CULTURAL LANDSCAPE ASSESSMENT

FOR

MICHAUX STATE FOREST

Adams, Franklin, Cumberland and York Counties,

Pennsylvania

Prepared for the

Appalachian Trail Conservancy
Boiling Springs, Pennsylvania

On behalf of the
South Mountain Partnership

Prepared by

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CHAPTER 1 – INTRODUCTION AND OVERVIEW

The South Mountain Partnership is a group of organizations and individuals working to protect, preserve, and enhance the landscape and communities in the South Mountain region of Pennsylvania. The Partnership was formed in 2006 as a Cultural Landscape Initiative of the Pennsylvania Department of Conservation and Natural Resources (DCNR) with the goal of identifying values at a landscape scale, revitalizing communities, and engaging local and regional partners in conservation and economic development. The South Mountain Partnership has over fifty member organizations representing government agencies, municipalities, non-profit organizations, academic institutions, and private businesses.

In 2012, partners met to consider development of a South Mountain Cultural Heritage Project documenting historic and cultural resources at a landscape level throughout the region. This Cultural Landscape Assessment for the Michaux State Forest is a pilot project and initial phase of the larger South Mountain Cultural Heritage Plan focusing on a distinctive core landscape of the Partnership.

The Cultural Landscape Assessment for Michaux State Forest establishes a context and provides a model for the documentation and assessment of other South Mountain landscapes. It outlines historic contexts for the landscape; describes how the landscape has changed over time; identifies important landscapes and associated types of building, site, and landscape resources; and considers appropriate future management and treatment and recommendations. While intended to focus specifically on Michaux State Forest, the Cultural Landscape Assessment addresses the landscape of South Mountain as a whole and its relationship to the broader landscapes of the adjacent valleys.

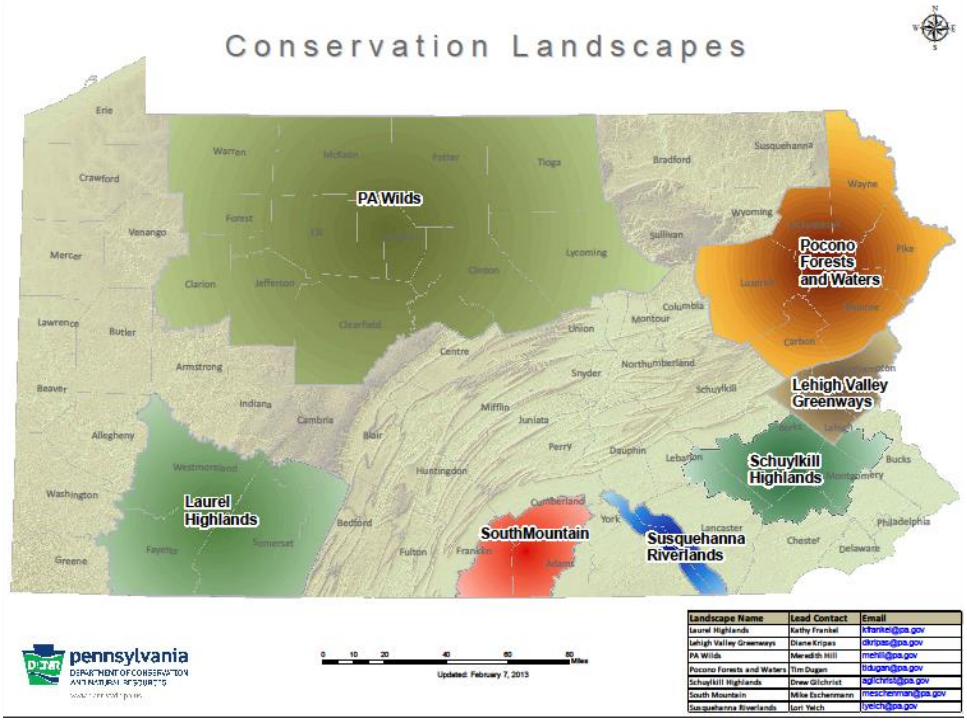
Chapter 1 provides an introduction to the landscape assessment, outlining its background, context, and purpose. It focuses on portraying the mission and programs associated with the South Mountain Partnership and Michaux State Forest. A separate condensed version of the Cultural Landscape Assessment has been prepared to serve as an executive summary for the study.

THE SOUTH MOUNTAIN PARTNERSHIP

The South Mountain Partnership is a regional, landscape-scale conservation initiative in south-central Pennsylvania created to guide efforts within the South Mountain Conservation Landscape, one of seven Conservation Landscapes identified by the Pennsylvania Department of Conservation and Natural Resources (DCNR) throughout the state.

Conservation Landscape Initiative

DCNR's Conservation Landscape Initiative was established in 2006 as an approach to large-scale landscape conservation while promoting sustainable economic development. The initiative is focused on areas of high conservation importance, including several areas of high forest fragmentation pressure, such as the Poconos region, South Mountain in the south-central region, and the Schuylkill Highlands in urbanizing southeast (DCNR 2010:4A-16).



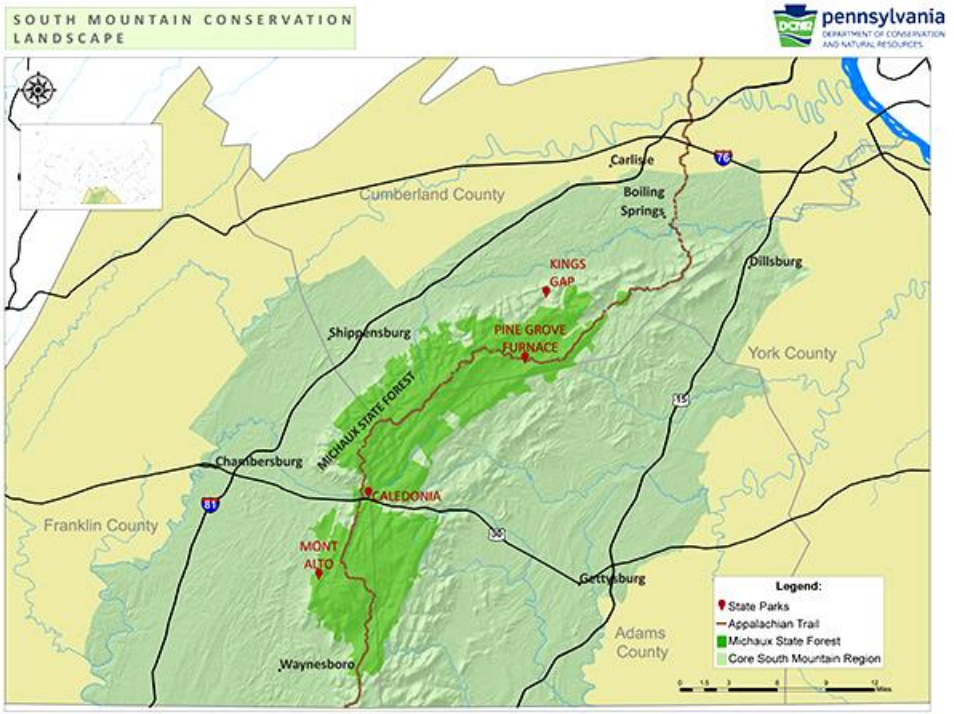
DCNR's seven Conservation Landscape Initiatives (DCNR)

Seven regional areas have been identified by DCNR for participation in the program based upon conditions and their capacity to work together to drive strategic investments and actions around sustainability, conservation, community revitalization, and recreational projects. Each of these seven regional areas has strong natural assets, local readiness and buy-in, and the potential for significant state-level investment and support around conservation interests. Criteria for designation of the Conservation Landscapes included:

- **Presence of DCNR-owned lands –** large blocks of state parks and forests provide the foundation for the landscapes and a staffing presence that can help guide the initiative;

- **Sense of Place –** regions with a sense of place and identity, in many cases based on landscape character not political boundaries;
- **Readiness –** made more ready by opportunity or threats, such as changes in the economic base, depopulation, or development and sprawl;
- **Engagement –** civic engagement potential to bring people of the region together to identify common values and concerns;
- **Strategic Investments –** the potential for state agencies and other statewide and regional partners to provide high-level leadership, financial support, and technical assistance to local partners in building better communities, conserving identified values, and investing in sustainable economic development.

Partnerships with state agencies and other statewide organizations are important in framing and incentivizing the Conservation Landscape process. Through regional collaboration, state, regional, and local organizations have worked together in each designated Conservation Landscape on a variety of strategic and regionally appropriate projects and initiatives. The Conservation Landscape approach is value-driven, place-based, and locally grounded (DCNR 2015).



Core area of the South Mountain Conservation Landscape in green (DCNR)

The South Mountain Conservation Landscape

The South Mountain Conservation Landscape encompasses the geographic area of South Mountain and adjacent valley lands in Franklin, Cumberland, York, and Adams Counties. A core area for the South Mountain Conservation Landscape has been identified that extends from beyond Interstate 81 on the west to beyond Route 15 on the east and includes approximately 1100 square miles. However, the Partnership's vision and activities embrace the entirety of the Cumberland

Valley on the west and the rolling agricultural lowlands to the east within the four counties.

The South Mountain Conservation Landscape encourages and promotes appreciation and protection of the intrinsic geographic, geologic, biologic, natural, agricultural, and heritage resources and values of the South Mountain landscape and the important connections these have to the quality of life and place in the region (DCNR 2015).

The South Mountain Partnership

The South Mountain Partnership was organized in 2006 in conjunction with DCNR's Conservation Landscape Initiative and operates as a public-private partnership under the leadership of DCNR and the Appalachian Trail Conservancy, which serves as the Partnership's administrative entity. Over the past nine years, the South Mountain Partnership has grown into an active alliance of citizens, businesses, non-profits, academic institutions, and local, state and federal government agencies and officials collaborating to envision and secure a sustainable future for the South Mountain landscape. The Partnership has over fifty member organizations.

The Partnership's mission involves:

> *Conserving Landscape Resources to enrich the quality of life and sense of place of the South Mountain region's citizens and communities.*

The Partnership identifies three primary goals:

- **Conservation of Landscape Resources** – conserving and stewarding the natural, cultural, recreational, and agricultural resources that make the South Mountain landscape unique;
- **Promotion of Landscape Resources** – elevating public awareness of the natural, cultural, recreational, and agricultural resources;
- **Connections Across the Landscape** – creating a community of collaboration amongst a critical mass of public agencies, non-profit and community organizations, businesses, and citizens (SMP 2015).

Programs undertaken by the Partnership are illustrative of the means through which it has worked toward these goals since its inception. Programs include:

- Regular Partnership meetings (generally three per year) at which partners meet, exchange information, learn about initiatives, and discuss issues;
- The South Mountain Speakers Series, three to four presentations or talks each year for partners and the general public on topics of regional interest;
- Mini-Grants awarded competitively to local partners for initiatives advancing and implementing the Partnership's strategic concepts, including community engagement;

- Go Local for Health, an ongoing series of workshops on regional community wellness, agriculture, local foods, nutrition, recreation, and fitness;
- South Mountain Research Corps and Science Summit, a proposed series of annual workshops bringing together local university students and researchers with land owners and managers around practical land management stewardship challenges and issues on the conservation and stewardship of the region's ecological and natural systems;
- Additional workshops and forums on topics of regional interest such as trails, land use, balancing nature and commerce, and reinventing the commercial corridor;
- Special projects such as this Cultural Landscape Assessment.

Where possible, partners collaborate on land conservation and protection, facilitating the acquisition or protection of threatened open space, promoting agricultural and landscape conservation initiatives, and facilitating community planning.

Fermata Report

In 2008, when the South Mountain Conservation Landscape was in its early stages and striving to coalesce around common ground in the interest of conserving the region, DCNR engaged Fermata, Inc. to assess opportunities and challenges present within the South Mountain landscape.

Fermata, a firm specializing in experiential tourism and outdoor recreation as sustainable approaches to community revitalization, prepared strategic assessments for five of DCNR's designated Conservation Landscapes. Their overview for South Mountain culminated in a report released in December of 2009: the *South Mountain Conservation Landscape Initiative Strategic Plan*, which was instrumental in shaping the strategic vision of the Partnership (SMP 2015).

The report recognizes the two primary thematic strengths of the South Mountain landscape – **agriculture** and **conservation** – and outlines ideas for a strategic approach to interpretation, engagement, protection, and enhancement.

The approach to agriculture highlights the unique landscape character of both the South Mountain Fruit Belt on the east side of the mountain and the Cumberland Valley on the west. The **South Mountain Fruit Belt** is recognized as unique and important–perhaps even world class. Its agricultural landscape has a distinctive sense of place and provides the public with scenic views, cultural attractions, recreational opportunities, nutritious fresh foods, wildlife habitat, and employment (Fermata 2009).

The report emphasizes the need for engaging both the agricultural industry and general public in a unified vision for the Fruit Belt that supports and strengthens its agricultural network. Ensuring that the Fruit Belt remains economically viable is central to any strategic approach.

The vision and approach must support both the industrial scale entities that are its economic base and small local initiatives that embody its character and

provide the best opportunities for public engagement. Using experiential tourism to strengthen the local agricultural economy and underscore the need for unified community and landscape planning is at the core of a variety of coordinated supporting initiatives that may be employed.

Similarly, agriculture in the **Cumberland Valley** has unique attributes that can be specifically branded, promoted, and strengthened. Its remarkable landscape, many enterprises, appealing communities, and tourism infrastructure are clear strengths. Opportunities for creating a fresh foods strategy through agri-tourism, culinary tourism, and emphasis of historic cultural identity are highlighted.

The Fermata report strongly recommends using South Mountain's central role in the early development of conservation and forestry in Pennsylvania as the basis for experiential tourism and recreation around the theme **Cradle of Conservation**. The theme would introduce the story of conservation in America and directly connect that story to the South Mountain landscape.

Public engagement through these three thematic subjects – South Mountain Fruit Belt, Cumberland Valley, and Cradle of Conservation – is the key to the report's perspective. Development of a coordinated interpretive plan for experiential tourism using a heritage area and scenic byway landscape approach is recommended. Proactive and creative use of web-based technologies and media is emphasized, with the South Mountain Conservation Landscape initiative as its organizing entity. A variety of specific ideas and recommendations are suggested, demonstrating both a way of thinking and a series of concrete actions that might be taken.

The Fermata insights have provided the basis for development and evolution of the Partnership's ongoing programming. Specifically, the Speakers Series reflects the direction and impact of the historic Michaux Lecture that gave impetus to conservation in Pennsylvania. The various recommendations on agricultural heritage are reflected in programming such as the Go Local for Health forums and various projects supported through the Mini-Grant program. The Partnership's South Mountain Science Forum is inspired by several ideas and approaches included in the report, such as the development of a sustainability center within the Conservation Landscape.

Ideas and approaches outlined in the Fermata report will continue to inspire new ideas and initiatives and can be expected to form the nucleus around which a coordinated approach to interpretation, recreation, agriculture, and community and landscape conservation will coalesce. This approach is recognized in the organization and recommendations of this cultural landscape assessment.

2011-2016 Strategic Plan

The South Mountain Partnership acted regionally through working groups to consider a range of topical issues between 2006 to 2010 as part of the initial phase implementing the vision that had been articulated. This process was further informed in 2009 by the Fermata Report. In 2010, a concise Strategic Plan was developed to outline goals, strategies, objectives, and actions to guide activities from 2011 through 2016. Over the past five years, the Partnership has been active in implementing elements of this Strategic Plan.

The Strategic Plan lists three goals, essentially the same as those listed above from the Partnership's recently updated website:

- Preserve, sustain, and develop critical natural and cultural assets of the region;
- Promote the region's natural and cultural assets and develop them into a major regional economic force;
- Build a critical mass of public and private organizations, non-profits, and citizens to support the Partnership's mission.

Based upon these goals, four strategies were outlined for their implementation:

A. **Inventory and prioritize** natural and cultural assets so that they can be preserved, promoted, and developed;

B. **Promote and advocate** for natural and heritage assets, agriculture, and recreation and showcase organizations and businesses that actively support them;

C. **Collaborate with key communities** to preserve, promote, and develop natural and heritage assets, agriculture, and recreation;

D. **Sustain current partners** and **develop program and activities** that will attract a broad demographic.

Under Strategy A on the inventory and prioritization of assets, objectives and actions are outlined for the prioritization of natural lands, agricultural lands, trail projects, and heritage resources. Lead and contributing partners are identified for each activity. Information is to be complied into a regional atlas to provide a comprehensive view of its landscape assets.

Under Strategy B, promote and advocate, seven objectives and actions are outlined, including development of a regional outdoors festival, promotional pieces for agriculture and recreation, and development of a geo-trail. Additional objectives include branding the Fruit Belt, further developing the annual Speakers Series, and supporting businesses and non-profits related to recreation, agriculture, heritage, and natural assets.

In Strategy C, collaborating with communities, the Partnership works with interested and "ready" municipalities beginning with those adjacent to South Mountain in providing training and resources, seeking funding for land conservation, development of greenways and trails, and preservation and promotion of heritage assets. Place-based educational opportunities are stressed related to schools and teacher development.

Strategy D, sustaining partners and developing programs, emphasizes maintaining an organizational structure for the Partnership while implementing its Mini-Grant program, continuing partner development through quarterly meetings and outreach, and developing and implementing a communications strategy.

This Cultural Landscape Assessment for Michaux State Forest and its surrounding landscape relates primarily to Strategy A in the inventory and prioritization of

natural and cultural resources. However, it supports elements of the other strategies by defining the historic contexts through which the regional landscape is appreciated and viewed in a holistic and integrated manner. The plan assists in identifying themes and resources for interpretation, promotion, and protection.

South Mountain Cultural Heritage Plan

Following completion of the Strategic Plan, assigned partners considered how best to implement objectives related to Strategy A, the inventory and prioritization of natural and cultural assets. The result was development of a South Mountain Cultural Heritage Plan integrating the identification and appreciation of natural and cultural resources using a cultural landscape approach.

The South Mountain Cultural Heritage Plan is a long-range project to develop a regional plan for defining, interpreting, and sharing the South Mountain landscape's major historical contexts or narratives. Using a cultural landscape approach, the project is intended to:

- Greatly increasing the knowledge and understanding of the presence and importance of the cultural resources at a landscape level in the region;
- A repository for regional cultural resource information;
- Ensuring the preservation of important cultural resources while providing public access to them;
- Providing information about the cultural resources for tourism and education materials by telling the stories about the region's history;
- Streamlining the environmental review and permitting processes for proposed development and redevelopment in the region by providing information about the presence, absence, and significance of cultural resources at a landscape level, in lieu of project-by-project and site-by-site inventorying and analysis;
- Enhancing local and regional land use planning and zoning to protect and enhance important cultural resources and their settings;
- Enhancing Michaux State Forest cultural resource management through the identification of important cultural resources at the landscape level.

There is currently no standardized or coordinated Geographic Information System (GIS) mapping and database for all of the cultural resources of the region, and many historically-significant sites are not mapped on the PHMC's Cultural Resources GIS (CRGIS). Cultural resource maps are on a variety of paper and electronic media. Historic documents and artifacts are stored in a variety of local facilities without appropriate cataloging, access security and environmental controls.

While the Partnership has identified potential landscape-level historic and cultural themes in its work over the years, there are currently few historical contexts written to describe those themes at a landscape level into which the region's historic and cultural resources can be better appreciated. Currently, cultural resources are usually described on a site-specific basis with limited context information.

Similarly, there is currently no comprehensive cultural resource management plan for the region, nor is there an organization with the responsibility to develop or implement one. The Heritage Area Program administered by the DCNR does not include the South Mountain region. There are no cultural heritage planning initiatives proposed or underway in the other Conservation Landscape Initiative areas. Proposed land development activities affecting known cultural resources are required to comply with the State History Code and the National Historic Preservation Act when state and federal funds or permits are required. Mitigation of impacts on cultural resources is typically required on a project-by-project, site-by-site basis and is usually not programmatic.

The identification of pre-historic and historic resources for the development of municipal comprehensive plans is not typically a robust effort. Secondary sources are typically used to identify well-know cultural resources and limited field research has been done to identify unknown resources.

Cultural Heritage Plan Approach and Pilot Project

The concept for the South Mountain Cultural Heritage Plan is to develop a regional plan that includes the type of content commonly found in cultural landscape assessments and heritage area management action plans, but expands on that model by incorporating the characteristics of a comprehensive plan. More specifically, the plan should define the area's historical contexts and set goals to interpret and promote its associated resources. It should also recommend land management and revitalization strategies designed to maintain and enhance the distinctive character of the region's communities and rural landscapes.

Cultural landscapes are distinctive landscapes that have been shaped by humans through the conscious or unconscious manipulation of natural systems. Cultural landscapes offer a lens through which to consider how people have adapted to and changed the landscapes upon which they live, and thus can reflect social and cultural attitudes of individuals and communities; a comprehensive understanding of such landscapes can be central to understanding how we have gotten to where we are today, both physically on the landscape and culturally within communities.

The Cultural Landscape Assessment for the Michaux State Forest is a pilot project and initial phase of the larger South Mountain Cultural Heritage Plan, focusing on a distinctive core landscape within the region. It will establish a context and provide a model for the documentation and assessment of other South Mountain landscapes. The project will assist State Forest staff in identifying and managing historic cultural landscape features and resources locally for public benefit and will guide communities and other partners in the recognition and treatment of cultural landscapes regionally.

MICHAUX STATE FOREST

Michaux State Forest is located along the ridgelines of the South Mountains in south-central Pennsylvania and is the central focus of the South Mountain Conservation Landscape. Encompassing approximately 85,500 acres, the state forest straddles the boundaries of Adams and York Counties on the east and Franklin and Cumberland Counties on the west. It is the heart of the Bureau of Forestry's Forest District 1 and is the largest area of conserved lands within the region.

Michaux State Forest is significant as Pennsylvania's first state forest. It is central to the early twentieth century story of conservation and forestry in Pennsylvania and is often referred to as the "cradle of forestry," although it shares this title with the Asheville region of North Carolina. The state forest is named in honor of Andre Michaux and his son, Francois Andre Michaux, the well-known French botanists (DCNR 2009).

Today, Michaux State Forest is a vital part of the regional landscape, providing recreational opportunities to the residents of surrounding communities and managing and preserving important natural resources. The state forest is a key member of the South Mountain Partnership.

DCNR and the Bureau of Forestry

Article 1, Section 27 of the Pennsylvania Constitution states: "*Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.*"

Pennsylvania Department of Conservation and Natural Resources (DCNR) is the lead agency in state government responsible for fulfilling this aspect of the Pennsylvania Constitution. Consequently, its mission states: *We conserve and sustain Pennsylvania's natural resources for present and future generations' use and enjoyment.*

DCNR is charged with maintaining and preserving Pennsylvania's 120 state parks; managing 2.2 million acres of state forest land; providing information on Pennsylvania's ecological and geologic resources; and establishing community conservation partnerships with grants and technical assistance to benefit rivers, trails, greenways, local parks and recreation, regional heritage parks, open space and natural areas (DCNR 2015 Fact Sheet).

In addition to four administrative and support entities, DCNR works through four programmatic bureaus responsible for managing resources and conducting a wide range of conservation, recreation, and education programs:

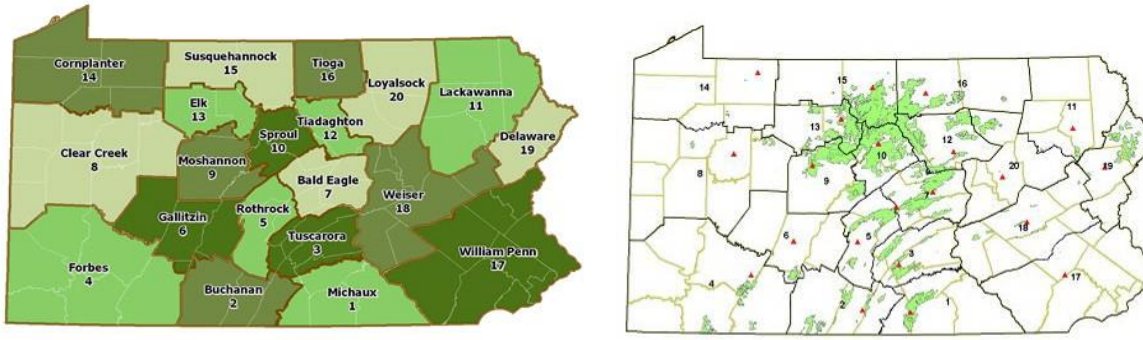
The **Bureau of State Parks** operates, maintains, and manages Pennsylvania's 120 state parks and 30,000 acres of park lands, providing outdoor recreation programs, nature interpretation, and environmental education activities for residents of the Commonwealth.

The **Bureau of State Forests** manages Pennsylvania's state forest system and works to ensure the long-term health, viability and productivity of the Commonwealth's forests and ecosystems.

The **Bureau of Recreation & Conservation** provides technical and financial assistance for community parks, trails, recreational facilities, and regional programs in partnership with county and local governments; land trusts; and greenway, trail, river, and heritage organizations. This bureau manages DCNR's Conservation Landscape Initiative.

The **Bureau of Topographic and Geologic Survey** serves the citizens of Pennsylvania by collecting, preserving, and disseminating impartial information on the Commonwealth's geology, geologic resources, and topography to promote understanding, wise use, and conservation of Pennsylvania's lands and natural resources (DCNR 2015 Fact Sheet).

Michaux State Forest is part of DCNR's Bureau of Forestry and is headquarters and the primary resource within Forest District 1 (one of twenty state forest districts) which encompasses York and Adams Counties and eastern portions of Franklin and Cumberland Counties.

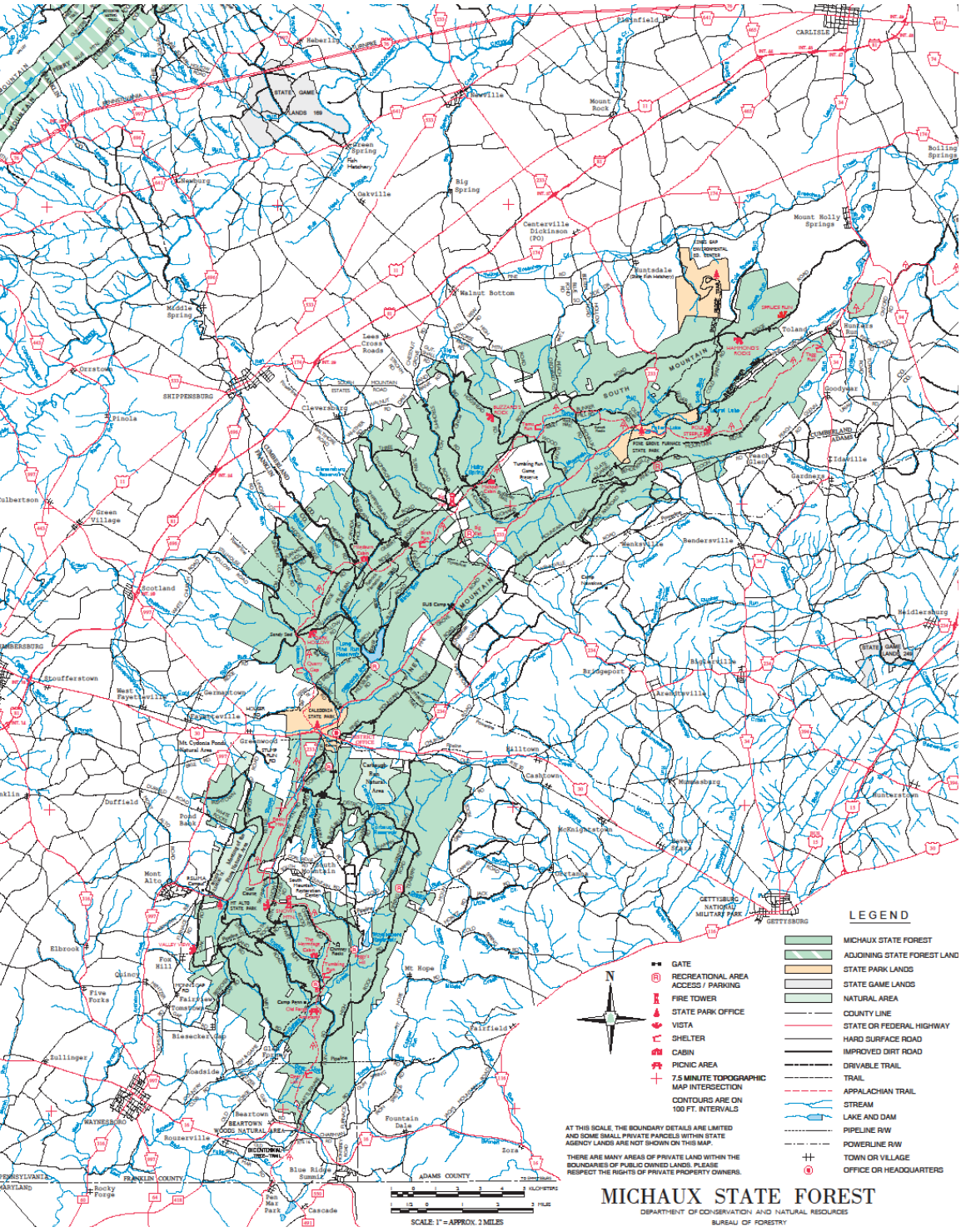


Pennsylvania's State Forest Districts (left) and State Forests (right) (DCNR)

The mission of the Bureau of Forestry is to ensure the long-term health, viability and productivity of the Commonwealth's forests and to conserve native wild plants.

The Bureau of Forestry fulfills this mission by:

- Managing state forests under sound ecosystem management, to retain their wild character and maintain biological diversity while providing pure water, opportunities for low-density recreation, habitats for forest plants and animals, sustained yields of quality timber, and environmentally sound utilization of mineral resources;
- Protecting forestlands, public and private, from damage and/or destruction by fires, insects, diseases and other agents;
- Promoting forestry and the knowledge of forestry by advising and assisting other government agencies, communities, landowners, forest industry, and the general public in the wise stewardship and utilization of forest resources;
- Protecting and managing native wild flora resources by determining status, classifying, and conserving native wild plants (DCNR 1995:32).

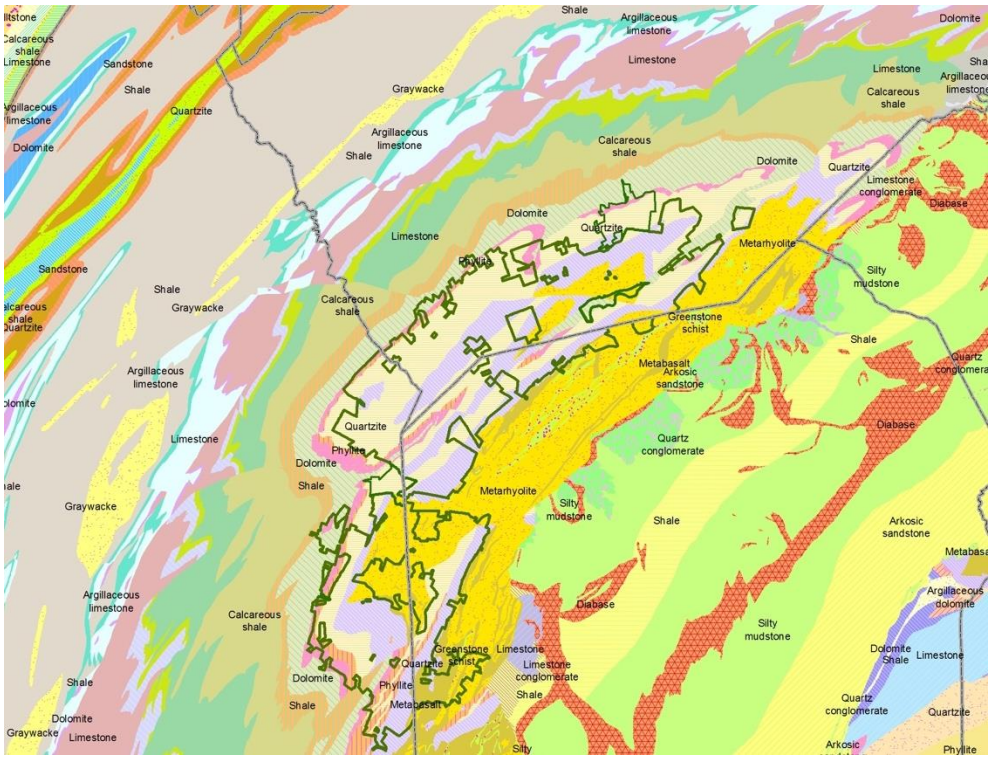


Public Use Map for Michaux State Forest

Landscape Context

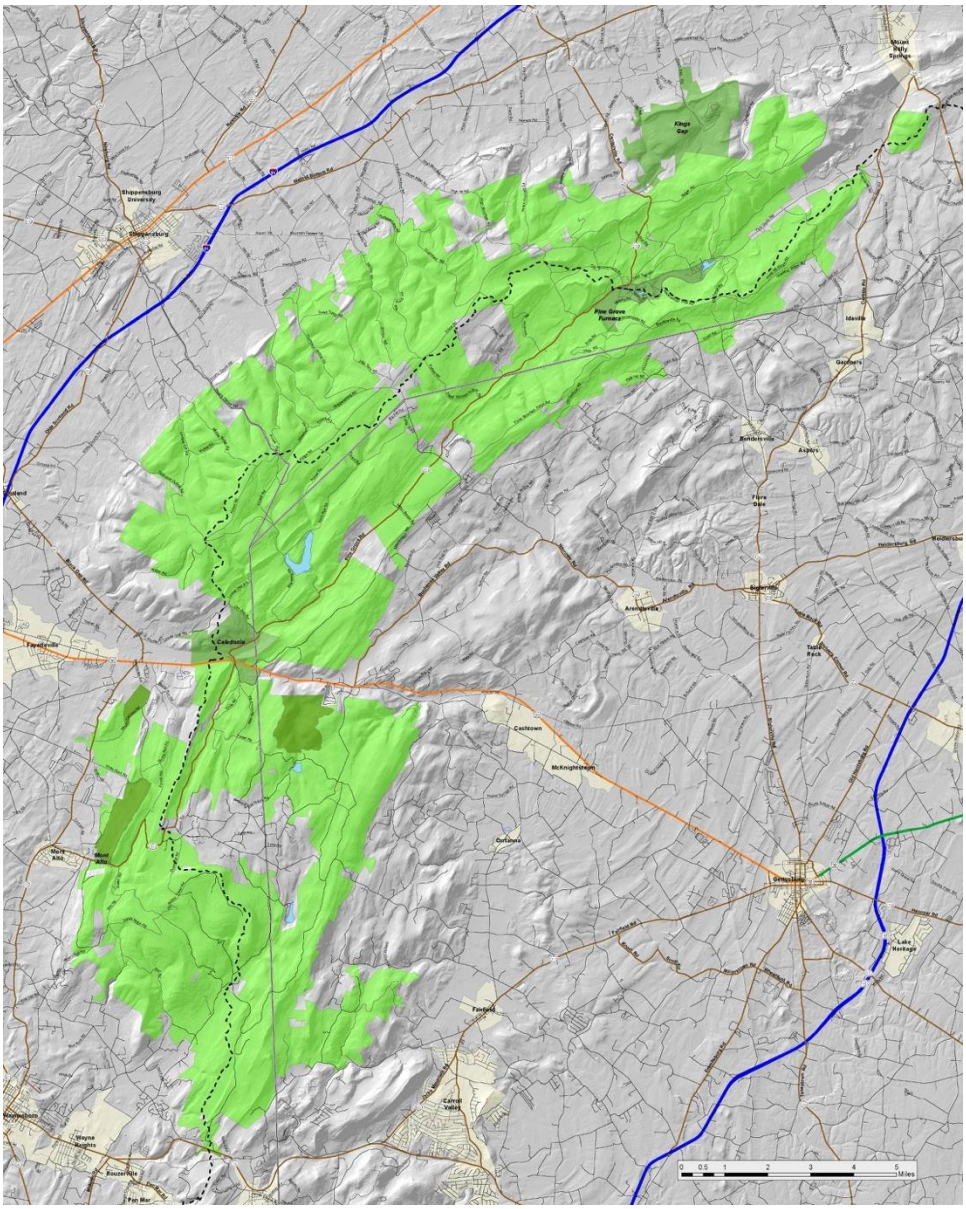
First established in 1901, Michaux State Forest is comprised primarily of former iron furnace lands that had been ravaged by the extensive harvesting of trees to create the charcoal that fueled local iron furnaces. Over the past hundred years, employing evolving forestry management philosophies and techniques, the state forest lands have succeeded into a maturing second growth forest.

Chapter 2 of this Cultural Landscape Assessment provides more detail on the South Mountain landscape. The Michaux State Forest lands are located primarily on the quartzite and sandstone rock formations that are resistant to weathering and create the steep north-south ridges of the South Mountain system. Too steep for other uses and with poor, shallow soils, these ridges supported the forests that fed the local iron industry. With the forests removed and the local iron industry in decline, the land was good for little else and was inexpensive for purchase and reclamation by the Commonwealth.



The boundaries of Michaux State Forest closely follow the alignment of South Mountain's quartzite and sandstone rock formations

Today, forests of oak species, including chestnut, scarlet, northern-red, black, and white oak, along with red maple, black birch, blackgum, hickory, pine and tuliptree dominate the slopes. A mix of oak and pitch pine is common on ridge tops that tower 1000 feet above the limestone valleys to the east and west (DCNR 2015 Michaux Website).



Roads and trails within Michaux State Forest (placeholder for roads/trails map)

Roughly parallel north-south roads follow the ridge tops and valleys of the state forest's landforms. Intersecting east-west crossroads follow mostly valleys and hollows that cut through the ridges. The state forest has a hierarchy of **roads and trails** that are managed for various uses, most of which were once used for logging. They include:

- Hard surface roads for public automobile travel;
- Improved dirt roads for sightseeing and forest automobile access;
- Drivable trails for off-road vehicles;
- Administrative roads for staff access and non-motorized recreational uses;

- Trails for hiking, horseback riding, and some recreational motorized uses;
- Special trails for hiking that have received special designation, most prominently the nationally designated Appalachian Trail that follows a north-south course through the state forest (DCNR 2009).

Water is probably the most important single resource within Michaux State Forest. The need for a safe water supply was a primary reason that the state legislature was convinced to preserve the forest in the early twentieth century. Today, several adjacent communities still obtain all or part of their water supply from within forest lands. Until recently there have been four impoundments, five wells, and seven developed springs within Michaux providing water to local residents on the mountain and in the adjacent valleys below (DCNR 2009).

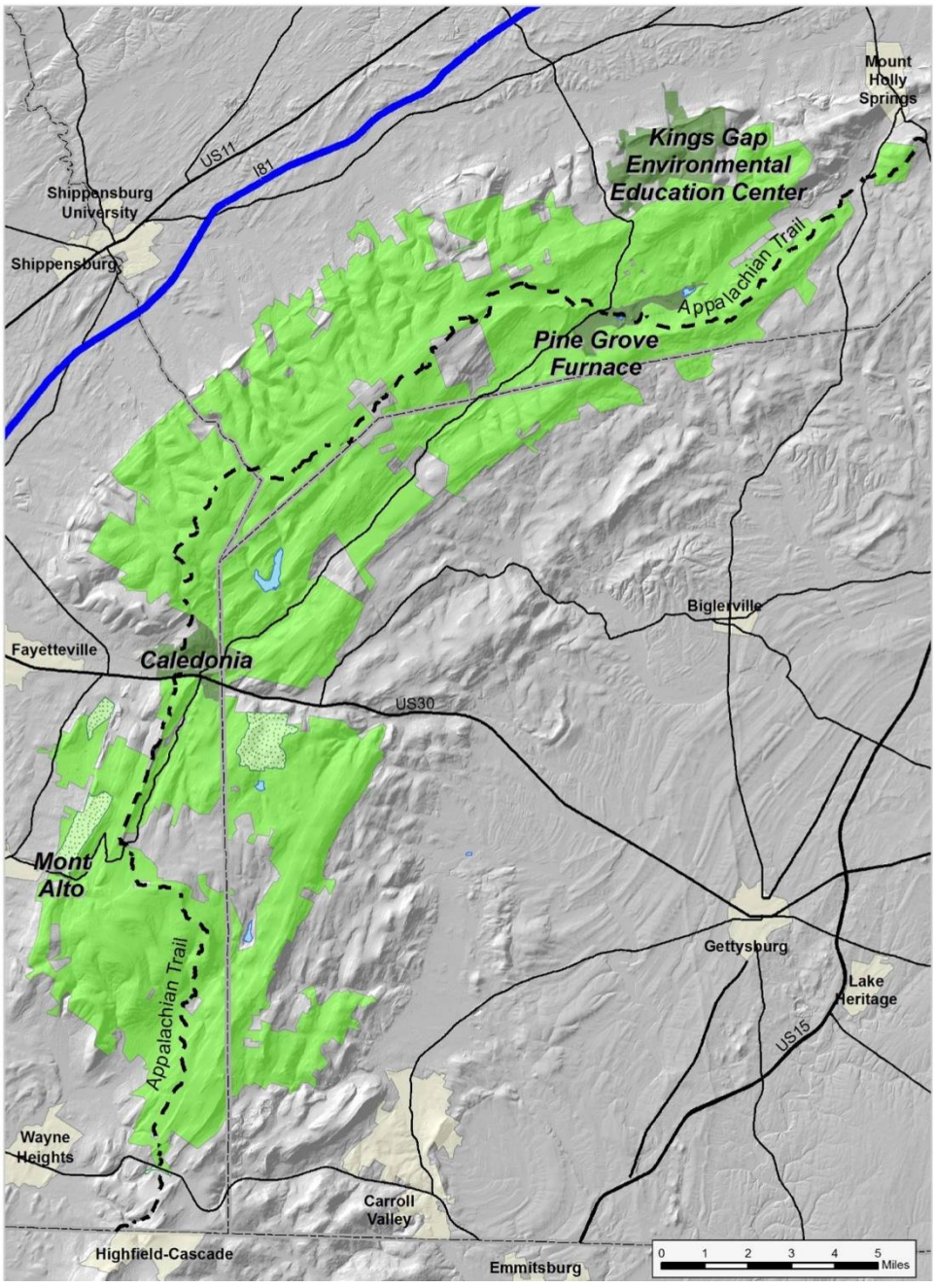
County surveys created over the past twenty years through the Pennsylvania **Natural Heritage Program** have identified a number of important ecological plant communities and locations within Michaux State Forest that warrant special notice and protection. These are discussed further in Chapter 2, and all are included in the state forest's management and protection program.

Several of these have been designated **Natural Areas**, a special management designation used by the Bureau of Forestry to protect unique or unusual biological, geological, scenic, and historic features. Natural areas are left alone to be managed by nature, and human intervention is limited. They provide places for scientific observation, protect special plant and animal communities, and conserve outstanding examples of natural beauty. Four designated Natural Areas are located within Michaux State Forest:

- **Meeting of the Pines Natural Area** – A 611-acre Natural Area located adjacent to the Mont Alto campus featuring five species of native pines growing together;
- **Carbaugh Run Natural Area** – A 780-acre area established to protect several unique archeological sites where Native Americans quarried stone and produced projectile points;
- **Mt. Cydonia Ponds Natural Area** – A 183-acre area on the lower western slopes established to protect the numerous seasonal ponds scattered throughout the area that provide critical breeding habitat for certain reptiles and amphibians;
- **Beartown Woods Natural Area** – A 27-acre area that is a relic northern hardwood forest type found in northern Pennsylvania, New York, and New England (DCNR 2009).

Special Wildlife Management Areas are another designation used for areas where improved habitat can be created to benefit threatened species. Michaux State Forest established and manages forty-three herbaceous wildlife openings across the forest as Special Wildlife Management Areas to provide improved brood-rearing habitat for wild turkey, whose population has severely declined here. Current efforts involve rejuvenating these areas to a diverse mix of native grass, wildflower, shrub, and tree species that provide year-round food and cover for game and non-game species (DCNR 2015 Management Activities).

Michaux State Forest is adjacent to four **state parks** with which it shares significant resources and has a close working relationship. They include Caledonia State Park, Pine Grove Furnace State park, Mont Alto State Park, and Kings Gap Environmental Education and Training Center.



Michaux State Forest in its regional landscape context

Programming

As a productive working forest, Michaux State Forest provides timber resources to the local economy while managing for ecosystem health and the natural character of the forest. Harvesting of **timber** in Michaux State Forest brings in about $1 million per year in saw-timber and pulpwood sales to the private sector (DCNR 2009).

Timber sale contracts are normally executed with a two-year timeframe to complete the harvest. The 2015 work plan for Michaux lists nine active timber sales, five approved sales, and five tentative sales in progress (DCNR 2015 Management Activities).

Michaux State Forest provides a variety of active outdoor **recreational opportunities** for the general public and is the venue for a number of yearly events. The state park's recreational attraction is enhanced by the presence of four state parks, Mont Alto, Caledonia, Pine Grove Furnace, and Kings Gap, within or adjacent to it and the recreational programming they provide.

Michaux is one a few state forests in Pennsylvania experiencing extreme recreation use pressures, primarily due to its proximity to surrounding populations. However, the state forest receives very limited resources in support of the varied and important recreational opportunities the forest provides to residents of the surrounding communities and visitors.

Recreational opportunities include:

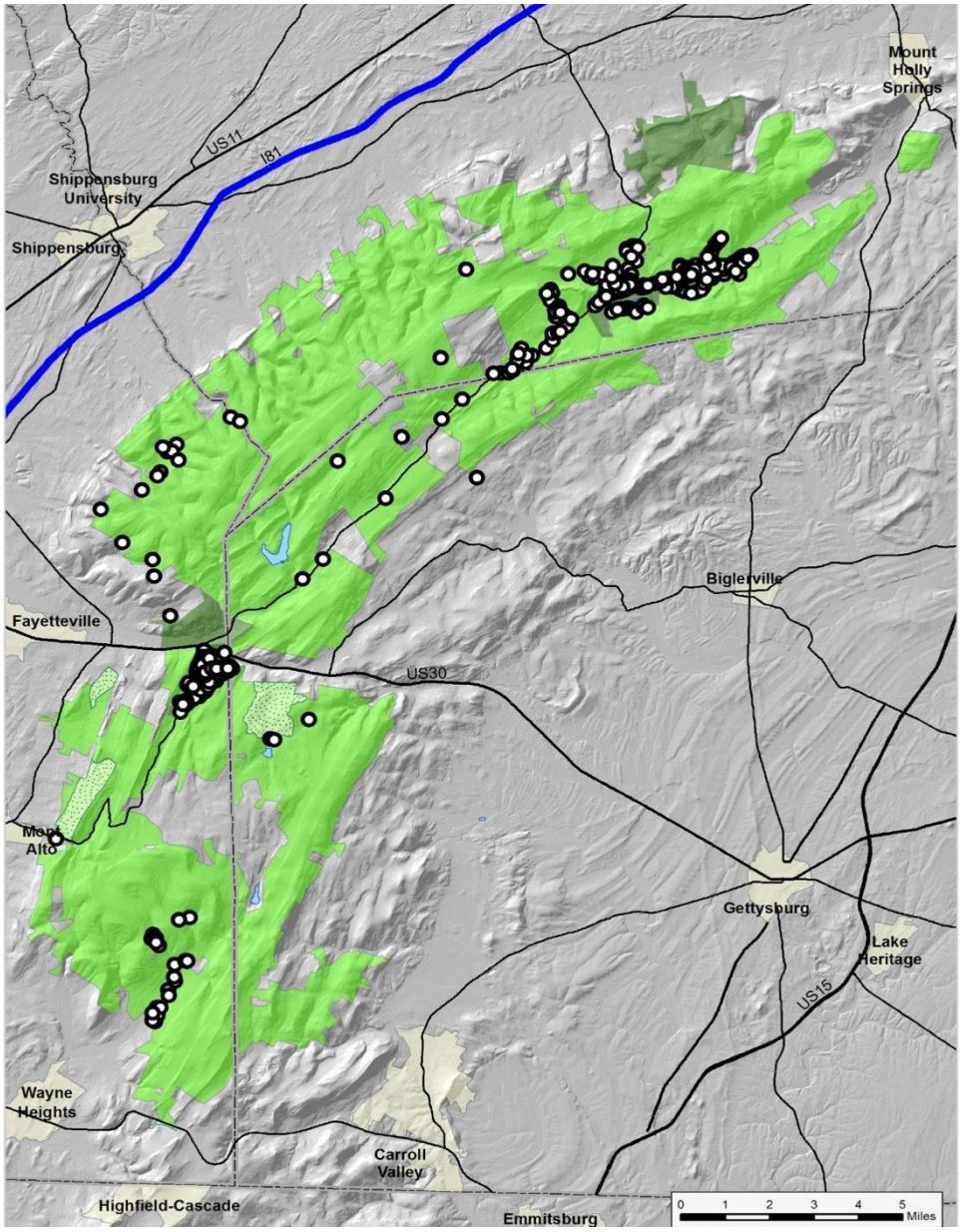
- Scenic or pleasure driving;
- Hiking;
- Picnicking;
- Camping;
- Fishing and boating;
- Hunting;
- Horseback riding;
- Cross-county skiing and snowshoeing;
- Mountain biking;
- Motorized trails (ATV and snowmobile).

Recreational use of Michaux State Forest is its most visible activity. Its economic impact on the local area approaches that provided by the forest's timber and water resources. Michaux State Forest and the state parks located within it provide a full range of recreational opportunities, including an eighteen-hole golf course managed by Caledonia State Park. Scenic driving is the single largest use of state forests; for many this is the sole purpose of their visit to state forest lands. Michaux has about 300 miles of trails, many of which are not blazed and follow the course of abandoned logging roads. Activities such as ATV riding, horseback riding, mountain biking, rock climbing, and primitive camping are becoming increasingly popular. (DCNR 2009; DCNR 2003:230).

Because of Michaux State Forest's striking character and its location in south-central Pennsylvania both as a prominent regional feature and within driving

distance of the major metropolitan areas of Philadelphia, Baltimore, and Washington, the state forest is heavily used as a recreational destination. Heavy recreational use places stress on the landscape and its resources and taxes the state forest's staff capabilities. Overuse can cause significant damage, such as graffiti at popular and accessible locations and erosion along motorized trails.

Michaux State Forest is also a popular location for **events**, many of which are large annual events sponsored by outside organizations. Occurring from April through October, they include running events, mountain biking events, horseback rides, treks, reenactments, and a motorcycle race. The 2015 list of management activities for Michaux includes 16 large events and is incomplete.



Leased sites with privately owned cabins within the state forest

Public outreach and **engagement** is an important part of the state forest's responsibilities. State forest staff stays in touch with local partners, participates in local programs, and provides information at public and partner meetings on an ongoing basis. Informational meetings for the general public are conducted on issues within the state forest as well.

The state forest conducts trail work **volunteer** days approximately four times a year. State forest habitat tours are also provided about four times a year. The tours are designed to provide an overview of state forest goals and activities and provide both the general public and various stakeholder groups better understanding of the social and ecological goals that drive the state forest's management priorities and activities (DCNR 2015 Management Activities).

Finally, Michaux State Forest is host to over 400 **leased campsites** spread throughout the forest along primary roads. Private owners holding these leases have been permitted to build cabins, many of which have grown into full-scale residences over the years. The leases generally involve small parcels of land, usually about one-quarter-acre in size, with leases that are renewable for 10-year terms. Many leases have been handed down within families, generation to generation. In most cases existing leases may be transferred to new owners, provided the new lessees are Pennsylvania residents. Their use as permanent residences is prohibited.

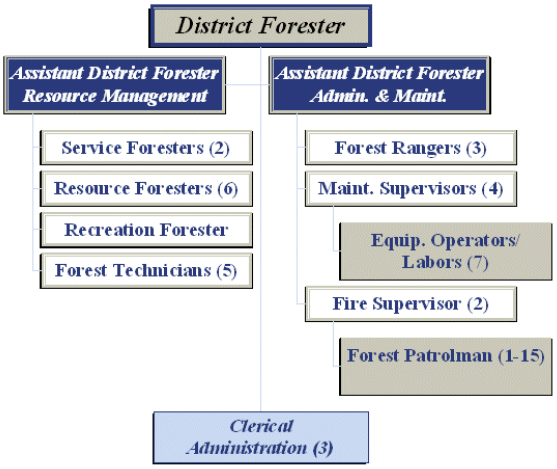
Sites were first leased on state forest lands in the first half of the 1900s, mostly to hunting groups. The introduction of long-term leases allowed owners to construct small cabins for recreational use on their sites. This program was started in 1913 and continued through 1970, when state forest land was closed to additional leased forest campsites.

Management of the forest surrounding leased forest campsites is intended to preserve and enhance their aesthetic value and generally involves maintaining a 150-foot uneven-age management buffer around existing buildings (DCNR 2003:226 & 235).

Forest Management

Michaux State Forest is managed by the staff of Forest District 1 based at its headquarters in the state forest on U.S. Route 30 near its intersection with PA Route 233. The District staff is comprised of thirty full-time staff members and ten seasonal employees.

The staff is led by a District Forester and two Assistant District Foresters. One Assistant District Forester with a crew of six foresters is responsible for forest resource management activities. The other Assistant District Forester oversees staff responsible for physical maintenance. They include two crews, one of which works predominately on road maintenance and the other which works predominately on building maintenance. This staff also includes four rangers, a mechanic, and the Fire Forester. The District has two full-time administrative staff members.



Typical District Office Organization Chart (DCNR 2003:13)

District staff manages Michaux State Forest in accordance with policies, goals, and objectives established in the 2003 State Forest Resource Management Plan and its 2007 Update. The State Plan, in turn, is based upon the Bureau of Forestry's strategic plan, *Penn's Woods - Sustaining Our Forests*.

When the State Plan was completed in 2003, its policies and goals were used to create individual Forest Resource Management Plans for each of the Bureau's tewnty state forests. However, most of these individual plans, including the one for Michaux State Forest, were very general in nature and did not provide detailed management guidance with respect to conditions in the landscape. Michaux State Forest will be developing a new, detailed Forest Resource Management Plan in 2016. This Cultural Landscape Assessment is anticipated to serve as the cultural resource component of the 2016 plan.

2003 State Forest Resource Management Plan and 2007 Update

The story of the evolution of forest conservation and management can be told in the history of Michaux State Forest. The management of Pennsylvania's state forests has been an evolving process, beginning with the first purchase of land for Michaux State Forest in 1898. Early management efforts focused on the protection of forest resources and were characterized by restoration, reforestation, and land acquisition.

As Pennsylvania's forests recovered in the early and mid-1900s, management philosophies changed. During World War II, as well as in the post-war era, raw material extraction became the primary management objective with research and management efforts focused on single commodities or species. Intensive development of recreational facilities and timber management began a shift in resource management philosophy during the 1950s and 1960s.

By the 1960s, increasing demands by various forest users, as well as a renewed environmental awareness, resulted in the development of the management concept of multiple-use or multiple-resource management. Although certain resources were considered dominant, there was an effort to include a wider array of considerations into management strategies (DCNR 2003:7).

The initial management plans for state forests, written in 1955, focused primarily on timber management and watershed protection. Major revisions in the plans written in 1970 and 1985 incorporated new knowledge and reflected these changing management philosophies and cultural values.

In 1992, with increasing pressures on state forests, the Bureau of Forestry initiated a fourth generation of planning with a strategic planning effort to address the issue of long-term sustainability. In 1995, this effort resulted in the bureau's strategic plan, *Penn's Woods - Sustaining Our Forests*. As part of the strategic planning effort, the bureau adopted a mission statement, noted earlier in this section, which articulates the bureau's commitment to manage the state forest using the principles of ecosystem management. A new State Forest Resource Management Plan based on principles of ecosystem management was completed in 2003 and updated in 2007 (DCNR 2003:2).

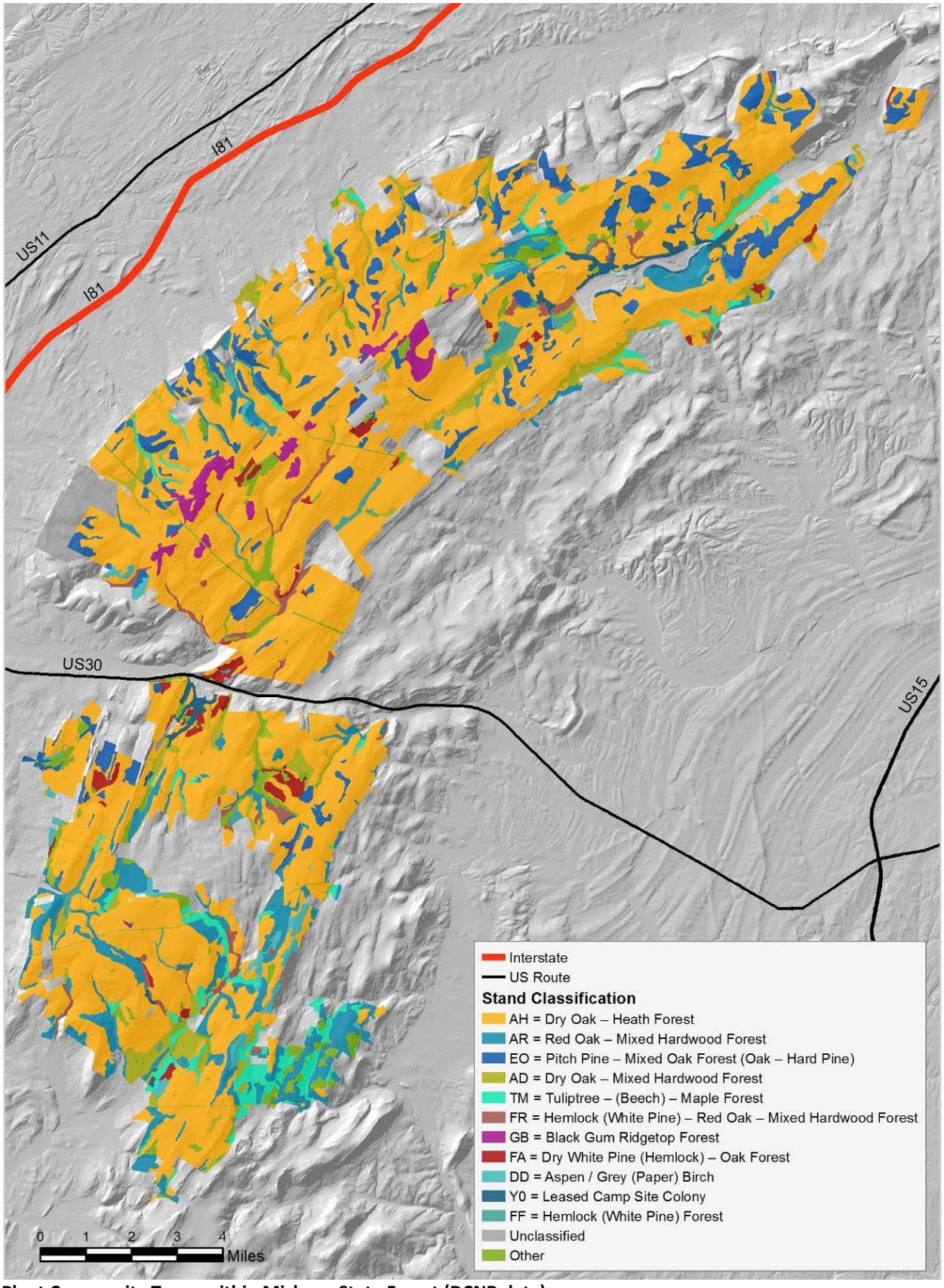
Ecosystem management seeks to conserve the natural patterns and processes of the forest while advancing long-term sustainability. It promotes the conservation of plant and animal communities and the landscapes and habitats that support them. It also accounts for needs and values of people and communities. This results in a holistic, integrated approach to managing forest resources (DCNR 2015 Michaux Website).

As summarized in the Bureau's strategic plan, ecosystem management can simply be defined as an ecological approach to resource management. All aspects of an ecosystem are considered important, and the interdependency of biological and non-biological systems and cycles is recognized as central to this holistic approach. Humans are part of the ecosystem and must be taken into consideration in the development of management strategies. Ecosystem management does not preclude resource use, including timber harvesting, hunting or other recreational activities.

The primary goal of ecosystem management is to keep the complex interdependencies of ecosystems intact and functioning well over long periods of time. The essence of maintaining ecosystem integrity is to retain the health and resilience of systems so they can accommodate short-term stresses and adapt to long-term changes. The key elements include the maintenance of a diversity of plants and animals and the properly functioning nutrient, water and energy cycles (DCNR 1995:8).

The State Forest Resource Management Plan is organized into twelve core sections, plus an Executive Summary and an Overview, to address the resources, uses, and values of the state forests:

1. Communications
2. Ecological Considerations
3. Forest Health Components
4. Geology/Minerals
5. Soil Resources
6. Water Resources
7. Fauna Resources
8. Flora Resources
9. Recreation
10. Silviculture/Timber Management
11. Non-timber Forest Products
12. Infrastructure



Plant Community Types within Michaux State Forest (DCNR data)

Each of the twelve core sections contains an introduction, history, inventory, policy statement, goals, objectives, guidelines or actions, monitoring indicators of sustainability, and critical research needs. This information provides a basic understanding of the directions the Bureau of Forestry intends to follow concerning the management of the state forests. In addition, operating manuals and other documents are referenced and attached via links on the Internet. Together, with its reference materials, the plan provides a comprehensive source of information and guidance on the management issues of the state forest for the Bureau of Forestry and the public (DCNR 2003:3).

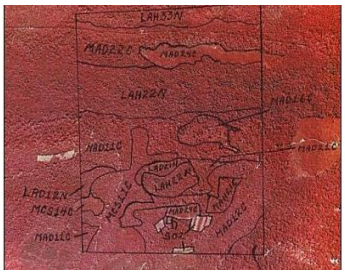
The resource management policies and guidelines as outlined in the State Plan and applied to actual landscapes in the state forests will be an evolving process as more is learned about change in ecological systems. Through scientific study and field experience, the policies and management techniques that tend to yield the desired results will likely change over time. Even the idea of what is a desired result may change. Forest management involves a process of continuous observation, experimentation, and learning.

Land Classification and Management Zones

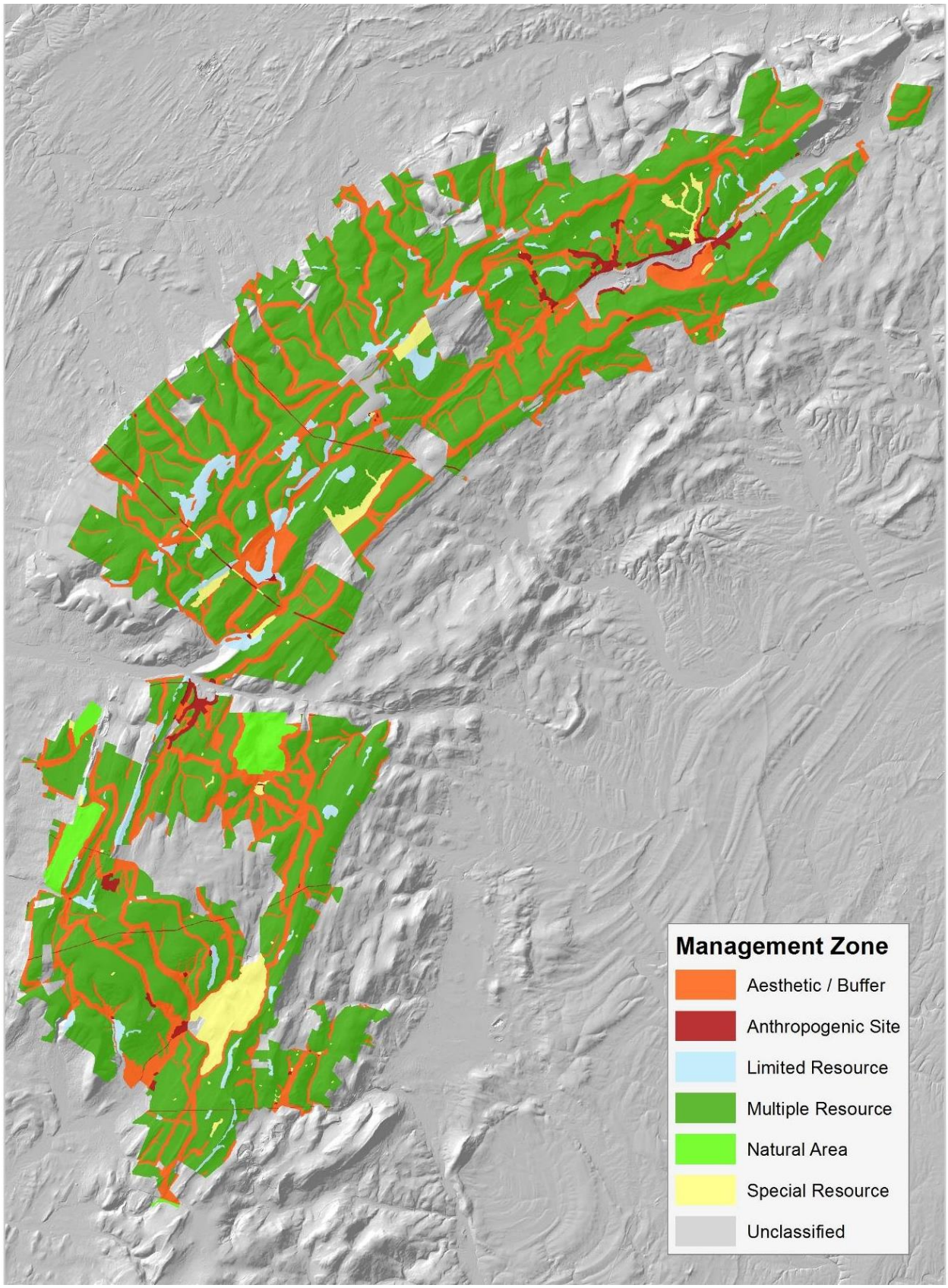
Conducting and maintaining accurate and current forest resource inventories and assessments is critical to implementing ecosystem management and achieving sustainable forestry. As part of its resource planning and management strategy, the Bureau of Forestry conducts and maintains many inventories. These inventories provide information on various levels, including statewide, eco-region, individual state forest, landscape, and finally, plant community type, or forest stand level.

The foundation of the Bureau's inventory and assessment process is the delineation of state forests into land classification and management zones. Through a combination of aerial photo interpretation and field reconnaissance, every acre of state forest has been delineated into land classification units based on the primary features of the dominant vegetation. This delineation is expressed through assignment of a Land Classification and Management Zone code to every acre of state forest land, providing information on:

- Management Zone;
- Plant Community Type;
- Site Class;
- Size and Stocking Class;
- Commercial Availability.



This information was documented on aerial photographs and then digitized to create a GIS coverage of approximately 70,000 land classification units of forest stands, each of which contains a code for the above attributes, along with district, acreage, and compartment number.



Management Zones within Michaux State Forest (DCNR data)

Using this information, various attributes of the forest landscape can be mapped for planning purposes. For example, the land classification unit code MAD24C denotes; M = Multiple Resource Management Zone; AD = Dry Oak-Mixed Hardwood Forest; 2 = Site Class 2; 4 = Size and Stocking Class 4; and C = Commercial land base (DCNR 2003:19-20).

Detailed information on the classification system and code is included in an *Inventory Manual of Procedure for the Fourth State Forest Management Plan*, also known as the Typing Manual (DCNR 1999). This classification system is used by Forest Districts in the management of forest lands on a year-to-year basis. The analysis of this information and the modification of classification units based on the analysis is a continuing process undertaken in ongoing management decisions and the development of State Forest Management Plans for each of the 20 State Forests. The results of some analyses are presented in various chapters of the State Forest Resource Management Plan.

Appendix 1A of the Typing Manual describes the 7 Management Zones currently used in the management of state forests. They include:

AESTHETICS / BUFFER MANAGEMENT ZONE (B) is applied to areas where connectivity, aesthetics and water quality conservation are the primary values. These areas encompass a wide array of lands and are associated with linear features such as roads, trails, and stream corridors or encompass significant features of State Forest lands. Appropriate forest community types within this zone are considered part of the commercial forest land base, however, timber harvest is excluded from certain areas. In addition to roads, trails, stream corridors, this management zone includes areas such as wetlands, park buffers. picnic areas, lease sites, and buffers around designated Natural Areas.

ANTHROPOGENIC SITE MANAGEMENT ZONE (H) applies to man-made structures or facilities such as roads, rights-of-ways, mineral sites, tower sites, leases, forest district buildings, and so forth. The primary value for this zone is human amenities.

LIMITED RESOURCE MANAGEMENT ZONE (L) is applied to areas of State Forest lands where management alternatives are limited due to site quality or topographic constraints. Recreation, aesthetics, water, and soil retention are the primary values. Site or topography are inhibiting factors that restrict or prohibit management practices on these areas (e.g. recreational facilities such as picnic areas, parking lots, restrooms, etc. would typically not be placed on these areas). This zone is typically not part of the commercial forest land base. Timber harvesting is usually not practical.

MULTIPLE RESOURCE MANAGEMENT ZONE (M) is applied to areas of State Forests where timber, water, recreation, fauna, flora and minerals are the major values. This is the majority of lands within the State Forest system and is the least restrictive, most encompassing management zone. Appropriate forest community types within this zone are considered part of the commercial forest land base.

NATURAL AREA MANAGEMENT ZONE (N) is applied to those areas that have been designated or are pending designation by the department as State Forest

Natural Areas. Natural Areas are defined as an area of unique scenic, historic, geologic or ecological value, which is maintained in a natural condition by allowing physical and biological processes to operate, usually without direct human intervention. These areas are set aside to provide locations for scientific observation of natural systems to protect examples of typical and unique plant and animal communities, and to protect outstanding examples of natural interest and beauty. The four designated Natural Areas within Michaux State Forest are listed earlier in the Landscape Context section of this chapter.

SPECIAL RESOURCE MANAGEMENT ZONE (S) is applied to areas of State Forest lands that are managed for specific values such as public plant sanctuaries, special wildlife management areas, certain recreation sites, vistas and reservoirs. These zones have specific management recommendations or plans; recommendations depend on the values that are being recognized. Forest community types within this zone are typically not part of the commercial forest land base, however timber harvesting is allowed if specific management recommendations recognize timber harvesting as an appropriate management tool. Michaux State Forest manages 43 designated Special Resource Management Areas across forest lands to provide improved habitat for the wild turkey population.

WILD AREA MANAGEMENT ZONE (W) is applied to those areas that have been designated or are pending designation by the department as State Forest Wild Areas. A Wild Area is defined as an extensive area which the general public is permitted to see, use and enjoy for such activities as hiking, hunting, fishing and the pursuit of peace and solitude. No development of a permanent nature is permitted so as to retain the undeveloped character of the area and conserve ecological resources. There are no designated Wild Areas within Michaux State Forest (DCNR 1999:13-17).

2010 Pennsylvania Forest Action Plan

The Bureau of Forestry receives funding from the US Forest Service for a variety of programs. As a requirement for receiving this funding, the 2008 Farm Bill required the bureau to undertake a five-year assessment documenting the condition of Pennsylvania's forests across all ownerships and establishing a framework for developing strategies to achieve long-term forest sustainability.

This evaluation and planning is known as the *Pennsylvania Forest Action Plan* (DCNR 2010 Action Plan). In addition to meeting these Federal requirements, the bureau utilized this process as an opportunity to undertake a holistic, long-term evaluation and strategic planning effort for Pennsylvania's forests. The completion of the Farm Bill requirements in June, 2010 was the first step of a longer-term, continuous endeavor, including updating the bureau's strategic plan: *Penn's Woods*, which was developed and adopted in 1995 (DCNR 2010 Assessment:1-1).

The Pennsylvania Forest Action Plan took an in-depth look at the state's forest resources and was organized into two parts. The first part, The *Pennsylvania Statewide Forest Resource Assessment*, was an assessment of current forest conditions and trends. The assessment indentified priority issues, delineated important landscapes, and laid a foundation for the development of strategies and actions (DCNR 2010 Assessment). The second part, *Pennsylvania Forest*

Strategies, outlined long-term strategies for addressing identified issues and achieving sustainability in Pennsylvania's forests (DCNR 2010 Strategies).

The assessment of current conditions looked at eighteen detailed indicators of sustainable forestry organized under seven categories or criteria:

Criterion 1: Conservation of Biological Diversity

Criterion 2: Maintenance of Productive Capacity of Forest Ecosystems

Criterion 3: Maintenance of Forest Ecosystem Health and Vitality

Criterion 4: Conservation and Maintenance of Soil and Water Resources

Criterion 5: Maintenance of Forest Contribution to Global Carbon Cycles

Criterion 6: Maintenance and Enhancement of Long-Term Multiple Socioeconomic Benefits to Meet the Needs of Societies

Criterion 7: Legal, Institutional, and Economic Framework for Forest Conservation and Sustainable Management (DCNR 2010 Assessment:3-2)

Analysis of the eighteen indicators of sustainability revealed a cautionary sustainable conclusion, with many causes for concern. Some indicators, such as forest health, forest composition, and fragmentation and parcelization, rated low and represent major cause for concern. Other indicators, including overall amount of forestland, water quality, recreation opportunities, and species of concern, received more favorable ratings.

Overall, the assessment found that Pennsylvania's forests tend toward a sustainable condition, but with some areas of major concern. Based on the sustainability analysis and stakeholder input, eight priority issues were identified:

- Land Use;
- Forest Health;
- Forest Management;
- Climate Change;
- Communicating Natural Resource Values;
- Energy Development;
- Wildland Fire and Public Safety;
- Plant and Animal Habitat.

For each issue, the assessment described the situation, presented and discussed available data, and laid a foundation for developing long-term strategies and actions (DCNR 2010 Assessment:6-1).

Part two of the Action Plan outlined strategies for addressing the identified issues. An additional issue not included in the assessment, Recreation and Quality of Life, was added to the original seven.

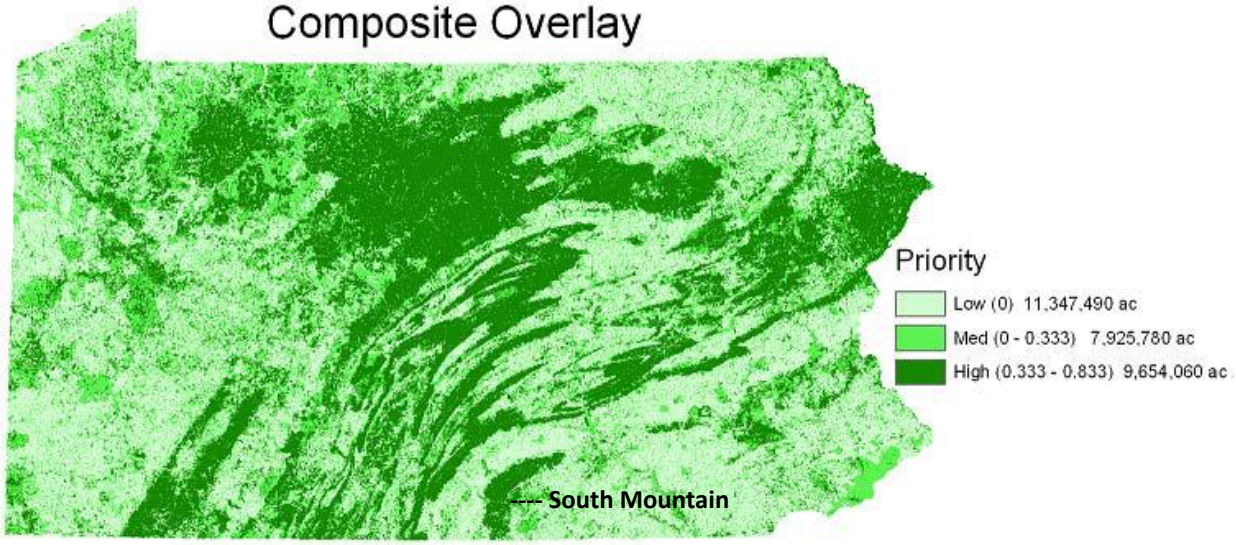
For each issue, a short narrative was provided, along with a list of the specific strategies for addressing it. For some strategies an initial list of tasks or actions was provided. The details of each strategy were organized in a matrix format with the following columns:

1. Long-term Strategy
2. Priority Landscape Areas
3. Secondary Issues
4. Program Areas that Contribute
5. Key Stakeholders
6. Resources Available/Required
7. Measures of Success
8. Supports National Objective

The strategies were designed to be broad in nature and scope. Some encompass current programs while others suggest the need or potential for future directions. Details for the strategies are being further developed as priorities are determined and implementation is undertaken (DCNR 2010 Strategies:ii).

In assessing the conditions of the Commonwealth's forests, the Pennsylvania Statewide Forest Resource Assessment identified **Priority Landscapes** across the state. To identify the Priority Landscapes, six spotlighted perspectives of landscape were used: (1) Forest Pests, (2) Wildfires, (3) Ecological, (4) Water, (5) Urban, and (6) Working Forests. For each, a priority landscapes map was produced that classifies all 28 million acres of the state into high-medium-low priority categories based on the map's theme. The six priority landscape map results were combined into a composite overlay to show intersecting priority landscape areas (DCNR 2010 Assessment, Appendix 5A:5A-1).

These landscape areas will be utilized as a basis for implementing the strategies developed by the Action Plan. With respect to the six spotlighted perspectives, South Mountain and Michaux State Forest ranked as a Priority Landscape under three: Ecological, Water, and Working Landscape. As a result, South Mountain ranked as a High Priority Landscape in the final composite overlay.



Priority Landscapes identified in the Pennsylvania Statewide Forest Resource Assessment (DCNR)

CULTURAL LANDSCAPE ASSESSMENT

This Cultural Landscape Assessment has been undertaken with funding by a Keystone Historic Preservation Project Grant from the Pennsylvania Historical and Museum Commission with additional funding provided by DCNR through the South Mountain Conservation Landscape program under the management of the Appalachian Trail Conservancy.

As noted at the beginning of this chapter, this Cultural Landscape Assessment for the Michaux State Forest is a pilot project and initial phase of the larger South Mountain Cultural Heritage Plan, described previously, focusing on a distinctive core landscape within the region. It will establish a context and provide a model for the documentation and assessment of other South Mountain landscapes. The project will assist State Forest staff in identifying and managing historic cultural landscape features and resources locally for public benefit and will guide communities and other partners in the recognition and treatment of cultural landscapes regionally.

The project has two broad goals:

- To serve as a model for the understanding, assessment, appreciation, and stewardship of historic and cultural resources throughout the South Mountain Conservation Landscape;
- To serve as the historic and cultural component of the management plan for Michaux State Forest.

The significance of a historic property can be judged and explained only when it is evaluated within its historic context. Historic contexts are those patterns or trends in history by which a specific occurrence, property, or site is understood and its meaning (and ultimately its significance) within history or prehistory is made clear. Historians, architectural historians, folklorists, archeologists, and anthropologists use different words to describe this phenomena such as trend, pattern, theme, or cultural affiliation, but ultimately the concept is the same. (NPS 1995/2002: Section V, Understanding Historic Contexts)

Through review of historical background information, resource inventories, and planning documents and through field review of landscapes and resources, this Cultural Landscape Assessment considers the South Mountain landscape's cultural heritage and associated historic resources within a broader context of historical trends to better understand its contribution to national, state, and regional history.

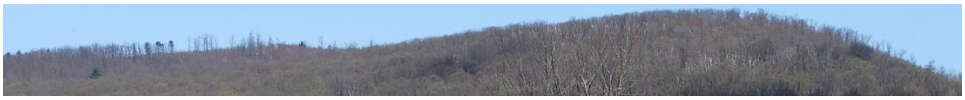
The Cultural Landscape Assessment reviews the surviving physical evidence of cultural activities within several overarching historic contexts and identifies their significance with respect to criteria established by the National Register of Historic Places. Other types of cultural values and associations are also considered where appropriate, such as landscape associations with the history of forestry and conservation and with the historical development of Native American peoples.

Four broad historic contexts are identified and described under which the majority of South Mountain's historic resources developed and its landscape evolved. They include:

- Mineral Extraction and Industry Context;
- Forest, Forestry, and Conservation Context;
- Recreation Context;
- Impact of Government Context;

The history of each historic context is summarized including national, state, regional, and local significance. Much of the local history is based upon the work of a number of local historians and organizations, who have studied the sites and identified available sources.

Associated historic resources and resource types are identified under each historic context, sometimes under several distinct categories. Significance, conditions, and issues related to resources are considered. This assessment is not, however, a complete inventory of historic resources either on South Mountain or within Michaux State Forest. Rather, the assessment provides the context for recognizing and identifying resources and suggests the kinds of additional inventory and studies might be undertaken in the future to more fully fill in remaining gaps.



CHAPTER 2 – THE SOUTH MOUNTAIN LANDSCAPE

The landscape of South Mountain and its surrounding four-county region is unique and is central to Pennsylvania's historical and cultural development. Rising above its adjacent lowlands, South Mountain's ridges create a dominating visual presence and historically served as an obstacle to westward movement. Throughout Pennsylvania's history, from Native American eras to the present, South Mountain has been significant as a source of natural resources.

This dual nature – obstacle to westward movement and source of natural resources – characterizes our relationship with the mountain. The landforms, geology, soils, and waters characteristic of the South Mountain region shaped land use, settlement patterns, and cultural development, creating the south-central Pennsylvania landscape we see today.

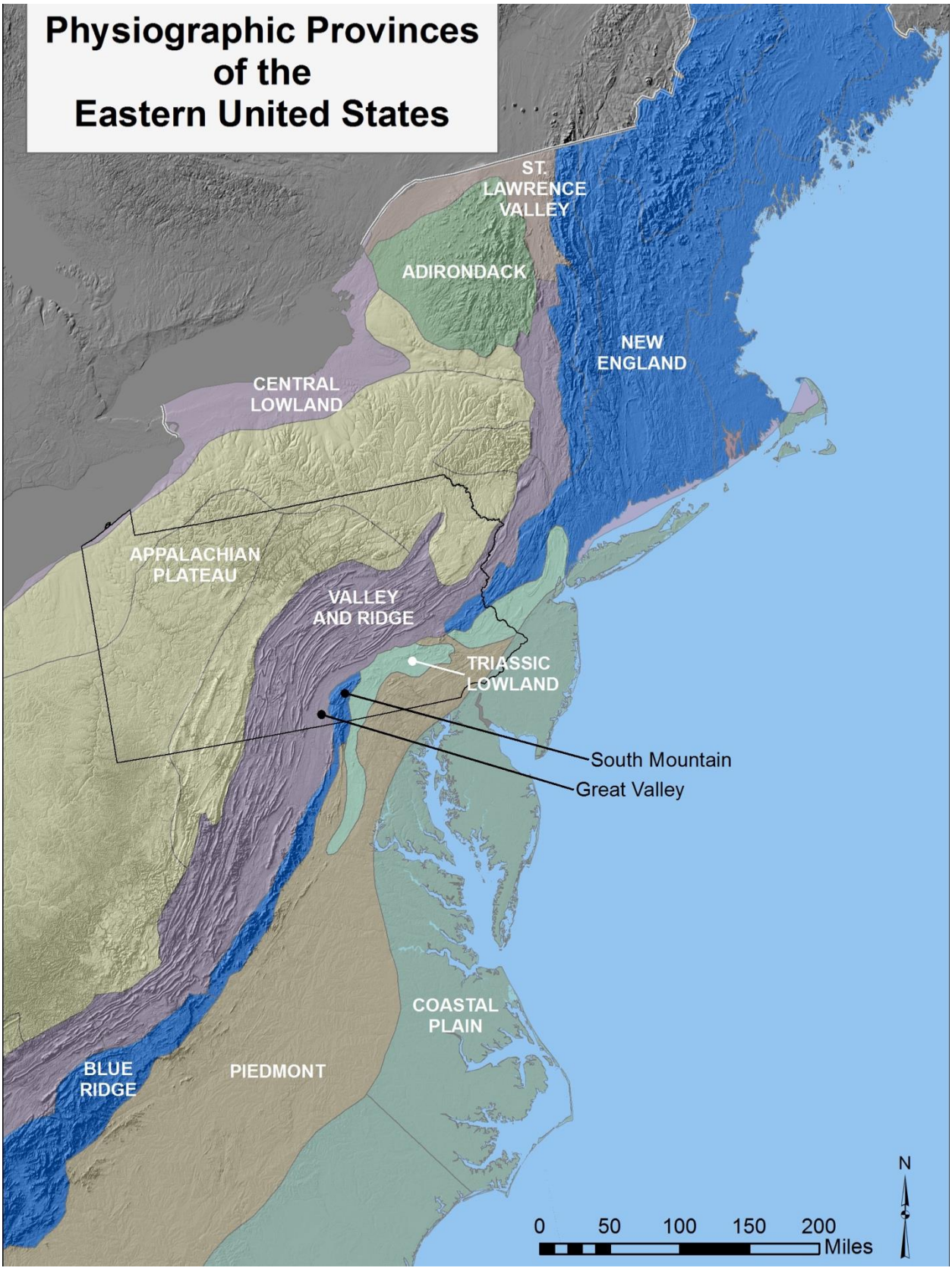
LANDFORMS

The South Mountain Conservation Landscape includes local portions of three vast landforms of national scale and significance.

South Mountain itself is the northern terminus of the great **Blue Ridge Mountains** that extend from northern Georgia through North Carolina and Virginia into Maryland and Pennsylvania. The Blue Ridge Mountains have two general structural components, the broad complex width of the Great Smokey Mountains in North Carolina and the long narrow band of Blue Ridge in Virginia. The Great Smokey Mountains are the highest and most formidable mountains east of the Rockies (Sevon 1991:47; Miller 1995:20).

The Blue Ridge formation extends approximately 70 miles through Maryland and Pennsylvania and is locally known as South Mountain. A complex of ridges and rocky hills, South Mountain begins as a narrow ridge at the Potomac River just east of Harpers Ferry and extends northward, growing wider and higher and joining with the Catoctin Mountains near the Pennsylvania border.

The South Mountain complex is its widest and highest in Pennsylvania in the South Mountain Conservation Landscape. Turning east, the formation plunges into the earth and ends as a series of small rocky hills near Dillsburg. The Pennsylvania portion of the Blue Ridge/South Mountain formation is distinct and different from that in Maryland and Virginia in terms of overall geological structure (Sevon 1991:47; Anthony 2014:1).



Physiographic provinces of the eastern United States

Further north, a similar and related formation reappears as the Reading Prong, a southern extension of the Rambo Mountains in New Jersey, the Hudson Highlands in southeastern New York, and the New England topographic region (Van Diver 1990:15; Miller 1995:20). Between South Mountain and the Reading Prong is a sizable gap, one of the largest breaks in the entire Appalachian mountain barrier and a major avenue heading to the west (Miller 1995:20).

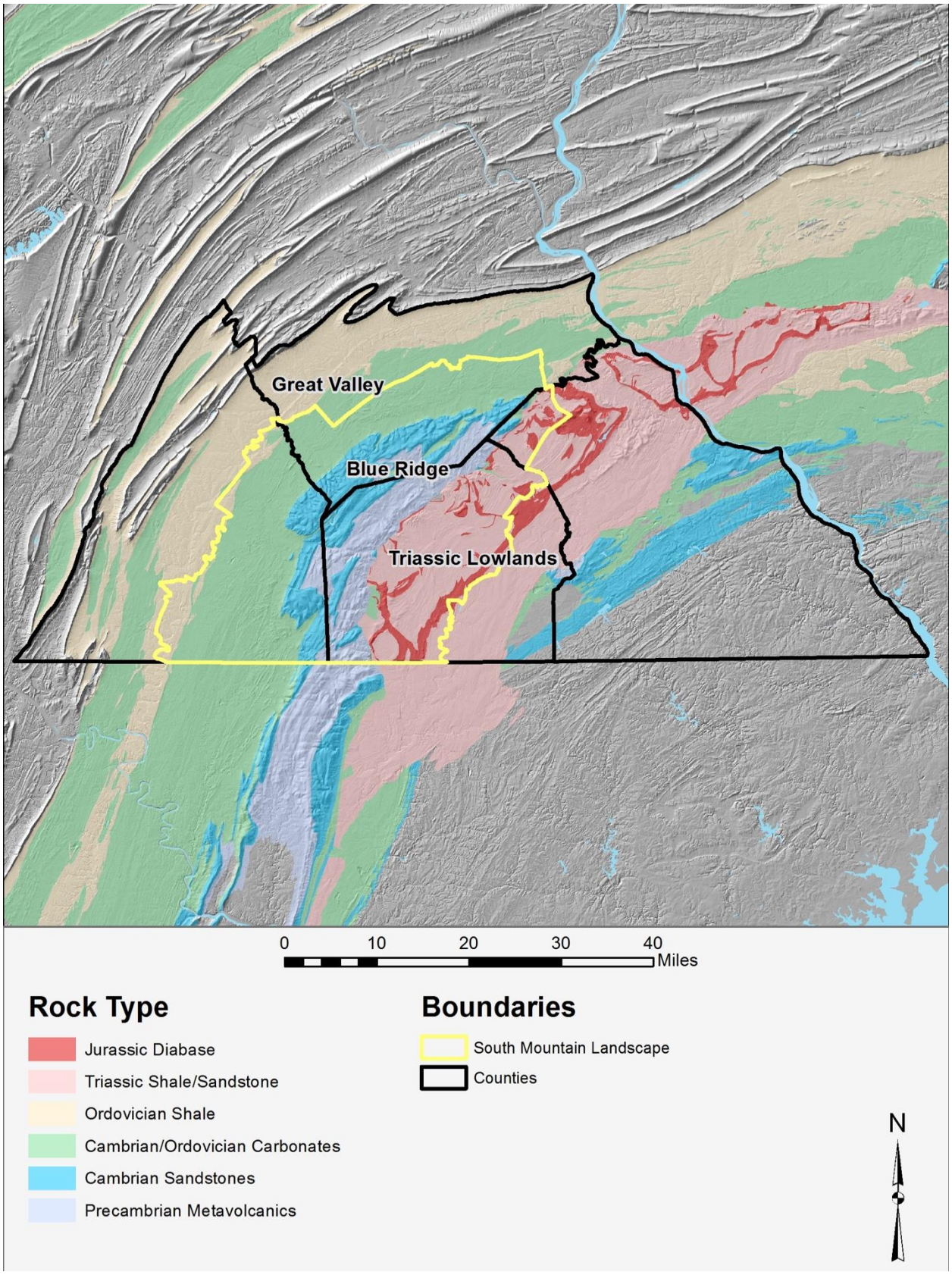
Immediately west of South Mountain and the Blue Ridge formation is the **Great Valley**, a topographically distinct part of Pennsylvania's Ridge and Valley region and its largest and easternmost valley. The Great Valley is part of a trench of continental scale that extends almost without interruption nearly 2000 miles from Quebec to Alabama (Miller 1995:20). The Great Valley portion of this trench stretches from New York to Georgia (Van Diver 1990:14).

In south-central Pennsylvania, the Great Valley is known locally as the Cumberland Valley. To the north, in the middle of Pennsylvania, it is known as the Lebanon Valley and further north as the Lehigh Valley. To the south in Maryland it is known as the Hagerstown Valley, and in Virginia it is the famous Shenandoah Valley.

Regardless of its local names, the Great Valley is known for its fertile limestone soils and was a focus of early European settlement. The valley has also served as an important migration route, a major avenue for emigrants in the 18th and early 19th century from Philadelphia south to North Carolina and west to Kentucky and Tennessee.

To the east of South Mountain are the **Triassic Lowlands**, an area of low rolling topography that blends into the Piedmont region of southeastern Pennsylvania. The Triassic Lowlands of Pennsylvania extend north into New Jersey and New York and south into Maryland. They are disconnected from but associated with similar Triassic formations in Connecticut and Massachusetts, Virginia, and North Carolina (Van Diver 1990:15).

Comprised of red shale, sandstone, and conglomerate, the Triassic region is a rolling plain of reasonably workable soils attractive to agriculture. Intruded into its sedimentary rock formations, however, are areas of volcanic diabase that are resistant to weathering, poor for farming, and form wooded ridges and knobs throughout the landscape.



Regional geological formations

GEOLOGICAL FORMATIONS

Similar to its overall landforms, the geology of the South Mountain Conservation Landscape is comprised of three broad categories of rock: the metamorphic rocks of the mountain, the limestone based rocks of the Cumberland Valley, and the shale and sandstone of the Triassic Lowlands.

The Metamorphic Geology of South Mountain

The oldest rocks within the regional landscape are the metamorphic rocks that form the high ridges and hills of South Mountain, the northernmost portion of the Blue Ridge Mountains. These rocks occur in two general formations, the sandstone/quartzite ridges that are the backbone of the mountain topography and the metarhyolite formation that is its east-facing slope.

Precambrian Metavolcanics

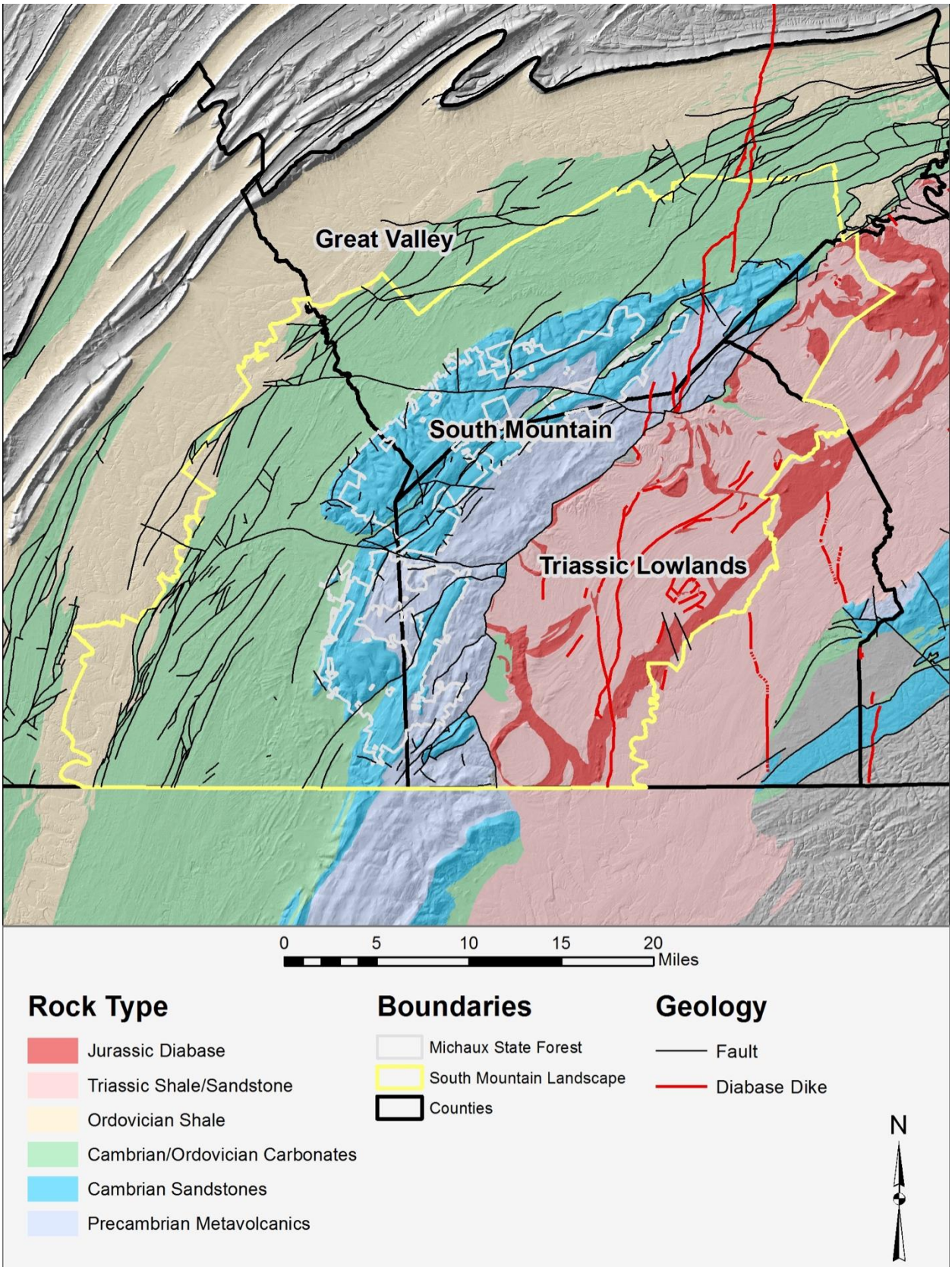
Metarhyolite is a metamorphic volcanic rock that formed as lava flows during a major continental breakup that caused the formation of a major ocean basin more than 600 million years ago in Precambrian time. After the lava flow formed, it was buried and subjected to high temperatures and pressures causing metamorphism and changes to its mineral composition (Way 1986:21).

This formation is also infused with rocks known as metabasalt and greenstone schist which are closely related to the metarhyolite's volcanic history. Together, these rocks are known as the Catoctin volcanics. To the south, in Maryland, the more coarsely grained metabaslt, which forms as an intrusive flow in gaps and fractures underground as opposed to surface flow, is more common than the metarhyolite in Pennsylvania (Way 1986:21; Sevon 1991:34).

Metarhyolite is a hard, light grey to purple rock with a very fine, almost glassy grain caused by the rapid cooling of the initial lava. Due to its hardness and chipping characteristics, metarhyolite was used for the making of chipped-stone tools by Native Americans. South Mountain is well known for its pre-historic metarhyolite quarries, a significant historic resource of the area (Carr 2015:115).

Metarhyolite is the predominant rock of South Mountain's eastern slopes and foothills and includes the Buchanan Valley. Its eastern edge is a deep fault line located west of Fairfield, through Cashtown, and east of Bendersville.

Resistant to weathering, the metarhyolite formation is predominantly steep sloped woodland and includes the western edge and upper reaches of the Adams County Fruit Belt. The soils into which it weathers tend to be deep, stony, and well-drained. While about half of South Mountain's metarhyolite formation is too steep and stony for farming, the remaining portion, mostly occurring in long slopes facing southeastward, has been largely cleared and planted with fruit trees (USDA 1967:3).



Geology of Michaux State Forest and the South Mountain Conservation Landscape

Cambrian Sandstone

To the immediate west of the metarhyolite are the metamorphosed sandstone, quartzite, and conglomerate rock formations that form South Mountain's high ridges. Known as the Chilhowee Group, these formations were originally laid as sediments over the Catoctin volcanics in the widening ocean basin of the Catoctin rift (Way 1986:29; Delano 2015). Like the volcanics, they were metamorphosed by intense heat and pressure over time.

Four distinct geologic formations are identified in the Chilhowee Group that together have a sedimentary thickness of approximately 5200 feet. They include the Loudoun, Weverton, Harpers, and Antietam Formations. The Weverton Formation is known for its resistant ledges of conglomerate quartzite, the gravel of which may have derived from the Catoctin volcanics. On South Mountain, the Harpers Formation is represented by a series of white quartzite beds known as the Montalto Member. Only the Montalto Member and the Antietam Formation are reliably dated, due to the presence of fossils which place them in the Lower Cambrian, around 570 million years ago. The other formations are older, Lower Cambrian to Precambrian (Way 1986:29; Sevon 1991:36).

Highly resistant to weathering, these sandstone/quartzite rock formations form a series of high, generally north-south ridges, such as Piney Mountain, Green Ridge, Rocky Mountain, Monalto Mountain, and East Big Flat Ridge. The ridges are then cut laterally by eroding stream corridors, at least some presumed to be along zones of highly fractured or faulted rocks more susceptible to mechanical and chemical weathering (Way 1986:5).

Composed of large grains and chemically resistant to acidic rain, South Mountain's sandstones weather to large pieces not easily moved by fluvial processes (Anthony 2014:2). On the mountain's steep north-western slopes, the resistant Antietam sandstone has very slowly eroded causing formation of a thick wedge-shaped deposit of sandstone-rich colluvium (rock, sediment, and soil) 1/2 to 2 1/2 miles wide and in some places over 100 feet deep over the underlying carbonate rocks. This mantle extends the entire western length of South Mountain in Pennsylvania (Anthony 2014:8).

Water flowing from South Mountain seeps down through the colluvium and into the carbonate rock, flowing west through dissolved underground cavities and emerging at ground level in a series of springs in the vicinity of Yellow Breeches Creek (Anthony 2014:2; Way 1986:9). At the surface, this accumulated colluvium has resulted in a gently rolling, westward sloping topography with occasional depressions and sinkholes and a limited number of surface streams, that are often dry in summer.

In the nineteenth century, South Mountain's ridges were subject to intense logging, providing charcoal for local iron furnaces. Soils formed from the sandstone tends to be moderately deep, well drained, and of medium texture. Erosion generally has been slight, but gulleying has followed the removal of vegetation for logging operations during the nineteenth century. Additional sheet erosion has occurred where fire destroyed the soil's protective cover (USDA 1967:2).

Following the decline of the local iron industry, much of this land, devoid of mature woodland, was purchased by the Commonwealth. As a result, most of the sandstone/quartzite formations on South Mountain are now located within the boundaries of Michaux State Forest.

Limestone Based Rocks of the Cumberland Valley

A continuous deposition of sediments occurred in the ocean basin that began widening in the Precambrian era. As erosion and uplift decreased and the basin filled, less sand was available and limestone and muddy limestones were deposited over the Chilhowee Group sandstones. These carbonate rocks were deposited as sediments in lower Cambrian through Ordovician times, approximately 500 million to 450 years ago, without a structural break and represent a long period of tectonic quiet. Today, they form the geology of the Cumberland Valley (Delano 2015; Sevon 1991:33; Van Diver1990:29).

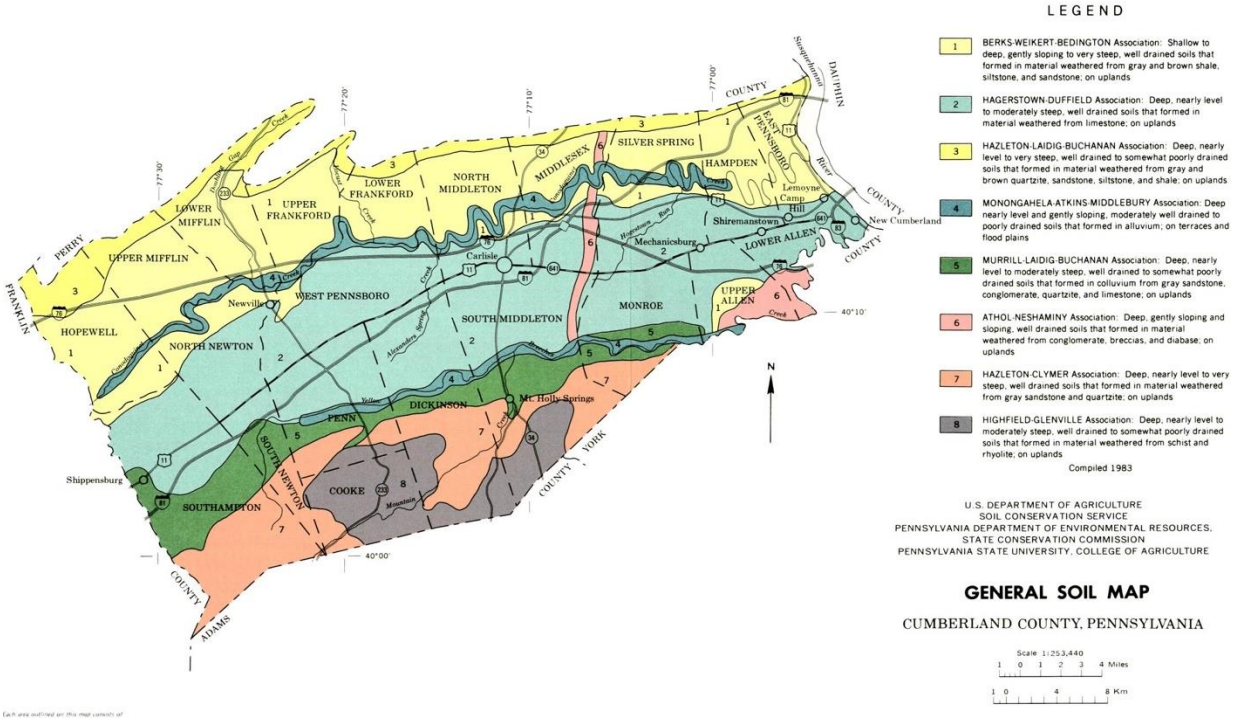
Cambrian/Ordovician Carbonates

A series of carbonite-rich formations, limestones and dolomites with interbedded mudstones, overlie the Chilhowee Group and are present in the southeastern half of the Cumberland Valley, just west of South Mountain. The series begins with the Tomstown Formation, a dolomite containing thin shaly interbeds, laid immediately over the Chilhowee Group's Antietam sandstone. This is followed by bands of the Waynesboro, Elbrook, Zullinger, and Shadybrook Formations, largely limestone and dolomite, each with its own sedimentary characteristics. These formations extend northwest to the middle of the valley, just beyond Chambersburg, Shippensburg, Carlisle, and Mechanicsburg, and coincide with the western border of the core area of the South Mountain Conservation Landscape.

The Tomstown Formation is the carbonate rock overlaid by the thick wedge of colluvium weathered from the ridges of Antietam sandstone discussed in the previous section. Due to these deposits, Tomstown dolomite is rarely visible on the surface. The soils of the colluvium are deep and well drained to somewhat poorly drained. Its major limitations are surface stones and a seasonal high watertable. The colluvium's rolling surface topography, inclined to the west and northwest, is used primarily for cropland, pasture, and woodland. Orchards are also suitable to its stony soils. Sand and gravel quarries have been opened in some locations to mine its sandy deposits (USDA 1986:7,24).

The Tomstown Formation is particularly significant as the source of iron ore for South Mountain's iron furnaces. As the dolomite weathers, it forms residual deposits (residuum) of clay, sand, and rock on top of the formation, along faults, and in voids. South Mountain's iron ore was formed through the chemical weathering of various minerals in these residual deposits.

