This chapter of the assessment provides information on the historical, demographic, and local government aspects of the Spruce Creek watershed. The chapter describes the national significance of iron mining in the region and identifies some of the artifacts of this history that can still be found throughout the watershed.

Demographic information about the watershed community is also contained in this chapter including information on population change and employment characteristics. A summary of municipal plans and ordinances enacted by the watershed’s municipalities, and the effect these regulations have on other topics addressed throughout this watershed assessment is also presented.
HISTORY

Early Watershed Residents

The first known inhabitants of the Barrens, otherwise known as the Great Pine Barrens, were the Shawnee Native Americans. A group of Delaware Native Americans settled in the area after the Shawnee, however, they did not stay long. French explorers were also attracted to this area of the watershed as a result of its strange geological formations of sand and clay. Although the French did not initially know about the iron ore resource located in the region, some of the Native Americans were familiar with it and passed this knowledge on to other European settlers.

By 1800, very few Native Americans remained. The first white settlers, primarily of Scots-Irish, German, and English backgrounds, used two major routes to travel to the area. One route followed the Juniata River to Lewistown, while a second route continued along the Juniata River past Lewistown to Huntingdon, and across Tussey Mountain to today’s Ferguson and Halfmoon townships.

Early settlers were drawn to the area by agricultural and iron mining opportunities. The Spruce Creek watershed has some of the best farmland in Pennsylvania, and early agricultural production was enhanced by the fertile limestone soil of the Valley. The iron mining industry which was a part of the larger Juniata ironworks, played a key role in the nation’s economic growth between the late 1700s to early 1900s. This industry was greatly promoted by the development of transportation systems such as the railroad.

Watershed Townships

Patton Township was established in 1794 in Centre County (Figure 5.1). The township was named for Colonel John Patton, who purchased large tracts of land, mainly in the Barrens, to mine iron ore for the operation of Centre Furnace. The Scotia iron works were also located in Patton Township.

Ferguson Township was formed in 1801 and was named for Thomas Ferguson, an early settler who was a mill operator in the Village of Pine Grove Mills. Other small communities were established in the township during that century, including the iron ore producing center of Gatesburg.

Halfmoon Township was formed in 1847 and received its name from the crude halfmoon figures Native Americans placed on trees to mark their routes through the valley. Abraham Elder established the earliest settlement in the township in 1784. Iron ore was later found in the southern part of the township in the Barrens.

Franklin Township was the earliest township to be established in the watershed. The township was formed in March of 1789, from part of Tyrone Township. Just nine years later, in January 1798, Warriors Mark Township was formed from part of Franklin Township. Spruce Creek Township was the last township to be established in the watershed. This township formed in September 1895, from sections of Morris, Franklin and Porter townships.

Iron Mining

The discovery of iron ore in central Pennsylvania in 1784 brought settlement to the area in the late 18th and early 19th centuries. An ample supply of excellent quality iron, central Pennsylvania's "gold," and the location of these ore deposits near deposits of limestone, timber to make charcoal, and water to power the fans and blowers, made this industry possible. The demand for iron in towns and cities in eastern United States for use as utensils, machinery, and in railroad construction provided a large local demand and profitable market. Central Pennsylvania led the United States in iron production many years before the Pittsburgh region became important. Centre
Furnace, built by prominent Philadelphians Samuel Miles and John Patton in 1791, was the first iron furnace to be built in the region.

By 1849, the importing of cheaper iron from Great Britain, plus the emergence of Pittsburgh as the country’s major iron producing center, resulted in steep competition for the ironmakers, causing the iron industry in the region to decline. Eventually, the high cost of transportation ultimately forced many of the marginal firms out of business. Today, there are many remnants of the iron mining that can still be seen throughout the watershed.

**Huntingdon Furnace**

The Huntingdon Furnace, in operation from 1796 to 1869, was the first iron furnace in the Spruce Creek watershed. Landowner Mordecai Massey, Judge John Gronniger, who provided the working capital, and experienced ironworker George Anshutz, established the Furnace. These three began the operation on about 15 acres, with only two or three ox teams for hauling the ore. By 1805, with the growth of the operation, the first stack was abandoned and the present furnace was built (Figure 5.2). By 1819, the Furnace estate had grown to encompass over 40,000 acres.
In the 1830s, Huntingdon Furnace’s vast holdings became the property of the "Iron King," Peter Shoenberger, of the Juniata Valley and Pittsburgh. After his death in 1854, the land passed to his sons. By the 1880s, the furnace was out of blast because of the depression in the iron trade. Lois R. Peck and Edward S. Newlin, who own the Silver Barn Farm in Snyder Township, purchased the 1,800-acre property, including woodland and mineral rights, in March 1963. Seven structures of the Huntingdon Furnace estate survive including the stack (1805), company store, office, ironmaster’s mansion (1851), grist mill (1808), mill house, and worker’s house (Figure 5.3).

Pennsylvania Furnace

The Pennsylvania Furnace was in operation from 1813 to 1888 (Figure 5.4). John Lyon, a Centre County landowner who owned a farm that covered the area that is now Centre Hall, constructed the furnace. This furnace had the largest capacity of any built in Central Pennsylvania to that date. The furnace and associated buildings were located in Centre County. The ore deposits, limestone, and charcoal for the operation were all obtained from Nittany Valley, and
the mansion house was located just across the county line in Huntingdon County, where a large spring provided a plentiful water supply.

The furnace lands covered hundreds of acres in Ferguson Township in Centre County and Franklin Township in Huntingdon County (Figure 5.5). Until 1826, the Furnace’s annual production of "pig iron" averaged 1,500 tons. The Lewisburg and Tyrone Railroad Company opened lines to the Pennsylvania Furnace on November 8, 1880.

The Johnston home, a 12 room building constructed in 1833, was the Superintendent’s home and the office of the Company. At the back of the house where the pay office was located, remains the original door complete with its small glass window panes.

**Colerain Forges**

Three forges were constructed from 1810 to 1814 at Colerain Forges on Spruce Creek. The Upper and Lower Sligo were completed in 1810 and 1814, respectively, by Patton and Roach and the Marshall Forge was constructed in 1814 by Samuel Marshall. Colerain Forges’ total production of iron between 1828 and 1860 was 29,661 tons, or an average of nearly 1,000 tons annually, and was valued at more...
than $60,000. These iron works were one of the county’s most profitable, and the output exceeded the value of pig iron at either Huntingdon Furnace or Pennsylvania Furnace. The profitability of the Colerain Forges is also reflected by the size of the ironmaster’s mansion, which is exceeded in size only by the Pennsylvania Furnace mansion in Huntingdon County. A remaining two-story log house northeast of the mansion could have been a worker’s or manager’s house.

**Franklin Forge**

Around 1825, Samuel Wigton settled in Franklinville, purchased a farm, and started the Franklin Forge. In September 1828, Samuel died and was buried in Graysville Cemetery. After his death, Samuel’s brother, Christopher Hughes Wigton, moved from Chester County to operate the Forge until its closure in 1845. Christopher Wigton was the great, great, grandfather of Edward S. Newlin, who is currently part owner of the Huntingdon Furnace estate. The “pigs” and “blooms” were carried by large wagons drawn by four or six horses to Water Street where they were loaded onto canal boats. The "mansion" house burned down in 1918.

**Scotia**

Scotia was established in 1880 by Andrew Carnegie who purchased 365 acres of Scotia ore land from Moses Thompson (Figure 5.6). Carnegie named the property Scotia, "little Scotland," to remember his native nation. He wished to use this property to make a model mining community. In 1881, the development of Scotia was prompted by the laying of railroad tracks between Fairbrook to Scotia, and by the laying of the foundation for the great ore washer. Additionally, in 1882, Pennsylvania Furnace closed down and moved all its equipment to Scotia. During the days of the Scotia operation, the number of employees increased from the original 85 to the peak of 250.

Geographically, Scotia had three sections: Scotia, River Hill and Marysville. Marysville consisted of 14 privately owned houses. Scotia and River Hill, however, were company owned. Scotia had 11 double houses for 11 families and one single house for the superintendent (Figure 5.7). Other facilities were built in the region around 1900 including the Methodist Episcopal Church, the Rabbit Hill grammar school, and the Benore Post Office. Patton Township's population topped 1,000 in 1900.

