



Conservation Action Plan CAP 106 Forest Management Plan

Developed for:

**CLARENCE SCHOCK MEMORIAL PARK
AT GOVERNOR DICK**

Mailing Address:

P.O. Box 161
Mt. Gretna, PA 17064

Property Location:

3283 Pinch Road
Lebanon, PA 17042

Developed by:

Barry S. Rose, Certified Forester #579, TSP 11-7334
Forest Regeneration Services, Inc.
P.O. Box 1260
Gouldsboro, PA 18424
Office Phone: (570) 842-2252
Mobile Phone: (717) 228-4854
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Managed Acreage: 1,105 acres

Preparation Date: November 2016

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DRAFT

SIGNATURES AND APPROVALS

This Forest Management Plan (FMP) is provided as a guide to help landowners accomplish the objectives that they have for their forest. This FMP will act as a guide for landowners in achieving the sustainable benefits of managing their forest resources for the next 10 years. With this FMP, the landowner automatically complies with the standards and benefits of the US Forest Service's Forest Stewardship Program, the American Forest Foundation's American Tree Farm System and is eligible for NRCS Cost Share programs. This plan will need to be reviewed and approved by the local NRCS District Conservationist, DCNR Service Forester, Technical Service Provider, and Landowner.

The Forest Stewardship Program and American Tree Farm Program are designed to promote wise use and sustained benefits of forest resources. While participation in these programs can provide benefits of forest management information networks, national recognition, financial tax savings, and increased forest product income generation through select markets, by NRCS policy, the landowner is not required to participate in these programs. If the landowner wishes to participate in either of these programs, please check the appropriate boxes and proceed to the Landowners Pledge.

Forest Stewardship Program Participation

Yes: ☒ No: ☐

Tree Farm Program Participation

Yes: ☐ No: ☒

Landowner's Pledge for Forest Stewardship/Tree Farm Program Status

Since timber harvesting has a significant impact on our forest resources, we agree to complete commercial timber harvests recommended in the plan with the assistance of a professional forester. We understand that the forester is to designate trees to be cut based on a written prescription derived through a careful stand analysis of the stands involved.

We understand that a DCNR Service Forester or forest consultant will periodically review the implementation of our FMP to assist us in properly following the plan for my objectives. To enable him/her to carry out this responsibility we will make available copies of plan amendments and/or timber harvesting prescriptions before carrying out a major activity. We understand that we are not obligated to obtain approval from the service forester but that he/she may advise me if prescriptions do not appear to serve the goals of my FMP or meet Forest Stewardship/Tree Farm standards.

If we choose to deviate from the guidelines in the FMP, we agree to return the applicable signs designating my property as a "Stewardship Forest" or "American Tree Farm" to the DCNR Service Forester.

Landowner Signature

Date

Forest Stewardship/American Tree Farm/EQIP Program Certifications

We are satisfied with the content and recommendations contained in this FMP, and will make an honest effort to follow them for the ten-year period covered by the plan. We understand that the information within this plan may be used by NRCS and DCNR for conservation planning, and is not protected by legal privacy acts for either agency.

Landowner Signature

Date

We certify that this FMP meets the requirements of the federal Forest Stewardship Program, American Tree Farm Program, and the USDA Environmental Quality Incentives (EQIP) Program and/or the Quality Criteria for Forest Management Plans in Section III of the USDA NRCS Field Office Technical Guide.

Technical Service Provider

Date

DCNR Service Forester

ATFS Inspector #

Date

PA Unique ID Number

Certified Tree Farm #

NRCS District Conservationist

Date

PROPERTY OWNERSHIP

Lebanon County Commissioners (Trustees)

Room 207, Municipal Building
400 South 8th Street
Lebanon, PA 17042

Park Representatives:

Mr. Chuck Allwein, Board Member
Telephone: (717) 926-5143
eMail: callwein7@comcast.net

Mrs. Audrey Wells, Naturalist
Telephone: (717) 964-3808
eMail: governordick@hotmail.com

GOVERNMENT OVERSIGHT

Lebanon County Service Forester

Mr. Gary L. Gilmore
Woodland Stewardship Coordinator
PA DCNR Bureau of Forestry
Rural & Community Forestry Section
400 Market Street
Harrisburg, PA 17105
Telephone: (717) 418-5203
eMail: ggilmore@pa.gov

NRCS District Conservationist

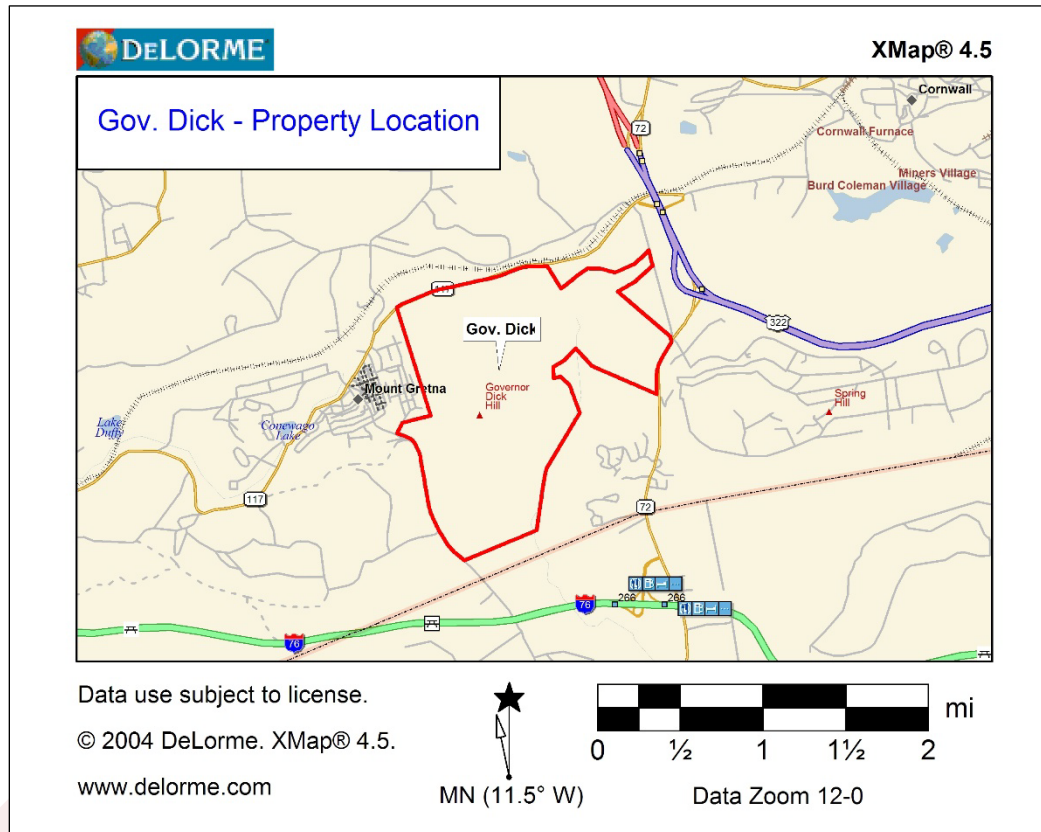
Mr. Michael Snyder
USDA Lebanon Service Center
2120 Cornwall Road, Suite 6
Lebanon, PA 17042
Telephone: (717) 272-3908
eMail: michael.snyder@pa.usda.gov

Please note: *Informal updates to the plan can be made with handwritten notes. Be sure to include a date and initial these notes throughout the management plan.*

PROPERTY DESCRIPTION

Directions:

The property is located east of and adjacent to Mt. Gretna, Lebanon County, Pennsylvania. Road frontage is found along Route 117, Pinch Road, and Route 72. The main entrance and Environmental Center is located south of Mt. Gretna at 3283 Pinch Road. See map below:



GPS Coordinates: 40 14' 13.22" N
 76 27' 38.17" W

From the Turnpike: Take the Lancaster-Lebanon exit. Turn right onto Rt. 72 South. Travel about 1 mile and turn right onto Cider Press Rd. At stop sign, turn right onto Pinch Rd. The Center is at the top of the hill on the right.

