Mason-Dixon Council
Boy Scouts of America

Camp Sinoquipe

Forest Management Plan

2016
FOREST MANAGEMENT PLAN

Camp Sinoquipe

March 2016

+/- 507 Acres (GIS)

Property Location:
Town of Fort Littleton
Fulton County, Pennsylvania

Prepared For:
Mason-Dixon Council
Boy Scouts of America
Mark Barbernitz, Scout Executive
18600 Crestwood Drive
Hagerstown, MD 21742

Prepared By:
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Bellefonte, PA 16823
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Property Uses & Management Goals

Understanding the uses of a property and the management goals are the most crucial start to the management planning process and guide direction for management activities. Based on discussions with the council, the property uses and goals for management are understood as follows:

Property Uses

- Camp for Boy Scouts
- Hiking
- Horseback riding
- Cross country skiing
- A place of solitude and mental/physical/spiritual renewal
- Bird watching
- Wildlife watching
- Fishing

Management Goals

- Preservation of the natural environment of the site.
- Protection of the Camp Program areas.
- The health and safety of facility users.
- Forest resource management to provide income to support the other objectives.
- Timber harvesting of any kind will focus on forest health, and will not be conducted for the sole purpose of financial needs.
- Adhere to all Conservation and Management objectives set forth in the Conservation and Environmental Education Plan, which was prepared by the Mason-Dixon Council on August 28, 2014.

This report has been developed to characterize the timber resources of the property and outline recommendations for sustainable management within the bounds of these management goals.
Executive Summary

Ownership Information

**Tract Name:** Camp Sinoquipe  
**Owner Name:** Mason-Dixon Council, Boy Scouts of America  
**Contact Person:** Mark Barbernitz, Scout Executive  
**Contact Person Address:** 18600 Crestwood Drive, Hagerstown, MD 21742  
**Contact Person Phone No.:** Office: 301.739.1211 Mobile: 717.519.7970  
**Contact Person Email Address:** mark.barbernitz@scouting.org  
**Property Location:** 684 Boy Scout Road, Fort Littleton, PA  
**Tax Parcel ID#:** 05-12-007A, 05-12-007D, 05-12-054, 05-14-039, and 05-14-041  
**Deed Book/Page:** 0323/0048, 0089/0215, 0070/0282, and 0058/0035  
**Total Acreage of Property:** +/- 507  
**Total Management Stand Acreage:** 482  
**Number of Management Stands:** 11

Property Description

**General History:**
The property has a diverse land use history that includes farming, logging, and recreation. This can be seen by evidence of old farming and homestead areas, particularly on the northern portion of the property. There is an old graveyard and evidence of an old logging railroad located on the southern portion of the property.

**Access:**
There is +/- 4,300 feet of frontage on Boy Scout Road and +/- 900 feet of frontage on Plum Hollow Road. Internal access is provided by way of established access roads and maintained recreational trails.

There is an existing landing for harvest operations located off the main access road on the northern portion of the property. No landings currently exist south of Boy Scout Road.

**Boundary Line Maintenance:**
**Length:** 6.45 miles total estimated perimeter (as mapped)  
**Paint Color:** None  
**Condition:** Poor  
**Last Maintenance:** Unmaintained  
**Next Scheduled Maintenance:** 2016  
Boundary lines should be re-painted every +/- 10 years depending on condition.
Topographic and Water Features Present:
This ownership has significant topographic diversity that includes gentle slopes, steep slopes, flat bottomland, a plateau, deep ravines, gullies, drainages and side hill finger ridges, and rolling terrain. It is equally diverse in water features that include spring seeps, vernal pools, a lake, intermittent drainages, and permanent creeks. Plum Run and Little Aughwick creek are the most pronounced creeks on the property. The Genesee River also splits and re-converges within the confines of the ownership forming an island of land - a unique land form feature. The soils range from well drained to poorly drained, and in most areas where the terrain is steep or along drainages and creeks are deep and highly erodible; there is much evidence of past landslides and sloughing. The terrain and sensitive soils will present operational challenges and limitations in some areas.

Special or Unique Features:
Wetland area southwest of Lake Sinoquipe
All Camp related facilities and sites
Old Railroad grade in stand 7, which is now used for a hiking trail

Rare, Threatened, or Endangered Species:
An inquiry was made to the Pennsylvania Natural Heritage Program. Records from the PA Game Commission, the PA Fish & Boat Commission, the US Fish & Wildlife Service indicate that there are no rare, threatened, or endangered species or any known habitats of special concern present on this property. Records from the PA Department of Conservation and Natural Resources however indicated a “potential impact”, and further review was needed. A follow-up with PA DCNR indicated a record of wild lupine within the camp boundaries. These documents are located in the Appendix section later on in this report.

The camp was also documented in the Fulton County Natural Heritage Inventory (June 2008) as having habitat for a ‘species of special concern’, an animal that inhabits primarily open areas with loose sandy soils. This report also states that the northern portion of camp provides habitat for a ‘vulnerable plant species of special concern’, a wildflower that inhabits dry sandy soils in open environments.
Cover Type Summary:

Distribution of Cover Type (482 Ac.)

Detailed descriptions of forest cover types can be found under the Forest Cover Type tab of this report and the cover type is designated individually for each stand under their respective stand description in this report.

Timber Size Class Summary:

Size Class Distribution (482 Ac.)

Average size class has been designated individually for each commercial stand under their respective stand descriptions in this report.
Management History/Plan Updates & Changes:

Original Plan/Enrollment: 1997

Last Update: 1997

Changes: A timber survey was completed in 2010, but no updates to the original plan were made at that time.

History:

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Tract Summary of Inventory Data

All volumes are estimates based on a statistical sample. Volumes will vary plus or minus depending on sample size and are not guaranteed. These figures are not intended for use in advertising the sale of standing timber or real estate; Forecon, Inc. cannot guarantee any result if used in such a manner.

Species Comp (% Basal Area)

Sawtimber Volume (D): +/- 3,407,500 BF

- Chestnut Oak: 173,800
- Hickory: 219,600
- White Oak: 689,500
- White Pine: 1,352,600
- Other: 267,300
- Red Oak: 244,400
- Red Maple: 69,800
- Hemlock: 148,700
- Sugar Maple: 160,600
- Black Oak: 81,200

Density of Seedling Regen (% Plots)

- Low: 73%
- None: 12%
- Moderate: 15%

Density of Sapling Regen (% Plots)

- High: 1%
- None: 2%
- Moderate: 15%
- Low: 62%

Density of Woody Comp (% Plots)

- Primary Types: Witch Hazel, Spicebush, Beech

- None: 39%
- Low: 53%
- Moderate: 8%

Density of Herbaceous Comp (% Plots)

- Primary Types: Fern, Greenbriar

- None: 29%
- Low: 66%
- Moderate: 3%
All mapping was prepared using the best available information about the property from various sources and does not represent instrument survey accuracy. Acreages are estimated using geographic information system (GIS) technology and may not be consistent with acreages calculated by the county tax office or the ownership deed. This map is not a legal survey.
All mapping was prepared using the best available information about the property but cannot ensure and does not guarantee the accuracy of the mapping. Acreages are estimated using geographic information system (GIS) technology and may not be consistent with acreages calculated by the county tax office or the ownership deed. This map is not a legal survey.
None. Acknowledgment of the U.S. Geological Survey would be appreciated in products derived from these data.

BOY SCOUTS OF AMERICA
MASON-DIXON COUNCIL
CAMP SINOQUIPE
507 GIS ACRES
SINOQUIPE ROAD
DUBLIN TOWNSHIP
FULTON COUNTY, PA
MARCH 2016
USGS TOPOGRAPHY

All mapping was prepared using the best available information about the property from various sources and does not represent instrument survey accuracy. Acreages are estimated using geographic information system (GIS) technology and may not be consistent with acreages calculated by the county tax office or ownership deed. This map is not a legal survey.
Forest Inventory & Data Management Methodology

Before forest management recommendations can be made, an inventory of the forest must first be conducted. The information gathered from that inventory is the foundation for making forest management decisions and determining the appropriate silvicultural treatments for sustainability. It is also the first stage in seeking answers to the questions: “What do we have?”; “What’s its condition?”; and “Can we achieve our goals?”

Forest Type Mapping & Stand Delineation

An important step of the inventory process is to identify and delineate the different management areas of the forest (forest stands). This delineation is typically based on the combination of three variables: 1) forest cover type (i.e. northern hardwood, central hardwood, etc.); 2) Density or Stocking level (i.e. overstocked, understocked, etc.); and 3) size classification (i.e. saplings, poles, sawtimber, etc.). Where necessary or sensible, stand boundaries may also be delineated using physical features (i.e. streams, roads, topographic features, etc.).

The inventory method used for this management plan allows for thorough systematic coverage of forested areas. As such, we are able to accurately identify and map changes in forest type, stocking, and size class during the inventory process. Using this information together with current aerial imagery and topographic maps, we are able to clearly group the forest into stands for management.

Individual forest stand for this property are delineated over aerial imagery and topographic mapping that can be found later in this report.

Sampling & Statistical Modeling

The inventory is merely a sampling process. Small samples, or plots, are placed throughout the forest where information is collected from a set of trees at each location. Using a statistical procedure, the data from these samples are combined to calculate averages and create models of the structure and condition of the forest as a whole. The variable plot radius method (also called point sampling) was used to sample the forest for this management plan. This is one of the more common forest inventory methods used for forest management planning by the forestry profession.

The points were systematically located in grid fashion to achieve an even representative distribution across the forest. At each point, sample trees were identified by species; their diameter at breast height was measured in inches (DBH – measured 4.5 feet above the ground); their merchantable height was measured in the number of 16 foot logs to the nearest half log (i.e. 1 log = 16 feet; 1 ½ logs = 24 feet; etc.); tree quality was determined (acceptable growing stock or unacceptable growing stock); each tree was classified for its primary product (sawtimber, pulpwood, or cull); and the percent observable defect was estimated in 10% increments. Other observations made at each plot location may include: seedling and sapling regeneration; seedling, sapling, and pole quality; deer browse impact, and competing vegetation.

Detailed inventory specifications can also be found in the appendix of this report.

Disclaimers

All mapping was prepared for forest management planning purposes using the best available information about the property and does not represent instrument survey accuracy. Acreages are estimated for management planning purposes using geographic information system (GIS) technology and may not be consistent with acreages calculated by the county tax office or the ownership deed. Boundary line positions on the map may have been adjusted from county tax office mapping, but only where gross discrepancies were discovered in the field based on existing geographic/physical features. Inventory data
is calculated and reported using GIS acres. As such, it may be necessary to adjust volumes and/or the mapping itself if used for other purposes (i.e. sale of property, certified property appraisal, tax abatement programs, etc.).

The forest was inventoried through statistical sampling to determine stocking, structure, and condition of the forest. Statistical sampling has varying degrees of accuracy compared to 100% sampling, especially for sawtimber volume and value. Data was collected from small saplings to large mature trees and was used to characterize forest cover type, tree species composition, tree condition and quality, for prescribing silvicultural treatments, and for use in management planning. References to volume are rudimentary, and only provide rough estimations. Furthermore, estimates of volume were not intended for use in advertising the sale of timber and/or real estate; FORECON, Inc. cannot guarantee any result if used in such a manner. FORECON, Inc. should be contacted for additional consultation if it is desirable to use this information for anything beyond the intended use associated with this plan.

Please also note in smaller stands, sample sizes are also small. The smaller the sample size the less reliable the data becomes. Figures from smaller stands need to be used carefully with this in mind.
Forest Type

Central Hardwoods, or Oak-Hickory are represented by stands where the dominant species are red oak, white oak, chestnut oak, black oak, etc. Hickory, black gum, red maple, sugar maple, tulip poplar, white ash, black cherry, basswood, and black walnut are the more common tree associates found growing secondarily with this type.

Shrub species commonly found in the understory of this forest type include dogwood, sassafras, ironwood, blue beech, blueberry, hazelnut, rhododendron and witch-hazel.

These forests tend to grow in well-drained drier sandier soils.

Mixed Hardwoods & Softwoods, or Oak-Pine are represented by stands where half or more of the stocking is made up by softwoods (i.e. conifers/evergreens like hemlock, pine, spruce). Red maple, black cherry, yellow birch, black birch, American beech, and sugar maple are the more common hardwood components of this forest type.

Rhododendron, witch-hazel, and striped maple are the typical shrub species found in the understory of this type. A sparse herbaceous layer (mostly fern) and a rich moss layer are common.

This forest type can be found across soils with a fairly broad range of drainage patterns, from moist but well drained upland areas to poorly drained lowland areas. Natural mixed forests, however, are found more often than not in lowland areas along creeks and other water bodies.
**Early successional forest**, or transition forest, is a generic term widely used to describe forests that have naturally developed and evolved on abandoned fields and pastures. They are found on a wide variety of sites and soil conditions, and vary in species composition, stocking, condition, and quality. Aspen, elm, white ash, red maple, black cherry, white pine, gray birch, pin cherry, thorn apple, blue beech, iron wood, service berry, etc. are common tree species in transition forests. Grasses and other types of herbaceous vegetation are also a common component of these sites. The tree species tend to be relatively short lived and in many cases will eventually be replaced by other longer-lived species as the site continues to evolve and change. They are in transition, not yet having fully developed into commercially manageable forest. For the most part these areas have little commercial value with limited management opportunities; they do, however, provide important forest cover and add habitat diversity to a property. Outside of any habitat management activities, common practice is to allow them to continue developing on their own.
Forest Health & Condition

Competing Vegetation

Competing vegetation refers to those species of trees, shrubs, or plants that would interfere with the ability of commercially or ecologically important species to regenerate, survive, and grow. Ferns, beech, striped maple, and black birch are some the most common types of interfering vegetation encountered in the forest.

Ferns are aggressive, they prosper in shade as easily as they do in full sunlight, and are capable of spreading quickly by way of their root system and by seed. They are capable of forming a dense layer of intense shade and competition on the forest floor where seed germination occurs, essentially stopping other species from regenerating. Research has found that the presence of ferns can reduce the number of desirable seedlings by as much as 80% compared to stands where ferns were controlled.

Their aggressive nature is illustrated in the series of pictures below. The first picture to the far left is of a forested area prior to harvest. While they do not overwhelm the site, ferns are noticeably present. The second picture in the middle is taken at the same location immediately following the clearing of a 1-acre patch that was purposely created to regenerate hardwoods; the ferns were not perceived as a problem and were not treated prior to harvest. The last picture is taken at the same patch cut location 1 year following treatment. The ferns have invaded and spread to completely cover the site. At this fern density tree seeds are unable to germinate, become established, and survive. This happens commonly when fern cover is not properly evaluated prior to prescribing regeneration treatments.
Beech spread aggressively; they prosper very well in shade and are able to grow new trees directly from their root systems (referred to as root suckering). This often gives beech an advantage over other tree species that must germinate from seed. Their tolerance to shade allows them to develop at a faster rate, and they are able draw water and nutrients through a well-established and often extensive root system – they have a head start. They often form dense thickets, creating intense shade in the understory. Other species struggle to compete for light, water, and nutrients.

All of the saplings in the top right picture are beech trees in a thicket that formed through suckering; it shows how extensively they are able to dominate an area.

Beech suckering is especially widespread following the harvest of a larger tree (i.e. 6” +); the second picture down to the right shows where this has occurred. In the upper middle of the picture is a barely discernable beech stump. The stump itself has sprouted to the point of obscurity, and root suckers have formed a thick carpet around it. This will easily develop into a thicket of saplings like the picture above.

Striped maple produces large quantities of seed and has a high germination rate. Like beech, they form dense thickets and create very intense shade that prohibits other tree species from germinating, becoming established, and surviving with any degree of success. They are able to tolerate shade and in large populations their broad leaves create umbrella like conditions like that formed in the third picture down to the right.

Black birch is another tree species that reproduces in large numbers. It has a moderate tolerance to shade, but responds very well in sunlight. If seed producing trees of even minor abundance are present they can produce enough seed to easily invade harvested sites, especially where large openings were created. The bottom picture to the right is of a forest that had been previously harvested. The vast majority of the light brown colored saplings in the understory are black birch.

Invasive species are a serious concern for forest management and regeneration. Some of the more common native and non-native species include: grape vine, garlic mustard, Japanese knotweed, honeysuckle, multiflora rose, mile-a-minute weed, Japanese stilt grass, and bindweed (Photos below). All of these grow aggressively and threaten the successful regeneration of other desirable species.
Competing Vegetation and Invasive Species Control

Species of competing vegetation like birch, striped maple, ironwood, etc. can be controlled through manual cutting. However, this is not always the most cost effective form of control as efficiencies vary with the age, size, and densities of the trees and the size of the site.

Merely cutting species like beech, grapevine, or the invasive herbaceous vegetation summarized above does not eliminate the problems they create for regeneration – they just keep coming back and can actually worsen from cutting. These species can be managed with limited success, through manual cutting and pulling, but only through regular dedicated treatment; and there are still no guarantees. The most effective and efficient form of control is through the application of herbicides. Handheld application with backpack spraying equipment is effective for small areas of herbaceous vegetation where herbicide is sprayed directly on the foliage or a pre-emergent herbicide (for herbaceous plants) is sprayed on the ground in early spring.

For beech trees and grapevine, hand application is also an effective tool; a specially formulated chemical can be applied directly on the bark at the base of the tree, where it will absorb through, killing it. The same chemical can be applied to a fresh cut stump or vine with even greater effectiveness, as it will be drawn down into and spread throughout the root system killing it and any suckers growing from it.

Where chemical control over a large area is required, ground vegetation and saplings can be mechanically treated using wheel or track driven machines mounted with mist sprayers. Mechanical spraying is very effective, but it is sometimes necessary to follow up with spot hand treatment to deal with taller trees that the mist sprayers could not reach (typically anything over 15 feet in height) or any patches that were missed.

The picture below illustrates the benefits of treating competing vegetation with herbicide. This area was densely populated by beech and striped maple. The dense vegetation that is still green in the background marks the boundary line with the neighboring property, beyond which chemical was not applied. The area in the foreground was just as dense prior to treatment. The difference is quite dramatic. The herbicide treatment was effective in killing the beech and striped maple. With sunlight able to reach the ground other species have the opportunity to germinate, become established, and survive. The best window for regeneration to develop and colonize the site is typically between 3 and 5 years after treatment.
The pair of pictures below is an example of fern control through the mechanical application of herbicides. The picture to the left is of an area dominated by fern. The picture to the right was taken at the same location one year after the area had been treated with herbicide. The treatment was successful.

If handled and used correctly according to the manufactures directions, herbicides are safe and approved for use in the forest. Glyphosate or Sulfmetruon-methyl are the most common chemical ingredients in herbicides used for treating ferns and grasses or for application on foliage. Glyphosate is one of the more common chemical ingredients in herbicides used for basal bark, cut stump, or frilling application. These chemicals are environmentally friendly having no soil activity because they have high rate of absorption in the plant material and bind tightly to soil particles; they are broken down quickly by microorganisms and sunlight and have a short half-life of approximately 30-45 days.

Sulfmetruon-methyl is somewhat mobile in runoff if exposed to rain immediately after application – none of these, however, is a threat to ground water or aquatic organisms; they are categorized by the EPA as the least toxic and do not cause health problems like cancer, mutations, nerve damage, DNA damage, or birth defects in humans or animals; and in animals they do not accumulate in the food chain. These chemicals only affect plants, because animals do not have the same enzymes that are affected by them. Furthermore these chemicals are laced with a repellent to deter animals from eating the vegetation that has been treated.

All chemicals should be applied according to manufacturers Material Safety Data Sheets (MSDS). Herbicides should be minimally applied to achieve the desired result, and should be applied by a trained and licensed applicator.
Deer Impacts

Deer can have a significant negative impact on young seedlings and must be considered when managing for forest regeneration. One of their primary feeding mechanisms is to browse on the young tender shoots of tree seedlings and shrubs. In doing so they remove buds and kill a small portion of the stem; the buds are critical to the future growth, development, and form of trees. Regular and repeated browsing can have a pruning effect on young trees, causing them to become poorly formed (i.e. crooked or bushy/bonsai-like) and prevents them from growing taller.

When the deer population exceeds the ability of the range to support it, damage to timber or farm and vegetable crops occurs, and forest sustainability is threatened. Deer populations in many parts of the northeastern U.S. are high and present a considerable problem for the successful regeneration of forests. Excessive browsing will result in death among seedlings and is chiefly responsible for substantial losses - forest sustainability is at risk in many areas. Deer numbers continue to increase, which is evidenced by the widespread reports of damage caused to trees, shrubs, and plants in residential settings, as they search beyond the forest for additional sources of food.

Deer Management and the Woodland Owner:

The woodland owner plays an important role in deer management. Effective deer management is a combination of actions by government agencies, landowners, and hunters. The first and most fundamental tool in deer management is to control the harvest. Overall control of the deer harvest is accomplished by the state agency regulations, which set the open hunting seasons and bag limits each year. The length of the seasons and the bag limits may be vary for different parts of the state based on deer populations and hunting pressure. They are designed to give hunters a chance to harvest the proper number of deer from the standpoint of herd management to satisfy the demand for recreational hunting. These regulations and their enforcement are the state’s share of the management process.

Deer are a natural part of the forest, a community that supplies them with food and cover. Deer populations within the carrying capacity of the range cause no serious damage. Overpopulation of deer, however, can eliminate understory vegetation, including reproduction of desired timber species. If overpopulation continues for several years, deer will eventually eat almost all the vegetation within their reach, and the woods will have a “browse line” or park-like appearance. This is accompanied or followed by disease and starvation in the deer herd until the herd size matches the reduced carrying capacity. When such deer die-offs occur, then the deer, forest, woodland owner, and deer hunter lose.

One alternative is to maintain a healthy herd in harmony with its environment by harvesting a sufficient number of deer of both sexes each year. In addition, habitat management can be practiced, increasing the population level and providing more quality hunting.

Owners that do not actively hunt their property should consider inviting others onto their property for hunting or consider entering into a lease agreement with hunters. A lease agreement with specific requirements for herd management can be helpful for landowners trying to control deer on their property.
Managing post-harvest debris may offer another form of protection to seedlings. By leaving tops from felled trees intact, and/or by felling trees in a pattern where the residual tops form a pseudo fence, can limit access to seedlings. The tops will eventually begin to break down, so this is only a temporary measure and has limited results. If this method is employed, it is recommended that timber sale contracts include specific requirements and specifications about top lopping limitations, top placement, and/or minimum top diameter restrictions.

A comprehensive approach that incorporates as many of these practices as possible to controlling the impacts from deer is the best one.

The most effective method to prevent damage from browsing is to erect a fence around the perimeter of the harvest area after the harvest is complete. This is only recommended and necessary for stands where harvesting is specifically planned for regenerating purposes, and especially where an investment in herbicide has been made beforehand. This can be very expensive and is typically a worst-case recommendation, where deer populations are very high and all else has failed. Where deer populations are high, the difference made by an exclosure can often be dramatic, as illustrated in the picture to the right.
Insect Pests

Insects that prey upon trees pose one of the greater threats to our forests. Those most common to the eastern United States and subject to scrutiny, surveillance, and research by government agencies, forest industry, universities, and the forestry community include:

The **emerald ash borer** is native to Asia, arriving in the United States in the early 1990’s. Since its arrival it has devastated ash populations in many areas throughout the central Great Lakes region. It has been found in Michigan, Ohio, Indiana, Illinois, Pennsylvania, and most recently in West Virginia. The adult beetles lay eggs under the bark of the ash tree; once hatched the larvae feed extensively on the tender wood just under the bark forming wide spread galleries up and down the trunk of the tree. Their numbers are so large that collectively they girdle the tree killing it. The larva burrow into the tree only to later emerge as an adult when the cycle repeats itself. The exit hole of the adult beetle has a distinctive “D” shape on its side. Current efforts to control the spread have been through quarantines to restrict the transport of ash logs, firewood, removed trees and tree parts from residences, and nursery stock. Research is in progress for insecticidal control, but little has been developed and there is no known wide spread control method.

The **forest tent caterpillar** is native to the United States and has always been a natural inhabitant of the forests of the northeast. The adult moth lays eggs in masses that hatch when leaves first begin to appear in the spring. They are defoliators, typically preferring to feed on the leaves of sugar maple and aspen trees. When out breaks occur, populations rise to astronomical levels and typically remain there for 3 years and then subside. During that time they can defoliate vast areas of forest. In most cases mortality is unlikely except where repeated defoliation occurs and is compounded by other stresses like harvesting, drought, re-foliation, etc. They do, however, cause diameter growth to decline by as much as 90%. During out breaks, this insect is best controlled through aerial spraying of pesticide over larger areas. If applied at the right time of year and during the right stage of caterpillar development, pesticides are very effective.