There were many fires associated with the Scotia iron works, the most devastating of which occurred on January 11, 1908, after Carnegie sold the Scotia operation to the Bellefonte Furnace Company. The losses included the immense ore washer, the latest machinery for preparing the ore for market, the jig house, nine stationary engines, two large water tanks and twelve ore cars. Damage was estimated at $15,000, only $6,000 of which was covered by insurance. After a series of rebuilding and repair work, production returned to normal by August. The most likely reason for Carnegie’s disposal of his Scotia property was economic. Like most other small Pennsylvania mines, Scotia’s prospects were keenly affected by the development of new and more efficient processes of iron manufacture. There was also a growing supply of high quality ore from the Great Lakes region that could be mined and shipped to the manufacturer at significant savings. In addition
to these economic considerations, Carnegie officials were increasingly concerned about the questionable supply of ore from the Scotia mines.

The era of prosperity and industrial activity at Scotia ended in 1911 with the closing of the iron works. The railroads were abandoned and eventually removed. By 1922 or 1923, the houses down by the washer, the village of Scotia, and the iron works disappeared. Only the village of Marysville remains today as a living legacy of this era of the community's history.

In the early 1940s, there was one last attempt to initiate a viable mining operation at the site. A small company, the Scotia Mining Company, built a small ore washer. However, the furnaces returned the ore because it contained a great deal of silica and was not properly washed. The U.S. Bureau of Mines became interested in the area around the same time as the establishment of the Scotia Mining Company. Very few pockets of ore were found, however, and their washer was also considered to be inefficient. After the 1940s, the area fell into such decay that little evidence of the once prosperous mines remained (Figure 5.8). Soon the only reminders of the area's history were the open mining cuts. As these cuts were covered by a thick growth of underbrush and heavy scrub oak, they have become impossible to detect. The Pennsylvania Game Commission acquired 6,455 acres of land in the Barrens in 1942, which are officially known as Scotia Game Lands No. 176. The land today includes the Scotia Rifle and Pistol Ranges and it is maintained and managed for the purpose of outdoor recreation, primarily sport hunting.

Figure 5.7 Scotia Ore Mines 1892, *The Story of Scotia* (Harry Williams)

Figure 5.8 Remains of the Ditches of the Washer
Tow Hill

Tow Hill, located between Scotia and Gatesburg on the Fairbrook Branch of the Pennsylvania Railroad, was the iron mining site of several mining companies. Mining operation began on roughly 450 acres of land, leased from the Pennsylvania Furnace Company by James Pierpont, who had been at Scotia with Carnegie. In 1885, the site was taken over by Tyrone Mining and Manufacturing Company and one year later, the Juniata Mining Company started operations. On May 31, 1889, the heavy rain that resulted in the Johnstown Flood filled the ore holes at Tow Hill, causing the cessation of operations. The mine closed down completely in the early 1900’s. Many men who worked at Tow Hill lived in their own homes, often located several miles away in settlements such as Gatesburg, and Stormstown. According to an interview (January 29, 1975) with Catherine Davis Rudy, a long-time resident, there were three rows of eight log houses at Tow Hill. There were also two big frame houses, painted red, where the head boss and the accountants lived. One Gatesburg resident, Ernest Harpster, has done research on the Tow Hill ore mine (Figure 5.9). The remains of Tow Hill, which include the stone foundation of the washer, the boarding house, the store and post office, and some artifacts at the site of workers’ houses, as well as many fire bricks with company names, are found within the State Game Lands. The remains of the old ore pits are visible today as ponds (Figure 5.10).

Iron Ore Banks

Today, the remains of iron ore banks in the watershed are mostly located on private lands with the exception of the Red bank and the Tow Hill bank, located in the game lands, and a part of the Pennsylvania bank, located on land owned by the State College Borough Water Authority (Figure 5.11). Many of these iron ore banks were studied by J. P. Lesley during the Second

Figure 5.9 Sketched Maps of Tow Hill  (Ernest Harpster)
Geological Survey. This survey is the primary source of information used for mapping the iron ore banks in the Spruce Creek watershed. Detailed information about each ore bank is shown in Appendix 5A. The "estimated quantity," as shown in this table, provides only a rough approximation of total ore quantity since these calculations were made around 1874 and most banks continued to be mined for some time after that date.

**Transportation**

As the iron industry began to flourish, pressure to improve methods of transportation increased. The shipping of iron products to Pittsburgh, Baltimore, and Philadelphia was initially either by slow and expensive caravans of pack horses along difficult-to-travel paths, or by water on flat-bottomed boats called “arks.” Between the 1820s and 1840s, transportation options improved with the completion of the turnpikes in the 1820s and 1830s, and the opening of a canal system in the 1830s and 1840s. By 1859, the first railroad in the region began to operate.

**Turnpike**

Before the construction of the Turnpike, one transportation option was the use of stage coaches. The first stage coach, which took three days to run from Harrisburg to...
Huntingdon, began to run in 1808 and was called "Experiment." Mail was sent on the stage and by 1829, daily deliveries were made.

The Spruce Creek and Philipsburg Turnpike Road Company was constructed under an act of March, 24, 1849. By 1859, Warriors Mark Township owned 30 shares of this road, which traversed southeast to northwest, through Warriors Mark and Spring Mount. Two toll gates were located in the Spruce Creek Watershed. One was at Graysville on the site of Mrs. Alex Johnston’s home. Another gate, called the "Hook," is an old stone house located on the north side of the road near the Spruce Creek Trout Hatchery in lower Spruce Creek.

Canal

The first canal boat was launched from Huntingdon on Saturday, July 15, 1831. The canal brought food and other necessities to Water Street, a freight station on the Pennsylvania Canal, which served as headquarters for freighters, teamsters, and canal boat men. Freight and passengers destined for Warriors Mark were brought on horseback around Tussey Mountain. By 1870 part of the canal was abandoned, locks were removed, bridges were torn down, and the bed of the canal became dry. By 1875 the canal was completely abandoned.

Railroad

The Lewisburg and Tyrone Railroad was a single track, wide gauge railroad built with a pick and shovel, saw and ax, and horse and cart. Tanks located along the route provided the water for the train’s steam engine. One of these tanks was located in Warriors Mark township near what was the Henry Haggerty home and another was located at Pennsylvania Furnace.

On November 8, 1880, the Lewisburg and Tyrone Railroad Company opened a branch to Pennsylvania Furnace. The route for that line, as shown by the train schedule, was between Pennsylvania Furnace and Tyrone, by way of several towns in the Spruce Creek watershed, including Marengo, Loveville and Warriors Mark (Figure 5.12). By 1881, the Pennsylvania Railroad had opened a new branch to Scotia; a run that took about a half an hour (Appendix 5B). Other names for this railroad included: Lewisburg and Tyrone Branch, Pennsylvania Railroad; Lewisburg, Centre and Spruce Creek Railroad; Fairbrook Branch, Pennsylvania Railroad; Bellefonte, Nittany, and Lemont Railroad; and Bellefonte, Lemont, and Lewisburg Railroad.

The Bellefonte Central Railroad was first built to serve the iron mining production and later to facilitate the cement industry. The Bellefonte Central Railroad ran two trains a day from Tyrone to Scotia, and one daily freight train from Bellefonte. Iron from Scotia was shipped to Bellefonte and from there, to Pittsburgh (Appendix 5C). On Saturday’s, the Railroad offered a passenger train from Scotia to Bellefonte. Other names for this railroad include the Bellefonte and Buffalo Run Railroad; Nittany Valley and Southwestern Railroad and; Buffalo Run, Bellefonte, and Bald Eagle Railroad (Figure 5.13).

The Hewitt McNitt Lumber Company Logging Railroad, owned by the Hewitt McNitt Lumber Company, moved its large mill from Snydertown to Waddle in 1909 after purchasing 4,500 acres of timberland in the Great Pine Barrens near Scotia.

