

2.1 GEOGRAPHY AND DEMOGRAPHY

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements.

The U.S. EPR FSAR includes the following COL Item in Section 2.1:

A COL applicant that references the U.S. EPR design certification will provide site-specific information related to site location and description, exclusion area authority and control, and population distribution.

This COL Item is addressed as follows:

{Site specific information related to site location and description is addressed in Section 2.1.1. Exclusion area authority and control is addressed in Section 2.1.2, and population distribution is addressed in Section 2.1.3.}

2.1.1 SITE LOCATION AND DESCRIPTION

{Section 2.1.1.1 through Section 2.1.1.3 are added as a supplement to the U. S. EPR FSAR.

2.1.1.1 Specification of Location

A site area map for the BBNPP site is provided in Figure 2.1-1. The coordinates of the center of the containment building for BBNPP are provided in Table 2.1-1 for both the Geodetic Latitude/Longitude and the Universal Transverse Mercator (UTM) coordinate systems.

Figure 2.1-2 and Figure 2.1-3 depict the BBNPP site and the surrounding area within 50 miles (80 km) and 10 miles (16 km), respectively. The BBNPP site occupies 424 acres (172 hectares). No commercial, industrial, institutional, recreational, or residential structures are located within the BBNPP site.

The BBNPP site is located in Salem Township in western Luzerne County, Pennsylvania and approximately 3 mi (4.8 km) east of Columbia County, Pennsylvania. The BBNPP site is on the west bank of the Susquehanna River. The prominent natural features of the BBNPP site region are two state parks (Nescopeck and Ricketts Glen State Parks), a county park (Moon Lake Park), and several mountains including, the Nescopeck and Hess Mountains on the eastern side of the river and Lee, Huntington, Penobscot, and Shickshinny Mountains to the north of the site. The Susquehanna River, another natural feature, is approximately 1,000 to 1,600 feet (300 to 500 meters) across and too shallow for navigation other than for small recreational watercraft; no ports are located along the river in the vicinity of the BBNPP site.

Luzerne County includes many incorporated cities and boroughs, including Hazelton, Nanticoke, Nescopeck, Shickshinny, West Hazelton, and Wilkes-Barre. Columbia County also has many incorporated cities, towns, and boroughs, including Berwick and Bloomsburg. Berwick, Nescopeck, and Shickshinny are located within 10 miles (16 km) of the BBNPP site. The Luzerne County seat, Wilkes-Barre, PA, is approximately 20 miles (32 km) northeast of the site. The Columbia County seat, Bloomsburg, PA, is approximately 16 miles (26 km) west of the site.

U.S. Route 11 is the closest main road to the BBNPP site and runs south and then east of the site. Pennsylvania State Routes 93 and 239 are located south of the site and I-80 and I-81 are located south and east of the site, respectively. Route 11 provides the main access to the site via North Market Street, Confers Lane, and Beach Grove Road. Two railroads are located within the vicinity of the site. The North Shore Railroad, which only makes deliveries to Susquehanna Steam Electric Station (SSES), follows the west bank of the Susquehanna River and has a spur

that serves the SSES site. The other railroad, the Canadian Pacific, is located on the east bank of the Susquehanna River.

A Pennsylvania National Guard facility is located approximately 4 mi (6.4 km) southwest of the site in the borough of Berwick. The other closest military facilities are the Tobyhanna Army Depot, located about 38 mi (61 km) to the east, and Fort Indiantown Gap, located about 50 mi (80.5 km) to the southwest. Several industrial facilities are located within the vicinity of the BBNPP site, including the SSES Units 1 and 2 (immediately east of the site), Deluxe Building Systems (southwest of the site), Leggett and Platt, (north-northwest of the site), Heller's Gas and Custom Made Fireplaces (southeast of the site), Western International Distribution Center (south-southeast of the site), and two industrial parks on the east and south sides of Berwick. These industrial facilities and parks are depicted on Figure 2.1-3.

The metropolitan centers closest to the BBNPP site are Wilkes-Barre, PA, approximately 20 mi (32 km) to the northeast; Scranton, PA, approximately 35 mi (56 km) to the northeast; Allentown, PA, approximately 50 mi (80 km) to the southeast; Harrisburg, PA, approximately 70 mi (113 km) to the west-southwest; Philadelphia, PA, approximately 95 mi (153 km) to the southeast; and New York City, NY, approximately 120 mi (193 km) to the east-southeast. Figure 2.1-2 provides the location of the closest cities and towns.

2.1.1.2 Site Area Map

A site area map for the BBNPP site is provided in Figure 2.1-1. This map shows the following attributes:

- ◆ Plant property (owner controlled area) lines. The owner controlled area of the plant property is 882 acres (357 hectares). The site boundary within the owner controlled area is 424 acres (172 hectares).
- ◆ Exclusion Area Boundary (EAB). Figure 2.1-4 provides an enlarged site area map that provides a scaled plot plan of the exclusion area in 22 ½ degree segments centered on the 16 cardinal compass points.
- ◆ Location and orientation of principal plant structures within the site area. Figure 2.1-5 shows an enlarged view of BBNPP.
- ◆ Location of BBNPP, which is the only industrial structure within the site. There are no commercial, military, transportation facilities, institutional, recreational, or residential areas on the BBNPP site.
- ◆ True North and Plant North.
- ◆ Highways, railways, and waterways that traverse or are adjacent to the site.
- ◆ Prominent natural and man-made features in the site area.

2.1.1.3 Boundary for Establishing Effluent Release Limits

The exclusion area is considered the restricted area. The exclusion area boundary (EAB) for BBNPP is a circle with a radius of 2,272 ft (692 m) or approximately 0.43 mi (0.69 km) measured from the centerpoint of the Reactor Containment Building as depicted on Figure 2.1-4. The EAB establishes a radius of at least 0.393 mi (0.632 km) from the potential release points. In accordance with 10 CFR 50.34(a)(1)(ii)(D)(1), an individual assumed to be located at any point

on the EAB will not receive a radiation dose in excess of 25 rem TEDE over any two hour period following a postulated fission product release into the containment (CFR, 2007b). The EAB is established in accordance with 10 CFR 100.21(a) and 10 CFR 100.3 (CFR, 2007c).}

This area will be conspicuously posted and administrative procedures, including security patrols will be imposed to control access to the area. Section 2.1.2.1 provides additional discussion regarding the control of access to the EAB.

2.1.2 EXCLUSION AREA AUTHORITY AND CONTROL

Section 2.1.2.1 through 2.1.2.4 are added as a supplement to the U. S. EPR FSAR.

2.1.2.1 Authority

The BBNPP site was originally comprised of multiple parcels ranging in size from 1 acre (0.4 hectares) to 228 acres (92 hectares), totaling 424 acres (172 hectares). The Owner Controlled Area is 882 acres (357 hectares). An additional 384 acres (155 hectares) along the rail road and the North Branch of the Susquehanna River is adjacent, but detached from the main parcel.

PPL Susquehanna, LLC, a subsidiary of PPL Generation, LLC owns 90% of the existing SSES Units 1 and 2. Allegheny Electric Cooperative owns 10%. PPL Bell Bend, LLC, owns the BBNPP project. PPL Bell Bend, LLC and PPL Susquehanna, LLC, for their respective parceled areas within the BBNPP EAB, possess the authority to determine all activities including the exclusion and removal of personnel and property. PPL Bell Bend, LLC, and PPL Susquehanna, LLC, for their respective parceled area within the BBNPP EAB, will exercise dominion and control in the event of an emergency to afford protection of public health and safety. There are five parcels outside the site boundary, but within the BBNPP EAB shown in Figure 2.1-27, for which PPL Bell Bend does not currently have ownership, including mineral rights. PPL Bell Bend, LLC will obtain exclusion authority for these parcels. Control of access to the BBNPP EAB within the site boundary is provided by posting the boundary and performing security patrols.

2.1.2.2 Control of Activities Unrelated to Plant Operations

No activities unrelated to plant operation are planned within the BBNPP EAB. One family farm is included in the exclusion area boundary. There are no residents at this farm. Terms of the contract for acquisition of this property by PPL Bell Bend, LLC provide access to this farm for family members, provided no residence is established and the area is vacated if PPL Bell Bend, LLC requests it. There are five parcels outside the site boundary, but within the BBNPP EAB shown in Figure 2.1-27, for which PPL Bell Bend does not currently have ownership, including mineral rights. PPL Bell Bend, LLC will obtain exclusion authority for these parcels.

2.1.2.3 Arrangements for Traffic Control

North Market Street traverses the BBNPP EAB. US Route 11 provides access to the SSES Units 1 and 2 and the BBNPP site via North Market Street, Beach Grove Road, and Confers Lane. PPL Bell Bend, LLC will make arrangements with Salem Township and with the Pennsylvania State Police for control of traffic on North Market Street in the event of an emergency. The Pennsylvania Emergency Management Agency and Salem Township will incorporate traffic control provisions in their emergency procedures.

2.1.2.4 Abandonment or Relocation of Roads

There are no public roads traversing the BBNPP EAB that will have to be abandoned or relocated because of their location.

2.1.3 POPULATION DISTRIBUTION

The population surrounding the site, up to a 50 mi (80 km) radius, was estimated based on the two most recent U.S. Census Bureau decennial census data (1990 and 2000) (USCB, 2000) and additional county population projection for 2010, 2020, and 2030 obtained from the Pennsylvania State Data Center which used a cohort-component demographic projection model (PAC, 2008a; PAC, 2008b). Quadratic or linear equations were fit to trend lines for the years 1990, 2000, 2010, 2020, and 2030 for Pennsylvania counties to calculate population projections for each county at decadal intervals for the period 2040 through 2060. The population distribution for counties were projected within SECPOP 2000 population rosette and tables (SECPop 2000, 2003) in 10 concentric bands at 0 to 1 mi (0 to 1.6 km), 1 to 2 mi (1.6 to 3.2 km), 2 to 3 mi (3.2 to 4.8 km), 3 to 4 mi (4.8 to 6.4 km), 4 to 5 mi (6.4 to 8.0 km), 5 to 10 mi (8.0 to 16 km), 10 to 20 mi (16 to 32 km), 20 to 30 mi (32 to 48 km), 30 to 40 mi (48 to 64 km), and 40 to 50 mi (64 to 80 km) from the site, and 16 directional sectors, each direction consisting of 22 ½ degrees. In addition, the same population information was generated for the year of initial plant operation, and the end of plant life. This information is used for comparison against NRC population density criteria. It is projected that initial plant operation will occur in 2018. The license would expire 40 years after initial operation. For the purposes of this evaluation, the year 2058 is the expiration of the plant license. These populations are included with the decade populations that follow and are addressed in detail in Section 2.1.3.6.

Section 2.1.3.1 through Section 2.1.3.6 are added as a supplement to the U. S. EPR FSAR.

2.1.3.1 Population Within 10 mi (16 km)

Figure 2.1-6 shows places of significant population grouping, such as cities and towns, and other features within 10 mi (16 km) of the site. The map includes concentric circles drawn with the BBNPP site at the center point, at distances of 1, 2, 3, 4, 5, and 10 mi (1.6, 3.2, 4.8, 6.4, 8.0, and 16 km). The map is divided into 22 ½ degree segments with each segment centered on one of the 16 compass points. According to data in the U.S. Census Bureau 2000 decennial census data (USCB, 2000), Berwick is the largest community with a population of 10,744. Other major towns within the 10 mi (16 km) radius include Conyngham (population of 1,958), East Berwick (population of 1,998), Glen Lyon (population of 1,881), Mifflinville (population of 1,213), Nescopek (population of 1,528), and Shickshinny (population of 959).

The resident population distribution within 10 mi (16 km) of the BBNPP site was computed using SECPOP 2000 (SECPop 2000, 2003) which overlays the 2000 census block point data (the smallest unit of census data) on the grid of concentric circles and 16 directional sectors. Radii for concentric circles are defined by the user prior to SECPOP 2000 computations. SECPOP calculation results can be displayed, printed, or saved as a rosette, a table, a MACCS2 (MELCOR Accident Consequence Code System) site file, or a MACCS2 like comma separated variable file.

The population projections within the 10 mi (16 km) of the BBNPP site were obtained for 2010, 2020, and 2030 (PAC, 2008a; PAC, 2008b) to plot population trend lines for counties. Quadratic or linear equations were fit to trend lines to calculate population projections for each county at decadal intervals. Population projections were entered into the population multiplier in SECPOP 2000 for decadal years 2010 through 2060. Population multipliers in SECPOP 2000 are applied to the census block point data to project population within each sector of the SECPOP 2000 rosette. The overall trend for the period 2000 to 2060 is for an increase in resident population.

The population distributions (including transient population) and related information were tabulated for all distances and in all sixteen directions. Figure 2.1-7 through Figure 2.1-15 show

the cumulative population (i.e., resident plus transient population) for the year 2000, and projected populations (by decade) through the year 2060. Each figure was developed using ESRI Arc GIS Version 9.2 and the grid sectors were populated with data from the SECPOP 2000 for each time interval. Figure 2.1-14 and Figure 2.1-15 show population projections for the year of initial operation and the year of initial license expiration. Each figure shows cumulative population by direction and radius, and has been provided in lieu of tabulation. It is required that projected changes in population growth “within about 5 years” after initial site approval be evaluated. Initial site approval would occur in the 2012 time frame. Plant construction is scheduled to begin in 2012. Therefore, the 2010 decade population and the 2018 population for initial operation are suitable for this evaluation.

The population within 10 mi (16 km) radius is presented for the years 2000 to 2060 in Table 2.1-3 and for Columbia, Luzerne, and Schuylkill counties in Table 2.1-2. Transient population and related location information within the 10 mi (16 km) radius is presented in Table 2.1-6 through Table 2.1-9.

2.1.3.2 Population Between 10 and 50 mi (16 and 80 km)

The 50 mi (80 km) radius centered at the BBNPP site includes all or parts of 22 Pennsylvania counties (Berks, Bradford, Carbon, Columbia, Dauphin, Lackawanna, Lebanon, Lehigh, Luzerne, Lycoming, Monroe, Montour, Northampton, Northumberland, Pike, Schuylkill, Snyder, Sullivan, Susquehanna, Union, Wayne, and Wyoming). Figure 2.1-16 identifies significant population groupings, such as cities and towns within the 50 mi (80 km) radius. Concentric rings are drawn at 10 mi (16 km) increments between 10 and 50 mi (16 and 80 km) using the BBNPP as the center point. Radii divided the rings into 22 ½ degree segments centered on one of the 16 compass points. Census data for the years 1990 and 2000 were used as well as population projections for the years 2010, 2020, and 2030, to compute population between 10 and 50 mi (16 and 80 km). The same methodology was used to develop the 10 mi (16 km) population grid. The population grid from 10 and 50 mi (16 to 80 km) is illustrated on Figure 2.1-16.

Transient population was not quantified for the 10 to 50 mi (16 to 80 km) radii. The 50 mi (80 km) decadal population distributions for the years 2000 through 2060 and the years of initial operation and plant shutdown for BBNPP are shown in Figure 2.1-17 through Figure 2.1-23, Figure 2.1-25, and Figure 2.1-26, and has been provided in lieu of tabulation. Total populations for each time periods, including the years of initial operation and plant shutdown are summarized in Table 2.1-4. County population projections for counties within or intersected by the 50 mi (80 km) radius are summarized in Table 2.1-5.

2.1.3.3 Transient Population

2.1.3.3.1 Transient Population Within 10 mi (16 km)

The transient population within 10 mi (16 km) of the BBNPP are summarized in Table 2.1-6 (major employers), Table 2.1-7 (major recreational and attractions), Table 2.1-8 hospitals and nursing homes, and Table 2.1-9 (schools) within the 10 mi (16 km) radius. The tables include addresses, and latitude and longitude coordinates in relation to the BBNPP site. The area has six major employers: Berwick Hospital Center (population 600), Berwick Offray (population 600-700), Berwick Retirement Village (population 131), DeLuxe Building Systems (population 300), PPL Susquehanna (population 1,460 including onsite contractors), and Wise Foods (population 700).

Recreational areas consist of seven camping facilities. The largest, Camp Louise, is operated by the Girl Scouts in the Heart of Pennsylvania Council. During June through August the camping

population is 250-350 persons, and weekend camping throughout the year can reach a maximum of 300 persons. Camp Setebaid utilizes facilities at Camp Louise for a two week period, July 8 through August 9, for 170 diabetic children and camp staff.

The Berwick Hospital Center (population 941) and Berwick Retirement Village (population 371) are located within Berwick with a combined capacity of 1,312 persons.

The area has 13 elementary, middle, and high schools with the 10 mi (16 km) radius with a total student and staff population of 5,473. The area contains no museums or historical sites with transient populations. The SCI Retreat (a prison facility) with a listed capacity of 806 inmates is located within 8.1 m (13 km) of BBNPP. Luzerne County Community College operates a satellite campus in Berwick. The student population is comprised of local residents and there are no dormitory facilities for a transient population (PED, 2008).

The daily transient population within the 10 mi (16 km) radius is estimated at 13,187. This estimate will fluctuate during the summer, and reaches the maximum number during the recreational camping period from April to October.

2.1.3.3.2 Transient Population Between 10 and 50 mi (16 and 80 km)

A general discussion of transient population for the 10 to 50 mi (16 to 80 km) radius is provided below. A quantitative estimate of the transient population for the 10 to 50 mi (16 to 80 km) radius is not provided for the following reasons:

1. There are no significant centers of transient population between 10 and 50 mi (16 to 80 km) from the BBNPP site;
2. Back Mountain, PA located approximately 20 miles (32 km) from BBNPP with a population of 26,690, Wilkes-Barre located approximately 20 miles (32 km) from BBNPP with a population of 43,123, and Scranton, PA located approximately 35 miles (56 km) from BBNPP, are the largest centers of transient population (tourist, commuters, and other business travelers), and resident population centers that dilute the proportion of transients.
3. The BBNPP site is not located in an area where there is a significant population increase due to transient land use, such as recreational, agriculture or industrial. The counties of Columbia and Luzerne experience a daytime net increase of 6,243 commuting transients, primarily due to the lack of significant population centers in the 10 mi (80 km) radius.