From Ephrata: Travel west on Rt. 322 towards Hershey. Take Mt Gretna exit on right. At bottom of ramp, turn left onto Rt. 117 North. In the town of Mt Gretna turn left onto Pinch Rd. The Center is 1 mile on the left.

From Lancaster: Travel north on Rt. 72, through Manheim. Turn left onto Pinch Rd. Travel about 1½ miles. The Center is at the top of the hill on the right.

From Harrisburg: Travel east on Rt. 322 past Hershey. Turn right onto 117 South. Remain on 117 S through Colebrook. In the town of Mt Gretna, turn right onto Pinch Rd. the Center is 1 mile on the left.

Total Ownership Acreage: 1,105 acres

Total Forested Acreage: 1,093 acres

Landowner Resides on Property: No

Basic topography (estimate percent of total acreage that is):

Complex topography (many steep ravines and aspects) ☒

Simple topography (few ravines and changes of aspect)..... ☐

The surrounding topography is typically hilly to mountain-like. Elevations on the property range from +/- 600 feet (above sea level) along Chickies Creek in the southern section of the property to around 1,148 feet at the summit of Gov. Dick Hill located near the Observation Tower. Approximately 4,000 feet (horizontal distance) separates the two elevation extremes on this property.

Watershed Tract:

Chesapeake Bay ☒

Delaware River Basin..... ☐

Ohio River Basin ☐

Number of management units: 9

Forest Access by Vehicles:

Excellent (80% accessible)..... ☐

Good (at least 50%)..... ☐

Fair (at least 25%)..... ☒

Poor (less than 10%) ☐

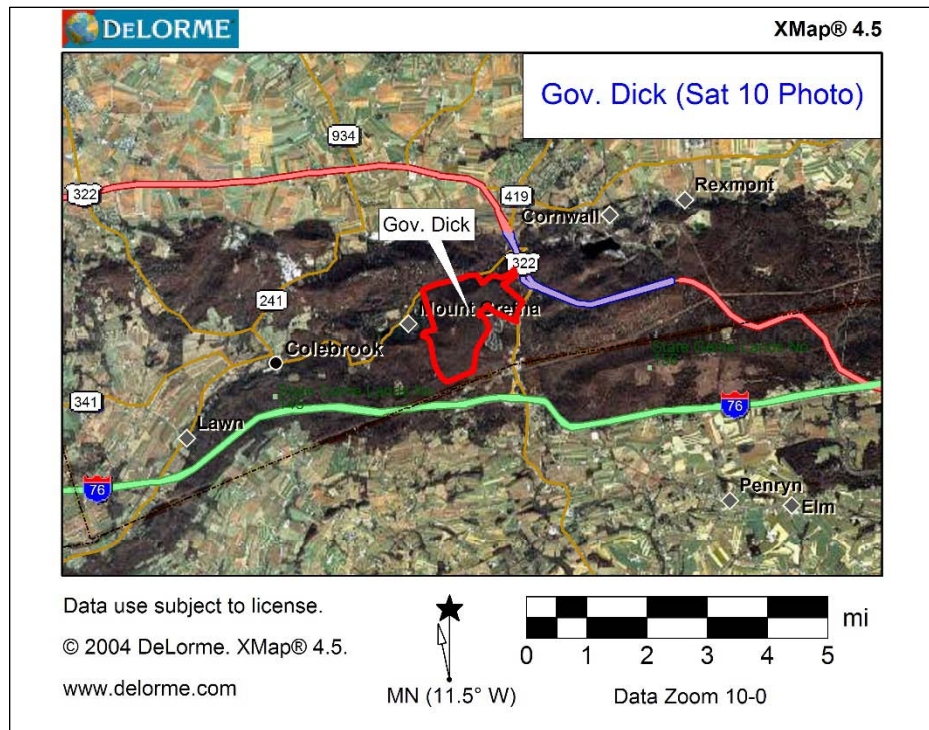
Approximately 50% of the property boundary is adjacent to three different state roads. There are four parking areas along these roads at trail heads. There is a 1.9 mile gated vehicle access road through the middle of the property, and 13.3 miles of trails. For more information, refer to Management Unit #1

Access is afforded to the public via approximately 14 points of entry. Most of these accesses are primitive and consist of foot/bike/horse trails. Parking facilities are generally *inadequate* relative to the volume of users in all areas except the recently established **Environmental Center** located on Pinch Road. The north, east and west slopes of the property can be accessed via improved road segments, dirt roads, and an extensive foot/bike/horse trail system. The south slope is generally accessible via foot and/or mountain bike only.

The Property within the Landscape:

This property lies within a woodland corridor locally known as Furnace Hills that stretches more or less east-west along the Lebanon County / Lancaster County lines. The north-south width of the Furnace Hills corridor, which includes the Clarence Schock Memorial Park at Governor Dick (hereinafter called Gov. Dick), is approximately 2.8 miles. Gov. Dick's centralized location and size (more than 60% or 1.7 miles of the corridors width) make it an essential link for migrating woodland wildlife within the region. Large expanses of farmland, rural communities, and small cities dominate the landscape north and south of this corridor. State Game Lands #145 is situated west of Pinch Road and shares a common boundary with Gov. Dick. See map below.

Interstate 76 runs in an east-west direction across the state forming a migration barrier to most ground dwelling animals. This interstate highway is located less than 2,500 feet from the southernmost boundary of Gov. Dick. The Middle Creek Wildlife Management Area, the largest migratory waterfowl management area in this region of Pennsylvania is located just 12 air miles east-northeast of Gov. Dick.