There were two major rail lines to Scotia. One branch of the Pennsylvania Railroad, constructed in 1881, ran north from Tyrone through Pennsylvania Furnace to Scotia. A second line, constructed by the Bellefonte Central Railroad during 1895, ran from Mattern Junction (Waddle) to Scotia. Eventually, the Pennsylvania Railroad abandoned its branch, leaving the railbed to the encroaching wilderness.
The Hewitt McNitt Lumber Company used these abandoned railroads. The logging railroad from the sawmill, which was situated in the center of the "Horseshoe Curve," ran parallel with the tracks of the Bellefonte Central railroad until it passed Mattern Junction, where it rejoined the Scotia branch of the Bellefonte Central Railroad.

The remainder of the branch to Scotia was upgraded to allow the logging trains to use the railroad. From Scotia to Fairbrook, the logging railroad used the former railbeds of the Pennsylvania Railroad. There were several short branches and spur lines. One approached Gatesburg, another Stormstown and Centennial, others wandered through the Barrens. In the vicinity of Scotia, the logging railroad use abandoned grades that led to the various ore pits. The total length of logging railroad constructed during this period was seventeen miles, which included the three miles between Waddle and Scotia (Figure 5.14).
Historic Buildings

National Register Listed Eligible Properties

Ten sites in the watershed have been listed or are eligible for listing on the National Register of Historical Places by the Pennsylvania Historical Museum Commission, Bureau for Historic Preservation (Table 5.1). Listing in the National Register, however, does not interfere with a private property owner's right to alter, manage or dispose of property. Listing in the National Register contributes to preserving historic properties by recognizing the significance of the property to the nation, the state, or the community. A listed site is given consideration in the planning for federal or federally assisted projects, is eligible for federal tax benefits, and when funds are available, qualify for federal assistance for historic preservation.

Houses

An examination of the period in which the historic houses were constructed helps to reveal the pattern of settlement in the Spruce Creek watershed. There is some variation in the style of and the material used for construction of these historic houses. The earliest structures were made from logs or stones. In the watershed, however, some brick houses remain.

There is some speculation that the earliest settlement in the watershed occurred near what is now the village of Spruce Creek, due to its proximity to the Little Juniata River. Settlement is thought to have extended east, following the path now traveled by today’s Route 45. GIS mapping focused mostly on houses along the Route 45 heritage corridor, was conducted to provide a visual assessment of the periods in which these homes were constructed (Appendix 5D). Similar maps of Pennsylvania Furnace (Appendix 5E) and Huntingdon Furnace area (Appendix 5F), the two prominent iron furnaces of the watershed, were also developed as a supplement of the iron mining history study.

The historic houses that remain in the watershed were mostly constructed during the 1800s as a byproduct of the growing iron mining industry. One stone house, along Spruce Creek near the Colerain Picnic Area, however, was most likely constructed during the late 1700s (Figure 5.15). Colerain Forges Mansion, known as the oldest ironmaster’s mansion in the watershed, was originally built in 1810 and was expanded around 1860.
The Pennsylvania Furnace Mansion was constructed in 1834 (Figure 5.16). The mansion is located 0.1 mile north of Route 45 and just south of the Centre County line. The Pennsylvania Furnace Mansion is the largest and one of the best-preserved ironmaster’s houses of Huntingdon County. This L-shaped house is made of native limestone, and its dimensions are approximately 70 feet by 50 feet.

The Huntingdon Furnace Mansion was constructed in 1851 (Figure 5.17). It is located northwest of Township Route 31106 and State Route 45. The Huntingdon Furnace Mansion is one of the seven surviving structures of this iron furnace site.
The Colerain Forges Mansion was constructed in 1810 (Figure 5.18). It is located on a bend of Spruce Creek and Route 45. The Colerain Forges Mansion is potentially the only surviving structure related to the forge operations here, although a two-story log house northeast to the mansion could have been a worker’s or manager’s house. The size of the mansion is only exceeded by Pennsylvania Furnace mansion in Huntingdon County.

Many historic buildings can still be seen in Halfmoon and Ferguson townships. One of these structures in Halfmoon Township is known as the Abraham Elder House. This five bay, two-story limestone house was built by the first settler of Halfmoon Township in 1808. Part of the home was once used as a tavern. Today, this home is listed on the National Register of Historic Places. Another historic building in Halfmoon Township is the Halfmoon Grange building, originally constructed in 1830 as the Halfmoon Academy. The Grange converted the building in the 1870’s for its use. A third historic building in the township is the George Wilson Homestead. This two-story, three bay stone house was built by a prominent Quaker and the second known settler of Halfmoon Township in 1810. This home is also listed on the National Register of Historic Places.

The Hoffman Log House is located in Ferguson Township and was built in 1790. The house is a small, one room log cabin with a massive stone chimney. Also in Ferguson Township, the founder of Gatesburg built the Jacob Gates Stone House in 1828. The Ralph Homan Residence is a five bay, two and one-half story stone farmhouse with a two-story addition in the rear that was built in Ferguson Township in 1845. The home features a full architrave under the cornice and a wide porch supported by square columns.

Barns and Mills

There are many historic barns in the Spruce Creek watershed. Unlike historic houses, barns typically do not exhibit a variety of details or changes in architectural style; therefore it is difficult to identify their age. Despite this, it may be assumed that a barn was built around the time the farmhouse was erected.

Various methods of milling have been used to produce flour, clothing, wood and paper. Many of these mills, including grist and flourmills, paper mills, and saw mills appeared from late 1700s. The gristmill at Huntingdon Furnace, which is most likely the oldest preserved mill in the watershed, was built around 1808 (Figure 5.19).

Churches

Since settlement began in the Spruce Creek watershed, there have been a variety of different churches including; Amish, Baptist, Brethren,
Community, Lutheran (Centre Line, Gatesburg, Seven Stars, Warriors Mark), Methodist (Centre Line, Dungarvin, Franklinville, Huntingdon Furnace, PA Furnace, Ross, Warriors Mark), Presbyterian (Baileyville Chapel, Upper Spruce Creek-Graysville (Figure 5.20), Warriors Mark), Quaker (Friends Meeting Center (Half Moon)), United Brethren (Centre Line, Grazier), Catholic, and Missionaries-Ministers.

Huntingdon County Heritage Plan

The Huntingdon County Heritage Plan, funded by the Southwestern Pennsylvania Heritage Preservation Commission, was developed by the Huntingdon County Planning and Development Department in 1995. The 1995 plan was based on the Huntingdon County Historic Preservation Plan, completed by the Huntingdon County Heritage Committee in 1990. The vision of the Heritage Plan is to "celebrate and conserve the cultural heritage of the region, vigorously promote high-quality visitor experiences, and provide regional economic revitalization and opportunities to maintain the quality of life for residents by telling the story of America’s industrial heritage and the people who have lived and are living it." Goals of the plan are to increase residents’ awareness of local history, and to provide education on the benefits of community planning and historic preservation.

One product that has resulted from this effort is the development of the "Heritage Loop." This loop is a driving tour that links significant historic places in Huntingdon County, and contains a part traversing the Spruce Creek watershed from Spruce Creek village to Pennsylvania Furnace via Route 45.

PUBLIC SPACE AND RECREATION

Public land in the watershed, including Rothrock State Forest, and the State Gameland, provide beautiful natural scenery and wildlife habitat. With its rich natural, historical and cultural heritage, the Spruce Creek watershed offers an ideal place for recreational activities including fishing, hunting, hiking, and picnicking.

Scotia Gamelands

Scotia Gamelands No. 176 was acquired by the Pennsylvania Game Commission in 1942, and is maintained and managed for the purpose of outdoor recreation, primarily sport hunting. Bicyclists and hikers also find the wide, easy trails of the Gamelands enjoyable. The Scotia Rifle and Pistol Ranges are also located in the gamelands (Figure 5.21).
Rothrock State Forest

Rothrock State Forest is named for Dr. Joseph Trimbel Rothrock, a native of Mifflin County, who is recognized as the Father of Forestry in Pennsylvania. Rothrock State Forest is composed of roughly 95,000 acres of land and is located within the Ridge and Valley Province of central Pennsylvania.

Rothrock State Forest is managed to provide recreational opportunities for thousands of visitors each year while making a significant contribution to Pennsylvania's economy with its high quality timber production. Four state parks are located within the boundary of Rothrock State Forest: Greenwood Furnace State Park, Penn Roosevelt State Park, Trough Creek State Park and Whipple Dam State Park. They offer extensive recreational opportunities including picnicking (pavilions available), swimming, camping, fishing, biking and hiking.