Allentown, PA (population 106,632) is the largest population center intersected by the 50 mi (80 km) radius with a significant transient population. Allentown has a transient population of approximately 5,218 people distributed as follows:

- ◆ 2,113 people in college dormitories and off campus housing,
- ◆ 1,027 people in local jails and other confinement facilities (including police lockups),
- ◆ 880 people in nursing homes,
- ◆ 223 people in hospitals/wards and hospices for chronically ill,
- ◆ 222 people in military hospitals or wards for chronically ill,

- ◆ 153 people in other non-institutional group quarters, 108 people in homes or halfway houses for drug/alcohol abuse,
- ◆ 106 people in other non-household living situations,
- ◆ 99 people in homes for the physically handicapped,
- ◆ 76 people in homes for the mentally retarded,
- ◆ 56 people in mental (psychiatric) hospitals or wards,
- ◆ 53 people in halfway houses,
- ◆ 44 people in homes for the mentally ill,
- ◆ 25 people in religious group quarters,
- ◆ 16 people in training schools for juvenile delinquents,
- ◆ 12 people in job corps and vocational training facilities,
- ◆ 5 people in wards in general hospitals for homeless patients (USCB, 2000).

The Lehigh Valley International Airport (ID: ABE) is located in Allentown, PA and has an average monthly passenger population of 71,192.

2.1.3.4 Low Population Zone

The Low Population Zone (LPZ) for Bell Bend is a 1.5 mi (2.4 km) radius centered on BBNPP. It is completely contained within the LPZ for SSES Units 1 and 2 which consists of the area within a 3 mi (4.8 km) radius of the SSES Unit 1 (Figure 2.1-24). For conservatism, the BBNPP LPZ will be defined as the entire area of the SSES Units 1 and 2 LPZ. The communities of Beach Haven, East Berwick, Nescopeck, and Wapwallopen lie within the LPZ. There are no nursing homes, hospitals, prisons, or schools operating within the LPZ. The major employer within the LPZ is the PPL Susquehanna, LLC.

The resident and transient population distributions within the existing LPZ for each decade from 2000 through 2060 is denoted as the 2 mi (3.2 km) cumulative population on Figure 2.1-7 through Figure 2.1-13. The population within the LPZ including years 2018 and 2058, the expected year of initial operation and the expected year of license expiration for BBNPP are summarized in Table 2.1-11.

There is a significant increase in daily transient population at the BBNPP site. Residents in the LPZ would have the highest population at night as resident return from commutes to worksites within Luzerne and surrounding counties (Table 2.1-10).

In accordance with 10 CFR 50.34(a)(1)(ii)(D)(2), an individual located on the outer radius of the LPZ for the course of the postulated accident (assumed to be 30 days) would not receive a radiation dose in excess of 25 rem TEDE (CFR, 2007b). For SSES Units 1 and 2, the LPZ encompasses an area within 3 mi (4.8 km) radius from a centerpoint between the SSES Units 1 and 2 Reactor Buildings. It has been determined that the BBNPP could achieve the 25 rem TEDE within 1.5 mi (2.4 km). Onsite emergency preparedness personnel have developed an Emergency Planning Zone (EPZ) that extends beyond the BBNPP site boundary and its

Radioactive Emergency Plan establishes evacuation routes both onsite and offsite. Under these plans, emergency preparedness personnel would have ample time to take appropriate protective measures to all affected individuals within and beyond the LPZ.

Facilities and institutions in and beyond the LPZ that may require special consideration when evaluating emergency plans are defined out to a distance of 10 mi (16 km). The 10 mi (16 km) radius includes the LPZ and approximates the SSES Units 1 and 2 EPZ. Hospitals and nursing homes within the EPZ are listed in Table 2.1-8. Schools within the EPZ are listed in Table 2.1-9. There are no major recreational areas and attractions in the LPZ.

2.1.3.5 Population Center

The nearest population centers that meet the definition contained in 10 CFR 100.3 (distance from the reactor to the nearest boundary of a densely populated center containing more than about 25,000 residents) are Back Mountain, PA located approximately 20 miles (32 km) from BBNPP with a population of 26,690, Wilkes-Barre located approximately 20 miles (32 km) from BBNPP with a population of 43,123, and Scranton, PA located approximately 35 miles (56 km) from BBNPP with a population of 76,415 (USCB, 2000). All three are located north-east of BBNPP. The distance between Back Mountain, Wilkes-Barre, Scranton, and the BBNPP site is approximately 12.5, 12.5, and 22.7 times the 1.5 mi (2 km) radius of the BBNPP LPZ respectively. Therefore, it meets the requirement that the population center distance be at least one and one-third times the distance from the reactor to the outer boundary of the LPZ as defined in 10 CFR Part 100.21(b) (CFR, 2007c). Transient populations were not used to establish the nearest population center.

The largest population center within the 10 mi (8 km) radial distance from the BBNPP is Berwick, PA. Berwick's population was 10,744 as reported in the 2000 Census Report (USCB, 2000).

2.1.3.6 Population Density

This section describes populations and resulting population densities in the years of initial operation and the end of operations. For the purposes of this study, it is assumed that initial operation of BBNPP begins in 2018 and the end of operation is upon license expiration which is projected to be 2058, 40 years thereafter.

Additional population data is illustrated for the decades 2000 through 2060 in Figure 2.1-7 through Figure 2.1-13 for the 10 mi (16 km) vicinity and in Figure 2.1-16 through Figure 2.1-23 for the 50 mi (80 km) vicinity.

Table 2.1-11 shows the cumulative population in year 2000 within 30 mi (48 km) of the BBNPP site and projected cumulative populations in years 2018, (assumed year of initial operations) the decadal years 2020 through 2060, and 2058 (assumed year for end of operations). Table 2.1-11 shows the actual (2000 Census) and projected population density (persons/mi²) to demonstrate that the population density does not exceed 500 persons/mi² (200 persons/km²) at the time of the projected COL approval and within 5 years thereafter consistent with guidance provided in Regulatory Guide 4.7, Position C.4 (NRC, 1998) and Regulatory Guide 1.206 (NRC, 2007). The population for the startup year (2018) is below a population density of 500 persons/mi² (200 persons/km²) for all radial distances 1, 2, 3, 4, 5, 10, 20, and 30 mi (1.6, 3.2, 4.8, 6.4, 8.0, 16, 32, and 49 km). The highest population density at startup (2018) is projected to be 278.1 persons/mi² (111 persons/km²) at the 20 mi (32 km) radial distance. The land area calculated at this distance is 1,256 mi² (3,253 km²).

Table 2.1-11 presents the total population at the end of operations data (2058). For all radial distances 1, 2, 3, 4, 5, 10, 20, and 30 mi (1.6, 3.2, 4.8, 6.4, 8.0, 16, 32, and 49 km), the population is below the 1000 persons/mi² (400 persons/km²) density criterion. The highest projected population density in 2060 is 352.5 persons/mi² (136.1 persons/km²) at the 20 mi radial distance. The land area at the 20 mi (32 km) radial distance is 1,256 mi² (3,253 km²).

2.1.4 REFERENCES

{This section is added as a supplement to the U. S. EPR FSAR.

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CFR, 2007b. Title 10, Part 50.34, Code of Federal Regulations, Contents of construction permit and operating license applications; technical information, 2007.

CFR, 2007c. Title 10, Part 100, Code of Federal Regulations, Reactor Site Criteria, 2007.

PED, 2008. Pennsylvania Department of Education, 2008. School Tree.org, Website: <http://pennsylvania.schooltree.org/counties-page1.html>, Date accessed: May 2008.

NRC, 1998. General Site Suitability Criteria for Nuclear Power Stations. Regulatory Guide 4.7, Rev 2, Nuclear Regulatory Commission, April 1998.

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SECPOP 2000, 2003. Sector Population, Land Fraction, and Economic Estimation Program (NUREG/CR-6525, Rev. 1). Division of Risk Analysis and Applications Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Website: <http://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr6525/cr6525.pdf>

USCB, 2000. Census 2000 Summary File 1 (SF 1) 100-Percent Data. Website: <http://factfinder.census.gov>, Date Accessed: May 2008.}

Table 2.1-1—{BBNPP Specific Location of the Center of the Containment Structure}

Latitude/Longitude (NAD 27) (Degrees)	Latitude/Longitude (NAD 83) (Degrees)	UTM, Zone 18N (78W to 72W) (NAD 27) (Meters)	UTM, Zone 18N (78W to 72W) (NAD 83) (Meters)
N 41° 05' 11"	41° 05' 12"	North/South 4,548,796	North/South 4,549,017
W 76° 09' 55"	76° 09' 54"	East/West 402,125	East/West 402,157

Table 2.1-2—{Population for Counties Within 10 mi (16 km) Radius of BBNPP}

Year	County Population		
	Columbia	Luzerne	Schuylkill
1990	63,202	328,149	152,585
2000	64,151	319,250	150,336
2010	64,573	306,900	147,227
2018	66,586	300,094	147,477
2020	67,233	297,473	146,872
2030	69,944	288,847	146,567
2040	73,672	279,743	147,388
2050	78,209	271,440	149,159
2058	82,432	265,154	151,259
2060	83,570	263,632	151,879

Table 2.1-3—{SECPOP Population Within 10mi (16 km) Radius of BBNPP (2000 - 2060)}

Year	Population Within 50 mi (80 km) Radius
2000	49,596
2010	51,942
2018	54,987
2020	55,087
2030	58,047
2040	62,685
2050	66,124
2058	69,027
2060	69,687

**Table 2.1-4—{SECPOP Population Within 50 mi (80 km) Radius of BBNPP
(2000 - 2060)}**

Year	Population Within 50 mi (80 km) Radius
2000	1,661,993
2010	1,739,722
2018	1,842,901
2020	1,846,147
2030	1,945,412
2040	2,101,293
2050	2,216,209
2058	2,312,686
2060	2,335,586

Table 2.1-5—{Population Census and Projections (2010-2060) for Counties Within 50 mile (80 km) Radius of BBNPP}

County	Year									
	2000	2010	2018	2020	2030	2040	2050	2058	2060	
Berks	373,638	412,708	444,048	451,816	493,080	535,110	578,408	613,904	622,897	
	62,761	60,763	60,385	59,528	58,864	56,269	53,449	50,765	50,035	
Bradford										
Carbon	58,802	63,311	65,750	67,079	69,340	72,990	76,251	78,846	79,493	
Columbia	64,151	64,573	66,586	67,233	69,944	73,672	78,209	82,432	83,570	
Dauphin	251,798	256,478	263,206	263,198	270,543	273,403	275,469	275,965	275,929	
Lackawanna	213,295	205,061	201,121	199,867	195,388	191,130	187,888	185,880	185,459	
Lebanon	120,327	122,619	126,382	126,397	131,470	134,601	137,986	140,537	141,152	
Lehigh	312,090	318,365	331,428	331,455	350,262	363,206	378,223	390,496	393,599	
Luzerne	319,250	306,900	299,756	297,473	288,847	279,743	271,440	265,154	263,632	
Lycoming	120,044	116,071	114,579	113,434	110,322	104,923	98,806	93,136	91,610	
Monroe	138,687	173,612	202,324	208,641	240,385	268,017	292,765	310,264	314,319	
Montour	18,236	17,299	17,293	17,018	17,080	16,604	16,240	15,927	15,845	
Northampton	267,066	288,886	308,282	313,925	338,632	366,453	395,801	420,586	426,964	
Northumberland	94,556	93,363	92,858	93,121	92,481	93,104	94,153	95,414	95,788	
Pike	46,302	63,739	77,120	81,017	94,707	108,479	120,573	129,276	131,317	
Schuylkill	150,336	147,227	146,832	146,872	146,567	147,388	149,159	151,259	151,879	
Snyder	37,546	38,358	38,853	39,140	39,068	39,116	38,800	38,352	38,212	
Sullivan	6,556	6,352	6,418	6,330	6,303	5,993	5,622	5,245	5,140	
Susquehanna	42,238	48,625	73,987	61,846	77,835	128,036	160,626	190,307	198,229	
Union	41,624	46,497	49,407	50,174	52,471	53,981	54,346	53,867	53,640	
Wayne	47,722	52,604	59,025	60,781	67,349	74,478	81,703	87,572	89,052	
Wyoming	28,080	26,919	24,045	24,075	20,631	19,888	17,999	16,487	16,109	
Total	2,815,105	2,930,330	3,069,685	3,080,420	3,231,569	3,406,584	3,563,916	3,691,669	3,723,870	

**Table 2.1-6—{Transient Population Facilities - Major Employers Within 10 mi (16 km)
Radius of BBNPP}**

Name of Facility	Address	Location	Population
Berwick Hospital Center	701 East 16th Street Berwick, PA 18603	41° 4'13.47"N 76°13'50.49"W	600
Berwick Offray	2015 West Front Street Berwick, PA 18603	41° 2'51.00"N 76°16'19.64"W	600-700
Berwick Retirement Village	801 East 16th Street Berwick, PA 18603	41° 4'13.30"N 76°13'47.32"W	131
DeLuxe Building Systems	499 West Third Street Berwick, PA 18603	41° 3'14.08"N 76°14'29.42"W	300
PPL Susquehanna	769 Salem Blvd. Berwick PA 18603	41° 5'30.60"N 76° 8'45.80"W	1460
Wise Foods	228 Rasely Street Berwick, PA. 18603	41° 2'48.77"N 76°15'1.54"W	700

Table 2.1-7—{Transient Population Facilities - Major Recreational Areas and Attractions Within 10 mi (16 km) Radius of BBNPP}

Name of Facility	Address	Location	Population
Acorn Acres	1334 State Road 118 Benton, PA 17814	41°10'32.22"N 76°16'49.43"W	April-October 346
Camp Louise Girl Scouts in the Heart of Pennsylvania	195 Hawk Road Shickshinny, PA 18655	41°11'8.70"N 76°11'3.08"W	June-August 250-350 Weekends 300
Camp Setebaid	195 Hawk Road Shickshinny, PA 18655	41°11'8.70"N 76°11'3.08"W	July-August 170
Council Cup Campground	212 Ruckle Hill Road Wapwallopen, PA 18660	41° 6'16.43"N 76° 5'27.28"W	250-300 Year Round April-October 295
Good's Campground	288 State Road 118 Benton, PA 17814	41°10'32.22"N 76°16'49.43"W	April-October 100-300 Weekend 10 Weekly
Hidden New Lake Campground	745 Hunlock Harveyville Rd Shickshinny, PA 18655	41°13'8.78"N 76°13'7.37"W	April-October 200-300
Whispering Pines Camping Estates	1557 N Bendertown Road Stillwater, PA 17878	41°10'47.17"N 76°19'10.74"W	April-October 250
Susquehanna Riverlands	634 Salem Blvd. Berwick, PA 18603	41°08'88.67"N 76°14'81.87"W	Year-round 100,000 people per year

**Table 2.1-8—{Special Facilities - Hospitals and Nursing Homes
Within the 10 mi (16 km) Zone}**

Name of Facility	Address	Location	Population
Berwick Hospital Center	701 East 16th Street Berwick, PA 18603	41° 4'13.47"N 76°13'50.49"W	341/600 941
Berwick Retirement Village	801 East 16th Street Berwick, PA 18603	41° 4'13.30"N 76°13'47.32"W	240/131 371

Table 2.1-9—{Special Facilities - Schools Within 10 mi (16 km) Zone}

Name of School	Address	Location	Student Enrollment	Staff	Total Population
Salem Elementary School	810 East Tenth Street Berwick, PA 18603	41° 3'56.85"N 76°13'30.22"W	496	32	528
Fairview Friends School	1541 Fairview Ave Berwick, PA 18603	41° 3'4.25"N 76°15'34.68"W	12	4	16
Heritage Christian Academy	112 Butternut Street Berwick, PA 18603	41° 3'50.72"N 76°13'54.48"W	11	2	13
Fourteenth Street Elementary School	1401 N Market Street, Berwick, PA 18603	41° 3'49.30"N 76°14'14.55"W	214	15	229
Mulberry Street Elementary	West Sixth & Mulberry Street Berwick, PA 18603	41° 3'24.32"N 76°14'19.95"W	104	10	114
Orange Street Elementary School	845 Orange Street Berwick, PA 18603	41° 3'6.76"N 76°14'38.89"W	386	29	415
Berwick Area High School	1100 Fowler Ave Berwick, PA 18603	41° 3'57.74"N 76°13'45.82"W	992	70	1062
Nescopek Elementary School	315 Dewey Street Nescopek, PA 18635	41° 3'5.03"N 76°12'54.48"W	276	19	295
Berwick Area Middle School	1100 Evergreen Drive Berwick, PA 18603	41° 4'11.85"N 76°13'45.59"W	897	68	1260
Garrison Memorial School	West Vine Street Shickshinny, PA 18655	41° 9'9.70"N 76° 9'6.89"W	186	12	198
Hunlock Creek School	21 Sunset Lake Road Shickshinny, PA 18655	41°11'59.86"N 76° 7'17.38"W	304	17	321
Huntington Mills School	417 Shickshinny Lake Road Shickshinny, PA 18655	41°11'31.43"N 76°13'56.48"W	315	19	334
Northwest Area High School	243 Thorne Hill Road Shickshinny, PA 18655	41°10'58.83"N 76°11'23.38"W	646	42	688

Table 2.1-10—{Commuting Patterns To and From Columbia and Luzerne Counties (2000)}