The **gypsy moth** is native to Europe and Asia, first arriving in the United States over 100 years ago. It has since become a natural part of forests, but is one of our most devastating forest pests. Like the forest tent caterpillar, they are defoliators, preferring to feed on the leaves of oak trees. When outbreaks reach epidemic levels, complete defoliation over large areas is catastrophic. Growth rates decline significantly and repeated defoliation compounded by other stresses, results in relatively high levels of mortality. Aerial spraying of pesticide over larger areas is also the most effective means of controlling this insect. Applied during the right stage of caterpillar development, pesticide is very effective.
The **Asian long horned beetle** is another native of Asia, first arriving to the United States in the mid 1990’s. It was first discovered in NY City, where it destroyed thousands of maple trees. It has since been discovered in Chicago and New Jersey. The adult beetles lay their eggs under the bark of the maple tree and when the larvae hatch they feed on the tender tissue just under the bark. As they mature they burrow deeper into the tree and later emerge as an adult to begin the cycle over again. To date it has been mostly limited to urban areas, but if it spreads to the native maple forests of the northeast it could devastate the maple population. Current efforts to control its spread have been to remove or chemically treat all maple trees within a half mile radius of an infected host tree. Quarantines are in place to restrict the transport of packaging material, nursery stock, and removed trees from residences. There no known wide spread control method.

The **hemlock wooly adelgid** was also introduced from Asia; first, on the west coast of the United States in the 1920’s and later spreading to the east coast in the 1950’s. It is a small aphid-like insect distinguished by its white waxy wool-like covering. Hemlock is its primary host species with spruce being an alternative. They appear like masses of tiny cotton balls on the underside of branches at the base of the needles. Immature nymphs and adults damage trees by sucking sap from the twigs to where the trees lose vigor, drop needles prematurely to the point of defoliation, and typically causes death within a few years. These insects reproduce quickly – a single adelgid will produce up to 300 eggs per year, which in total can yield 90,000 new insects per year. These vast numbers can spread to other trees and areas easily by way of wind, birds, mammals, humans, and the transport of nursery stock. Its greatest impact has been in regions where winters are relatively mild; it currently infests about one half of the region where hemlocks grow in the east. These areas have seen large scale defoliation and death of hemlock forests – this insect could cause catastrophic ecological impacts. It is possible to inject trees with pesticides and spray individual trees with insecticidal oils and soaps. This is, however, not practical for landscape scale application. This insect has no natural enemies in the U.S., but government agencies have found two non-native beetle species that feed exclusively on the adelgids, and in areas where they have been introduced adelgid populations have been reduced by 50-90% within a few months; the beetles themselves quit reproducing when there are no adelgids present. To date, the beetles are the only known control that can be applied to large-scale forest areas.

The **spring and fall cankerworm** are native to the U.S. Often called inch worms or loopers, they are common defoliators of a wide variety of hardwood trees; oak, elm, hickory, maple, ash, and cherry are among some of the primary host species. There has not been a large-scale outbreak of this insect in several decades, but the fall cankerworm in particular does cause some small areas of defoliation in the forest every year. Local infestations can last for three or four years; trees defoliated for two or more years will become weaker with slowed growth,
slowed or reduced mast production, and may die as a result. The eggs and larvae are attacked by other insect parasites and predators and other natural enemies normally help control the population, but like other worm species, larger outbreaks can be controlled through the application of pesticide when applied at the right time.

The *sugar maple borer* is a native long horned beetle to the U.S. This beetle is a common pest to the sugar maple, and is found where ever it grows – sugar maple is the only known host to this insect. Its outbreaks are relatively inconsequential compared to defoliating insects, but it is very damaging where it occurs. The adult beetles lay eggs in cracks, under bark scales, or around wounds; when the larvae hatch they burrow forming a meandering gallery across the tree beneath the bark; this takes place over a two year period before the larvae develop into adults and emerge. Mortality is rare, but partial girdling of the tree results. This damage, however, usually occurs within the first 20 feet of the stem degrading the most valuable part of the tree due to scarring, discoloration, and rot. The partial girdling further causes decreased productivity due to crown dieback above the wounded area. The tree is also more susceptible to breakage where larger wounds have weakened the stem. The maple borer is actually a secondary insect and tends to attack trees that are already under stress. The most common stress associated with borer damage is overcrowded conditions due to lack of management. The best way to control and minimize damage from the maple borer is forest management that includes the removal of poor quality and previously damaged trees. Timber stand improvement thinnings are particularly important in younger pole stands when they are just reaching the size most susceptible to attack.

The *sirex woodwasp* (Sirex noctilio) is native to Europe, Asia, and Africa. It is the most common species of wood wasp found in solid wood packing materials at U.S. ports-of-entry. This wasp attacks pine plantations and is reported to cause up to 80% mortality. In the northeastern U.S. it is a specific threat to red pine, Scots pine, and Austrian pine, but will occasionally attack spruce and fir trees; other target species in North America include Monterey, loblolly, slash, shortleaf, ponderosa, lodgepole, and jack pine. There are several native woodwasps (or horntails) in North America; the native species only attack dead or dying trees, whereas the Sirex woodwasp will attack living trees. As females lay their eggs in the sapwood of the tree, they simultaneously inject a fungus and a toxic mucus to create an environment for the larvae to develop; together they kill the tree. The larvae feed on the fungus as they tunnel through the wood. Infested trees will drip sap from the small holes created at egg laying sites. After the larvae mature into adults, they emerge from the tree leaving exit holes 1/8 to 3/8 inch in diameter. After emerging, females will lay between 20 and 450 eggs. This woodwasp can be controlled successfully, by introducing a parasitic nematode into infected trees; the nematode infects larvae and sterilizes adult females. An active forest management program, however, can also help control the population by controlling stocking levels and mortality; stressed and suppressed trees are more susceptible to infestation. Only an entomologist can positively identify Sirex noctilio. Suspect woodwasps should, therefore, be collected and brought to a local county extension office or the State Department of Agriculture.
Monitoring for these and other pest should be included in any regular property inspections. Insects are a natural part of the forest, but where damage is occurring beyond what appear to be normal levels, further assessment and monitoring should be considered, and if necessary a suppression program should be employed. In particular, if the presence of the emerald ash borer, the Asian long horn beetle, or the Sirex woodwasp is suspected, governmental agencies should be notified immediately and control measures should be taken to minimize or eliminate the threat they pose.
Suggested Silvicultural Systems & Management Guides

**Silviculture**

“Silviculture has been variously defined as: the art of producing and tending a forest; the application of knowledge of silvics in the treatment of a forest; the theory and practice of controlling forest establishment, composition, structure, and growth. Silvicultural practice consists of the various treatments that may be applied to forest stands to maintain and enhance their utility for any purpose. The duties of the forester are to analyze the natural and social factors bearing on each stand and then devise and conduct the treatments most appropriate to the objective of management.” [Smith, 1986]

Silviculture is both an art and a science. The science (silvics) gives us the knowledge to understand how trees and forests grow; how they react to treatment, stress, natural forces, soil conditions, etc. The art is applying the knowledge in the field; the ability to make decisions and adapt to changing situations; the ability to take innovative approaches in the application of silviculture; the willingness to experiment.

Silviculture is a tool used to manipulate forest vegetation for many different purposes. Growing timber to produce lumber, paper, fuel, etc., has always been the traditional purpose of silviculture. However, it can also be used directly or indirectly to enhance wildlife habitat, water quality and quantity, recreation, aesthetics, forest sustainability, etc. by strategically manipulating the forest for a specific outcome.

Silviculture does not merely focus on the harvesting of trees. It is the harvest of trees to enhance the growth and development of other trees; it is the harvest of trees to ensure the continuity of ecological functions; it is the harvest of trees to improve the health and productivity of the forest; it is the harvest of trees to produce income and increase the value of the forest; it is the harvest of trees for the regeneration and renewal of the forest; it is the harvest of trees to enhance other uses; and sometimes it is the decision at any point in time to not harvest at all. In most cases, the practice of silviculture is more concerned with what is left behind; what results from harvesting. It is about providing the landowner the ability to realize continued and sustainable benefit from the forest.

**Sustainable Forest Management**

The organization of a forested property to provide a sustained flow of forest benefits is the very heart of forest management. A formal management structure is essential to ensure periodic harvesting activities do not degenerate into opportunistic timber mining; instead harvesting occurs in a strategic and orderly manner to sustain forest benefits over the long-term.

The basic requirements of a fully managed forest are that tree age and size classes are in the right proportion with consistent rates of growth, so predictable periodic yield of forest benefits may be obtained. Such a system can also facilitate the sustained production of a broad array of forest values, such as: continuous forest cover, clean water, wildlife habitat, timber, and recreational opportunities.

From a silvicultural standpoint there are two kinds of forest units, or stands: those that are evenaged and those that are all aged (unevenaged). An evenaged stand is one whose individual trees originated at about the same time, either naturally or artificially. An all aged stand is one where the trees have originated at different times, with several different age classes throughout. The silvicultural process for managing each type is slightly different.

**Evenage Silviculture**

Under traditional evenage silviculture, a forest is systematically tended until mature and then harvested to regenerate and start over – always maintaining a forest composed of trees approximately the same
age. This is a long process, and depending on the species could take up to a century to complete the cycle (or rotation). It is a process of sustainability - repeated renewal of the forest. Typically several different treatments would take place throughout this rotation that focus on tending, harvesting, and then regenerating the forest.

Forest Thinning

From the beginning stages of a young forest, thinning would be strategically planned every 10 to 20 years aimed at tending and growing the best crop trees until they reach maturity and are ready to regenerate again.

A thinning during the very early stages of development might be a noncommercial treatment (often referred to as forest or timber stand improvement - TSI), where stems that are not yet large enough (or good enough) to be sold, are cut for the purpose of improving the growth and development of the better crop trees — often thinning from below the main crown canopy to remove unacceptable growing stock first.

Timber stand improvement paves the way early on for the next set of treatments to be more commercial in nature, where forest products are harvested and sold to generate interim income while continuing the tending process; low-grade commercial products (i.e. firewood, pulpwood, or pallet logs) are removed first, and perhaps some of the codominant and dominant sawtimber trees of unacceptable quality. In many cases, a thinning is a combination of both TSI and the removal of commercial products. If harvesting concentrates on removing poor quality trees during these first treatments, later thinnings provide greater return, as we will be in position to select the worst of the best trees for removal.

In all cases, we always strive to maintain an optimal level of stocking to fully utilize the site and maximize growth. The key to improving and maintaining value from thinning is to maintain high levels of stocking of the desired species of the best quality so that successive treatments yield the highest amount of benefit and allow the seed source to perpetuate.

Forest Regeneration

Once an evenaged forest has reached maturity it is time to consider starting the process over again by regenerating the forest. One of the more effective methods used for forest regeneration is the shelterwood method. A shelterwood is essentially a heavy thinning to open up the canopy so sunlight is allowed to reach forest floor, stimulating seeds to germinate. Depending on the species, this might occur in one or two harvests (two stage shelterwood). The higher quality dominant and codominant desirable species of trees are retained in the stand as a source of seed for the next generation of forest. They will also provide short-term cover for the new seedlings until they become fully established.

If the forest has been thinned properly to this point, the trees forming the shelterwood should have good genetic character and they should have the best commercial qualities. Many of the trees removed in the shelterwood harvest should also have been of decent quality and value providing further interim income.

If there is any competing vegetation on site that will interfere with seed germination, growth, and establishment (i.e. beech saplings, black birch, ferns, striped maple, grass, shrubs, grape vine, invasive species, etc.), they will need to be treated with herbicide or by other methods before the shelterwood harvest. If the competing vegetation is not brought under control, a second application may be necessary. If the deer population is high, and other methods to control their numbers are unsuccessful, it may be necessary to erect fencing at some point following the shelterwood harvest.

Depending on the site and the species, it takes approximately 2 to 3 years for the site to “green up” and usually takes 3 to 10 years (depending on the species composition, seed production, site quality, growing
season, climate, etc.) for the new forest of large seedlings and saplings to become fully established. By maintaining the parent trees on site for 3-10 years, not only are we able to take advantage of the pre-existing seed bank, but we also take advantage of the continual input of seed from the trees that are retained – especially during the bumper seed crops that typically occur at 3-5 year intervals for most hardwood species. With the proper light conditions created through the harvest, the large volumes of seed that are dropped, and the control of competing vegetation and deer, large numbers of seedlings should become established.

Once the site has reached the appropriate level of stocking, the parent trees are removed. This releases the young forest to develop on its own without competition, thereby allocating all of the available growing space to them. What remains is a dense forest of small saplings. Approximately 10 to 20 years following the overstory removal, the trees should be tall enough to maneuver and see through comfortably.

(Timing is important for the shelterwood harvest; parent trees should be removed before the new trees are allowed to grow larger than 1 inch in diameter at breast height; any larger and they become less flexible and more susceptible to permanent damage and breakage during the removal of the larger trees.)

And a new evenaged forest begins, and the silvicultural process is repeated – Tend, Harvest, and Regenerate. These are known mechanisms to affect seedling regeneration and survival in an evenaged forest.

Before tending operations begin again, the forest should be allowed to undergo a natural selection process. Competition early on in stand development is important – the trees will begin to reveal their genetic qualities as the poorer ones struggle for canopy position. It will also force the trees to grow straight and tall, which induces clear stem development – the shedding of lower limbs from a lack of sunlight (fewer limbs = fewer knots = better lumber). This natural selection process should not be allowed to go on for too long though or we risk the trees developing small crowns – larger crowns allow for better food production and, hence, a greater rate of growth. A stand should be examined 20 to 40 years following regeneration and parent tree removal; at that time consideration should be given to prescribing a noncommercial timber stand improvement thinning – the first treatment directing the future development of the stand.

Age vs. Size

It is important at this point to explain that in a typical evenaged forest, smaller trees are not necessarily younger. In most cases the trees in these forests are very close in age; the larger ones are more vigorous having developed faster and better than the others. For all intents and purposes the smaller trees are “runts” that have become suppressed by the more vigorous overstory trees. They are not as healthy and less productive; and for most species their suppressed state will only worsen over time leaving them little ability to improve, even with management. It is not a genetic quality that we want to put effort and resources into perpetuating.
As an example, this characteristic is most easily recognized in a plantation setting like that shown in the picture to the right. Both of these trees are the same age – they were planted at the same time. Yet the one on the right is half the size of the one on the left. This is a genetic shortcoming. It is important to address these trees early on in stand development – if we do not remove as many of them that silviculture will allow as soon as they can be identified, they only add to the competition in the stand and take up valuable resources and sun light that are important to the better trees. It is very likely that the tree to the left could have achieved an even better rate of growth if the competition created by the tree on the right had been removed earlier.

**All-Age (Unevenage) Silviculture**

The process for all-age silviculture is essentially the same as evenage silviculture, except we tend, harvest, and regenerate at the same time with each harvest. In an all-aged forest we are maintaining a structure that includes trees of different age classes from young to old. Instead of managing an entire community of trees we focus more on managing individuals or small groups – selected mature trees are harvested to regenerate new trees in their place; and we simultaneously tend the younger age classes by removing the excess numbers. The forest continually undergoes the renewal process through harvesting, but always maintains a high canopy, because the overstory is never removed in its entirety. To maintain an all-age structure thinning is strategically planned every 15 years.

There are two subsystems of all-age silviculture – “single tree selection” and “group selection”. Each caters to a slightly different circumstance. Single tree selection is used in managing trees with higher tolerances to shade, as it involves removing single trees scattered through the forest. Group selection can also be used with trees more tolerant to shade, but is also used in managing trees less tolerant to shade; small opening are created to expose the ground to more direct sunlight. Both methods can be used together effectively to manage for an all aged structure.

It was mentioned above that in evenaged forests smaller trees were often smaller because of genetic differences and not age. This is not always the case in an all aged forest – smaller trees are younger trees that have been deliberately managed for. There will, however, still be undesirable genetic qualities in trees that must be identified and addressed while tending the younger age classes.

The first important difference between all-aged and evenaged silviculture, is that this type of management can only be successful if the species present will tolerate shade – sugar maple, beech, hickory, red maple, hemlock, balsam fir, and red spruce are some of the primary shade tolerant species in the northeast. In all aged silviculture, only small amounts of sunlight will reach the forest floor at a time, and that is typically for only a short period. Once regeneration is established it will need to be able to survive and thrive in the shade, until it can be released during the next thinning.

Competing vegetation must be monitored continuously in an all aged forest and must be dealt with as needed to sustain desirable seedling germination and establishment.

**Two Age Silviculture**

The visual impacts from evenage management are much more dramatic than those resulting from all-age management. The final harvest to release the understory changes the forest from one composed of widely spaced tall trees to one composed of densely spaced short trees. Two-age silviculture may offer an alternative to mitigate some of the visual impacts from evenage management.

This approach is a variation of evenage management, where some of the shelterwood trees are retained when the understory is released. By leaving overstory trees, the residual stand would be composed of two distinct age classes. The retained trees allow some of the high canopy to remain intact, but are few
enough to not interfere with the development of the young forest growing underneath. In pursuing two-
age management, basal area stocking would be reduced to 20 to 30 square feet per acre made up by 15
to 20 evenly distributed sawtimber trees per acre in dominant and codominant positions. The goal is for
both age classes to share the site equally for the short term (i.e. each composing about 50% of the basal
area).

An added benefit to retaining some of the original overstory is the opportunity to generate revenue
during the first TSI treatment that would normally not produce sawtimber. This approach also provides
for some habitat management opportunities by maintaining diversity of tree size and crown position; it
also ensures some mast production where species like oak, hickory, etc. remain on site. For the benefits
outlined above, it is often a good decision to employ this method, but should be made on a case-by-case
basis.

**Evenage to All Age Conversion Silviculture**

Under some circumstances or where appropriate to the landowner’s goals, it is sometimes desirable to
attempt converting an evenaged stand to an all-aged stand. In order to facilitate this kind of conversion,
however, it is critical that the species composition of the stand be heavier towards those species that are
tolerant of shade, as is ideal for all aged management. While not required, it is also beneficial for quicker
short-term results if the stand has adequate numbers pole size trees of acceptable growing stock.

The conversion begins by creating small patch cuts 1/5th acre in size throughout the forest/stand. Approximately 1-2 patch cuts should be created for every 3 acres of the stand area, where all trees down
to 1” in diameter are to be cut inside the patch perimeter. The rest of the forest between the patches
would be thinned as per a normal evenaged prescription where stocking levels are reduced by about 20-
25%. It is important that as many of the largest trees and the best pole trees in the matrix between
patches are maintained in the stand.

This process would need to be repeated every ten years. This will slowly incorporate new age classes into
the forest, as it develops into an all-age system. It could, however, take 50 to 100 years to fully make the
conversion.

It is important to note that if the intervals are spread too much further than 10 -15 years, the understory
trees (especially those intolerant to shade) are at risk of developing a “flat top”. This condition results
from the adjustment that overtopped suppressed trees make to a low light environment. The trees
develop the flat top in an effort spread their leaves horizontally to keep from shading its own leaves. The
problem is that once a tree does this, it has relegated itself to a subordinate life and will never truly
develop properly. So in this situation, even trees of good genetic composition could be forced into a
suppressed runt like condition that is irreversible.

If it is apparent that any competing vegetation will interfere with the establishment and development of
new age classes, they will need to be treated with herbicide before hand or they will hinder the success of
conversion.

Skid trail location is an important consideration with this form of management. Skidders can be
permitted to enter the patches to retrieve cut trees, but main skid trails should not be located through
the patches. The soil compaction caused by repeated skidding will prohibit seedling germination and
development on the trail. Skid trails should be located well outside the edge of the patch, as seedlings are
also likely to develop outside of the patch due to the side lighting that will occur into the shaded areas.

This is a relatively new concept. Current research does not extend very far into the future of a stands
development to predict outcome precisely. If this is technique is employed, it will be important to
evaluate the results at the start of each cycle before the next treatment begins, and after 2 or 3 entries it may be necessary to adapt management.

**Growing Stock Condition**

Used in forestry, the term “inventory” has to take on a broader meaning than just a list of goods or materials. This is true primarily because a tree is both the factory and the product. Distinguishing between the two is important for deciding which trees should be kept as growing stock (the factory) and which should be harvested for use (the product). For this reason, forest inventory means more than accounting for the products that would be harvested for use. It includes information about growth, quality, treatment needs, and other things that go beyond a listing of what there is at a given time. For silvicultural purposes, growing stock is a more comprehensive forest measurement than volume, and can be a important tool to understand the health, condition, trajectory, and potential of a forest.

There are two basic classifications of growing stock, that which is acceptable and that which is unacceptable. Where as, unacceptable growing stock trees (UGS) can be described as those trees having a higher risk for future survival (typically not able to survive for another 20 years) or with little or no potential to improve in quality and value (to develop into lumber producing sawtimber); they are trees of low vigor, poor health, poor form, that have excessive levels of decay, or are an undesirable species. The cherry tree pictured left, is an example of unacceptable growing stock; it is crotched low to the ground and has a large sprout growing from the left side at the stump. In this condition, the tree would be graded as pulpwood/firewood and will not improve to a sawtimber grade.

A “cull” tree is a specific kind of unacceptable growing stock. It is defined as a tree having less than 50% useable volume due to decay or physical abnormalities, and is considered too poor to be useable. The sugar maple tree pictured above would be considered a cull because of the large canker and associated rot.

Acceptable growing stock trees (AGS) are simply in the opposite condition of their unacceptable counterparts; they are straight, sound, healthy, and vigorous. AGS are expected to survive until the next harvest and either are or have the potential to grow into sawtimber. The sugar maple tree pictured all the way to the right above exhibits these desirable characteristics.

It is also important to distinguish that the sawtimber product classification does not automatically mean that a tree is of high quality. In fact, trees can produce lumber volume, but because they may be expected to die within the next 20 years or have extremely poor form or are unlikely to improve in quality, may be rated as an UG. Likewise, a smaller pole or sapling sized tree that is straight, relatively free of defects, looks like it will survive, and appears to have sawtimber potential, may in fact be a suppressed understory tree with a poorly formed crown that will never truly develop any further beyond its current status would be rated as an UG.
For stands that are fairly well stocked, we typically aim to maintain acceptable growing stock levels to 75% or better throughout the life of the stand. The proportion of acceptable growing stock can be improved through the removal of unacceptable growing stock trees. Any treatments administered should target their removal first before removing any of the acceptable growing stock. By reducing undesirable growing stock to the extent possible during early thinnings, intermediate thinnings and the first harvest of the regeneration sequence have more opportunity to yield better timber and more value. Selecting and maintaining trees of acceptable growing stock condition starts early in the development of a stand (i.e. 20-40 years of age). By putting forth the time, effort, and cost to control unacceptable growing stock early in stand development, there are likely to be greater financial benefits throughout the life of a stand.

Growing stock is primarily measured according the number of square feet of basal area. Basal area is the cross sectional area of a tree at 4.5 above the ground (diameter at breast height – DBH) and is expressed on a per acre basis. It is the total area of an acre that is physically covered by trees.

The growing stock condition and basal area stocking for each stand is covered in greater detail in the individual stand summaries in this plan.

In making decisions about selecting which trees should be harvested, not every “bad” tree in the forest needs to be cut. A bad tree, but of the right species and in the right place is as important as a good tree in the right place. For example, a large over mature “bushy” sugar maple, cherry, or oak tree may still be a good seed producer or a heavily limbed hemlock tree might contribute to the species diversity of a forest; in the right circumstances trees like these may be important to leave in the residual stand. It is also important to maintain a stocking of regularly spaced trees of the right number to keep the site fully utilized; it is often necessary to leave some UGS to maintain the level of stocking above this threshold. Plus with large over mature bushy trees, it is important to consider if they will cause excessive damage or destruction of other desirable trees in the forest when harvested; some times it is better to leave a bad tree to avoid irreparably harming others during logging.

Growing stock used in the context of this discussion is used to help make silvicultural decisions aimed at sustainable forest management. In many cases for the sake of maintaining or enhancing aesthetics, it may often be the best decision to leave a particular tree, regardless of its growing stock condition. Sometimes the shape, form, size, or location of a particular tree has a visual appeal to those that might use the forest. Den and other trees used by wildlife, that would be rated as unacceptable growing stock most of the time, are valuable to birds and mammals and could be retained for purposes other than timber production. Culls, trees with cavities, and trees of deteriorating condition are critical habitat components. Just as important to wildlife, are those trees that are good mast producers like beech, oak, and hickory; their nuts are an important food source and may be valuable to retain as well, regardless of their timber quality. Maintaining a diversity of species is also taken into consideration; it is often warranted to maintain trees of a particular species that are less abundant, regardless of their growing stock condition.

The maple tree pictured right would be considered an UG, but might be desirable to retain for its form and aesthetic appeal. Additionally, this particular tree is of a desirable species and has an expansive healthy crown - it may be good seed producer and is likely the parent of many of the smaller trees growing around it; it also has several cavities that can provide wildlife dens. Leaving a
tree like this may be beneficial for no other reason than to protect the forest from damage; a tree of this size with its wide crown will damage a large number of trees when felled and more yet during skidding. The benefits of harvesting do not out way the costs to the residual stand.