Indian Caverns at Franklinville

In the early Nineteenth Century, Indian Caverns was one of the many hiding places of the band of highwaymen associated with David Lewis-popularly known as "Robber" or "Davie" Lewis. Today, the caverns are a popular tourist destination.

Mid-State Trail

The Mid-State Trail is a cross-country hiking trail that follows the border between Huntingdon and Centre counties for a distance of more than 50 miles. There may be other opportunities to develop trails in the watershed. In fact, BikePA.com has suggested the construction of a biking route that passes through SpruceCreek, ColerainForge, Franklinville, Seven Stars, Graysville, and Rockspring (Figure 5.22).

Colerain Picnic Area

Colerain Picnic Area used to be a popular recreational place for the local residents. There are ice mines at the base of the mountains and several lookouts at the top of the hills. When driving up along Colerain Road, one can have a spectacular panoramic view of the whole area. However, with the privatization of the stream in that area (Figure 5.23), people no longer have access to the water. Since then, use of the picnic area has diminished, which has led to physical degradation due to a lack of maintenance. Colerain Road also has become an illegal dumpsite in the watershed.

Camp Kanesatake

Camp Kanesatake, a Native American name meaning "camp on the hill," is a private camp, located in a scenic area on Warriors Mark Run, three miles north of its confluence with Spruce Creek. The camp opened in the summer of 1923 and is a part of the Central Pennsylvania Christian Institute. The camp is situated on 312 acres of forested land and includes a number of rustic buildings and lodges (Figure 5.24).
Historic preservation is one of many important considerations in the watershed. The question remains, however, about how best to carry out the preservation of historic structures and sites. Some local residents have expressed an interest in preserving the history, but are concerned that such efforts will open the region to tourism. They would like to see preservation efforts address the natural aspects of the historic sites and maintain these natural features. There are some who see the benefit of creating regional tools designed to highlight and inform others about the history of the watershed. Achievement of this goal could incorporate strategies such as, the archeological identification of historic remnants and the establishment of interpretative signs and trails. The need for increased access to existing public land, and for the acquisition of more land, are other issues of concern. Residents in the watershed express different opinions about the type of public land that they would like to see in their community. There are some individuals who are more interested in "passive" recreational areas that maintain the natural features of the site. Some examples of "passive" recreation land include the State Gamelands and Rothrock State Forest. Other residents would like to see more "active" recreational areas, such as parks and soccer fields.

A third issue of concern in the watershed is concern about the quality of the natural features in the watershed. Much of the land that is in the watershed is privately owned, and the preservation of this land as forest, or agricultural land, is important to the overall character of the watershed.

The idea of developing multi-purpose public spaces can be one way to address these concerns. A multi-purpose public space can combine development of new public spaces with historic preservation, natural feature protection, and education. This type of space can not only increase available recreational opportunities, but it can enhance historical preservation and interpretation, and provide protection of significant ecological features such as riparian buffers and wildlife habitat.

There are several opportunities for developing multi-purpose public space in the watershed. One of the opportunities is along a former railroad line. The old railroad line, in particular the stretch from the Scotia area to Pennsylvania Furnace, could be developed into a trail. Historic remnants left over from the iron mining days at Scotia and Tow Hill are scattered around this railroad line, which is located within the State Gamelands. This trail presents an opportunity to integrate recreational activities with historical interpretation and preservation at a site that is ecologically important.
A second site that presents an opportunity to develop a multi-purpose public space is the site of the Pennsylvania Furnace. This furnace had what used to be the largest iron mining production in the watershed. Today, there are several historic structures that remain including the well-preserved ironmaster’s mansion, a post office and several workers’ houses. The iron ore banks at the site are the natural manifestation of the production. The State College Borough Water Authority currently owns a major part of the ore banks. The site today provides a variety of opportunities for development as a multi-purpose area. The site has many aesthetic attributes, which could enable it to be developed as a park for recreational activities such as hiking, picnicking and bird watching. In addition, the ecological aspect of the site provides habitat for wildlife. Finally, the site could be used to provide interpretation of the former mining history by highlighting the mining cuts that have scarred the land. A proposal for Pennsylvania Furnace Park was made to the community and included a set of strategies for the accomplishment of such a public park.

The idea of a multi-use park space appears to have the potential to provide solutions for some of the concerns in the watershed. Through the development of such a site, it could be possible to integrate the mining history of the region into everyday life, thereby increasing awareness in a way that is not intrusive. In addition, a multi-use site could increase the number of public areas in the watershed. Finally, multi-use public space could provide for ecological restoration and preservation.

DEMOGRAPHICS

When considering the overall characteristics of the Spruce Creek watershed, it is also important to consider the demographic components of the watershed’s residents. These social and economic characteristics can have a significant impact on how the watershed looks. Due to its proximity to the growing Centre Region, as well as the planned I-99 corridor, the watershed will most likely undergo changes in the future. By understanding the various social and economic attributes, however, it may be possible to ensure that changes are positive rather than negative. Although the watershed boundary crosses into six separate municipalities, for the purposes of this assessment, population and other demographic estimates for Patton Township will not be included due to the small land area of the township that actually falls within the watershed boundary. Additionally, the ecologically based watershed boundary does not coincide with the politically determined township boundaries. As a result, entire municipalities are not contained within the watershed boundary. Despite this, the following census data numbers have not been adjusted to reflect just the portion of the municipality found within the watershed boundary. Therefore, these values will be an overestimate of actual watershed values.

Population Change

The population in both Centre and Huntingdon counties has increased over the past 100 years. This population increase, however, is not the result of steady population growth rates. Huntingdon County experienced periods of population growth and decline over this time period (Table 5.2). A similar trend of growth and decline can be seen in some of the municipalities within the watershed (Table 5.3). Overall, however, there is a general trend of increasing population in the municipalities with the exception of Franklin and Spruce Creek townships (Figure 5.25). While population growth in the watershed on the whole has generally shown steady growth over the last 40 years, the majority of this growth has taken place in the municipalities located within Centre County.
Population Density and Distribution

With an increase in population, there naturally follows an increase in the density of residents in a municipality. Overall population densities are increasing in the municipalities located in Centre County, while in Franklin and Spruce Creek townships, due to a slight decrease in population, population densities fell slightly (Table 5.4) (Pennsylvania State Data Center 1999a, 1999b). There are no major population centers within the watershed and as a result, the population in the watershed can be characterized as predominantly rural. According to

Table 5.2 Population and Rate of Change in Centre and Huntingdon Counties, 1900 to 2000

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<th>Huntingdon County Population</th>
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<td>1920</td>
<td>44,304</td>
<td>2.0</td>
<td>39,848</td>
<td>4.0</td>
</tr>
<tr>
<td>1930</td>
<td>46,294</td>
<td>4.5</td>
<td>39,021</td>
<td>-2.1</td>
</tr>
<tr>
<td>1940</td>
<td>52,608</td>
<td>13.6</td>
<td>41,836</td>
<td>7.2</td>
</tr>
<tr>
<td>1950</td>
<td>65,922</td>
<td>25.3</td>
<td>40,872</td>
<td>-2.3</td>
</tr>
<tr>
<td>1960</td>
<td>78,580</td>
<td>19.2</td>
<td>39,457</td>
<td>-3.5</td>
</tr>
<tr>
<td>1970</td>
<td>99,267</td>
<td>26.3</td>
<td>39,108</td>
<td>-0.9</td>
</tr>
<tr>
<td>1980</td>
<td>112,760</td>
<td>13.6</td>
<td>42,253</td>
<td>8.0</td>
</tr>
<tr>
<td>1990</td>
<td>123,786</td>
<td>9.8</td>
<td>44,164</td>
<td>4.5</td>
</tr>
<tr>
<td>2000</td>
<td>135,758</td>
<td>9.7</td>
<td>45,586</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Table 5.3 Population and Rate of Change in Watershed Municipalities, 1930 to 2000

