Tuscarora State Forest
Resource Management Plan

The state forest system of Pennsylvania, approximately 2.2 million acres of forest land, comprises thirteen percent of the forested area in the commonwealth. The Bureau of Forestry is the steward of this land; and the Bureau’s mission includes managing state forests under sound ecosystem management, retaining the forest’s wild character and maintaining 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. In 2016, the Bureau revised its State Forest Resource Management Plan (SFRMP), which is the primary instrument that the Bureau uses to plan, coordinate, and communicate its management of the state forest system. The SFRMP sets forth broad policies, as well as more focused goals and objectives about state forest resources and values, to ensure that the overarching goal of state forest management – ensuring sustainability – is achieved.

State forest management is a coordinated effort involving central office program areas and field staff in twenty forest districts located throughout Pennsylvania. Each district is responsible for managing wildland fire, destructive insects and disease on all lands throughout the district – public and private. The district staff promote wild plant conservation and private forest land conservation and stewardship. The staff also provides for the protection, administration and management of state forest lands within the district.

This Tuscarora State Forest Resource Management Plan provides an overview of the district and its operations on state forest land and sets forth a framework for future management of Tuscarora State Forest. The planning horizon for this District SFRMP is approximately five to ten years, after which time it will be revised to reflect changing conditions and priorities.

The Bureau also creates District Activity Plans that describe the management activities that the Bureau will take within each district that may affect the public’s use of state forest land. These are implementation plans that address how goals and objectives in the SFRMP and District SFRMPs are being achieved. The District Activity Plans are written at the start of each calendar year and revised midway through the year. They are posted on District webpages so that the public may review and comment upon them.

This Tuscarora SFRMP is comprised of a District Overview, a listing of District Priority Goals and a collection of landscape management unit (LMU) plans, which are described in more detail below.
District Overview

1) Location and Description
The Tuscarora State Forest is located in south-central Pennsylvania including parts of Cumberland, Franklin, Huntingdon, Juniata, Mifflin and Perry Counties. It consists of 96,168 acres divided into two main parts, the North Block and the South Block. The Tuscarora State Forest derives its name from the Tuscarora Mountain that lies at the center of the District.

Narrow valleys sandwiched between steep rocky ridges characterize the terrain of this forest. These fertile valleys are ideal for growing majestic oak and hemlock forests. Although not especially rich in species diversity, the streams and soils are generally quite fertile and produce abundant growth. There are healthy populations of most wildlife species native to this region.

The greatest recreational uses include: hunting and fishing, scenic driving, hiking, horseback riding and mountain biking. There is one State Forest Hiking Trail, the Tuscarora Trail, with twenty-three miles in this forest. The Flat Rock Trail is about 2-1/2 miles in length and extends from Colonel Denning State Park to the Flat Rock Vista that overlooks the Cumberland Valley. This is probably the most used trail in the forest with visitors virtually every day and some very heavy use during the fall foliage season. Big Spring State Park is administered by the Forest District as a Picnic Area. Another State Forest Picnic Area, Karl Guss, is in East Licking Creek Valley.

Clear, cold, high quality streams flow from the forest. Un-deeded islands in the Juniata River between Mount Union and Duncannon are also part of the Tuscarora State Forest. A few of these islands are used for camping and waterfowl hunting.
2) District Organization

The Tuscarora State Forest comprises about five percent of the 2.1 million-acre state forest system. Administrative responsibility of the Tuscarora State Forest is delegated to the District Forester, whose office is located at 4455 Big Spring Road, Blain, Pennsylvania 17006. There are two Forest Maintenance Divisions: the Bryner Headquarters, located in close proximity to the District Office, and the East Licking Creek Headquarters, located at the eastern end of the North Block. Following is an organizational chart displaying the personnel of the Tuscarora Forest District.

3) Acquisition History

The first state purchase of land in what is now the Tuscarora State Forest was 7,608 acres bought in 1902 from J. Preston Thomas at $1.72 per acre on the Juniata-Mifflin County Line in Licking Creek Valley. Originally called the Rothrock Forest Reserve, this tract was later merged with the Pennypacker and McClure Reserves to form the present Tuscarora State Forest. The Thomas tract was very familiar to Joseph Rothrock when he was a young boy. Timber in that valley had been harvested over a long time, beginning with John Winn in 1840.

The second purchase, also in Licking Creek, was for 6,738-acres from the Logan Iron and Steel Company in 1906. These lands included land previously owned by the Gifford family and the old Bell’s iron furnace in West Licking Creek.
The first major acquisition in the Pennypacker Reserve, now the South Block of the Tuscarora State Forest, was in 1906 when 4,708-acres were bought from Harry W. Meetch. An additional 9,851-acres were acquired that same year from William B. Meetch. In 1907, 4,311-acres were acquired from the Perry Lumber Company of which William B. Meetch was president. Thus by 1908, over one third of the present Tuscarora State Forest had been acquired from willing sellers.

<table>
<thead>
<tr>
<th>Purchased From</th>
<th>Acres</th>
<th>Price</th>
<th>Date</th>
</tr>
</thead>
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<td>J. Preston Thomas</td>
<td>7,608</td>
<td>$13,114.62</td>
<td>9/30/1902</td>
</tr>
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<td>Logan Iron &amp; Steel Co.</td>
<td>6,738</td>
<td>23,582.88</td>
<td>2/01/1906</td>
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<td>H. W. Meetch</td>
<td>4,708</td>
<td>12,079.28</td>
<td>9/24/1906</td>
</tr>
<tr>
<td>W. B. Meetch</td>
<td>9,851</td>
<td>27,101.25</td>
<td>1/02/1907</td>
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<td>Perry Lumber Co.</td>
<td>4,311</td>
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<td>4/18/1907</td>
</tr>
<tr>
<td>D. S. McNitt</td>
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<td>11,601.56</td>
<td>11/26/1910</td>
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<tr>
<td>Vincent Lumber Co.</td>
<td>3,570</td>
<td>10,677.00</td>
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</tr>
<tr>
<td>Max N. Manbeck et ux</td>
<td>2,806</td>
<td>11,224.00</td>
<td>5/12/1948</td>
</tr>
<tr>
<td>James M. Junk</td>
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<td>7/27/1950</td>
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<tr>
<td>U.S. Dept. of Agriculture</td>
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<td>Gift</td>
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<td>Shippensburg Water Auth.</td>
<td>3,218</td>
<td>1,800,000.00</td>
<td>2/1/2004</td>
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</tbody>
</table>

From 1902 to the present, many smaller purchases were made and added to the Forest.

4) **Historical Land Use and Disturbance**

The pre-settlement forest generally consisted of hemlock in the stream bottoms with American chestnut and oak on the slopes and mountaintops. Most of the original forest was cut between 1830 and 1903. The first tracts of the present Tuscarora State Forest were acquired in 1902, and by 1920, about fifty percent of the present forest had been purchased. Portions had been clearcut, but much of the land was only partially cut, and even some stands of large trees remained. Forest fires here were not as frequent or severe as they were in many other parts of Pennsylvania, but they certainly shaped the species composition of the present forest. There was one iron furnace and four logging railroads located in the lands that are now the Tuscarora State Forest. Small farms with cleared fields were also a part of the past land use. The majority of those farmlands were located in the upper end of Shermans Valley and were part of the acquisition from the U. S. Department of Agriculture in 1955. That land had been purchased by the Federal Government during the economic depression of the 1930’s. A few houses and a barn remain standing. Five CCC camps were located in the Tuscarora, with another just outside the forest, on private land.

The forest has been heavily and repeatedly impacted by insects and disease resulting in widespread tree mortality and altered forest structure. Just after the period of exploitation, the forests of this area were hit hard by the chestnut blight. Extensive stands of young American Chestnut mixed with various species of oak, which covered much of the forest at that time, suffered the elimination of chestnut. The next major impact came after World War II when the most accessible areas of the forest were treated with a
selection harvest that removed some over-mature timber and culls. Even-aged management began in 1965, and there were some early successes, but difficulties with adequate advance regeneration, due mostly to over-browsing by white-tailed deer, made regenerating oak stands very difficult. Gypsy moth hit hard in the late 1970’s and through the 1980’s prompting heavy salvage shelterwood and clearcut treatments. The result from this period was extensive understories of less-desirable competing vegetation (red maple, black birch, striped maple and witch-hazel) and thick stands of nearly pure black birch. Deer populations declined in the late 1990’s and successful regeneration of oak stands was again possible. Gypsy moth populations continued to cycle with severe outbreaks leaving large areas of dead oak trees in their wake. Although most silvicultural regeneration treatments since 1995 have been successful at regenerating mixed oak stands, there has been a significant shift toward much more black birch in the forest at the expense of oak.

Today, the forest has matured, and large trees of many species cover the mountains and hollows. Past disturbance has resulted in many multi-aged stands. Once fairly common in the Tuscarora, the oldest second growth trees and residuals from the early cutting are disappearing since many of those trees are now over one hundred and fifty years old. Approximately fifteen percent of the forest is currently in younger age classes regenerated by even-aged treatments since 1965. Approximately fifty percent of the forest is zoned as “Potential Old Growth” (Zones N, W, & L; N=natural Area; W=wild area; L=limited; see pg. 54 of the SFRMP).

5) Physiography and Geology

The Tuscarora State Forest lies almost entirely within the Ridge and Valley physiographic province. This area contains geologic strata of the Ordovician and Silurian Geologic Periods. The dominant Formations found on the Tuscarora State Forest from oldest to youngest are: Reedsville (shale), Juniata (shale and sandstone), Tuscarora (sandstone), Rose Hill (shale), Mifflintown (shale) and Bloomsburg (shale and limestone). These formations are bent, folded and twisted with a few significant faults. Generally, the ridges of this region are formed by the eroded anticlines of the Tuscarora formation. Typically, the Rose Hill formation forms the side slopes on one side of the ridge, and on the other side of the ridge the Juniata formation forms a bench with Reedsville shales forming the mid and lower slopes. With few exceptions soils are capable of growing merchantable trees virtually everywhere, even on ridgetops and rocky slopes. The soils derived from the Tuscarora Formation are generally sandy and have low buffering capacity and low base saturation. Therefore, streams confined to the Tuscarora Formation are sensitive to acidification. Most of the other soils have good moisture holding capacity and nutrients needed for good tree growth. Calcium is generally lacking in the Juniata and Tuscarora Formations and the lower part of the Rose Hill Formation. Other formations supply enough calcium for calcifiles, such as sugar maple, to grow well. Calcium to aluminum ratios have been implicated in some plant growth relationships. The Tuscarora has low Ca and low Al so the ratio is high. For other geologies with low calcium the Ca:Al ratio is low and this could indicate Al toxicity. Another nutrient status that may be significant is that the Rose Hill Formation has high amounts of manganese which can be toxic in some conditions. Indian cucumber is known to be very sensitive to Mn, and this species is totally absent from the Rose Hill Formation soils.
6) **Eco-regions**
The Tuscarora State Forest lies almost entirely within the Ridge and Valley Eco-region, with a small portion in the Great Valley Eco-region. This region is distinguished by the parallel ridges and valleys formed by the erosion of folded layers of sedimentary rocks. The mountains are predominantly erosion resistant sandstone with shale layers in the foothills, side-slopes and narrow valleys. Some of the broader valleys contain limestone at the surface. This pattern leads to a predominance of acidic dry forest on the ridges, agriculture in the broader valleys with small pockets of rich forest, and a mix of forest and fields on the shale hills.

7) **Conservation Landscapes**
Throughout Pennsylvania, seven large regions are working together to drive strategic investment and actions around sustainability, conservation, community revitalization, and recreational projects.

Known as conservation landscapes (Figure 7-1), these collaborations are found in regions where there are strong natural assets, local readiness and buy-in, and state-level investment and support.

Founded on the regions’ sense of place and resource values, conservation landscapes motivate citizens and elected officials to take on the challenge of effective land use planning, investment, civic engagement, and revitalization.

![Figure 7-1: The seven Conservation Landscapes in Pennsylvania.](image-url)
Although none occur within the Tuscarora State Forest District, the principles of collaboration are vital throughout public land management and these conservation landscapes are an important component in management of state forest land overall. To find out more, visit DCNR’s Conservation Landscapes webpage: https://www.dcnr.pa.gov/Communities/ConservationLandscapes/Pages/default.aspx

8) Land Cover, Forest Ownership, and Other Public/Protected Lands

Forests cover fifty eight percent of the land in the District with agricultural use on most of the remainder. Evergreen forest and wetlands are a very small percentage of the land cover. There are no cities or large towns, the largest being Lewistown, which is on the border of three Forest Districts. Seventeen percent of the forest land is publicly owned, and most of that is the Tuscarora State Forest. State Game Lands are the second largest public land owner in this District with around 50,000 acres in about ten tracts. Together, State Forest and Game Land tracts provide significant protection of forest connectivity along the ridges in this region. There are also several State Parks: Little Buffalo, Colonel Denning, Fowlers Hollow, and Big Spring. One large tract of private land that is managed by the Nature Conservancy is the Reinaman Wildlife Sanctuary. It is located just east of the Tuscarora on Blue Mountain.

Figure 8-1. Acres of land cover types from National Land Cover Database for entire district.
Figure 8-2. Percentage of total acreage within the Tuscarora State Forest District that is forested vs. non-forested and the ownership breakdown of the forestland (public vs. private), (based on US Forest Service FIA plot data: https://www.fia.fs.fed.us/).
Figure 8-3. Public/protected lands within entire district.

Forest cover is increasing in the region due to ingrowth from area previously classed as developed and from fields, mostly on poor soils of hills and ridges. There is very little conversion of forest to agriculture, but it does occur. Most of the forest loss is due to development, especially low density residential use, but gain from this same use is greater than losses. The scale of net gain is in the 1 – 2% range for the 5- year period between inventories.
Figure 8-4. Gross forest loss and forest gain 2011-2016 (based on US Forest Service FIA plot data: https://www.fia.fs.fed.us/) by land-use categories for (a) the entire state; and (b) within the Tuscarora State Forest District. The colors in *forest gain* represent the type of land cover FROM WHICH the forestland came (e.g. agricultural could be an old farm field that gained enough tree cover in that period to now be classified as forest). Similarly, colors in *forest loss* represent the categories TO WHICH forestland was converted (e.g. agricultural could be a forest that was cut and converted to pasture).