The residuum is found along the west edge of South Mountain at the base of the wedge-shaped colluvium mentioned in the previous section, the contact point between the colluvium and the Tomstown dolomite. Where the residuum and its iron ore were shallow enough to get to, they were mined. A small but important formation of Tomstown dolomite and its residuum are also found in the valley of Mountain Creek at the base of Piney Mountain (Way 1986:27; Sevon 1991:59).



Soils of Cumberland County. Reddish and gray colored soils at bottom are of sandstone and metarhyolite on South Mountain. Dark green is soils on colluvium at the base of the mountain. Light green are soils derived from limestone and dolomite. Yellow soils are derived from shale. (USDA 1986)

To the west and northwest of the Tomstown dolomite and the colluvium, the other four carbonate-rich formations weather into soils that are considered the best agricultural soils in the valley. With a gently rolling surface topography, these soils are deep and well drained, formed on uplands in material weathered from the limestone and dolomite below. In most areas, these soils are used for cropland, pasture, and woodland. Their major limitations are erosion, rock outcrops, and sinkholes. Dairying is the primary form of agriculture practiced. Where limestone outcrops occur, land is usually in pasture, and the cultivation of crops is not possible. The limestone of the formations below is also quarried (USDA 1986:7,51).

Ordovician Shales

The western/northwestern side of the Cumberland Valley is underlain by a thick sequence of grey to dark grey shale called the Martinsburg Formation. Deposited as mud in the depths of the ocean basin directly over the carbonate formations reviewed above, the Martinsburg shales date to about 450 million years ago. Somewhat more hilly than the eastern side of the valley, the Martinsburg shale weathers to a soil that is fairly suitable for agriculture, though not as prime as the soils over the carbonate formations. Much of the land is in crops and pasture. The main limitations of the soil are shallow and moderate depth to bedrock and very low to moderate available water capacity (USDA 1986:9,24).

The fairly continuous deposition of marine sediments that make up the rocks of the South Mountain region, from the Precambrian metarhyolite lava on the east to the Martinsburg shale on the west, ended about 450 million years ago.

Successive layers of sediments continued to be deposited over the formations discussed above for approximately the next 100 million years, as the region experienced two periods of mountain building and deposition, the Taconic Orogeny, beginning as the Martinsburg shale was being deposited, and the Acadian Orogeny, about 370 to 400 million year ago.

During both of these events, continental plates closed, mountains were created somewhere to the east, and sediments continued to be deposited over the rocks we see in the South Mountain area today. The younger rocks formed from these later sediments can be seen in western Pennsylvania but have been eroded from above South Mountain. (Van Diver 27:33; Cuff 1989:12; Delano 2015).

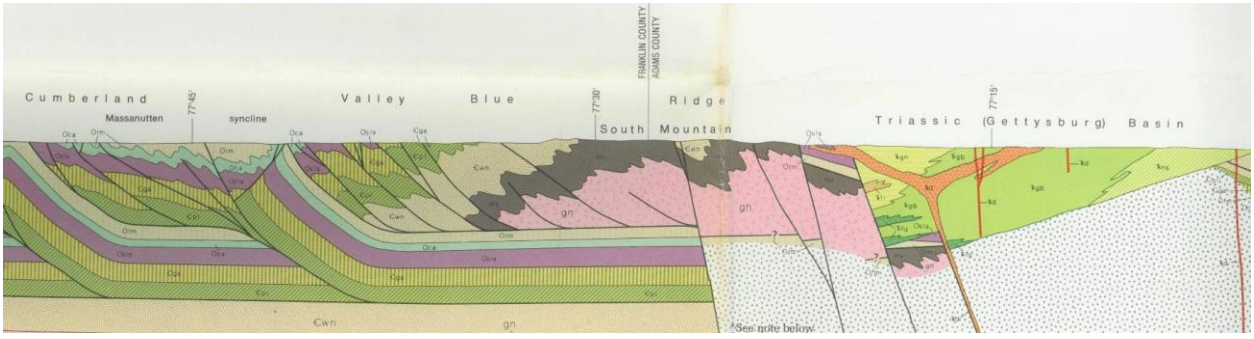
The Alleghenian Orogeny

The structure of Pennsylvania geology was dramatically shaped by a period of intense mountain building called the Alleghenian Orogeny, approximately 300 to 220 million years ago during the Pennsylvanian and Permian geologic periods.

The Alleghenian Orogeny was a violent collision and fusion of the European, North American, and African continental plates forming the super continent Pangea. The east coast of North America was matched up with the projecting northwest coast of Africa. Pre-existing ocean floor was subducted below the Ridge and Valley, and old crystalline rocks were thrust westward over younger sedimentary rocks of the continental margin (Cuff 1989:12).

The effect on Pennsylvania was dramatic as the African continent pushed buried rock formations westward. The collision caused formation of the ancient Appalachian Mountains. The rocks we see today are the roots of those former mountains.

A cross section of today's geological structure shows the dramatic impact of this continental collision on Pennsylvania's rock formations. The impact was more intense to the east and less intense to the west, farther away from the central axis of impact, somewhere off today's east coast.



Geological cross section through the South Mountain region (DER 1980)

In the Piedmont of southeastern Pennsylvania, ancient bedrocks were thrust up and extremely deformed. In the South Mountain region the deeply buried Catoctin metarhyolite, Chilhowee sandstones, and related rocks were thrust up and formed into a vast arch. In the Cumberland Valley and Ridge and Valley province beyond, formations of older rocks were faulted and pushed up over younger rocks in repeating patterns. The violent westward movement of rock

formations reached as far as the Appalachian Plateau of western Pennsylvania, which was only mildly deformed and remained largely intact.

In the older metarhyolite and sandstone rocks of South Mountain, the intense faulting shifted the structural alignment of the formations and is still evident in the topography today. North-south, along the general axis of the formation, faulting weakened the rocks and subsequent erosion has created a series of roughly parallel north-south valleys, such as those of Mountain Creek, the East Branch of Antietam Creek, and the headwaters of the eastern branch of Conococheague Creek (DER 1980; Sevon 1991:62). East-west, across the rock formation, two large faults shifted the structure laterally. The Shippensburg Fault passes through Shippensburg to the west and Pine Grove Furnace on South Mountain. The Carbaugh-Marsh Creek Fault to the south creates the gap through which Route 30 and earlier historic roads and trails traverse the mountain (Sevon 1991:18,43).

Evidence from paleomagnetic data shows that at this time the location on the continental plate that would become Pennsylvania was located almost precisely on the equator (Van Diver 1990:34). The tropical climate and swampy, lowland conditions of this long period created deep vegetative sediments that formed Pennsylvania's coal deposits far to the west of the South Mountain region during the Alleghenian Orogeny (Van Diver 1990:42-43; Miller 1995:205).

Shales and Sandstones of the Triassic Lowlands

Once formed, the North American and African plates began to separate during the Triassic period, about 200 million years ago. In the early stages of separation, crustal stretching and tension occurred that was most intense in the metamorphic belt that would eventually become the Piedmont and Blue Ridge regions, including South Mountain.

The stretching caused fracturing of large blocks of the earth's crust in a line east of the Blue Ridge province from North Carolina to Massachusetts. Great linear blocks along this line subsided, creating wedge-shaped basins into which layer upon layer of sediments poured from the eroding mountains to the east. In addition, lava flowed up through the fractures and injected itself horizontally between the sediments (Van Diver 1990:34; Miller 1995:22;35-36).

These sediments and volcanic flows formed the rocks we now see in the Triassic Lowlands east of South Mountain. A deep fault line separates the younger Triassic sediments from the much older Catoctin metarhyolite on the eastern flank of South Mountain. Less resistant to weathering, the Triassic rocks have eroded into a gently sloping topography of rolling hills, now primarily in agricultural use.

Triassic Shale/Sandstone

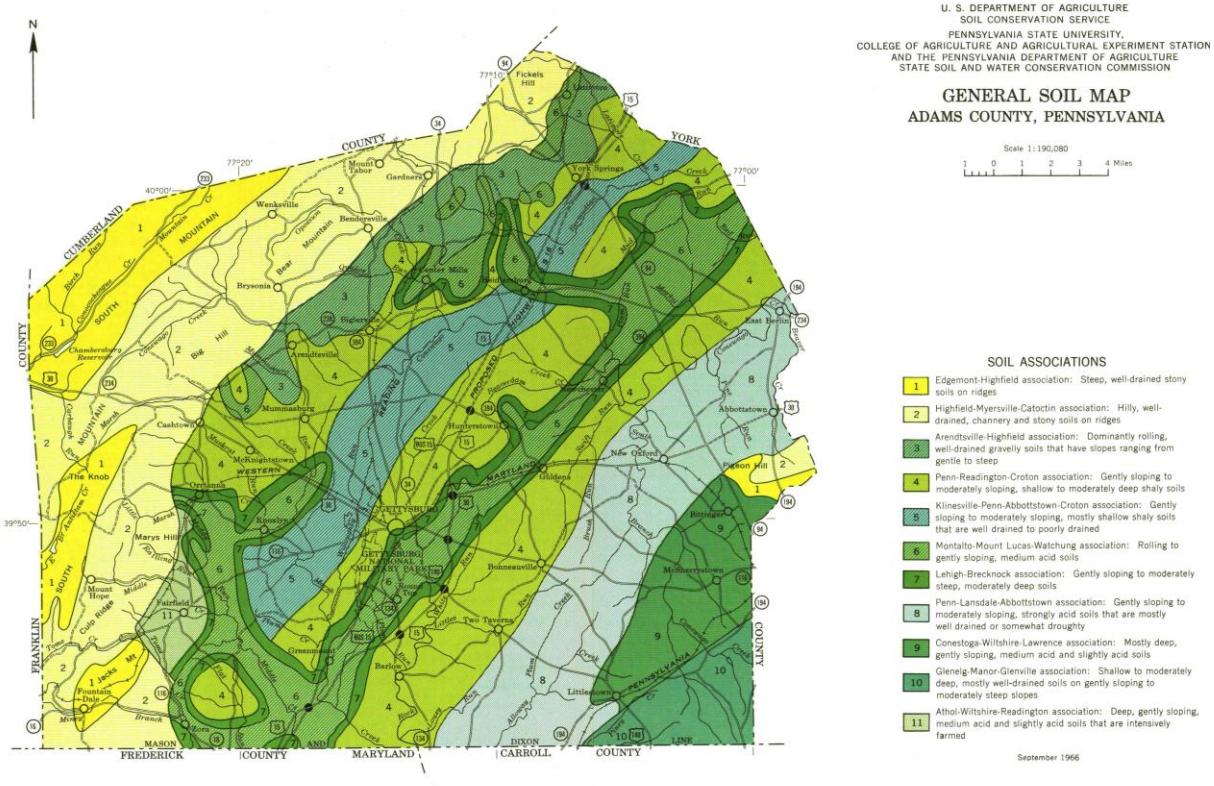
The Triassic rocks are comprised of shales, sandstones, and conglomerates, easily recognizable due to the red color of both the rocks and their soils. The rocks occur in two general formations in the South mountain region and devolve into two broad soil associations.

To the west, forming the foothills of South Mountain mostly in Adams County, is a conglomerate known as Quartz Fanglomerate with well-rounded quartzite

pebbles and cobbles set in a reddish brown, sandy matrix (DER 1980). The rock forms a rolling topography of uneven and complex slopes rising in elevation into the mountain. Its soil is gravelly, well-drained, and set in a matrix of silt and sand with high moisture capacity and that permits the deep penetration of roots (USDA 1967:2).

This is the heart of the South Mountain/Adams County Fruit Belt, the most important fruit-producing district in the state. Its excellent soil water drainage conditions combine with a desirable physical environment well-suited to fruit trees. Good air drainage on the slope and foothills of South Mountain help protect the orchards against late spring frosts (Miller 1995:200)

To the east, in the rolling lowlands, the rocks comprise the Gettysburg Formation, a reddish-brown silty mudstone and shale with thin red sandstone interbeds. The gently rolling topography of this formation is easy to farm and is an important agricultural region of Adams and York Counties. Its soils, however, are low in natural fertility, shallow to the underlying shale, and moderate to low in the moisture availability to plants. The soils are also susceptible to erosion, and many of the steeper slopes are severely eroded. Adequate yields of alfalfa, corn, small grains, hay, and pasture can be produced if management is good and includes heavy fertilization (DER 1980; USDA 1967:3).



Soils of Adams County. Green soils are derived from the shales, sandstones, conglomerates, and diabase of the Triassic Lowlands. Light yellow soils are derived from the metarhyolite formation on the eastern flank of South Mountain. Dark yellow soils on the left edge are the high sandstone ridges of South Mountain. (USDA 1967).

Jurassic Diabase

Throughout the Triassic Lowlands, the volcanic rock that was interjected from below during the period of faulting and rock movement now forms low ridges and knobs that stand above the rolling agricultural lands. Mostly steep-sloped and in woods or pasture with outcroppings, the rock, known as diabase, is resistant to weathering and not suitable for cultivation (Miller 1995:19,35; USDA 1967:3).

By the mid-Jurassic period, 150 million years ago, some of the fracturing and faulting of the older rocks connected to form a dominant rift zone that split the originally broader Appalachian Mountains down the middle and a linear sea filled the gap – the juvenile Atlantic Ocean (Van Diver 1990:33-35; Miller 1995:22;34-35; Cuff 1989:12).

Today's Topography – A Product of Differential Erosion

A long period of relative tectonic stability followed the Appalachian Orogeny and subsequent Triassic faulting as the North American and European/African continental plates continued to separate and the ancient Appalachian Mountains eroded away. By about 30 to 50 million years ago, the mountains are believed to have been reduced to a relatively gently eastward sloping plain (Miller 1995:24,36; Cuff 1989:12).

Since that time, **differential erosion** of hard and soft rocks combined with the periodic mild uplift, increasing the effects of erosion, have exposed the rocks we see today and created today's topographic relief. As would be expected, the hard sandstone, quartzites, and metavolcanics form the slowly eroding higher elevations of South Mountain. The softer and more rapidly eroding limestones, dolomites, and shales form low rolling topography of the Cumberland Valley. Similarly, the softer shales and sandstones east of South Mountain form the gently rolling Triassic Lowland.

The long period of erosion of the Appalachian Mountains and the differential erosion that has taken place since undoubtedly have long and complex histories about which little is known. Their accumulated sediments have presumably built up at the bottom of the continental shelf of the Atlantic Ocean, which continues to expand 150 million years after it began.

More recently in geological terms, the Pleistocene epoch, approximately 2.6 million years ago to 11,700 years ago, saw repeated cycles of **glaciation** in northern latitudes. The continents were essentially in their present positions on the earth during these times. Why the climate fluctuated between glacial and interglacial conditions is an active area of research.

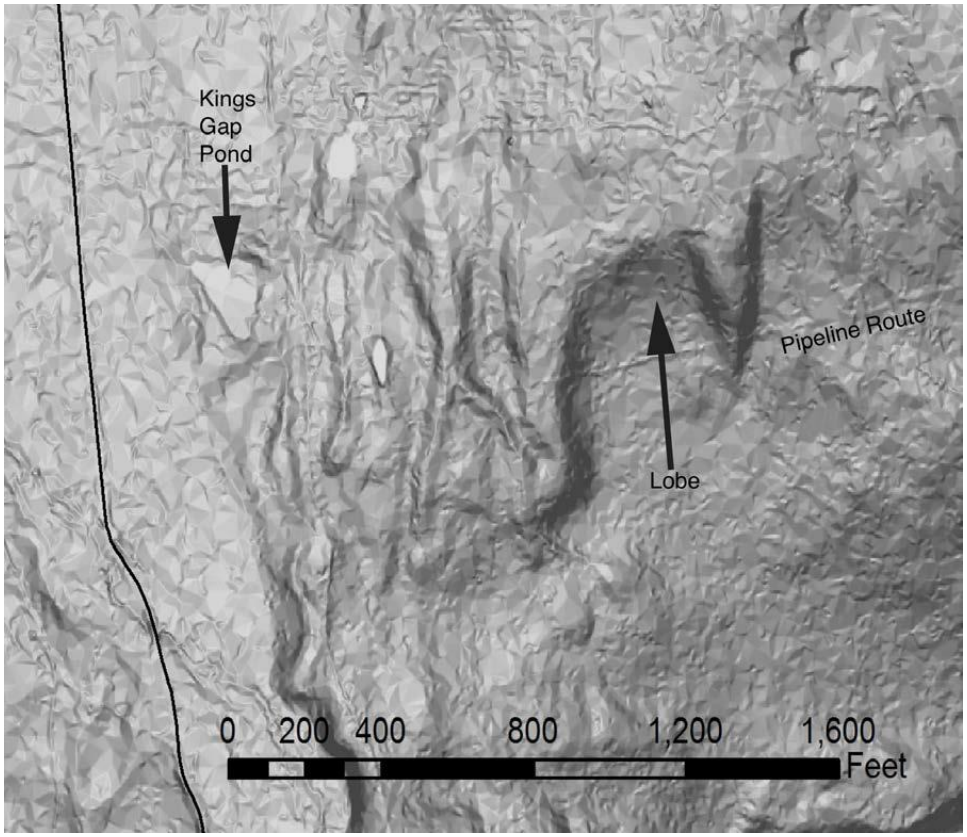
Glaciers reached Pennsylvania during the two most recent glaciations, covering the northwest and northeast corners of the state. The older, the Illinoian age, occurred 350,000 to 300,000 years ago, and the most recent, the Wisconsinan age, occurred 85,000 to 11,700 years ago.

While these glaciers never reached the South Mountain region, their weight and outwash influenced the development of the Susquehanna River and influences of the cold glacial periods can be seen in the rocks of South Mountain (Miller 1995:39-42; Van Diver 1990:16-22).

Tors are projecting rock masses at ridge or mountain peaks continuous with the bedrock below that have not been broken down by weathering. Hammond Rock, a popular outcropping on South Mountain, is believed to be a tor, a prominent erosional remnant that sticks up above an otherwise gently-sloping surface that is inferred to have formed in a periglacial climate during the colder parts of the Pleistocene.

Other similar knobs occur to the south and north of Hammond Rock. During the late Wisconsinan, from at least 16,000 to 14,000 years ago, tundra has been shown to have been present on South Mountain based upon plant identification, evidence of its cold climate. Large tilted blocks lay next to the core of Hammond's Rock which were cleaved by the expansion of ice as the result of periglacial conditions during the Pleistocene (Anthony 2014:15; Sevon 1991:80;154-156).

Similarly, lobes of bouldery culuvium (rocks and soil) weathered from the Antietam sandstone of South Mountain have been identified on the mountain's western slopes. Formed under periglacial conditions during the Late Wisconsinan, these lobes moved slowly down the frozen slope as they thawed and expanded in the warmer air while the frozen ground below did not. These lobes are not active in our present climate and are almost perfect replicas of periglacial lobes seen in arctic and alpine regions today. They generally moved only a few centimeters a year (Anthony 2014:8) Other periglacial geologic features have been identified and studied on South Mountain as well (Sevon 1991:72)



Lobe of colluvium that moved downhill under periglacial conditions (Anthony 2014:10)

WATER AND DRAINAGE

Precipitation, the flow of water, and the ability of rock formations and soil to hold and transmit water for wells and vegetation has an important impact upon landscape and land use. The amount of water the region receives is a function of climate and weather patterns. The South Mountain region is a transitional area between climate impacts from the east, the Piedmont and Coastal Plain, and from the west, central and western Pennsylvania.

Weather patterns influencing Pennsylvania generally come from two directions. Coastal storms move up the seaboard from the south bringing moisture off the Atlantic Ocean with winds from the northeast. Western storms move across Pennsylvania generally through the Ohio River Valley, bringing moisture drawn from the south and the Gulf of Mexico. Storm patterns are influenced by fluctuations in the location of the jet stream across the northern United States, which varies but in general is located over southern Pennsylvania in winter and over the Great Lakes, above Pennsylvania in summer (Miller 1995:45).

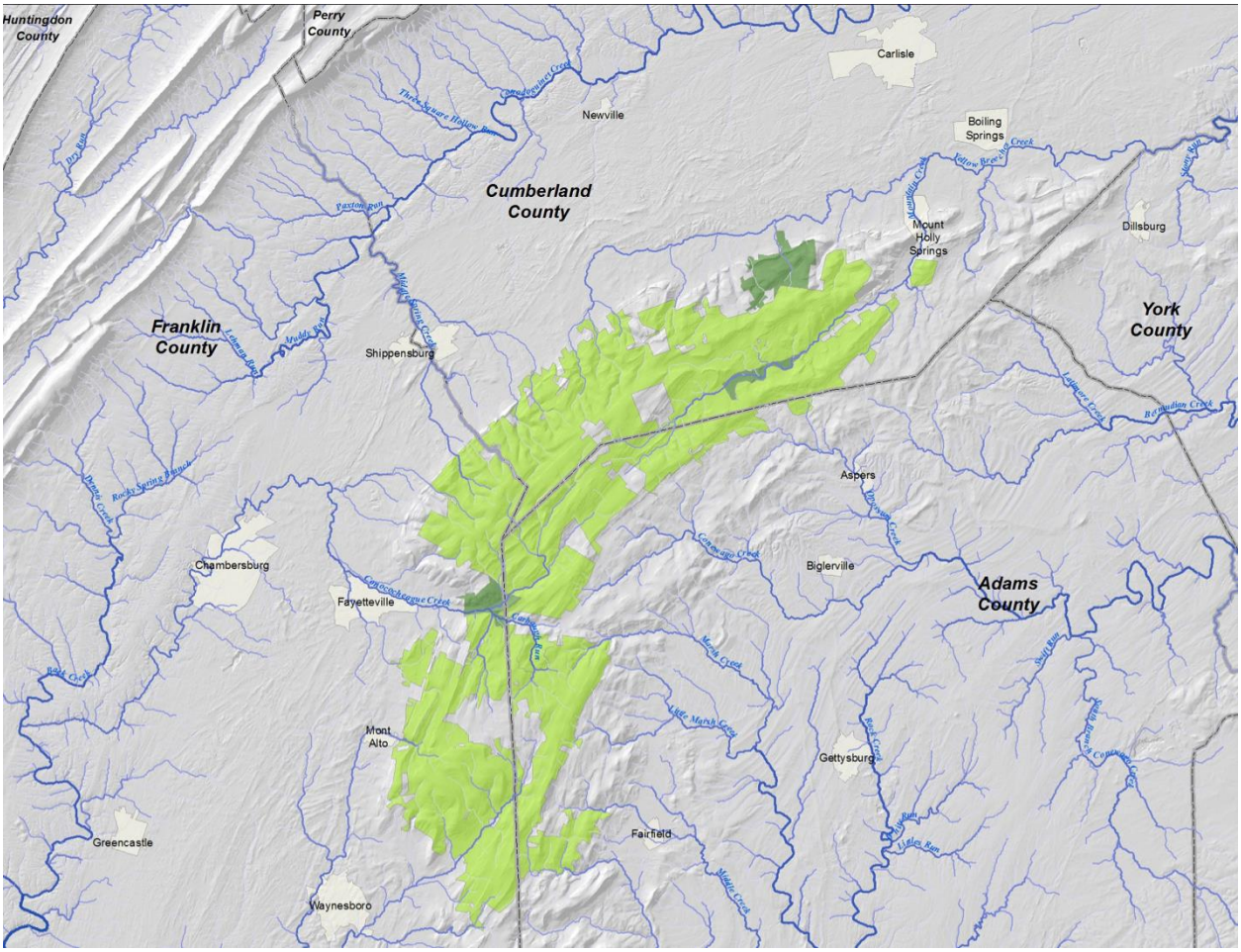
The South Mountain region is more strongly impacted by western storms than by coastal storms, and its **climate** is more continental than maritime. Coastal storms may reach westward to South Mountain and the Triassic Lowlands at their outer edge, but this warmer, moister climate of the Piedmont and Coastal Plain is only mildly felt in York and Adams Counties.

Western storms, however, move directly across the South Mountain region. The slightly higher elevation of the Allegheny Plateau in western Pennsylvania creates a rain shadow across the Ridge and Valley region of central Pennsylvania, including the Cumberland Valley. As a result, the Cumberland Valley receives over 2 inches less rainfall than either western Pennsylvania or eastern Pennsylvania, about 38 to 40 inches per year. The Triassic Lowlands, influenced somewhat by the coast as mentioned above, receives about 40 to 42 inches (Cuff 1989:28; Miller 1995:50).

The flow of streams and the availability of groundwater within the South Mountain region are a direct result of bedrock geology. The region's streams tend to flow along paths of least resistance, over weaker and less resistant rock (Miller 1995:37-38).

The availability of **groundwater** varies by rock type. Limestone and dolomite, soluble in water, are the least resistant and tend to have increased subsurface flow through dissolved solution channels. Water can sometimes move too quickly and unpredictably in limestone, lacking the filtration necessary to remove pollutants. Shale, also weak, erodes but has limited subsurface flow through fractures, limiting the amount of groundwater available and encouraging increased surface runoff after storms. Sandstone is resistant to weathering but allows diffuse subsurface flow through the spaces between grains as well as through fractures and therefore tends to have increased groundwater. Metamorphic rock is resistant to weathering, and its dense crystalline structure inhibits groundwater flow (Cuff 1989:34).

Rivers in the South Mountain region flow either eastward toward the Susquehanna River or south to the Potomac River. In the western Cumberland Valley, there are two creeks flowing through the Martinsburg shale. The Conococheague Creek flows south to the Potomac and the Conodoguinet Creek flows north and east to the Susquehanna. The watershed between them is located half way between Shippensburg and Chambersburg.



Creeks in the vicinity of Michaux State Forest and the South Mountain Conservation Landscape

The **Conococheague Creek** has its headwaters in two branches. The eastern branch originates on South Mountain in the valley along Rt 233 north of Caledonia State Park, to the south near the community of South Mountain, and in the sandstone ridges of the mountain's western flank. The main creek flows west out of the mountain through the fault gap where Rt 30 is located and winds around through the limestone topography to Chambersburg. Two reservoirs on South Mountain, Long Pine Run Reservoir and Birch Run Reservior form the Chambersburg reservoir system and have historically provided water supply to Chambersburg through this creek. The Birch Run Reservoir has been recently removed.

The western branch originates in the shale topography northwest of Chambersburg and joins the east branch to the south, northwest of Greencastle. The creek then meanders south through Maryland, joining the Potomac River at Williamsport.

The **Conodoguinet Creek** also has two branches, the eastern of which originates in the sandstone ridges of South Mountain's western flank. Various creeks flow west from the mountain through Shippensburg and join the western branch. The creek then flows north and east following the shale formation north of Carlisle and joining the Susquehanna River north of Camp Hill.

Both creeks follow the grain of the Martinsburg shale rock formation. Both creeks have well-defined surface flow in lateral branches and runs flowing down from Blue Mountain. Branches on the east and south sides, flowing from the limestone topography in the center of the valley, are much fewer and less defined due to subsurface absorption and flow. Because the Martinsburg shale is shallow to bedrock and has low groundwater flow, these creeks tend to flow high and rapidly following a rain event, increasing the potential for erosion. Limited water is absorbed either by the soil or through the bedrock (USDA 1986:9,24).

Antietam Creek drains the southwest corner of the Cumberland Valley in Pennsylvania and flows south through Maryland to the Potomac River. It originates primarily in two branches on South Mountain, one flowing through Mont Alto and the other through Old Forge and Glen Forney. The two branches join south of Waynesboro. A reservoir located near the headwaters of the eastern branch provides water supply to Waynesboro. Two additional tributaries drain the limestone topography west of Mont Alto and exhibit the limestone characteristics similar to those discussed below for Yellow Breeches Creek.

Yellow Breeches Creek parallels the base of South Mountain from Brookside and Walnut Bottom north and east to the Susquehanna River at New Cumberland. Well studied by geologists and geomorphologists, the course of the creek lays at the outer edge of the wedge-shaped colluvium deposit weathered from the Antietam sandstone high on the mountain. The colluvium lays over Tomstown dolomite.

Small streams flowing down from the mountain tend to seep into the sandstone-rich coluvium, which transmits the water well. Some of the water flows west/north through the colluvium. The remaining water seeps down into the dolomite and then flows west/north through underground solution channels. The water then re-appears at ground level in a line of springs all along the edge of the colluvium, as well as in the creek itself. Boiling Springs, where the water bubbles up in pools as if boiling, was named for this phenomenon.

As a consequence, the numerous streams flowing off the side of the mountain tend to disappear as they reach the colluvium, water flowing below ground as opposed to on the surface.

To the west of Yellow Breeches Creek in the limestone topography, surface water flow is almost non-existent. Rainwater hitting the ground is quickly absorbed into the soil and rock and is conveyed through underground solution channels. The

direction of water flow and the availability of groundwater can be unpredictable. Sinkholes are prevalent throughout this topography.

Mountain Creek is a significant creek that flows from South Mountain to Yellow Breeches Creek. Formed in a long, well-defined upland valley west of Piney Mountain, the creek flows over a wedge of Tomstown dolomite that was lifted high into the mountain and is the principal factor in the formation of iron ore here and the establishment of Pine Grove Furnace. Mountain Creek flows north and exits the mountain at Mount Holly Springs, where its water fall powered numerous mills in the 19th century.

The east side of South Mountain is drained to the Susquehanna River from the vicinity of Biglersville, Beechersville, and the Fruit Belt and to the Potomac River from south of that area. In the northern area, the **Conewago** and **Little Conewago Creeks** have numerous headwater runs on the east side of Piney Mountain that flow in a complex pattern through the metarhyolite and Triassic conglomerate foothills of the Fruit Belt onto the rolling plain of the Triassic Lowland. Equally complex and well-defined stream patterns then follow the rolling shale and sandstone topography northeast to the Susquehanna River.

In the southern area, from a point about five miles above Gettysburg, a series of small streams flow south across the Triassic Lowlands toward Maryland. The courses of these streams are affected by both the north-south grain of the underlying shale and the presence of diabase, which forms north-south trending ridges and knobs and resists the flow of streams.

On the east side of Gettysburg, these streams form **Rock Creek**. On the west side, they flow into **Marsh Creek**, which also reaches west to the southern Fruit Belt and the eastern slopes of South Mountain. At the southern end of South Mountain, below Cold Springs Road, **Middle Creek** and **Toms Creek** drain the narrow valleys cut into the east side of the mountain. All of these creeks eventually join the Monocacy River in Maryland, which flows into the Potomac River.

Characteristic of shale topography, these creeks of the Triassic Lowlands flow full and quickly after rain storms, not absorbing significant amounts of water either in their soils or through their bedrock. Because of shallow bedrock and thin soils with limited water holding capacity, the creeks tend to have low flows between storms, there being limited groundwater to feed them. Water capacity can be a serious issue and limiting factor in the Triassic Lowlands, affecting agriculture, the production of wells, and the installation of septic systems (USDA 1967:3).

ECOREGIONS AND VEGETATION

Vegetation and native plant communities reflect the vegetative context in which the South Mountain is located and the climate, geology, topography, soils, and other natural features that influence local variations. The entire South Mountain region is located within the broad area of the Appalachian Oak Forest of North America's eastern deciduous forest which encompasses most of the lower two-thirds of Pennsylvania (Cuff 1989:52; Miller 1995:74).

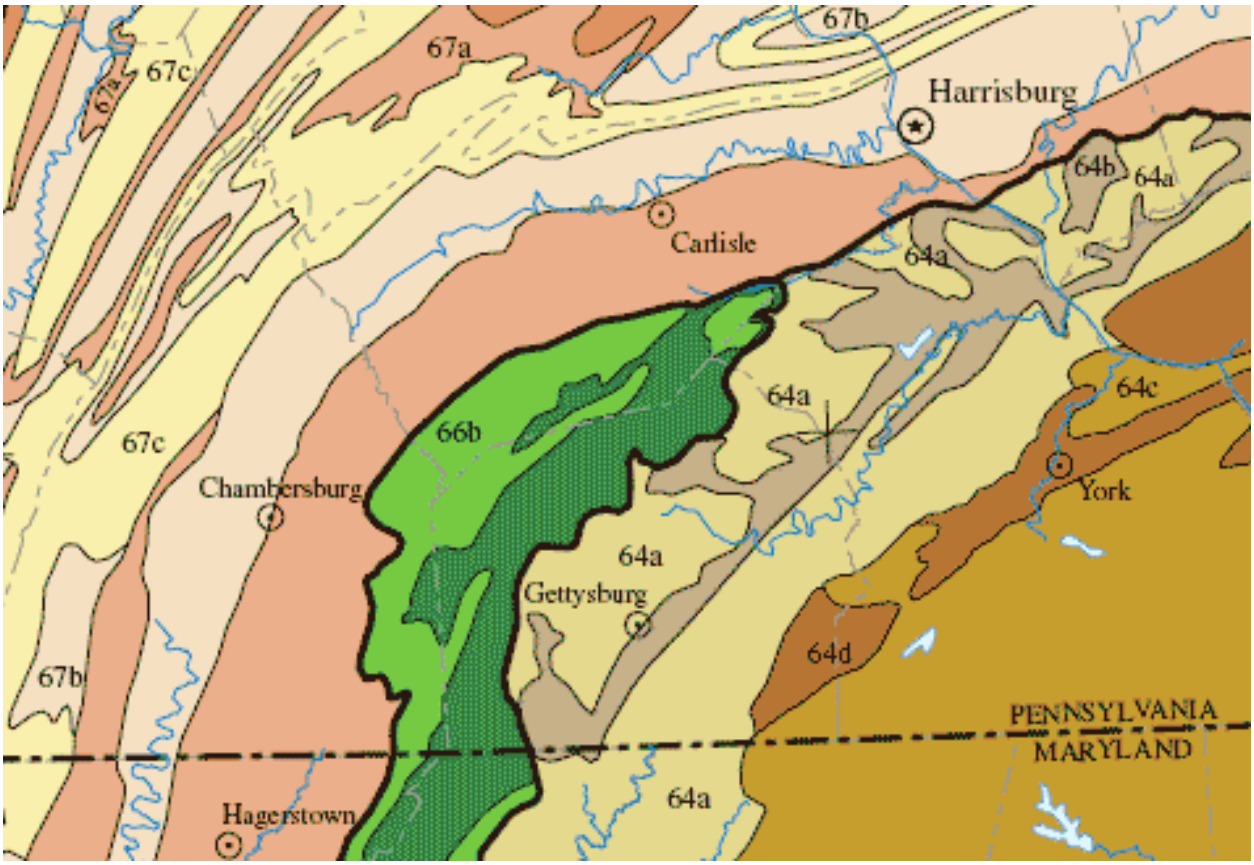
Both natural and human disturbance have had an enormous impact upon the vegetation of the region in terms of the vegetation that is present and the plant communities that develop naturally. With respect to natural disturbance, for example, this area was originally classified as the Oak-Chestnut Forest Region in Lucy Braun's landmark 1950 publication *Deciduous Forests of Eastern North America*. However, the American chestnut that was once a dominant feature of this landscape was virtually eliminated by the chestnut blight fungus introduced to North America in 1904. Other forms of natural disturbance including insects, animals, and storms are ongoing agents of change. Though termed "natural," some of these agents of change are actually an unintended impact of human activity.

The introduction of a considerable number of non-native species by humans over the last three centuries which have since naturalized into the landscape has had a significant impact upon the region's plant communities. Some of these naturalized species are considered invasives and negatively impact the diversity and health of plant communities.

Overall, human activity has been the dominant factor in determining the vegetative character of the landscape of the South Mountain region over the past three hundred years. Before about 1700, most of this area is believed to have been forested, even though impacted for thousands of years by Native American peoples. Only a small fraction of forest cover remains within the region today beyond the ridges of South Mountain, most having been cleared for agriculture and development. Most of the forest that does remain has a long history of logging and is in some stage of regrowth (TNC 2005:6).

Ecoregions

The federal government and state agencies have identified a national system of ecoregions that denotes areas of general similarity in ecosystems and the type, quality, and quantity of environmental resources. Used to inform the understanding, monitoring, and management of natural resources, the ecoregion system uses geology, physiography, climate, soils, vegetation, wildlife, and land use to identify areas of common character. The system is organized into four levels with level IV being the finest grain, which is useful in the understanding of local ecosystems and plant communities. DCNR's Bureau of Forestry has adopted ecosystems based on the national system for forest management.



EPA Level IV Ecoregions. Ecoregion 64 is the Northern Piedmont and includes the Triassic Lowlands (64a) and Diabase and Conglomerate Uplands (64b).

Ecoregion 66 is the Blue Ridge Mountains. On this map South Mountain is shown in green and includes on the right the Northern Igneous Ridges (metabrhyolite and metabasalt, 66a) and on the left the Northern Sedimentary and Metasedimentary Ridges (quartzite, 66b).

Ecoregion 67 is the Ridge and Valley, including the Great Valley to the west of South Mountain. The Great Valley (also known locally as the Cumberland Valley) includes on the right the Northern Limestone/Dolomite Valleys (67a) and on the left Northern Shale Valleys (67b).

The ecoregions identified for the South Mountain region conform to the geological areas outlined previously in this chapter. Additionally, responding to the extent of human impact on the landscape, the Pennsylvania Natural Heritage Program has identified important natural plant communities and species of special concern within the four counties. The Pennsylvania Natural Heritage Program is a partnership between the Department of Conservation and Natural Resources, Western Pennsylvania Conservancy, Pennsylvania Game Commission, and Pennsylvania Fish and Boat Commission. Surveys identifying exemplary natural plant communities have been prepared for each of the four counties and are reviewed in the discussion of ecoregions below.

Ecoregion 64 – Northern Piedmont

The area in Pennsylvania between the fall line near Philadelphia bordering the coastal plain and the Blue Ridge physiographic province, which includes South Mountain, is within the ecoregion known as the Northern Piedmont. The western portion of this area, within the South Mountain region, is called the Triassic Lowlands and is identical to the Triassic Lowlands geological area discussed earlier in this chapter. The Natural Areas Inventories for Adams and York Counties identify 40 and 90 natural areas of special interest, respectively including areas within South Mountain and the Triassic Lowlands (TNC 1996:6; York County Planning Commission 1997).

Ecoregion 64a – Triassic Lowlands

The Triassic Lowlands are underlain by Triassic shale and sandstone, as discussed earlier in this chapter, and is a plain characterized by wide undulating ridges, broad nearly level valleys, limited local relief, and a mosaic of farms and houses. Soils are shallow to bedrock, only moderately fertile, and have limited water availability to plants. Springs are uncommon because the comparatively flat and undissected relief, in combination with limited permeability, offers little means for ground water to flow to the surface.

The historic Appalachian Oak Forest has been replaced by a mosaic of farms, houses, and woodland. Agriculture has been favored historically by nearness to urban markets, fairly fertile soils, and a long growing season of 170-183 days. Dairy farming is the main source of farm income. Beef cattle, poultry, fruit, vegetables, and grain are also important. Suburbanization continues to increase throughout the area, especially in proximity to larger communities, with related land uses (Wood 199:19-20).

Very little forest cover remains within the area. Generally, only the steep slopes and wetter area continue to be in woodland, usually dominated by oaks, tulip poplar, and hickory (TNC 1996:14; York County Planning Commission 1997:8). Tulip poplar is the dominant species of many of the remaining woodlands because it grows more quickly after clearing. As the forest matures, however, more shade tolerant species become more prevalent because tulip poplar does not regenerate in the shade of a closed canopy (York County Planning Commission 1997:7).

Hickory tends to be more abundant here than elsewhere within the Piedmont because the soils are less acidic and more calcium- and magnesium-rich than

those derived from non-sedimentary rocks. Red maple and black tupelo are less abundant for the same reason (Wood 1999:19-20).

Some of the unforested lands that were seldom or never plowed support native grasses with scattered small trees similar to sites in Virginia (TNC 1996:16). Wetlands are becoming rarer within the region due to development and are an important resource for conservation.

Agricultural landscape of the Triassic Lowlands south of Gettysburg. Shallow soils derived from shale with little water availability supporting dairy, beef, grains, and pastureland. (Google Earth)

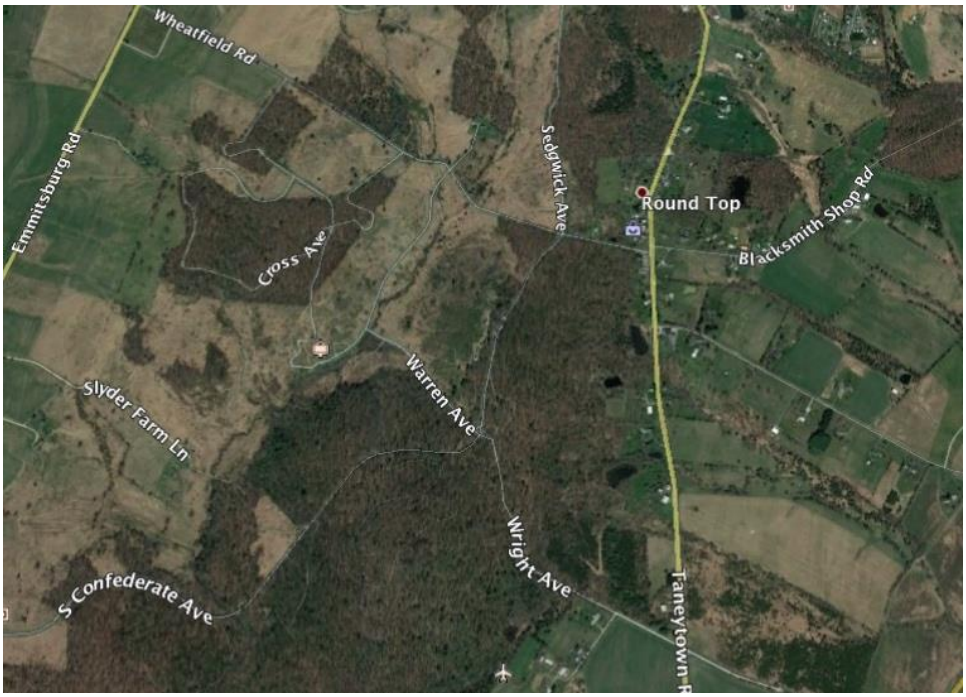
Ecoregion 64b – Diabase and Conglomerate Uplands

Within the Triassic Lowlands are areas underlain by volcanic diabase that is highly resistant to weathering. These areas are characterized as woody, stony hills and steep ridges where local relief can vary considerably. They include adjacent areas of shale and sandstone that were altered and made harder, denser, and less porous by the intrusion of the volcanic diabase (Wood 1999:19-20). At some locations the diabase formation occurs as prominent hills with large rock outcrops and boulder fields.

Thin, finely textured clayey soils have commonly developed over diabase and are non-acidic and shallow. They are harder to till and best suited for forest or pasture. Interestingly, the diabase has more open joints than the surrounding shale or sandstone and yields more groundwater, which is softer than the hard water from wells in the shale or sandstone (Wood 1999:19-20).

Woodland is common on the diabase uplands, especially where the surface is steep or covered in rocks or boulders. Where farms occur, they are usually scattered among woodland and idle land. Woodland plant communities derive from the original Appalachian Oak Forest and are dominated by white and red

oaks. The flora on soils derived from the diabase intrusions, which are basic in character, are distinctive; acid loving plants are absent from this area (Wood 1999 19-20). The mineral-rich soils may support a diverse herb flora, and several rare plant species are associated with the diabase (TNC 1996:14).



Diabase ridge with woodland vegetation cutting through the agricultural landscape of the Triassic Lowlands. (Google Earth)

Ecoregion 66 – Blue Ridge Mountains

South Mountain is located at the northern end of the Blue Ridge Mountains geological province, as discussed at the beginning of this chapter. The Blue Ridge Mountain ecoregion coincides with this geological province and is comprised of two Level IV sub-regions, one related to the mountain's Catoctic metarhyolite geology and the other to the Chilhowee sandstone geology. Both of these sub-regions extend south from South Mountain to near the Roanoke River in southern Virginia (Wood 1999:23).

In Pennsylvania, DCNR's Bureau of Forestry uses a similar ecoregion identification but does not distinguish between the two Level IV sub-regions. Michaux State Forest is located predominately within the sandstone sub-region.

Natural area inventories of the region identify South Mountain as an "exceptional natural feature" worthy of particular attention. Several globally rare plant and animal species as well as rare natural communities and an abundance of high quality vernal pools are found here. Many of the highest priority natural areas identified in the inventories fall within the South Mountain region and are managed as special natural areas. South Mountain also functions as an important interstate greenway, linking Pennsylvania with southern natural areas (TNC 2005:23).

Ecoregion 66a – Northern Igneous Ridges

The Northern Igneous Ridges sub-region of Ecoregion 66 includes the metarhyolite geological area of South Mountain in Pennsylvania discussed previously in this chapter. In Maryland and Virginia, this sub-region is also comprised of metabasalt, a related igneous rock type formed underground rather than as a surface flow, and diabase. Soils are characterized by low fertility, acidity, stoniness, and steepness.

Rt. 233 on the east boundary of the state forest travels long the top of a high, steep, wooded metarhyolite ridge. (Google Earth)

This area remains extensively forested, and the predominant natural vegetation is successional second growth woodlands derived from the Appalachian Oak Forest plant community featuring oaks and other hardwoods. A number of natural areas of special interest and concern have been identified in this area in the Adams County survey, including steep wooded ravines, seeps on the flank of the mountain, and wetlands. These include seepage swamps, which are relatively small forested or shrub dominated wetlands found on lower slopes where water emerges at the surface with a diffuse flow (TNC 1996:17).

On South Mountain, localized dairy farming and poultry raising occurs, and orchards of the Adams County/South Mountain Fruit Belt are found in the Buchanan Valley and southeast flanks of the mountain (Wood 1999:23-24).

Ecoregion 66b – Northern Sedimentary and Metasedimentary Ridges

The Northern Sedimentary and Metasedimentary Ridges portion of Ecoregion 66 includes the Chilhowee metamorphic sandstone and quartzite geological formations on the west side of South Mountain. Much of this area is within Michaux State Forest and is composed of high, steeply sloping, northeast trending ridges and deep, narrow, somewhat discontinuous valleys. The sandstone geology is resistant to erosion and weathers to thin soils that are stony, steep, acidic, and of low fertility. Streams have limited buffering capacity and are subject to acidification (Wood 1999:24).

Most of this area is wooded with second growth oak-pine and oak-hickory forest type groups of the Appalachian Oak Forest plant community. Oak species including chestnut, scarlet, northern-red, black, and white oak, along with yellow-poplar dominate the lower slopes. A white-pine forest type is found along some streams, while a mixed oak-pitch pine forest type is common on dry ridge top sites and southwest facing slopes. Red maple, sweet (black) birch, black gum, and hickory are common associates in all the forest types (DCNR 2003 Michaux:7).

Tall sedimentary ridges along the west boundary of Michaux State Forest (bottom laft to top right) cut perpendicularly with streams flowing down into the valley. Note sandstone quarry. (Google Earth)

The natural areas inventory emphasizes that several notable variations in the typical mixed oak forest composition occur with relationship to soil, soil moisture, and topography. Drier ridge tops characterized by shallow nutrient-poor soils are characterized by chestnut oak and black gum with red maple and other oaks as associates and understory shrubs including blueberry, huckleberry, and mountain laurel.

Pitch pine-scrub oak barrens are among several of the large areas identified of special significance by the natural areas inventories. Big Pine Flat within Michaux State Forest is an important example of this community type. Many stream corridors and adjacent north-facing slopes are dominated by hemlock with a minor component of yellow birch and an understory of rhododendron.

Vernal pools are a particularly significant set of natural resources with rare species of plants and animals and are located along the toe of the western slopes of the mountain in Franklin and Cumberland Counties. Because they are ephemeral and free of breeding fish, the vernal pools attract many species of salamanders, turtles, frogs, and toads. A number of swamp seeps are identified as significant wetland areas on the mountain (TNC 1996:17; 2004:5; 2005:6-7).

Ecoregion 67 – Ridge and Valley

Ecoregion 67 coincides with the Ridge and Valley physiographic province, which in Pennsylvania extends from the base of South Mountain west to the Appalachian Plateau. In the South Mountain region, this area includes the Great Valley, or Cumberland Valley, which is a distinct area within the province.

As discussed earlier in this chapter, the Cumberland Valley is comprised of two parallel geological formations, limestone and dolomites to the east and shales to the west. These two formations comprise the valley's designated Level IV ecoregions as well.

Ecoregion 67a – Northern Limestone/Dolomite Valleys

The Northern Limestone/Dolomite Valleys ecoregion is located on the eastern side of the Cumberland Valley in Franklin and Cumberland Counties and is characterized by broad, level to undulating, fertile landscape that is extensively farmed. Sinkholes, underground streams, and other karst features have developed on the underlying limestone and dolomite, and as a result, the drainage density is low. Where streams occur, they tend to have gentle gradients, plentiful year around flow, and distinctive fish assemblages (Wood 1999:27).

Farming predominates throughout the area with scattered woodlands occurring in steeper areas. Only a small fraction of forest cover remains, most having been cleared for agriculture or development. Remaining woodlands have second growth and successional variations of the Appalachian Oak Forest, often featuring early successional species. Farming and urbanization have created biological islands where small natural areas are surrounded by agriculture or development. This isolates gene pools of wildlife and/or plant communities, inhibiting gene flow between populations (Wood 1999:27; TNC 2004:6; 2005:5).

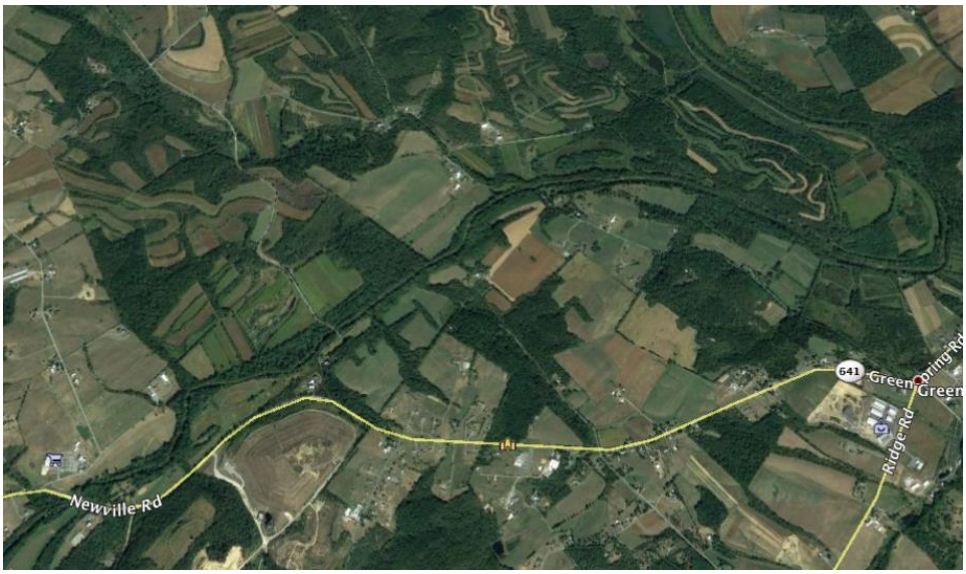
Limestone landscape of the east side of the Cumberland Valley with its pattern of intensive agricultural fields and having few surface creeks. (Google Earth)

Natural area inventories for Franklin and Cumberland Counties identify a number of significant plant communities, many of which are related to the distinctive springs and seep that occur west of the South Mountain colluvium discussed earlier in this chapter. Special plant communities also occur along streams and in the vicinity of limestone rock outcroppings, where calcium loving species including Sugar Maple and Basswood dominate (TNC 2004:32; 2005).

Ecoregion 67b – Northern Shale Valleys

In the Cumberland Valley, the Northern Shale Valley ecoregion is located along the western side of the valley and is underlain by Martinsburg shale with relatively poor soils. Characterized by rolling valleys and low hills, the underlying shale is not as permeable as the limestone, so surface streams are larger and drainage density is higher than on the eastern side of the valley. More soil erosion occurs over the shale area such that stream turbidity can be comparatively high and the stream habitat relatively impaired (Wood 1999:27; TNC 2004:2).

As on the east side of the valley, farming predominates in this area, however more areas of woodland occur both along streams and on uplands. Scattered shale barrens occur on steep west and south facing slopes (Wood 1999:27). Natural area inventories for Franklin and Cumberland Counties document an increased number of significant plant communities than are found on the east side of the valley. Many occur along stream corridors but some include areas of shale outcrops, loose shale on steep slopes, and bare shale areas where distinctive plant communities have developed (TNC 2004; 2005).



Shale landscape of the west side of the Cumberland Valley with agricultural fields and pastures between patterns of winding streams. (Google Earth)

THE LANDSCAPE'S CULTURAL DEVELOPMENT

The South Mountain Conservation Landscape and its surrounding area experienced a distinctive pattern of cultural development that remains evident in the landscape today. The region's development was influenced by the physical attributes of the landscape–topography, soils, water, natural resources–combined with a unique settlement history and its subsequent evolution.

Chapter 3 of this cultural landscape assessment provides a overview of the South Mountain region's historical development. Later chapters discuss aspects of the landscape in relation to particular historic contexts of state and national significance. Below is a summary of several broad themes of the region's cultural development and a brief description of the resulting landscape we see today.

The Pennsylvania Cultural Hearth

In pre-contact times, before European occupation, south-central Pennsylvania was a sort of backwater area of cultural development, well beyond the zones of more lively development in other parts of North America (Miller 2002:396). The region's prehistoric history is outlined in the chapter on the Native American Historic Context.

The special personality of the Pennsylvania landscape, including the landscape of the South Mountain region, emerged in the 18th century with settlement by various groups of European immigrants and had a national impact. This development may be attributed to three primary factors.

First was the **large number of immigrants** that flowed through Philadelphia and Southeastern Pennsylvania during the 18th and early 19th centuries and their particular ethnic makeup. Philadelphia was a primary entrance point for immigration to the colonies during the 18th century. By the time Southeastern Pennsylvania began to be fully settled, almost a century after the founding of Virginia, Massachusetts, New Amsterdam, Maryland, and southern colonies, lessons had been learned about the effective settlement of new populations. William Penn's policy of tolerance welcomed a wide variety of European groups, particularly English, Welsh, Scots-Irish, and several varieties of ethnic Germans. It was a diverse mixture of groups, most with strong cultural traditions, coexisting through the opportunities presented. Immigrants came as families, extended families, and community groups, many of particular religious persuasions.

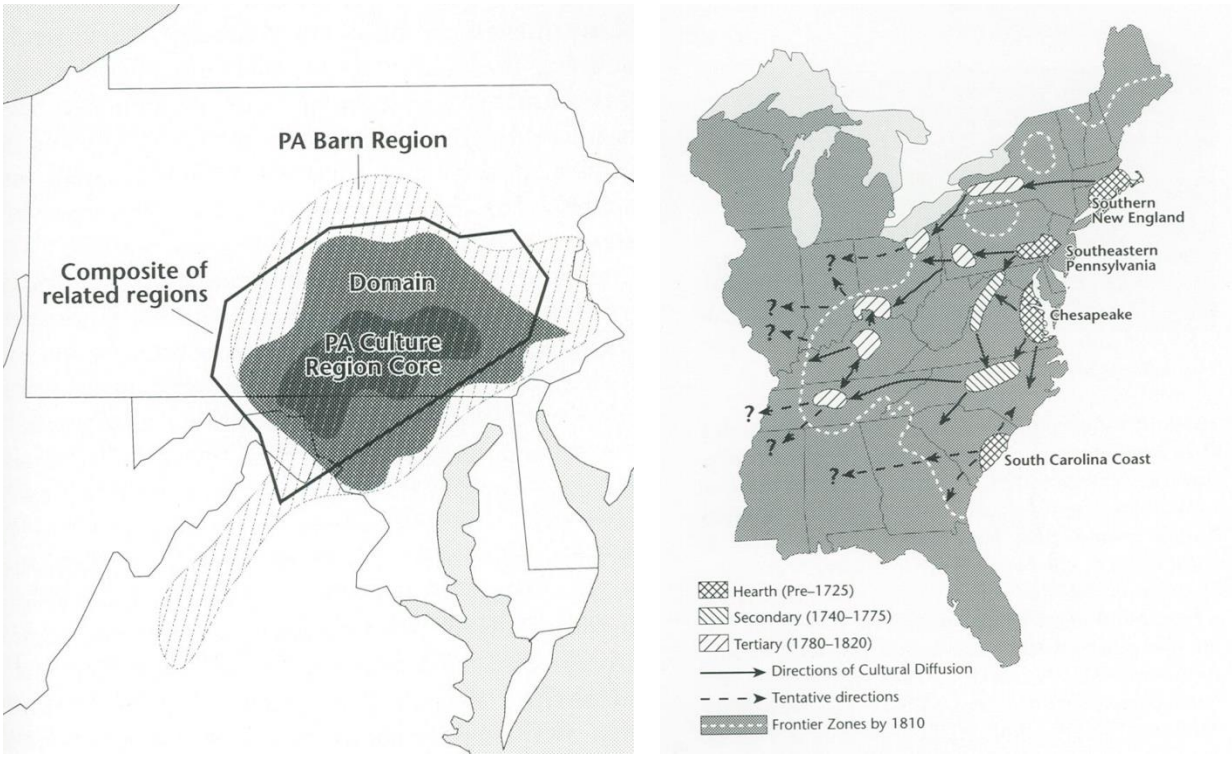
Second was the **availability of good land**. Unlike the glaciated landscape of New England and the swampy lowlands of Virginia, Maryland, and the South, Southeastern Pennsylvania offered a vast area of rolling topography with excellent soils that were easily converted to prosperous farms. The region's temperate climate favored the grain-based agriculture practiced.

Third was **access to the interior** of the continent. Between the northern tip of South Mountain and the vicinity of Reading, the Great Valley is in direct contact with the Triassic Lowlands to the east, without the imposing physical barrier of the Blue Ridge Mountains found in Maryland, Virginia, and North Carolina and the similar mountains found to the north. Both early settlers and new immigrants had direct access to the valley. From the 1730s into the early 19th century, large

numbers of migrants traveled through Southeastern Pennsylvania, down the valley to Virginia and North Carolina, and west through the southwest tip of Virginia into Tennessee, Kentucky, and the Ohio River Valley. This was a major migration route of the nation's early settlement. Along this route, settlers spread the cultural traditions of Southeastern Pennsylvania south and west. For much of early American history, Philadelphia and its hinterland served as a funnel through which immigrants and locals entered the major settlement streams whereby the Upper South, Middle West, and places beyond were settled. Because many of these settlers were Pennsylvania-born, many the sons of Pennsylvania farm families, Southeast Pennsylvania innovations and attitudes diffused throughout a broad swath of the continent (Miller 2002:398).

Cultural geographers identify Southeastern Pennsylvania as the Pennsylvania Cultural Area or **Pennsylvania Cultural Hearth** (Cuff 1898:154; Meinig 1986:131; Miller 1995:132; Miller 2002:396; Zelinsky 1993) . The South Mountain region is the western edge of the Pennsylvania Cultural Hearth's core area, which extends across south-central Pennsylvania from Lancaster and Berks Counties to Franklin and Cumberland Counties.

The predominant characteristic of the Pennsylvania Cultural Health was its settlement by "yeoman farmers" creating a relatively homogeneous yet diverse agricultural landscape of **small independent farms**. Each family farm was a variation on a theme, composed of similar elements in a wide variety of patterns–farmsteads, fields, woodlots, lanes, and other landscape elements that were needed to make the farm work. The settlement pattern of each farm was shaped by the particular characteristics offered by its natural landscape.



Pennsylvania Cultural Hearth (Miller 1995:136-137)

Within this agricultural landscape, **market towns** and crossroad villages were established and provided places where farmers obtained services, purchased goods, and sold produce. A large number of mills to process agricultural produce were built at locations where water power could be harnessed, sometimes a focus for town or village development. Towns and villages became centers of craftsmanship and small business as well as centers of social, religious, legal, and government life.

As agriculture developed through the late 18th and early 19th centuries, an interdependent **market system** matured, binding farm and town, each providing services to the other. Local merchants and wholesalers purchased farm produce for shipment beyond the region. Social, business, and political positions were fluid, flexible, and egalitarian, with many roles and participants.

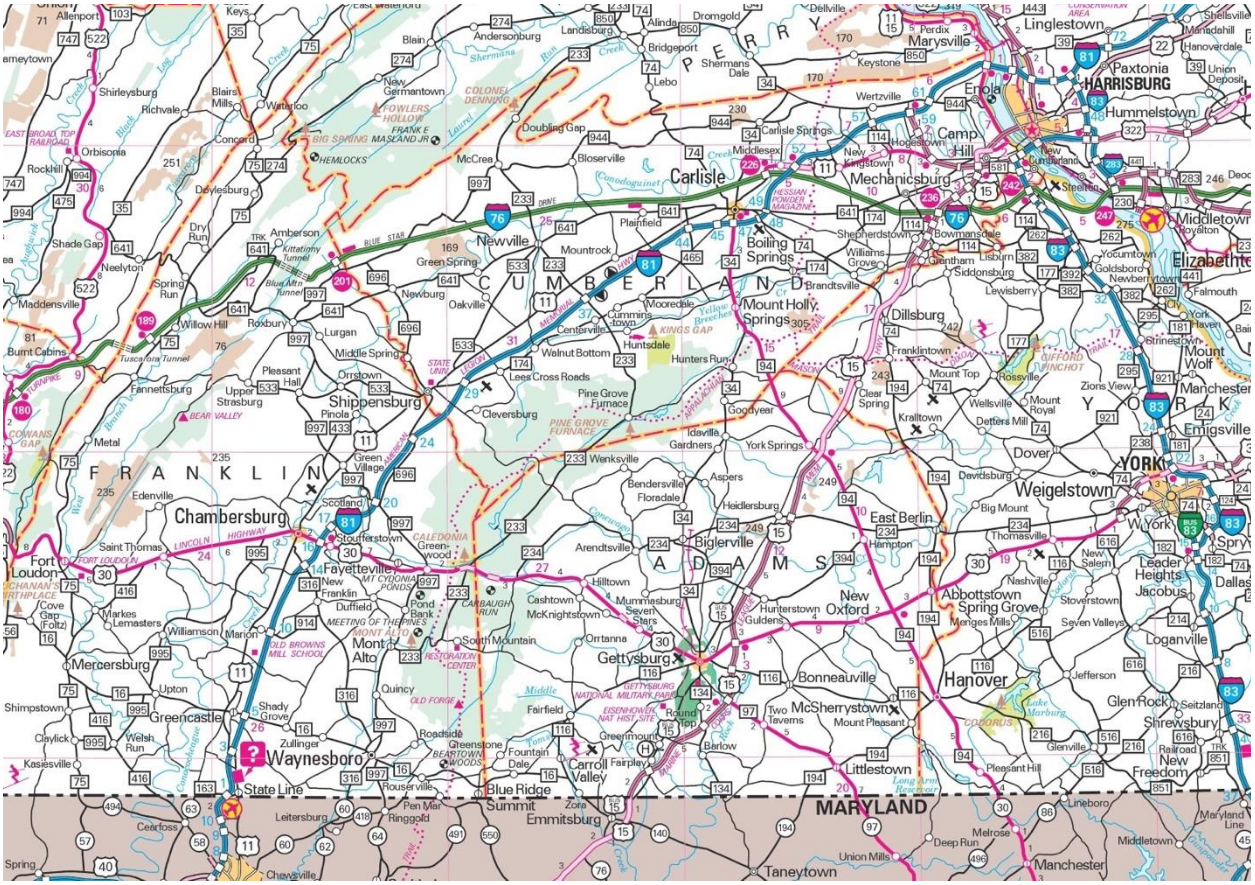
This agricultural market system was in sharp contrast to the plantation system that had developed in eastern Virginia and the South, where agriculture and craftsmanship were focused on the plantation, and social, religious, and government institutions were concentrated among a few leading families. It was the agricultural market system, however, that spread down the Shenandoah Valley from Pennsylvania and Maryland and west to become a bedrock feature of the nation's heartland.

Character defining features of the Pennsylvania Cultural Hearth included the town plan on a grid with a central public square, the linear crossroads village, the Pennsylvania farmhouse, the Pennsylvania barn, the springhouse, other outbuilding and vernacular dwelling types as well as grammar, food-ways, and social customs. The Pennsylvania barn is a particularly visible and widely recognized feature of the region. The Pennsylvania town form, with central square, grid of streets, tight lots, lack of front yards, shade trees, and rear alleys, provided a model that was used throughout the mid-west.

Transportation Networks

Transportation played an important role in the region's settlement, and transportation routes followed logical patterns suggested by topography and ease of movement. From Indian trails, to early wagon roads, to the development of improved turnpikes, to railroads, to early automotive roads, to the interstates of the mid-20th century, transportation improvements used the same or similar routes, avoiding mountains, using valleys, exploiting gaps, and following ridgelines to avoid river crossings.

The earliest **wagon roads** along which migration occurred tracked west through Lancaster, York or Harrisburg, and south down the Great Valley through Virginia. Early roads passed into the Great Valley (Cumberland Valley) either north of South Mountain or through the South Mountain Gap (Cashtown, Rt. 30) or Nichols Gap (Rt. 16). The Great Philadelphia Wagon Road made use of both gaps as well as a route east of South Mountain crossing the Potomac River at Harper's Ferry. Within the valley, the course of Rt. 11 is the historic route south into and through Virginia (Cuff 1989:96).



Transportation network within the South Mountain region

Turnpikes with improved roadbeds were developed linking primary settlement areas in Pennsylvania between 1874 and the mid-1830s. In the South Mountain region, turnpikes included the course of Rt. 11 down the valley from Harrisburg through Carlisle and Chambersburg as well as that of Rt. 30 from Gettysburg through the South Mountain (Cashtown) Gap to Chambersburg (Miller 1995:235; Cuff 1989:96).

The development of **railroads** followed in the mid and late-19th century, which brought about a revolution in the economy with respect to the movement of goods, exploitation of natural resources, development of manufacturing, and urbanization (Miller 1995:140). Within the South Mountain region, railroads were constructed down the Cumberland Valley from Harrisburg paralleling Rt. 11 and linking valley communities in 1839-41 (Cuff 1989:97). Additional routes along Yellow Breeches Creek and linking Gettysburg with Carlisle (with a spur to Pine Grove Furnace) were constructed later.

Railroads linked local communities to the national network. The South Mountain region, however, was never a prominent component of the primary railroad lines of national significance. Nonetheless, railroads were of local significance in the movement of agricultural produce, development of local manufacturing, and for a short while the shipping of natural resources products from South Mountain.

Major **roads** developed during the early twentieth century followed the routes of earlier roads and included today's RT. 11, Rt. 30, Rt. 15, Rt. 34, Rt. 116, and Rt. 16. The Pennsylvania Department of Transportation was established in 1903, and funding for paving of a state road network was approved in 1911 (Miller 1995:240). A national effort initiated in 1913 created the Lincoln Highway (current Rt. 30 across South Mountain), the nation's first coast-to-coast road, by linking and improving a network of local roads. Federal aid for the construction of roads began in 1916.

Most of Pennsylvania's primary roads were paved by 1930 and have been continually improved to the present. A network of nationally designated US highways was created by 1940 and included US Routes 11, 15, and 30 through the South Mountain region (Miller 1995:241). In some areas, particularly along Rt. 30 and Rt. 16, modern improvements and realignments have bypassed and left historic remnants of earlier versions of the road.

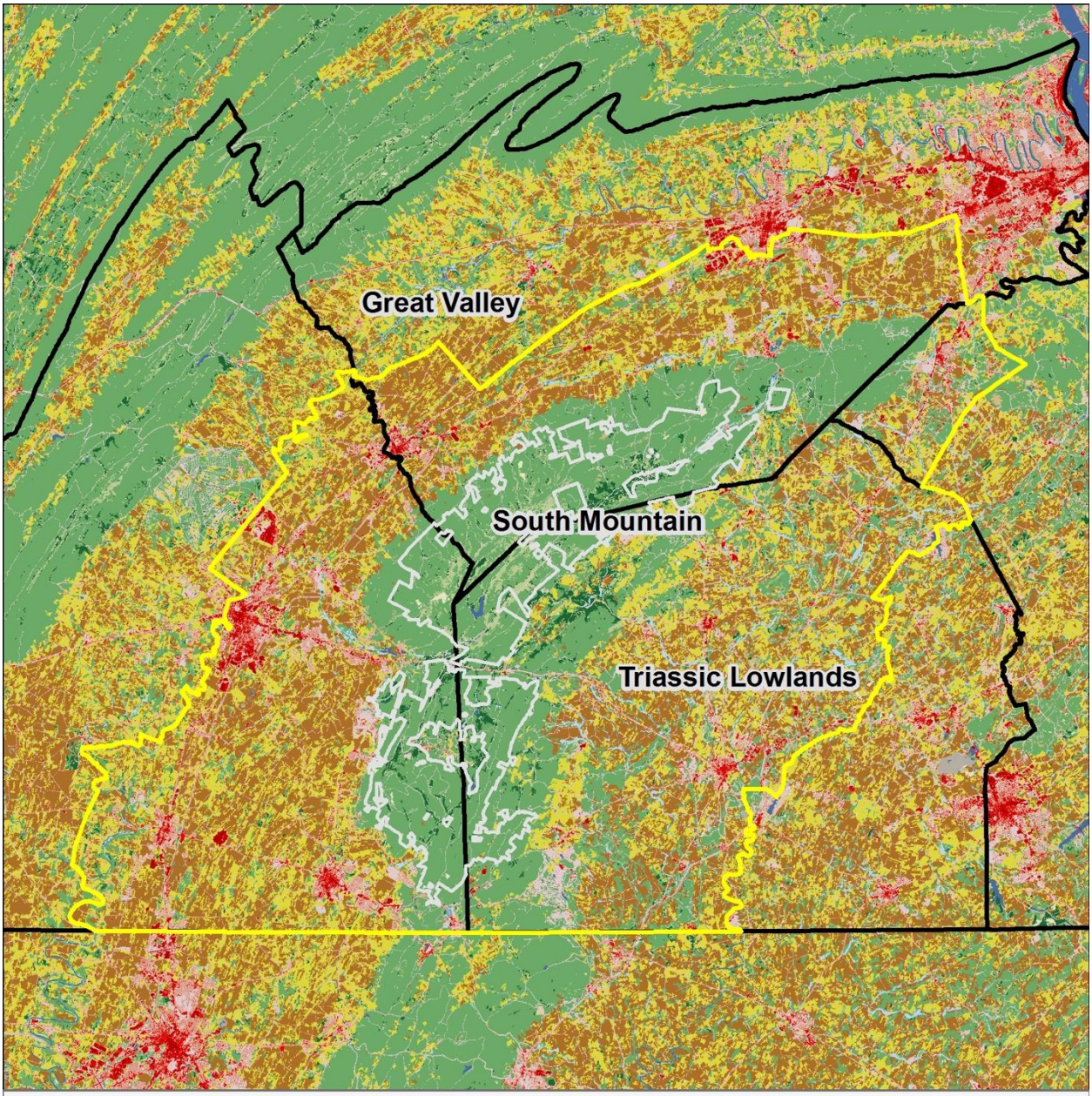
The two **interstate highways** through the region that form the backbone of today's automobile network include the Pennsylvania Turnpike, I-76, east-west and I-81 paralleling Rt. 11 south through the valley. The Pennsylvania Turnpike was a pioneering effort in the construction of limited access highways. The portion west of Middletown through the valley and crossing the Appalachian Mountains was opened in 1940. The portion east to New Jersey was opened in 1951 (Cuff 1989:98; Miller 1995:242). The intersection of I-76 and I-81 at Carlisle and the access they provide to key population centers nationally has led to the development of trucking and warehouse facilities of national significance within the region.

Landscape Patterns – Agriculture and Community

Agriculture remains the predominant land use in the areas surrounding South Mountain as it has since early European settlement in the mid-18th century. Market towns and crossroad villages established and developed in the 18th and early 19th centuries remain the center of community life today.

Cultural geographers identify three general types of Pennsylvania landscapes (Miller 2002:400; Miller 1995:135). The earliest and most extensive is the **agrarian landscape** occupied by farm families beginning in the early 1700s and continuing until the limits of arable land were reached in the 1850s (Miller 1995:400). Supported by merchants, craftsmen, and services in market towns and villages as discussed above, this agrarian/mercantile, small-scale landscape retains its patterns, structure, and basic integrity throughout the South Mountain region today. The 1850s saw the peak development of the region's agrarian landscape.

A second generation of cultural landscape type emerged in Pennsylvania after 1850 as an **urban-industrial landscape** and developed rapidly in the late-19th century through urbanization, the growth of manufacturing communities and regions, and the emergence of new types of communities related to the mining


Great Valley
South Mountain
Triassic Lowlands
0
5
10
15
20
Miles
Land Use
Open Water
Developed, Open Space
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Barren Land (Rock/Sand/Clay)
Deciduous Forest
Evergreen Forest
Mixed Forest
Shrub
Grasslands/Herbaceous
Pasture/Hay
Cultivated Crops
Woody Wetlands
Emergent Herbaceous Wetlands
Boundaries
Michaux State Forest
South Mountain Landscape
Counties
N

of coal. This landscape included the metropolitan areas of Philadelphia and Pittsburgh; transportation and manufacturing hubs such as Altoona and industrial towns along the Lehigh, Ohio, Allegheny, and Monongahela Rivers; and the coal mining regions of the Allegheny Plateau and Lackawanna Valley. Development of these communities was closely related to the arrival of a variety of new ethnic populations, a polyglot mixture of new immigrants from many places, different from the agrarian English, Scots-Irish, and Germans of the 18th and early 19th centuries (Miller 1995:141; Miller 2002:401).

Facilitated first by the construction of canals and soon after by the construction and maturation of regional and national railroad networks, new types of community and landscape patterns emerged that differed from what had come before. Linked across large areas, these new community landscapes were urban-industrial in character. While they had little in common with the older cultural patterns of the state, they did resemble parallel developments in other sections of the nation.

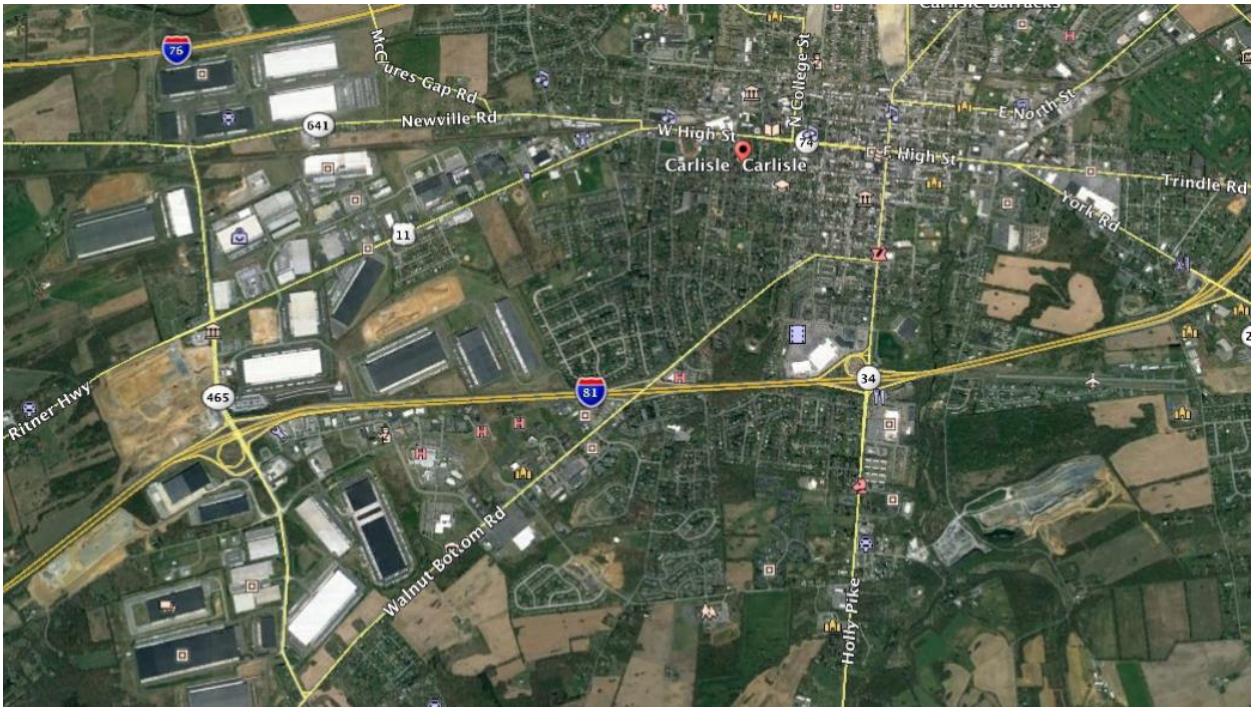
This late 19th century urban-industrial landscape type, widespread throughout Pennsylvania, is little evidenced in the South Mountain region. Canals were not constructed here. The region's principal transportation focus, south through the Great Valley, significant during the wagon era of the late 18th and early 19th centuries, was not relevant to these new changes.

While railroads certainly influenced manufacturing and growth in the South Mountain region's larger towns, their impact was limited and localized and did not dramatically alter the larger, already well established agrarian landscape patterns. While it might be argued that the devastating impact of the iron industry on South Mountain was similar to that related to coal mining, especially in its later years, the overall landscape patterns related to the iron industry were more closely related to colonial patterns in the eastern part of the state as a variant of the larger agrarian landscape.

The third wave of landscape change in Pennsylvania identified by cultural geographers is most visible and widespread in the growth and spread of suburbs. Closely related to the emergence and influence of the automobile, **roadside commercial and suburban landscapes** are manifestations of advances in transportation and communication, as well as a sign of general affluence. Beginning in the early 20th century and accelerating after World War II, these changes in cultural landscape patterns are seen throughout Pennsylvania in communities of all sizes that are experiencing a degree of economic vitality. They are still evolving today and include the widespread construction of developments with single family homes, apartments, commercial corridors, shopping centers, office parks, and social and institutional facilities.

Within the South Valley region, suburban landscape change can be seen surrounding historic communities all all sizes, along primary commercial road corridors, at interstate interchanges, and at various locations along back country roads. Much of today's community planning and growth management effort is focused on improving the character of this ongoing wave of change.

In the vicinity of larger cities such as Philadelphia and Pittsburgh, and even around smaller cities such as Harrisburg and York, suburbs have taken on identities of their own as freestanding communities. Within the South Mountain region and much of the larger Pennsylvania Cultural Area, however, suburban development exists primarily as a layering over and within the early 19th century landscape patterns, affecting it but without loss of its essential personality and character (Miller 1995:143).



Suburban landscape superimposed over Carlisle's historic nineteenth century agricultural landscape. Historic downtown Carlisle is on the upper right. Around the historic town are suburban residential areas, commercial areas, and business/warehouse areas heavily influenced by the locations of highway interchanges. (Google Earth)

Within the region of the South Mountain Conservation Landscape, South Mountain stands as an island of green and connected open space. There are no other large areas of natural landscape. In addition to serving as a visible landmark and source of regional identity, South Mountain is a heavily used **recreational destination** both for local residents and for people farther away. The increased access to and use of outdoor recreational attractions such as seen on South Mountain is a consequence of the mobility provided by today's automobile oriented landscape. Recreational use must be balanced with the mountain's significance as an ecological resource and is a challenge for land managers.

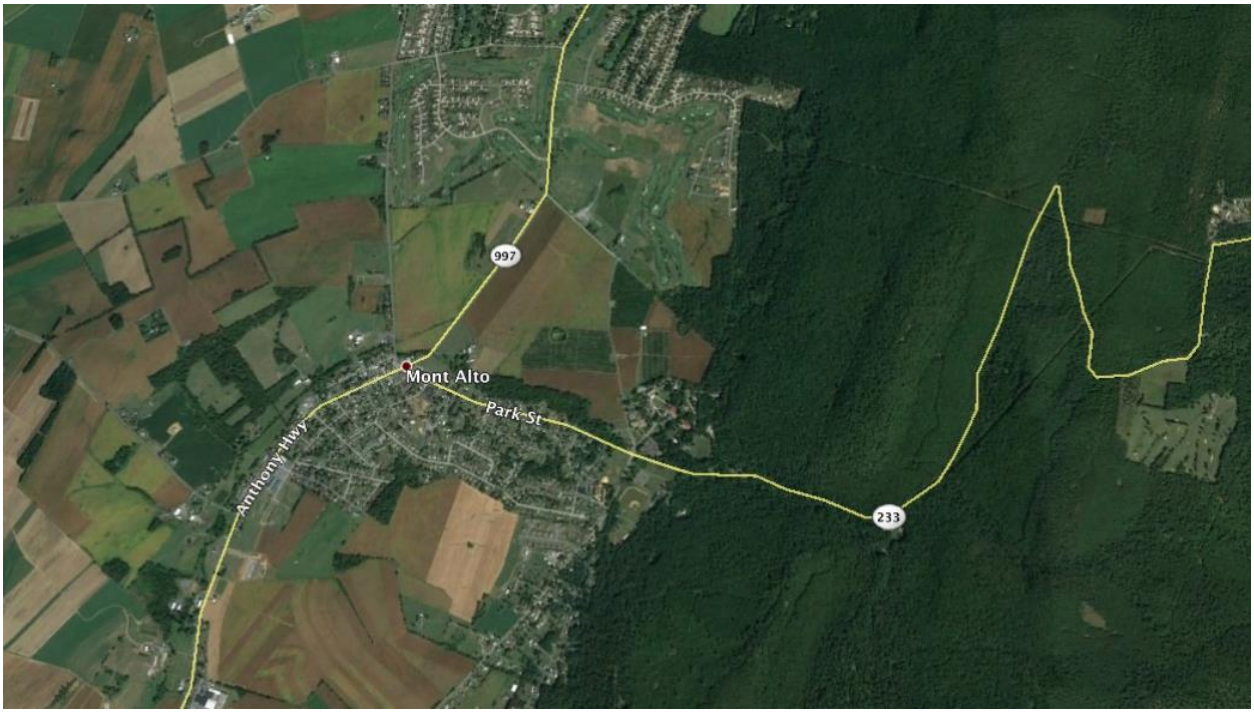
The landscape surrounding South Mountain **retains the overall character** of its peak period of agrarian development by the 1850s while absorbing layers of later change. In the Cumberland Valley, agriculture practiced on family farms continues to be the primary land use, predominantly dairy, livestock, and grains (Cuff 1989:203). Historic farmsteads remain as the centers of farm life and tend to be well preserved while adapting to modern farm practices. Most of the region's farmsteads have been identified and surveyed as historic resources.

Field patterns and lot lines reflect historic early 19th century precedents: many long and thin; comprised of parallel lines in a wide variety of local groupings; and conforming to local topography, landscape features, and early road layouts. Many local groupings of field patterns follow the predominant grain of valley's north-south topography.

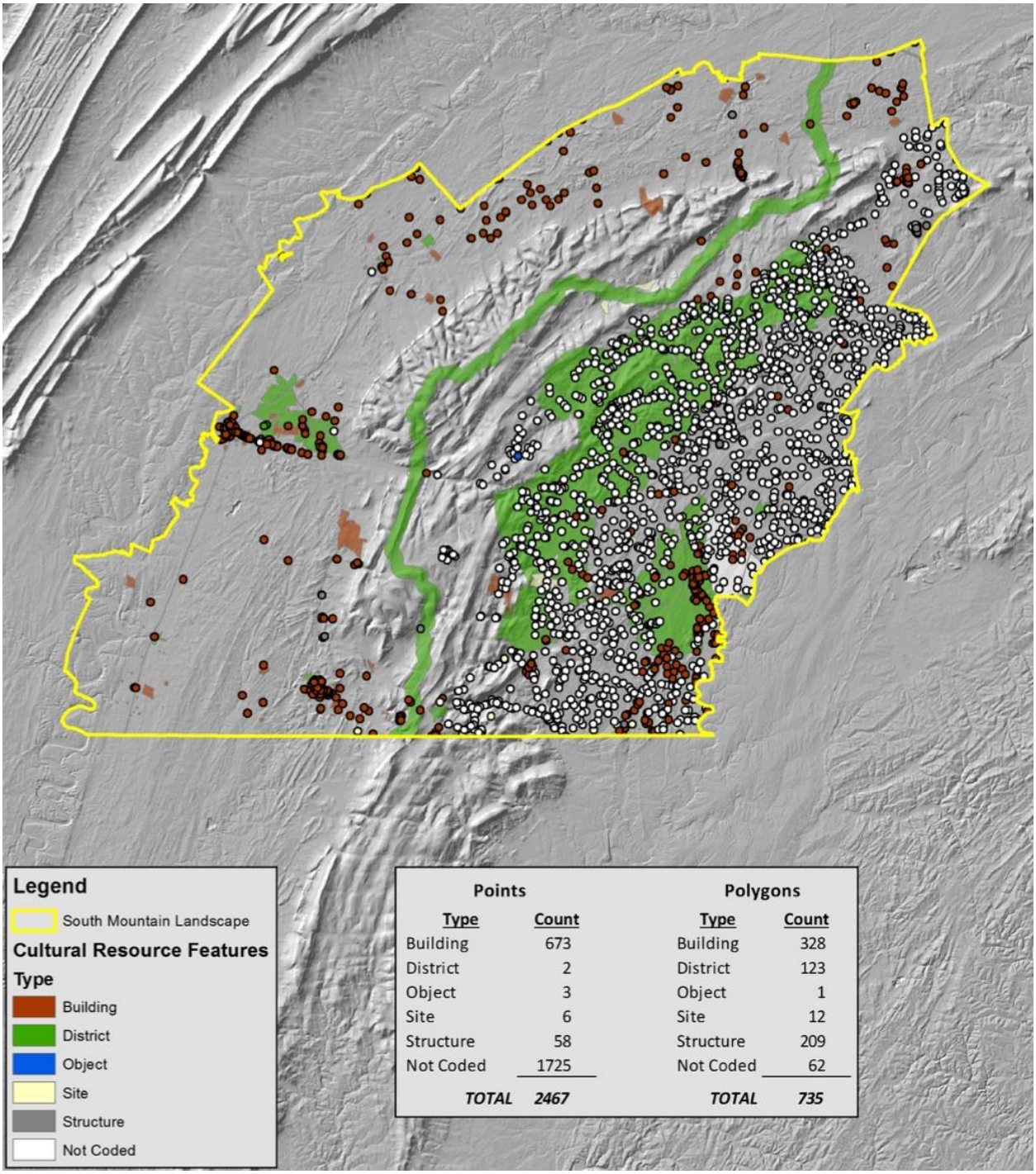
On the eastern side of the valley, with its fertile limestone soils and few surface streams, farms are largely open with few trees and woodlots. On the west side of the valley, field patterns adapt to the winding streams and there are increased wooded areas, often related to the steep slopes along streams. Suburban landscape features introduced throughout the valley have increased the number of trees where they occur, and thin lines of trees can be seen lining roads, streams, railroads, and a few field edges.

Road patterns retain their historic alignments, connecting communities and places in opportunistic patterns (as opposed to planned orthogonal girds) directly connecting destinations while favoring high ground to avoid the need for stream crossings.

Route 11 is the backbone and primary north-south road in the valley, located roughly through its center but on the limestone side where there are fewer streams. Market towns are spaced at approximately 10 mile intervals along the road down the valley toward southern Virginia, with the exception of Carlisle to Shippensburg, which measures about 20 miles. Small linear and crossroads villages are also found along the route as well as on less traveled parallel and transecting rural valley roads.



The village of Mont Alto adjacent to South Mountain. New suburban development has developed around the historic village and in larger subdivisions within the landscape to the north. Yet the overall agricultural character of the Cumberland Valley is predominant. (Google Earth)



Distribution of surveyed cultural resources within the South Mountain Conservation Landscape (PHMP CRGIS data)

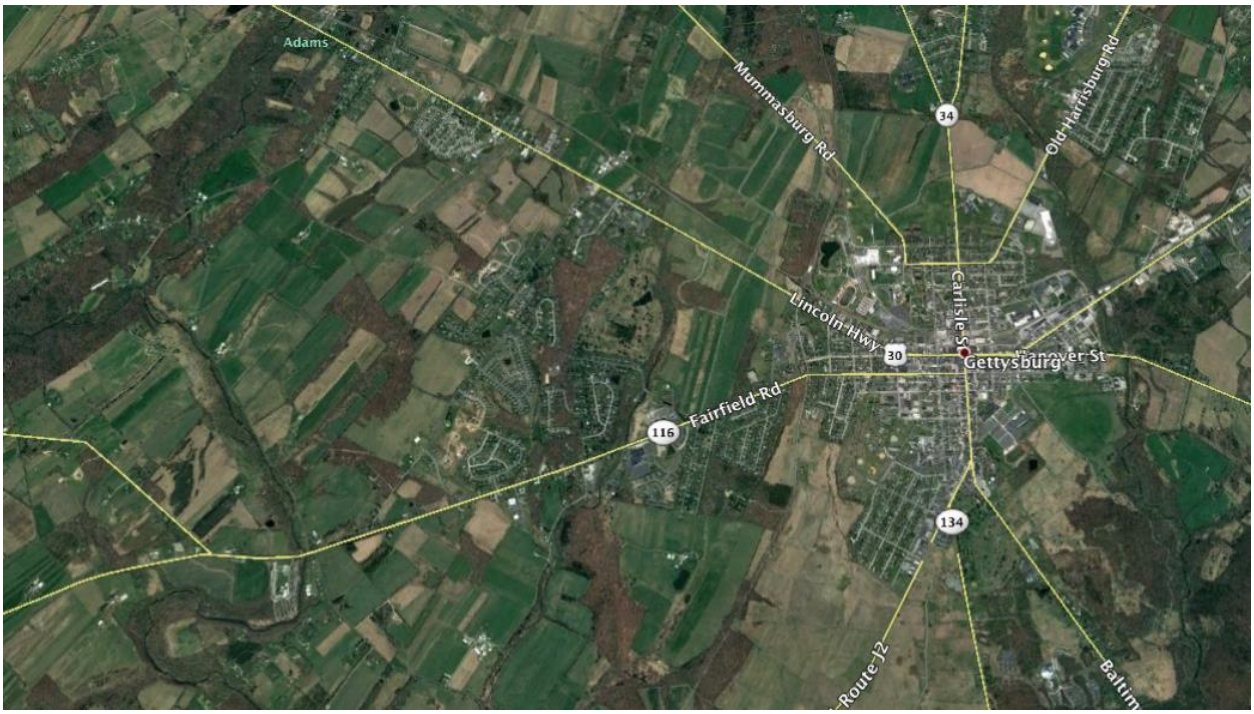
The valley's market towns are the regional focus of government, business, commercial, education, and social activity and are generally thriving. Another modern trend of the automobile landscape is the growth of heritage tourism, similar to that of recreational destinations noted above. The growth of heritage tourism within the region is most prominently seen at Gettysburg, a national tourism destination, but is also evident in the revitalization of historic valley

towns such as Carlisle, Shippensburg, Chambersburg, Greencastle, and Waynesboro.

Smaller linear and crossroad villages have not fared as well. Most dwellings in the historic villages are small and closely spaced both to each other and to the road. Historic commercial uses have disappeared. Lacking investment, many are rental properties and not well cared for.

Similar historic 19th century cultural landscape patterns remain throughout the Triassic Lowlands east of South Mountain as well. As discussed earlier in this chapter, the South Mountain or Adams County Fruit Belt along the eastern flank of the mountain is well known and documented as a distinct type of agricultural cultural landscape. Further east, 19th century farms, farmsteads, and crossroad villages dominate the landscape as they do in the valley with similar agricultural land patterns.

In the Triassic Lowlands, however, the topography is more rolling, the streams are more prevalent, the land is less fertile, and outcroppings of diabase create knobs and ridges of woodland as features of the landscape. These features create a somewhat different character to the landscape than is found in the valley. Livestock farming and pasture are stronger in some areas here than dairy and cultivated crops.



Gettysburg (right) in the Triassic Lowlands east of South Mountain. Battlefield preservation has helped preserve historic landscape character in the vicinity of the town. Wooded areas tend to be diabase outcroppings. (Google Earth)

CHAPTER 3 – HISTORICAL OVERVIEW

The South Mountain region, encompassing portions of Cumberland, Franklin, Adams and York counties, has provided important natural, mineral and recreational resources for its earliest inhabitants through the present day. The area's abundant forests and raw materials supported the country's early iron industry, while the fertile limestone soils contributed to the Great Valley's rich agricultural heritage and the slopes of the mountain provided ideal conditions for the orchard culture of the Adams County Fruit Belt. Michaux State Forest, which encompasses the wooded ridge along the top of the mountain, was formed in the early twentieth century and served as an early incubator for state forestry initiatives. Although modern development has overtaken portions of the area, much of the South Mountain region reflects the agricultural and orchard based landscape established in the nineteenth century.

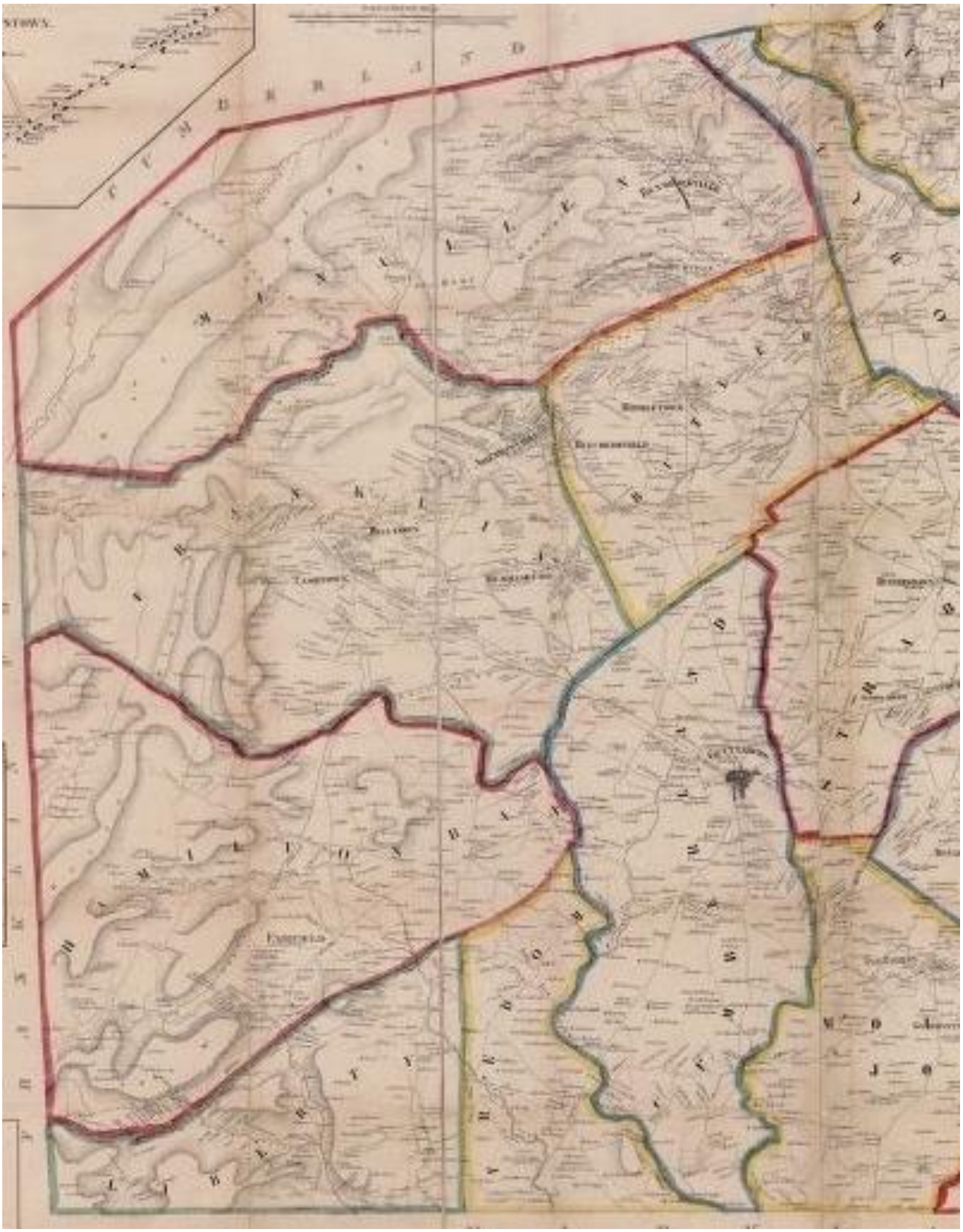
NATIVE AMERICANS ON THE MOUNTAIN

Native Americans were the first human inhabitants of the South Mountain region and the Cumberland Valley. They lived and camped along the area's streams, used minerals and rocks in the mountain formations for tools and weapons, and cultivated crops in the fertile soils of the valleys. They forged paths along natural landforms and hunted game that came off the mountain into cleared areas.

The earliest Native Americans were likely nomadic hunters who lived in temporary camps established as they traveled through the Cumberland Valley. During the Paleoindian period (12,000-10,000 BP), the Indians would have located more permanent villages near the Susquehanna River. Base camps and kill sites have been identified by accumulation of lithic debris and tools associated with animal killing and processing.

As the climate transitioned to an overall warmer and drier one during the Archaic period (10,000-3000 BP), the predominantly conifer forests of the region declined and hardwood trees rounded out the wooded areas. Natives divided themselves into groups, or bands, and began crafting goods, such as tools and weapons made from metarhyolite deposits found in the South Mountain area, as well as quartzite and limestone quarried from the mountain.

The Woodland period (3000-450 BP) saw the establishment of more permanent villages, where the Native Americans transitioned from horticulture to agriculture to grow fruit, grains, legumes, roots, tubers and greens. Also during this period, Indians exploited natural materials and resources to create ceramic goods. By



Western portion of Adams County in 1858 (Hopkins 1858)

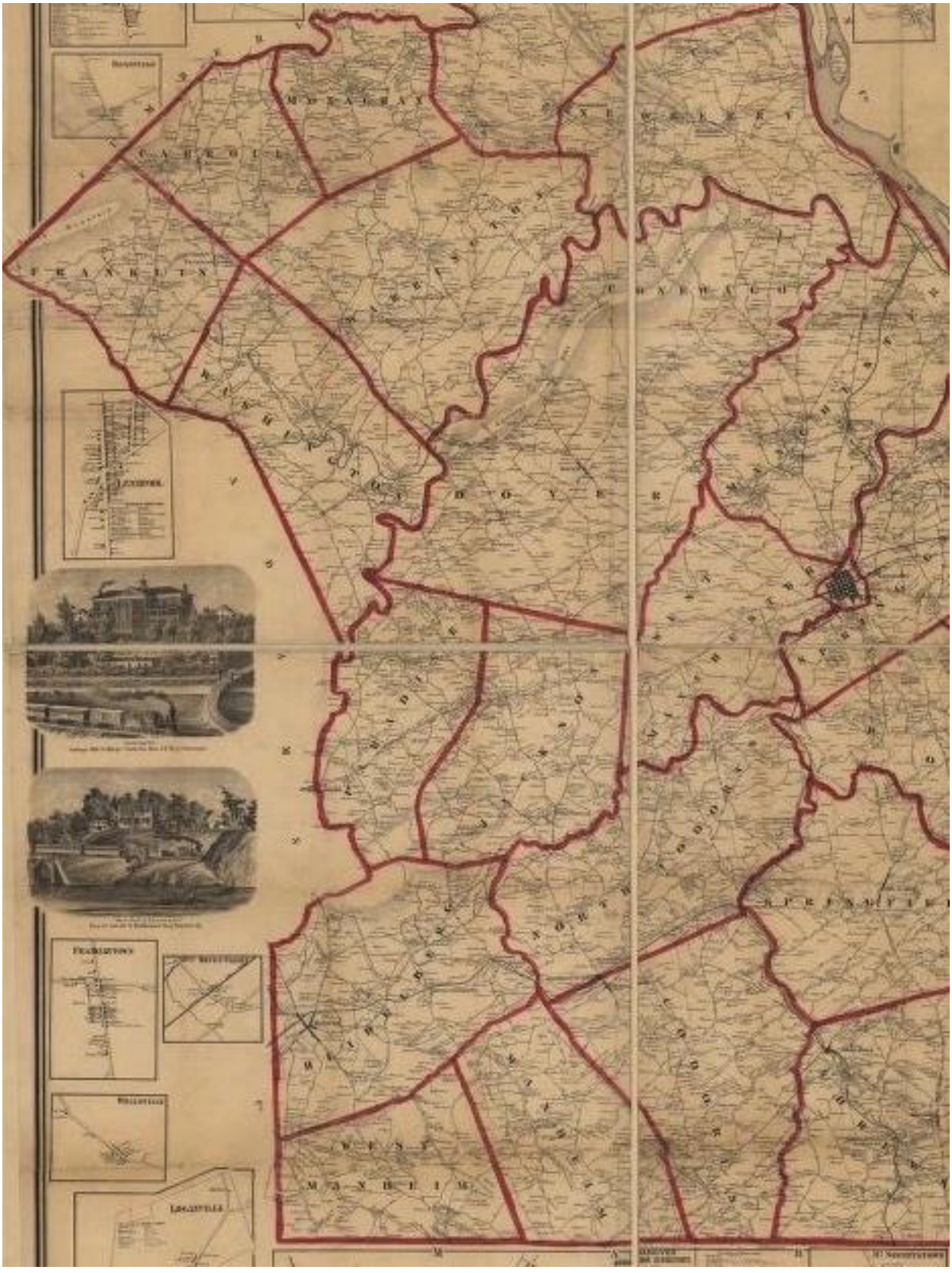
the end of the Woodland period, European explorers had made contact with Native Americans and a time of clashes over land and uneasy settlement occurred.

During the century between ca. 1575 and ca. 1675, the Susquehannocks, an Iroquois speaking culture, occupied much of central Pennsylvania and the Cumberland Valley. These Native Americans tended to move to new fertile lands and water sources every few years, where they hunted, fished and collected their food. The Susquehannocks were at war with the Delaware and Iroquois during the mid-seventeenth century and were eventually driven out of Pennsylvania by the Iroquois, who then gained control of the Susquehannocks land, including the Cumberland Valley. By the early eighteenth century, the Shawnee had migrated to the area from the south and west and established villages in Cumberland County near the Conodoquinet and Yellow Breeches creeks. Most of the Shawnee left the area by the late 1720s as European settlers were claiming lands in Cumberland County (CCCP 2008:4-1 – 4-3).

Although some archaeological evidence of Native American occupation of the area has been identified in the South Mountain region, one of the lasting reminders of these early inhabitants is reflected in the Algonquian names of some local waterways, including the Conodoguinet Creek and the Callapatsink Creek, the original name of the Yellow Breeches. Additional vestiges of the natives' early existence in the area are manifest in several roads and turnpikes running through the valley and across the mountain, many of which intersected at Carlisle. Present day Route 11 roughly follows the Great Trail, Walnut Bottom Road was known as the Walnut Bottom Path, and portions of Trindle Road were part of the Frankstown Path, which traveled east-west across the mountain. (CCCP 2008:4-3 – 4-5).

EARLY EUROPEAN SETTLEMENT (1725-1780)

The broad flat area below the western slopes of the South Mountain is known as the Great Valley. This band of fertile land extends southward into Virginia and northeastward to New Jersey. Within Pennsylvania, the Great Valley is between 10 and 25 miles wide and extends about 150 miles, bounded on the north by long, narrow, steep ridges and on the south by South Mountain and a band of hills that separate the Great Valley from northern Bucks, Montgomery, Chester, Lancaster, and York Counties. Within this larger region, the eastern end of the Great Valley is knowns as the "Lehigh Valley"; the flat area from Reading to Harrisburg as the "Lebanon Valley"; and the portion from the Susquehanna River to the Maryland line, through Cumberland and Franklin counties, is called the "Cumberland Valley" (McMurry, et al. 2011:9). The portion of Adams County within the South Mountain region includes the eastern slopes of the mountain, with ridges of red shale and sandstone forming rough and rocky hills, and a belt of limestone passing through the southeast corner of the county (Rupp 1848:521).



Western portion of York County in 1860 (Shearer 1860)

South Mountain itself did not attract many permanent settlers, but it did provide valuable iron ore, limestone and sandstone, as well as an abundant supply of timber to fuel the region's numerous furnaces and mills (Rupp 1848:365). Deposits of copper and other minerals were found within the Adams County section of the mountain (Rupp 1848:521).