Parameter	County	Count
Worker Outflow from Columbia and Luzerne County to Counties in 50 mi (80 km) Radius	Berks	196
	Bradford	39
	Carbon	653
	Dauphin	271
	Lackawanna	8,190
	Lebanon	81
	Lehigh	828
	Lycoming	431
	Monroe	1,706
	Montour	2,146
	Northampton	159
	Northumberland	1,117
	Pike	306
	Schuylkill	1,582
	Snyder	69
	Sullivan	114
	Susquehanna	71
	Union	240
	Wayne	163
	Wyoming	910
	Total	19,272
Worker Outflow from Columbia and Luzerne Counties to Areas Outside 50 mi (80 km) Radius	Total	2,966
Worker Inflow to Columbia and Luzerne County from Counties in 50 mi (80 km) Radius	Berks	78
	Bradford	91
	Carbon	2,242
	Dauphin	54
	Lackawanna	6,993
	Lebanon	45
	Lehigh	245
	Lycoming	469
	Monroe	667
	Montour	1,056
	Northampton	116
	Northumberland	1,290
	Pike	133
	Schuylkill	3,750
	Snyder	96
	Sullivan	75
	Susquehanna	234
	Union	56
	Wayne	327
	Wyoming	2,214
	Total	20,231
Worker Inflow to Columbia and Luzerne Counties from Areas Outside 50 mi (80 km) Radius	Total	8,250
Net Worker Inflow to Columbia and Luzerne Counties	Total	6,243

Table 2.1-11—{SECPOP Actual (2000) and Projected (2010-2060) Population Within the 1 mi (1.6 km) to 30 mi (48 km) Zones}

Year	SECPOP Radius (Land Area)									
	1 mi (1.6 km) (3.1 mi ²)	2 mi (3.2 km) (12.6 mi ²)	3 mi (4.8 km) (28.3 mi ²)	4 mi (6.4 km) (50.2 mi ²)	5 mi (8.0 km) (78.5 mi ²)	10 mi (16 km) (314 mi ²)	20 mi (32 km) (1,256 mi ²)	30 mi (48 km) (2,826 mi ²)		
2000	280	1,334	2,733	9,935	18,691	49,596	315,044	603,635		
2010	294	1,399	2,863	10,407	19,571	51,942	329,878	631,904		
2018	310	1,480	3,030	11,016	20,726	54,987	349,330	669,325		
2020	310	1,482	3,034	11,029	20,761	55,087	349,952	670,497		
2030	327	1,563	3,200	11,625	21,871	58,047	368,776	706,585		
2040	354	1,687	3,453	12,552	23,620	62,685	398,242	763,118		
2050	373	1,778	3,644	13,246	24,916	66,124	420,071	804,887		
2058	390	1,859	3,806	13,826	26,019	69,027	438,402	839,974		
2060	393	1,873	3,840	13,961	26,261	69,687	442,752	848,289		

Table 2.1-12—{SECPOP Actual (2000) and Projected (2010-2060) Population Density (persons/mi²) within the 1 mi (1.6 km) to 30 mi (48 km) Zones}

Year	SECPOP Radius (Land Area)									
	1 mi (1.6 km) (3.1 mi ²)	2 mi (3.2 km) (12.6 mi ²)	3 mi (4.8 km) (28.3 mi ²)	4 mi (6.4 km) (50.2 mi ²)	5 mi (8.0 km) (78.5 mi ²)	10 mi (16 km) (314 mi ²)	20 mi (32 km) (1256 mi ²)	30 mi (48 km) (2826 mi ²)		
2000	90.3	105.9	96.6	197.9	238.1	157.9	250.8	213.6		
2010	94.8	111.0	101.2	207.3	249.3	165.4	262.6	223.6		
2018	100.0	117.5	107.1	219.4	264.0	175.1	278.1	236.8		
2020	100.0	117.6	107.2	219.7	264.5	175.4	278.6	237.3		
2030	105.5	124.0	113.1	231.6	278.6	184.9	293.6	250.0		
2040	114.2	133.9	122.0	250.0	300.9	199.6	317.1	270.0		
2050	120.3	141.1	128.8	263.9	317.4	210.6	334.5	284.8		
2058	125.8	147.5	134.5	275.4	331.5	219.8	349.0	297.2		
2060	126.8	148.7	135.7	278.1	334.5	221.9	352.5	300.2		

Figure 2.1-1—{BBNPP Site Area Map}

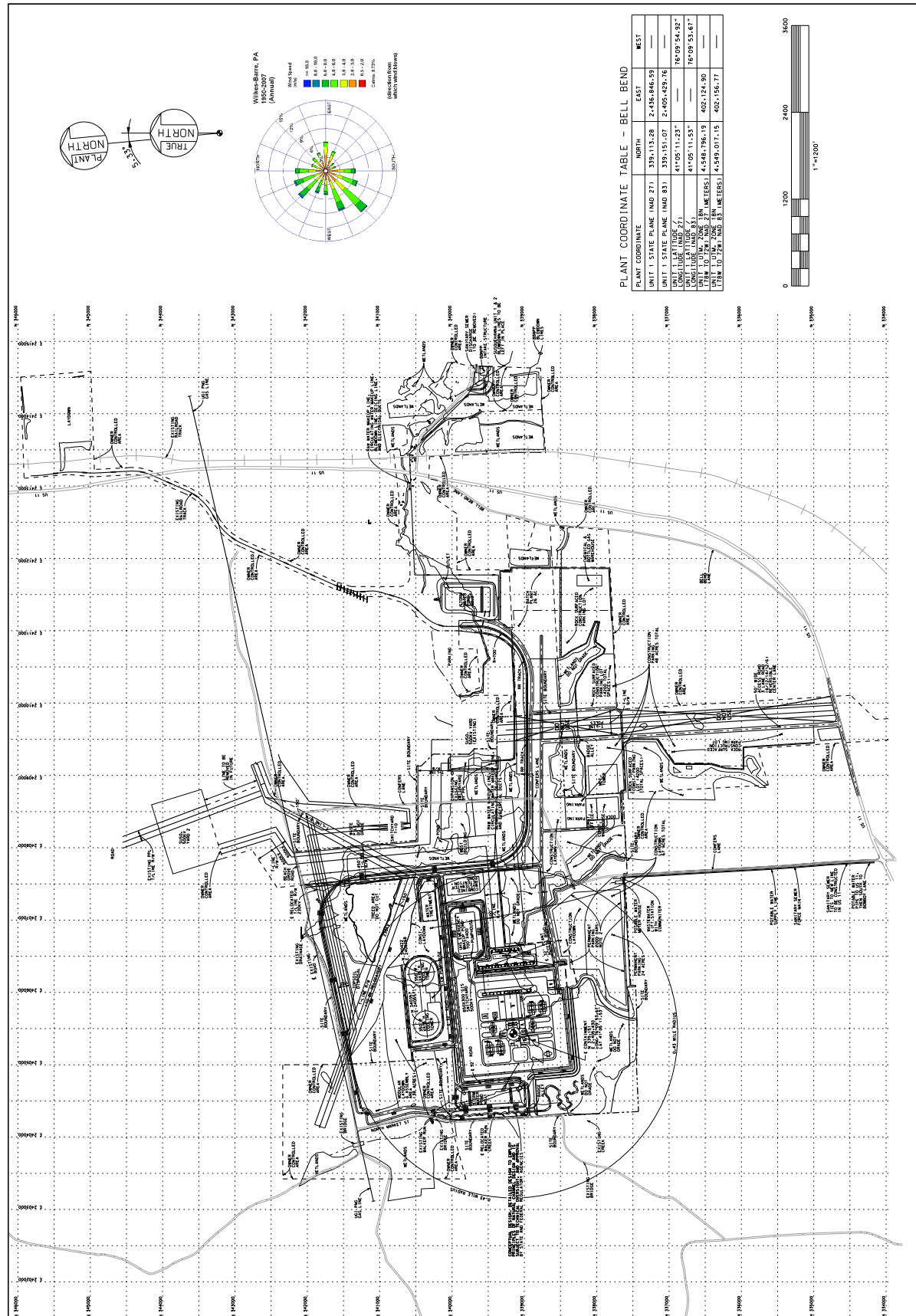


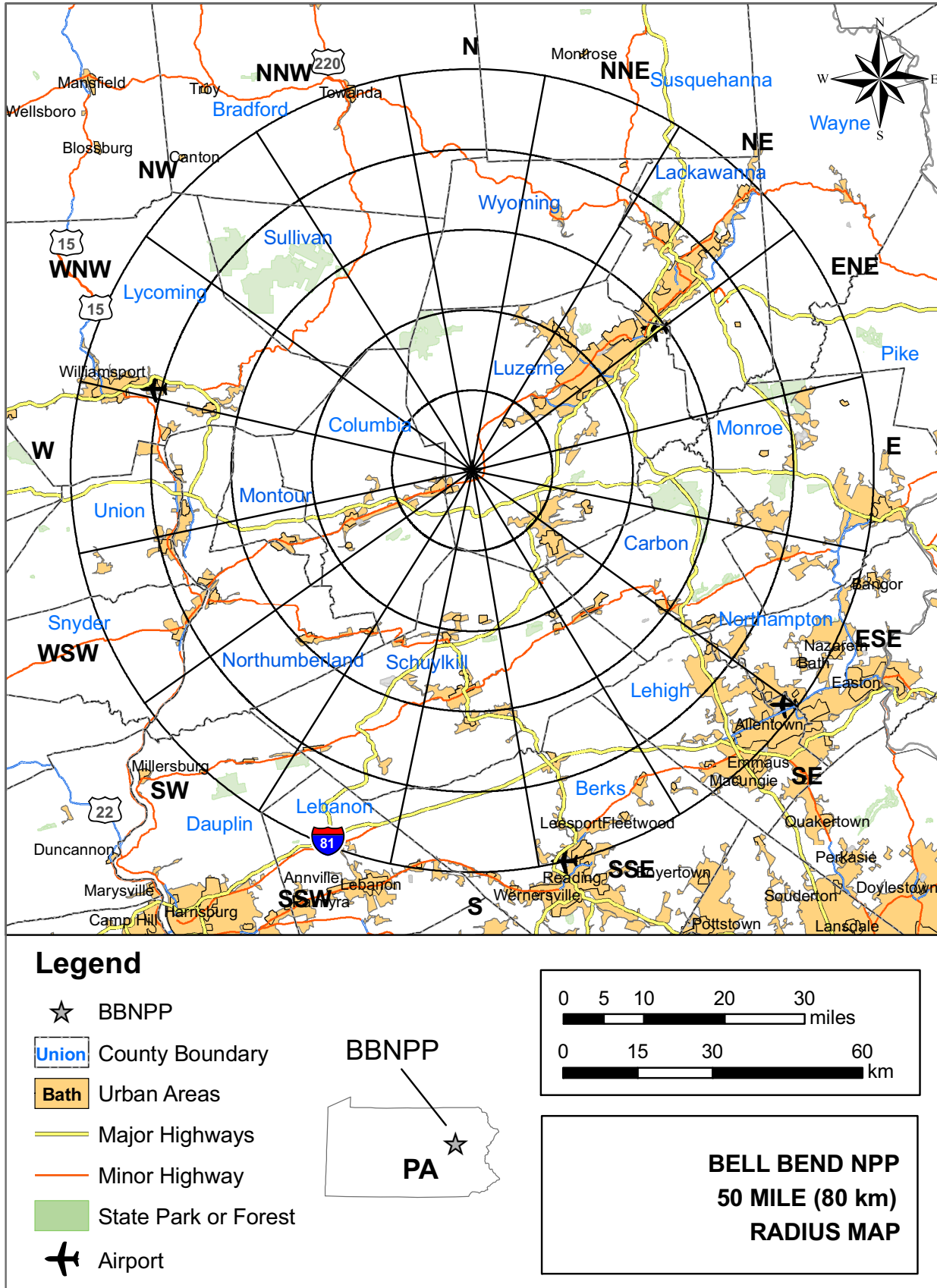
Figure 2.1-2—{BBNPP Site 50 Mile (80 km) Radius}