9) **Population Centers**

The Tuscarora State Forest is located about twenty-five to fifty miles from the densely populated Harrisburg Area. Many visitors come from that area but less than visit the Michaux State Forest. The towns of Lewistown and Mount Union are also close to the Northern portion of the Tuscarora. The population is very dispersed closer to the Forest.
10) Forest/Plant Community Types

The forest stands of the Tuscarora are dominated by northern red oak and chestnut oak. Unless recently harvested, these stands are mature or nearly mature. Indeed, the Tuscarora has some of the oldest oak forests in Pennsylvania with trees over 150 years old not uncommon. Large portions of this forest were cut over before the railroad era, or were not easily accessible; and this resulted in many residual trees left standing even in the railroad logging areas. Also, the period of frequent fire was less intense than in other parts of PA and this resulted in very pure stands of fine mixed oak. Gradually red maple and black birch filled in the understory, and now also dominate many areas regenerated between 1965 and 2010.
Figure 10-1. Acreage of state forest land in this district by aggregated forest type. The forest types are described on p. 108 of the 2016 SFRMP.
Figure 10-2: Species composition (top 5 species) of all stems over 4.5 inches dbh in the forest communities that have over 15 Continuous Forest Inventory (CFI) plots in a district. Tuscarora State Forest has over 54,000 acres of red oak-mixed hardwood forest, which comprises about 57% of total state forest acreage in this district. For more information and summaries of the Bureau's CFI data, see the online interactive tool here: https://pa-forestry.shinyapps.io/cfi_explorer/

Figure 10-3: Species composition (top 5 species) of all stems over 4.5 inches dbh in the forest communities that have over 15 Continuous Forest Inventory (CFI) plots in a district. Tuscarora State Forest has over 20,000 acres of dry oak-heath forest, which comprises about 21% of total state forest acreage in this district. For more information and summaries of the Bureau's CFI data, see the online interactive tool here: https://pa-forestry.shinyapps.io/cfi_explorer/
11) Oil, Gas, and Mineral Rights – Ownership and Development
Most of the Tuscarora was purchased fee simple. The areas of severed mineral rights are mostly in the James C. Nelson Wild Area and the Land Use areas received from the Federal Government in 1955. One mineral lease was issued in the past but has since expired with one dry well drilled and plugged.

Figure 11-1. Acres of subsurface ownership/status on state forest land within the district. Acreage figures are derived from bureau GIS data, not acreages specified in lease or subsurface agreements. Severed Gas Rights Acres include only severed rights lands where the subsurface ownership has been verified. Partially severed areas that have been leased are counted as DCNR Issued Lease Acres, as opposed to Severed Gas Rights Acres.

12) Water

a) Major Watersheds
The majority of the Tuscarora State Forest drains into the Chesapeake Bay through the Susquehanna River but a small portion drains to the same bay through the Potomac. The major sub-basins are Shermans Creek, Tuscarora Creek, Blacklog Creek and Juniata River. Within these watersheds Laurel Run and East Licking Creek are important streams in the Forest.
b) Major Municipal Supplies

Previously there were several municipal water supplies on or near the Tuscarora State Forest but today there is only one, Mifflintown Water Authority. They have an impoundment on East Licking Creek less than one mile from State Forest Land.

c) Fish and Boat Commission Stream Habitat Prioritization

The Fish and Boat Commission Biologists have prioritized Blacklog Creek, Kansas Valley and Shermans Creek for improvement efforts in the District. Almost all the other streams are ranked medium priority.
Figure 12-2. Streams within the district prioritized for aquatic habitat improvement projects based on PFBC Stream Habitat Improvement Prioritization Tool.

d) River Islands
The Tuscarora State Forest owns several river islands on the Juniata River between Mount Union and Duncannon. These are part of the Juniata River Water Trail. Currently six of these islands have designated primitive camping sites. Two of the islands are large enough that they have two campsites on them giving the Tuscarora State Forest a total of eight river island campsites. The islands with designated campsites are spaced fairly evenly throughout this section of river. These campsites are only accessible from the water and require no permit to camp at them.

13) Harvest Allocation
The bureau created a harvest allocation model that sets timber harvest schedules for state forest land in each district. The goals of the model are to promote and maintain desired landscape conditions, create a diversity of successional stages and native forest communities, balance the age class distribution and provide a sustained yield of quality timber. The model uses the bureau’s forest inventory data, economic information, bureau policies and desired ending target forest conditions to develop timber harvest schedules that best meet the bureau’s silvicultural and timber management goals. A detailed discussion of the harvest allocation model can be found in the 2016 SFRMP, beginning on page 93.

The bureau is presently in the second harvest allocation period of the model. The district’s timber harvest goals for the second period are shown in the table below. Since most of the Tuscarora is classified as site 1 or site 2 red oak forest, most of the timber harvest is planned to come from that
timber type. The ten-year overstory removal goal works out to be about five percent of the multiple resource area of the Tuscarora.

Table 13-1. Target shelterwood (Shelt), overstory removal (OR), intermediate (Int), and buffer treatment acreages for the second decade of the timber harvest schedule, aggregated by forest type, site class, stocking level, and treatment. Additional shelterwood treatments for 3 or more stage shelterwoods are not represented in these targets.

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<th>Aggregated Forest Community Type</th>
<th>Site 1 Fully-stocked</th>
<th>Site 1 Understocked</th>
<th>Site 2 Fully-stocked</th>
<th>Site 2 Understocked</th>
<th>Site 3 Fully-stocked</th>
<th>Site 3 Understocked</th>
<th>Totals</th>
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</thead>
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<tr>
<td></td>
<td>Shelt OR Shelt OR</td>
<td>Shelt OR Shelt OR</td>
<td>Shelt OR Shelt OR</td>
<td>Shelt OR Shelt OR</td>
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<td>40 142</td>
<td>2,119 2,642</td>
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</table>

14) Economy and Timber Products Industry

The economy of the area surrounding the Tuscarora State Forest is diverse but a large part of the economy is agriculture based including wood products. Juniata County is second in Pennsylvania with twenty-two full time operation sawmills and almost as many secondary wood processing companies such as pallet shops, wood pellets, wood shavings, etc. Many primary and secondary producers of logs are located off PA state route 322 because of close proximity to the major highway and some of the state’s best oak timber. Many of these businesses do not employ large numbers of people; consequently, a very large percentage of the District’s residents, especially in Juniata and Perry Counties, commute to the metropolitan area of Harrisburg, Mechanicsburg and Carlisle for employment. Thus, this area provides a huge pool of workers for that metropolitan area.

Timber Products Industry:

The booming timber industry in the late 1800’s and early 1900’s greatly influenced the development of the current Tuscarora State Forest and its surrounding area. Some of the finest red oak stands in the Commonwealth can be found on the Tuscarora State Forest. A result of the large-scale clearcutting on
most of the mountains, low deer numbers and the ensuing wildfires led to regeneration of the fire hardy oak.

Today, the timber industry is still a vital economic contributor to this District and the area. In Perry and Juniata Counties, there are 53 forestry and wood products establishments employing 1,356 people. These harvest almost $8 million in timber each year and contribute over $53 million to the economy of these two counties. In all the counties encompassing the Tuscarora State Forest, there are 176 forestry and wood product establishments employing 4,490 people. These harvest over $34 million in timber each year and contribute $279 million to the economy of the District. These figures are the latest available from Penn State Extension.

The demand for this area’s quality red oak, white oak, tulip poplar and other hardwoods continues to be very high. Responsible management of our forest, especially if it can be achieved on private land, will assure that the future demand can be met.

15) Wildlife

Wildlife is an integral and valued part of the ecosystem that is found on the Tuscarora State Forest, from the elusive and endangered Allegheny woodrat to the popular and highly sought after white-tailed deer. As a district, we strive to balance the needs of habitat for all animals. This section highlights the most important habitat features as they relate to wildlife, our most imperiled species and lastly a brief look at the importance and history of the white-tailed deer as it relates to forest management.

**Habitats**

Scrub oak is occasionally found on certain xeric sites on the Tuscarora State Forest. Where possible, these areas will be maintained in the early stages of succession and enhanced to expand the current populations. Currently scrub oak is found on Dead End Road, Blue Mountain Road, Pine Ridge and on sections of the double powerline.

The hemlock stands growing along most of the streams in the district are valued as thermal cover for animals in the winter and to shade the streams in the summer to insure healthy stream temperatures for native brook trout. While some of these stands have suffered negative effects from hemlock wooly adelgid, the district, in coordination with the bureau’s Forest Health Division, has been identifying and treating these stands to ensure minimum damage going forward.

Vernal pools have been identified at various locations throughout the forest. When these pools are located, district staff ensure a buffer is maintained around the pools during any management activity.

The district maintains 23 permanent herbaceous openings, also known by the abbreviation PHO, and by the term wildlife openings. These openings have been the site of various projects throughout the past. The limiting factor is and will continue to be available resources and staff time available to maintain them. Recently the district has looked into the possibilities of partnering with outside conservation groups, such as the National Wild Turkey Federation to fund projects.

Species of special concern

Allegheny Woodrat (Neotoma magister)
Allegheny woodrats measure approximately 16 inches long, half of which is tail. The majority of its body is brownish-grey in color, while the undersides and feet are white. Woodrats have large eyes, naked ears and long vibrissae (whiskers), which when pulled back will reach the shoulder. The most visible characteristic, which sets the Allegheny woodrat apart from Old World rats, is its tail. The tails of European rats are naked or slightly hairy with the skin clearly visible beneath. The tail of the Allegheny woodrat is completely covered with hairs approximately one-third of an inch long and is prominently bicolored; nearly black above and white below.

Appalachian Cottontail (Sylvilagus obscurus)
Appalachian cottontails are secretive, forest-dwelling rabbits that are not abundant over most of their range. The Appalachian cottontail occurs only within the Appalachian Mountain chain, almost exclusively in dense conifers and deciduous cover at high elevations. The Appalachian cottontail closely resembles the eastern cottontail. It differs only in its slightly smaller size, shorter ears and greater amount of black on the back.

Timber Rattlesnake (Crotalus horridus)
The timber rattlesnake, which is a resident of Pennsylvania forests, is currently a candidate species of special concern in Pennsylvania that is regulated by the PA Fish & Boat Commission (PFBC) (PA Code, Title 58, Chapter 75). Rattlesnakes are also classified as being a reptile Species of Greatest Conservation Need in the PA Wildlife Action Plan (PGC-PFBC 2015). The district recognizes that its forest management program impacts the habitat for timber rattlesnakes and, as such, follows the guidance set forth in the Timber Rattlesnake Strategy plan can be found here: https://www.dcnr.pa.gov/Conservation/Biodiversity/BiodiversityManagement/OtherWildlife/Pages/default.aspx/

Bats (Myotis spp.)
Forest management strategies and uses for these lands include forest management and timber harvesting which has the potential to impact the foraging, roosting, maternity colony, spring staging, fall swarming and migratory habitat for bat species that occur in Pennsylvania, including the federally endangered Indiana bat (Myotis sodalis) and federally threatened northern long-eared bat (Myotis septentrionalis). However, forest management and prescribed burns also help to create foraging habitat which is beneficial to bats. To avoid impacts to the greatest extent possible and mitigate them where they might occur, the Bureau of Forestry is working with the U.S. Fish and Wildlife Service (USFWS) in developing a Habitat Conservation Plan (HCP) for the Indiana bat and northern long-eared bat.

Deer Management
Since European settlement of the land that currently makes up the Tuscarora State Forest, deer populations have gone through population cycles. By the early 1800s deer were almost expatriated from most of the district. An example of this can be found in “A Century of Wild Game Hunting in Penn’s Woods” by Earl Noll where he described the early years of only hunting small game in the head of Blacklog Valley and the rare occurrence of two deer being harvested in the same year. Following reintroduction of deer from Michigan in the early 1900s, the deer population grew steadily. With the limited doe hunting, access to mostly edge habitat along fields and early successional forest following
mass timber harvesting that took place from 1880 to 1930, conditions were ideal for deer. Aldo Leopold described the negative effects of deer overpopulation in Game Management published in 1948 and even described seeing a similar situation earlier in the 20th century in the American southwest. This account is in the chapter of the Sand County Almanac called “Thinking Like a Mountain.” This trend of high deer numbers took place on the Tuscarora State Forest, most likely peaking in the late 1970s and following into the 1990s.

In the 1990s, scientific researchers started to consider the effects of very high deer populations on the forest ecosystem, especially impacts of browsing on regeneration of certain tree species. The Bureau of Forestry also started to address the issue of overly abundant deer by erecting fences to keep deer out of newly harvested areas. The funding for this was made possible through the regeneration funds which came from timber sale revenue. The DMAP program was also initiated in Pennsylvania in the 1990s and has been utilized by the Tuscarora State Forest since. DMAP offers additional harvest permits in certain areas in which deer populations are abundant and may impact forest regeneration. In 2000, the Pennsylvania Game Commission drastically altered the deer seasons in Pennsylvania in an effort to bring the deer population into balance with the natural ecosystem. This set off a series of conflicts with stake holder groups, mostly hunter advocacy groups, which continues to this day.

It appears that these efforts have achieved their stated goal. There is very little need for deer fencing on the Tuscarora State Forest as of 2018. Deer fences which have been up for over a decade are being removed as funding permits. DMAP, while still used, is now applied as more of a strategic tool and targets areas with expanding or high populations of deer. Most areas with high populations of deer are caused by a refuge effect from large tracts of adjacent privately-owned land. The district also tries to balance the needs of hunters as an important user group with the mission of managing the forest ecosystem.

For the complete deer management plan please follow the link below.
https://www.dcnr.pa.gov/Conservation/Biodiversity/BiodiversityManagement/DeerManagement/Pages/default.aspx

16) Wildland Fire

a) Wildfire Suppression
Each forest district maintains a Fire Resource Plan, which provides the district with a standardized guide for wildfire response, readiness and staffing. The plan is continuously updated and adapted to meet current management objectives and standards.

All district staff play a critical role in wildland fire suppression. The district has one full time fire forester whose primary job functions involve wildfire suppression, training and prevention as well as coordinating training, equipment and suppression efforts for the other district staff members. All other district staff have wildland fire suppression as a collateral duty in various capacities. Most field staff meet the minimum national standard of a Firefighter Type 2 or above which makes them
qualified to serve as firefighters on the fire line. Many of the district staff have advanced trainings and qualifications that allow them to perform various other crucial functions such as tree felling, dozer line construction, and other command and leadership capacities. Staff who do not meet the minimum national standards assist in administrative or logistical roles such as dispatching, fire billing, equipment maintenance, etc.

The district maintains two dedicated Type 6 Engines and one Type 2 Tactical Water Tender. These are the primary apparatus relied upon for wildland fire suppression and patrol. Engines are housed separately, one in the north block and one in the south block, to increase response time and readiness. The engines are used as an initial response vehicle as well as a fire patrol vehicle during periods of elevated fire danger. The water tender is primarily housed in the south block and is used as a call-when-needed resource. Additionally, the district has a UTV with a 75-gallon fire suppression unit, two Type 3 dozers (north and south blocks), an enclosed command trailer equipped with radios and table tops for large incidents, and a command vehicle utilized by the fire forester.

The district has had very few large fires over the past ten years. The entirety of the district’s wildfire suppression efforts in recent history have been on fires less than one hundred acres, the majority under twenty-five acres. The largest recent fire on the Tuscarora State Forest was the Three Square Hollow Fire that burned about seventy-six acres in the south block in the fall of 2016. Most suppression activity by district staff occurs on private land on wildland fires caused by people burning trash and debris.

b) Prescribed Fire
Prescribed fire is becoming an increasingly important management tool on the state forest. Increased available training for staff and more opportunities for gaining qualifications is improving the viability of a prescribed fire program. The majority prescribed fire plans involved reducing competing vegetation for oak management as a primary objective. Burning to improve low quality sites, maintaining herbaceous openings and promoting fire adapted species are also objectives that can be utilized on the state forest.