OWNERS FOREST MANAGEMENT GOALS

The Board Members of Gov. Dick established the following guidelines for this plan:

- a. Keep the forest healthy with minimum changes.
- b. Address the abundance of mature trees and the lack of regeneration of new growth.
- c. Address the lack of evergreens throughout.
- d. Keep a percentage of old growth, especially along Pinch Road and high-use/visibility areas.
- e. Improve road/trail access.
- f. Reduce fire risk.
- g. Improve roadside parking.
- h. Reduce invasive species.
- i. Develop a charcoal history display site.
- j. Address options for controlling tick and mosquito populations.
- k. Encourage bird walks, native plant workshops, and educational programs.
- l. Encourage the Audubon Society's involvement in bird counts and utilize their expertise.
- m. Create interpretive trail(s). Trail signs and brochure(s) identifying trees, plants and flowers of the area, and other special interest areas and history.
- n. Control deer population.
- o. Manage forest for its health, not profit.
- p. Don't be afraid to cut trees to manage the tract and provide some income.
- q. Favor silvicultural practices that include group selection to encourage natural tree regeneration over clearcutting. It is understood that deer exclosure fences are likely needed to protect project areas where regeneration practices occur. In many cases, fences should be established prior to harvesting (for several years) to encourage advanced regeneration to become established.
- r. Project areas should be used as an educational opportunity for the public. Signs should be displayed to explain the intent, process, reasoning for the practice in a natural unobtrusive way.
- s. Use all means necessary to assure the successful outcome of each practice.

PROPERTY HISTORY

Gov. Dick is a 1,105-acre forested site set aside for public education, nature walks and other primitive (non-motorized) recreational activities in a woodland setting located near Mount Gretna, Pennsylvania. The trustees (the Lebanon County Commissioners) are charged with oversight of the land trust and bylaws compliance.

Mr. Clarence Schock granted these lands for public use so that people would have a forested place to enjoy themselves and thereby come to appreciate nature through participation, education and contemplation of its natural community. Excerpts from the original deed recorded on April 22, 1954 are as follows:

"... TO HAVE AND TO HOLD the tract of land above described with the appurtenance IN TRUST forever as a playground and public park, upon the following terms and conditions: The portion thereof which is now forest or woodland shall be maintained as forest and woodland and where possible additional portions shall be planted as forest and woodland; Hunting and shooting and the smoking of cigars, cigarettes, pipes and tobacco shall be prohibited at all times upon the land hereby conveyed; the land shall be posted with notices at least once each year forbidding hunting and shooting, and appropriate notices shall be maintained forbidding the smoking of cigars, cigarettes, pipes and tobacco upon the land;

The trust shall be for the enjoyment of persons traveling on foot; and no automobile, vehicle or mobile machinery shall be allowed to move or travel upon roads on the land except upon the business of the trust or with the written permission of the trustee or upon such public roads as may hereafter be built by state municipal authority...."

In 1941, Mr. Schock reorganized the SICO Company as a non-profit corporation with earnings to be utilized for the promotion of educational, literary and scientific purposes. In 1955, the SICO Company was renamed to the SICO Foundation, which was later renamed the Clarence Schock Memorial Foundation in 2003. The Clarence Schock Foundation was dedicated to promoting activities for public education, literary and scientific purposes. Recently, the Foundation withdrew from oversight of Gov. Dick. The Lebanon County Commissioners are now the sole trustees of the property.

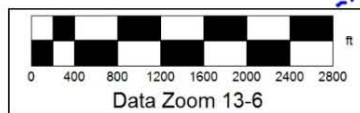
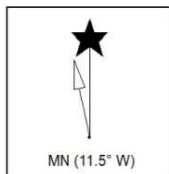
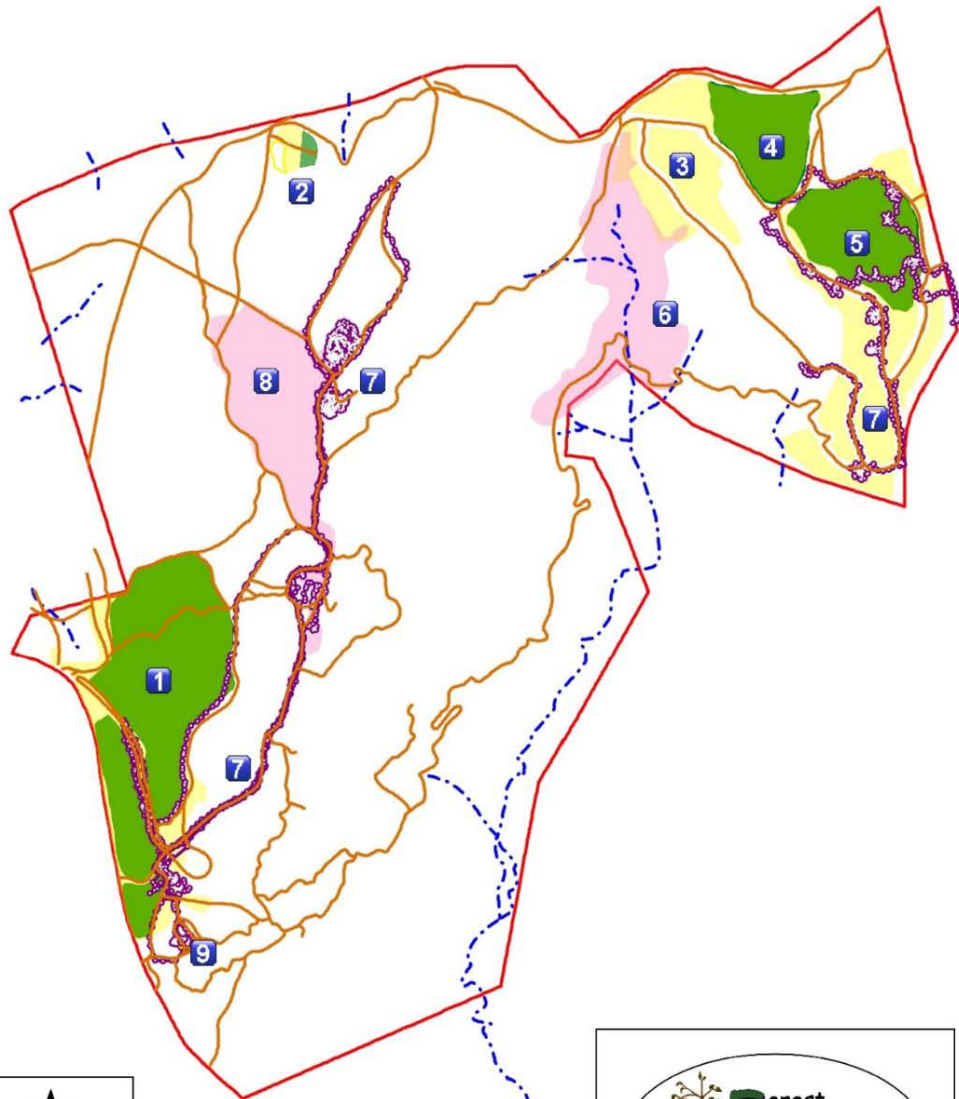
In 2005, the board of trustees authorized the writing of a Forest Stewardship Plan. Since then, many of the recommendations outlined in that plan were implemented. See chart below.

ACTIVITIES COMPLETED:

The following activities have been completed since 2009. Most activities were introduced in the previous Forest Stewardship Plan written and approved in 2005.

