301,697
47	$5,684,924	$22,697,806	$33,817,579
48	$5,125,973	$20,463,792	$30,486,331
49	$4,591,226	$18,326,881	$27,300,310
50	$4,079,473	$16,282,218	$24,252,253
51	$3,589,565	$14,325,189	$21,335,264
52	$3,120,410	$12,451,414	$18,542,789
53	$2,670,969	$10,656,729	$15,868,601
54	$2,240,257	$8,937,180	$13,306,787
55	$1,827,337	$7,289,011	$10,851,728
56	$1,431,320	$5,708,652	$8,498,086
57	$1,051,361	$4,192,712	$6,240,790
58	$686,657	$2,737,972	$4,075,023
59	$336,445	$1,341,370	$1,996,209
60	$0	$0	$0

Table 4-67 Projected Property Tax Receipts Under Each Development Scenario: Cattaraugus County

Year	Low	Average	High
1	$352,403	$1,233,864	$1,938,671
2	$860,184	$3,188,206	$4,732,373
3	$1,481,644	$5,440,777	$8,149,720
4	$2,015,299	$8,157,862	$12,053,705
5	$2,720,284	$11,019,336	$16,358,640
6	$3,509,760	$14,250,551	$21,189,011
7	$4,368,703	$17,566,271	$26,235,560

Table 4-67 Projected Property Tax Receipts Under Each Development Scenario: Cattaraugus County

Year	Low	Average	High
8	$5,288,112	$21,033,182	$31,548,719
9	$6,260,464	$24,826,063	$37,115,245
10	$7,281,290	$28,665,990	$42,923,539
11	$7,995,153	$31,393,435	$47,025,564
12	$8,596,506	$33,701,404	$50,494,647
13	$9,124,940	$35,736,242	$53,552,153
14	$9,603,000	$37,581,960	$56,324,381
15	$10,044,364	$39,288,775	$58,887,391
16	$10,456,628	$40,884,675	$61,283,600
17	$10,844,441	$42,386,681	$63,538,910
18	$11,210,999	$43,806,818	$65,671,226
19	$11,558,737	$45,154,248	$67,694,242
20	$11,889,134	$46,434,488	$69,616,379
21	$12,203,056	$47,650,897	$71,442,680
22	$12,501,327	$48,806,666	$73,177,939
23	$12,784,730	$49,904,829	$74,826,706
24	$13,054,008	$50,948,265	$76,393,307
25	$13,309,868	$51,939,710	$77,881,850
26	$13,552,980	$52,881,764	$79,296,238
27	$13,783,981	$53,776,896	$80,640,178
28	$14,003,478	$54,627,454	$81,917,193
29	$14,212,045	$55,435,664	$83,130,629
30	$14,410,230	$56,203,645	$84,283,665
31	$11,234,388	$43,836,426	$65,730,216
32	$9,906,265	$38,663,388	$57,976,121
33	$8,955,312	$34,966,704	$52,432,226
34	$8,226,260	$32,102,273	$48,143,921
35	$7,624,230	$29,739,461	$44,603,989
36	$7,091,590	$27,645,729	$41,467,689
37	$6,600,465	$25,720,261	$38,579,497
38	$6,136,757	$23,909,560	$35,859,828
39	$5,693,793	$22,177,827	$33,266,741
40	$5,262,614	$20,498,405	$30,747,607
41	$4,852,949	$18,902,772	$28,354,159
42	$4,463,722	$17,386,740	$26,080,110
43	$4,093,911	$15,946,328	$23,919,493
44	$3,742,545	$14,577,756	$21,866,634
45	$3,408,703	$13,277,431	$19,916,146
46	$3,091,507	$12,041,941	$18,062,911
47	$2,790,125	$10,868,044	$16,302,066
48	$2,503,768	$9,752,661	$14,628,991
49	$2,231,682	$8,692,865	$13,039,298

Table 4-67 Projected Property Tax Receipts Under Each Development Scenario: Cattaraugus County

Year	Low	Average	High
50	$1,973,156	$7,685,879	$11,528,818
51	$1,727,511	$6,729,060	$10,093,590
52	$1,494,103	$5,819,901	$8,729,851
53	$1,272,320	$4,956,018	$7,434,028
54	$1,061,580	$4,135,149	$6,202,724
55	$861,333	$3,355,142	$5,032,713
56	$671,052	$2,613,954	$3,920,930
57	$490,240	$1,909,644	$2,864,466
58	$318,424	$1,240,368	$1,860,552
59	$155,153	$604,375	$906,562
60	$0	$0	$0

Table 4-68 Projected Property Tax Receipts Under Each Development Scenario: Chautauqua County