Figure 2.1-3—{BBNPP Site 10 Mile (16 km) Radius}

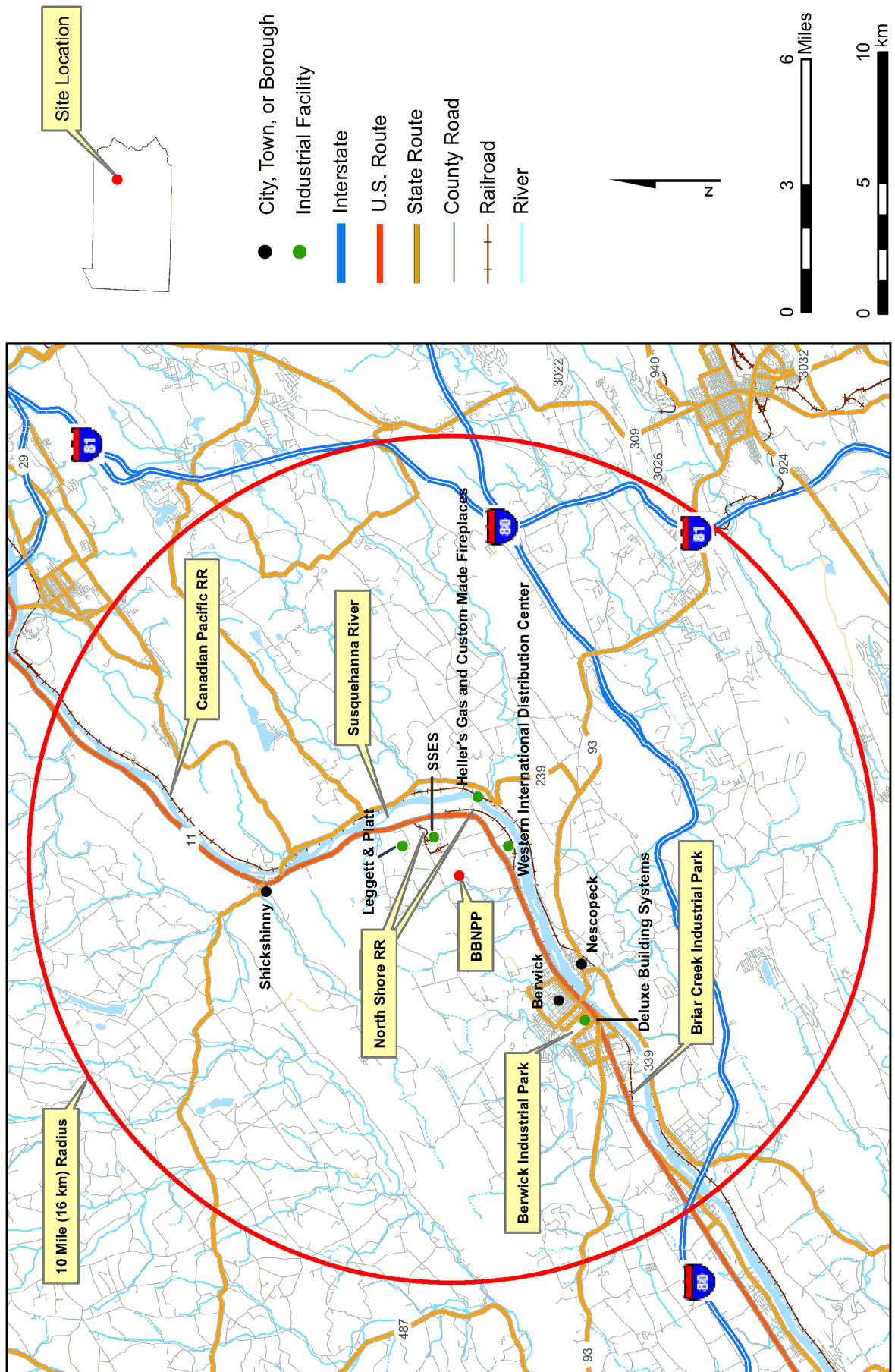


Figure 2.1-4—{BBNPP Exclusion Area Boundary}

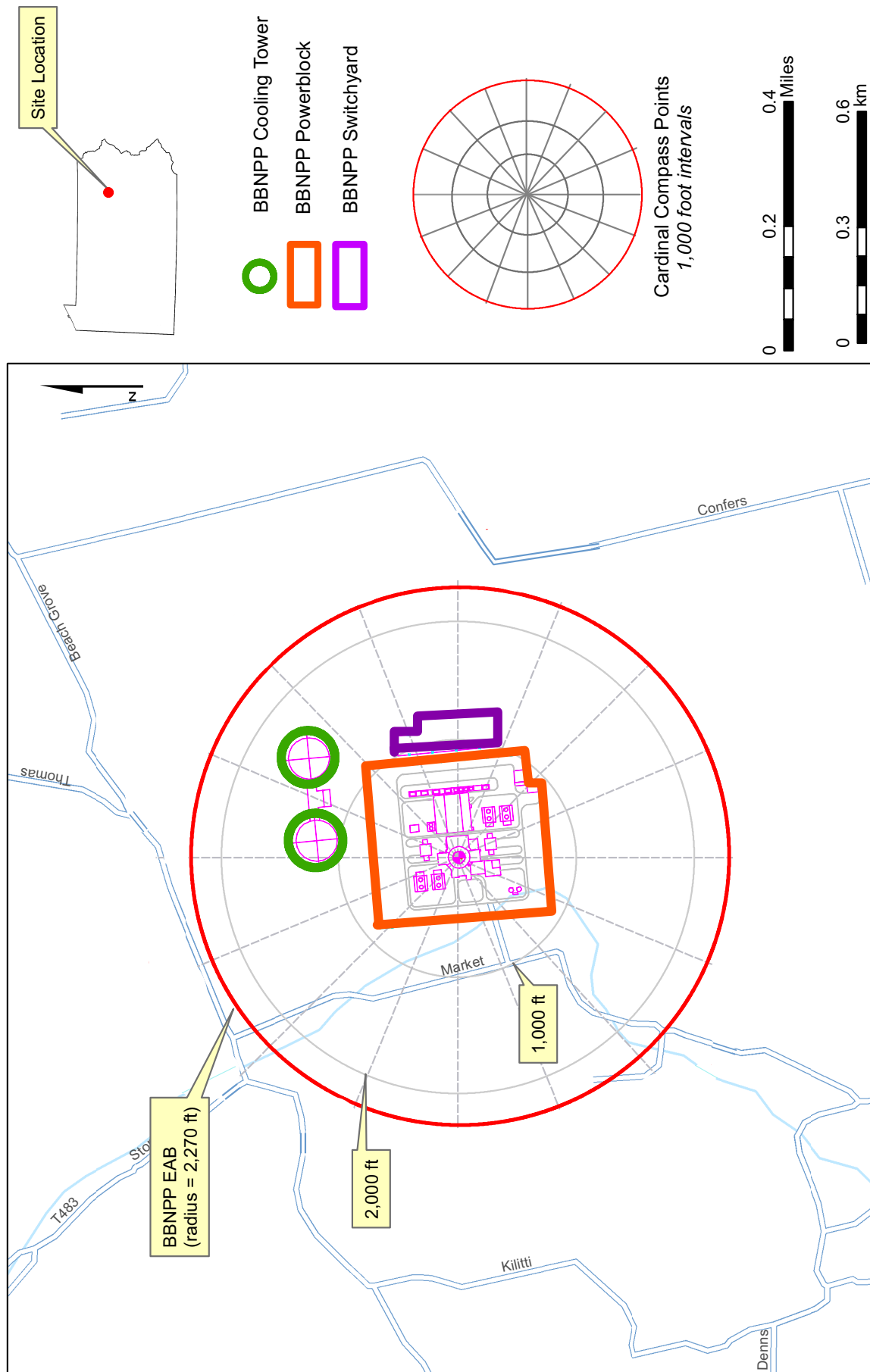


Figure 2.1-5—{BBNPP Principle Plant Structures}

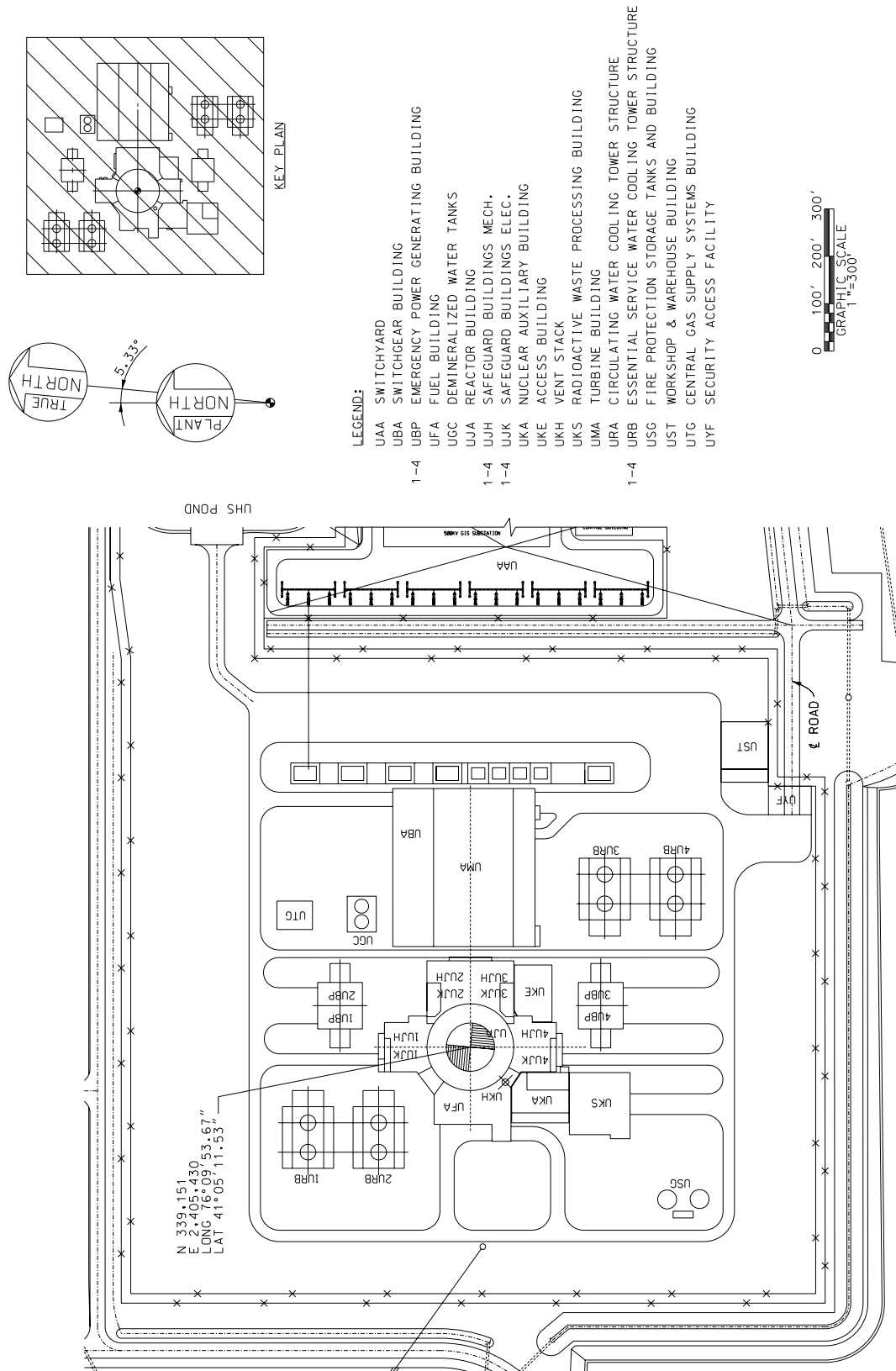


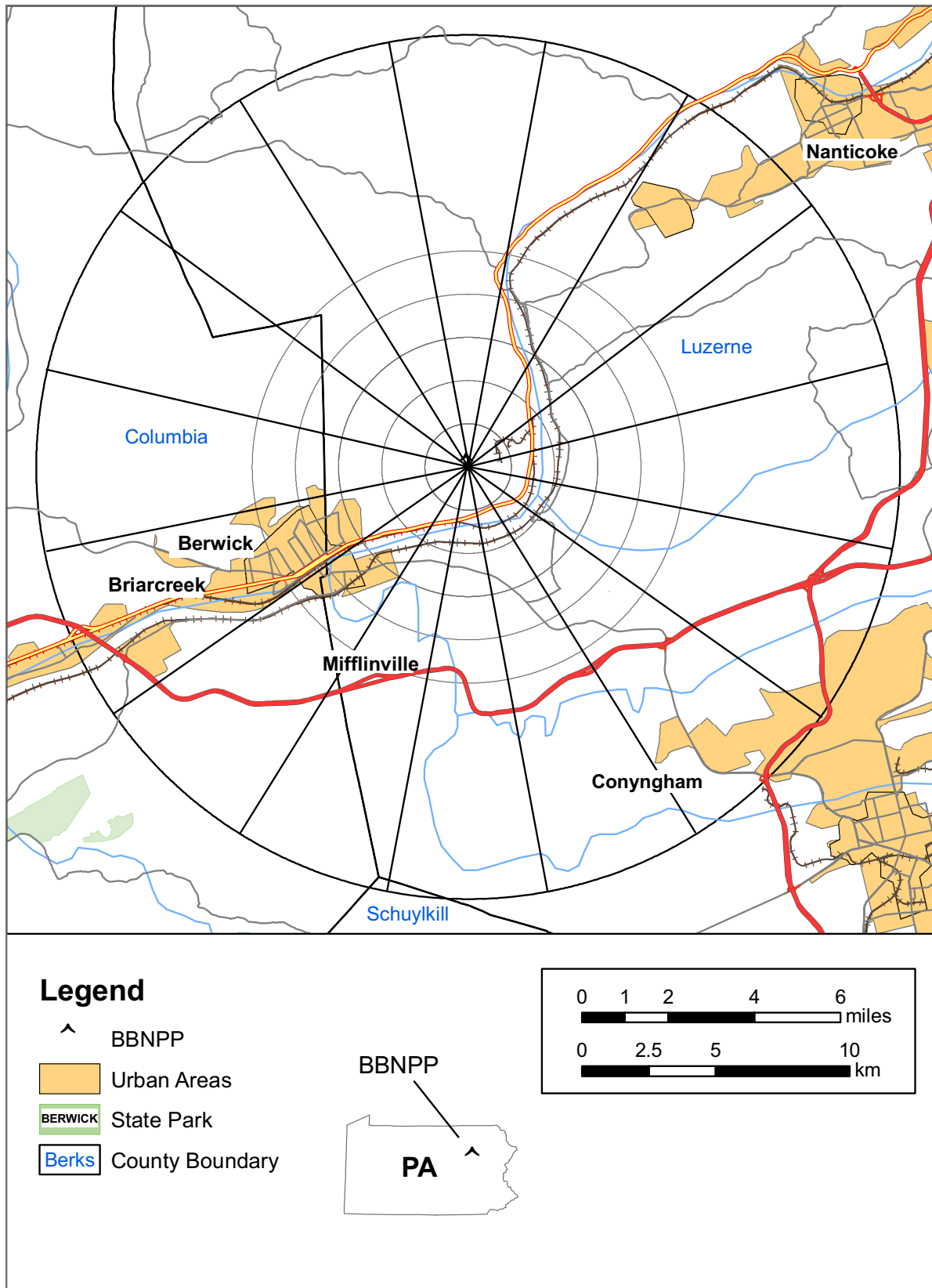
Figure 2.1-6—{BBNPP 10 Mile (16 km) Radius Map}

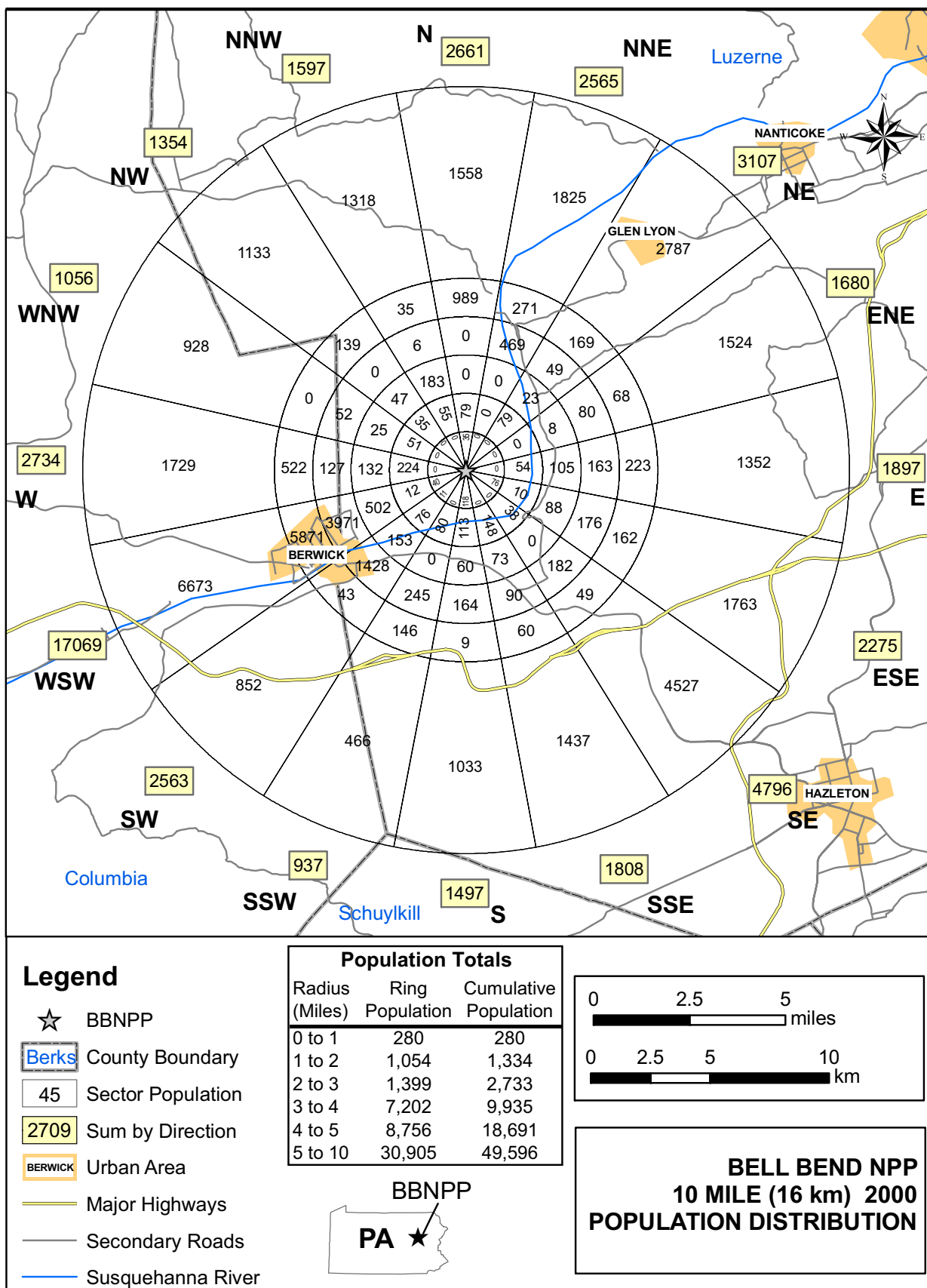
Figure 2.1-7—{BBNPP 10 Mile (16 km) 2000 Population Distribution}

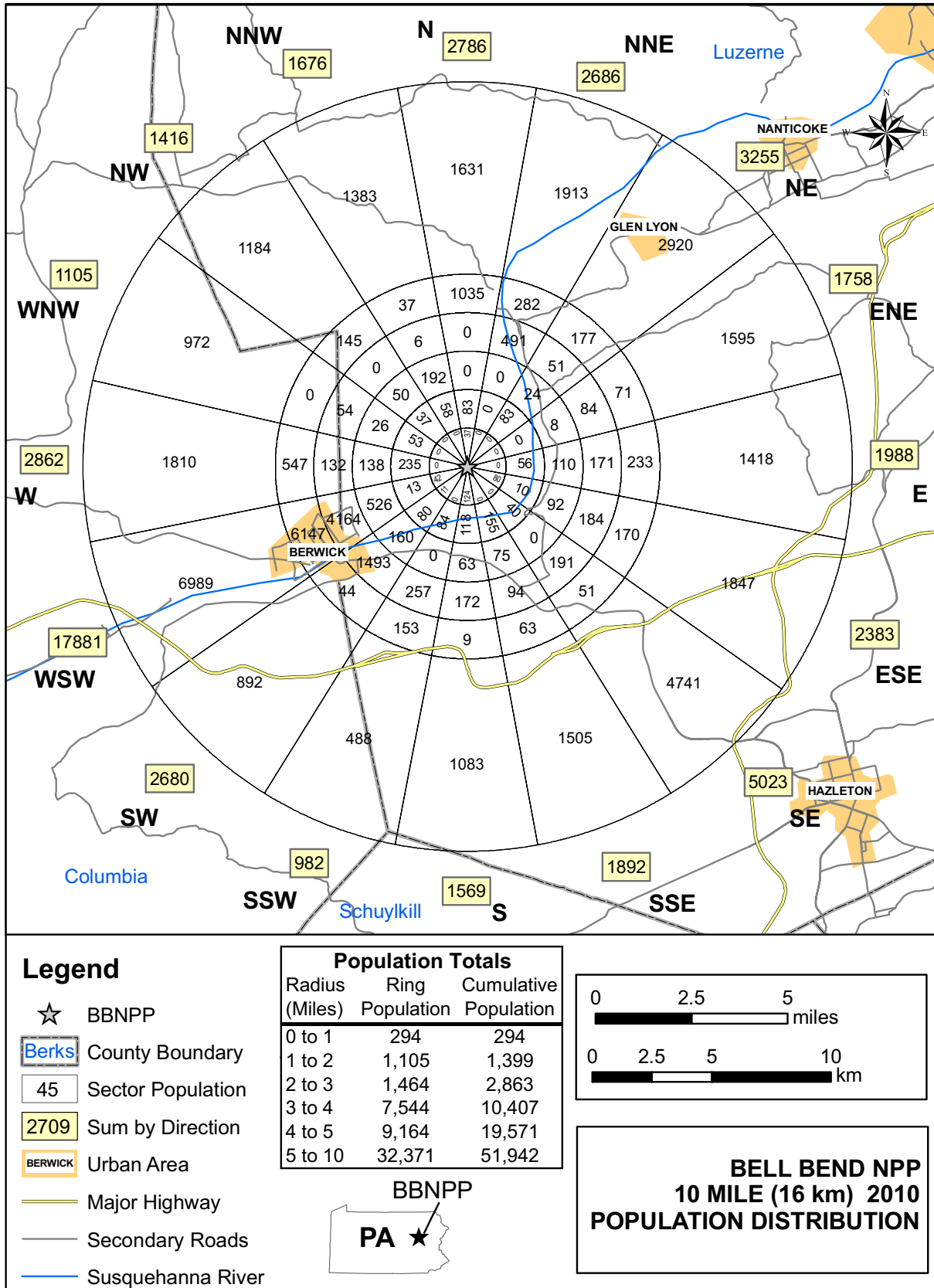
Figure 2.1-8—{BBNPP 10 Mile (16 km) 2010 Population Distribution}