Activities Completed Between 2009 and 2016					
Map #	Date	Practice Code	Project Name/Activity/Practice	General Purpose and Location	Acres
	8/1/18	314	Brush Mgmt. - Trails	Chem, Individual Plant Treatment	32.4
	8/1/18	315	Weed Control - Trails	Chemical, Spot	32.4
	8/1/17	490	Invasive Plant Control - Trails	Chemical, Hand Application	64.8
	8/1/17	612	Plant Seedlings	8200 seedlings protected in fence	41.0
	8/1/17		2016 Marcellus Grant	ADA Handicap Boardwalk Project	
	7/1/16		NRCS - EQIP	Funding for activities	
	12/1/16	106	10 yr. rewrite of FSP		1,105.7
1	2/3/09		Timber Sale - Oak Salvage	Forest Management	67.0
9	7/10/09		Commonwealth of PA	Rain Garden	
	10/16/09		Growing Greener	Funding for Activities	
1	11/19/09		Herbicide - Oak Salvage Sale	48.25 hours + herbicides	
7/8	4/15/10	314	Ailanthus Control	Basal Bark / Hack & Squirt	38.4
1	4/15/10		FENCE - Oak Salvage Sale	Fence Construction by Reiley (53 acres @11,780 lin ft @ \$2.28/ft)	53.0
1	4/29/10	612	Tree Planting - Oak Salvage Sale	15000 seedlings	67.0
7	10/7/10		Weed Control - Trails	MAM - Herb application in June	
9	10/22/10		Rain Garden	Growing Greener	
	5/31/11		SILVAH Survey	5/2/11 and 5/26/11	
7	5/31/11		Herbicide - MAM	5 acres MAM 2.4 acres woody	7.4
7	7/8/11	315	MAM Weed Control	bouldering area near radar site	3.7
7	7/20/12	314	Brush Mgmt./ Chem. And Mech. Methods	6.3 ac ailanthus control + 2.4 ac radar site prep.	8.7
	12/19/12		NRCS - EQIP	Funding for Activities	
1	1/10/13	666	FSI/ Tree shears BB, BG	Black birch understory reduction	20.0
5	3/23/13		Timber Sale #1(Rte 72)	Forest Management	49.0
1	4/4/13	666	FSI/ Tree shears BB, BG	Black birch understory reduction	21.0
	5/9/13		NRCS - EQIP	Funding for Activities	
	6/19/13	327	NRCS - EQIP	Radar Site - Warm Season Grass	1.4
3/4	2/27/14		Timber Sale #2	Forest Management	37.0
7	6/4/14		Herbicide Application	Pre-emergent trail spraying	
5/4	6/4/14	382	Fence #1 and #2 Construction	1 = 3919ft. (23 acres), 2 = 3604 ft. (18 acres)	41.0
	7/14/14	666	TSI	Tree Thinning with Shears	18.0
	7/14/14	314	Herbicide - Chem. HEAVY Infest.	Spicebush in Rte. 72 Fence	23.0
6	7/14/14	314	Herbicide - Chem. MEDIUM Infest.	Herb. barberry/headwaters of Chickies Creek	30.0
	7/14/14	587	Structures for Water Control	39 waterbars installed	
	7/25/14		NRCS - EQIP	Apply to 4 payments of 7/14/14	
	8/27/14		2014 Marcellus Grant	Apply to 2 payments of 6/4/14	
	1/1/15		2015 Marcellus Grant	Applied to rewrite of 2016 FSP	
2/5	5/1/15		Timber Sale	Tree salvage and demo area	
	5/29/15		NRCS - EQIP	Funding for Activities	
2	7/1/15		Demo Area Establishment	Prep and Fence	
	8/21/15		2014 Marcellus Grant	Funding for activities	
5/4	7/25/16		Herbicide Application	Fence #1 and #2 Invasive Respray	

2009-2016 Completed Activities Map



Data use subject to license.