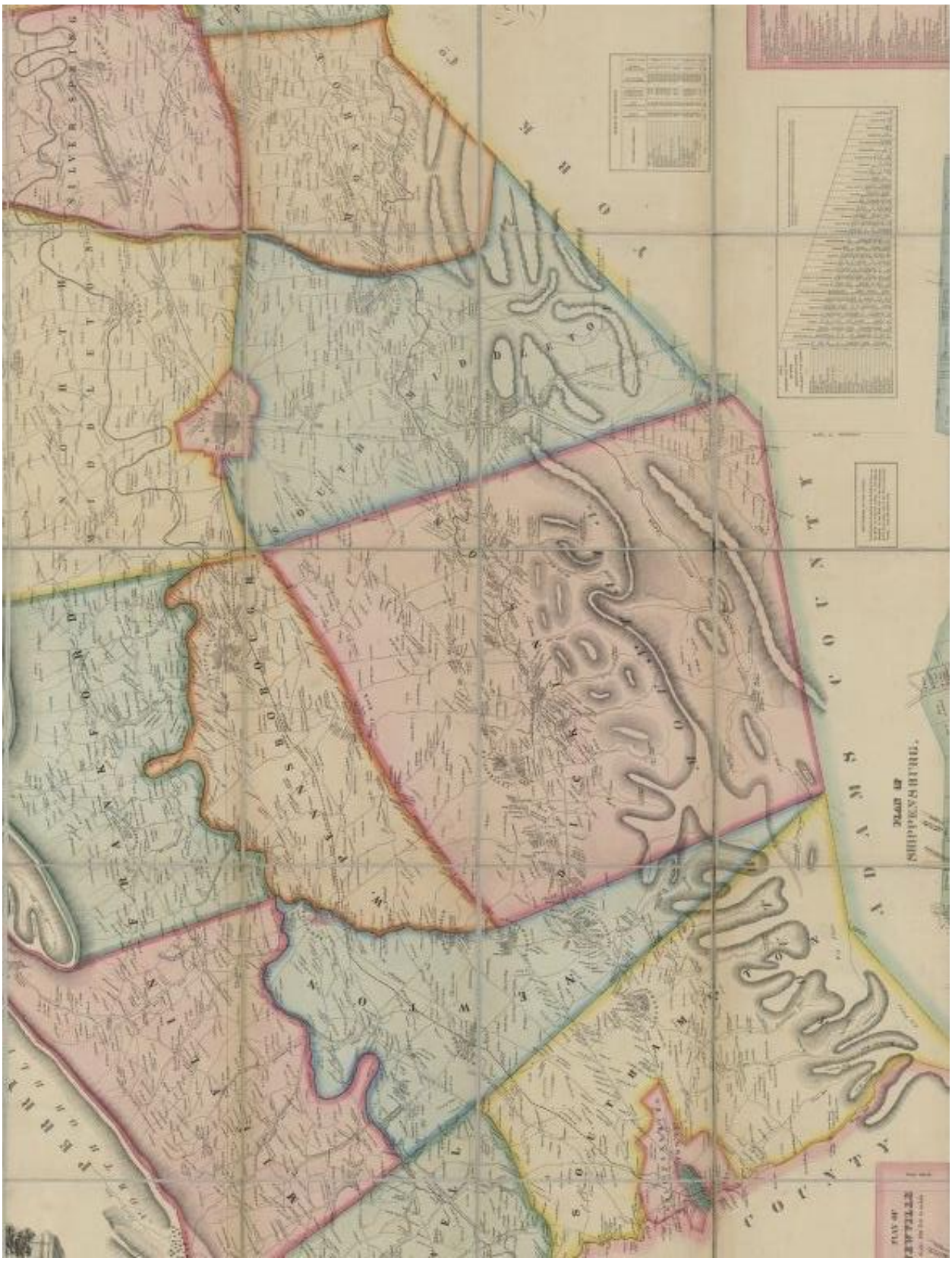
Around 1715, James Letort, noted as the first European settler in Cumberland County, established a trading post near a spring-fed limestone stream (now known as LeTort Spring Run) that ran through the Carlisle area. Letort understood the language of the Shawnee and served as a liaison of sorts between the Indians and early white settlers. He moved west in the late 1720s after an influx of European settlers into the area further strained relations with the Shawnee (CCCP 2008:4-5 – 4-6).

Irish and Scotch-Irish settled in the Cumberland Valley during the 1720s and 1730s, part of a Great Migration, while members of the Six Nations (Shawnee and Iroquois) and Susquehannocks were still living in the area (Rupp 1848:350-351). Like the Native Americans before them, the Europeans settled in the fertile valleys near the region's springs and creeks. German settlers followed, and by the end of the eighteenth century, there were nearly equal numbers of Scotch-Irish and German inhabitants in Cumberland County.

Cumberland County was formed from the western portion of Lancaster County in 1750 and stretched westward from the Susquehanna River. The central portion of the county encompasses the limestone valley between the Tuscarora mountain range to the north and South Mountain to the south, and included the towns of Shippensburg at the southwestern edge and Carlisle as the hub in the center of the county. Smaller towns and villages developed at crossroads, along major waterways and around the forges, furnaces and mills established in the mid-eighteenth century. The Carlisle Iron Works was located in the village of Boiling Springs in South Middleton Township, and the Pine Grove Iron Works, which included Pine Grove Furnace and Laurel Forge, together eventually included about 25,000 acres of mountain land in the southwestern portion of the county.

The first white settlers in what would become Franklin County were Scotch and Scotch-Irish, who claimed "the slate lands" in the 1740s-1750, before the more fertile limestone lands further west were surveyed or located. The slate lands were situated in the eastern portion of the county near the base of South Mountain and provided wood, watercourses and water-meadows and were generally free of rock at the surface (Rupp 1848:484-485).

Franklin County was established in 1784 from portions of Cumberland County. Similar to Cumberland, Franklin is bounded on the east and west by mountains with the limestone valley running through the center. Chambersburg, located in the center of the county, was the principal town, with smaller villages situated at the base of the mountains and in association with the numerous saw and grist mills scattered throughout the county. The Mt. Alto Iron Company was located in the southeastern portion of the county, and Caledonia Iron Works along the border with Adams County.



Cumberland County in 1858, north to left (Bridgens 1858)

Early settlers in the Adams County area were principally Scotch-Irish who landed in the southwestern part of the county 1740s, and some English descendants who settled the borders of Maryland. Germans settled the limestone region between Hanover and Littlestown (Rupp 1848:545). The eastern portion of the county, which had been cleared by Native Americans to facilitate hunting, was almost entirely devoid of timber and was known as The Barrens. Most of the trees grew back following European settlement in the early eighteenth century (Beers 1886:51).

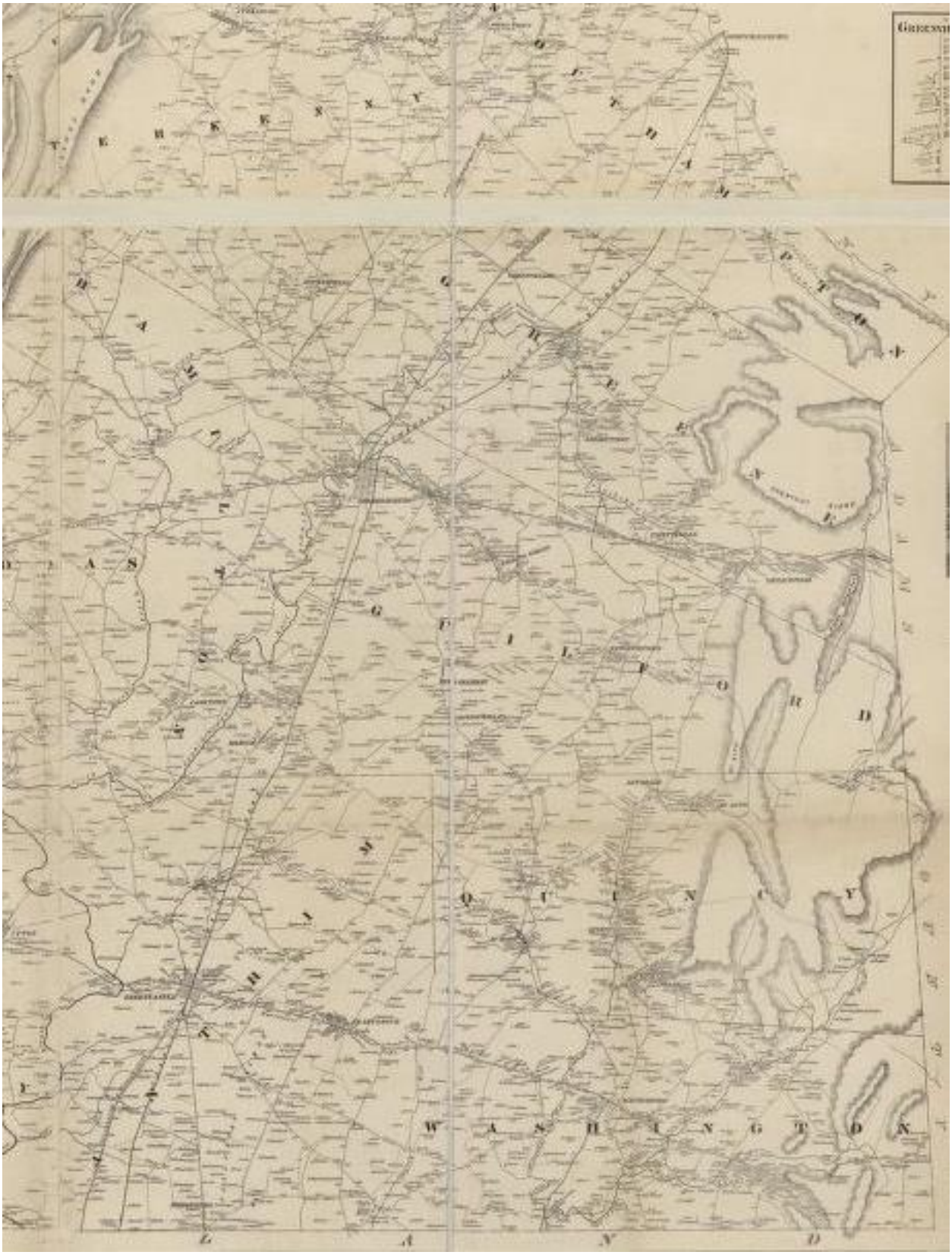
Adams County was erected from the western part of York County in 1800. Bounded on the west by South Mountain, the central and eastern portions of the county consist of rolling hills and a smaller limestone valley to the southeast. Major towns in the county included Gettysburg in the center and Littlestown at the Maryland border, with smaller villages near the eastern edge of the county, and very little early development in the mountain portion.

After the French and Indian War ended in 1763, the Cumberland Valley became more densely populated as European settlers migrated westward. By the end of the eighteenth century, much of the farmland in the valley had been claimed. Settlers also had discovered the valuable iron ore deposits on South Mountain and established the iron furnaces and forges that would characterize the mountain landscape and complement the region's agricultural-based economy through most of the next century.

The earliest farms in the valley would have included a small log or stone house reflective of the settler's ethnic heritage; later, larger and more substantial houses in the area were built of stone or brick with four or five bays and a gable roof. Early barns were typically small ground barns (on one level) because farmers did not need much room for livestock or crop storage. Additional farm buildings included kitchens, spring houses, smoke houses, still houses and bake houses. The farm landscape typically was made up of small crops fields, woodlots, orchards and meadows, with little definition between these elements and neighboring farms (McMurry, et al. 2011c:15-22).

INDUSTRY AND AGRICULTURE (1750-1860)

European settlers brought farming methods from their home countries, but also were introduced to native crops such as corn, beans, peas, squash and melons by Native Americans, who had been cultivating these crops to supplement game and fish in their diets. Farms in the South Mountain region produced crops and goods for their own consumption and for selling and trading to both local and distant markets. This economic model resulted in the production of diverse crops and broadened the farmer's reach and exposure to a variety of goods and services (McMurry 2011b:10). In addition to grain, grass and vegetable crops grown within the Cumberland Valley, farmers planted apple orchards that provided not only fresh fruit, but also dried fruit, cider (both sweet and hard), vinegar, and apple butter (McMurry 2001c:13). Adams County, especially, had the right combination of landforms and soils to excel in tree-fruit culture; however, this industry did not develop until transportation links and innovations in cultivation were established near the end of the nineteenth century (McMurry 2011a:13).



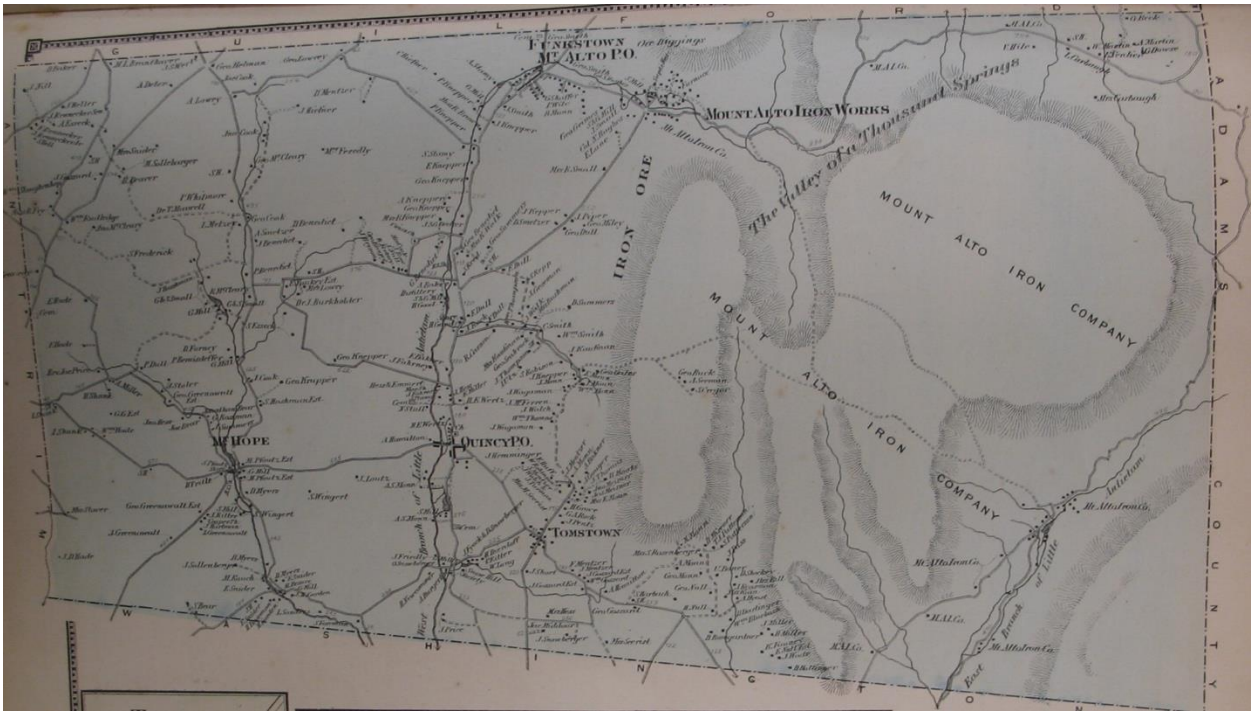
Eastern portion of Franklin County in 1858 (Davidson 1858)

The early settlers focused on clearing land and planting crops to feed themselves and sell to local and regional markets. Despite the limestone rich soil in the Cumberland Valley, farmers found that planting the same crops in the same fields exhausted the soil and nutrients, and some families chose to move from the area to find fresh land to farm. The German farmers who took up the depleted land began rotating their crops among the fields and enriched the soil with lime and other organics, including manure harvested from livestock. This crop-and-livestock system produced a diverse array of both crops and livestock products and proved to make farms more efficient with field husbandry and animal husbandry working in tandem (McMurry 2011c:24). Thus farms in the Cumberland Valley were able to tap into the domestic markets to provide for the growing population and take advantage of the improved roads, and the newly built canals and railroads, to distribute goods (McMurry 2011c:23-24).

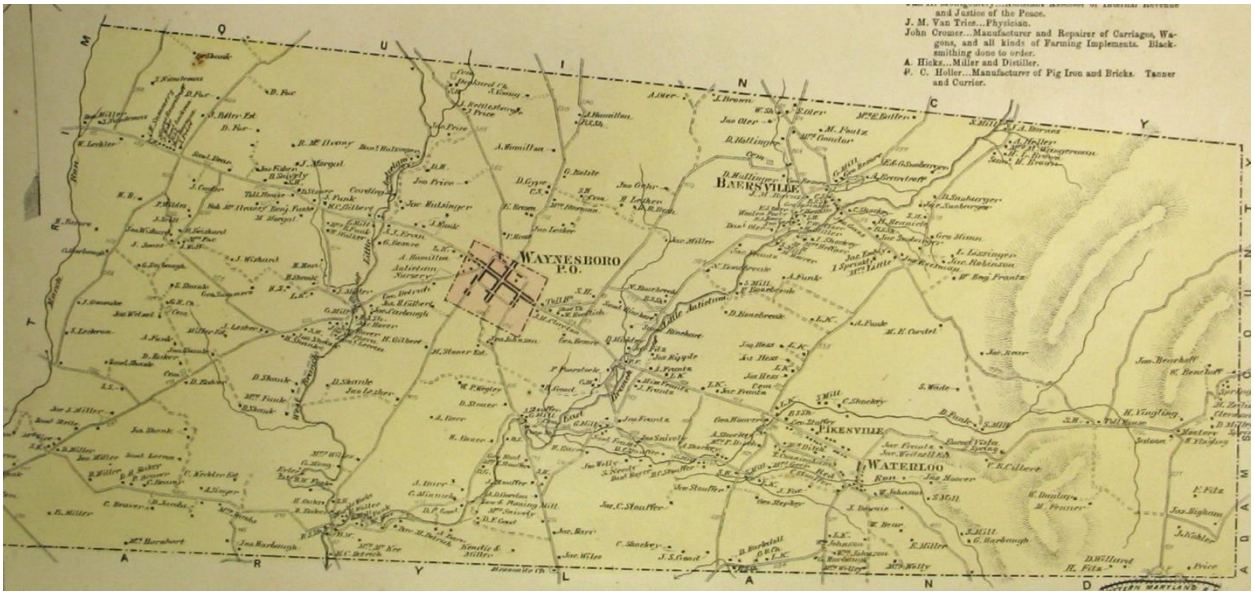
The principal crops grown by Cumberland Valley farmers during the nineteenth century included wheat, corn, oats and hay, supplemented in smaller numbers by other grains, grasses and produce. As part of the newly adopted crop-and-livestock system, livestock in the valley included cattle, horses and swine. The predominance of swine, and rye crops in certain areas, was reflective of the German culture and dietary habits (McMurry 2001c:33).

During this period, farm tenancy rates in Cumberland County were higher than other areas in the Great Valley. In the South Mountain region, vast tracts of land were owned by iron companies and the fertile farmland parcels were often rented out to local farmers who would grow crops and raise livestock for both personal use and providing products back to the company as rent for the land. Another factor contributing to the higher farm tenancy rates in the area was the concentration of Germans, who tended to keep immediate and extended family members together by sharing land, most notably between father and sons (McMurry 2001c:27).

Rupp's 1848 history of several counties in central Pennsylvania – including Cumberland, Franklin and Adams – provides information about numbers and sizes of farms, as well as statistics about local industries. As of 1838, Cumberland County contained 1,474 farms, with average farm size of 110 acres, growing wheat, rye, oats, barley, corn, potatoes, turnips, buckwheat, hemp and flax (Rupp 1848:367), and Franklin County included 2,064 farms, with farm sizes ranging from 100 to 300 acres (Rupp 1848:452). Rupp notes that areas of Adams County were not ideal for cultivation, but application of lime had enriched the soils and agriculture had improved during the first half of the nineteenth century. At the beginning of the century, wheat, grain and feed for horses was brought into Adams from other counties, but by 1840, crops of wheat, rye, corn, hay, buckwheat and potatoes were grown in the county (Rupp 1848:521-522).



Quincy Township, Franklin County in 1868 (Beers 1868)



Washington Township, Franklin County in 1868 (Beers 1868)

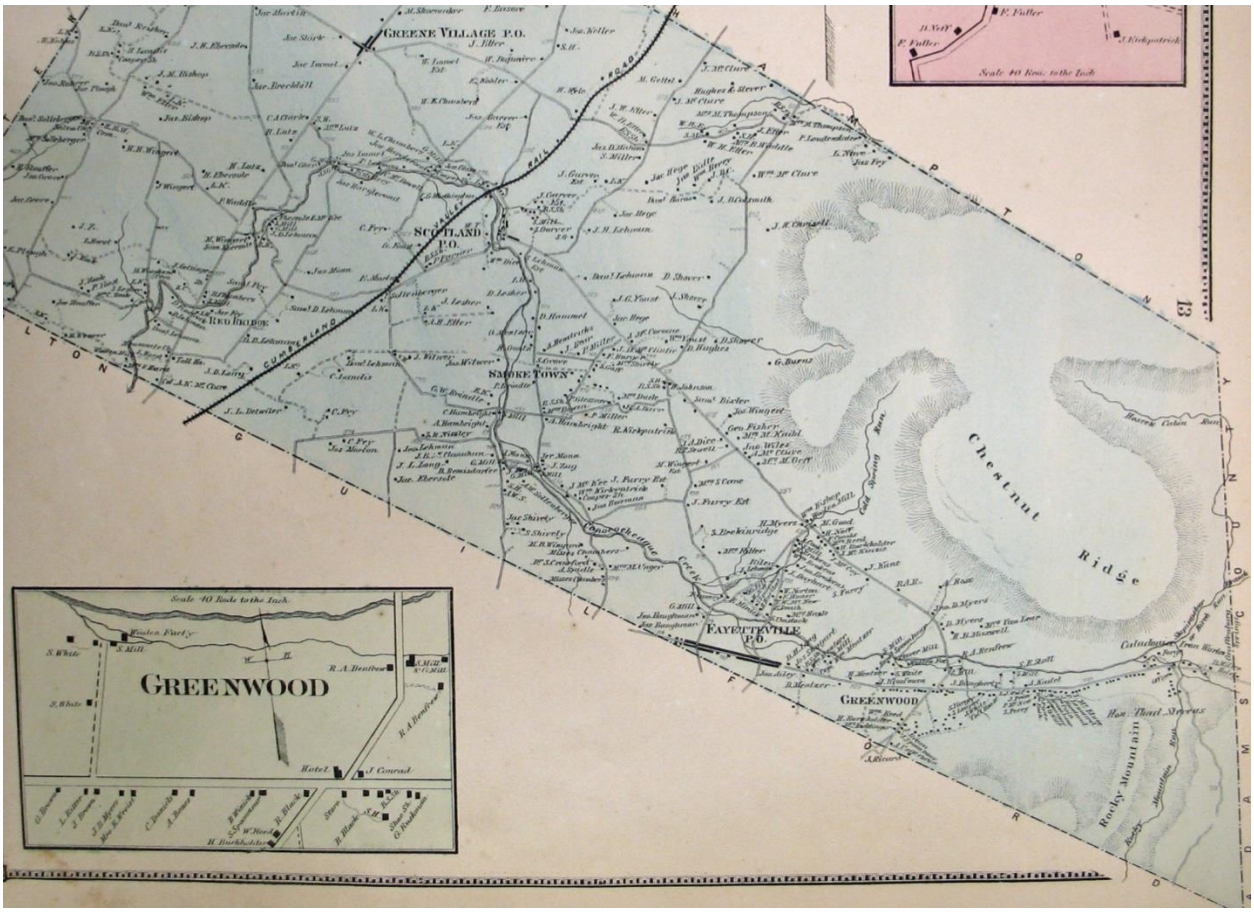
In Adams County, traditional crop-and-livestock farming was occurring in the eastern portion of the county while the western portion of the county was focusing on fruit trees and the development of commercial orchards. In the early decades of the nineteenth century, farmers had discovered that the climate, soils and topography along the eastern slopes of South Mountain were ideal for fruit-tree culture, but it wasn't until later in the century that conditions aligned so that the Adams County Fruit Belt, as the region became known, was able to capitalize on its location (McMurry 2011a:11).

The "Fruit Belt" consists of a 4-6-mile-wide swath of land that includes much of Latimore, Huntington, Tyrone, Menallen, Butler, Franklin and Hamiltonban townships, as well as the villages of York Springs, Bendersville, Biglerville, Arendtsville and Fairfield (McMurry 2011a:8). The fruit belt is situated on the lower eastern slopes of the mountain, at 700-900 feet; the sloping feature of the orchard region allows heavier cold air to drain to the valleys so that the fruit trees are spared from frost damage (McMurry 2011a:10).

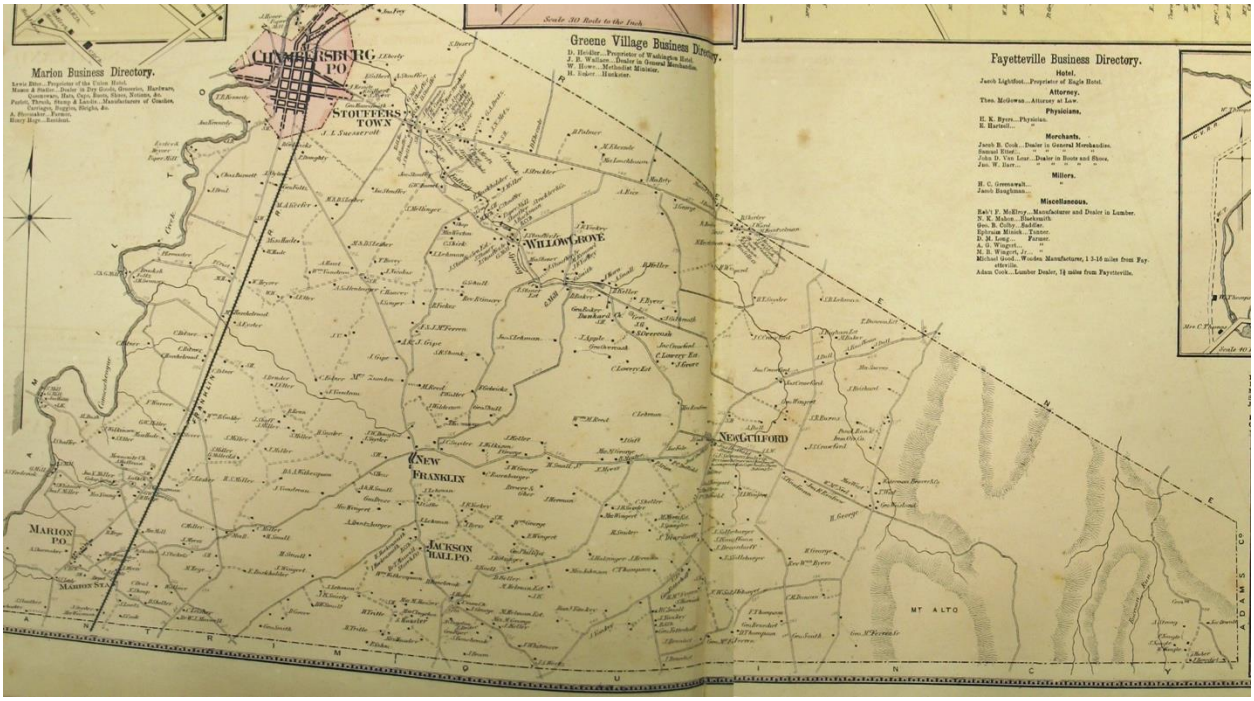
By the mid-nineteenth century, several fruit nurseries had been established in the Arendtsville and Bendersville areas with apple orchards growing hundreds of varieties and at various stages of growth, in addition to peach, pear, cherry and other types of fruit trees (McMurry 2011a:13-14). Other than the few nurseries dedicated to growing and cultivating fruit trees, the nascent orchard industry began as small plots of trees grown in conjunction with grain and grass crops on a mixed farm. The development and expansion of transportation networks into western Adams County during the later decades of the 1800s provided a way to distribute the fruit to both local and regional markets.

Farm properties in the South Mountain region during this period likely included several principal buildings, such as a two-story, four or five bay house with a gable roof, a large barn and a variety of domestic and agricultural outbuildings. The predominant barn type in the area was the forebay bank barn (also known as the Pennsylvania barn), which facilitated the crop-and-livestock system of farming by providing space to store grasses and spent grain for feed, room to house livestock, and storage of manure (McMurry 2001c:48). Domestic outbuildings, likely located closer to the house, would include spring houses, summer kitchens, smoke houses, butcher houses and privies. Agricultural outbuildings would be located closer to the barn, and included pigsties, corn cribs, machine sheds, and occasionally lime kilns. Many farms also included one or more tenant houses. The property would have been divided into small square or rectangular fields, sometimes separated by fencing or other markers, the house and yard set off by a fence, and woodlots and orchard trees, often planted along the property boundary (McMurry, et al. 2011c:38-63). For farms in the fruit belt, the basic domestic and agricultural buildings would be similar to those found in the Cumberland Valley, with barns and other outbuildings (spring house or ice house) being used to store and pack fruit (McMurry, et al 2011a:20).

While farmers were busy settling and cultivating the valley land and the fruit belt slopes, activities on South Mountain focused primarily on the iron industry. The sizeable deposits of iron ore in the mountain were recognized and exploited by



Greene Township, Franklin County in 1868 (Beers 1868)



Guilford Township, Franklin County in 1868 (Beers 1868)

early settlers, who began to establish iron furnaces and forges in the second half of the eighteenth century. In addition to the valuable ore deposits, the vast forested areas of the mountain provided trees for making of charcoal as fuel to power the furnaces. In the early nineteenth century, these industries continued and expanded, and the facilities themselves, as well as the worker housing, nearby villages, transportation networks and vast landholdings dominated the landscape and culture of South Mountain.

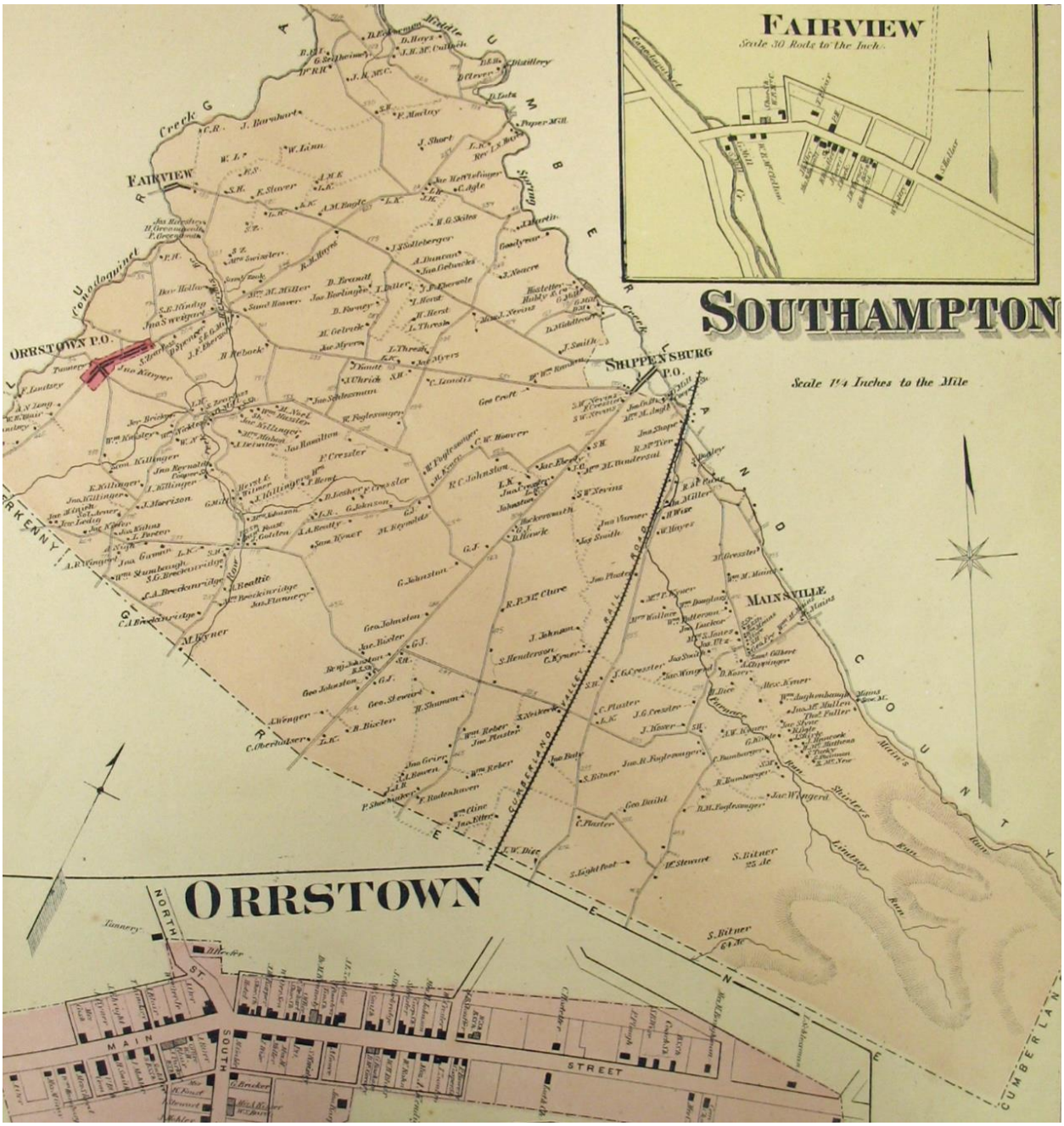
In 1840, Cumberland County included 6 furnaces that produced 2,830 tons of cast iron, and five forges and rolling mills that produced 2,150 tons of bar iron. The furnaces and forges consumed 10,600 tons of fuel and employed 400 hands, including mining operations (Rupp 1848:372). The 1840 census for Franklin County enumerated 8 furnaces that produced 3,810 tons of cast iron and 11 forges, bloomeries and rolling mills that produced 1,125 tons of bar iron. These furnaces and forges used 8,552 tons of fuel and employed 518 hands, including mining operations (Rupp 1848:452). In Adams County, the 1840 census reported only 3 furnaces in the county, which produced 50 tons of cast iron, consumed 50 tons of fuel and employed 10 men, including mining operations (Rupp 1848:522).

THE MATURING AGRICULTURAL LANDSCAPE (1860-1900)

The Civil War had a transformative effect on the country's overall economic, political and social attitudes and also impacted the South Mountain region directly as Union and Confederate troops fought to control the region's transportation corridors, natural and built environments, industries and commercial products, as well as the area's food supplies. Throughout the war, command of rail lines and roadways changed sides periodically, and tracks, rolling stock and depots were frequently destroyed. Local industries, especially those related to iron manufacture and processing of raw materials and crops, were seized by commanders on both sides of the conflict. Farmland, crops and buildings also were appropriated to supply troops with food, lodging and space for military headquarters. The Battle of Gettysburg, fought over three days in July 1863, was a major turning point in the war; however, numerous skirmishes took place throughout the region in association with the battle.

Nineteenth century maps illustrate the range of development and economic activities that were occurring in the South Mountain region. Within Cumberland and Franklin counties, pockets of iron ore were noted in many of the townships that contained mountain land, and iron companies were listed as owners of tens of thousands of acres that provided raw materials and fuel for their enterprises. Most of the mountain land was undeveloped, save for the iron furnaces and forges, whereas towns and villages were located in the foothills and valleys (D.G.Beers 1868; F.W. Beers 1872). Most of Adams County's industry centered on milling and included very little iron-related businesses (Lake 1872).

Though the iron industries appeared as major landholders, the industry had been hit hard by raids and damage related to the Civil War. The industry was eventually affected by innovations in fuel and production and the discovery of high-grade



Southampton Township, Franklin County in 1868 (Beers 1868)

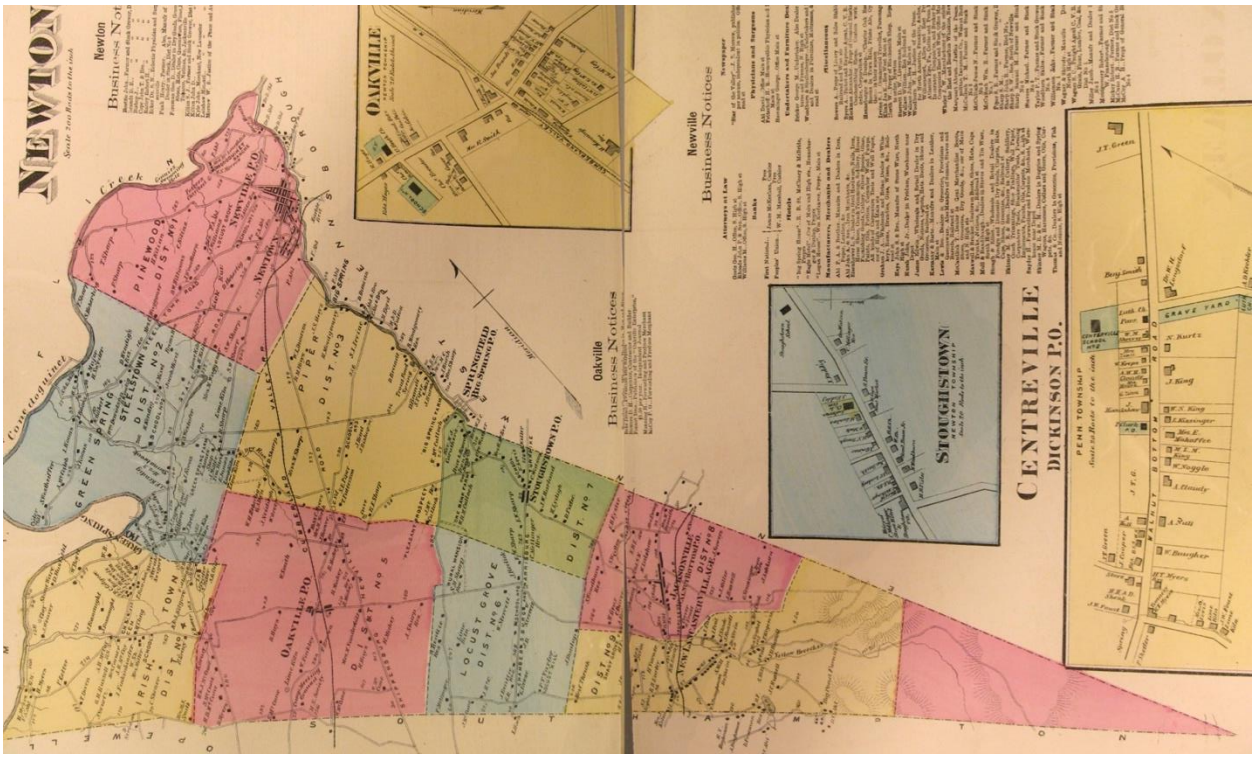
ore near the Great Lakes that supplanted the South Mountain region as a center of iron production (Swartz 1986:5). During the last decades of the nineteenth century, the region's remaining furnaces and forges closed and enterprising owners developed other industrial initiatives as well as parks and recreation areas to attract paying customers on the little used rail lines.

According to the 1872 Cumberland County atlas, iron-related industries included the Carlisle Iron Works in Boiling Springs (South Middleton Township), Laurel Forge and Pine Grove Furnace in Penn Township, and Big Pond Furnace in Southampton Township. Located on the east side of the lake in Boiling Springs, the Carlisle Iron Works included an office, coal house, furnace, forge, grist mill, stable, coal shed and several barns, as well as 10,000 acres of land in the southwestern portion of the township. Owned by the South Mountain Iron Company, Pine Grove included the company's offices and store, furnace, blacksmith and carpenter shops, a railroad depot, grist mill, engine houses, and a boarding house. Laurel Forge included several forge buildings, the manager's residence, coal house, a boarding house, carpenter shop, coal dwelling houses and a depot. Big Pond Furnace was depicted as a smaller operation and included a furnace and forge (F.W. Beers 1872).

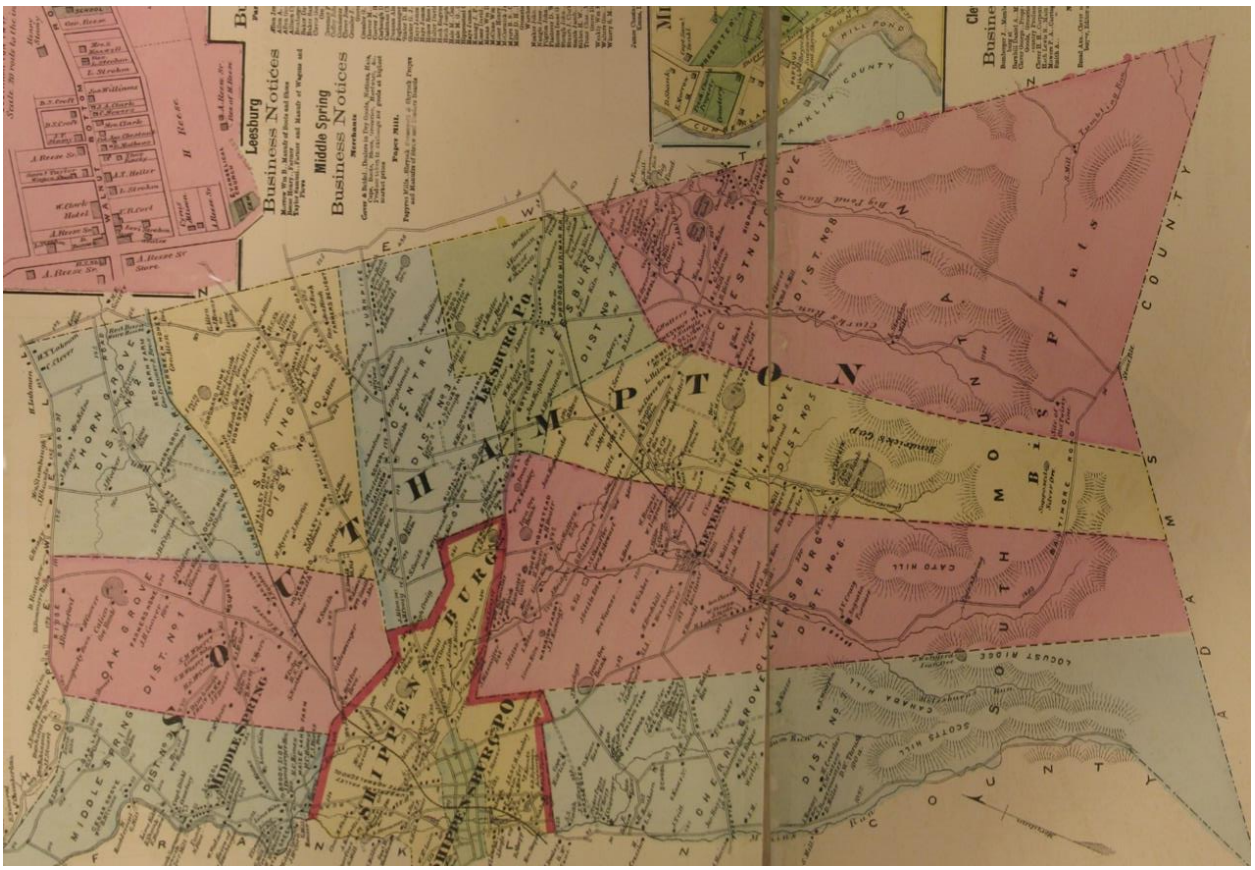
Additional industries noted in Cumberland County included limestone quarries and kilns, sandstone quarries, and paper mills in Mount Holly Springs and Newville. Under the business notices on individual maps, most listings were for farmers and stock growers, with fewer listings for professional or tradesmen. Within the South Mountain region of the county, Carlisle, Shippensburg , Mount Holly Springs, and Boiling Springs were the major community centers, and smaller villages, such as Whitehouse (Dickinson Township), Hockersville, Centerville and Mill Town (Penn Township), Cleversburg, Middle Spring and Leesburg (Southampton Township), supported the farms and industries in the area (F.W. Beers 1872).

The 1868 Franklin County atlas paints a similar picture to that of Cumberland County in terms of occupation and use of the South Mountain region. The Mont Alto Iron Company owned most of the land in the eastern half of Quincy Township, with the iron works located in the northeastern section of the township; a portion of the company's landholdings continued into southern Guilford Township. A number of saw and grist mills were located along the West Branch of Little Antietam Creek. The Caledonia Iron Works was situated in the northeastern portion of Greene Township along the Adams County line. The business included a forge and offices, as well as several other buildings. Chambersburg and Waynesboro were the principal towns in the county, with smaller villages along the foothills and in the valley, including Funkstown, Tomstown, Quincy and Mt. Hope (Quincy Township) and Greenwood, Fayetteville, Scotland, Smoketown and Green Village (Greene Township), and the community of Moneterey in Washington Township (D.G. Beers 1868).

As shown on the 1872 Adams County atlas, the section of South Mountain known as Green Ridge, extended through the county. Within Franklin Township at the northern end of the county, saw, shingle and lath mills were located along the Conococheague and Conawago creeks. Menallen Township also included many



Newton Township, Cumberland County in 1872, north to left (Beers 1872)



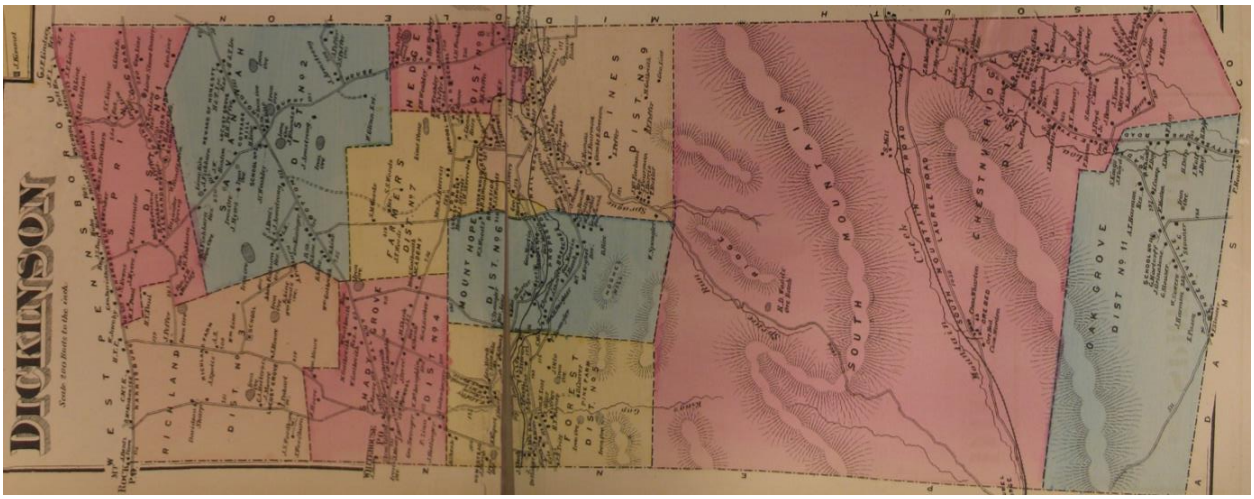
Southampton Township, Cumberland County in 1872, north to left (Beers 1872)

saw mills, most of which were located in the mountainous western section of the township. South Mountain Iron Company, which ran the Pine Grove Furnace and Laurel Forge just over the Cumberland County line, owned several properties in the northern and western portions of Menallen Township, between the Piney Hill and Bear Mountain sections of the mountain. Hamiltonban Township contained saw mills, a cooper shop and a carpenter shop in the Green Ridge area of the mountain, with some farming occurring in the valley along the eastern edge of the township. Gettysburg was the principal town in the county, and villages along the base of the mountain included Fairfield, Cashtown, Hilltown, Arndtsville and Bendersville (Lake 1872).

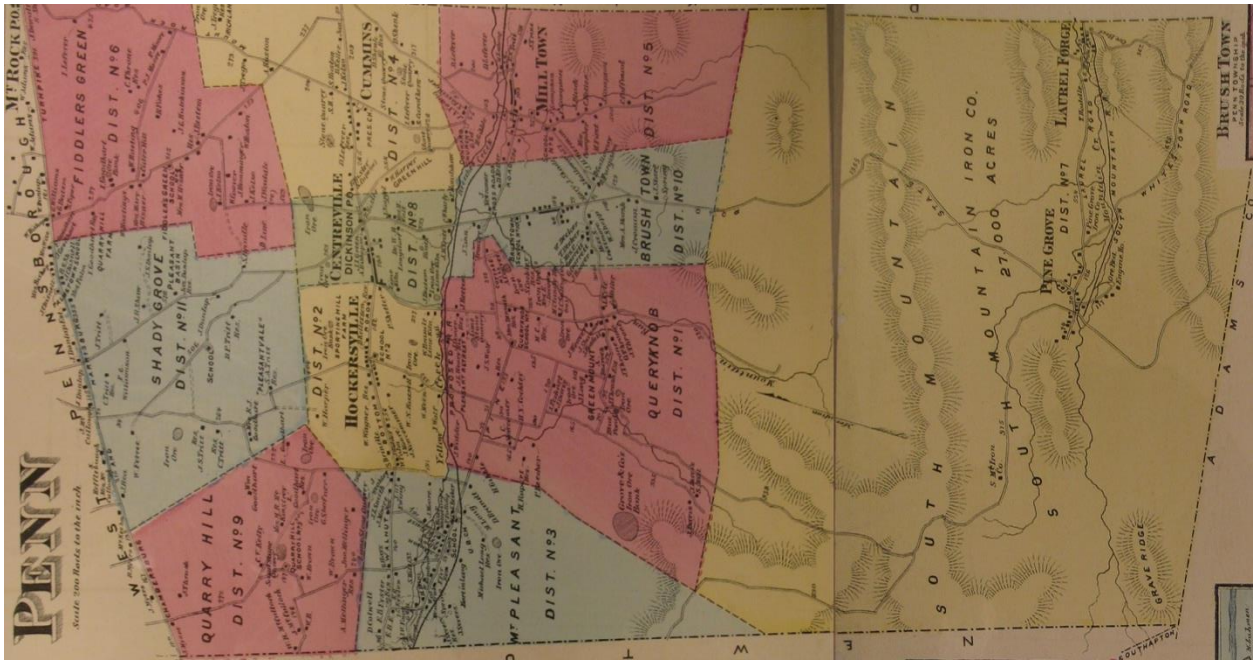
Transportation networks were crucial to moving agricultural and industrial products throughout the South Mountain region and to both eastern urban markets and mid-western outlets. Overland roads roughly followed earlier paths forged by the Native Americans and major roads connected the large towns of the Cumberland Valley with each other and with the state capital at Harrisburg, north and east of the region. The Harrisburg-Chambersburg Turnpike (which generally follows present Interstate 81 and U.S. Route 11), the Chambersburg-Gettysburg Turnpike (roughly parallel to present U.S. Route 30) and the state road from Carlisle to Gettysburg (present PA Route 34) formed the backbone of the road network in the region, along with secondary roads such as Walnut Bottom Road, York Road, Pine Road, Laurel Road and Gettysburg Road. Few roads crossed over South Mountain, though some smaller local roads provided access and circulation around the iron furnaces and forges at the higher elevations.

During the mid-nineteenth century, small independent railroads were built throughout Pennsylvania that linked coal mines, iron foundries to previously distant markets. Regional rail lines also provided an outlet for agricultural products where a farmer could ship goods from the center of the state to the markets in Philadelphia in the same day. The Cumberland Valley Railroad was organized in 1831 and began work on the line in 1836. The first segment between Lemoyne and Carlisle opened in August 1837 and three months later the line was extended southward to Chambersburg. In January 1839, a bridge over the Susquehanna was completed and via connections with other lines, the path from the South Mountain region to Philadelphia was opened (ExplorePAHistory.com 2003:Historical Markers).

The Cumberland Valley Railroad was considered a general-purpose railroad and hauled farm products, iron-ore products and passengers, as well as mail newspapers, parcels and telegraphic communications. During the Civil War, the rail line carried Union troops and supplies and became a target of Confederates. In 1859 the Pennsylvania Railroad bought controlling interest in the Cumberland Valley Railroad, but allowed the regional line to run somewhat independently. During the late nineteenth century, the Cumberland Valley Railroad bought several smaller lines and eventually connected central Pennsylvania with the Shenandoah Valley, as well as West Virginia coal markets and iron ore traffic through and around the South Mountain region (ExplorePAHistory.com 2003:Historical Markers).



Dickinson Township, Cumberland County in 1872, north to left (Beers 1872)



Penn Township, Cumberland County in 1872, north to left (Beers 1872)

The South Mountain Railroad was built in 1868-1869 by the South Mountain Iron Company to provide an outlet for iron products generated from the Pine Grove Furnace. The line connected to the Cumberland Valley Railroad on the east side of Carlisle and included stops at Bonnybrook, Craighead, Mount Holly Springs, among others, before it terminated at Pine Grove. The line was reorganized as the Harrisburg & Gettysburg Railroad in the 1880s (Beers 1886:340). An extension of the rail line from Pine Grove Furnace southward past a slate quarry and into northern Adams County, organized as the Hunter's Run & Slate Belt Railroad, was completed in 1892 (Watts 1991).

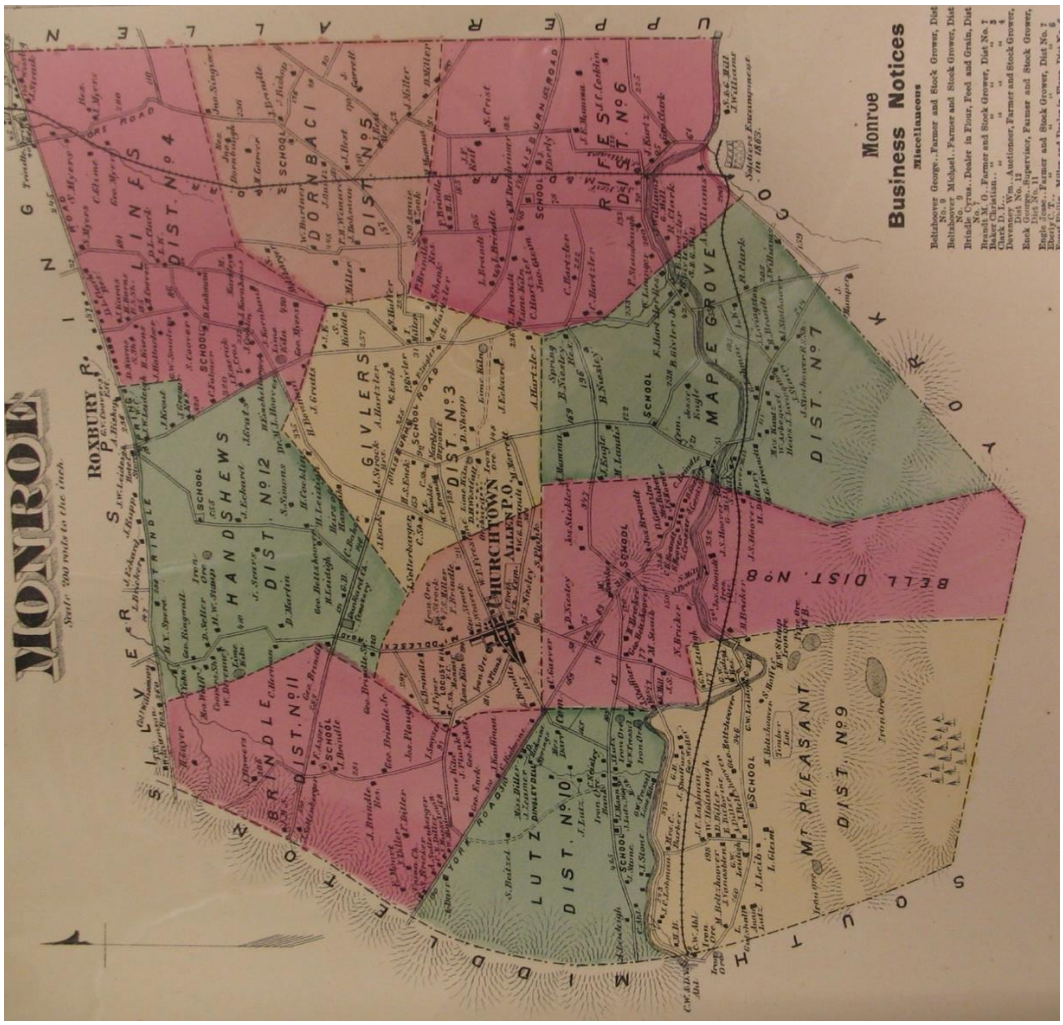
Additional railroads that served the South Mountain region included the Meramar (alternatively known as "Mirimar" and "Miramar"), incorporated by the iron company of the same name to connect the Carlisle Iron Works at Boiling Springs with the western part of the county. Work on the railroad was begun in October 1861 and completed in 1875. The line was eventually purchased and reorganized as the Harrisburg & Potomac Railroad (Beers 1886:347). The Mont Alto Railroad was opened in 1872 and connected to the Cumberland Valley Railroad near Chambersburg and ran to the Mont Alto Park and furnaces in Quincy Township, Franklin County.

By the end of the nineteenth century, the South Mountain region had been settled for nearly 150 years, and the landscape reflected the evolution of agricultural and industrial activities established by the early settlers. The patchwork of farms in the valley, the orchards along the eastern slopes, and the iron and stone industries that claimed the mountain top formed the basis of the region's economy and characterized the diverse landscape knitted together by road and rail networks. Although agriculture would remain the mainstay of the Cumberland Valley, South Mountain itself was about to undergo a significant transformation related to management of its natural and physical resources.

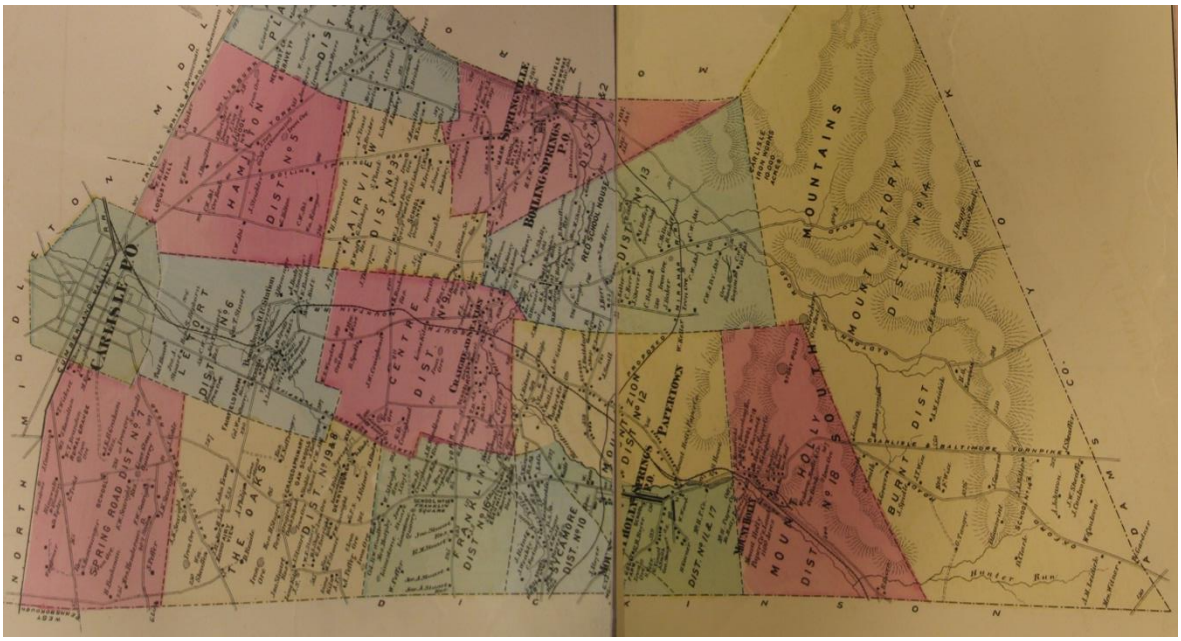
TWENTIETH-CENTURY TRANSFORMATION

Between 1900 and 1940, farmers in the Cumberland Valley focused on dairying, poultry farming and growing wheat, corn, alfalfa, oats and hay crops. Modernization and specialty production transformed agriculture into a more complex business, with automobiles and tractors replacing horses for pulling and hauling, mechanized equipment supplementing manual labor, and railroads and trolleys providing faster and more widespread distribution of products (McMurry, et al. 2011c:64-65).

During this period, dairying was subject to new sanitation requirements so that modifications of nineteenth century barns and construction of separate milk houses were necessary to comply with the rules. At the same time, milk was no longer processed on the farm, but rather was sold in fluid form for direct consumption or to specialty farms that produced butter, cheese, evaporated milk, ice cream or candy (McMurry, et al. 2011c:69). Dairy farmers filled out their herds with cows known for high milk production and feeding and maintaining cows became a year-round activity.



Monroe Township, Cumberland County in 1872, north to left (Beers 1872)



South Middleton Township, Cumberland County in 1872, north to left (Beers 1872)

Poultry farming rose to a more prominent place in the farm economy in the early twentieth century. Cumberland Valley farmers raised turkeys and chickens, posting above average production for both meat and eggs (McMurry, et al. 2011c:70-71). Farmers either modified existing barns or built large poultry houses to accommodate the increased flocks.

By the middle decades of the twentieth century, urban sprawl was encroaching on agricultural land throughout the Great Valley. Farms were reduced in number but enlarged in size, and small-scale diversified regionally oriented farms could not compete with the large-scale capital intensive specialized agri-businesses (McMurry 2011c:118). Suburbanization developed a bit slower in Cumberland and Franklin counties, thus smaller farms persisted in the Cumberland Valley. Specialization continued to focus on dairying and poultry farming, as well as swine production, and crop farming was mainly limited to wheat, hay and corn. Family subsistence activity declined and feed, fertilizer and food were often purchased off the farm. Off-farm employment supplemented farm income (McMurry 2011c:120-124).

While farm orchards became less prominent in the Cumberland Valley, commercial orchards took over large-scale fruit production in the Adams County Fruit Belt. San Jose Scale, a destructive insect, inflicted widespread damage to Pennsylvania's farm orchards at the turn of the century. As Adams County orchards were coming of bearing age ca. 1905, an effective spray treatment was developed, and the orchards were able to control the pest and continue to plant and cultivate fruit trees (McMurry 2011a:24). Large orchards were discernable by the 1930s and the distinctive fruit belt landscape began to take shape. Although apples were the most popular tree fruit, peaches, cherries, nectarines, plums and pears were also grown in the area and these shorter-lived, smaller trees were inter-planted between immature apple trees as a way to generate additional income (McMurry 2011a:38).

Apples were shipped out of Adams County by rail, bound for European markets and to processing plants to evaporated, canned or make into cider, vinegar or apple butter (McMurry 2011a:25). By the mid-twentieth century, Adams growers shipped large amounts of fresh apples and were in competition with apple growers in the western United States to supply fruit to national markets. However, nearly half the Adams apple crop went to processing, where Adams County became a national leader (McMurry 2011a:45).

The fruit belt landscape changed during this period, with diversified agriculture giving way to orchard specialization, and the overall the apple orchards took on a more uniform look. Dwarf trees took up less space but yielded high production and the closely spaced plantings, as well as contour planting, further transformed the appearance of orchards on the slopes of South Mountain (McMurry 2011a:68-69).

Farms in the South Mountain region included many of the same buildings described under nineteenth century farms, but some of the older buildings were altered to accommodate raising poultry or to meet dairy sanitation standards (McMurry, et al., 2011c:81-85). New buildings that likely appeared on many farms included silos, which stored silage feed and facilitated increased

productivity for dairy cows; garages; milk houses; milking parlors; poultry houses; and stable barns and freestall barns to house large herds of cattle. Farmsteads were often landscaped, with the house and vegetable gardens surrounded by fences, shade trees and lawns, and utility lines were strung along roadways. Other landscape features of the twentieth-century farm consisted of smaller areas devoted to pastures, woodlots and farm orchard; fencing; contour plowing and strip cropping; and ponds, which served recreational uses, as well as water for irrigation and mixing sprays (McMurry, et al. 2011c:86-117;126-140).

While Cumberland Valley farms maintained many of the same building complexes and field patterns throughout the nineteenth and twentieth centuries, fruit farms exhibited more dramatic changes. In the early decades of the twentieth century, new buildings associated with fruit farming included cold storage facilities, packing houses (located near railroad sidings), and roadside stands. Processing plants, such as canneries, evaporators, vinegar making facilities, were found in Biglerville, Aspers, Gardners and other villages (McMurry, et al. 2011a:29). Additional built resources dating from the mid-twentieth century included packing and sorting houses, bulk bin storage, migrant housing, apiaries, water tanks and ponds for irrigation and spray mixing (McMurry, et al. 2011a:49-72).

With the decline of the iron industry that had dominated the mountain land and resources, opportunities were opened up to promote conservation and recreational uses of the forests and rudimentary infrastructure already in existence. Formal forest conservation and management programs put into place during the early twentieth century, along with the establishment of parks and camps developed through government assistance and private contributions, resulted in both physical and philosophical changes to South Mountain.

Encompassing nearly 85,000 acres in Cumberland, Franklin and Adams counties, Michaux State Forest was named to honor Andre Michaux and his son Francois Andre, French botanists who traveled through Pennsylvania in the second half of the eighteenth century and left funds to promote the progress of agriculture and silviculture in the state. Inspired by conservation lectures given by Dr. Joseph Rothrock, funds were used to establish the Pennsylvania Forestry Association in 1886 and formation of a Governor's Commission to study the forest situation around the turn of the century. Originally a division of the Department of Agriculture, the Department of Forestry was formed as a separate entity in 1901 (Swartz 1986:4).

The Pennsylvania legislature passed an act authorizing the purchase of unseated lands for forest reservations; the first purchase of land for what would become Michaux State Forest was 558 acres in April 1902. Later that same year, over 18,000 acres were acquired from the Mont Alto Iron Company and about 14,000 acres were purchased from the Caledonia Mining Company. In a series of sales during 1912-1913, 16,869 acres in the Pine Grove Furnace area were bought from the South Mountain Mining and Iron Company. Initially, these collected forest areas were called Forest Reserves, but the names were later changed to state forests after Gifford Pinchot became Commissioner of Forestry in 1920. Following several reorganizations of the department and combining of landholdings, the state forest operation in the South Mountain area was renamed

Michaux, which included Caledonia, Pine Grove Furnace and Mont Alto parks, as well as the Mont Alto Nursery. (Swartz 1986:4)

Establishment of the State Forest Academy at Mont Alto in 1903 had a major influence on the forest. Students learned forest management through forest fire control and tree planting, and later included a research component instituted in 1929 (Swartz 1986:5). The forest itself had gone through a number of physical changes beginning with removal of original timber for use to make charcoal as fuel for the iron industry to major forest fires occurring between 1890 and 1930 and blights, insect invasions and damage from deer throughout the twentieth century (Swartz 1986:5).

During the 1930s, the country fell into a deep economic depression and the federal government developed several make-work programs where the unemployed were provided work opportunities and a paycheck in exchange for undertaking infrastructure improvement projects. One of these programs, known as the Civilian Conservation Corps (CCC), established camps throughout the country's state parks and forests with the goal of protecting, restoring and maintaining forest resources and building roads, bridges, dams and public recreational camp facilities.

The CCC was especially active in Pennsylvania and had 151 camps, second only to California (DNCR State Parks: The CCC Years). Several of these camps were established on South Mountain within Michaux State Forest, including camps at Old Forge, Pine Grove, Big Pond, and Caledonia (Swartz 1986:6). Camp Penn at Old Forge is operated by a private entity and many of the original buildings constructed by CCC workers remain. The camp at Pine Grove was converted to a prisoner of war camp during World War II and was occupied by German Naval officers, Rommel's Africa Corps and Japanese officers. The POW camp disbanded and the property was later leased to various church groups through the 1972. The camp was abandoned, however, and the buildings were sold or demolished by the Bureau of Forestry, though foundations of the structures still exist on the site (Swartz 1986:6).

In addition to the scientific and land management aspects occurring within the forest, other activities were occurring that resulted in diverse uses and highlighted the benefits of the mountain. Dr. Joseph Rothrock, who recognized the benefit of pure mountain air and clean water, founded a camp near Mont Alto for the treatment of tuberculosis patients. The facility was under the jurisdiction of the Department of Health between 1907 and 1967, when it was transferred to the Department of Welfare. The hospital was converted to a senior care home for individuals discharged from a state mental institution and is known as the South Mountain Restoration Center (Swartz 1986:6; Yellnik 2001:30).

The forest has supported recreational activities beginning in the late nineteenth century with the establishment of parks, picnic grounds and dance pavilions at Caledonia and Mont Alto, and Pine Grove. A portion of the Appalachian Trail was located within Michaux State Forest by at the early 1930s and shelters and cabins for overnight use by hikers are located within the forest. Currently, the 36 miles of the trail in the South Mountains is in public ownership. Further recreational

uses of the forest include camping, fishing, hunting, horseback riding, bird watching and rock climbing (Swartz 1986:20-21).

MODERN LANDSCAPE

Today, the South Mountain region contains a mix of historic and modern buildings, uses and landscape features. The South Mountain anchors the region and its forested stands provide areas for recreation and education. The valley on the western side of the mountain is largely agricultural in nature, with some modern development extending around larger settled areas, such as Carlisle, Shippensburg and Chambersburg. The eastern slopes of the mountain are still dominated by commercial fruit orchards. Large plots of regularly spaced trees and packing and processing facilities are located in the area.

Modern highways have replaced some of the older major roads that extend through the area; the portion of Interstate 81 within Cumberland and Franklin counties was constructed during the 1960s and 1970s, and currently is a heavily travelled through corridor that supports a large amount of commercial truck traffic. Trucking companies and warehouses represent much of the modern development in the vicinity of I-81.

Though some modern commercial and industrial development has cropped up in the area, the South Mountain region continues to reflect the diverse uses and landscape features that attracted Native people and Europeans to settle the area.

CHAPTER 4 ▪ EVALUATION AND RECOMMENDATIONS

The Cultural Landscape Assessment for Michaux State Forest provides a unified understanding of the interconnected cultural and natural history of South Mountain through a geographic and demographic regional context intended to support appropriate preservation of related resources. The Cultural Landscape Assessment identifies important historic cultural and natural resources of the South Mountain landscape so that stakeholders may consider appropriate measures for their protection, management, and interpretation. It promotes recognition of resource importance, the communication of this importance to resource users, and the development of strategies for their appropriate management. This study may be used as a point of departure for the development of other types of studies such as interpretive plans and management and master plans. In addition, this study is intended to serve as a framework for additional research, investigation, and planning, as well as a model for other land management studies, projects, and plans.

Principal goals of the Cultural Landscape Assessment are the identification of types cultural landscape resources that are present within the South Mountain landscape and articulation of their value and importance. Through such awareness, specific resources can be identified in the field and appropriate strategies can be developed for their management and interpretation. The plan considers various types of cultural landscape resources through a lens of a historic context—an overarching historic theme that demonstrates how each resource is tied to a larger framework of historic activities that occurred on the local, regional, and/or national scale during a similar time frame. Connecting South Mountain resources to a broader context makes it easier to evaluate their importance, connect features across time and space, and develop thematic narratives.

EVALUATING THE IMPORTANCE AND VALUE OF HISTORIC RESOURCES

One of the purposes of the Cultural Landscape Assessment is to assist Michaux State Forest and the South Mountain Partnership in identifying, preserving, and protecting the historic integrity of natural and cultural resources reflective of the history and evolution of the South Mountain landscape. The legacy of South

Mountain's industrial and mineral extraction, forestry, recreation, and governmental heritage survives today throughout the built environment and cultural landscape. Preserving and protecting these resources that have survived from past periods of South Mountain's history ensures that future generations will have the opportunity to experience and learn about the region's rich legacy and conserves recreational and cultural tourism opportunities. Knowledge of the character, composition, and history of cultural landscape features will enable Michaux State Forest and the South Mountain Partnership to address preservation needs and consider methods for conveying the importance of the region's heritage to visitors through interpretation.

Principal goals of the Cultural Landscape Assessment are the identification of cultural landscape resources and an articulation of their value and importance that can be used to guide appropriate management strategies and interpretive programs. The plan considers each cultural landscape resource through a lens of the historic context – an overarching thematic discussion of how each feature is tied to a larger framework of activities that occurred on a local, regional, and/or national scale during a similar time frame. By connecting South Mountain resources to a broader context, it becomes easier to evaluate their importance, connect features across time and space, and develop thematic narratives.

CULTURAL LANDSCAPES

This assessment treats South Mountain as a single cultural landscape that can be subdivided into component parts, each of which possesses a site-specific history as well as a connection to broader themes and trends. Cultural landscapes are defined as "geographic areas, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values (Birnbaum 1994)."

As with many cultural landscapes, South Mountain also has the potential to reveal much "about our [human/society's] evolving relationship with the natural world (Birnbaum 1994)." The historic cultural features of the South Mountain landscape are uniquely tied to the environment and the region's natural features and systems. This is especially true given the environmental stories the South Mountain landscape relates about forest devastation and the rise of conservation and forestry in Pennsylvania.

Cultural landscapes are typically:

> composed of a number of character-defining features, which, individually or collectively contribute to the landscape's physical appearance as they evolved over time. In addition to vegetation and topography, cultural landscapes may include water features such as ponds, streams, and fountains; circulation features, such as roads, paths, steps, and walls; buildings, furnishings, including fences, benches, lights, and sculptural objects.
>
> Most historic properties have a cultural landscape component that is integral to the significance of the resource… A historic property consists of all its cultural resources—landscapes, buildings, archeological sites and

collections. In some cultural landscapes, there may be a total absence of buildings (Birnbaum 1994).

The South Mountain landscape includes historic resources with the potential to reveal important aspects of our country's industrial, forestal, agricultural, recreational, and governmental history.

To explore and express the key linkages among uses and users, this study employs a cultural landscape approach to documentation and analysis, tying the origins and subsequent uses of cultural features whenever possible to elements of the environment, and making connections at the landscape level to illustrate the context within which cultural activities occurred.

The Fruit Belt, eastern flank of South Mountain

THE ROLE OF THE NATIONAL REGISTER OF HISTORIC PLACES

This Cultural Landscape Assessment is concerned with evaluating the importance of South Mountain's historic resources. The most widely accepted metric for evaluating the significance and integrity of historic resources is the National Register of Historic Places. The Cultural Landscape Assessment uses National Register criteria to identify the historically important elements and features worthy of preservation and, most importantly, to indicate why they should be protected.

For cultural landscapes, documenting the physical conditions associated with a place and assessing and evaluating the importance of natural and man-made historic resources is crucial to determining a strategy for their management. Cultural landscape analysis involves two primary activities: evaluating historic significance and assessing historic integrity. Both are tested against criteria determined by the National Register of Historic Places, which has developed

nationally-recognized methods for evaluating the significance and integrity of historic resources. Many resources that are not individually eligible for listing in the National Register may none-the-less be significant to a cultural landscape as contributing resources.

NATIONAL REGISTER OF HISTORIC PLACES ELIGIBILITY

The National Register defines historic significance as "the importance of a property to the history, architecture, archeology, engineering, or culture of a community (NPS 1997:3)." For a property to be eligible for inclusion in the National Register of Historic Places, it must possess significance under one of four National Register criteria. The Criteria for Evaluation state:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; **or**

B. That are associated with the lives of persons significant in our past; **or**

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; **or**

D. That have yielded, or may be likely to yield, information important in prehistory or history (NPS 1995).

The significance evaluation identifies the important historical associations of the property, as well as its architectural, archeological, and social value. The property's significance is also tied to a period of time in which its important contributions were made and the historic contexts within which the activities that occurred on the property may be placed. The assessment and evaluation considers the site's history within recognized historic contexts to determine its contribution to the broad patterns of American history. It is important to note that historic resources, particularly cultural landscapes, may have several areas of historical significance, and that "An understanding of the landscape as a continuum through history is critical in assessing its cultural and historic value (Birnbaum 1994)."

Features within a property that are related to a particular historic context and that were present during the context's identified period of significance are considered to be "contributing features" to the historical significance of the property. However, contributing features must also possess integrity.

Farm in the Cumberland Valley, western flank of South Mountain

Integrity is the ability of a historic property to convey its significance. Therefore, the significance evaluation must be completed first. The National Register defines historic integrity as "the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's prehistoric or historic period (NPS 1997:4)." Integrity is assessed through seven aspects defined by the National Register:

Location is the place where the historic property was constructed or the place where the historic event occurred;

Setting is the physical environment within and surrounding a property;

Design is the combination of elements that create the form, plan, space, structure, and style of a property;

Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property;

Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;

Feeling is a property's expression of the aesthetic or historic sense of a particular period of time; and

Association is the direct link between an important historic event or person and a historic property (NPS 1995:44-45).

In order to retain historic integrity, a property must possess many of these seven aspects.

Farm in South Mountain's Buchanan Valley

Integrity is assessed by identifying the character-defining features of a historic resource and determining whether enough of these features remain and are visible to convey the determined significance. Character-defining features are prominent or distinctive aspects, qualities, or characteristics of a historic property that contribute significantly to its physical character. More simply put, character-defining features are those things that make a property special, make it worthy of inclusion within the historic property or district, and make it more than one in a crowd. Any time that one of those features is removed or hidden, it detracts from the understanding and character of the property, diminishing its importance. In order to retain historic integrity, character-defining features must be preserved and protected.

MULTIPLE PROPERTY DOCUMENTATION

A specific approach to evaluating the significance of the South Mountain landscape is the National Register of Historic Places Multiple Property Documentation Form, which assembles information for complex historic sites that may be best addressed as more than one individual property. The Multiple Property Documentation Form allows for the nomination of groups of related significant properties, and recognizes the themes, trends, and patterns of history shared by the properties. The form is organized into historic contexts and defines the property types that represent those historic contexts.

The Multiple Property Documentation Form streamlines the method of organizing information collected in surveys and research for registration and planning purposes. It facilitates the evaluation of individual properties by comparing them with resources that share similar physical characteristics and historical associations.

The Multiple Property Documentation Form is a cover document and not a National Register nomination in its own right, but serves as a basis for evaluating

the National Register eligibility of related properties. It may be used to nominate and register thematically-related historic properties simultaneously or to establish the registration requirements for similar properties that may be nominated in the future. When nominated and listed in the National Register of Historic Places, the Multiple Property Documentation Form, together with individual National Register Forms, constitute a multiple property submission (NPS 1999).

Information common to the group of properties is presented in the Multiple Property Documentation Form, while information specific to each individual building, site, district, structure, or object is placed on an individual National Register Nomination form. As a management tool, the thematic approach provides essential information for historic preservation planning because it evaluates properties on a comparative basis within a given geographical area and because it can be used to establish preservation priorities based on historical significance (NPS 1999).

A Multiple Property Documentation Form has been prepared for Michaux State Forest related to forestry and Civilian Conservation Corps resources by students at Shippensburg University (Couser undated). This existing form should be reviewed and expanded if determined appropriate using information outlined in this Cultural Landscape Assessment. An additional Multiple Property Documentation Form could alternatively be prepared to address other relevant contexts identified for South Mountain as part of this Cultural Landscape Assessment.

Boiling Springs, north of South Mountain where the region's iron industry began

NATIONAL REGISTER SIGNIFICANCE OF THE SOUTH MOUNTAIN LANDSCAPE

The South Mountain landscape covers a vast land area that bears witness to a complex history of cultural use that has influenced the composition and character of the built and natural environment. It is the land on which a complex history of cultural use has influenced both the natural and built environment. The South Mountain region is a cultural landscape possesses historic value for its association with events and trends in local, state, and national history. Numerous historic cultural and natural resources are present within the South Mountain landscape to convey these historic associations. The historic features that comprise the South Mountain landscape can be tied to interesting and significant stories of past residents and other interested parties that merit recordation and interpretation for the benefit of a wide range of visitors.

When examined within the framework of state and national historic significance standards, many of the features present within the South Mountain landscape appear to contribute to a property or properties that are potentially eligible for listing in the National Register of Historic Places. Listing in the National Register of Historic Places is an honorific designation that conveys special consideration when government-authorized or sanctioned projects suggest physical change of the property and/or property's setting. Listing involves a rigorous evaluation process and requires a property to meet several criteria of a historic context that provide historic context for the property.

Among the many values of listing on the National Register of Historic Places is the use of information in land planning and management, ability to raise awareness of the importance of place, the site understanding that comes from the process of completing the nomination, and the potential to take advantage of rehabilitation tax credits and/or other grants and program funds that require National Register listing.

The South Mountain landscape, either in whole, or in part or parts, likely constitutes one or more rural historic districts that are significant at the state and local levels under National Register Criteria A, B, C, and D in the areas of Agriculture, Architecture, Conservation, Early Settlement, Industry, Recreation, Science, and Politics/Government during the period of ca. 1730 to 1966. The year 1730 was selected as the potential beginning of an overarching period of significance as the origin of early European-America settlement within the region, while 1966 represents the fifty-year age consideration for listing properties in the National Register of Historic Places. Specific resources may have a more limited period of significance within this broader extended period. There are, however, examples of resources being listed prior to the fifty year age consideration.

This period of 1730-1966 spans the significant events and associations of several historic contexts important in the region. The contexts include, but are not limited to, mineral extraction and industry, forestry and conservation, recreation, agriculture, and the impacts of war and public programs on local lifeways. Each of the related activities have left evidence on the landscape. There is a wide range

of historic resources and cultural landscape features that appear to contribute to the significance of the South Mountain landscape; these are presented in the historic context in the chapters that follow.

Although the evaluation of historic resources focuses primarily on surviving above-ground resources, it is highly likely that the South Mountain landscape possesses significance and information potential through features that exist in the below ground archeological record (Criterion D). That is certainly the case for prehistoric quarries already recognized on South Mountain and is also highly likely the case for historic iron industry sites that have yet to be fully studied. Although documentation of archaeological resources is beyond the scope of this project, it constitutes one of the areas recommended for future investigation.

Remnant of the Lincoln Highway in the South Mountain Gap

INTERPRETIVE VALUE OF THE SOUTH MOUNTAIN LANDSCAPE

In addition to preserving and protecting important cultural landscape features, the Cultural Landscape Assessment of South Mountain recommends that Michaux State Forest and the South Mountain Partnership use the information contained herein to support planning efforts and initiatives. The development of thematic interpretive programming will connect residents and visitors more deeply to the place and enable them to more easily understand and appreciate the significant resources and history in the South Mountain landscape.

Recommendation #1:

At present, site-specific interpretation is undertaken primarily in the two state parks on South Mountain—Pine Grove Furnace State Park and Caledonia State Park. Regionally, there are other local historic sites that present their stories, while county visitor bureaus promote local history and sites and several

connective storylines. Automobile and walking tours have been developed by a range of organizations and local governmental entities that tie visitors to themes such as bird watching, agriculture, craft, and local history. These types of efforts should be supported and expanded to include a wider range of resources and sites, tied to regional themes and coordinated with site presentations.

Recommendation #2:
The South Mountain landscape has the ability to tell many stories spanning centuries of time and generations of inhabitants. The local stories of life and cultural heritage, often interesting in their own right, are generally representative of significant broad themes in American history. The South Mountain landscape offers the potential to reach a diverse audience on several levels, and to be of compelling interest to local residents as well as visitors from across the nation and other countries. Interpreting the many stories that can be teased out of the history of South Mountain is an essential part of the protection strategy for the property's heritage resources. Interpretation helps to engender stewardship of the resources and the support of the regional community as well as the broader public.

Recommendation #3:
Interpretation should be thought of as more than simply providing visitors with names, dates and descriptions of events. In some cases, interpretation should feature inspirational stories, highlight enlightening facts, and shed light on how the present place that visitors are experiencing came to be. Interpretation should focus on a central tenet of highlighting the themes—the central concepts or ideas—that give an interpretive subject significance. Interpretation should focus on the big ideas that convey the meaning of an event, story, or resource. The interpretation should convey interpretive themes using the stories and resources tied to the actual place where things happened. It is important to connect these places to the broader context within which they fit.

The National Park Service expresses interpretation as a process of helping each visitor find an opportunity to personally connect to a place (NPS 2007). Making connections means communicating concepts that every human being, regardless of culture or background, can understand and relate to. Effective interpretation, therefore, should be considered for its ability to connect with a wide audience, and as many universal themes as possible.

Interpretation tied to place, yet inclusive of multiple stories and cultures, will offer the greatest appeal to a diverse audience. However, interpretation is only successful when it uses information to reveal meanings and relationships. Good interpretation should stir visitors' emotions and provoke reconsideration of the facts. It should be engaging rather than didactic, dynamic rather than passive.

Recommendation #4:
Future interpretive planning for the region should build upon well-developed themes that emerge from sound research and documentation. Such themes are critical to establishing an effective intellectual and emotional connection with the place for visitors. This connection will ultimately enable visitors to understand the significant meanings inherent in the South Mountain landscape and to come away with a sense of engagement.

Gravel road constructed by the Civilian Conservation Corps

RECOMMENDATIONS FOR ONGOING INITIATIVES

The most important accomplishments of this Cultural Landscape Assessment have been (a) identification of the key themes or historic contexts through which the South Mountain landscape developed, (b) identification of the types of resources associated with those themes and contexts, and (c) recognition of how local stories are connected to the larger regional picture. In undertaking this assessment, it has become evident that there is a great deal of interesting work yet to be done.

The seven overarching points that have become clear in the preparation of this Cultural Landscape Assessment are:

1. South Mountain is an integral part of a larger, regional, predominantly agricultural landscape.
2. The underlying characteristics of that regional landscape are defined by clearly delineated natural attributes – geology, landforms, soils, water, and ecosystems.
3. The region's natural landscape was dramatically altered–devastated–by the eighteenth and nineteenth century settlement of European peoples but remains remarkably resilient.
4. The South Mountain region retains historic significance and integrity as a nineteenth century agricultural landscape. Strong cultural patterns visible upon the landscape today are comprised of character-defining features that became fully developed by the mid-nineteenth century.

5. Within the regional landscape, South Mountain has always been a source of natural resources – both prehistorically and historically, continuing today. The natural resources of importance have changed over time.
6. South Mountain is historically significant primarily for (a) the role that the iron industry played in the regional economy and (b) its role in the development of forestry and conservation in Pennsylvania.
7. Today, South Mountain remains significant for forest stewardship and as a regional recreational resource.

Recommendation #5:

Avenues for future research are based on gaps in the documentation that was readily available to the team involved in writing this Cultural Landscape Assessment. Targeted research and investigation involving specific topics is warranted as funds and time permit. Some of the avenues for future research identified through development of the Cultural Landscape Assessment are discussed in the paragraphs that follow.

In undertaking this project, the extent to which the South Mountain landscape is integrated with the larger regional landscape required the examination of history and historic patterns of development beyond what occurred on the mountain itself – incorporating the heritage of the Great Valley (Cumberland Valley) to the west and the Triassic Lowlands to the east. The extent to which the histories of specific sites on South Mountain have been studied is uneven, and their stories are tied to larger regional stories that are also poorly documented.

The information needed to undertake a project of this type is varied and extensive in nature. In trying to pull together available information for this assessment, the assistance of local historians was critical, both in identifying sites and identifying sources of information. The important stories of South Mountain have not been well told. Primary sources have yet to be fully investigated and assimilated. Secondary sources tend to be broad and general and lack the depth and rigor warranted of their subjects. Older articles and monographs are not well referenced and are sometimes inaccurate and incomplete.

One of the values of this Cultural Landscape Assessment is that it provides a list of sources available to future researchers. Although the list is likely incomplete, certainly with respect to primary sources, which we have not had the time to research, a tremendous amount of information is assembled, particularly as it relates to the historic contexts conveyed in the chapters that follow. The available sources vary in quality, but they enable us to see the big picture to which individual sites and resources relate.

Signage along a South Mountain portion of the Appalachian Trail

With the large picture in place as covered by the historic contexts, interesting work remains in drilling down to explore and document individual resources on South Mountain. The multiplicity of sites associated with the iron industry, for instance, are not well recorded. Sites associated with the establishment of early state forest or specific projects undertaken by the Civilian Conservation Corps also require the mining of archives for primary documents.

Most of what is known to date, both in terms of sources and on-site investigation, is currently housed in the minds and private collections of local historians. Their work is invaluable and needs to be recognized, appreciated, synthesized, and made more widely accessible. Historians working on similar topics at one end of the mountain are not necessarily in communication with historians at the other end of the mountain. Topics that overlap have not yet been fully related. Pulling the threads of this knowledge together is a future endeavor of great value.

With these points in mind, the following additional observations and recommendations on different areas of activity are suggested for consideration.

The South Mountain Partnership

- DCNR's South Mountain Conservation Landscape initiative and the **South Mountain Partnership** are the best vehicles for coordinating a regional approach to a variety of inter-related issues, programs, and activities, including those related to historic preservation. Participation in the initiative appears impressive. There is no other comparable regional forum.

- The South Mountain landscape is larger than the lands encompassed by Michaux State Forest. A **South Mountain Focus Group** should be created within the South Mountain Partnership to focus specifically on the South Mountain landform itself to establish consensus on priority issues and initiatives, guide the implementation of projects, and coordinate with regional activities. The South Mountain Focus Group should include representatives of the state forest, state parks, county planning agencies, conservation organizations, friends groups, mountain farms and businesses, and others as appropriate.
- Within this framework, **ad hoc groups** should be created on an as-needed basis to undertake specific implementation initiatives and actions related to recreation, preservation, and interpretation. Some of those initiatives should include those outlined below.

Management Plan for Michaux State Forest

- Michaux State Forest is planning to update its management plan in 2016. This Cultural Landscape Assessment should be adopted as a **foundation document** for the management plan.
- Chapter 6 of this Cultural Landscape Assessment provides background on the historic context of **Forest, Forestry, and Conservation** and identifies the types of historic and cultural landscape resources associated with that context. The management plan for Michaux State Forest should recognize this historic context and the value of those historic and cultural landscape resources.
- Michaux State Forest is historically significant for its **leading role** in the establishment of a conservation ethic and forestry program in Pennsylvania. This role is not simply historic, but should be ongoing and continuing as a foundation principle in the management plan.
- The most important focus of the management plan should be the cultivation, re-establishment, and stewardship of a **healthy and diverse forest ecosystem**. This point raises interesting questions about both defining and managing for that ecosystem. Re-establishing previously existing historic conditions is not the goal. The most appropriate and important forest ecosystem for South Mountain is likely one that has never actually existed before. This is to be determined by biologists, wildlife experts, foresters, and others in the scientific community.
- The management plan should address critical management issues of local, state, national, and international importance as identified in recent and ongoing state forestry plans. Michaux State Forest should **continue to be a leader** in conservation, forestry, and ecosystem management – a living laboratory for experimenting, developing, advancing, and using creative techniques and cutting edge methodologies. Biodiversity, habitat preservation, and climate change are likely to be among the critical issues addressed.

Vernal pond near Kings Gap

- Michaux State Forest has limited staff capacity and funding. **Partnerships** are going to be essential in undertaking the range of activities needed to achieve the goals and implement the strategies and objectives of the management plan. The South Mountain Partnership should be a primary vehicle for undertaking those partnerships.
- The management plan should be aware that **historic resources** are found throughout the forest and should be identified and appropriately treated. For the most part, historic resources within the state forest are not fragile. Examples include historic wagon roads that are now trails; or former industrial sites, quarries, and charcoal hearths that are now topographic features; or Civilian Conservation Corps projects that remain as gravel roads or park amenities that are still in use.

  Some resources, however, are fragile and endangered, such as the prehistoric quarries along Snaggy Ridge, which have been widely recognized, and the Big Pond furnace stack, which, while technically on private land, is located within a few feet of state forest boundaries and is associated with features that have yet to be documented (as well as about 5,000 acres of state forest land). In early February 2016, the landmark remnant stone wall of the barn on the historic farm at Camp Michaux associated with Pine Grove Furnace collapsed and South Mountain lost an important piece of its history.

  Such features should be recognized and receive special consideration and protection where possible. This **Cultural Landscape Assessment** should

be used as a point of departure in recognizing, appreciating, and protecting the range of historic resources within the state forest.

- The locations and conditions of many of the historic resources referred to in the previous bullet point have yet to be documented. The management plan should support the **identification, survey, and documentation** of historic resources, discussed further below.
- The management plan should encourage the **interpretation** of historic resources as a part of ongoing programming and a partnership initiative within the South Mountain Partnership.
- The management plan should recognize the historic role that **recreational activities** have played within the region and how they continue to contribute to regional quality of life. Recreational activities should also be a partnership initiative.
- **Leased sites** within the state forest should be recognized and treated as historic cultural resources such as would be appropriate within a local historic district.

Leased camp near Pine Grove Furnace

Survey of Natural, Historic, and Cultural Resources

- The Pennsylvania State Historic Preservation Office is considering upgrading its **Cultural Resource Geographic Information System** (CRGIS). The South Mountain Partnership should participate in the consideration of how that system should be upgraded and serve as a leader in its implementation.

- The South Mountain Partnership should create a **comprehensive regional GIS database** of the historic natural and cultural resource information in collaboration with local universities that includes state, county, and local data layers. The system should be integrated with the GIS databases of county planning offices, as possible. Historic resource surveys should be recorded on the Partnership database.
- Through the leadership of the Adams, Cumberland, Franklin, and York County planning offices, the South Mountain Partnership should spearhead **upgrading of historic resource surveys** for the region. Methodologies should be developed through which surveys may be upgraded township-by-township through partnership initiatives organized at the local level and coordinated through county planning offices. Surveys should be designed to use the upgraded CRGIS noted above and Pennsylvania State Historic Preservation Office methodologies. Incentives, guidance, and technical support should be provided.

Earthen dam at Big Pond Furnace constructed by the Civilian Conservation Corps

- Surveys should use a **cultural landscape approach**, identifying landscape patterns and overlaying elements of the natural landscape that affect them. Historic road networks, boundary systems, farm configurations, communities, landscape features, and other features characteristic of regional settlement patterns should be identified to provide a context for the survey of individual buildings, structures, and sites.
- The regionally significant **historic contexts** to which resources relate should be confirmed and added to. Agricultural context studies already prepared by the Pennsylvania State Historic Preservation Office for the

Cumberland Valley and the Fruit Belt should be used as a starting point along with those in this Cultural Landscape Assessment. Additional historic contexts significant to the region should be identified. **Resource types** (or typologies) inherent within each context should be identified and outlined for use in local surveys.

- For the South Mountain landscape in particular, a systematic long-term program for the **survey and documentation** of individual historic sites and resources should be undertaken. Such surveys could be undertaken by university students under academic and professional guidance. A methodology should be developed using the Pennsylvania State Historic Preservation Office forms and standards. Efficient standards for photo documentation and drawings for sites and structures should be developed using CAD. The documentation should be incorporated into regional Partnership and county GIS systems and into CRGIS as discussed above.

  In the preparation of this Cultural Landscape Assessment, as noted above, it became evident that the level of survey and documentation of historic resources on South Mountain requires further work. Surveying of individual resources was not part of the scope of this project, but should be undertaken as a systematic long-term initiative. Even sites as well-known as Caledonia Iron Furnace and Old Forge have been poorly studied and documented. For some sites, such as the iron furnace properties, **period plans** should be prepared showing how the sites evolved over time, deepening understanding of how sites were used and the significance of both present and missing resources.

  Suggested priorities for survey and documentation in the South Mountain landscape include:
  - Nineteenth century wagon roads and trails;
  - Iron furnace properties as described in Chapter 5 of the assessment, including property boundaries, ore banks, sites of former support buildings and housing, water power systems, farms, and other site features;
  - Early forestry initiatives from primary source documents;
  - Civilian Conservation Corps camps and projects from primary source documents (roads, trails, recreation sites, plantings, etc.); and
  - Late nineteenth century and early 20th century recreation sites.

Historical Research

- Support the work of **local historians**, historical societies, and historical organizations in undertaking research on topics, sites, and people associated with South Mountain.
- Compile a **comprehensive annotated bibliography** of sources and references associated with South Mountain history. Organize or cross reference the bibliography by topic. Note locations or resources and how to access materials. Note the quality and limitations of materials. Provide

links to materials available online, and post new materials online where possible.

- **Archive** collected materials with county historical societies. Create digital archives that can be accessed by researchers and the general public.

Remnant stone wall of historic barn at Camp Michaux, recently collapsed

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- Assemble a comprehensive digital collection of **historic maps** of the South Mountain region. Include the maps in the South Mountain regional GIS database. Overlay historic maps on contemporary map layers. Analyze historic maps to identify cultural patterns that developed over time and remain evident in the landscape today.
- Confirm and expand the **historic contexts** significant to the region.
- Identify and prioritize **research topics** for use in an organized, long-term program of historical research. Some topics may be broad and contextual while others may be site specific. Organize a **research program** to be implemented over time by university students and local historians according to their interests. Use an established **research protocol** to coordinate work, provide consistency, and promote standards of quality.
- Convene a **round table** of local and university historians from the four counties that could meet periodically to share interests and information

and could serve as a **council of scholars** to coordinate and guide regional research.

- Review the existing **Multiple Property Documentation Form** for forestry and Civilian Conservation Corps sites prepared for South Mountain by Shippensburg students to determine whether it needs to be updated or amended. Prepare new Multiple Property Documentation Forms for other historic contexts for South Mountain discussed in this Cultural Landscape Assessment. Relate the survey and documentation of individual sites to those Multiple Property Documentation Forms.
- Work with local and regional partners to undertake **special research studies** of groups and types of historic resources. Recent studies of mills in Cumberland County and of the legacy soils of mill ponds throughout the Cumberland Valley should be models for the development of future similar studies.
- Consult with archeologists at the Pennsylvania Historical and Museum Commission to determine what additional investigations should be undertaken related to the **Snaggy Ridge** prehistoric quarries or elsewhere on South Mountain. (See Chapter 5, page 5-12)

Hammonds Rocks

Interpretation and Storytelling

- Use a **regional approach** to interpretation and storytelling using the landscape to tell representative stories of meaning, significance, and interest. Use interpretation as a way of **engaging residents** and visitors and encouraging support for landscape conservation, historic

preservation, and community enhancement. This approach is used by many of Pennsylvania's state and national heritage areas.

- Adopt a **regional branding and identity** for the South Mountain Partnership to which each county and community can relate and which can be cooperatively marketed. Form a regional heritage tourism marketing collaboration with recognition by the Pennsylvania Tourism Office.
- Adopt key storylines that relate to characteristics and attributes of the cultural landscape. Use the storylines to attract public interest and provide gateways to deeper themes and topics. The following six storylines are suggested:
    - **The Natural Landscape** – Highlight the structure, characteristics, and qualities of the South Mountain region's natural landscape – geology, landforms, waterways, ecosystems, etc. Feature special natural areas identified within each county and on South Mountain. Closely coordinate interpretation with recreational opportunities, especially hiking and the Appalachian Trail.
    - **Forestry and Conservation** – As suggested in the South Mountain Partnership's 2009 Fermata study, tell the story of South Mountain and Michaux State Forest's leading role in the development of a conservation ethic and the practice of forestry in Pennsylvania.
    - **Agriculture** – As also recommended in the Fermata study, focus on the history and current practice of agriculture within the region, both farming in the Cumberland Valley and the Fruit Belt of Adams County. As emphasized, the South Mountain Conservation Landscape retains historic significance and integrity to the period and character of its mid-nineteenth century agricultural landscape. It is the western edge of what cultural geographers refer to as the Pennsylvania Cultural Hearth. Its characteristics are visible throughout the landscape and are prominent in community identity and branding. The Fruit Belt is historically significant to the late nineteenth and early twentieth centuries. Contemporary local foods, agricultural products, events, and life should be featured.
    - **Iron Industry** – Interpret the regional story of the iron industry on and around South Mountain and how it was an integrated part of the nineteenth century agricultural landscape. Feature Pine Grove Furnace, Caledonia, and Mont Alto State Parks on South Mountain. Embrace the entire South Mountain landscape in the storytelling. Connect to other furnace sites and adjacent communities and landscapes. Connect the iron industry's environmental story to the rise of conservation and forestry.
    - **Civil War** – Use the story of the Confederate approach to and retreat from Gettysburg as a means to engage visitors, connect

communities and interpretive sites, and connect to regional landscape themes. The Civil War story is of great public interest, and Gettysburg is a national tourism destination. Take advantage of it to tell a comprehensive regional story across the landscape. Include stories of the Monterey Pass Battlefield and the Underground Railroad's relationships to the Caledonia and Pine Grove Furnace ironworks. Feature Thaddeus Stevens as a potential topic of interest to connect sites regionally through interpretation.

- **Lincoln Highway** – Similarly, use the popular story of the Lincoln Highway and state designation of the Lincoln Highway Heritage Corridor as a vehicle through which to tell the recreational story of South Mountain and the region. Use the story to move visitors through the landscape, connecting communities along and beyond the Route 30 corridor. Relate the story to other recreational activities within the region.

- Prepare a **regional interpretive plan** to link existing interpretive sites related to each storyline. Identify touring routes. Provide interpretation at each designated site along the routes. Feature historic communities where services such as restaurants are provided as destinations. Develop new interpretation and interpretive experiences to fill out and connect storylines at existing sites and to incorporate new sites to be identified. Develop overarching interpretive media to provide the regional context for each storyline and connections across the landscape.
- Prepare a similar **interpretive plan for South Mountain**. Feature the Natural History, Iron Industry, and Forestry and Conservation storylines. Use the state parks as focal points and key destinations. Strengthen interpretation at the state parks. Develop driving routes on the gravel roads through the mountain landscape with interpretive stops at appropriate locations. Use hiking trails and natural features to convey stories. Feature the Appalachian Trail.

Broken cemetery stone at Pine Grove Furnace

Historic Preservation

- Organize a **Historic Preservation Network** within the South Mountain Partnership comprised of local historical commissions, historic architectural review boards, historical societies and organizations, and other historic interests. Conduct periodic workshops at various locations throughout the year to meet, consult, exchange information and experiences, have presentations of interest. Use the Network to promote historic preservation at the grassroots level.
- Form a **leadership group** through the network to spearhead regional advocacy, provide support to local preservation groups, and coordinate regional preservation initiatives.
- Prepare a **regional historic preservation plan**. Coordinate closely with county planning offices with the goal of having the plan adopted as a supporting element of county comprehensive plans. Identify regional preservation issues and needs. Develop approaches and strategies for preservation of agricultural landscapes, market towns, and crossroad villages. Highlight and support local community preservation programs. Coordinate with land conservation, agricultural conservation, greenway, and open space initiatives. Coordinate with economic development, community revitalization, and heritage tourism interests. Use a cultural landscape approach. Identify means through which historic preservation and landscape conservation can be seen as contributing to local quality of life.

CONCLUSION

South Mountain is a relatively undiscovered landscape of "firsts" with an incredible interplay of distinct cultural land uses and activities occurring repeatedly over the same terrain. Protecting evidence of this heritage and sharing

the stories of the individual resources, their connection to larger systems, and the layer upon layer of cultural use over time is of interest to a variety of audiences.

The power of the cultural landscape approach to looking at the South Mountain landscape is its ability to reflect several significant themes and stories simultaneously. Michaux State Forest and South Mountain are significant for their state and regional focus on forestry and conservation. In the past and in the future, they have and will influence the way forestry is conducted so that healthy ecosystems, diversity, and resilience are central to our relationship with the natural landscape.

Big Pond Iron Furnace – threatened resource

CHAPTER 5 – MINERAL EXTRACTION AND INDUSTRY CONTEXT

> Although we have about 20,000 acres connected with the estate, and use our own wood, make the charcoal and haul it, yet charcoal varies greatly in quality from the different kinds of wood, from variableness of weather, difference in skill and care of colliers, and the same uniformity in work is scarcely attainable that should characterize anthracite furnaces. Our objective point, so far as the works are concerned, is a uniformly best quality of product for the purposes to which our iron is suited, and secondly, quantity and cheapness.
>
> —Colonel George B. Wiestling, Mont Alto, December 3, 1875

South Mountain has served local and regional human populations as a source of natural resources from Native American times to the present. Forest and mineral resources have been predominant among the natural resources the mountain has provided. Forest resources are discussed as a historic context in Chapter 6 of this cultural landscape assessment. This chapter provides an overview of mineral resources extracted from South Mountain, the industries they supported, and the remaining tangible evidence of these activities in the landscape today.

OVERVIEW OF THE HISTORIC CONTEXT

Pennsylvania's complex geology has been a subject of intense study by professional geologists and academics for many years. A cross section of the state tells the story of geological events that occurred on a planetary scale over the course of over 600 million years. Geologists studying Pennsylvania have played a leading role in piecing together the story of our past, a portion of which is outlined in Chapter 2 of this document.

But this story has not been of purely academic interest. Economic opportunity, community need, technological progress, and mere survival have played central parts in how and why we have taken advantage of the mineral resources available to us. Pennsylvania's diversity of geological environments has produced a wide variety of mineral and rock species, many of which have had important economic uses (Cuff 1989:16). Pennsylvania's exploitation and use of mineral resources has been part of the national story of growth and development, and in some areas, the state has led the nation in mineral development. Mineral resources have played a key role in Pennsylvania's economy since Colonial times and continue to do so today.

The Influence of Oil and Coal

Pennsylvania's mineral development is probably best known for oil and coal, the mining of which fueled a boom in industrialization and manufacturing in the late 19th and the 20th centuries. Oil was discovered in Pennsylvania in 1859 which led to an oil boom that lasted into the 1870s and to the early development of an oil industry of national and international significance.

But is was Pennsylvania's vast deposits of coal that transformed the state into an industrial and manufacturing powerhouse. Roughly one third of Pennsylvania's area is underlain by coal beds, anthracite coal in potions of the Appalachian Mountains and Lackawanna Valley in the east and bituminous coal in a large area of the west. The mining of these resources transformed the landscapes and communities where the coal was located, as noted in Chapter 2, and changed the state's ethnic and social profile.

Over the late 19th century and well into the 20th century, coal powered the dramatic growth of manufacturing and urban development in and around Philadelphia, Pittsburgh, and other cities. The state became a national and international leader in steel technology, production, and manufacturing. Railroads tied the coal fields and urban centers together and linked them to other manufacturing and urban centers in the east, mid-west, and across the nation.

Since the 1950s, however, coal production in Pennsylvania has declined as states like Wyoming increased production. The state's leadership in the steel industry has also waned. Associated with this decline has been an economic struggle for survival for many communities, and the environmental devastation sustained due to poor mining practices will be felt statewide for a long time to come.

The strong manufacturing base that was developed over the past hundred and fifty years, however, continues to be an asset, and Pennsylvania continues to be one of the nation's major industrial states. Today, Pennsylvania is experiencing another mineral resource boom with the extraction of natural gas from its large deposits of Marcellus Shale through the recently developed technology of fracking.

Study of Pennsylvania's Geology and Mineral Resources

The economic importance of Pennsylvania's early mineral industries led to the establishment of the Pennsylvania Geological Survey as a key state agency, which has been studying Pennsylvania's geology since 1836. The importance of oil and coal to the state's economy underscored the need for continued study of Pennsylvania's geology and mineral resources and support for the Survey's work along with the establishment of educational and research centers in the state's prominent universities.

The Pennsylvania Geological Survey's present organization dates to 1919, well into the period of coal's predominance. Officially known as the Bureau of Topographic and Geological Survey, it was authorized by the General Assembly "to undertake, conduct, and maintain the organization of a thorough and extended survey of the State, for the purpose of elucidating the geology and topography of the State." It was also given the responsibility to "put the results

of the survey, with the results of previous surveys, into a form convenient for reference (DCNR Survey 2015)."