<table>
<thead>
<tr>
<th>Decade</th>
<th>Halfmoon Rate</th>
<th>Ferguson Rate</th>
<th>Franklin Rate</th>
<th>Spruce Creek Rate</th>
<th>Warriors Mark Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1930</td>
<td>399</td>
<td>-</td>
<td>1,549</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1940</td>
<td>450</td>
<td>12.8</td>
<td>1,936</td>
<td>440</td>
<td>5.0</td>
</tr>
<tr>
<td>1950</td>
<td>464</td>
<td>3.1</td>
<td>2,388</td>
<td>390</td>
<td>-11.4</td>
</tr>
<tr>
<td>1960</td>
<td>478</td>
<td>3.0</td>
<td>3,832</td>
<td>60.5</td>
<td>-14.6</td>
</tr>
<tr>
<td>1970</td>
<td>543</td>
<td>13.6</td>
<td>6,531</td>
<td>70.4</td>
<td>37.2</td>
</tr>
<tr>
<td>1980</td>
<td>717</td>
<td>32.0</td>
<td>8,105</td>
<td>24.1</td>
<td>1.5</td>
</tr>
<tr>
<td>1990</td>
<td>1,469</td>
<td>104.9</td>
<td>9,368</td>
<td>15.6</td>
<td>0.4</td>
</tr>
<tr>
<td>2000</td>
<td>2,357</td>
<td>60.4</td>
<td>14,063</td>
<td>50.1</td>
<td>-4.1</td>
</tr>
</tbody>
</table>

Figure 5.25 Population Growth in Watershed Municipalities, 1930 to 2000
SPRUCE CREEK WATERSHED

100

101

the US Census Bureau, “urban” includes places that have been incorporated as cities, villages, and boroughs and have a population of 2,500 or more, or those census designated places that have more than 2,500 people. Residential development in the watershed instead consists of low-density development of an agricultural or rural nature. There are numerous villages and small neighborhoods scattered throughout the watershed that serve as centers for community activities.

Population Projections

The population in municipalities in the watershed has been growing in the past few decades. With the proximity of the watershed to The Pennsylvania State University, the Centre Region, and the soon to be constructed section of Interstate 99, it is expected that population in Halfmoon and Ferguson townships will continue to grow (Table 5.5) (Herbert, Rowland and Grubic, Inc. 2000).

Characteristics of Watershed Residents

Age. The largest age group in the watershed is ages 35 to 44 (Figure 5.26). The next largest group is ages 25 to 34. In Pennsylvania, the largest age group is age 25 to age 44, which is aligned with watershed age groups.

Race. Over 90 percent of all residents in the watershed are white. The next largest group is made up of individuals whom are of Asian descent (6%). In Pennsylvania, approximately 85.4 percent of individuals in the state are classified as white, while only 1.8 percent of the state’s population is classified as Asian.

Standard of Living. The standard of living varies between the municipalities in the watershed, with some general similarities with respect to the municipality’s county (Table 5.6). Median household income in the watershed ranges from $33,750 to $62,198, while median family income ranges from $43,250 to $67,222. The watershed median household income is $44,840 and the median family income in $53,849. The watershed incomes are higher than the median household and family incomes for Pennsylvania, which are, respectively, $40,106 and $49,184. There is a large difference in the median family incomes between municipalities in Centre County versus the median family incomes in the Huntingdon County portion of the watershed. Halfmoon Township household and family incomes are significantly higher than both the watershed average and the Pennsylvania median values.

Table 5.4 Population Density per Square Mile in Watershed Municipalities, 1996 and 2000

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Halfmoon</td>
<td>22.6</td>
<td>86.9</td>
<td>104.3</td>
</tr>
<tr>
<td>Ferguson</td>
<td>48.1</td>
<td>241.8</td>
<td>292.4</td>
</tr>
<tr>
<td>Franklin</td>
<td>31.7</td>
<td>14.5</td>
<td>14.1</td>
</tr>
<tr>
<td>Spruce Creek</td>
<td>8.2</td>
<td>33.3</td>
<td>32.1</td>
</tr>
<tr>
<td>Warriors Mark</td>
<td>29.5</td>
<td>50.4</td>
<td>55.4</td>
</tr>
</tbody>
</table>

Table 5.4 Population Density per Square Mile in Watershed Municipalities, 1996 and 2000

Table 5.5 Population Projections for the Watershed Municipalities

<table>
<thead>
<tr>
<th>Municipality</th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halfmoon</td>
<td>3,250</td>
<td>4,150</td>
</tr>
<tr>
<td>Ferguson</td>
<td>15,473</td>
<td>17,851</td>
</tr>
<tr>
<td>Franklin</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Spruce Creek</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Warriors Mark</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Projections unavailable.

Table 5.5 Population Projections for the Watershed Municipalities

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Median Household Income</th>
<th>Median Family Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferguson</td>
<td>$46,703</td>
<td>$62,461</td>
</tr>
<tr>
<td>Halfmoon</td>
<td>$62,198</td>
<td>$67,222</td>
</tr>
<tr>
<td>Franklin</td>
<td>$38,864</td>
<td>$43,250</td>
</tr>
<tr>
<td>Spruce Creek</td>
<td>$33,750</td>
<td>$47,188</td>
</tr>
<tr>
<td>Warriors Mark</td>
<td>$42,687</td>
<td>$49,125</td>
</tr>
<tr>
<td>Total Watershed</td>
<td>$44,840</td>
<td>$53,849</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>$40,106</td>
<td>$49,184</td>
</tr>
</tbody>
</table>

Table 5.6 Median Household and Family Incomes in Watershed Municipalities, 2000
Poverty Rate. The poverty rate of people in the watershed overall is comparable to the rate of poverty statewide (Table 5.7). Ferguson Township has the highest level of poverty, while Halfmoon Township, which had the highest income levels, had the lowest rate of poverty.

Housing Type. Throughout the municipalities in the watershed, the majority of people own their own home, although there are a number of rental properties located in all of the municipalities (Figure 5.27). The largest percent of total available housing can be found in Ferguson Township. Again, this may be attributable to the proximity of the municipality to the Pennsylvania State University. Despite the large number of rental properties in Ferguson, only a small percentage were vacant at the time of the last census. Conversely, approximately 20 percent of rental properties in Franklin and Spruce Creek townships were vacant. There seems to be a small surplus of available housing in the watershed as can be seen by the small percentage of housing that was vacant at the time of the last census.

Education. The majority (80%) of all residents in the watershed ages 25 and above have a high
school diploma or equivalency (Figure 5.28). Additionally, approximately 50 percent of watershed residents 25 and older have a bachelors degree or higher. In Pennsylvania, approximately 82 percent of the population ages 25 and older have completed high school, however, only about 22 percent of this same group has a bachelors degree or higher. Just over 50 percent of the Ferguson Township residents and approximately 40 percent in Halfmoon Township residents over age 25 have obtained at least a bachelors degree.

Major Employers

There is no single major employer located in the watershed. However, it is a reasonable assumption that watershed residents are finding employment through the top three employers in Centre and Huntingdon counties.

As of 1999, in Centre County, the top three employers were The Pennsylvania State University, the State College Area School
In Huntingdon County, two of the largest generators of employment are state and local government. The top three major employers in Huntingdon County at the time of the latest comprehensive plan update were state correctional institutions, Owens Corning Fiberglass, and the Mead Corporation, Blair Plant. Other major employers in the county are J.C. Blair Memorial Hospital, Berg Electronics, the school districts, Bonney Forge Company, and Juniata College (Huntingdon County Planning Commission 1997).

The major employers in the Juniata River Basin, of which the Spruce Creek watershed is a part, are Seton Leather in Bedford County, the Altoona Hospital in Blair County, JLG Industries in Fulton County, Standard Steel in Mifflin County and Empire Kosher in Juniata County (Juniata Clean Water Partnership 2000). Some of these companies may provide employment to watershed residents as well.

**Employment by Industry**

Although the watershed is primarily rural and agricultural in nature, many of the residents who live in the area are not dependent upon farming for their livelihood (Figure 5.29). In fact, only a small overall percentage of the watershed’s population, 2.5 percent, is employed in the agriculture, forestry, fishing and hunting or mining industry. According to the U.S. Census Bureau, the term “industry” refers to the type of business an employer conducts. The largest percentage of the watershed’s workforce is employed in the educational, health and social services industry. Despite these general characteristics for the watershed, regional differences exist throughout the watershed. The townships in Huntingdon County have more people employed in the agriculture, forestry, fishing and hunting and mining industry than the Centre County municipalities of Halfmoon and Ferguson townships. Some of these regional differences may be the result of the type of growth that is occurring in the Centre Region and the proximity of the watershed to this growing area.