**Stocking Density**

The stocking density of a stand is an important measurement to determine whether or not a stand is ready for treatment. It is technically defined as the actual stand density compared to the average maximum density common to its forest type. Simply put, it is used to describe how crowded the trees are for that particular forest type. Stocking is used here to prescribe management for maximum tree growth and regeneration.

The level of crowding can be characterized in one of five ways to prioritize treatment.

- **Over stocked** stands are highly crowded with slow rates of growth and high rates of mortality. These stands should receive the highest priority for treatment.
- **Fully stocked** stands become increasingly crowded, with slowing rates of growth and increasing rates of mortality. These stands should also be prioritized for treatment.
- **Well stocked** stands are not crowded and the trees are able to achieve high rates of growth without competition. On a per acre basis volume production in total is highest at this stocking level. Unless it is ready for regeneration these stands do not require treatment.
- **Under stocked** stands are not crowded either, but the site is underutilized and total volume production is much lower. This condition would be expected on a temporary basis in mature stands harvested for regeneration purposes. In other circumstances where exploitive or negligent over harvesting has occurred in an immature stand, it will be susceptible to invasion by competing vegetation, and/or the development of an unwanted or premature understory. There is also risk that tree quality may deteriorate as the trees become more open grown – branches may sprout on the main trunk from dormant buds and existing limbs may not shed as quickly; the trees become knottier, creating poorer quality lumber. If the stand still contains enough trees of acceptable growing stock to warrant further management, it should be left alone to accumulate additional growing stock.
- **Under stocked with acceptable growing stock** would be used to characterize a stand that, regardless of total stocking, does not have enough good trees to warrant further management. If there is an adequate seed source of desirable species, an attempt to regenerate the stand should be made. Otherwise consideration should be given to an alternative use for the land other than the production of high quality timber.

**For evenage silviculture** stocking is evaluated and characterized through the use of an evenaged stocking guide, an example of which is depicted right. Using a chart like this, we are able to plot the stocking density for a particular stand based on the number of trees and the square feet of basal area present in the upper
canopy (excludes most understory trees). We are then able to accurately assess the degree of crowding by comparing the stand against the A, B, or C lines and make decisions about when to harvest. Charts like this one are used to illustrate stocking density in the individual stand summaries in this plan.

Stands with densities over the A line are over stocked. Stands with densities from the A line to about half way to the B line are fully stocked. Stands with densities from the B line to about half way to the A line are well stocked. Stands with densities below the B line are under stocked; this is normal for stands where proper regeneration harvesting has occurred (i.e. shelterwood). Stands where parent trees have been removed to release new forest and/or where a two-age silviculture is being employed are likely to drop below the C line temporarily; this is not of concern if new forest regeneration has been successfully established underneath first.

The degree of crowding (stocking density) can be controlled through thinning. By removing trees from the stand we are able to stimulate growth of those that remain. We are also able to control the degree of mortality by reducing the competition between trees and concentrate growth on those trees that are expected to stay alive between treatments. Managing within the thresholds established by the guide typically allows for harvesting every 10-20 years.

Even age management can be used in all kinds of timber/forest types, but works especially best with species that prefer full sunlight (i.e. cherry, ash, oak, etc.).

Different guides exist and are used based on the forest type that is being evaluated. The guides primarily used in the eastern United States are for: Northern Hardwoods, Mixed Northern Hardwoods & Softwoods, Allegheny Hardwoods, Central Hardwoods, and various softwood/plantation species. A different guide may be used and is displayed in the individual stand summaries in this plan.

For all age silviculture stocking is evaluated and characterized through the use of an all aged stocking guide, an example of which is depicted right. This bar chart shows the number of trees per acre of desired stocking levels vs. actual stocking levels. For this silvicultural system stocking levels are evaluated exclusively by the number of trees per acre present in a particular diameter/size class. It is assumed that trees of different diameter represent trees of differing age. They are grouped together into five specific size classes to represent five age classes: SAPS – saplings sized trees 1-5 inches DBH; POLES – pole sized trees 6-11 inches DBH; SSAW – small sawtimber sized trees 12-15 DBH; MSAW – medium sawtimber sized trees 16-19 inches DBH; and LSAW – large sawtimber sized trees 20+ inches DBH.

Research has determined that to maintain a sustainable all aged structure there is a certain minimum number of trees within each age class that need to be maintained all the time (Desired Stocking). As new age classes are
formed through regeneration of trees and others grow and advance into larger size/older age classes the numbers of trees increases beyond the desired stocking level for any one particular class; once there are enough trees over these minimums to support a thinning, harvesting can occur sustainably. The surpluses in any class determine the number of trees per acre that can be safely removed without jeopardizing sustainability. Typically managing to these minimums allows for harvesting every 15 years.

This form of management works best with species that can tolerate shade (i.e. sugar maple, red maple, hickory, hemlock, etc.)

The all age stocking guide above is an example of a stand, where it is overstocked in most size classes except for the saplings class (Actual Stocking – green bars; Desired Stocking – orange bars). The surpluses are quite evident, and may be enough to support a commercial thinning.

In this example, it is critical to note that without an adequate number of saplings to grow into the larger classes, a deficiency will eventually form. Harvesting in this stand would need to ensure proper treatment to start a new age class. It may also be prudent to leave smaller trees in the pole class above the desired stocking level to keep them in the stand longer to make up for any possible future deficiencies.

It is also important to consider species composition when evaluating stocking levels and developing prescriptions. Undesirable species like beech and other forms of competing vegetation can sometimes make the stocking levels look better on paper than in reality (especially in the sapling class). It is not uncommon to have an all aged forest with a heavy beech component in the sapling class. This is not a favorable condition, because without desirable seedling and sapling regeneration, the stand will not be able to maintain a sustainable structure long term if the competing vegetation is not addressed.
Best Management Practices for Erosion & Sedimentation Control

Best Management Practices (BMP’s) are methods that prevent or reduce the erosion and movement of sediment, nutrients, pesticides and other pollutants from the land to surface or ground water, or which otherwise protect water quality from potential adverse effects of timber harvest activities. These practices are developed to achieve a balance between water quality protection and the management of timber.

Due to the potential erosion problem, designated management activities should occur at a safe distance from main drainages, spring/seep areas, and vernal pools. Buffer strips around these locations should be designated and when deemed necessary, no forest management activities should occur within these areas. Disturbance to wetlands should be minimized to ensure little or no loss of function. Rutting from skidding activities should be minimized wherever possible, most especially on slopes where water flow can occur causing erosion and sedimentation.

Wherever water resources are present, minimizing erosion during management activities should be mandatory. Any drainages or creeks that flow on a property pose a potential for creek bank erosion during high rainfalls and spring thaws. If access through any of these areas is necessary, the use of culverts, corduroys, bridges, etc. should be used to keep erosion to a minimum.

Planning & Methods of Protection:

Landing areas should be appropriately sized for the scope and size of the timber harvest and should be located on firm or frozen ground. As often as possible they should be located at least 200 feet from water bodies, watercourses, and wetlands. Where it is necessary to locate landings within 200 feet of a water resource, additional measures should be employed if necessary to ensure that water flow is minimized and sediment is prevented from flowing into the water (i.e. silt fence, hay bales, water bars, etc.).

Haul roads should be located as often as possible in stable locations, with minimal slope, and should be constructed using suitable materials. They should be located away from water bodies, watercourses, and wetlands, and whenever possible should allow for an adequate filter strip. The road should be crowned and ditched where appropriate to shed and capture water. Where crossing streams or drainages is necessary, properly sized culverts or bridges should be used. Avoid crossing wetlands, but if necessary design the road to have minimal impact or loss of function.

Skid trails should be located as often as possible on stable ground and should avoid steep slopes where possible. When operating on steep slopes break the grade and ensure proper drainage and soil stabilization (i.e. water turnouts, water bars, etc.). When operating on unstable ground avoid skidding under wet conditions and/or take steps to minimize rutting (i.e. corduroy, tree tops, etc.). Where necessary to cross drainages or streams, culverts or temporary bridges should be installed. If necessary, hay bales and/or silt fence should be installed down stream from the crossing to prevent sediment from flowing downstream. Careful planning and location of skid trails will help considerably in controlling soil erosion.

Streamside Management Zones (SMZ’s) are those areas directly associated with a water body, watercourse, or wetland that are specifically designated and maintained as a buffer during and after a harvest operation. Harvest activities should be minimized or avoided in these areas to protect water quality while equipment is operating on the property. Benefits from SMZ designation can include sediment filtration; shade to maintain cool water temperatures; food in stream courses; stream bank protection; flood plain stabilization; recreation; wildlife corridors; and timber production. SMZ’s should be maintained along all perennial streams, ponds, perennial springs, and any springs, reservoirs, and streams that serve as domestic water supplies. The distance of the SMZ edge from the stream could vary from 50
to 300 feet minimum depending on the slope, sensitivity of the water resource, and the stability of the soil.

Some examples of different erosion and sedimentation control methods and practices are depicted below.

Temporary bridges provide an effective stream crossing for heavy equipment and helps protect and minimize disturbance to the streambed and banks.

When placed in smaller creeks and drainages, hay bales can provide an effective temporary sediment trap downstream from a stream crossing.

Geotextile mats help stabilize and support forest roads. This material is permeable to water and can help control rutting and water flow.

Smoothing ruts in skid trails after use minimizes the channeling and ponding of water during rainfalls and spring melts.
Stream Bank Management & Protection:

Erosion control along stream banks and drainages is a long-term commitment. Several methods of protection can be implemented to slow down the erosion process. Possible controls are as follows:

1. Remove trees that have tipped over and have fallen into the stream. These trees can alter the stream course and cause immediate bank erosion. Release pressure on stream banks from trees that are “out of the vertical”.

2. Seeding of creek banks will slow down soil erosion into the creek. Applications that include mulching and netting form an additional protective mat that holds the soil and fertilizer in place until the seed germinates and grows. Several types of seed are available. The use of soil maps and aspect of an area will aid in determining the correct seed.

3. Application of logs and stones in the creek bed will help stop undercutting of the creek bed. Coordinating this activity during the dry season will allow erosion access and the least amount of disruption to the tributary of Great Forks Creek. Any activity on the creek should be done with the cooperation of the lead state forestry agency to ensure the proper permits have been obtained.

4. Biotechnical erosion control measures such as planting willow wattles, dead-tree revetments, etc. are also viable options.
Wildlife Habitat Management Practices

Diverse forest types coupled with, brushy transition areas, and open fields provide a significant amount of “edge” which is crucial to many forms of wildlife. Many practices can be applied both in the forested and open areas of any property to enhance wildlife habitat. Some examples of these practices include:

- Create and/or leave snags and cavity trees standing in the forest for nesting and dens sites, and places for birds to forage for insects. Care should be taken, however, as some snags and/or dead trees may pose an overhead hazard.
- Plant and/or maintain a reasonable level of mast producing trees like oak, hickory, and beech.
- Utilize woody debris/blocks of wood left on landings after harvesting to create piles that serve as “wildlife condominiums”. Stumps piled from road or landing construction provide the same kind of cover.
- Regeneration harvesting allows young succulent herbaceous plants and trees to develop on the forest floor and provide food, cover, breeding, and nesting habitat for a variety of animal and bird species.
- Minimize or restrict timber harvesting in springtime when birds are nesting in trees, shrubs, and on the ground.
- Create brush piles from slash accumulated from harvesting to create dens for rabbits and other wildlife.
- Create living brush piles by partially cutting through small diameter trees or shrubs and tipping them over in groupings.
- Maintaining dead woody debris and logs on the forest floor provide shelter for salamanders, amphibians, small mammals, reptiles, etc. In the right location larger down trees or tipped out root systems can help create ground dens for larger mammals like bear, coyote, and fox.
- Create and/or maintain rock piles and rock walls or protect open hill slopes with exposed flat rocks for snakes and small mammals to use.
- Vernal pools are small shallow temporary wetlands that form in depressions from spring/fall rains and snowmelt. They should be protected from disturbance as they provide much-needed habitat to amphibians like frogs, toads, and salamanders. These are also a

Snags/dead standing trees provide feeding and nesting areas for birds, bats, and other small tree dwelling animals.

While they have little or no timber value, trees like this make ideal dens for a variety of animals.

Mast producing trees, like oak, drop their nuts in late summer early fall providing an excellent source of food for many mammals and birds.
source of drinking water for forest dwelling animals and are a rich food supply for many different organisms.

- Create and/or maintain open fields – A single opening is fine, but several smaller openings are better. Seasonally mowing open fields keeps grasses lush for grazing. Mowing specifically in late summer and early fall has the added benefit of stimulating the production of seed, which is an important source of food for many animal and bird species. It is important to avoid mowing grass areas in spring and early summer when most bird species are breeding and nesting. These areas also attract large numbers of insects providing an important source of food for many bird species.

- Create grassland food plots that contain: wheat, rye, oats, clover, alfalfa, crown vetch, soybeans, winter pea, sunflower, etc. Fall plantings of wheat or rye mixed with clover, alfalfa, or vetch provides good fall and spring feeding. A planting of a perennial hay crop provides seed and insect foraging in the summer months. Areas planted with a mixture of soybean, millets, winter pea, and chufas will provide feeding areas in the fall and winter.

- Create and/or maintain shrub communities; periodically mowing these areas will prevent them from reverting to forest cover. Mowing small sections of these areas on a rotational basis will maintain brush in some areas while the mowed ones grow back. As with grass areas, mowing in spring and early summer is not recommended.

- Create shrub land food plots that contain black berry, raspberry, elderberry, blue berry, apple, sumac, rhododendron, crab apple, hawthorn, dogwood, choke cherry, wild plum, etc.

- Create woodland food plots - Interplant tree and/or shrub species like white cedar, aspen, ironwood, red oak, white oak, balsam fir, hemlock, witch hazel, serviceberry, flowering dogwood, etc. in more open areas (i.e. regeneration harvests)

- Create small coniferous plantings in patches or long corridors to create additional browse and cover. Dense stands of softwoods provide wildlife with significant benefits. Bear and deer will use such areas for denning or bedding in winter months; the dense canopy provides cover from convective heat loss on cold winter nights or during winter storm events. Many wildlife species will use these areas as secure travel routes or ambush points.
- As per best management practices, protect streams, ponds, wetlands, and water bodies from disturbances that cause sediment, erosion, or degradation that would disrupt or inhibit their function. These are sources of drinking water for animals and habitat to fish and other water dwelling organisms.

- Protecting spring seeps is important for a number of reasons, but in addition to being a source of water for wildlife, spring seeps rarely freeze in the winter and provide them access to insect larvae and vegetation in the winter months; especially for turkeys and other birds.

- Plan for the retention of a few tall individual trees during overstory removal harvesting in regeneration areas. These trees provide hunting perches for raptors and other birds of prey.

More detailed information and recommendations on wildlife enhancement activities can be provided as desired. Information is readily available on management for deer, grouse, turkey, and rabbits and their food and shelter needs. Information is also available for the management of non-game species of birds, mammals, reptiles, and amphibians.
Biodiversity

In the ever-changing field of resource management, “biodiversity” has become a necessary consideration and integral part of decision making. Multiple use management is the Conservationist’s approach to maintaining biodiversity.

Where timber harvesting is involved, the responsible agencies must consider:

1. The presence of rare, threatened or endangered plant or animal species.
2. Preservation of trees that are scarce seed sources in a given stand.
3. Preservation of species diversity.

Inquiries were submitted to the appropriate State Agency to review the most current significant habitat mapping relative to the ownership. Responses are summarized in the Executive Summary and/or the Appendix.

If rare, threatened, or endangered plant or animal species are present in forest management areas on the ownership, the resource manager should understand the implications that forest management activities may have and adjust accordingly.

Furthermore, in each stand where harvesting, thinning, or timber stand improvement is to be performed, it is important to preserve scarce seed sources.

It is also incumbent upon resource managers to preserve and enhance tree species diversity in a given stand. Simply stated, this means that no particular species of tree should be eliminated through thinning, harvesting, or timber stand improvement.
All mapping was prepared using the best available information about the property, has not been surveyed and does not reflect current property boundaries. Acreages are estimated using geographic information system (GIS) technology and may not be consistent with acreages calculated by the county tax office or the ownership deed. This map is not a legal survey.

Legend:
- bsa_zone18
- bsa_zone18stands

<table>
<thead>
<tr>
<th>STAND</th>
<th>ACRES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>24.3</td>
</tr>
<tr>
<td>1B</td>
<td>37.4</td>
</tr>
<tr>
<td>2</td>
<td>6.3</td>
</tr>
<tr>
<td>3</td>
<td>112.5</td>
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<tr>
<td>4</td>
<td>29.3</td>
</tr>
<tr>
<td>5</td>
<td>30.5</td>
</tr>
<tr>
<td>6A</td>
<td>26.0</td>
</tr>
<tr>
<td>6B</td>
<td>17.0</td>
</tr>
<tr>
<td>7</td>
<td>67.0</td>
</tr>
<tr>
<td>8</td>
<td>44.1</td>
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<td>9</td>
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<td>11</td>
<td>11.2</td>
</tr>
<tr>
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<td>25</td>
</tr>
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</table>

Total 507
All mapping was prepared using the best available information about the property from various sources and does not represent instrument survey accuracy. Acreages are estimated using geographic information system (GIS) technology and may not be consistent with acreages calculated by the county tax office or the ownership deed. This map is not a legal survey.

Legend

bsa_zone18
bsa_zone18stand

Projection: NAD83 zone 18 North
Towaday/Chesapeake/Colorado College data

TimberH&C

 clients

2016

Private

State_College

BSA

STAND       ACRES
1A  24.3
1B  37.4
2   6.3
3  112.5
4  29.3
5  30.5
6A  26.0
6B  17.0
7  67.0
8  44.1
9  52.4
10 24.0
11 11.2
  25
Total 507
### Commercial Stand Description

#### Stand 1A

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acreage</strong></td>
<td>24.3</td>
</tr>
<tr>
<td><strong>Forest Cover Type</strong></td>
<td>Central hardwoods</td>
</tr>
<tr>
<td><strong>Topography</strong></td>
<td>Rolling</td>
</tr>
<tr>
<td><strong>Water Resources</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Special Sites</strong></td>
<td>None observed during inventory</td>
</tr>
<tr>
<td><strong>Age Structure</strong></td>
<td>All-aged</td>
</tr>
<tr>
<td><strong>Size Class</strong></td>
<td>Poletimber</td>
</tr>
<tr>
<td><strong>Site Quality</strong></td>
<td>Fair</td>
</tr>
<tr>
<td><strong>Total Sawtimber Volume</strong></td>
<td>+/- 109,600</td>
</tr>
<tr>
<td><strong>Total Pulpwood Volume</strong></td>
<td>+/- 32.9</td>
</tr>
<tr>
<td><strong>Sawtimber Quality</strong></td>
<td>Fair</td>
</tr>
<tr>
<td><strong>Last Harvest Year</strong></td>
<td>2010</td>
</tr>
<tr>
<td><strong>Snags &amp; Den Trees</strong></td>
<td>5.5</td>
</tr>
<tr>
<td><strong>Primary Pole Species</strong></td>
<td>Hickory and red maple</td>
</tr>
<tr>
<td><strong>Pole Condition</strong></td>
<td>Fair</td>
</tr>
<tr>
<td><strong>Primary Seedling Species</strong></td>
<td>Mixed oak</td>
</tr>
<tr>
<td><strong>Seedling Stocking</strong></td>
<td>Low to moderate</td>
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<tr>
<td><strong>Deer Browse Intensity</strong></td>
<td>Moderate to High</td>
</tr>
<tr>
<td><strong>Primary Sapling Species</strong></td>
<td>Birch, red maple</td>
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<tr>
<td><strong>Sapling Stocking</strong></td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>Sapling Condition</strong></td>
<td>Fair</td>
</tr>
<tr>
<td><strong>Woody Comp. Species</strong></td>
<td>Witch hazel</td>
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<tr>
<td><strong>Woody Comp. Stocking</strong></td>
<td>Low</td>
</tr>
<tr>
<td><strong>Herbaceous Veg. Species</strong></td>
<td>Grasses and greenbriar</td>
</tr>
<tr>
<td><strong>Herbaceous Veg. Coverage</strong></td>
<td>Low</td>
</tr>
</tbody>
</table>

#### Species Composition (% Basal Area)

- Hickory 8%
- Black Oak 4%
- Other Common Species 16%
- White Oak 36%
- White Pine 36%

#### Sawtimber Volume (D): +/- 4,506 BF/Acre

- Chestnut Oak: 0
- Hickory: 152
- White Oak: 1,864
- White Pine: 2,000
- Other: 272
- Red Oak: 0
- Red Maple: 0
- Hemlock: 0
- Sugar Maple: 0
- Black Oak: 218

#### Distribution of Growing Stock

- Size Class: Map of basal area distribution with classes labeled as follows:
  - SAPS
  - Poles
  - SM Saw
  - MED Saw
  - LG Saw

- Basal Area - Ft²/Acre: Range from 0 to 30
- Basal Area - Ft²/Acre (Acceptable Growing Stock, Unacceptable Growing Stock)
**Diagnosis & Prescription:**

- **Stocking Level**: under stocked
- **Adequately Stocked with AGS**: no
- **Next Harvest**: 25 years +
- **Harvest Type**: none – let develop
- **Target BA/Acre**: n/a
- **Necessary to Retain UGS**: n/a
- **Understory Potential**: fair
- **Regeneration Inhibited**: yes
- **Herbicide Treatment**: basal bark spray
- **Herbicide Target**: birch
- **Next Herbicide Treatment**: 0-5 years
- **Future Management Potential**: fair
- **Aesthetic Impact of Prescription**: low
- **Insect/Disease**: none
- **Accessible**: yes
- **Site Limitations**: none
- **Stream Crossing**: none
- **OGM/Utilities**: none

- This is a developing stand of central hardwood dominated timber – primarily composed of mixed oak, hickory, and white pine.
- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.
- The stocking in AGS alone is not adequate enough to support a well-stocked stand.
- This stand needs to continue developing. Since the harvest that was conducted in 2010, it appears that the stand has yet to regenerate successfully with desirable hardwood species. Mixed oak seedling stocking is low to moderate. Birch and red maple are the primary sapling species, however there are also mixed oak and even black cherry saplings as well in smaller percentages. The birch and red maple are negatively affecting the establishment of desirable oak seedlings that need more sunlight to grow. The understory data recorded at the plot level all indicated moderate, which indicates about 1/3 low to mid canopy overhead cover. An herbicide application should be considered to reduce the number of unacceptable saplings. Invasive plants and trees such as ailanthus and multiflora rose that are found in the stand during the herbicide application should be treated as well. This will give the oak seedlings a chance to become established. Overall, the stand is composed of desirable valuable species in the pole and sawtimber classes, and has long term growth potential warranting management. Oak regeneration should be monitored on an annual basis after the herbicide application. If the adequate establishment is not occurring by the 3rd year, supplemental tree planting should be considered.
Commercial Stand Description

**Stand 1B**

<table>
<thead>
<tr>
<th>Acreage</th>
<th>37.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Cover Type</td>
<td>central hardwoods</td>
</tr>
<tr>
<td>Topography</td>
<td>side hill, steep</td>
</tr>
<tr>
<td>Water Resources</td>
<td>Little Aughwick on eastern side</td>
</tr>
<tr>
<td>Special Sites</td>
<td>none observed during inventory</td>
</tr>
<tr>
<td>Age Structure</td>
<td>all-aged</td>
</tr>
<tr>
<td>Size Class</td>
<td>small sawtimber</td>
</tr>
<tr>
<td>Site Quality</td>
<td>fair</td>
</tr>
<tr>
<td>Total Sawtimber Volume (Bdft-Inter1/4&quot;)</td>
<td>+/- 259,700</td>
</tr>
<tr>
<td>Total Pulpwood Volume (Cords)</td>
<td>+/- 229.7</td>
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<tr>
<td>Sawtimber Quality</td>
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<tr>
<td>Last Harvest Year</td>
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</tr>
<tr>
<td>Snags &amp; Den Trees (stems/acre)</td>
<td>3.3</td>
</tr>
</tbody>
</table>

**Primary Pole Species**: hard maple, hickory, and oak  
**Pole Condition**: fair to good  
**Primary Seedling Species**: red maple, hard maple, and mixed oak  
**Seedling Stocking**: low  
**Deer Browse Intensity**: low to moderate  
**Primary Sapling Species**: hickory and hard maple  
**Sapling Stocking**: low  
**Sapling Condition**: fair  
**Woody Comp. Species**: spicebush  
**Woody Comp. Stocking**: low  
**Herbaceous Veg. Species**: grasses and fern  
**Herbaceous Veg. Coverage**: low

### Species Composition (% Basal Area)

- Chestnut Oak 5%  
- Hickory 17%  
- White Oak 9%  
- White Pine 8%  
- Other Comm Spp 12%  
- Red Oak 3%  
- Red Maple 7%  
- Sugar Maple 30%  
- Black Oak 3%