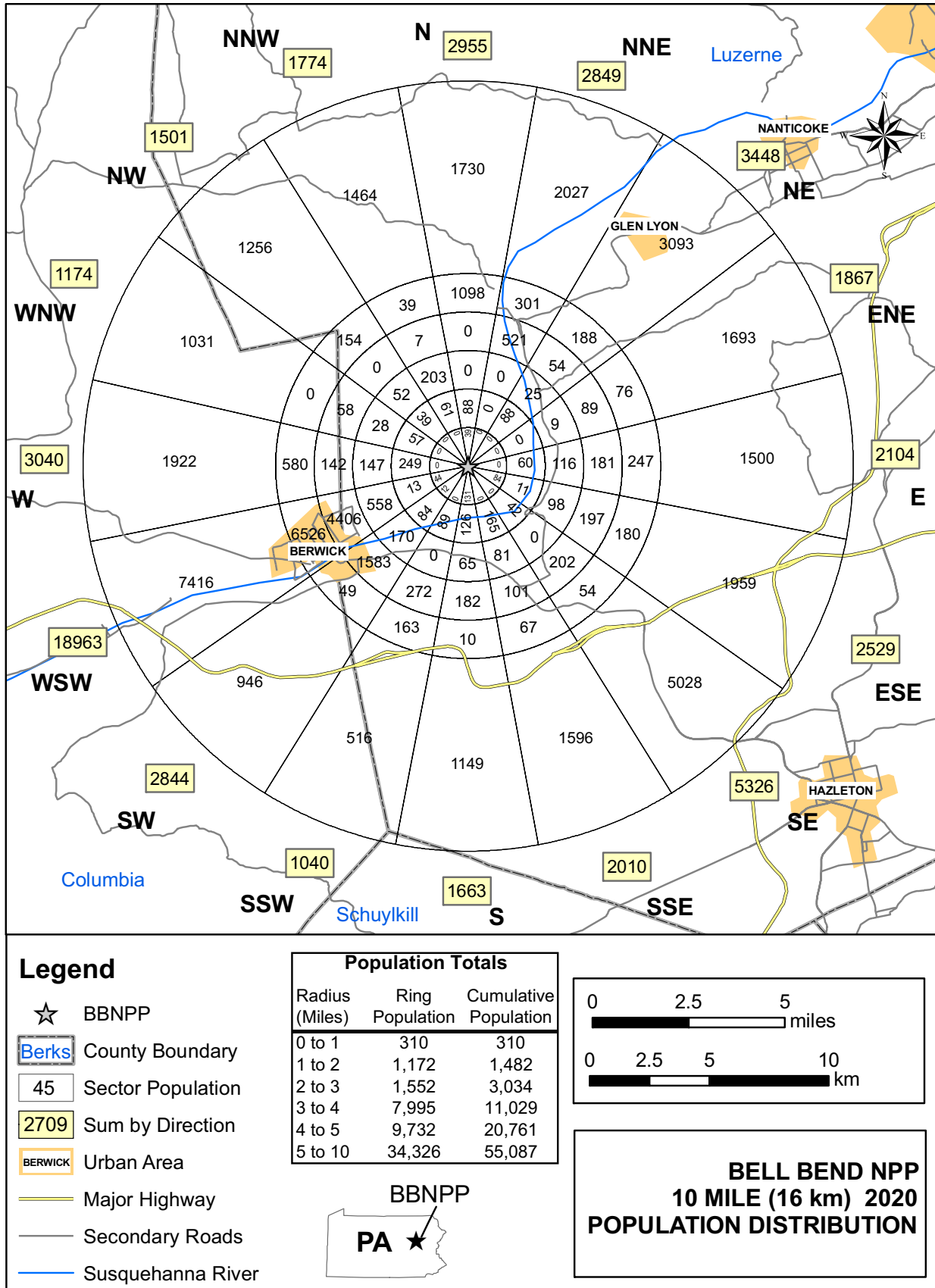
Figure 2.1-9—{BBNPP 10 Mile (16 km) 2020 Population Distribution}

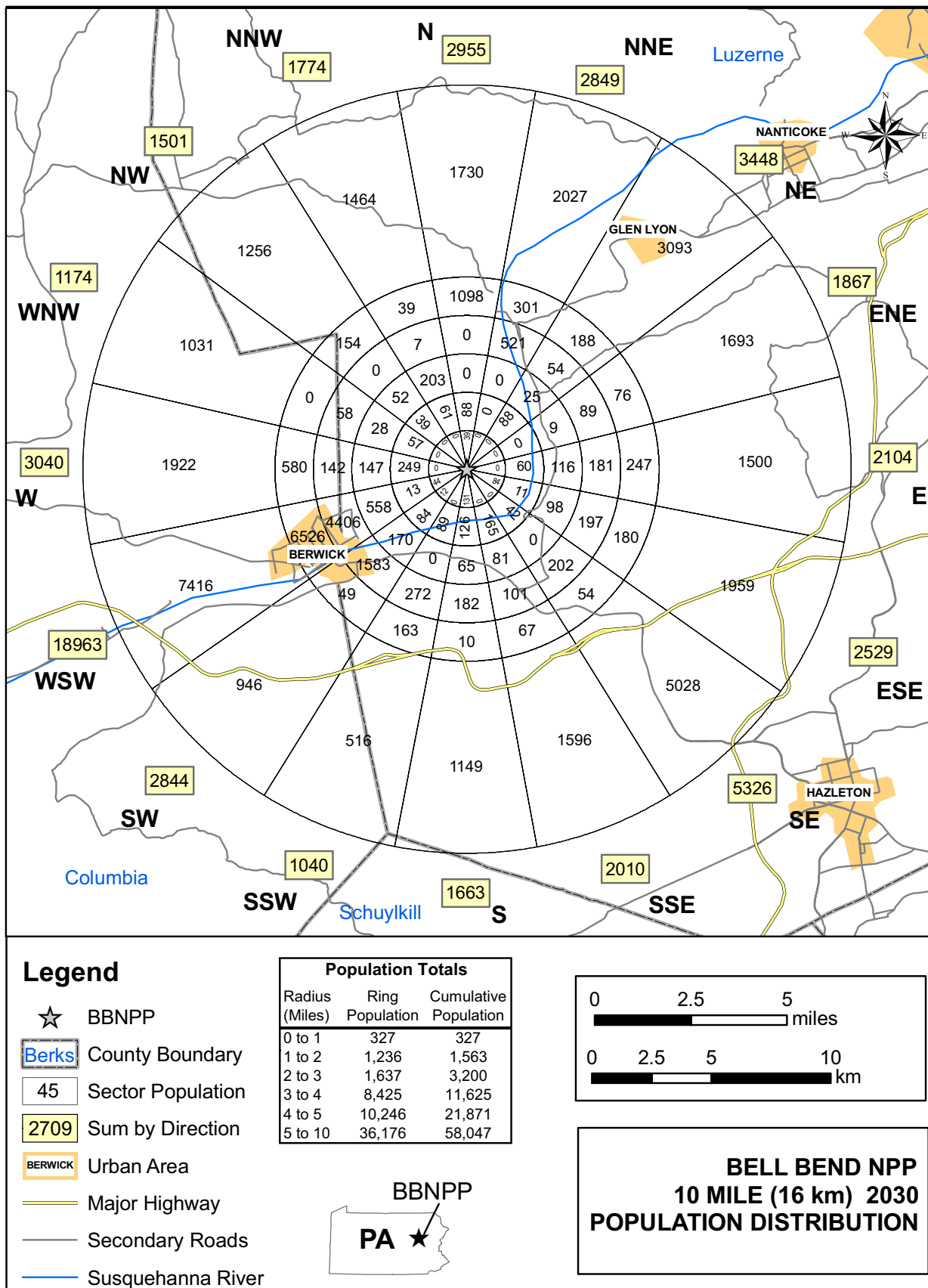
Figure 2.1-10—{BBNPP 10 Mile (16 km) 2030 Population Distribution}

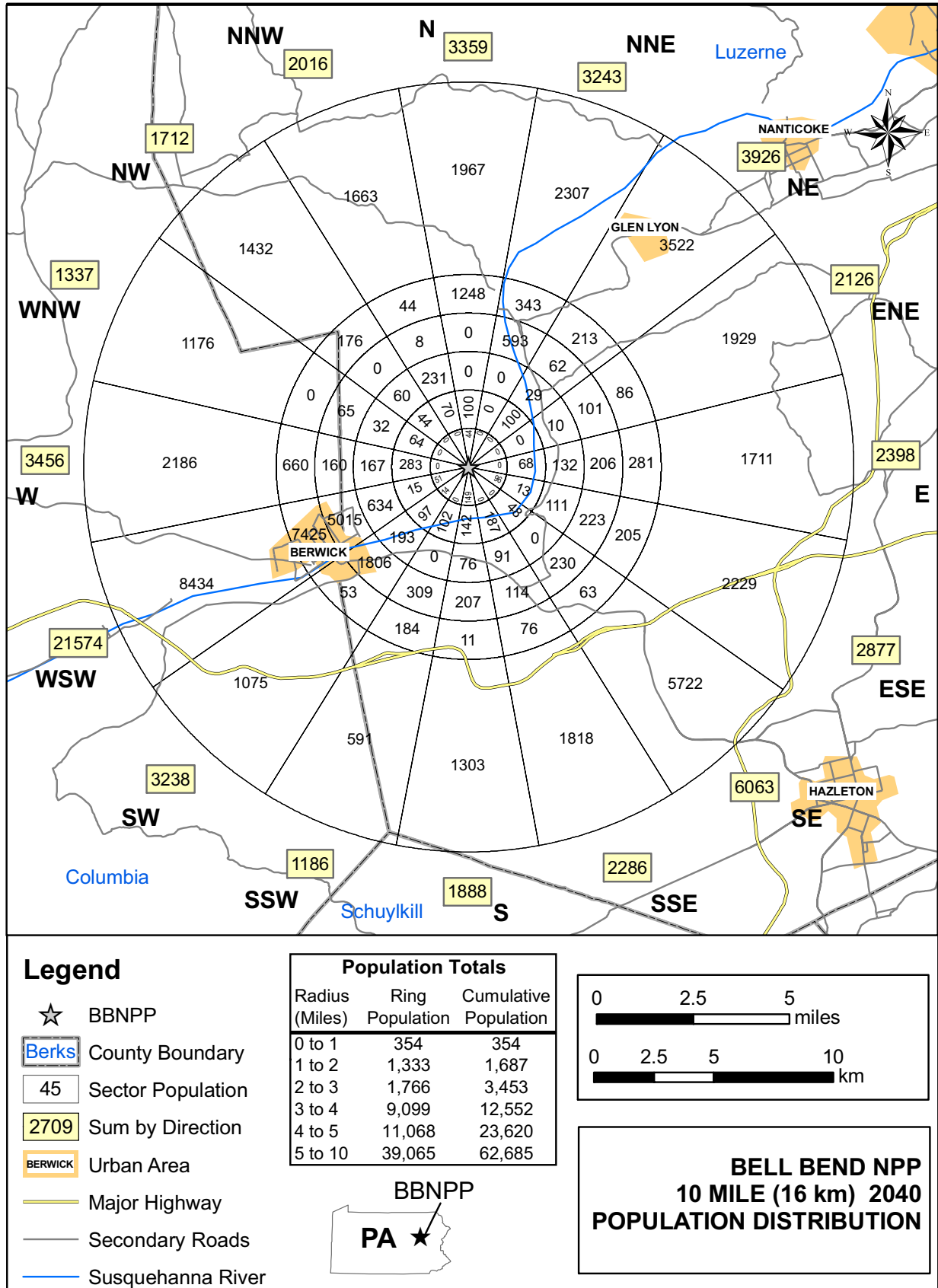
Figure 2.1-11—{BBNPP 10 Mile (16 km) 2040 Population Distribution}

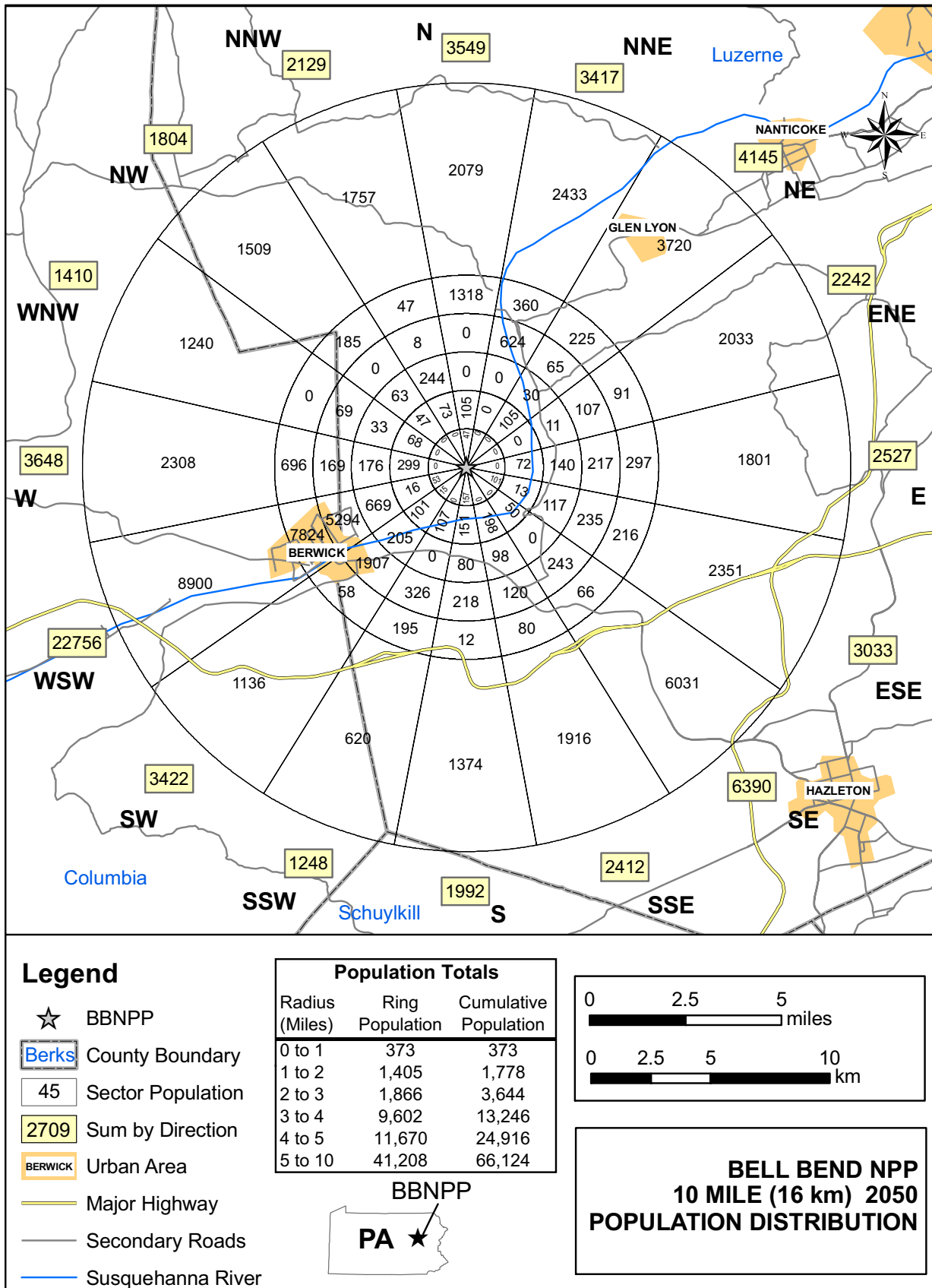
Figure 2.1-12—{BBNPP 10 Mile (16 km) 2050 Population Distribution}

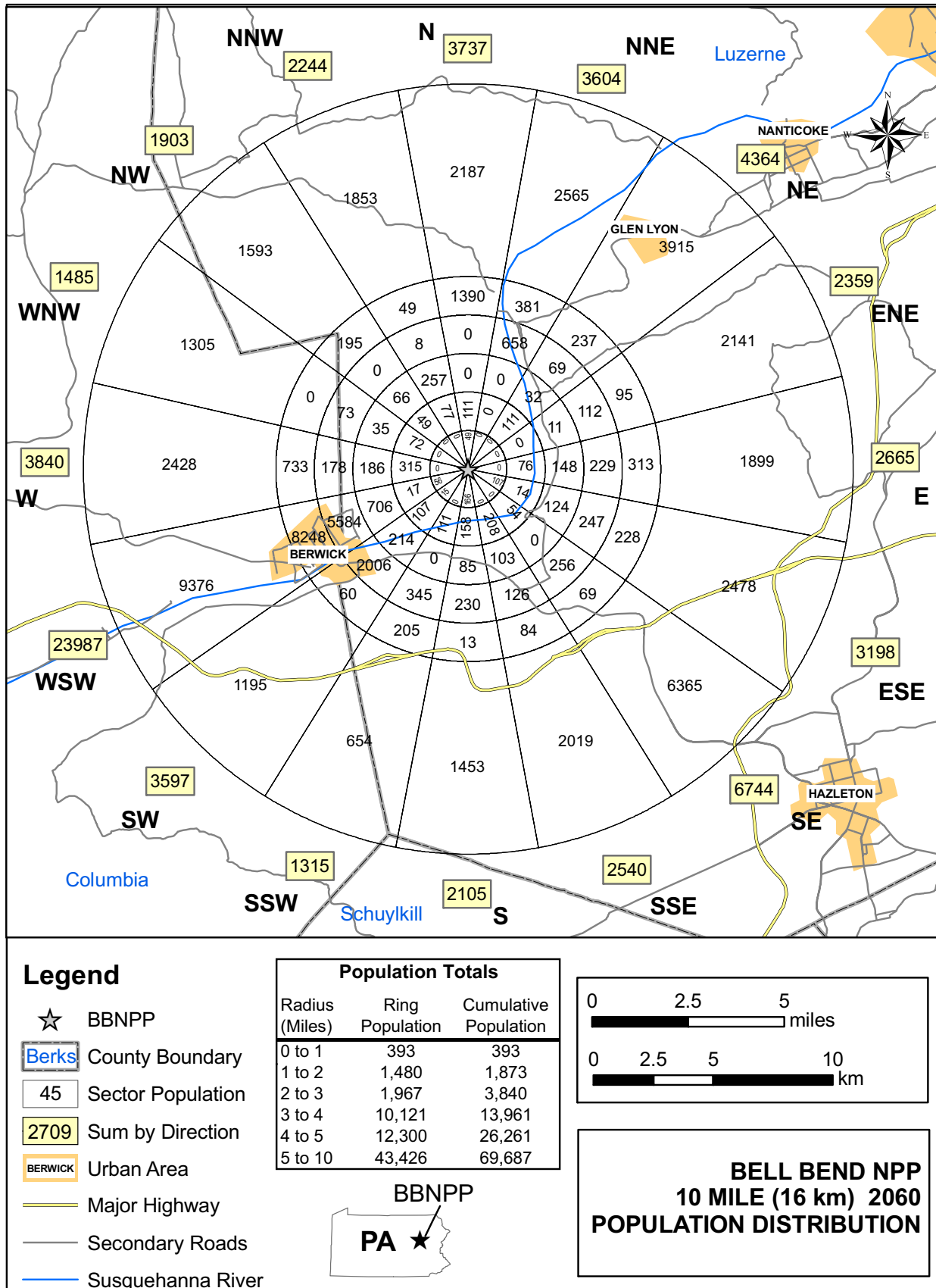
Figure 2.1-13—{BBNPP 10 Mile (16 km) 2060 Population Distribution}