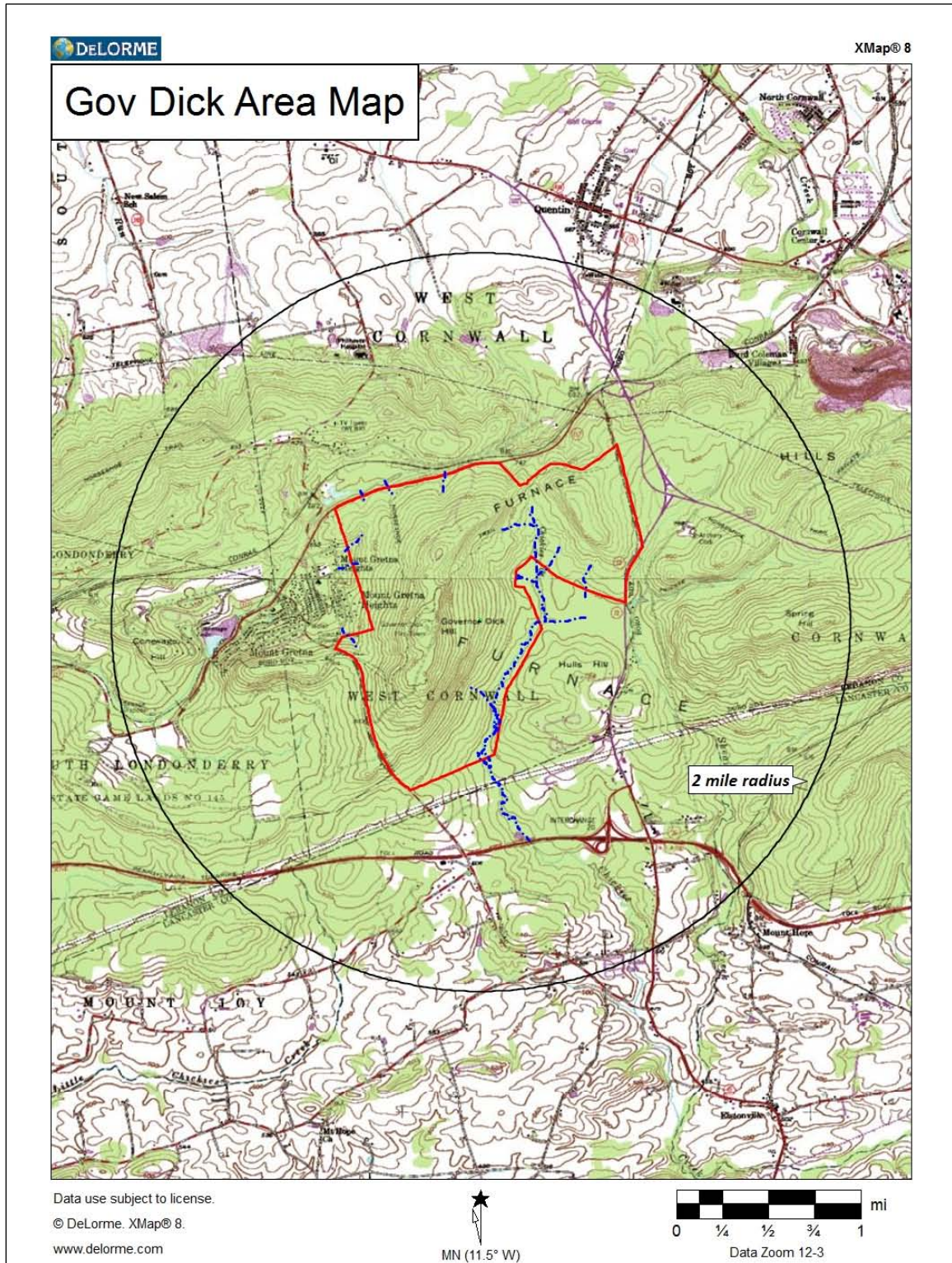
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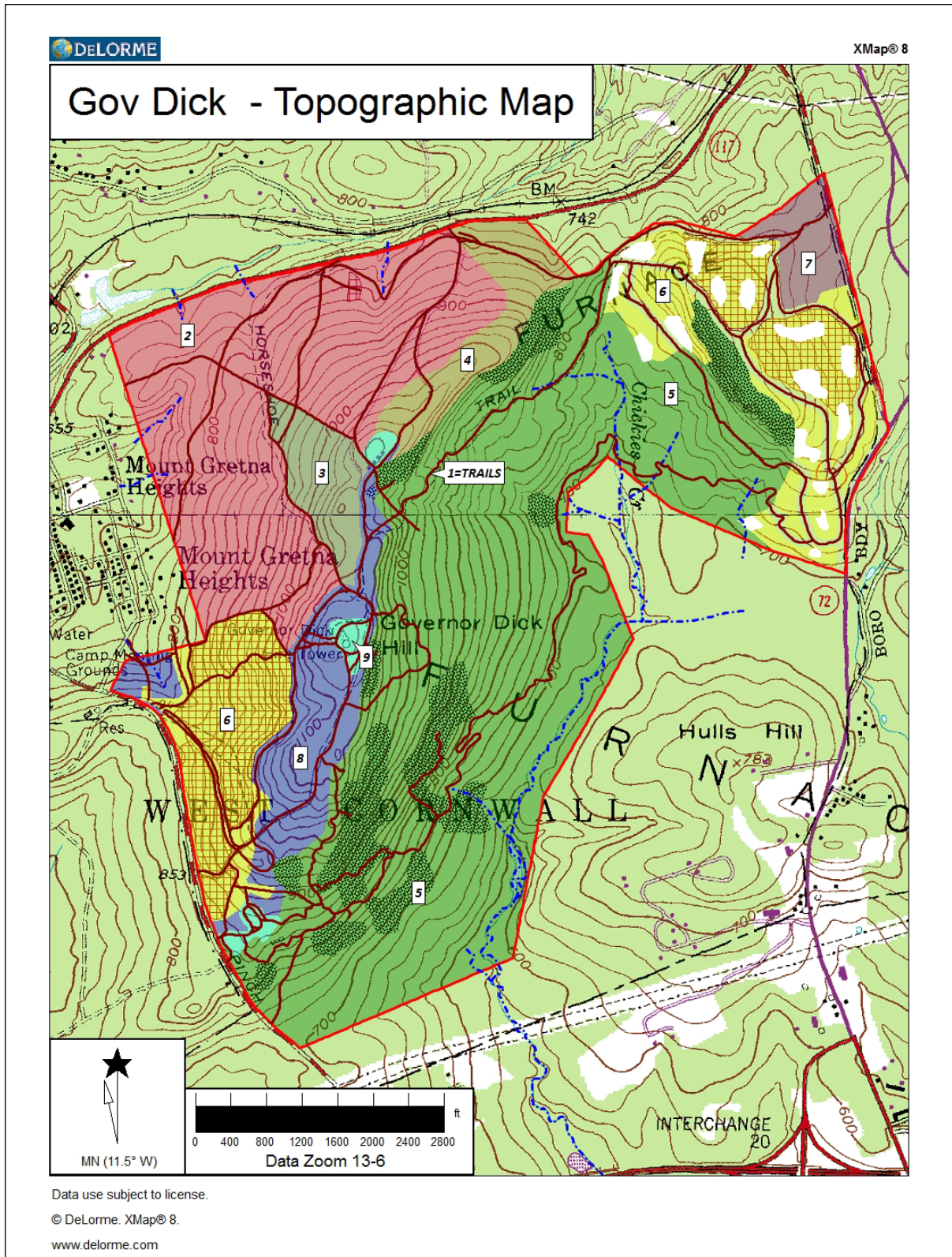
PROPERTY MAPS

1. Topographic Maps

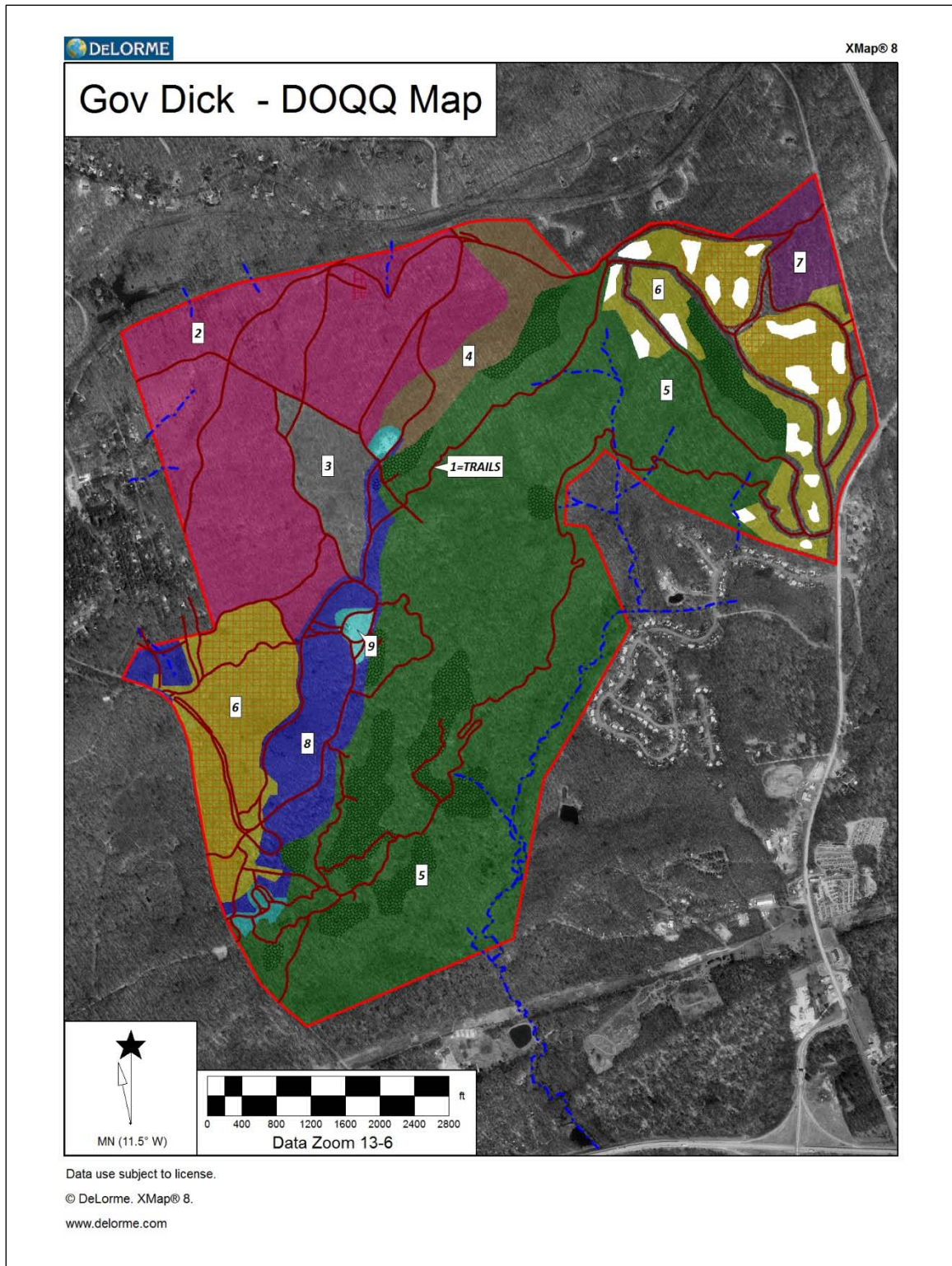
a. Landscape map



b. Property map



2. Aerial Photograph



Soils Map

Parent Material Name—Lebanon County, Pennsylvania
(Gov Dick Parent Material Map)