17) Major Forest Health Issues
The Tuscarora State Forest could be described as fairly healthy, but it is not pristine and has changed greatly since the beginning of European settlement in the area. Even prior to local European settlement the forest was changing but remained intact and in good condition until the development of logging railroad technology and chestnut blight arrived in the early 1900’s. Except for the loss of American chestnut, the altered age structure and precipitously less conifer component, the forest recovered nicely by mid-century. Of course, wildlife populations were greatly altered, but they too gradually recovered to the point that nearly all the native wildlife species have returned, with a few exceptions. Sites that were once cultivated for agronomic crops have been the slowest to recover, and in many cases, they are the most
impacted by pests such as invasive plants. As will be described below, the forest has suffered greatly from invasive pests especially in the last forty years. Resisting these pests and mitigating their impacts has become a major part and central consideration for management of the forest.

a) Invasive Plants

“Invasive plant” describes a plant that grows aggressively, spreads and displaces other plants. Invasive plants tend to appear on disturbed ground, and the most aggressive can invade existing ecosystems. Invasive plants are generally undesirable because they are difficult to control, can escape from cultivation and can dominate large areas. In short, invasive plant infestations can be extremely expensive to control, as well as environmentally destructive.

Invasive plants are noted for their ability to grow and spread aggressively. Invasive plants can be trees, shrubs, vines, grasses or flowers, and they can reproduce by roots, shoots, seeds or all three. Invasive plants tend to:

- Not be native to North America;
- Spread, reproducing by roots or shoots;
- Mature quickly;
- If spread by seed, produce numerous seeds that disperse and sprout easily;
- Be generalists that can grow in many different conditions; and
- Be exploiters and colonizers of disturbed ground.

The species below are the most serious threat or worst offenders to our native ecosystems. They are all common in the south-central region of the state, where the Tuscarora State Forest is located.

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Common Name</th>
<th>Plant Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliaria petiolata</td>
<td>Garlic Mustard</td>
<td>Flower</td>
</tr>
<tr>
<td>Carduus nutans</td>
<td>Musk thistle</td>
<td>Flower</td>
</tr>
<tr>
<td>Cirsium arvense</td>
<td>Canada thistle</td>
<td>Flower</td>
</tr>
<tr>
<td>Cirsium vulgare</td>
<td>Bull thistle</td>
<td>Flower</td>
</tr>
<tr>
<td>Datura stramonium</td>
<td>Jimsonweed</td>
<td>Flower</td>
</tr>
<tr>
<td>Conium maculatum</td>
<td>Poison hemlock</td>
<td>Flower</td>
</tr>
<tr>
<td>Eleagnus umbellata</td>
<td>Autumn olive</td>
<td>Shrub</td>
</tr>
<tr>
<td>Polygonum cuspidatum</td>
<td>Japanese Knotweed</td>
<td>Shrub</td>
</tr>
<tr>
<td>Lonicera morrowii</td>
<td>Morrow's honeysuckle</td>
<td>Shrub</td>
</tr>
<tr>
<td>Lonicera tatarica</td>
<td>Tatarian honeysuckle</td>
<td>Shrub</td>
</tr>
<tr>
<td>Rosa multiflora</td>
<td>Multiflora Rose</td>
<td>Shrub</td>
</tr>
<tr>
<td>Spirea japonica</td>
<td>Japanese spirea</td>
<td>Shrub</td>
</tr>
<tr>
<td>Ailanthus altissima</td>
<td>Tree-of-heaven</td>
<td>Tree</td>
</tr>
<tr>
<td>Aralia elata</td>
<td>Japanese Angelica Tree</td>
<td>Tree</td>
</tr>
<tr>
<td>Celastrus orbiculatus’</td>
<td>Oriental bittersweet</td>
<td>Vine</td>
</tr>
<tr>
<td>Lonicera japonica</td>
<td>Japanese honeysuckle</td>
<td>Vine</td>
</tr>
<tr>
<td>Polygonum perfoliatum</td>
<td>Mile-a-minute</td>
<td>Vine</td>
</tr>
</tbody>
</table>
The following species are invasive plants that are known to invade native plant communities and are deserving of our vigilance. They are all common in the south-central region of the state, where the Tuscarora State Forest is located.

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Common Name</th>
<th>Plant Form</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Bromus tectorum</em></td>
<td>Cheatgrass</td>
<td>Grass</td>
</tr>
<tr>
<td><em>Hesperis matronalis</em></td>
<td>Dame's rocket</td>
<td>Flower</td>
</tr>
<tr>
<td><em>Ornithogallum nutans</em></td>
<td>Star-of-Bethlehem</td>
<td>Flower</td>
</tr>
<tr>
<td><em>Pastinaca sativa</em></td>
<td>Wild parsnip</td>
<td>Flower</td>
</tr>
<tr>
<td><em>Perilla frutescens</em></td>
<td>Beefsteak plant</td>
<td>Flower</td>
</tr>
<tr>
<td><em>Phalaris arundinacea</em></td>
<td>Reed canary grass</td>
<td>Grass</td>
</tr>
<tr>
<td><em>Microstegium vimineum</em></td>
<td>Japanese Stiltgrass</td>
<td>Grass</td>
</tr>
<tr>
<td><em>Oplismenus undulatifolius</em></td>
<td>Wavyleaf Basketgrass</td>
<td>Grass</td>
</tr>
<tr>
<td><em>Arthroxon hispidus</em></td>
<td>Carpetgrass</td>
<td>Grass</td>
</tr>
<tr>
<td><em>Beberis thunbergii</em></td>
<td>Japanese barberry</td>
<td>Shrub</td>
</tr>
<tr>
<td><em>Ligustrum obtusifolium</em></td>
<td>Border privet</td>
<td>Shrub</td>
</tr>
<tr>
<td><em>Ligustrum vulgare</em></td>
<td>Common privet</td>
<td>Shrub</td>
</tr>
<tr>
<td><em>Rhamnus catharticus</em></td>
<td>Common buckthorn</td>
<td>Shrub</td>
</tr>
<tr>
<td><em>Rhodotypos scandens</em></td>
<td>Jetbead</td>
<td>Shrub</td>
</tr>
<tr>
<td><em>Cynanchum louiseae</em></td>
<td>Swallow-wort</td>
<td>Vine</td>
</tr>
</tbody>
</table>

For more information: http://www.dcnr.pa.gov/Conservation/WildPlants/InvasivePlants/Pages/default.aspx

Honeysuckle, Japanese barberry and multiflora rose are prevalent in the Tuscarora Forest in areas that had been under cultivation. Larger infestations of these species have been and should continue to be targeted by contract herbicide treatments when funding is available. One oriental bittersweet site is continually monitored and receives herbicide treatments periodically. Tree-of-heaven is very common on the forest and has been for many decades. However, it has been observed that it is being negatively impacted by a naturally occurring *Verticillium* wilt (*V. albo-atrum*). Still, the natural spread of the *Verticillium* is slow; therefore, the plan to manage tree-of-heaven continues to be the eradication of existing stems in areas scheduled for timber harvesting to prevent root suckering. Seedlings of tree-of-heaven may become a problem within woven wire fences and should be monitored. Unfortunately, mile-a-minute is now somewhat common in the Tuscarora Forest. Herbicide treatments should still be used to control mile-a-minute in or near areas scheduled for timber harvesting to prevent larger infestations. In areas where large infestations of mile-a-minute already exist, weevils have been released as a biological control. The weevils don't eradicate infestations of mile-a-minute, but they do cause enough damage to reduce vigor and seed production. Japanese stiltgrass has also become extremely common on the Tuscarora, particularly along roads. The strategy for stiltgrass is similar to *Ailanthus* in that where a timber harvest is planned, herbicide treatments should be used to prevent or reduce its spread. The same strategy should be used for the other invasives listed above or any others that show up in the future.
b) Non-Native Insects and Disease

Gypsy moth (*Lymantra dispar*) has been the single greatest impact on the Tuscarora State forest since chestnut blight and the rapid harvesting of the early 20th century. This invasive insect has been responsible for the loss and degradation of timber worth millions of dollars. Just when the gypsy moth reached this area, the deer herd was at its peak. Overstory mortality and high browsing pressure on the most palatable, browse-sensitive species caused a devastating and long-lasting shift in the composition of the forest. This species shift in the understory and overstory of the forest has resulted in decreased ecological function, the formation of recalcitrant understories of competing vegetation, and a significant shift away from oak-dominated forests to forest types increasingly dominated by maple and birch.

From 1979 through 1994 gypsy moth was chronic at moderate impact, and much of the State Forest was treated with insecticide over those years. A population-limiting fungus brought an end to the chronic presence of gypsy moth but seems to have brought us into a new era of extreme population spikes with rapid build-up and sudden collapse. Those years of high populations require treatment with effective insecticides to save the forest from conversion to birch or red maple.

Hemlock wooly-adelgid also had a significant impact on the Tuscarora State Forest and surrounding area. Many hemlock trees have died, including in the old growth areas of the Hemlock Natural Area. Hemlock is still present but in greatly reduced proportion. In some stands all the hemlock has died. The District has undertaken insecticide treatment of strategically located stands across the district to keep remnant stands on the landscape. Since 2003, a concerted effort is being made to keep the remaining large old hemlocks alive in the Hemlock Natural Area by applying insecticide periodically. Until some natural controls are found these periodic treatments will be required to retain these majestic trees.

Emerald ash borer entered the District in 2007. Ash seed was collected and submitted for long term storage. By 2010 we were salvaging infested trees, and now most of the ash trees in the district are gone except for seedlings and saplings. Because of the rapid spread of the insect and the difficulty of treatment, the Tuscarora has not done any insecticide treatment for the emerald ash borer. We are looking for lingering ash (ash that survived the initial wave of mortality) and studies are ongoing regarding the mechanisms of survival in these trees.

Chestnut blight was a devastating disease that was found in Pennsylvania in the early nineteen hundreds. Through the 1920’s chestnut salvage was done as much as financially possible. American chestnut was found just about everywhere in the Tuscarora State Forest, and its desirable wood and important mast crops have been sorely missed.

18) Major Recreational Uses

Hunting, fishing, camping, hiking and sightseeing are several prominent recreational uses of the Tuscarora State Forest which bring a lot of people to this area. Other major forms of recreation that bring people here include snowmobiling, picnicking, horseback riding and mountain biking.
Hunting, particularly for deer and turkey, is extremely popular here, and hunting season makes for one of the busiest times on the Tuscarora State Forest. The increase in the bear herd in this area has also caused a growing number of bear hunters in the District. Fishing is another popular activity with 60 miles of trout stream in the Tuscarora State Forest where both native and stocked trout can be found. Fish habitat improvements have been installed in Sherman’s Creek, Fowler Hollow Run and East Licking Creek. A four-mile section of East Licking Creek has been designated as a Delayed Harvest Artificial Lures Only trout fishing area. Shawmut Boat Access along Route 103 near Newton Hamilton in Huntingdon County serves those who enjoy boating and fishing on the Juniata River. Camping remains very popular with a total of 94 motorized campsites which see the bulk of the use. People can also camp at one of the 4 shelters in the District or primitive camp most areas of the state forest (see State Forest Rules & Regulations). Primitive camping is also available on marked islands in the Juniata River that are managed by DCNR.

Hiking is very popular in the Tuscarora. The Tuscarora Trail is a State Forest Hiking Trail that was originally created as a new route for the Appalachian Trail. It first departs the Appalachian Trail at the top of Blue Mountain in Deans Gap. It travels along ridge tops, southwesterly, towards Maryland, where it connects to the Big Blue Trail before joining the Appalachian Trail again in Shenandoah National Park. The trail is over 250 miles in length, with 110 miles in Pennsylvania and approximately 23 miles crossing the Tuscarora State Forest. There are two lean-tos located along the Tuscarora Trail in this District, one in Fowlers Hollow and one south of Colonel Denning State Park near the Wagon Wheel. Backpack camping is permitted along the state forest portion of the trail as well as in the two rustic open-faced shelters that are located along the trail. The Potomac Appalachian Trail Club maintains the Tuscarora Trail. The Tuscarora Trail is marked with rectangular blue blaze marks. One hundred and sixty-seven miles of short, district hiking trails are located throughout the Tuscarora State Forest. The majority of these trails have signs at the starting and terminal points. Volunteers do most of the trial maintenance on these trails. The most used district hiking trail is the Flat Rock Trail which is about 2½ miles in length and extends from Colonel Denning State Park to the Flat Rock Vista. It is a moderate to rugged hike to the top of the Blue Mountain. At the top of the mountain, Flat Rock Trail joins the Tuscarora Trail to the Flat Rock Vista. This vista is a natural rock outcrop that affords a view of the great Cumberland Valley. Many of the district trails and roads are also open for mountain bike use and horseback riding.

A large part of the public use of the forest is spent in driving forest roads. At almost any time of the year, and especially when the seasons change, many people drive these roads to enjoy the scenery, to look for wildlife or just to experience the relative quiet and solitude of the forest environment. A total of 157 miles of state forest roads provide some of the finest scenic views in Pennsylvania and ample wildlife observation opportunities. The public use roads are used heavily during the non-winter, weekend and evening hours as scenic drives. The Tuscarora State Forest also maintains a number of scenic vistas which allow enhanced viewing of the local landscape.
Figure 18-1. Acres of state forest land in this district by Recreation Opportunity Spectrum (ROS) classifications. ROS is an inventory system developed by the U.S. Forest Service, to characterize land by types of recreation experiences. ROS is described on p. 42 of the 2016 SFRMP. “Other Zones” refers to Semi-Developed and Developed zones.

19) Cultural and Historic Resources

As custodians of public land, DCNR is also custodian of the historical and cultural resources found within the forest. One important mission of the Bureau of Forestry is to educate the public by promoting the many values of forests. One way we do this is by sharing and interpreting information about the importance of the forest to people in the past as well as the present. Some of the historical resources in the Tuscarora State Forest most valued by the public are the CCC camps and the structures that the CCC worked on, such as the West Licking Creek Fountain and Pavilion #5 at Big Spring. Other resources of interest are the signs and ruins of the several railroads and industries found in the forest such as the unfinished tunnel and the Henry’s Valley tannery as well as Edward Bell’s Furnace. The remnants of farms and settlements in the form of houses, barns, spring houses, stone walls and cemeteries are further examples of our heritage. People are interested in the stories of these places and the people associated with them. The District Office houses some artifacts and documents related to the history and culture of the area.

The Tuscarora Treasures, published on the District website and Facebook pages, is one means of sharing and conserving information about some of the special places in the forest. The District also houses records, photos and stories about the Department and its employees who lived and worked in the Tuscarora State Forest. Some of these documents are unique and should be preserved.

The O’Donel House is the only structure on Tuscarora State Forest land listed on the National Register of Historic Places. It is a well-preserved house and barn typical of the area.
20) Special State Forest Designations

a) High Conservation Value Forests

Table 20-1. Acres of High Conservation Value Forest by category. To comply with Principle 9 of the FSC U.S. Forest Management Standards, the bureau evaluated and assessed areas for inclusion as HCVFs. While the BOF believes that all state forest lands are of highest conservation value, areas not designated as such are still of equal importance and are protected through law and best management practices. will maintain and/or enhance the values for which they have been designated. More information about HCVFs can be found in the SFRMP, p. 64.