Toward that end, the Survey has published hundreds of books, maps, magazines, and pamphlets on Pennsylvania's geology and mineral resources over the years. New publications continue to be developed every year. More recently, GIS, internet, and digital technologies have provided powerful new mediums through which the Survey, universities, and industry conduct their research and convey geological information useful to academic, economic, and planning interests as well as the general public (DCNR Survey 2015).

Consequently, a great deal is known about Pennsylvania's mineral resources. While South Mountain and its surrounding region have not been the focus of oil, coal, or natural gas development or their urban and manufacturing consequences, they are an interesting and important part of Pennsylvania's mineral development story and have benefitted from the state's sophisticated professional network of geologists and the mineral resource industry.

Geological surveys and maps from the 1870s and 1880s locate mineral resource sites in and around South Mountain and record their condition and use. A century later, in the late 1960s and early 1970s, detailed maps and publications were still being produced analyzing and describing the geology and mineral resources of the South Mountain region using updated technologies and information. These analyses were undertaken specifically to support the economic development of the region's mineral resources. Geologists continue to study the region today.

South Mountain's Mineral Resources

Because of the diversity of its geology, South Mountain has provided a range of mineral resources for human use. Two areas of mineral resource extraction and use are of particular interest and significance: (1) the Native American quarrying of metarhyolite and (2) the late 18th and 19th century mining and processing of iron ore. Both are related to historic contexts of state and national significance.

South Mountain's Prehistoric Quarries

The Native American quarrying of metarhyolite on South Mountain appears to span all time periods dating back to approximately 10,000 years ago and was extensive during what is termed the Transitional period, 2700 to 4300 years ago. Highly desirable as a lithic material from which to make certain types of tools, specifically broadspears and projectile points, artifacts of metarhyolite are found widely distributed throughout the Mid-Atlantic region. This distribution, as much as 200 miles from South Mountain, indicates either development of a trading network by prehistoric peoples or the expenditure of considerable effort by individuals or groups to acquire the material through direct procurement (Carr 2001:2; Beckerman 1981:7-8).

South Mountain's metarhyolite quarries have been the subject of study by archeologists since the 1890s. Detailed systematic investigation of the sites, however, has been limited (Carr 2001:1,2). The quarries are significant for the information they tell us about prehistoric technologies. Detailed study of the sites provides evidence on how the quarries were used, what material was most desired, how the stone was extracted, and how it was shaped and refined.

In recent decades, investigators have focused on identifying the unique geochemical signatures of stone quarried from different sites, enabling analysis of distribution patterns of different lithic types. Comparison with similar information obtained about quarry sites in other locations for other types of raw materials from which to make stone tools provides important information on mining, settlement patterns, and trade during different periods of Native American cultural development (Beckerman 1981:8; Carr 2001:2; Bondar 2001:1). The South Mountain quarries are unique resources of national significance from which important information can be obtained.

The Development of Iron Ore

During the late 18th century and continuing into the late 19th century, South Mountain was extensively exploited for the mining and processing of iron ore, dramatically impacting its landscape. South Mountain is part of Pennsylvania's statewide story of leadership in the early iron industry, a story of national significance that led directly to the state's later dominance in steel and manufacturing in the late 19th and early 20th centuries.

The iron and steel industry played a critical role in the development of the United States, and Pennsylvania is widely recognized as its historical center. Pennsylvania emerged as America's foremost iron producer by the mid-18th century. Initiated in the southeastern portion of the state, iron production expanded rapidly westward between 1784 and 1830 as settlement spread and new sources of iron ore and the other needed resources were identified (Beckerman 1991:E-1).

South Mountain was part of this westward expansion of Pennsylvania's early iron industry. The entrepreneurs and families that led the development of iron furnaces in the older portions of the state had the expertise and means to take advantage of new opportunities to the west. From southeastern Pennsylvania, the iron industry spread west first into the Susquehanna Valley and then to South Mountain, the Appalachian Mountains, and beyond (Beckerman 1991:E-2; Cuff 1989:100; Eggert 1994:21-23,30).

While coal fueled Pennsylvania's dominance in steel and manufacturing in the late 19th century, it was the presence of iron ore, limestone, water power, and large quantities of wood for charcoal that fueled the iron industry. South Mountain had supplies of all of these resources in abundance. Charcoal, water power, and wagon transportation were key factors closely associated with the iron industry into the early 19th century. With these in play, South Mountain was well positioned for the profitable operation of iron furnaces. The mountain's ore banks and furnaces were at the center of a large, rapidly developing, and prosperous agricultural community. The local production of iron was an important component of the regional economy.

South Mountain visually dominated and contrasted with the surrounding agricultural landscape in the 19th century as it does today. The repeated harvesting of timber on the mountainsides for charcoal production to power the furnaces left second and third growth successional woodlands visible from the valleys below. While the social and physical structure of iron furnace plantations in and around South Mountain replicated the patterns of the earlier eastern plantations, many furnaces also became the core of larger, more economically

diverse communities that developed around them, such as those at Boiling Springs and Mount Holly Springs. Most of South Mountain's iron works were not isolated, but were on the edge of and integrated into the larger economic and social patterns of the prosperous surrounding agricultural landscape. This is in contrast to iron furnaces that developed in the mountains further to the west and a distinctive feature of the South Mountain industry.

The centers of Pennsylvania's westward expansion in the iron industry, however, are widely recognized as being the Juniata River region in the Appalachian Mountains, north and geologically west of South Mountain, and the Pittsburgh area. Joining the state's southeastern region, these areas led the technological advances in iron production and processing that the state experienced in the mid-19th century (Beckerman 1991:E-2; Eggert 1994:30-33; Cuff 1989:102).

The substitution of coal for charcoal in the southeast and Pittsburgh iron furnaces by about 1860 led to improved productivity and changes in where and how iron could be produced. Coal powered steam engines replaced the need for water power and dramatically increased both reliability and productivity. Railroads allowed the large-scale transport of raw materials away from the ore beds where iron ore was mined. Improvements in technology and production led to increased production and the establishment of larger and more complex operations.

The result was a break in the dependency upon the traditional rural locations where iron ore, limestone, water power, and forests for charcoal production were present. Over the late 19th century, iron production facilities became increasingly established in urban locations convenient to labor, manufacturing, and transportation rather than in rural locations close to natural resources. Iron production and refinement was no longer an appendage of agricultural society as it had been in the 18th and early 19th centuries but were rapidly becoming a driving force of the industrialization, urbanization, and manufacturing that exploded in the late 19th and early 20th centuries (Eggert 1994:45-52).

The opening of high quality ore in the Mesabi Range of Minnesota and other locations by the 1890s and the means to transport them in large quantities by railroad and ship eliminated the need for reliance on the poor quality ores in locations such as South Mountain.

The iron industry was further transformed following the nation's first commercially successful production of steel in Pennsylvania in 1867. Through the late 19th century, the production and manufacturing of steel rapidly increased, with the eventual construction of huge steel mills that dwarfed the earlier iron furnaces and completed their decline (Beckerman 1991:E-2; Cuff 1989:102; Eggert 1994:79,85-88).

On South Mountain, producers tried to adapt and be profitable but continued to rely on charcoal and outmoded facilities throughout the late 19th century. The South Mountain region remained predominantly agricultural, and the importance of local iron production diminished with the changes in transportation as well as with the revolutionary changes in how and where manufacturing was organized. The importance of local craftsmen in the agricultural region's market towns declined. South Mountain iron producers were increasingly competing on a

national scale, being overcome by economic and technological forces well beyond their ability to adapt.

By the 1890s, iron production on South Mountain had run its course. As an extension of Pennsylvania's 18th and early 19th iron industry, South Mountain was a regional center of production, significant to the state and national story. The survival of physical remnants of the iron industry within the landscape and the integration of the industry with the historical development of the region's distinctive agricultural communities gives South Mountain a unique place in Pennsylvania history.

South Mountain's Other Mineral Resources

Though less central to the region's economy and with less impact upon the landscape, South Mountain has been the source of other mineral extraction activities over the course of its history and continues to be so today. From the early 1800s into the early-to-mid 1900s, South Mountain was mined as a source of copper, limestone, slate, clay, and other types of mineral fillers. Then as well as today, quarries on South Mountain are a source of sand and aggregates for road and building construction. These historic and ongoing uses are discussed further later in this chapter.

HISTORICAL OVERVIEW OF MINERAL EXTRACTION AND INDUSTRY

South Mountain is endowed with a rich and varied abundance of mineral resources that have contributed to the economy and life of the region. The historical overview below surveys the range of mineral resources extracted from South Mountain and outlines the sources of information available about them. The main focus, however, is upon the two mineral resources of primary historical significance, the metarhyolite quarried by Native Americans and the iron ore, the mining and refining of which altered the mountain's landscape over the course of the 19th century.

With respect to iron, this section looks at the South Mountain iron industry as a whole in relation to the state-wide context discussed above. The three iron furnaces most closely associated with Michaux State Forest and most widely recognized are examined more closely with an eye to how they made use of the landscape and their impact upon the landscape.

The next section reviews the extent to which historic landscape resources remain for each of the various mineral resources. Issues such as the need for further field work and documentary research for all of these resources is discussed.

Native American Metarhyolite Quarries on South Mountain

As introduced in the previous section, Native American quarrying of metarhyolite on South Mountain is of national significance for the information it provides about prehistoric technologies, resource procurement, mining processes, trade, and settlement patterns of our landscape's prehistoric peoples. As mentioned, the quarrying of metarhyolite on South Mountain appears to span all time periods dating back to approximately 10,000 years ago and was extensive during what is termed the Transitional period, 2700 to 4300 years ago.

Human occupation of Pennsylvania extends back at least 11,200 years and possibly as long as 16,000 years ago, when glaciers had just receded from northern portions of the state. Over this time, the landscape's vegetation has dramatically changed with the warming climate, and the cultures of Native American peoples changed as well.

Evidence of how evolving Native American cultures used the South Mountain landscape is rare to non-existent. As cultures evolved, lifeways, technologies, food sources, and settlement patterns changed. Landscapes became used in different ways. There can be little doubt that the South Mountain landscape was used by these changing cultures as a source of food, whether vegetative or wildlife, as well as a source of other needed natural resources.

However, archeological evidence indicates that settlement tended to concentrate in the valleys along rivers and around water sources rather than on the rugged mountainous terrain. Few prehistoric archeological sites have yet been found on South Mountain. It is expected that the mountain was used seasonally and that evidence of temporary camps may be present. How Native American cultures may have influenced the landscape, such as by managing plant communities and game habitat through use of fire, is not known. Such direct management would seem more likely in the broad valleys and rolling hills of the Great Valley and Triassic Lowlands than it would on the more remote landscape of South Mountain.

This lack of archeological evidence found on South Mountain to date is what makes the mountain's metarhyolite quarries so unique and significant. For at least 8,000 years, Native American cultures focused specifically on South Mountain, and probably a particular location on the mountain, as a source of lithic material for toolmaking.

As outlined in Chapter 2, metarhyolite is a metamorphic volcanic rock initially formed as lava flows during a major continental breakup more than 600 million years ago in Precambrian times. After the lava flows formed, they were buried and subjected to high temperatures and pressures causing metamorphism and changes to their mineral composition and structure (Way 1986:21; Carr 2001:5). Metarhyolite is a hard, light grey to purple rock with a very fine, almost glassy grain caused by the rapid cooling of the initial lava flow. The metamorphism affected and presumably improved the knapping or working quality of the material by Native Americans (Carr 2001:5).

The Archaic Period, 4300 to 10,000 Years Ago

First evidence of the use of metarhyolite for toolmaking is found during the Archaic period of Native American cultural development, 4300 to 10,000 years ago. As with earlier periods, stone tools during the Archaic period were predominantly formed from available materials such as chert and jasper. However, during this period metarhyolite and quartz were added as preferred toolstone as well (Carr 2015:77). In the Early Archaic, up to 20% of the projectile points in the Susquehanna and Delaware River drainages were produced using metarhyolite (Carr 2001:19).

By about 9000 years ago, in the Early Archaic, glaciers had receded, the climate was warming, and pine-oak forest had moved northward covering most of Pennsylvania. The result was a significant increase in available food resources for Native American peoples (Carr 2015:75,87). By about 6000 years ago, glaciers still in Canada had retreated sufficiently north to allow for changes in weather patterns that increased wind flows and storms from the Caribbean and Gulf of Mexico. Gradually, warmer and moister conditions prevailed across eastern North America, approaching the weather patterns of today's climate. With the warmer climate, the forests of Pennsylvania became richer in food resources, including plant communities—nuts, seeds, roots and berries—as well as the birds and mammals that feed on them.

The Archaic period is a time of adaptation to this changing forest environment. This 6000-year-long period of time is divided by archeologists into three sub-periods, early, middle, and late, based on changes in the stone artifacts made by the prehistoric peoples and the apparent changes in their lifeways and settlement patterns.

Broadly speaking, however, populations increased and became more settled. Over time, settlement apparently first concentrated in the floodplains spread throughout adjacent upland areas, favoring sites along small streams and at springheads. Native American bands gradually became larger and less mobile, apparently expanding beyond purely family groupings to more complex social organization. Primary settlements still concentrated in the floodplains and grew larger in size. By the Late Archaic, 4,300 to 6,000 years ago, the Native American population in Pennsylvania probably numbered in the thousands (Carr 2015:73-76;87-91).

Among the changes in stone toolmaking was the use of metarhyolite from South Mountain as a favored material. Metarhyolite has been found in archeological excavations throughout the Archaic Period at distances that represent the movement of bands over large territories (Carr 2015:97).

The Transitional Period, 2700 to 4300 Years Ago

The Transitional period of prehistoric cultural development represents a response to the increased population pressure building during the Archaic period. This was compounded by a temporary change in climate that resulted in fewer available food resources. This period exhibits the intensification of food processing methods, a significant change in how stone tools were made, the introduction of portable cooking containers, and change in the organization of social groups (Carr 2015:108). South Mountain's metarhyolite plays an important role in this story.

As noted above, the Late Archaic period was characterized by changes in weather patterns resulting in warmer, moister conditions not dissimilar to today's climate. During the subsequent Transitional period, however, approximately 4300 to 3000 years ago, the climate seems to have turned warm and dry, with reduced rainfall. Water levels were lower, wetland areas receded, and streams had reduced flow.

As a result, there appears to have been an overall decrease in vegetation and available food supplies. Food availability became less predictable. Early in the

period, the vegetation began as an oak-hemlock forest, but the hemlocks disappeared and were replaced by hickory, which was better adapted to dryer conditions (Carr 2015:108-109).

Settlement sites associated with the Transitional period tend to be closer to water sources than in other periods but are exploiting the same ecological settings. Sites are found in the valleys of major rivers where water flow was more constant, in the uplands along small streams, and adjacent to swamps and bogs. The appearance of being closer to water sources such as wetlands may actually be a result of the receding of the wetlands due to reduced water levels—the settlements weren't actually closer, the edge of the wetlands had receded farther away.

As during previous periods, settlement patterns were seasonal. But during the Transitional period camps involved more families who lived at locations for longer periods of time. The largest sites were in the floodplain, but there were also a large number of sites in a wide variety of upland topographic settings. The larger sites appear to have been base camps featuring large food processing areas involving steaming or boiling as well as roasting. Cultivation of squash and a variety of seed plants also seems to have occurred there. The sites represent both a more intensive strategy for exploiting the environment and an increase in social activity (Carr 2015:127,130).

Seasonal patterns include the larger sites in the floodplain that served as spring gathering places for multiple bands to take advantage of fish migration and for food processing, ceremonies, and trade. In the summer, families broke into small groups to exploit a wide variety of plants and animals both in the floodplain and in upland areas. In the fall, families focused on collecting a variety of nuts but also hunted in the uplands. In winter, hunting in small family groups in upland areas was the emphasis. Winter may also have been the time when groups went to quarry sites such as those on South Mountain to collect tool making materials (Carr 2015:128).

The Transitional period is characterized by a significant change in chipped-stone tool technology. There were changes in the types of tools being made, the way they were made, and the stone used to make them. The hallmark of the Transitional period was the introduction of the broadspear and the use of metarhyolite, jasper, and argillite as preferred materials for its making (Carr 2105:107).

The earliest broadspears date to about 4300 years ago and are found in Virginia and the Carolinas, as well as the Middle Atlantic. Beginning about 3900 years ago, broadspears changed shape and are found in two varieties: the Susquehanna broadspear and the Perkiomen broadspear. The Susquehanna broadspear has angular corners and is usually made from South Mountain metarhyolite. The Perkiomin broadspear has rounded corners and a narrower base and is usually made from jasper from Lehigh or Berks Counties. While the two types are sometimes found at the same sites, the Susquehanna broadspear is most common in the Susquehanna River drainage basin and the Perkiomin broadspear is most common in the Delaware River drainage basin (Carr 2015:112).

Broadspears are multipurpose implements and were frequently reworked into distinctively shaped knives, scrapers, and drills (Carr 2015:108). Usually a little less than 3 inches long, broadspears started out their use-life with long, wide, symmetrical blades. They could be re-sharpened and were frequently reworked to serve as knives, resulting in an asymmetrical shape in which one edge was more frequently sharpened than the other. Some archeologists argue that broadspears were not used as spearpoints at all and always functioned as cutting, scraping, and drilling tools (Carr 2015:117-118).

The Susquehanna broadspear, flake, blank, and finished product (Carr 2015:117)

The knapping techniques used to make broadspears were fundamentally different from those used during the Middle and Late Archaic periods. The making of the Susquehanna broadspear started at the quarry where, on South Mountain, blocks of metarhyolite were dug out of the ground, and large stone hammers were used to break them into flat flakes, a foot or more in diameter. These large flakes were then chipped into “blanks” using large wooden or antler hammers. The blanks could be easily transported away from the quarry to other locations where they could be finished. The blanks were formed into broadspears by shaping and thinning both sides to less than 3/8-inch thick and finished by notching the base (Carr 2015:117).

Initially, only broadspears were made using the preferred Transitional stone types of metarhyolite, jasper, and argillite. By 3400 years ago, however, 60 to 80 percent of all artifacts were made using these three materials. This is true for sites that are as much as 200 miles away from the source of the stone, suggesting an extensive trading system (Carr 2015:113). Trade is obvious in the archeological record during the Transitional period and seems to have been extremely important for economic and probably social reasons. It is not clear to archeologists why extensive trade arose only in items made from these few stone materials. It is possible that tools made of these stones are all that remain of a

trading system that also included many other commodities such as food and raw materials that are not preserved in the archeological record (Carr 2015:130).

The finding of metarhyolite broadspears and other tools at Transitional sites far from South Mountain indicates the important role that this stone played in the technology, economy, and culture of the time. In the Susquehanna River basin, where the use of metarhyolite was concentrated, the extent of the trading network is clear. Along the main branch of the river, metarhyolite is found in large quantities as both finished product and debitage. In the upper part of the river basin and along the smaller streams, it is mainly found as finished tools. This suggests that blanks acquired from the quarry on South Mountain were being transported to settlement sites in the lower valley where they were worked into finished tools to be traded in the upper valley (Carr 2015:134).

Later Periods

The development of Native American culture from 2700 to about 450 years ago is known as the Woodland period. It is followed by the Contact period in which Native Americans were in increased touch with Europeans with catastrophic consequences.

The Woodland period is characterized by the widespread and common use of fired-clay ceramics. Much more is known about Native American culture during this period than others due to the number of sites and the array and variety of artifacts that have been recovered, especially ceramics. Many styles of ceramics have been identified, and these have been used to define a large number of pottery types, phases, or archeological cultures (Carr 2015:141).

Compared to the Transitional period, there were many changes in the way stone tools were made during the Woodland period. The preference for use of metarhyolite, jasper, and argillite from which to make stone tools was no longer as strong as it had been. A variety of distinctive projectile points with a variety of shapes using a variety of materials were produced (Carr 2015:144). Metarhyolite, while continuing in usage, was no longer the material of choice. Clay pottery, not the broadspear, was the hallmark of the Woodland period.

In the Late Woodland, 1100 to 450 years ago, the climate continued to be warm and wet, but a brief cold period ensued toward the end known as “The Little Ice Age.” This cold period decreased the predictability of natural food sources and shortened the growing season for the developing agriculture. The vegetation is characterized as oak, chestnut, and hemlock forest. The frequent use of floodplains for farming resulted in much of these areas being open or in various stages of successional growth (Carr 2015:170).

Well-made pottery and triangular arrowheads are the hallmarks of the Late Woodland period. Use of bows and arrows replaced the use of various types of hand-thrown and propelled spears by at least about 1000 years ago (Carr 2015:79). Late Woodland pottery exhibits relatively elaborate designs, allowing archeologists to identify various cultural groups. The development of agriculture during this period is reflected in the variety of grinding stones, including pestles, mullers, and pitted stones, found at archeological sites (Carr 21015;170).

In the Susquehanna River basin, settlement sites became larger, and eventually stockaded villages appeared, indicating the need for common defense due to widespread warfare or feuding. Villages were occupied for years at a time. Agriculture evolved from small-scale gardening to the larger scale slash-and-burn farming of corn, beans, and squash. There was continued procurement of a variety of wild plants and animals, however. During the Late Woodland period there was a change in social structure from smaller egalitarian bands to larger and more complex but still egalitarian tribal organization (Carr 2015:183,186-188,193).

The Late Woodland period ended about 450 years ago, about 1550 AD, with European contact and the influx of European trade goods, diseases, and conflict. About this time, the Susquehannock culture appeared in the lower Susquehanna River basin replacing the Late Woodland. The Susquehannocks were Iroquoian-speaking and shared many similarities with the Iroquois of New York. It is believed that they moved south from that region, conquering, absorbing, or simply replacing the indigenous Late Woodland peoples living there (Carr 2015:212).

The Susquehannock homeland was in the lower river basin in what is now Cumberland, Dauphin, Lancaster, and York Counties. The Susquehannocks lived in large fortified villages in the floodplains along the river, several of which have been extensively investigated. Villages may have included as many as 3000 people. The Susquehannocks farmed extensively and moved their villages every twenty to thirty years to more fertile fields. Use of most Native American tools was replaced by European tools within the first 100 years of contact. By about 1675, nearly all Native American material goods were partially or completely European made (Carr 2015:206;212).

Following contact, the Susquehannocks engaged in extensive fur trade with the English, Dutch, and Swedes and controlled the region's fur trade for nearly one hundred years. They were in constant conflict with other Native American tribes during this time, especially the Seneca of western New York, who were jealous of their control of European goods. Warfare, disease, and proximity to expanding European settlement contributed to their decline between 1675 and 1763 (Carr 2015:212).

South Mountain's Snaggy Ridge Quarries

South Mountain was the source of the metarhyolite used by Native Americans for tool making beginning as far back as the Archaic period 10,000 years ago and with particular significance during the Transitional period, 2700 to 4300 years ago. As outlined in discussion of the region's geology in Chapter 2, metarhyolite is the predominant rock of South Mountain's eastern slopes in Pennsylvania. Prehistoric quarries for metarhyolite have been identified on South Mountain from south-central Pennsylvania through central Maryland (Carr 2001:5).

The metarhyolite outcroppings on the South Mountain vary considerably in texture, color, and structure (Way 1986:21). The metamorphic process that turned the original igneous rock rhyolite into metarhyolite caused the formation of phenocrysts or small crystals of feldspar or quartz in the rock and are a distinguishing characteristic of South Mountain metarhyolite. This rock structure is believed to affect the knapping quality of the material (Carr 2001:5).

Among the best known metarhyolite quarry sites are those along Snaggy Ridge in Michaux State Forest. Also known as Carbaugh Run for the stream along its east side, the sites have been studied by archeologists since the 1890s and were listed on the National Register of Historic Places in 1986. Now protected, the sites have been the focus of extensive, uncontrolled, and illegal collecting for decades. The Carbaugh Run Natural Area was created within Michaux State Forest as an additional protective designation for the archeological sites, increasing the penalties for removing or disturbing the ecology or the artifacts (Carr 2001:5; Beckerman 1981)).

Snaggy Ridge is oriented north/south and is approximately 5 kilometers long and 2 kilometers wide. Bedrock exposures are numerous along the upper flanks, and the ridge top is relatively narrow, usually less than 100 meters wide. Exposed bedrock does not appear to have been worked by prehistoric peoples (Carr 2001:6,7).

As evidenced by the citations of this section, the most thorough study to date of the Snaggy Ridge quarries was undertaken by Kurt Carr, Laura Dribelis, and Robert Winters and presented in an unpublished report at a 2001 meeting of the Society for American Archeology. The authors examined Snaggy Ridge closely, tested metarhyolite samples from the entire area, and undertook test excavations at several locations.

With respect to quality of material for knapping and working, they found that while much of the metarhyolite on the ridge seemed workable, the best material was associated with the location of the historic quarry pits. They also found that buried material was significantly better for working than material exposed at the surface, probably due to the increased moisture in the rock. As noted above, the metarhyolite on South Mountain varies considerably in texture, color, and structure, resulting in differential flaking quality and ease and quality of working. These variations can appear suddenly across the landscape. The differential quality of the metarhyolite would explain the concentrated area of Native American quarries in what is probably the location of the best material for tool making (Carr 2001:8).

The most intensive areas of prehistoric quarry activity on Snaggy Ridge are located at or near the ridge top, and the most heavily used area is along the northern third of the ridge. Six separate quarry sites were located, each with large quantities of debitage forming layers at least 20 cm thick under the leaf mold. One featured quarry was approximately 300 meters long along the ridge top. Another was as much as ten acres in size. Shallow depressions two to fifteen meters in diameter within the larger quarry areas represented individual quarry pits excavated into the bedrock (Carr 2001:8).

The 2001 report's investigations found that metarhyolite was excavated from below ground at the quarries rather than being collected from the surface or from bedrock outcroppings. Native Americans preferred to excavate for the better quality material despite the additional work required. Because of the inhospitable nature of the ridge, following excavation the stone was tested for quality, reduced in size into large flakes to facilitate movement, and removed from the

ridge top to other sites. Little or no reduction and few other activities appear to have occurred at the ridge top quarries (Carr 2001:17,19).

Below the ridge-top quarries, at springheads, rockshelters, and along the valley stream, are several sites that appear to be workshop sites. Here, metarhyolite removed from the quarries above was worked and enhanced prior to being removed from the area. One site may be a large base camp (Carr 2001:18-20).

Snaggy Ridge is a significant archeological site that informs our knowledge of how Native American cultures exploited the mineral resources of South Mountain. Particularly during the Transitional period of Native American cultural development, when metarhyolite was one a of a few strongly preferred materials for making of stone tools, Snaggy Ridge's quarries were extensively used. The appearance of metarhyolite tools at sites throughout the Mid-Atlantic region helps illuminate the extent of Native American trade and settlement patterns and the importance of the South Mountain quarries.

South Mountain's Iron Industry

The mining and processing of iron ore had a significant impact upon the South Mountain landscape and contributed more to landscape change than any other mineral extraction or other activity prior to the establishment of the state forest. The devastation caused by the iron industry ultimately led to government action to preserve forest lands and protect water sources, creating the regenerated forest we have today.

South Mountain's iron industry was part of the westward expansion of the iron industry which first developed in southeastern Pennsylvania during the early-to-mid eighteenth century then spread central Pennsylvania. The first bloomery forge for separating iron from iron ore was constructed in Pennsylvania near Pottstown in 1716. Over the next two decades, the iron industry in southeastern Pennsylvania developed considerably. By 1726 and 1729, iron furnaces were being established at promising sites as far west as Lancaster and Berks Counties. Over the course of the 1740s, 50s, and 60s the number of furnaces in these counties dramatically increased. By 1783 at the end of the Revolutionary War, eighty-four ironworks had been established in Pennsylvania (Eggert 1994:19-20,30; Bining 1938:172-175).

In the seventeen years between 1783 and 1800, the number of ironworks in Pennsylvania nearly doubled, as an additional eighty-three works were constructed. 46% of this growth occurred in the southeastern counties, 30% occurred in central Pennsylvania, (the Susquehanna Valley and adjacent Allegheny Mountains), and 24% occurred west of the Alleghenies. Of the twenty-four new ironworks in central Pennsylvania, eighteen were located in the Juniata region, two were in Cumberland County, two were in Franklin County, and two were in Bedford County (Eggert 1994:30).

The first iron forge west of the Susquehanna River was established in Boiling Springs at the north end of South Mountain about 1750, marking the beginning of industrial development in the Cumberland Valley. South Mountain was not the only location for new ironworks, however. About fourteen additional furnaces and forges were introduced at various locations in York, Cumberland, and

Franklin Counties over the course of the late eighteenth century, from the 1760s to 1800 (Bining 1938:172-175; Eggert 1994:23; Tritt 1984:8-1).

New ironworks continued to be established in this region during the first half the nineteenth century, which should be considered the peak period of their development here. In addition to ironworks in the immediate vicinity of South Mountain, at least seven new ironworks were constructed at other locations in Adams, Cumberland, and Franklin Counties between 1800 and 1830. New ironworks were constructed at other locations after mid-century in 1865 and as late as 1880 (Wiestling in Haas undated:40-43).

At least fourteen ironworks were established in the immediate vicinity of South Mountain between 1750 and 1882. Listed chronologically, they include:

- **Boiling Springs Forge** (1750), Boiling Springs, Cumberland County – first significant iron operation (perhaps a bloomer, though that is not proven; it was not yet a blast furnace) west of the Susquehanna River (Bining 1938:172; Weltman personal communication).

- **Carlisle Iron Works** (1762), Boiling Springs, Cumberland County – the construction of a blast furnace led to the substantial growth and significance of Boiling Springs in relation to South Mountain's iron industry. Tax records indicate the initial site encompassed 2250 acres (Smith 1990). The ironworks were acquired in sole ownership by Michael Ege in 1792 and became the centerpiece of Ege's substantial South Mountain holdings. Operated under successive ownerships with improvements, the works were closed in 1894 (Tritt 1984:8-1,8-2; Weltman personal communication).

- **Pine Grove Furnace** (c.1770), Cooke Township, Cumberland County – the date of establishment is uncertain, but is believed to be about 1770. Pine Grove was associated with several men who also were owners of Carlisle Iron Works, most notably Michael Ege, who became full owner in 1803. Pine Grove expanded and became one of the largest and most productive ironworks in the South Mountain region (Weltman 2015: Pine Grove 3-4). Discussed further below.

- **Mount Holly Iron Works** (c.1771), Mount Holly Springs, Cumberland County – the ironworks included a furnace and forge. The forge was in existence as late as 1848. The furnace was torn down in 1855 to give place to a paper mill (Wiestling in Haas undated:40). Ore banks associated with the furnace were located one quarter mile off and six miles to the southeast (Weltman 2015 Big Pond Notes–from Lesley 1859).

- **Cumberland Furnace** (1794), Penn Township, Cumberland County – built by Michael Ege on Yellow Breeches Creek, seven miles west of Mount Holly Springs as part of his extensive holdings on South Mountain. The furnace blew out permanently in 1854 (Tritt 1984-2; Wiestling in Haas undated:41). The works were abandoned due to a scarcity of charcoal,

INSERT MAP LOCATING IRONWORKS LISTED. USE RELIEF MAP AND FOCUS IN CLOSELY ON SOUTH MOUNTAIN SHOWING BOUNDARIES OF MICHAUX STATE FOREST, STREAMS, AND CURRENT ROADS.

and the stack was being demolished in 1859 for construction of a paper mill. Ore was obtained from the Peach Orchard bed 3 miles west, McCullock's and Goodpart's beds 2 miles northwest, Lee bank 5 milesnorth, and Dillstown 13 miles east (CCHS 2015:188; Weltman 2015 Big Pond Notes–from Lesley 1859).

- **Mont Alto Iron Works** (1807), Quincy Township, Franklin County – furnace constructed by the Hughes family, who were experienced with ironworks at nearby sites in Maryland. A foundry was added in 1815. The property, reported to include 16,000 acres, was sold to George Wiesting and partners in 1866 to become the Mont Alto Iron Works. The works were reconstructed and improved and remained in operation until 1893 (WAIHT 2015 Files). Discussed further below.

- **Mont Alto Forge (Old Forge)** (1811), Quincy Township, Franklin County – forge and other works constructed by the Mount Alto Iron Works at a remote site on South Mountain due to the limited space for water power facilities at the site of the main furnace. Slag and cinder transported here from the furnace by wagon was crushed to recover iron that remained. Closed in 1866 and razed in 1868 (Haas undated:3-4). Discussed further below.

- **Maria Furnace** (1822), Hamiltonban Township, Adams County – built by four partners, including Thaddeus Stevens and James Paxton. The iron ore deposit upon which the furnace depended, located one mile to its northeast, was of poor quality, and the products they cast developed a poor reputation. The furnace was closed in 1838 after the partners shifted the focus of their operations to Caledonia (Hoch 2005:202-206).

- **Augusta Furnace** (1824-27), Southampton Township, Cumberland County – erected by John Moore of Carlisle on a stream four miles west of Big Pond (CCHS 2015:28; Weltman 2015 Big Pond Notes–from Lesley 1859; Smith 1990). Discussed further below.

- **Mary Ann Furnace** (1829), Southampton Township, Cumberland County – erected by John Moore on the same stream a mile below the Augusta Furnace. The furnace was abandoned in 1851 (CCHS 2015:28; Weltman 2015 Big Pond Notes–from Durant 1880; Smith 1990).

- **Big Pond Furnace** (1836), Southampton Township, Cumberland County – erected by John Moore and his son and operated by them until 1846 at which time it was lost through a sheriff's sale. Schoch Sons & Co. acquired the property in 1847 and constructed a forge in 1851 or 1852, manufacturing pig iron and blooms for boiler plates. The property was sold to P.A. Ahl in 1870, who conveyed it to the Philadelphia and Reading Coal and Iron Co. in 1872. The works burned in 1880, which ended operations. (Weltman 2015 Big Pond Notes–from Goodyear 1903 and

Lesley 1859; also noted by Wiestling in Haas undated:42). Discussed further below.

- **Caledonia Furnace** (1837), Greene Township, Franklin County – Established by Thaddeus Stevens and James Paxton as an alternative site to the Maria Furnace. Discussed further below.

- **Chestnut Grove Furnace** (1837), Idaville, Adams County – Chestnut Grove was a cold blast furnace built by Duncan & Mahon. Its ore was magnetite, said to be of very great richness developed from the igneous and metamorphic formations on the east side of South Mountain. The ore banks were located about one mile south-east of the furnace. Successive owners were unable to make the furnace profitable in part due to low water power and other difficulties. However, the furnace continued to operate until 1874 and by 1877 was partially dismantled and idle (Frazer 1877:243).

- **Cleversburg Furnace** (1880), Southampton Township, Cumberland County – a hot-blast charcoal furnace erected by George Clever and Jacob Bomberger in the village of Cleversburg. The furnace was in operation for only three years (CCHS 2015:30; Smith 1990; Weltman 2015 Cleversburg Notes- from Goodyear 1903).

- **Katherine Furnace** (1882), Boiling Springs, Cumberland County – constructed as a modern improvement fueled by anthracite coal by D.V. Ahl, who had acquired the Carlisle Iron Works (Smith 1990; Tritt 18984:8-2).

After the Civil War, changes in technology discussed earlier in this chapter rendered the old furnaces and forges increasingly obsolete. While the South Mountain ironworks attempted to modernize and adapt, and some new furnaces were still introduced, they could not compete with the scale of change occurring within the iron, steel, and manufacturing industries (Eggert 1994:45-52). The last iron furnaces in the South Mountain region closed in the 1890s.

The Iron Industry Landscape

South Mountain's ironworks were an integral part of the broader agricultural landscape established in York, Adams, Cumberland, and Franklin Counties during the late eighteenth and early nineteenth centuries. As this agricultural landscape developed, intensified, and prospered, so did its ironworks. The iron industry was an important part of the regional economy, providing wrought iron to local blacksmiths, craftsmen, and small manufacturers located in local market towns and villages, as well as cast iron products to farmers and residents. In addition to its importance to the local market, iron was exported out of the region as well. Leaders of the iron industry were also influential community leaders. As with the agricultural landscape, the iron industry reached a peak period of development in the years before the Civil War.

While ironworks were established throughout central Pennsylvania in the late eighteenth and early nineteenth centuries, they tended to concentrate in locations with the best sources of iron ore. In addition, ironworks needed water power, limestone, and access to large quantities of wood for making charcoal. South Mountain was favored for all of these necessary resources and thus became a concentrated location for regional ironworks.

Because of the need to be in proximity to these natural resources, ironworks tended to be located in rural and remote areas. In southeastern Pennsylvania, ironworks developed as relatively self-sufficient communities, which became known as iron plantations. This pattern was established in the early ironworks in the South Mountain region as well. However, as the nineteenth century progressed, the pattern was modified within the South Mountain region.

Iron Ore Banks. Most important for the siting of ironworks was proximity to sources of high quality iron ore. Of the needed raw materials, ore was the most difficult to find and the heaviest to transport (Eggert 1994:6).

Iron does not occur in its native state but is found chemically combined with other elements and compounds. The percentage of iron in different earth materials varies considerably, and when iron is concentrated in high enough amounts by any one of several natural processes, it becomes of interest as a raw material for the recovery of iron. Several kinds of iron-rich earth materials have been mined as iron ore (Way in Sevon 1991:140). On South Mountain, iron-rich deposits are found around the mountain's edges. On the west side, iron is found in limonite associated with the Tomstown Formation of dolomite. On the east side, iron is found in magnetite associated with the mountain's igneous and metamorphic rocks.

South Mountain's best deposits of iron ore are associated with the Tomstown Formation, deposits defined by geologists as a massive dolomite containing thin shaly interbeds (DER 1980). South Mountain's iron ore banks (mines) and furnaces tend to be located along this formation, which is found along the northern and western downslope edges of the mountain, the eastern edge of the Cumberland Valley. An important outlier of Tomstown dolomite is found along Mountain Creek in the heart of South Mountain's northern end. This site was the impetus for the establishment of Pine Grove Furnace. The magnetite deposits on the east side of South Mountain did not prove commercially viable for the iron industry.

As noted in the discussion of geology in Chapter 2, the Tomstown Formation was laid as a sediment immediately over the Antietam Sandstone that today forms the high western ridges of the mountain. Over geological time, the hard sandstone has resisted weathering, while the softer dolomite has eroded away, creating the variation in topographic relief.

While highly resistant and much slower to erode, the high sandstone ridges have gradually weathered over time and created a thick deposit of sandstone-rich colluvium (rock, sediment, and soil) over the Tomstown dolomite below. This thick, wedge-shaped deposit of colluvium extends about 1/2 to 2 1/2 miles wide from the base of the ridge and in some places is over 100 feet deep over the

underlying rock. This mantle extends the entire western length of South Mountain in Pennsylvania (Anthony 2014:8).

It is here that the best iron deposits have formed. As the Tomstown dolomite weathers, it forms residual deposits (residuum) of clay, sand, and rock in the colluvium on top of the formation, along faults, and in voids. Iron ore was formed through the chemical weathering of various minerals in these residual deposits. The ore is referred to as brown-hematite ore and consists mostly of limonite, a general term for hydrous iron oxides (Way 1986:11,27).

Ranging in color from dark brown to yellow, South Mountain's limonite displays a variety of forms and iron content. South Mountain's ores are not particularly rich, yielding between 36% and 54% metallic iron. Impurities such as too much phosphorus sometimes created serious problems for the ironmasters, and certain promising ore banks had to be abandoned (Way 1986:11,27).

Where the residuum and its iron ore were shallow enough to get to, they were mined. In the early days, many mining operations were small and shallow, and one or two operators could supply more than one furnace with ore. Farmers along the base of the mountain supplemented their incomes by mining ore on their properties. Under some circumstances, larger trenches of pits were developed, but these rarely exceeded 40 to 50 feet in depth (Way in Sevon 1991:140). Iron ore banks grew in scale as the industry developed. The control of adequate quantities of good sources of iron ore was critical for the financial viability of an ironworks.

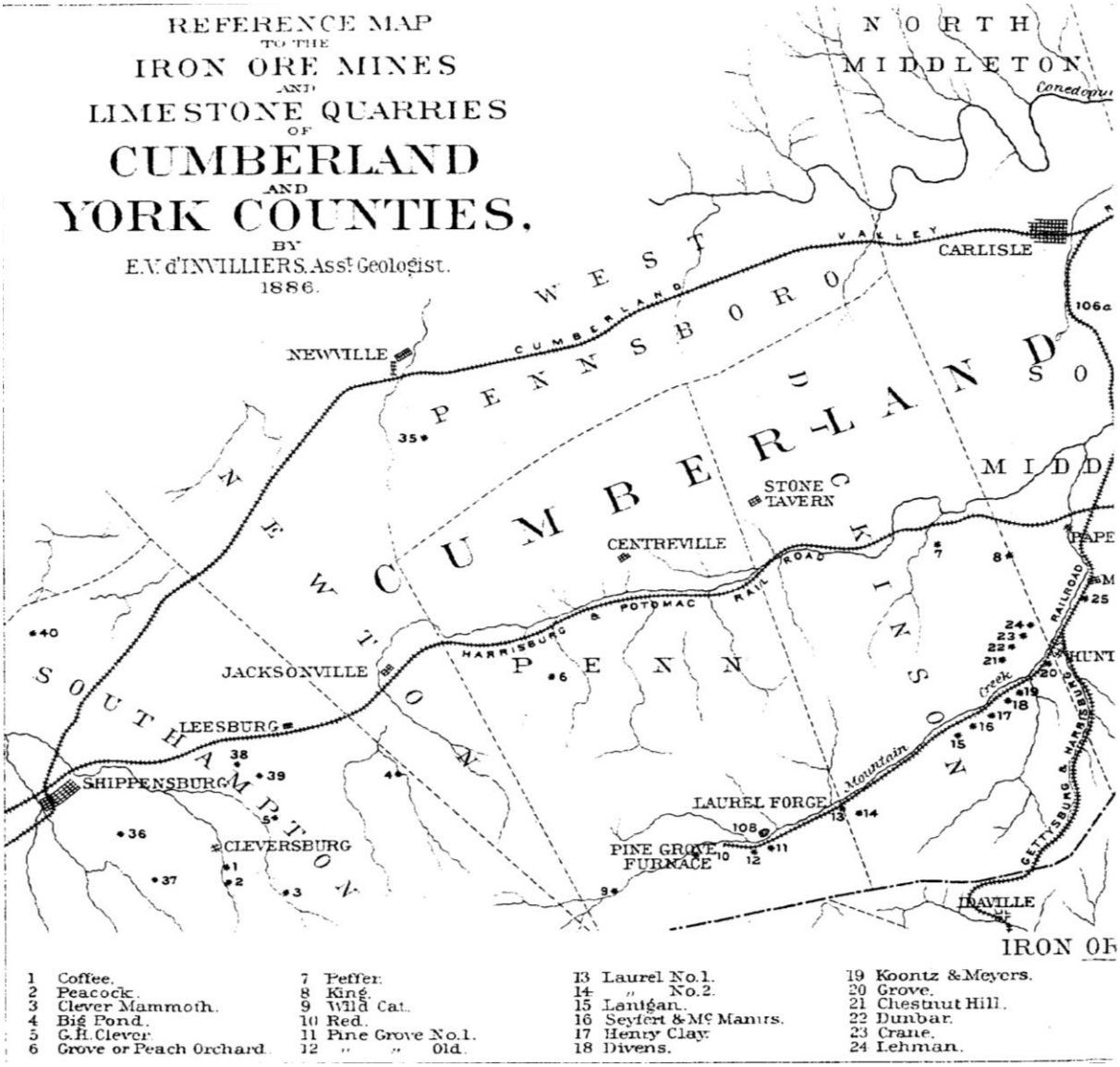
A detailed description of iron ore deposits along South Mountain with accompanying sketches and map was prepared by geology professor J. Peter Lesley of the University of Pennsylvania and published in 1873 by the American Philosophical Society. In assessing the South Mountain deposits, Lesley stated "I judge that the quantity of ore attainable by proper mining has no assignable limit, and may furnish supplies for centuries. (Lesley 1873:7)" Lesley had prepared a survey of furnaces, forges, and roller mills in the United States in 1859, including those along South Mountain, which was updated in 1866 and 1874 (Lesley 1859).

Lesley stated further in his South Mountain survey: "A general examination of the past and present workings of the furnaces running upon these mountain ores shows that it takes about 2½ tons of ore to make a ton of metal. 130 to 140 bushels of charcoal may be put down as the average of fuel required (Lesley 1973:18)."

Between 1874 and 1889, the Pennsylvania Geological Survey, an agency of state government, conducted an extensive survey of mineral resources throughout the state. Published as the Second Geological Survey of Pennsylvania, the agency prepared an unprecedented volume and quality of geologic reports, including over 80 texts, nearly 600 accompanying maps and illustrations, a hand atlas, a six-volume grand atlas, and miscellaneous other publications (Penn State University Libraries 2015). In several of the reports, the Survey locates, documents, describes, and maps iron ore banks associated with South Mountain. Active furnace operations are also discussed. Iron ore mines in Cumberland and Franklin Counties are extensively described in E.V. d'Invilliers' 1886 report and in Persifor

Frazer's 1877 report. Adams and York County mines are the focus of Frazer's 1876 report (d'Invilliers 1886; Frazer 1876 & 1877).

Although iron ore banks were located all along the perimeter of South Mountain, the best banks, as noted above, were located over the Tomstown dolomite. The region's ironmasters located their works in close proximity to these ore banks. Most were located over the dolomite along the western base of the mountain in a line from Boiling Springs south to Mount Alto. Most are in Cumberland County.



Detail of a survey of iron ore mines and limestone quarries prepared by E.V. d'Invilliers associated with his *Report on the iron ore mines and limestone quarries of the Cumberland-Lebanon Valley*, in the *Annual report of the Geological Survey for 1886* (d'Invillies 1886; image copied from Sevon 1991:146).

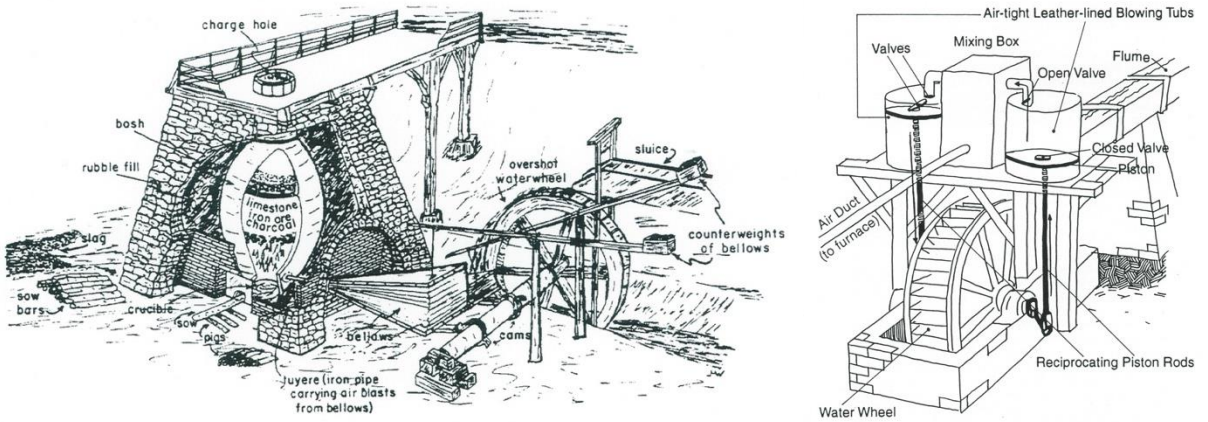
As noted, Pine Grove Furnace was located over a formation of Tomstown dolomite in the heart of South Mountain. Two South Mountain ironworks were located on the east side of the mountain in Adams County, Marie Furnace and Chestnut Grove Furnace. Maria Furnace was closed by its owners in 1838 due in

part to the poor quality of the available ore (Hoch 2005:203-206). Its owners relocated their works to the west side of South Mountain in proximity to the better ore, establishing Caledonia Furnace. Today, the abandoned sites of former ore banks are located throughout the area.

Limestone Quarries. The second necessary raw ingredient required for iron-making is limestone, which was used as a fluxing agent in separating contaminants from the ore. As the iron ore and limestone melted in the furnace, the impurities in the ore floated to the top of the liquid. The melted limestone combined with the nonmetallic impurities, converting them to liquid slag. Every few hours, slag was allowed to drain off the top of the molten iron collecting in the bottom of the furnace (the crucible). After the slag cooled and solidified on the ground, it was typically discarded or used as road fill. Today, slag can be found scattered around furnace sites and appears as a glassy rock, varied in color, and often containing small holes formed by gas bubbles (Way 1986:11).

Limestone was usually quarried from sites close to the iron furnace. Many locations along South Mountain were available for quarrying limestone. D'Invilliers' 1886 report describes and maps limestone quarries in the vicinity of South Mountain's ironworks.

Water Power. While the location of ironworks near adequate deposits of good iron ore was of primary importance, the precise siting of the ironworks was dictated by the need for water power. Water power was an essential part of the ironworks, needed to provide furnace blast and to power forges and other machinery. Water power was used to force air into the furnace, promoting high-temperature combustion of charcoal fuel and resulting in chemical reactions that liberated the elemental iron in the ore from its chemical bonds to oxygen, silica and various other impurities. (Way in Sevon 1991:138; Weltman personal communication).



Water wheels using bellows (left) and blowing tubs (right) (Way in Sevon 1991:138; Eggert 1994:9)

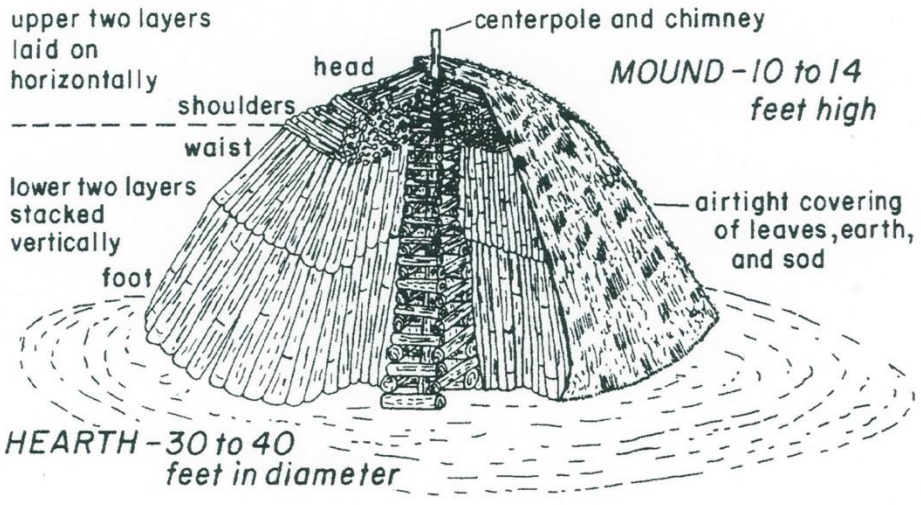
A water wheel located near the furnace powered a bellows which compressed the air and forced it as a steady blast through a duct called a "tuyere" into the furnace interior just above the base or "crucible" of the furnace, where the molten iron collected. As the forced air bubbled up through the melting raw materials, it fed oxygen to the fire, increased the heat of combustion and promoted the chemical reactions that separated the iron, from the ore. At the

beginning of the nineteenth century, bellows began to be replaced with closed blowing cylinders or blowing tubs (Eggert 1994:6-8).

The use of water power required that iron furnaces be located along streams with water flow of adequate volume and year-round reliability. Furnaces generally operated about nine months of the year, shutting down during unbearably hot weather in the summer and in winter when freezing interfered with the operation of the water wheel (Eggert 1994:11).

The large-scale landscape infrastructure required to provide water power included not only a reliable stream but usually an uphill dam and pond, raceway leading to and causing water to turn the water wheel, and tailrace connecting back to the stream. This arrangement required sufficient topographic relief to provide the necessary fall as well as enough relatively level space for the structures associated with the furnace, waterwheel, and support facilities. The layout was adapted to the specific characteristics of the landscape where the works were located; each was different.

County atlases from 1858 show a significant number of water powered saw mills located along streams on South Mountain as well as the iron furnaces. The northern and western flanks of South Mountain have as many as forty streams, about twenty-five of which are located in the concentrated area of furnace development between Boiling Springs and Caledonia. Not all of these streams, however, have the characteristics required for the construction of water power systems and iron furnaces. Where dams, ponds, raceways, and waterwheels were constructed, their remnants can often be seen today.



Charcoal hearth (Way 1986:12; Way in Sevon 1991:142)

After the 1850s, water turbines or steam engines largely replaced the use of water wheels, allowing for more reliable and year-round use of the furnaces. However, some local ironworks were slow to adopt the new technologies; for example, Pine Grove Furnace did not replace its outmoded furnace water wheel with a seam-driven apparatus until 1877. Water power continued to be used in

some applications until the very end of the 19th century (Eggert 1994:8; Weltman personal communication).

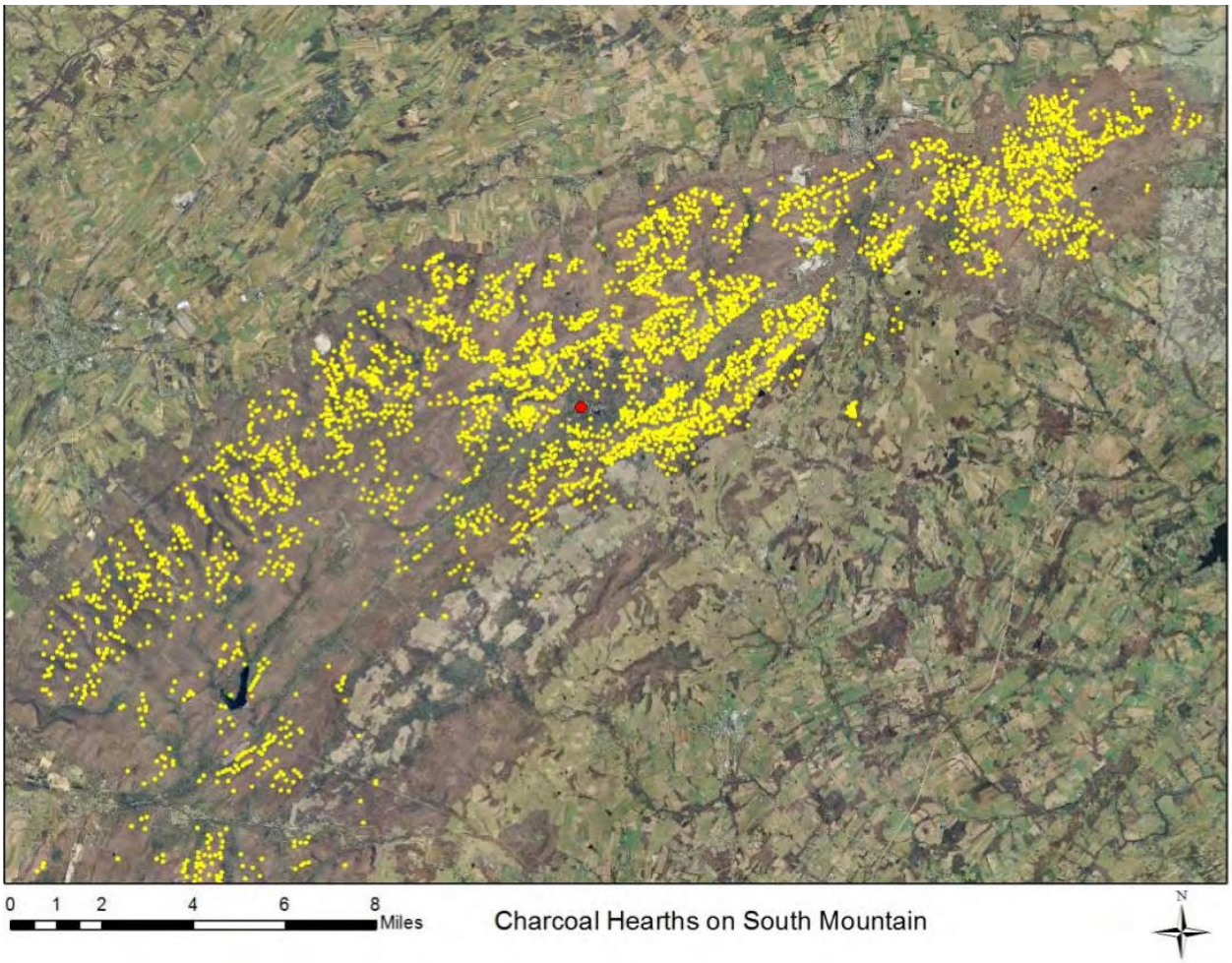
In order to produce charcoal, great quantities of wood were needed. As discussed in Chapter 6 related to forests and forestry, the process of making charcoal entailed felling trees, cutting the trees into cord wood, and charring the wood in large circular leveled areas known as charcoal "pits" which were large, above-ground stacks wood covered with dirt and leaves. These pits were built atop carefully leveled circular flat areas called "heaths." (Weltman personal communication)

Charcoal-making or "coaling" involved slowly burning a mound of stacked wood, which was as much as 10- to 14-feet high, 30- to 40-feet in diameter, and made up of 30 to 50 cords. One or two skilled colliers and one or more helpers carefully stacked the mound of wood, covered it with dirt and leaves, lighted it, and monitored it continuously, night and day, for as long as twol weeks as it slowly smoldered in a low-oxygen environment until it was finished charring. As many as ten to twelve colliers were needed to keep one furnace going (Way in Sevon 1991:140; Eggert 1994:3). The greater part of the coaling was done between May and the end of October (Eggert 1994:3). While working on the mountainsides, the colliers lived in crude huts, each team of two to four colliers using one hut to take turns sleeping in while they tended to as many as nine nearby charcoal hearths simultaneously (Weltman personal communication).

A completely burned charcoal mound yielded from 800 to 1200 bushels of charcoal, representing 20 to 30 cords of wood. This is equivalent to about one acre of forest with 20 to 25 years of tree growth. The amount of charcoal consumed by iron furnaces was enormous. At full capacity, an average furnace used 800 bushels of charcoal every 24 hours. Over a period of a year, a furnace required 240 or more acres of woodland. Assuming 20 to 25 years for regrowth, iron companies need to keep about 25 times their annual need in growing trees, or about 6,000 acres.

The forest lands owned by ironworks increased over time with the continuing need for charcoal to fuel their furnaces and forges. Carlisle Iron Works was established in Boiling Springs in 1762 with 2250 acres, grew to about 7000 acres before the end of the century, and was cited as 10,000 acres in 1873 (Smith 1990; Binning 1938:22; Lesley 1873:11).

The property associated with Big Pond Furnace was about 6000 acres in size during its period of operation from 1836 to 1880. Most of this tract was acquired by the Commonwealth of Pennsylvania in 1932 and added to Michaux State Forest (Lesley 1873:16; Weltman 2015 Big Pond Notes–from Goodyear 1903 and The Tyrone Daily Herald). The property supplying Pine Grove Furnace eventually grew to more than 20,000 acres by the late 1800s, comprising much of the northern third of South Mountain (Weltman 2015: Pine Grove 2). The Mount Alto Iron Company owned 19,200 acres of land when it was first offered for sale in 1901, comprising much of the southern third of today's state forest (Thomas 1985:19).



Charcoal hearths identified on South Mountain using LiDAR imagery. Red dot indicates the location of Pine Grove Furnace (Anthony 2014: Guidebook 11)

Over time, the longer a furnace operated, the supply of wood for charcoal gradually emerged as the key factor in its continuing success (Eggert 1994:6). Scarcity of wood for charcoal led to the closing of some furnaces, as South Mountain's forests became increasingly depleted and as some furnaces struggled to secure enough wooded land. Scarcity of charcoal was cited as cause for abandoning Cumberland Furnace in the 1850s, which had been established with an original tract of 2400 acres in 1794 (Weltman 2015 Big Pond Notes–from Lesley 1859; Smith 1990).

Ironworks properties therefore had to be large, and the extent of charcoaling was felt over the entire mountain. A study undertaken in 2013 by geologists Noel Potter, Helen DeLong, and K. Brubaker using LiDAR imagery identified over 3000 charcoal heaths on the northern end of South Mountain. Each charcoal hearth comprised a leveled area approximately 30 feet in diameter, cut into the slope on the uphill side and filled on the downhill side. The hearths are visible today throughout South Mountain's woodlands and can be identified as flat circles on the LiDAR imagery. In addition to the charcoal heaths, the mountainside is crossed by a network of trails used to access the hearths, some of which have developed into roads and trails still used today.

The devastation caused by the production of charcoal on South Mountain was extensive. For about 145 years, from the establishment of the first ironworks in Boiling Springs in 1750 to end end of iron-making on the mountain in 1895, South Mountain's woodlands were repeatedly cut for wood to make charcoal. Cut woodlands were allowed to re-sprout and develop into successional second growth woodlands until they were large enough to cut again. Soil erosion and fire added to the problems. Growth tended to be thickets of sprouts due to frequent fires and cutting on a short cycle (DeCoster 1995:15).

Ironworks. The core of the iron plantation was the ironworks where iron was separated form the iron ore and refined. Furnaces, forges, and a wide variety of supporting buildings and structures were necessary to make the ironworks function. Technological advances brought change to the ironworks over time.

The first ironworks in Boiling Springs in 1750 was presumably a **bloomery forge**, the earliest form of iron production in which ore was broken into small pieces and heated. While the iron did not melt, it turned into spongy semi-molten balls. Forgemen collected these balls on the end of a long bar and alternately reheated and hammered them into a small "bloom" of wrought iron to be used by blacksmiths and artisans. The process was not only wasteful of iron and charcoal, it required much labor and produced only small quantities of poor quality iron, which remained full of slag (Eggert 1994:5; Way in Sevon 1991:138).

The most common form of iron production in Pennsylvania and the center of iron manufacturing activity from the eighteenth century until about 1850 was the c**old-blast charcoal furnace**, depicted above in the illustration related to water wheels. Until the late 1830s, the basic technology for ironworks in America underwent no significant change. Rectangular stone charcoal furnaces, about 25 feet square at the bottom and 25 to 35 feet in height, were usually built adjacent to a hillside to facilitate loading via a bridge. The furnaces were filled from the top with alternate layers of iron ore, charcoal, and limestone. Later, wooden or stone superstructures were built directly atop the furnaces to increase efficiency and output when combined with steam-driven blast machinery and fuels like anthracite coal (Way in Sevon 1991:138; Eggert 1994:6; Weltman personal communication).

As discussed above in relation to water wheels, air forced into the furnace from below heated the mixture to a temperature high enough to cause the ore to melt and the iron to separate and accumulate at the bottom. The gases escaped through the stack, and the physical impurities from the ore combined with the molten limestone flux to produce slag, a waste product. The molten iron was tapped and allowed to run into molds made in special sand on the floor of the casting shed adjacent to the furnace. The molds formed "pigs" for further refinement and use or consumer products such as iron pots or pans. Wooden molds were used for specialized castings such as stove plates (Way in Sevon 1991:138; Eggert 1994:6-11).

Pig iron was hard because of carbon and other impurities remaining. It was also brittle, unmalleable, and once cold could not be bent. To be useful for blacksmiths to fashion into tools or other articles, it had to be changed into wrought iron by removing almost all of the carbon and changing its microscopic crystalline

structure. This was done by reheating the pig iron and working it at a **finery forge**. Forges were constructed in association with some iron furnaces in the South Mountain region.

Like furnaces, forges used charcoal for fuel and water power for air and to drive the heavy hammers used to beat the iron. The pig iron was heated with a strong oxidizing air blast to burn out some of the carbon, silicon, and other impurities. The semi-molten iron was then worked into a lump called a "half-bloom," placed on an anvil, and pounded with a massive power-driven hammer until it cooled. Half-blooms were repeatedly heated and pounded until they became flat, thick bars of wrought iron.

The bars could be marketed at this stage or still further refined through further reheating and hammering into long bars of "decarbonized" iron. These bars were then fashioned and cut into shapes and lengths to meet the requirements of blacksmiths, wheelwrights, coopers, and others who would turn them into consumer goods. Products were produced for local and regional markets but were also shipped to more distant locations such as Philadelphia and Baltimore. Larger slabs called "blooms" were also produced for use in rolling mills, discussed below.

Forges varied widely in size, equipment, and number of workmen, ranging from little more than smithies to the precursors of modern factories. Water power to run their heavy hammers required location near fast-flowing streams. After 1830 steam engines began to be introduced to run the hammers and generate air blasts. By 1850, about half of Pennsylvania's forges were powered by steam engines, making water power unnecessary and increasing efficiency and capacity (Eggert 1994:11-14).

In addition to the primary types of ironworks, furnaces and forges, there were a number of types of secondary works that were often located nearby. **Slitting mills** cut wrought iron bars into strips using water powered shears. The strips were then heated and repeatedly passed through rollers until they reached the desired thickness and were cut. The slit iron they produced was made into nails at **naileries**.

By the beginning of the nineteenth century, **rolling mills** were being developed to make sheet iron and iron plate, gradually replacing some uses of forges. Rather than being hammered out, rolling mills used heavy water-powered trains of rollers to flatten red-hot pig iron to required thicknesses for plate, sheet, rod iron, or other basic iron forms. Repeated passes back and forth through the heavy rollers were required. These iron forms were then sold to tinsmiths, blacksmiths, and small factories or workshops where they were fashioned into a wide variety of consumer products. Over the years, the rolling mills, like the refining forge before it, grew in size, employed more workmen, and developed increasingly sophisticated machinery (Eggert 1994:14).

In addition to the works themselves, a wide variety of **support structures** were needed for the ironworks to operate. These included saw mills, charcoal sheds, stables, workshops, sheds, grist mills, offices, and store. Due to the relatively remote location of most ironworks near sources of raw materials and the

limitations of travel by wagon, ironworks needed to be relatively self-sufficient communities and were known as **iron plantations**, large landholdings supplying as much of their needs for work and living as possible. Some ironworks, such as Pine Grove, had their own farms. Housing reflected the social structure of the workplace, with prominent residences for the ironmaster's family, and a range of housing types for supervisors, skilled craftsmen, workers, and their families. Each ironworks in the South Mountain region had its own particular layout and facilities.

The Evolving Iron Plantations. The creation of ironworks as largely self-sufficient communities was in keeping with the well-established character of eighteenth century iron plantations in southeastern Pennsylvania. The early ironworks in the South Mountain region, an extension of those to the east and founded by many of their families, followed this pattern. By the mid-nineteenth century, however, South Mountain's ironworks had developed a different pattern, more fully integrated with the surrounding agricultural landscape.

The Carlisle Iron Works is an example. The ironworks were founded in 1762 in a location with convenient availability to raw materials and water power. By the 1790s, a traditional iron plantation had developed around the works, similar to those in southeastern Pennsylvania. The ironworks were then under the ownership of Michael Ege, son of an influential family from Berks County active in iron manufacture over three generations (Tritt 1994:8-1).

A community of workers lived in cabins near the forge between the lake and Yellow Breeches creek. Other than in the area of the ironworks, there was little development during the 1815-1845 period. Michael Ege added a new metal furnace and another forge, additional housing for the over 200 workmen, and stables. Ege acquired the grist mill adjacent to his works in 1815 for feed and flour for his plantation. He expanded his holdings considerably and became owner of four furnaces and two forges. At the peak period of his ownership, he had undisputed rights to about twenty-five contiguous miles of mountain tracts of virgin timber and rich ore deposits (Tritt 1984:8-2).

Only a few other dwellings existed in Boiling Springs other than those related to the ironworks before the founding of the village in 1845. Boiling Springs was laid out in 1845 by Daniel Kauffman on land owned by his family adjacent to the ironworks. The grid plan for the village was typical of those of Pennsylvania market towns throughout the region. The iron industry and a large immigration of German settlers from York County were the main reasons for the subsequent growth of the village, which expanded beyond the community associated with a traditional iron plantation (Tritt 1984:8-2).

Some of the German settlers were employed at the nearby ore banks and ironworks. But many were tradesmen, providing services to the growing village and surrounding farms. Gradually, Boiling Springs evolved from an iron plantation into a complete Pennsylvania market town. Boiling Springs had several dry goods merchants, blacksmiths, builders, carpenters, and a shoemaker, coach-maker, wagon-maker, tinner, harness-maker, butcher and baker. By 1872, the village contained about 75 dwellings and had a population of about 400. By 1885, the

population had grown to about 500, with a central commercial district, residences, and churches (Tritt 1984:8-2).

Similar patterns developed with the ironworks established elsewhere along the base of the mountain form Boiling Springs to Mount Alto. At Mount Holly Springs, a manufacturing village grew up around the original ironworks that had been established circa 1771. The ironworks were removed in 1855 for construction of a paper mill, for which the village became known.

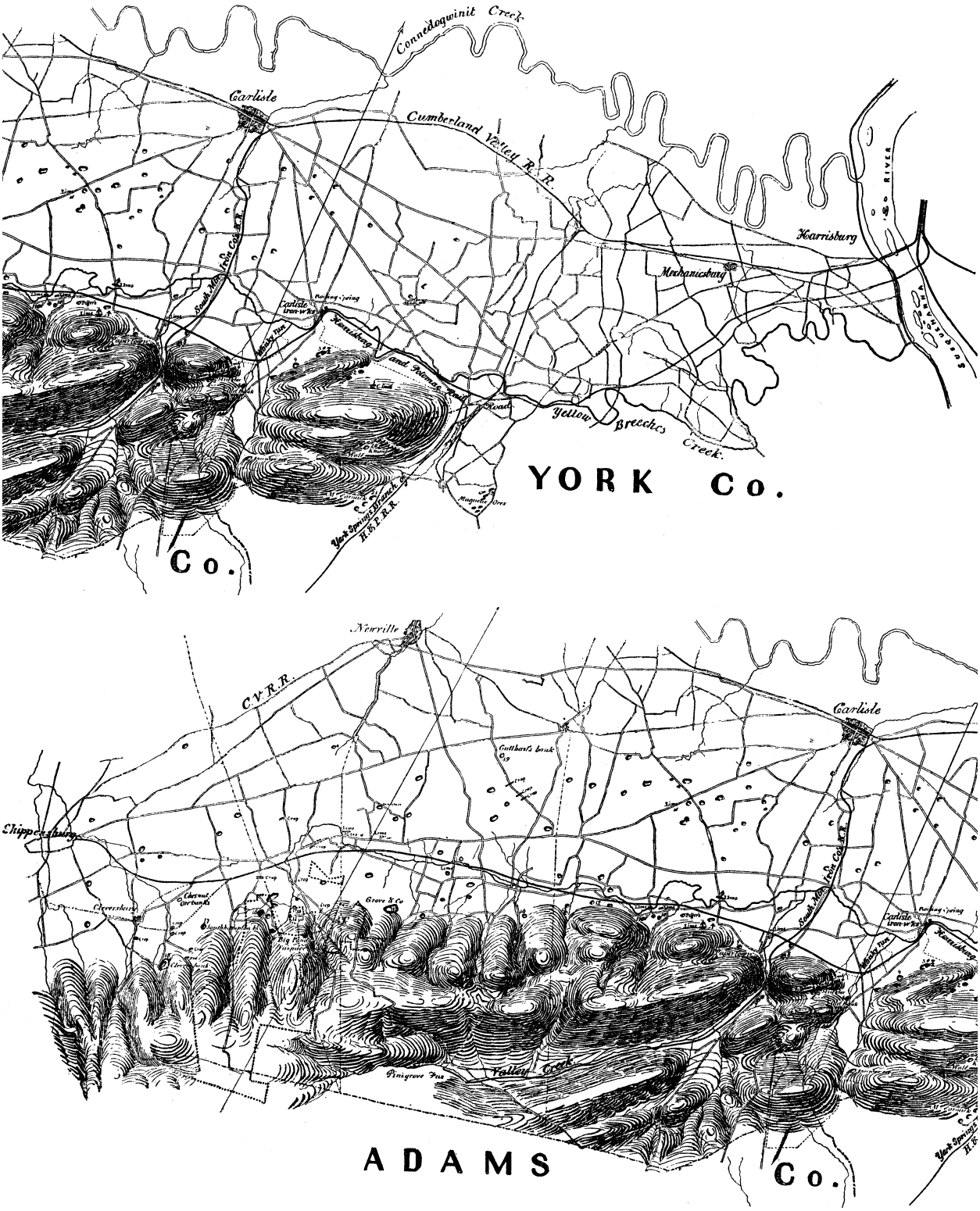
The Cumberland, Augusta, Mary Ann, and Big Pond furnaces were established on streams at the base of South Mountain's western slope in Cumberland County. Assemblages of buildings, structures, and landscape infrastructure similar to those of a traditional iron plantation were constructed around them. However, the construction was less intense, and these sites were not remote or isolated like the classic eighteenth century iron plantations. The county atlas from 1858 shows the furnace sites in close proximity to saw mills, grist mills, farms, and crossroad villages—a mature agricultural landscape by the mid-nineteenth century.

Caledonia and Mount Alto furnaces, though somewhat further into the mountain, were nonetheless similarly situated in close proximity to the valley's prosperous agricultural landscape. Both were able to become private parks in the late nineteenth century directly connected to nearby communities. The sole ironworks in the South Mountain region that retained the traditional iron plantation form was Pine Grove Furnace due to its isolated location in the heart of the mountain along Mountain Creek. Pine Grove Furnace is discussed further below.

Transportation and Technological Change. Wagon roads were used to transport the various forms of pig iron, iron bar, and other iron products from South Mountain's furnaces and forges to local, regional, and national markets from their founding into the mid-nineteenth century when railroads were introduced into the valley. Slow, expensive, and laborious, wagon transport was a defining feature of the region's nineteenth century agricultural landscape.

Nineteenth century **wagon roads** can be seen on the 1858 atlases prepared for York, Adams, Cumberland, and Franklin Counties. The construction of improved turnpikes connecting communities by private companies during the first half of the century provided better roads along segments of the transportation routes. Mount Alto Furnace hauled loads to the C&O Canal along the Potomac River at Williamsport for transport to distant markets. Pine Grove Furnace transported iron goods on large wagons pulled by six mules over a road to Hunter's Run connecting to the Carlisle and Hanover Turnpike (today's Route 34) and then on to the **railroad** at Carlisle (Watts 1991:2).

The Cumberland Valley Railroad was chartered in 1831 and 1835 and completed in 1837, connecting Chambersburg to Lemoyne (Bridgeport) on the Susquehanna River opposite Harrisburg. A railroad bridge across the river was completed in



Overlapping maps of ore banks and quarries surveyed along the Harrisburg & Potomac Railroad (Lesley 1873)

1839. To the south, the Franklin Railroad connecting Chambersburg to Hagerstown was chartered by Pennsylvania in 1832 and Maryland in 1837. Opened between Chambersburg and Greencastle in 1837 and to Hagerstown in 1841, the railroad had difficulties and was poorly constructed. It was reconstructed and acquired by the Cumberland Valley Railroad in the late 1850s, extending the railroad's reach down the valley. The Pennsylvania Railroad purchased controlling interest in the Cumberland Valley Railroad in 1859 (MMA 2015; Watts 1991:3).

The Cumberland Valley Railroad helped connect South Mountain furnaces and forges to broader regional and national markets, though the iron companies were still required to haul their products by wagon to the railroad line at the center of the valley. After the Civil War, efforts were made to connect the iron industry's furnaces and ore banks to the emerging national railroad network.

The South Mountain Iron and Railroad Company was incorporated in 1864 to connect Pine Grove Furnace to Carlisle. Constructed in 1868-69, the railroad was in operation by 1870. Its line ran from Pine Grove Furnace to Hunter's Run then north through Mount Holly Springs to Carlisle (Watts 1991:2-4).

George Wiestling and partners incorporated the Scotland and Mont Alto Railroad when they acquired the Mont Alto Furnace in 1864 and began construction of a branch line connecting Mont Alto to the Cumberland Valley Railroad at Chambersburg. The branch line opened in 1872 and was later extended from Scotland to Waynesboro (MMA 2105).

In 1867 the Caledonia & South Mountain Railroad was chartered to connect the Caledonia Iron Works with Pine Grove, Papertown (Mount Holly Springs), and Carlisle. The charter was extended in 1870, but the line was never constructed (Watts 1991:3; Taber 1987:110).

A railroad originally chartered as the Mirimar Iron and Railroad Company in 1870 was under construction in 1871 and in operation by 1873. Under the control of Daniel and Peter Alh of Newville, this line ran along the base of South Mountain from the Cumberland Valley line in Shippensburg through Boiling Springs before turning north to reconnect to the Cumberland line in Lemoyne (Cathell 2015; Watts 1991:6).

J. Peter Lesley's 1873 survey of iron ore banks was titled "The Iron Ores of the South Mountain Along the Line of the Harrisburg and Potomac Railway, in Cumberland County, Pennsylvania." With detailed descriptions of ore banks, including sketches, the survey has the appearance of a promotional piece and may document the railroad's purpose of providing access for the mining and transport of ore and furnace products. Several of the descriptions document the hauling of ore to Harrisburg, Reading, and Columbia for processing (Lesley 1873:17). A branch Lesley noted as under construction in 1873 was to extend south through Dillsburg to York Springs. The branch was touted to provide access to the hermatite ore on South Mountain (presumably along Mountain Creek) and the east side of South Mountain's magnetic iron ores, or magnetite, found in igneous and metamorphic rocks (Lesley 1873:19).

The Gettysburg and Harrisburg Railroad was incorporated in 1882 to run from South Mountain at Hunter's Run south to Gettysburg. Financed by Jay Cooke, the line was opened to the public in 1884 (Watts 1991:9).

Post Civil War war economic conditions appear to have spurred interest and investment in the South Mountain iron industry as evidenced by construction of the railroads cited above as well as improvements to iron furnaces. Lesley's survey notes renovations to Peter Alh's Big Pond Furnace, with "the stack being raised to 36 feet, with a new hot-blast, building, &c. (Lesley 1873:16)"

He writes that the Carlisle Iron Works, then belonging to C.W. and D.V. Alh, "has been lately extensively improved with new hot-blast and blow-house, additional tuyere, increased blast, &c., and the weekly production of metal raised to 45 or 50 tons. The power is entirely by water, supplied in abundance by Yellow Breeches Creek and a group of powerful springs on the property (Lesley 1873:11)."

The Mont Alto and Caledonia furnaces, discussed below, were also improved during this period. The Panic of 1873, brought on by the failure of Jay Cooke, whose vast holdings included Pine Grove Furnace, brought an end to this optimism.

The technological improvements changing the iron industry which the South Mountain ironmasters sought to make use of included steam engines, puddling, and hot-blast furnaces. All three were made possible by the use of coal which was cheaper and became easier to procure than charcoal.

An improved **steam engine**, invented in England and introduced in Philadelphia in 1801, was increasing in use by 1830, with over a thousand in Pennsylvania. Steam engines replaced water power and enabled mills, furnaces, and manufacturers to locate in urban areas where there was access to labor and transportation. Powered by coal, they were more powerful, more efficient, and could operate year-round. Access to transportation through which the coal could be supplied was a necessity (Eggert 1994:46).

During the 1850s, the iron market shifted toward industrial and railroad uses such as boiler plate, castings, machinery, and rails. These uses required stronger iron materials than could be produced through the old process of hammered iron and led to significant technological improvements to rolling mills. The development of **puddling furnaces** improved the refinement of pig iron and gradually replaced the earlier refining forges. Puddling furnaces used coal and were faster, safer, more efficient, and less costly than hammering pigs into wrought iron at a refinery forge. The key improvement was a furnace design that kept the fuel separate and out of contact from the pig iron allowing use of less pure coal (Eggert 1994:46-47,61).

Rolling mills, of which puddling furnaces were but a part, were growing in number, size, and sophistication throughout the mid-nineteenth century and were replacing forges. By 1849, rolling mills were producing 80% of Pennsylvania's wrought iron. By 1856, it was 90% (Eggert 1994:50).

Hot-blast furnaces using anthracite coal instead of charcoal were developed in the 1830s and increased in use after 1850. In a hot-blast furnace, air is pre-heated before being blown into the furnace. The pre-heated air was found necessary to overcome the coal's resistance to ignition that occurred under cold-blast conditions. The use of coal was about half the cost of charcoal, burned hotter, reduced the fuel needed, allowed higher temperatures, and increased furnace capacity. Hot blast was also added to many charcoal furnaces to increase efficiency, though a bias in favor of clod-blast charcoal iron persisted among some furnace operators and their customers well into the 19th century.

Perhaps most importantly, coal provided by railroad connections freed ironworks from dependence upon the increasingly scarce amounts of charcoal that could be produced from the depleted forests. After the Civil War, coked bituminous coal replaced the use of anthracite. All of the remaining South Mountain furnaces converted to hot-blast following the Civil War and the few new furnaces constructed used the technology as well.

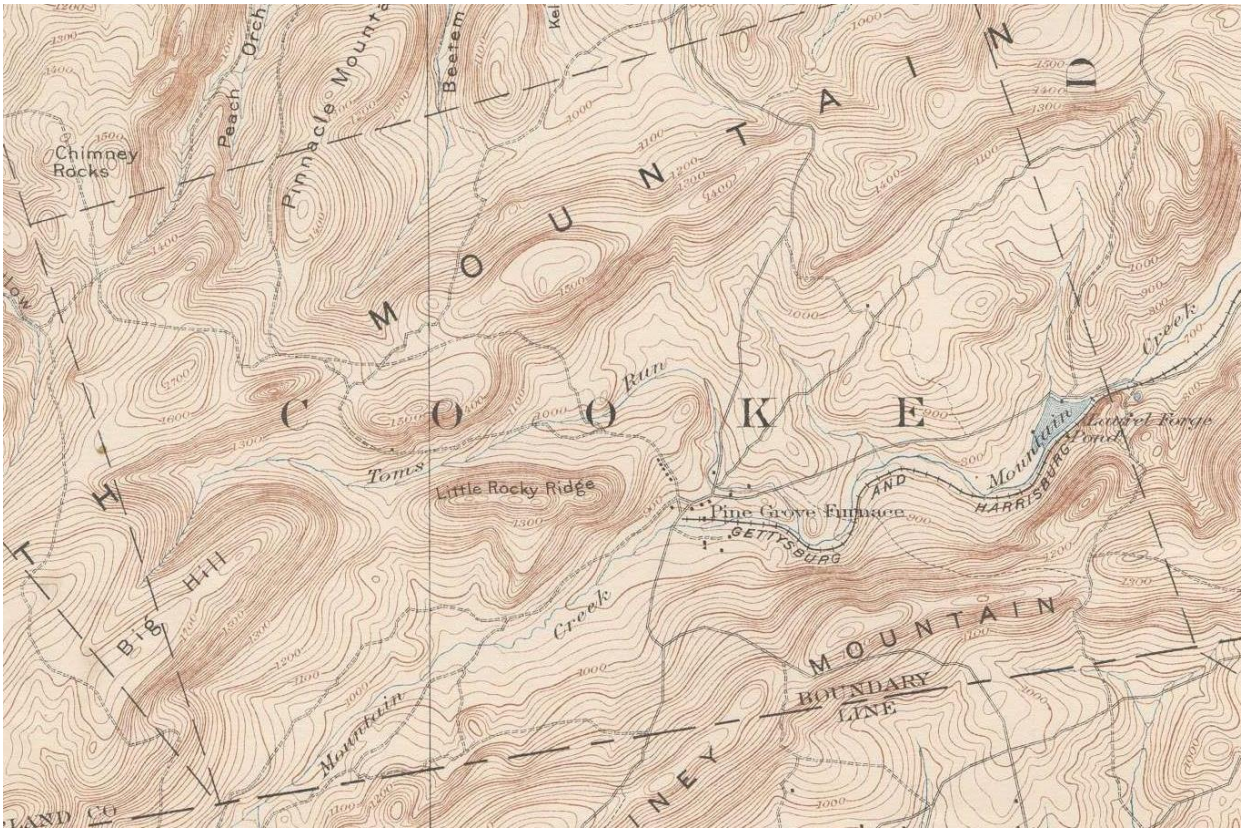
These changes in technology—railroads, steam engines, advanced puddling and rolling mills, and hot-blast furnaces—transformed the iron industry. An overview of the landscapes associated the three South Mountain ironworks most closely associated with Michaux State Forest traces these changes and the eventual end of the iron industry on South Mountain.

Pine Grove Furnace (c.1770-1895)

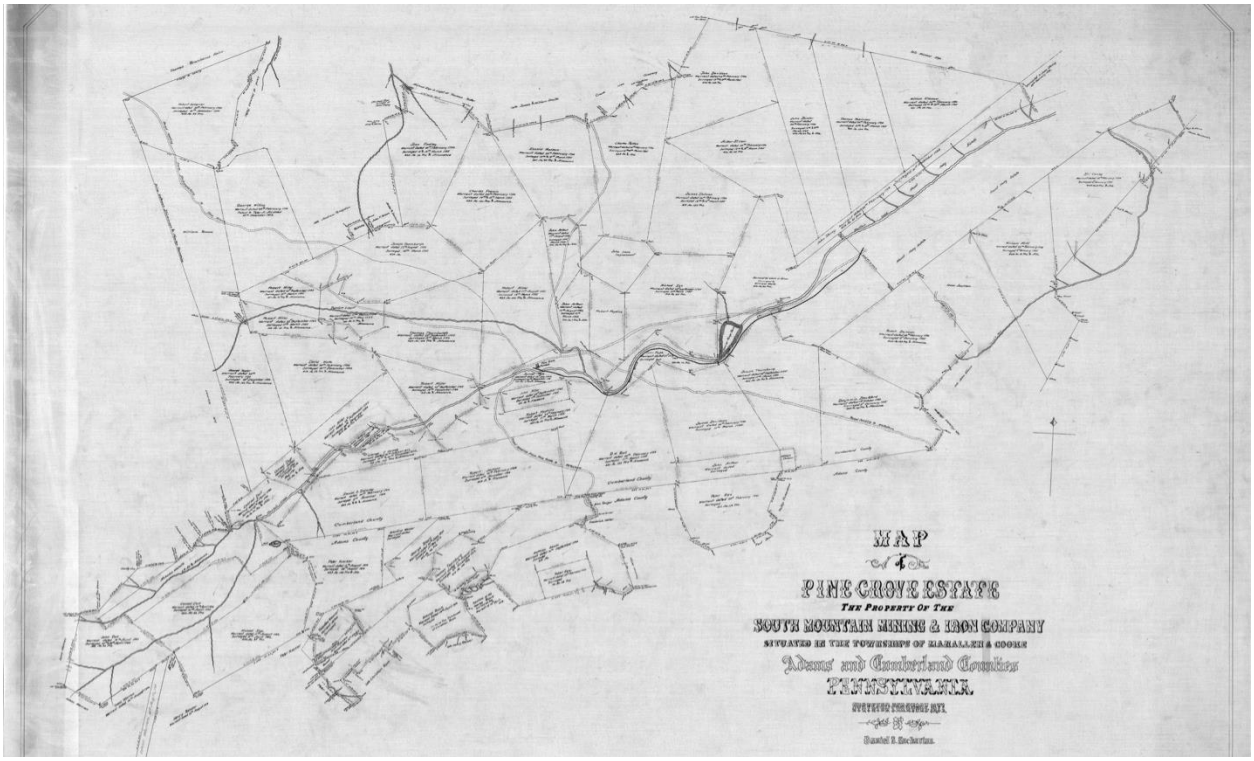
Pine Grove Furnace is located along Mountain Creek in the northern portion of South Mountain and Michaux State Forest. Purchased by the Commonwealth of Pennsylvania in 1912-1913, the 16,869-acre property became the Pine Grove Division of the South Mountain Forest Reserve and was absorbed into the newly formed state forest in 1920. The core of the furnace lands became Pine Grove Furnace State Park.

Pine Grove Furnace is significant as one of the most prominent ironworks in the South Mountain region. Because of its isolated location atop the mountain, Pine Grove established and retained the characteristics of a relatively self-sufficient iron plantation on the model of the classic eighteenth century iron plantations in southeast Pennsylvania. With access to high quality iron ore and extensive forest lands from which to make charcoal for fuel, Pine Grove Furnace was able to last in this mode to the end of the charcoal iron furnace era in Pennsylvania.

Historic maps and photographs document the extent to which the ironworks affected the South Mountain landscape. While the 696-acre state park encompasses much of the historic core of the ironworks, a wide variety of iron industry activities and resources were located on the approximately 16,173 acres outside of and surrounding today's park. Many of the built resources related to the ironworks in both the forest and the park were demolished before and after acquisition by the Commonwealth. However, landscape features related to the ironworks are clearly visible and have been identified by local historians.



Detail of USGS map, Newville Quadrangle; surveyed 1916 (USGS 1900-1919, image courtesy of Andre Weltman)



Map of the Pine Grove Estate 1877; the furnace is located in the approximate center (PA State Archives, Harrisburg, courtesy of Andre Weltman)

The range of historic ironworks resources at Pine Grove Furnace is typical of the types of building and landscape resources outlined above in the chapter. A number of those resources are reviewed below. Pine Grove Furnace has been fairly well studied, though no systematic documentation of its historic resources has been completed. The landscape assessment presented here provides the groundwork for such documentation, which should be undertaken.

In addition, a new detailed history of Pine Grove Furnace should be written using the extensive amount of information and knowledge that has been gleaned by local historians. The historical information outlined below has been obtained primarily from a paper written by local historian Andre Weltman of the Friends of Pine Grove Furnace State Park for the Gardner Digital Library of the Cumberland County Historical Society (Weltman 2015 Pine Grove). Most of the maps and photographs below were also provided by Mr. Weltman and provide a great deal of information about Pine Grove Furnace's historic landscape.

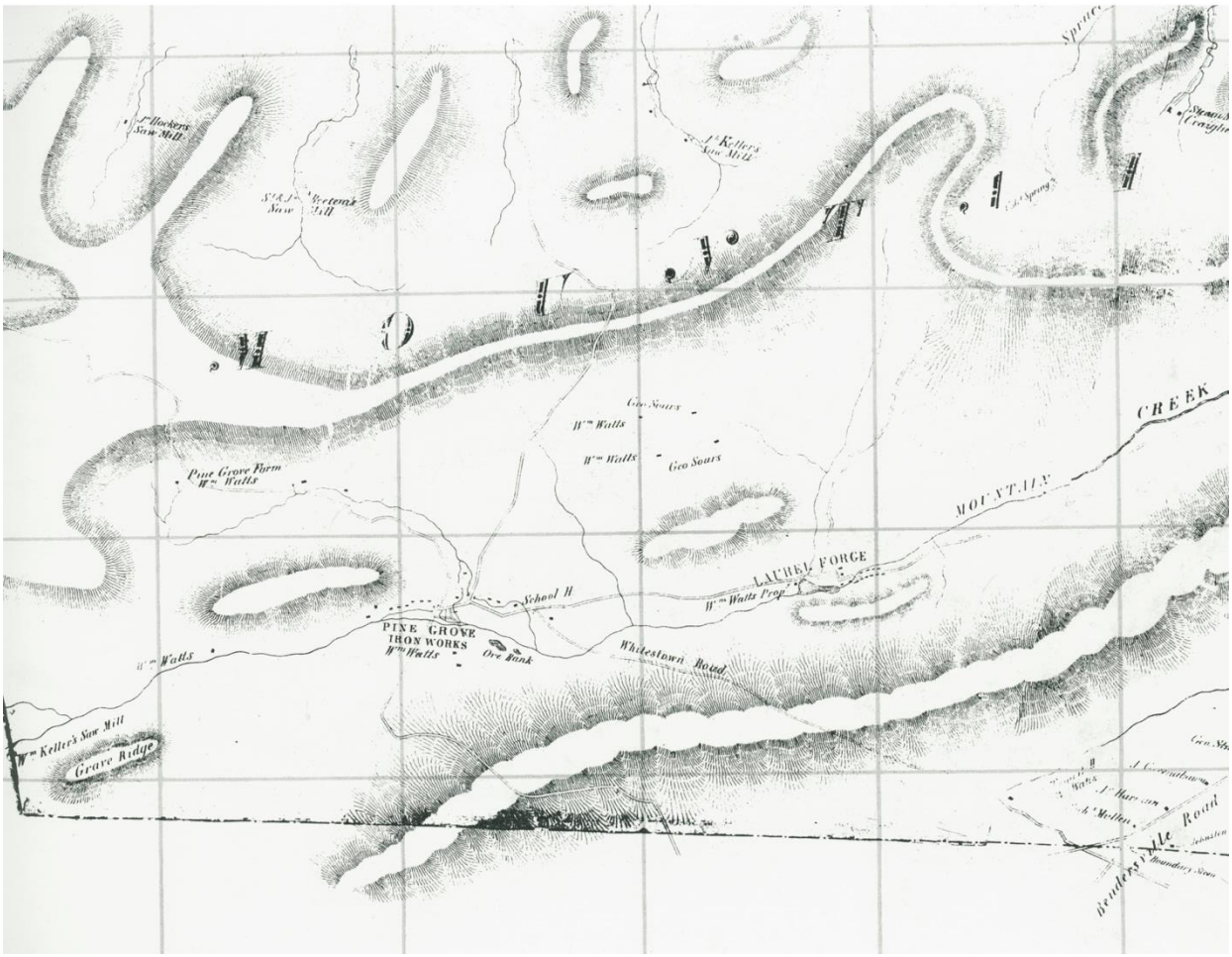
Brief History. The date for initial construction of a furnace at Pine Grove is uncertain but believed to be about 1770. The first mention of a furnace in deeds occurs in 1782. Regardless, Pine Grove remains among the early ironworks in the South Mountain region.

Pine Grove is associated with some of the prominent families of the region involved in iron manufacturing, including Joseph and Thomas Thornburg and Michael Ege who became owners of the property in 1788. Michael Ege became full owner of Pine Grove in 1803, adding to his substantial holdings on South Mountain. By the time of his death in 1815, Michael Ege owned four iron furnaces plus associated forest lands and farms totaling as much as 50,000 acres.

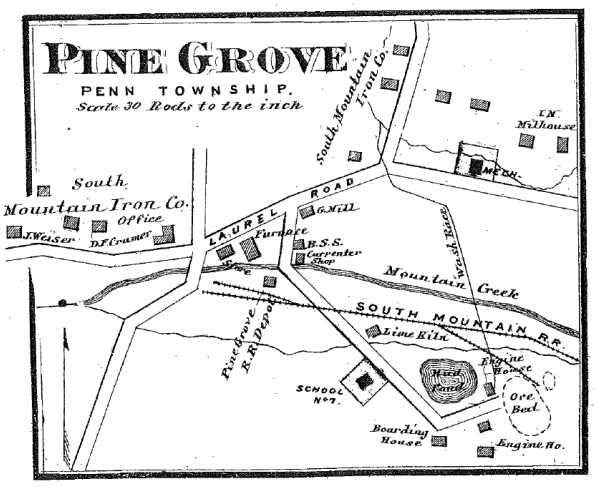
Beginning in 1800, Michael's oldest son Peter took over management of Pine Grove, where he spent most of the rest of his life until his death in 1847. Peter Ege became full owner of Pine Grove Furnace in 1816. He constructed the existing ironmaster's mansion between 1827 and 1829, and Laurel Forge in 1830. In 1835, he sold Pine Grove to his two sons to avoid debt, but he continued to live there. The ironworks went into bankruptcy and was sold at sheriff's sale in 1838, probably due to the national economic downturn in the Panic of 1837.

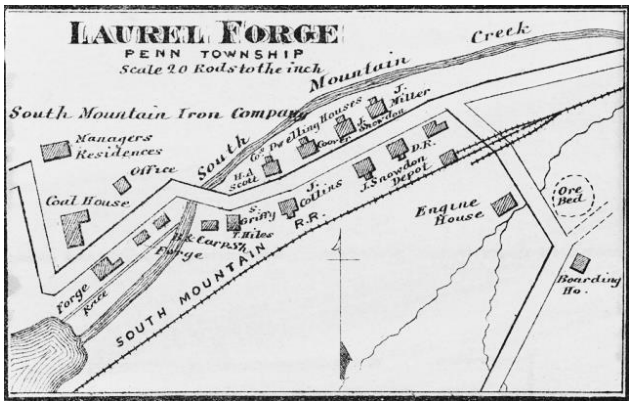
Despite the sheriff's sale, Pine Grove remained associated with the Ege family. The property was purchased in the 1838 sale by Fredrick Watts and his law partner Charles Penrose. Watts was married to Peter Ege's niece, whose father, Peter Ege's brother, inherited the Carlisle Furnace at Boiling Springs. Watts became sole owner of Pine Grove in 1843 but did not ask Peter Ege and his wife, the aunt and uncle of Watt's wife, to leave the brick Ironmaster's Mansion they had built. Peter's sons continued to manage the furnace until 1844, when Frederick Watts sold Pine Grove to his brother William, who moved to the property and managed the ironworks until his retirement in 1864.

William Watts sold the furnace to William Moorehead, who resold it to a newly formed company, the South Mountain Iron Company, controlled by Philadelphia financier Jay Cooke. Moorehead was a business partner and brother-in-law of Cooke, who was the richest man in the country at the time.



Dickinson Township (South) from the Atlas of Cumberland County, 1858 (CCHS)





Pine Grove Furnace and Laurel Forge from Beer's Atlas of Cumberland County, 1872 (courtesy of Andre Weltman)

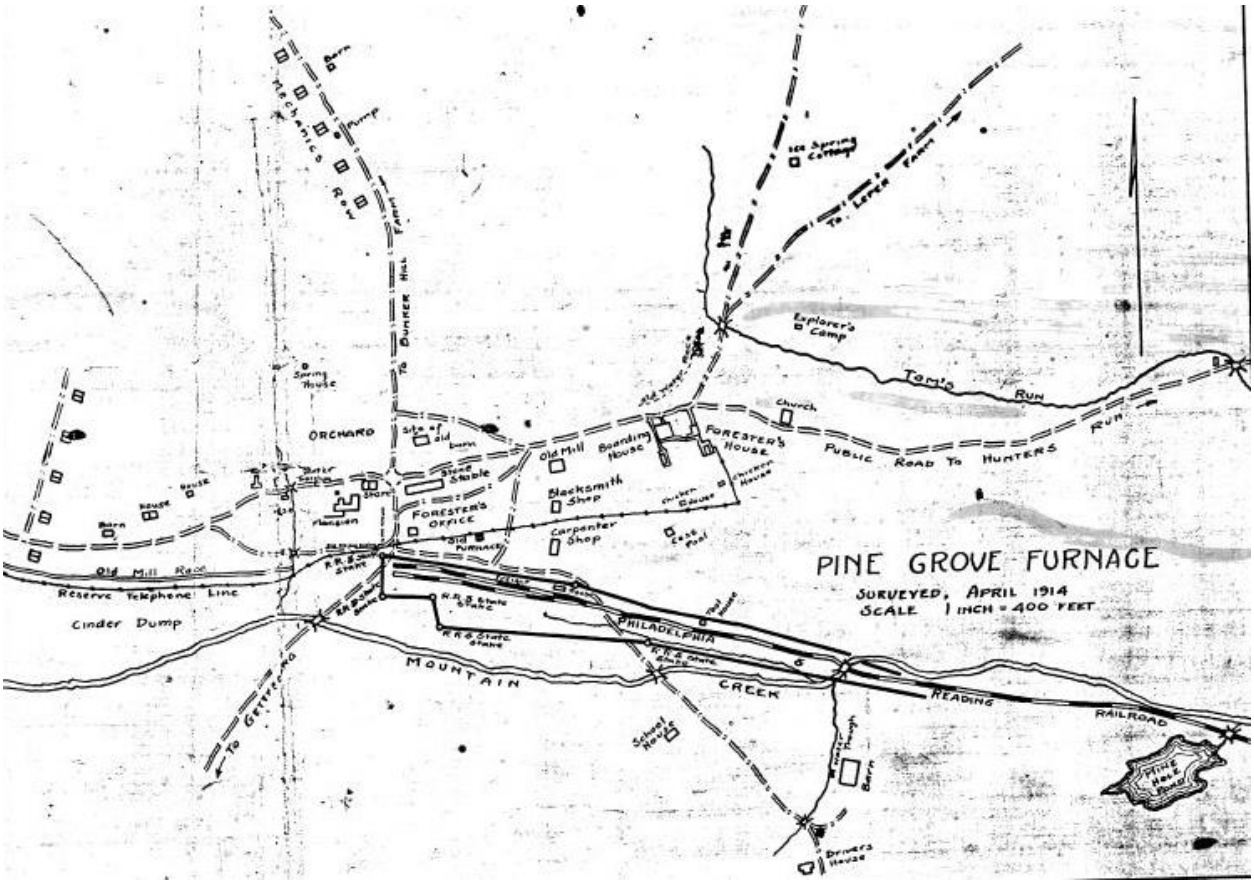
The company chartered the South Mountain Railroad in 1865 to connect Pine Grove to Carlisle. The railroad was constructed in 1868-69 and in operation by 1870. Embroiled in Cooke's financial difficulties, the company was sold to a large conglomerate in November, 1872, which defaulted on its mortgage in the national Panic of 1873, that was largely blamed on Jay Cooke. Pine Grove went "out of blast" in July 1874.

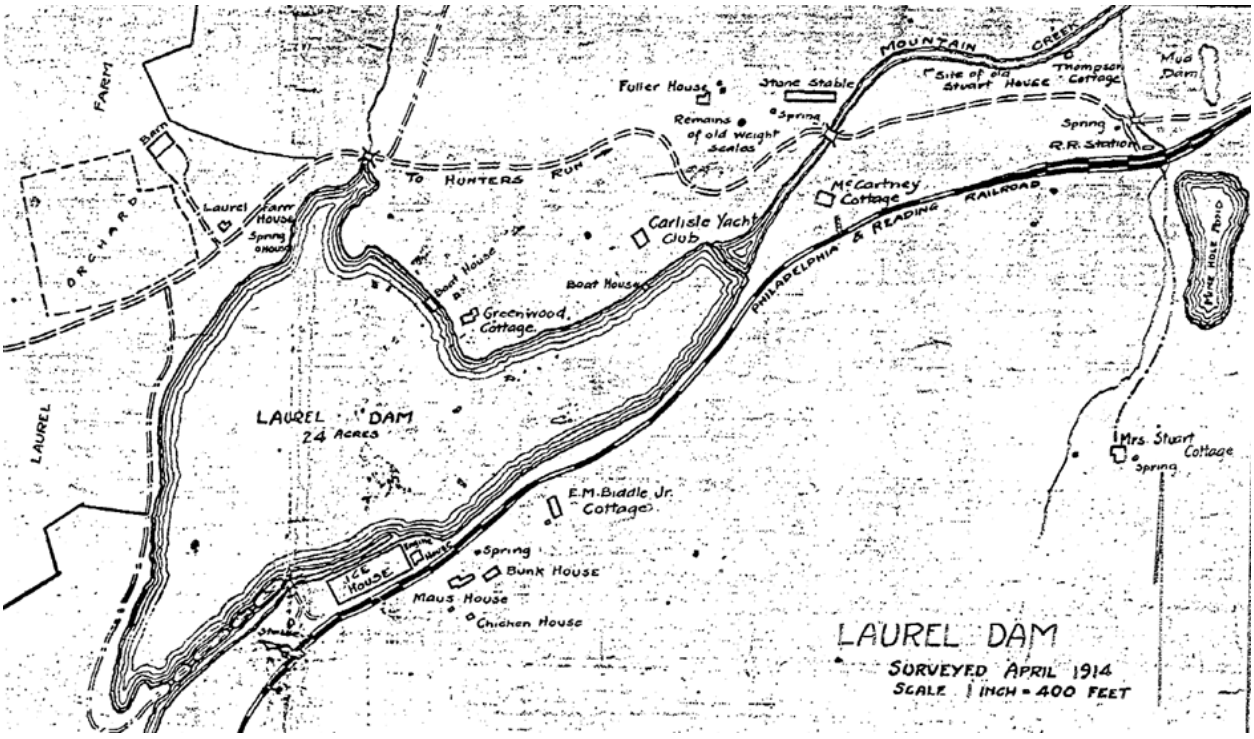
Three years later, Cooke repurchased the ironworks with the furnace's former superintendent, Jackson Fuller, forming the South Mountain Mining and Iron Company. They brought in engineer John Birkinbine to upgrade the furnace in the winter of 1877. The refurbished ironworks went back into operation in 1878 and ran for just five years before being shut down again. The furnace was restarted again briefly in April 1895 before ceasing operations for good. Other uses were sought for the property, discussed further below, before being sold to the Commonwealth of Pennsylvania in a series of sales in 1912 and 1913 (Weltman 2015 Pine Grove).

Property Boundaries. The configuration of property boundaries at Pine Grove Furnace appear to have changed over time with different ownerships and initiatives. It would be interesting to know the sequence of those changes and how they may relate to natural features, the ironwork's story, and the range of historic resources. To date, the only property map available for this study is the 1877 Map of the Pine Grove Estate that was located in the Pennsylvania State Archives in Harrisburg archives by Andre Weltman. Others must exist, particularly a survey of the 16,869-acre property purchased by the Commonwealth in 1913. The Commonwealth did perform focused surveys of the furnace and forge areas in April 1914 (apparently performed in part to mark clearly the right-of-way of the railroad), but a detailed survey of the rest of the large property has not yet been located (Andre Weltman personal communication).

The 1877 map is very interesting and cites land warrants dating from 1762 and 1785 to 1873. Most date to 1794 and involve some of the leading characters in the region's iron industry. The circumstances related to the warrants and changes in property configurations should be investigated.

Wagon Roads. Large-scale landscape features associated with the property include the network of roads upon which the ironworks depended from its founding until 1870. Period maps show eighteenth century wagon roads connecting to Hunter's Run, Carlisle, Shippensburg, Gettysburg, and Whitestown. Some of these roads still exist today as paved roads, such as **Hunter's Run Road** (labeled Pine Grove Road on park brochures and probably the most used historically) and **Route 233** to Carlisle. These roads have been improved for modern automobile use; they should be examined for segments that may have been rerouted. The 1919 USGS map, surveyed in 1916, probably shows older eighteenth century roads most accurately in relation to contemporary maps. Its comparison to available 1937 aerial photographs and current trail maps is telling.