Compared to Pennsylvania overall, a larger percentage of the watershed’s workforce is employed in the educational, health and social services industry. The state, on the other hand, has a greater percentage of its workforce employed by the manufacturing and retail industries.

**Occupational Structure**

“Occupation” differs from “Industry” in that it refers to the type of work that an individual does while on the job. Overall, there does not appear to be a significant regional difference in the occupation of employed individuals in the municipalities in the watershed (Table 5.8). This is most likely the result of the proximity of the watershed to such population centers as the Centre Region and Altoona. Based upon the commuting data, the average resident travels 27 minutes to work and it can be assumed that residents from the Huntingdon County municipalities are just as likely to travel to the Centre Region for work, as does a resident living in a Centre County municipality. Therefore, opportunities for employment are not limited to watershed residents based upon the township in which they live.

**Unemployment**

In the watershed, there are regional differences between the levels of unemployment in the civilian labor market in townships in Centre County as compared to the level of unemployment in townships in Huntingdon County (Figure 5.30). Ferguson and Halfmoon townships have
Figure 5.29 Percent of Workforce by Industry for Watershed and Municipalities, 2000
relatively low unemployment rates that fall just slightly above 2 percent. Franklin, Spruce Creek and Warriors Mark townships, however, have unemployment rates between 2 and 3 times higher. Overall, the watershed has a lower rate of unemployment than the state rate, except for Spruce Creek whose rate is equal to the state rate.

**Table 5.8 Percent of Workforce by Occupation for Watershed and Municipalities, 2000**

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Management, Professional and related</th>
<th>Service</th>
<th>Sales and office occupations</th>
<th>Farming, Forestry, Fishing</th>
<th>Construction, extraction, and maintenance occupations</th>
<th>Production, transportation and material moving occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferguson</td>
<td>56.3</td>
<td>12.1</td>
<td>20.5</td>
<td>0.3</td>
<td>5.1</td>
<td>5.8</td>
</tr>
<tr>
<td>Halfmoon</td>
<td>47.3</td>
<td>12.7</td>
<td>23.5</td>
<td>0.6</td>
<td>6.4</td>
<td>9.5</td>
</tr>
<tr>
<td>Franklin</td>
<td>32</td>
<td>17.5</td>
<td>14</td>
<td>10.5</td>
<td>10.1</td>
<td>15.8</td>
</tr>
<tr>
<td>Spruce Creek</td>
<td>28.6</td>
<td>6.8</td>
<td>36.8</td>
<td>3</td>
<td>12.8</td>
<td>12</td>
</tr>
<tr>
<td>Warriors Mark</td>
<td>31.8</td>
<td>13.5</td>
<td>21.2</td>
<td>4.5</td>
<td>10.8</td>
<td>18.3</td>
</tr>
<tr>
<td>Watershed</td>
<td>52.2</td>
<td>12.3</td>
<td>21.0</td>
<td>0.9</td>
<td>5.9</td>
<td>7.6</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>32.6</td>
<td>14.8</td>
<td>27</td>
<td>0.5</td>
<td>8.9</td>
<td>16.3</td>
</tr>
</tbody>
</table>

**Figure 5.30 Percent Civil Labor Force Unemployed, 2000**

**Commuting**

Given the rural nature of much of the watershed, as well as the information about the industries in which the residents of the watershed work, it is interesting to note the length of the commute and the method of transportation used. There are not enough jobs within the watershed
to employ all residents as a result, it can be assumed that the residents are traveling outside of the watershed to get to their respective places of employment. On average, watershed residents are traveling approximately 27 minutes to get to work. As expected, the largest percentage of residents drive or carpool to work.

**TRANSPORTATION**

Historically, residents in the watershed relied upon stage coach and railroad for transportation in the watershed. Today, residents rely upon two state highways to travel into and out of the region; Highway 550 and Highway 45. There is also a network of smaller secondary township roads in the watershed. Overall, the rural nature of the watershed and the lack of population density does not allow for the provision of a mass transit system.

Highway 45 heads southwest from Boalsburg toward the village of Spruce Creek and the confluence of Spruce Creek and the Little Juniata River. Highway 550 heads southwest from the village of Matternville toward the village of Warriors Mark and passes through Stormstown on its way. These highways are two lane roads that are heavily traveled and the volume of traffic is a concern of many watershed residents.

**Interstate 99 Corridor – Route 220 Improvement Project**

The new section of Interstate 99 (I-99), also known as the Innovation Corridor, is being constructed to connect the Pennsylvania Turnpike (I-76) in Bedford County to Interstate 80 (I-80) in Centre County (Figure 5.31). The new interstate segment will provide direct access to Centre County and The Pennsylvania State University. According to the I-99 Innovation Corridor website, the corridor will serve as a resource to businesses by enabling them to locate in areas that offer their employees easy commutes, affordable housing, and access to recreational and cultural experiences. There is also the thought that the corridor will lead to economic stimulation of the entire region (The I-99 Innovation Corridor Alliance 2004). The actual construction of the highway is planned for the west side of Bald Eagle Ridge, however, the eastern edge of the project area encompasses parts of the townships of Warriors Mark and Halfmoon, on the east side of ridge. Currently, only individual residences are located within the project area. These residents mostly use Route 550 to access their homes (U.S. Department of Transportation et al. 1996). The Centre Region Comprehensive Plan from 1990 identifies woodland areas and steep slopes along the Bald Eagle Ridge as conservation areas (U.S. Department of Transportation et al. 1996). An updated comprehensive plan, completed in 2000, indicates that the protection of the ridge remains a priority as the forestland provides for wildlife habitat and improved air quality while helping to facilitate the recharge of groundwater. This plan also indicates the need to “preserve existing forested areas along the Mount Nittany Expressway” to reduce the need for the construction of other types of noise and visual buffers along the highway (Centre Regional Planning Agency 2000). The 1992 Warriors Mark Township Comprehensive Plan also has indicated that the ridge should be protected in order to provide for open space and conservation of important natural features such as the woodlands (U.S. Department of Transportation et al. 1996).
PLANNING TOOLS AND REGULATORY CONTROLS

A variety of tools are available to municipalities to plan and regulate for the future growth and development of their communities. These tools include efforts such as the development of comprehensive plans, while others include regulations that address the type and layout of land use in the municipality. In the watershed, both Centre and Huntingdon counties have recently developed comprehensive plans. Phase I of the Huntingdon County Comprehensive Plan (background studies), was completed in 1997 and Phase II, the plan itself, was completed and approved in 2000. The Centre County Comprehensive Plan, completed in 2003, is awaiting approval. Ferguson and Halfmoon townships are a part of the Centre Region. The Centre Regional Planning Agency completed its comprehensive policy plan for the entire region in 2000. In addition to these county or region-wide plans, some municipalities such as Halfmoon, Ferguson, and Warriors Mark townships have developed comprehensive plans and local ordinances, as a way to control the type of land use that occurs in different areas of their community (Table 5.9). Spruce Creek, Warriors Mark, Ferguson and Halfmoon have all implemented subdivision and land development ordinances. Ferguson and Halfmoon townships have also developed a zoning ordinance and map. These ordinances designate what type of land use is to occur in a specific area of the municipality. Warriors Mark township is currently in the process of developing a zoning ordinance. Some of these municipalities have adopted or proposed developing other ordinances that address issues related to land development, including stormwater management, rural preservation, and water well construction.

Regional Growth Boundary

The Centre Region’s Regional Growth Boundary is one tool implemented by the Centre Region to try to control the location of new development. The growth boundary is based upon the present and the predicted future locations of public services and facilities. It is recommended that development activity occur within this boundary to enable residents to obtain cost-

<table>
<thead>
<tr>
<th>Type of Ordinance</th>
<th>Halfmoon</th>
<th>Ferguson</th>
<th>Franklin</th>
<th>Warriors Mark</th>
<th>Spruce Creek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive Plan</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X**</td>
<td></td>
</tr>
<tr>
<td>Zoning</td>
<td>X**</td>
<td>X</td>
<td></td>
<td>X*</td>
<td></td>
</tr>
<tr>
<td>Subdivision Ordinance</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Building Permits</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Rural Preservation Ordinance</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stormwater Ordinance</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Well Ordinance</td>
<td>X*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Under Development
**Under Revision

Table 5.9 Plans and Ordinances Developed, or Currently Under Development, by Watershed Municipalities
efficient services. Growth and development outside of this boundary is recommended to take place in a way that is compatible with the existing uses in the area (Centre Regional Planning Agency 2000). The Centre Region Regional Growth Boundary extends into a portion of Ferguson Township (Figure 5.32).