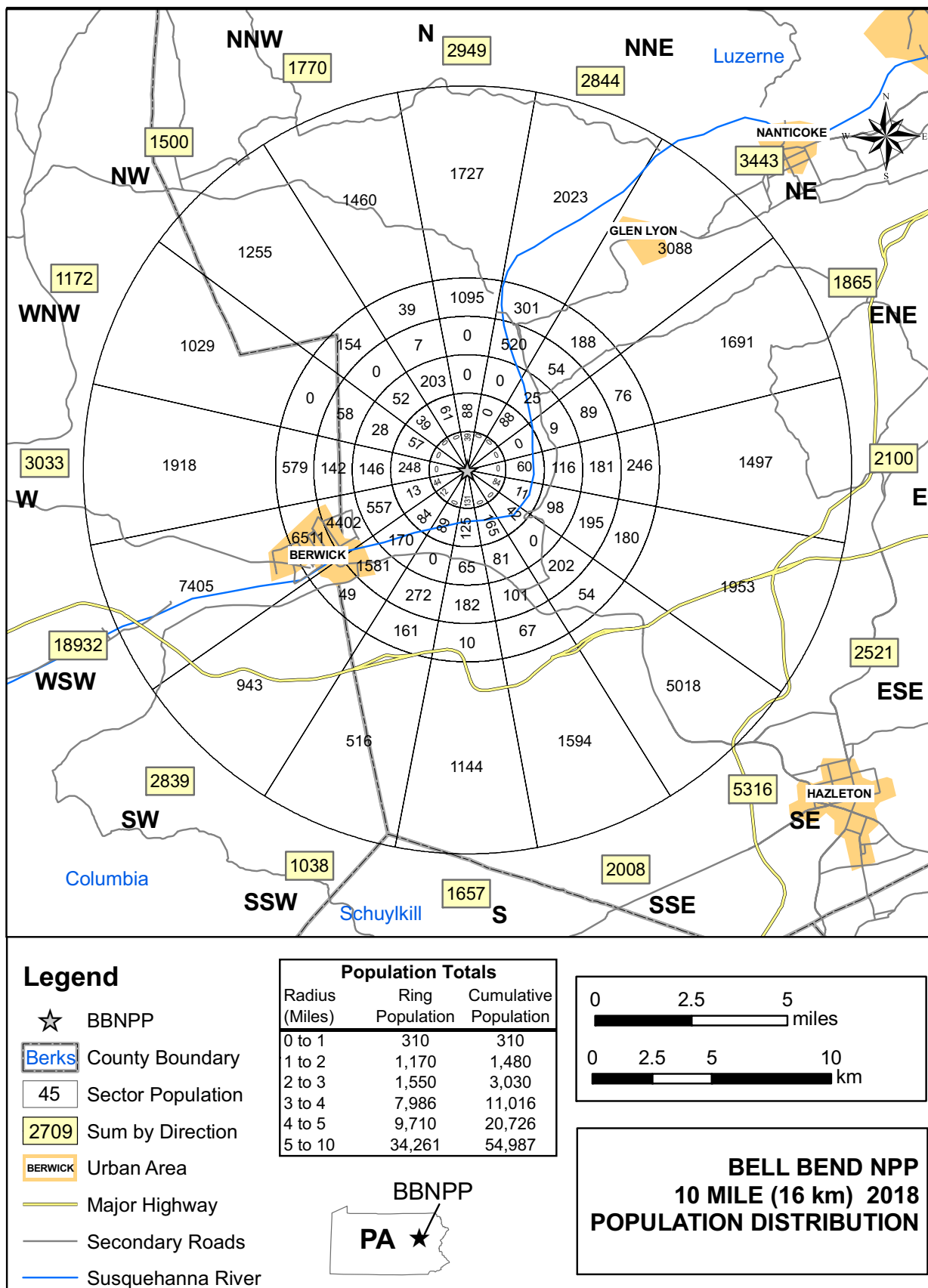
Figure 2.1-14—{BBNPP 10 Mile (16 km) 2018 Population Distribution}

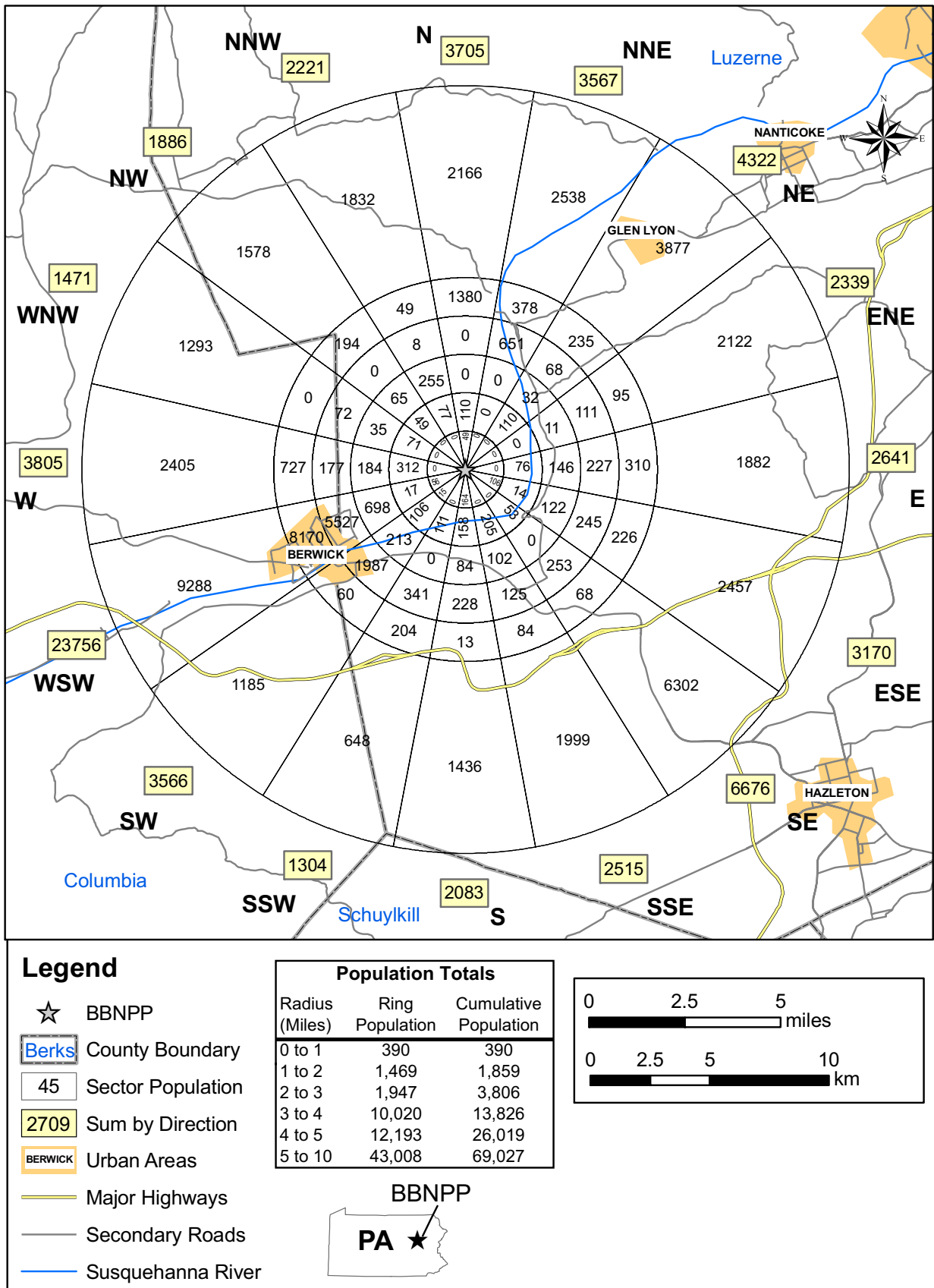
Figure 2.1-15—{BBNPP 10 Mile (16 km) 2058 Population Distribution}

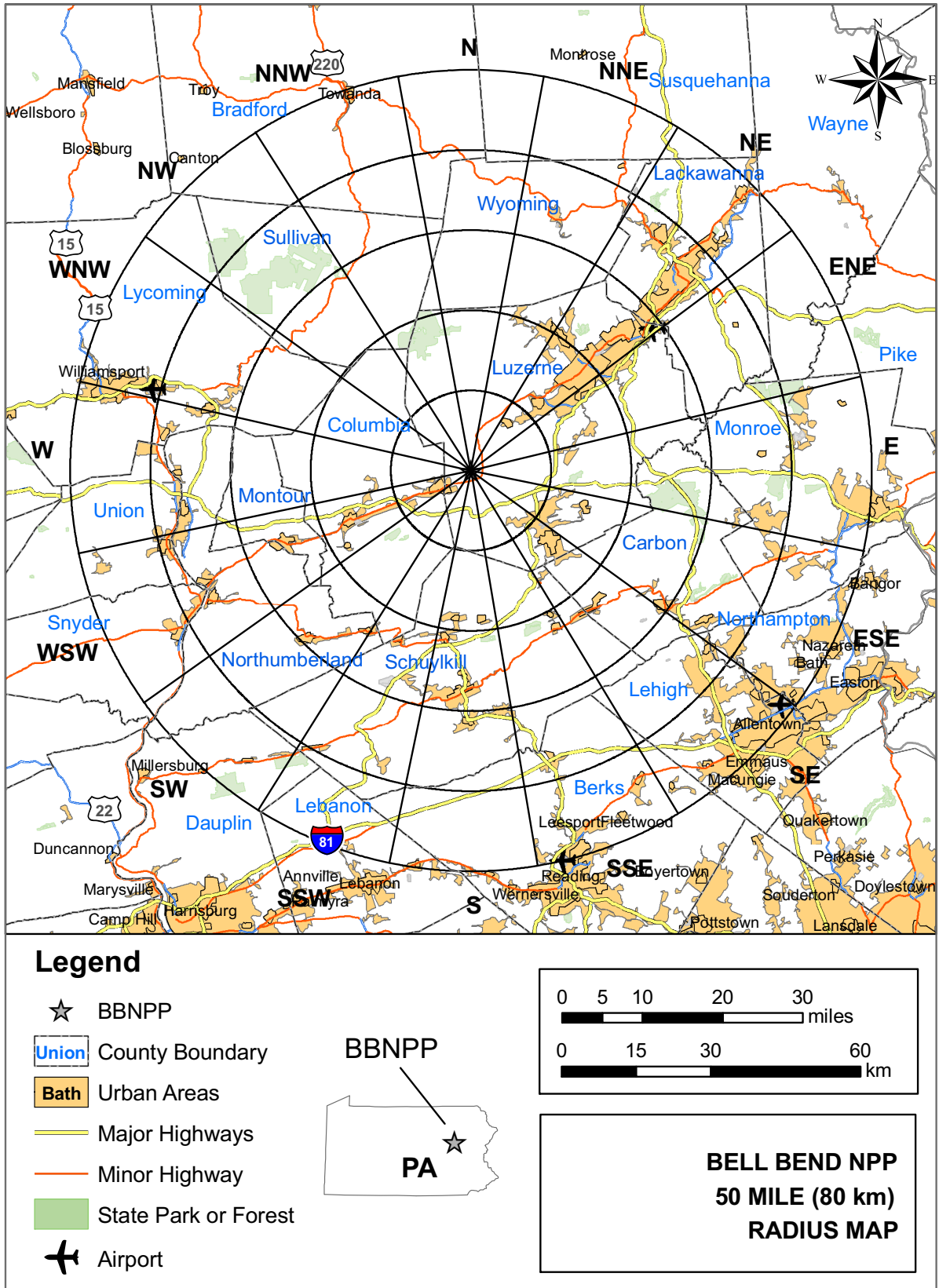
Figure 2.1-16—{BBNPP 50 Mile (80 km) Radius Map}

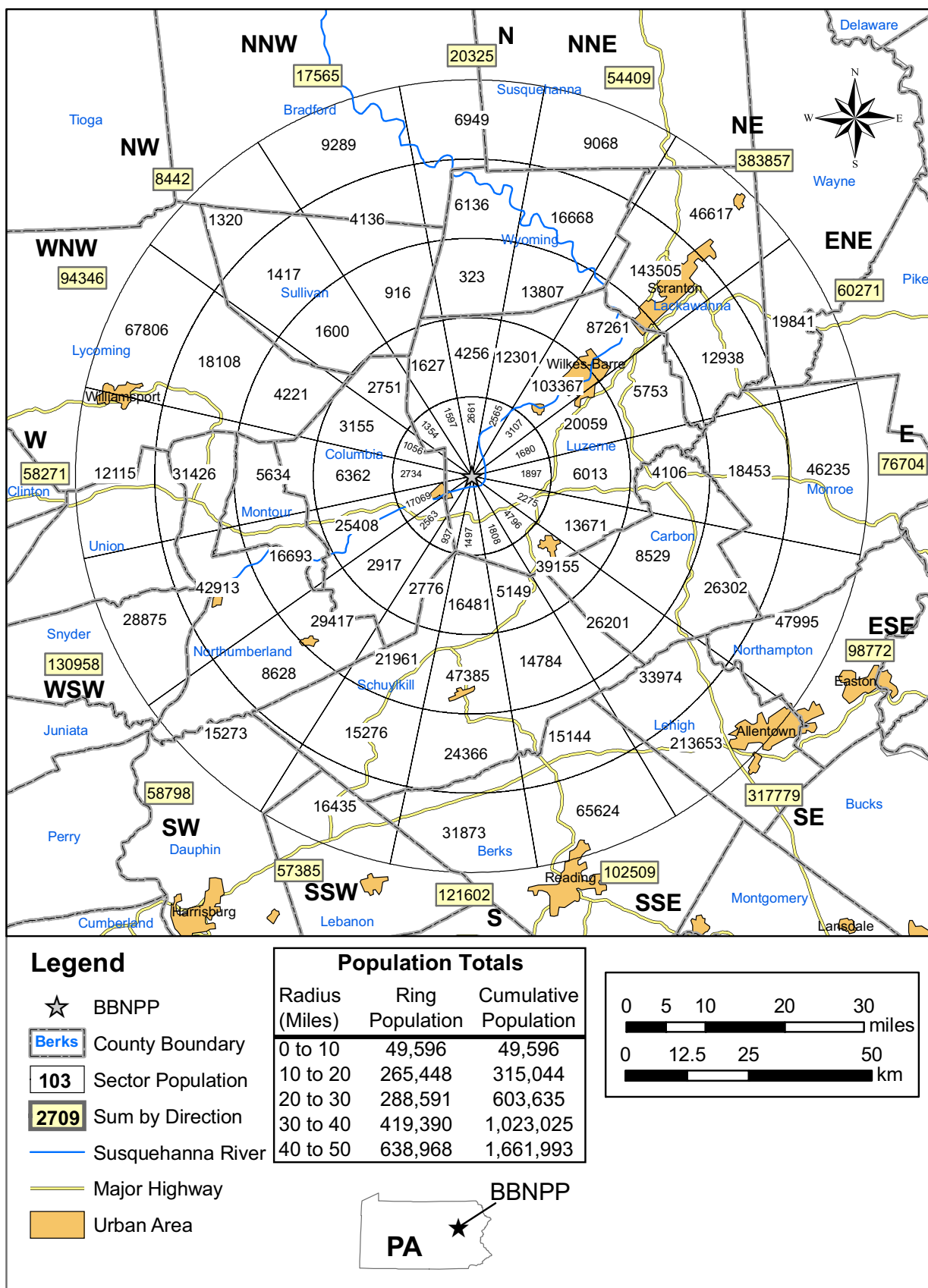
Figure 2.1-17—{BBNPP 50 Mile (80 km) 2000 Population Distribution}