<table>
<thead>
<tr>
<th>HCVF Category</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1, areas legally protected or managed primarily for concentrations of biodiversity values that are significant at the ecoregion or larger scale</td>
<td>197</td>
</tr>
<tr>
<td>1.2, areas with significant concentrations of rare, threatened or endangered species or rare ecological communities, endemic</td>
<td>0</td>
</tr>
<tr>
<td>2.1, significant large landscape-scale forest where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance?</td>
<td>0</td>
</tr>
<tr>
<td>2.2, areas significant to biodiversity conservation at the ecoregion scale because it contains landscape-scale biodiversity values that are not present on other forests due to landscape-scale habitat modifications on surrounding lands</td>
<td>0</td>
</tr>
<tr>
<td>3.1, old growth stands</td>
<td>76</td>
</tr>
<tr>
<td>3.2, roadless area &gt;500 acres in size or that has unique roadless area characteristics</td>
<td>0</td>
</tr>
<tr>
<td>3.3, rare, threatened, or endangered ecosystem</td>
<td>0</td>
</tr>
<tr>
<td>4.1, areas providing a source of community drinking water</td>
<td>0</td>
</tr>
<tr>
<td>4.2, areas protecting community drinking water supplies</td>
<td>0</td>
</tr>
<tr>
<td>4.3, extensive floodplain or wetland forests that are critical to mediating flooding or in controlling stream flow regulation and water quality</td>
<td>0</td>
</tr>
<tr>
<td>6.2, areas with cultural features created intentionally by humans</td>
<td>0</td>
</tr>
</tbody>
</table>

b) Wild and Natural Areas

Table 20-2. Total acreage of Wild and Natural Areas on state forest land within Tuscarora State Forest.

<table>
<thead>
<tr>
<th>Tuscarora</th>
<th>Name</th>
<th>Acreage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Areas</td>
<td>Frank E. Masland Natural Area</td>
<td>1,257.0</td>
</tr>
<tr>
<td></td>
<td>Hoverter and Sholl Box Huckleberry Natural Area</td>
<td>10.1</td>
</tr>
<tr>
<td></td>
<td>The Hemlocks Natural Area</td>
<td>99.1</td>
</tr>
<tr>
<td></td>
<td>Natural Area Total</td>
<td>1,366.1</td>
</tr>
<tr>
<td>Wild Areas</td>
<td>James C. Nelson Wild Area</td>
<td>5,345.1</td>
</tr>
<tr>
<td></td>
<td>Wild Area Total</td>
<td>5,345.1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>6,711.2</td>
</tr>
</tbody>
</table>
c) Other Designations

There are two Important Mammal Areas in the Tuscarora State Forest and an Important Bird Area. Both IMA’s are designated primarily for the Allegheny woodrat habitat. The Tuscarora State forest and surrounding rocky ridges are very important for the sustainability of *Neotoma magister* in Pennsylvania. The IBA is primarily for the extensive blocks of forest as well as the Blue/Kittatinny Mountain migration route.

21) Interpretive Plans

**Tuscarora State Forest District Interpretive Goals**

1. Foster an awareness and encourage sustainable use of resources by communicating, promoting and modeling good stewardship and best management practices.
2. Encourage exploration and participation in low impact recreation within the Tuscarora State Forest.
3. Support effective partnerships with local communities that benefit the community, the resource and the visitor.
4. Develop engaging experiences that promote intellectual and emotional connections between the resource and visitors.
5. Communicate the ongoing challenges of balancing natural resource use with society’s needs, wants and desires.
6. Foster an appreciation and understanding of the history of Pennsylvania’s forests and their role in our lives.

The Tuscarora Facebook page is a primary communication tool and reaches many thousands of people.

One unique aspect of interpretive work in the District is the “Tuscarora Treasures.” It is a listing with photos, locations and descriptions of some of the most interesting places in the Tuscarora State Forest. Working cooperatively with the Perry County Bicentennial Heritage Trail, these sites have been added to their web-based information as well as the Tuscarora Facebook page and web site. Cooperation with the Perry County Bicentennial Committee is on-going.
District Priority Goals

The 2016 SFRMP set forth Principles, Goals and Objectives that focus on the variety of resources, uses and values of state forest land. These Principles, Goals and Objectives were organized around 12 Resource Chapters:

- Communications
- Timber and Forest Products
- Native Wild Plants
- Wildlife
- Water Resources
- Soils
- Geologic Resources
- Wildland Fire
- Forest Health
- Recreation
- Infrastructure
- Cultural Resources

The Principles, Goals and Objectives in the SFRMP apply universally across all of state forest land. Due to their broad application, they were written in relatively general terms. This District SFRMP provides an opportunity to prioritize goals that are more specifically applicable at the district level. The District Priority Goals that follow provide points of emphasis for state forest land management within Tuscarora State Forest over the next five- to ten-year planning horizon.

Tuscarora State Forest District Goals

1. Create a mosaic of diverse forest types and age classes, especially maintain native oak forests of diverse age classes. The primary means of accomplishing this goal will be through timber harvesting following the harvest allocation plan.

2. Conserve high quality cold water stream habitats.

3. Provide habitat for species of special concern and high conservation responsibility by conserving, maintaining and increasing habitat quality. Key habitat types include:
   1. Rock habitat with mast producing species especially on the main ridges as this is an important mammal area designated primarily for Allegheny woodrat.
   2. Hemlock and white pine in pure stands, mixed stands and scattered within hardwood stands.
   3. Wetlands, seeps and ephemeral pool ecosystems with special attention to maintaining the plant sanctuaries and federally endangered species.

4. Maintain current level of wild character while providing opportunities for dispersed recreation.
   1. Improve parking, trails, signs and facilities, while blending aesthetically into the surroundings. Balance infrastructure with the ability to maintain it.
   2. Maintain multi-use trail network, including snowmobile trails and improve access and parking without decreasing primitive, non-motorized areas.

5. Provide interpretive information to forest visitors and virtual visitors through many means (including through tours, literature, auto tours, kiosks, interpretive panels and Facebook) especially about;
1. Forest management and ecology in the Ridge and Valley Region of central PA.
2. History & Culture including: two CCC camps, three railroads, early human occupation, European settlement, past industrial use of the land and forest recovery.

6. Limit damage from pests including insects, disease and invasive plants. Especially gypsy moth, hemlock wooly adelgid and invasive shrubs.
Landscape Management Unit Plans

With the 2016 revision of the SFRMP, the bureau introduced the LMU concept to facilitate consistent, structured and integrated resource management and planning across large landscape units on state forest and adjoining lands. LMUs were delineated for all state forest land in 2016-2017. The LMU, which complements other ecological delineations, now serves as the primary unit for landscape-level planning and management on state forest lands. LMUs help the bureau facilitate planning on a landscape scale that has ecological context, incorporate multiple forest uses and values and promote ecological analysis. The units also serve as a tool to facilitate cooperative management with adjoining forest districts, landowners and agencies. An explanation of how LMUs were delineated is found in the 2016 SFRMP on page 62.

The bureau has developed LMU Plans for every LMU containing state forest land. The LMU Plans for LMUs within the Tuscarora District are found below. Each LMU Plan contains three elements:

- Abstract – a one to two-page narrative describing the LMU and its important features;
- LMU Priority Goals – a list of points of emphasis for state forest land management within the LMU, similar to the District Priority Goals, but at the LMU level; and
- Profile – tables, charts and accompanying text that more fully describe the LMU’s characteristics.
Bower
Landscape Management Unit

Overview

The Bower LMU is roughly 87,939 acres in size and is located predominately in Perry County. Fifty-one percent of the LMU consists of the Tuscarora State Forest in what is commonly called the “South Block”. Forty-Nine percent of the LMU is privately owned. Three State Parks (Big Spring, Col. Denning and Fowlers Hollow) comprise 377 acres of the LMU. The Bower LMU falls into the Ridge and Valley Eco-region of Pennsylvania. There are four major ridge systems in this LMU: Rising Mountain, Sherman’s Mountain, Blue Mountain and Bower Mountain. There are also various other small ridges and valleys. The LMU is primarily drained by Sherman Creek and Laurel Run, the entire LMU is in the Chesapeake Bay Watershed.

Most of the LMU was harvested between 1860 and 1910. Narrow gauge railways were used to transport the timber and timber products. Because of this the fire return interval most likely increased until fire suppression was instituted by the Civilian Conservation Corps which happened right after most of the large-scale logging was ending. This combination of large scale timber harvest, lack of early fire suppression and a low to non-existent deer population contributed to the formation of the current even-aged oak dominated forest type that covers the LMU today. During the 1930’s there were 2 CCC camps within the current LMU. These workers did much to construct the road and trail system still in use today. By 1907 the State had acquired ownership of 19,000 acres that today is the Tuscarora State Forest. Much of the land along Laurel Run in what is known as Henry’s Valley and the land along the headwaters of Sherman Creek was in agricultural use prior to government ownership.

Today 87% of this LMU is covered by deciduous hardwood forest. On State Forest Land 71% is currently typed as an oak dominated forest with 6% typed as a conifer mostly hemlock forest and 23% falling into other forest types. Of these other forest types, most are dominated by black birch or red maple. This LMU has been subjected to continuous outbreaks of gypsy moth going back to the early 1980’s. The gypsy moth outbreaks have resulted in large salvage timber sales and many unsalvaged dead trees across much of the LMU. The current management use of this LMU is predominately that of timber harvesting and other habitat related work with the overarching goal of reaching a balanced age class distribution and increasing diversity. A good portion of the better sites have already seen some type of timber harvest, thus shifting the harvest activity to less productive sites and sites that have been more difficult to regenerate.
The Tuscarora Trail, a State Forest hiking trail and an offshoot of the Appalachian Trail, runs east to west through this LMU mostly following the crest of the Blue Mountain. There are two natural areas in the LMU: the Masland Natural Area and the Hemlocks Natural Area, which is an old growth hemlock stand which has had severe negative impact due to the hemlock woolly adelgid. Allegheny woodrat habitat sites are also very common in this LMU. This LMU also includes two State Forest Wild Plant Sanctuaries one of which harbors a federally endangered plant species.

Priority Goals & Objectives

1. Create a mosaic of diverse forest types and age classes with the majority in oak types, but also with a significant amount in other forest community types such as northern hardwoods, conifer, tuliptree/maple, scrub oak woodland, hard pine, palustrine pin oak/swamp white oak and a variety of early successional types, including shrub types. Especially try to increase white pine component and conserve hemlock. Reduce birch stands through gradual conversion to more desirable types and increased species diversity within birch stands.

2. Conserve high quality cold water stream habitats of Laurel Run (EV), Sheaffer Run, Bull Run, Shermans Creek, Fowlers Hollow Run and Trout Run (EV).

3. Conserve ephemeral pool ecosystems and endangered plants as well as early successional habitats with special attention to the plant sanctuaries and federally endangered plant populations.

4. Provide habitat for species of special concern and high conservation responsibility by conserving, maintaining and increasing habitat quality. Key habitat types include:
   1. Rock habitat with mast producing species especially on the main ridges as this is an important mammal area designated primarily for Allegheny woodrat.
   2. Hemlock and white pine in pure stands, mixed stands and scattered within hardwood stands. Kansas Valley especially has both older and young hemlock and white pine.

5. Maintain current level of wild character while providing opportunities for dispersed recreation.
   1. Improve parking, trails, signs and facilities, while blending aesthetically into the surroundings. Balance infrastructure with the ability to maintain it.
   2. Maintain multi-use trail network, including snowmobile trail and improve access and parking without decreasing primitive, non-motorized areas.

6. Provide interpretive information to forest visitors and virtual visitors through many means (including through tours, literature, auto tours, kiosks, interpretive panels and Facebook) especially about;
   1. Forest management and ecology in the Ridge and Valley Region of central PA.
   2. History & Culture including two CCC camps and three railroads, as well as early human European settlement, past industrial use of the land and forest recovery.
7. Limit damage from pests including insects, disease and invasive plants, especially gypsy moth, hemlock wooly adelgid and invasive shrubs. Continue experimentation on limiting stiltgrass spread along roadsides.

Profile

Table 1. LMU acreage: total and state forest land only.

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Forest Land</td>
<td>45,043</td>
</tr>
<tr>
<td>LMU Total</td>
<td>87,939</td>
</tr>
</tbody>
</table>

Ecoregion: Ridge and Valley

Figure 1. LMU acreage by land cover categories from the National Land Cover Dataset for the entire LMU.

The majority land use is “deciduous forest” which means there is a large contiguous expanse of one cover type, but there are opportunities to increase some less common types such as evergreen forest, mixed forest, shrub/scrub and herbaceous without weakening that value. Some pressure exists on private land for low density residential development around the edges of the State Forest.

Table 2. Miles of roads by category on state forest land in this LMU. Road categories are described on p. 199 of the 2016 SFRMP.

<table>
<thead>
<tr>
<th>Road Category</th>
<th>Total Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z1 - Public Use Road</td>
<td>60</td>
</tr>
</tbody>
</table>
Laurel Run road is the primary public use road through the forest. Route 274 and a few township roads also provide access. Gated administrative roads are generally in good shape and provide the access needed but are a challenge to maintain with current staffing. A connection in Gunter Valley would be desirable and an extension of the road system is needed in the Doubling Gap area.

Table 3. Miles of trails on state forest land in this LMU open to various types of recreational use.

<table>
<thead>
<tr>
<th>Trail Category</th>
<th>Total Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiking</td>
<td>191</td>
</tr>
<tr>
<td>Biking</td>
<td>163</td>
</tr>
<tr>
<td>Equestrian</td>
<td>163</td>
</tr>
<tr>
<td>X-Skiing</td>
<td>167</td>
</tr>
<tr>
<td>ATV I</td>
<td>0</td>
</tr>
<tr>
<td>ATV II</td>
<td>0</td>
</tr>
<tr>
<td>Snowmobile / Joint Use Road</td>
<td>78</td>
</tr>
</tbody>
</table>

An important hiking trail in this LMU is the Tuscarora Trail, especially the section from Col. Denning State park to Flat Rock which is heavily used for day hiking. The Tuscarora Trail is mostly closed to biking and horseback riding, most of the other trails are shared use. Four Adirondack type shelters are located in the LMU and are used by through hikers and small groups. Horseback riding is more frequent in this area than in other parts of the forest. Although the snowmobile trail system is scenic, snow conditions are typically only excellent for a few days each year. Cross country skiing is not very common but most rails are open for this use.
Figure 2. Acreage of state forest land in this LMU by aggregated forest type. The forest types are described on p. 108 of the 2016 SFRMP.

Red oak, white oak and chestnut oak grow very well in this LMU but have suffered from mortality due to repeated gypsy moth defoliation. Regeneration, especially of red oak, is challenging through most of this LMU and is very poor on private land. The “other hardwoods” type is mostly black birch which has replaced red oak and other oak stands following oak mortality over the last 40 years. There is very little white pine, and hemlock has suffered widespread mortality from hemlock wooly adelgid. Young sugar maple and yellow poplar are regenerating well on appropriate soils, and those vegetation types associated with them may increase in the future. Because of the ecological and economic value of the oaks and their fitness for the sites, oaks are worth working for to retain and regenerate in the next rotation.
Figure 3. Acreage of state forest land in this LMU by site class. Site classes denote the potential quality of the growing site. “Site 0” indicates non-forested lands or forested lands where the vegetation has not yet been typed. Other site classes are described on p. 53 of 2016 SFRMP.