### Sawtimber Volume (D): +/- 6,941 Bdft/Acre

<table>
<thead>
<tr>
<th>Tree Type</th>
<th>Volume (Bdft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chestnut Oak</td>
<td>313</td>
</tr>
<tr>
<td>Hickory</td>
<td>1,150</td>
</tr>
<tr>
<td>White Oak</td>
<td>818</td>
</tr>
<tr>
<td>White Pine</td>
<td>1,118</td>
</tr>
<tr>
<td>Other</td>
<td>447</td>
</tr>
<tr>
<td>Red Oak</td>
<td>150</td>
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<tr>
<td>Red Maple</td>
<td>126</td>
</tr>
<tr>
<td>Hemlock</td>
<td>0</td>
</tr>
<tr>
<td>Sugar Maple</td>
<td>2,524</td>
</tr>
<tr>
<td>Black Oak</td>
<td>297</td>
</tr>
</tbody>
</table>

### Distribution of Growing Stock

<table>
<thead>
<tr>
<th>Size Class</th>
<th>Basal Area - Ft²/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAPS</td>
<td>Unacceptable Growing Stock</td>
</tr>
<tr>
<td>POLES</td>
<td>Acceptable Growing Stock</td>
</tr>
<tr>
<td>SM SAW</td>
<td>Acceptable Growing Stock</td>
</tr>
<tr>
<td>MED SAW</td>
<td>Acceptable Growing Stock</td>
</tr>
<tr>
<td>LG SAW</td>
<td>Acceptable Growing Stock</td>
</tr>
</tbody>
</table>

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**Diagnosis & Prescription:**

- **Stocking Level:** well stocked
- **Adequately Stocked with AGS:** yes
- **Next Harvest:** 10-15 years
- **Harvest Type:** evaluate for TSI or thinning
- **Target BA/Acre:** n/a
- **Necessary to Retain UGS:** n/a
- **Understory Potential:** fair
- **Regeneration Inhibited:** yes
- **Herbicide Treatment:** none
- **Herbicide Target:** none
- **Next Herbicide Treatment:** n/a
- **Future Management Potential:** fair
- **Aesthetic Impact of Prescription:** low
- **Insect/Disease:** past gypsy moth mortality
- **Accessible:** no
- **Site Limitations:** steep
- **Stream Crossing:** none
- **OGM/Utilities:** none

- This is an established stand of central hardwood dominated timber – primarily composed of hard maple, white pine, hickory, and chestnut oak.
- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.
- This stand has a fair amount of potential, but is still developing. Despite that it is well stocked it needs to remain in a crowded competitive state for a longer period of time to force the trees to grow straight, shed lower limbs, and suppress the less vigorous trees. This may result in a short term loss of growth, but is a worthwhile risk to take if better quality trees will result. It should be re-examined in the future to see if this strategy was successful; if not, then the management strategy should be altered accordingly.
- The stocking in AGS alone is adequate enough to support a well-stocked stand in the future. The next harvest (10-15 years) should focus on the removal of UGS first. Depending on the amount of UGS at the time, the type of harvest may either be non-commercial TSI or a commercial thinning.
Commercial Stand Description

Stand 2

**Acreage:** 6.3  
**Forest Cover Type:** mixed hardwood / pine  
**Topography:** gently rolling  
**Water Resources:** Little Aughwick on eastern side  
**Special Sites:** intermittent drainage, near campsite  
**Age Structure:** all-aged  
**Size Class:** medium sawtimber  
**Site Quality:** fair  
**Total Sawtimber Volume (Bdft-Inter1/4”):** +/- 62,300  
**Total Pulpwood Volume (Cords):** +/- 8.6  
**Sawtimber Quality:** fair  
**Last Harvest Year:** unknown  
**Snags & Den Trees (stems/acre):** none tallied in plots

**Primary Pole Species:** hickory  
**Pole Condition:** fair  
**Primary Seedling Species:** mixed oak  
**Seedling Stocking:** low  
**Deer Browse Intensity:** moderate  
**Primary Sapling Species:** red maple  
**Sapling Stocking:** low  
**Sapling Condition:** fair  
**Woody Comp. Species:** n/a  
**Woody Comp. Stocking:** none  
**Herbaceous Veg. Species:** greenbrier  
**Herbaceous Veg. Coverage:** low

**Species Composition (% Basal Area)**

- White Oak 67%
- Red Oak 8%
- Red Maple 17%
- Other Comm Spp 8%

**Sawtimber Volume (D):** +/- 9,889 Bdft/Acre

- Chestnut Oak 0
- Hickory 0
- White Oak 8,317
- White Pine 0
- Other 0
- Red Oak 1,571
- Red Maple 0
- Hemlock 0
- Sugar Maple 0
- Black Oak 0
**Diagnosis & Prescription:**

- **Stocking Level:** well stocked
- **Adequately Stocked with AGS:** no
- **Next Harvest:** None
- **Harvest Type:** none – retain for riparian
- **Target BA/Acre:** n/a
- **Necessary to Retain UGS:** n/a
- **Understory Potential:** low
- **Regeneration Inhibited:** yes
- **Herbicide Treatment:** none
- **Herbicide Target:** none
- **Next Herbicide Treatment:** n/a
- **Future Management Potential:** low
- **Aesthetic Impact of Prescription:** low
- **Insect/Disease:** none
- **Accessible:** yes
- **Site Limitations:** SMZ
- **Stream Crossing:** none
- **OGM/Utilities:** none

- This is an established stand of mixed hardwood / pine dominated timber – primarily composed of white oak, red oak, and pine.
- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.
- This stand has a fair amount of potential, but is still developing. Despite that it is well stocked it needs to remain in a crowded competitive state for a longer period of time to force the trees to grow straight, shed lower limbs, and suppress the less vigorous trees. This may result in a short term loss of growth, but is a worthwhile risk to take if better quality trees will result. It should be re-examined in the future to see if this strategy was successful; if not, then the management strategy should be altered accordingly.
- The stocking in AGS alone is not adequate enough to support a well-stocked stand. This stand is a riparian buffer that surrounds an intermittent drain, so there is little long-term potential for timber management. This stand serves as excellent wildlife habitat as well, especially with a higher component of unacceptable growing stock near the drain.
Commercial Stand Description

**Stand 3**

**Acreage:** 112.5

**Forest Cover Type:** central hardwoods

**Topography:** gently sloping to steep, ravines

**Water Resources:** ephemeral drainages

**Special Sites:** hiking trails

**Age Structure:** all-aged

**Size Class:** poletimber

**Site Quality:** poor to fair

**Total Sawtimber Volume (Bdft-Inter1/4"): +/− 488,400**

**Total Pulpwood Volume (Cords): +/− 869.8**

**Sawtimber Quality:** fair to good

**Last Harvest Year:** unknown

**Snags & Den Trees (stems/acre):** 2.4

**Primary Pole Species:** mixed oak, red maple, and hickory

**Pole Condition:** fair

**Primary Seedling Species:** mixed oak

**Seedling Stocking:** low

**Deer Browse Intensity:** low

**Primary Sapling Species:** mixed oak, red maple, and birch

**Sapling Stocking:** low

**Sapling Condition:** fair

**Woody Comp. Species:** witch hazel and grape vine

**Woody Comp. Stocking:** low

**Herbaceous Veg. Species:** greenbrier

**Herbaceous Veg. Coverage:** low

---

**Species Composition (% Basal Area)**

- Chestnut Oak: 18%
- Hickory: 12%
- White Oak: 22%
- White Pine: 14%
- Sugar Maple: 7%
- Red Maple: 7%
- Red Oak: 6%
- Other Comm Spp: 7%
- Other NonComm Spp: 1%

**Sawtimber Volume (D): +/− 4,342 BF/Acre**

- Chestnut Oak: 817
- Hickory: 569
- White Oak: 1,144
- White Pine: 1,071
- Other: 120
- Red Oak: 305
- Red Maple: 106
- Hemlock: 0
- Sugar Maple: 134
- Black Oak: 76
Diagnosis & Prescription:

Stocking Level: well stocked  
Adequately Stocked with AGS: yes  
Next Harvest: 10-15 years  
Harvest Type: evaluate for TSI or thinning  
Target BA/Acre: n/a  
Necessary to Retain UGS: n/a  
Understory Potential: low  
Regeneration Inhibited: yes  
Herbicide Treatment: none  
Herbicide Target: none  
Next Herbicide Treatment: n/a  
Future Management Potential: high  
Aesthetic Impact of Prescription: moderate  
Insect/Disease: none noted  
Accessible: yes  
Site Limitations: none  
Stream Crossing: none established  
OGM/Utilities: water line and buried cable

- This is an established developing stand of central hardwood dominated timber – primarily composed of white oak, white pine, and chestnut oak.
- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.
- This stand has a fair amount of potential, but is still developing. Despite that it is well stocked it needs to remain in a crowded competitive state for a longer period of time to force the trees to grow straight, shed lower limbs, and suppress the less vigorous trees. This may result in a short term loss of growth, but is a worthwhile risk to take if better quality trees will result. It should be re-examined in the future to see if this strategy was successful; if not, then the management strategy should be altered accordingly.
- The stocking in AGS alone is adequate enough to support a well-stocked stand in the future. The next harvest (10-15 years) should focus on the removal of UGS first. Depending on the amount of UGS at the time, the type of harvest may either be non-commercial TSI or a commercial thinning.
Commercial Stand Description

Stand 4

- **Acreage**: 29.3
- **Forest Cover Type**: central hardwoods
- **Topography**: gently sloping, ravines
- **Water Resources**: ephemeral drainages
- **Special Sites**: none noted during inventory
- **Age Structure**: all-aged
- **Size Class**: poletimber
- **Site Quality**: fair
- **Total Sawtimber Volume (Bdft-Inter1/4'')**: +/- 75,400
- **Total Pulpwood Volume (Cords)**: +/- 112.8
- **Sawtimber Quality**: fair
- **Last Harvest Year**: 2010
- **Snags & Den Trees (stems/acre)**: 2.5

**Primary Pole Species**: mixed oak, red maple, and hickory
**Pole Condition**: fair
**Primary Seedling Species**: mixed oak
**Seedling Stocking**: moderate
**Deer Browse Intensity**: moderate
**Primary Sapling Species**: mixed oak, red maple, and hickory
**Sapling Stocking**: low
**Sapling Condition**: fair
**Woody Comp. Species**: n/a
**Woody Comp. Stocking**: none
**Herbaceous Veg. Species**: grasses and greenbrier
**Herbaceous Veg. Coverage**: low
Diagnosis & Prescription:

Stocking Level: well stocked
Adequately Stocked with AGS: no
Next Harvest: 25+ years
Harvest Type: none – let develop
Target BA/Acre: n/a
Necessary to Retain UGS: n/a
Understory Potential: fair
Regeneration Inhibited: no
Herbicide Treatment: none
Herbicide Target: none
Next Herbicide Treatment: n/a
Future Management Potential: fair
Aesthetic Impact of Prescription: low
Insect/Disease: none noted
Accessible: yes
Site Limitations: none
Stream Crossing: yes
OGM/Utilities: none

- This is a developing stand of central hardwood dominated timber – primarily composed of mixed oak, white pine, and hickory.
- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.
- This stand was last harvested in 2010. It is understood that the harvest was “loggers choice” and based on field observations it appears that mostly the higher quality/valued larger diameter trees were cut. This practice (diameter limit or high grading) is normally considered to be detrimental to the productivity and genetics of the forest. In this case, however, other than removing a lot of the larger quality timber and limiting short term opportunities for another sawtimber harvest, it appears that the stand may have had two distinct age classes at the time of the harvest, where the understory and midstory were reasonably stocked with good saplings and poles to serve as a productive future timber crop.
- Overall, this stand needs to continue developing. It is inconsistently stocked, has marginal timber quality and value, and is still in a state of transition; it lacks structure in general. The stocking in AGS alone is not adequate enough to support a well-stocked stand. When it has reached full stocking a timber stand improvement thinning will likely be the first treatment needed. The sawtimber trees will need to be evaluated, but it may be possible to support the harvest of some of the larger sawtimber trees at the same time; if not they should be left to continue growing.
Commercial Stand Description

Stand 5

- **Acreage**: 30.5
- **Forest Cover Type**: mixed hardwood / pine
- **Topography**: gently sloping, ravines
- **Water Resources**: ephemeral drainages
- **Special Sites**: evidence of old homesteads and farming
- **Age Structure**: all-aged
- **Size Class**: poletimber
- **Site Quality**: poor

- **Total Sawtimber Volume (Bdft-Int1/4")**: +/- 146,800
- **Total Pulpwood Volume (Cords)**: +/- 321.8
- **Sawtimber Quality**: poor
- **Last Harvest Year**: unknown
- **Snags & Den Trees (stems/acre)**: 44.0

- **Primary Pole Species**: white pine, mixed oak, red maple
- **Pole Condition**: fair
- **Primary Seedling Species**: mixed oak
- **Seedling Stocking**: low
- **Deer Browse Intensity**: low to moderate
- **Primary Sapling Species**: white pine, red maple
- **Sapling Stocking**: low
- **Sapling Condition**: fair
- **Woody Comp. Species**: witch hazel
- **Woody Comp. Stocking**: low
- **Herbaceous Veg. Species**: grasses, greenbrier
- **Herbaceous Veg. Coverage**: low

**Species Composition (% Basal Area)**

- White Oak 13%
- White Pine 25%
- Red Oak 2%
- Red Maple 4%
- Black Oak 7%
- Other Comm. Sp. 45%
- Chestnut Oak 4%

**Sawtimber Volume (D): +/- 4,813 BdF/Acre**

- Chestnut Oak 279
- Hickory 0
- White Oak 233
- White Pine 2,957
- Other 1,161
- Red Oak 0
- Red Maple 0
- Hemlock 0
- Sugar Maple 0
- Black Oak 184

**Distribution of Growing Stock**

119 Ft² Basal Area/Ac - 93% AGS

- SAPS
- POLES
- SM SAW
- MED SAW
- LG SAW

Acceptable Growing Stock
Unacceptable Growing Stock
Diagnosis & Prescription:

**Stocking Level**: well stocked

*Adequately Stocked with AGS*: yes

**Next Harvest**: 20 years

**Harvest Type**: evaluate for TSI or thinning

**Target BA/Acre**: n/a

**Necessary to Retain UGS**: n/a

**Understory Potential**: low

**Regeneration Inhibited**: yes

**Herbicide Treatment**: none

**Herbicide Target**: none

**Next Herbicide Treatment**: n/a

**Future Management Potential**: low

**Aesthetic Impact of Prescription**: moderate

**Insect/Disease**: none noted

**Accessible**: yes

**Site Limitations**: none

**Stream Crossing**: none

**OGM/Utilities**: none

- This is an established stand of mixed hardwood / pine dominated timber – primarily composed of white pine, Virginia pine, and mixed oak. It appears to have developed from abandoned agriculture.

- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.

- Overall, this stand needs to continue developing. It is inconsistently stocked, has marginal timber quality and value, and is still in a state of transition; it lacks structure in general. When it has reached full stocking a timber stand improvement thinning will likely be the first treatment needed. The sawtimber trees will need to be evaluated, but it may be possible to support the harvest of some of the larger sawtimber trees at the same time; if not they should be left to continue growing.

- The current stocking in AGS alone is adequate enough to support a well-stocked stand in the future. This may change as the stand develops during the next 20 years.
Commercial Stand Description

Stand 6A

<table>
<thead>
<tr>
<th>Acreage: 26.0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Forest Cover Type:</strong> mixed hardwood / pine</td>
</tr>
<tr>
<td><strong>Topography:</strong> gently sloping</td>
</tr>
<tr>
<td><strong>Water Resources:</strong> ephemeral drainages</td>
</tr>
<tr>
<td><strong>Special Sites:</strong> camp sites</td>
</tr>
<tr>
<td><strong>Age Structure:</strong> all-aged</td>
</tr>
<tr>
<td><strong>Size Class:</strong> medium sawtimber</td>
</tr>
<tr>
<td><strong>Site Quality:</strong> good</td>
</tr>
<tr>
<td><strong>Total Sawtimber Volume (Bdft-Inter1/4&quot;)</strong>: +/- 255,300</td>
</tr>
<tr>
<td><strong>Total Pulpwood Volume (Cords)</strong>: +/- 129.0</td>
</tr>
<tr>
<td><strong>Sawtimber Quality:</strong> fair to good</td>
</tr>
<tr>
<td><strong>Last Harvest Year:</strong> unknown</td>
</tr>
<tr>
<td><strong>Snags &amp; Den Trees (stems/acre)</strong>: 28.6</td>
</tr>
</tbody>
</table>

| Primary Pole Species: red maple, birch, hickory |
| Pole Condition: fair |
| Primary Seedling Species: red maple |
| Seedling Stocking: low |
| Deer Browse Intensity: low |
| Primary Sapling Species: white pine, birch |
| Sapling Stocking: low |
| Sapling Condition: fair |
| Woody Comp. Species: witch hazel, spicebush |
| Woody Comp. Stocking: low |
| Herbaceous Veg. Species: fern, greenbrier |
| Herbaceous Veg. Coverage: low |

### Species Composition (% Basal Area)

- Chestnut Oak: 11%
- Black Oak: 2%
- Sugar Maple: 2%
- Red Maple: 8%
- Red Oak: 7%
- Other Comm Spp: 18%
- White Pine: 28%
- Hickory: 10%
- White Oak: 16%

### Sawtimber Volume (D): +/- 9,819 Bdft/Acre

- Chestnut Oak: 1,419
- Hickory: 423
- White Oak: 1,831
- White Pine: 3,773
- Other: 965
- Red Oak: 781
- Red Maple: 192
- Hemlock: 0
- Sugar Maple: 185
- Black Oak: 250

### Distribution of Growing Stock

122 Ft² Basal Area/Ac - 84% AGS
**Diagnosis & Prescription:**

- **Stocking Level:** well stocked
- **Adequately Stocked with AGS:** no
- **Next Harvest:** 15-20 years
- **Harvest Type:** evaluate for TSI or thinning
- **Target BA/Acre:** n/a
- **Necessary to Retain UGS:** n/a
- **Understory Potential:** low
- **Regeneration Inhibited:** yes
- **Herbicide Treatment:** none
- **Herbicide Target:** none
- **Next Herbicide Treatment:** n/a
- **Future Management Potential:** high
- **Aesthetic Impact of Prescription:** moderate
- **Insect/Disease:** none noted
- **Accessible:** yes
- **Site Limitations:** none
- **Stream Crossing:** none
- **OGM/Utilities:** none

- This is an established stand of mixed hardwood / pine dominated timber – primarily composed of white pine, white oak, and chestnut oak.
- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.
- This stand has a fair amount of potential, but is still developing. Despite that it is well stocked it needs to remain in a crowded competitive state for a longer period of time to force the trees to grow straight, shed lower limbs, and suppress the less vigorous trees. This may result in a short term loss of growth, but is a worthwhile risk to take if better quality trees will result. It should be re-examined in the future to see if this strategy was successful; if not, then the management strategy should be altered accordingly.
- The stocking in AGS alone is adequate enough to support a well-stocked stand in the future. The next harvest (15-20 years) should focus on the removal of UGS first; it may be necessary to retain some UGS as place holders and as additional future sources of seed to maintain target residual stocking levels. Depending on the amount of UGS at the time, the type of harvest may either be non-commercial TSI or a commercial thinning.
- This stand contains several campsites and other structures associated with camping. This stand should be monitored annually to inspect for hazard trees. These hazard trees should be removed as needed to ensure public safety around the camping areas.
### Commercial Stand Description

#### Stand 6B

<table>
<thead>
<tr>
<th>Description</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acreage</strong>:</td>
<td>17.0</td>
</tr>
<tr>
<td><strong>Forest Cover Type</strong>:</td>
<td>mixed hardwood / pine</td>
</tr>
<tr>
<td><strong>Topography</strong>:</td>
<td>moderately steep, ravine</td>
</tr>
<tr>
<td><strong>Water Resources</strong>:</td>
<td>ephemeral drainages</td>
</tr>
<tr>
<td><strong>Special Sites</strong>:</td>
<td>camp maintenance area</td>
</tr>
<tr>
<td><strong>Age Structure</strong>:</td>
<td>all-aged</td>
</tr>
<tr>
<td><strong>Size Class</strong>:</td>
<td>medium sawtimber</td>
</tr>
<tr>
<td><strong>Site Quality</strong>:</td>
<td>fair</td>
</tr>
<tr>
<td><strong>Total Sawtimber Volume (Bdft-Inter1/4&quot;)</strong>:</td>
<td>+/- 155,300</td>
</tr>
<tr>
<td><strong>Total Pulpwood Volume (Cords)</strong>:</td>
<td>+/- 187.0</td>
</tr>
<tr>
<td><strong>Sawtimber Quality</strong>:</td>
<td>fair to good</td>
</tr>
<tr>
<td><strong>Last Harvest Year</strong>:</td>
<td>unknown</td>
</tr>
<tr>
<td><strong>Snags &amp; Den Trees (stems/acre)</strong>:</td>
<td>none tallied in plots</td>
</tr>
</tbody>
</table>

#### Species Composition (% Basal Area)

- **White Pine**: 36%
- **White Oak**: 12%
- **Sugar Maple**: 9%
- **Red Maple**: 9%
- **Hemlock**: 3%
- **Sugar Maple**: 3%
- **Black Oak**: 2%
- **Chesnut Oak**: 3%
- **Hickory**: 7%
- **Other Comm Spp**: 6%
- **Red Oak**: 3%

#### Sawtimber Volume (D): +/- 9,135 Bdft/Acre

- **Chestnut Oak**: 182
- **Hickory**: 171
- **White Oak**: 388
- **White Pine**: 5,294
- **Other**: 0
- **Red Oak**: 0
- **Red Maple**: 535
- **Hemlock**: 2,359
- **Sugar Maple**: 0
- **Black Oak**: 206

#### Distribution of Growing Stock

- **148 Ft³ Basal Area/Ac - 85% AGS**
- **Acceptable Growing Stock**
- **Unacceptable Growing Stock**
**Diagnosis & Prescription:**

- **Stocking Level:** well stocked
- **Adequately Stocked with AGS:** yes
- **Next Harvest:** 10-15 years
- **Harvest Type:** evaluate for TSI or thinning
- **Target BA/Acre:** n/a
- **Necessary to Retain UGS:** n/a
- **Understory Potential:** low
- **Regeneration Inhibited:** yes
- **Herbicide Treatment:** none
- **Herbicide Target:** none
- **Next Herbicide Treatment:** n/a
- **Future Management Potential:** low
- **Aesthetic Impact of Prescription:** low
- **Insect/Disease:** none noted
- **Accessible:** yes
- **Site Limitations:** rocky, steep
- **Stream Crossing:** none
- **OGM/Utilities:** none

- This is an established stand of mixed hardwood / pine dominated timber – primarily composed of white pine, hemlock, and mixed oak.
- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.
- This stand has a fair amount of potential, but is still developing. Despite that it is well stocked it needs to remain in a crowded competitive state for a longer period of time to force the trees to grow straight, shed lower limbs, and suppress the less vigorous trees. This may result in a short term loss of growth, but is a worthwhile risk to take if better quality trees will result. It should be re-examined in the future to see if this strategy was successful; if not, then the management strategy should be altered accordingly.
- The stocking in AGS alone is adequate enough to support a well-stocked stand in the future. The next harvest (10-15 years) should focus on the removal of UGS first. Depending on the amount of UGS at the time, the type of harvest may either be non-commercial TSI or a commercial thinning.
# Commercial Stand Description

## Stand 7

**Acreage:** 67.0  
**Forest Cover Type:** mixed hardwood / pine  
**Topography:** bottomland, wetlands  
**Water Resources:** Plum Run, Dry Run  
**Special Sites:** camp areas, hiking trails  
**Age Structure:** all-aged  
**Size Class:** poletimber / small sawtimber  
**Site Quality:** fair to good  
**Total Sawtimber Volume (Bdft-Inter1/4"): +/- 600,300**  
**Total Pulpwood Volume (Cords): +/- 320**  
**Sawtimber Quality:** fair to good  
**Last Harvest Year:** unknown  
**Snags & Den Trees (stems/acre):** 33.9

**Primary Pole Species:** white pine, red maple, mixed oak  
**Pole Condition:** fair to good  
**Primary Seedling Species:** red maple, mixed oak  
**Seedling Stocking:** none to low  
**Deer Browse Intensity:** low  
**Primary Sapling Species:** white pine, red maple  
**Sapling Stocking:** low  
**Sapling Condition:** fair to good  
**Woody Comp. Species:** beech  
**Woody Comp. Stocking:** low to moderate  
**Herbaceous Veg. Species:** fern, greenbrier  
**Herbaceous Veg. Coverage:** low

### Species Composition (% Basal Area)

- **White Oak:** 18%  
- **White Pine:** 18%  
- **Sugar Maple:** 5%  
- **Hemlock:** 19%  
- **Red Maple:** 7%  
- **Other NonComm Spp:** 2%  
- **Other Comm Spp:** 24%  
- **Red Oak:** 3%  
- **Hickory:** 4%

### Sawtimber Volume (D): +/- 8,961 Bdft/Acre

- Chestnut Oak: 0  
- Hickory: 49  
- White Oak: 1,387  
- White Pine: 3,261  
- Other: 2,072  
- Red Oak: 313  
- Red Maple: 240  
- Hemlock: 1,590  
- Sugar Maple: 49  
- Black Oak: 0

### Distribution of Growing Stock

- **SAPS:** 113 Ft² Basal Area/Ac - 79% AGS
Diagnosis & Prescription:

Stocking Level: under stocked

Adequately Stocked with AGS:

Next Harvest: 20+ years

Harvest Type: none – let develop

Target BA/Acre: n/a

Necessary to Retain UGS: n/a

Understory Potential: med

Regeneration Inhibited: no

Herbicide Treatment: none

Herbicide Target: none

Next Herbicide Treatment: n/a

Future Management Potential: low

Aesthetic Impact of Prescription: low

Insect/Disease: none noted

Accessible: yes

Site Limitations: wet

Stream Crossing: none

OGM/Utilities: none

- This is a developing stand of mixed hardwood / pine dominated timber – primarily composed of white pine, hemlock, sycamore, and mixed oak.

- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.

- The stocking in AGS alone is not adequate enough to support a well-stocked stand. Since this stand is a riparian buffer that surrounds Plum Run, there is little long-term potential for timber management. This stand serves as excellent wildlife habitat as well, especially with a higher component of unacceptable growing stock.

- This stand contains a campsite as well as a scenic hiking trail. This stand should be monitored annually to inspect for hazard trees. These hazard trees should be removed as needed to ensure public safety around the recreational areas.
### Commercial Stand Description

#### Stand 8

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acreage:</strong></td>
<td>44.1</td>
</tr>
<tr>
<td><strong>Forest Cover Type:</strong></td>
<td>mixed hardwood / pine</td>
</tr>
<tr>
<td><strong>Topography:</strong></td>
<td>gently rolling</td>
</tr>
<tr>
<td><strong>Water Resources:</strong></td>
<td>Lake Sinoquipe, ephemeral drainages</td>
</tr>
<tr>
<td><strong>Special Sites:</strong></td>
<td>main camp area, hiking trails</td>
</tr>
<tr>
<td><strong>Age Structure:</strong></td>
<td>all-aged</td>
</tr>
<tr>
<td><strong>Size Class:</strong></td>
<td>small sawtimber</td>
</tr>
<tr>
<td><strong>Site Quality:</strong></td>
<td>good</td>
</tr>
<tr>
<td><strong>Total Sawtimber Volume (Bdft-Inter1/4&quot;)</strong>:</td>
<td>+/- 337,300</td>
</tr>
<tr>
<td><strong>Total Pulpwood Volume (Cords)</strong>:</td>
<td>+/- 293.3</td>
</tr>
<tr>
<td><strong>Sawtimber Quality:</strong></td>
<td>fair to good</td>
</tr>
<tr>
<td><strong>Last Harvest Year:</strong></td>
<td>unknown</td>
</tr>
<tr>
<td><strong>Snags &amp; Den Trees (stems/acre):</strong></td>
<td>none tallied in plots</td>
</tr>
</tbody>
</table>

#### Species Composition (% Basal Area)

- White Oak: 30%
- White Pine: 37%
- Chestnut Oak: 10%
- Hickory: 4%
- Black Oak: 3%
- Sugar Maple: 3%
- Red Maple: 6%
- Red Oak: 2%
- Other Comm Spp: 12%
- Other NonComm Spp: 1%

#### Distribution of Growing Stock

112 Ft² Basal Area/Ac - 91% AGS

- SAPS
- POLES
- SM SAW
- MED SAW
- LG SAW

#### Sawtimber Volume (D): +/- 7,649 BF/Acre

- Chestnut Oak: 109
- Hickory: 245
- White Oak: 2,401
- White Pine: 4,052
- Other: 576
- Red Oak: 0
- Red Maple: 138
- Hemlock: 0
- Sugar Maple: 0
- Black Oak: 127

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Diagnosis & Prescription:

Stocking Level: well stocked
Adequately Stocked with AGS: no
Next Harvest: 20 years
Harvest Type: evaluate for TSI or thinning
Target BA/Acre: n/a
Necessary to Retain UGS: n/a
Understory Potential: low
Regeneration Inhibited: yes
Herbicide Treatment: none
Herbicide Target: none
Next Herbicide Treatment: n/a
Future Management Potential: low
Aesthetic Impact of Prescription: high
Insect/Disease: none noted
Accessible: yes
Site Limitations: none
Stream Crossing: none
OGM/Utilities: gas line, water line buried, electric line

- This is an established stand of mixed hardwood / pine dominated timber – primarily composed of white pine and white oak
- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.
- This stand has a fair amount of potential, but is still developing. Despite that it is well stocked it needs to remain in a crowded competitive state for a longer period of time to force the trees to grow straight, shed lower limbs, and suppress the less vigorous trees. This may result in a short term loss of growth, but is a worthwhile risk to take if better quality trees will result. It should be re-examined in the future to see if this strategy was successful; if not, then the management strategy should be altered accordingly.
- The stocking in AGS alone is not adequate enough to support a well-stocked stand. The next harvest (20 years) should focus exclusively on the removal of UGS; it will be necessary to retain some UGS as place holders and as additional future sources of seed to maintain target residual stocking levels. Depending on the amount of UGS that needs to be removed at the time, the type of harvest my either be non-commercial TSI or a commercial thinning
- This stand is the central part of the campground, therefore it contains many campsites and other structures associated with camping. This stand should be monitored annually to inspect for hazard trees. These hazard trees should be removed as needed to ensure public safety around the camping areas.
**Commercial Stand Description**

**Stand 9**

- **Acreage**: 52.4
- **Forest Cover Type**: mixed hardwood / pine
- **Topography**: gently rolling
- **Water Resources**: Lake Sinoquipe, Plum Run
- **Special Sites**: camping areas, hiking trails, cope course
- **Age Structure**: all-aged
- **Size Class**: medium sawtimber
- **Site Quality**: good
- **Total Sawtimber Volume (Bdft-Inter1/4")**: +/- 801,300
- **Total Pulpwood Volume (Cords)**: +/- 316.0
- **Sawtimber Quality**: fair to good
- **Last Harvest Year**: unknown
- **Snags & Den Trees (stems/acre)**: 1.2

**Species Composition (% Basal Area)**

- White Oak: 4%
- Hickory: 2%
- Chestnut Black Oak: 1%
- Sugar Maple: 1%
- Red Maple: 1%
- Red Oak: 1%
- White Pine: 38%
- Other NonComm Spp: 2%
- Other Comm Spp: 1%

**Sawtimber Volume (D): +/- 15,290 BF/Ac**

- Chestnut Oak: 231
- Hickory: 298
- White Oak: 2,718
- White Pine: 8,531
- Other: 46
- Red Oak: 2,714
- Red Maple: 324
- Hemlock: 40
- Sugar Maple: 46
- Black Oak: 344

**Primary Pole Species**: mixed oak, white pine, red maple
- **Pole Condition**: fair to good
- **Primary Seedling Species**: red maple, white pine
- **Seedling Stocking**: low
- **Deer Browse Intensity**: low
- **Primary Sapling Species**: white pine, red maple
- **Sapling Stocking**: low to moderate
- **Sapling Condition**: good
- **Woody Comp. Species**: witch hazel
- **Woody Comp. Stocking**: low
- **Herbaceous Veg. Species**: fern, greenbrier
- **Herbaceous Veg. Coverage**: low
**Diagnosis & Prescription:**

**Stocking Level:** well stocked

**Adequately Stocked with AGS:** yes

**Next Harvest:** 10-15 years

**Harvest Type:** evaluate for TSI or thinning

**Target BA/Acre:** n/a

**Necessary to Retain UGS:** n/a

**Understory Potential:** low

**Regeneration Inhibited:** yes

**Herbicide Treatment:** none

**Herbicide Target:** none

**Next Herbicide Treatment:** n/a

**Future Management Potential:** high

**Aesthetic Impact of Prescription:** high

**Insect/Disease:** none noted

**Accessible:** yes

**Site Limitations:** wet areas

**Stream Crossing:** none

**OGM/Utilities:** none

- This is an established stand of mixed hardwood / pine dominated timber – primarily composed of white pine and mixed oak.
- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.
- This stand has a fair amount of potential, but is still developing. Despite that it is well stocked it needs to remain in a crowded competitive state for a longer period of time to force the trees to grow straight, shed lower limbs, and suppress the less vigorous trees. This may result in a short term loss of growth, but is a worthwhile risk to take if better quality trees will result. It should be re-examined in the future to see if this strategy was successful; if not, then the management strategy should be altered accordingly.
- The stocking in AGS alone is adequate enough to support a well-stocked stand in the future. The next harvest (10-15 years) should focus on the removal of UGS first. Depending on the amount of UGS at the time, the type of harvest may either be non-commercial TSI or a commercial thinning.
- This stand contains several campsites and other structures associated with camping and outdoor recreational activities. This stand should be monitored annually to inspect for hazard trees. These hazard trees should be removed as needed to ensure public safety around the recreational areas.
Commercial Stand Description

Stand 10

**Acreage:** 24.0  
**Forest Cover Type:** Early Successional  
**Topography:** gently rolling, bottomlands  
**Water Resources:** Lake Sinoquipe, Little Aughwick  
**Special Sites:** wetlands  
**Age Structure:** even-aged  
**Size Class:** sapling / poletimber  
**Site Quality:** fair to good  
**Total Sawtimber Volume (Bdft-Inter1/4"):** +/- 59,600  
**Total Pulpwood Volume (Cords):** +/- 116.9  
**Sawtimber Quality:** fair  
**Last Harvest Year:** unknown  
**Snags & Den Trees (stems/acre):** 11.4

**Primary Pole Species:** red maple, hickory, hard maple  
**Pole Condition:** fair  
**Primary Seedling Species:** red maple  
**Seedling Stocking:** low  
**Deer Browse Intensity:** low  
**Primary Sapling Species:** red maple  
**Sapling Stocking:** none to low  
**Sapling Condition:** fair  
**Woody Comp. Species:** witch hazel, spicebush  
**Woody Comp. Stocking:** moderate  
**Herbaceous Veg. Species:** grasses  
**Herbaceous Veg. Coverage:** low

**Species Composition (% Basal Area)**

- Hickory 35%
- Chestnut Oak 5%
- Black Oak 10%
- Sugar Maple 20%
- Red Maple 15%
- Other Common Spp 15%
- Other 15%

**Sawtimber Volume (D):** +/- 2,479 BdF/Acre

- Chestnut Oak 0
- Hickory 1,546
- White Oak 0
- White Pine 0
- Other 0
- Red Oak 0
- Red Maple 0
- Hemlock 0
- Sugar Maple 646
- Black Oak 288

**Distribution of Growing Stock**

67 Ft² Basal Area/Ac - 95% AGS

- SAPS
- POLES
- SM SAW
- MED SAW
- LG SAW

**Size Class**

- Acceptable Growing Stock
- Unacceptable Growing Stock

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**Diagnosis & Prescription:**

**Stocking Level:** under stocked  
**Adequately Stocked with AGS:** no  
**Next Harvest:** 25+ years  
**Harvest Type:** none – let develop  
**Target BA/Acre:** n/a  
**Necessary to Retain UGS:** n/a  
**Understory Potential:** fair  
**Regeneration Inhibited:** no  
**Herbicide Treatment:** none  
**Herbicide Target:** none  
**Next Herbicide Treatment:** n/a  
**Future Management Potential:** low  
**Aesthetic Impact of Prescription:** low  
**Insect/Disease:** none noted  
**Accessible:** yes  
**Site Limitations:** wet, rocky  
**Stream Crossing:** none  
**OGM/Utilities:** none

- This is a developing stand of mixed hardwood / pine dominated timber – primarily composed of hickory, sugar maple and mixed oak. It appears to have developed from abandoned agriculture.
- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.
- Overall, this stand needs to continue developing. It is inconsistently stocked, has marginal timber quality and value, and is still in a state of transition; it lacks structure in general. When it has reached full stocking a timber stand improvement thinning will likely be the first treatment needed. The sawtimber trees will need to be evaluated, but it may be possible to support the harvest of some of the larger sawtimber trees at the same time; if not they should be left to continue growing.
Commercial Stand Description

Stand 11

| Acreage: 11.2 | Primary Pole Species: hard maple, red maple |
| Forest Cover Type: central hardwoods | Pole Condition: fair |
| Topography: flat, bottomlands | Primary Seedling Species: hard maple |
| Water Resources: Little Aughwick, intermittent drainage | Seedling Stocking: low |
| Special Sites: none noted during inventory | Deer Browse Intensity: low |
| Age Structure: all-aged | Primary Sapling Species: hard maple |
| Size Class: small sawtimber | Sapling Stocking: low |
| Site Quality: good | Sapling Condition: fair |
| Total Sawtimber Volume (Bdft-Inter1/4"): +/- 56,200 | Woody Comp. Species: grape vine |
| Total Pulpwood Volume (Cords): +/- 108.7 | Woody Comp. Stocking: low |
| Sawtimber Quality: fair | Herbaceous Veg. Species: greenbrier, grasses |
| Last Harvest Year: unknown | Herbaceous Veg. Coverage: low |
| Snags & Den Trees (stems/acre): none tallied in plots |

Species Composition (% Basal Area)

<table>
<thead>
<tr>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hickory</td>
<td>39%</td>
</tr>
<tr>
<td>Sugar Maple</td>
<td>46%</td>
</tr>
<tr>
<td>Other Comm Spp</td>
<td>12%</td>
</tr>
<tr>
<td>Red Oak</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>12%</td>
</tr>
</tbody>
</table>

Sawtimber Volume (D): +/- 5,072 Bdft/Acre

<table>
<thead>
<tr>
<th>Species</th>
<th>Volume (Bdft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chestnut Oak</td>
<td>0</td>
</tr>
<tr>
<td>Hickory</td>
<td>2,357</td>
</tr>
<tr>
<td>White Oak</td>
<td>0</td>
</tr>
<tr>
<td>White Pine</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>170</td>
</tr>
<tr>
<td>Red Oak</td>
<td>250</td>
</tr>
<tr>
<td>Red Maple</td>
<td>0</td>
</tr>
<tr>
<td>Hemlock</td>
<td>0</td>
</tr>
<tr>
<td>Sugar Maple</td>
<td>2,250</td>
</tr>
<tr>
<td>Black Oak</td>
<td>0</td>
</tr>
</tbody>
</table>

Distribution of Growing Stock

110 Ft² Basal Area/Ac - 76% AGS

<table>
<thead>
<tr>
<th>Size Class</th>
<th>Basal Area - Ft²/Ac</th>
<th>Acceptable Growing Stock</th>
<th>Unacceptable Growing Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAPS</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POLES</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SM SAW</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MED SAW</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LG SAW</td>
<td>50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Diagnosis & Prescription:

Stocking Level: well stocked
Adequately Stocked with AGS: yes
Next Harvest: 10-15 years
Harvest Type: evaluate for TSI or thinning
Target BA/Acre: n/a
Necessary to Retain UGS: n/a
Understory Potential: fair
Regeneration Inhibited: no
Herbicide Treatment: none
Herbicide Target: none
Next Herbicide Treatment: n/a
Future Management Potential: fair
Aesthetic Impact of Prescription: high
Insect/Disease: none noted
Accessible: yes
Site Limitations: wet
Stream Crossing: none
OGM/Utilities: none

- This is an established stand of central hardwood dominated timber – primarily composed of hickory and sugar maple.
- At the current stocking level the degree of crowding is low, growth rates will be high, and mortality will be low.
- This stand has a fair amount of potential, but is still developing. Despite that it has almost reached full stocking it needs to remain in a crowded competitive state for a longer period of time to force the trees to grow straight, shed lower limbs, and suppress the less vigorous trees. This may result in a short term loss of growth, but is a worthwhile risk to take if better quality trees will result. It should be re-examined in the future to see if this strategy was successful; if not, then the management strategy should be altered accordingly.
- The stocking in AGS alone is adequate enough to support a well-stocked stand in the future. The next harvest (10-15 years) should focus on the removal of UGS first. Depending on the amount of UGS at the time, the type of harvest may either be non-commercial TSI or a commercial thinning.
Non-Forest & Non-Commercial Stand Descriptions

**Stand Area:** Lake/open area/baseball field

**Acres:** 25.0

**Cover Type:** Non-forest

**Description:** This area is comprised of Lake SInoquipe, a baseball field, and a maintained open area near the camp entrance.
## 10 Year Work Schedule

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>Research &amp; Establish all property lines. Survey if need be.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td>2017</td>
<td>Stand 1A – herbicide application</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td></td>
<td>Inspect stands 6A, 7, 8, and 9. Remove hazard trees as needed.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td>2018</td>
<td>Inspect stands 6A, 7, 8, and 9. Remove hazard trees as needed.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td></td>
<td>Evaluate oak regeneration in stand 1A.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td>2019</td>
<td>Inspect stands 6A, 7, 8, and 9. Remove hazard trees as needed.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td></td>
<td>Evaluate oak regeneration in stand 1A.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td>2020</td>
<td>Inspect stands 6A, 7, 8, and 9. Remove hazard trees as needed.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td></td>
<td>Evaluate oak regeneration in stand 1A.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td></td>
<td>Supplemental tree planting (if needed) in stand 1A.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td>2021</td>
<td>Inspect stands 6A, 7, 8, and 9. Remove hazard trees as needed.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td>2022</td>
<td>Inspect stands 6A, 7, 8, and 9. Remove hazard trees as needed.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td>2023</td>
<td>Inspect stands 6A, 7, 8, and 9. Remove hazard trees as needed.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td>2024</td>
<td>Inspect stands 6A, 7, 8, and 9. Remove hazard trees as needed.</td>
<td>☐ Completed/Date________</td>
</tr>
<tr>
<td>2025</td>
<td>Re-Inventory property and Update Management Plan</td>
<td>☐ Completed/Date________</td>
</tr>
</tbody>
</table>
Glossary of Forestry Terms

Acceptable Growing Stock – Trees which are healthy, vigorous and of good form to produce sawlog material, either now or in the future.

Acre – A land area of any shape, having 43,560 square feet. A football playing field contains approximately one acre.

AGS – See Acceptable Growing Stock.

Basal Area – See Stem Basal Area.

Board Foot – A standard volume measurement of lumber. Often described as an imaginary board one foot square and one inch think; actually, any dimension of lumber with a volume of 144 cubic inches.

Biological Maturity – See Maturity.

Clearcutting – The harvesting of all, or nearly all, of a crop of trees.

Conifer/Coniferous – A term meaning “cone bearing” as in trees with needle like leaves that bear their seed in cones. See Softwood.


Cull – A live tree which is judged to be unmerchantable, both presently and in the foreseeable future. This can be because there is no market for this species, or because the tree contains too many defects, such as rot or crookedness to sell it profitably.

DBH (dbh) – Abbreviation for Diameter at Breast Height. This height has been standardized at 4.5 feet above the ground.

Even-aged Forest or Stand – A forest, stand, or crop of trees having no, or relatively small, differences in age.

Financial Maturity – The point at which a tree’s financial value to the landowner has peaked. This may or may not coincide with biological maturity. See Maturity.

Forest Succession – The various natural stages that a forest goes through from open, bare ground to a mature forest.

Forest Type – A category of forest usually defined by its vegetation, particularly its dominant vegetation as based on percentage cover of trees.

Hardwood – A conventional term meaning a tree which is broad-leaved and deciduous; that is, it looses its leaves in winter.

Hardwood Forest Type – A forested area which has a makeup of 80% or more in hardwood species, on a merchantable volume basis.

Highgrading – Process of harvesting only high-value, superior quality trees from a forest.

Inoperable – See Operability.

Intermediate – See Tolerance.

Intolerant – See Tolerance.
**Maturity** – A loose term for the stage at which a tree has attained full development, particularly height, and is in full seed production. Thereafter a decline in vigor, health and soundness marks the stage of overmaturity.

**MBF** – Abbreviation for Thousands of Board Feet, M is the Roman numeral for 1,000. For example 16,000 Board Feet would be written 16 MBF.

**Merchantable** – Able to be harvested and sold profitably.

**Mixedwood Forest Type** – A forested area which contains both hardwood and softwood species in a more or less homogeneous mixture, each of which separately does not constitute as much as 80% or more of the merchantable volume. Example, 75% hardwood and 25% softwood.

**Monoculture** – Raising crops of a single species, generally even-aged. Also, a crop so raised.

**Operable** – See Operability.

**Operability** – A loose term referring to the ease or economic feasibility with which timber harvesters can conduct a harvesting operation. An area that can be traversed with the heavy equipment necessary to handle timber is operable, unless lack of merchantable timber in the area or political considerations make it infeasible; then it is inoperable.

**Pioneer Species** – See Tolerance.

**Plantation** – The establishment of a stand of trees by physically planting seedlings in the ground.

**Pulpwood** – Trees, or sections of trees, which are sold to a paper mill to be used to make paper pulp. Since the wood is reduced by the papermaking process to its fiber content, trees are often used which are not of sufficient size, quality or soundness to be used as sawlog material. For this reason, pulpwood is usually not as valuable a product as sawlogs. The term also refers to a group of trees which have no sawlog sections in them. See also Sawtimber.

**Regeneration** – The act of renewing tree cover by establishing young trees naturally or artificially. Regeneration usually maintains the same forest type and is done promptly after the previous stand or forest is removed.

**Relative Density** – The ratio, proportion, or percent of absolute stand density to a reference level defined by some standard level of completion.

**Sawlog** – A section of a tree which is long enough, straight enough and sound enough to be sawn into lumber of various kinds.

**Sawtimber** – Trees which have sections that can be utilized as sawlogs.

**Selective Harvesting** – The process of removing only trees that fall into a predetermined category, usually of size, quality or species.

**Shelterwood System** – Even-aged silvicultural system in which, in order to proved a source of seed and/or protection for regeneration, the old crop (the shelterwood) is removed in two or more successive cuttings.

**Silvics** – The study of the life history and general characteristics of forest trees and stands, with particular reference to locality factors, as the basis for the practice of silviculture.
Silviculture – Generally, the science and art of cultivating forest crops, based on a knowledge of silvics. More particularly, the theory and practice of controlling the establishment, composition, and growth of forest.


Softwood – A conventional term meaning a tree which has needle-like leaves, bears its seed in cones, and generally does not lose its leaves in winter. Frequently called “evergreens”. Examples are: pine and spruce.

Softwood Forest Type – A forested area which contains 80% or more softwood species, on a merchantable volume basis.

Species – A scientific category of plant or animal. There is generally a sterility barrier between species; they cannot interbreed.

Stand – A contiguous group of trees sufficiently uniform in age-class distribution, composition, structure, and growing on a site of uniform quality.

Stand Structure – The horizontal and vertical distribution of components of a forest stand including the height, diameter, crown layers, and stems of trees.

Standard Pulp Cord – Any stack of round or split wood occupying 128 cubic feet of space; but generally described as a stack measuring four feet high, four feet wide and eight feet long.

Stem Basal Area – The cross-sectional area of a tree’s trunk, measured at 4.5 feet above the ground for standardization. It is usually expressed in square feet per acre, meaning the sum of the individual tree’s cross-sectional areas on the acre. It is dependent on tree diameters and tree spacing and can be used as a measure of forest density. Timber volumes can be related to this parameter. It is used a great deal by foresters to describe forest conditions because basal area per acre can be measured in moments at any given point using specially-ground optical prisms that can be carried in a pocket.

Succession – See Forest Succession.

Tolerance – This is a term that expresses a tree’s ability to grow in the shade of other trees; that is its “tolerance” of shade. There are three general classes; intolerant, intermediate and tolerant. Intolerants (also called pioneer species) need lots of sunlight to exist and grow well. They are fast-growing and competitive, and can grow fairly well in partial shade. If either intolerants or intermediates are kept in heavy shade for more than five or ten years, they tend to lose their growing vigor, begin to die off, and won’t regain their vigor even when shade is removed. Tolerants are able to exist for many years in the shade of other trees, and then grow well once the shade has been removed. Examples of intolerant species are: aspen and white birch.

Tolerant – See Tolerance.

UGS – See Unacceptable growing stock.

Unacceptable Growing Stock – Trees which are decadent, overmature, diseased or will never have good enough form to produce sawlog material.

Unmerchantable – Not able to be sold profitably.