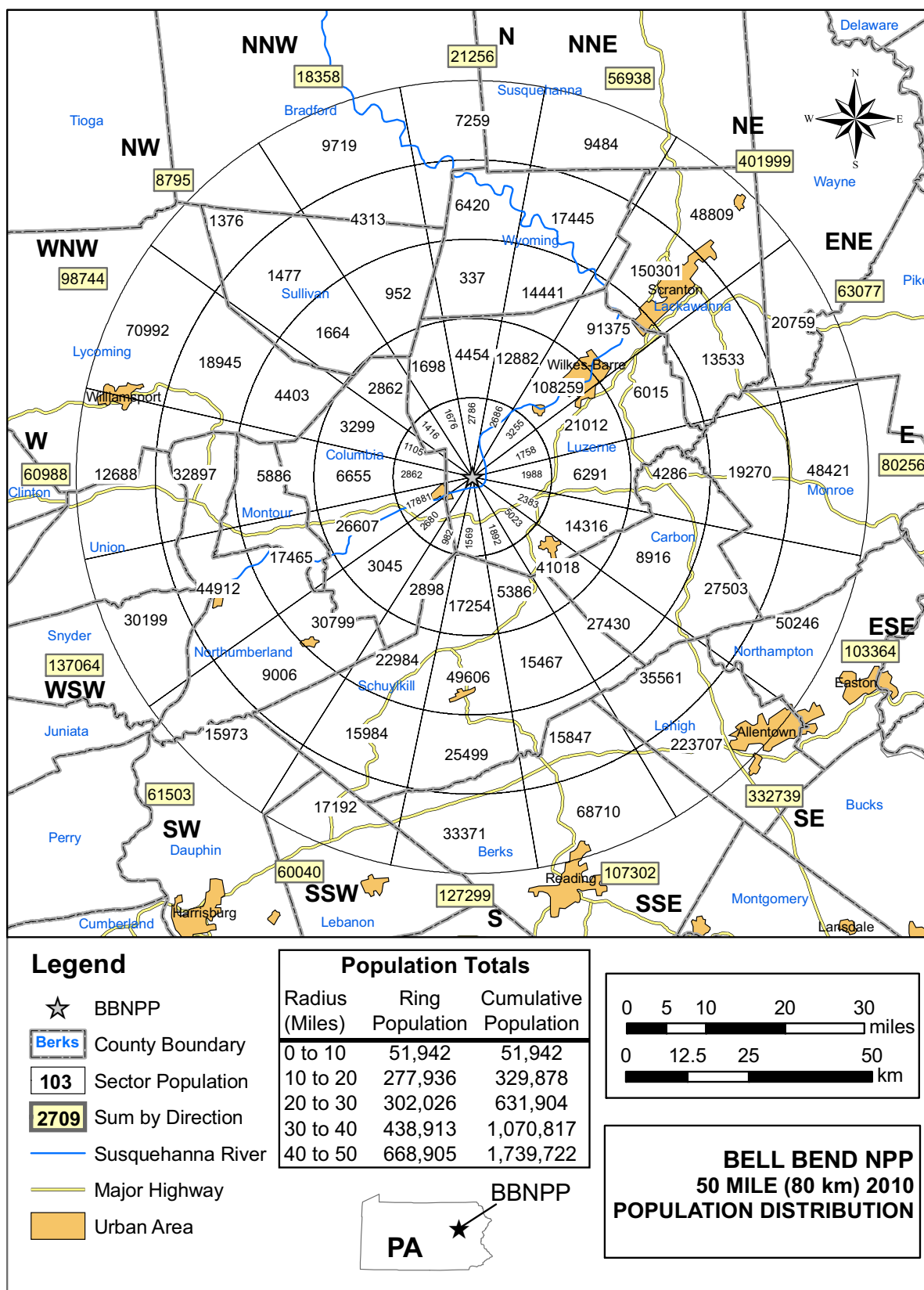
Figure 2.1-18—{BBNPP 50 Mile (80 km) 2010 Population Distribution}

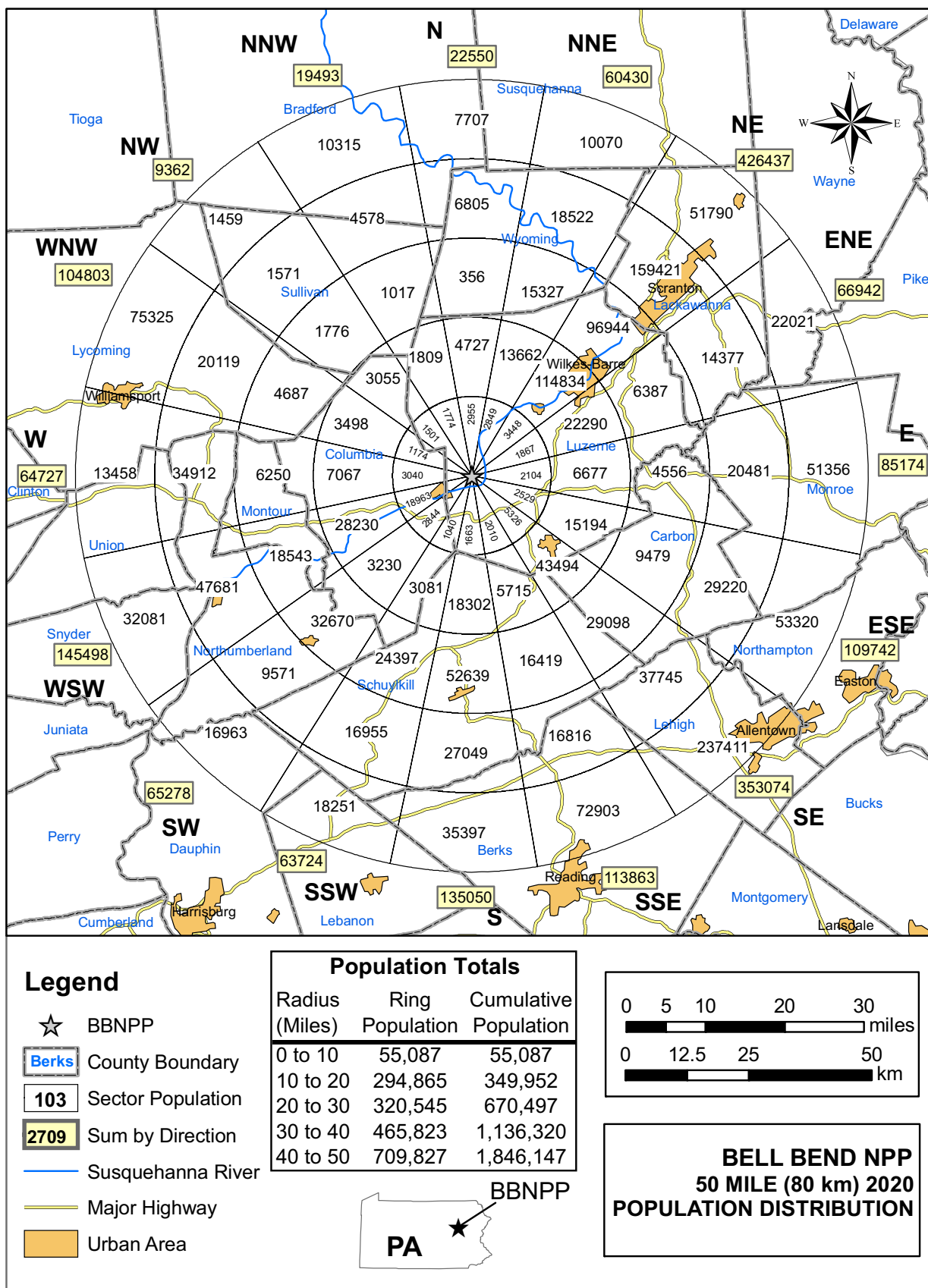
Figure 2.1-19—{BBNPP 50 Mile (80 km) 2020 Population Distribution}

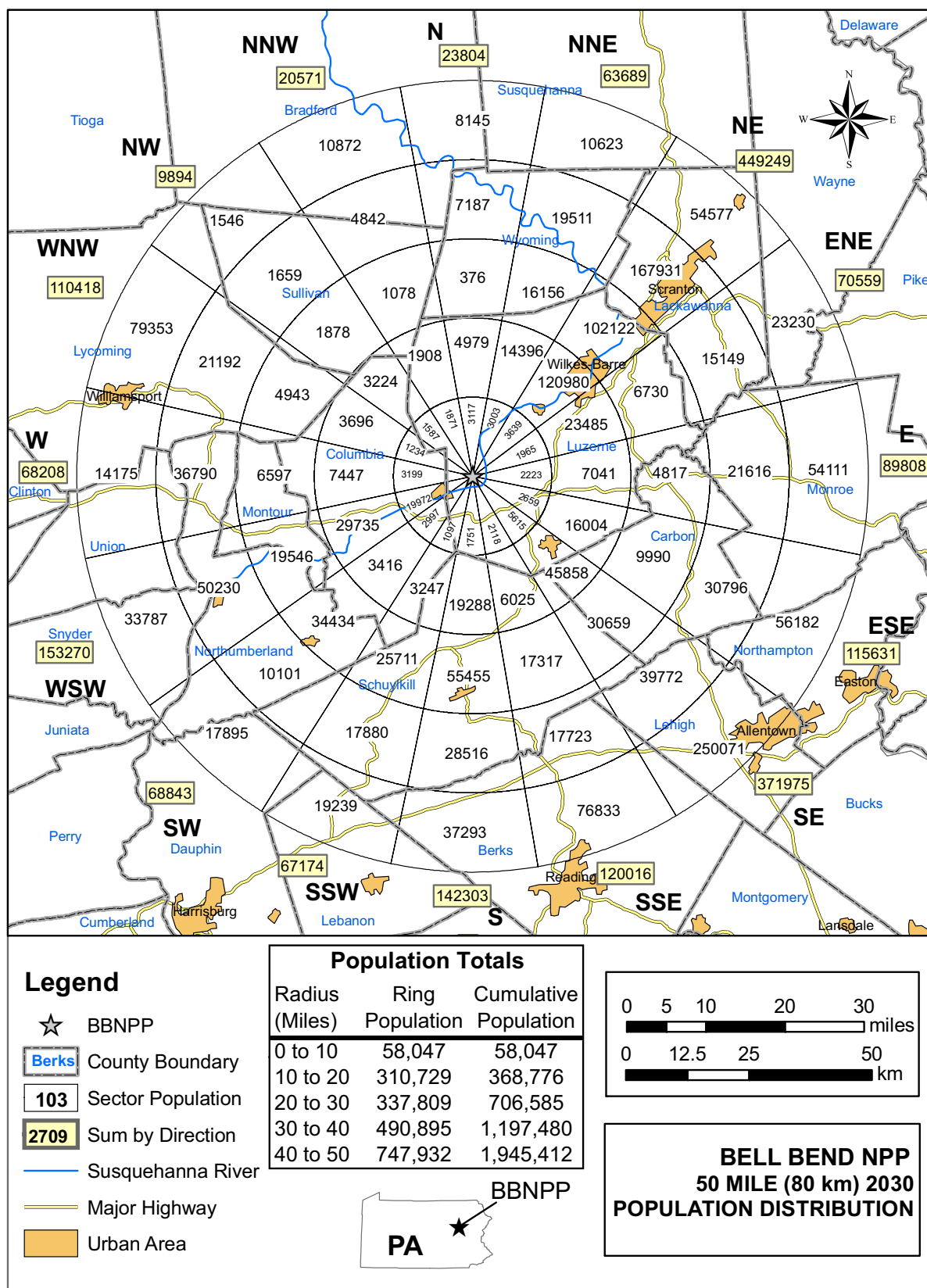
Figure 2.1-20—{BBNPP 50 Mile (80 km) 2030 Population Distribution}

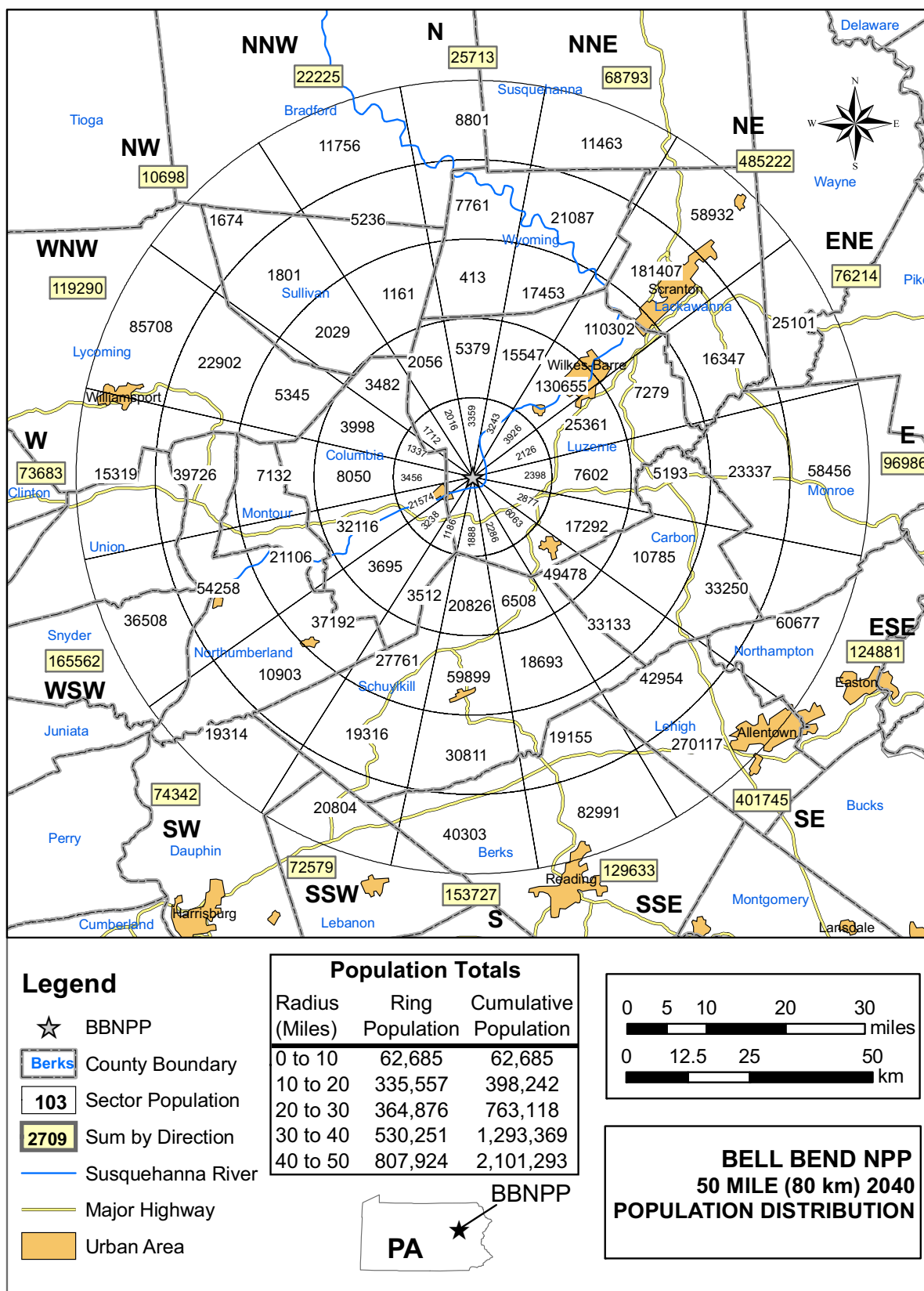
Figure 2.1-21—{BBNPP 50 Mile (80 km) 2040 Population Distribution}

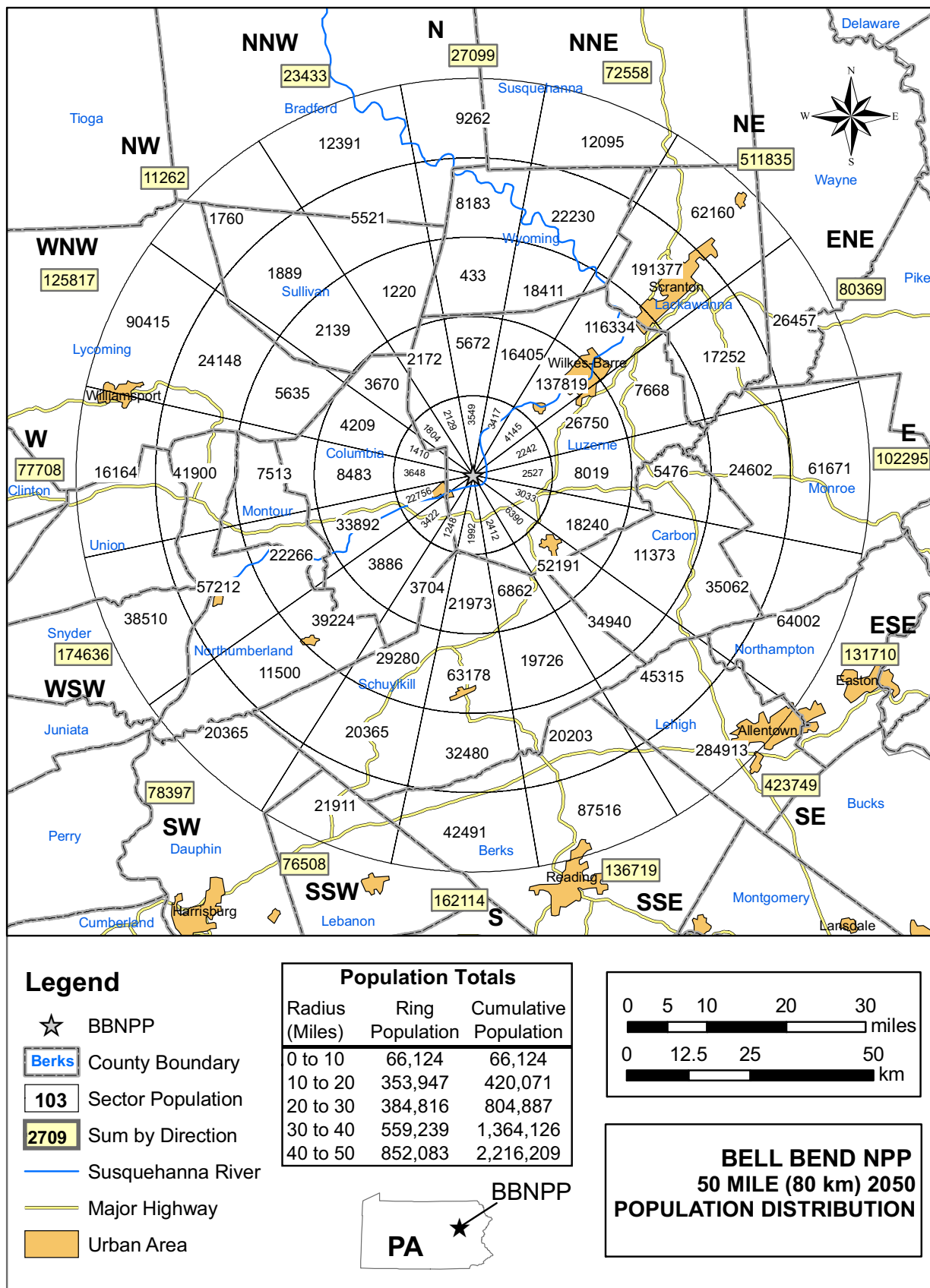
Figure 2.1-22—{BBNPP 50 Mile (80 km) 2050 Population Distribution}