The soils in this state forest are very productive for trees. Even the site 3 stands have commercial sawtimber. Oak is the dominant species on all three site classes.
Figure 4. Acreage of state forest land in this LMU by management zone. Management zone is dictated by primary land use and land capability. Further descriptions of commerciality and zoning are found on p. 54 of the 2016 SFRMP.

There are two Natural Areas in this LMU. Commercial productivity is limited primarily by the combination of steep slope and rockiness on the upper mountain sides. A few places have limited accessibility across private land. Several important pipelines cross through the LMU and are the primary use in the anthropogenic zone.

Figure 5. Acres of state forest land in this LMU by forest age classes.

The Tuscarora State Forest has a relatively more balanced age distribution than most of Pennsylvania for several reasons. Timber harvesting began around 1820 but had relatively low impact on stand age until the later half of the 1800’s with heavier harvesting for bark and the railroads were built. A portion of this LMU was clearcut around the start of the 20th century but by no means all of it. In fact, evidence indicates that only the most accessible sites, close to the Perry Lumber Company tracks were actually cut clean. After 1890 small tanneries closed and farm fields were gradually abandoned. Some lands purchased more recently for State Forest had been clearcut in the mid to later 20th century. The peaks around age 10 and 40 are due primarily to gypsy moth mortality in addition to planned regeneration harvests. Unfortunately, much of that is black birch. Large portions of the Tuscarora had a two age structure with old remnants from mid 19th century cutting, (often 125+ years old) a major age class of oak from the chestnut blight years (~100yrs old), and then a midstory of red maple (around 50 years old). Most of the oldest age class within stands is dying out.
Table 4. Miles of stream by classification within entire LMU. Department of Environmental Protection stream classifications are described in Chapter 93 Water Quality Standards of Title 25 in the Pennsylvania Code.

<table>
<thead>
<tr>
<th>Class</th>
<th>Total (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceptional Value Waters</td>
<td>22</td>
</tr>
<tr>
<td>High Quality Waters</td>
<td>129</td>
</tr>
<tr>
<td>Perennial Cold Water Streams</td>
<td>32</td>
</tr>
<tr>
<td>Undesignated</td>
<td>28</td>
</tr>
<tr>
<td>Warm Water Streams</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>213</strong></td>
</tr>
</tbody>
</table>

The North Fork of Laurel Run is exceptional value waters, Trout Run above the old reservoir is Wilderness Trout. Upper Shermans Creek, Sheaffer Run, and Fowlers Hollow Run are High Quality. Some stream reaches are impacted by acidic deposition, including the South Fork of Laurel Run which is being treated with limestone sand. The acidity problem is slowly decreasing, probably due to the Clean Air Act regulations. At one time most of the streams in the LMU were stocked with trout, but now few sections are. Naturally reproducing brook and some brown trout are found in streams throughout the LMU.

Figure 6. Acres of state forest land in this LMU by Recreation Opportunity Spectrum (ROS, 2012) classifications. ROS is an inventory system developed by the U.S. Forest Service, to characterize land by types of recreation experiences. ROS is described on p. 42 of the 2016 SFRMP. “Other Zones” refers to
Semi-Developed and Developed zones. A large part of this LMU is zoned “Other” due to its accessibility and proximity to roads. Whenever possible the Semi-Primitive and Semi-Primitive Non-Motorized areas will be maintained as they are and not opened to access by vehicles.

Table 5. Core forest index value for state forest land in this LMU. The core forest index is a rating value out of 100 that expresses the proportion of the area within the LMU that is increasingly far away from dense areas of fragmenting features.

<table>
<thead>
<tr>
<th>LMU Name</th>
<th>Core Forest Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bower</td>
<td>95</td>
</tr>
</tbody>
</table>

The score falls within the 47th percentile of all state forest LMUs, making it moderately fragmented relative to other portions of state forest land.
Licking Creek
Landscape Management Unit

Overview
The Licking Creek LMU is 85,209 acres and is located in Juniata, Mifflin and Huntington Counties. Forty two percent of this LMU is comprised of state forest land. The vast majority of the remaining land is privately owned forest land. The Shade Mountain to the south, Blue Mountain to the north and Blacklog Mountain in the middle traverse the length of this LMU.

Much of the area was logged between about 1840 and 1910 in the western end and central part of the LMU, first for charcoal and then for props and saw logs. There are over 130 known charcoal hearth sites in this area. Farther east, the majority was logged between about 1900 and 1930, much of it by the Vincent Lumber Company. A smaller portion of the area had been cleared for farmland during the 1800’s. The CCC played an important role in developing sections of this LMU and there were two camps located here. Much of the area had burned over because of fires caused by early settlers and railroads. By the mid-twentieth century, the land that had been logged or cleared for farming had reverted back to primarily an oak forest with some pine and hemlock intermixed.

Logging is currently still a common practice on private lands within the LMU; however, it generally consists of “high grading” or “diameter limit cutting”. Timber management on state forest lands within the LMU usually entails salvage cutting of dead timber or shelterwood cutting followed by overstory removal cutting after regeneration is sufficient to replace the existing forest stand. This LMU has twelve known vernal pools and includes a State Forest Wild Plant Sanctuary.

Priority Goals & Objectives

1. Create a mosaic of diverse forest types and age classes. Regenerate and maintain a majority of the landscape in healthy red oak stands of various age classes. Conserve and increase less common forest types such as northern hardwoods, Allegheny hardwoods, tuliptree/maple,
white pine/red oak, white oak, white pine/hemlock, hard pine/scrub oak woodland; and maintain in several age classes. Regenerate to type approximately 1,000 acres per decade.

2. Conserve important water resources including:
   1. High-quality cold water streams (East Licking Creek, West Licking Creek, Blacklog Creek)
   2. Wetlands including: vernal pool complexes, bogs, fern and sedge wetlands, young forest and shrub wetlands, high canopy forested wetlands of various types.

3. Provide habitat for species of special concern and high conservation responsibility by conserving, maintaining and increasing habitat quality. Key habitat types include: rock habitat with mast producing species nearby, mature oak hickory forest, conifer forest, pitch pine and scrub oak.

4. Maintain current level of wild character while providing opportunities for dispersed recreation:
   1. Preserve low trail density with limited new connections of old or existing trails.
   2. Improve parking, trails, signs and facilities, while blending aesthetically into the surroundings.
   3. Provide high quality horse, mountain bike and hiking trails.
   4. Lengthen snowmobile trails and improve access and parking.

5. Provide interpretive information to forest visitors and virtual visitors, especially about forest management, ecology and history including: railroads, two CCC camps, Edwards or Bells iron furnace and charcoaling, early forestry history, Joseph Rothrock, etc.

6. Prioritize the maintenance of wild character and promote opportunities for primitive recreation experiences.

Profile

Table 1. LMU acreage: total and state forest land only.

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Forest Land</td>
<td>35,802</td>
</tr>
<tr>
<td>LMU Total</td>
<td>85,209</td>
</tr>
</tbody>
</table>

Ecoregion: Ridge and Valley
The majority land use is “deciduous forest” which means there is a large contiguous expanse of one cover type, but there are opportunities to increase some less common types such as evergreen forest, mixed forest, shrub/scrub and herbaceous without weakening that value. This LMU has more white pine than any of the others in the Tuscarora State Forest, and there are opportunities to increase the evergreen forest cover and mixed forest cover by releasing understory white pine.

Table 2. Miles of roads by category on state forest land in this LMU. Road categories are described on p. 199 of the 2016 SFRMP.

<table>
<thead>
<tr>
<th>Road Category</th>
<th>Total Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z1 - Public Use Road</td>
<td>34</td>
</tr>
<tr>
<td>Z2 - Drivable Trail</td>
<td>10</td>
</tr>
<tr>
<td>Z3 - Administrative Road</td>
<td>54</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>98</strong></td>
</tr>
</tbody>
</table>

Licking Creek Drive runs through the middle of this LMU. The public roads of Black Log Valley, Black Log Mountain Road, Wynn Gap and McVeytown Roads are also important public access roads. A few of the more important gated administrative roads are Black Log Bench, Shade Bench, Gifford and Steltzer/Spruce Gap Roads. Most of the administrative roads are dead end.
roads. The road system is pretty well built out with only a few places requiring extensions of existing roads.

Table 3. Miles of trails on state forest land in this LMU open to various types of recreational use.

<table>
<thead>
<tr>
<th>Trail Category</th>
<th>Total Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiking</td>
<td>94</td>
</tr>
<tr>
<td>Biking</td>
<td>94</td>
</tr>
<tr>
<td>Equestrian</td>
<td>94</td>
</tr>
<tr>
<td>X-Skiing</td>
<td>94</td>
</tr>
<tr>
<td>ATV I</td>
<td>0</td>
</tr>
<tr>
<td>ATV II</td>
<td>0</td>
</tr>
<tr>
<td>Snowmobile / Joint Use Road</td>
<td>37</td>
</tr>
</tbody>
</table>

Most of the trails in this LMU were once wagon roads, charcoal trails or fire trails. These tend to go up and down the mountain ridges and frequently dead end. There is some mountain biking and horseback riding in this LMU, mostly in the West End of Licking Creek.

Figure 2. Acreage of state forest land in this LMU by aggregated forest type. The forest types are described on p. 108 of the 2016 SFRMP.

Red oak grows very well here and is the dominant vegetation type, even on steep rocky slopes. Other oaks include chestnut oak/heath, white oak and some scarlet and black oaks in Licking Creek. There was a moratorium on clearcutting from the late 1970’s until the mid 1980’s due
to lack of desirable regeneration. Some of the early clearcuts did regenerate well, but others converted to birch and *Ailanthus*. Tulip poplar is increasing in the east and west ends of Licking Creek, and white pine is increasing in the middle.

**Figure 3.** Acreage of state forest land in this LMU by site class. Site classes denote the potential quality of the growing site. “Site 0” indicates non-forested lands or forested lands where the vegetation has not yet been typed. Other site classes are described on p. 53 of 2016 SFRMP.

Most of the State Forest land in this LMU are site 1 or 2. There is relatively little site 3 and much of that is limited zone. Even much of the limited zone has large trees. Soils are good for growing trees and this becomes a challenge because of competing vegetation with desirable trees. Much of the silviculture revolves around controlling or managing competing vegetation.
Figure 4. Acreage of state forest land in this LMU by management zone. Management zone is dictated by primary land use and land capability. Further descriptions of commerciality and zoning are found on p. 54 of the 2016 SFRMP.

Slightly more than half the State Forest in this LMU is in the multiple resource zone and available/accessible. The non-commercial and multiple resource areas are mostly ridgetops and benches cut off by surrounding limited terrain.
Some tracts in this part of the forest were heavily harvested prior to acquisition by the Commonwealth around 1900 – 1910. Other portions were cut for charcoal for the iron furnace in the early 1800’s. A few tracts in the headwaters and upper slopes were only partially harvested and many old trees have gradually died or been harvested over the years. This leads to a rather flatter age distribution than most State Forest.

Table 4. Miles of stream by classification within entire LMU. Department of Environmental Protection stream classifications are described in Chapter 93 Water Quality Standards of Title 25 in the Pennsylvania Code.

<table>
<thead>
<tr>
<th>Class</th>
<th>Total (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Quality Waters</td>
<td>127</td>
</tr>
<tr>
<td>Human-made Impoundment/ Pond</td>
<td>1</td>
</tr>
<tr>
<td>Perennial Cold Water Streams</td>
<td>4</td>
</tr>
<tr>
<td>Undesignated</td>
<td>22</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>153</strong></td>
</tr>
</tbody>
</table>

Major streams are East Licking Creek which has a delayed harvest special regulation for fishing, West Licking Creek and Blacklog Creek. All three are productive trout fisheries.

Figure 5. Acres of state forest land in this LMU by forest age classes.

Figure 6. Acres of state forest land in this LMU by Recreation Opportunity Spectrum (ROS, 2012) classifications. ROS is an inventory system developed by the U.S. Forest Service, to characterize land by...
types of recreation experiences. ROS is described on p. 42 of the 2016 SFRMP. “Other Zones” refers to Semi-Developed and Developed zones. Other than not having a primitive zone, this LMU has a nice blend of the different ROS zones allowing most users to be able to find a type of recreation suitable to their expectations. It’s “Other Zone” is due primarily to much of the land base being long and narrow with a road running down the center.

**Table 5.** Core forest index value for state forest land in this LMU. The core forest index is a rating value out of 100 that expresses the proportion of the area within the LMU that is increasingly far away from dense areas of fragmenting features.

<table>
<thead>
<tr>
<th>LMU Name</th>
<th>Core Forest Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licking Creek</td>
<td>96</td>
</tr>
</tbody>
</table>

This score is highest within the district. The score falls within the 69th percentile of all state forest LMUs, making it among the less fragmented areas relative to other portions of state forest land.
Little Buffalo
Landscape Management Unit

Overview
The Little Buffalo LMU is a landscape in the eastern part of Perry County. It consists of only ten acres of state forest land which is the Hoverter & Scholl Box Huckleberry Natural Area. This Natural Area is designated for the box huckleberry colony which is one of three locations where it is found in Pennsylvania. 989 acres of the unit is the Little Buffalo State Park and 2,844 acres of the unit consists of State Game Lands 290, 256, and 281 which makes up the primary public opportunity for recreation. Two-thirds of the unit is covered with forest land, mostly privately-owned. These woodlots and ridgetop forests between farm fields are for the most part not actively managed. The service forester attempts to work with landowners and promote sustainable forest management. However, most of these woodlots are subject to “high-grading” or “diameter limit cutting”. Parent material for the soils in the unit is made up of shale, siltstone, and mudstone. The unit is located in the Chesapeake Bay Watershed.

Priority Goals
1. Ensure the continued survival of the box huckleberry at this location.
2. Monitor for invasive plants or other pests in the Natural Area at least twice a year and evaluate control options as necessary.
3. Manage recreation in the natural area in a way that protects the viability of the colony, while also promoting education of forests and wild plants.

Profile
Table 1. LMU acreage: total and state forest land only.

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Forest Land</td>
<td>10</td>
</tr>
<tr>
<td>LMU Total</td>
<td>97,612</td>
</tr>
</tbody>
</table>

Ecoregion: Ridge and Valley
Figure 1. LMU acreage by land cover categories from the National Land Cover Dataset for the entire LMU.

This LMU is characterized by rolling hills of farmland, large residential lots, small villages and forested hillsides and ridges. The major natural cover type is deciduous forest with a lot of oak forest, but much of the forest is reverting to farm fields.

Table 2. Miles of roads by category on state forest land in this LMU. Road categories are described on p. 199 of the 2016 SFRMP.

<table>
<thead>
<tr>
<th>Road Category</th>
<th>Total Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z1 - Public Use Road</td>
<td>0</td>
</tr>
<tr>
<td>Z2 - Drivable Trail</td>
<td>0</td>
</tr>
<tr>
<td>Z3 - Administrative Road</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
</tr>
</tbody>
</table>

There are no State Forest roads or motorized trails in this LMU. Access to the Natural Area is via Huckleberry road, a township road.