Surveys of Pine Grove Furnace and Laurel Forge in 1914 (courtesy of Andre Weltman)

The **Old Shippensburg Road** has been abandoned as a through road but still exists as a dirt road and trail. It included the current Bunker Hill Road and extended west beyond Camp Michaux before curving back north to meet what is now a segment of Ridge Road. As a dirt road and trail, it probably retains a great deal of integrity in terms of its alignment and physical character from at least the date of the 1916 USGS survey. An upper branch connects to what is now Ridge Road, which is of later construction.

The **Gettysburg (or Bendersville) Road** remains in part as a paved road and in part as a dirt road or trail. Part of it now follows what was the bed of the Hunter's Run and Slate Belt Railroad, discussed below, and the connection from the railroad bed to the top of Piney Ridge appears to have been constructed later, perhaps when Piney Mountain Ridge Road was constructed. The former **Whitestown** (Idaville) **Road** from the state park to Piney Mountain Ridge Road appears to remain as a segment of the Appalachian Trail. Beyond Piney Mountain Ridge Road, it exists as a dirt or gravel trace.

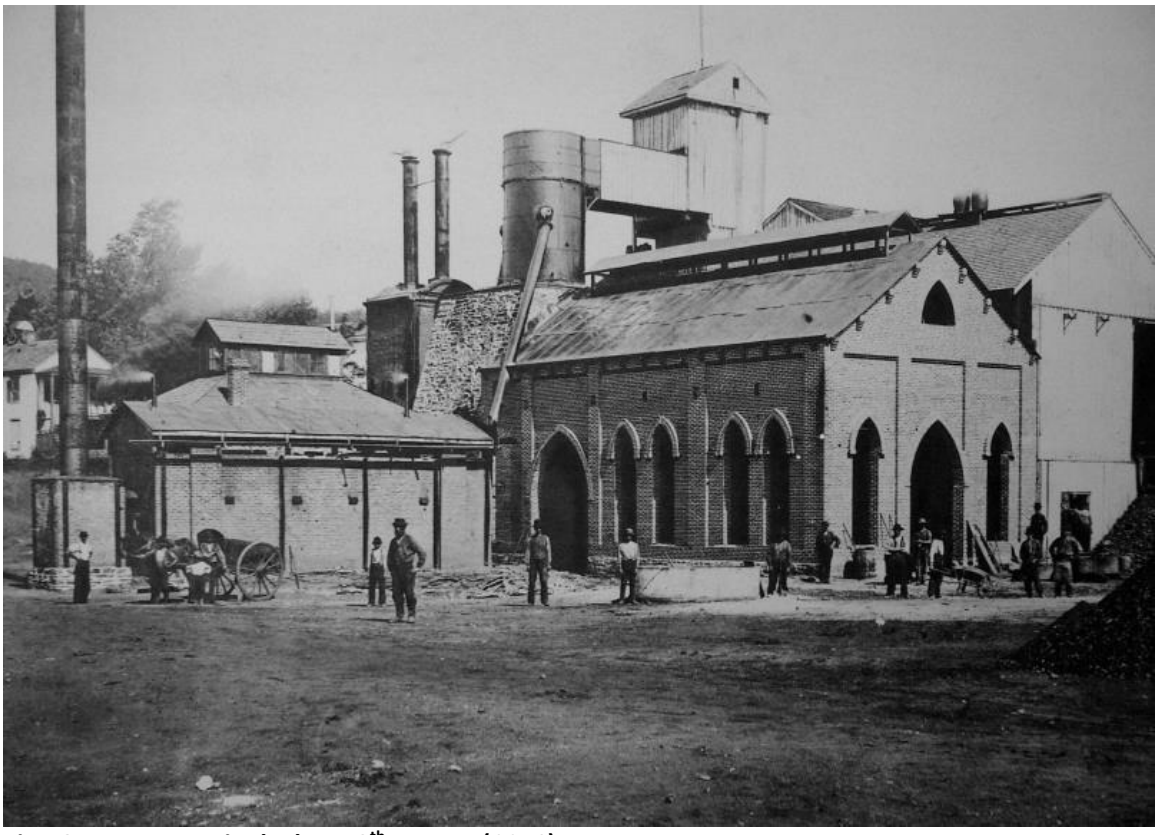
Other roads and trails from the 1900-1919 USGS maps of South Mountain (Leeper Road, Buck Ridge Trail/Daugherty Road, Cold Spring Road, others) appear to still remain as well and probably retain high integrity from their eighteenth century configuration and character (USGS 1900-1919). Michuax Road and most of Ridge Road, Piney Mountain Ridge Road, Michaux Road, and others were constructed by the CCC and were in existence by late 1937, as shown on aerial photographs.

Other trails and other features show clearly on the 1937 aerials and could be eighteenth century remnants. More about all of these roads, how they were used, and when they were constructed should be investigated.

Railroads. The opening of the **South Mountain Railroad** by 1870 connecting Pine Grove to Carlisle was essential for the furnace's survival but failed to make the operation viable for more than a couple of decades in the face of the massive changes to the industry nationwide.

The portion of the South Mountain Railroad reaching all the way to Pine Grove Furnace was abandoned in March, 1940; to Laural Lake in 1955; and service from Hunter's Run toward Toland ended in 1961 (Watts 1991:16; Andre Weltman personal communication). Today, the remaining railroad bed from Laurel Lake to Fuller Lake is paved as Old Railroad Bed Road to its intersection with the Appalachian Trail. Beyond the Appalachian Trail, the bed continues as a trail, becomes the beach along Fuller Lake and extending on toward the vicinity of the furnace stack. The portion of the railroad bed east from Laurel Lake toward Hunter's Run had existed as a trail but has been closed by local landowners, been neglected, and become mostly impassible.

The extension of the **Hunter's Run and Slate Belt Railroad** south of the park still exists in various forms. Immediately out of the park, crossing Murphy Road, it does not appear on current maps but may be traceable in the woods. It is then picked up as a portion of Bendersville Road and continues on as Slate Quarry Road, which is actually a multi-use trail. The railroad bed then crosses Piney Mountain Ridge Road and descends Piney Ridge toward Wenksville as Old Railroad Road, which is a dirt and gravel road that passes the site of a former slate



Pine Grove Furnace in the late 19th century (CCHS)

Pine Grove Furnace circa 1914 (CCHS)

quarry belonging to the Pine Grove Furnace ironworks and Jackson Fuller Brick and Slate Company.

Charcoal. Most of the approximately 20,000 acres comprising the eighteenth century Pine Grove Furnace property was used to supply charcoal to the furnace and forge. As discussed above and in Chapter 6 and as can be seen in late eighteenth century photographs, the repeated cutting of trees and charcoal processing devastated the forest. Thousands of **charcoal hearths** remain as features in the landscape throughout the forest. Together, they represent an important set of historic resources.

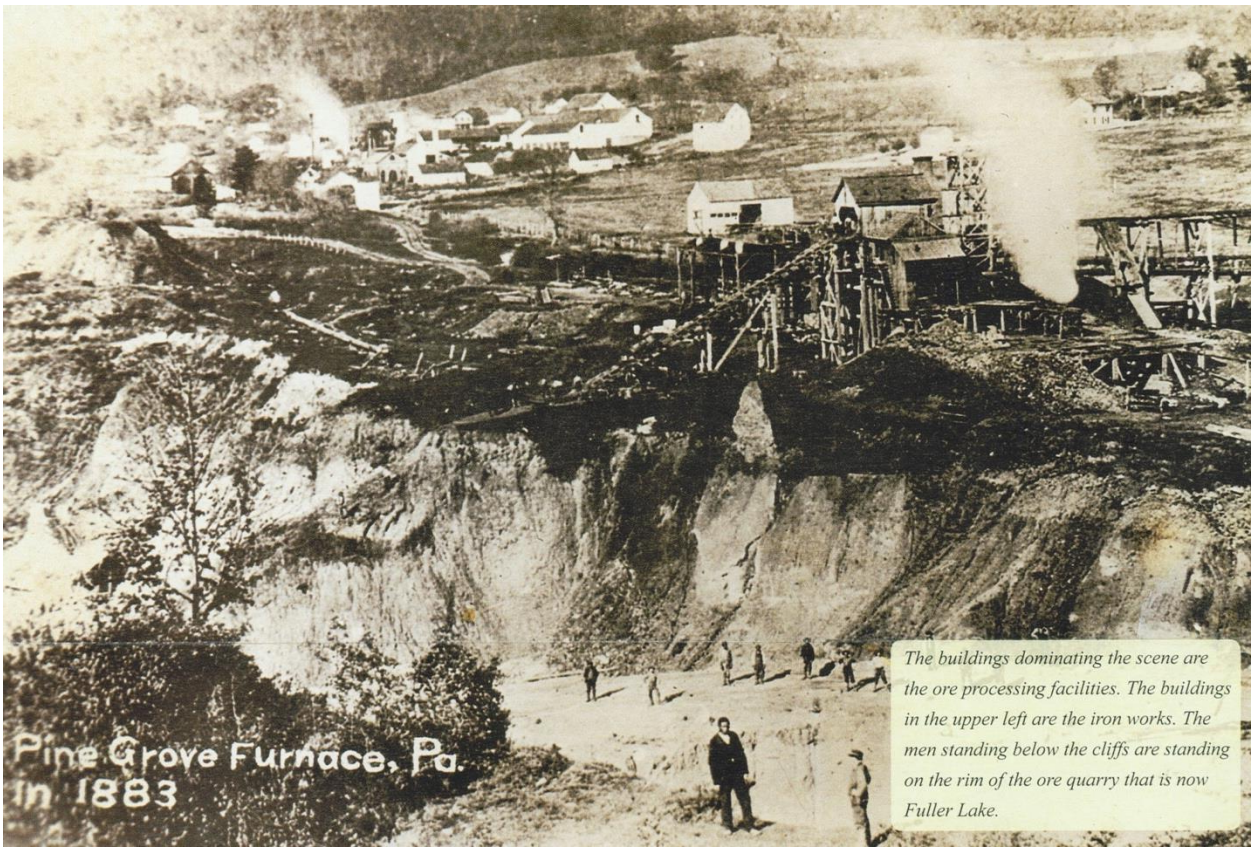
Historic **logging trails** and wagon roads must have connected the charcoal hearths and areas where wood was harvested, and the hearths to the furnace itself. These may still exist and form the basis for the network of trails and logging roads existing today. Further detailed examination of the distribution of charcoal hearths and trails using the LiDAR imagery and field work might shed light on the organization of the eighteenth century charcoal operation. It is not unusual to encounter remnants of charcoal heaths along the edges of modern trails and loggin roads. Sometimes today's paths and tenting areas are set in the middle of hearths because the flat space created for charcoaling remain as a convenient smooth area more than a century later (Andre Weltman personal communication).

Iron Ore Banks. In the folding and faulting that occurred during the Alleghenian Orogeny about 300 million years ago, a large block of Tomstown dolomite was thrust up and intermixed with the older sandstone and metarhyolite formations of South Mountain. As the mountain eroded, the dolomite became exposed as the valley of Mountain Creek. Iron ore deposits formed as limonite in the residuum that accumulated at the fault line between the dolomite and the sandstone of Piney Ridge. These iron ore deposits were the primary reason for the establishment of Pine Grove Furnace in the heart of the mountain.

Iron ore was mined at four locations at the ironworks. The largest was **Pine Grove No. 1 Bank** located adjacent to Mountain Creek and depicted in period photographs. By the 1890s when mining there ended, the pit had been worked to a depth of about 90 feet. It exists today as Fuller Lake. A second, smaller **Old Bank** is located to the southwest. Some 19th century sources also refer to **Pine Grove No. 2 Bank** a short distance east of Fuller Lake (Andre Weltman personal communication).

Downstream are two ore mines in the vicinity of Laurel Lake. **Laurel No. 1 Bank** is located just downstream from the lake to the southeast of the railroad bed. Pine Grove depended largely upon the ore from this mine in the mid-1880s. Smaller **Laurel No.2 Bank** is located about 300 yards further southeast and closer to the mountain and was worked from 1878 to 1881.

Two additional ore banks were tested and/or mined southwest and upstream of the furnace. The Thomas Iron Company's smaller **Red Bank** was opened in 1874 less than a mile south of the furnace, near the modern state park campgrounds (note that two different pits in that area were described as the "Red Bank" in later geology reports). Iron ore from Red Bank was sent elsewhere in the mid-1870s as



1883 view of the iron ore bank, now Fuller Lake (CCHS; Pine Grove Furnace State Park brochure; Flower 1933:16)

Detail of aerial photograph of Pine Grove Furnace State Park, flown October, 1937 (PSU 1938)

smelting at Pine Grove had temporarily ceased due to the Panic of 1873 (Andre Weltman personal communication).

The **Wild Cat Pits** two miles southwest from the furnace upstream along Mountain Creek were explored in 1880 and were unusually rich for the area (50% iron, versus typically 42% to 44% in deposits closer to the furnace). A plan to extend the railroad to these pits was publicized (Gettysburg Complier, December 2, 1880). However they contained too much phosphorous (1.3%) to yield good pig iron, and the Wild Cat beds were never developed. Over a dozen deep test pits at this site are still visible, including a few with timber mine props still intact from the 19th century and leading into horizontal "drift" mine entrances, an unusual feature for Pine Grove Furnace mining operations (Andre Weltman personal communication).

Two mines near Hunter's Run also supplied ore to the works. In later years, construction of the railroad allowed Pine Grove to bring in ores from more distant locations, as the ore bank near the furnace was filling with water and not able to provide a consistent supply (Watts 1991:21-26; Weltman 2015 Pine Grove; d'Invilliers 1886). All of these features remain visible in the landscape.

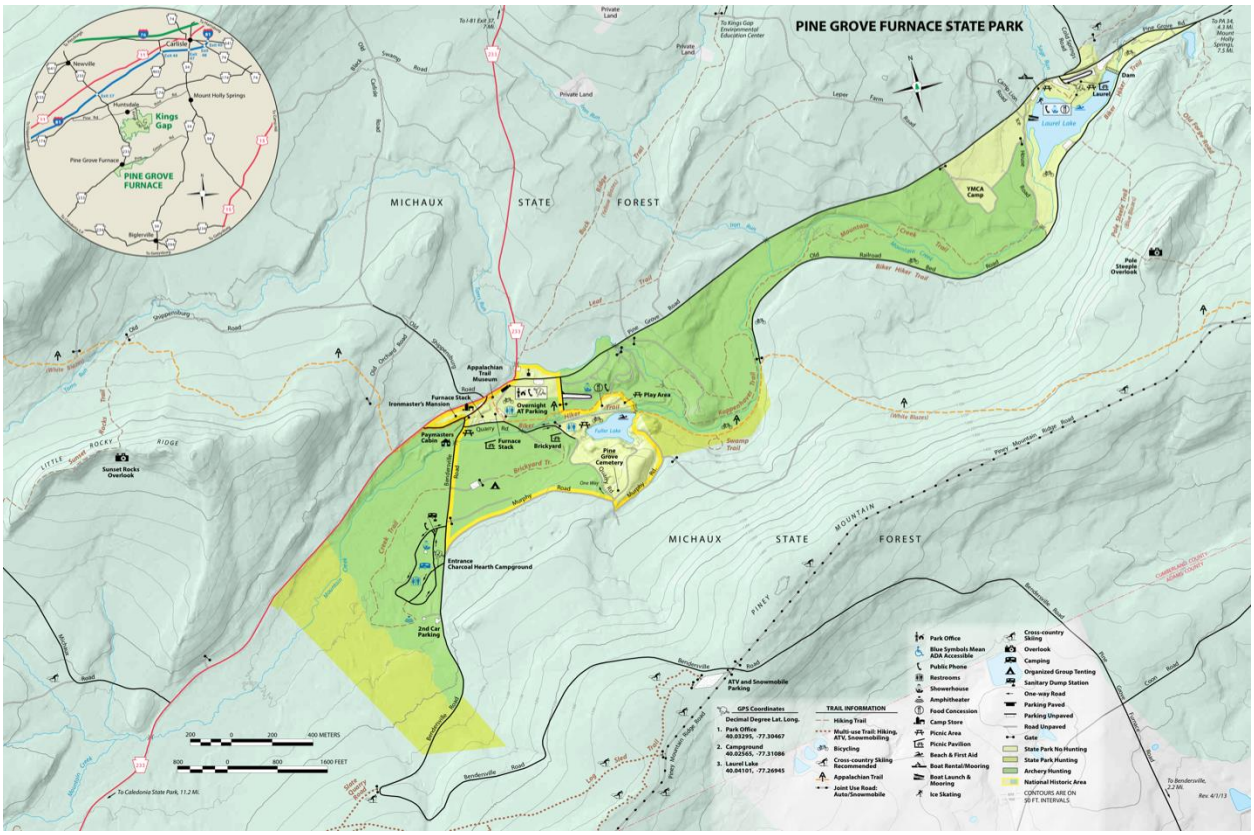
Tailing piles and slag dumps are a significant part of the landscape associated with all of the ore beds mentioned above and later in this chapter. Many have been identified, but others that have become wooded may be less apparent and should be surveyed both on park and state forest lands. A very large slag dump, as much as 50 feet tall, extends for approximately 100 yards along the north bank of Mountain Creek just south of the Mansion and is still visible today (Andre Weltman personal communication).

Limestone Quarries. A large limestone quarry about five acres in size is located to the south of Fuller Lake ore pit and provided limestone for use as flux in the furnace. Another, smaller quarry about three quarters of an acre in size is nearby. Stone from these quarries was mined and shipped out in large quantities even after the shut down of the iron operation. Today, a few exposures of the limestone are visible around the edges of the larger quarry (Watts 1991:25; Way 1984:13,15).

Water Power. Pine Grove Furnace and Laurel Forge both depended upon water power provided by the flow of Mountain Creek. The landscape features created to harness this power are significant historic resources warranting recognition and preservation.

Pine Grove was among the last furnace in Pennsylvania to still use an outmoded waterwheel system to power its air blast machinery. In late 1877, when engineer John Birkinbine arrived to modernize the iron operation, he found an old waterwheel and pair of blowing tubs in place. Birkinbine replaced them with a steam engine.

The remnants of a headrace powering the waterwheel at the **furnace** exist between Mountain Creek and Route 233. The headrace is labeled on the 1914 survey of Pine Grove and is clearly evident in the field beginning about 450 yards upstream of the furnace stack. At this point, the race is at an elevation at least 15 feet higher than the creek, enough to provide the needed head of about 16 feet



Historic landscape resources related to Pine Grove Furnace are present on state forest lands beyond the boundaries of Pine Grove Furnace State Park (DCNR official state park map)

once the water reached the waterwheel further down-flow. The water was presumably carried by an elevated wooden trough from this point to the furnace.

The headrace can be easily traced for about 200 yards, and discontinuous traces of the race can be followed about nine-tenths of a mile to a point where it appears to diverge from Mountain Creek. There is no indication of a dam, which suggests that the flow of Mountain Creek was strong enough and reliable enough to power the furnace operation. Further investigation is warranted. A tail race, still easily visible today, is located south of Quarry Road and connects back to the creek (Weltman 2013 Water Race). Both the headrace and tail race are entirely within the state park property.

A second headrace that powered a waterwheel in the **grist mill** parallels the north side of Route 233 and connected to Tom's Run four-tenths of a mile from the intersection of Route 233 with Pine Grove Road at the park office. This race is also shown on the 1914 survey and is located on state forest property. The tail race from the grist mill no longer exists. It is possible that this race was initially used to power the furnace before construction of the mill (Weltman 2013 Water Race).

Water was used to power an overshot wheel which hauled water out of the **Pine Grove No. 1 Bank** ore bank, now Fuller Lake. A portion of the headrace remains in fair condition from its origin at Mountain Creek near the park's family campground, across Bendersville Road and continuing past the group

campground eastward to Quarry Road where an overhead flume may have taken water the final 100 yards to the western edge of Fuller Lake. The remains of a foundation and tailrace for the wheel are still visible today off Quarry Road, just south of the Brickyard Day Use Area parking lot (Berman 1976:7-3; Andre Weltman personal communication).

Laurel Forge was operated using two water wheels that were supplied with water through construction of a large dam across Mountain Creek to create Laurel Forge Pond, the site of today's Laurel Lake. The site of the dam was located 60 feet upstream from today's dam, which was constructed in 1968. The original 1830 timber crib dam, constructed of logs and stones with a dirt layer on the upstream side, failed at least three times, in 1847, 1889, and 1919. Each time it was rebuilt. The lake was used to commercially harvest ice beginning in the 1880s. An ice house was located along the south side and is visible in the 1914 survey (Weltman 2015 Pine Grove). The location of the forge is today a gravel parking lot next to the modern dam, and the foundation of the ice house is now a small parking lot for the Pole Steeple Trail on the south side of Laurel Lake. These features are within the state park property.

Ironworks. The core of the ironworks was an area of intense use and is the center of Pine Grove State Park today. Late eighteenth century photographs show that this area had an agricultural/industrial character with limited vegetation, as might be expected of a classic iron plantation. Period maps suggest how the site developed over time, with new structures and features added and some removed. Most useful are the 1872 maps of the furnace and Laurel Forge areas in comparison with the 1914 surveys that were undertaken after purchase by the Commonwealth. What is currently Route 233 was relocated from south to north of the Ironmaster's Mansion between these times.

The furnace area may be considered to have five zones of activity or use, extraction, processing/refinement, support, administration, and community. As is typical of the core of an iron plantation initially laid out in the eighteenth century, these zones are tightly packed and overlapping. Specific buildings, structures, and landscape features associated with each zone changed over time. They include features mentioned in other parts of this section, such as the ore banks, water power system, and railroad. Internal roads connected various structures and areas of activity.

In general, the features were laid out downhill to uphill—extraction to processing/refinement to community. But it is complex, overlapping, and interwoven. The three primary landmarks around which other features are organized are Fuller Lake (Pine Grove No. 1 Bank), the furnace stack, and the Ironmaster's Mansion.

The core of the furnace area has been listed on the National Register of Historic Places and is described in its 1976 nomination form (Berman 1976). The nomination provides an inventory of structures and sites that is probably incomplete. Building upon information shown on the historic maps and research that has been undertaken, detailed period maps should be prepared for both the combined furnace and Laurel Forge areas. The maps should include features on

both state park and state forest lands and should illustrate how the site functioned. Based upon available maps and projecting earlier, the periods 1815, 1858, 1872, and 1914 are suggested.

Most of the core activity and resources were located within what is now the state park, but others, especially residential areas along Old Shippensburg Road and Route 233, were located on what is now state forest lands. In addition to buildings, these included a range of domestic and other landscape uses. They also tie to the other quarries, farms, roads, woodlands and other landscape features discussed here.

Farms. Pine Grove Furnace is believed to have included five farms that were probably used to support workers and families living at the ironworks. In this activity, Pine Grove exhibits characteristics of a classic eighteenth century iron plantation in being as self sufficient as possible. In later years, the farms were operated by tenant farmers. An 1887 lease agreement stipulating terms for management of three of the farms is in the collection of the Cumberland County Historical Society (Bland 2004:16). All of the farms warrant further investigation with respect to their agricultural use.

The farms were located in areas suitable for cultivation and pasture within the estate. Four of the five farms are shown in the 1937 aerial photograph reproduced in this chapter. **Furnace Farm** (also known as Home Farm) is believed to have been associated with the core furnace property, probably north and uphill from the mansion and works. Significant parts may also have been to the south of the mansion. A barn, spring house, orchard, and possible farm house are labeled in this vicinity on the 1914 survey. Areas around Pine Grove today that are planted in tall pines in dense regular rows were probably farmland replanted by the government later. A number of these areas can be identified.

Laurel Farm was part of the Laurel Forge site and is labeled as such on its 1914 survey with a farm house, spring house, barn, and orchard. It was located in the vicinity of today's Camp Lion Road. Neither area has been surveyed in the field for this report, and it is not known what farm-related structures or landscape features may remain.

The 1938 aerial photograph shows two other farms as well. **Black Swamp Farm**, was located along the west side of Route 233 approximately three-quarters of a mile to a mile north of the park intersection. **Leeper Farm** was located to the top right in the photograph along Leeper Farm Road just west of Buck Ridge Trail (former Daugerty Road) just over a mile north of the park (locations provided by Andre Weltman, personal communication). A private inholding exists on a portion of the former Leeper Farm. It is not known whether any historic building or landscape features remain on these two farms, however there are stone foundations at the upper end of Leeper Farm Road that are presumably from a barn or farm house (Andre Weltman personal communication).

Bunker Hill Farm (also known as Gardner Farm) was located along Old Shippensburg Road and is now accessed from Michaux Road. On the 1858 map reproduced in this chapter the site is labeled Pine Grove Farm. This was the site of the Civilian Conservation Corp's Pine Grove Furnace Camp S-51. During World

War II, it was converted into Camp Michaux, a POW interrogation camp. The primary camp facilities were located on the west side of Michaux Road, which were probably fields and orchards during the farm use. On the east side of the road is the ruin of the stone barn, which had one wall standing until the spring of 2016 when it collapsed. The site of the farmhouse is easily visible today, though its foundations were modified in the POW era. The locations of other outbuildings are probably also remaining here. Old Shippensburg Road, now called Bunker Hill Road, is a dirt trail east-west just downslope from the barn. The Pine Grove Furnace CCC camp and Camp Michaux are discussed in Chapter 8 of this plan.

Additional Features. A number of additional features are related to the iron furnace in the vicinity of Pine Grove. A small, former quarry is located on state forest land along the northeast side of Old Shippensburg Road about three-tenths of a mile north of Route 233. Situated in the metarhyolite formation, this pit was used to mine **talcose schist**, a soft somewhat greasy feeling rock (locally known as soapstone) that was used to line the interior of the furnace in its early years of operation (this function was later fulfilled by fire brick). Its refractory characteristics resisted the intense heat generated within the furnace and helped prolong the life of the structure (Way 1986:13,15; Andre Weltman personal communication).

A series of eighteenth century **iron ore banks** are located along Hunter's Run Road in the vicinity of Toland. These ore banks are discussed in and appear on d'Illvillier's 1886-87 map and report (D'Illvilliers 1886; Way 1986:12,25; Watts 1991:21,23). Five ore banks along the south side of the road west of Toland may be within the boundaries of the state forest. Four ore banks on the north side of the road and creek above Toland are on private land and were being mined in the 1880s. The ore bodies were irregular and mixed with white clay, which was a nuisance because of the large volumes of water needed to remove it (Way 1986:25).

However, the full value of the **white clay** for use in the manufacture of paper, brick, tile, and white cement was realized in the early 1900's, at which point the white clay began to be actively mined (Way 1986:25). This mining of clay in the vicinity of Toland is discussed further later in this chapter.

However, in 1891, the Pine Grove owners formed the Fuller Brick and Slate Company to exploit the **clay and slate** resources in the Pine Grove area. Four hundred acres were deeded over to the new company from the South Mountain Mining and Iron Company and a brick works was established at Pine Grove west of Fuller Lake (Pine Grove No. 1 Bank). The brick works used white clay mined from the Pine Grove area (mostly Laurel No. 1 Pit, where as much as 30 feet of clay overlaid the iron ore) as well as from the vicinity of Toland and Mount Holly, manufacturing decorative white and colored brick, fire brick, and paving brick. At its peak, the firm operated three kilns and employed thirty workers. In 1913, the land was deeded back to the iron company for sale to the Commonwealth. The brickworks was used as a stable by the Forestry Department and may be the building west of the lake (Mine Hole Pond) labeled "Barn" in the 1914 survey. It was later torn down, and and the only remains are two concrete pads near the

picnic pavilion on Quarry Road (Watts 1991:30; Andre Weltman personal communication).

The **slate quarry** was located over the ridge of Piney Mountain as was the destination of the Hunter's Run and Slate Belt Railroad that extended up and over the ridge from Pine Grove. As noted in the discussion of railroads above, the bed of this line remains as portions of existing roads and trails today. Prior to the building of the railroad extension over the mountain, the slate was hauled out on wagons by way of Arendtsville. The slate was mainly used by the brick operation. An effort was also made to sell it for mantels and roofing, but the operation was never prosperous. In 1907, four miles of track running from Pine grove to the the Slate Belt were torn out (Watts 1991:29-30.52,59-61; Andre Weltman personal communication). The railroad and the slate quarry appear to be on state forest land.

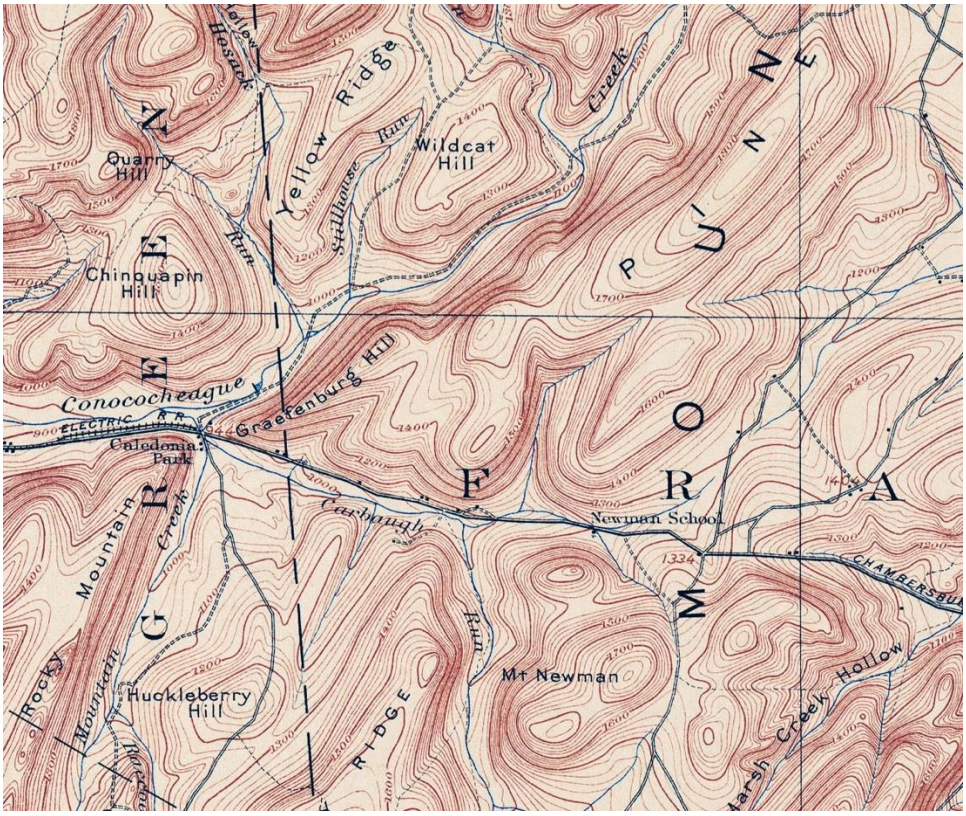
Borrow pits have been dug into the sandstone on the west side of Piney Mountain in the vicinity of the furnace, southwest of the Ironmaster's House. The **sand** quarried here and from other locations may have been used for molds in the ironmaking process and possibly for brick. More recently, it has been used as a top-dress for hauling roads within the forest (Way 1986:24; Anthony 2014 Road Log 4,6).

Caledonia Iron Furnace (1837-1870)

The site of the former Caledonia Iron Furnace is located at the western end of the gap in South Mountain through which today's Route 30 passes. This historic gap and road are the primary route traversing South Mountain, connecting Gettysburg with Chambersburg.

The furnace was sited at a location where Conococheague Creek drops down from the hills to the north and could be dammed to provide water power. Ore banks were located along the base of the mountain to the west, and wood for charcoal was available on the mountain. The core of the ironworks is now located within Caledonia State Park. Purchase of the vast ironworks property by the Commonwealth in 1903 established the central portion of today's Michaux State Forest.

Caledonia is significant as one of the principal ironworks operating on South Mountain and through its association with Congressman and abolitionist Thaddeus Stevens. Documented as a site on the National Underground Railroad Network to Freedom, Caledonia is thought to have been part of the Underground Railroad connections within the region and supportive of local black communities (Harris 2008).

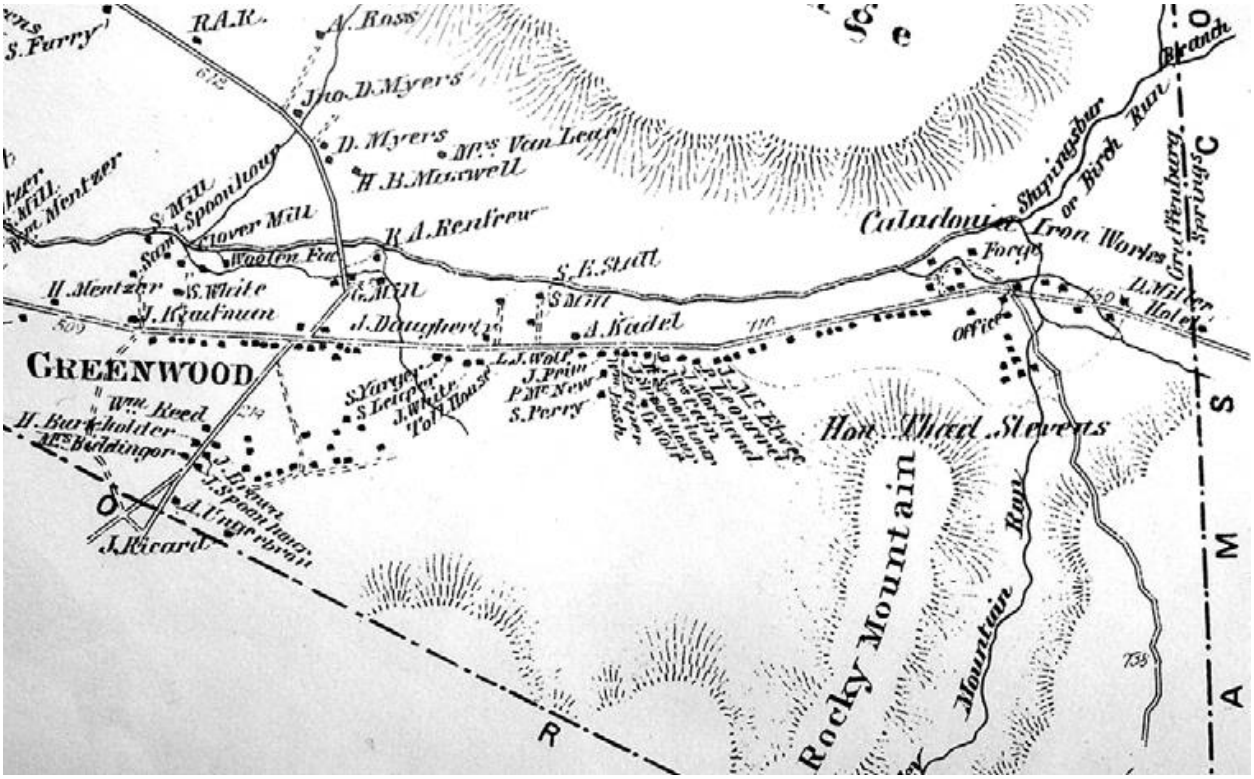


Detail of USGS map, Fairfield Quadrangle, showing the Caledonia Furnace area (left) and Chambersburg Pike Gap, surveyed in 1885 and 1908 (USGS 1900-1919)

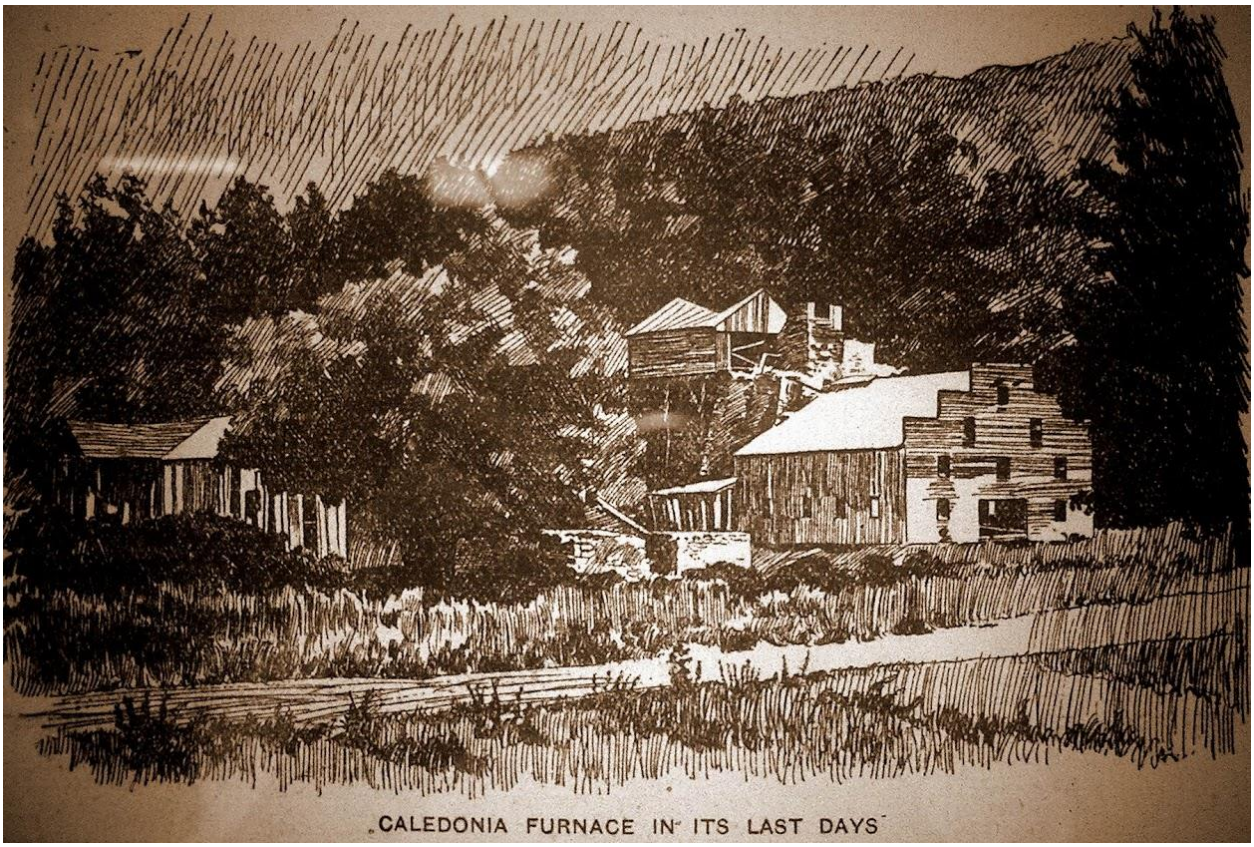
Brief History. In 1828, Thaddeus Stevens, James Paxton, and two other partners constructed Maria Furnace southwest of Fairfield in Adams County. The furnace struggled, however, in part because of the poor quality of iron ore on the east side of the mountain. Stevens and Paxton bought out the other two partners and established a long-running business relationship, with Paxton running the works.

In 1830, Stevens built Mifflin Forge at the Caledonia site to process ore from Maria Furnace. The location and sixteen-mile distance from the furnace, however, suggest that the forge was the beginning of a plan for the future. The forge and adjacent blacksmith shop burned in November 1833 in two separate events, possibly arson related to a long-running land dispute with the Hughes family, owners of Mont Alto Furnace. The forge and shop were rebuilt, and a "big house" was also added to the complex (Hoch 2005:202-204).

Stevens and Paxton constructed Caledonia Furnace at the forge site in 1837. In 1839, a washout from a rainstorm exposed the Pond Bank iron ore deposit southwest of Caledonia. Paxton and Company bought the deposits, and African Americans who lived south of Greenwood in a small village known as Africa mined the ore. According to Caledonia's manager, Pond Bank's ore was used almost exclusively during the last ten years that the furnace was in blast (Hoch 2005:205-206). A community of African Americans living on Yellow Hill northeast of Caledonia produced charcoal for Pine Grove Furnace and may also have sold charcoal to Caledonia (Hoch 2005:203).



Beers Atlas of Franklin County, 1868 (Harris 2008)



1895 sketch of Caledonia Furnace from Mira L. Dock's *Thaddeus Stevens as Ironmaster* in The Philadelphia Times (TSS Files; reproduced in Harris 2008)

Maria Furnace ceased operations in 1838, and the partners focused their efforts on Caledonia. The company struggled financially, and in 1848, Stevens bought Paxton out. During the 1850s, Caledonia's superintendent is reported to have actively participated in the conveyance of fugitive slaves from the village of Africa to Pine Grove Furnace (Hoch 2005:206-208; Harris 2008:7).

In 1852, Stevens and another partner constructed a rolling mill three quarters of a mile west of the furnace along the creek. The furnace produced nail rods, wagon tires, and plowshares in addition to the boiler plate that Caledonia had produced for years. The also built a second forge near the rolling mill (Hoch 2005:208).

The operation continued to be financially strained until the beginning of the Civil War, when iron products became in high demand. In June, 1863, however, the Confederates burned the furnace, rolling mill, and forges on their march to Gettysburg. Stevens had been there at least a few days before the Confederates arrived and is reported to have escaped north by horse in the direction of Pine Grove Furnace (Hoch 2005:208).

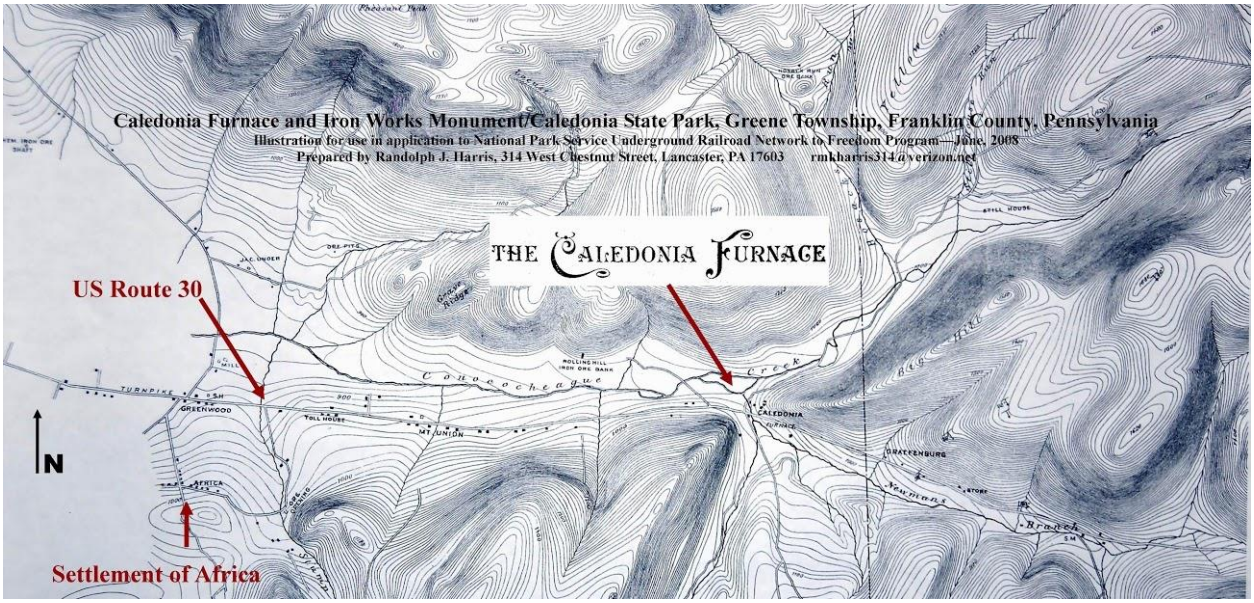
Stevens' superintendent authored a long list of buildings and goods lost. Buildings included a forge house, chaffery forge, rolling mill, two blacksmith shops, furnace, furnace run-out and bellows, furnace house, furnace wheel shaft, bloom forge, run-out at the forge, forge coal house, two other coal houses, smoke house, iron house, office (including records), sawmill, bridge house, and new water wheel (Hoch 2005:208).

Stevens had the furnace and one forge rebuilt. In 1865, he formed a partnership with Daniel and Peter Ahl, prominent Cumberland Valley ironmasters, for half-interest in the ironworks. The Ahls obtained a charter to build the Caledonia & Southern Railroad in 1867 to run from Caledonia to Pine Grove Furnace, but the line was never constructed (TSS 2015 Chronology).

Caledonia Furnace ceased operations in 1867, and Stevens died in 1868. The forge, however, continued to operate until 1879 under the management of the superintendent and oversight of Stevens' executors, using up stockpiles of cast iron. Furnace lands at this time encompassed about 18,000 acres (TSS 2015 Chronology).

In December, 1887, after court battles over liens on Stevens' properties, the executors sold the remainder of Caledonia Iron Works, including 12,000 acres of land, to Samuel Diller of Lancaster. He conveyed the ironworks and lands to Isaac Diller and son in 1888, and they organized the Caledonia Mining & Manufacturing Company with an office at the Graeffenburg Inn, where Isaac resided. The company operated two saw mills, a shingle mill, sand rock grinding mill, and two ore banks (TSS 2015 Chronology).

In 1890, they incorporated the Chambersburg, Gettysburg Railroad Company and began construction of a railroad connecting to the Mont Alto Railroad northwest of Fayetteville, through Caledonia, to the Wolfe Hill Mine four miles north of Caledonia. Wolfe Hill is just northwest of and overlooking Long Pine Run Reservoir today. The line opened in 1891 but ran for only a few years. Track was removed between Caledonia and Wolfe Hill in 1895, and that same year the Caledonia Mining & Manufacturing Company ceased operation (TSS 2015 Chronology).



Map from the Pennsylvania Second Geological Survey, surveyed in 1874 and annotated to show the relationship between Caledonia Furnace and the settlement of Africa (Harris 2008; reproduced in TSS Files)

View of Caledonia Furnace taken just before the stack was destroyed (TSS Files)

The Commonwealth of Pennsylvania purchased the Caledonia property from the company in 1903 to create the Caledonia Division of the State Forest Reservation, which later was merged with the Mont Alto and Pine Grove Divisions to become Michaux State Forest.

In 1903, the Chambersburg, Gettysburg, and Waynesboro Electric Railroad began construction of an electric railroad originally intended to run from Chambersburg to Gettysburg. Though shown on the 1902 USGS map, the line was not completed to Caledonia until 1905, when the company leased the old ironworks site to create an amusement park (TSS 2015 Chronology). Along with other public and private initiatives, the area became a recreational destination and eventually a state park. The electric railroad operated until December, 1926.

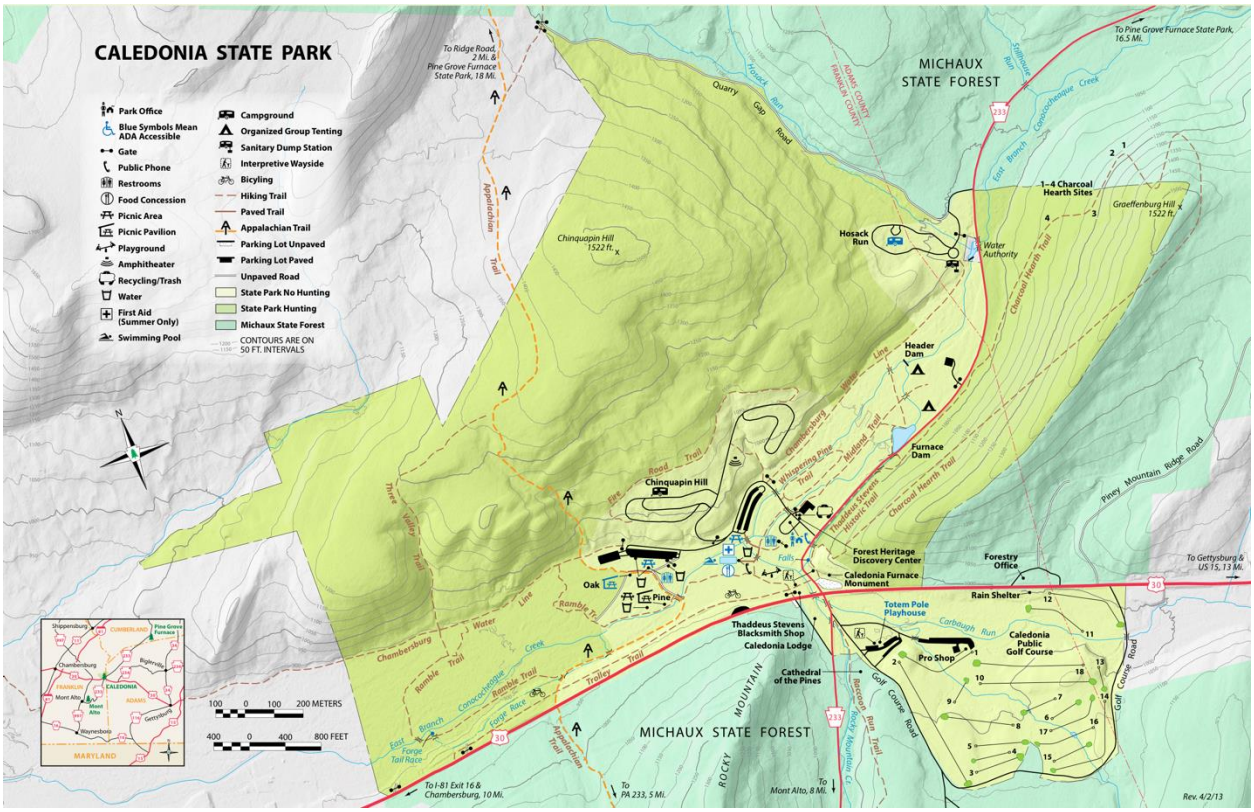
Property Boundaries. The size of the Caledonia Furnace property changed over time, and maps of its boundaries have not been found in the course of preparing this report. Research into purchases and ownerships over time should be undertaken if it has not been already, and maps should be prepared showing how the overall configuration of the property changed. Such maps would assist in further understanding of the property's historic landscape resources. The ore banks acquired by Stevens and Paxton should be included in the study. A map of the exact boundaries purchased by the Commonwealth in 1903 is of interest.

Wagon Roads. The road through the Caledonia gap is of historical significance as a Native American trail, early migration route, nineteenth century wagon road and turnpike, early twentieth century Lincoln Highway, and primary travel route today. Maps from the late nineteenth and early twentieth centuries show wagon roads and trails in use on South Mountain during the period of the furnace's operation. These roads should be identified in relation to property boundaries and the roads and trails existing in the state forest today.

Railroads. Caledonia was never connected to a railroad during its period of operation as a furnace and forge, but the 1891 Chambersburg, Gettysburg Railroad Company and 1905 Chambersburg, Gettysburg, and Waynesboro Electric Railroad are of interest and significance. The locations of their railroad beds and facilities should be fully documented as they existed in the park and state forest and to the west.

Charcoal. Like Pine Grove Furnace, the large property associated with Caledonia Furnace was extensively harvested for timber with which to make charcoal. A number of saw mills are shown on eighteenth century maps as well, the sites of which should be documented. A number of **charcoal heaths** have been identified on the state park property and are interpreted for visitors along the park's Charcoal Hearth Trail. It is not apparent, however, that these hearths have yet been appropriately documented. Possible **logging roads** should also be documented and analyzed in relation to the hearths, today's roads and trails, and other possible features.

In the use of LiDAR imagery to identify charcoal hearths as discussed above under Pine Grove, the density of hearths in the vicinity of Caledonia appears less than the density further north. This work should be further examined and continued to the southern portion of the state park if it has not been done so far.



Map of Caledonia State Park today (DCNR official state park map)

Iron Ore Banks. Ore banks associated with Caledonia Furnace have been identified in histories of the ironworks and Thaddeus Stevens and are mapped and described in documents related to Pennsylvania's Second Geological Survey (Frazer 1877; d'Invillies 1886). As shown on the 1874 map reproduced in this section, some of these **ore banks** are located within state park or state forest boundaries.

Additional properties owned by Stevens and Paxton, such as Pond Banks, should be surveyed and coordinated with historical documentation of Caledonia Furnace. Hoch cites Stevens and Paxton's purchase of the Daniel Gring farm in Green Township for iron ore in 1836 (Hoch 2005:205). **Tailing piles** related to these banks and the ironworks in general should be mapped. The historical relationships between the ironworks and the ore banks should be investigated and documented.

Limestone Quarries. The source of limestone flux used at Caledonia Ironworks does not appear to be documented. Some documentation may exist in sources not yet reviewed, such as in the geological surveys. Hoch's history notes the role of quarries on Wolf Hill, accessed by the 1891 railroad decades after the furnace closed. The railroad's access cut to Wolf Hill is still visible today as a wide passageway leading from Route 233 to the base of the Long Pine Run dam and was used during construction of that dam (Andre Weltman personal communication) The location and possible historic uses of this quarry should be investigated.

Water Power. Portions of the water power system serving the Caledonia Furnace remain in place and are located within the boundaries of the state park. The headrace, furnace dam, pond, and header dam are part of the Thaddeus Stevens Historic Trail interpreted by the park. Presumably the tail race ran into nearby Carbaugh Run. The 1874 geological survey shows the pond, but the road crosses the dam on the south side of the pond instead of up its east side as it does today.

Further investigation is needed to project how other features might have been organized. How the forges, rolling mill, saw mill and other operations mentioned in the report of Civil War damages and other available documentation were supplied with water power should be examined and interpreted for the public.

Ironworks. The Civil War list of damages suggests a well developed ironworks operation with numerous structures with various functions (Hoch 2005:210). However, it does not list dwellings and any other structures that were not destroyed. No detailed plan of the ironworks appears to exist. Pre-Civil War records were destroyed, and we are not presently aware of later records that might exist. The topographic surveys from the 1870s through the early nineteen-hundreds suggest the locations for various structures which provide a starting point for further investigations.

The furnace was located in the parking lot at the intersection of Route 30 and Route 233 where the Furnace Monument and interpretive signage are now located. The monument is a small scale re-creation of the furnace stack on the furnace site erected by the Alpine Club in 1926. It incorporates the 1837 iron lintel cast at Maria Furnace. The bronze tablet was added by the club in 1927 (TSS 2015 Chronology). The topography, with the embankment, headrace, and flat work area above, suggests how the furnace area was laid out. A new detailed topographic plan should be created for the park if one does not already exist as a base for future investigations. Archeological work should be undertaken in the parking area to look for building foundations to determine the plan of the area.

The 1868 and 1874 maps suggest layouts of buildings and races. An 1858 county atlas identified locations for the furnace, forge, saw mill, blacksmith shop, office, and dwellings. The rolling mill and second forge were located three-quarters of a mile west of the furnace between the creek and the historic turnpike. The 1858 and 1868 maps suggest locations of dwellings along the turnpike.

The age of the existing Blacksmith Shop is in dispute, and the structure has gone through many transitions. It may have been the original blacksmith shop, but other records indicate the Chambersburg Gettysburg Railway Company built it when the park was leased to them (Foltz 2006).

Cottage #1 is a log structure, served as the furnace store, and is the only remaining structure believed to date to the Civil War period. It functioned as Stevens' office in the few years after Caledonia was burned. In the 1950s when Route 30 was widened, the building was moved further south, rotated 90 degrees, and set on a new foundation (Foltz 2006).

It is suggested that a long term research program be undertaken to create period plans for various points in the site's history, including both the iron furnace and recreational eras. After documentary research is completed, a systematic

program of archeological investigations should be undertaken to explore the entire site, locate buildings and other features, and document its historical development. Such a project could be undertaken by local universities under the oversight of the Pennsylvania Historical and Museum Commission.

Mont Alto Iron Furnace (1807-1835)

Mont Alto Furnace was located in the narrow gap of the West Branch of Antietam Creek as it descends from the west side of the South Mountain formation. Land formerly associated with the furnace and purchased by the Commonwealth in 1901 comprises the southern third of Michaux State Forest. The historic furnace site today is the campus of Penn State Mont Alto.

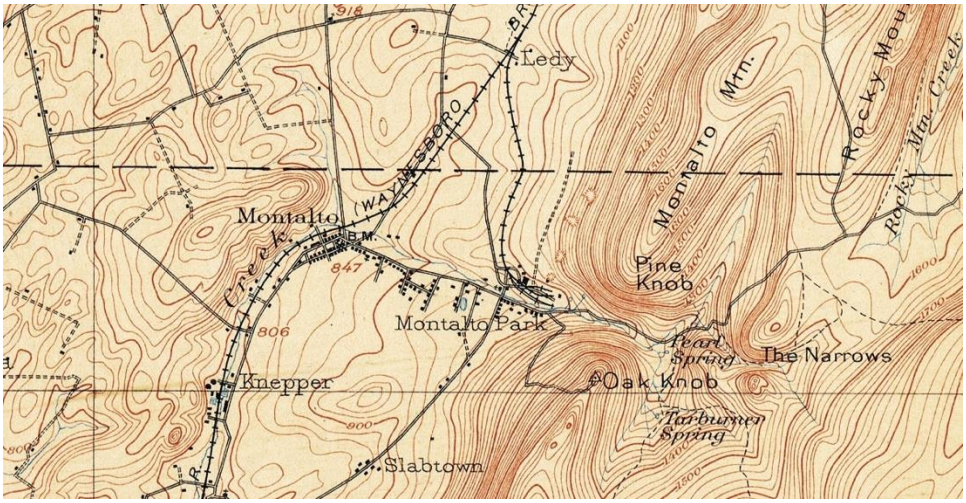
The history and development of this land during the iron industry era is similar to that related to Pine Grove and Caledonia discussed above. Mont Alto, however, has the special distinction of being the central focus for the establishment of the state's forestry program through the founding of the Pennsylvania State Forestry Academy on the site of the old furnace. Today the site houses a branch of Pennsylvania State University. That story is told in Chapter 6 of this document, Forest, Forestry, and Conservation Context. This section provides background on the ironworks and its related resources.

Brief History. Sources relating the early history of Mount Alto and the Hughes family appear to be incomplete and are sometimes contradictory. It appears that Mont Alto Furnace was constructed by Colonel Daniel Hughes and his sons Daniel and Samuel in 1807–1808 (Smith in Haas undated:59). The Hughes family was prominent in western Maryland, where they had developed a series of furnaces and forges. Their first ironworks was the Mount Aetna Furnace at the foot of South Mountain in what is now Washington County in the late 1760s. Under the leadership of Colonel Daniel Hughes and his brother Samuel, the family prospered, casting household wares such as pots, pans, skillets, kettles, Dutch ovens, stoves, and firebacks for the local market (WAIHT 2015 Hughes Family).

By the time of the Revolutionary War, the Hughes family owned over 12,373 acres along the mountain, several large farms, and a tannery. They became influential within the region and were active in local government. With money advanced by the colony and Continental Congress, they improved their ironworks and profited from the casting of cannons for the Continental Army. By the end of the Revolution, the Hughes family managed what was probably the largest ironworks complex in western Maryland, including the Mt. Aetna Furnace, Antietam Furnace, and Great Rock Forge (WAIHT 2015 Hughes Family; Smith in Haas Undated:60). The Mount Aetna and Antietam Furnace sites today are archeological sites and have been recorded with some historical background in state and National Register surveys.

As the ore supply dwindled in the vicinity of Mount Aetna Furnace, Colonel Daniel Hughes and his sons Daniel and Samuel looked north to establish the Mount Alto Furnace. In 1807, they hired Samuel Lane, a millwright, to construct the ironworks and mansion house and serve as the works superintendent (Smith in Haas Undated:60). Pig iron was reportedly hauled by wagon to the Potomac River, where it was shipped downriver on flat boats (WAIHT 2015 Hughes Family).

The flow of the West Branch Antietam Creek on which Mont Alto Furnace was located was insufficient for expanding operations beyond the furnace, and the narrow gap through which the creek flows was too constrained for construction of a pond to increase and manage water power. In 1810-1811, the Hughes therefore constructed two dams and two forges on the East Branch of Antietam Creek in the vicinity of today's Old Forge Picnic Area and Camp Penn (WAIHT 2015 Chronology; Haas Undated:3).



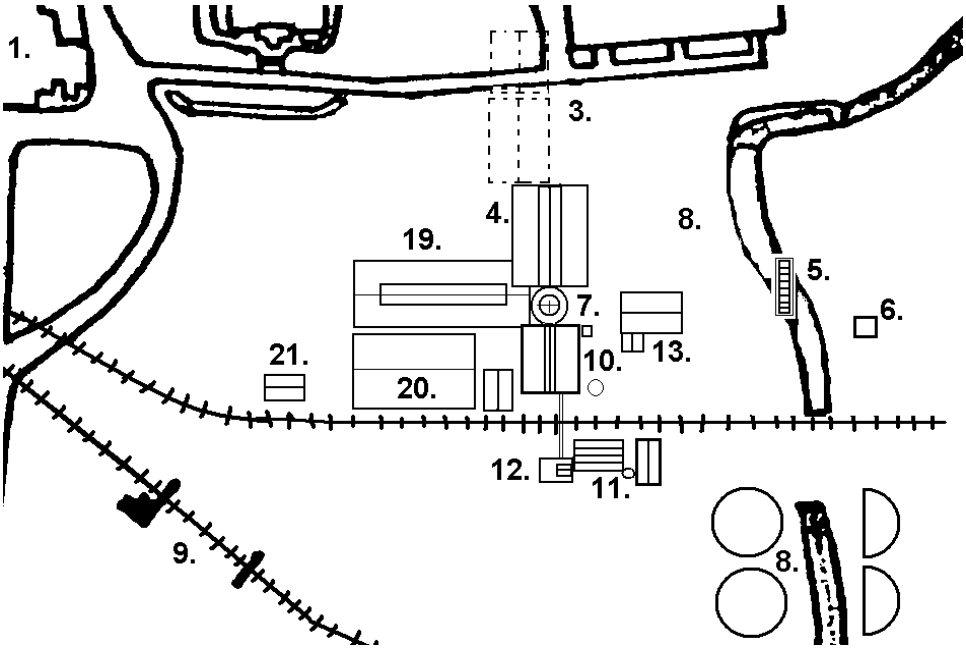
Detail of USGS map, Chambersburg Quadrangle, showing the Mont Alto Furnace area surveyed in 1900 (USGS 1900-1919)

The first dam was probably constructed near the present day Waynesboro water plant on Rattlesnake Run Road, just northeast of Camp Penn. The dam turned a water wheel to drive an up-and-down sawmill built there. This mill would provide the bulk of the lumber needed by the furnace and forges. The second dam was constructed on the creek across from Camp Penn to power the forges. One of the forges used a heavy hammer or "cinder stamper," driven by the wheel, to crush forge slag and cinder hauled from the furnace to recover iron that remained. The other presumably refined pig iron from the furnace (Haas Undated:3,60; WAIHT 2015 Old Forge).

In 1815, a foundry was built at the furnace site. Pig iron was made into stoves, fire backs, heath plates, hollow ware, flat iron, and other cast iron articles. Pig iron was hauled to the C&O Canal in Williamsport, Maryland (WAIHT 2015 Furnace).

It appears that Colonel Hughes died in 1818, son Daniel died in 1825, and son Samuel managed the furnace until his death in 1845 (Smith in Haas Undated:60; WAIHT 2015 Furnace). It was Samuel Hughes with his sons John Holker Hughes and Napoleon Hughes with whom Thaddeus Stevens battled in court for almost forty years (Hoch 2005:195-199).

In 1832, the Hughes family built a rolling mill and chaffery forge on the East Branch below the earlier forges and just north of Glen Forney. These facilities were powered by a 36-foot diameter waterwheel, 12-feet wide. In 1835, a nail factory was constructed further south near the Quincy Township-Washington



Plan of Mont Alto Furnace superimposed over a map of today's Penn State Mont Alto campus (WAIHT Files)

Mont Alto Furnace in 1884, Buildings 19 & 20 in foreground of the plan above (WAIHT Files)

Township line. The nail factory operated until 1850, when it was destroyed by fire (Haas Undated:3-4).

John Holker Hughes took over the ironworks after Samuel's death 1845. In 1854, he built he Emmanuel Episcopal Chapel, which he sold to the Episcopal Church for one dollar in 1857. The 1860 census lists Holker Hughes as furnace proprietor and his brother Napoleon Hughes as furnace manager. In 1864, Holker Hughes sold Mont Alto Furnace to Isaac S. Waterman, Thomas Beaver, and Colonel George B. Wiestling (Smith in Haas Undated:60).

According to Hoch's biography of Thaddeus Stevens, the new owners found neglected buildings in such poor repair that many were torn down (Hoch 2005:199). Whatever the case, they set about to significantly modernize the old works. With Colonel Wiestling as superintendent, Waterman & Co. rebuilt everything outside of the the stack. The furnace height was increased from 31 feet to 37 feet. The diameter of the bosh was increased from 8 feet to 9 feet, and later to 9½ feet. The old 30-foot diameter water wheel was replaced with a steam engine (Smith in Haas:undated:61-62; Frazer 1877:257-259).

The facilities on the East Branch were shut down. The rolling mill continued in operation until 1866, and the forge was shutdown and razed in 1868. The salvageable equipment was removed from the sites and the remains scrapped or hauled away (Haas Undated:4).

At the furnace site in 1866, Colonel Wiestling constructed the second largest bloomy forge in Pennsylvania. In 1867, they built the first successful charcoal kilns in the state. Other improvements included four ore kilns and the roasting of fine ore in a large boiler. By the 1870s, Mont Alto Furnace employed over five hundred men, owned seventy-five horses and mules, used twenty-one steam engines, and operated seventeen mines, seven farms, a foundry, machine, blacksmith, carpenter, and wheelwright shops, and two sawmills. Many of the workers and their families lived in houses owned by the company (Smith in Haas Undated:62).

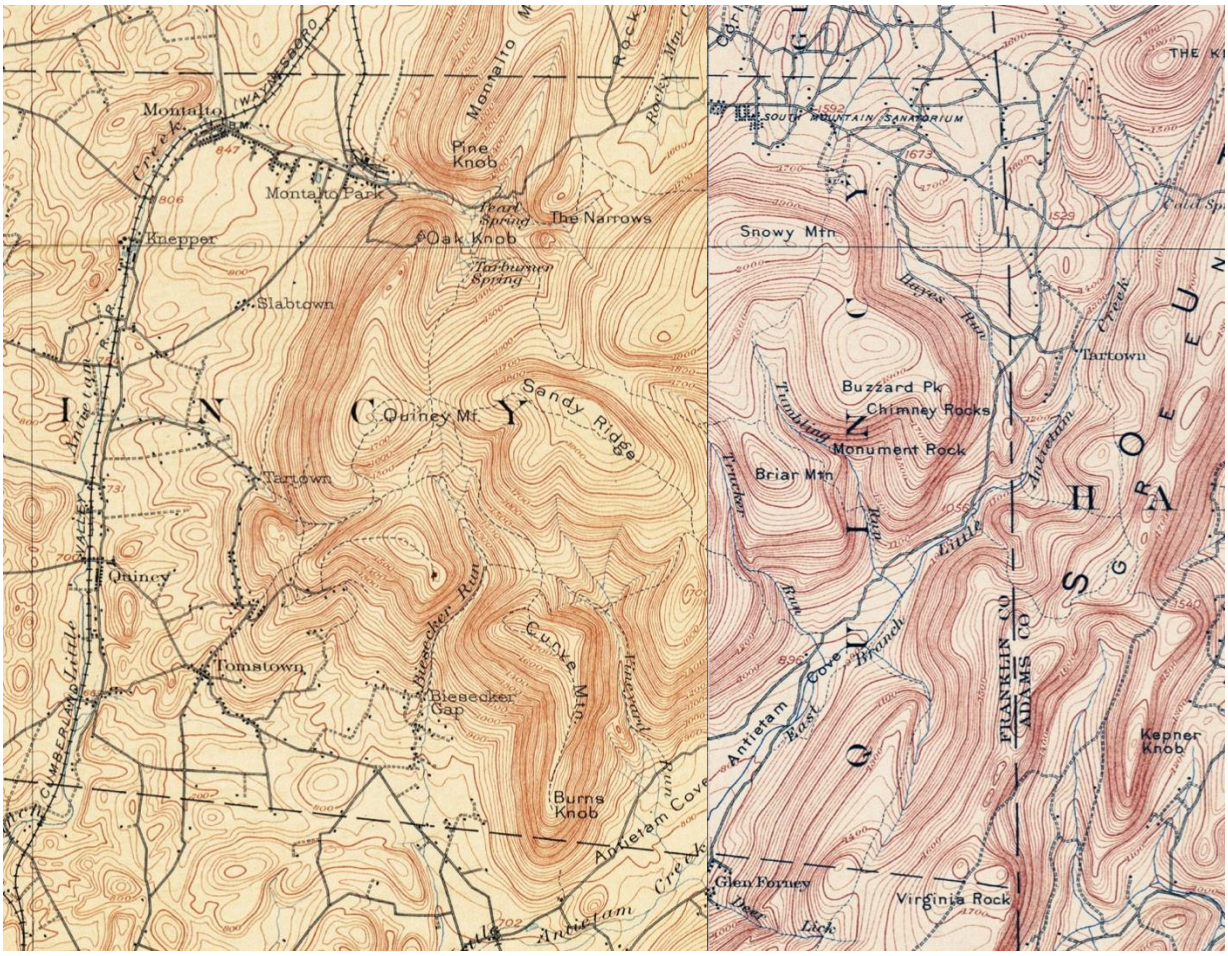
By the 1870s, the furnace products were being hauled to Chambersburg to be shipped on the Cumberland Valley Railroad and to Pen Mar, Maryland for shipment on the Western Maryland Railroad. In 1872, furnace workers built ten and a half miles of track from Mont Alto Furnace to a point on the Cumberland line three and a half miles northeast of Chambersburg.

In an 1875 letter to Persifor Frazer, who was conducting the state's survey of ore banks, Colonel Wiestling wrote the quote at the beginning of this chapter about having about 20.000 acres and their objectives in producing quality products.

Weistling also wrote:

"You can also perceive from the difference in the few partial analyses of our ores that we can make different kinds of iron, or iron suitable for different purposes- any of it would be 'good.'

…It is important to know what particular purpose a specified make is good for, and this largely governs its value…Iron made from our No. 3 mine is strong and chills well, making it valuable for car-wheels. That made from Mine No. 4, No. 8,



Matched USGS maps of the showing Mont Alto (upper left) in relation to Old Forge, which was located along the East Branch Little Antietam Creek in the vicinity of its junction with Tucker Run (lower right). Glen Forney is further downstream. Map on left surveyed 1900; map on right surveyed 1885 and 1908 (USGS 1900-1919).

Pond Bank, Mill Bank and others, more closely resembles Norway iron in its softness and tenacity, fitting it for rivet rods, flange plate and firebox iron.

…until 1875, we were always closely sold up, and indeed found it impossible to fill all orders. We are proud of the reputation of our iron, and do our utmost in every department to improve it (Frazer 1877:260-262)."

In order to maximize income from the railroad, Colonel Wiestling designed and built Mont Alto Park in 1875 at a site uphill from the ironworks. The park proved to be very popular and highly successful.

In 1889, the furnace, foundry, engine rooms, boiler house, all patterns and machinery were destroyed by fire caused by a gas explosion during the casting process. Colonel Weistling formed a new company with himself as President and General Manager and built a new, larger furnace. Weistling died in1891, and yet a new company was formed with his brother Edward as manager. However, in 1893, the furnace ceased operations due to competition and massive changes in the iron and steel industries (Smith in Haas Undated:63; WAIHT 2015 Furnace).

With Joseph Rothrock leading the effort to establish a state forest reserve, the Mont Alto Furnace was informally offered for sale by the company's trustees In July, 1901 – 19,200 acres of land and the buildings thereon, excluding the buildings on the recreational area administered as Mont Alto Park, which was still a profitable venture. A separate property totaling about 3000 acres that had been the property of Colonel Weistling was purchased somewhat later. A portion of this property, including the location of the furnace and Colonel Weistling's house, became the new campus of the Pennsylvania State Forest Academy (Thomas 1985:19-20; Maas 2003:105).

Initial work at the site involved tearing down dilapidated houses and sheds as well as the foundry buildings. By June, 1903, the Forest Academy's director reported that the site around the foundry was almost cleared and would soon be ready for trees and ivy (Thomas 1985:28).

The Commonwealth purchased the Mont Alto Park property in May, 1902 and rented the park to a concessionaire, who had the use of it during the summer months (DNCR Park brochure; Thomas 1985:53). Most of the former Mont Alto Furnace lands were combined with the Caledonia Reserve into the South Mountain Reserve, which later became Michaux State Forest. The park became Mont Alto State park, and the core of the furnace area became Penn State Mont Alto. Subsequent forestry aspects of the property's story are outlined in Chapter 6, and recreational aspects are outlined in Chapter 7.

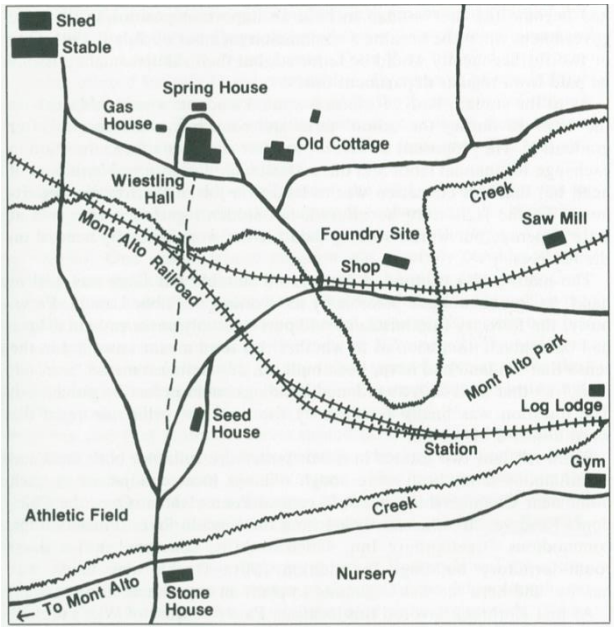
Property Boundaries. The property boundaries of land associated with Mont Alto Furnace grew over time. The properties purchased by the Commonwealth in 1901 and 1902 were in three parts, the overall furnace lands, the Wiestling property, and Mont Alto Park. Together, the three properties appear to have comprised about 22,200 acres.

Maps of the three parcels have not been uncovered in the preparation of this report, but the vast majority of the land became known as the Mont Alto Reserve and was officially joined with the Caledonia Reserve to created the South Mountain Reserve of the state forests system (Maas 2003:105). Eventually, with the addition of the Pine Grove Reserve, the land was designated as Michaux State Forest.

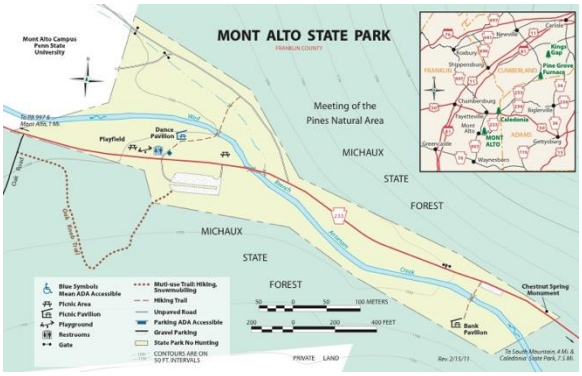
It would be desirable to map the three original parcels in further study of Mont Alto Furnace and its landscape resources. The core of the furnace property became the Pennsylvania State Forest Academy and is now the campus of Penn State Mont Alto. Mont Alto Park is now Mont Alto State Park.

Wagon Roads. Nineteenth century maps show wagon roads that existed during the period of iron industry development and use. These include county atlases from 1858 and 1868, geological surveys of South Mountain from the 1870s and 1880s, and USGS surveys from 1885, 1900, and 1908. Details of several of these maps are reproduced in this report.

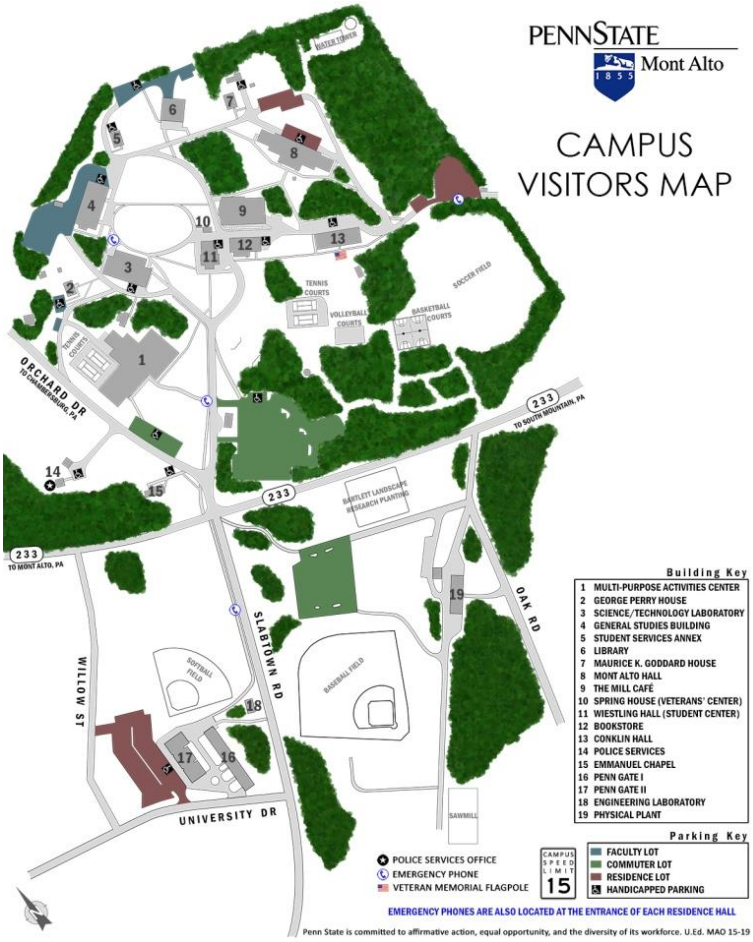
Primary wagon roads appear to have crossed east-west through the community of South Mountain and north-south through the valley of East Branch Antietam Creek. The east-west crossing is a paved road today including **Cold Springs Road** on the west, **South Mountain Road** in the community of South Mountain, and



Map of the former furnace site in 1907 with remaining structures after founding of the Forestry Academy (Thomas 1986:20)



Map of Mont Alto State Park in the gap east of campus (DCNR official state park map)



Map of the Mont Alto campus today; Building 11 is Wiestling Hall.

Route 233 through Mont Alto gap. The north-south road is today's **Old Forge Road**.

These wagon roads should be thoroughly studied and mapped in relation to roads and trails existing in the state forest today. Investigation by local historians has shown that the routes of some of the historic roads have been changed over time. Others have been abandoned and exist today as forest trails. Additional roads have been added within the state forest, particularly during the 1930s when the Civilian Conservation Corps was at work. Some of these roads may have been prior trails before being improved. Some trails are shown on the nineteenth century maps.

Railroads. As noted in the brief history above, the **Mont Alto Railroad** was constructed in 1872 from the furnace connecting to the Cumberland Valley Railroad at a point about three and a half miles northeast of Chambersburg. The railroad can be seen on period maps and ran directly through what is now the Penn State campus ending at Month Alto State Park to the east. The branch line was extended south to Waynesboro in 1875 (Smith in Haas Undated 63).

Remnants of the line remain as earthworks, the railroad bed, and possibly small structural features that can be seen in the woods at the park and elsewhere today. The historic railroad bed can be traced across the valley to its former connection to the Cumberland line. The railroad does not enter state forest lands.

Charcoal. The forest lands associated with Mont Alto Furnace encompassed most of the southern third of today's Michaux State Forest. These forests were used for the production of charcoal as fuel for the furnace throughout the ironwork's history.

As quoted at the beginning of this chapter, in 1875 Colonel Wiestling wrote: "Although we have about 20,000 acres connected with the estate, and use our own wood, make the charcoal and haul it, yet charcoal varies greatly in quality from the different kinds of wood, from variableness of weather, difference in skill and care of colliers, and the same uniformity in work is scarcely attainable that should characterize anthracite furnaces." He goes on to suggest that the different qualities of charcoal and the different ores mined result in different kinds of iron, or iron suitable for different purposes (Frazer 1877:260).

Charcoal hearths and **logging roads** are found throughout the Mont Alto property. It is not clear whether the charcoal hearths have been identified here using Lidar imagery as they were in the Pine Grove area, discussed above. As with Pine Grove, the patterns of distribution of hearth and trail features should be studied for information as to forest use during the iron industry period. The relationships of features to today's roads and trails should be examined. Possible features should be preserved.

Iron Ore Banks. The need for high quality ore is stated as the reason for the Hughes family's move north from the vicinity of Hagerstown to Mont Alto in 1807. Smith's history also noted that the furnace operated **seventeen mines** by the late nineteenth century (Smith in Haas Undated:62). The 1858 county atlas shows an ore bank located north of the furnace site on what must be state forest land.

The location, production, and quality of the iron ore banks associated with Mont Alto Furnace are reviewed in Frazer's 1875 survey as well as d'Invillier's survey ten years later (Frazer 1877:257; d'Invilliers 1886:1421-22). They are the subject of Colonel Wiestling's letter quoted above. The ore banks should be located and further studied. Some others may be located on state forest land.

Limestone Quarries. Limestone quarries are also the subject of the Frazer and d'Invillier studies undertaken as part of Pennsylvania Second Geological Survey. No other discussion of limestone quarries has been encountered in the limited histories of Mont Alto obtained during the course of preparing the current report.

Water Power. The mountain gap at Mont Alto through which the West Branch Antietam Creek runs is referred to as The Narrows and was known for its many springs. The furnace was probably sited here because of its proximity to good ore banks and the flow and fall of the creek. Mont Alto Furnace was powered by a **water wheel**, which was removed and replaced with a steam engine in 1864 (Frazer 1877:258; Smith in Haas Undated:61).

In review of the limited available histories of Mont Alto, no mention has been seen of a pond for water power at the main furnace site. The existence of any raceways have not been identified; these are in need of further documentary and field investigation. Sources suggest that the gap was too narrow for a pond and that the furnace depended upon a reliable flow by natural means.

Among the numerous springs in the West Branch gap is one known as **Tarburner Spring** located on the hilltop approximately a mile and a half due east of the furnace site. Water from this spring is reported to have been known for its purity and bottled and sold throughout the Cumberland Valley. The spring was also used as a water supply for the Forestry School and Forest District Office at Mont Alto. Its name came from tar burning pits constructed before the Civil War. Tar used for greasing wagon axles and other purposes was obtained by digging pits into which were placed pieces of pitch pine wood to a depth of several feet. These pits are said to have been still visible in 1930. The pits and their contents were then covered with earth and the wood was then fired. As a result of this form of burning, tar was obtained as a residue and charcoal as a byproduct (DFW 1930:31-32; repeated in Thomas 1985:54).

The fact that there was no good location for a pond at the Mont Alto Furnace location in the West Branch gap is given as reason for construction of the forges and other works on the East Branch Antietam Creek five miles to the east. Three dams are thought to have been constructed along the East Branch and are discussed below in relation to the works in the vicinity of Old Forge.

Ironworks. The works at Mont Alto were extensive and constructed in two broad phases as outlined in the brief history above. The 1807 works featured a water powered cold-blast **furnace** and supporting structures. A **foundry** was added in 1815. County atlases from 1858 and 1868 suggest the arrangement of buildings in the landscape. The 1858 atlas labels the furnace, **ironmaster's residence, office, chapel, two saw mills,** and an **ore bank.** Later descriptions of the works imply a fully developed industrial site.

Smith's description of the main furnace site by the 1870s lists a furnace; foundry; facilities for steam engines, blacksmith, carpentry and wheelwright shops; two sawmills and housing. **Charcoal kilns** and other works were also constructed (Smith in Haas Undated:62). A 2012 exhibit of the Waynesboro Area Industrial Heritage Trust recreated a plan of the works constructed by Colonel Wiestling and included a number of historic photographs. The plan and an 1884 photograph of the core furnace buildings are reproduced above in this section.

These structures were located at the site of today's Penn State campus. The Wiestling residence, spring house, chapel, and a building listed in 1907 as a seed house still exist (see maps above). Other features can be identified in the landscape, including stone walls, embankments, and railroad beds. To the east, the pavilion and a number of historic site features remain at Mont Alto State Park.

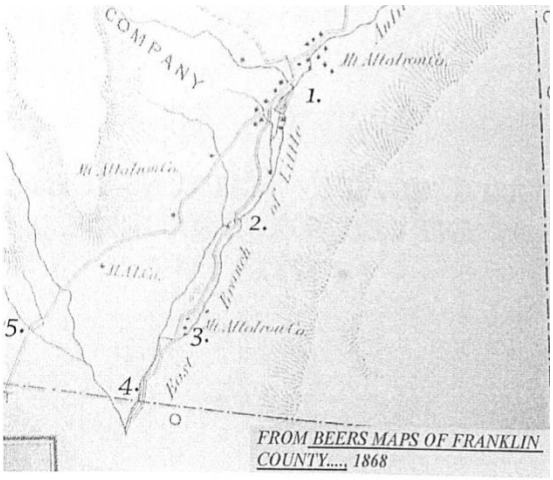
Numerous historic features remain from the iron industry period along the East Branch Antietam Creek in the vicinity of **Old Forge** within the state forest. Local historian Stanley Haas has studied this area in detail and published his findings in an undated monograph and tour in association with the Waynesboro Area Industrial Heritage Trust (Haas Undated; WAIHT 2012). Haas provides maps (some reproduced here), descriptions, and background historical information on the dams, raceways, water wheels, works, and other features. His field work is impressive and very helpful in understanding the sites and recording their significance.

Three dams are believed to have been constructed along the East Branch. The first is believed to have been on the site of the Waynesboro water treatment plant today on Rattlesnake Run just north of Old Forge. This dam and its wheel are thought to have powered a saw mill. Just downstream, at the site of today's Old Forge Picnic Area, was a second dam, remnants of which still exist. This was the site of **two forges**, one thought to have been a chaffery forge and the other a bloomer forge.

The 1868 map from the county atlas that Haas uses to illustrate his tour shows locations of a number of **buildings** in this area. Haas describes the raceway system, water wheels, and historic road, identifying features that can still be seen today. The schoolhouse dam site is described here as well.

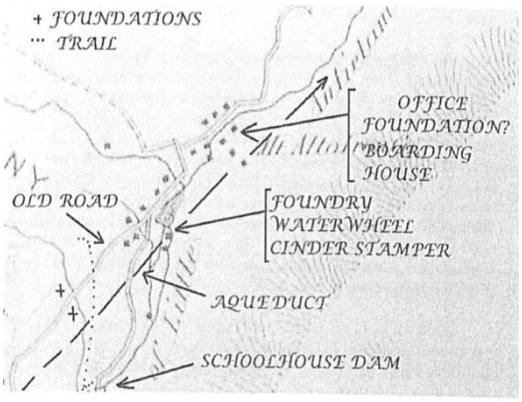
A 1930s publication about the state forest notes that this area was used as a Boy Scout camp at that time under a ten-year renewable lease to the Waynesboro Young Men's Christian Association. Four acres were leased on which **four cabins** were built. The old forge **pond** with its tone breastwork served as a swimming pool. The **foundations** of the forge, water wheel pit, and other features were still visible (DFW 1930:35,37). Later, the Civilian Conservation Corps camp was constructed here and many of its resources remain today as Camp Penn. The CCC period is reviewed in Chapter 8 of this report.

Below Old Forge, Haas identifies the sites of the 1832 **rolling mill**. The pond, water wheel breastwork, foundations, and raceway can been seen today along with the site of the former mule barn and a pile of forge slag. All of these features are on state forest land. Up behind the waterwheel site the remains of the Glen Forney Civilian Conservation Corps camp can be found in the form of foundations and



1. OLD FORGE SITE.
2. SCHOOLHOUSE DAM SITE.
3. ROLLING MILL SITE.
4. NAIL MILL / SHINGLE MILL SITE.
5. OLD MOUNTAIN CEMETARY

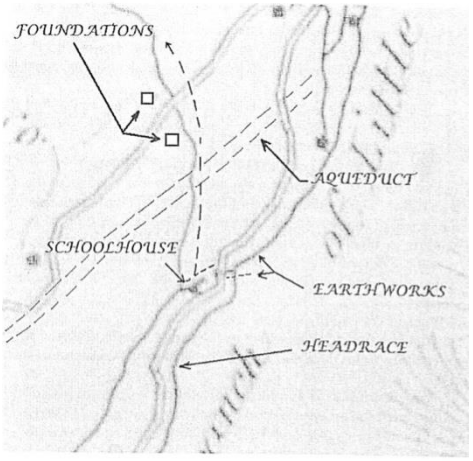
1. THE FORGE SITE



Items to see:

1. The foundations of the office along the road.
2. The foundations of the waterwheel.
3. Approximate location of the boarding house in the playing field.
4. The aqueduct.
5. Foundations along the Old Road to the Fish and Game.

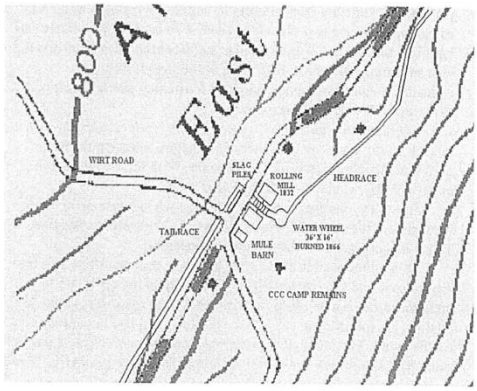
2. SCHOOLHOUSE DAM SITE



ıs to see:

1. The elevated earthworks (dam).
2. Location of the school (no remains found).
3. Trail across the aqueduct to the "Old Road".
4. Foundations on the "Old Road".

3. THE ROLLING MILL SITE



Items to see:

1. Waterwheel Foundation.
2. Site of the rolling mill.
3. Site of the mule barn.
4. Headrace and pond.
5. Remains of forges.
6. Salamanders (cooled contents of a forge).
7. Driveline trench?
8. Slag piles.

Historic iron industry features at the Old Forge, Rolling Mill, and related sites along East Branch Antietam Creek within the state forest are described in an automobile/walking tour prepared by Stanley Haas and the Waynesboro Area Industrial Heritage Trust (WAIHT 2012).

earthwork (WAIHT 2012). The site of the 1850 **nail mill** is located further south at the township line. This site is on private property.

Detailed field survey and documentation of remaining features should be undertaken and PHMC survey forms should be prepared for each site. Archeological investigations could provide valuable information about the sites, the period, and the iron industry.

Farms. Smith's overview of the history of Mont Alto Furnace states that the ironworks owned seven farms (Smith in Haas Undated:62). Research should be undertaken to determine where these farms were and their relationship to the works. The tour of Old Forge notes that one of the farms owned by the furnace was located just to the northwest of the rolling mill south of Old Forge (WAIHT 2012). A 1930 guide book of forest activities mentions several acres of abandoned farm land located along the Mont Alto road just north of The Old Forge having been reforested with white pine in 1901 (DFW 1930:36). It is not clear which road was being referred to as the Mont Alto road in 1930. Investigation of additional primary sources is needed.

Mountain Communities. The community of **South Mountain**, surrounded by Michaux State Forest, has not been thoroughly studied for this report. Field review of remaining historic buildings, mostly residences, suggests that its development was significantly influenced by the establishment of the South Mountain Restoration Center. Presumably, many of the dwellings were the residences of Center employees or service providers.

However, county atlases from 1858 and 1868 show dwellings in the area that were probably agricultural and possibly related to timber and iron industry uses. Mid-nineteenth century land ownership would be interesting to map. The extent to which Mont Alto Furnace owned the land that is now the community of South Mountain has not been investigated here. The early 1900s UGSG maps show an extensive network of roads within the community, around what is labeled then as the South Mountain Sanatorium. Land owned by the Commonwealth was probably furnace land.

The early maps also show the crossroad of **Cold Springs** to the east of South Mountain where a summer hotel was located and identify a community called **Tartown** along East Branch Antietam Creek on the west side of Green Ridge. Information on these small communities has not been researched in the preparation of this report but is a subject for future investigation. Mention is made in Haas, however (Haas Undated:50).

Haas notes that the Mont Alto Furnace and forges helped support several **surrounding communities**, including Bieseckers Gap, Glen Forney, and Beartown (WAIHT 2012). The village of Mont Alto must have also been heavily dependent upon the ironworks. Late nineteenth century histories report that the furnace employed over five hundred workers. These communities deserve further study in this regard, and historic resources associated with the furnace should be identified.

North of Bieseckers Gap, a small mountain **cemetery** exists about 300 feet off the road, apparently on state forest land. Small headstones may be found just to the

east and west of the entrance to the cemetery. A hand carved stone in the southeast corner of the cemetery has a date of 1834 (WAIHT 2012). The cemetery should be surveyed, marked, and monitored, and its history should be investigated and interpreted.

In the history of the State Forest Academy, it is noted that descendants of iron industry charcoal burners and laborers who lived on the mountain in tight-knit communities were in conflict with the newly established school (Thomas 1985:41). Such conflict probably also existed with residents of communities along the flanks of the mountain who had worked in the iron industry and timbering. Continuing conflicts are said to exist today. If there is a social continuity between historic and present attitudes with respect to the forest in South Mountain communities, this would be an interesting topic of study.

Augusta and Big Pond Iron Furnaces

In addition to the three furnaces discussed above, two other nineteenth century iron furnaces are directly related to property managed by Michaux State Forest. Both are located along the western base of South Mountain in Cumberland County.

In the History of Cumberland County, Pennsylvania (1886), Pliny Durant writes: "In 1824, John Moore, of Carlisle, commenced the erection of a furnace on the run at the foot of the South mountain, about three-quarters of a mile above where the powder mill stood, which he named Augusta. A few years after a second was erected on the same stream, about a mile below Augusta, which was called Mary Ann. A third was built at a later period (1836) about four miles east of the latter which was named Big Pond (Weltman 2015 Big Pond Notes)."

Augusta Furnace was located on Milesburn Run at the base of South Mountain just within state forest lands. The ruins of the furnace, today a pile of stones, can be found on the east side of Baltimore Road a short distance after passing into the state forest.

In the recently published *Water-powered Mills of Cumberland County, Pennsylvania*, local historian David Smith outlines research in primary sources related to Augusta and Mary Ann Furnaces (CCHS 2015:28-31). While his research does not confirm a date of construction, he notes that John Moore was likely the person who built both Augusta and Mary Ann Furnaces sometime is the 1820s, possibly with one or more partners. Other sources suggest dates of 1827 for Augusta and 1829 for Mary Ann (Smith 1990).

Augusta Furnace appears on an 1858 map of Southampton Township in the Atlas of Cumberland County labeled as "Old Furnace (CCHS 1858)." Its location is also shown on an 1863 Confederate map prepared for Stonewall Jackson by Jedediah Hotchkiss (Weltman 2015 Route Map). The best depiction of Augusta Furnace, however, is the 1872 Beers map of Southampton Township, center-left below.

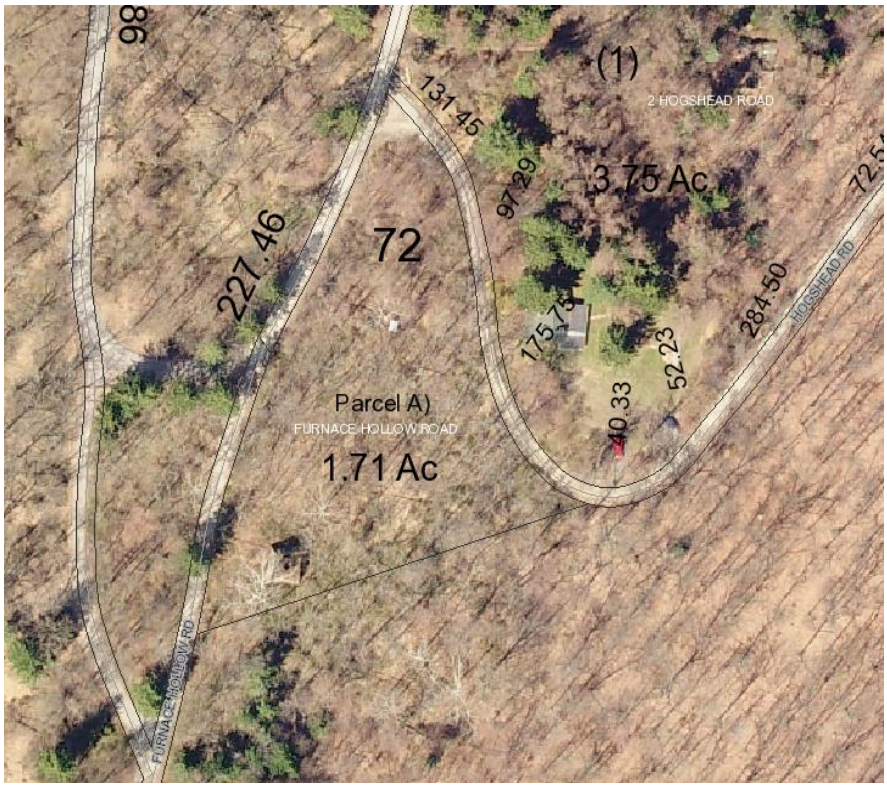
Smith notes that in 1838, the property included two furnaces, a mansion house, two stone stables, thirteen log tenant houses, one chopping mill, an office, a log house, a stone spring house, and 4200 acres of land. A newspaper article reports that Augusta Furnace was nearly abandoned by February of 1869 (CCHS 2015:29-30).

Beers map of Southampton Township in the Atlas of Cumberland Co. (Beers 1972)

Both Augusta and Mary Ann Furnaces were associated with successive owners of the historic White House, built in 1820 and located on the southwest corner of Baltimore, Whitmer, and Cleversburg Roads about a mile north of Augusta. Mary Ann Furnace was also known as White House Furnace. As Smith suggests, and if Durant's information from his 1886 history quoted above is correct, Mary Ann Furnace may have been located in the vicinity of the historic ironmaster's house (CCHS 2015:29). The White House and a building identified as Augusta Furnace Tenant House, a half mile north of Augusta, are identified in the Pennsylvania Bureau for Historic Preservation's CRGIS database and online website. No remains of Mary Ann Furnace are believed to exist. Mary Ann was reportedly abandoned in 1851 (Weltman 2015 Big Pond Notes-from Lesley 1859).

Further investigation of Augusta Furnace should be undertaken. The configuration of the historic 4200-acre property should be mapped. Indications may exist in the field to suggest how the site was laid out and in particular how the furnace was connected to Milesburn Run for water power. The historic buildings and landscapes around the White House and tenant house should be studied. A dwelling is shown on the 1972 map adjacent to Augusta Furnace. A historic resource known as Cleversburg Reservoir is located west of the furnace in CRGIS files. The 1863 Confederate map suggests the location of a pond in this area. Iron ore banks that may have been associated the Augusta, Mary Ann, and Cumberland furnaces are shown on various period maps and described in various surveys. Portions of the historic ironworks landscape are located on state forest lands.

Detail of the 1858 Atlas of Cumberland County showing Big Pond Iron Works at lower right (Image courtesy of Andre Weltman)



The Big Pond Furnace stack is the square in the lower left of this aerial photo. The light black line below it is the state forest boundary, apparently drawn to specifically exclude it (2008 image available online from Cumberland County, PA Property Mapper provided courtesy of Andre Weltman)

Big Pond Furnace is believed to have been constructed by John Moore in 1836 (Smith 1990; Weltman 2015 Big Pond Notes–from Goodyear 1903 and Lesley 1859; Wiestling in Haas undated:42). Moore and his son operated the furnace until 1846 at which time it was lost through a sheriff's sale.

Schoch Sons & Co. acquired the property in 1847 and constructed a forge in 1851 or 1852, manufacturing pig iron and blooms for boiler plates. Schoch Sons is shown as owner on the 1858 atlas of Cumberland County. The map suggests a configuration for the ironworks, with a complex of structures to the north of the furnace and a pond to the west.

The property was sold to P.A. Ahl in 1870, who conveyed it to the Philadelphia and Reading Coal and Iron Co. in 1872. In May 1880, C.W. Ahl leased the works, putting up new hot blast and getting a heavy stock of charcoal ready to go into blast. However, the charcoal took fire burning the charcoal house, stock house, and engine house which ended operation. The estate consisted of about 6000 acres of land, 14 dwellings, office, and stables (Weltman 2015 Big Pond Notes–from Goodyear 1903 and Lesley 1859; Wiestling in Haas undated:42).

In 1932, the Commonwealth of Pennsylvania purchased 5500 acres of the furnace property as an addition to Michaux State Forest. However, either then or sometime after, the furnace stack itself was apparently deliberately cut out of the state forest lands. The furnace sits on a small 1.71-acre parcel bounded by state forest roads. The state forest boundary is within a few feet of the stack.

Detail of aerial photograph of Big Pond Furnace, flown October, 1937 (PSU 1938)

The aerial photograph above shows the vicinity of Big Pond Furnace in 1937. The furnace stack is a small light square near the center-right (compare to the lot photo on previous page). The pond to the left was constructed by the Civilian Conservation Corp but is in about the same location as the pond in the 1858 map. The CCC camp is the large light rectangle north of the stack. The pond is on state forest land, but the stack and the camp are not. A number of other buildings are visible in the photograph as well, none of which are present today. Several were on state forest land.

The historic configuration of the ironworks should be studied. The headrace that turned the water wheel at the furnace stack runs south along the hillside intersecting the creek that fed the pond. The pond is dry, but the long, straight dam and other features remain. The furnace's ore banks are described in Lesley's 1873 survey (Lesley 1873:15-16) as well as others from the same period. Archeological investigations could provide information on the layout and use of the furnace property. The furnace stack is rapidly deteriorating. Though not on state land, at minimum it should be fully documented and a PHMC survey form prepared. Emergency stabilization would be preferred.

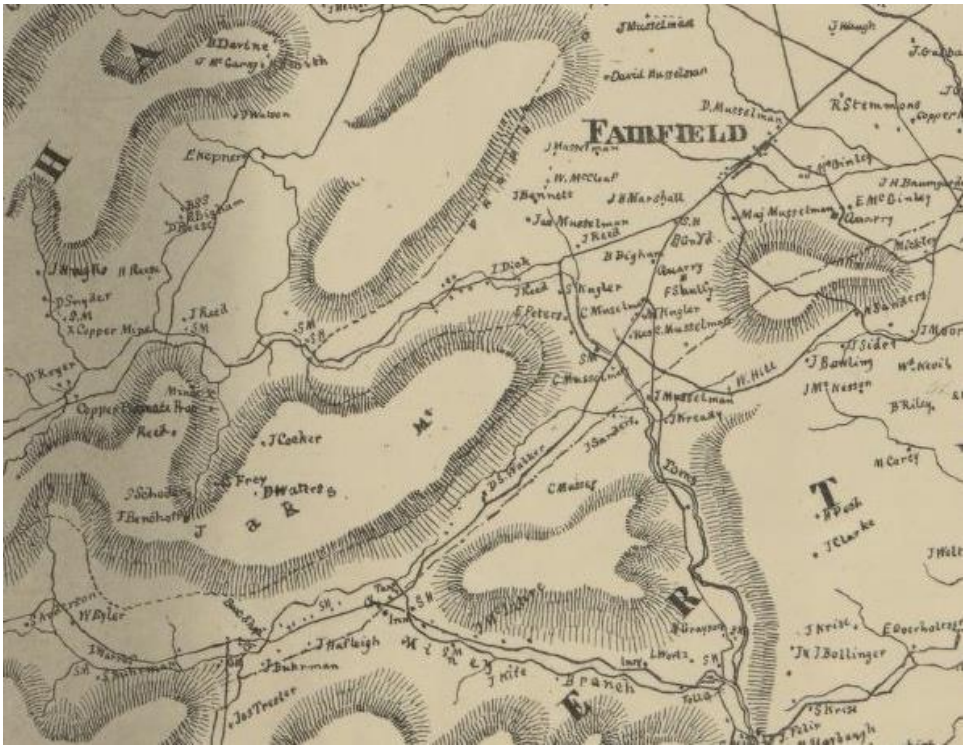
Photo of furnace stack in the 1960s (PHMC files); photo today—the left side of the stack has collapsed.

Copper Mining

Small-scale copper mines were worked on South Mountain on both sides of the Maryland-Pennsylvania border in the eighteenth and early nineteenth centuries. As early as 1833, prospectors made an opening for the discovery and extraction of copper on the Watson farm in Hamiltonban Township, Adams County. Over the course of about the next ninety years, numerous excavations were made between Blue Ridge Summit and Orrtanna in search of native copper, but local deposits yielded too little to justify long-term capital investment (Hatleberg 2013:1).

The source of the copper was a narrow discontinuous belt of deposits in South Mountain's Catoctin metabasalt and adjacent metarhyolite rock formations. The belt extends for a distance of about eight miles in Pennsylvania and trends with the grain of the rock formation and the mountain at an angle of about 20 degrees north and east. Most of the copper deposits are found in the metabasalt along a metabasalt-metarhyolite contact and fault zone running parallel to the foliation of the rock. Similar deposits occur in an extension of the belt in Maryland and in similar rocks in Virginia (Sevron 1991:131; Rose 1970:6).

In Pennsylvania, the well-defined group of deposits is located mainly in western Adams County. The sites of fifteen prospects and workings are recorded, though a report dated to 1911 estimates that about 200 pits, tunnels, trenches, and other excavations had been dug. Production was very small and had ended by 1920. The total value of the copper excavated is estimated at only about $10,000 (Rose 1970:1).



The sites of two copper mines on South Mountain are noted near the left edge of this 1858 map of Adams County (Library of Congress)

Of the fifteen recorded sites, twelve are located in southwestern Adams County and two are in adjacent Franklin County. The locations of the sites are described and mapped in Arthur Rose's 1970 report on Metal Mines and Occurrences in Pennsylvania. Very brief histories of each site are noted along with a description of the host rock, structure of the formation, and nature of the works. References in which the works are cited are provided.