Vigor – A loose term which generally refers to a tree’s ability to compete with other nearby trees for sunlight and soil nutrients, its resistance to disease and insect attack, and overall size and shape when fully grown.
Inventory Specifications for Mason-Dixon Council, BSA - 2016

Two Dog Method Set: Mgmt_10BA

Cruise Design and Statistical Standards

1.) **Sampling Method**: 10 Basal Area Factor Variable Radius Plot inventory, with point centers established on a systematic “line-plot” grid system.

2.) **Sampling Intensity**: The intent of the sampling intensity is to efficiently acquire statistically reliable information for each stand or strata. A good representative inventory with minimal variability is important. The plot spacing for this project will begin as a 7 ch x 7 ch grid, but should be adjusted as necessary depending on forest type, terrain, potential number of stands, stand size, perceived variability, property configuration, etc.

   A stand/strata must have more than one sample plot. BAF 10 sample points should be put in all stands even if small in size. Plot data based on a small sample size may be adequate enough to determine species composition, growing stock quality, and stocking levels, but will likely be unreliable for sawtimber volumes.

3.) **Data Collection**: All data will be collected on hand held Pocket PC data recorders incorporated with Pocket Dog data collection software, then downloaded and compiled on Two Dog (version 2.0) forestry software system.

Mapping and Stratification

Forest stand type maps will be developed to stratify inventory information. These maps will provide information relevant to forest cover types, timber size classifications, timber stocking, timber quality, species composition, etc.

Cruisers are to map the location of the following geographic features as they are encountered in the field; this information may be important for management recommendations and/or operations:

- Access roads
- OGM roads
- OGM well sites (record OGM company name)
- Gravel pits
- Water wells
- Gas, power, or other utility lines
- Landings
- Stream courses (any stream that would require BMP crossing or bridge pad)
- Wet areas – wetlands (open or wooded), vernal pools, swails, large springs seeps, etc.
- Openings/out areas (any non-forest/non-commercial area large enough that acreage should be removed from the stand and tract total)
- Major recreational trails – hiking, cross-country skiing, ATV, etc.
- Inaccessible areas – rock outcroppings, steep areas, cut-off/orphaned areas, etc.

Cruisers are expected to develop type maps in the field for the sample areas they are responsible for and are to coordinate with cruisers in adjacent areas and the field crew chief in the development of a final stand map.
The field crew chief will develop a final stand map. All plots must clearly fall within a stand. Plots that are moved must be clearly marked with an arrow pointing to and distance to the new location. Added plots must be located and clearly marked on the map with their plot number. Dropped plots must be clearly marked and noted. Any of the geographic features mapped as per above are to be marked and indicated on the final stand map.

The field crew chief will be responsible for stratifying plot data by stand post inventory and updating stand acreages in the Two Dog data file as per GIS calculations.

Field Procedures

1.) Sample point locations will be located as accurately as possible in correspondence to the cruise map. In the event a sample point falls within less than 1 chain of a map-able non-forest type or unproductive area the point will be relocated backward, forward, or perpendicular to the line of travel until it is at least 1 chain away from the non-forest type. If the relocation of the sample point in either direction is still infringed upon by the non-forest type, the sample will be taken at a location least infringed upon by the non-forest type. A sample point may be excluded from the inventory only if a reliable sample can not be obtained after all measures of relocating the sample point have been made. The cruiser will note any such adjustments to sample point location on the field and final map, and record any other pertinent information.

Non-forest or unproductive types, either mapped or unmapped, include roads, power-lines, pipelines, bogs, water bodies, fields, open wetlands, beaver flows, barrens, rock outcroppings, etc. Mapping these as precisely as possible is critical to accurately calculating stand and tract acreage.

In the event a point falls within 1 chain of a boundary line, the point will be moved back along the line of travel to a point 1 chain from the boundary. The cruiser will note any such adjustments to sample point location on the field and final map, and record any other pertinent information.

2.) Cruisers will record the point number, observed forest cover type, size class, and density classification at each sample point location. Cruiser will also record information about stand health and condition, timber quality, age structure, soil conditions, site quality, wildlife considerations, competing vegetation, thoughts for management, past harvesting, any other information pertinent for management planning.

3.) If a point is a legitimate “null” point in the inventory, it is critical in Two-Dog to indicate that the point is to be included in the data calculations. On the point data screen in Pocket Dog there is the Point ID box in the lower right hand corner of the screen; at the bottom of the box is a square with a red or green diamond in it. Pocket Dog will recognize if tree data was collected in the plot or not. If tree data was collected this diamond will be green. If tree data was not collected (i.e. null point) the diamond will be red. When tree data is not collected Pocket Dog automatically considers the point a deleted point, not a null point. For a legitimate null point the cruiser will need to tap on the red diamond and select “Include this point in calcs”, or it will be ignored and not included.
4.) At each sample point, beginning with the first tree directly in line with the line of travel then proceeding in a clockwise direction, each tree greater than 1.1” dbh and falling within the 10 BAF variable radius plot will be measured and tallied. All borderline trees will be determined to be “in” or “out” by calculating the limiting distance of each borderline tree with slope corrections applied as necessary.

Limiting Distance for all borderline trees will be determined using the following method:

a) Measure, from the uphill side, the diameter (dbh) of the borderline tree to the nearest 0.1” (inch) and mark the point at which the measurement was made with a paint stick.

b) Measure to the nearest 0.01 feet (1/100th foot) the horizontal distance from the face of the tree (at dbh) to point center.

c) Calculate the limiting distance of the tree by either a) multiplying the diameter of the tree by the 10 BAF Conversion Factor of 2.708, or b) using a lookup table of plot radii for trees of different diameters for a 10 Basal Area Factor prism. (NOTE: the Pocket Dog look up table for limiting distance uses a 2.75 multiplier based on a measurement from the center of the tree – if using the Pocket Dog look up table, the radius of the tree must be added to horizontal distance measured from the face of the tree to get the corresponding measurement from the center of the tree.)

If the resulting distance is greater than the measured horizontal distance then the tree is “in” and will be recorded in the tally. Conversely, if the measured distance is greater than the calculated limiting distance then the tree is “out” and is not to be recorded.

NOTE: Adjustments to correct for slope when determining limiting distance of borderline trees will be made by sighting a clinometer on a point at eye level upon the tree in question and recording the percent slope. Determine the Slope Correction Factor from the conversion table and multiply this figure by the limiting distance of the tree to calculate the slope corrected limiting distance. Then, measure the distance, parallel to the slope, from the face of the tree to point center. If this measurement is less than the slope corrected limiting distance the tree is “in” and recorded in the tally. Conversely, if the measured distance is greater than the slope corrected limiting distance the tree is “out”.

Data Collection

The following information will be recorded on the PDA for all trees tallied at each sample point location.

A. Species (SP), from the specified Species Code List incorporated within each PDA unit for Pocket Dog. Species Codes are as follows:

<table>
<thead>
<tr>
<th>Pocket Dog Code</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Black Cherry</td>
</tr>
<tr>
<td>02</td>
<td>Sugar Maple</td>
</tr>
<tr>
<td>03</td>
<td>White Ash</td>
</tr>
<tr>
<td>04</td>
<td>Red Maple</td>
</tr>
<tr>
<td>05</td>
<td>Red Oak</td>
</tr>
<tr>
<td>06</td>
<td>Hemlock</td>
</tr>
<tr>
<td>07</td>
<td>Beech</td>
</tr>
<tr>
<td>08</td>
<td>White Oak</td>
</tr>
<tr>
<td>09</td>
<td>Scarlet Oak</td>
</tr>
<tr>
<td>10</td>
<td>Chestnut Oak</td>
</tr>
<tr>
<td>11</td>
<td>Black Oak</td>
</tr>
<tr>
<td>12</td>
<td>Aspen</td>
</tr>
<tr>
<td>13</td>
<td>Basswood</td>
</tr>
<tr>
<td>14</td>
<td>Birch</td>
</tr>
<tr>
<td>15</td>
<td>Cucumber</td>
</tr>
<tr>
<td>16</td>
<td>Hickory</td>
</tr>
<tr>
<td>17</td>
<td>Yellow Poplar</td>
</tr>
<tr>
<td>18</td>
<td>White Pine</td>
</tr>
<tr>
<td>19</td>
<td>Black Gum</td>
</tr>
<tr>
<td>20</td>
<td>Butternut</td>
</tr>
<tr>
<td>21</td>
<td>Elm</td>
</tr>
<tr>
<td>22</td>
<td>Black Locust</td>
</tr>
<tr>
<td>23</td>
<td>Black Walnut</td>
</tr>
<tr>
<td>24</td>
<td>Tamarack/Larch</td>
</tr>
<tr>
<td>25</td>
<td>Scotch Pine</td>
</tr>
<tr>
<td>26</td>
<td>Red Pine</td>
</tr>
<tr>
<td>27</td>
<td>Norway Spruce</td>
</tr>
<tr>
<td>28</td>
<td>White Spruce</td>
</tr>
<tr>
<td>29</td>
<td>Red Spruce</td>
</tr>
<tr>
<td>30</td>
<td>Black Spruce</td>
</tr>
<tr>
<td>31</td>
<td>Striped Maple</td>
</tr>
<tr>
<td>32</td>
<td>Den Tree</td>
</tr>
<tr>
<td>33</td>
<td>Snag</td>
</tr>
<tr>
<td>34</td>
<td>Other Softwood</td>
</tr>
<tr>
<td>35</td>
<td>Other Hardwood</td>
</tr>
</tbody>
</table>
B. Product Code (PROD) for each tree tallied is to be recorded follows:

01 = Sawtimber (11.1” DBH and larger)
02 = Pulpwood (1.1” DBH and larger; see also note below)
05 = Cull (1.1” DBH and larger; see also note below)

NOTE: For all non-commercial size saplings/poles 5.0” dbh and smaller the Product Code (PROD) will be recorded as either Pulpwood (if acceptable growing stock) or Cull (if unacceptable growing stock).

C. Diameter (DBH) measured at a point 4.5’ above the ground (dbh) on the uphill side of the tree. Diameters will be measured with a diameter tape. All trees 1.1 inches dbh and larger will be recorded by two (2) inch diameter classes as per the following examples:

<table>
<thead>
<tr>
<th>Diameter Range</th>
<th>Diameter Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1” - 7.0”</td>
<td>6”</td>
</tr>
<tr>
<td>7.1” - 9.0”</td>
<td>8”</td>
</tr>
<tr>
<td>9.1” - 11.0”</td>
<td>10”</td>
</tr>
<tr>
<td>11.1” - 13.0”</td>
<td>12”</td>
</tr>
<tr>
<td>13.1” - 15.0”</td>
<td>14”</td>
</tr>
<tr>
<td>etc.</td>
<td>etc.</td>
</tr>
</tbody>
</table>

D. Height (MHT).

Saw-timber: record the number of 16’ logs (minimum ½ log) to the nearest ½ log to a minimum top diameter of 10 inches or to a point where the tree no longer meets USFS grade 3 specifications due to forks, crook, excessive sweep, defect, etc. Record all ½ logs as a 5 (i.e. 1½ log tree = 15).

Pulpwood: record the number of 16’ logs by estimating the number of 8 foot bolts contained in each merchantable stem to a minimum top diameter of 4” or to a point where the tree becomes unmerchantable due to forks, defect, etc. Individual trees must contain at least one 8’ bolt.

*Minimum Standards For Diameter and Height: Saw-timber trees must be 11.1” dbh or greater and contain at least 8 feet of grade 2 log (2 clear faces) (10” minimum top diameter) anywhere in the stem. Pulpwood trees must be at least 5.1” dbh or greater and contain at least one 8 foot bolt.

NOTE: Do not record Height (MHT) for any non-commercial size sapling/poles (5.0” dbh and smaller) that are tallied. Remember that non-commercial size sapling/poles of acceptable growing stock are recorded as Pulpwood, whereas those that are unacceptable growing stock should be recorded as a cull.
E. Defect (DFC) will be recorded as a percentage within the given tree by increments of 10%. For a tree with no defect (100% sound), no entry will be made. A tree with 10% defect is recorded as a 10, and a tree with 20% defect is recorded as a 20, and so on. **DO NOT RECORD IN 5% INCREMENTS.**

Determinations for defect will be made as per the following.

*Tree Volume Distribution (%) by 8 foot section*

<table>
<thead>
<tr>
<th>Logs</th>
<th>1 Log</th>
<th>1½ Logs</th>
<th>2 Logs</th>
<th>2½ Logs</th>
<th>3 Logs</th>
<th>3½ Logs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>55</td>
<td>37</td>
<td>29</td>
<td>24</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>32</td>
<td>25</td>
<td>22</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31</td>
<td>24</td>
<td>20</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>21</td>
<td>18</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td>7</td>
</tr>
</tbody>
</table>

F. Tree Quality (Q) will be determined for each measured tree as either Acceptable Growing Stock (AGS) or Unacceptable Growing Stock (UGS) as A or U respectively using the following criteria:

**A (AGS):** Acceptable Growing Stock trees are those that are suitable for retention in the stand for at least the next twenty year period. They are trees of commercial species and of such form, quality, and vigor capable of yielding saw-timber products now or at some future date.

- Products restricted to sawtimber or pulpwood only (i.e. culls cannot be an AG).
- Sawlog quality must have at least 2 sides clear.
- Generally do not include clumps. There are cases where warranted (i.e. twins on same stump of high quality) – use best judgment.
- Tree should have a fair to good crown and is not in a suppressed crown position.

**U (UGS):** Unacceptable Growing Stock trees are those that do not have the potential to make marketable saw-timber products in the future. They may be high-risk trees with disease or die-back which threaten their survival, contain excessive damage or defect, or are of extremely poor form.

- Products can include sawtimber, pulpwood, or cull.
- All culls should automatically be coded as an UG.
- Any tree incapable of yielding sawtimber products now or at some time in the future should automatically be coded as an UG.
- In most cases, beech should automatically be coded as an UG unless of perfect health and quality, but should be judged on a tree by tree or stand by stand basis.
- In all cases, beech non-commercial saplings/poles should automatically be coded as an UG.
- In all cases, black birch non-commercial saplings/poles should automatically be coded as an UG.
- Undesirable understory hemlock in a hardwood stand should be coded as an UG, unless the project manager deems otherwise.
- Generally include clumps.
- Trees with poor crowns and/or in suppressed crown positions should automatically be coded as an UG.
- In all cases, non-commercial species like ironwood, striped maple, blue beech, serviceberry, etc. should be coded as an UG.
G. **Comments** (on main plot screen): The cruiser will record any information important to note about that plot area or provide clarification/explanation of data collected in the comments box accessed from the main plot screen:

H. Text Data Fields. Prior to collecting tree data for each sample point, comments and/or observations about the surrounding stand area will be made and recorded as per the following criteria. **No fields should be left blank:** the only exception is when you are not collecting data for that parameter (i.e. snow depth doesn’t allow for collecting regen info; early spring – ferns haven’t emerged; project manager directed to ignore specific text data, etc.). This allows the option to return to the site at a later data and collect the missing information if desired. If specific data is not collected it should be noted on the two dog file list form.

- **Seedling Regen** – this is a subjective account of desirable seedlings (under 1” dbh) found directly underfoot and in the adjacent surrounding area based on the cruisers judgment. You should not base your observations strictly on what is underfoot; the intention is to conduct a general assessment of the area immediate to, and represented by, the plot. Note: you are assessing desirable regen only - if the only regen on the plot is beech, for example, then record none for the plot. This information is important for judging reproductive potential, etc.
  - Heavy (i.e. over 2/3 ground cover)
  - Moderate
  - Light (i.e. less than 1/3 ground cover)
  - None

- **Seedling Species** – record the most abundant species of desirable regen present. If there is no desirable regen present as recorded for Seedling Regen above then “none” should also be recorded for the species. If the species you encounter is not included in the picklist, selecting “other” is acceptable, but it is preferable that the cruiser write in the actual species name to provide better information – especially if the “other” species is found consistently.
  - Be – black cherry
  - Sm – sugar maple
  - Wa – white ash
  - Rm – red maple
  - Ro – red oak
  - Other
  - None

- **Browsing** – this is a subjective account of damage to seedling and sapling from deer browsing. Generally assess the area immediate to and represented by the plot. The intent is to use this information to assess seedling condition. If something more is worth noting, record in the comments box or in field notes (i.e. everything in area heavily browsed). This information is important in not only determining deer pressure, but seedling quality/condition.
  - Heavy (i.e. over 2/3 browsed, repeated browsing, etc.)
  - Moderate
  - Light (i.e. less than 1/3 browsed)
  - None

- **Sapling Regen** - this is a subjective account of desirable saplings (1-5” dbh) found within the plot area and in the adjacent surrounding area based on the cruisers judgment. You should not base your observations strictly on what is within the plot; the intention is to conduct a general assessment of the area immediate to and represented by the plot. The prism generally only picks up saplings right near plot center, and the plot data collected may not provide as accurate a picture as your observations. Note: you are assessing desirable saplings only - if the only saplings on the plot are beech, for example, then record none for the plot. Don’t mistake large seedlings for saplings – make sure the observation is restricted to saplings larger than 1”.

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Where cover is moderate to heavy, make note if saplings are large or small, record in comments - for example: “large sap”.

Heavy (i.e. over 2/3 low to mid canopy overhead cover – can’t see overstory well)
Moderate (i.e. 1/3 low to mid canopy overhead cover)
Light (i.e. less than 1/3 low to mid canopy overhead cover)
None

- **Sapling Species** - record the most abundant species of desirable saplings present. If there are no desirable saplings present as recorded for Sapling Regen above then “none” should also be recorded for the species. If the species you encounter is not included in the picklist, selecting “other” is acceptable, but it is preferable that the cruiser write in the actual species name to provide better information – especially if the “other” species is found consistently.

  Bc – black cherry
  Sm – sugar maple
  Wa – white ash
  Rm – red maple
  Ro – red oak
  Other
  None

- **Sapling Condition** – generally assess the condition of the saplings. Primarily you should be looking at bole form and crown form assessing the degree of suppression (if any). Record N/A if there is sapling regen is recorded as none. This information is important for assessing future development and productivity as well as assessing suitability for all-aged silviculture (if the right species comp.)

  Good (i.e. less than 1/3 suppressed)
  Fair
  Poor (i.e. over 2/3 suppressed)
  N/A

- **Pole Species** - record the most abundant species of pole present - the intent is to look beyond the plot and characterize the poles beyond what is recorded in the plot data. If there are few poles in the stand then “none” may be appropriate to record – use your best judgment (i.e. if only a couple of poles in the surrounding area is it worth noting; when in doubt, however, record the species). If the species you encounter is not included in the picklist, selecting “other” is acceptable, but it is preferable that the cruiser write in the actual species name to provide better information – especially if the “other” species is found consistently. This information is important for assessing species composition in the mid/understory and suitability for all-aged silviculture

  Bc – black cherry
  Sm – sugar maple
  Wa – white ash
  Rm – red maple
  Ro – red oak
  Other
  None
- **Pole Condition** – generally assess the condition of the poles. Primarily you should be looking at bole form and crown form assessing the degree of suppression (if any). Record N/A if there is sapling regen is recorded as none. This information is important for assessing future development and productivity as well as assessing suitability for all-aged silviculture (if the right species comp.)

  Good (i.e. less than 1/3 suppressed)
  Fair
  Poor (i.e. over 2/3 suppressed)
  N/A

- **Woody Interference** - this is a subjective account of woody interfering vegetation (including grapevine) of all sizes from seedlings on up, but primarily assessing the forest floor, understory, and midstory canopy layers (low shade) within the plot area and in the adjacent surrounding area that in your judgment may or may not affect the ability of the stand to regenerate. You should not base your observations strictly on what is within the plot; the intention is to conduct a general assessment of the area immediate to and represented by the plot. The plot data collected with the prism may not provide as accurate a picture as your observations. Remember: any trees recorded in the overstory prism plot that fit this category should automatically be recorded as an UG.

  Heavy (i.e. over 2/3 of understory and mid story stocking)
  Moderate
  Light (i.e. less than 1/3 of understory and mid story stocking)
  None

- **Woody Interference Species** - record the most abundant species of woody interference present. If there is no woody interference present as recorded for Woody Interference above then “none” should also be recorded for the species. Note that hemlock is one of the selections; this would apply in a predominantly hardwood stand that has an unwanted understory hemlock component; in most situations this would be considered interfering vegetation unless otherwise directed by the project manager. In a mixed wood or hemlock stand understory hemlock is probably a desirable component and should not be categorized as woody interference. Note also that grapevine is included in this category; if there is a situation where there is an abundance of undesirable trees and grapevine together, record which ever is most dominant and make a note in the comments. For example if beech is the dominant species record beech in the text field and write “grape” in the comments or vice versa. If the species you encounter is not included in the picklist, selecting “other” is acceptable, but it is preferable that the cruiser write in the actual species name to provide better information – especially if the “other” species is found consistently.

  Be – beech
  Stm – striped maple
  Bir – black birch
  Laur – laurel/rhododendron
  Iron – ironwood
  Hem – understory hemlock
  Grv – grape vine
  Shrubs
  Other
- **Herbaceous Interference** - this is a subjective account of fern, grass, or other unwanted herbaceous vegetation within the plot area and in the adjacent surrounding area that in your judgment may or may not affect the ability of the stand to regenerate. You should not base your observations strictly on what is within the plot; the intention is to conduct a general assessment of the area immediate to and represented by the plot. If selecting from the other category and if you are able to identify the vegetation, overwrite “other” with the actual species name, for example if garlic mustard is the primary herbaceous interference record “Moderate Garlic”, etc.

  - Heavy Fern (i.e. over 2/3 ground cover)
  - Moderate Fern
  - Light Fern (i.e. less than 1/3 ground cover)
  - Heavy Grass (i.e. over 2/3 ground cover)
  - Moderate Grass
  - Light Grass (i.e. less than 1/3 ground cover)
  - Heavy Other (i.e. over 2/3 ground cover)
  - Moderate Other
  - Light Other (i.e. less than 1/3 ground cover)
  - None

I. Field Notes.

A Tract Inspection Report for Management Plans is to be completed by the field crew chief as part of the inventory process. Other members of the field crew should make notes of any information pertinent to the tract inspection report and provide that to the field crew chief. Tract inspection reports are to be placed in the job file.

A Stand Inspection Report is to be completed by the field crew chief, members of the field crew, and/or the project manager for each stand they encounter in the field that is to be designated on the stand sketch map. Preliminary stand numbers are to be assigned to the stand sketch map that corresponds to the stand inspection report. The project manager or field crew chief should inspect the property and stand delineations as per the sketch map and any adjustments should be made prior to forwarding to the GIS Dept. for final mapping. Once final stand numbers are assigned with final mapping those numbers are to be transferred to the appropriate stand inspection report. This information is critical to whoever will be authoring the plan. This information should be recorded and summarized during and immediately following the inventory of those stands. Stand inspection reports should be placed in the job file.
Data Processing & Management

All inventory data will be down-loaded, processed and compiled by Forecon, Inc. using the TWO DOG 2.0 Forest Inventory Software Program. For the purposes of processing and evaluation the sample will be considered a random sample.

All saw-timber shall be reported in MBF (thousands of board feet) in the Doyle Log Rule. All pulpwood shall be reported in cords. Listed below are the form classes to be used for sawtimber volume computations in the TWO DOG 2.0 program:

<table>
<thead>
<tr>
<th>Species</th>
<th>Form Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ash</td>
<td>81</td>
</tr>
<tr>
<td>Aspen</td>
<td>81</td>
</tr>
<tr>
<td>Basswood</td>
<td>81</td>
</tr>
<tr>
<td>Beech</td>
<td>83</td>
</tr>
<tr>
<td>Birch</td>
<td>80</td>
</tr>
<tr>
<td>Black Cherry</td>
<td>83</td>
</tr>
<tr>
<td>Black Gum</td>
<td>78</td>
</tr>
<tr>
<td>Black Oak</td>
<td>78</td>
</tr>
<tr>
<td>Butternut</td>
<td>80</td>
</tr>
<tr>
<td>Chestnut Oak</td>
<td>78</td>
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<tr>
<td>Cottonwood</td>
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<td>Elm</td>
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<td>Hard Maple</td>
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<td>Hemlock</td>
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<td>Hickory</td>
<td>81</td>
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<td>Red Oak</td>
<td>79</td>
</tr>
<tr>
<td>Red Maple</td>
<td>82</td>
</tr>
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BOY SCOUTS OF AMERICA
MASON-DIXON COUNCIL
CAMP SINOQUIPE
507 GIS ACRES
SINOQUIPE ROAD
DUBLIN TOWNSHIP, PA
FULTON COUNTY, PA
MARCH 2016
PLOT LOCATION MAP

Legend

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Projection: NAD83 zone 18 North
Datum: North American 1983

All mapping was prepared using the best available information about the property; however, accuracy and detail are not guaranteed.
Acreages are estimated using geographic information system (GIS) technology and may not be consistent with acreages calculated by the county tax office or the ownership deed. This map is not a legal survey.
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Legend
- 7x7cruise_zone18
- bsa_zone18
- bsa_zone18stands

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Projection: NAD83 zone 18 North.