MAP LEGEND

Area of Interest (AOI)		 colluvium derived from diabase
 Area of Interest (AOI)		 residuum weathered from diabase
Soils		 residuum weathered from sandstone and siltstone
Soil Rating Polygons		 residuum weathered from sandstone and/or residuum weathered from conglomerate
 colluvium derived from diabase		 Not rated or not available
 residuum weathered from diabase	Water Features	 Streams and Canals
 residuum weathered from sandstone and siltstone	Transportation	 Rails
 residuum weathered from sandstone and/or residuum weathered from conglomerate	 Interstate Highways	 US Routes
 Not rated or not available	 Major Roads	 Local Roads
Soil Rating Lines	Background	 Aerial Photography
 colluvium derived from diabase		
 residuum weathered from diabase		
 residuum weathered from sandstone and siltstone		
 residuum weathered from sandstone and/or residuum weathered from conglomerate		
 Not rated or not available		
Soil Rating Points		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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.

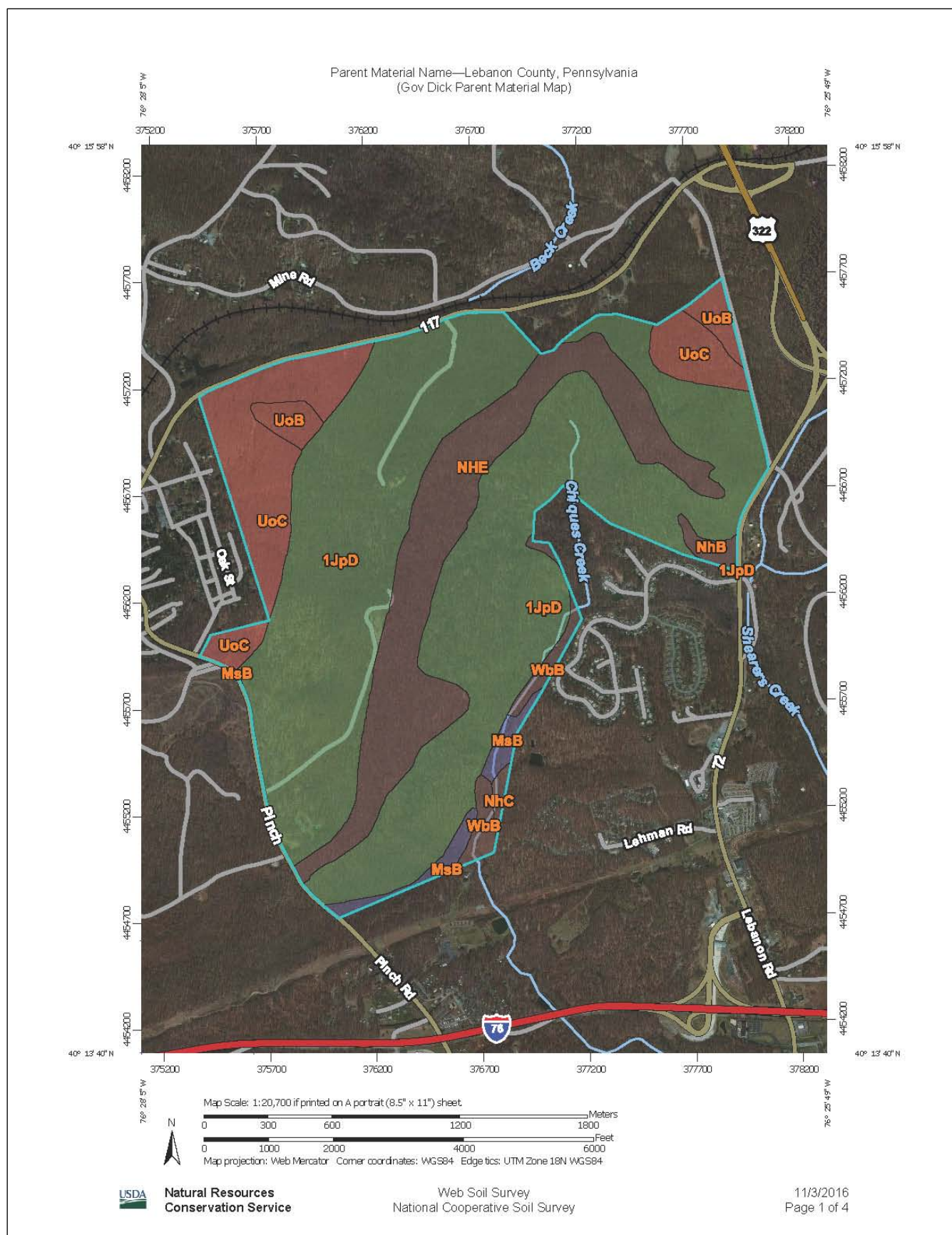
This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lebanon 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: Mar 26, 2011—Jul 2, 2011

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.



Parent Material Name

Parent Material Name— Summary by Map Unit — Lebanon County, Pennsylvania (PA075)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1JpD	Joanna loam, 8 to 25 percent slopes, extremely stony	residuum weathered from sandstone and/or residuum weathered from conglomerate	725.1	65.0%
MsB	Mount Lucas extremely stony silt loam, 3 to 8 percent slopes	colluvium derived from diabase	19.2	1.7%
NhB	Neshaminy extremely stony silt loam, 3 to 8 percent slopes	residuum weathered from diabase	7.8	0.7%
NhC	Neshaminy extremely stony silt loam, 8 to 25 percent slopes	residuum weathered from diabase	3.6	0.3%
NHE	Neshaminy extremely stony silt loam, steep	residuum weathered from diabase	189.1	17.0%
UoB	Ungers extremely stony loam, 3 to 8 percent slopes	residuum weathered from sandstone and siltstone	22.9	2.1%
UoC	Ungers extremely stony loam, 8 to 25 percent slopes	residuum weathered from sandstone and siltstone	127.6	11.4%
WbB	Watchung extremely stony silt loam, 0 to 8 percent slopes	residuum weathered from diabase	20.0	1.8%
Totals for Area of Interest			1,115.3	100.0%

Description

Parent material name is a term for the general physical, chemical, and mineralogical composition of the unconsolidated material, mineral or organic, in which the soil forms. Mode of deposition and/or weathering may be implied by the name.