Some of the copper mines are shown on 1858 maps of Adams County, including the G.M. Hopkins map and the map above from the Library of Congress. Many of the dates recorded for the sites range from 1850 to 1910. A surprising number date to the early twentieth century. Mine shafts and tunnels of 30 feet, 40 feet, 50 feet, and up to 120 feet are noted along with several open cuts. The deepest shaft is listed as being 300 feet deep with a level area then extending eastward 115 feet (Rose 1970:7). Dr. Hatleberg, cited above, is a physician, resident of Hagerstown, and local historian who has researched a number of the copper mining sites and recounts the interesting stories of the sites and their owners.

Other Mineral Resources

South Mountain has been the source of a variety of other quarrying activities that have been economically profitable during different historic periods. The mining of clay for specialty brick, tile, and other products was noted above in the discussion of Pine Grove Furnace and was undertaken in the early twentieth century in an effort to extend the life and profitability of the works there. Quarrying of limestone near Pine Grove Furnace, quarrying of slate on the east face of Piney Mountain, and commercial harvesting of ice from Laurel Lake were also noted.

In the early twentieth century **white clay** was also mined in the valley of Mountain Creek north of Toland. Between 1890 and 1910, at least five companies mined white clay deposits in this area (Way 1986:25).

The Philadelphia Clay Company owned the most extensive clay deposit, and its mine and mill were the largest and best equipped in the region. Mining involved tunnels driven into the mountainside and headings that branched at right angles under the clay beds. At appropriate locations, large rooms were excavated along the headings. When the supporting props and pillars were removed, the clay crumbled or flowed down into the room and was hauled out of the tunnels by mule or locomotive to the mill located near the mine mouth (Way 1986:25-26).

Huge amounts of water were used to separate the clay, using settling tanks, presses, and drying ovens. The principle use for the white clay from this area was originally in the manufacture of paper, especially that requiring a smooth, absorbent surface for fine printing, such as for wallpaper When mixed with more plastic clay for body, the South Mountain clays produced excellent light-colored building brick that was both hard and impervious, the kind of brick produced at the Pine Grove Furnace site (Way 1986:26; Watts 1991:46-47).

White clay was also made into white enameled tile and was used as a mineral filler in the production of chinaware, paint, horse liniment, white cement, and as a fill for dam construction (Sevon 1991:130-131). Mining of white clay for these uses appear to have ended in the Toland mines by the 1970s (Way 1986:26).

Granulated **greenstone** in South Mountain's metabasalt has been mined for roofing granules mineral filler in composition stone and flooring, concrete blocks, Portland cement, terrazzo, and dressing for clay-mineral tennis courts (Sevon 1991:131).

However, in the late twentieth century to the present, most of the quarry activity on South Mountain has been for **sand and aggregate**. Several significant quarrying operations are lined along the base of the west face of the mountain excavating sand deposits weathered from the sandstone ridge of the Antietam Formation. Processing plants for the sand and aggregate are located southwest of Mount Holly Springs and near Fayetteville.

One of the oldest of the current quarries has been in operation since 1915. Others have been in operation since the 1960s, and several new mines were opened in the 1980s. Sand deposits from the Antietam Formation are noted as being relatively high purity of silica, yielding white and buff colored sands. Initial operations extracted sand exclusively from on-site alluvial deposits. Later activities involved quarrying stone. Some sand is processed in a dry operation using a crusher and screens. Other plants use a wet process to produce sand and aggregates (Sevon 1991:127-128)

Washed sands are used primarily in the production of ready-mix concrete, masonry and specialty sands, precast and pre-stressed concrete products, paving, driveways, landscaping, and anti-skid products. Specialty sands are used for asphalt, filtration beds, landfills, and as golf course sand. Aggregates are used for a variety of road and construction uses and are produced in accordance with PennDOT requirements (Sevon 1991:127-128;130).

DISCUSSION OF HISTORIC CONTEXT WITHIN THE FRAMEWORK OF THE NATIONAL REGISTER OF HISTORIC PLACES

Many of the mineral extraction resources associated with the South Mountain landscape can be tied directly to the events and associations discussed in the historical overview above. Most are at least fifty years of age, and those that relate directly to areas, periods, and criteria of significance as outlined in the National Register of Historic Places guidance documents could be identified as contributing to a National Register eligible property.

Two specific contexts related to mineral resource extraction on South Mountain and use have been identified as of particular interest and significance: (1) the Native American quarrying of metarhyolite and (2) the late 18th and early 19th century mining and processing of iron ore. Several other historic activities could be further explored as well, such as mining and manufacturing for white clay, limestone, slate, and copper.

Two sites related to these contexts within Michaux State Forest are already listed on the National Register of Historic Places. South Mountain's Carbaugh Run Rhyolite Quarry Site (the Snaggy Ridge quarries) was listed on the National Register in 1986 (Adams County, #86000817) and was studied in further detail in archeological investigations. Pine Grove Furnace was listed on the National Register in 1977 (Cumberland County, #77001158).

The mapping of areas considered significant under these two listings should be reexamined. The Carbaugh Run / Snaggy Ridge sites warrant continued archeological investigation, which might lead to changes to its National Register mapping and significance. Mapping of the Pine Grove nomination includes the core area of the historic iron furnace, but not related but more distant landscape features—the Laurel Forge site, ore banks, and other related features outside of the core area. The area and features included in the nomination should be reexamined.

A few other sites related to South Mountain's historic iron industry have been surveyed, such as Old Forge Camp, but most have not. The Old Forge site, however, is referenced for its Civilian Conservation Corps significance, but not as the site of historic iron forges. The Multiple Property Documentation Form for Forestry and Civilian Conservation Corps sites within Michaux State Forest prepared by students from Shippensburg University identifies charcoal pits or hearths associated with Mont Alto Furnace as significant resources but no other iron-related resources.

Outside of the state forest, a few iron industry sites have been surveyed, such as the White House (Augusta Furnace ironmaster's house), Augusta Furnace Tenant House, and historic railroads. The Boiling Springs Historic District, particularly significant to the iron industry, has been listed on the National Register. However, many resources related to the iron industry have not been surveyed, such as additional furnace sites, buildings related to furnace sites, and ore banks.

The types of sites and resources that can be found within the landscape are outlined above in this chapter and are listed below. Individual resources

associated with each typology are discussed in the chapter and summarized in the section that follows. The potential contribution of these resources to a National Register eligible property is indicated.

RESOURCE TYPOLOGIES WITHIN THE SOUTH MOUNTAIN LANDSCAPE

Resource typologies within the South Mountain landscape that relate to the mineral extraction and industry context include:

- Native American Quarry Landscapes
- Iron Furnace Properties
- Network of 19th Century Wagon Roads
- Railroads
- Copper Mine Sites
- Clay Mine and Manufacturing Landscapes

Almost the entire Michaux State Forest landscape is significant to the iron furnace properties and the late 18th and 19th century iron industry in Pennsylvania. This is because the state forest was created out of lands directly associated with the Pine Grove, Caledonia, Mont Alto, Augusta, and Big Pond Iron Furnaces. Pine Grove, Caledonia, and Mont Alto State Parks share this significance and are core areas within the landscape. Additional resources and landscape areas outside of the state forest are significant to these furnaces and the larger South Mountain iron industry as well.

This significance is supported by the National Register of Historic Places Multiple Property Nomination Documentation Form for Iron and Steel Resources of Pennsylvania, 1716-1945 (Bomberger 1991). Specific resources have been identified and researched largely through the work of local historians, which is summarized above in this chapter. More work needs to be undertaken with respect to onsite survey and official documentation.

SPECIFIC RESOURCES WITHIN MICHAUX STATE FOREST

As described in this chapter, there is a wide range of specific historic resources within Michaux State Forest associated with the mineral extraction and industry typologies listed above. Many of these specific resources are landscape oriented, involving landscape features such as quarries, dams, charcoal hearths, haul roads, or railroad beds, rather than the construction of buildings. Most are closely associated with specific natural resources—minerals, water, or timber.

The historic factors that drove the extraction of mineral resources on South Mountain changed over time with changes in industry, technology, economics, and social organization. This overall context is discussed in the introductory section to this chapter, particularly in relation to the historical development and national significance of the iron and steel industry in Pennsylvania.

Intense industrial use of South Mountain wound down toward the end of the 19th and beginning of the 20th centuries. Since that time, the forest has reclaimed many of the historic sites discussed in this chapter, making them difficult to

discern today. However, they are a significant part of the region's history, and their documentation is important so their stories and their peoples can be recognized, understood, and appreciated by future generations.

The individual resources that support the mineral extraction and industry context and their potential significance are summarized and discussed below.

Native American Quarry Landscapes

Native American quarrying of metarhyolite on South Mountain was intensive and conducted over thousands of years. While the use of metarhyolite for tool making was steady and consistent over this long period, there were specific times when the material was of special value and significance and was specifically chosen over other available materials. In this sense, the stone has special significance to certain Native American societies and periods of development.

The particular area of quarrying activity appears to be related to the high quality of the stone found there for the making of tools. The quarry sites are spread over a fairly large area where this high quality material is found. Within the overall area, specific sites appear to be organized into a hierarchy of use related to extraction, processing, and support activities.

Investigation of the Snaggy Ridge site provides important information about prehistoric settlement patterns and cultures as they evolved over time. The 2001 archeological report on the quarries was the first systematic scientific study of this important resource. Archeological and scientific interest is ongoing, and the site's comparison with the organization and use of other types of quarry sites in the Mid Atlantic region is supported by new scientific techniques. Continued investigations should be undertaken.

South Mountain's metarhyolite quarries have been the subject of archeological interest since at least the 1890s. The general location of the Carbaugh Run/Snaggy Ridge quarries is widely known. Some of the sites have been disturbed by unauthorized artifact hunters such that their value in providing scientific information has been compromised.

The quarry area has received recognition from its listing on the National Register and increased protection from unauthorized disturbance through its official designation as the Carbaugh Run Natural Area within Michaux State Forest. The locations of specific quarries, processing sites, and related features are not publicized for their protection. Archeologists note that other prehistoric quarries exist along the metarhyolite formation in Pennsylvania and Maryland, but it is not clear whether other prehistoric quarry sites are present within the state forest. We have seen no references to any in the preparation of this report.

Iron Furnace Properties

Michaux State Forest was created out of the lands of former iron furnaces that were no longer economically viable. Historic resources related to iron industry uses are found throughout the forest. Most of the state forest land was acquired from three ironworks, Pine Grove in the north, Caledonia in the center, and Mont Alto in the south. Land associated with the Augusta and Big Pond Furnaces at the base of South Mountain's western edge in Cumberland County was also acquired.

Brief histories of these five ironworks are summarized in the body of this chapter from information and sources provided by local historians. The range of remaining specific historic resources associated with each of the ironworks is discussed. The chapter's review of these resources is organized into the following categories of types of landscape resources associated with iron furnaces:

- Property Boundaries
- Wagon Roads
- Railroads
- Charcoal
- Iron Ore Banks
- Limestone Quarries
- Water Power
- Ironworks
- Farms
- Additional Features

Networks of wagon roads and railroads are also identified here as separate typologies because they are part of the larger regional landscape, aside from specific roads and railroads being associated with specific ironworks.

The highest concentration of specific resources associated with an ironworks is found at its core site were the iron furnaces, forges, and supporting structures were located. These sites were intense, small-scale, 19th century industrial landscapes. Though similar to the 18th century iron plantations of southeastern Pennsylvania, the ironworks of the South Mountain region where nonetheless closely associated with the larger agricultural landscape of the Cumberland and Susquehanna Valleys.

Ironworks were dependent upon natural resources of good ore, water power, and large quantities of wood for charcoal. South Mountain provided these resources. While the iron furnaces and forges are the most obvious historic resources and were the central focus of historic activity, related essential resources such as ore banks, water power systems, logging roads, and charcoal hearths are spread across the landscape on the vast tracts of land upon which the ironworks depended.

These resources should be recognized and studied. The significance of the larger landscape areas associated with iron furnaces and their resources should be recognized with respect to National Register assessment and designation.

Pine Grove Furnace. The best preserved of the South Mountain ironworks is Pine Grove Furnace, because of its size, longevity, and isolated location. Pine Grove has the full range of types of historic ironworks resources remaining, from the preserved remains of the historic furnace, to historic buildings, to ore banks, to charcoal hearths and other resources. Pine Grove Furnace and its remaining resources are discussed in the body of this chapter. The photograph above shows the pit for the water wheel that pumped water out of the ore pit.

The core of the ironworks is located within Pine Grove Furnace State Park and has been listed on the National Register. Beyond the core area and the park, however, a wide range of related historic resources still remain. These include quarry sites, roads and trails, railroads, charcoal hearths, and farms used to support the community.

In addition to being the best preserved, Pine Grove Furnace is also the best studied of the South Mountain ironworks. Period plans should be developed to show how the ironworks evolved over time. The full extent of its historic landscape and remaining historic resources should be recognized, documented, and preserved. Pine Grove Furnace should continue to receive special attention in the future.

Caledonia Furnace. Like Pine Grove, the core area of the historic Caledonia Furnace ironworks is preserved as a state park. However, fewer iron industry resources remain as compared to Pine Grove. Most visible is the Blacksmith Shop, whose history and date of construction is uncertain. The reconstructed furnace monument has developed significance in its own right as a commemorative feature. The relocated furnace office and water power features, such as the pond and the headrace pictured above, are all that appear to remain from the ironworks era in terms of built features.

The history and resources associated with Caledonia Furnace are reviewed in the body of this chapter. Caledonia retains most of its visible integrity from its period as a recreational site beginning in the early twentieth century, rather than from its period as an ironworks. However, remaining features and topography provide clues to the site's ironworks appearance. The exact configuration of the ironworks is not clear, but historic 19th century maps not only suggest its layout, they also show how large the core area of the ironworks was, well beyond the area of today's state park.

Caledonia should be further studied. Period plans should be created showing how the ironworks evolved over time. Archeological investigations should be undertaken to locate the remains of historic structures. Associated iron ore banks should be located and surveyed. The full extent of the iron industry lands should be recognized and documented. Its history should be written.

Mont Alto Furnace. The historic ironworks land associated with Mont Alto Furnace comprises the southern third of Michaux Sate Forest. The core of the ironworks was located on what is now the Penn State Mont Alto campus, founded as the Pennsylvania State Forestry Academy after the ironworks had closed. As discussed in the body of this chapter, a number of historic buildings and structures from the ironworks era remain on the campus.

Mont Alto State Park, located just east of the campus and the historic ironworks, is significant primarily for its recreational context and use. It was created as a private park toward the end of the iron industry period. The core area of Mont Alto Furnace, including the park, should be further studied and documented as recommended for Pine Grove and Caledonia.

Within the state forest, a number of historic resources related to the ironworks remain. Most significant are the forge, rolling mill, nail mill, and related features constructed along East Branch Antietam Creek. The photograph above shows one of those sites. Known collectively as Old Forge, these sites are recognized today primarily for the Civilian Conservation Corps resources surviving at the forge site.

The ironworks resources have not been fully studied or documented. Local historians have collected information about the sites and explored them in the field. However, these sites, including the dams, raceways, water wheel pits, building foundations, and other landscape features, need to be fully surveyed and documented. Their significance as early 19th century industrial sites should be recognized. As with Pine Grove and Caledonia, the broader landscape associated with Mont Alto Furnace should also be recognized and documented and remaining features, such as charcoal hearths and logging roads, should be preserved.

Augusta Furnace. Not as much is known about Augusta Furnace as is known about the three furnaces noted above. The site of the furnace stack is marked on state forest land by a large pile of rocks that remain. Other site features may also exist and could help shed light on the layout of the works.

Augusta Furnace was associated with a complex of buildings and former mills centered at the edge of the valley, along Baltimore Road about a mile west of the state forest boundary. Only a few of the historic structures remain, including the former ironmaster's house. Research, however, suggests that the ironworks included a large number of structures and as much as 4000 acres. Much of that land may have been within Michaux State Forest. Further research needs to be undertaken, and forest lands should be surveyed for remnant features such as charcoal hearths, logging roads, and raceways. Together, the buildings, features, and landscape associated with Augusta Furnace could be considered a historic district.

Big Pond Furnace. The photograph above shows a dam on state forest land that may have controlled water feeding the headrace for Big Pond Furnace. In 1932, the Commonwealth purchased 5500 acres of former furnace lands as an addition to Michaux State Forest. It appears, however, the the historic furnace stack was intentionally excluded from that purchase.

The core of the Big Pond Furnace complex is located partly on state forest land and partly on private land. A former pond on forest land was improved during the Civilian Conservation Corps years but appears to have existed in the mid-nineteenth century across the road from the furnace stack. A number of buildings were present as well. The complex needs further study to determine its layout and development over time.

The stone furnace stack, on private land but located within a few feet of the state forest boundary, is deteriorating. It is the only surviving furnace stack associated with the ironworks at South Mountain other than the stacks at Pine Grove State Park. Another historic furnace just outside our core study area also survives in Boiling Springs, though stabilization is needed and is now being discussed (as of 2016) by local government and interested members of the public. An initiative needs to be undertaken to preserve it. Emergency stabilization and protection should be a first step. Further study could lead to a determination of National Register eligibility. As with the other furnace properties, survey and study should be undertaken to identify remaining resources on the full 6000 acres identified historically as related to Big Pond Furnace, including those on state lands.

Network of 19th Century Wagon Roads

Nineteenth century maps depict a network of wagon roads and trails within South Mountain connecting to communities to the east, north, and west. These wagon roads were important to the iron industry for the shipment of products and goods in and out as well as for movement within the mountain landscape. They were the primary means of transportation.

Many of these wagon roads continue to exist. Some are modern paved roads. Others have become gravel roads within the state forest. Others are now trails, access roads, or logging roads. Some are traces in the landscape. Some roads that still exist have been altered to change course over time.

The network of historic roads needs to be systematically studied and surveyed in the field. New roads that were added during the early forestry era in the early 1900s and by the Civilian Conservation Corps during the 1930s should also be documented and differentiated from those related to the 19th century ironworks.

Historic logging roads that connected to charcoal hearths should be identified if possible using LiDAR imagery. Many may still exist as trails. This overall transportation network is a significant contributing feature of the ironworks landscape both for South Mountain as a whole and for the individual iron furnace properties.

Railroads

Railroads were constructed to access iron ore banks and iron furnaces during the late nineteenth century in an effort to modernize and upgrade the ironworks. A railroad was constructed to Pine Grove Furnace in 1870, Mont Alto Furnace in 1872, and Caledonia Furnace in 1891. The Caledonia line was constructed after the end of iron production but was still related to mineral extraction. The Pine Grove line was later extended to reach the slate quarry on Piney Mountain.

The photograph above shows the bed of the historic Pine Grove Furnace line, now a walking trail within the state park. The significance of these railroads also relates to the recreation context discussed in this study for their use to access public parks created during the late 19th and early 20th centuries. Only portions of the Pine Grove and Caledonia railroads are present within state forest lands. These railroads are part of the broader regional and statewide systems and are significant to Pennsylvania's industrial development.

Copper Mine Sites

Copper mines are shown on historic maps in the 19th century in a belt extending along the portion of South Mountain in southwestern Adams County. A number of these mines were documented in 1970s, and several have been studied by local historians. Some of the copper mines are located within the boundaries of Michaux State Forest. These historic copper mines have not been surveyed or

studied with respect to their historical significance, however. Such study should be undertaken and the sites of historic copper mines identified.

CHAPTER 6 – FOREST, FORESTRY, AND CONSERVATION CONTEXT

> Foresters are essentially men of action. As a matter of fact, most of us enter forestry because, more than any other profession you might name, it offers a life of outdoor activity. In short, a career that is occasionally hard physically, but always interesting. Consequently, foresters as a class are prone to busy themselves with their daily tasks and leave the telling about them to others.
>
> — Henry E. Clepper, *The Seedling (1934–1935)*

OVERVIEW OF THE HISTORIC CONTEXT

Located at the core of the South Mountain Landscape is Michaux State Forest, a public reservation that extends over more than 85,000 acres. Established in 1901 as Pennsylvania's first state forest, Michaux extends between the Maryland-Pennsylvania border and the outskirts of Harrisburg, encompassing parts of Adams, Cumberland, and Franklin counties. The reservation was assembled from properties that had formerly served as a source of timber for the charcoal that powered the local iron industry. The iron furnaces on South Mountain played a significant role in the history of forestry. As in several locales within the United States iron furnaces led to initial destruction of old growth forests and densely forested regions such as the South Mountain region. The removal and burning of trees to make charcoal left the hillsides of South Mountain cleared of mature trees and blackened by fire by the end of the nineteenth century. The blackened hillsides left by the charcoal furnaces, and other damaged forested areas observed in Pennsylvania by medic and botanist, Dr. Joseph T. Rothrock, were the focus of a series of lectures presented by Rothrock that formed the basis for a state forestry program.

For more than a century, Michaux State Forest has served as a model of two inter-related endeavors—management of forest resources for commerce, recreation, and other public values, and conservation of soil, water, and biotic resources. As such, the South Mountain Landscape reflects broader national trends in American history. The establishment of Michaux State Forest closely followed the

establishment of first school of forestry in America by German forester Carl Schenck near Asheville, North Carolina, and associated large scale forest management efforts overseen by George Vanderbilt at the end of the nineteenth century. The Mont Alto School of Forestry, established in 1903 on the outskirts of Michaux State Forest, was the first school of forestry within the state of Pennsylvania. The school was instrumental in laying the foundation for forestry practices within the state reservation. In both of these endeavors, one individual—Joseph Rothrock—was instrumental in raising awareness of and convincing the state legislature of the need to establish forestry reservations and train foresters.

These ground-breaking efforts preceded the establishment of the U.S. Forest Service in 1905, and federal forestry reservations resulting from the Weeks Act of 1911, that allowed the federal government to acquire land in the Eastern United States for the establishment of national forests, and followed the guidance afforded by the Organic Act of 1897, which introduced as a federal mission the idea of a national forest system "to improve the forest, provide favorable conditions for water flows, and furnish a continuous supply of wood to meet people's needs." (USDA 2015) The work begun at South Mountain during the first decade of the twentieth century continued to influence forestry at the state level for decades, and several individuals involved in forestry in Pennsylvania, most notably Gifford Pinchot, were also instrumental in developing federal forestry policy.

While in practice forestry and conservation are two distinct fields, they both arose during the nineteenth century in response to societal changes, and a heightened awareness of the need for conservation and environmental stewardship, resulting from the damaging effects of the industrial revolution and associated resource exploitation on American landscapes. Conservation emerged in part due to the efforts of nineteenth century writers, artists, and activists who championed the value of the native American landscape. The Transcendentalist movement of the early nineteenth century led by writers Henry David Thoreau and Ralph Waldo Emerson, and the work of naturalist John James Audubon, contributed to a growing appreciation of nature.

Conservation of the Yosemite Valley and the Mariposa Giant Sequoia grove in California in 1864 served as the first example of a state government setting aside land as a public reservation based on its environmental value. Yellowstone, established in 1872, was the first federal reservation established for the same reason. By the national centennial, celebrated in Philadelphia in 1876, Americans had begun to realize that their landscape was recognized throughout the world for its variety and wonders, helping to elevate the nation in terms of its status among the established powers of Western Europe. Protection of the wonders of the American landscape became a focus of many groups and organizations following the 1876 Centennial as a point of national pride. These efforts were supported by the professionalization of conservation as a science, as well as land planning fields such as landscape architecture. Of the many individuals who played a leading role in articulating the need for conservation, perhaps the best

known is John Muir, whose efforts resulted in the establishment of the Sierra Club. Pennsylvania's history closely follows these national trends.

Forestry as a profession arose during the fourth quarter of the nineteenth century in response to problems arising from over-logging and associated environmental degradation. Early foresters were concerned with stabilizing land that had been badly treated with resulting soil loss, stream degradation, and fires. Following land stabilization, foresters were concerned with forest rejuvenation, and sustainable methods of timber harvest. American forestry followed tenets first developed in Germany where no forests of note had survived the demands of its population by the eighteenth century. The first American foresters were trained in Germany, and relied on German methods, but quickly realized the need to test new methods in adapting the European principles to the specific needs of American forests. The first clients of American foresters were private individuals with large land holdings. However, forestry soon became the purview of state and federal government agencies seeking to protect water and soil resources for the benefit of the public.

The Michaux State Forest was established in direct response to environmental concerns resulting from deleterious land management practices associated with nineteenth century industry and agriculture. As such, the forestry context associated with Michaux State Forest is also integrally linked to the historic context of industry and mineral extraction, discussed in Chapter 5 of this assessment. Located at the heart of the Mid-Atlantic region, with several large rivers suitable for transporting goods and materials, Pennsylvania was a center of early urbanization and industrialization, and its forests the focus of many demands. Like many areas of the Eastern United States, Pennsylvania's forests were cleared for agriculture and for use of the timber. Wood was an important fuel, and also served as a construction material. Wood generated several chemicals used in industrial activities, such as tanning of leather.

The activity with one of the greatest impacts on the forests of the South Mountain Landscape was the iron making industry. Where local geology had produced iron ore deposits, wood was used to make the charcoal needed to smelt the iron as early as the second quarter of the eighteenth century. By the fourth quarter of the nineteenth century, coal and coke began to replace charcoal as a fuel to smelt the iron ore, altering the former relationship between iron forges and forest resources. However, even after most furnaces had been converted to coal, wood continued to be harvested in great quantities to serve as ties for rail lines and the infrastructure for coal mines. By the time the iron industry in Pennsylvania began to decline, circa 1895, due to the accessibility of vast ore deposits of better quality in the Mesabi Range of Minnesota, 3.5 to 4 million acres of forest had been cut over in Pennsylvania. With each iron furnace requiring approximately twenty to thirty-five thousand acres of forest to sustain it, and charcoal production averaging the equivalent of one acre area of woodland each day, the forests around each furnace are thought to have been harvested between two and four times. The environmental consequences of these sustained clearing activities included soil erosion that filled streams and rivers with silt, and uncontrolled fires arising from charcoaling operations. Fires were such a problem that is has been

estimated that millions of acres of woodlands burned before they could be harvested—more than was cut to fuel the ironworks (DeCoster 1995: 2-3, 13). The evolution of the iron industry and iron furnaces in the vicinity of South Mountain are discussed in Chapter 5 of this assessment.

Although early forestry reservations in Pennsylvania were concerned with addressing these problems, over time the role of state as well as national forests has grown to encompass the provision of outdoor recreational opportunities for surrounding communities. Federal New Deal programs established during the Great Depression supported the enhancement of forest reservations at both the state and federal levels. Pennsylvania benefitted from these programs—particularly the Civilian Conservation Corps (CCC). CCC enrollees addressed fire management needs, built roads and fire towers, and cleared brush, while also enhancing recreation areas for the public. As such, the forestry and conservation context of Michaux State Forest also relates directly to a context of recreation. At the same time, views on environmental stewardship and the importance of biodiversity, coupled with the threat of climate change, have led to changes in the practice of forestry.

Within the South Mountain Landscape, tangible evidence of these trends exist in the form of the Michaux State Forest, Mont Alto School of Forestry, and Kings Gap Environmental Education Center, several natural areas, and the sites of New Deal era CCC camps.

HISTORICAL OVERVIEW OF THE FOREST, FORESTRY AND CONSERVATION CONTEXT

The following overview portrays the historical development of the South Mountain forest from prehistoric times to the present. It focuses upon the forces that caused degradation of the forest during the 18th and 19th centuries, the rise of forestry and conservation in the late 19th century, and development and change in the practice of forestry during the 20th century. The overview relates developments specific to South Mountain and Michaux State Forest to larger state and national trends and events. This discussion relates the background contexts presented in other chapters of this cultural landscape assessment related to the iron industry, governmental programs, and recreation to their impacts on South Mountain's forest, forestry, and conservation.

Much of the information summarized here is drawn from Lester DeCoster's *The Legacy of Penn's Woods: A History of the Pennsylvania Bureau of Forestry*, a publication prepared for the Pennsylvania Department of Conservation and Natural Resources in 1995 on the centenary of the establishment of the Pennsylvania Bureau of Forestry. This information is then supported and expanded with content drawn from a variety of other sources.

The historical overview in this chapter provides a substantive foundation for understanding and appreciating the historical context within which the entire cultural landscape assessment for Michaux State Forest is presented. At the end of this chapter, specific landscape resources associated with this historic context are discussed.

Forests in Eastern North American, prehistory to early settlement (1682–1730)

The concept of forestry and conservation of Pennsylvania woodlands was first promoted by William Penn, who arrived in the Philadelphia area from England in 1682 to serve as proprietor and governor of the colony following its grant to Penn by King Charles II in 1681. Penn recognized the need and market in England for wood products and sought to protect the commercial potential of the colony's forests. In support of this notion, Penn suggested that colonists consider "in clearing ground, care be taken to leave on acre of trees for every five acres cleared, especially to preserve oak and mulberries for silk and shipping." His suggestion, however, was disregarded by most colonists (DeCoster 1995: 1-2).

Penn's influence would have more lasting value in other areas. Although first named New Wales, the colony was later renamed Pennsylvania in honor of Penn. The name also includes the Latin word for woods—*silva*—further suggesting the value of the forest (DeCoster 1995: ix).

By 1682, settlers in the region had already begun to clear the native forests that covered the majority of the New World encountered by European visitors and immigrants. Dutch settlers began to occupy the area that is now Philadelphia by the 1620s. Swedish settlers established a small colony on the Delaware River in 1638. These settlers built cabins of logs, a technique that would become a

hallmark of American pioneer settlement. By 1662, settlers had erected the first sawmill in Pennsylvania in the area of present-day Philadelphia, and Dutch, English, and French traders were already competing for control of the area and its resources. Thus forests nearby were being cut for fuel and building material and burned for agricultural clearing (DeCoster 1995:2).

The forests of Pennsylvania are thought to have covered more than 90 percent of Pennsylvania's 28.7 million acres prior to European settlement (Thorpe 1997:2). Here, the forests were not only plentiful, but also diverse, with a wide variety of species reflecting Pennsylvania's location at the junction between northern and southern forest zones (Woods 2010).

Although Pennsylvania's forests have often been described as an unbroken expanse of trees, it is more likely that there were regular clearings or openings formed by both natural forces and human activities involving fire and agriculture. Native Americans are known to have burned woodlands to clear land for villages and agriculture, and to control the movement of game, as well as to allow for views of the surrounding landscape and potential approach by enemies. Pre-settlement forests burned frequently enough due to Indian and natural fire that burnable fuels generally did not accumulate to dangerous levels (DeCoster 1995:1).

American settlement patterns differed in significant ways from those of Native Americans. Although Native Americans established villages, they also moved when resources diminished, and their settlements generally remained small in comparison with those of the European settlers, who clustered together in ever growing towns and cities. Around the settlement, Europeans exhausted resources in an ever widening circle, including cutting larger and larger areas of forest. The settlers adopted several Native American techniques, including that of piling wood around large trees to clear areas with minimal labor, and setting the woods on fire to clear underbrush to enhance hunting. Fire became an increasingly destructive problem as they moved from the remnants of cut forests to standing forests (DeCoster 1995:1).

Early Fire Laws

The problem of uncontrolled fires within Pennsylvania's forests appears to have been of sufficient concern to early colonists that the state legislature began to pass laws to improve the situation in 1700. Between 1700 and 1735, the Colonial legislature enacted a series of laws against "unseasonable firing of woods" tied to penalties associated with associated damages. These laws did little to reduce forest fires, however, as the state neglected to fund or staff a public agency to enforce the laws or educate the public about the problem (DeCoster 1995:3).

The Colonial and Revolutionary War Eras (1730–1783)

Forests and the Iron Industry

As described in Chapter 5, throughout the mid-to-late eighteenth and nineteenth centuries, the land that would later become Michaux State Forest was central to the iron industry in the Cumberland Valley region. The raw materials essential to the industry included locally available iron ore, limestone, water for water power, and timber that could be used to produce the charcoal necessary to fuel the iron

furnaces and related operations. The early iron industry heavily impacted Pennsylvania forests due to their reliance on wood for charcoal. Within the South Mountain region, blast furnaces established during the eighteenth century included the Carlisle Iron Works at Boiling Springs (1762), Mt Holly Iron Works (c.1771), Pine Grove Furnace (c.1770), and Cumberland Furnace (1794) (Witmer 1990; Andre Weltman personal communication).

Exploration and Western Migration During the Early National Period (1783–1815)

Westward Migration

Following the establishment of the United States, Americans began to migrate westward, seeking land to establish farms and settlements. Settlement within Central Pennsylvania expanded. At the same time, settlers moved through the area to reach lands to the south and west.

Central Pennsylvania served as an important migration route for settlers headed south and west due to its geography. The Blue Ridge and related mountains, together extending from Maine to Georgia, provided a barrier to early westward migration. A gap in this barrier located in the vicinity of Harrisburg, north of South Mountain, provided access to the Great Valley through which migrants could travel south and then west. The Great Valley and South Mountain region became relatively wealthy and populous as a tide of people flowed across its land and used its resources. According to John and Diane Stemmons, authors of *Pennsylvania in 1800,* between 1795 and 1805 one of the world's greatest migrations of people moved into and through Pennsylvania, altering the forests and the land whether they stayed or not (Stemmons 1978). Where they settled, the migrants cleared remaining forests and established fields for cultivation. Over time, their trails became roads, and were joined by canals and then rail lines. Their settlements also grew, fed by raw materials and resources brought from farther and farther away (DeCoster 1995:2).

While the landscapes associated with the Great Valley to the north and west and the Lancaster Valley to the east offered prime agricultural soils and level well-watered terrain, the steeply-sloped land of South Mountain was less well suited to agriculture. It was instead developed principally by industrialists for iron manufacture. By the first quarter of the nineteenth century, there were a number of iron furnaces established along the edges of South Mountain where iron ore deposits could be accessed and water power was available.

All of these furnaces relied on charcoal for their fuel obtained by the logging of the South Mountain forests, with devastating environmental impacts over time. Iron masters typically purchased about twenty thousand acres or more around their furnaces and forges to supply the necessary charcoal wood (DeCoster 1995:13). The process, discussed in Chapter 5, entailed felling the trees, cutting them into cord wood, and charring the wood in large circular leveled and cleared areas known as hearths. Thousands of charcoal hearths can still be discerned throughout the South Mountain landscape. These historical resources, coupled with furnace remnants of the furnaces themselves, remain a physical reminder of

the early destruction of the old growth forests of South Mountain and also set the stage to tell the history of the conservation movement in the area.

It is often said that one acre of forest was needed to produce enough charcoal to fuel one day of iron making at each blast furnace. However, the amount of forest needed would vary between more or less efficient furnaces, and at any single furnace as technology improved over the decades. As a general statement, an iron plantation might require more than 600 acres of forest annually in the form of charcoal for smelting and further steps in iron processing, as well as wood for construction and to keep people warm in the winter (Andre Weltman personal communication).

Tree clearing was calculated for return. Chestnut trees, which were plentiful in American forests prior to devastation resulting from a pest introduced from China around the turn of the twentieth century, was considered to provide a minimum of fifteen cords per acre on a rotation of thirty years (Thomas 1985:21).

Many companies scattered their cuts over their acreage to maintain an average hauling distance. This left a considerable area growing, but the growth tended to be thickets of sprouts because of the frequent fires and cutting. As the supply close by the furnaces was depleted, workers traveled farther and farther afield, sometimes ten or twelve miles to secure the necessary wood. Workers would travel to the site of their charcoal hearths in a large wagon drawn by mules and return to the furnace with a load of charcoal. John Birkinbine, President of the Pennsylvania Forestry Association, described the practice,

> As a rule the men who chopped and coaled [made charcoal] saw nothing of their families from Monday morning until Saturday night when working on jobs that were remote from the furnaces and forges. The charcoal makers [called colliers] built simple cabins at the work sites. When the men moved on to new wood sources the cabins would be abandoned. They were built of logs cut from the woods nearby and were covered with leaves and earth for insulation and some protection from rain and snow (DeCoster 1995:14; from Birkinbine, 1897).

The fire that was used as a clearing tool by settlers and to make charcoal for the iron works remained a problem and threat to residents and forest resources. The ironworks attempted to control fires and prevent cattle from grazing the land to promote reforestation. At most blast furnaces and bloomeries the workmen were organized to fight fire. When an alarm was given all who could be spared were sent out stop the spread of the fire, not only on property connected with the ironworks but on contiguous land. Often the entire work force spent days fighting fire at the expense of the ironworks proprietors. In 1794, legislation was passed that suggested conviction of “willfully setting the woods on fire” would be associated with a fine of “not less than twenty dollars or more than fifty dollars (DeCoster 1995:3).”

Conservation was otherwise of little concern, although in 1791 the Philadelphia Society for the Promotion of Agriculture awarded medals to those who planted locust trees, which were needed for hard and durable posts and wooden pegs used in some types of construction (DeCoster 1995:3).

Andre Michaux

In 1785, as westward migration is beginning to heavily influence the character and composition of Central Pennsylvania forests, French botanists Andre Michaux and his son, Francois Andre Michaux, were dispatched to America to study its plant life by King Louis XVI (Savage 1986:34-35). The father and son team recorded their travels in America over a twenty year period in several publications that included *Travels West of the Alleghanies Made in 1793–1796; in 1802; and 1803,* and a landmark three-volume work, *The North American sylva, or, a description of the forest trees of the United States, Canade, and Nova Scotia. Considered particularly with respect to their use in the arts and their introduction into commerce. To which is added a description of the most useful of the European forest trees*.

Although these publications focused on classifying forest trees and plants, they also conveyed observations regarding social and economic conditions in the new nation. Accounts of their travels suggests that François Andre Michaux traveled through the Cumberland Valley near the South Mountain area alone, and only once on his way from Philadelphia to Pittsburgh in 1802 (Savage 1986:216-222).

Returning to America in 1817, the younger Michaux described the increasingly "alarming destruction of trees in America" by settlers and timbering entities (DCNR 2003:62-63). Despite a lack of a direct connection between the Michauxs and South Mountain, Francois Andre Michaux's bequest of $12,000 "for the extension and progress of agriculture and more especially of silviculture [science-based management of forests] in the United States" upon his death in 1855 had a significant impact on the eventual founding of the state forest (DeCoster 1995:4; Savage 1986:358).

The Antebellum and Civil War Periods (1815–1865)

By 1850, the majority of Pennsylvania residents lived on farms or in small rural settlements. At the same time, iron furnaces continued to be an important part of state and local economies. Although changes were occurring with the industry, including conversion from charcoal to coal, there were as many as two hundred charcoal furnaces scattered throughout the state. Established South Mountain furnaces continued to operate and a number of new furnaces were started, all continuing to harvest trees from the mountain for production of charcoal.

As with earlier periods, the control of fire remained a concern of the state legislature. In 1824, the Pennsylvania General Assembly passed a law forbidding the "willful setting of fires," with conviction carrying a fine not to exceed $500 and punishment of imprisonment at hard labor not to exceed one year. Although the terms of punishment were severe, once again the law was not enforced and there was little change in the behavior of residents. Another fire law enacted in 1860, made "wilful setting" of forest fires a misdemeanor subject to a fine not to exceed one hundred dollars and imprisonment of no more than one year (DeCoster 1995:3).

The Postbellum Period (1865–1895)

Iron industry

Following the Civil War, the iron industry began to change in response to technological advances and the rise of the railroad as a transportation system. The rail lines allowed for the introduction of coal as a fuel to replace charcoal.

Most of Pennsylvania's charcoal furnaces closed with the opening of the Mesabi Range in Minnesota in the late nineteenth century. The discovery of Mesabi's high quality ore; the ability to transport raw materials and finished products efficiently on railroads and waterways to and from industrial sites at large population centers; and the fundamental *economies of scale* resulting from giant iron and steel plants, all conspired to eventually displace the relatively smaller quantities of pig and wrought iron produced by localized iron works. Despite effort to adapt and improve, the last of South Mountain's iron furnaces closed in the 1890s.

The closing of the iron furnaces left a legacy of environmental degradation at South Mountain and elsewhere. Yet because the iron furnace companies had maintained large blocks of forest land, and through crude methods, tried to encourage natural reproduction of forests, these often proved to be the most suitable land available for purchase when the new state forestry agency started to acquire land during the early twentieth century (DeCoster 1995:15).

Timber Industry

Although the use of charcoal to power Pennsylvania ironworks waned during the last quarter of the nineteenth century, the need for wood products continued to rise to fuel construction needs. Though more critical in other areas of the state than on South Mountain, logging for the timber industry devastated the state's forests, compounded environmental degradation, and raised public concern.

The state of Pennsylvania led the nation in logging in 1870, and remained fourth in the nation by 1900. The forests along the state's northern tier were largely cleared and then abandoned by large timber companies, practicing a "cut out and get out" philosophy in which shoddy workmanship was the norm (Thomas 1985:5). The approach resulted in piles of slash that contributed to the ongoing problem of wildfires. Denuding areas of trees, removed the protective cover of the tree canopy and roots to hold the soil.

As with charcoaling, these logging practices led to flooding and erosion, and stream siltation that diminished water quality as habitat and a drinking water source. The loss of topsoil also severely limited the forest's ability to regenerate itself. In *A Century of Forest Resources Education at Penn State*, Historian S.W. Fletcher notes "There is no more shocking example of greed and utter disregard for public welfare than the ruthless devastation of the forests of Pennsylvania by the lumber companies between 1840 and 1900." Following the logging practices that characterized the period, the landscape that remained became known as the "Pennsylvania Deserts." (Woods 1986)

Ineffective fire laws continued to be passed through this period. A fire "prevention act" passed in 1870 identified county commissioners as responsible for locating and prosecuting those who were guilty of burning timberland. Once again, enforcement of the legislation was not funded. In 1879, another fire prevention act suggested that "any person or persons who shall wantonly and

willfully kindle any fire on the lands of another, so as to set on fire any woodlands, barrens or moors, within the limits of this Commonwealth shall be guilty to pay a fine not exceeding three hundred dollars, and undergo an imprisonment not exceeding twelve months, or either or both, at the discretion of the court; and prosecutions for such offenses may be commenced at any time within two years from the commission thereof." (DeCoster 1995:3)

The Roots of Forestry and Conservation in America

In the United States, the first tangible act of public conservation occurred in 1864 with the establishment of the Yosemite reservation by the federal government and its transfer to the state of California. One of the resources considered worthy or conservation was the Mariposa Grove of giant sequoia trees. Naturalist John Muir's concerns regarding the way the land was managed led to the establishment of Yosemite National Park in 1890. Conservation of the remarkable geothermal features and other landscape resources in northwestern Wyoming were protected as part of the first national park at Yellowstone in 1872.

Around the same time, the idea of protecting other forest reserves within the United States began to be promoted in response to the ravages of the industrial revolution and an appreciation for the value of American wilderness. Among the challenges faced by conservationists during the 1870s and 1880s were Western interests which resisted all efforts to protect land from exploitation. These interests were able to delay conservation actions by taking advantage of the democratic process that allowed for endless investigations, committees to gather information, and debates in Congress. Finally, in 1876, Congress created the office of Special Agent in the Department of Agriculture to as a way to consider and assess the quality and conditions of forests in the United States. In 1881, this office was expanded into a newly formed Division of Forestry.

In 1886, Bernard F. Fernow was appointed chief of the Division of Forestry. Fernow was one of America's first foresters. A highly educated but thin-skinned Prussian who came to America in 1876 to attend one of the first forest conferences, Fernow had decided to remain in the United States. His first job was to manage private woodlands, including fifteen thousand acres of forest in Pennsylvania owned by Cooper Hewitt and Company that were harvested for charcoal. Fernow, with his European training, brought the idea of sustained yield to bear on the policies of the agency, showing how forests could be managed to prevent timber harvests exceeding annual tree growth. Fernow was instrumental in helping to craft the legislation establishing federal forest reserves that finally passed Congress in 1891. The legislation authorized the president to set aside forest reserves for the public domain that would be managed by the Department of the Interior. By 1892, President Benjamin Harrison had created fifteen reserves containing thirteen million acres. Despite this success in designating forest reserves, the federal government as of yet had no plan for how to manage the land. (Bolgiano 1998:84-85)

The Rise of Forestry in Pennsylvania

By the third quarter of the nineteenth century, the deleterious effects of logging were being recognized throughout the state of Pennsylvania. One of the people who was instrumental in sounding the alarm and raising awareness of the

problem was Dr. Joseph T. Rothrock. Rothrock was a medical doctor as well as a botanist. In 1877, he was chosen as the Michaux Lecturer by the American Philosophical Society of Philadelphia, custodian of the funds left by Francois-Andre Michaux in his will in 1855 to promote botanical education, silviculture, and the new science of forestry emerging abroad. At the time, Rothrock was serving as professor of botany in the auxiliary faculty of medicine at the University of Pennsylvania.

The resulting Michaux Forestry Lectures were among the first attempts to educate the Pennsylvania public on forestry. They were a key to establishing an understanding of forestry in Pennsylvania and in the United States. Rothrock presented his lectures several times a year in Horticultural Hall in Philadelphia. He illustrated them using lantern slides that featured images of the commonwealth's forests, which he collected in person by traveling throughout the state. During his travels, Rothrock began to understand the extent of the problem and the deplorable condition of the state's forests, and became determined to act. Rothrock delivered the Michaux lectures each winter for the next fifteen years, addressing a wide range of issues related to forestry. As part of his Michaux lectures, Rothrock began to explain the potential to manage forests for regeneration. At the same time, he introduced many of the concepts that have been adopted as part of state and federal forest management programs—touting the benefits of forests to a community: physical health, enhanced hunting and fishing, hiking and family recreation, clean air and clean water, flood control, and a more pleasant climate. (Thomas 1985:3-7; Woods 2010)

Although the Michaux lectures were given mainly at the University of Pennsylvania, they drew interest and raised awareness amongst the citizenry far beyond academia. Rothrock's lectures were instrumental in introducing Americans to the new field of forestry, and brought attention to the problem of Pennsylvania's disappearing forests (DeCoster 1995:4).

At the same time, at the state level, Governor John F. Hartranft began urging the legislature to address poor forestry practices. In 1873, he requested the legislature consider a bill to prevent "stripping of our mountains and hills for their trees." In 1874, Hartranft followed this up with a plea for "some measure to arrest the wanton and indiscriminate destruction of the forests of the state." Although Hartanft's requests did not result in sweeping legislation, the state legislature, in April 1885, authorized the governor to designate a day each year as Arbor Day. The principal goal of Arbor Day was to encourage the planting of trees in order to celebrate and safeguard forests. (DeCoster 1995:3-4)

After several years of discussion, the state legislature finally decided to authorize an assessment of the condition of Pennsylvania's forests, as part of an effort to address the emerging problems associated with deforestation in the late 1880s. On April 26, 1887, the General Assembly passed a joint resolution authorizing Governor James A. Beaver to appoint a committee of "not more than five persons to serve without compensation, to examine and consider the subject of forestry in Pennsylvania, and report the results of their labors, by bill or otherwise to the next regular session of the legislature." After the committee was appointed, the

group prepared a study that proposed establishment of a forest commission. This proposal was rejected by the legislature in 1888. Speaking at the meeting of the American Forestry Congress in Philadelphia October 16, 1889, the Honorable Washington Townsend of West Chester said, "Pennsylvania is not ready to adopt a proper system of forestry. When the people thoroughly understand the matter it will come." (DeCoster 1995:7)

Within Pennsylvania, the debate over the role of government in forestry policy continued. Finally, on May 23, 1893, Public Law 115, which allowed for the establishment of a state Forestry Commission was passed. The law charged the governor with appointing two persons, one a competent engineer, the other a botanist, to examine forest conditions within the state and suggest appropriate actions by March 15, 1895. Dr. Rothrock was hired as the botanist, while William Findlay Shunk served as the engineer. After Shunk fell ill, the bulk of the work fell to Rothrock. Shunk, however, did provide valuable information to the report regarding geologic and water features as they related to forests. (DeCoster 1995:7)

During this tumultuous period, recognizing that legislation would not be forthcoming, and may not adequately address the problems with Pennsylvania's disappearing forests, citizens groups began to form to deal with forest related problems. The groups organized around a variety of causes relating to forest preservation, including the protection of forests in parks and wilderness areas, the study and promotion of forest best care practices, education and outreach, and the promotion of forest-friendly legislation. Of these groups, the one that met with the most success was the Pennsylvania Forestry Association (PFA). (DeCoster 1995:10)

In its initial form, the PFA was a woman's club organized and funded by prominent Philadelphia citizens in early 1886 under the name the Association for the Promotion of Scientific Forestry. Led by Mrs. Brinton Coxe and Mrs. John P. Lundy, the group joined forces with other Philadelphia-based groups, such as the Historical Society of Pennsylvania. Among their first activities was to invite speakers knowledgeable on the issues to address the organization and help to raise awareness of the needs. Among the speakers at one significant organizing meeting were Dr. Joseph T. Rothrock and Bernhard Fernow, then head of the new U.S. Division of Forestry in Washington. The information conveyed at the early organizing meetings helped to form the goals and mission of the group, which included support for the creation of state parks and forests. In June 1886, the organization was renamed the PFA. Notable names in forestry, including Rothrock and John Birkinbine, were included among the organization's officers. The organization published the first issue of its magazine, *Forest Leaves*, a month later using a portion of the $5,000 in funds that had been collected to start the association, hire staff, and publish the magazine. The PFA grew quickly due to ongoing concerns about forest conditions and the public attention created through the speeches, meetings, and press reports promoted by the organization. By 1887, the PFA boasted 450 members. In contrast, the American Forestry Congress (a national group) had only 139 members at the time. (DeCoster 1995:4-5)

In the end, the PFA proved not only a major influence in Pennsylvania, but on the national level as well. After two national forestry groups—the American Forestry Congress and the National Forestry Association—met with the Pennsylvania Forestry Association on October 15, 1889, in Philadelphia at the eighth meeting of the American Forestry Congress, a new organization—the American Forestry Association (AFA) was formed from the union of the two national groups. The AFA, known today as American Forests, still operates as a national voice for the forestry concerns of American citizens. (DeCoster 1995:5)

The PFA remained an influential force for years to come. In 1892, as the Michaux Forestry Lectures were scheduled to end, the PFA funded additional lectures by Dr. Rothrock, which were not limited to the Philadelphia area. Using his lantern slides, Rothrock illustrated his concerns regarding the poor condition of denuded Pennsylvania hillsides with photographs taken around the state and promoted the message "Forests are a crop, protect them from fire, take care of them (DeCoster 1995:5)." Of concern was how to convince the lumber companies that forest management was profitable, particularly given the long-term investment that was required to plant, cultivate, and guard a crop that took decades to mature. Rothrock understood that he would have to prove the potential profit to be made in growing forests, and that the current practices associated with logging would soon destroy the entire crop of trees. One of Rothrock's mantras became "Woodman, cut those trees judiciously (Woods 2010)." Over time. Rothrock interested several key individuals in his cause, including Mira Lloyd Dock, a well-known public lecturer and leader of the "City Beautiful" movement, and George Hermann Wirt, the state's first professionally trained forester. Rothrock remained closely linked to the PFA throughout his career.

Forestry Training and Education

While in Pennsylvania, as at the national level, it had become clear by the late 1800s that forests served an important environmental purpose, but were suffering from the destructive impact of widespread logging, few Americans had experience or training in the management of forests. The early efforts to establish forestry measures were led by individuals who recognized the imperative of the forestry crisis and the associated issues of resource conservation, as well as the need to train professionals to handle it. For advice, those involved in early forestry programs in America recognized the need to turn to the Germans. Among these individuals was Dr. Joseph Rothrock.

In 1880, Rothrock traveled to the University of Strasbourg in Germany, where he studied botany. While there, Rothrock visited several European managed forests, witnessing the results of scientific forestry policies that had long been in effect in German forests. The careful management of timber resources effected by German foresters greatly impressed him, and inspired Rothrock to introduce similar practices to the United States. Forestry as a science had been invented in eighteenth-century Germany, where woodlands were cut so destructively that they turned into heaths. Lacking wood even to keep warm, Germans were forced to rehabilitate their woods. They devised the practice of silviculture, the growing of trees for repeated harvests, using carefully devised methods. (DeCoster 1995:6)

During the late nineteenth century, however, as the need to practice forestry emerged at the federal and state level, there were no forestry education programs in the United States. Those interested in pursuing a career in forestry were forced to travel to Germany to study under their established system. Several Americans chose to travel to Europe to study forestry during the 1880s, and then attempted to establish schools in the United States. In Pennsylvania, Joseph Rothrock began to promote the establishment of a forestry education program during the 1880s.

Turn of the Century Changes (1895–1917)

Pennsylvania State Forestry Commission

In March 1895, the Pennsylvania State Forestry Commission delivered a report on its findings relating to evaluation of state forests, and needs relating to protection of natural resources. The comprehensive study, led by Dr. Rothrock, suggested the following:

- The state owned no land other than that immediately around public buildings.
- The amount of forested land had decreased from more than 90 percent of the state's total area at settlement to 36 percent at the end of the nineteenth century. The report suggested that this total fell below safe levels for wood supply, water protection, and public health.
- Concerns regarding the state of Pennsylvania's forests resulted from the clearing of some inappropriate land for agriculture, the ongoing threat of uncontrolled fires, and destructive logging practices.
- Current taxation policies were contributing to the problem by providing incentives to clear forests beyond the needs of agriculture or wood supply. (DeCoster 1995:7)
- While the report recommended a state forestry program, it recognized several challenges to establishing such a program
    - the technical expertise to manage forests was not available;
    - there was no system for gathering forestry information;
    - there were no forest tree nurseries to support reforestation efforts;
    - repeated fires prevented reforestation;
    - private owners abandoned their land after cutting the forests in response to the tax laws;
    - forest industries were transitory, leading to a transient wood economy;
    - forests were regarded as nonrenewable resources by most people.

To address these problems, with a particular emphasis on the need for the state to protect public drinking water supplies through forestry practices, the report proposed that the state pursue the following actions:

- Fund a full-time forestry commission office to deal with the state's forest problems.
- Acquire land suitable for growing forests to protect the headwaters of streams, ensure wood supply, and demonstrate the benefits of forestry to the public;
- Organize a fire prevention and protection system to enforce laws and educate people regarding careless use of fire, and detect and extinguish fires as they occur to minimize damage;
- Assist wood industries and forest landowners in growing and utilizing materials from the state's forests;
- Gather and distribute information regarding the forest conditions;
- Propose solutions to the tax laws that encouraged cutting and abandonment of forests.

In the report, Rothrock also emphasized the importance of forests as a commercially important crop:

> The art of forestry is the production of the largest crop of the most desirable timber in the least time and at the least expense on land that is unsuited for remunerative agriculture, or for profitable grazing. Such at least must be our definition for the present, in this country. It may happen, however, in the future that forest growth will be the best paying crop on lands which are also well adapted to either agriculture or grazing. The law of supply and demand will decide this. It will thus be recognized that forestry is but an extension of agriculture and that it is subject to exactly the same business laws that govern our ordinary agricultural operations involving only a longer reach of years to mature a slower growing crop. (DeCoster 1995:8; from Rothrock 1895)

Rothrock also noted other values associated with forests: "Forests provide beauty. They affect our air, water, and our future." (DeCoster 1995:8; from Rothrock 1895) In his section of the report Shunk noted:

> We hither to a wooded country and for six generations the axe has been busy making room for corn and grass. He concluded that forest removals probably affected water flow, but that experts lacked agreement as to the extent of the effects. It is enough, however, for practical purposes to have learned that the forests influence the flood. The proverb says, 'When you sell a cow you sell the milk too.' So the man who plants a forest plants its functions too, which will act in due time whether the man knows of the influence or not beforehand. The trees hinder sun and wind from drying the ground; from melting and heaping snow. They fend the shock of beating rains. Their offcast leaves and twigs and their dead trunks decay quicker in the moist air of the forest than on the open field, forming a loose thirstful mold, sheltered and fostered by the yearly renewing ground litter. Their damp shade favors the growth of moss, another strong water drinker. The matted

> floor, and in winter climates, the cover of deep snow, keep the soil tender and open in texture, thereby promoting absorption; whereto likewise the deep going tree roots give furtherance by making channels downward in the under earth. Side roots hunching the soil like moles and the tangled surface cumber and slacken the flow of water after heavy rains; and all these agencies, whatever other duties they may have, do work together to the one end of holding back waters which would else make flood. (DeCoster 1995:8; from Shunk 1895)

The Pennsylvania Division of Forestry, Department of Agriculture, 1895

Based on the commission's report, and the support of groups like the PFA, the legislature formed a state Division of Forestry within the Department of Agriculture in 1895 to "encourage and promote the development of agriculture, horticulture, forestry and kindred industries." The legislature recommended that a commissioner of forestry be appointed. The first individual to fill the position was Dr. Rothrock in September 1895. (DeCoster 1995:10)

Rothrock accomplished many things during his tenure (1895–1904) as commissioner. First and foremost, he set in motion the purchase of lands for State Forestry Reservations, the training of foresters for state service, the establishment of forest tree nurseries to support reforestation, and the formation of a system of facilities and people to detect and extinguish forest fires. Resulting from these efforts was a land acquisition program that allowed the state to directly control land of its own in major forest and watershed zones. In 1897, the Commonwealth established the Forestry Reservation Commission, which was authorized to acquire "unseated lands" (land without buildings or fields) through tax sales or by purchasing from private owners (Couser undated). In 1899, the Act was amended to allow purchase of unseated lands whether they were up for tax sale or not(DeCoster 1995:34). The commission was first authorized to "locate acquire and condemn, subject to jury damages, three reservations of not less than forty thousand acres each, upon the headwaters of the Delaware, Susquehanna and Ohio rivers." (DeCoster 1995;33) Between 1898 and 1910, the state acquired 924,798 acres for forest reservations or reserves through Rothrock's active involvement.

Another key outcome was the establishment of a forest academy to train foresters for state service. Based on the legislation relating to the establishment of state forests, they were:

> to provide a continuous supply of timber, lumber, wood and other forest products; protect the watersheds; conserve the water and regulate the flow of rivers and streams of the state; and to furnish opportunities for healthful outdoor recreation to the public. (DeCoster 1995:86)

In 1898, he began to suggest that schools educate students on the principles of forestry. He also asked for funding to "furnish tree seeds and information to schools starting the next Arbor Day," and began a program to educate students about the new science of forestry (DeCoster 1995:30). The presence of state nurseries and a state forestry agency were also used to promote tree planting programs in cities and along pubic roads. In 1901, Public Law 569 encouraged the planting of shade trees along public streets. The same year, Public Law 610

encouraged tree planting along roadsides. There was a protection program in the law offering tax abatement for landowners who protected the planted trees through fencing and other means. The abatement was not to exceed one-fourth of the road tax. It was used somewhat, but the rebate amounted to only fifty cents per tree and it was unpopular with city and town officials because it made extra work for assessors. (DeCoster 1995:42-43)

Rothrock's goals for fire suppression and prevention addressed a critical concern of many state residents, but were challenging to meet. Newspapers printed articles in support of the state's enforcement of fire laws. The Philadelphia *Record* indicated on July 10, 1899, "It is a pleasure to know that two misdemeanants found guilty of kindling forest fires are languishing in the Huntingdon County Jail. The news ought to be spread abroad in the State as a deterrent to others who, out of willful malice or a mere spirit of deviltry are guilty of this crime. The yearly destruction of growing timber in Pennsylvania by reason of spreading fires inflicts heavy loss upon owners of woodland property and makes almost nugatory, the efforts of the State for forest preservation." (DeCoster 1995:12)

Thousands of forest acres continued to burn in Pennsylvania year after year. An annual fire loss of 350,000 acres was not unusual. In 1897, the forestry commission estimated that fires had burned 191,029 acres of Pennsylvania forests. Some years, the number was reduced by better fire protection or wetter weather, but would tend to rise again later. In September 1899, the American Forestry Association's magazine, The Forester, quoted Rothrock as saying: "The recent destructive forest fires in Centre County bring prominently forward the laws passed by the legislature of 1897 for the suppression of forest fires and the question may be raised, and doubtless will be, are these laws effective? The answer is, yes."

Rothrock cited figures to show that the loss to forest fires had dropped from $1 million in 1886 to $53,000 in 1896. He said "Two fire laws are responsible: First, the Act of March 30, 1897, making constables of townships ex officio fire wardens, responsible for extinguishing and reporting fires under penalty for failing to do so; they also can require the assistance of others; second, the Act of July 15, 1897, making it the duty of county commissioners to appoint persons under oath whose duty it shall be to ferret out and bring to punishment all persons or corporations who either willfully or otherwise cause the burning of timberlands. There is a penalty to be levied against the commissioners if they fail to make the specified appointments."

In 1897, after formation of the Bureau of Forestry, the 1870 fire protection act was changed to include penalties for the failure of county commissioners to comply with the measure, and the state treasurer was authorized to pay half the expense of employing forest fire protection staff. A companion law made township constables forest fire wardens, with authority to recruit persons for extinguishing forest fires, and compensation was authorized.

These were the early attempts at fire control through legislation, without an education and enforcement system. The enactment of law after law after law forbidding reckless use of fire gradually evolved into a combination of laws that prohibited various other unsafe practices, established enforcement systems for

the laws, attempted to educate people regarding fire prevention, and provided systems for detecting and controlling fires. (DeCoster 1995:3)

The forestry department began pressing for fire tower and patrol systems to detect forest fires in their early stages so that a quick response could be made. The department stationed people at lookout points, some of which, called tree towers, were little more than perches in tall trees. The nation's first man-made fire-lookout towers followed at Michaux State Forest in 1905, and were improved with steel construction in 1914, also a first, and located at Michaux State Forest. Roving patrols were operated during the risky seasons of spring and fall. (DeCoster 1995:47; DCNR 2015)

State forestry employees were also made ex- officio forest fire wardens in 1907. In 1909, the Fire Warden's Act authorized the commissioner of forestry, who also served as the chief forest fire warden, to appoint forest fire wardens throughout the state. The Act was a positive step toward better fire protection, but failed to provide adequate patrols for early detection and for fighting fires while they were still small. A professional state-level fire organization was approved in 1915. George Wirt was appointed to head the organization. This completed the basic fire prevention and protection organization still working today. (DeCoster 1995:41)

State Department of Forestry

On February 25, 1901, the legislature and governor approved Rothrock's plan to elevate the role of his division within the Department of Agriculture to the State Department of Forestry. Rothrock was appointed to head the new department, which began to purchase land rapidly and add staff. George Wirt was appointed to head the department. Wirt's first assignment was to prepare a forest management plan for the Mont Alto Forest Reserve (combined with other iron company lands in 1920 as the newly named Michaux State Forest) then being purchased west of Gettysburg in the South Mountains. Wirt also established a tree nursery in the reserve on April 20, 1901. He also located boundaries, planted trees, and put fire protection and careful timber sales in place on the reserves. Wirt was instrumental in helping Rothrock establish the forestry school at Mont Alto that opened in 1903; he was subsequently named the first director of the academy. (DeCoster 1995:31-33)

In 1904, Robert S. Conklin, who had been appointed deputy commissioner of forestry in 1903, replaced Rothrock as director of the department. Conklin had recently established a research center at Mont Alto in affiliation with the forest academy. The center was concerned with the study of practical topics such as tree planting techniques and treating insects and diseases that impacted forests. While director, Conklin focused on continuation and further development of the forest academy; expansion of the state forests; improved fire prevention; promotion of forest conditions in the state; and improved information gathering on forest conditions throughout the state. State forest acreage more than doubled during Conklin's sixteen year term as head of the director. Conklin also expanded the state forest tree nurseries started by Rothrock. (DeCoster 1995:41-42)

The value of forests in protecting water quality was recognized in 1905 when the commissioner of forestry and the Forestry Reservation Commission were authorized to give municipalities the privilege of impounding water on state forest reservations. This provision was further strengthened in 1909 when municipalities were authorized to acquire lands suitable for establishing municipal forests. At the same time, the department was tasked with advising the municipalities on these endeavors. (DeCoster 1995:44)

Between 1905 and 1920, the Department of Forestry accomplished many challenging projects, including addressing the future of buildings on land acquired for forest reserves, building necessary new structures, locating and marking miles of boundary lines on the newly acquired lands and many more miles of roads, fire lanes, and bridges, and installing telephone lines and radio systems. (DeCoster 1995:47)

Other changes that occurred during the first two decades of the twentieth century included the establishment of grazing laws and timber sale protocols. During the early years of its existence, the commission allowed property owners living near forest reservations to graze their cattle within the public land. However, after repeated abuse of this privilege through overgrazing, the commission created “rule 17” for reservation management in 1906, which stipulated that owners would need permission to graze their cattle, and placed grazing activities under the control of the commissioner. Timber sales were also begun circa 1906. Initial timbering was conducted by hired foresters charged with recovering some of the growth that had occurred in the forest reservations. (DeCoster 1995:35)

By 1912 there were 966,295 acres in Pennsylvania forest reservations. In 1916, these tracts were renamed state forests. Additional acreage continued to be added. By 1917, the state managed 1,017,773 acres of forest land. However, a plan prepared in 1920 that outlined an overall goal of acquiring an additional five million acres, and several efforts to establish a bond issue to fund the purchase of the land, were not successfully implemented. (DeCoster 1995:36)

The Bureau of Forest Protection was formed as a division of the state Department of Forestry in 1915 through Governor Martin Brumbaugh’s signing of Public Law 797. The new bureau was responsible for preventing, controlling and extinguishing fires on all forest land within the commonwealth. George Wirt was appointed chief forest fire warden and head of the new bureau later that year. By 1917, Wirt had placed trained fire wardens in twenty-one fire districts across the state. (DeCoster 1995:47)

Public Law 797 also established the Bureau of Publicity within the Department of Forestry. This fulfilled one of George Wirt’s proposals in 1912 concerned with educating the public about forestry. The need for the bureau had also been recognized in 1915 during a meeting in Galeton where those in attendance passed a resolution endorsing the idea of “a special bureau to educate and inform the public about forestry.” The new bureau was headed by Forester N.R. McNaughton. One of the bureau’s first projects was to create and staff a forestry exhibit at the Pennsylvania Welfare and Efficiency Conference. In support of the goal of reducing forest fires, the bureau issued 450 news articles and initiated

work on a motion picture about preventing forest fires titled "The Curse of the Forest." The bureau used Mont Alto to stage a forest fire for the film. Over time, the film was viewed by two hundred thousand people. (DeCoster 1995:47-48)

Gifford Pinchot and the U.S. Forest Service, 1898–1910

During the same period in which Pennsylvania was creating a new agency for the establishment and management of forest reserves, the United States government was in the process of similarly organizing itself around the new conservation need.

The Organic Act of 1897 introduced the mission of the federal government in establishing national forests as to improve the forest, provide favorable conditions for water flows, and furnish a continuous supply of wood to meet people's needs, helping to bolster the idea that a system of national forests were needed to protect the public interest. In 1898, Gifford Pinchot was appointed by President William McKinley to head the young Division of Forestry of the U.S. Department of Agriculture, replacing Bernhard Fernow (DeCoster 1995:57).

Born in Simsbury, Connecticut, in 1865 of French immigrants, Pinchot traveled in wealthy and exclusive circles. After attending Yale University between 1885 and 1889, Pinchot attended the world-famous French Forestry School at Nancy in 1890, and became the first American-born formally trained forester. Immediately after receiving his degree, Pinchot began practicing in New York City as America's first forest consultant. One of his clients was George Vanderbilt, who hired him to help manage forests associated with his Biltmore estate and Pisgah land in western North Carolina as part of one of the first large forestry programs established in the nation (DeCoster 1995:58). After spending three years with Vanderbilt in North Carolina, Pinchot moved to New York where he opened an office as a forestry consultant. He was soon hired by corporate and individual owners of extensive forestlands in the Adirondacks and Pennsylvania, who paid him to prepare management plans. During this period, Pinchot began to consider the role that government should play in protecting forests and other natural resources from exhaustion by the private sector (Bolgiano 1998:86).

Pinchot was appointed Chief of the newly formed United States Forest Service in 1905 by his good friend President Theodore Roosevelt (1901-1909). As the first chief of the new agency, Pinchot established the ranger system and the esprit de corps that still characterizes the agency. He was a successful advocate for the need for forest conservation, and believed that the federal government should offer a model for private forestry. Pinchot's policies included programs that incorporated some of Carl Schenck's ideas about enlisting private forest owners in cooperative management ventures with the government, while also ensuring that private property rights were respected in laws governing timbering on private land. (Bolgiano 1998:89)

Consistent with Schenck in this belief, Pinchot suggested that forests should be conserved in order to supply human society with its particular needs. In this belief, however, he was of the same mind as many conservationists of the era. For example, he once accompanied John Muir, the famous preservationist and founder of the Sierra Club, on trek through the Western United States to look at public reservations. Muir argued passionately for leaving natural systems alone,

while Pinchot spoke just as firmly about the need to use them efficiently. Their difference of opinion could not be reconciled later when the men took opposing sides in the controversy over building a dam in Hetch Hetchy Canyon in California that began in 1908. (Bolgiano 1998:89)

The Weeks Act, 1911

The Organic Act was immediately followed by the introduction of nearly fifty bills in Congress to establish an Appalachian forest reserve, an idea that Carl Schenck had favored. Key groups that advocated for forest reserves in the East were the Appalachian National Park Association and the Society for the Protection of New Hampshire Forests, who encouraged federal acquisitions of forests in the southern Appalachians and in the White and Green Mountains of New England(Bolgiano 1998:90). In December 1899, the 56th Congress was encouraged to consider setting up parks to protect the headwaters of important water courses within mountainous regions as a measure to prevent drought and floods believed to be caused by destructive logging. Governors of impacted states were actively involved in promoting the law, while first President McKinley, and later President Theodore Roosevelt presented the need for action along these lines in their messages to Congress. (DeCoster 1995:64)

The national forests that Pinchot organized after he became chief in 1898 were located in the West, because they were created from land already owned by the federal government, based on the authority imbued in the department by the Forest Reserve Act of 1891. In the East, where private land would have to be secured to establish reserves, debates raged over states' rights and the constitutionality of federal land purchases. However, because Appalachian mountain lands were in such bad condition, the majority of the affected states were willing to allow purchase of land for the purpose. Timber companies were eager to sell tracts from which they had already removed everything of potential value for the next half century or that remained so rugged and remote that they weren't worth the expense of cutting. (Bolgiano 1998:90)

Congress, however, remain unconvinced that forests were important for regulating stream flow and weather until extensive flooding in 1907 caused millions of dollars' worth of damage along the Monogahela and Ohio Rivers, and could be traced back to the cutover conditions of the upper watershed in West Virginia. Because of the loss of tree cover on the slopes of Appalachian mountains, in many regions formerly navigable streams were silting up, and streams that once flowed dependably were drying up. (Bolgiano 1998:91)

But national forests were not created easily in the East. Over a ten-year period, six different Congresses considered forty-seven bills on the subject. The bill that finally became law was submitted by Representative John W. Weeks of Massachusetts. Weeks would go on to serve as senator, and later Secretary of War under presidents Warren G. Harding and Calvin Coolidge. While serving as Secretary of War, Weeks was also elected president of the National Forest Reservation Commission, which included the Secretary of the Interior, Secretary of Agriculture, two members of the Senate appointed by the President, and two representatives appointed by the Speaker of the House. Weeks held the position based on the perceived importance of forest influences on stream navigability

due to the fact that the Secretary of War was concerned with the ability to move military forces on American waters. (DeCoster 1995:64)

Pinchot was quick to point out that problems originating in headwater areas affected many states, and that it was in the national interest for the federal government to help resolve them. Pinchot was fired from his position as Chief of the U.S. Forest Service by President William Howard Taft in January 1910 after sparking a loud, long and furious interagency war with Secretary Ballinger of the Interior Department. By this time, Pinchot's efforts had already laid the groundwork for the Weeks Act of 1911 that authorized federal purchase of forests to protect the headwaters of navigable streams, with an immediate goal of acquiring millions of acres in the southern Appalachians. Protection of the navigability of rivers and streams was the cardinal purpose behind the Weeks Law, although wood supply for nationally strategic reasons was discussed as well. Forest management and timber production were added to watershed concerns as compatible activities. It was required that land purchases approved by the commission also be approved by the state. Agricultural lands within national forest purchase boundaries could be resold for farming by the secretary of agriculture. The Weeks Law also required that twenty five cents out of every dollar paid to the federal government for timber harvesting or other national forest use, be remitted to the state for schools; in addition, ten cents of each dollar of income was to be spent for roads in the national forests, and another ten cents put into a sinking fund to repay money advanced for roads. With the forests so depleted, it was years before many counties would realize money from timber sales on Forest Service land, however. (Bolgiano 1998:91-92)

Under Pinchot, the U.S. Forest Service decided from the beginning of the program to only purchase land from willing sellers. The first lands targeted for purchase were located on high-elevation slopes and ridges that drained to watercourses associated with navigable streams. (Bolgiano 1998:91)

Within months of the passage of the Weeks Act, the U.S. Forest Service had been offered land totaling well over a million acres for purchase within the Appalachians. Most of the land was comprised of large tracts, often totaling tens of thousands of acres, owned by timber companies that had already cleared much of the forest. The first eastern national forest established, however, resulted from the sale of George Vanderbilt's large land holdings near Asheville; in 1916, President Woodrow Wilson proclaimed Pisgah Forest, where Pinchot and Schenck had served as forest managers, the Pisgah National Forest. (Bolgiano 1998:92)

Once land had been acquired for forest reserves, the U.S. Forest Service established district offices nearby and staffed them with rangers. Pinchot was clear about his vision for the type of person he expected to fill the job of rangers: "thoroughly sound and able bodied, capable of enduring hardships and of performing severe labor under trying conditions." Although many of those living in the mountains of Appalachia were in a position to meet those qualifications, and were familiar with the region, few had the technical education required to pass the required civil service exam. Therefore, many district rangers were brought to the offices as outsiders, and thus oftentimes met with indifference or

hostility. Although the U.S. Forest Service hoped to reduce the tensions between the district office rangers and the local community by encouraging rangers to participate in community life, in the end what proved more helpful was the opportunity to hire local people in other positions, such as assistants, office workers, and field laborers. (Bolgiano 1998:94)

Otherwise, it was as firefighters that mountain men found their niche in the U.S. Forest Service. From the beginning, the federal government, as had been the case in Pennsylvania, made putting an end to forest fires its primary mission. In Appalachia, meeting this mission required constant vigilance, particularly since Appalachian farmers were in the habit of regularly using fire to get rid of excessive timber, green up pastures, and get rid of pests. Convincing mountaineers that they shouldn't set fires took a long-term commitment of education. Rangers lectured in schools, handed out literature, and met with land owners regularly in order to change the local cultural practice of burning. (Bolgiano 1998:94-95)

Michaux State Forest

In 1901, the Department of Forestry was created to both acquire and manage the forestland. One of the first properties purchased under this plan was the lands of the former Mont Alto Iron Company as the Mont Alto Reserve. Later, the majority of the Caledonia Furnace lands would be purchased as the Caledonia Reserve. Together these two reserves would form the southern part of Michaux State Forest, which lies within the Potomac River watershed. In 1902, these tracts gained the distinction of becoming Pennsylvania's first state forest park. The initial Michaux State Forest reserve totaled approximately 32,000 acres. (Thorpe 1997:7; DCNR 2105, Caledonia and Mont Alto websites; Savage 1986:357-359)

In 1905, the acquired lands on the southeast side of the Great Valley were named South Mountain Reservation, and split into two divisions: Mont Alto and Caledonia.

In 1913, the grounds of Michaux were expanded yet again with the addition of the lands of the former Pine Grove Furnace, bringing the borders of the protected forests to their modern boundaries. Today, the Michaux State Forest is home to 30 miles of the 2,000-mile Maine to Georgia Appalachian Trail as well as four state parks. Over time nineteen state forests were established in the Commonwealth. (DCNR 2105, Pine Grove website; Swartz 1986; Savage 1986:4)

The reserve program was one of the first of its type in the country. Rothrock and his supporters had helped to form the nucleus of a nationwide conservation movement. During the twentieth century, the new Michaux State Forest was central to the burgeoning field of forestry (DeCoster 1995:4). Goals for the land included reforestation in an area that had been over-logged during the previous century and a half and the prevention of forest fires.

In a report to Rothrock prepared by John Birkinbine, it was suggested that lands that had been held by the now defunct charcoal industry might serve as the nucleus for systematic forest reproduction and forest conservation (DeCoster 1995:15). Birkinbine was in an interesting position to comment on forest renewal. An engineer who modernized Pine Grove Furnace starting in 1877, he was associated with that ironworks for the next two decades. He went on to be known

internationally as a mining and hydraulic engineering consultant linked to iron operations as far away as Mexico and Europe. His work in the iron industry also led to a leadership role in the United State Association of Charcoal Workers and related organizations. Birkinbine and others in the late 19th century argued that the impact of the charcoal iron industry on forests was not as severe as that of the lumber industry, discussed earlier (Andre Weltman personal communication).

Much of the forest land acquired at Michaux and other early state forest reservations were lands formerly used for charcoal production acquired from the iron companies. Thus, many of the first forests managed by the division of forestry had been shaped by the iron industry.

Immediately needed were competent forest managers and land overseers to protect the state's investment from fire and theft. To meet this need, the state began to hire forest rangers. These site managers were usually chosen from the areas in which they would serve due to the need to have practical knowledge of the area and the people where they worked. Later, ranger duties would expand to include a variety of projects. However, the early rangers were mainly on site in a protective capacity. By January 1912, ninety rangers had been assigned to state forest reserves in twenty-six counties. (DeCoster 1995:34)

During the first decade of the state forestry agency, rangers and foresters carried out their responsibilities while faced with a lack of roads, or roads in poor conditions, a lack of boundary delineation, extensive fires, wood poachers, low pay, and poor living conditions. Lacking phones, radios, and often electricity, the rangers and foresters relied on the U.S. postal service as their primary means of communicating with the far-away headquarters in Harrisburg. Letters were often concerned with tent replacements and other housing requests. (DeCoster 1995:51)

In part, Rothrock's program in Pennsylvania was modeled on forest reserve work already underway in New York state. At the turn of the twentieth century, Pennsylvania and New York were the only states having both the financial wherewithal and the interest in purchasing forest land for public purposes. New York state acquired land to protect watersheds, as a flood control measure, and to implement fire protection programs. They also created wilderness areas where harvesting was not allowed. Wealthy owners of Adirondack estates became a driving force for the wilderness approach in New York as they wanted the forests around their lands preserved. Pennsylvania, however, also planned to use forest land for growing and harvesting wood on a sustainable basis. (DeCoster 1995:33-34)

During the early twentieth century, a new threat to Pennsylvania's forests emerged in the form of an introduced fungal disease from Asia that effectively killed most of the American chestnut trees in the United States. After the blight was identified in Pennsylvania in late 1908, a state inspection, organized to determine the extent of the disease. The program started operating in the spring of 1909. The Pennsylvania Department of Forestry had the services of the best expert on the disease available, Dr. John Meckleborough to survey the problem. By 1910 chestnut blight was found in Pennsylvania all along South Mountain to the Maryland line southwest of Gettysburg. Reporting on the findings,

commissioner Conklin said, “The usefulness of the chestnut timber is so well known and recognized that its loss would be a calamity of appalling proportions.” Before the blight struck it is estimated that 20 percent of the forest trees in Pennsylvania were chestnuts. The trees grew large–up to seventeen feet in diameter. Nuts from the trees were valuable food sources for wildlife and people. Chestnut lumber was handsome and easily worked into furniture and trim. The wood was durable and used for railroad ties, poles, and long-lasting fence rails; the bark was a source of tannin for leather tanneries.

By 1913, the chestnut blight fungus had swept through Pennsylvania. Unfortunately, no amount of money or concern could stop the blight. It was such an effective killer of trees and spread so easily on the wind that in a few years, the American chestnut, one of the dominant and most valuable trees of Pennsylvania and many other states was essentially wiped out. The blight also swept through Michaux, killing nearly all of the chestnuts. Because there was nothing the foresters could do to save the trees, they instead tried to save the wood. The forestry school had a portable sawmill at their campus that could be taken out into the woods when the trees were being cut. This sawmill was moved throughout the Mont Alto Reserve during the blight to process the dead chestnut trees before they were subject to rotting. (DeCoster 1995:48-49) Even today, reminders of the once abundant chestnut trees are visible in the Camp Michaux area in the form of a few original telephone poles along Michaux Road made from blighted chestnut, and fence posts remaining in the forest from the former farm there (Andre Weltman personal communication).

Another challenge faced by the foresters at Michaux State Forest was white pine blister rust, which likely arrived in the United States on white pine seedlings imported from Europe. Pines infected with the disease developed swollen blisters on their stems. The trees died as the blistered areas enveloped their vascular systems, and bright orange spores drifted into the air as the blisters burst. The disease spread first through the white pines of New England in 1905, raising concerns for the entire population since spores from the blister rust fungus blew easily on the wind. Fortunately, however, the fungus must pass through an entire life cycle on an alternate host, currants and gooseberries of the genus *Ribes*, before it can infect pines. When this was discovered, foresters determined to destroy currant and gooseberry plants near white pines. The Department of Forestry reported blister rust near Philadelphia in 1905; fortunately, the disease spread very gradually from there and was thought to have been stopped or contained several times. In 1929 control of white pine blister rust became a cooperative program between the Pennsylvania Department of Agriculture, the United States Department of Agriculture, and the Pennsylvania Department of Forests and Waters. The Pennsylvania White Pine Blister Rust Law gave all legal authority for control of this disease to the Department of Forests and Waters in 1933. Control work proceeded for decades but by 1972, with better understanding of the impossibility of removing all *Ribes* from pine forests and the realization that because of the functioning of the disease, pines would not all be infected, control efforts were ended. Pennsylvania still has significant forests of white pine because, fortunately, this disease is not a consistent killer of trees. (DeCoster 1995:49-50)

State Tree Nursery

The reserve was also home to the first transplant or forest tree nursery in the United States (Savage 1986:359). The tree nursery was established at Mont Alto in the spring of 1902 with the sowing of six pounds of pine seed. Wirt also supervised the planting of ten thousand one-year-old white pine seedlings on South Mountain, and pruning and thinning a pine thicket, in April 1902. This area was very popular with recreationists and many campers used the site. Road improvement work was underway in 1902 to improve access.

By 1909, state nurseries were growing 5.8 million forest tree seedlings. A 1910 commission report described the nursery at Mont Alto, including the use of rye, cowpeas, and manure from the forest academy stables as fertilizer to improve the clay soil. A second tree nursery was established on state forestry reservation land in Clearfield County in 1911. The number of nurseries continued to increase, and soon most state forests had at least a small tree nursery; state foresters grew and planted trees of every imaginable species. (DeCoster 1995:43)

By 1914 the planting of trees in urban areas was considered by shade tree commissions in cities such as Pittsburgh, Wilkes-Barre, and York. The State Forest Commission was called on to provide advice to these municipal commissions, establishing the early basis for present urban forestry programs. (DeCoster 1995:46)

State nurseries eventually supplied trees for highway corridors. Nursery operations slowed during the World War I years of 1917 and 1918, but picked up again by 1920, when the department was operating three large nurseries and one small one. Annual capacity of all state nurseries was ten million seedlings. The leading species planted were white pine, Norway spruce, Scotch pine, pitch pine, red pine, European larch, red oak, white ash and jack pine. By 1923, 34.9 million trees had been planted on both state and private lands. By 1936, the total number of trees being grown in Pennsylvania on state and private lands had risen to 179 million seedlings. (DeCoster 1995:48)

Recreation

Recreation was also envisioned by Rothrock as part of the programming for forestry reservations. Recreation has been an important part of Michaux State Forest from its inception through the present day. The Mont Alto Forestry Reservation immediately included a park (an existing recreation area previously built by the iron company), and the forest commission added more parks as more lands were acquired. Hunting, fishing, camping and hiking were popular compatible uses of forestry reservations. The increased use of the parks and forestry reservations led to problems with people setting up semi-permanent camps and homes, and habitat destruction. In 1904, the Forestry Commission published a list of regulations governing camping. Anyone camping on forestry lands had to have a permit, which was free after the applicant requested the rules and regulations and the permit from the Harrisburg forestry office. In 1913 the Department of Forestry was authorized to lease small tracts of state forest land to Pennsylvanians for campsites. One advantage of the establishment of campgrounds was that they greatly decreased the number of forest fires caused by dispersed campers. Over the course of the twentieth century, the state forest

reservations became increasingly popular destinations for visitors interested in outdoor recreation. The demand for public use rose as nearby population centers grew. Improved highways and automobiles gradually made even the remote forest reservations accessible. (DeCoster 1995:43)

One of the premier recreational features of Michaux State Forest is the Appalachian Trail, a National Scenic Trail that extends between Maine and Georgia. Completed in 1937, the Appalachian Trail traverses the extent of the forest. (DCNR 2105, Michaux website; NPS Appalachian Trail website)

State Parks

Within Michaux lie four state parks: Mont Alto, Caledonia, Pine Grove Furnace, and Kings Gap, established in the early twentieth century specifically to administer land for public use. Later, the function of operating parks was made a separate agency from the forest commission, but both public land types continue to offer recreational uses, and recreational use of state forests continues to rise. These state parks have a number of hiking trails and allow fishing and hunting. Pennsylvania began to set aside land for public use in the form of state parks during the latter part of the nineteenth century. Pennsylvania's first state park was Valley Forge, created in 1893. By 2011, the state had established 120 state parks, administered by the Pennsylvania Bureau of State Parks, one of the largest state park systems in the nation. (Cupper 1993:9-10; DCNR 2015, History website)

Mont Alto State Park was established in 1902. It occupies the former site of an amusement park constructed on Mont Alto Furnace lands in 1875, one quarter mile southeast of the blast furnace. The park land follows the Little Antietam Creek stream corridor in an area once referred to as the valley of a thousand springs. The park was started by the furnace company as a commercial venture to take advantage of the beautiful setting and rail access. People came by train from Harrisburg, Chambersburg, Philadelphia, Baltimore, and Washington; sixty-six thousand people patronized the park in 1883. The park had a dining room, shooting gallery, bowling alley, and croquet field located in and around the stream corridor. (DCNR 2015, Mont Alto website) The iron company's "flying horses" or carousel was housed under the curving metal roof of what is today a state park picnic pavilion (Andre Weltman personal communication).

In 1903, Caledonia Furnace was acquired for Michaux State Forest. Like Mont Alto, the property included recreational features such as picnic grounds, a dance hall, and the Graeffenburg Inn. It, too, would eventually become a separate state park property. Caledonia State Park contains two campgrounds.

Pine Grove State Park was established in 1913. Pine Grove has two lakes with beaches for recreational swimming (DCNR 2015, Pine Grove website). Hiking trails are also prevalent throughout the two state parks.

National Park Service

The National Park Service was formed as part of the Organic Act of 1916 to oversee unique federal reservations protecting America's natural and prehistoric wonders. Like state park administration in Pennsylvania, the new agency would take some time to develop.

The Invalid's Camp Tuberculosis Center at Mont Alto

In his commissioner's report of 1902, Rothrock estimated that five thousand Pennsylvanians had tuberculosis. People infected were genteelly referred to as "invalids, or consumptives." The disease reduced lung capacity to barely life-supporting levels and was often a death sentence. There was no known cure, but patients living away from the city in a fresh-air environment seemed to recover. The tuberculosis "fresh air cure" was based on observations made of people who lived and worked outdoors. Rothrock, trained as a medical doctor, suggested in his report that state forest reservations be used for recovery camps or sanitoriums where patients could be provided access to fresh, healthful air. (DeCoster 1995:39)

Rothrock established the first small camp for tuberculosis patients atop South Mountain, four miles from the forestry school at Mont Alto, in 1902. Mira Dock, a member of the State Forestry Reservation Commission, reported on her visit to the camps in the 1902 Commission Report. "On Sept 27, 1902, accompanied by my sister, L. L. Dock, a trained nurse, with considerable experience in camp life, I visited the Invalid's Camp at Mont Alto Reservation. The camp is located on a wide plateau, reminding us both of places in the Black Forest, much resorted to for the fine air by invalids who are locally known as 'air snappers.' Rothrock maintained the facility with private contributions until June 1, 1903, when the legislature appropriated $8,000. (DeCoster 1995:39)

Dr. Addisson M. Rothrock, Joseph Rothrock's father, served as the camp physician for the South Mountain Camp Sanatorium in 1903. He described the camp as "located in the heart of the 50,000-acre Mont Alto State Forestry Reservation, with fine cool air (lows of 16 below zero in the winter.) This camp was started in June of 1903. The area is isolated from air contamination. Air breathed by the camp inmates is filtered through many miles of foliage. Its isolation is such that no hostility or dread, on the part of others, is caused by the presence of so many consumptives. The water supply is ample and pure. There were 35 patients in this camp in 1903." (DeCoster 1995:40, from Rothrock 1903)

Those taking advantage of the camps were expected to care for themselves by supplying their own food, clothing, and other necessities. The state provided cabins for them to live in, and a resident medic, but little else. A plot where residents were allowed to grow a small vegetable garden was available for each camp. (DeCoster 1995:40)

The legislature later appropriated $15,000 for the 1905–1907 period. On June 1,1907, the camp was transferred to the newly created Department of Health. Even after the sanatorium received public funding, it continued to rely heavily on private donations and the efforts of the Rothrock. (DeCoster 1995:39)

Forestry Education

Forestry education was introduced in the United States near Asheville, North Carolina in 1898 by German Carl Alwin Schecnk (1868-1955). Scheck was born in the town of Darnstadt, Germany. He studied forestry at the Institute of Technology in Darmstadt, and later the University of Giessen, in part under the direction of visiting professor Sir Dietrich Brandis, an influential forester who introduced the field to Great Britain and several of the country's colonial holdings. Schenck received a Ph.D. in 1895, at which time he relocated to the United States

to look for work in the field of forestry. On Brandis's recommendation, Schenck succeeded Gifford Pinchot as forester for George Vanderbilt, in charge of overseeing the Vanderbilt Estate and Pisgah Forest. Vanderbilt, the heir of a wealthy railroad family, had decided to create a showpiece estate in the southern mountains in the 1880s. Over the course of several years he purchased over one hundred thousand acres of land in the mountains south of Asheville and additional land adjacent to the town. The majority of the land had been used either for farming or logging, although some remained forested. On an 8,000-acre tract outside of Asheville, Vanderbilt constructed one of the largest residences in America, which he called Biltmore House. Gifford Pinchot was the first to work with Vanderbilt on his assembled property to develop a managed forest. Pinchot, however, stayed at Biltmore for only three years, long enough to build wicker fences for erosion control and initiate selective harvesting. Bolgiano 1998:85-86)

Schenck, in the meantime, would play a more important role in Vanderbilt's project. As he began his work, Schenck wrote "Except for a few inaccessible spots, there was not a tree left on the entire Biltmore estate that was fit for lumber." During his fourteen years serving Vanderbilt, Schenck experimented with many methods to improve the property. Trained in Europe's woodlands, which offer far less diversity of species and terrain, Schenck was forced to adapt his methods to the task of improving the unfamiliar Appalachian forest to promote the regeneration of a forest at Biltmore Estate. (Bolgiano 1998:86) Because there were no nurseries to acquire trees for reforestation, Schenck brought white pines from Germany to serve as his first plantings at Biltmore (DeCoster 1995:42).

While under the employ of George Vanderbilt, Schenck also operated the first school of forestry in America at Biltmore Forest. Between 1898 and 1913, Schenck graduated more than 300 students, many of whom were the sons of wealthy landowners who boarded in local homes or resided in rough cabins adapted for the purpose. Pennsylvania's first degreed forester, George Wirt, came from this school. Schenck's curriculum was evenly divided between fieldwork and classroom study. Schenck engaged his students using the findings of his own forestry work for Vanderbilt on the larger property, known as the Pisgah Forest, which was named for the Biblical peak where Moses viewed the promised land. (Bolgiano 1998:87)

Schenck's course work addressed erosion control, measurement of lumber, and the economics of harvesting. Erosion control, and the protection of topsoil was of tantamount importance. Schenck explained the need to plant trees to cover eroding fields to protect topsoil. He also explained methods for selective tree cutting and thinning aimed at improving the growth of remaining trees. He also taught the students to clear-cut pines to favor hardwoods wherever possible. Schenck also conveyed methods for decision-making regarding the timing of stand harvesting, explaining how to monitor pests and diseases. A particular focus was the design of a management plan that would yield private profits by showing how economical the practice of conservative forestry could be. Many sons of timber barons learned to recalculate the bottom line from "cut out and get out" to "cut and grow and cut again" at Schenck's school. (Bolgiano 1998:87)

Almost immediately after Biltmore opened, the New York State College of Forestry at Cornell University in Ithaca began to accept students. By 1900 the Yale University Forestry School had been established in New Haven, Connecticut, established through a $150,000 gift from Gifford Pinchot and family. Pinchot's gift was designed to promote forestry graduates who could staff the newly established U .S. Forest Service, which he headed. (DeCoster 1995:37)

Professional disagreements about the focus of the curriculum for these early American forestry schools quickly consumed America's foresters. While Schenck believed that foresters needed to have practical knowledge of logging because it was their job to make forestry an economically viable proposition, Pinchot did not support the idea that foresters should be taught about logging since they were concerned primarily with the maintenance of forests by controlling the way they were used. Based on this fundamental disagreement, Schenck and Pinchot had a falling out in 1901, with Pinchot referring to Schenck as "an antichrist" for including logging methods in his forestry school curriculum. Pinchot would later propose federal regulation of all private-forest harvesting, causing a great debate over policy in the forestry profession. Their argument and the extent to which foresters should get involved with the economic use of forests continues to be debated today. (DeCoster 1995:37)

As training of foresters began to move forward, a professional society for foresters, the Society of American Foresters, was formed in 1900. Initially a small group that met in Pinchot's mansion in Washington, D.C., the Society of American Foresters sometimes hosted President Roosevelt due to his friendship with Pinchot. (DeCoster 1995:37)

The Pennsylvania State Forestry School at Mont Alto

In 1895, as Rothrock was organizing his small agency, there were only three people in America trained as foresters; Bernhard Fernow, Gifford Pinchot, and Carl Schenck. As noted previously, all had been trained in Europe. Rothrock recognized the need to produce more foresters for Pennsylvania, particularly practical foresters, based in science but also knowledgeable about using axes and saws to harvest trees. Returning to his proposals from the 1880s, he decided the state might begin to train its own foresters and appealed to the state to create a forestry education program. Rothrock was convinced the state's new forestry program would not thrive without trained personnel to manage the forest reserves. Joseph Rothrock suggested that the new school to train foresters with both theoretical and practical skills. In addition to classroom courses in math and science, students would learn firefighting techniques and the use of equipment such as axes and saws. He went on to urge the training of foresters in a Pennsylvania school, and placing them in charge of state-owned forests to increase their productivity. (DeCoster 1995:37)

Rothrock published an article in October 1901 in the Pennsylvania Forestry Association magazine *Forest Leaves* titled "A Suggested Pennsylvania Forestry School." Following the article, several of Rothrock's commissioners set out in January 1902 to solicit philanthopist Andrew Carnegie for assistance in starting such a school. When both the state and Carnegie turned down the idea of starting a school, Rothrock changed his tack and decided to begin a school on his own and

then solicit funds to help the school already in operation to keep going. (Thomas 1985:24-25)

Rothrock's first effort involved identifying land for the school. Rothrock settled on land that had been part of the former Mont Alto Iron Company. The property included several buildings, such as the former home of the last ironmaster, which is now known as Wiestling Hall. The campus was located at the base of the South Mountain Ridge, at the edge of the Caledonia and Mont Alto forest reserves, and a mile away from the village of Mont Alto. The proximity to state reserves and forests, and to towns and cities such as Harrisburg, were important factors in the selection of the site for a campus. With the nearby reserves and forests, and a range of terrain, students would be able to really study forestry, not just *about* forestry. The hands-on approach recommended by Rothrock was consistent with that of Wirt, who indicated in his "Report of the State Forester" of 1901–1902, that forestry is primarily a study of nature and "can best be done under natural conditions rather than from text-books and dried specimens." Rothrock further illustrated this in an article for the PFA magazine, *Forest Leaves,* in April 1916, comparing that a forest is to a school of forestry as a hospital is to a medical student. The forest is the 'final and best 'laboratory' for the forester." (Woods 2010; Thomas 1985:26-29)

In order to secure faculty for the school Rothrock turned to his trained friends and supporters Mira Lloyd Dock and George Wirt, who would act as the general professor of all forestry subjects. George Wirt was the son of Rothrock's good friend Jacob Wirt. Rothrock had previously convinced George Wirt to attend Biltmore Forest Academy. Another principal member of the proposed faculty was Irvin C. Williams, a member of the bar and of the Forestry Commission, who would teach commercial law. (Woods 2010)

In order to open the school, Wirt, Wirt's sister, and a few student-assistants went to Mont Alto in April 1902 to start the commonwealth's first forest tree nursery, make roads, build fences, and improve the land before school was officially in session. Wirt and his party were able to tear down the dilapidated buildings that remained on the property from the iron business and sell all the materials they didn't need for the school for about $14,000. Rothrock and Wirt finally managed to convince the legislature to act. House Bill 33 was signed on May 13, 1903 by Governor Pennypacker, establishing the Pennsylvania State Forestry School at Mont Alto and providing the sum of $16,000 to the cause. The commission paid $5,685 to buy the Mont Alto property adjacent to the forest reserve to set up the academy, with George Wirt placed in charge. (PSU 2015, Mont Alto website; Thomas 1985:26-29)

To provide a financial incentive to students to attend the new school, Rothrock suggested offering them work on the reserves during the school year, and the promise of jobs in the state forestry service after they graduated. His proposal suggested giving the students a free education in exchange for the manual labor involved with work on the reserves and the understanding that the degree would lead to a job in the forestry department. Though this was a victory for Rothrock, he was not satisfied. The newly acquired furnace lands were mostly bare from years of timbering for charcoal, had suffered a number of small forest fires, and

were regularly and illegally timbered by locals. State ownership of the land meant nothing if there was not anyone to manage and protect it. What Rothrock wanted were professional foresters to act as both agents of the law and naturalists. It would be their jobs to protect the forests from fires and unauthorized hunting and timbering, and help with reforesting efforts. (Woods 2010; Thomas 1985:30-31)

The first four students entered the academy in June 1903. Ten additional students matriculated in September 1903. Governor Pennypacker, along with Rothrock and other members of the State Forestry Reservation Commission, visited Mont Alto in the Summer of 1903 and celebrated the opening of the school in September. In December, Wirt wrote that in September, thirteen young men had reported for duty, of who three had been working six to eight months as student-assistants. These men constituted the first class of the Pennsylvania State Forest Academy. The degree was conveyed based on a two-year course of education and training. (DeCoster 1995:37; Thomas 1985:31-38)

The first group of students was an odd collection of men—some had high levels of education from other universities, while others had not completed grade school. Some were very young, not seventeen, while others were older than Wirt, who was only 23, and had wives and children living on the campus with them. They also had varying levels of experience in forestry. Each student had to have his own horse with which to travel through the reserves, and each had to wear a uniform and commissioned pistol while on duty. They were indeed acting wardens of the forests, and had the authority to enforce the safety of the forests. The actual classroom aspect of the school did not really start until the third week of December, because students worked outside nearly every single day, and only on bad-weather days did they stay inside to learn from text books. (Woods 2010; Thomas 1985:31-38)

Initially, students were paid thirty dollars per month to attend the academy based on the fact that they would be working in the state forest system, and had committed to working for the commission upon graduation. Later, this policy was changed to provide free room and board and the three-year course of classroom work in chemistry, physics, algebra, silviculture, zoology, and German, as well as practical work in the field involving firefighting and the use of forest tools-axes, compasses, and tree-measuring devices. The Mont Alto Reserve would serve as their training lab. Wirt in particular was the curriculum creator. He wanted the students to acquire forestry skills and then to learn the reasons behind the use of those skills. Students needed to understand the purposes of forest management and the best methods to achieve those purposes. Wirt struggled to find the right balance of theoretical and practical knowledge to teach his students, and as the story goes, he assigned his student-assistants to weed-pulling in the nursery while he rode up into the park with several textbooks and course lists from various schools forestry schools, including some European ones. They were students of a school, and did for a certain amount of time every week sit in classrooms with textbooks, but the majority of their work was real manual labor, done on the campus, in the nursery, and the reserves. Wirt wrote that after some time and "with much prayer and meditation," he rode back from the park with a course of

study in hand. The school was run somewhat like a German forestry school or military academy, with strict rules and a demerit system. (Woods 2010; Thomas 1985:31,39,45)

When he finally got his school, Rothrock spent little time celebrating. He and his faculty went right to work, trying to minimize the current crises of vandalism, timber thievery, and most importantly fire destruction. The first and foremost mission of the forestry school was to protect the forest from sustaining further damage. They quickly identified the primary source of that damage as fire. Rothrock rationalized that the students would be an excellent source of manual labor to fight any fires that broke out in the Mont Alto and Caledonia reserves, at the same time training them for fire suppression activities in other state forests. He used this as part of his justification for the school to the Pennsylvania General Assembly in 1902. (Thomas 1985:30,41)

Because of his concern with fire suppression, Rothrock made one of the primary duties of the students to be acting wardens of the forest, learning to prevent fires and help the fire crews put them out when they occurred. Rothrock's goal original idea was to produce *foresters,* not *wardens,* but with the problem at hand being the rapid burning and destruction of the forests, he did initially train wardens. However, as the school grew, Rothrock and Wirt molded the curriculum to produce foresters. Those who were not quite up to the challenge of becoming foresters were trained as wardens. Over time, the curriculum and the surrounding forests and reserves improved, the student body and faculty grew, and each successive graduating class was better than the last. (Woods 2010; Thomas 1985:31)

Fire crews tended to be small and inefficient, and access to the fires via roads was virtually nonexistent. In the early 1900s, a "good" year was when only 30,000 acres burned; in a "bad" year, well over 170,000 acres could be destroyed. Rothrock knew that it was not only the trees at risk—forest fires left many buildings and lives destroyed in their path. Therefore, reforestation had to come second to fire prevention, given that there was no reason to plant thousands of seedlings when tens of thousands of trees were burning. (Woods 2010; Thomas 1985:43-44)

In 1905, two years after the school was established, Pennsylvania's first wooden fire lookout tower was constructed at Oak Knob. The first steel tower was constructed in 1914, further enabling the students to carry out their fire prevention work. During the heyday of fire tower usage, the area had more active lookout towers than any other area of Pennsylvania. (Graham 1995; DCNR 2015, Michaux website, About)

Once measures had been put in place to prevent forest fires, the school turned its attention to reforestation. To accomplish this, a nursery was established at Mont Alto to grow saplings to be transplanted throughout Michaux. Originally the nursery had poor soil quality and had difficulty producing young trees, especially pine. However, the problem was later corrected and the nursery went on to produce literally millions of saplings. As of 1930, the nursery had produced "35,184,404 seedlings and transplants." The nursery was abandoned sometime after 1970; its legacy continues however through the surviving reforestation

areas and the ongoing practice of raising transplants within state forests. Trees grown in the Forestry School's nursery populate the southern portion of Michaux, and the dense forest there is the result of the first state nursery. (DFW 1930:13; Couser undated)

Following the chestnut blight, there were numerous clearings where trees had died. The forestry school used the nursery to begin planting other trees in place of the chestnuts and restore the forest. Oftentimes. conifers, particularly white pine and Norway spruce, were used. Two areas where this practice remains evident is near the nursery's reservoir and along Quincy Road. In 1927, students planted one hundred Chinese chestnuts within the Mont Alto Forest Reserve to experiment with them as a replacement for the American chestnut and whether they would survive the blight. By 1930, some had been attacked by the fungus, but none had been killed. (DFW 1930:17.21-23)

On Arbor Day 1905, Wirt asked the students to locate native tree species not found on campus. When they returned with more than 400 specimens and 30 species that met Wirt's criteria, he encouraged the establishment of an arboretum at Mont Alto. The resulting collection of native species continues to provide a training ground for students, as well as a research site for the development of new hybrids. (Woods 2010; Thomas 1985:55)

The first class graduated from the academy in 1906. All received employment offers and were placed at different forest reservations. As it turned out, the Academy helped Rothrock deal with the state's political patronage system. Until this time, political affiliation rather than technical qualifications, was often the deciding factor in filling many government jobs. (A statewide Civil Service Commission was created in 1939 and activated in 1941, but only became effective years later.) As Rothrock preferred to staff his agency with qualified individuals rather than political appointees, the pool of trained foresters emerging from the state forestry school were the best candidates for his jobs and he was able to fill the positions accordingly. In September 1906, a new class of thirteen students entered the academy; each had to post a $500 bond and commit to working for the commission. The academy harvested wood valued at $1,237 during 1906, with students involved in much of the work. (Woods 2010; Thomas 1985:60)

That same year, the new academy was forced to compete for students when a new technical forestry program was established at the Pennsylvania State College. The two schools operated separately for many years, before considering the idea of a merger. (Woods 2010)

Following World War I, representatives of Pennsylvania's two forestry schools began to talk more seriously about merging the programs into one. In the discussions, Rothrock expressed concerns about the potential loss of Mont Alto's practical curriculum in a possible merger with a more traditional university. However, by the 1920s, the context of education had changed, with most universities offering baccalaureate studies. The professional and practical training of Mont Alto was now considered an unusual educational method. However, Rothrock's school was recognized for its success in preparing students for immediate jobs. Referred to as an *academy*, it did not offer a baccalaureate curriculum. Given the state's appreciation for Rothrock's methods, the

Pennsylvania State College was merged with the Mont Alto academy to form Pennsylvania State Forest Academy in 1927. (DeCoster 1995 38-39)

The students, however, were adamantly opposed to the merger. They knew the history and the struggles of their schools founders, and did not want to be absorbed by the big-name university that originally denied their beloved school, especially now that the school had risen to prominence on its own. In 1929 the facilities at Mont Alto were turned over to the local commonwealth campus branch of Pennsylvania State College. Instructors from Mont Alto either transferred to Penn State at this time or moved to the North Carolina forestry school, taking their students with them. A research institute operated by the Forestry Commission remained at Mont Alto. Mont Alto had graduated 243 students by the time of the merger, but from that point on, the campus was used as the first year of training for Penn State forestry students—the remaining three years of their degree were finished at University Park. In the 1960s, the Forest Academy merged with the Pennsylvania State University System, and is known as Penn State Mont Alto today. (PSU 2015, Mont Alto website)

The impact of the Pennsylvania State Forest Academy was tremendous. As one of the first forestry schools in the U.S. and the first in Pennsylvania, the academy started by Rothrock trained the first generation of foresters to manage Pennsylvania's newly formed state forests. They helped develop forest fire suppression techniques, reforested former charcoaling grounds, and replanted following the chestnut blight. Many of their efforts focused on Michaux State Forest, although their techniques were employed throughout the state to help return health to lands ravaged by logging and industry during the nineteenth century. (Couser undated)

World War I (1917–1918)

When the United States entered World War I on April 16, 1917, many members of the Pennsylvania forestry department were called into service. Most of the young men who trained at Mont Alto Forest Academy enlisted. They were accepted readily because their job requirements ensured exceptional fitness for military service. This left the department with a severe shortage of staff and materials through the remainder of the war. Reports from the period indicate that construction of steel fire-lookout towers continued, however. (DeCoster 1995:55)

The forests of Pennsylvania were not drawn upon as significantly as other natural resources. Although large quantities of American wood were used to make wood and paper products and shipping containers, much of the wood used to construct the trenches in Europe was taken from European forests. Enlisted American foresters were, however, often assigned to supervise logging jobs and sawmill operations near the front lines. In these efforts, many Pennsylvania foresters and rangers witnessed the benefits of European forestry first hand, as they harvested and processed trees at the front in American engineer battalions created especially for this function. (DeCoster 1995:55)

Period between the Wars (1918–1941)

Improved Communications

After World War I, George Wirt began to improve the communications systems within forest reserves by building fire lookout towers, and stringing telephone lines between them. (DeCoster 1995:58)

In 1920, the forestry department passed a new policy authorizing its personnel to provide forestry assistance to private land owners. The program was quickly used by private land owners, and became the basis for a highly successful advisory programs to the private ownership sector that controlled nearly 70 percent of the forest land in the state. (DeCoster 1995:46)

The Influence of the Automobile

Americans began using automobiles in greatly increasing numbers after World War I. Private automobiles led to two new challenges associated with Pennsylvania state forests: an increase in the number of visitors, which impacted the existing road network, and a loss of trees. As reported in December 1919 by Raymond Winter, forester at White Deer State Forest, "We are losing trees near the roads as people are driving into the forests and digging up the states trees for ornamentals. They are very difficult to catch as they come and go very quickly at unpredictable times." (DeCoster 1995:54)

State Forest Commission

In 1919, the state forestry reservations were renamed state forests while the State Forestry Reservation Commission was renamed the State Forest Commission. The state legislature approved a proposal allowing the commission to condemn land to round out the boundaries of state forests. Like federal forest reservations, the commission contributed to the coffers of county government where state forests were located, paying a county tax of one cent per acre per year as well as road and school taxes of two cents per acre per year. (DeCoster 1995:46)

Gifford Pinchot, Commissioner of Pennsylvania's Forestry Department, 1920

In 1919, Pennsylvania's Governor William C. Sproul asked Gifford Pinchot to look at the operation of Pennsylvania's Forestry Department. Following his review of the agency, Pinchot expressed his interest in the job of forest commissioner. Governor Sproul replaced Commissioner Conklin with Pinchot in early 1920. Pinchot was the first forester to be Pennsylvania Forestry Commissioner. In a letter to Governor Sproul, March 23, 1920, Pinchot said, "Yesterday you expressed interest in knowing what has been done in the Department of Forestry since you were good enough to ask me to take charge. Because of engagements made before your offer reached me, I have had but six days in Harrisburg since my appointment, otherwise there would be more to report. A good beginning has been made in substituting a feeling of cooperation and mutual interest among members of the department instead of the previous condition of master and man, and the result is already evident in a marked improvement of output morale." (DeCoster 1995:57)

Pinchot served as Pennsylvania forestry commissioner for only two years. He decided to run for the governorship just as he entered his second year of service. Because of Pinchot's experience and his "now-if-not-sooner" philosophy, his short two-year term brought many changes to the department, including strong fiscal and organizational controls instituted by Pinchot. He also divided the state

into twenty-four forest districts with a district forester in charge of all activities in each district. The headquarters office was divided into four units covering each of the department's major responsibilities. He expanded "service forestry" efforts, providing forestry expertise to increasing numbers of private forest owners and forest industries. He quickly set about acquiring more forestry lands. Pinchot specified that formal forestry training was a requirement for positions in forestry. He upgraded the forest academy to a four-year school, instituting a bachelor of science degree in forestry. He extracted from the General Assembly a special appropriation of one million dollars for an expanded fire-detection system. This fund built more than 50 new steel fire towers in strategic locations with telephone connections and road access, and later increased to become a network of 160 fire observation towers. (DeCoster 1995:58)

The Forester's Letter

Pinchot, in an attempt to keep people involved and informed, started a newsletter called *The Forester's Letter*, which was mailed to all employees of the department. In addition, Pinchot regularly used a variety of communication methods to champion issues he considered important. In June 1920, he sent a letter to 23,500 industries in Pennsylvania to call attention to the state's importation of wood, which he considered unnecessary and detrimental to the economy, instead recommending that private enterprise, along with the state foresters, continue to focus on growing wood locally. He also wrote and spoke frequently regarding his belief that federal authorities should control how private forests were managed. (DeCoster 1995:59)

In December 1920, most state foresters in America met in Harrisburg to organize as the National Association of State Foresters. At the meeting, Pinchot pushed vigorously, but unsuccessfully, for the state foresters to endorse federal regulation of private forests. (DeCoster 1995:61)

By 1921 the Forestry Department managed more than two hundred acres of state forest parks organized as seven individual units, as well as nine forest monuments, covering twelve hundred acres, and two special scenic areas. Several of the state forest parks were reconstituted private parks, such as the one at Mont Alto. At the same time, the state was in possession of 1,126,236 acres of forest reserve land, second only to New York, which boasted 1,936,492 acres of state-owned forests. Wisconsin was a distant third with 380,443 acres. In addition to the forest parks, there were also areas of special beauty or interest that had informally been set aside and protected on state lands. During the 1920s, this practice was formalized; areas of special natural or recreational interest were set aside by the State Forest Commission "because of their noteworthy or historic groves of trees, or scenic attributes, they have been considered worthy of special preservation." (DeCoster 1995:63)

In April 1922, Pinchot took leave without pay to run for the Republican nomination for governor. In November he was elected governor of Pennsylvania. He served for the one term (1923–1926) allowed, remained out of office for a term, and then ran successfully for a second term in 1930. (DeCoster 1995:62)

Fire Suppression

During the 1920s, Pinchot's efforts to improve fire detection and suppression resulted in a great expansion of the fire lookout system. As commissioner, Pinchot secured one million dollars for the project. The new money paid for the construction of fifty, sixty-foot-tall steel fire towers, and telephone lines to connect them. In each tower maps showing the territory within twenty miles were mounted on round tables, allowing the people manning the towers to locate exactly any fires spotted. With the new system, fires could be spotted, located, and reported quickly. (DeCoster 1995:60)

By January 1, 1921, the department employed 201 people, with 60 foresters, 82 forest rangers, and the rest serving as clerks, stenographers, and surveyors. During fire season, the department engaged seasonal workers to supplement the full-time staff, including 69 towermen, 52 inspectors, 214 fire bosses, and 17 patrolmen. There were also 581 special forest-fire wardens and game protectors, not paid by the department, and 1,695 local forest-fire wardens, paid only when actually fighting fires. (DeCoster 1995:60-61)

The job of district forester and other forester positions required an education and some training in forestry. The district forester supervised one of the twenty- four districts. Each district had an office with clerical support and assigned foresters and rangers. (DeCoster 1995:60-61)

During the early 1920s, the accessibility of state forests improved through construction of 199 miles of new roads and 280 miles of new trails. In addition, 1,334 miles of old roads and 1,167 miles of old trails were maintained or repaired. An additional 143 miles of fire roads and 157 miles of fire trails were also developed. (DeCoster 1995:61)

Allegheny National Forest

In addition to the Pennsylvania state forest system, the federal government established the Alleghany National Forest in 1921, which is Pennsylvania's only national forest. The new national forest was the first application in Pennsylvania of the Weeks Law, under which lands could be acquired in the East, with permission of the state involved. The National Forest Reservation Commission, formed under this law, was approved to purchase 412,000 acres in the headwaters of the Allegheny River. (DeCoster 1995:64)

The Pennsylvania Forestry Association welcomed the establishment of the new national forest, and had campaigned for it vigorously. As noted in the June 22 edition of *Forest Leaves*,

> A National Forest within the borders of the State of Pennsylvania is soon to become reality. It will be in the heart of the once-famous white pine and hemlock region, where lumbering was the first industry; followed by oil and gas. Today, most virgin timber has been cut. About half a million acres of mostly cut-over land will be bought.
>
> Owing to the highly developed industrialized condition of our country, there will always be a large demand for forest products, which are so important to the prosperity of our region. One of the most important future functions of the Allegheny National Forest will be to help supply this demand. (DeCoster 1995:65)

As noted by the PFA, most of the timber in the Allegheny National Forest had been cut and fires had burned over the land. It would takes years for the forest to regenerate. (DeCoster 1995:65)

Today, Alleghany National Forest extends over approximately 517,000 acres and includes land in Elk, Forest, McKean, and Warren counties in the northwestern corner of the state. Approximately 463,000 acres are forested; 42,000 acres are non-forest; and 11,000 acres are covered by water, primarily the Allegheny Reservoir. The forest is administered by two Ranger Districts: Bradford and Marienville. The Forest Service brought new concepts in forest management to the Allegheny Plateau—multiple benefits and sustainability. (USDA 2015)

Robert Y. Stuart, Pennsylvania Commissioner of Forestry, 1922–1923

Maj. Robert Young Stuart, who had served as deputy forestry commissioner under Gifford Pinchot, and acting commissioner during Pinchot's leave of absence to run for governor, assumed the position of Commissioner of Forestry following Pinchot's inauguration as governor of Pennsylvania in January 1923. Stuart had attended the Yale University School of Forestry and worked in various positions in the national forests. During World War I, he took military leave and was sent to France as a captain, heading the 19th Forestry Engineer Regiment. He was assigned to the American Expeditionary Force headquarters in France to secure timber for two forestry units. He also supervised the substantial movements of wood from French forests to the Allied war effort throughout the war. (DeCoster 1995:66)

Stuart continued many of Pinchot's programs, including *The Forester's Letter,* and to address fire suppression. Prior to Stuart's tenure, the department had begun building campsites in state forests for the motoring public, which, as noted earlier, was growing. By 1923, the forestry department had fourteen Class A campgrounds located along main roads in state forests. There were also twenty Class B campsites served by secondary roads. Stuart was involved in expanding the program. (DeCoster 1995:66)

Among these Class A campgrounds, only one was located in the Michaux State Forest ("Laurel Lake Park" on the western side of Laurel Lake in today's Pine Grove Furnace State Park; by 1925 this location had been downgraded to a Class B campground). In addition, the system of parks and forests included only seven "State Forest Parks" statewide in 1923 (special parks at Caledonia and Mont Alto were so designated, but not yet Pine Grove Furnace) (Andre Weltman personal communication).