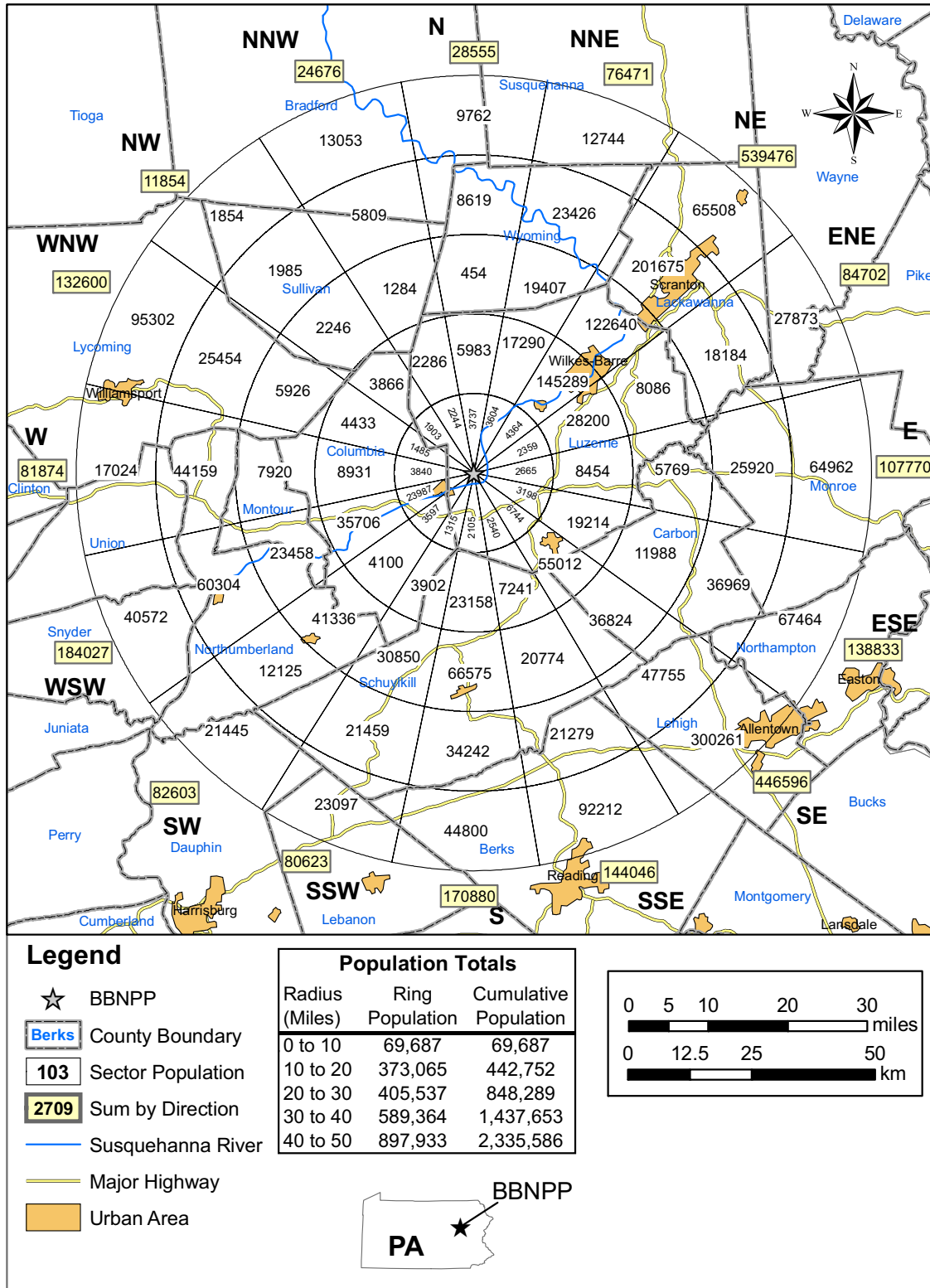
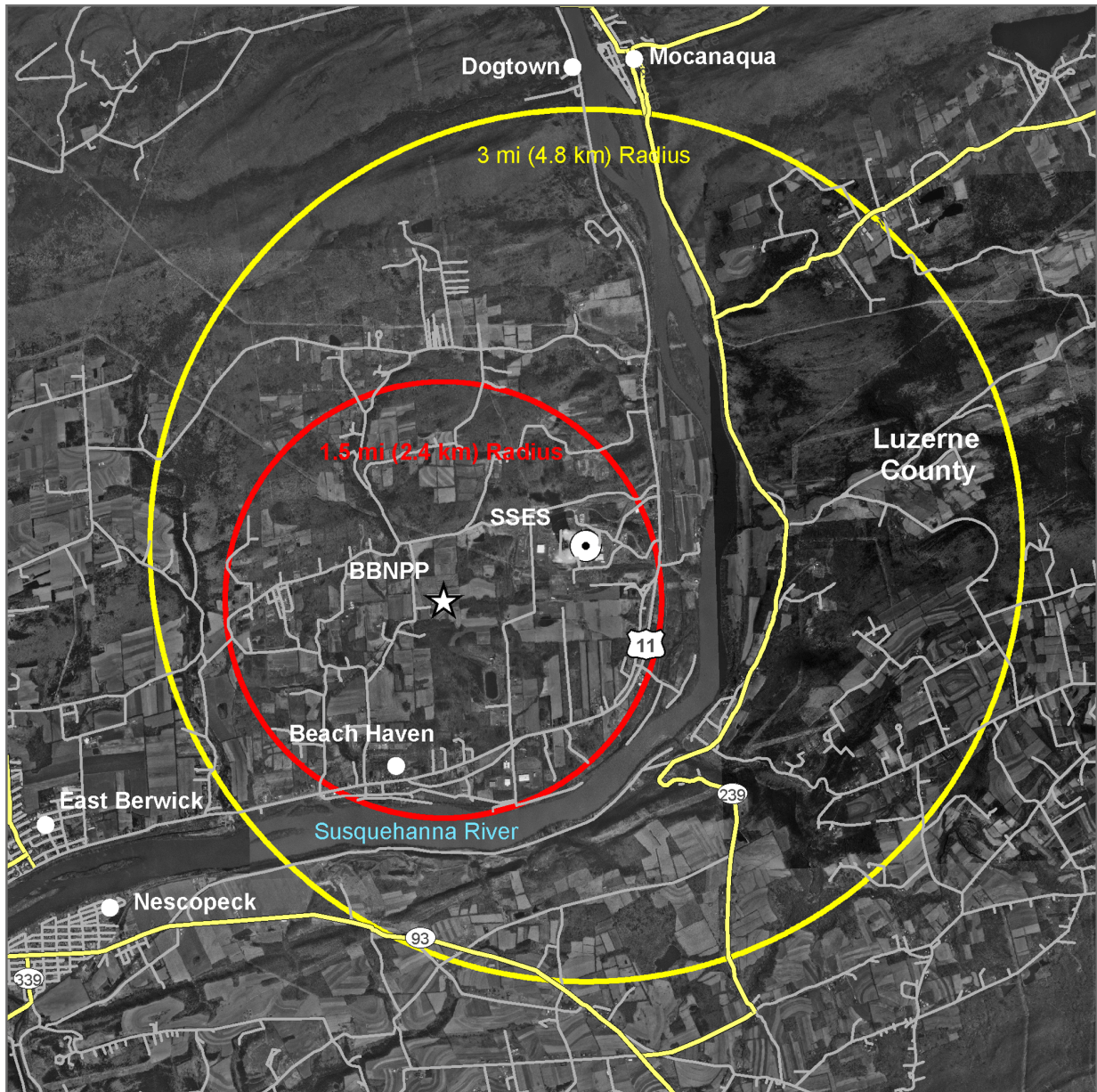
Figure 2.1-23—{BBNPP 50 Mile (80 km) 2060 Population Distribution}

Figure 2.1-24—{BBNPP Low Population Zone}**Legend**

- ☆ BBNPP
- ⊙ SSSES
- ▭ BBNPP LPZ
- ▭ SSSES LPZ
- Major Highways
- Secondary Roads

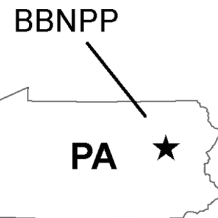


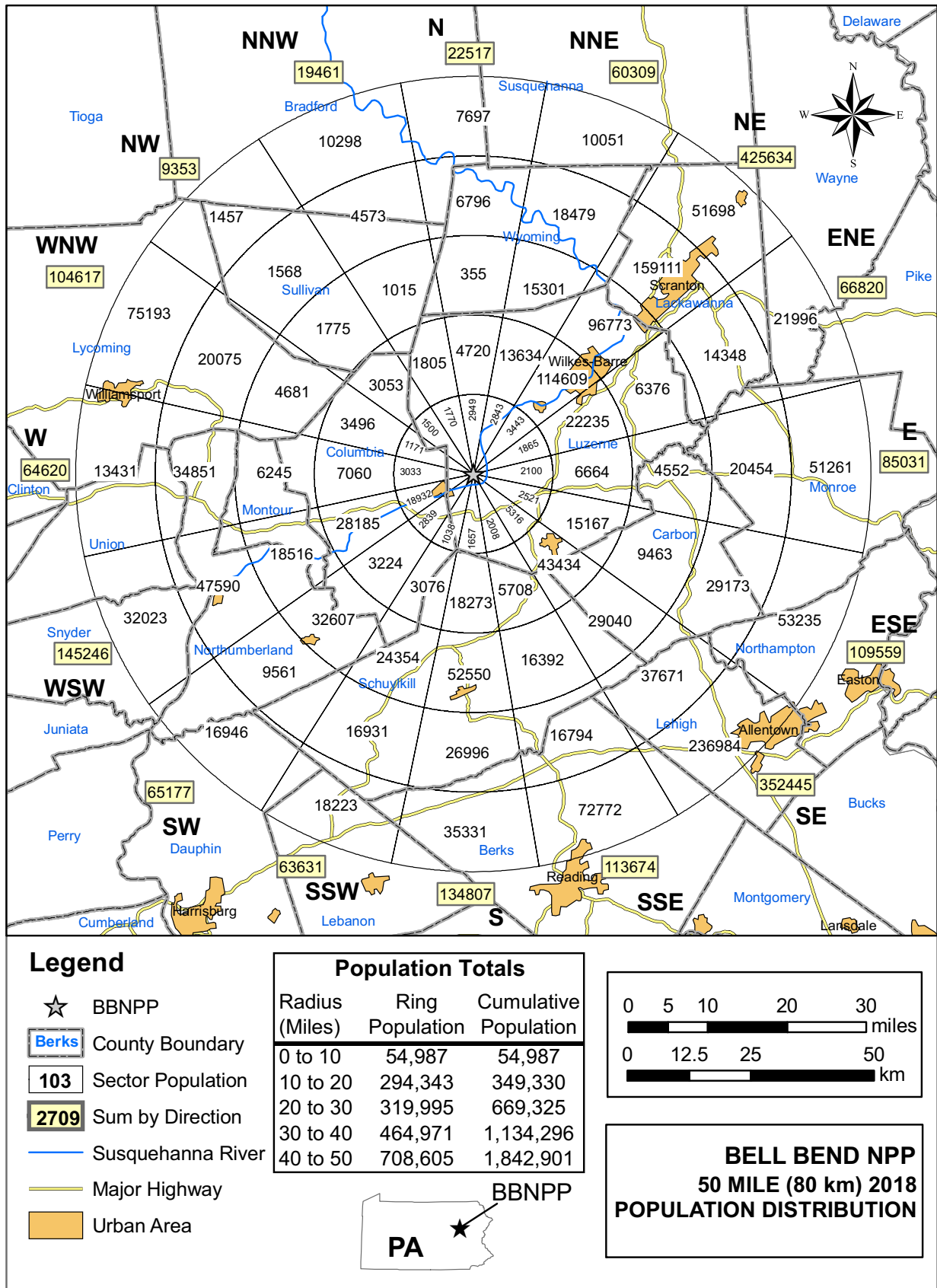
Figure 2.1-25—{BBNPP 50 Mile (80 km) 2018 Population Distribution}

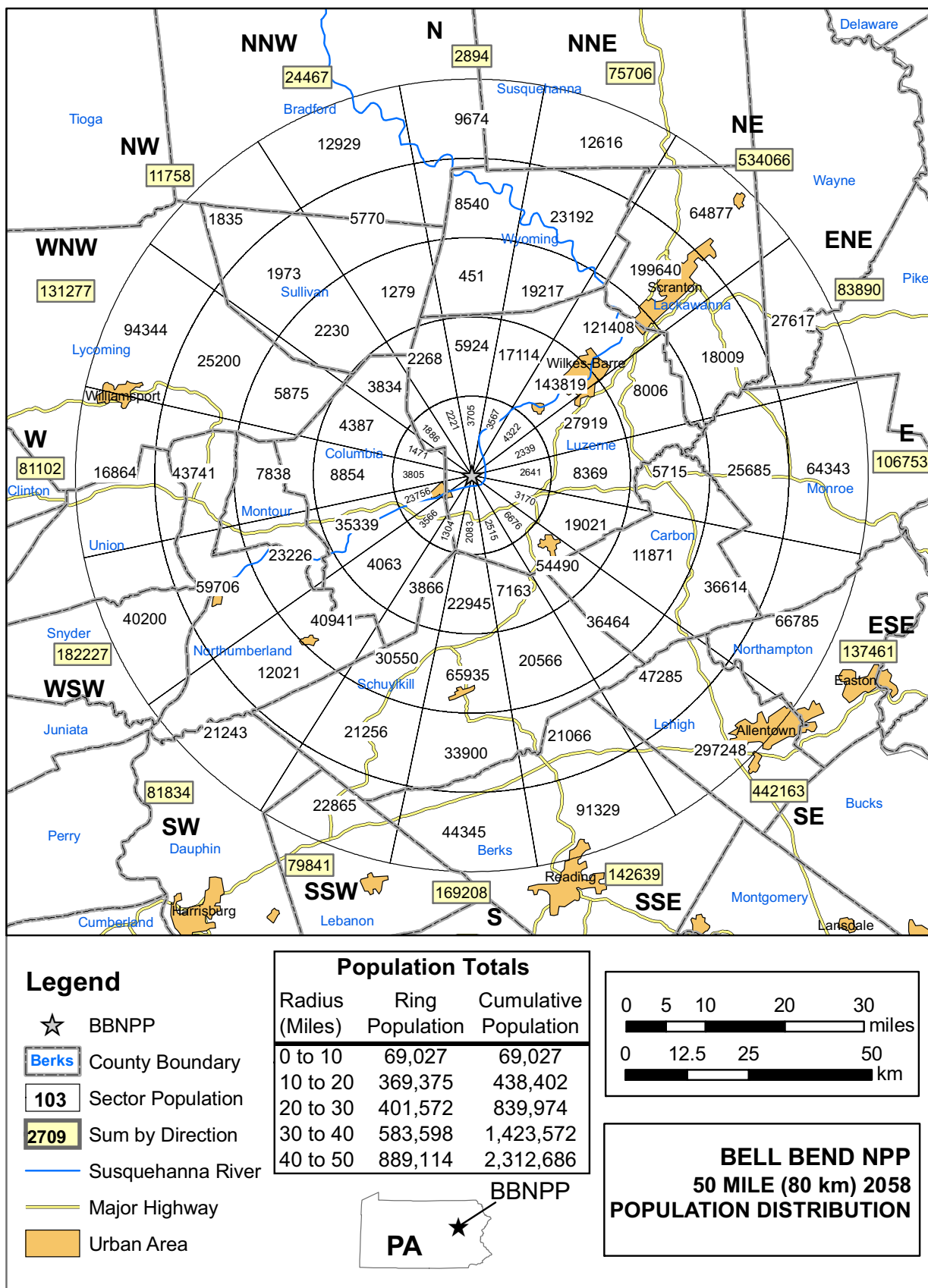
Figure 2.1-26—{BBNPP 50 Mile (80 km) 2058 Population Distribution}

Figure 2.1-27—{EAB Area and Land Owners}**I**

**This figure contains proprietary information and has been withheld under
10 CFR 2.390 (a)(4)**

See Part 9 of the COLA Application