The data is not verified and may not be complete with things affected by the owner or the county. This map is not a legal survey.
Acknowledgment of the U.S. Geological Survey would be appreciated in products derived from these data.

BOY SCOUTS OF AMERICA
MASON-DIXON COUNCIL
CAMP SINOQUIPE
507 GIS ACRES
SINOQUIPE ROAD
DUBLIN TOWNSHIP
FULTON COUNTY, PA
MARCH 2016
PLOT LOCATION MAP

Legend

-.cl - Cruise_zone18
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Projection: NAD83 zone 18 North
TimetreeFlows/GIS/Operations/commercial
All maps are prepared using the best available information.
The project team, when possible, will survey and verify the accuracy of such information.
For more information on the National Map Program or the National Geospatial-Intelligence Agency (NGA), go to http://www.nga.mil or contact the NGA Web Access Office, 703-692-4500.

This map is not a legal survey.

Legend

- - bsa_zone18
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Custom Soil Resource Report for
Fulton County, Pennsylvania
BSA - Camp Sinoquipe

March 9, 2016
Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.
### MAP LEGEND

**Area of Interest (AOI)**
- Soups
  - Soil Map Unit Polygons
  - Soil Map Unit Lines
  - Soil Map Unit Points
**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

**Source of Map:** Natural Resources Conservation Service  
**Web Soil Survey URL:** http://websoilsurvey.nrcs.usda.gov  
**Coordinate System:** Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

**Soil Survey Area:** Fulton County, Pennsylvania  
**Survey Area Data:** Version 10, Nov 16, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

**Date(s) aerial images were photographed:** Jun 18, 2010—Sep 25, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
## Map Unit Legend

**Fulton County, Pennsylvania (PA057)**

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
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</thead>
<tbody>
<tr>
<td>As</td>
<td>Atkins silt loam</td>
<td>43.0</td>
<td>8.2%</td>
</tr>
<tr>
<td>Be</td>
<td>Barbour fine sandy loam</td>
<td>4.4</td>
<td>0.8%</td>
</tr>
<tr>
<td>Bf</td>
<td>Basher fine sandy loam</td>
<td>29.5</td>
<td>5.6%</td>
</tr>
<tr>
<td>BkB</td>
<td>Berks channery silt loam, 3 to 8 percent slopes</td>
<td>4.7</td>
<td>0.9%</td>
</tr>
<tr>
<td>BkC</td>
<td>Berks channery silt loam, 8 to 15 percent slopes</td>
<td>20.1</td>
<td>3.8%</td>
</tr>
<tr>
<td>BkD</td>
<td>Berks channery silt loam, 15 to 25 percent slopes</td>
<td>9.1</td>
<td>1.7%</td>
</tr>
<tr>
<td>BrA</td>
<td>Brinkerton silt loam, 0 to 3 percent slopes</td>
<td>3.1</td>
<td>0.6%</td>
</tr>
<tr>
<td>BrB</td>
<td>Brinkerton silt loam, 3 to 8 percent slopes</td>
<td>20.7</td>
<td>3.9%</td>
</tr>
<tr>
<td>BuB</td>
<td>Buchanan gravelly loam, 3 to 8 percent slopes</td>
<td>44.3</td>
<td>8.4%</td>
</tr>
<tr>
<td>BuC</td>
<td>Buchanan gravelly loam, 8 to 15 percent slopes</td>
<td>8.0</td>
<td>1.5%</td>
</tr>
<tr>
<td>BxB</td>
<td>Buchanan cobbly loam, 0 to 8 percent slopes, extremely stony</td>
<td>3.8</td>
<td>0.7%</td>
</tr>
<tr>
<td>BxD</td>
<td>Buchanan cobbly loam, 8 to 25 percent slopes, extremely stony</td>
<td>18.5</td>
<td>3.5%</td>
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<tr>
<td>EgC</td>
<td>Elliber very channery silt loam, 8 to 15 percent slopes</td>
<td>15.2</td>
<td>2.9%</td>
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<tr>
<td>EgD</td>
<td>Elliber very channery silt loam, 15 to 25 percent slopes</td>
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<td>0.7%</td>
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<tr>
<td>ErB</td>
<td>Ernest silt loam, 3 to 8 percent slopes</td>
<td>9.7</td>
<td>1.8%</td>
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<tr>
<td>FrC</td>
<td>Frankstown channery silt loam, 8 to 15 percent slopes</td>
<td>2.8</td>
<td>0.5%</td>
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<tr>
<td>FrE</td>
<td>Frankstown channery silt loam, 25 to 35 percent slopes</td>
<td>39.3</td>
<td>7.5%</td>
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<tr>
<td>HRD</td>
<td>Hazleton and Dekalb soils, 8 to 25 percent slopes, extremely stony</td>
<td>2.3</td>
<td>0.4%</td>
</tr>
<tr>
<td>HRF</td>
<td>Hazleton and Dekalb soils, 25 to 75 percent slopes, extremely stony</td>
<td>43.7</td>
<td>8.3%</td>
</tr>
<tr>
<td>KWF</td>
<td>Klinesville and Weikert soils, 25 to 60 percent slopes</td>
<td>131.9</td>
<td>25.0%</td>
</tr>
<tr>
<td>LaC</td>
<td>Laidig gravelly loam, 8 to 15 percent slopes</td>
<td>11.1</td>
<td>2.1%</td>
</tr>
</tbody>
</table>
Fulton County, Pennsylvania (PA057)

<table>
<thead>
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<th>Map Unit Symbol</th>
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<tbody>
<tr>
<td>LbD</td>
<td>Laidig gravelly loam, 8 to 25 percent slopes, extremely stony</td>
<td>15.3</td>
<td>2.9%</td>
</tr>
<tr>
<td>MoB</td>
<td>Monongahela silt loam, 3 to 8 percent slopes</td>
<td>17.1</td>
<td>3.2%</td>
</tr>
<tr>
<td>Pu</td>
<td>Purdy silty clay loam</td>
<td>0.1</td>
<td>0.0%</td>
</tr>
<tr>
<td>SrD</td>
<td>Sideling gravelly loam, 8 to 25 percent slopes, extremely stony</td>
<td>0.4</td>
<td>0.1%</td>
</tr>
<tr>
<td>W</td>
<td>Water</td>
<td>18.9</td>
<td>3.6%</td>
</tr>
<tr>
<td>WeB</td>
<td>Weikert channery silt loam, 3 to 8 percent slopes</td>
<td>1.1</td>
<td>0.2%</td>
</tr>
<tr>
<td>WeD</td>
<td>Weikert channery silt loam, 15 to 25 percent slopes</td>
<td>5.1</td>
<td>1.0%</td>
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<tr>
<td><strong>Totals for Area of Interest</strong></td>
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<td><strong>527.2</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

### Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.
The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a soil series. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into soil phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An undifferentiated group is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include miscellaneous areas. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.
Fulton County, Pennsylvania

As—Atkins silt loam

Map Unit Setting

National map unit symbol: l8xc
Elevation: 300 to 3,000 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 44 to 59 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition

Atkins and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Atkins

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from shale and siltstone

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 40 inches: silty clay loam
H3 - 40 to 60 inches: gravelly silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D

Minor Components

Tyler
Percent of map unit: 5 percent

Ernest
Percent of map unit: 5 percent
Brinkerton

Percent of map unit: 3 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave

Pope

Percent of map unit: 2 percent

Be—Barbour fine sandy loam

Map Unit Setting
National map unit symbol: l8xm
Elevation: 300 to 1,500 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 44 to 57 degrees F
Frost-free period: 120 to 214 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Barbour and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Barbour

Setting
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Reddish coarse-loamy alluvium derived from sedimentary rock

Typical profile
Ap - 0 to 6 inches: fine sandy loam
Bw - 6 to 20 inches: fine sandy loam
C - 20 to 65 inches: very gravelly sand

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B

Minor Components
Atkins
Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave

Hustontown
Percent of map unit: 5 percent

Brinkerton
Percent of map unit: 3 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave

Soils that pond
Percent of map unit: 2 percent
Landform: Flood plains

Bf—Basher fine sandy loam

Map Unit Setting
National map unit symbol: l8xr
Elevation: 200 to 1,000 feet
Mean annual precipitation: 32 to 46 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Basher and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Basher
Setting
Landform: Flood plains
Down-slope shape: Convex  
Across-slope shape: Linear  
Parent material: Loamy alluvium derived from shale and siltstone

**Typical profile**  
H1 - 0 to 9 inches: silt loam  
H2 - 9 to 27 inches: silt loam  
H3 - 27 to 42 inches: gravelly loam  
H4 - 42 to 60 inches: very gravelly fine sandy loam

**Properties and qualities**  
Slope: 0 to 3 percent  
Depth to restrictive feature: 72 to 99 inches to  
Natural drainage class: Moderately well drained  
Runoff class: Low  
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)  
Depth to water table: About 18 to 24 inches  
Frequency of flooding: Occasional  
Frequency of ponding: None  
Available water storage in profile: Moderate (about 7.5 inches)

**Interpretive groups**  
Land capability classification (irrigated): None specified  
Land capability classification (nonirrigated): 2w  
Hydrologic Soil Group: B/D

**Minor Components**  
Atkins  
Percent of map unit: 7 percent  
Landform: Flood plains  
Landform position (three-dimensional): Base slope  
Down-slope shape: Concave  
Across-slope shape: Concave

Barbour  
Percent of map unit: 3 percent

**BkB—Berks channery silt loam, 3 to 8 percent slopes**

**Map Unit Setting**  
National map unit symbol: 2sgb5  
Elevation: 320 to 3,570 feet  
Mean annual precipitation: 37 to 50 inches  
Mean annual air temperature: 47 to 56 degrees F  
Frost-free period: 148 to 192 days  
Farmland classification: Farmland of statewide importance

**Map Unit Composition**  
Berks and similar soils: 85 percent
Custom Soil Resource Report

*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Berks**

**Setting**
- **Landform:** Ridges, mountain slopes
- **Landform position (two-dimensional):** Summit, shoulder, backslope
- **Landform position (three-dimensional):** Upper third of mountainflank, side slope
- **Down-slope shape:** Convex
- **Across-slope shape:** Convex, linear
- **Parent material:** Residuum weathered from shale and siltstone and/or fine grained sandstone

**Typical profile**
- **Ap - 0 to 7 inches:** channery silt loam
- **Bw1 - 7 to 15 inches:** channery silt loam
- **Bw2 - 15 to 28 inches:** very channery silt loam
- **C - 28 to 36 inches:** extremely channery silt loam
- **R - 36 to 46 inches:** bedrock

**Properties and qualities**
- **Slope:** 3 to 8 percent
- **Depth to restrictive feature:** 20 to 40 inches to lithic bedrock
- **Natural drainage class:** Well drained
- **Runoff class:** Medium
- **Capacity of the most limiting layer to transmit water (Ksat):** Moderately low to high (0.06 to 5.95 in/hr)
- **Depth to water table:** More than 80 inches
- **Frequency of flooding:** None
- **Frequency of ponding:** None
- **Calcium carbonate, maximum in profile:** 1 percent
- **Gypsum, maximum in profile:** 1 percent
- **Salinity, maximum in profile:** Nonsaline (0.0 to 1.0 mmhos/cm)
- **Sodium adsorption ratio, maximum in profile:** 1.0
- **Available water storage in profile:** Very low (about 2.9 inches)

**Interpretive groups**
- **Land capability classification (irrigated):** None specified
- **Land capability classification (nonirrigated):** 2e
- **Hydrologic Soil Group:** B
- **Other vegetative classification:** Dry Uplands (DU2)

**Minor Components**

**Weikert**
- **Percent of map unit:** 10 percent
- **Landform:** Ridges
- **Landform position (two-dimensional):** Shoulder, backslope
- **Landform position (three-dimensional):** Side slope
- **Down-slope shape:** Linear
- **Across-slope shape:** Convex
- **Other vegetative classification:** Droughty Shales (SD2)

**Brinkerton**
- **Percent of map unit:** 5 percent
- **Landform:** Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave

BkC—Berks channery silt loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 2sgcg
Elevation: 320 to 3,570 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 47 to 56 degrees F
Frost-free period: 148 to 192 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Berks and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting
Landform: Ridges, mountain slopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Upper third of mountain flank, side slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile
Ap - 0 to 8 inches: channery silt loam
Bw1 - 8 to 14 inches: very channery silt loam
Bw2 - 14 to 26 inches: very channery silt loam
C - 26 to 36 inches: extremely channery silt loam
R - 36 to 46 inches: bedrock

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Very low (about 3.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Dry Uplands (DU2), Dry Uplands (DU3)

Minor Components

Weikert
Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Droughty Shales (SD2)

Brinkerton
Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave

BkD—Berks channery silt loam, 15 to 25 percent slopes

Map Unit Setting
National map unit symbol: 2sgb7
Elevation: 320 to 3,630 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 47 to 56 degrees F
Frost-free period: 148 to 192 days
Farmland classification: Not prime farmland

Map Unit Composition
Berks and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks
Setting
Landform: Ridges, mountain slopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Upper third of mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile
Ap - 0 to 7 inches: channery silt loam
Bw1 - 7 to 14 inches: very channery silt loam
Bw2 - 14 to 21 inches: extremely channery silt loam
C - 21 to 36 inches: extremely channery silt loam
R - 36 to 46 inches: bedrock

Properties and qualities
Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Dry Uplands (DU2)

Minor Components
Weikert
Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Droughty Shales (SD2)

Brinkerton
Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Foottslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
BrA—Brinkerton silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: l8xz
Elevation: 300 to 3,000 feet
Mean annual precipitation: 35 to 55 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 217 days
Farmland classification: Not prime farmland

Map Unit Composition

Brinkerton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brinkerton

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Local fine-silty colluvium derived from sedimentary rock

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 18 inches: silty clay loam
H3 - 18 to 46 inches: silty clay loam
H4 - 46 to 65 inches: channery silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 15 to 34 inches to fragipan
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Minor Components

Atkins
Percent of map unit: 6 percent
Landform: Flood plains
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave

Laidig
Percent of map unit: 5 percent
Landform: Mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Concave

Philo
 Percent of map unit: 5 percent

Berks
Percent of map unit: 4 percent
Landform: Ridges, valleys
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear

BrB—Brinkerton silt loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 18y0
Elevation: 300 to 3,000 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 217 days
Farmland classification: Not prime farmland

Map Unit Composition
Brinkerton and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brinkerton

Setting
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave

Parent material: Local fine-silty colluvium derived from sedimentary rock

Typical profile

\[ H1 \text{ - 0 to 9 inches: silt loam} \]
\[ H2 \text{ - 9 to 18 inches: silty clay loam} \]
\[ H3 \text{ - 18 to 46 inches: silty clay loam} \]
\[ H4 \text{ - 46 to 65 inches: channery silt loam} \]

Properties and qualities

\textbf{Slope:} 3 to 8 percent
\textbf{Depth to restrictive feature:} 15 to 34 inches to fragipan
\textbf{Natural drainage class:} Poorly drained
\textbf{Runoff class:} Very high
\textbf{Capacity of the most limiting layer to transmit water (Ksat):} Moderately low to moderately high (0.06 to 0.20 in/hr)
\textbf{Depth to water table:} About 0 to 6 inches
\textbf{Frequency of flooding:} None
\textbf{Frequency of ponding:} None

\textbf{Available water storage in profile:} Low (about 3.4 inches)

Interpretive groups

\textbf{Land capability classification (irrigated):} None specified
\textbf{Land capability classification (nonirrigated):} 4w
\textbf{Hydrologic Soil Group:} D

Minor Components

\textbf{Ernest}
\textit{Percent of map unit:} 10 percent

\textbf{Laidig}
\textit{Percent of map unit:} 5 percent
\textbf{Landform:} Mountains
\textbf{Landform position (two-dimensional):} Footslope
\textbf{Landform position (three-dimensional):} Lower third of mountainflank
\textbf{Down-slope shape:} Concave
\textbf{Across-slope shape:} Concave

\textbf{Berks}
\textit{Percent of map unit:} 5 percent
\textbf{Landform:} Ridges, valleys
\textbf{Landform position (two-dimensional):} Backslope
\textbf{Landform position (three-dimensional):} Side slope
\textbf{Down-slope shape:} Convex, linear
\textbf{Across-slope shape:} Convex, linear

\textbf{Atkins}
\textit{Percent of map unit:} 3 percent
\textbf{Landform:} Flood plains
\textbf{Down-slope shape:} Concave
\textbf{Across-slope shape:} Concave

\textbf{Philo}
\textit{Percent of map unit:} 2 percent
BuB—Buchanan gravelly loam, 3 to 8 percent slopes

Map Unit Setting
   National map unit symbol: I8y2
   Elevation: 300 to 3,000 feet
   Mean annual precipitation: 35 to 55 inches
   Mean annual air temperature: 45 to 59 degrees F
   Frost-free period: 120 to 217 days
   Farmland classification: All areas are prime farmland

Map Unit Composition
   Buchanan and similar soils: 85 percent
   Minor components: 15 percent
   Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Buchanan

Setting
   Landform: Mountain slopes, valley sides
   Landform position (two-dimensional): Footslope
   Landform position (three-dimensional): Lower third of mountainflank, base slope
   Down-slope shape: Concave, linear
   Across-slope shape: Linear, concave
   Parent material: Mountain slope colluvium derived from sedimentary rock

Typical profile
   H1 - 0 to 8 inches: gravelly loam
   H2 - 8 to 32 inches: gravelly loam
   H3 - 32 to 65 inches: gravelly loam

Properties and qualities
   Slope: 3 to 8 percent
   Depth to restrictive feature: 20 to 36 inches to fragipan
   Natural drainage class: Moderately well drained
   Runoff class: High
   Capacity of the most limiting layer to transmit water (Ksat): Moderately low to
     moderately high (0.06 to 0.20 in/hr)
   Depth to water table: About 18 to 36 inches
   Frequency of flooding: None
   Frequency of ponding: None
   Available water storage in profile: Low (about 4.3 inches)

Interpretive groups
   Land capability classification (irrigated): None specified
   Land capability classification (nonirrigated): 2w
   Hydrologic Soil Group: C
Minor Components

Andover

Percent of map unit: 6 percent
Landform: Depressions
Landform position (three-dimensional): Mountainbase
Down-slope shape: Concave
Across-slope shape: Concave

Bedington

Percent of map unit: 3 percent

Philo

Percent of map unit: 3 percent

Berks

Percent of map unit: 3 percent

BuC—Buchanan gravelly loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 18y4
Elevation: 300 to 3,000 feet
Mean annual precipitation: 35 to 55 inches
Mean annual air temperature: 45 to 59 degrees F
Frost-free period: 120 to 217 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Buchanan and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Buchanan

Setting
Landform: Mountain slopes, valley sides
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank, base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Mountain slope colluvium derived from sedimentary rock

Typical profile
H1 - 0 to 8 inches: gravelly loam
H2 - 8 to 32 inches: gravelly loam
H3 - 32 to 65 inches: gravelly loam

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Minor Components

Andover
Percent of map unit: 6 percent
Landform: Depressions
Landform position (three-dimensional): Mountainbase
Down-slope shape: Concave
Across-slope shape: Concave

Bedington
Percent of map unit: 3 percent

Berks
Percent of map unit: 3 percent

Philo
Percent of map unit: 3 percent

BxB—Buchanan cobbly loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting
National map unit symbol: l8y8
Elevation: 300 to 3,000 feet
Mean annual precipitation: 35 to 55 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 217 days
Farmland classification: Not prime farmland

Map Unit Composition
Buchanan and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Buchanan
Setting
Landform: Mountain slopes, valley sides
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank, base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Mountain slope colluvium derived from sedimentary rock

Typical profile
H1 - 0 to 4 inches: cobbly loam
H2 - 4 to 30 inches: gravelly clay loam
H3 - 30 to 65 inches: channery clay loam

Properties and qualities
Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C

Minor Components
Andover
Percent of map unit: 5 percent
Landform: Depressions
Landform position (three-dimensional): Mountainbase
Down-slope shape: Concave
Across-slope shape: Concave

Philo
Percent of map unit: 3 percent

Berks
Percent of map unit: 2 percent

BxD—Buchanan cobbly loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting
National map unit symbol: l8y9
Elevation: 300 to 3,000 feet
Mean annual precipitation: 35 to 55 inches
Mean annual air temperature: 45 to 59 degrees F
Frost-free period: 110 to 217 days
Farmland classification: Not prime farmland
Map Unit Composition

Buchanan and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Buchanan

Setting
Landform: Mountain slopes, valley sides
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank, base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Mountain slope colluvium derived from sedimentary rock

Typical profile
H1 - 0 to 4 inches: cobbly loam
H2 - 4 to 30 inches: gravelly clay loam
H3 - 30 to 65 inches: channery clay loam

Properties and qualities
Slope: 8 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C

Minor Components

Hazleton
Percent of map unit: 5 percent

Andover
Percent of map unit: 4 percent
Landform: Depressions
Landform position (three-dimensional): Mountainbase
Down-slope shape: Concave
Across-slope shape: Concave

Bedington
Percent of map unit: 2 percent

Berks
Percent of map unit: 2 percent

Philo
Percent of map unit: 2 percent
EgC—Elliber very channery silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: l8z1
Elevation: 300 to 1,600 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Elliber and similar soils: 90 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Elliber

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from cherty limestone

Typical profile

H1 - 0 to 8 inches: very channery silt loam
H2 - 8 to 65 inches: extremely channery silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A

Minor Components

Pecktonville

Percent of map unit: 4 percent
Shallow soils
Percent of map unit: 3 percent

Clarksburg
Percent of map unit: 3 percent

EgD—Elliber very channery silt loam, 15 to 25 percent slopes

Map Unit Setting
National map unit symbol: 18z2
Elevation: 300 to 1,600 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition
Elliber and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Elliber
Setting
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from cherty limestone

Typical profile
H1 - 0 to 10 inches: very channery silt loam
H2 - 10 to 65 inches: extremely channery silt loam

Properties and qualities
Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 6.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Minor Components

Pecktonville
Percent of map unit: 4 percent

Shallow soils
Percent of map unit: 3 percent

Clarksburg
Percent of map unit: 3 percent

ErB—Ernest silt loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: l8z3
Elevation: 300 to 3,000 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 44 to 59 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Ernest and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ernest

Setting
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Local fine-silty colluvium derived from sedimentary rock

Typical profile
H1 - 0 to 7 inches: silt loam
H2 - 7 to 27 inches: channery silty clay loam
H3 - 27 to 43 inches: channery silty clay loam
H4 - 43 to 65 inches: channery silt loam

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups
- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 2e
- Hydrologic Soil Group: C

Minor Components

**Berks**
- Percent of map unit: 8 percent
- Landform: Ridges, valleys
- Landform position (two-dimensional): Backslope
- Landform position (three-dimensional): Side slope
- Down-slope shape: Convex, linear
- Across-slope shape: Convex, linear

**Brinkerton**
- Percent of map unit: 5 percent
- Landform: Depressions
- Landform position (two-dimensional): Toeslope
- Landform position (three-dimensional): Base slope
- Down-slope shape: Concave
- Across-slope shape: Concave

**Atkins**
- Percent of map unit: 2 percent
- Landform: Flood plains
- Landform position (two-dimensional): Toeslope
- Landform position (three-dimensional): Dip
- Down-slope shape: Linear
- Across-slope shape: Concave

FrC—Frankstown channery silt loam, 8 to 15 percent slopes

Map Unit Setting
- National map unit symbol: l8z7
- Elevation: 300 to 1,800 feet
- Mean annual precipitation: 34 to 50 inches
- Mean annual air temperature: 46 to 57 degrees F
- Frost-free period: 140 to 200 days
- Farmland classification: Farmland of statewide importance

Map Unit Composition
- Frankstown and similar soils: 90 percent
- Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Frankstown

Setting

Landform: Valleys
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from limestone, siltstone, sandstone, and shale

Typical profile

H1 - 0 to 9 inches: channery silt loam
H2 - 9 to 16 inches: channery silty clay loam
H3 - 16 to 37 inches: channery silty clay loam
H4 - 37 to 65 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B

Minor Components

Clarksburg

Percent of map unit: 4 percent

Penlaw

Percent of map unit: 3 percent
Landform: Swales
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave

Shallow soils

Percent of map unit: 3 percent
FrE—Frankstown channery silt loam, 25 to 35 percent slopes

Map Unit Setting

National map unit symbol: l8zc
Elevation: 300 to 1,800 feet
Mean annual precipitation: 34 to 45 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 190 days
Farmland classification: Not prime farmland

Map Unit Composition

Frankstown and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frankstown

Setting

Landform: Valleys
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from limestone, siltstone, sandstone, and shale

Typical profile

H1 - 0 to 3 inches: channery silt loam
H2 - 3 to 16 inches: channery silty clay loam
H3 - 16 to 37 inches: channery silty clay loam
H4 - 37 to 65 inches: silt loam