The soil surveyor uses parent material to develop a model used for soil mapping. Soil scientists and specialists in other disciplines use parent material to help interpret soil boundaries and project performance of the material below the soil. Many soil properties relate to parent material. Among these properties are proportions of sand, silt, and clay; chemical content; bulk density; structure; and the kinds and amounts of rock fragments. These properties affect interpretations and may be criteria used to separate soil series. Soil properties and landscape information may imply the kind of parent material.

For each soil in the database, one or more parent materials may be identified. One is marked as the representative or most commonly occurring. The representative parent material name is presented here.

Forestland Productivity

This table can help forestland owners or managers plan the use of soils for wood crops. It shows the potential productivity of the soils for wood crops.

Potential productivity of merchantable or common trees on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forestland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Trees to manage are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service, National Forestry Manual.

Report—Forestland Productivity

Forestland Productivity--Lebanon County, Pennsylvania				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			<i>Cu ft/ac</i>	
1JpD—Joanna loam, 8 to 25 percent slopes, extremely stony				
Joanna, extremely stony	Northern red oak	65	43.00	Eastern white pine, Virginia pine
	Virginia pine	60	86.00	
MsB—Mount Lucas extremely stony silt loam, 3 to 8 percent slopes				
Mount lucas, extremely stony	Northern red oak	80	57.00	Eastern white pine, Virginia pine, Yellow-poplar
	Virginia pine	75	114.00	
	Yellow-poplar	90	86.00	

Forestland Productivity--Lebanon County, Pennsylvania				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			<i>Cu ft/ac</i>	
NhB---Neshaminy extremely stony silt loam, 3 to 8 percent slopes				
Neshaminy	Northern red oak	80	57.00	Black walnut, Eastern white pine, Japanese larch, Norway spruce, Virginia pine, Yellow-poplar
	Yellow-poplar	90	86.00	
NhC---Neshaminy extremely stony silt loam, 8 to 25 percent slopes				
Neshaminy	Northern red oak	80	57.00	Black walnut, Eastern white pine, Japanese larch, Norway spruce, Virginia pine, Yellow-poplar
	Yellow-poplar	90	86.00	
NHE---Neshaminy extremely stony silt loam, steep				
Neshaminy	Northern red oak	80	57.00	Black walnut, Eastern white pine, Japanese larch, Norway spruce, Virginia pine, Yellow-poplar
	Yellow-poplar	90	86.00	
UoB---Ungers extremely stony loam, 3 to 8 percent slopes				
Ungers	Northern red oak	67	43.00	Eastern white pine, Virginia pine
	Virginia pine	65	100.00	
UoC---Ungers extremely stony loam, 8 to 25 percent slopes				
Ungers	Northern red oak	67	43.00	Eastern white pine, Virginia pine
	Virginia pine	65	100.00	
WbB---Watchung extremely stony silt loam, 0 to 8 percent slopes				
Watchung, extremely stony	Northern red oak	80	57.00	Eastern white pine, European larch, Norway spruce
	Pin oak	85	57.00	

Data Source Information

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

FOREST RESOURCES ENHANCEMENT AND PROTECTION

PROTECT SPECIAL SITES & SOCIAL CONSIDERATIONS

Special sites

Gov. Dick's 1,105 acres of virtually unfragmented forestland is essential to maintaining the integrity of the Furnace Hills woodland corridor. The north/south width of the Furnace Hills corridor, which includes Gov. Dick, is approximately 2.8 miles. Gov. Dick's centralized location and size (more than 60% or 1.7 miles of the corridors width) make it an essential link for migrating woodland wildlife within the region.

A taste of the history surrounding Clarence Schock Memorial Park can be found by searching the Internet. One particularly interesting site is <http://governordick.tripod.com/history.html> which describes an intriguing period of our history and an insight into Gov. Dick and the local community of Mount Gretna. Many references to iron and steel and "Furnace Hills" conjure images of the industrial revolution; a period in our history when conservation and natural resource management had little or no meaning.

Gov. Dick followed much the same path as nearly all the forestlands of Pennsylvania. Historical pictures and records describe a time around the turn of the 20th century where nearly all the timber resources in Pennsylvania were consumed by the "industrial furnaces" of that time. By the early 1900's all usable wood, large and small, was turned into energy, chemical, or other product. Entire landscapes lay devoid of sizable trees and brush land prevailed.

Charcoal hearths attest to this same fate at Gov. Dick. The telltale hearths can still be identified throughout Gov. Dick. One need not travel far before coming across a flattened circular earth disturbance once used to produce charcoal. In fact, many of the existing trails intersect the "charred earthen circles" that are roughly 30 feet in diameter. The sites can often be recognized by blackened surface soils and the intrinsic nature of these circular flats to be wetter than surrounding soils. This is due to the soils reduced permeability resulting from the baking and compactions of soils during the charcoal-making process.

Abandoned portions of an historic small gauge railroad grade are found at Gov. Dick. The unique 2-foot-gauge railroad connected the Cornwall & Lebanon R.R. (current location of rails-to-trails) north of Mount Gretna (via Lake Conewago) to the upper slopes of Gov. Dick Hill. After an accident in 1915, the rail-line was retired and dismantled. The 2-foot-gauge railroad is noted as the only operating rail-line of its type in United States history. The railroad grade enters onto Gov. Dick at the current location of the Pinch Road parking lot, cutting south and paralleling Pinch Road for a distance to gradually ascend the slope. At a point not too far upslope from the newly built **Environmental Center** the grade switches back to continue its accent to the summit of Gov. Dick Hill. Most of the original grade has been maintained for continued use as hiking trails.

The Observation Tower located at the summit of Gov. Dick Hill provides a panoramic view of the horizon. Five counties are said to be visible from atop the Tower – Lebanon, Lancaster, Dauphin, York, and Berks. The best view is perhaps towards the south to southwest horizon. Gretna Springs Retirement Community can be seen near the base of the hill. Manheim, Lititz,

and Lancaster are somewhat visible further out on the horizon. An artist's rendition of the landscape could provide interesting information such as the location and distance of Blue Mountain and Manheim. Several of these panoramic "maps" could be created and affixed atop podiums in appropriate locations in the Observation Tower.

The elevations along this ridge are the highest that can be found on this property and among the highest elevations found anywhere in the Furnace Hills region. The view of the Furnace Hills region and the farmlands that stretch beyond is spectacular.

Several scenic overlooks can be created to increase the enjoyment and appreciation felt by hikers, mountain bikers, and horseback riders. Numerous rock outcrops along the ridgeline of Gov. Dick Hill provide ample opportunities to overlook the woodlands below. Several possible vista locations have been marked on the map. Trails can be constructed to encourage use of the vistas.

The Horseshoe Trail traverses the property in an east-west direction along the northern boundaries of [Mgmt. Units #2, #4, #6 and #7](#). This trail provides a continuous recreational corridor that extends across a multitude of land use types in southeastern Pennsylvania. This trail has historic and cultural significance worth preserving for future generation.