Year	Low	Average	High
1	$258,222	$904,108	$1,420,551
2	$630,296	$2,336,142	$3,467,622
3	$1,085,667	$3,986,701	$5,971,666
4	$1,476,700	$5,977,632	$8,832,291
5	$1,993,274	$8,074,363	$11,986,710
6	$2,571,759	$10,442,019	$15,526,141
7	$3,201,145	$12,871,596	$19,223,974
8	$3,874,837	$15,411,957	$23,117,164
9	$4,587,323	$18,191,172	$27,196,008
10	$5,335,328	$21,004,859	$31,452,006
11	$5,858,408	$23,003,381	$34,457,744
12	$6,299,046	$24,694,533	$36,999,697
13	$6,686,253	$26,185,550	$39,240,069
14	$7,036,549	$27,537,991	$41,271,405
15	$7,359,957	$28,788,651	$43,149,438
16	$7,662,041	$29,958,038	$44,905,248
17	$7,946,209	$31,058,626	$46,557,815
18	$8,214,803	$32,099,224	$48,120,259
19	$8,469,606	$33,086,547	$49,602,613
20	$8,711,703	$34,024,636	$51,011,049
21	$8,941,727	$34,915,954	$52,349,263
22	$9,160,284	$35,762,838	$53,620,765
23	$9,367,946	$36,567,511	$54,828,891
24	$9,565,258	$37,332,083	$55,976,810
25	$9,752,738	$38,058,559	$57,067,532

Table 4-68 Projected Property Tax Receipts Under Each Development Scenario: Chautauqua County

Year	Low	Average	High
26	$9,930,877	$38,748,845	$58,103,917
27	$10,100,142	$39,404,749	$59,088,682
28	$10,260,978	$40,027,990	$60,024,408
29	$10,413,804	$40,620,203	$60,913,548
30	$10,559,023	$41,182,937	$61,758,429
31	$8,231,941	$32,120,919	$48,163,483
32	$7,258,765	$28,330,402	$42,481,710
33	$6,561,960	$25,621,676	$38,419,448
34	$6,027,751	$23,522,778	$35,277,215
35	$5,586,616	$21,791,440	$32,683,348
36	$5,196,327	$20,257,268	$30,385,239
37	$4,836,457	$18,846,391	$28,268,932
38	$4,496,677	$17,519,609	$26,276,108
39	$4,172,098	$16,250,691	$24,376,036
40	$3,856,154	$15,020,103	$22,530,154
41	$3,555,974	$13,850,911	$20,776,366
42	$3,270,770	$12,740,046	$19,110,069
43	$2,999,793	$11,684,591	$17,526,887
44	$2,742,331	$10,681,777	$16,022,665
45	$2,497,710	$9,728,970	$14,593,455
46	$2,265,286	$8,823,671	$13,235,507
47	$2,044,450	$7,963,504	$11,945,256
48	$1,834,623	$7,146,213	$10,719,319
49	$1,635,254	$6,369,653	$9,554,480
50	$1,445,820	$5,631,789	$8,447,683
51	$1,265,825	$4,930,685	$7,396,027
52	$1,094,796	$4,264,503	$6,396,754
53	$932,286	$3,631,497	$5,447,246
54	$777,868	$3,030,010	$4,545,014
55	$631,137	$2,458,463	$3,687,695
56	$491,710	$1,915,361	$2,873,042
57	$359,221	$1,399,282	$2,098,923
58	$233,323	$908,873	$1,363,310
59	$113,687	$442,853	$664,279
60	$0	$0	$0

The increase in ad valorem property taxes would have a significant positive impact on the finances of local government entities. While these figures are not directly comparable to the current county revenues and expenditures data presented in Section 3.4 (Revenues and Expenditures), the figures can be used to show the order of magnitude of these impacts. The total property tax receipts shown above were calculated using the overall full-value tax rate, meaning the impact figures

presented above include town, village, school district, and other special taxing districts revenue and county property tax receipts.

In addition to the positive fiscal impacts discussed above, local governments would also experience some significant negative fiscal impacts as a result of the development of natural gas reserves in the low-permeability shale. As described in previous sections, the use of high-volume hydraulic-fracturing drilling techniques would increase the demand for governmental services and thus increase the total expenditures of local government entities. Additional road construction, improvement, and repair expenditures would be required as a result of the increased truck traffic that would occur. Additional expenditures on emergency services such as fire, police, and first aid would be expected as a result of the increased traffic and construction and production activities. Also, additional expenditures on public water supply systems may be required. Finally, if substantial in-migration occurs in the region as a result of high-volume hydraulic fracturing operations, local governments would be required to increase expenditures on other services, such as education, housing, health and welfare, recreation, and solid waste management to serve the additional population.

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