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Minor Components

Shallow soils
Percent of map unit: 5 percent

Clarksburg
Percent of map unit: 5 percent

Gently sloping soils
Percent of map unit: 5 percent

HRD—Hazleton and Dekalb soils, 8 to 25 percent slopes, extremely stony

Map Unit Setting
National map unit symbol: 18zj
Elevation: 500 to 2,800 feet
Mean annual precipitation: 34 to 60 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition
Hazleton and similar soils: 55 percent
Dekalb and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Hazleton

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Residuum weathered from sandstone

Typical profile
H1 - 0 to 10 inches: channery sandy loam
H2 - 10 to 42 inches: channery sandy loam
H3 - 42 to 65 inches: extremely channery sandy loam
H4 - 65 to 75 inches: bedrock

Properties and qualities
Slope: 8 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 40 to 79 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.43 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Description of Dekalb

Setting
Landform: Mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile
H1 - 0 to 7 inches: cobbly sandy loam
H2 - 7 to 28 inches: cobbly sandy loam
H3 - 28 to 32 inches: extremely cobbly sandy loam
H4 - 32 to 42 inches: bedrock

Properties and qualities
Slope: 8 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Minor Components
Buchanan
Percent of map unit: 5 percent

Sideling
Percent of map unit: 5 percent
HRF—Hazleton and Dekalb soils, 25 to 75 percent slopes, extremely stony

Map Unit Setting

- National map unit symbol: l8zk
- Elevation: 500 to 2,800 feet
- Mean annual precipitation: 34 to 60 inches
- Mean annual air temperature: 46 to 59 degrees F
- Frost-free period: 110 to 180 days
- Farmland classification: Not prime farmland

Map Unit Composition

- Hazleton and similar soils: 65 percent
- Dekalb and similar soils: 25 percent
- Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hazleton

Setting

- Landform: Mountain slopes
- Landform position (two-dimensional): Backslope, shoulder
- Landform position (three-dimensional): Upper third of mountainflank
- Down-slope shape: Convex, linear
- Across-slope shape: Linear, convex
- Parent material: Residuum weathered from sandstone

Typical profile

- H1 - 0 to 10 inches: channery sandy loam
- H2 - 10 to 42 inches: channery sandy loam
- H3 - 42 to 65 inches: extremely channery sandy loam
- H4 - 65 to 75 inches: bedrock

Properties and qualities

- Slope: 25 to 75 percent
- Percent of area covered with surface fragments: 9.0 percent
- Depth to restrictive feature: 40 to 79 inches to lithic bedrock
- Natural drainage class: Well drained
- Runoff class: Medium
- Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.43 to 6.00 in/hr)
- Depth to water table: More than 80 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 7s
- Hydrologic Soil Group: A
Description of Dekalb

Setting

Landform: Mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 4 inches: cobbly sandy loam
H2 - 4 to 30 inches: very channery sandy loam
H3 - 30 to 34 inches: extremely channery sandy loam
H4 - 34 to 42 inches: bedrock

Properties and qualities

Slope: 25 to 75 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Minor Components

Sideling
Percent of map unit: 5 percent

Buchanan
Percent of map unit: 5 percent

KWF—Klinesville and Weikert soils, 25 to 60 percent slopes

Map Unit Setting

National map unit symbol: l8zz
Elevation: 300 to 2,800 feet
Mean annual precipitation: 36 to 54 inches
Mean annual air temperature: 37 to 58 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Klinesville and similar soils: 45 percent
Weikert and similar soils: 45 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 3 inches: very channery silt loam
H2 - 3 to 18 inches: very channery loam
H3 - 18 to 28 inches: bedrock

Properties and qualities

Slope: 25 to 60 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D

Description of Klinesville

Setting

Landform: Ridges, valleys
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from siltstone

Typical profile

H1 - 0 to 3 inches: very channery silt loam
H2 - 3 to 8 inches: very channery silt loam
H3 - 8 to 14 inches: very channery loam
H4 - 14 to 24 inches: bedrock

Properties and qualities

Slope: 25 to 60 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D

Minor Components
Moderately well drained soils
Percent of map unit: 4 percent

Hustontown
Percent of map unit: 4 percent

Moderate to gently sloping soils
Percent of map unit: 1 percent

Leck kill
Percent of map unit: 1 percent
Landform: Mountains
Landform position (two-dimensional): Backslope

LaC—Laidig gravelly loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: l90d
Elevation: 300 to 2,500 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 217 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Laidig and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laidig
Setting
Landform: Mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Mountain slope colluvium derived from sedimentary rock

Typical profile
H1 - 0 to 8 inches: gravelly loam
H2 - 8 to 35 inches: gravelly loam
H3 - 35 to 65 inches: very gravelly loam

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: 30 to 50 inches to fragipan
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 30 to 50 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B

Minor Components
Berks
Percent of map unit: 8 percent

Buchanan
Percent of map unit: 7 percent

LbD—Laidig gravelly loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting
National map unit symbol: l90J
Elevation: 300 to 2,500 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition
Laidig and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.
Description of Laidig

Setting

Landform: Mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Mountain slope colluvium derived from sedimentary rock

Typical profile

H1 - 0 to 5 inches: gravelly loam
H2 - 5 to 36 inches: gravelly loam
H3 - 36 to 65 inches: very gravelly sandy clay loam

Properties and qualities

Slope: 8 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 30 to 50 inches to fragipan
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 30 to 50 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Minor Components

Buchanan
Percent of map unit: 9 percent

Berks
Percent of map unit: 6 percent

MoB—Monongahela silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 190v
Elevation: 300 to 1,800 feet
Mean annual precipitation: 30 to 55 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 110 to 187 days
Farmland classification: All areas are prime farmland
Map Unit Composition

- Monongahela and similar soils: 80 percent
- Minor components: 20 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Monongahela

Setting

- **Landform:** Stream terraces
- **Landform position (two-dimensional):** Toeslope
- **Landform position (three-dimensional):** Tread
- **Down-slope shape:** Linear
- **Across-slope shape:** Linear
- **Parent material:** Old alluvium derived from sedimentary rock

Typical profile

- **H1 - 0 to 10 inches:** silt loam
- **H2 - 10 to 23 inches:** silt loam
- **H3 - 23 to 48 inches:** loam
- **H4 - 48 to 63 inches:** silt loam

Properties and qualities

- **Slope:** 3 to 8 percent
- **Depth to restrictive feature:** 18 to 30 inches to fragipan
- **Natural drainage class:** Moderately well drained
- **Runoff class:** Medium
- **Capacity of the most limiting layer to transmit water (Ksat):** Moderately low to moderately high (0.06 to 0.60 in/hr)
- **Depth to water table:** About 18 to 30 inches
- **Frequency of flooding:** None
- **Frequency of ponding:** None
- **Available water storage in profile:** Low (about 4.1 inches)

Interpretive groups

- **Land capability classification (irrigated):** None specified
- **Land capability classification (nonirrigated):** 2e
- **Hydrologic Soil Group:** C/D

Minor Components

- **Unadilla**
  - **Percent of map unit:** 7 percent
  - **Landform:** Outwash terraces
  - **Landform position (two-dimensional):** Toeslope
  - **Landform position (three-dimensional):** Tread
  - **Down-slope shape:** Linear
  - **Across-slope shape:** Linear

- **Wheeling**
  - **Percent of map unit:** 5 percent

- **Lakin**
  - **Percent of map unit:** 5 percent

- **Holly**
  - **Percent of map unit:** 3 percent
  - **Landform:** Flood plains
Pu—Purdy silty clay loam

Map Unit Setting
National map unit symbol: I918
Elevation: 480 to 3,000 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition
Purdy and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Purdy
Setting
Landform: Terraces
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Slackwater terrace alluvium derived from sedimentary rock

Typical profile
H1 - 0 to 7 inches: silty clay loam
H2 - 7 to 40 inches: silty clay
H3 - 40 to 65 inches: silty clay

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: 60 to 99 inches to lithic bedrock
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Available water storage in profile: High (about 9.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Minor Components

**Tyler**
- Percent of map unit: 8 percent

**Monongahela**
- Percent of map unit: 3 percent

**Blairton**
- Percent of map unit: 2 percent

**Ernest**
- Percent of map unit: 2 percent

SrD—Sideling gravelly loam, 8 to 25 percent slopes, extremely stony

**Map Unit Setting**
- National map unit symbol: l91j
- Elevation: 500 to 2,400 feet
- Mean annual precipitation: 34 to 50 inches
- Mean annual air temperature: 46 to 57 degrees F
- Frost-free period: 120 to 200 days
- Farmland classification: Not prime farmland

**Map Unit Composition**
- Sideling and similar soils: 85 percent
- Minor components: 15 percent
- Estimates are based on observations, descriptions, and transects of the mapunit.

**Description of Sideling**

**Setting**
- Landform: Mountain slopes
- Landform position (two-dimensional): Footslope
- Landform position (three-dimensional): Side slope
- Down-slope shape: Concave
- Across-slope shape: Convex
- Parent material: Fine-loamy colluvium derived from sedimentary rock

**Typical profile**
- H1 - 0 to 4 inches: gravelly loam
- H2 - 4 to 38 inches: gravelly clay loam
- H3 - 38 to 74 inches: channery silty clay loam

**Properties and qualities**
- Slope: 8 to 25 percent
- Percent of area covered with surface fragments: 9.0 percent
- Depth to restrictive feature: 60 to 80 inches to lithic bedrock
- Natural drainage class: Moderately well drained
- Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 31 to 47 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Minor Components

Fluvaquentic dystrudepts

Percent of map unit: 5 percent

Buchanan

Percent of map unit: 5 percent

Weikert

Percent of map unit: 5 percent

W—Water

Map Unit Setting

National map unit symbol: l91p

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 59 degrees F

Frost-free period: 120 to 214 days

Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Parent material: Rivers streams ponds

Properties and qualities

Runoff class: Negligible

Frequency of ponding: Frequent
WeB—Weikert channery silt loam, 3 to 8 percent slopes

Map Unit Setting

- **National map unit symbol:** 2v4vr
- **Elevation:** 360 to 1,700 feet
- **Mean annual precipitation:** 37 to 50 inches
- **Mean annual air temperature:** 47 to 56 degrees F
- **Frost-free period:** 148 to 192 days
- **Farmland classification:** Farmland of statewide importance

Map Unit Composition

- **Weikert and similar soils:** 85 percent
- **Minor components:** 15 percent

Estimates are based on observations, descriptions, and transects of the map unit.

Description of Weikert

Setting

- **Landform:** Ridges
- **Landform position (two-dimensional):** Backslope, shoulder
- **Landform position (three-dimensional):** Nose slope
- **Down-slope shape:** Convex
- **Across-slope shape:** Convex
- **Parent material:** Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

- **Ap - 0 to 7 inches:** channery silt loam
- **Bw - 7 to 14 inches:** very channery silt loam
- **C - 14 to 18 inches:** extremely channery silt loam
- **R - 18 to 28 inches:** bedrock

Properties and qualities

- **Slope:** 3 to 8 percent
- **Depth to restrictive feature:** 10 to 20 inches to lithic bedrock
- **Natural drainage class:** Somewhat excessively drained
- **Runoff class:** Low
- **Capacity of the most limiting layer to transmit water (Ksat):** Moderately low to high (0.06 to 6.00 in/hr)
- **Depth to water table:** More than 80 inches
- **Frequency of flooding:** None
- **Frequency of ponding:** None
- **Salinity, maximum in profile:** Nonsaline (0.0 to 1.0 mmhos/cm)
- **Available water storage in profile:** Very low (about 1.9 inches)

Interpretive groups

- **Land capability classification (irrigated):** None specified
- **Land capability classification (nonirrigated):** 3e
- **Hydrologic Soil Group:** D
- **Other vegetative classification:** Droughty Shales (SD2)
Minor Components

**Berks**
- **Percent of map unit:** 9 percent
- **Landform:** Ridges
- **Landform position (two-dimensional):** Summit, shoulder, backslope
- **Landform position (three-dimensional):** Side slope
- **Down-slope shape:** Convex
- **Across-slope shape:** Convex, linear

**Bedington**
- **Percent of map unit:** 5 percent
- **Landform:** Hills, hillslopes
- **Landform position (two-dimensional):** Summit
- **Landform position (three-dimensional):** Interfluve
- **Down-slope shape:** Convex, linear
- **Across-slope shape:** Linear, convex

**Brinkerton**
- **Percent of map unit:** 1 percent
- **Landform:** Hillslopes
- **Landform position (two-dimensional):** Footslope
- **Landform position (three-dimensional):** Base slope
- **Down-slope shape:** Concave, linear
- **Across-slope shape:** Concave

WeD—Weikert channery silt loam, 15 to 25 percent slopes

**Map Unit Setting**
- **National map unit symbol:** 2v4vs
- **Elevation:** 340 to 4,040 feet
- **Mean annual precipitation:** 37 to 50 inches
- **Mean annual air temperature:** 47 to 56 degrees F
- **Frost-free period:** 148 to 192 days
- **Farmland classification:** Not prime farmland

**Map Unit Composition**
- **Weikert and similar soils:** 85 percent
- **Minor components:** 15 percent
- Estimates are based on observations, descriptions, and transects of the mapunit.

**Description of Weikert**

**Setting**
- **Landform:** Ridges
- **Landform position (two-dimensional):** Shoulder, backslope
- **Landform position (three-dimensional):** Side slope
- **Down-slope shape:** Linear
- **Across-slope shape:** Convex
Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile
- A - 0 to 6 inches: channery silt loam
- Bw - 6 to 12 inches: very channery silt loam
- C - 12 to 15 inches: extremely channery silt loam
- R - 15 to 25 inches: bedrock

Properties and qualities
- Slope: 15 to 25 percent
- Depth to restrictive feature: 10 to 20 inches to lithic bedrock
- Natural drainage class: Somewhat excessively drained
- Runoff class: High
- Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 6.00 in/hr)
- Depth to water table: More than 80 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
- Available water storage in profile: Very low (about 1.5 inches)

Interpretive groups
- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 6e
- Hydrologic Soil Group: D
- Other vegetative classification: Droughty Shales (SD3)

Minor Components

Berks
- Percent of map unit: 9 percent
- Landform: Ridges
- Landform position (two-dimensional): Summit, shoulder, backslope
- Landform position (three-dimensional): Side slope
- Down-slope shape: Convex
- Across-slope shape: Convex, linear

Ernest
- Percent of map unit: 3 percent
- Landform: Hillslopes
- Landform position (two-dimensional): Footslope
- Landform position (three-dimensional): Side slope
- Down-slope shape: Concave
- Across-slope shape: Linear

Wharton
- Percent of map unit: 2 percent
- Landform: Ridges
- Landform position (two-dimensional): Backslope
- Landform position (three-dimensional): Interfluve, side slope, head slope
- Down-slope shape: Concave
- Across-slope shape: Concave

Hartleton
- Percent of map unit: 1 percent
- Landform: Ridges
- Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
1. PROJECT INFORMATION

Project Name: BSA mason dixon  
Date of review: 3/7/2016 8:07:39 AM  
Project Category: Forest Stewardship Plan,  
Project Area: 543.5 acres  
County: Fulton Township/Municipality: Dublin  
Quadrangle Name: BURNT CABINS ~ ZIP Code: 17223  
Decimal Degrees: 40.084605 N, -77.968679 W  
Degrees Minutes Seconds: 40° 5' 4.6'' N, -77° 58' 7.2'' W

2. SEARCH RESULTS

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<thead>
<tr>
<th>Agency</th>
<th>Results</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA Game Commission</td>
<td>No Known Impact</td>
<td>No Further Review Required</td>
</tr>
<tr>
<td>PA Department of Conservation and Natural Resources</td>
<td>Potential Impact</td>
<td>FURTHER REVIEW IS REQUIRED, See Agency Response</td>
</tr>
<tr>
<td>PA Fish and Boat Commission</td>
<td>No Known Impact</td>
<td>No Further Review Required</td>
</tr>
<tr>
<td>U.S. Fish and Wildlife Service</td>
<td>No Known Impact</td>
<td>No Further Review Required</td>
</tr>
</tbody>
</table>

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.
3. AGENCY COMMENTS
Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are valid for two years (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies strongly advise against conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE: Further review of this project is necessary to resolve the potential impacts(s). Please send project information to this agency for review (see WHAT TO SEND).

DCNR Species: (Note: The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: http://www.gis.dcnr.state.pa.us/hgis-er/PNDI_DCNR.aspx.)
Scientific Name: Sensitive Species**
Common Name: 
Current Status: Special Concern Species*
Proposed Status: Special Concern Species*

PA Fish and Boat Commission
RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service
RESPONSE: No impacts to federally listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.
* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

** WHAT TO SEND TO JURISDICTIONAL AGENCIES **

If project information was requested by one or more of the agencies above, send the following information to the agency(s) seeking this information (see AGENCY CONTACT INFORMATION).

Check-list of Minimum Materials to be submitted:

- ___ SIGNED copy of this Project Environmental Review Receipt
- ___ Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
- ___ Project location information (name of USGS Quadrangle, Township/Municipality, and County)
- ___ USGS 7.5-minute Quadrangle with project boundary clearly indicated, and quad name on the map

The inclusion of the following information may expedite the review process.

- ___ A basic site plan (particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
- ___ Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
- ___ Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. For cases where a "Potential Impact" to threatened and endangered species has been identified before the application has been submitted to DEP, the application should not be submitted until the impact has been resolved. For cases where "Potential Impact" to special concern species and resources has been identified before the application has been submitted, the application should be submitted to DEP along with the PNDI receipt. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. DEP and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at http://www.naturalheritage.state.pa.us.
5. ADDITIONAL INFORMATION
The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552, Harrisburg, PA. 17105-8552
Fax:(717) 772-0271

PA Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane, Bellefonte, PA. 16823-7437
NO Faxes Please

U.S. Fish and Wildlife Service
Pennsylvania Field Office
110 Radnor Rd; Suite 101, State College, PA 16801
NO Faxes Please.

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA. 17110-9797
Fax:(717) 787-6957

7. PROJECT CONTACT INFORMATION
Name:______________________________________________________________
Company/Business Name:______________________________________________
Address:____________________________________________________________
City, State, Zip:_______________________________________________________
Phone:(_____)_________________________Fax:(______)___________________
Email:_____________________________________________________________

8. CERTIFICATION
I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

__________________________________________    _______________________
applicant/project proponent signature                                      date
March 14, 2016

Jason M. Wenrich
FORECON, Inc.
P.O. Box 128
Bellefonte, PA 16823
Email: jwenrich@foreconinc.com (hard copy will not follow)

Re: Mason-Dixon Council BSA – Camp Sinoquipe Forest Stewardship Plan
Dublin Township, Fulton County, PA

Dear Mr. Wenrich,

Thank you for the submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt Number 20160307552045 for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources under DCNR’s responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

No Impact Anticipated (with Conservation Measure)

PNDI records indicate species or resources under DCNR’s jurisdiction are located in the vicinity of the project. However, based on the information you submitted concerning the nature of the project, the immediate location, and our detailed resource information, DCNR has determined that no impact is likely. No further coordination with our agency is needed for this project.

Conservation Measure

Wild Lupine (Lupinus perennis), a PA Rare species, was last observed on the Camp Sinoquipe property in 1987 to the northeast of the lake in an old clear-cut. Viability of this population was estimated to be poor, as only a couple individuals were documented. This population has likely been eliminated due to forest succession. Please see the attached documents for a Biotics record and a map of its estimated location.

Because wild lupine was historically documented on the Camp Sinoquipe property, there is a chance that it may still be found in existing suitable habitat, or may colonize the property in the future. This species prefers open fields, right-of-ways, woods edges, and roadsides in sandy acidic soils. Its conspicuous flowers typically appear April – July, maturing into robust fuzzy seed pods. The distinctive umbrella-like leaves are visible throughout the growing season. Wild lupine is readily identifiable, with little or no botanical training.

Wild lupine is an early successional specialist, requiring open canopy conditions on well drained, dry, and acidic sandy soil, including sandy loams. Existing populations can be maintained by eliminating overhead canopy, cutting competing saplings and large woody shrubs, and removing accumulated leaf litter or duff by either prescribed burns or mechanical methods (e.g., raking).

Wild lupine is hard to miss, and all personnel conducting forestry work in this area should be made aware of its potential presence, its typical habitat conditions, and its identifying characteristics. Timber harvesting operations may enhance habitat by opening up the canopy. Herbicide programs should be conducted with extreme care, especially along edges and in dry openings. Please report any suspected wild lupine populations to our office.
DCNR recommends the following steps to help prevent the spread of invasive species:

- The area of disturbance should be minimized to the fullest extent that would allow for construction. This will help to lessen the area of soil and vegetation disturbance associated with this project.

- If possible, please clean all construction equipment and vehicles thoroughly (especially the undercarriage and wheels) before they are brought on site. This will remove invasive plant seeds from the equipment and undercarriages of the vehicles that may have been picked up at other sites.

- Avoid using seed mixes that include invasive plant species (e.g. crown vetch) to re-vegetate the area. Please also attempt to use weed-free straw or hay mixes when possible. More information about Pennsylvania invasive plants can be found here: http://www.dcnr.state.pa.us/conservationscience/invasivespecies/index.htm

This response represents the most up-to-date review of the PNDI data files and is valid for two (2) years only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. Should the proposed work continue beyond the period covered by this letter, please resubmit the project to this agency as an “Update” (including an updated PNDI receipt, project narrative and accurate map). As a reminder, this finding applies to potential impacts under DCNR’s jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth’s other resource agencies for environmental review.

Should you have any questions or concerns, please contact Jason Ryndock, Ecological Information Specialist, by phone (717-705-2822) or via email (c-jryndock@pa.gov).

Sincerely

Greg Podniesinski, Section Chief
Natural Heritage Section
**Element Occurrence Record**

<table>
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<tr>
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<th>Scientific Name</th>
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### Summary

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### Element

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### Site/Directions

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#### Survey Site

**Survey Site Name**

#### Directions

PA TURNPIKE (US 76) EXIT ONTO US 522 N (INTERCHANGE 13). TAKE 522 N TO FT LITTLETON, THERE TAKE L.R. 29046 1.9 MI TO SECONDARY RD. TURN LEFT CROSS L. AUGHWICK CR. PROCEED TO CAMP SINOQUIPE. EO LOCATED ALONG "YELLOW TRAIL" NE OF THE LAKE.

### Locators

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### Element Occurrence Record

**EO ID** 10805  
**Subnational**  
**Scientific Name** *Lupinus perennis*  
**EOCODE** PDFAB2B340  
*** 4**

#### Confidence Extent
**Additional Inventory Needed** N

#### Survey Information

**Surveyor**

**Survey Date** 1987-06-27

**First Observation Date** 1979  
**Last Observation Date** 1987-06-27

**EO Data** F87WAL01: 1987 JUN 27, TWO INDIVIDUALS, MANY FRUITS, RECRUITMENT-NONE. OTHER COLONIES IN THE AREA? IS THIS AN EO?

#### Contacts

<table>
<thead>
<tr>
<th>Contact ID</th>
<th>Individual Name</th>
<th>Institution Name</th>
<th>Note</th>
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#### EO Rank

**EO Rank Factor Survey Data**

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**Size of EO**

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**Basic EO Rank**

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<tr>
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<tbody>
<tr>
<td>D - Poor estimated viability</td>
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</table>

**EO Rank Date** 1:30:00AM

**EO Rank Comment**

EXTANT. SMALL EO, ONLY TWO PLANTS.

#### Description

**EO Type BCD**

**General Description** NEAR TRAIL ON BOY SCOUT CAMP PROPERTY. AREA E OF TRAIL CLEAR CUT Apx 15-20 YEARS AGO. DOMINANT SPECIES INCLUDE: QUERCUS RUBRA, Q. PRINUS, PINUS VIRGINIANA, HOUSTONIA LONGIFOLIA, U87WAL01.

**Min. Elevation** 800.00 feet 244.00 meters

**Max. Elevation** feet meters

**EO Observed Area** 1.00 acres 0.40 hectares

#### Protection

**U.S. Endangered Species Act Status**

**State Interpreted Status**

**USESA Status**

**More Land**

**Protection Comments** KEEP AREA OPEN.

**More Protection**

**TNC involvement**

**MA/Ownership**

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#### General Comments

**Additional Topics**

**Additonal Topics**

---

**QC 1 Enterd**  
**QC 2 Entered**
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<th>EO ID</th>
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<td>Lupinus perennis</td>
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**Topic Keywords**

- Keywords

**Documentation**

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**References**

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<tr>
<td>U87WAL01PAUS</td>
<td>Walck, JEFFREY L. 1987. LETTER &amp; REPORT ON VASCULAR PLANTS AND SELECTED VERTEBRATES OF BOY SCOUT CAMP SINOQUIPE, FULTON CO. U87WAL01PAUS.</td>
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