Table 3. Miles of trails on state forest land in this LMU open to various types of recreational use.

<table>
<thead>
<tr>
<th>Trail Category</th>
<th>Total Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiking</td>
<td>0.4</td>
</tr>
<tr>
<td>Biking</td>
<td>0</td>
</tr>
<tr>
<td>Equestrian</td>
<td>0</td>
</tr>
</tbody>
</table>
A short hiking trail is located in the Natural Area.

**Figure 2.** Acreage of state forest land in this LMU by aggregated forest type. The forest types are described on p. 108 of the 2016 SFRMP.

The forest of the Natural Area is dominated by a multi-aged stand of white pine, oak and with some understory hemlock. There is a small portion of old field with black cherry and red maple trees.
Figure 3. Acreage of state forest land in this LMU by site class. Site classes denote the potential quality of the growing site. “Site 0” indicates non-forested lands or forested lands where the vegetation has not yet been typed. Other site classes are described on p. 53 of 2016 SFRMP. The stand is typed as site 2; a small portion could arguably be site 1.
**Figure 4.** Acreage of state forest land in this LMU by management zone. Management zone is dictated by primary land use and land capability. Further descriptions of commerciality and zoning are found on p. 54 of the 2016 SFRMP.

All the State Forest in the LMU is in the Natural Area.

**Figure 5.** Acres of state forest land in this LMU by forest age classes.

The mature trees in the stand are around 140 years old. Younger age classes are initiating in the understory and in openings. There is a distinct age class around 80 – 100 years old and another around 30 years old.

**Table 4.** Miles of stream by classification within entire LMU. Department of Environmental Protection stream classifications are described in Chapter 93 Water Quality Standards of Title 25 in the Pennsylvania Code.

<table>
<thead>
<tr>
<th>Class</th>
<th>Total (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Quality Waters</td>
<td>128</td>
</tr>
<tr>
<td>Perennial Cold Water Streams</td>
<td>8</td>
</tr>
<tr>
<td>Undesignated</td>
<td>149</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>285</strong></td>
</tr>
</tbody>
</table>

The major streams in the LMU are Shermans Creek, Buffalo Creek and Little Buffalo Creek. Water quality is generally good, with agriculture being the greatest impairment to water quality.
Figure 6. Acres of state forest land in this LMU by Recreation Opportunity Spectrum (ROS) classifications. ROS is an inventory system developed by the U.S. Forest Service, to characterize land by types of recreation experiences. ROS is described on p. 42 of the 2016 SFRMP. “Other Zones” refers to Semi-Developed and Developed zones.

The Natural area is small and surrounded by low density residential areas. It serves as a small community park frequented by some locals for a nice walk and some visitors from far away interested in the very old plant.
Tuscarora
Landscape Management Unit

Overview
The Tuscarora LMU is 56,231 acres in size and is located predominantly in northwestern Perry County and southern Juniata County, with a small section in northeastern Franklin County. Twenty-seven percent (15,182 acres) of this LMU consists of state forest land. Thirty-five percent (5,345 acres) of the state forest land is in the James C. Nelson Wild Area where logging is generally prohibited. The other seventy-three percent (41,048 acres) is privately owned forest or farm land. Tuscarora LMU falls into the Ridge and Valley Eco-region of Pennsylvania. The Tuscarora and Conococheague mountains traverse the length of the LMU. There are also various other small ridges and valleys.

Much of this LMU was heavily logged between 1860 and 1920 by the East Waterford Lumber Company, Pine Creek Lumber and Timber Company, Tuscarora Lumber Company and W.P. Zartman, among others. The James C. Nelson Wild Area saw a narrow-gauge railway used to transport the timber and timber products. The James C. Nelson Wild Area also had a narrow-gauge rail system to move sandstone from the side of Tuscarora mountain to the brick plant just outside of Thompsontown. The company operated from 1921 until 1950. Because of this the fire return interval most likely increased until fire suppression was instituted by the Civilian Conservation Corps or (CCC) which happened right after most of the large-scale logging was ending. This LMU had one CCC, located just south of East Waterford in Kansas Valley. Numerous projects and activities were associated with the CCC in this area, such as road construction, fire suppression, trail building and tree planting. The combination of large scale timber harvest, lack of early fire suppression and a low to non-existent deer population contributed to the formation of the current even-aged oak dominated forest type that covers the LMU today.

The Tuscarora LMU consist mostly of mixed oak (86%) forest. This LMU has several disturbance events over the years, everything from timber harvesting, fire, native and non-native insects and weather events, like drought and early or late frost. Logging is currently still a common practice on private lands within the LMU however it generally consists of “high grading” or “diameter limit cutting”. Timber management on state forest lands (excluding the Wild Area) within the LMU usually entails salvage cutting of dead timber or shelterwood cutting followed by overstory removal cutting after regeneration is sufficient to replace the existing forest stand. The current management use of this LMU is predominately that of timber harvesting and other
habitat related work with the overarching goal of reaching a balanced age class distribution and increasing diversity. This LMU also includes a State Forest Wild Plant Sanctuary.

**Priority Goals & Objectives**

1. Create a mosaic of diverse forest types and age classes with the majority in red oak, oak heath, white oak or mixed white oak hemlock stands of various age classes. These should be regenerated to type. Only 6,284 acres of the total LMU are zoned State Forest Multiple Resource and Commercial. Make sure it remains healthy (control gypsy moth), and that young and middle-aged stands are continuously represented across the LMU. Community types to increase in the LMU are white pine and early succession wetlands.

2. Conserve high quality cold water stream habitats of Kansas Valley Run and Horse Valley Run.

3. Provide habitat for species of special concern and high conservation responsibility by conserving, maintaining and increasing habitat quality. Key habitat types include:
   1. Rock habitat with mast producing species especially on Conococheague Mountain and Tuscarora Mountain west of Route 850, an important Mammal Area.
   2. Hemlock and white pine in pure stands, mixed stands and scattered within hardwood stands. Kansas Valley especially has both older and young hemlock and white pine.

4. Maintain a high level of connectivity within this LMU and with the adjacent Bower LMU especially of ridgetop and rocky areas as it is mostly surrounded by agriculture and residential areas.

5. Maintain current level of wild character while providing opportunities for dispersed recreation.
   1. Making some connections of trails in Kansas Valley and with the Bower LMU will improve recreation values.
   2. Improve parking, trails, signs and facilities, while blending aesthetically into the surroundings. Balance infrastructure with the ability to maintain it.
   3. Maintain snowmobile trail and improve access and parking without decreasing primitive, non-motorized areas.
   4. Keep wild character as a high priority in this LMU due to the James C. Nelson Wild Area, other public lands, important connectivity and relatively high “wild character” score. Promote opportunities for primitive recreation experiences.

6. Provide interpretive information to forest visitors and virtual visitors especially about:
   1. Forest management and ecology in the Ridge and Valley Region of central PA.
   2. History & Culture including one CCC camp and two logging railroads, as well as past industrial use of the land and forest recovery.

**Profile**

**Table 1.** LMU acreage: total and state forest land only.

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State Forest Land</strong></td>
<td>15,197</td>
</tr>
<tr>
<td><strong>LMU Total</strong></td>
<td>56,231</td>
</tr>
</tbody>
</table>

**Ecoregion:** Ridge and Valley
This LMU is a nearly continuous linear mountain ridge broken in only a few places by gaps and narrow coves or valleys. The mountain soils are well suited to mixed oak forest with hemlock in the gaps and riparian areas. Very little of this soil is suited to intensive agriculture, or residential or commercial development. Streams and wetlands are small. Evergreen forest, especially white pine, could be increased, but hemlock wooly adelgid has taken a heavy toll on the hemlock. The best scrub oak sites are on Game Lands 88.

Kansas Valley and Little Valley roads are the primary Z1 roads. They provide good access though the multiple resource stands in the LMU. These roads are in good shape. Loop Road and Concord road are the main Z3 roads and are solid, but rough in places. Recent utility work has improved both of these important roads. Access is also provided by state highways. The only access for the public to the James Nelson Wild area is near VanDyke. A right of way exists to the south side but it has never been developed.
Table 3. Miles of trails on state forest land in this LMU open to various types of recreational use.

<table>
<thead>
<tr>
<th>Trail Category</th>
<th>Total Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiking</td>
<td>30</td>
</tr>
<tr>
<td>Biking</td>
<td>30</td>
</tr>
<tr>
<td>Equestrian</td>
<td>30</td>
</tr>
<tr>
<td>X-Skiing</td>
<td>30</td>
</tr>
<tr>
<td>ATV I</td>
<td>0</td>
</tr>
<tr>
<td>ATV II</td>
<td>0</td>
</tr>
<tr>
<td>Snowmobile / Joint Use Road</td>
<td>21</td>
</tr>
</tbody>
</table>

In the winter Kansas Valley and Little Valley, along with Loop Rd and Little Knob Rd, make a nice snowmobile trail (joint use). The remainder of the trails in this LMU are short old fire trails, but are open to most non-motorized uses. There are no trails open to ATVs in the Tuscarora SF.

Figure 2. Acreage of state forest land in this LMU by aggregated forest type. The forest types are described on p. 108 of the 2016 SFRMP.

Red oak grows very well on the mid and lower slopes in this LMU. Growth of mature trees is good although there have been repeated cycles of mortality, mostly as a result of gypsy moth defoliation. Some concerns include undesirable competing vegetation, gypsy moth, hemlock wooly adelgid and perhaps other pests. Regenerating red oak is a challenge. Chestnut oak,
white oak and black oak are common associates in the red oak type, as well as red maple and black birch. Regeneration of mixed oak stands in parts of this LMU has been good; however, a few problem areas remain. The “other hardwoods” component is mostly black birch and is likely to increase as more oak dies without more desirable regeneration. Hemlock is also declining. There are some areas of conifer plantation. White pine seems to do well in Kansas Valley and should be increased there. A block of hemlock in Kansas Valley is treated regularly with insecticide to maintain that hemlock stand.

Figure 3. Acreage of state forest land in this LMU by site class. Site classes denote the potential quality of the growing site. “Site 0” indicates non-forested lands or forested lands where the vegetation has not yet been typed. Other site classes are described on p. 53 of 2016 SFRMP.

Soils in this LMU are generally very good for growing trees, even on steep rocky slopes. The site 3 areas are very rocky and still produce commercial size trees, but harvesting is difficult because of the rock.
Figure 4. Acreage of state forest land in this LMU by management zone. Management zone is dictated by primary land use and land capability. Further descriptions of commerciality and zoning are found on p. 54 of the 2016 SFRMP.

A large portion of the State Forest in this LMU is in the James Nelson Wild Area. The Limited Resource Zone is especially found on the upper, south facing sides of Conococheague and Tuscarora Mountains. Anthropogenic zone is mostly utility rights of way and the Big Knob Tower site. The two acres of special resource zone are maintained in permanent herbaceous openings.
Figure 5. Acres of state forest land in this LMU by forest age classes.

Timber harvesting began in this LMU back in the early 1800’s but did not stimulate much area of new age classes until the logging railroad era, which began around 1890. This era ended in this area around 1920. Therefore, most of the stands are between 100 and 130 years of age. The small peak of stands originating around the 1980’s was due to salvage clearcuts and salvage shelterwood treatments following gypsy moth defoliation.

Table 4. Miles of stream by classification within entire LMU. Department of Environmental Protection stream classifications are described in Chapter 93 Water Quality Standards of Title 25 in the Pennsylvania Code.

<table>
<thead>
<tr>
<th>Class</th>
<th>Total (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Quality Waters</td>
<td>62</td>
</tr>
<tr>
<td>Perennial Cold Water Streams</td>
<td>28</td>
</tr>
<tr>
<td>Undesignated</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td>129</td>
</tr>
</tbody>
</table>

Kansas Valley Run is a high quality cold water stream with naturally reproducing trout. Horse Valley Run is stocked with trout. Laurel Run is impaired by acidity.
Figure 6. Acres of state forest land in this LMU by Recreation Opportunity Spectrum (ROS, 2012) classifications. ROS is an inventory system developed by the U.S. Forest Service, to characterize land by types of recreation experiences. ROS is described on p. 42 of the 2016 SFRMP. “Other Zones” refers to Semi-Developed and Developed zones. A large part of this LMU is zoned “Other” due to its accessibility and proximity to roads. Whenever possible the Semi-Primitive and Semi-Primitive Non-Motorized areas will be maintained as they are and not opened to access by vehicles.

Table 5. Core forest index value for state forest land in this LMU. The core forest index is a rating value out of 100 that expresses the proportion of the area within the LMU that is increasingly far away from dense areas of fragmenting features.

<table>
<thead>
<tr>
<th>LMU Name</th>
<th>Core Forest Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuscarora</td>
<td>95</td>
</tr>
</tbody>
</table>

This score falls within the 55th percentile of all state forest LMUs, which is relatively average level of fragmentation relative to other LMUs.
Tuscarora Forest District: Interpretive Plan

May 9, 2016:

Planning Team Members:
Gene F. Odato
District Forester
Stephen Wacker
Assistant District Forester
David Aurand
Mgmt. Forester
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Theme & Subthemes

Current Interpretation
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Introduction

It is the intent of the Bureau of Forestry to have an interpretive plan in place within each state forest district. Once completed, this plan can stand alone or be placed as an addendum to the District Resource Management Plan. This plan is directly linked to the State Forest Resource Management Plan through key messages and guiding principles.

Interpretation is defined as a mission-based communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource. The interpretive plan is a goal driven process that helps us achieve our mission, protect the resource and provide visitors with the best possible interpretive service.

This State Forest District Interpretive Plan uses a thoughtful planning process to identify the stories, management issues and resources that are specific to each state forest district. Completed plans will help us determine which communication strategies are best suited for achieving our goals and setting priorities will help allocate funds for interpretive projects. Resource conservation requires public understanding and support. Interpretation is one tool to help us achieve that goal.
DCNR and Bureau of Forestry Missions and Key Messages

Both the department and bureau missions and key messages should be present in our interpretive efforts. Keep these in mind as you plan your interpretive projects. If an interpretive project does not address our mission or contain a key message, it should not be considered.

**DCNR Mission**

We conserve and sustain Pennsylvania’s natural resources for present and future generations’ use and enjoyment.

**Vision**

As Pennsylvania’s leader and chief advocate for conservation and outdoor recreation, we will inspire citizens to value their natural resources, engage in conservation practices and experience the outdoors.

**Goals**

- Improve stewardship and management of state parks and forests
- Promote statewide land conservation
- Build and maintain sustainable and attractive communities
- Create outdoor connections for citizens and visitors

**DCNR Key Messages**

- Natural resources are critical to our health, economy, and quality of life.
- Everyone uses and has the opportunity to enjoy Pennsylvania’s vast natural resources.
- The future of Pennsylvania’s natural resources depends on you.

**The Bureau of Forestry’s Mission…**

…is to ensure the long-term health, viability and productivity of the commonwealth’s forests and to conserve native wild plants.

**Bureau of Forestry’s Key Messages:**

The Bureau of Forestry has developed a set of forest-related key messages that complements the department’s communications efforts. The bureau considers and uses these key messages when developing communications products.