The Centre Regional Planning Agency (CRPA), would like to maintain this boundary in a way that allows for the continuation of agricultural land uses in the townships. In the CRPA’s 2000 Comprehensive Plan, one action to help achieve this goal is to develop a funding mechanism that is linked to the Centre County Agricultural Land Preservation Board’s land conservation easement program. The agency also recognizes the need to continue to direct residential and commercial development to those areas within the boundary that are best suited for that type of development. The agency has stated that this boundary should be re-evaluated every five years to allow for readjustments.

**Zoning**

Zoning is another important tool that municipalities can use to help control development. Through the development of such an ordinance, municipalities can determine...
the best, and most efficient location of uses, such as residential, commercial or industrial, and develop a map of the districts where these uses are allowed to occur. In this way, a zoning ordinance can help a municipality meet the stated goals of the community. Two of the municipalities in the watershed have developed a zoning ordinance, and Warriors Mark is currently in the process of developing an ordinance. Figure 5.33 shows the zoning districts that are found within the watershed. The zoning ordinances are implemented at the township, not the watershed, level and additional zoning districts are located in portions of the municipality not within the watershed boundary.

In Ferguson Township, nine different zoning districts fall within the watershed’s boundaries; 1) Agricultural Research, 2) Forest/Gamelands, 3) Rural Agricultural, 4) Rural Residential, 5) Single Family Residential, and very small portions in 6) Mobile Home Park, 7) Planned Residential Development, 8) Suburban Family Residential and 9) Light Industry, Research and Development districts (Ferguson Township 1981). Short summaries of what each zoning district means are included in Appendix G. These summaries, however, are not fully inclusive of the information provided by the Township’s ordinances and should not be used in the place of the official information found in the
Ferguson Township Zoning Ordinance and the Township of Ferguson Subdivision Regulations.

In Halfmoon Township, there are five different zoning classes in the township and four of these are in the watershed; 1) Agricultural, 2) Residential, 3) General Commercial, and 4) Limited Industrial districts (Halfmoon Township 1972). Short summaries of what each zoning district means are included in Appendix H. These summaries are not fully inclusive of the information provided by the township’s ordinances and should not be used in the place of the official information found in the Halfmoon Township Subdivision Regulations and the Zoning Ordinance of the Township of Halfmoon.

To help direct residential uses in Halfmoon Township’s Agricultural Zoning District in a way that meets the district’s overall purpose as described in the appendix, the township has identified two different types of development; Rural Preservation Developments and Traditional Developments. A Rural Preservation Development must follow the design standards found in Section 2039 of the Halfmoon Township Subdivision Regulations. These regulations require that a developer identify primary conservation areas on the site including wetlands, floodplains, and streams. Depending on the type of Rural Preservation Development to be built, the developer must either 1) leave at least 35% open land with a minimum lot size of a half acre or 2) keep maximum average density to one dwelling unit per five acres with minimum lot sizes of two acres. Under this option, country lots can only be subdivided if 35 percent of the site can be kept as open space.

Halfmoon Township is currently in the process of revising their zoning ordinance.

Open Space

The importance of open space has long been recognized by the Pennsylvania General Assembly. In 1968 (1967 P.L 992, No. 442), the Commonwealth and the 67 counties were authorized to “preserve, acquire or hold land for open space uses.” In the Spruce Creek watershed, the preservation of open space is an important way to achieve the goal of preserving and protecting the rural character of the watershed. In 1996, Act 1996-153 expanded the authorization of the right to hold open space to “all local government units throughout the Commonwealth,” including municipalities (Halfmoon Township Planning Commission 2003). The Spruce Creek watershed municipalities, in recognition of the importance of open space to their community goals, have implemented strategies to protect and provide for open space.

The Halfmoon Township Board of Supervisors instituted an effective and progressive strategy to preserve the rural character of the township. In 1999, the township adopted the Rural Preservation Development Ordinance (RPDO). Most significantly, the community passed a referendum that raised revenue from a 2 mil increase in the real estate tax to obtain open space in the township through techniques such as a lease and/or purchase of development rights or conservation easements. The overall intent of Halfmoon Township’s program is “to encourage continued agricultural uses, to protect natural resources, to preserve the rural character of Halfmoon Township and to ensure that growth results in a community of functional neighborhoods and increases collective security and community identity” (Halfmoon Township Planning Commission 2003). In 2003, the township passed the Open Space Preservation Ordinance to identify the procedures and standards for using the funds provided by the Open Space Referendum to achieve the overall purposes of the township’s Open Space Preservation Program.
Halfmoon Township’s definition of open space provided in the Open Space Preservation Ordinance is broad and includes lands that have the following characteristics (Section 100 (E));

1. Farmland, working farms and agriculture uses;
2. Forests and land being used to produce timber crops;
3. Scenic areas for public visual enjoyment from public rights of way;
4. Undeveloped land areas between communities that are primarily residential;
5. The presence of natural and scenic resources, including, but not limited to, soils, streams, flood plains, steep slopes or marshes;
6. Presence of water resources and watershed areas including natural covers which help prevent floods and soil erosion thereby protecting water quality and replenishing surface and ground water supplies; or
7. Sites of particular historic, geologic, animal habitat or botanic interest.

The township has established a Land Rating System, which the Open Space Preservation Board uses to select the properties to be protected through the lease or purchase of easements.

Halfmoon Township has also implemented rural preservation design standards into their land development ordinances (Section 2039) (Halfmoon Township Planning Commission 1985). Some of the general purposes of the rural preservation development standards are to encourage the continuation of agriculture, to protect the natural resources through the conservation of open space, and to preserve the character of the township. There are two types of Rural Preservation Developments; Neighborhood Lots and Country Lots. Neighborhood Lots require that at least thirty-five percent of the land be maintained for open land uses and Country Lots must maintain maximum average density of one dwelling unit per five acres with a minimum lot size of two acres. The design process for rural preservation developments shall identify primary conservation areas such as wetlands, floodplains, streams, steep slopes, sinkholes, and wellhead protection zones and secondary conservation areas. These include, but are not limited to, land as identified in county Natural Heritage Inventory or in the Historic Resources of Centre Region report, mature forests, and Class I and II soils. After these conservation areas are identified, they are prioritized for inclusion into these open land areas, giving primary conservation areas greatest priority for inclusion into open land area.

Warriors Mark Township also recognizes the importance of protecting open space and has incorporated standards to do so into its subdivision and land development ordinance (Warriors Mark Township Board of Supervisors 1998). Part of the overall purpose of the ordinance is the “conservation of natural features and rural open space which are central to the Township’s character” (Section 102). To meet this stated goal, the township has incorporated Growing Greener “Smart Growth” standards into their subdivision and land development ordinance. These standards require that 50% of any residential property development of greater than four units be set aside as open space (Section 502 (c)). The township further requires that land less suitable for development be located in this open space parcel. Examples of this type of land include prime agricultural lands (Class I and II), steep slopes, wetlands, stream corridors, floodplain, wildlife habitat and historic sites (Section 505).

Spruce Creek Township’s subdivision and land development ordinance addresses the importance of open space as well. One of the purposes of their subdivision and land development ordinance is to “conserve open land, including those areas containing unique and sensitive natural features such as woodlands, steep slopes, streams, floodplains and wetlands, by setting them aside from development” (Section 102) (Spruce Creek Township Board of Supervisors 2003).
The township requires that “Environmentally Sensitive Areas” be protected from “inappropriate development through easement, deed restriction and/or donation to an appropriate conservation organization” (Section 412). Environmentally Sensitive Areas are “areas with slopes of over fifteen percent (15%), floodway areas, unstable soils or geology, riparian buffers, natural heritage areas and wetland areas” (Section 800).