Cook Forest State Park

In 1928, the Commonwealth of Pennsylvania authorized $450,000 to purchase property from the heirs of lumber baron Andrew Cook. To meet the purchase price, the Cook Forest Association, a private conservation organization, raised an additional $200,000. The purchase of the land with its large stand of old growth forest marked the first time the Department of Forests and Waters purchased land to preserve an outstanding natural resource which became Cook Forest State Park. (DCNR 2015, History website)

Conservation, Forestry, and the Great Depression, 1929 –1941

Following the stock market crash that began on October 24, 1929, America's economy began a long downward slide. The Great Depression that consumed the decade of the 1930s would play an influential role in the expansion of federal forest reserves. Make-work programs created by the federal government also contributed to state and national forest areas through the provision of a work force that addressed fire suppression needs, built roads, and improved recreational facilities for the public.

The acreage of federal park lands increased through the work of an agency created by President Franklin Delano Roosevelt to resettle people living on the poorest agricultural lands, and turn ownership of the land over to the federal government for parks and national forests. One of the areas targeted by the Agricultural Adjustment Administration was the steep, eroded fields of Appalachia.

By the 1930s, the U.S. Forest Service had secured thousands of acres of forest reserve within the Appalachians. Although fires remained of concern, forest wardens were beginning to get them under control. Forest trees were beginning to regenerate in protected areas. The U.S. Forest Service, however, was so entrenched in the process of fire control that it suppressed its own research showing that some kinds of fires at certain times could be useful to humans without unduly harming forest communities. Once Smokey Bear was introduced in 1944, the message of fire control spread quickly to the general public as well. (Bolgiano 1998:100)

Although the federal rangers and their staff worked hard to meet the goals of forest regeneration on public lands, it was not until the additional work force of President Roosevelt's New Deal programs was made available to help that the eastern national forests were put to rights.

In order to address the problems associated with environmental decline, the Roosevelt administration also sought to convert unproductive and exhausted farmland into parks and recreation areas, or national forests. The program sought to take sub-marginal farm lands out of production and convert them to recreational and conservation land. The hope was that the purchase of sub-marginal land by the Forest Service and other government agencies would put money in the hands of farmers so they could survive the Great Depression (Conrad 1997:68). National forests and parks were the recipients of thousands of acres of land acquired after being classified as sub-marginal for farming. The program, which involved owner relocation and land acquisition, began in 1935, and was continued under the Farm Security Administration after 1937. The Federal Emergency Relief Administration also developed land programs that allowed destitute farmers to take up subsistence homesteads on government land. These programs eventually led to exchanges of land with the U.S. Forest Service.

State parks also benefited from the program when sub-marginal lands were converted into Recreation Demonstration Areas. These new public open spaces were generally built near large cities in order to serve as open-air recreation for urban dwellers. The five demonstration areas in Pennsylvania—Blue Knob,

Hickory Run, French Creek, Laurel Hill and Raccoon Creek—were turned over to the Commonwealth in 1945 and became state parks.

Another influence of the New Deal on the National Forest System, especially in the East, was a failed master plan prepared by the U.S. Forest Service and titled the "National Plan for American Forestry." Submitted to Congress as part of an Omnibus Forestry Bill in 1940, the plan, although not endorsed had a profound influence on the U.S. Forest Service for years to come by suggesting the extension of public ownership of forest lands, and more intensive management on all forest lands. These principles were soon adopted by the U.S. Forest Service in its approach to land management, and drove the creation of eighty new national forests in the East. (Conrad 1997:68)

One of the programs that President Franklin Delano Roosevelt established as part of his New Deal to help Americans struggling financially was the Civilian Conservation Corps, known as the CCC. The program sought to support conservation of the nation's natural resources—timber, soils, and water—by providing employment and training to jobless, unmarried young men. To make sure that there was plenty of national forest land for the men to work on, tens of millions of dollars were appropriated for land acquisition. (Bolgiano 1998:100-101)

Roosevelt based the program in part on his experience as New York governor, where he had helped to put thousands of unemployed young men to work on public works projects, including on abandoned and sub-marginal lands that the state had acquired for reforestation beginning in 1930, Roosevelt had campaigned for the 1932 Presidential election with a pledge to fight against soil erosion and declining timber resources by hiring unemployed young men from large urban areas to take on needed projects. As in New York, Roosevelt's New Deal sought to establish a temporary emergency relief administration where the unemployed were hired to work on reforestation projects, clearing underbrush, fighting fires, controlling insects, constructing roads and trails, and developing recreation facilities. His proposal suggested that government recruit thousands of unemployed young men, enroll them in a peacetime army, and organize groups of enrollees to undertake projects around the country to repair damage done to soil and water resources by poor farming, logging, and mineral extraction. At the time, environmental problems resulting from the loss of 700 million acres of virgin forests and 6 billion tons of topsoil were being felt by many around the country.

The CCC was highly successful. Over the course of nine years between 1933 and 1942, more than three million young men participated in this massive conservation effort, which quickly became the most popular of Roosevelt's New Deal programs. The CCC camps were constructed as close as possible to the areas of proposed projects. Their work was dependent on a plan prepared by a department or agency. Many enrollees were devoted to Soil Conservation or Forestry. Their camps included an associated designation, such as SC for Soil Conservation or F for Forestry. The men built fire towers, telephone lines, picnic tables, overlooks, trails and campgrounds with wells, fireplaces, and privies. They piled up boulders and brush piles in erosion ditches to stop the force of water.

They thinned out thousands of acres of choked stands of young tree. They dug up all the gooseberry and currant bushes they could find to eliminate them as a reservoir of blister rust, a fungus that killed white pines. Whatever other timber improvement projects the rangers could devise, the CCC enrollees performed it. In some national forests with nurseries, they planted hundreds of thousands of seedling trees. The CCC also built many miles of roads.

The program began to dwindle in summer 1940 as the government began to focus on resources for national defense and developing infrastructure for military training facilities. With the bombing of Pearl Harbor in December 1941, it soon became clear that federal projects not directly associated with the war effort were not a priority. A joint committee overseeing the evaluation recommended the CCC be abolished by July 1, 1942. Although the CCC was never formally abolished, its funding was severely curtailed in June 1942 by a narrow vote of 158 to 151. With its funding cut, the CCC was forced to conclude operations formally at the end of the federal fiscal year on June 30, 1942. Some former CCC camps were reactivated between 1941 and 1947 as Civilian Public Service camps where conscientious objectors performed work of national importance as an alternative to military service. Other camps were used to hold Japanese American internees or German prisoners of war.

The CCC in Michaux State Forest

The CCC had a profound impact on the state of Pennsylvania, helping to improve the health and viability of the forests and natural areas, while also enhancing state parks. During their tenure in Pennsylvania, the CCC built roads, reforested areas that had been cleared by industrial activity, and built bridges and dams. Enrollees combated natural disasters such as floods and forest fires, and cleaned up after damaging storms. (Otis 1986) Pennsylvania benefitted from having the second highest number of camps and enrollees in the country. They were able to do so based on having plans in place for work efforts, thanks to the foresight of Governor Gifford Pinchot.

Five CCC camps were established within the vicinity of the Michaux State Forest during the 1930s and are discussed further in Chapter 7 of this report. Camps State Forest (S) 51-PA (Pine Grove Furnace) and S-70-PA (Camp South Mountain [Old Forge]) were established on May 6, 1933, followed shortly after by camps S-107-PA (Camp Caledonia, which became State Park {SP} 18-PA in October 1936) and S-108-PA (Big Pond) in June of 1933. (DCNR 2015, Pine Grove website) The final camp, Soil Conservation Service (SCS) Camp 4-PA (Camp Waynesboro) was established in December of 1935, specifically to address the issue of soil erosion. (DCNR 2015, CCC Years website) The camp at Pine Grove Furnace, S-51, occupied land along today's Michaux Road once owned by the ironworks.

Camp enrollees protected the forests from fire, improved infrastructure, and built day use areas, continuing to enhance the forests where the iron industry had formerly denuded the hillsides in collecting wood for charcoal. Corpsmen removed stumps and planted seedling trees in an effort to combat soil erosion and flooding, thus establishing the second growth forest that prevails today. In addition to planting, corpsmen built up an infrastructure that included roads, bridges and trails. Notably, corpsmen developed the Appalachian Trail that runs

through Michaux Forest, including building bridges and shelters for hikers on the trail.

The camp at Big Pond, S-108-PA closed in 1937, followed by Camp Caledonia, S-107 in 1939, and Camp Waynesboro, SCS-4-PA, in 1940. Pine Grove Furnace, S-51-PA, and Camp South Mountain (Old Forge), S-70-PA, closed in 1941, ending the CCC presence there. (Speakman 2006) The CCC camps in Michaux State Forest are discussed further in Chapter 8 of this Cultural Landscape Assessment.

World War II (1941–1945)

The entry of the United States into World War II in 1941 ushered in a new era, which entailed first the hardship of war, and then a slow recovery. Eventually, when it arrived, the recovery was strong and Americans prospered. For all intents and purposes, United States entry in World War II ended the Great Depression. It also served to end President Roosevelt's New Deal programs, including the CCC, due to the enlistment of young men in the war effort, and the loss of funding. The national forest and park funding programs also nearly ended completely, and were not renewed after the war. With approximately five million acres encompassed by the system, the national forests in the East achieved their current configuration by 1941. Although funding would increase under the administrations of John F. Kennedy and Lyndon B. Johnson in the 1960s, the effort to expand conserved federal forest land has never again matched what was accomplished during the 1930s. Most of the tracts that were purchased after the war were concentrated in the badly cut over and mined lands of the Daniel Boone National Forest in eastern Kentucky, which became the last national forest to be established in the Appalachians in 1966. (Bolgiano 1998:102-103)

In the meantime, many forestry employees entered the armed services. Those who remained focused on helping to provide wood products for war. With labor shortages, new personnel had to be trained. The Pennsylvania Timber Production War Project was initiated to support this need and coordinate with other wood industry entities involved in supplying the war effort. Harvesting projections and allotments were increased in the state forests on a diameter-limit basis to provide needed raw material. The diameter-limit basis that allowed for removal of trees of specified sizes was used because it required less forestry staff to supervise than more-complex harvesting systems. (DeCoster 1995:77)

Between 1942 and the end of the war in 1945, harvests from state forests yielded more than 100 million board feet of timber. American participation in World War II also meant that the national forests had to provide war material. Although the volume of timber harvest had dropped far below the peak reached in 1909, wood products never completely stopped coming out of Appalachia, including the national forests. (DeCoster 1995:77)

Pulpwood was considered a strategic material and pulpwood cutters were much sought after. Besides the need for large amounts of conventional paper from wood pulp, the troops needed cellulose nitrate, also derived from wood pulp. The material was the base for nitrocellulose that became smoke-less powder for explosives, and clear, strong lacquers and plastics for everything from airplane windshields to military map containers. (DeCoster 1995:77)

Because Allied countries in Europe had exhausted their forest resources during World War I, American forests were expected to supply the war effort. In Pennsylvania, efforts made toward meeting this need was described in the July-October 1944 issue of *Forest Leaves* "Increased timber cutting continues, necessitated by war needs. Pennsylvania continues to lead the northeastern states in lumber production." This was a change from forest management policy up to this point, which had been a response to the overharvested forests of the nineteenth century:

> There had been a long downward decline from the tremendous harvests, peaking in 1899 when Pennsylvania produced almost 2.5 billion board feet of lumber. State timber production hit bottom at 73 million board feet in 1932. The trend was reversed after 1932. After the war is over, production will probably drop again, as it did in 1920-after the First World War. There is no reason though, why the state's 15 million acres of forests couldn't grow and produce 2.5 billion board feet of timber per year on a sustainable basis. (DeCoster 1995:77-78, from *Forest Leaves*)

Because of defense needs and high wages afforded in the defense plants located in urban areas, labor was difficult to come by for forest harvesting work. In 1944, prisoners of war were employed to harvest wood in the forests of many states including Pennsylvania. Within the National Forests, U.S. Forest Service policy favored small, portable sawmills that local people could afford to run with family and a few hired hands. During the war, the annual total number of board feet cut in national forests in the South increased from less than 100 billion board feet to nearly 250 billion. Most of whatever old growth was left went to build bridges, barracks, boats, aircraft, and packing crates to ship supplies overseas. The last of the dead chestnut trees were cut for extract to tan the leather that went into making soldiers' boots. (Bolgiano 1998:104)

Prisoner of War Camps

In Pennsylvania, some of the CCC camps that had been closed in 1941 or 1942, were reopened to house and train war prisoners to harvest wood. In the Michaux State Forest, a large interrogation facility was operated with more than fifteen hundred prisoners that included officers and non-commissioned officers of the German navy and Rommel's Afrika Corps, as well as Japanese military personnel. Three camps were established on abandoned CCC sites within Allegheny National Forest. Forty prisoners arrived in April 1945 at Lyman Run camp and soon after another camp was opened at Bark Shanty campsite. The army provided guards and interpreters, while the paper and lumber companies hired the prisoners at prevailing rates. The fees were paid to the U.S. Army. (DeCoster 1995:78)

At Michaux, a Prisoner of War (POW) interrogation center was opened on the site of the CCC camp near Pine Grove Furnace. The CCC camp buildings were adapted to support camp needs. The Army also constructed additional buildings, including a hospital, as well as guard towers, and perimeter fencing.

After Germany surrendered in May and Japan in August, 1945, the prisoners were returned to their home countries. Some chose to stay in Pennsylvania and settled near Coudersport. Most facilities were abandoned after this and poorly

maintained buildings were taken down. At Camp Michaux, the camp was decommissioned in late 1945. At that time, ownership reverted to the Commonwealth of Pennsylvania under the management of Michaux State Forest. In 1948, the United Presbyterian Church and the Church of Christ leased the POW camp buildings from the Commonwealth, and used them for church camps and meetings for the next twenty-five years. The churches abandoned their lease in 1972, and the buildings deteriorated. Some were sold off at an auction three years later, while the rest were razed. Evidence of the camp survives in the form of foundations, circulation systems, guard tower bases, and information etched into concrete work. At other camps, only a few buildings remained by 1951. (Bland 2006; DeCoster 1995:78))

The CCC camp at Old Forge was also adapted for use by a religious organization. The buildings have been continually maintained over the years and the camp survives today as a relatively intact example of a CCC camp.

Post World War II Era (1945–1960)

Although Pennsylvania forests had been impacted by the demands of the war, it also contributed some useful technology to the profession of forestry. For example, improvements in aerial photography developed during the war were used to tabulate the forest area of the state by county and township. (DeCoster 1995:78)

The post war landscape also changed in response to a demographic shift that occurred in population from rural to urban living. The war appears to have set in motion an increase in urbanization and industrialization in Pennsylvania. The forest policies of Pennsylvania, like many other states, eventually were adapted to this change, which reflected a population that increasingly did not make a living by working on the land. (DeCoster 1995:78)

Improvements in state forest management included the completion of a statewide radio system within the state forests in 1948 that linked together 150 forest fire observation towers with headquarters and district forester offices, development of the first detailed management plans for the state forests using aerial photographs, and growth of the department's role as an advisor to private forest owners through programs such as "Farm Forestry" and "Service Forestry." The program benefitted in 1950 when the Cooperative Forest Management Act was approved by Congress. The Act allowed the federal government to pay up to half the cost of providing technical services to private landowners, forest operators, wood processors, and public agencies, with respect to the multiple-use management and environmental protection and improvement of forest lands, the harvesting, marketing and processing of forest products and the protection, improvement, and establishment of trees and shrubs in urban areas, communities and open spaces. (DeCoster 1995:80)

Cooperation between state and federal forest service programs and the timber industry as well as private land owners with timber reserves increased following World War II. In 1947, Pennsylvania joined the Tree Farm System, which had been started in the West by the Weyerhaeuser Company, and asked for a pledge by landowners to protect forests from fire and manage them as sustainable crops.

The lands of private owners who joined the effort were "certified" as Tree Farms. The Pennsylvania Forestry Association became the state sponsor of the program, in cooperation with forest industries and the state forestry agency. To promote forest fire prevention, the "Keep Pennsylvania Green" program was inaugurated in 1949 and sought to establish joint private/public efforts to educate the public regarding forest fire prevention. The system supplemented state and federal fire prevention efforts by adding private funds and manpower to the public programs. (DeCoster 1995:80-81)

Growth in the economy also stimulated a cutting boom in the national forests that continued for decades. As veterans returned and started families, the resulting demand for housing drove up the value of trees. In response, the timber industry began to pressure the U.S. Forest Service to make more wood available. By the 1960s, the Forest Service was tripling and quadrupling its cut. Amounts and methods of cutting were mandated by the high-level administrators, removing some of the district rangers' autonomy and their ability to let the immediate community have a say in land-use decisions. At the national level, the acceleration in harvest was estimated at less than overall annual timber growth, because there remained so many areas where second-growth trees not yet matured enough to harvest. Nonetheless, Appalachian forests were in the process of making a remarkable recovery. Even though the U.S. Forest Service had taken the least productive lands plagued with the most destructive abuses, they had been able, through dedicated care, to make that land productive again. (Bolgiano 1998:104-105)

Public officials increasingly wanted to determine what exactly the nation's forests should be expected to produce. On private lands, trees tended to get cut when they reached a size that of worthwhile economic return. Within the national forests, however, large areas were not cut over where the land was deemed unsuitable for harvest because of steepness or erodible soil. This allowed for millions of acres of forest within Appalachia in particular to potentially recover toward old growth compositions. While the ecological implications of this are now recognized, this was not understood until the 1980s, and then not by the U.S. Forest Service. (Bolgiano 1998:106-107)

At the same time, new values began to be recognized in association with national forest land: recreation and access to nature. Increasingly, the postwar generation was inclined to visit public lands for refreshment and recreation. With economic prosperity came additional leisure and the ability for Americans to afford automobiles. Increasingly, more and more of the millions who lived in the Mid-Atlantic and the Southeast began to vacation in national and state parks and forests. Bolgiano 1998:107)

To address the needs of Pennsylvania's urban population, Secretary of Forests and Waters Maurice Goddard established a goal of ensuring that a park or forest recreation facility was located within twenty-five miles of most Pennsylvanians in 1955. Until the 1950s, most state forests were in remote areas. By 1955, improved road systems, such as the Pennsylvania Turnpike and the Penn-Lincoln Parkway were making travel easier and more convenient. Industries were switching from a six-day to a five-day, forty-hour week, giving people more leisure

time to use public recreation areas. Although the automobile age was in full swing by now, roads were still rough and narrow. Goddard calculated that a trip of twenty-five miles for a day's visit to parks and recreation areas was practical for most people. (DeCoster 1995:84)

His goal required money to build facilities on land already owned by the department and to acquire new land closer to population centers. One of the sources came from the Oil and Gas Fund, established in 1955. All revenue from oil and gas leases on state forest land was placed in a fund to be used for conservation, recreation, and flood control. Goddard convinced the legislature to pass a bill dedicating the revenue from oil and gas leases on state lands for land acquisition and recreation facilities. (DeCoster 1995:84)

Finally, during the later 1950s, the state began to use its detailed management plans completed for all 1,833,539 acres of state forest lands to direct wood harvests, including such techniques as uneven-age management and group cutting. The goal was to create forests with trees of varying ages. However, by 1965, studies showed that this type of forest management was failing to establish desirable young trees in harvest areas as replacements for those that had been cut. The concentration on the selection method was changed, after much study and debate, to include even-age, or clear-cut management where timber, wildlife, and watershed management were the primary consideration. With this technique, whole sections of forests were harvested at one time, creating conditions for replacement forests of uniform age. (DeCoster 1995:82)

Fire suppression practices were improved through the use of airborne "water bombing" beginning in 1960.

Conservation and Ecology (1960–1970)

During the 1960s, a profound shift occurred in American conservation in response to the findings of several scientific studies conducted in western United States parks. It was during the early 1960s that the emerging science of ecology began to suggest an increasing need for environmental stewardship and the protection of water and soil resources, profoundly influencing federal and state land management policies. In 1963, two reports radically transformed policy priorities within federal agencies involving land management. The primary document that led to this transformation was the *Report of the Advisory Board on Wildlife Management in the National Parks.* The study, known primarily as the Leopold Report for the name of the committee chairman who led the investigation, A. Starker Leopold, was prepared on the request of Secretary of the Interior Stewart Udall in response to the problem of elk overgrazing at Yellowstone National Park.

The committee's investigations revealed that current land management policy was contributing to unexpected changes in the ecology of Yellowstone National Park, and, by association, other natural and wilderness areas. Alarmed by the implications of this finding, the committee exceeded their charge, and presented a blueprint for altering the basic management philosophy for the national parks. The Leopold Report suggested that the primary purpose of the parks was the maintenance of the ecological balance among plant and animal communities located in America's national parks, and restoration to their condition at the time

of European Contact as nearly as possible. The report recommended that a permanent staff of scientists oversee management priorities in each park. A second study prepared within a year of the Leopold Report addressed the related question of scientific research within national parks. Known as the Robbins Report after its chairman, W. J. Robbins, this document corroborated the findings of the Leopold Report and advocated the emerging shift in approach increasingly adopted by scientific and conservation communities. The Robbins Report suggested an increase in the amount of scientific research conducted in the parks to support ecosystem preservation.

By 1963,

> Adoption of the Leopold report's recommendations as well as continued pressure to diversify the system to include recreation as well as preservation strained a National Park Service already undergoing change and growth from Mission 66. In the next six years these two issues would demand continual adjustment and reinterpretation. Secretary of the Interior Stewart Udall signaled the new tone with his 1964 letter on national park management. In it the secretary reaffirmed the Leopold report as a guideline and differentiated the management prescriptions for natural, historic, and recreational areas. The latter was a tacit admission of the growing complexity of the agency's mission. (Dilsaver 1996, chapter 6)

The complexity of federal management policies continued to grow over the next decade. Within ten years, the influence of the Leopold Report had led to passage of several federal acts that served to diversify the role and duties of federal agencies in managing land and natural resources. In 1964, Congress passed the Wilderness Act, which authorized the federal government to acquire wilderness areas for the benefit of present and future generations of Americans. Wilderness areas were defined as large tracts of undeveloped land that would not be subject to logging, mining, road development, or other cultural activities resulting in disturbance to plant and animal communities and such natural environmental features as soil and water. The Wilderness Act was part of a broader strategy to establish a National Wilderness Preservation System, composed of federally owned and designated wilderness areas administered to remain unimpaired for the use and enjoyment of the people. The legislation prompted the National Park Service to carefully examine all parks that potentially qualified as wilderness areas and provided additional legal protection for park areas threatened with development. The National Park Service argued that the application of this legislation to parks was redundant because they were already managed for roadless preservation. The Wilderness Act would be used to prevent certain projects intended to provide access to undeveloped park interiors, such as the Tioga Road in Yosemite National Park.

In 1965, Congress passed the Land and Water Conservation Fund Act, which established a fund for acquisition of new recreation lands either within or adjacent to existing park units or as new parks themselves. A portion of the money to be provided to the fund would come from fees charged at existing parks. The fund was administered by the Bureau of Outdoor Recreation. The Land and Water Conservation Fund Act provided funds for the eventual purchase of

several hundred thousand additional acres by various national forests, but these were lands with specific recreational value.

The Land and Water Conservation Fund Act was followed in 1966 by passage of the National Historic Preservation Act, which defined the duties of the National Park Service with regard to historic sites and structures. The act authorized the Secretary of the Interior to create and maintain a national register of historic districts, sites, and structures and to establish programs of matching grants to states and to the National Trust for Historic Preservation. The National Park Service became the coordinating agency for these activities and its director the executive director of the Advisory Council on Historic Preservation.

In 1967, President Lyndon B. Johnson signed into law the Clean Air Act, which provided another layer of protection for park resources, but also demanded management compliance. Parks were identified as areas of desired maximum air purity. As such their airsheds would be more tightly constrained in terms of the production of pollutants.

In 1968, President Johnson signed both the Wild and Scenic Rivers Act and the National Trails System Act. The Wild and Scenic Rivers Act provided for the protection and preservation, in free-flowing condition, of selected rivers that possessed outstanding scenic, recreational, geologic, fish and wildlife, historic, or cultural value. The Act identified eight rivers and adjacent lands in nine states as initial components of the wild and scenic river system, to be administered variously by the secretaries of Interior and Agriculture. It also named twenty-seven other rivers or river segments to be studied as potential additions to the system. The National Trails System Act provided for the establishment of national recreation trails accessible to urban areas, to be designated by the Secretary of the Interior and the Secretary of Agriculture according to specific criteria to be established by Congress to recognize exemplary trails of local and regional significance as well as national scenic trails. The Act designated two national scenic trails as components of the trails system: the Appalachian Trail and the Pacific Crest Trail, also referred to as the Pacific Crest National Scenic Trail. It also ordered fourteen other routes to be studied for possible national scenic trail designation.

This legislation was followed in 1969 by the National Environmental Policy Act, which formed the nation's basic charter for environmental protection. It directed federal agencies to carry out their functions in a way that avoided or minimized environmental degradation and required them to conduct planning with studies of potential environmental impact for all development projects. In addition, the planning process would be open for public input. (NPS 2015, timeline website)

This latter provision was to have extraordinary results as conservation organizations in particular became powerful players at the required hearings. NEPA rounded out a short period during which the duties and ground rules of the NPS evolved with dizzying speed especially for old-time employees, hired at a time when the parks were distant, serene enclaves of natural landscape architecture. (Dilsaver 1996: chapter 6)

Thus, the changes set in motion by the Leopold and Robbins Reports in 1963 and the rapid passage of legislation that followed in the 1960s led to a broad expansion of federally managed lands in the 1960s and 1970s, as well as procedures for managing them.

Pennsylvania State Forests

Just as public recreation expanded at the federal level, in Pennsylvania the state had used oil and gas funds to increase public access to open space. During a time of rapidly increasing demand for public outdoor recreation, when department figures showed the number of visitors to Pennsylvania state parks had risen to twenty-four million in 1961 from eight million in 1955, Goddard was not satisfied with the progress and decided to add two state bond issues to his agenda. After being reappointed in 1959, Goddard secured the governor's support for Project 70, a bond issue proposal to raise $70 million for public lands and facilities. The proposal earmarked $40 million for the Department of Forests and Waters to acquire property in forty-three urban counties where ninety percent of the state's people lived. The remaining funds were to go to the Fish and Game Commissions for critical habitat acquisition and to the State Planning Board. The bond measure was approved in November 1963, and Governor Scranton signed the enabling legislation into law as Act 8 on June 22, 1964. (DeCoster 1995:84)

In addition, in 1962 Goddard separated state park operations from forestry, setting up a Bureau of State Parks to specialize in park management. The parks were supported by a national program in 1966 referred to as the National Neighborhood Youth Corps. Pennsylvania employed fifteen hundred young people in conservation work in state forests and state parks. (DeCoster 1995:84)

In 1966, Goddard approached Governor Raymond Shafer about Project 500, another referendum bond issue. This effort involved appropriating $500 million for land acquisition, recreational facilities, and a variety of environmental projects ranging from strip mine reclamation to sewage treatment plants. The Land and Water Conservation and Reclamation Act implementing Project 500 was signed by Governor Shafer January 19, 1968. (DeCoster 1995:84)

Emerging Practices (1970–1995)

By the first Earth Day—April 22, 1970—interest in the environment had risen to unimaginable heights, which was reflected in a tenfold increase in visitation to all national forests since World War II. A diffuse but powerful force called "outdoor recreation" was emerging to challenge the supremacy of timber as the major value of national forest lands. (Bolgiano 1998:107)

Although tourism has been part of American life since frontier days, now people thronged to parks and natural areas to enjoy the rivers, trails, campgrounds, roads, and views that were available to them in the national forests. Many visitors were impressed enough to decide to move in closer proximity to these open spaces. In a reversal of the rush to urban living following World War II, rural populations again surged from 1970 to 1995. During this period, Congress passed the Payments in Lieu of Taxes Act to increase and diversify the revenues that counties received from the national forests. Satellite dishes made TV reception possible in even remote areas. A burgeoning service economy helped to reduce

the region's poverty rate by almost half. It was during this period that citizens began to question U.S. Forest Service policies involving clear-cutting, and to engage more decidedly in the management of public forest lands. (Bolgiano 1998:107)

In Pennsylvania, similar trends have affected forest management. In 1970, Shafer signed Act 275 establishing the Department of Environmental Resources (DER, now the Department of Environmental Protection, or DEP) in response to the National Environmental Policy Act. The restructuring of the department took effect January 19, 1971, under the new administration of Governor Milton J. Shapp. Shapp merged the Departments of Forests and Waters and Mines and Mineral Industries. Goddard, who opposed the formation of the new department, was retained by Shapp as acting secretary to start up the new department and eventually was appointed as secretary. In January 1975, Shapp, who had been re-elected, under a new constitutional provision allowing two consecutive terms, reappointed Goddard to his sixth term directing the state's forestry programs. (DeCoster 1995:85)

The DER represented a changing view of land and forest management. The perspective has shifted from the early view of forests as obstacles to be cleared and consumables to be used; to the protect-from-fire and manage-for- timber policies that followed; to the outdoor recreation phase of building state-owned and operated facilities. The environmental concerns that coalesced with Earth Day in 1970 became significant. Each new concern has been added like a blanket over the earlier ones, so that today we still have the need to clear forests, consume their products, protect them from fire, use them for commerce and recreate in them, but these goals were now overlaid with new concerns as to how forests affect our whole environment. (DeCoster 1995:86-88)

The environmental area of concern is expressed in Article I, Section 27, which was added to the State Constitution as the Pennsylvania Environmental Bill of Rights in 1972. It indicates that: "The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and aesthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources the Commonwealth shall conserve and maintain them for the benefit of all the people." (DeCoster 1995:88)

In 1970 the State Forest Commission changed its concept of setting aside forest monuments and scenic areas in state forests to a more ecology-based designation of special areas, and passed a resolution establishing thirteen "natural areas" and one "wild area" in state forests. Natural areas were defined as having a "unique scenic, historic, geologic or ecological value which will be maintained in a natural condition by allowing physical and natural processes to operate without direct human intervention." Of course, the Forestry Bureau had recognized values other than timber on state lands from the start, and these new designations were a formalization of long-term policies to preserve special forest areas. By 1995, the state was managing seventy-seven areas totaling nearly 215,000 acres as natural and wild areas. (DeCoster 1995:86)

In 1975, the Department of Environmental Resources Environmental Quality Board published expanded definitions and guidelines governing selection and administration of natural areas and wild areas. The number of wild areas was increased to thirteen, and natural areas to forty-four. Together, these areas covered more than 160,000 acres of state forest land. Later, a DER "flora and fauna" policy stated that "State Forest lands should provide habitats that support a "diversity of animal and plant communities and should serve as examples in promoting the conservation of native wild flora." A vigorous wild and native plant conservation program is operating in the DER and the bureau. (DeCoster 1995:88-89)

In 1977, with visitor use growing, the state struggled to meet maintenance and operation needs. With dwindling funds, the state was forced to lay off staff, close some areas, and delay maintenance. (DeCoster 1995:85)

Recreation continued to be one of the major function of the state forests, with 900 miles of hiking trails, 200 miles of cross-country ski trails, 2,400 miles of snowmobiles trails, 2,500 miles of roads, and 28 picnic areas. More than 200,000 acres had restrictions on development and motor vehicle use. The restricted areas were composed of sixteen wild areas (143,359 acres) and 61 natural areas (59,182 acres). However, there were still private cabins on many state forest lands from past campsite leases. Under this program, small tracts (100 feet by 100 feet) could be leased for private cabins, four thousand two hundred of these leases are still active under strict department guidelines regarding use and maintenance of the structures. The leasing of new sites was discontinued in the early 1970s. However, existing leases, totaling around 4,000 statewide including in Michaux State Forest, are allowed to continue with renewals every four years. (DeCoster 1995:86)

During the 1980s, the department administered a fund of $15 million to rehabilitate hundreds of miles of state forest roads. Most of these roads had not received major treatment since the CCC days. The department also replaced many substandard district headquarters buildings and added new ones using Pennsylvania Conservation Corps program funds and workers. This project was an employment and conservation program created at the state level and was modeled on the federal CCC program. Prior to 1980, money from state forest timber sales went into the general fund. During this period, timber sale receipts were deposited in a restricted account used for Forestry Bureau programs. (DeCoster 1995:89)

By 1986 Pennsylvania had more than four million acres of public forest land: 2.1 million acres in state forests, 1.25 million acres in state game lands, 500,000 acres in federal ownership (mostly in the Allegheny National Forest), and 280,000 acres in state parks. All of these lands remain open for public recreation. (DeCoster 1995:86)

State Forester James Nelson, who had instituted log grading programs to improve the value of state timber sales and developed a timber inventory system for state forests in 1964, and whose guidelines were used in making the change from uneven-age to even-age forestry on state lands to improve reforestation success, later served as a forest resource planner, developing timber management zoning

criteria, wildlife habitat guidelines. After 1989, Nelson directed a Pennsylvania Forest Stewardship program using federal cost-sharing to implement expanded forestry programs with private landowners, and to inform urban residents as well. The stewardship program broadened previous service-forestry-type programs to include the spectrum of forest functions ranging from aesthetics and wildlife to effects on soil and water. Stewardship programs continue to promote broad-based forestry plans for private forest owners, using forestry and biological expertise. Nelson also developed biodiversity guidelines for state forests to encourage the regeneration of diverse mixes of trees and other plants on state forests and added new natural areas and wild areas. Finally, he initiated acquisition of natural areas outside of state forest boundaries before retiring in 1993. (DeCoster 1995:90)

1995 Strategic Plan

In 1995, the Bureau of Forestry completed a strategic plan titled "Penn's Woods, Sustaining Our Forests." It includes the contributions of agency employees and hundreds of citizens and citizens' groups in determining the critical issues to be addressed by the Bureau of Forestry in the future. The over-arching goal of the plan was "to ensure the long-term viability, health and productivity of our forests while providing benefits to all Pennsylvanians." (DeCoster 1995:91)

The prime mission of the Bureau of Forestry is found in Article 1, Section 27 of the Pennsylvania constitution: "*Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.*" Consequently, the bureau operates under these principles:

- All forest lands provide public values.
- The forests and native wild plants of Penns11vania are socially and economically Important to the citizens of the Commonwealth.
- The Bureau of Forestry encourages public participation and involvement.
- The Bureau of Forestry will provide leadership and oversight in the management and protection of forest and native wild plant resources.
- The Bureau of Forestry will strive to instill a stewardship ethic in the general public.
- Ecosystem management will guide the Bureau of Forestry's approach to forest resources management.
- State forest lands will be managed to retain their wild character. where possible.

An Ecological Approach (1995 to the Present)

The Bureau of Forestry's 1995 strategic plan heralded a fundamental development in forestry management in Pennsylvania by embracing the principles of ecosystem management that had been evolving within the scientific community since the late 1940s. Based upon the 1995 strategic plan, the Bureau of Forestry completed work on a comprehensive new State Forest Resource Management Plan in 2003. The new plan took a holistic, integrated approach to managing forest resources in which all aspects of an ecosystem are considered

important and the interdependency of biological and non-biological systems and cycles is recognized. The 2003 Resource Management Plan was updated in 2007 and reinforced in 2010 with preparation of the Pennsylvania Forest Action Plan in response to Federal requirements for funding support. The 2010 Action Plan documents the condition of Pennsylvania's forests across all ownerships and establishes a framework for developing strategies to achieve long-term forest sustainability.

The 2003 Resource Management Plan, 2007 update, and 2010 Action Plan are discussed in Chapter 1 of this cultural landscape assessment along with the current structure of the Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry, and forest management statewide and within Michaux State Forest. The evolution of issues, thinking, policy, and approach to management of Pennsylvania's forests, including Michaux State Forest, is a direct result of the history outlined above. Michaux State Forest has played an important role in this history, not only in its early years but ongoing. The significant evolution over the past hundred and twenty-five years in recognizing and countering the devastation of Pennsylvania's forests, managing the recovering of the forests, and responding to changes in both public values and scientific understanding is impressive and represents a continuing challenge of great importance to the Commonwealth and the nation.

DISCUSSION OF HISTORIC CONTEXT WITHIN THE FRAMEWORK OF THE NATIONAL REGISTER OF HISTORIC PLACES

Many of the forest, forestry, and conservation resources associated with the South Mountain Landscape can be tied directly to the events and associations discussed in the historical overview above. As noted previously, those that are at least fifty years of age and relate directly to areas, periods, and criteria of significance as outlined in the National Register of Historic Places guidance documents could be identified as contributing to a National Register eligible property.

Several of the forestry features present within the Michaux State Forest are already discussed in a Multiple Property Documentation Form that relates to both forestry and the Civilian Conservation Corps: "Forestry in Michaux State Forest, 1760-1942; the Civilian Conservation Corps (CCC) in Michaux State Forest, 1933-1942." Prepared by graduate student from Shippensburg Univerity, the form indicates how individual properties should be further evaluated in order to list them on the National Register.

Several properties associated with Michaux State Forest have already been listed in the National Register of Historic Places. These include "Emergency Conservation Work (ECW) Architecture in Pennsylvania State Parks: 1933-1942, Thematic Resources," and "Pine Grove Furnace," which relates directly to the mineral extraction context more than to the forest, forestry, and conservation context.

The types of resources that relate to the forest, forestry, and conservation context within the South Mountain Landscape as a whole are listed and briefly discussed below. Following this overview of resource typologies, individual examples of resources by type found within Michaux State Forest are reviewed and discussed. The potential contribution of these resources to a National Register eligible property is indicated.

RESOURCE TYPOLOGIES WITHIN THE SOUTH MOUNTAIN LANDSCAPE

Resource typologies within the South Mountain Landscape that relate to the forest, forestry, and conservation historic context include the following:

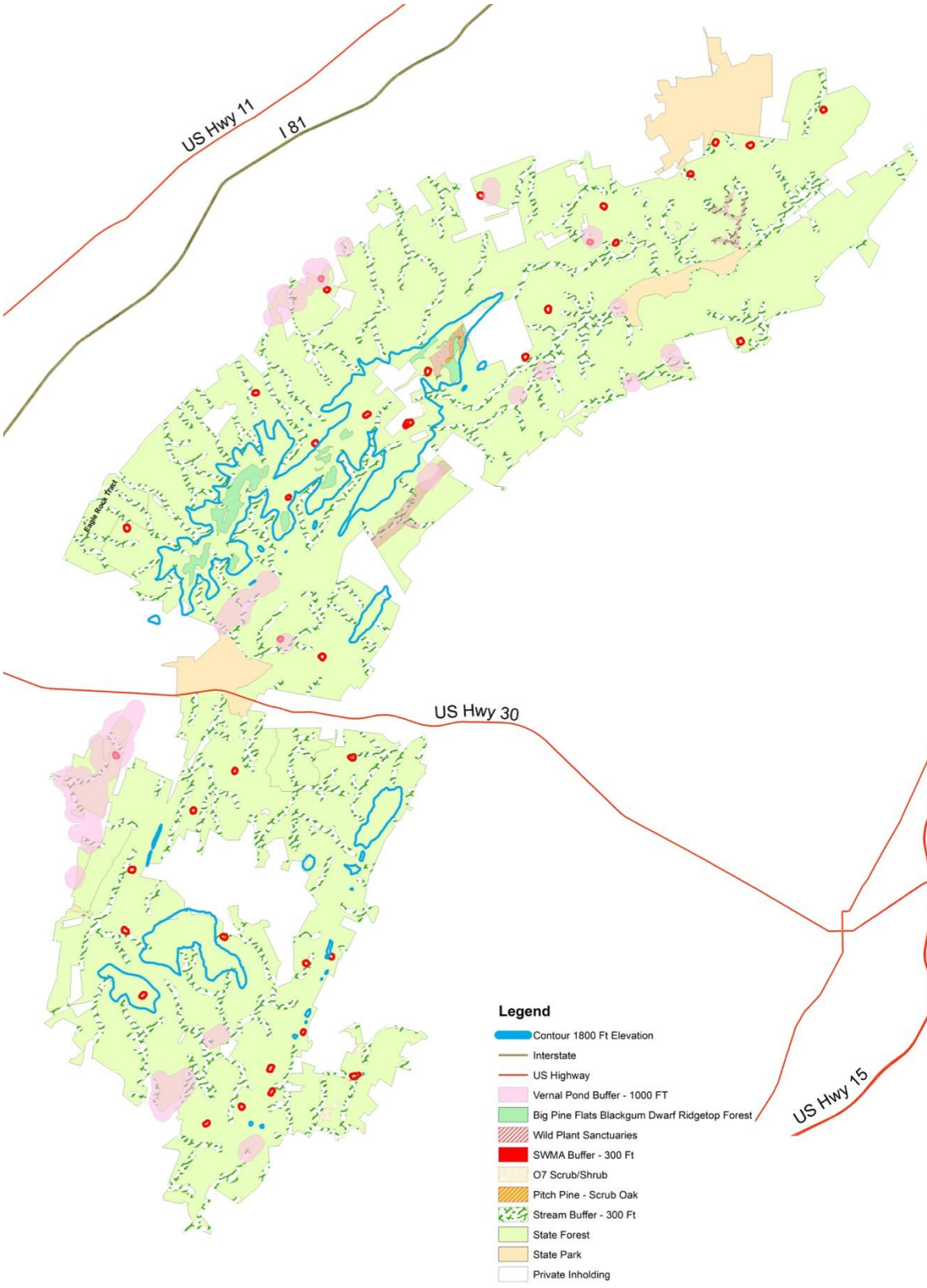
- State Forest Land
- State Park Land
- Natural Areas
- Timber Management Resources
- Fire Protection Resources
- Water Quality Protection and Supply Resources
- Game and Fishery Resources
- Forestry Education Sites
- Historic Sites

Forest, forestry, and conservation related resources located within the South Mountain Landscape are numerous, varied, and of many sizes and scales. At a broad level, forest, forestry, and conservation resources are the milieu or medium that binds the landscape together as a whole, at a secondary level to the South Mountain landform itself. The extensive area covered by forest is a direct outgrowth of the establishment of Michaux State Forest as a gesture of conservation to restore healthy natural systems following the harvesting and burning that occurred throughout much of the nineteenth century that resulted in a landscape denuded of trees.

The forest is the focus of activities related to sustainable forest management, forest stand improvement, tree planting for riparian and stream buffer plantings, reforestation and wildlife habitat plantings, recreation, infrastructure improvements, and the installation of identity, informational, boundary, and regulatory signage. The district forest office complex and other support facilities also relate to this resource type.

Extent of Forested Area Today

Michaux State Forest abuts or encircles several state park properties that were also derived from former iron furnace properties but that include concentrations of recreational and historical features managed primarily for visitors rather than for forest stands. Additional state forest land is being managed for natural resource values rather than timber. These are specifically designated as natural areas. Their establishment is outlined in the historical overview above, and they are further discussed in Chapter 1.



Michaux State Forest – A Management System for Attaining EcoRegional Goals (2015)

Within this milieu are numerous features that can be tied directly to timber management within the state forest. These include the system of gravel roads that crisscross the state forest. These roads, and their associated stone culverts, swales, and grading signature, are in some cases the result of work conducted by students of the state forestry school at Mont Alto or by the Civilian Conservation Corps. There are also interior logging roads used less frequently as well as numerous recreational trails. Many of these gravel roads, logging roads, and trails are artifacts left over from the 19th century iron industry and repurposed for forest use.

Wooden bollards, wood and metal gates, and groupings of rocks and boulders limit access to many of the forest's roads and trails. Many of these roads are clearly graded, and some are supported by stacked stone retaining systems. The state forest's logging roads appear to be used less frequently, such as when the forest stands they access are targeted for harvest or other management procedures. Along the logging roads there are also typically staging areas that are used for placement of heavy equipment and log storage. Various types of signage and markers are used for public and department purposes within the forest. A more recent addition to the state forest associated with forest management are fenced plots used to exclude deer.

Fire protection features are also an important component of forest management present throughout the state forest. These include fire lookout towers and fire roads.

As noted above in the context, protection of water quality for public use and needs served as one of the justifications for forest management and the establishment of state forests in Pennsylvania, as well as at the federal level. Located within Michaux State Forest are several bodies of water set aside for public purposes. These include Long Pine Run Reservoir and Carbaugh Reservoir designated to supply municipal potable water) and Laurel Lake and Fuller Lake (used for recreation such as swimming, fishing, and boating). Tom's Run is designated as a PA Fish & Boat Commission "Class A" wild trout stream and Mountain Creek is designated as a "Class B" stream. Finally, within the South Mountain Landscape there are state managed game and fishery resources such as the Huntsdale State Fish Hatchery.

SPECIFIC RESOURCES WITHIN MICHAUX STATE FOREST

Within Michaux State Forest are a wide range of specific resources associated with the resource typologies listed above. Most of these resources are directly related to forest management and some are historically significant with respect to the cultural landscape's forest, forestry, and conservation context. These resources and their potential significance are identified and discussed below.

State Forest Land

Within the typology of State Forest Land are specific resources that have been developed over the past one hundred and ten years since the state forest's establishment. The various resources present today may be associated with different periods of the state forest's historical development and may be representative of different aspects of the forest's evolving management and policy programs. Many of the resources in active use have been continuously upgraded to meet ongoing requirements.

Michaux State Forest. The Michaux State Forest property as a whole is a historic landscape that is likely significant at the state level as the first state forest in the Commonwealth of Pennsylvania. The most significant resource is the forest itself, which is a manifestation of its natural ecological characteristics and succession as well as of evolving forest management policies, practices, and values. The forest is a dynamic system. Its value as a natural ecological system outweighs purely historical considerations. The forest will continue to be managed in accordance with Bureau of Forestry planning and policy documents and evolving scientific insights and best practices. Sustainable forest management, forest stand improvement, tree planting for riparian and stream buffer plantings, biodiversity, and wildlife habitat will continue to be priorities. Nonetheless, the history of the forest's natural systems and how they have changed and evolved is of great interest and is part of the story that Michaux State Forest can convey to the general public.

Various natural resource components of the property support its historic land use, such as management as a forest to meet goals and objectives, and evidence of planting programs, including those relating to the activities of the Mont Alto School of Forestry. The property is marked and identified by the state with identity, boundary, wayfinding, directional, and regulatory signs and boundary delineations. Related elements that are at least fifty years of age constitute historic resources that support the significance of the property within this context.

State Park Land

Further discussed in the chapter on the recreation context, the state parks associated with Michaux State Forest are historically significant landscapes on South Mountain. While not within the state forest with respect to management responsibility, their history is closely associated with the establishment and development of the state forest. Park staff cooperate with forestry staff in addressing landscape, resource, and programming issues on an ongoing basis.

Pine Grove Furnace State Park. The 17,000-acre Pine Grove Ironworks was sold to the Commonwealth of Pennsylvania in 1913 to be part of the state's forest reserve system. Most of the land became part of Michaux State Forest, however a portion became Pine Grove Furnace State Park. The park includes the core area of the historic furnace, which it preserves and interprets, and is fully surrounded by the state forest.

Because the boundaries of the historic furnace lands extended well beyond the boundaries of the state park, much of the historic landscape, historic furnace activities, and associated resources related to the park's interpretive story are located within Michaux State Forest. The history of the property is directly tied to the forest, forestry, and conservation context, as well as to the landscape's mineral extraction and industry context. Pine Grove State Park contributes to the significance of the both contexts, though its individual resources are primarily associated with mineral extraction and iron production.

Mont Alto State Park. Mont Alto Park was established in 1875 as a private recreational attraction associated with the Mont Alto Iron Furnace. In 1902, the Commonwealth of Pennsylvania purchased the iron furnace lands as the state's first forest reserve. A profitable ongoing concern at the time, the park facilities were rented by the state to a concessionaire, who operated the park during the summer months. Eventually, the property became part of the state park system.

Because of its association with the forest reserve and the Mont Alto forestry school, the property contributes to the forest, forestry, and conservation context. Its primary association, however, is with the recreation and mineral extraction and industry contexts. Features include the bell-shaped pavilion, stone wall features, streambank erosion control stonework, other stone features not identifiable, layout, and trails.

Caledonia State Park. Like Mont Alto and Pine Grove Furnace, Caledonia is a state park that falls within the physical area encompassed by Michaux State Forest. Purchased shortly after Mont Alto, the lands of the Caledonia Iron Furnace were combined with those of Mont Alto to create the state's first forest reserve.

Caledonia was also used as a private recreational park before its acquisition by the state and is thus related to both the recreation and mineral extraction and industry contexts. Because of its association with the establishment of the early forest reserve, the property relates to the forest, forestry, and conservation context and contributes to the significance of Michaux State Forest.

Kings Gap Environmental Education Center. The Kings Gap Environmental Education Center is part of the state park system and is surrounded on several sides by Michaux State Forest. The Center sits on lands once used for charcoal production. The historic Cameron Mansion, constructed in 1908, is a notable public attraction with a spectacular view of the Cumberland Valley below. The mansion was built out of local quartzite explicitly due to the known danger of the forest fires discussed earlier.

Kings Gap became a DCNR property with the assistance of The Nature Conservancy in 1973. Additional land acquisition facilitated by The Nature Conservancy in 2011 almost doubled the size of this state park facility to more than 2,500 acres. The property includes environmentally sensitive vernal ponds downhill from the mansion near the base of the mountain.

Natural Areas

Natural areas are an important part of the current forest management and land stewardship practices of the state and of Michaux State Forest in particular. The idea of dedicating natural areas within the state forest system, however, was not adopted until 1970. Therefore, the existing natural areas that are part of the Michaux State Forest system and the South Mountain Landscape postdate the fifty-year age consideration and associated period of significance.

Discussed in Chapter 1, these areas remain an important resource of the state forest. Carbaugh Run Natural Area is associated with the mineral extraction and industry context as a prehistoric quarry site. Natural areas designated with Michaex State Forest include:

- Meeting of the Pines Natural Area
- Carbaugh Run Natural Area
- Mt. Cydonia Ponds Natural Area
- Beartown Woods Natural Area

Timber Management Resources

Timber management resources include the infrastructure improvements associated with forest management as it has developed since the establishment of Michaux State Forest. While the date of construction of most of these features is not known, many were established early in the state forest's history and may be remnants of iron industry use of the land. Historical accounts of the Mont Alto forestry school's early days and the Civilian Conservation Corp's work during the Great Depression specifically discuss road and infrastructure improvements. Research in primary source archives is needed to determine to which historic construction campaigns individual resources are associated. Over the years, however, many features have been improved, replaced, and changed such that they relate primarily to more recent history and do not fit within the fifty-year period required for designation. Nonetheless, they are significant to note and require further study.

State Forest Access Roads (gravel). Extending throughout Michaux State Forest is a system of gravel access roads that are open to the public and provide access to the forest landscape. Some of these roads can be identified on historic 19th century maps, and most are likely associated with the landscape's iron furnace and charcoal history. Some roads may have been constructed or improved by students of the Mont Alto forestry school in the early 1900s or by the Civilian Conservation Corps workers during the 1930s.

While it has not been possible to age date each segment of the road network to determine those that are at least fifty years of age, these roads generally reflect the heritage of forest management and are an essential feature of the property. Further research is needed to determine the age of each road. However, they should all be treated as important cultural resources. Many of the gravel roads may have been re-graded, re-graveled, and improved over the years. Nevertheless, with respect to location, character, and continuity of use, the roads retain historical significance.

Bridges. Associated with the road network are a number of bridges. Like the roads, the age of individual bridges has not been determined as part of this study, however the CRGIS system of the Bureau for Historic Preservation indicates that a number of the concrete bridges seen on paved roads throughout the state forest were constructed during the 1930s. Well within the state forest's period of significance, these bridges should be considered contributing features within the forest historic landscape.

Stone Culverts. One of the important features of the gravel road network within the state forest is the system of culverts, pipes, and swales that collects and channels stormwater alongside and beneath the roads so they do not get washed out. Many of these structures are elaborate stone collection features. As discussed above, the date of their construction is not determined. These are character-defining features of the gravel road network, and those that are at least fifty years of age contribute to the significance of the forest under the forest, forestry, and conservation context.

Wooden Bollards. The edges gravel roads in some places are protected by the installation of wooden bollards that serve as a safety feature or to limit access to areas that are not open to the public. It is unlikely that any of these systems is fifty years of age or older due to the tendency of wood to deteriorate in a shorter time frame. However, further research should be conducted to determine if similar systems have been used for more than fifty years. The bollard contribute to the character of the forest landscape.

Logging Roads (unimproved). In addition to the publicly accessible gravel roads that traverse the state forest, there are numerous unimproved logging roads and trails that lead off of the main roads with regularity. It is likely that these roads are used periodically to access different forest stands in addition to their

recreational use. Many of these roads and trails probably date to the iron industry and charcoal period of forest use and were later retained and improved. Further research is needed to determine which of these roads have historic antecedents and may exceed fifty years of age.

Staging Areas. Staging areas are present in association with many logging roads. These are typically level open areas used during timbering activities. It is not known which, if any, relate to historic forest activities, but they are representative of a characteristic use of the forest landscape. Further research is needed to consider the age of the existing and historic staging areas.

Gates and Rock Bollards. Access to many logging roads and trails is controlled by use of gates as well as by use of large rocks that block access. Various styles and types are seen throughout the forest limiting access to logging roads, staging areas, and utility corridors. These include log gates that swing to open, and the placement of groups of large rocks and boulders. Again further research is needed to determine what kinds of gates and bollards have been used in Michaux State Forest historically, which may survive, and if existing systems or specific features exceed fifty years of age.

Nurseries. Michaux State Forest is known historically for tree nurseries that were established in the forest during its early years and used to raise young tree with which to reforest the degraded landscape. Early nurseries were established across from the site of the Mont Alto forestry school in 1902 and at Caledonia in 1908. Management of the nurseries was a primary activity of the school and the state forest for decades, and thousands of trees of various species were grown from seedlings and planted to repopulate and restore the forest. The historic nurseries contribute to the forest, forestry, and conservation context and are significant features of the historic property.

Deer Exclosures. Protecting forest stands from deer browse is a relatively recent forest management technique. There are a few examples of exclosure fences in the state forest. These likely postdate the period of significance associated with the state forest, but are of interest for interpretive purposes in educating visitors regarding forest management techniques.

Historically, the Commonwealth had constructed deer *enclosures* as well, designed to keep deer in for their protection. In the 1920s, shortly after the purchase of the Pine Grove Furnace lands, the Commonwealth established a large, 1200 acre deer protection/breeding enclosure north of the modern park, possibly between Route 233 and Ridge Road to the southeast. There was also a smaller enclosure for deer called “the deer pens,” and this may be where American bison donated by the Federal government may have been kept (Andre Weltman personal communication).

Fire Protection Resources

The suppression of fire was a leading challenge in establishment and management of the early forest system. Techniques and facilities were developed that remain part of today's forest management.

Fire Roads. Fire roads are an important management feature within the state forest. Fire suppression has been a primary objective of state foresters since Michaux was established and was a major problem in degraded forest lands throughout Pennsylvania in the late 19th and early 20th centuries. Further study is required to determine if there are historic examples of fire roads within the Michaux State Forest.

Fire Lookout Towers. Fire lookout towers have been an essential feature of the Michaux State Forest and began to be constructed to provide early identification of fires as part of a statewide fire alert network. Pensylvania's first wooden fire tower was constructed in Michaux in 1905 and its first steel towers was constructed in 1914. Eventually the towers were connected with telephone lines and later radios to facitilate communication. Today Michaux State Forest contains several examples of historic fire towers including Big Flat Tower fire tower (1921) and Snowy Mountain fire tower.

Water Quality Protection and Supply Resources

The protection of regional sources of drinking water for communities was a driving factor in securing legislative support and funding for land conservation and forestry in the late 19th and early 20th centuries, including on South Mountain. Headwaters and streams became a focus for protection, and reservoirs were constructed.

Reservoirs. There are several reservoirs within the state forest property that were established based on the mission of the forestry division to protect water resources and drinking water for the public. Local communities served by the reservoirs include Chambersburg and Waynesboro. One of the early reservoirs—Birch Run—is no longer in use and has recently been restored to young forest. Further research is needed to outline the history of the forest's reservoirs. Those that exceed the fifty-year age consideration contribute to the significance of the state forest under this context.

Active reservoirs within the boundaries of Michaux State Forest include Long Pine Run Reservoir and Carbaugh Reservoir. Wayneboro Reservoir is located on South Mountain as well, but not within the boundaries of the state forest. The reservoirs are also used for recreational purposes, primarily fishing.

Game and Fishery Resources

State game, fishery, and similar resources are closely related to the conservation theme for Michaux State Forest.

Huntsdale State Fish Hatchery. The Huntsdale State Fish Hatchery is located just northwest of South Mountain along Yellow Breeches Creek and relates to the Michaux State Forest's conservation and recreation contexts. Constructed in 1932, the hatchery is a historic property that has been helping to stock local streams.

Forestry Education Sites

As outlined in the historical overview above, Michaux State Park was instrumental in early development of educational programming for forestry in Pennsylvania and has continued to be engaged in educational programming to the present day. In addition to the forestry school at Mont Alto, the state forest itself has served as a laboratory and training ground for young foresters. Sites associated with educational and construction projects undertaken by student in the early days of the forest's establishment require further research and identification.

Pennsylvania State Forestry School at Mont Alto. The state forestry school at Mont Alto was officially established in 1903 and was among the earliest forestry schools in the nation. Envisioned, promoted, and organized by Joseph Rothrock, the purpose of the school was to educate a new generation of young men in the emerging science of forestry to work the Pennsylvania's recently created forest reserve system.

Today, the historic school is known as Penn State Mont Alto and is part of the Penn State University network. The landscape and a number of buildings associated with the original school, remnants of the former iron furnace, still survive and remain as landmarks. An arboretum of specimens collected by students is a featured element of the campus.

Historic Sites

A number of historic sites related to the history of South Mountain are found with Michaux State Forest and are discussed in the chapter related to the mineral extraction and industry, the impact of government programs, and recreation. Civilian Conservation Corps sites, noted below, are of particular significance to the forest.

Camp Penn. The former Civilian Conservation Corps camp site at Old Forge has been used as a summer camp by church groups for many years. The continued use has preserved the historic resources associated with the property.

Today, these include the chapel, canteen, bunkhouses, kitchen, recreational facilities, stone culverts, stone hearth, streambank erosion control stonework, bridge abutments and wood planking, stone drinking fountains, other stone features the historic use of which are not readily identifiable. The CCC enrollees who supported state park needs relating to forestry were housed in this surviving collection of buildings and structures during the mid-1930s. The complex contributes directly to the significance of the forest, forestry, and conservation context.

Other CCC Camp and Project Sites. Although no longer present, the sites of several other former CCC camps are located within the state forest, and are remnants of the work undertaken by the CCC relating to conservation and forestry. Projects completed by CCC workers are found both within and near the state forest lands and require research and documentation. These include road, park, dam, and other facilities as well as forest reclamation. Sites related to the CCC work contribute to the significance of the state forest under the forest, forestry, and conservation context.

Gladfelter Pulp Wood Company Forest. A recent addition to Michaux State Forest, the former Gladfelter Pulp Wood Company Forest, also known as Tree Farm Number One, was Pennsylvania's first certified tree farm. The 2500-acre property is located in Hamiltonban Township, Adams County, near Fairfield, on the southeastern flank of South Mountain. A historic farmstead, the property was purchased by the Gladfelter Pulp Wood Company in the mid-twentieth century as a location for the practice sustainable forestry to provide pulp wood for the Gladfelter's paper company. In 1947, a portion of the property was designated as Pennsylvania's first certified tree farm in accordance with best practices for sustainable forestry of the American Tree Farm System. The property was managed as such for sixty years until being purchased as an addition to Michaux State Forest using state and federal funding. Though not historically a part of the state forest, the property contributes to the forest, forestry, and conservation context. A historic farmhouse, bank barn, sheds, and agricultural features are located on the property.

CHAPTER 7 – RECREATION AND HEALTH

> Mont Alto Park starts its entrance where the old furnace building used to stand, and the park extends back for nearly a mile through what is known as the valley of a thousand springs. This park is the only one already established on forest reservations and the state can be proud of it. The little Antietam Creek, which rises in the mountains back of the park, flows the entire length of the park. The 'ramble' along the stream proceeds through laurel, rhododendron, and under the shade of white pine, hemlock, gum and sycamore. The ramble passes many springs, retreating to the large spring known as the 'Pearl of the Park.'
>
> — George Wirt, Pennsylvania Forestry Commission, 1902

OVERVIEW OF THE HISTORIC CONTEXT

The South Mountain landscape has evolved since early European-American settlement in the mid- to late-eighteenth century from densely-forested wilderness, to an area heavily impacted by industrial endeavors and mineral extraction, to one dominated by public land conservation and recreation. The proximity of urban centers—in particular Harrisburg, Baltimore, and Washington D.C.—to South Mountain allows convenient access to the recreational amenities afforded by Michaux State Forest and its associated state parks for millions of people. Since the establishment of the state forest and state park facilities beginning in 1902, the region has become an increasingly popular recreational destination. The Commonwealth of Pennsylvania continues to update and enhance the recreational resources available to the public.

Today, the Michaux State Forest contains miles of roads and trails for walking, hiking, bird watching, and motoring, while Mont Alto, Pine Grove, Caledonia, and Kings Gap state parks have numerous recreational facilities for swimming, boating, picnicking, hiking, and walking, as well as play equipment, ball fields, golf, and interpreted historic resources. Present-day recreational activities are rooted in the natural beauty and terrain of the South Mountain landscape that were initially developed during the late nineteenth and early twentieth centuries for similar purposes as a way for the declining iron companies to remain in business while increasing business on local railroad/trolley lines.

In addition, the region has been a destination for health and relaxation since the nineteenth century due to the presence of mineral springs and the desire for

exposure to fresh mountain air. Dr. Joseph Rothrock, who was instrumental in establishing Michaux State Forest, also recognized the health benefits of South Mountain and established a tent camp for the benefit of tuberculosis patients and others with chronic lung ailments. The tent camp eventually evolved into an expansive sanatorium atop South Mountain. Additionally, communities such as Monterey, Mount Holly Springs, and Boiling Springs grew in response to the popularity of spas and resorts that developed around these natural amenities and became places of renewal. At the same time, inns and taverns have catered to travelers and served as recreational centers for the local communities around them.

The history and increased popularity of recreation in the South Mountain region is consistent with broader national trends that are the result in part of increased leisure time and availability/affordability of the private automobile. As Americans have come to enjoy more and more leisure time due to the adoption of the 40-hour work week and the passage of labor laws, many have used the time to seek out parks and public lands offering recreational amenities. The federal government recognized the importance of recreation and access to open space through the work of the Outdoor Bureau of Recreation in 1962. The work of the bureau led the federal government to target the establishment of new parks and recreation areas within proximity to urban areas for the benefit of the public. The Commonwealth of Pennsylvania has followed a similar path in augmenting and updating its recreational amenities.

As an added benefit, the myriad of recreational opportunities afforded by Michaux State Forest and associated state parks create portals through which the thousands of people who visit the area annually can be introduced to the rich cultural and natural history of the South Mountain landscape.

HISTORICAL OVERVIEW OF RECREATION AND HEALTH

Recreation is an outgrowth of play, which is an essential element of human life. The Oxford English Dictionary defines recreation as “the action of recreating (oneself or another), or fact of being recreated, by some pleasant occupation, pastime or amusement.” The term recreation has been in use in this context since the 1400s. Rooted in the Latin *recreatio*, it refers to restoration or recovery. During the modern era, the term has come to relate more to more organized activities. In his book entitled *Leisure*, a standard textbook for students of recreation and related fields, John Kelly suggests that recreation “is socially organized for social ends.” (Markavitch 1999:2) The same evolution can be seen in recreational activities at South Mountain, whereby the earliest pursuits related to health and physical restoration, while today’s activities are more organized and active. The resources of the health and restoration movement are inns, taverns, spas, resorts, and health facilities, while those of organized recreation are parks, trails, and sports facilities.

In eighteenth- and early nineteenth-century America, work was understood to convey social and moral value, while leisurely pursuits were generally frowned upon (McLean 2011:67). Churches condemned the commercial amusement parks and halls and performance facilities that began to arise concurrently with the

factories and work houses of the Industrial Revolution as morally corrupting and venues for introducing sin into the community. Over the course of the nineteenth century, new forms of commercial amusement began to crop up in many locales, including dime museums, dance halls, shooting galleries, bowling alleys, billiard parlors, beer gardens, and prostitution houses. Amusement parks were established on the outskirts of many cities and towns. Railroads and transit companies often offered reduced-fare rides to these parks.

One of the most popular gathering places within many communities during the early nineteenth century was the tavern. Most taverns were popular social centers for men where they could partake of "hard drinking, heavy smoking, and an enormous amount of alcohol-stimulated talk." (McLean 2011:68)

Leisure time increased during the late nineteenth and early twentieth centuries as the government began to set limits on the number of hours that an individual could work in the factories and other industrial enterprises. In 1868, Congress passed the first legislation along these lines that restricted mechanics and laborers employed by the federal government to eight-hour work days. Unions pressed for the eight-hour work day for workers in privately-owned enterprises for many years, finally achieving some acceptance for the idea by the late nineteenth century. Overall, the average work week for all industries, including agriculture, declined from 61.7 hours in 1860 to 54.9 hours in 1910. With increased leisure time, churches and other organizations began to raise concern about the impact that this might have on civil society during the final quarter of the nineteenth century. In 1876, journalist Horace Greeley observed that "although there were teachers for every art, science, and 'elegy,' there were no 'professors of play.' 'Who will teach us incessant workers how to achieve leisure and enjoy it?'" (McLean 2011:71)

The Recreation Movement in the United States c. 1850–1910

Social historians and recreation scholars define a period spanning the mid-nineteenth century through the early twentieth century as the Public Recreation Movement, a period characterized by widespread development of organized recreation activities and facilities by government and voluntary agencies designed to improve society, particularly in response to the health challenges posed by the Industrial Revolution. Scholars have identified four distinct initiatives that contributed to the overall Public Recreation Movement: 1) the Adult Education Movement; 2) the Development of National, State, and Municipal Parks; 3) the Establishment of Voluntary Organizations; and 4) the Playground Movement. Many of these were inspired by trends occurring in Europe. (McLean 2011:71-77)

The Adult Education Movement

During the early nineteenth century, one of the civic concerns of American society was the desire to cultivate the intellect of the country's citizenry so that they could more fully engage in the affairs of the young democracy. Founding fathers John Adams and Thomas Jefferson were strong advocates of education as a good use of leisure time. The Adult Education Movement spawned the Lyceum movement, which focused on lectures, dramatic performances, class instructions, and debates, grew to encompass over 900 local chapters that promoted

education by sponsoring lectures, readings, dramatic performances, and debates. The Chautauqua organization, begun by a Methodist minister and a businessman in Upstate New York in 1874 as a summer camp for adults and families, grew out of the Lyceum movement. By the twentieth century, circuit Chautauquas that traveled around the country with tents providing educational programs, culture, and entertainment, particularly in rural areas, had become very popular. The Adult Education Movement promoted reading as a valuable activity. This contributed to a proliferation of free public libraries. The Adult Education Movement is also linked to the adoption of compulsory universal education and the need for better educated workforce.

Development of National, State, and Municipal Parks

With industrialization contributing to pollution and destruction of natural resources, Americans became concerned for the need to preserve America's wild places and natural resources. The federal government took the lead in 1864 by setting aside a wilderness area in California primarily for recreational use. The Yosemite Valley and the Mariposa Grove of Big Trees were initially designated a California state park, but would later become a national park. The first national park was established in 1872 at Yellowstone. It was established as a national park due to the fact that the land to be preserved extended across the boundaries of three territories — Wyoming, Idaho, and Montana. Establishment of Yellowstone National Park opened the door to a new land management strategy, one that would protect open space for public enjoyment. With the number of national parks growing, President Woodrow Wilson created the National Park Service in 1916 as the agency tasked with administering national park lands for the benefit of the public. Although natural resource conservation was one of the primary goals of creating the first national parks, recreation quickly became a focus, and a use that has continued to be accommodated and supported by the National Park Service today.

At the same time, the need for open space as a means for releasing the pressures of urban life within cities led to the creation of the first public urban park with this goal — Central Park in New York City. The brainchild of Frederick Law Olmsted and Calvert Vaux, the first 840-acre section of Central Park opened to the public in 1858.

Establishment of Voluntary Organizations

The ill effects of the Industrial Revolution also spawned the establishment of several important non-profit organizations designed to address poor urban conditions and improve the lives of children. The Young Men's Christian Association (YMCA) was founded in Boston in 1851, followed by the Young Women's Christian Association (YWCA) 15 years later. These organizations were initially to provide religious fellowship among adults and children, but gradually expanded their programs to include recreation. Settlement houses, such as University Settlement in New York City (1886) and Hull House in Chicago (1889), were founded by social activists in urban neighborhoods to help the poor, particularly immigrants, adjust to modern urban life by offering educational as well as leisure programs.

Playground Movement

Another highly motivated urban initiative, the Playground Movement, began in Boston, Massachusetts, in order create play opportunities for poor urban children living in overcrowded conditions. The Boston Sand Garden is considered the first playground in the country. Inspired by sand gardens seen in Berlin Germany, the Boston Sand Garden was started by a group of public-minded citizens who placed a large pile of sand behind the Parmenter Street Chapel in a working class neighborhood where young children came to play with wooden shovels. By 1887, there were ten sand gardens in Boston and women were employed to supervise play.

In New York City, activist Walter Vroomand, focused the public's attention on the need for supervised play areas for the city's burgeoning population of children. He observed that in 1890, New York had a population of 350,000 children without a single playground, even though the city had 6,000 acres of parkland. (This was not in fact true as Central Park did have an informal children's play area at the southern end of the park called the "Kinderberg" or "Children's Mountain," which children could use to climb on.) In 1895, the State of New York passed a law that decreed, "Hereafter no school house shall be constructed in the City of New York without an open–air playground attached to or used in connection with the same." The movement to build more playgrounds was officially recognized by the City in 1897, when Mayor William L. Strong appointed a Small Parks Advisory Committee to advise him on playgrounds, play equipment, and trained recreation specialists. Playgrounds were accepted as having a "healthful influence upon morals and conduct . . . for the physical energies of youth, which, if not directed to good ends, will surely manifest themselves in evil tendencies." The playground movement fell within a larger reform movement that sought to improve access to recreation not as an end to itself, but as a way to enhance social morality. Theodore Roosevelt, who served as the Honorary President of the Playground Association of America stated, "If we would have our citizens contented and law-abiding, we must not sow the seeds of discontent in childhood by denying children their birthright of play." (NYCP 2016)

Another influence in the evolution of recreation was the bicycle movement of the 1890s. The popularity of cycling—for health, transportation, and the love of the machine—has been described by many as a craze. The Good Roads Movement in America was a direct outgrowth of the bicycle movement, which sought public investment in road networks to facilitate cycling. The Good Roads Movement in turn led to the creation of new roads and routes that were later adopted by motorists as the automobile became increasingly available. Recreational motoring grew exponentially over the course of the twentieth century and resulted in such routes as the Lincoln Highway (Route 30; historically, the Chambersburg Pike) that passes through Michaux State Forest.

Recreation and Healthful Pursuits in the Michaux Forest Region

The influences of the national recreation movement are apparent in the evolution of recreation on South Mountain and in Michaux State Forest. During the eighteenth and nineteenth centuries, the South Mountain landscape that encompasses Michaux State Forest was predominantly exploited for resource

extraction, including timber, iron ore, copper, and gravel. It was not until the economic viability of the iron industry began to wane that recreation was introduced into the South Mountain landscape as a way to adaptively re-use iron production centers in such a way as to generate income for the iron companies and associated local railroads. During the fourth quarter of the nineteenth century and early twentieth century, this took the form of amusement or recreational parks, accessed by trains and trolleys conveying visitors from surrounding towns and cities, established to take advantage of the natural environment as well as rides and games in bucolic settings. These were located at Mont Alto, Pine Grove, and Caledonia.

Prior to the late nineteenth century, local residents were principally concerned with the effort required to make a living from the land. The first settlers established farms in the fertile valleys to the east and west of South Mountain. For these early settlers, churches were often the center of community social life. Recreational activities revolved around church socials, dances, and meals, as well as community events such as weddings and funerals. One of these events, an annual summer picnic started by two churches just east of South Mountain during the mid-nineteenth century, later evolved into the South Mountain Fair in Arendtsville, which continues to this day (McCleaf 2016). Local farm families also likely brought with them traditional games to be played during the limited leisure time available to them. Recreation likely also took the form of swimming, boating, and fishing.

The earliest form of recreation that left a lasting footprint on South Mountain was the roadside tavern. These facilities, as noted above, were popular places for public gatherings within many communities, but one that was often frowned upon by religious institutions. Taverns were established to take advantage of the trade of travelers. As such, they were typically located along principal transportation routes. Graeffenburg Tavern, which straddled Adams and Franklin counties along Route 30 near Caledonia Iron Works, was one such tavern within the bounds of Michaux State Forest.

Resorts and spas were another important recreational attraction in the area. The limestone geology in the vicinity of South Mountain endowed the region with numerous springs that were touted for their health benefits; many area place names bear witness to this bounty–Boiling Springs, Mount Holly Springs, York Springs, and Cold Spring. Springs attracted people from far and wide. Resorts were built to capitalize on their popularity. Two examples of well-known resorts in close proximity to Michaux State Forest were Monterey, to the south, and Mount Holly Springs, to the northwest, of the mountain. The popularity of spas and resorts around South Mountain is consistent with broader trends occurring elsewhere within the United States at the time.

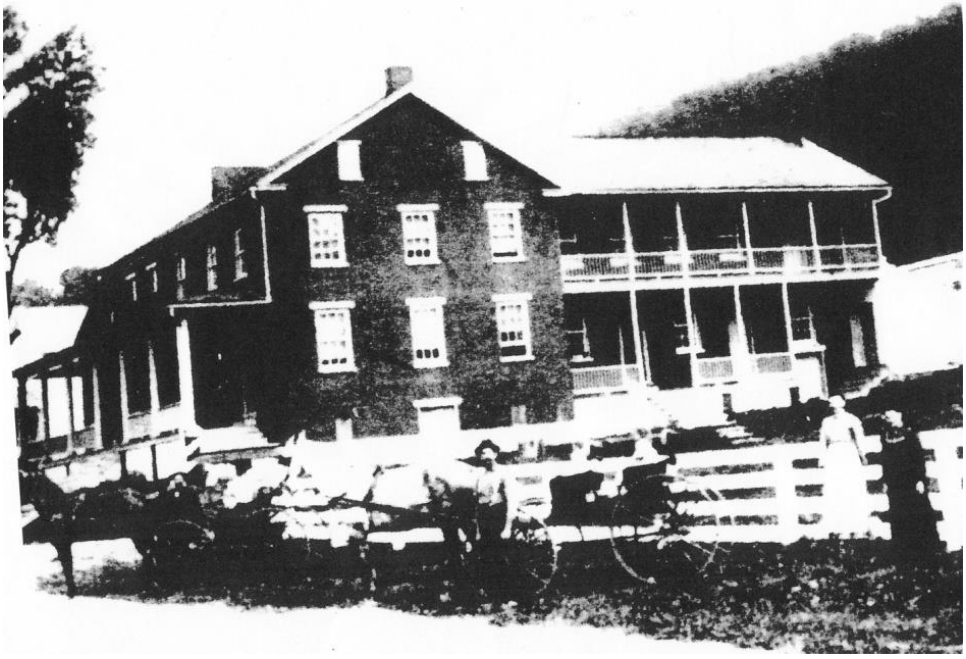
Taverns, c. 1780-1980

The land west of the Susquehanna River began to be settled during the mid- to late-eighteenth century. Wagon roads followed the routes of earlier Native American trails, bringing settlers of European-American descent to the region, and carried others to the frontier beyond. Taverns were established to cater to

the needs of travelers along the principal roads, who were principally traders, trappers, waggoneers, teamsters, drovers (herdsman), and settlers.

Like churches, taverns became centers of community life and were among the earliest recreation centers in the region. In fact, villages often grew up around them. Although the primary purpose of the tavern was to provide food and lodging, they quickly became synonymous with community social centers. In 1798, Cumberland County's *Quarter Docket* indicated that at least sixty taverns were operating within the County. Although the importance of the taverns began to decline with the advent of the railroad in the 1840s and 1850s, which reduced the traffic along many roads, taverns remained a feature along roadsides throughout the nineteenth century and into the twentieth century. Even as the tavern declined in popularity after the Civil War, the buildings continued to serve other functions. Today, approximately fifty-four buildings that were originally established as taverns survive in Cumberland County alone.

As noted above, one example of an early tavern associated with area travel was the Graeffenburg Tavern. Graeffenburg, built in 1802, was sited along the Chambersburg Pike (Route 30) within present-day Michaux State Forest.



Graeffenburg Tavern, 1890

It was established by Alexander Caldwell straddling the border of Adams and Franklin counties. The name of the tavern was derived from a spa in Austria. The building featured two bars, one at each end of the building, allowing the owners to avoid tax collection when either one of the County officials came calling. A post office was located in the Inn from 1849 to 1891.

Although the tavern burned in a fire in 1849, it was soon rebuilt. In 1862, Confederate Gen. Jeb Stuart and a cavalry regiment stopped at the tavern after capturing Chambersburg, Pennsylvania. The Confederates are reported to have consumed some fifty-one gallons of alcohol during their stay. Confederate Gen.

Jubal Early also passed through the area in 1863, and burned the tavern as well as the nearby Caledonia Iron Works to the ground. The tavern was rebuilt after the Civil War; it became a popular health spa during the 1880s.

The property continued to operate as the Graeffenburg Inn until destroyed by arson in 1980. In June 1982, William Putch, director of the Totem Pole Playhouse, opened The Caledonia Station on the site, a restaurant in a restored 90-year old Pullman dining car. The site is now occupied by a maintenance building for the Michaux State Forest. (Kalbaugh 1982; Winkleman 2009)

Resorts, c. 1800-1940

Numerous resorts sprang up in the region during the early nineteenth century to accommodate people seeking healthful mountain air and the perceived medicinal qualities of mineral and clear springs. Interest in spas and resorts resurged during the late nineteenth century, partly due to promotion by railroads and trolleys.

Two examples of resort communities built to take advantage of South Mountain resources were Monterey to the south and Mount Holly Springs to the northwest. Both developed into thriving resort communities. By the turn of the twentieth century, the area around Monterey alone boasted nine inns and one hundred boarding houses designed to accommodate visitors to the area who were interested in taking advantage of the recreational amenities available at several locales. (Sturtevant 1975)

Monterey existed solely as a way station and resort community. Located on a flat plateau at Nicholson's Gap just south of Michaux State Forest, Monterey was established along Charmian Road, part of the former Baltimore-Pittsburg Turnpike. The development of the resort followed that of an inn and turnpike way station established along this important travel route as early as 1810. The presence of natural springs at this location was an additional draw for visitors. In 1848, the Monterey Inn was built at this location as a resort that promoted access to the springs. During the Civil War, the Monterey Inn hosted both Confederate and Union soldiers, often at the same time. General Lee is known to have retreated through Nicholson's Gap following Confederate defeat at Gettysburg in July 1863. The importance of Monterey as a resort and spa destination was documented in a National Register of Historic Places nomination in 1975:

> Monterey's growth into a famous resort occurred in two stages, the first due to its location on a flat plateau on South Mountain which created a pass through the mountains known as Nicholson's Gap. The present Charmian Road was part of the Baltimore-Pittsburgh Turnpike (c.1816) which made the area accessible from eastern cities. People were attracted by the area's climate as well as the natural springs, both pure and mineral, around which such nearby spas as Bubbling Spring (c.1800) and, a little later, Cold Springs (now Buena Vista) were started. Monterey boasted such springs at the junction of the present Charmian Road and Monterey Lane, where an inn or way station has stood since 1810. The most famous of them was the Monterey Inn, which was built in 1848 and destroyed by fire in 1941. The area's prominence as a resort essentially parallels the fortunes of the Monterey Inn. (Sturtevant 1975)

The second phase of resort development was in response to the availability of rail travel to the area. The Western Maryland Railroad was the first line to promote excursion use to local resorts to increase ridership in 1873. In 1883, the railroad also began to advertise transportation to another type of recreational amenity, the amusement park. That year, the rail company extended its excursion business to the new Pen Mar Amusement Park and the associated 600-room Blue Mountain House in 1883, both developed by the railroad company. The railroad was highly successful in luring visitors to the region, which they referred to as the "Coney Island of the Blue Ridge" as suggested by ridership statistics. While excursion ridership in 1875 totaled 72,510, by 1898 it had increased to 558,248.

In 1885, the Monterey Land Company, a group of prominent Baltimoreans, purchased Monterey Springs farm and built a planned summer resort community with a variety of activities available to residents, including the Monterey and Blue Ridge Improvement Association Library, and the Monterey Club, which included golf and tennis facilities. Monterey thrived as a summer resort from 1885 through World War II. By the mid-1940s, many people were driving automobiles and excursion ridership on the rail lines had begun a steep decline. The Monterey Inn burned in 1941. (Sturtevant 1975)

Another resort community, Mount Holly Springs, developed within an industrial town to the northwest of South Mountain. Water power harnessed from Mountain Creek that flowed down South Mountain fueled mills associated with iron and paper industries. At the same time, the natural beauty, mountain springs, and proximity to a well-built and maintained turnpike attracted people to Mount Holly Springs for holidays and health. An 1886 description of the resort notes that

> [Mount Holly Springs] is … an old and established summer resort, dating from a very early period. Its situation is delightful; protected by the mountains, cool in summer, particularly in summer evenings, it lies amid scenery which might afford an inspiration to an artist. The Mountain Creek, flowing rapidly down through the long gorge from its high recesses, here rests in wider crystal sheets, 'where the green mountains bending hang their heads,' and are reflected as in a mirror. These sheets, particularly the Upper Holly Dam, afford both boating and piscatorial sport, as well as ample motive power for the mills. From Upper Holly the stream runs in a deep bed beside the turnpike, and under the shade of many trees, and with the mountains on either hand. There are few more beautiful places in Pennsylvania; and it will, on account of its situation and scenery, its pure mountain air and summer climate, continue to attract the weary who are longing for recreation or rest, and the lover of nature who seeks to live where she lavishes her beauties. (Bates 1886:354)

In 1901, Mount Holly Springs was transformed into a much larger enterprise by entrepreneur, Patricio Russ, a principal stakeholder in the Carlisle and Mt. Holly Railroad. Russ established the Mount Holly Trolley between Carlisle and the town and built Mount Holly Park on leased land just south of town along Mountain Creek. The park featured a restaurant, dance pavilion, network of paths, flower gardens, and picnicking locations. The resort offered concerts, bowling, tennis,

boating, hiking, ball fields, and a roller coaster and Ferris wheel. Russ later constructed a bandstand on an island in the Yellow Breeches Creek. Hikers could climb to the top of South Mountain where there was an observatory with a telescope. (Cress 2015)

The Mount Holly Park entrance and pavilion (Murray 2016)

View of South Mountain from Mount Holly Park ca. 1908 (Ebay)

Resort dining room at Mount Holly Park, September 1916 (Murray 2016)

During the park's heyday, a trolley left Carlisle every 30 minutes to transport visitors to Mount Holly Springs. The railway published a pamphlet entitles *Trolley to Holly* and described the park as a summer health resort "those in search of rest cannot fail to appreciate." The pamphlet touted the benefits of pure water and pine air, which "tones up the system" so much that "you regret all the years you missed coming here." The park finally closed in 1928 after the trolley began to

lose ridership to automobile travel. Today, the 200-acre site of the park is now the Mount Holly Marsh Preserve owned by Cumberland County and managed by The Nature Conservancy. (Murray 2016; TNC 2016)

The Role of Railroads and Trolleys in Recreation on South Mountain, 1835-1933

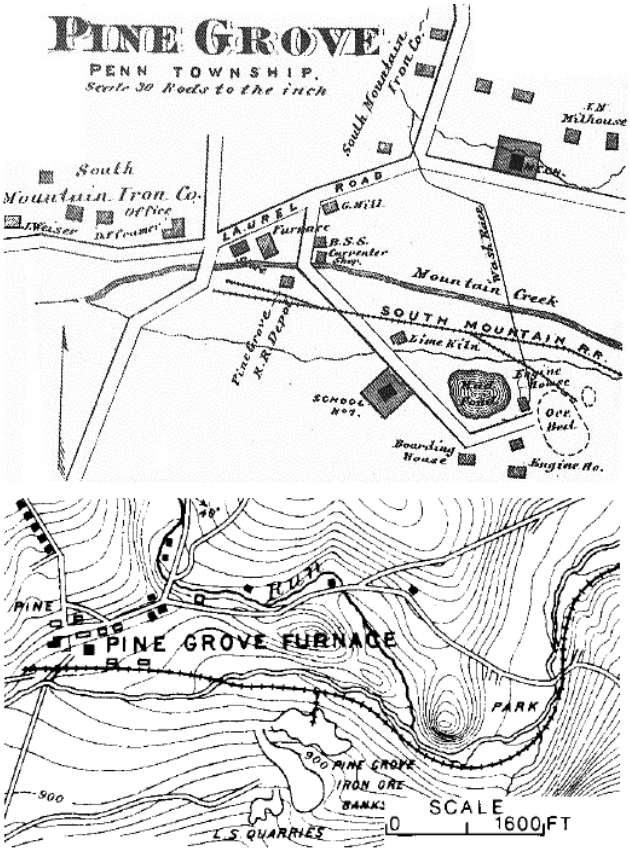
The Cumberland Valley Railroad (CVRR) was chartered in 1835 by the General Assembly to provide service from Harrisburg to Chambersburg via Carlisle and Shippensburg. It was completed in 1839. The CVRR was the main line that connected to branch lines that first served the iron industry sites on South Mountain. These branch lines were later used to access recreation parks at Pine Grove, Mont Alto, and Caledonia. Numerous other destination parks in the area were established by railroad and trolley companies during the late 1800s and early 1900s including at Williams Grove, Boiling Springs (one of the most popular), and, as noted above, Mount Holly Springs. The railroad and trolley offered excursion rates during summers.

The construction of branch lines to forges and furnaces was spurred by an increased demand for iron ore during and after the Civil War. The earliest of these branch lines to South Mountain was the 17-mile South Mountain Railroad which served Pine Grove Furnace. It was constructed by South Mountain Iron and Railroad Company in 1868 and 1869 (Watts 1991:2-3). The railroad connected with the CVRR near the present-day Army War College in Carlisle PA and crossed the valley to Mt. Holly Springs. From Mt. Holly Springs, the railroad followed Mountain Creek up South Mountain to Pine Grove Furnace. In June of 1878, an amusement park, Pine Grove Park, was established a half mile east of Pine Grove Furnace by investors in the railroad and furnace.

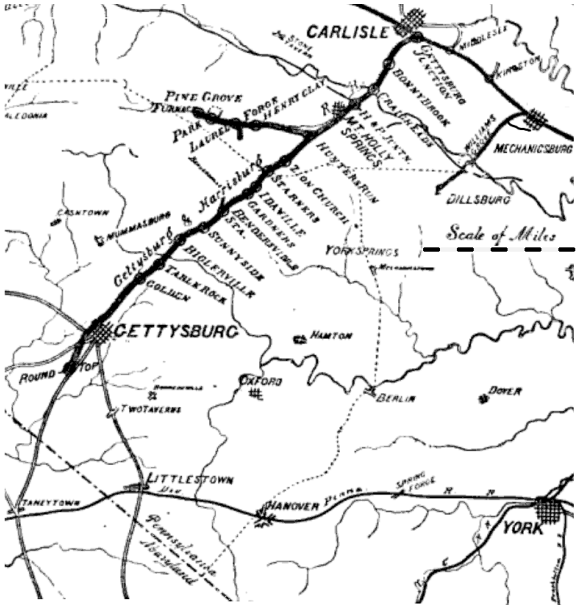
The Gettysburg and Harrisburg Railroad (G&H) took over the South Mountain Branch, created a junction at Hunter's Run just south of Mount Holly Springs, and extended the line to Gettysburg which opened in 1884. The tracks to Pine Grove Park were used by the first G&H excursion train from Gettysburg on May 28, 1884. In 1910, the Reading Company took up operation of the line from Hunters Run to Pine Grove Furnace. Pine Grove Park had closed circa 1901 (see 'Private Parks' below) and the state purchased the land that later became Pine Grove Furnace State Park. (Watts 1991:9-15; Andre Weltman personal communication)

Train travel as a form of recreation is poetically articulated in this 1886 description of the view of South Mountain from the G & H Railroad:

> Among the numerous branches of the Cumberland Valley Railroad, the South Mountain [Railroad], originally built to Pine Grove Furnace for the transportation of the iron ores and manufactured products of that region, but now extended to Gettysburg, is exceedingly interesting on account of the wildness of the scenery. The view as you pass along over these mountains toward Gettysburg is varied by intervals of forest, rude rocks, abrupt or broken declivities, deep chasms, over which the road is supported by trestle work, reminding one still of the unbroken and silent wilderness, but into which civilization is already pushing its way. Bates 1886:347)



Terminus of South Mountain Railroad at Pine Grove Iron Works depicted in 1872 (top) and 1899 maps. Note location of Pine Grove Park on right. side of lower map.



1885 map of the Gettysburg and Harrisburg Railroad with junction at Hunter's Run of Pine Grove branch line. Note stop at Pine Grove Park.

The branch line to the Mont Alto Furnace was the next to be developed on South Mountain. The Mont Alto Railroad opened in October 1872. In 1875, Mont Alto Park was opened by the Mont Alto Iron Company (see 'Private Parks' below) and the railroad began to carry picnickers in addition to freight. The Mont Alto Railroad was sold at foreclosure in 1901 and reorganized as the Cumberland Valley and Waynesboro Railroad (the track had been extended to Waynesboro and Fayetteville). It was sold to CVRR in 1906 which merged with the Pennsylvania Railroad in 1919. The state bought the park in 1903. The railroad spur to the park became known as the Mont Alto Park Track and continued to offer passenger service until June 28, 1933.

As a side note, a very short-lived railroad/stage coach connection was established in 1891 between Mont Alto and Gettysburg by the Chambersburg Gettysburg Railroad (CGR). Tracks connected to the Mont Alto Railroad at Conococheague Island near Fayetteville and ran through Caledonia Mining and Manufacturing property to the Wolfe Hill Mine, four miles north of Caledonia. Passengers wishing to get to Gettysburg could take the train from Chambersburg and pick up a stage coach from the Graeffenburg Inn at Caledonia. The CGR went out of business in 1893. Tracks between Chambersburg and Caledonia were removed in 1902. (Foltz 2008)

In 1903, electric rail (trolley) service was established to Caledonia from Chambersburg and became the last of the rail lines to be constructed on South Mountain industrial sites. Unlike the railroads to Pine Grove and Mont Alto, the trolley to and through Caledonia was built exclusively for passengers; by this time, industrial activity had long since ceased here. The Chambersburg, Gettysburg and Waynesboro Electric Railway Company (CGW) laid track over the old railroad right-of-way that had connected Chambersburg to Caledonia in the 1890s. The track was extended southeast and in 1905 trolley service was opened to Gettysburg. In that same year, CGW leased land from Caledonia State Park and opened an amusement park, extending a spur line of trolley track one mile into the park (see 'Private Parks' below). The lease was dropped in 1920 but the trolley remained open to passenger service for another six years and people continued to come to Caledonia State Park by rail. In December 1926, the CGW trolley service was discontinued.

Private Parks Established at Industrial Sites, 1870-1903

As noted above, several private parks were established at South Mountain industrial sites as a means for the iron companies to continue to generate income even as the iron industry was in decline. The advent of trolley and rail lines connecting the parks with nearby towns and cities delivered the clientele to the sites. Mont Alto Iron Company as well as Pine Grove Furnace were involved in establishing recreation parks on South Mountain during the 1870s. An amusement park was also created at Caledonia Furnace by a trolley company after the state purchased the property to create Caledonia State Park in 1903. The Chambersburg and Electric Railway Company leased land from the state and took advantage of buildings that remained from industrial operations to create a trolley and station and small park.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Round Trip Tickets from Carlisle, good one day only..70c.

Special Rates and Trains for Larger Parties.

South Mountain Railroad.

REGULAR TRAINS TO PINE GROVE PARK.

SEASON OF 1881.

P. M.	P. M.	A. M.		A. M.	P. M.	P. M.
4.10	12.30	7.15	Leave Harrisburg Arr.	11.30	8.20	7.40
4.39	12.59	7.44	.....Mechanicsburg.....	11.00	2.51	7.10
5.00	1.30	8.05	..South Mountain June..	10 30	1.20	6.50
5.50	1.56	8.31	...Mt. Holly Springs....	9.45	12.50	6.25
7.00	2.28	9.03	....Pine Grove Park.....	8.30	12.12	5.50
P. M.	P. M.	A. M.	Arrive.....Leave	A. M	P. M.	P. M.

WM. H. WOODWARD, Supt.

PINE GROVE FURNACE, June 4, 1881.

Train ticket to Pine Grove Park (Courtesy of Andre Weltman)

Mont Alto Park (1875-1902). In 1875, the Mont Alto Iron Company established the 'Magnificent Summer Resort' Mont Alto Park, taking advantage of the Mont Alto Railroad that connected with the Cumberland Valley Railroad (CVRR) approximately three and one-half miles north of Chambersburg. When it opened to the public, it featured a carousel with flying horses, a swimming pool, and hiking trails.

Pine Grove Park (1878-c1901). Pine Grove Park (also known as the South Mountain Railroad Excursion Park) opened soon after Mont Alto Park and attracted thousands of visitors during its twenty-year history. It was conceived by Jackson Fuller, co-owner with Jay Cooke of Pine Grove Furnace, to boost business on the railroad. The park operated between 1878 and 1903.[21] It was laid out on a 30-acre parcel of land in a grove of 'magnificent trees' east of the furnace. The park drew thousands of people during the late 1800s. In 1880 alone, more than 21,000 people visited the park. Although there was no admission fee, visitors arriving by train paid the cost of a train ticket to get to the park. Once at the park, visitors enjoyed a merry-go-round with flying horses, swings, ten pin bowling, a bicycle race track, boating, a 200-yard shooting range, a baseball field, and a dance pavilion. There were water fountains, lunch tables, and a ladies toilet room. The Fuller Cornet Band provided entertainment. In addition, visitors could pay ten cents to ride an old Baldwin steam car to the iron works and learn about the operation.