**Natural resources are critical to our health, economy, and quality of life.**

- Forests are Pennsylvania’s principal land use.
- Forests provide vital services to society. They clean our air, purify our water, provide habitat for plants and animals, and support key ecological processes.
- Forests provide a renewable source of wood products to society.

**Everyone uses and has the opportunity to enjoy Pennsylvania’s vast natural resources.**

- Healthy forests benefit all citizens, no matter where they live.
- Forests provide nearly boundless opportunities for healthful recreation.
- Forests serve as a source of inspiration and wonder.
- There is a forest to explore near you.

**DCNR leads everyday efforts to conserve Pennsylvania’s natural resources and connect people to the outdoors.**

- DCNR Bureau of Forestry leads Pennsylvania in forest and native wild plant conservation and stewardship.
- DCNR Bureau of Forestry seeks to foster an awareness of the forests’ many uses and values and inspire people to conserve them.

**The future of Pennsylvania’s natural resources depends on you.**

- People and communities every day shape the future of Pennsylvania’s forests.
- Sustaining our forests and associated values depends on wise stewardship.
- We have a responsibility to manage our forests for current and future generations.
State Forest Resource Management Plan: Communications Management Principle

This guiding principle for Communication Management is established in our State Forest Resource Management Plan and should assist in setting the direction of interpretive efforts.

<table>
<thead>
<tr>
<th>Communications Management Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>The citizens of Pennsylvania appreciate the forests of Pennsylvania and their resources and values and are engaged in the issues that affect them.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goals</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To provide education and interpretive opportunities regarding the values, services, and benefits of sustainable forest management.</td>
<td>1.1 Promote Project Learning Tree with Pennsylvania educators and youth leaders through workshops and material support.</td>
</tr>
<tr>
<td>1.2 Promote forestry and conservation through public education and outreach such as the statewide Envirothon, natural gas tours, ECO Camp, and other public programming partnerships.</td>
<td>1.3 Provide forest demonstration areas throughout the state forest system that show forest management practices.</td>
</tr>
<tr>
<td>1.4 Create statewide and district interpretive plans and increase the use of interpretive resources.</td>
<td>1.5 Promote a public stewardship ethic regarding the commonwealth’s forests and wild plant resources.</td>
</tr>
</tbody>
</table>

<p>| 1.6 Develop state-of-the-art resource management centers to house educational displays and stimulate interest in forest conservation. | 2.1 Maintain a steady and available supply of our public use maps, guides, and printed materials. |</p>
<table>
<thead>
<tr>
<th>2. To provide customer service and information that promotes the use and enjoyment of the state forest</th>
<th>2.2 Continually update and utilize electronic media, providing information in an engaging format on the bureau and its work.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. To engage the public and consider input in state forest management decisions.</td>
<td>3.1 Utilize advisory committees to engage stakeholders.</td>
</tr>
<tr>
<td></td>
<td>3.2 Provide information on forests, forest issues, and native wild plants.</td>
</tr>
<tr>
<td></td>
<td>3.3 Plan and coordinate public meetings on specific bureau topics including the SFRMP process and shale-gas management as well as issues of local interest at the district level.</td>
</tr>
<tr>
<td></td>
<td>3.4 Monitor and respond to social media questions and comments.</td>
</tr>
<tr>
<td></td>
<td>3.5 Coordinate responses to public inquiries on state forest management topics.</td>
</tr>
</tbody>
</table>
Overview of Tuscarora State Forest

Introduction

TUSCARORA STATE FOREST

The Tuscarora State Forest is located in south-central Pennsylvania in Cumberland, Franklin, Huntingdon, Juniata, Mifflin, and Perry Counties. It consists of 96,067 acres divided into two distinct blocks, the North Block and the South Block. The district is situated in the Ridge and Valley Eco-Region of Pennsylvania and is bisected by the Juniata River and bordered on the east by the Susquehanna River. The Tuscarora State Forest derives its name from the Tuscarora Mountain that runs southwest to northeast through the region. The mountain was named for the Tuscarora Indians; a tribe adopted by the Iroquois Nation and allowed to migrate through the region around 1714.

History

Land Acquisition History of the Tuscarora State Forest

Goals of Region Wide Interpretive Plans...

- Perry County Comprehensive Plan
- Juniata County Comprehensive Plan
- Mifflin County Comprehensive Plan
- Franklin County Comprehensive Plan
- Cumberland County Comprehensive Plan

Prior to the Europeans settling Pennsylvania, dense forests nearly covered the entire state, with the exception of a few natural meadows in the lowlands and scattered rocky areas in the highlands. These seemingly inexhaustible timber tracts provided the early settlers with
raw materials to produce charcoal for the iron and steel industries, ties for railroads, fuel wood and chemical distillation wood, as well as lumber for homes, buildings, furniture, barrels, and boxes. The settlers never envisioned that such forests could ever disappear. However, as Pennsylvania’s increasing population turned forest land into farms, and as expanding industries consumed more and more wood, the amount of standing timber grew smaller. Then, in the late 1800s, awareness began to grow that the forests were not inexhaustible. Large tracts of land once covered with virgin forests had been cut over and abandoned by the owners. Forest fires burned uncontrolled throughout much of the cutover area. Between 1860 (when Pennsylvania led the nation in lumber production) and 1900 (when it had to import lumber to fill its needs), various efforts were made to halt the depletion of the forests. The future wood supply and the restoration of once-forested areas greatly concerned conservation-minded citizens.

In 1887, the Pennsylvania General Assembly authorized the governor to appoint a committee to examine and consider the subject of forestry in Pennsylvania and report its findings at the next regular session of the legislature. In 1888, a Governor’s Commission was appointed to study the forest situation. Authorized by the legislature once again, the governor appointed a second commission in 1893. As a result of these studies, in 1895, Dr. J. T. Rothrock was appointed Commissioner of Forestry in the newly created Division of Forestry in the Pennsylvania Department of Agriculture.

In 1897, the legislature passed an act authorizing the purchase of unseated lands for forest reservations, thus marking the beginning of the Pennsylvania State Forest System. This act provided for the acquisition of not less than 40,000 acres in the headwaters of each of the main rivers of Pennsylvania, mainly the Delaware, Susquehanna, and Ohio, providing the land selected shall be of a character better suited to the growth of trees than to mining or agriculture, and that 50% of the area have an elevation of not less than 600 feet above sea level. In 1898, 7,500 acres of land in Clinton County became the first land purchased under this new act.

The first state purchase of land in what is now the Tuscarora State Forest was 7,608 acres bought in 1902 from J. Preston Thomas at $1.72 per acre on the Juniata-Mifflin County Line in Licking Creek Valley. Originally called the Rothrock Forest Reserve, this tract was later merged with the Pennypacker and McClure Reserves to form the present Tuscarora State Forest. The Thomas tract was very familiar to Joseph Rothrock when he was a young boy. Timber in that valley had been harvested over a long time, beginning with John Winn in 1840.

The second purchase, also in Licking Creek, was for 6,738-acres from the Logan Iron and Steel Company in 1906. These lands included land previously owned by the Gifford family and the old Bell’s iron furnace in West Licking Creek.

The first major acquisition in the Pennypacker Reserve, now the South Block of the Tuscarora State Forest, was in 1906 when 4,708-acres were bought from Harry W. Meetch. An additional 9,851-acres were acquired that same year from William B. Meetch. In 1907, 4,311-acres were acquired from the Perry Lumber Company of which William B. Meetch was president.

<table>
<thead>
<tr>
<th>Purchased From</th>
<th>Acres</th>
<th>Price($)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Acres</td>
<td>Total Value</td>
<td>Date</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------</td>
<td>--------------</td>
<td>------------</td>
</tr>
<tr>
<td>J. Preston Thomas</td>
<td>7,608</td>
<td>13,114.62</td>
<td>9/30/1902</td>
</tr>
<tr>
<td>Logan Iron &amp; Steel Co.</td>
<td>6,738</td>
<td>23,582.88</td>
<td>2/01/1906</td>
</tr>
<tr>
<td>H. W. Meetch</td>
<td>4,708</td>
<td>12,079.28</td>
<td>9/24/1906</td>
</tr>
<tr>
<td>W. B. Meetch</td>
<td>9,851</td>
<td>27,101.25</td>
<td>1/02/1907</td>
</tr>
<tr>
<td>Perry Lumber Co.</td>
<td>4,311</td>
<td>10,098.36</td>
<td>4/18/1907</td>
</tr>
<tr>
<td>D. S. McNitt</td>
<td>5,156</td>
<td>11,601.56</td>
<td>11/26/1910</td>
</tr>
<tr>
<td>Vincent Lumber Co.</td>
<td>3,570</td>
<td>10,677.00</td>
<td>9/09/1932</td>
</tr>
<tr>
<td>Max N. Manbeck et ux</td>
<td>2,806</td>
<td>11,224.00</td>
<td>5/12/1948</td>
</tr>
<tr>
<td>James M. Junk</td>
<td>1,589</td>
<td>9,540.48</td>
<td>7/27/1950</td>
</tr>
<tr>
<td>U.S. Dept. of Agriculture</td>
<td>4,150</td>
<td>Gift</td>
<td>5/26/1955</td>
</tr>
<tr>
<td>Kaiser Alum. &amp; Chem. Co.</td>
<td>5,373</td>
<td>53,735.83</td>
<td>1/20/1964</td>
</tr>
<tr>
<td>Shippensburg Boro Authority</td>
<td>3,344</td>
<td>1,800,000</td>
<td>2/26/2004</td>
</tr>
</tbody>
</table>

The lands of the Perry Lumber Company were located on Big Round Top, Rising Mountain, and Amberson Ridge. Details of the company’s operations are scarce, but two of the major stockholders were W. B. Meetch and Chas. L. Darlington. They had several portable sawmills located at various places on their land. The Meetch lands extended from Rising Mountain to Bower Mountain and Blue Mountain.

The 4,150-acre tract deeded to the Commonwealth by the United States Department of Agriculture in 1955 were originally acquired by the federal government during the depression years to retire sub-marginal farm land from cultivation and other agricultural uses. The government plan for this area, LU Pa 4, stated that over one-half of the area was non-forest or semi-forest land being farm land under cultivation, abandoned farm lands reseeding naturally, or abandoned farm lands planted in conifers. The two tracts in Fowler Hollow were 100% forested. The plan lists an area of over 3,900 acres in actual and potential timber and with the remainder to be used as leased camp areas and a recreational area in Fowler Hollow.

The 5,373 acres known as the Kaiser Tract were purchased from the Kaiser Aluminum and Chemical Corporation, which had acquired the land in 1938 with the purchase of the Van Dyke Silica Brick Company. The Van Dyke firm obtained the area from Henry Haws who purchased it upon the bankruptcy of the W. P. Zartman Lumber Company in 1917.

Beginning in 1904, Zartman assembled the acreage from smaller landowners and started cutting timber. In 1916, Zartman went bankrupt and abandoned this operation and one of similar size in Dauphin.

Since around 1988, there have been several additions and two deletions to District Acreages. A purchase of 250 acres was made in the Licking Creek Area (Mifflin County) on the North Slope of the Blacklog Mountain. This was called the "Doberman Tract".

A 206 Acre tract in the Spruce Gap area off of Pine Ridge Road was determined to belong to Mifflin County Commissioners. This was called the "Mifflin County Tract".
Another deletion occurred when the 283 acre Spielgelmyer Tract on the Blue Mountain near Denholm was determined to be that of Gerald Spielgelmyer, who owns and operates Spielgelmyer Lumber Company. This transaction took place during 1990 in Juniata County.

Also in 1990, the Bureau purchased the Steltzer Place. This 200 acre tract was very important to the Tuscarora State Forest since it was an interior holding, located in the upper east end of Blacklog Valley within Juniata County. Although the timber was cut extremely hard, it has very high value for wildlife habitat. The Davenport purchase occurred in 1993 and increased the district acreage by 382 acres. It lies on the north side of the Bower Mountain, in Perry County.

Another purchase, which was a little complicated, took place on the Conococheague Mountain's south side near Blain, Perry County. It involved a purchase of three different tracts and a land "swap" which resulted in addition of 96 acres to the District totals. This was the Hoverter/Foreman exchange, and occurred in 1993.

In Huntingdon County the Tuscarora State Forest added 16 acres to it's total with the acquisition of the "Bible-to-Youth Camp" (BYC) grounds in West Licking Creek in 1995. The Commonwealth had previously (1980's) owned this land. The camp had become vacant with the deteriorating buildings, which were burned during the winter of 1997.

A more recent large purchase was the Borough of Shippensburg's forested watershed and reservoir. The 3,344 acre watershed in Gunter's Valley was added to the state forest system in 2004.

One of the more interesting facets of westward expansion into these mountains was the discontinued construction of the Path Valley Railroad tunnel in the Conococheague Mountain near Big Round Top in western Perry County. During discussions with the Perry County Historical Society the foresters realized that if the geology would have supported a train tunnel in the 19th century the western end of Perry and northeastern edge of Franklin Counties would be much different today. So much so that the state forest would not be what exists today. The rural nature of the landscape would be totally different. The train tracks now run the length of the Juniata River and the PA Turnpike goes through the mountains in Franklin and Fulton Counties instead of Perry County.

The major activities of the Civilian Conservation Corps (CCC) program were road construction and improvement, trail improvement, building construction and recreational area development. Most of the present facilities on the Tuscarora State Forest were developed during the CCC era.

The Works Progress Administration (WPA) also contributed major improvements to the Tuscarora state forest during the Depression era. Local unemployed men were hired to build roads and recreational facilities. This was similar to the work of the CCC. A WPA crew was headquartered at the Bryner Ranger Station and built the Fowlers hollow Picnic Area and the Bryner Road. They also worked on various roads and trails in the North Block.

The first modern timber management plan was developed for the Tuscarora state forest in 1952. The original plan covered only the south block of the District. Three years later the plan for the north block was implemented. These original plans were based upon the
development of an uneven-age management system. On January 1, 1965, the plans were amended to permit a gradual transition to an even-age management system.

Previous to this Resource Management Period, the Tuscarora state forest was composed of six ranger divisions. During this period the four divisions, which comprise the south block, Col. Denning, Cole House, Showaker, and Bryner, were combined into one with the headquarters at the Bryner. West Licking Creek and East Licking Creek, which comprised the North Block, were combined and the headquarters located at East Licking Creek. The Bryner Ranger Headquarters was remodeled and two new buildings constructed. A new building was also constructed at East Licking Creek. Two buildings remain at the Showaker and two remain at West Licking Creek. The other buildings were removed at various times.

The Kansas Valley Picnic Area and the County Line Picnic Area were both closed in the fall of 1980. Money and resources were then concentrated on the renovation of Karl Guss Picnic Area. Included in the renovation was a new latrine, new pavilion, a water well, and a new footbridge along with new playground equipment and stones. Recent additions to the picnic area include new road surface, handicapped accessible tables, and the removal of the playground equipment. Also, several areas have been made handicapped accessible, which include the privy, pavilion, water pump, bridge, and two fishing access points. In 1999 and 2001, existing fish habitat structures on Licking Creek within the picnic area were rehabilitated as District Work Projects. During the 1970-1985 management period numerous State-owned buildings, formerly leased as camps, were removed. From 1985–2015 a few more state owned buildings were removed and some leased camps were rebuilt either on the same site or at new locations.