The Centre Regional Planning Agency (CRPA) also recognizes the importance of preserving and enhancing open space. In their policy plan, the CRPA has identified initiatives and actions that could help to meet the goal of open space preservation, including increased inter-municipal cooperation (Centre Regional Planning Agency 2000).

**Stormwater Management**

Specific stormwater management ordinances are present in Halfmoon, Ferguson and Warriors Mark townships. These address the intent and/or purpose of the ordinance, the detailed design and performance standards required, the plans required for proposed development applications, and enforcement actions available to the municipality. Spruce Creek Township has a stormwater management facilities section within its subdivision and land development ordinance. This section primarily follows and states the basic requirements of the Pennsylvania Storm Water Management Act (PA DEP, Bureau of Watershed Management).

**Statements of Purpose**

There are several similarities among three of the ordinances as to their intended purpose (Halfmoon Section 1502, Ferguson Section 103 and Warriors Mark Section 102). Among these are:

1. To manage and control accelerated runoff and sedimentation problems at their source by regulating the activities that cause these problems.
2. To utilize and preserve the natural drainage systems.
3. Encourage the recharge of groundwater and prevent deterioration of groundwater quality.
4. Maintain existing flows and quality of streams and watercourses within the Township and the Commonwealth.
5. Preserve and restore the flood carrying capacity of streams.
6. Provide proper design, installation and maintenance of all permanent stormwater management structures that are constructed in the Township.

Statements of purpose unique to each ordinance are as follows:

**Halfmoon, Section 1502, (G);** Provide performance standards and design criteria for watershed-wide stormwater management and planning.

**Halfmoon, Section 1502, (H);** Protect groundwater and surface water quality.

**Ferguson, Section 103, (C);** To assure that the peak rate of stormwater runoff (peak discharge) is no greater after development than prior to development within the predevelopment drainage sub area.

**Ferguson, Section 103, (D);** To minimize danger to public health and safety by providing management of stormwater runoff.

**Warriors Mark, Section 102, (G);** Provide performance standards and design criteria for township-wide stormwater management and planning.

Although **Warriors Mark, Section 102, (G)** and **Halfmoon, Section 1502, (G)** are almost identical, it is important to note that the
Halfmoon text refers *watershed-wide* planning rather than *township-wide* planning. Even if it is understood that stormwater does not obey jurisdictional boundaries, it is critical that regulatory language express this clearly.

**Performance and Design Standards**

There are some consistencies among the Halfmoon, Ferguson and Warriors Mark ordinances in the following areas.

**Peak Runoff Rate Control.** The ordinances all state that post-development rates of stormwater runoff shall not exceed the peak rates of runoff existing prior to development. This is regulated differently depending on the size of the area affected by development and the adjacency of the parcel to the main stem of an existing stream. The primary means of controlling rates of runoff are detention/retention ponds or other storage methods. A primary function of this storage is to reduce the incidence of flooding downstream of the development.

**Infiltration / Recharge.** Developers are encouraged to provide a development plan that maximizes the amount of stormwater infiltration that takes place on the developed parcel. The intent is to reduce the rate of stormwater runoff by allowing as much water as possible to infiltrate into the ground surface. Increased on-site infiltration also reduces the volume of runoff that will need to be stored and recharges groundwater aquifers.

**Sinkhole Protection.** (*Halfmoon, Section 1517*) (*Ferguson, Section 122*) (*Warriors Mark, Section 301, H*). These sections state that sinkholes are natural to the local geology and that they provide a direct conduit to the regional groundwater. There are three main methods of protection mentioned by all the ordinances. Water that is naturally flowing into existing sinkholes should be kept free of contaminants. No additional volume of water should be directed into any sinkhole. Also, sinkholes should be kept free of any types of trash or debris.

The Halfmoon Township Ordinance has some additional sections that are specific to stormwater infiltration and recharge, as well as protection of areas in which the groundwater is more vulnerable to contamination.

**Halfmoon, Section 1515, (C), Recharge Volumes (RV).** This section goes beyond suggesting that stormwater recharge be maximized on a development parcel. Through regulation of stormwater discharge/recharge volume, the ordinance details methods of adding infiltration zones as credit toward the amount of impervious surface that must be considered in the overall stormwater calculations. Essentially, the more infiltration capacity retained on the development parcel, the less stormwater infrastructure and storage developers are required to provide. On-site infiltration reduces peak runoff rates and flooding, reduces runoff volumes (which lessens degradation of stream channels) and improves surface and groundwater quality. It may also reduce capitol costs for the construction and maintenance of stormwater facilities.

**Halfmoon, Section 1515, Sensitive Areas and Developments.** The primary function of this section is to protect water resources that are highly valuable to the watershed community and also highly vulnerable to contamination by certain types of development. It defines sensitive areas around groundwater (drinking water) reservoirs and provides a provisional list of land uses that are considered to be Water Quality Sensitive (WQS). Such uses include vehicle fueling stations, salvage yards and interstate highways. This section is reminiscent of wellhead protection regulations that appear in many municipal codes, but because well contamination is often caused by the introduction of stormwater as a transport mechanism for contaminants from
the surface to the groundwater, its inclusion in the stormwater ordinance is appropriate.

**Prime Agricultural Soils**

Class I and Class II soils are generally considered to be prime agricultural soils. These soils have slight or moderate limitations that restrict their use. Growing Greener standards identify prime farmland as a Secondary Conservation Area. Other secondary features are woodland, hedgerows, wildlife habitat/corridors and historic sites. Primary Conservation Areas are steep slopes, stream corridors, flood plain and wetlands.

Protection of these soils in an agricultural area, such as the Spruce Creek watershed, is important to maintaining the rural character of the region and ensuring that agriculture can continue to be a land use. Overall, approximately 38% of all soils in the watershed are prime agricultural soils (Figure 5.34). Many of the watershed’s municipalities have incorporated standards for protection of these soils in their local ordinances.

Warriors Mark Township requires identification of all Class I and Class II soils on a property to be in the preliminary subdivision plan (Section 402 (k)). Section 505 (b) indicates that any prime agricultural soils be considered secondary conservation areas, and therefore requires that these be located in the 50% of the property to be left as open space. One of the goals of Halfmoon Township’s Open Space Preservation Program is to “protect areas of Halfmoon Township with productive agricultural soils for continued or future agriculture use, by conserving blocks of land large enough to allow for efficient farm operations” (Halfmoon Township 2003). As discussed in the previous section, through this program, Halfmoon Township leases or purchases development rights to protect open space in the township. The Open Space Preservation Ordinance, defines “[f]armland, working farms and agriculture uses” as open space (Section 100 (E)). In addition, the township’s rural preservation design standards as listed in Section 2039 of the subdivision ordinance defines Class I and II soils as a secondary conservation area. These conservation areas should be given consideration for exclusion from development.

Spruce Creek Township, in their subdivision and land development ordinance, recognizes the importance of agriculture in their township. One of the purposes of their ordinance is to “protect areas of the township with productive agricultural soils for continued or future agriculture use, by conserving blocks of land large enough to allow for efficient farm operation” (Section 102). Additionally, the identification of Agricultural Security Areas and environmentally sensitive areas must be included in a preliminary subdivision plan (Section 302 (c))

**Agricultural Security Areas (ASA)**

The designation of farmland as an Agricultural Security Area (ASA) provides a tool for protecting both the agricultural productivity and the rural character of the watershed. Landowners may participate in this program by petitioning the respective township which is required to hold a public meeting before approving the application. The designation of land as an ASA prevents municipalities from defining
normal farming operations as a public nuisance, forbids unreasonably restrictive zoning on farm practices and farm buildings and provides some protection of land condemnation through eminent domain. This protection states that eminent domain, or the taking of private land for public use, may be exercised only after the Pennsylvania Agricultural Lands Condemnation Approval Board (ALCAB) has determined that “no prudent and reasonable” alternative exists for condemnation. The designation of an ASA also requires the local jurisdiction to encourage the continuity, development and viability of agriculture of the designated lands. Enrollment in an ASA is a prerequisite for participating in farmland preservation easement programs funded by state and county grants. Approximately 48% (33,645 acres) of the watershed is designated as ASAs (Figure 5.35).

Figure 5.35 Agricultural Security Areas Map
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