By 1901, the park was in decline and was probably in disuse. It was damaged by forest fires in the summer of 1903. A 1913 plan to restore the private park was superseded by the Commonwealth's purchase of the surrounding area to establish Pine Grove State Park. Today, few physical traces of the amusement park remain. (*Star and Sentinel* 1903; Weltman 2015, Keynote address; Andre Weltman personal communication)

Caledonia Trolley Amusement Park (1903-1920). In 1903, the Commonwealth purchased the land formerly owned by the Caledonia Mining and Manufacturing Company for inclusion in the new Forest Reserve System as a future supply of timber as well as a destination 'outings grounds for citizens.' In the same year, the Chambersburg, Gettysburg, and Waynesboro Electric Railway Company (CGW) built a trolley line from Chambersburg to Caledonia and leased the area around the old furnace and blacksmith shop from the Commonwealth to create a trolley amusement park. The former blacksmith shop was adapted for use as a trolley station. The company constructed a dance pavilion with hardwood maple floors and amusement rides including a merry-go-round.

In 1905, the trolley line was extended to Gettysburg, which served to increase the number of visitors to the amusement park. In 1920, the railway company opted not to renew its lease at the park, but trolley service to Caledonia continued through 1926.

[21] Andre Weltman, Keynote address, Cumberland County Historical Society Annual dinner, December 2015.

State Parks Established at Former Industrial Sites, 1902-1913

The Commonwealth of Pennsylvania acquired the lands associated with three iron furnace located on South Mountain during the nineteenth century—Mont Alto, Pine Grove Furnace, and Caledonia—between 1902 and 1913. These lands were adapted for use as public parks at first referred to as state forest parks and later reclassified as state parks. These three sites were some of the earliest state parks within Pennsylvania, and are now part of a system that encompasses 121 parks and conservation areas. (DCNR 2015, park websites)

Mont Alto Park was considered one of the most beautiful in the southern part of the state, and was the principal outing park in the south-central portion of the state for many years. (DeCoster 1995:36)

Mont Alto State Park (1902). In 1902, the Commonwealth purchased a 23-acre private park on South Mountain from the Mont Alto Iron Company. The park included picnic facilities, a swimming pool, refreshment stand, hiking trails, and a carousel that had been converted into a dance pavilion. Mont Alto became the first state forest park in Pennsylvania and is within Michaux State Forest. The park straddles West Branch Antietam Creek, which offers excellent trout fishing. Today, the park has two picnic pavilions, one of which is modeled after the carousel built by the Mont Alto Iron Company, a playground, playfield, and access to snowmobile and hiking trails.

Caledonia State Park (1903). The 1,125-acre Caledonia State Park land was purchased by the Commonwealth from Caledonia Mining & Manufacturing Company in 1903 to serve as a supply of timber and an 'outings grounds for citizens.' (DCNR 2008, Caledonia) Over time, Caledonia has been developed for a wide variety of recreational activities, including camping, picnicking, swimming, trout fishing, hiking, golfing, and hunting. The park also includes historic interpretive trails and wayside exhibits that convey the history of the iron works,

the Appalachian Trail, and the Lincoln Highway. Located along the historic Lincoln Highway (Route 30), it is easily reached by many visitors.

In 1927, the Pennsylvania Alpine Club reconstructed a reduced-scale version of the old iron furnace stack from Thaddeus Stevens' iron works. Between 1933 and 1939, the Civilian Conservation Corps built several recreational amenities at the park including a park office, a building for the public pool, restroom facilities, a maintenance building, and two picnic pavilions. The CCC was also involved in completing the Appalachian Trail that passes through Caledonia. In 1936, the park became a National Recreation Demonstration Area under control of the National Park Service. (Foltz 2008) The federal agency built an office and museum to manage the site, but the park was returned to state control in 1940.

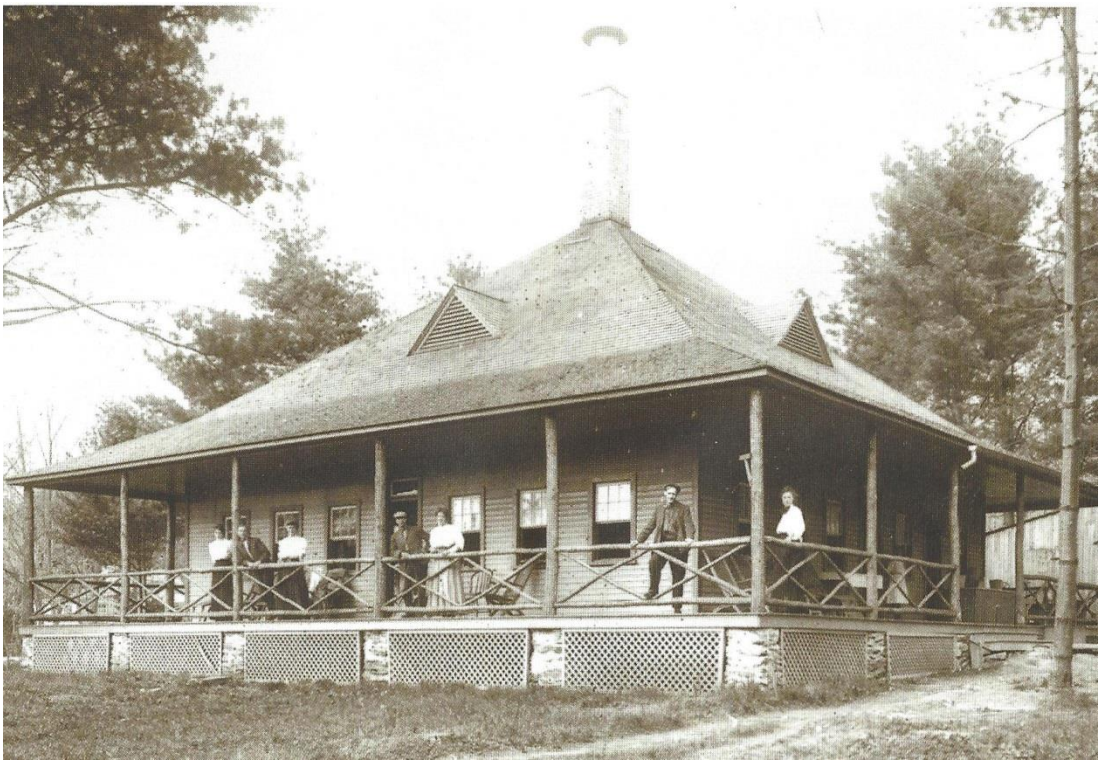
The Caledonia State Forest Park headquarters, 1932. (DeCoster 1995:35)

In 1951, a newly-formed summer-stock company known as the Totem Pole Playhouse moved from a converted garage in Gardners, Pennsylvania, to the dance pavilion in Caledonia State Park that had been built by the trolley line in association with the amusement park on the hilltop above the furnace monument. (Totem Pole Playhouse 2016) Bill Putch, husband of actress Jean Stapleton, ran the theater from 1954 until his death in 1983. In 1969, the playhouse was burned to the ground by an arsonist. It was rebuilt at its current location near the golf course and remains an important part of the local community.

Pine Grove Furnace State Park (1913). In 1913, 17,000 acres associated with Pine Grove Furnace was sold to the Commonwealth of Pennsylvania. Approximately 700 acres of the landholding eventually became Pine Grove Furnace State Park, dedicated for public use. The remainder became part of the state's new Forest Reserve system as Michaux State Forest. The park includes two lakes that were associated with industrial activities—Fuller Lake, 1.7 acres in size, that was the site of ore excavation, and Laurel Lake, 25 acres in size, created from Laurel Forge Pond, which was dammed circa 1830 for water power to fuel Laurel Forge. Laurel Lake is now used recreationally for swimming, boating, ice skating, and ice fishing, while Fuller Lake is used for swimming and fishing.

One of the unique features of the park is the cluster of historic buildings that remain from the Pine Grove Iron Works. Listed in the National Register of Historic Places, these features are interpreted for their role in the industrial history of South Mountain. A few of these buildings have been adaptively re-used. The brick Ironmaster's Mansion (built 1827-1829) is now a hiker hostel, a special event venue available for rent, and also serves as a museum. The modern park office and visitor's center is in an 1850s boading house. A former mule stables serves as the park store. The late 18th century grist mill is now the Appalachian Trail Museum and a social center for hikers who have reached the half-way point of the famous 2,186-mile National Scenic Appalachian Trail. The Paymaster's Cabin has been renovated for rental by park visitors.

The recreational opportunities within Pine Grove Furnace State Park are many and include a rail trail for bicyclists, hiking, interpretive trails, cross-country skiing, ice skating, swimming, boating, picnicking, fishing, hunting, camping, access to ATV and snowmobile trails. In addition, the park offers a range of environmental educational, recreational, and interpretive programs to visitors and school groups. Each year in October, the Fall Furnace Festival takes place at the site.



One of the assembly halls associated with the early sanatorium at South Mountain. These halls provided patients with a place to gather for socializing and recreation. (Yellnik 2001: 8)

The South Mountain Restoration Center, 1901–present

The South Mountain Restoration Center in Mont Alto began as a tent camp in 1901. Dr. Joseph Rothrock, discussed in Chapter 6 as the father of Pennsylvania forestry, is credited with unofficially starting the South Mountain Restoration Center when he camped with a few men at a grove of white pines four miles above Mont Alto. One of his companions was asthmatic and his condition was so improved at this location that Rothrock built a crude shack for him, thus establishing the beginnings of a place initially known as White Pine Camp for people who needed fresh air and sunshine for various afflictions. (Yellnik 2001:5-6)

Patients of the Mont Alto Sanatorium outside the spring house, 1904. (DeCoster 1995:40)

Between 1903 and 1905, the Pennsylvania State Legislature made several appropriations to improve the facilities at the camp. In 1907, the camp was transferred from the Department of Forestry to the Department of Health and renamed the Mont Alto Sanatorium, marking the beginning of the state effort to combat tuberculosis. (Yellnik 2001:8) In 1907, there were 30 patients at the facility; by 1912, there were 960. Between 1918 and 1956, the sanatorium took the shape that it has today and became known as the South Mountain Sanatorium. In 1924, the first children's hospital was established at the sanatorium; two hundred children were transferred from another sanatorium in that year.

By the time the sanatorium at South Mountain was established, similar health centers had been used to treat tuberculosis for nearly 40 years. The first of these sanatoria was established in Poland (then Silesia) in 1863 by Hermann Brehmer, who suffered from the disease himself and had been cured by traveling to the Himalayas. His story led to the belief that such sanatoria should be located at high altitudes with access to healthful breezes. Patients were prescribed regimens of rest, fresh air, and good nutrition in order to promote a healthy immune system that might fight the tuberculosis infection. The first facility in North America was

the Adirondack Cottage Sanatorium, established in 1885 in Saranac Lake, New York.

In 1945, the antibiotic streptomycin was found to be effective in curing tuberculosis which eventually led to the demise of the sanatorium. (Yellnik 2001:18) In 1956, it was renamed the Samuel G. Dixon State Hospital in honor of Pennsylvania's first commissioner of health, a physician and bacteriologist who had done pioneering work on tuberculosis immunity and tirelessly promoted public hygiene. In 1961, the hospital was one of four tuberculosis hospitals still in operation in Pennsylvania, but it was clear the need was quickly diminishing.

Postcard depicting the 1907-1918 period when the sanatorium was known as the Mont Alto Sanatorium. The cottages dotting the landscape are known as Dixon cottages, designed specifically for tuberculosis patients. (Boston Public Library Tichnor Brothers Collection)

Meanwhile, the Commonwealth realized it had a crisis in its mental hospital system with most hospitals over capacity and one-third of the patients aged sixty-five or over.

In 1965, the Samuel G. Dixon State Hospital was adapted for re-use as the South Mountain Geriatric Center for the long-term care of persons aged sixty-five or older who had been discharged from a state mental institution. In 1968, the Commonwealth's Office of Aging reorganized and broadened its scope, becoming the Office of Medical Services and Facilities. The age limit for admittance to the center was lowered to 21 in an effort to reduce overcrowding at state schools and

hospitals for the mentally disabled. (Yellnik 2001:25) The Center was renamed the South Mountain Restoration Center and remains so today.

Lincoln Highway

On July 1, 1913, a group of automobile enthusiasts were involved in the establishment of the Lincoln Highway Association, an organization intended "to procure the establishment of a continuous improved highway from the Atlantic to the Pacific, open to lawful traffic of all description without toll charges." (USDOT 2016) The road was to address both long-distance travel and transportation needs, as well as the recreational interests of the automobile enthusiasts. The route of the road incorporated some existing roads. Among them was the segment of Route 30 (known as Chambersburg Pike) that passed through the gap near Caledonia. The road was a popular route for recreational motorists. On October 4, 1921, the Good Roads Jubilee Pageant was held at Caledonia State Park and over 3,000 cars participated in a celebration of the Triangle Tour Route, a 113-mile route between Harrisburg, Gettysburg, and Chambersburg. (Foltz 2008) An estimated 30,000 people attended.

Jubilee Day October 4, 1921 – opening of a new concrete section of the Lincoln Highway between Chambersburg and Gettysburg (Lincoln Highway Collection of the University of Michigan)

Michaux State Forest Recreation

Initially, the 85,000-acre Michaux State Forest was established to manage and conserve forest resources that had been devastated by the iron industry. As the forest has become re-established and its resources carefully managed, recreational use of the land has grown substantially in recent years. Camping is permitted throughout the forest at several designated primitive sites. There are 60 miles of hiking trails within the forest (not including the Appalachian Trail), 130 miles of gravel roads for scenic drives, 132 miles of snowmobile trails, 4 miles of

maintained cross-country ski trails, maintained ATV trails (35 miles designated for summer; 42 miles designated for winter use), a picnic area with playground equipment and an athletic field, 37 miles of mountain biking trails, and 31 miles of horseback riding trails. Hunting and cold- and warm-water fishing are available. There is an eighteen-hole golf course in the forest. Thirty-seven miles of the National Scenic Appalachian Trail have traversed the forest since 1937 (managed by others).

The history and intriguing stories of the Michaux State Forest land are becoming more and more available through the efforts of local historians, geologists, and interested citizens. The information is available in several forms including a self-guided walking tour of Camp Michaux near Pine Grove Furnace State Park. The tour was developed and a guide was published by the Cumberland County Historical Society in 2011 (revised in 2014), written by David L. Smith. The guide can be downloaded from the Cumberland County Historical Society's website. The tour interprets the stories of four layers of history at twenty-seven different marked locations: Bunker Hill Farm (1787–1924), Pine Grove Furnace CCC Camp (1933–1942), Pine Grove Furnace POW Interrogation Camp (1943–1945), and Church Camp Michaux (1947–1972). (Smith 2014)

Similarly, the Waynesboro Industrial Heritage Trust developed an automobile/walking tour of the Old Forge historical sites with an accompanying booklet published in 2004. (WAIHT 2012)

Land Lease Cabins, 1920–present

Circa 1920, the Commonwealth of Pennsylvania decided to create a program that would allow citizens of the state to build small cabins on Michaux State Forest land for seasonal, recreational use under a program allowed through a 1913 state law. Strict requirements were established for the use and ownership of the cabins. One hundred by one hundred-foot building lots were leased for 10-year renewable intervals at $150/year. Cabins were limited in size to 1,000 square feet and were to be built from prescribed materials—chinked log with stone and rustic detailing—in order to convey a cohesive and appropriate vernacular style. They would be owned by the builder, but could not be occupied year round. Cabins could only be sold to citizens of the Commonwealth. The state was authorized to cancel a lease at any time if any of the covenants were violated. (Belisle 1999)

The cabins remain within the park and the program continues to this day. There are 450 cabins, most of which are clustered in two areas, around Caledonia State Park and in Pine Grove Furnace State Park, within Cumberland County. In the 1960s, demand for the cabins increased significantly and foresters decided to end the leasing program. No new leases have been issued since 1970, but existing leases are allowed to be renewed. The program is administered by the Pennsylvania Department of Conservation and Natural Resources.

Civilian Conservation Corps, 1933–1942

The Civilian Conservation Corps program was established as part of President Franklin D. Roosevelt's New Deal to employ young men throughout the country and improve economic conditions following the Great Depression. Five camps were established in the vicinity of Michaux State Forest:

1. Pine Grove Furnace (1933–1942)
2. South Mountain (1933-1941)
3. Big Pond (1933-1937)
4. Caledonia (1933-1939)
5. Waynesboro (1935-1940)

The CCC camps associated with South Mountain are discussed further in Chapter 8, Impact of Government Context.

This sign along Michaux Road recognizes the first CCC camp in Pennsylvania at Pine Grove Furnace. (http://www.schaeffersite.com/michaux/history-dave-smith.htm)

Corpsmen working in Michaux State Forest built infrastructure that included roads, bridges and trails. One recreational road built by the CCC just north of Route 30 and beginning on Milesburn Road is a 22-mile self-guided automobile tour that provides an overview of programs and points of interest in the forest. Another notable achievement was development of the 37-mile section of the Appalachian Trail that runs through the forest, including the building of bridges and shelters for hikers on the trail.

The CCC presence in Michaux is also credited with the construction of many recreational facilities. The camp at Caledonia State Park constructed a park office, a building for the public pool, restroom facilities, a maintenance building, and two picnic pavilions. The camp at Pine Grove Furnace constructed buildings and a decorative fountain as well as improved an old quarry that had filled with water (Fuller Lake) so it could be used as a swimming hole. In addition, corpsmen planted hundreds of trees to control erosion and help maintain a sustainable forest for future generations to enjoy.

Appalachian National Scenic Trail

Approximately 37 miles of the 2,180-mile Appalachian Trail, which traverses the scenic, wooded, pastoral, wild, and culturally resonant lands of the Appalachian Mountains, passes through Michaux State Forest. The idea for the trail, completed in 1937 between Mt. Katahdin in Maine and Springer Mountain in Georgia, was first proposed by Benton MacKaye in 1921. McKaye's vision was for the establishment of a footpath that would link planned wilderness communities where people could go to renew themselves. McKaye's vision led to the establishment of the Appalachian Trail Conference in 1925 with a mission to effect construction of the trail. Over the course of the next decade, the trail slowly took shape. New Deal era programs were instrumental in helping to complete the trail. Work on the trail was conducted in part by Civilian Conservation Corps enrollees, including the segment that extends through Michaux State Forest.

Appalachian National Scenic Trail midpoint marker, just south of Pine Grove Furnace State Park (http://www.panoramio.com/photo/78297548)

The trail continued to be administered privately by the Appalachian Trail Conference for 31 years after its completion in 1937. In 1968, Congress passed the National Trails System Act that established a nationwide system of scenic, historic, and recreation trails. Routes designated as National Scenic Trails were to "be extended trails so located as to provide for maximum outdoor recreation

potential, and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities." (NPS 1968)

The Appalachian Trail was one of the first footpaths designated a National Scenic Trail in 1968. Today it is co-managed by the Appalachian Trail Conservancy, National Park Service, U.S. Forest Service, numerous state agencies and thousands of volunteers. Pine Grove Furnace State Park houses the Appalachian Trail Museum—the only museum dedicated to hiking in the country—in a 200-year-old mill building. A festival is held at the museum each year in June. The Ironmaster's Mansion has been adapted for use as a hostel where hikers can reserve a place to sleep.

The segment that passes through the Michaux State Forest encompasses the half-way point along the trail. There is a long-standing tradition among through-hikers that they eat a half-gallon of ice cream purchased from the camp store at Pine Grove Furnace and eat it in one sitting. The Appalachian National Scenic Trail is one of the significant historic, and active, recreational resources located within the South Mountain landscape.

Recent Federal, State and Local Government Initiatives Promoting Recreation Health and Wellness, 1965–Present

The need for outdoor recreational opportunities to meet popular demand and help combat health epidemics such as obesity has become an increasing focus of federal, state, and local governments in recent decades. The recreational opportunities offered by Michaux State Forest are tremendous assets that can help fulfill some of these needs and goals of government programs.

In the late 1950s and early 1960s, the federal government began to recognize the need to provide more outdoor recreational facilities at the state and federal level, particularly in proximity to urban areas. Based on a series of studies conducted in the late 1950s that identified new park, parkway, and seashore opportunities for preservation, and a report prepared by the Outdoor Recreation Resources Review Commission to study the problem in a comprehensive way, the federal government established the Bureau of Outdoor Recreation in 1962 to address these needs. The studies suggested that the National Park Service would assume a heightened responsibility in planning a national recreation program and administering areas for that purpose. (NPS 2016, Questions of Resource Management) In 1963, the federal goal of providing more recreational opportunities within the national park system resulted in a Federal Executive Branch Policy Governing the Selection, Establishment, and Administration of National Recreation Areas, issued by the Recreation Advisory Council. The policy statement recommended that:

> Greater efforts must be made by Federal, State, and Local governmental and private interests to fulfill adequately the steeply mounting outdoor recreation demands of the American people; The Federal government should provide leadership and stimulus to this effort, but does not have sole or primary responsibility for providing recreation opportunities; Present Federal programs should be augmented by a system of national recreation areas made up of a limited number of areas where the recreation demand is not being met through other programs. (NPS 1968, Handbook)

The National Recreation Areas proposed by the Council were envisioned to:

- Provide Federal investment in outdoor recreation that is more clearly responsive to recreation demand than other investments that are based primarily upon considerations of preserving unique natural or historical resources, the need to develop and conserve public lands and forests, or the requirements of major water resource development undertakings;
- Be areas which have natural endowments that are well above the ordinary in quality and recreation appeal, being of lesser significance than the unique scenic and historic elements of the National Park System, but affording a quality of recreation experience which transcends that normally associated with areas provided by State and local governments;
- Be consistent with Federal programs relating to national parks, national forests, public lands, fish and wildlife, water resource development, grants for urban open space, recreation programs on private agricultural lands, and programs for financial assistance to States in providing recreation opportunities. (NPS 1968, Handbook)

Guidelines developed in conjunction with the policy statement suggested that National Recreation Areas should possess natural endowments well above the ordinary in quality and recreational appeal, affording a recreational experience that transcends that which is normally associated with recreation areas provided by state and local governments. They were also expected to include large land areas and to be located and designed to achieve a comparatively high recreation carrying capacity in relation to the types of recreation expected to be available. National Recreation Areas were to be significant enough to assure interstate patronage; be strategically located within easy driving distance—not more than 250 miles from urban population centers to be served—and readily accessible at all times, for all-purpose recreational use.

Additionally, outdoor recreation was to be the dominant or primary resource management purpose. Where natural resource conservation was also envisioned, the uses were expected to be compatible and not result in detriment to the environment. National Recreation Areas were to be considered for existing or proposed Federal water impoundments, and could include within their boundaries “scenic, historic, scientific, scarce or disappearing resources, provided the objectives of their preservation and enjoyment can be achieved on a basis compatible with the recreation mission.” (NPS 1968, Handbook)

Finally, the policy indicated that National Recreation Areas were to be established by an Act of Congress. Upon the request of the Executive Office of the President, the Recreation Advisory Council would review specific National Recreation Area proposals, based upon studies made or prescribed by the Bureau of Outdoor Recreation. The Council would recommend appropriate actions for each proposed National Recreation Area involving authorization, modification, priority of establishment, and the agency or agencies responsible for its management. In some cases, a joint federal-state management arrangement might be recommended. (NPS 1968, Handbook)

Early National Recreation Areas were established by interagency memoranda of agreement between the U.S. Bureau of Reclamation and the National Park Service. The resulting parks were managed by several different federal agencies, most of which were operating within the Department of the Interior or the Department of Agriculture, such as the National Park Service, Bureau of Land Management, and U.S. Forest Service.

The first National Recreation Area to be authorized was Boulder Dam (later renamed Lake Mead) National Recreation Area, in 1964. The national park unit was located in southeast Nevada and northwest Arizona. This was quickly followed by Spruce Knob-Seneca Rocks National Recreation Area in West Virginia, under the administration of the U.S. Forest Service, and Delaware Water Gap National Recreation Area in Pennsylvania and New Jersey, under the administration of the National Park Service, both of these were established in 1965.

Recent Initiatives Promoting Recreation and Health in Pennsylvania, 1970–present

In 1970, in response to the Earth Day Movement, the Pennsylvania Constitution was amended to include an environmental article as follows:

> The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic, and aesthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustees of these resources, the Commonwealth shall conserve and maintain them for the people.

In 2003, in response to the national obesity epidemic, Pennsylvania established Pennsylvania Advocates for Nutrition and Activity (PANA) to facilitate the implementation of Pennsylvania's *Nutrition and Physical Activity Plan to Prevent Obesity and Related Chronic Diseases*, published in 2003 by the Pennsylvania Department of Health. (DEH 2016)

Supported by funding from the Centers for Disease Control and Prevention, PANA's mission is to work collectively to make it easier to be healthy in the places people live, learn, work and play by changing environments to support healthier eating and physical activity options.

The goals of the program are to:

- Engage multi-level, multi-sector partners in coordinated action to improve healthy eating and active living;
- Enable environment and policy changes within organizational settings to support healthy eating and active living behaviors;
- Effect sustainable healthy eating and active living improvements across the wider community via large scale coordinated strategies.

The Franklin County Greenways Plan cites the value of the PANA program as an important ongoing recreational planning effort (Pashek Associates 2007:41).The County has served as one of two pilot projects under the program. PANA initiated the Keystone Active Zone (KAZ) program which has become a valuable resource in Franklin County. KAZ is the state's first effort to stimulate community and

school program and policy changes that support active living and improve nutrition in order to reduce and prevent obesity and its related health risks. The program encourages Pennsylvanians to have fun and stay fit by engaging in outdoor recreation at local parks, trails, or other outdoor open spaces.

To advance this mission, PANA created a directory and a website of Franklin County parks and recreation sites through the KAZ program. Franklin County continues as a pilot to increase the use of sites by children, families, and senior adults. Materials developed in Franklin County are serving as a model for communities throughout the state (www.KeystoneActiveZone.org). Advancement of the KAZ program in Franklin County is headed by a non-profit organization known as the Healthy Communities Partnership of Greater Franklin County, Inc.

DISCUSSION OF THE HISTORIC CONTEXT WITHIN THE FRAMEWORK OF THE NATIONAL REGISTER OF HISTORIC PLACES

Many of the recreation resources associated with the South Mountain Landscape can be tied directly to the events and associations discussed in the historical overview above. As noted previously, those that are at least fifty years of age and relate to National Register eligible property under one of the four criteria and within at least one area of significance can be listed as contributing resources.

Several of the recreation features present within the Michaux State Forest have been identified as contributing to the two historic contexts—forestry and the Civilian Conservation Corps—addressed in a Multiple Property Documentation Form. The CCC, for example, is known to have developed recreation areas and features associated with the state forest and the state parks, and improved the Appalachian Trail. Additional features located within the Michaux State Forest may also be contributing under other historic contexts as discussed in this document. These may relate to local resort and recreational property development during the late nineteenth and early twentieth centuries, and other park development during the first half of the twentieth century.

The types of resources that relate to the recreation context within the South Mountain Landscape are listed below. The individual features associated with each typology are described in the section that follows. The potential contribution of these resources to a National Register eligible property is indicated.

RESOURCE TYPOLOGIES WITHIN THE SOUTH MOUNTAIN LANDSCAPE

Resource typologies within the South Mountain Landscape that relate to the recreation historic context include:

- State Forest Lands
- State Park Lands
- Active Recreation Features

- Touring Roads and Overlooks
- Local Hiking and Interpretive Trails
- Through Hiking Trails
- Entertainment
- Accommodations
- Restorative Health and Resort Facilities

SPECIFIC RESOURCES WITHIN MICHAUX STATE FOREST

The recreational resources located within the South Mountain Landscape are numerous, varied, and of different sizes and scales. They are associated with state forest and state park lands, but also encompass public roads and national trail systems enjoyed by hikers and motorists, as well as lands contiguous to but not part of the state forest, such as the South Mountain Restoration Center. Some features, such as the state forest roads, are also used for logging and forest management and can be tied to more than one context. Some of the roads and trails that now serve recreational purposes were initially created for use by the nineteenth century iron industry, and thus also relate to more than one context.

In addition, several features established for alternative purposes, such as the reservoirs designed to help protect water quality for public use that support the mission of the state forest, are also used for recreation and are enjoyed by the public. Fishing, boating, picnicking, and swimming are some of the recreational activities that are permitted in association with water resources managed within state forest and state park land, such as Long Pine Run Reservoir, Carbaugh Reservoir, Laurel Lake, and Fuller Lake, and thus relate to the conservation and forestry context. Laurel and Fuller lakes are derived from sites of iron ore excavation and processing. As such they are also related to the mineral extraction context.

The individual resources that support recreation within Michaux State Forest and their potential significance are identified and discussed below.

State Forest Lands and Associated Recreation Features

Michaux State Forest. Recreational features associated with Michaux State Forest are varied and numerous. They include several miles of walking and hiking trails (see below), as well as 132 miles of snowmobile trails and 42 miles of ATV trails available for winter use, and 35 miles of ATV trails for summer use. There are also 31 miles of trails dedicated to equestrian use and related horse trailer parking and a 37-mile long multi-use trail that can be used for cycling. Trails generally are associated with wayfinding, informational, regulatory, and directional signage, as well as blazes. Trailheads are typically located near roads and parking. Although segments of these trails may follow historic routes, they are generally more contemporary additions.

Other recreational uses accommodated within the state forest are designated camp sites located throughout, boating afforded at Long Pine Run Reservoir, hunting during designated seasons, and fishing. The state stocks several trout streams for fishing within the forest. These include the East Branch of the

Conococheague Creek, East and West Branches of Antietam Creek, Mountain Creek, Laurel and Fuller lakes, and Waynesboro Reservoir. Warm water fishing is permitted in Long Pine Run Reservoir, Waynesboro Reservoir, and at the Carbaugh Dam. Skiing is also permitted in the winter; the state forest includes four miles of maintained cross-country ski trails.

The Michaux State Forest has been designated by the Audubon Society as an Important Bird Area. Audubon has published a birding tour route through the area. As such, the extant roads and trails are also used for birding. (See tour roads below.)

The boat launch at Long Pine Run Reservoir within Michaux State Forest.

Old Forge Picnic Grounds. Located along Old Forge Road near the intersection with Staley Road, Old Forge picnic area is a historic site within Michaux State Forest that was developed by CCC enrollees housed at the adjacent CCC camp now owned by the United Methodist Church and operated at Camp Penn. Local history enthusiasts have created a self-guided walking tour of the historic Old Forge site, which includes evidence of former iron furnace activities, as well as the CCC camp.

Old Forge picnic area features a parking area, trails, picnic shelters, grills, drinking fountains, an informational kiosk, trails and bridges with stone work, play equipment, and areas maintained in open space for recreational activities. The picnic area is significant for its association with the iron industry under the mineral extraction context, the CCC recreational features under the recreation context, and Camp Penn nearby under the government impacts context.

Historic recreational features associated with the Old Forge site include a rustic picnic shelter and stone drinking fountain and grill constructed by the CCC.

Camp Michaux. Camp Michaux is located within Michaux State Forest near Pine Grove Furnace State Park. The camp was the site of both a CCC enrollee camp and a prisoner of war camp. Local history enthusiasts have created a self-guided walking tour of the foundational ruins and remains of Camp Michaux. The walking tour follows the former alignment of a portion of the Appalachian Trail, as well as the circulation system used by the camp.

The foundational ruins and associated circulation routes are significant under the government impacts context. The current interpretive trail is a contemporary overlay, and not historically significant as a recreation feature, although it is of interest that it follows an earlier segment of the Appalachian Trail.

A kiosk providing information about the CCC and a foundational ruin at Camp Michaux.

Other CCC Recreational Features

Located across the road from the Big Pond Furnace stack is a cluster of recreational features established by the CCC during the New Deal era. These include a dam that was used to form an impoundment, and a picnic area. Stone picnic tables and the dam survive today in association with this CCC constructed recreational site, which is no longer used today.

One of the stone picnic tables built by the CCC to form a small recreation area near an earthen dam and stream impoundment.

State Park Lands and Associated Recreation Features

There are several state parks associated with Michaux State Forest that in and of themselves constitut4e historically significant landscapes. The history of these state park properties is closely tied to the history of the iron industry, as they were each established on former iron company lands. Recreational opportunities are both active, such as swimming, boating, and golf, and passive in the form of historic interpretation. Passive recreation is also afforded along road and trail corridors as motoring, bird watching, nature study, and photography.

Mont Alto State Park. Mont Alto Park was established in 1875 as a private recreational attraction associated with the Mont Alto Iron Furnace. In 1902, the Commonwealth of Pennsylvania purchased the iron furnace lands as the state's first forest reserve. A profitable ongoing concern at the time, the park facilities were rented by the state to a concessionaire, who operated the park during the summer months. Eventually, the property became part of the state park system.

The park features the bell-shaped pavilion, a contemporary replica of a historic shelter, playground, stone walls, stonework along the streambanks, trails, a parking area, and a historic shelter building. Historic features include the trails, historic shelter building, and stonework. Remaining features are contemporary additions that do not contribute to the significance of the historic park. Picnic facilities include two picnic areas, each with a pavilion, picnic tables and benches, grills, play equipment, parking, restrooms, trails with bridges, stone work along trails and stream, stone drinking fountain.

Historic recreational features associated with Mont Alto State Park include a picnic shelter, stone grills and drinking fountains, and other stonework. The picnic shelter with a bell-shaped dome is a replica of an earlier structure that housed the "flying horses" (carousel) in the 19th century amusement park.

Caledonia State Park. Like Mont Alto Furnace, the former Caledonia Iron Works Company lands were acquired by the Commonwealth of Pennsylvania during the early twentieth century for inclusion in the new state forest as a state forest park to provide recreational amenities to visitors. Most portions of the large Caledonia Iron Works property were incorporated into the new Caledonia Division of the South Mountain Reserve, which in 1920 became the middle portion of the newly named Michaux State Forest.

Caledonia was also used as a private recreational park before its acquisition by the state. The property is thus related to both the recreation and mineral extraction contexts. As an early example of a local, and state, recreational park, Caledonia contributes to the significance of Michaux State Forest under the recreation context. The historic attractions are linked via an interpretive trail.

Caledonia State Park features historic interpretive trails as well as active recreation. Active recreation features include a playground, swimming pool, picnic area, picnic pavilion, amphitheater, snack bar, changing facilities, and campgrounds. The two campgrounds— Chinquapin Hill Campground and Hosack Run Campground—afford 170 tent and trailer sites, electrical hook-ups, restrooms, showers, and playgrounds. Picnic facilities consist of a designated picnic area, 450 picnic tables, and two picnic pavilions. There are also biking, equestrian, and multi-use trails available to visitors for recreational use. Trails include the Thaddeus Stevens Historic Trail, Charcoal Hearth Trail, Whispering Pine Nature Trail, Midland Trail, Fire Road Trail, and Ramble Trail. There are historical and commemorative markers associated with some of the trails, such as the Dock Memorial for the Appalachian Trail. All of the active recreation features are contemporary additions or replacements of earlier similar features.

Fishing is permitted in the East Branch Conococheague and Rocky Mountain creeks, and Carbaugh Run. Hunting is permitted within the park during designated seasons.

The Thaddeus Stevens and Charcoal Hearth trails are likely historic. Several iron industry features that pre-date the park are interpreted along these trails, such as a reduced-scale replica furnace built in 1927, the Thaddeus Stevens Blacksmith Shop, and charcoal hearth sites.


CHARCOAL
HEARTH
TRAIL


3
THADDEUS STEVENS
◄ HISTORIC TRAIL

Historic recreational features associated with Caledonia State Park include a replica iron furnace, the Thaddeus Stevens blacksmith shop, stone-lined trails that provide access to iron furnace features, and a hut used to commemorate the Appalachian Trail.

South Mountain Golf Course (18-hole public course). The South Mountain Golf Course was constructed by Robert Miller on state land in 1922 as an amenity for the Graeffenburg Inn, which he leased. Originally constructed as a nine-hole course, Miller expanded it to 18 holes in 1927. The golf course continues to be an important recreational amenity of Caledonia State Park today.

Pine Grove Furnace State Park. Pine Grove Ironworks land was acquired by the Commonwealth of Pennsylvania in 1913 for inclusion in the state's forest reserve system, and to establish a third state forest park within the environs of Michaux State Forest. The park includes the core area of the historic furnace and associated office and residential structures, which are preserved and interpreted (see below). It also features numerous facilities for the recreational enjoyment of visitors. These include picnic shelters and areas, and hunting, boating, camping, swimming, fishing, bicycling, hiking, ATV riding, cross-country skiing, ice skating, snowmobiling, wildlife watching/birding areas. Pine Grove Furnace State Park campgrounds include 70 tent and trailer sites, picnic tables and fire rings, a sanitary dump station, and a camp store. Picnic facilities also include a shelter, picnic tables and benches, restroom facilities, and parking.

There is a swimming within the park at Laurel and Fuller Lakes and their associated beaches. Visitors may use the boat launch at Laurel Lake to launch watercraft. Fishing is permitted in Laurel and Fuller lakes and Mountain Creek. Laurel Lake is also used for ice skating and ice fishing in the winter. Hunting is permitted within the park during designated seasons.

There are many miles of roads and trails that support these uses. Trails include Creek Trail, Mountain Creek Trail; Koppenhaver Trail; Pole Steeple Trail (the trail is within the state forest but typically is accessed from a parking lot within the state park); Swamp Trail. There is a two-mile bike trail as well. The majority of the extant recreational features are contemporary additions to the landscape and do not contribute to the significance of the historic park. Exceptions include trails that follow former rail line routes, and the swimming areas established in the former ore excavation pits that relate to the mineral extraction history.

One of the iron ore extracting sites forms a lake used by visitors for swimming at Pine Grove Furnace State Park.

Historic interpreted features are part of the recreational attractions of Pine Grove Furnace State Park. These are accessed via trails, and interpretive information is afforded on wayside exhibits and in the maintained and interpreted historic buildings such as the Ironmaster's house and Paymaster house. Local historians have prepared self-guided tour information that is available to visitors. The historic attractions are linked via an interpretive trail.

Historic recreational features associated with Pine Grove Furnace State Park include the furnace, Ironmaster's Mansion, pay master's office, and a cemetery.

Kings Gap Environmental Education and Training Center. The property that serves today as the Kings Gap Environmental Education Center was acquired by the Commonwealth of Pennsylvania in 1973, and opened for its current use in 1977. The present-day mansion was built in 1908 by a prominent area family, the Camerons.

While the property may be significant for the architecture of the mansion and collection of early twentieth century buildings as well as its association with the Camerons, it does not support the historic context of recreation as the current use post-dates the fifty-year age consideration and associated period of significance.

View of the Cameron dwelling that serves as the focus of the environmental education and training center.

Touring Roads and Overlooks

Route 30—Lincoln Highway. Present-day U.S. Route 30 passes across South Mountain via Cashtown Gap, located along a fault line. The present road that follows the route of the earlier Chambersburg Turnpike. The turnpike itself likely follows an earlier American Indian trail. This route was used by Robert E. Lee's Army of Northern Virginia during the Gettysburg Campaign.

During the 1920s, the road was incorporated into a cross-continental travel and recreational motoring route known as the Lincoln Highway. The historic road corridor is interpreted within Caledonia State Park near the replica furnace. The road is a historic resource that contributes to the significance of the Michaux State Forest under the Recreation context.

Remnant of the concrete paving of the Lincoln Highway parallel to Route 30, and interpretive panel providing information about the highway at Caledonia State Park.

State Forest Access Roads. Extending throughout Michaux State Forest is a system of gravel roads that are open to the public and available to visitors for recreational motoring. Overall there are 130 miles of gravel roads, and five designated vistas with panoramic views, located at Spruce Run, Hammond Rocks, Buzzard Rock, Dark Hollow, and Snowy Mountain. The roads afford access to the recreational features of the state forest landscape, including overlooks, trails, and camping areas. Visitors can follow the 22-mile self-guided automobile tour of Milesburn Road developed by Youth Conservation Corps enrollees for the Commonwealth of Pennsylvania.

Some of these roads follow historic nineteenth-century routes used by the iron companies. Others were constructed or improved by students of the Mont Alto forestry school in the early 1900s, or by Civilian Conservation Corps enrollees during the 1930s. Many of these gravel roads appear to have been re-graded, re-graveled, and improved over the years. Nevertheless, with respect to location, character, and continuity of use, the roads retain historical significance. While further investigation is needed to identify all of the historic road segments present within the state forest, these gravel access roads generally reflect a long-standing heritage of forest management and recreation. As such, they should all be treated as important cultural resources.

View from one of the designated overlooks located along the state forest road system.

Local Hiking and Interpretive Trails

Michaux State Forest. The Michaux State Forest contains several miles of walking and hiking trails. These include Buck Ridge Trail, which links the Kings Gap Environmental Education and Training Center and Pine Grove Furnace State Park, and the 4.23-mile Rocky Knob Trail, located between Ridge Road and Birch Run Road. A portion of the trail follows a road constructed by the Civilian Conservation Corp (CCC) in 1937 that was intended to connect Ridge and Birch Run roads. The road project failed due to the area's rugged geology.

In 1976 the Youth Conservation Corp (YCC) constructed a trail beginning along the northern portion of the abandoned CCC project. The loop traverses a variety of scenic areas including Rocky Knob. Features along the way are interpreted based on a numbered station system developed in 1977 by a YCC crew. These trails are not historic, but may follow historic routes, such as the CCC road, over some segments.

Hiking trail in Michaux State Forest.

THROUGH HIKING TRAILS

Appalachian Trail. The Appalachian National Scenic Trail closely follows the Blue Ridge Mountain system for much of its length, including the portion located within Pennsylvania encompassed by Michaux State Forest. This narrow foot trail corridor was first proposed in 1924, with a vision articulated when the Appalachian Trail Conservancy (ATC) was formed in 1925 to advance proposals for a continuous "super trail" along the mountain crests of the eastern wilderness. The trail itself was completed between Maine and Georgia in 1937, partially through the efforts of the Civilian Conservation Corps during the Great Depression.

Stonework that supports the trail and is used in stormwater management features, as well as rustic shelters may potentially be attributed to the CCC. The regular active use of this recreation feature requires constant maintenance and upkeep and repair and replacement of deteriorated materials by a variety of volunteer groups. Other features associated with the trail, such as identity signs, directional signs, wayfinding signs, and blazes are generally contemporary additions or replacements of earlier features.

The trail corridor itself is generally historic, although it too is subject to change to reflect the needs of hikers. Within Michaux State Forest the segment that formerly passed through Camp Michaux has been rerouted around the former prisoner of war camp area. Thus, while much of the trail itself and some of the stonework and shelters are likely historic and the Appalachian Trail contributes to the significance of the state forest within the recreation context, the integrity is diminished to a degree by altered alignments and routes and replacement of historic elements over time.

One of the many signs marking the location of the Appalachian Trail within Michaux State Forest.

Appalachian Trail Museum. Located within Pine Grove Furnace State Park, near the midpoint of the national scenic trail, the Appalachian Trail Museum tells the unique story of this important footpath. The museum is housed in a grist mill associated with farming activities within the region that is more than 200 years old. It is located across the road from the Pine Grove General Store, where through-hikers have for many years traditionally stopped to celebrate reaching the midpoint by attempting to eat a half gallon of ice cream in one sitting. The museum, which opened in 2010, has welcomed visitors from throughout the United States and eighteen other countries. While the building is historic, the museum use is relatively new and a contemporary use that is not historic. As such it does not contribute to the recreation context.

The former grist mill that now features the Appalachian Trail Museum.

Entertainment

Totem Pole Playhouse. The Totem Pole Playhouse was established in 1950 as a summer stock theatre in a renovated garage building. The theater was later moved to a former dance pavilion located on the hill behind the furnace site within Caledonia State Park, which was owned at the time by the Cumberland Valley Railroad. The theater company transformed the building into a rustic summer theater that featured an eleven-show season using a resident troop. Several notable actors have been affiliated with the theater over the years, including Jean Stapleton. Totem Pole Playhouse became known as the Cadillac of summer theaters in New York circles during the 1960s.

The original theater building was destroyed in a fire set by an arsonist in 1969. After searching for a suitable replacement venue, the theater company moved to the current building located near the intersection of U.S. Route 30 and PA Route 233 on Golf Course Road within Caledonia State Park. Although the present-day theater is not historic, the Totem Pole Playhouse is a recreational and historic attraction of interest within Michaux State Forest.

View of present-day Totem Pole Playhouse.

Accommodations

Land lease houses. Within Michaux State Forest there are more than 300 residential properties used as second or vacation homes. The houses themselves are owned privately, but the owners must lease the land, which is owned by the state. There are restrictions on the degree to which the homes can be improved so that they may remain secondary and not become primary residences. The majority of the houses are historic. The local architectural vernacular for these structures is chinked log with stone and rustic wood detailing. These dwelling are primarily located along public road corridors, such as PA Route 233 and the road around the golf course at the Caledonia State Park. Leased house sites are located within Pine Grove Furnace State Park.

Views of two typical land lease houses located near Pine Grove Furnace State Park.

Restorative Health and Resort Facilities

South Mountain Restoration Center. The genesis for the South Mountain Restoration Center is the establishment of the Michaux State Forest in 1901 based on the guidance of Dr. J.T. Rothrock. After Rothrock, a medical doctor, took a group of locals to the mountains of Mont Alto to camp, one camper with asthma received relief from his condition due to the fresh mountain air. This led Rothrock to build a small complex of rustic housing features for those suffering from maladies such as tuberculosis, could be treated by immersion in the healthful environment that afforded access to fresh air and breezes. It was known as White Pine Camp and was administered by the department of forestry.

In 1907, the facilities that Rothrock established in the state forest at South Mountain were transferred to the state Department of Health. Over the past one hundred years, the campus, composed of numerous historic buildings and landscape open areas, has treated thousands of people for tuberculosis and mental illness, and provided general care for the elderly. The early forestry camp site later became Mont Alto Sanatorium, South Mountain Sanatorium, Samuel G. Dixon State Hospital, and South Mountain Geriatric Center, before acquiring its current name, South Mountain Restoration Center. Many of the historic buildings on the property were constructed between 1918 and 1956.

CHAPTER 8 – IMPACTS OF GOVERNMENT CONTEXT

> We know that a very hopeful and immediate means of relief, both for the unemployed and for agriculture, will come from a wide plan of the converting of many millions of acres of marginal and unused land into timberland through reforestation. There are tens of millions of acres east of the Mississippi River along in abandoned farms in cut-over land, now growing up in worthless brush. Why, every European nation has a definite land policy, and has had one for generations. We have none. Having none, we face a future of soil erosion and timber famine. It is clear that economic foresight and immediate employment march hand in hand in the call for reforestation of these vast areas.
>
> —Franklin Delano Roosevelt articulating his vision for the New Deal, 1932

OVERVIEW OF THE HISTORIC CONTEXT

The South Mountain landscape has been both directly and indirectly affected in several ways by governmental activities, policies, laws, and administration since early settlement. From land acquisition and ownership, to legislative boundaries, transportation and utility corridors, state park and forest development, and the waging of war, the character and composition of the South Mountain landscape has for centuries been influenced by government at the local, state, and federal levels. Governmental activities have also evolved over time in response to public need and expectation.

The impacts of government have decidedly affected the physical character and composition of South Mountain and its communities both directly and indirectly. The tangible physical expression of the government impacts is in evidence in a variety of ways. Early settlement patterns were influenced by government treaties with American Indian tribes, as well as by the state's land patenting process. Public road corridors also influenced patterns of settlement as roads were an important consideration for travel and transportation of goods. The government was also responsible for chartering railroad and turnpike companies, further influencing the character of the landscape associated with all-important transportation systems. Government also administered the local response to war-time needs, and such issues as securing supplies from manufacturers, such as the local iron furnace companies, which affected the health of the local economy. Government services, such as the Pennsylvania Geological Survey

established in 1836, were also important influences in settlement, industry, and agriculture, and associated landscapes.

During the late nineteenth and early twentieth centuries, Pennsylvania began to take an active role in conservation as part of its directive to protect the public. At a broad level, the designation of the earliest "forest reserves" (the core of the future "Michaux State Forest") to protect the environment and public water supply had a tremendous impact on the South Mountain landscape. In addition, specific areas within the new government-owned forest lands were set aside as distinct public parks—including first the Mont Alto and Caledonia parks previously built by the iron companies, and then the land that would eventually become today's Pine Grove Furnace State Park, followed decades later by Kings Gap. These administrative designations had a dramatic impact on the physical composition of the region.

During the mid-twentieth century, the economic ills of the Great Depression led President Franklin Delano Roosevelt to establish New Deal programs to help out of work Americans. Through these programs, states like Pennsylvania gained the assistance of young able-bodied men who were paid by the federal government to improve the condition of the nation's state and national parks and forests.

Pennsylvania, and Michaux State Forest, were beneficiaries of the resulting Civilian Conservation Corps program, which helped to reforest exhausted land, build roads, develop recreational amenities, and control fire. The impact of work conducted by the CCC remains tangible today. Throughout the twentieth century, both state and local government has become increasingly concerned with addressing the needs of public health, the environment, and public infrastructure. Examples of the influence of government on the South Mountain landscape relating to each of these issues exist at Michaux State Forest.

Because the physical expression of many of the government impacts noted above is pervasive and broad, several of these topics were addressed previously in the historical overview chapter of this report and not reiterated here. Topics addressed previously include early land settlement and land titling, treaties with American Indian tribes, county and town establishment, and chartering of roads, turnpikes, and railroads. The focus of this chapter is on government impact associated with state forest and park development, New Deal era programs, and World War II prisoner of war camps.

HISTORICAL DEVELOPMENT OF THE IMPACT OF GOVERNMENT

As has been discussed previously, there is a great deal of overlap between the Impact of Government context and other contexts addressed herein. For example, the CCC helped to reforest Michaux State Forest and is thus addressed in the Conservation and Forestry context. The CCC also supported the enhancement of public recreation amenities within the state parks located adjacent to Michaux State Forest, and is thus considered in the Recreation context. While the resources that relate to those two activities—forest access roads and forest stands, and picnic areas and trails—are discussed in the Conservation and Forestry, and Recreation contexts, this chapter is concerned

instead with the actual CCC camps, which were designed and built by the United States War Department and Army. Similarly, the prisoner of war camp that was housed at Camp Michaux was the direct result of government activities. As such it is featured in this chapter, although it is also mentioned in Chapters 6 and elsewhere.

Pennsylvania State Forests and State Forest Parks, 1893–1914

During the late nineteenth century, the discovery of high quality iron ore deposits in the Upper Midwest that could be transported via rail led to the demise of central Pennsylvania's iron furnace industry, which had formed around deposits of inferior quality. By the 1890s, the large land areas amassed by the three iron companies at South Mountain, now generally denuded of trees and blackened by repeated fires, were of little use for agriculture. The iron companies had already worked to reuse the land for recreational purposes by establishing resorts accessed by train and trolley service, with minimal financial success.

With the foresight and encouragement of Joseph T. Rothrock, more than 30,000 acres of former iron furnace company land was designated Pennsylvania's first state forest reserve in 1901. The reservation was named for the famous father and son botanists, Andre and Francois Andre Michaux, who had traveled through the region a century earlier, and whose legacy included the funding of Rothrock's Michaux Forestry Lectures. The lectures were instrumental in raising awareness for the need to establish a state forest conservation program and to protect land from deleterious logging and agriculture practices.

As the state's first commissioner of forestry, Rothrock laid the foundation for establishing state forest lands as a way to protect water supply and conserve soil, while allowing for wise harvesting using forestry principles developed in Germany. In addition, the state also established recreation areas within the state forest reservations on the site of the former Mont Alto and Caledonia Parks. Mont Alto was aquired in 1902, the site of the former Mont Alto Park where the owners had previously attempted to create a recreational resort linked to nearby towns by trolley and train. The park was intended to maintain the Mont Alto Iron Company after the decline in the iron industry during the 1890s.

The second was established nearby at the site of the Caledonia Iron Works in 1903. Land formerly owned by Pine Grove Iron Works was acquired by the Commonwealth of Pennsylvania in a series of sales in 1912-1913 following prolonged negotiations. The 16,869 acres of industrial works and surrounding forest, including the still-inhabited village where iron workers had lived, was initially called the "Pine Grove Division of the South Mountain Forest Reserve"; early formal reports often called the entire area the "Pine Grove Forest." (The 696-acre "Pine Grove Furnace State Park" was not yet administratively divided out of this large land purchase.) This reserve was combined with lands from the other iron companies to become the newly named "Michaux State Forest" in 1920. (DOF 1914; Andre Weltman personal communication)

Included with the land acquired in 1913 was the stone barn associated with Bunker Hill Farm. After the iron industry lands were sold to the state in 1913, the farm continued to be leased until at least the mid-1920s, when it closed.

One of the related developments within the region occurred in 1902, when Rothrock, who was also a medical doctor, created camps within the new state forest for people with tuberculosis and respiratory illnesses to provide access to fresh and healthful air. The camps were turned over to the Commonwealth's Department of Health in 1907 to be managed by the state. The South Mountain Restoration Center was founded based on the principles established by Rothrock for the camps.

The state forest property at South Mountain continued to grow to its current size of 85,000 acres over the course of the next few decades. At the same time, state government evolved to better manage and administer the new property type. In 1920, the region was renamed the Michaux District of the State Forest system. (Gettysburg Times 1920)

The state forest parks would be re-classified as state parks circa 1927–1929, following a reorganization of state government by Governor John Fisher. The Administrative Code of 1929 formed a new Bureau of State Parks: "For the purpose of promoting outdoor recreation and education, and making available for such use natural areas of unusual scenic beauty, especially such as provide impressive views, water falls, gorges, creeks, caves, or other unique and interesting features. . ."

The state park system at South Mountain was expanded in 1973 to accommodate plans to develop the Kings Gap Environmental Education Center. Approximately 1,400 acres were acquired at Kings Mountain along the northwestern edge of South Mountain in 1973 on land originally owned by the politically prominent Cameron family from Harrisburg. The property featured a large stone house built by James Cameron in 1908 as a summer home. The Cameron House features steel reinforced concrete in the internal structure, believed to be one of the first applications of this construction type locally. The design was intended to make the mansion as fire-proof as possible. The Environmental Education Center opened in 1977. The mansion serves as a training center for state agencies as well as an environmental education facility for teachers, students, and the general public.

State Fish Hatchery, Huntsdale

With initial construction completed in 1932, the Huntsdale State Fish Hatchery falls within a 167-acre property located just north of the mountain slope, between Route 233 and the entrance to Kings Gap. The property is owned by the Commonwealth of Pennsylvania and managed by the Fish and Boat Commission. The trout rearing facilities are supported by water obtained from multiple coldwater springs and a creek. Concrete raceways are used for trout production using intensive culture technology. Pond rearing is used for extensive culture, while indoor intensive culture of warm/coolwater fish also occurs on site. The Commonwealth uses the fish raised at the hatchery to stock area streams for fishing.

The New Deal Era, 1933–1942

The state parks were to benefit from national aid programs devised by the federal government during the Great Depression. Following the stock market crash that

began on October 24, 1929, America's economy began a long downward slide. By the time President Franklin Delano Roosevelt was inaugurated in March 1933, more than 25 percent of the American workforce was unemployed. Immediately upon his inauguration as part of a broader Roosevelt sought to implement a suit of programs designed to offer work to the unemployed and potentially stabilize the economy. Together these would become known as his New Deal.

Based in part on his experience as New York governor, where he had helped to put thousands of unemployed young men to work on public works projects, including on abandoned and sub-marginal lands that the state had acquired for reforestation beginning in 1930, Roosevelt had campaigned for the 1932 Presidential election with a pledge to fight against soil erosion and declining timber resources by hiring unemployed young men from large urban areas to take on needed projects. As in New York, Roosevelt's New Deal sought to establish a temporary emergency relief administration where the unemployed were hired to work on reforestation projects, clearing underbrush, fighting fires, controlling insects, constructing roads and trails, and developing recreation facilities.

Roosevelt's first New Deal program was the Emergency Conservation Work (ECW) Act. With the ECW, Roosevelt sought to solve two of the nation's greatest challenges—repairing the damage done to the nation's natural land and water resources due to poor management, and offering paid labor to America's youth. Within days of his inauguration, the President convened an emergency session of the 73rd Congress to address the needs of the nation. Two weeks later, on March 21, 1933, Roosevelt presented the EWC program to Congress, noting:

> … I propose to create a civilian conservation corps to be used in simple work, not interfering with normal employment, and confining itself to forestry, the prevention of soil erosion, flood control and similar projects. I call your attention to the fact that this type of work is of definite, practical value, not only through the prevention of great present financial loss, but also as a means of creating future national wealth. …(Roosevelt 1933)

His proposal suggested that government recruit thousands of unemployed young men, enroll them in a peacetime army, and organize groups of enrollees to undertake projects around the country to repair damage done to soil and water resources by poor farming, logging, and mineral extraction. By 1933, an estimated 12 to 15 million people were out of work, a high percentage of which were young men. Farms were being abandoned, businesses were going bankrupt, and more than 2,000 banks had shut their doors.

At the same time, environmental problems resulting from the loss of 700 million acres of virgin forests and 6 billion tons of topsoil were being felt by many around the country. President Roosevelt promised that, if granted the emergency powers he requested, 250,000 men would be established in work camps by the end of July 1933. Senate Bill S. 598, introduced on March 27, 1933, quickly passed both houses of Congress, and was on the President's desk to be signed by March 31, 1933. The resulting Executive Order 6101, dated April 5, 1933, authorized the CCC program. Representatives of the Secretaries of War, Labor, Agriculture and

Interior served on an Advisory Council that helped to oversee the program. By April 7, 1933, the first enrollees had been inducted.

The Civilian Conservation Corps

One of President Franklin Delano Roosevelt's earliest and dearest efforts to help America recover was the Civilian Conservation Corps, known as the CCC. The program sought to support conservation of the nation's natural resources—timber, soils, and water—by providing employment and training to jobless, unmarried young men. To make sure that there was plenty of national forest land for the men to work on, tens of millions of dollars were appropriated for land acquisition. (Bolgiano 1998:100-101)

Plans for the program began to take shape immediately, facilitated by the organizational prowess of the military. One of the concerns for the program was that the bulk of the unemployed youth were living in the East, while most of the projects were in the West. The Army was the only department capable of handling the logistics needed to organize and mobilize this workforce across great distances, and made responsible for developing the plans needed to meet the challenge of managing this enormous mission. The Army utilized the nation's transportation systems of rail lines and roads to move thousands of enrollees from induction centers to work camps, and employed regular and reserve officers, together with regulars of the Coast Guard, Marine Corps and Navy, to temporarily command the companies that were formed. Enrollees were dispatched to remote sites in forests, deserts, seashores, and canyons to carry out projects involving the conservation of natural resources and to create havens for public enjoyment.

While the Department of Labor was made responsible for the selection and enrollment of volunteers using state and local relief offices as the basis for qualifying individuals, reserve officers from the U.S. Army were in charge of the camps. The Departments of Agriculture and Interior were primarily responsible for planning and organizing the work to be performed, and were encouraged to devise projects in every state of the union.

The CCC was highly successful. Over the course of nine years between 1933 and 1942, more than three million young men participated in this massive conservation effort, which quickly became the most popular of Roosevelt's New Deal programs. The program was also attractive to America's unemployed. They lived in work camps and received a base pay of $30 per month, $25 of which they were required to send home to their families. They were encouraged to spend the rest in nearby towns, to bolster local economies. The program was organized along military lines and facilities included barracks and mess halls. Those qualifying for the program were U.S. citizens who were unemployed and on relief, unmarried, and between 18 and 28 years of age. (Bolgiano 1998:101)

Enrollees were volunteers who agreed to serve for a minimum six-month period. They would be given the option to extend their service period to as many as four periods, or up to two years, if they remained unable to find employment outside the CCC. They needed to pass a physical exam, or undergo a period of conditioning that allowed them to pass, to prepare them for the demands of physical labor. Enrollees worked 40 hours a week. In addition to their pay, they

received all of their food, clothing and medical care from the program. Over time, the program was expanded to include opportunities for African Americans, veterans, American Indians, and skilled laborers. These were known as locally experienced men; their inclusion in the program helped local communities near the camps by providing opportunities for their own unemployed.

The CCC camps were constructed as close as possible to the areas of proposed projects. Each camp was designed to house approximately 200 enrollees as a company. The earliest camps were composed of Army tents, but, as funding was appropriated by Congress to continue the program, these were replaced with wooden barracks. Camps also typically included other features such as officer/technical staff quarters, a medical dispensary, mess hall, recreation hall, educational building, lavatory and showers, technical/administrative offices, tool room/blacksmith shop, parade or assembly ground, and motor pool garages. The enrollees built their own camps.

Their work was dependent on a plan prepared by a department or agency. Many enrollees were devoted to Soil Conservation or Forestry. Their camps included an associated designation, such as SC for Soil Conservation or F for Forestry. The men built fire towers, telephone lines, picnic tables, overlooks, trails and campgrounds with wells, fireplaces, and privies. They piled up boulders and brush piles in erosion ditches to stop the force of water. They thinned out thousands of acres of choked stands of young tree. The dug up all the gooseberry and currant bushes they could find to eliminate them as a reservoir of blister rust, a fungus that killed white pines. Whatever other timber improvement projects the rangers could devise, the CCC enrollees did it. In some national forests with nurseries, they planted hundreds of thousands of seedling trees. The CCC also built many, many miles of roads.

By July 1940, with war in Europe and Asia, an increasing number of CCC projects became focused on resources for national defense, developing infrastructure for military training facilities, and forest protection. Fewer eligible young men were available after conscription commenced in 1940.

By late summer 1941, the CCC was in decline. A diminished number of applicants, problems with desertion, and the availability of jobs that siphoned off enrollees at the end of their six-month commitments reduced the program to fewer than 200,000 men in about 900 camps. With the bombing of Pearl Harbor, it soon became clear that federal projects not directly associated with the war effort were not a priority. The CCC came under review in 1941 as Congress considered the value of all federal agencies to the war effort. A joint committee overseeing the evaluation recommended the CCC be abolished by July 1, 1942. Although the CCC was never formally abolished, its funding was severely curtailed in June 1942 by a narrow vote of 158 to 151. With its funding cut, the CCC was forced to conclude operations formally at the end of the federal fiscal year on June 30, 1942.

Liquidation of the CCC was ordered by Congress by the Labor-Federal Security Appropriation Act (56 Stat. 569) on July 2, 1942. The process involved closing of the camps and leaving incomplete work projects in the best possible state, the relocation of enrollees and employees to homes and bases elsewhere, the

transfer of CCC property to the War and Navy Departments and other agencies, and the preparation of final accountability records. This was virtually completed by June 30, 1943, although liquidation appropriations continued through 20 April 1948. Some former CCC camps were reactivated between 1941 and 1947 as Civilian Public Service camps where conscientious objectors performed work of national importance as an alternative to military service. Other camps were used to hold Japanese American internees or German prisoners of war.

The Civilian Conservation Corps in Michaux State Forest

The CCC and later New Deal programs had a profound impact on the state of Pennsylvania, helping to transform the forests and natural areas of the state and enhancing state parks. The number of camps established in the state fluctuated over the life of the CCC but peaked at 141 in September 1935 (Speakman 2006), and a total of 194,500 Pennsylvania citizens served in the CCC nationwide (DCNR 2015, The CCC Years). Between March and September 1933, eighty-eight camps were established (Hendrickson, 1976). During their tenure in Pennsylvania, the CCC built roads, reforested areas that had been cleared by industrial activity, and built bridges and dams. Enrollees combated natural disasters such as floods and forest fires, and cleaned up after damaging storms. One of the reasons that Pennsylvania received so many camps was that it already had a plan in place for the camps, thanks to the efforts of Governor Gifford Pinchot. (Speakman 2006; Otis 1986)

Franklin Delano Roosevelt was a long-time disciple of his cousin, President Theodore Roosevelt's, chief forester, Gifford Pinchot. Based on Pinchot's ethic, Roosevelt had been a supporter of conservation throughout his political career. At his own Hyde Park estate, Roosevelt had worked to reforest the land that had been depleted by poor farming practices. Roosevelt based part of his presidential campaign platform on the need for national conservation and reforestation, and an employment plan to implement his ideas. He based his knowledge on these topics on information gained by corresponding with such key individuals as Pinchot, by this time Governor of the Commonwealth of Pennsylvania.

Roosevelt's ideas progressed during the fall of 1932 and winter of 1933 when he called on chief forester Robert Stuart to develop plans for putting thousands of men to work in federally owned forests. The Forest Service was tasked with identifying the condition of federal and state forests in order to identify areas requiring immediate attention and sites where camps might profitably be established. Pinchot's later readiness to put Civilian Conservation Corps camps to work based on the identification of needs, which resulted in Pennsylvania's attracting the largest number of camps nationwide after California, may have been the result of his correspondence with Roosevelt and his anticipation of what was to follow. (Salmond 1967:9; Speakman 2006)

Michaux State Forest is a prime example of the type of depleted environment that Roosevelt tasked the CCC with restoring or returning to productivity. Five CCC camps were established in the vicinity of the Michaux State Forest during the 1930s, the first occupying land formerly owned by Pine Grove Iron Furnace. The camps were known as Caledonia, Big Pond, Waynesboro, South Mountain, and Pine Grove Furnace. The camps were identified by codes that related to an aspect

of the work they were developed to do. SP stood for State Park, suggesting that Scotland was concerned with improvements to a state park. “S” was the abbreviation for State Forest land. “SCS” was used to delineate camps involved with the Soil Conservation Service.

Camp Caledonia, sometimes referred to as Camp Scotland, was located in Caledonia State Park. It was established on June 21, 1933, as camp S-107-PA, and later became SP-18-PA in October 1936. The camp would eventually complete a park office, a building for the public pool, restroom facilities, a maintenance building, and two picnic pavilions at Caledonia State Park. The camp was disbanded in 1939. Little remains of this camp besides foundations and small-scale structures.

Aerial photograph of Caledonia CCC Camp, 1937. Route 30 is the major east-west road. The camp is at the current location of the state park at the upper left. Below and to the right is the golf course, constructed in 1922 and 1927 (PSU 1938)

Big Pond was established on June 16, 1933 as S-108-PA within Cumberland County, Pennsylvania. It was disbanded in 1937 (DCNR 2015, Pine Grove). The Big Pond site is located near the northeastern end of Michaux State Forest along Big Pond Road near its intersection with Hogshead Road. Today this property, located just outside of the state forest, is redeveloped as a private residence. However, workers from the camp constructed a pond to the immediate west of the site. The pond no longer exists and is now wooded and is within the state park boundaries. The long earthen dam and a number of stone picnic tables associated with the pond remain.

Camp Waynesboro (SCS-4-PA), also referred to as Glen Forney, was established in Franklin County on December 28, 1935, specifically to address the issue of soil erosion (DCNR 2015, The CCC Years). The camp was located along Old Forge Road south of Camp South Mountain (Old Forge), just outside the present-day boundary of Michaux State Forest. It was disbanded in 1940. Little remains of this camp besides foundations and small-scale structures.

Detail of an aerial photograph of Big Pond Furnace repeated from Chapter 5, flown October, 1937. The CCC camp is the compound of buildings at upper center-right, today located just outside of the state forest boundary. The pond they constructed is visible in the lower center. (PSU 1938)

Camp South Mountain (Old Forge) (S-70-PA) was established on May 6, 1933, in Franklin County, Pennsylvania. It was disbanded in 1941. It was located along Old Forge Road within the state forest, near the intersection with Staley Road. This camp remains nearly intact today, is in good condition, and continues to be used.

The camp at Pine Grove Furnace was identified as S-51-PA. It was established on May 6, 1933 within Cumberland County. The camp was located along Michaux Road. The enrollees constructed buildings and a decorative fountain at the site of the CCC camp. They also built or improved some facilities at Pine Grove Furnace State park, a few of which are still in use today at the Laurel Lake beach area. Enrollees were tasked with reforesting areas that had undergone erosion. The camp was disbanded in 1942. There are several features in ruinous condition that survive from this camp, although it was later altered for use as a prisoner of war camp during World War II.

These camps undertook various projects that vastly improved conditions in the area. Enrollees protected the forests from fire, improved infrastructure that included roads, bridges and trails, and built day use areas, continuing to enhance the forests where the iron industry had denuded the hillsides in collecting wood for charcoal (Gerhold 2007). Between 1933 and 1941, the men of the CCC built roads, installed telephone lines, and constructed buildings throughout Michaux State Forest (Smith 2015). Enrollees also were involved in reforesting the land that had been previously cleared. They removed stumps and planted seedling trees in an effort to combat soil erosion and flooding, helping to establish the

second growth forest that prevails today. More than half of the public and private tree planting ever done in the United States was performed by the CCC. The proximity of state forest lands made this spot a logical place for establishment of a camp. Enrollees also helped develop the Appalachian Trail through Michaux Forest, including building bridges and shelters for hikers on the trail. The CCC presence in Michaux is also credited with the construction of many recreational facilities. (Speakman 2006:182)

The state benefitted from the establishment in 1935 of another New Deal program—the Works Progress Administration (WPA)—which was similar in scope to the CCC, but engaged in hiring local people who remained living at home. The WPA built many roads, buildings, and bridges in Pennsylvania state parks.

Camp S-108-PA closed in 1937, followed by S-107 in 1939, and SCS-4-PA in 1940. The last two camps, S-51-PA and S-70-PA, closed in 1941, ending the CCC presence in the area. (DCNR 2015, CCC Online Archive)

Pine Grove Furnace Civilian Conservation Corps Camp

As sites were selected for the development of CCC camps, it was not uncommon for former iron plantations to be selected due to the program's goal of rehabilitating land that had been ravaged by industry or poor farming practices. The former Bunker Hill farm, located two miles west of the Pine Grove Furnace site, was selected for the first CCC camp (S-51-PA, CCC Company 329) on state land in Pennsylvania in 1933. At the same time, a site in western Pennsylvania was selected for camp establishment within the Allegheny National Forest.

The first enrollees arrived to construct the camp in May 1933 from Fort Monroe, Virginia, and Carlisle Barracks, using the railroad that still operated between Hunter's Run and Pine Grove. The men, totaling approximately 200, camped near the railroad station, and set up a dining tent in front of the furnace stack. They walked the four miles each day to and from the farm to construct the camp. Once they had completed the mess hall, a tent camp was set up and the enrollees moved to the site from the furnace environs.

By late December of 1933, the 200 men and their leaders were able to move into newly-constructed barracks. The camp remained in operation for nine years. Enrollees built roads, including Michaux Road that leads to the camp today, installed telephone lines, reforested land throughout the region, built infrastructure in the state park, and continually made improvements to the CCC camp. By the time the camp closed there were more than forty buildings, a fully functioning water and sewage system, and electricity. During the nine years of its existence, the camp was responsible for road construction, planting trees throughout the 60 square mile area of the environmentally devastated area of the former iron plantation, and developing the infrastructure of Pine Grove Furnace State Park (Smith 2014:19).

Features of the camp included several garages, a gas station, structures used by the CCC to conduct the conservation work that was the purpose of the camp, Michaux Road, barracks, mess hall, two log cabins that provided housing for CCC officers, including the commander, a latrine, incinerator, bath house, and bridge across Tom's Run as part of the development of Michaux Road (formerly High

Mountain Road) in 1933. The CCC also built a forestry office where all plans for their work were developed and organized, as well as a recreation hall, an infirmary, a star-shaped concrete structure, a flagpole, and a fountain located at the end of an allée of spruce trees. The fountain and star-shaped structure feature blue slag, a waste product of the iron industry, and white quartz, decoration. A second allée of spruce trees lines the primary circulation route through the camp. The purpose behind a flight of steps built by the CCC camp has not been determined. (Couser undated:19)

Aerial photograph of Pine Grove Furnace CCC Camp, left-center of photo, flown in 1937. Camp buildings are located mostly to the west (left) of the road on the former Bunker Hill Farm. Pine Grove Furnace State Park is at the right edge of the photo. (PSU 1938)

The CCC camp included adaptive reuse of the original Bunker Hill farmhouse, that is now only a foundation, as staff housing. Historic documentation suggests the farm was present by 1787 was acquired by the iron industry in 1794. Produce from the farm was used to support the needs of workers, their families, and animals at the iron industrial complex. A stone barn wall was likely constructed in the late eighteenth or early nineteenth century. The sole remaining wall of the barn collapsed in the Febrary 2016.

During the development of the CCC program it was realized that an educational component would be useful. An arrangement was worked out with Shippensburg State Teachers College to develop the program. This barracks was converted for educational use. The educational program was responsible for publication of a newspaper entitled *Bunker Hill Bunk*. (Smith 2014:13)

The Pine Grove Furnace CCC camp was later used as a prisoner of war camp and, following World War II, a church camp, discussed below. There is an official State Historical Marker noting the contribution of the camp located at the junction of Pine Grove Road and Michaux Road.

South Mountain (Old Forge) Camp

A second CCC base that became known as Old Forge Camp was established on an 8-acre site of a former iron forge and rolling mill/mill pond located approximately eight miles northeast of Waynesboro, in Quincy Township. The property was part of the Mont Alto Iron Works. Now operated by the Central Pennsylvania Conference of the United Methodist Church and known as Camp Penn, the property remains generally intact, with many of the original buildings having been adaptively reused by the church. The camp was built in March 1933 and continued to provide employment for unemployed young people until 1941. The camp was determined eligible for listing in the National Register of Historic Places in 1994 by the Pennsylvania Historical and Museum Commission (Couser undated; Beck 1994).

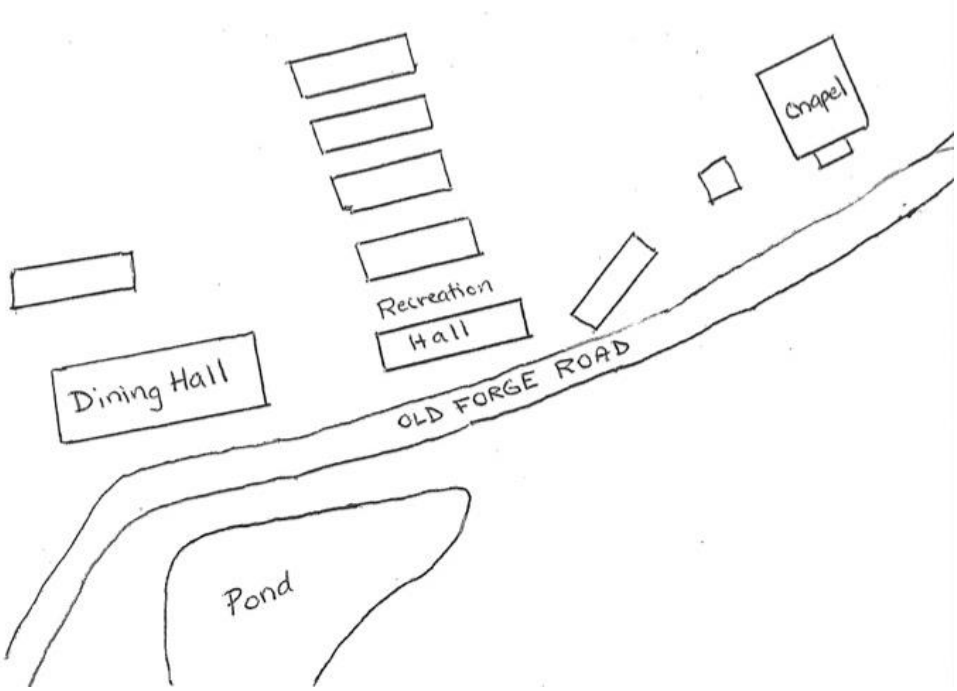
Aerial photograph of South Mountain/Old Forge CCC camp in 1937. The camp buildings are located to the left of the road. The rectangle to the right is the Waynesboro water treatment pond. (PSU 1938)

South Mountain, or Old Forge, Camp was developed as a complex of wood and stone buildings and structures that straddle Old Forge Road. A chapel, recreational facility, dining hall, dormitory cabins, and other buildings are located on the western side of the road, while a pond, stream, bridge, and park and recreational features edge the road to the east. The building currently used as a chapel features wide wooden planks, a bell tower, double front doors, and a stairway leading to a cross-beamed entryway. The building is constructed on pilings and sits slightly above the ground close to the roadway. Round stones are piled between the ground and first floor level to simulate a masonry stone foundation.

The rest of the buildings are more utilitarian in nature. They are generally long, narrow structures with gable roofs. A long one-pile recreation/fellowship building and a large dining hall parallel the road, south of the chapel, while a collection of barracks-style cabins and outbuildings are located behind. Although the buildings

were renovated in 1946 to accommodate church camp use, their exterior appearances are generally consistent with the CCC camp era. (Beck 1994:4)

CCC workers from the Old Forge Camp helped construct Red Run Park in Rouzerville and worked on the construction of the Pennsylvania Route 16 from Rouzerville to Blue Ridge Summit (Beck 1994:5).



Sketch of South Mountain/Old Forge Camp. (Beck 1994)

Camp Penn

In 1945, the Pennsylvania Conference of the United Brethren in Christ Church leased the camp facilities from the Pennsylvania Department of Forest and Waters, intending to establish a summer Christian education/leadership program. The church leased the camp for 10 years; renovations to the structures were funded by the Pennsylvania Conference. The church hired Clair S. Buchart of York to serve as architect for the renovations.

All of the buildings were originally erected on wood posts. Over time, many of the posts had rotted away and the buildings had begun to sag. As part of the renovation, the buildings were supported on new concrete block foundations. The interiors were rewired and wallboard was added and painted. The present-day chapel was established from a what had been a barracks structure. The exterior of the building was encased in lapped boards and the interior was finished in knotty pine. (Beck 1994:5)

World War II and U.S. Prisoner of War Camps, 1942–1945

Following United States entry into World War in December 1941, by 1942 it had become apparent to the War Department that it would need to be prepared to house prisoners of war and to learn strategic information from the prisoners

regarding weaponry and German military operations. Later, similar needs would emerge regarding the Japanese. The first interrogation sites were set up at Ft. Hunt, Virginia, and Byron Hot Springs, California. Over the course of the war approximately 680 internment camps were established that would ultimately house over 425,000 prisoners of war.

The camps were organized into 175 branch camps and 511 area camps and located throughout the United States. Every state, with the exception of Alaska, Hawaii, Nevada, North Dakota, and Vermont, had at least one prisoner of war camp. Most, however, were located in the South to save on the cost of heating the barracks. Some camps had to be designated "segregation camps" where Nazi "true believers" were isolated from other prisoners, due to their inclination to terrorize and even kill for fraternizing with their American captors (Walker 1985:19-37).

Camps located in Pennsylvania included Huntsdale, New Cumberland, a camp in Gettysburg at the McMillan Woods (Gettysburg Field), Pine Grove Furnace, and Reynolds, as well as Indiantown Gap Military Reservation, Olmstead Field, Tobyhanna Military Reservation, and Valley Forge General Hospital. Pine Grove Furnace and the camp in McMillan Woods near Gettysburg Battlefield shared a commanding officer.

Pine Grove Furnace Prisoner of War Interrogation Camp

Within a few months of the establishment of Ft. Hunt, it became clear that the facility was not sufficient to handle the interrogation demands. Of the three additional sites proposed, the former CCC camp at Pine Grove Furnace was chosen to be developed as a second East Coast interrogation facility.

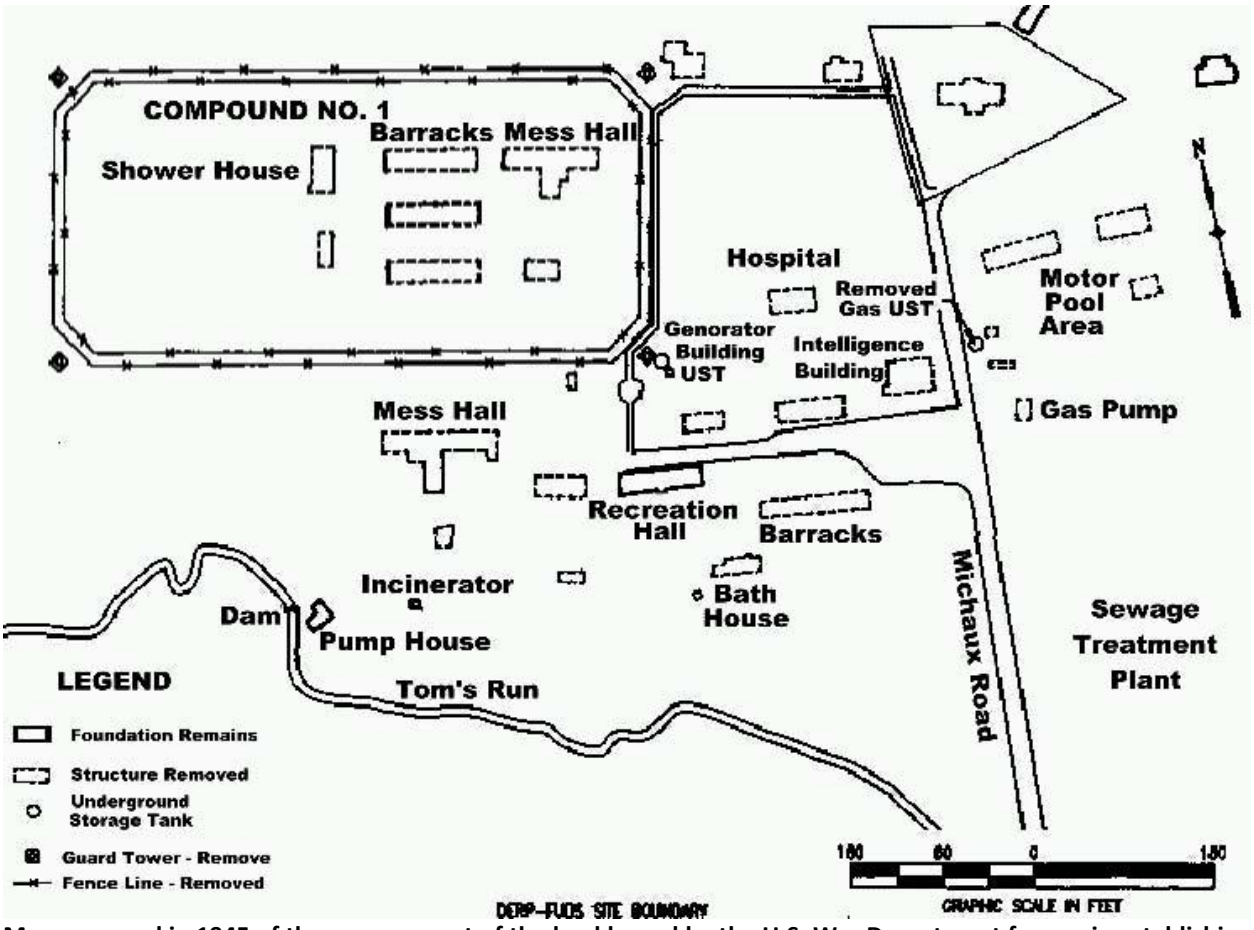
The Pine Grove Furnace prisoner of war camp was located in the South Mountains two miles west of the village of Pine Grove Furnace. It was established in 1943 on the grounds of the CCC camp established as Camp S-51-PA in 1933. Pine Grove Furnace prisoner of war camp was used by the Army Services Forces, Third Service Command, under the Provost Marshal General to house and interrogate German officers as well as one Italian. Late in the war, a small contingent of Japanese were housed there as well.

The War Department elected to adaptive the CCC facilities for use for the internment camp, augmenting them with guard towers and a barbed wire perimeter fence that stretched for more than 4,000 feet and included lighting. The adaptive reuse of existing CCC facilities for prisoner of war camps was a common practice of by the Provost Marshal General's office during World War II (DOD 1996).

The first official record of the camp is a lease on a 120.4-acre property and a no-acre permit issued to the War Department by the Commonwealth of Pennsylvania, Department of Forest and Waters. Although this lease was not signed until 1945, it is known that the War Department began work on the camp as early as December 1942 based on a review of various memoranda from the Provost Marshal General. These memoranda suggest that the camp was operational by May 20, 1943. However, it appears to have been classified as a

secret operation until July 14, 1943, when it was redesigned for general prisoner of war use and assigned to the Third Service Command.

The status of the camp was later changed again, and it was deleted from official listings of prisoner of war camps on August 23, 1944, in order to reestablish the secret status of the camp. The lack of information regarding earlier agreements between the state of Pennsylvania and the War Department likely relates to this secret classification. The Pine Grove Furnace Prisoner of War Interrogation Camp operated until November 1945, at which time the land reverted to the Commonwealth of Pennsylvania. (DOD 1996)



Map prepared in 1945 of the arrangement of the land leased by the U.S. War Department for use in establishing the Pine Grove Furnace prisoner of war camp. The camp was based within facilities established to support Camp S-51-PA associated with a Civilian Conservation Corps (CCC) located within the Michaux State Forest in 1933. Several buildings, such as barracks and a mess hall, were built for the Japanese prisoners housed there for a brief time at the end of the war. (DERP-FUOS 1996; Bland 2006:66)

Pine Grove Furnace was utilized by the Provost Marshal General as an interrogation camp for enemy officers. All of the nearly 1,500 prisoners housed at the camp at one time were officers, or non-commissioned officers. Initially, the prisoners were all Germans, and included members of Rommel's Africa Corp. The camp did not operate as a final destination for prisoners of war. Those interned

remained at the facility for a short period of time during which they were interrogated. They were later dispersed to other prisoner of war camps. More than 7,500 German prisoners were interrogated at the facility during the course of the war. While interned at Pine Grove Furnace, non-commissioned officers performed maintenance related tasks around the camp, such as road construction and brush clearing.

In accordance with the Geneva Convention, officers were not to be involved in contract labor or major forestry projects. However, it appears that prisoners were involved in the construction or repair of camp infrastructure. German names and ranks, or sometimes simply "PW" and a date, can be found etched into concrete in several places across the camp. For example, a concrete surround associated with the upper dam on Tom's Run which created the water-supply reservoir for the camp, still shows plainly visible lettering "PW = 22.5.45" (see photograph at the end of this chapter).

Otherwise, the prisoners of war spent their time involved in recreational activities including painting and sports. In addition to the recreation hall, there were outdoor recreation areas available to the prisoners. Although the prisoners were generally treated well, the security at the camp was tighter than many prisoner of war camps in the United States at the time due to the intelligence gathering activities. (Smith 2014:21)

Approximately 60 to 150 guards were stationed at the camp at varying times. When questioned by others, guards were instructed to say they were stationed at Carlisle Barracks, located approximately 30 minutes away, to maintain the secrecy of Pine Grove Furnace camp.

The Pine Grove Furnace camp featured two prison compounds, one for officers and one for enlisted men. Prison Compound One was the larger of the two. It was located near the fountain developed by the CCC. Prison Compound Two was located across the road in the vicinity of the existing barn wall. Prison Compound One featured four guard towers; two of the tower bases survive today. Prison Compound Two was associated with two guard towers; both of the bases survive today. The guard towers were located within the fenced compound, which featured entrance gates on High Mountain Road (today's Michaux Road) that prevented non-military persons from gaining access to the camp.

Evidence of one set of gates survives in the form of a metal plate set in concrete in the ground that was part of the locking mechanism. A road system that was part of an outer perimeter security system was also built around the camp. Surviving evidence of the road includes a segment to the east of Michaux Road, and bridge abutments that carried the road over Tom's Run. A flagpole base located along the entrance road into the camp also survives on site today. The Tom's Run Bridge was originally built by the CCC program when Michaux Road (originally known as High Mountain Road) was constructed in 1933. The bridge was improved by the military, and German writing can be found etched in the southeast side of the bridge. Approximately 100 yards south of the bridge was the south guard gate and entrance to the camp. (Smith 2014:21)

In addition to guard houses and perimeter fencing, the War Department added a bathhouse/latrine, hospital, generator building, storage building, and underground storage tank. Several CCC structures, such as the motor pool and recreation buildings, continued to be used for the same purpose. The recreation building was heavily modified by the Army for use as a staff recreation building. During church camp years, campers remember German prisoner of war paintings that hung in the building. Most of the structures were of wood construction.

A CCC garage located just behind the barn wall was used by the camp to house horses kept there for security purposes in case of an escape. The horses were never needed for this purpose but did provide recreation for guards and camp staff. The Bunker Hill Farmhouse was adaptively reused as U.S. Army housing. The foundation of the porch was improved during the prisoner of war era. Evidence of prisoner labor included the name, Erich John Berlin, etched into the top right of the porch foundation. Review of prisoner of war transportation records reveal that the camp housed an Erich John from Berlin (Smith 2014:5).

A view of the CCC-built fountain looking north along a Yucca-lined path leading from the Staff Recreation Hall. The POW camp entrance gate is at the left edge of the photo and the POW Mess Hall is beyond it. (Bland 2006:55)

Adaptations of the CCC camp included extensive renovation of the former Forestry Building to accommodate prisoner interrogation, and conversion of other structures for use as mess halls and barracks, and an infirmary. The CCC sewage treatment facilities were also adaptively reused by the Army for the prisoner of war camp. The CCC mess was heavily modified by the Army in 1942 and served as the dining facility for staff and guards during the prisoner of war era. One of the CCC barracks was removed during the conversion of the camp for prisoners because it was considered to be too close to the compound fence for security purposes (Smith 2014:21). Five barracks were built to house the increased demand for German prisoners in an open forested area west of the latrine and bath house (Smith 21014:11).

Several CCC log cabins were used to house camp guards and staff. One of these housed the camp commander. The last commander of the camp, Maj. Laurence Thomas was assigned a German prisoner of war as his orderly. The German, Herman Bachaus, was a talented artist who painted Thomas' home and office. (Smith 2014:9)

Near the site of the German prisoner of war mess hall, located in a former CCC barracks, is a stone and earth embankment. In front of the embankment there was a star fashioned from white gravel either by the US Army or by the German prisoners. Roll Call of the German prisoners was held next to this star. (Smith 21014:10)

Non-native yucca plants planted during the CCC era continued to thrive during the prisoner of war camp period and are still growing at the site today. These plants appear in some of the German paintings of the camp (Smith 2014:11).

Japanese prisoners in front of their barracks (Building 43) for evening colors and roll call. (Bland 2006:64)

In 1945 Compound One was divided in half and the newer western section was converted for use to interrogate Japanese prisoners. Approximately 160 Japanese prisoners were transported to the camp in 1945. These prisoners were housed in newer barracks constructed in the formerly unoccupied western area of the compound, with one of the barracks being converted for use as a mess hall. Interrogation of Japanese prisoners was limited as the war came to an end before the camp could fully accommodate this use. (Smith 2014:11)

The camp was declared surplus in late November 1945, and the Army discontinued use of the site. The 120.4-acre lease was canceled, and the one no-

acre permit was terminated by January 14, 1946. The property reverted to Commonwealth of Pennsylvania and the Pennsylvania Department of Forest and Waters as part of the Michaux State Forest. (Smith 2014:21)

Camp Michaux

On July 1, 1947, the entire property, including the existing CCC and prisoner of war camp improvements, were leased out to the Dickinson United Presbyterian Church and the Evangelical and Reformed Church (later the United Church of Christ), which had formed an alliance. The churches were responsible for maintaining the buildings and grounds. The church established a youth camp known as Camp Michaux under the auspices of Camp Michaux, Inc., and a formal lease was signed by the organization in 1948. The lease was good for ten years. It was renewed in 1958 and 1968. (Smith 2014:21-22)

The church renovated the camp, hired a full-time caretaker to live at the site, and made improvements such as a swimming pool and upgraded sewage treatment facilities. The church camp used one of the CCC barracks for arts and crafts and another for youth campers. The mess hall was used as the camp's dining hall. The prisoner of war era infirmary served as the home of the year round caretaker and his family. There was also a flagpole near the entrance road trail and the headquarters building. Latrines and bathhouses were present to serve church campers staying in the barracks at either end of the camp. Campers were housed in former barracks and other housing established by the CCC and the prisoner of war camp. The church camp used log cabins built by the CCC to house counselors. A pavilion was built on the north side of camp. Michaux Road was not paved until the church camp era. (Smith 2014:9-11)

The camp water system included the impoundment/reservoir on Tom's Run established for use by the prisoner of war camp, water tanks, and a pumping station. Camp Michaux, Inc. built a pump house to enhance the water system as well as a separate swimming pool when the water in the reservoir was no longer considered safe. The swimming pool was built in the early 1950s through construction of a second dam on Tom's Run and provided an improved location for water activities

To feed the pool, Tom's Run was divided into two channels a hundred yards west of the reservoir. The northern channel, lined with concrete, brought water into the pool; the southern channel ensured that water remained in Tom's Run east of the pool even in times of drought. A diving board was located near where the diversion channel entered the pool. The base of the diving board survives today. A pumping station was located adjacent to the original reservoir. The water was fed by gravity into the camp kitchens, bath houses, and latrines. Additional water tanks were later added across Michaux Road, further up the side of the mountain.

Two areas of Vesper Hill were used by the church camp for outdoor worship, one for younger and the other for older campers. Surviving there are a few bench supports and the remains of one bench seat. An outdoor pavilion was built for recreational purposes near the CCC-developed steps. The steps were used by the church camp to pose campers for photographs. (Smith 2014:5)

In 1946, the CCC forestry building was converted by the church camp to be used as a conference center. Known as Michaux Lodge, it could be used year round and gave the churches the opportunity to use the camp beyond its normal function as a summer youth camp. For at least 16 years the Appalachian Trail Conference held its fall meetings here. In March of 1970, the building burned due to a malfunctioning furnace. (Smith 2014:7)

The church continued to lease the property until December 31, 1972, for use as a summer camp site. By 1972, many of the buildings were in a state of disrepair, and neither the church nor the state desired to tackle necessary renovations. After the site reverted to the Commonwealth of Pennsylvania's Department of Environmental Resources, the state was unable to find other uses for the site and the buildings rapidly deteriorated. Initially, the fencing and much of the aboveground evidence of the CCC and prisoner of war camp structures was removed. In 1975, an auction of the surviving buildings was held and the purchasers of the buildings removed what they could take away. The remaining structures were then removed by the State. (Smith 2014:7)

Camp swimming pond (Smith 2014:12)

A walking tour (Smith 2014) has been established to allow visitors to experience the site and learn about its history. The tour is outlined in a printed brochure tied to numbered posts. One of the features highlighted on the tour at marker eight is a round concrete marker impressed with three letters near the center – POW. Other wording on the marker is difficult to read, but may include "Third Service Command", the triangular insignia for the Third Service Command, an American eagle, and "Pine Grove Camp" and "April 43-May 46." (These dates are not correct, they should read May 43 – Nov. 45.) At the bottom of the marker places were left for unit insignia of military units stationed at the camp. The walking tour has been used as a principal source for this discussion along with a 2006 book,

The Secret War at Home published by the Cumberland County Historical Society (Bland 2006).

Guided tours of the site sponsored by Cumberland County Historical Society are given each spring and fall. In addition, volunteers clear trails, erect numbered posts, and clear various sites within the former camp. During the Spring semester of 2013, Dickinson College began archeological work at the site which continued in 2014. (Smith 2014:22)

NATIONAL REGISTER ELIGIBILITY OF PROPERTIES AND RESOURCES ASSOCIATED WITH THE CONTEXT

Pine Grove Furnace Civilian Conservation Corps (CCC) camp and prisoner of war camp was determined eligible for listing in the National Register of Historic Places by the Pennsylvania Historical and Museum Commission in 2009 (Key #115369). The determination of eligibility indicates the significance of the property resides under Criteria A and D in the areas of Politics/Government and Historic Archeology at a local level for its association with the New Deal era construction of a Civilian Conservation Corps camp that was later adapted for use to house prisoners of war and to serve as an interrogation facility during World War II. The camp housed German naval prisoners of war and members of Rommel's Afrika Corps and Japanese prisoners of war. The period of significance for the property is indicated as 1933–1946. The period begins with the date the CCC camp was established and ends with the closing of the prisoner of war camp.

RESOURCE TYPOLOGIES WITHIN THE SOUTH MOUNTAIN LANDSCAPE

- State Forest and State Parks
- National Scenic Trails
- State Fish Hatchery
- Civilian Conservation Corps camps
- World War II prisoner of war camps

Government-related resources located within the South Mountain Landscape include the state forest property, as well as the state park properties, and several associated features derived from government activities and programs such as the sites of former Civilian Conservation Corps camps and a World War II prisoner of war camp. At a broad level, the state forest is the milieu that binds the landscape together as a whole. The extensive area covered by the forest is a direct outgrowth of the establishment in 1901 what would eventually become today's Michaux State Forest. The Appalachian Trail is an example of a National Scenic Trail, a designation derived from federal legislation. As such, it relates to government activities at a federal level, while the remaining site features are tied to state government.

The resources that fall within these state-administered properties relating to forestry and recreation area addressed in detail in other historic context chapters of this study.

SPECIFIC RESOURCES WITHIN MICHAUX STATE FOREST

Many of the individual features that support an understanding of this context and the resource typologies listed above are at least fifty years of age, and thus historic. Some are historically significant with respect to the cultural landscape's government impacts context where they are directly related to Pennsylvania's efforts to improve soil and water conservation, and to establish new opportunities for public recreation. These resources and their potential significance are identified and discussed below.

State Forest

Michaux State Forest

Michaux State Forest contains approximately 85,000 acres of land that serves multiple purposes, including recreation, natural resource conservation, municipal water supplies, sustainable timbering, hunting, fishing, and education. At a broad level, Michaux State Forest is the specific resource that relates to the typology of State Forest Land under the government impacts context.

The Michaux State Forest property as a whole is a historic landscape that is likely significant at the state level as the first state forest in the Commonwealth of Pennsylvania. It contains various examples of resources that relate to forestry that are addressed in the forestry and conservation context chapter. The property is marked and identified by the state with identity, boundary, wayfinding, directional, and regulatory signs and boundary delineations. It is administered by the Michaux State Forest District Office. Related elements that are at least fifty years of age constitute historic resources that support the significance of the property within this context.

Michaux State Forest District Office

The district office complex for Michaux State Forest is comprised of several buildings used for administration, maintenance, and other purposes. At least one of the existing buildings appears to be over fifty years of age. The dates of construction, evolution, and periods of use of the complex have not been researched for this cultural landscape assessment, and additional research is needed to determine its history. The building complex and its immediate landscape would support the significance of the property within the forest, forestry, and conservation context to the extent its date of construction and use for its current or related purpose exceed fifty years of age.

Kings Gap Environmental Education Center

The property that serves today as the Kings Gap Environmental Education Center (EEC) was acquired by the Commonwealth of Pennsylvania in 1973, and opened for its current use in 1977 as an integral part of the state park system. Kings Gap EEC falls within Michaux State Forest. The center is housed on a historic residential property, shown, located on a prominent knoll associated with South Mountain that affords views to the Great Valley to the north. The present-day mansion was built in 1908 by a prominent area family, the Camerons.

While the property may be significant for the architecture of the mansion and collection of early twentieth century buildings as well as its association with the Camerons, it does not support the historic context of forest, forestry, and conservation as the current use post-dates the fifty-year age consideration and associated period of significance, although the Camerons were forward-thinking stewards of the land.

State Parks

Further discussed in the recreation context chapter are the three other state parks associated with Michaux State Forest. These parks were created in the early twentieth century on historically significant iron company lands on South Mountain. First designated as state forest parks, these areas were intended to support recreational uses. They were reclassified as state parks in the 1920s. Many of these properties also contain historic resources that relate more directly to the iron industry and recreational activities. As such, they are considered in more detail in those chapters. Overall, however, they are historic and significant historic properties that represent early examples of a type within the Commonwealth of Pennsylvania.

Pine Grove Furnace State Park

The 17,000-acre Pine Grove Ironworks was sold to the Commonwealth of Pennsylvania in 1913 for inclusion in the state's forest reserve system. While a good deal of the land became part of Michaux State Forest, a portion formed Pine Grove Furnace State Park. The park features the core of the historic furnace and an associated collection of buildings. Nearby, elements of the furnace property, such as the ore excavation sites, have been converted for recreational use. The park offers a combination of historic interpretation and recreation. Pine Grove State Park contributes to the significance of both the iron industry and recreation contexts, while also relating to the government impacts context.

Pine Grove Furnace State Park offers educational and interpretive exhibits relating to the former iron furnace as well as recreational amenities such as swimming facilities and trails.

Caledonia State Park

Like Pine Grove Furnace, the former Caledonia Iron Furnace was acquired by the state as a state forest park to provide recreation to visitors on land that abuts Michaux State Forest. Purchased shortly after Mont Alto in 1902, the lands of the Caledonia Iron Furnace were combined with those of Mont Alto to create the state's first forest reserve.

Caledonia was also used as a private recreational park before its acquisition by the state and is thus related to both the recreation and mineral extraction and industry contexts. Because of its association with the establishment of the early forest reserve, the property relates to the forest, forestry, and conservation context, as well as the government impacts context, and contributes to the significance of Michaux State Forest.

Caledonia State Park offers interpretive exhibits and trails relating to the iron industry and the Lincoln Highway, which passes through the park, and recreational amenities.

Mont Alto State Park

Mont Alto Park was established in 1875 as a private recreational attraction associated with the Mont Alto Iron Furnace. In 1902, the Commonwealth of Pennsylvania purchased the iron furnace lands and established the state's first forest reserve park. A profitable ongoing concern at the time, the park facilities were rented by the state to a concessionaire, who operated the park during the summer months. Eventually, the property became part of the state park system.

Mont Alto State Park contains several recreational amenities for visitors including shelters, trails, play equipment, and picnic tables. Because of its association with the forest reserve and the Mont Alto forestry school, the property contributes to the forest, forestry, and conservation context. Its primary associations, however, are with the recreation and mineral extraction and industry contexts. As with Pine Grove, Mont Alto is also tied to the government impacts context.

National Scenic Trails

Appalachian Trail

Several miles of the 2,178-mile-long Appalachian National Scenic Trail passes through the Michaux State Forest. The midpoint of the trail is located in Cumberland County near Pine Grove Furnace State Park. There are amenities for hikers associated with Pine Grove Furnace and Caledonia State Parks. Features include the trail prism, rock edging, shelters, signage, and blazes. Through-hikers who reach the midpoint traditionally eat a half gallon of ice cream at the state park store. During the 1930s, the trail was enhanced through the work of the Civilian Conservation Corps, and completed in 1937.

Although the alignment of the trail has been altered in some locations, including a portion of the trail that once extended through the Pine Grove Furnace CCC and prisoner of war camp, the trail overall is historic and has been determined eligible for listing in the National Register of Historic Places. The federal government designated the trail a National Scenic Trail in 1968; it is one of only eight such trails within the United States today. It is significant under the government impacts context, as well as the recreation context, where information about the individual resources that comprise the trail are described.

State Fish Hatchery

Huntsville Fish Hatchery

Initially constructed in 1932, the Huntsville Fish Hatchery is located to the north of South Mountain and Michaux State Forest. The facilities include outdoor as well as indoor fish rearing pools. Historic features of the Huntsville Fish Hatchery include buildings, structures, and fish rearing pools. The outdoor pools are lined with cut stone.

Cool water species are raised in the cold water derived from springs on the property. Warmer water species are raised in water from a nearby stream. The fish raised at the hatchery are used to stock local streams. Many of the features on the fish hatchery property are historic and contribute to the government impacts context.

Civilian Conservation Corps Camps

Four Civilian Conservation Corps camps were established within the state forest during the 1930s. Evidence of two survives—Old Forge Camp and Pine Grove Furnace. Projects completed by CCC workers are found both within and near the state forest lands and require further research and documentation. These include road, park, dam, and other facilities as well as forest reclamation.

South Mountain (Old Forge) Camp

The Civilian Conservation Camp known as Old Forge is the best surviving example of CCC camps located within Michaux State Forest. The camp site at Old Forge has been used as a summer camp by the United Methodist Church for many years, operating under the name Camp Penn. The continued use has preserved the historic resources associated with the property.

Today, these include the chapel, canteen, bunkhouses, kitchen, recreational facilities, stone culverts, stone hearth, stream-bank erosion control stonework, bridge abutments and wood planking, stone drinking fountains, and other stone features the historic use of which are not readily identifiable. The CCC enrollees who supported state park needs relating to forestry were housed in this surviving collection of buildings and structures during the mid-1930s.

The Bureau of Historic Preservation has previously evaluated Camp Penn's chapel and found the property to be eligible for the National Register. The physical description of the site noted the property's "simple elegance and beautiful surrounding," and the narrative described the entire camp's importance "for its high degree of architectural integrity, its continuing use as a camp, and for its early association with the Civilian Conservation Corps (PHMC 1994)."

The complex contributes directly to the significance of the forest, forestry, and conservation context for the work conducted by the enrollees in the state forest, as well as the government impacts context. Several efforts conducted by the

camp involved enhancing recreational facilities in the area. For this reason, the camp is also significant under the recreation context.

Pine Grove Furnace Camp

Although the site is overgrown and in ruin, the former Pine Grove Furnace Camp site remains identifiable on the land to the northwest of Pine Grove Furnace State Park. Adaptively reused by the War Department as a prisoner of war camp during World War II, the camp featured barracks, a mess, recreation facilities, utilities, and a commemorative fountain and monument, and tree plantings.

Surviving evidence of the CCC camp includes allées of spruce trees and a stone fountain decorated with quartz and blue slag. The site of this camp, and its likely archeological information potential are significant and contribute to the significance of Michaux State Forest under the government impacts context.

World War II Prisoner of War Camps

Camp Michaux

Beginning in 1942-1943, the former CCC camp near Pine Grove Furnace was leased by the War Department and adapted for use as a prisoner of war camp that was used to interrogate German prisoners. The extant facilities of the CCC camp were adapted for this use, and the site enclosed by a perimeter fence. Entrances were marked with guard towers. Some of the existing facilities were improved, such as the water supply system while several new buildings were added.

Japanese prisoners were later brought to the facility, which was divided into two sections to keep the German and Japanese prisoners separate. Evidence of these uses and features survive on the site today primarily in the form of foundations and ruins. The site is significant within the government impacts context. Surviving evidence of one of the guard towers constructed in association with the prisoner of war camp, and concrete wall etched by a prisoner that contained the water supply reservoir for the camp.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