Key Resources and Events
Box Huckleberry Natural Area

In 1845, S. F. Baird, who later became the Secretary of the Smithsonian Institute, discovered an 8-acre colony of box huckleberry (Gaylussacia brachycera). However, it was not until 1918 that it aroused attention. At that time, Dr. F. V. Coville of the U.S. Department of Agriculture, after extensive studies, announced that the entire colony consisted of a single plant at least 1,300 years old. There is a possibility that it might be even older since cultivation and road building may have destroyed parts of the colony.

The box huckleberry forms a dark green mat only a few inches high on the acid soil in which it grows. In May and June, white or pink flowers appear and are followed by light blue fruit in July and August. These berries often lose their interior parts and become nothing but hollow shells.

The plant has creeping stems with upright branches, which bear oval evergreen leaves. The leaves, which resemble those of boxwood, are responsible for the common name of box huckleberry. In late fall and winter the leaves acquire a bronzy hue, lending a bit of color to the winter woodland.

The colony has spread by means of runners whose average growth is about six inches per year. This, coupled with the area occupied by the colony, is the means of determining the age of the plant. Reproduction of this plant from seed is virtually impossible; thousands of seeds produce only a few weak seedlings.
The Commonwealth acquired the 10.18 acres on which the box huckleberry is located in two separate transactions. In 1928, Lillian and Earl Kimmel deeded, by gift, four acres of the box huckleberry colony. The second parcel of 6.18 acres was acquired by the Commonwealth in 1968 from the Raccoon Valley Retreat, Incorporated.

The area, which is located southeast of New Bloomfield, was formally dedicated as a National Natural Landmark by the National Park Service in 1968.

The Frank E. Masland, Jr. Natural Area

Frank E. Masland, Jr. Natural Area is a 1,264 acres Situated between Laurel Run Road, Boiler Trail, Blain-McCrea Road, and the Laurel pipeline. Historically, it has been called “The Laurel Run Wilderness Area” and the timber harvesting has not been permitted since 1950. Along Laurel Run are found large, mature oak, white pine, yellow poplar, and hemlock, and the overall effect is one of unique beauty. Much of this area suffered significant mortality from the gypsy moth and is still recovering.

The Hemlocks Natural Area

The hemlocks Natural Area consists of 131 acres long both sides of Patterson Run. It is a narrow area approximately one and a half miles long and averages about 500 feet in width. The area supports at least 11 tree species including hemlock, red oak, yellow birch, red maple, and chestnut oak.

Nearly fifty percent of the hemlocks are over 24 inches in diameter and 4 ½ feet above the ground. Trees with diameters above 340 inches are common, and several exceed 40 inches in diameter. The largest tree measured is a 52-inch hemlock 109 feet tall, and the tallest one measured is a 38-inch hemlock 123 feet tall. A ring count of a cross section of a wind-thrown hemlock established the age of the oldest trees at 280 years. The area was officially designated as a Natural Area in 1970.

Hemlock wooly adelgid was first found at this site in 1999 but it may have been present before that. In 2001 the predatory beetle *Pseudoscyumnus tsuga*, was released to combat the infestation. By 2002 most of the hemlock trees in the natural area were in obvious decline and some had already died. A project review was proposed to treat selected trees in the Natural Area with insecticide to try to save some of the large old trees that the Natural Area was established to protect. This project is continuing and several research projects are underway to monitor the impact of the adelgid, the insecticide, and the changes to this ecosystem. Treatment to preserve at least a remnant of this small patch of old growth habitat should continue.

These natural areas also have the only special protection amphibian and reptile regulation in the Forest. The killing or taking these species is strictly prohibited.

The Gunter dam and reservoir formerly owned by Shippensburg Water Authority is in the Gunter Valley. The dame is scheduled to be removed in 2017 and Trout Run will run free again. The former reservoir area will be re-vegetated and the stream improvement devices will be placed in the stream. A few low water impoundments will hopefully be designed and installed to improve wildlife habitat.
East Licking Creek, a High Quality stream, is designated Delayed Harvest Only, Artificial Lures Only. This is the most popular trout stream in the state forest. Trout Unlimited has worked with the Tuscarora State Forest Staff and the PA Fish and Boat Commission to improve ATV access to the stream in order to stock the stream with trout. The recreational experience has been enhanced by distributing the stocked trout throughout the stream and not just at the bridge and picnic area.

There are several large scale events that occur on the state forest. The largest being the Enduro, a motorcycle event in June that attracts hundreds of off-road motorcycles. A fifty mile foot race and mountain bike race also make use of the south block portion of the state forest.

Many people enjoy the state forest just for the beauty of nature. So many drive the roads hoping to see a bear or a rattlesnake. Some drive long distances to see the spring migration of warblers and even more come out to hunt deer, bear and turkeys. The hundreds of miles of hiking/biking/equestrian trails are used throughout the year. One of the most popular trails is the Flat Rock trail that begins in Colonel Denning SP. Any given day will have people hiking the trail so they can visit the Flat Rock Vista.

Purpose and Goals

Purpose

The Tuscarora State Forest is one of the 20 state forests administered by the Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry. It comprises about 4% of the 2.1 million-acre state forest systems. Within the bureau, the administrative responsibility of the Tuscarora State Forest is delegated to the district forester, whose office is located at 4455 Big Spring Road Blain, Pennsylvania 17006-9734. The district forester is responsible for executing all of the sections of the State Forest Resource Management Plan. The Tuscarora State Forest has been reserved for timber production, recreation, and clean water supply.

District Interpretive Goals

7. Foster an awareness and encourage sustainable use of resources by communicating, promoting and modeling good stewardship and best management practices.
8. Encourage exploration and participation in low impact recreation within the Tuscarora State Forest.
9. Support effective partnerships with local communities that benefit the community, the resource and the visitor.
10. Develop engaging experiences that promote intellectual and emotional connections between the resource and visitors.
11. Communicate the ongoing challenges of balancing natural resource use with society’s needs, wants and desires.
12. To foster an appreciation and understanding of the history of Pennsylvania’s forests and their role in our lives.
Objectives (outputs, outcomes and impacts)
The objectives provide a measurable way in which the goals will be accomplished.

Outputs:

1. Interpret and communicate to the visitor our resource management efforts while maintaining the wild character of the state forest. (Goal 2, 4, 5, 6)
2. Develop at least one program or project with the Juniata/Perry County Forest Landowners group or the Tuscarora Forest Property Owners. (Goal 2, 3, 4, 5)
3. Work cooperatively with County Historical Societies and the Perry County 2020 to interpret the history of the region. (Goal 2, 3, 4, 6)
4. Provide and maintain historic, cultural and natural history waysides through Tuscarora Treasures. (Goal 2, 4, 5, 6)
5. Maintain a variety of recreational program offerings. (Goal 1 and 4)
6. Increase the visibility of the state forest by attending at least one community event where the state forest is promoted. (Goal 1, 3, 4, 5)
7. Work cooperatively with local school districts to serve as an outdoor classroom/laboratory. (Goal 2, 3, 4, 5)
8. Develop at least one additional volunteer opportunity. (Goal 3, 6)
9. Maintain a Community Recycling program at the district office. (Goal 1, 3)
10. Maintain a self-guided auto tour in North and South Blocks of the Tuscarora. (Goal 1, 2)

Outcomes: The anticipated short-term action resulting from the above outputs – “What the visitor will do.” Link them to the outputs.

1. Volunteerism will increase by 5% at Tuscarora State Forest (Outputs 1, 7, 9).
2. Vandalism will decrease by 15%.
3. Litter will decrease by 10%.
4. School group visitation will increase by 2%.
5. Friends group participation will increase by 15%.
6. General support will increase by 10%.
7. Rattlesnake survival is increasing.
8. Increase the # of Private Forest Landowners that adopt Silvicultural Best Management Practices.

Impacts: The long-term benefits to the state forest as a result of the above outputs and outcomes – What happens long-term. Link these to outcomes.

1. Staff time devoted to litter pick up will decrease by 15%. (Outcome 3)
2. Demands on staff time and operational budget required for state forest projects will be re-directed to other needs because of volunteer efforts. (Outcomes 1, 5)
3. BoF programs will receive adequate public support and funding. (Outcome 6)
Audiences and Market Considerations

Who makes up your current audience/visitors? Who are the players involved in the use and stewardship of your state forest? Are there any groups not serviced that you would like to include? Have you provided interpretation for all of your audiences?

1) **Current Visitors**
- During the summer and fall season of 2014 with the help of Colonel Denning State Park staff we surveyed hikers on the Flat Rock Trail. We found out that people from 7 states, and all parts of Pennsylvania came to hike out to the vista on Blue Mountain.
- A glance at our camping permits will show that we do get some campers from a few other states but mostly south-central PA.
- During large snow events snowmobilers from all over PA are attracted to visit the trails because of our snow grooming and excellent trails.
- Hunters and fisherman love to practice their sport in the wilds of the Tuscarora.
- People enjoy driving the roads to enjoy the scenery and hoping to get a glimpse of wildlife.
- Fourth grades from West Perry School District and others visit the Hickory Ridge Demonstration Area in May.
- Pipeline and forest workers visit the office to meet with staff and to see the live poisonous snakes. They tend not to kill them as they once did.
- Historians

2) **Current Web Visitors**
(a) Web visitors (9,000+) are typically visiting our Facebook page. Ease of operation allows us to maintain a friendly, interesting and responsive page. Our Facebook page has attracted worldwide attention because of our efforts with trail cameras.
(b) We have updated the webpage and people do visit it.

3) **Key Audiences**
- Hunters
- Fisherman
- Campers
- Driving tours
- Birders
- School age students
- Snowmobilers
- Hikers
- Mountain Bikers
- Pipeline and forest workers
- Private Forest Landowners
- Historians
- Mobility Device Permit Holders

4) **Future Markets and Trends**
- We see a future market in larger groups of extreme sports enthusiasts like 50K foot and Mountain bike races.
- Since we stopped stocking the trout streams there has been a drop in the numbers of fisherman on the streams.
- The number of birders is possibly trending upwards because of the good population of spring warblers.
- We expect to see more people using the river islands by kayak and canoe.
Kayak use on the river is definitely increasing at this time.

- We would like to see more forest landowners visit the state forest and become more in-tune with sustainable forestry.
- The mobility device permit program has improved access for dozens of visitors.
- Senior citizens and children need easier walking trails at the SF picnic areas.
- The continued use of social media, QR codes and the like will allow us to maintain contact with visitors through electronic media.
- The Tuscarora SF recognizes the importance of the PA Statewide Comprehensive Outdoor Recreation Plan (SCORP) and will continue to cultivate connections with the local community.

5) Theme and Sub-themes
The theme is a central statement that is the guiding message for all interpretation at the state forest. It defines the approach that interpretation will take. If this theme is correctly interpreted through a variety of media, it is the message that visitors take home. Sub-themes further develop the theme and are the logical progression into storylines. These are the stories that are important to you district. What do you want the visitor to know about your forest district? What message do you want the visitor to take home?

**Central Theme:** Tuscarora State Forest connects the past with the present through sound management of its forest resources.

**Sub-themes:**
Tuscarora State Forest resources will survive for future generations’ use and enjoyment through sound resource management and active stewardship.

- Develop Tuscarora Treasures to highlight important and interesting historical and natural resources.
- Tuscarora State Forest is part of a larger landscape influenced by surrounding communities.
- Maintain a healthy relationship with the community through fire protection and prevention, Special Activities and Commercial Activities Agreements for concessionaires.
- Our take home message should be one that motivates people to make the connections with our resources.

**Current Interpretation (personal and non-personal)**
Create an inventory and overview of the programs, waysides, exhibits, brochures, maps, etc., currently offered by this state forest.

- Personal
- Non-personal

**Issues, Challenges and Opportunities**
Key issues and challenges to interpretation/operations at the site and a list of possible solutions to each of these concerns. Interpretation is a management strategy.
How can you use interpretation to resolve some of your key management issues?

Many of the management issues are centered on vandalism and the repair and maintenance thereof. It is a challenge to stay ahead of the constant vandalism that occurs to every aspect of our business. Roads and ditches are rutted and tore up by 4x4 trucks, dirt bikes and ATV’s. Driving around gates, damage to gates, locks cut, bathrooms ruined, picnic tables burned, vistas with graffiti, fire towers damaged and stolen signs are but a few of the issues. Interpretative panels and posters can help to advertise the financial burden that vandalism brings to the state forest. Picnic Areas and fire towers have been discontinued due to the constant vandalism. Our challenge is to stay ahead of the vandals with unique ways to impede their progress. Simple things such as the use of vertical posts for road signs instead of horizontal boards have alleviated theft.

A second full-time ranger would help to deliver messages and provide law enforcement to deter criminal action.

Recommendations for Personal (P) and Non-personal (NP) Media

This section includes the specific descriptions for personal (staffing, programs) and non-personal (exhibits, publications, waysides, etc.) media as well as costs for each recommendation.

This is how you accomplish the objectives and prioritize your interpretive projects and funding.

This section is linked to the Project Request Sheet/Share Point Site. Your priorities become our priorities.

<table>
<thead>
<tr>
<th><em>Priority</em></th>
<th>*Rec Number</th>
<th>Recommendations (in priority order)</th>
<th>Corresponding Objectives</th>
<th>Estimated Cost</th>
<th>Project Lead</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Personal Services (P):</td>
<td></td>
<td></td>
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<tr>
<td>P1</td>
<td>1</td>
<td>Staffing (2 additional) 1 salaried/1 seasonal</td>
<td>$80,000/year</td>
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<td>P2</td>
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<td>Book</td>
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<td>P3</td>
<td>3</td>
<td>Campsite on-line registration</td>
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<td>Recreational Program - toboggan runs</td>
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<td>Description</td>
<td>Cost</td>
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<td>P5</td>
<td>Rattlesnake cages, food, brochure</td>
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<td>P6</td>
<td>Exhibit photos and taxidermy mounts</td>
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<td>Shaffer</td>
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<td><strong>Non Personal Services (NP):</strong></td>
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<td>NP1</td>
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<td>NP2</td>
<td>Interactive web site</td>
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<td>NP3</td>
<td>State Forest Welcome sign/Big Round Top</td>
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<td>State Forest Welcome sign and kiosk Gunters Valley</td>
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<td>NP11</td>
<td>Trail Cameras – take photos for Facebook</td>
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</table>

*The Priority number and Recommendation Number are needed when requesting an interpretive project from the Communication Section.

**Evaluation Strategies**

- How did we do?
- These are the methods that will be used to measure the effectiveness in meeting the objectives.
• Is that wayside effective?
• Are there less complaints?
• Review this plan every cycle in conjunction with the District Management Plan and SFRMP to discuss updates and changes needed.

Implementation Plan
For this section, you can take the recommendations and group them into “Ongoing Efforts”, “Phase I” and “Phase II” projects, if that is helpful in planning.

References
Comment card distribution
District 3 State Forest Resource Management Plan
Tuscarora State Forest map
Oak Regeneration Study
Woodrat Management Plan
Doubling Gap Recreation Plan