Rock, boulders, and "rubble land" comprise much of [Mgmt. Unit #5](#). This management unit contains large areas of continuous rock outcroppings intermingled with areas of woodland that are less rocky. Some "islands of soil and trees" found in these rockscapes exhibit less amounts of deer browse damage. These areas often exhibit increased vertical structure and contain plants not found elsewhere on the property. Plant species noted during the survey include serviceberry, hawthorn, hornbeam, hophornbeam, witch hazel, rubus spp., dogwood, and various unidentified forbes and grasses, increased incidence of sapling regeneration including tulip-poplar, red maple, ash, and several oak and walnut pole-sized trees. These rubble lands also tend to have many downed trees of various sizes indicating that windthrow due to shallow rooting is common. Thus explains the presence of shade-intolerant tree species. Raccoon, rodent, and squirrel tracks were observed and grey fox were heard during the survey indicating that this environment greatly adds to species richness not found elsewhere on the property.

Several relatively large (1 to 2 acre) grapevine tangles were found during the survey. The larger tangles tend to be located on the mid- to upper-slopes of [Mgmt. Unit #3](#), [Mgmt. Unit #4](#) and in [Mgmt. Unit #5](#) on the steep side slopes of rock outcroppings where shallow rooting of overstory trees is more likely. Groupings of several to many large trees were found windthrown within the rock outcroppings, thereby creating favorable conditions for grapevine establishment and expansion. Deer, squirrels, and a grey fox were sighted in and around the grapevine tangles. Deer were using these tangles for winter cover, though considered marginal for this use at best.

The overstory of white pine found in [Mgmt. Unit #2](#) provides a valuable change to structure of the surrounding habitat types. This high evergreen cover provides roosting sites for crows, owls, hawks and possibly turkey (if present).

Rock outcrops along the ridge tops of [Mgmt. Units #5 and #6](#) are important nesting and denning sites for birds, mammals, and reptiles. Turkey vultures were sited using these rock outcrops for nests.

Adjacent stand or ownership concerns

Gov. Dick is located immediately east of Mount Gretna and Mount Gretna Heights. State Game Lands #145 (located to the west) enhance the recreational opportunities of this woodland community by providing an additional 2,793 acres of public land. The nearby quaint artisans' community of Mount Gretna is nestled in a conifer-dominated woodland setting. The public is drawn to the area in large numbers to enjoy social and cultural activities in Mount Gretna, as well as outdoor recreational activities like hiking, biking, horseback riding, and swimming, as well as the additional opportunities of fishing and hunting on SGL #145. More than 2.9 miles of the historic Horseshoe Trail lies within the boundaries of Gov. Dick with many additional miles of hiking trails available for public use, including the Lebanon Rails-to-Trails system.

Recreation

This property is located immediately east of Mount Gretna and Mount Gretna Heights. State Game Lands #145 (located west of Gov. Dick) enhance the recreational opportunities of this woodland community by providing an additional 2,793 acres of public land. The nearby quaint artisans community of Mount Gretna is nestled in a conifer-dominated woodland setting. The public is drawn to the area in large numbers to enjoy social and cultural activities in Mount Gretna, as well as outdoor recreational activities like hiking, biking, horseback riding, and swimming, as well as the additional opportunities of fishing and hunting on State Game Lands #145. More than 2.9 miles of the historic Horseshoe Trail lay within the boundaries of Gov. Dick and traverses the property in an east-west direction. The trail is marked with yellow blazes as it follows or parallels much of the ridgeline inclusive of Gov. Dick Hill. This trail provides a continuous recreational corridor that extends across a multitude of land use types in southeastern Pennsylvania. An additional 11.7 miles of hiking trails are available for public use.

An Observation Tower stands at the summit of Governor Dick Hill. This 60+ foot tall structure affords visitors a wonderful panoramic view of the surrounding countryside from a unique perspective. The Tower is a very popular destination during all seasons of the year. The view offered during the fall foliage season is particularly attractive and peak use probably occurs at this time of year. Bird watchers can also view migratory birds from atop the Tower in the spring and fall seasons. However, a protective safety "cage" affixed to the top of the observation deck creates an obstructed landscape when viewing through binoculars or camera lens. The trails leading to the Tower provides a brisk uphill walk from the well-used parking lot on Pinch Road (located east-southeast of the Tower). The shortest route (from parking lot to Tower) is about 2,400 feet in length and rises 262 feet in elevation along its course; average grade is 12% slope.

"Bouldering" has become a recreational activity for the public. Forest resource management should be limited to invasive species control, interfering understory vegetation control and shade tolerant species planting in those areas.

The **Environmental Center** at Gov. is located off Pinch Road and affords many opportunities to learn about and enjoy the outdoors. Planned leisure and informative self-guided trails are sure to please those looking for a casual stroll near the **Environmental Center**.

Access

The boundaries of the property are well marked with red signs and yellow bands of paint (on trees) through most of the wooded areas. Route 117, Route 72 and Pinch Road form much of the perimeter elsewhere on the property and are also posted with red signs.

Access is afforded to the public via approximately 14 points of entry. Most of these accesses are primitive and consist of foot/bike/horse trails. Parking facilities are generally *inadequate* relative to the volume of users in all areas except the recently established **Environmental Center** located on Pinch Road. All areas of the property can be accessed via the extensive dirt road/trail system.

AIR, WATER AND SOIL PROTECTION

Access Roads

Trail maintenance is an ongoing project at Gov Dick due to the high amount of use by patrons of the park. Many storm water run-off issues were addressed in 2014 by constructing water bars with the assistance of NRCS funding. It is recommended that proper drainage structures be maintained throughout the entire trail system of Gov. Dick. Proper trail location, proper drainage, and proper levels of impact (i.e. foot travel, bike, and/or horse) are key factors to the successful maintenance of existing trails. Therefore, install water-bars with turnouts, box culverts or similar devices to divert water run-off from trail surfaces at standard intervals.

Streams, wetlands, ponds, lakeshore

Water resources are very limited. Therefore, explore possibilities to enhance existing water resources via establishment of water “puddles” and vernal ponds near spring seeps and hydric soils. Thoroughly research possible locations as well as benefit and risk factors associated with microsite biota before proceeding. See websites www.fs.fed.us/r8/boone/vernal.pdf and www.vernalpool.org.

Water resources include the headwaters of Chickies Creek located in [Mgmt. Unit #5](#) near the northeast boundary of the property. The stream originates at Gov. Dick and reaches little more than three feet in width further downstream on the property. Donegal Springs and Shearers Creek join the confluence of Chickies Creek Basin further downstream. The DER Bureau of Water Quality rates these streams as high quality cold-water fisheries (HQ-CWF).

The riparian zone is totally protected by forest. Small to medium-sized sawtimber dominates the surrounding overstory vegetation and primarily consists of white ash, tulip-poplar, white oak, hickory, black birch, and American beech. Understory plants include spicebush, witch-hazel, Japanese barberry, hornbeam, hophornbeam, greenbrier, grasses, forbes, and legumes. This vegetation extends more than one hundred feet from the stream's edge. Forest trees shade most of the stream from sunlight at mid-day.

The riparian zone surrounding Chickies Creek is underlain with Watchung extremely stony loam (map symbols WbB). The soil contains major hydric components. This soil is nearly level, deep and poorly drained. The water table is high. Large stones cover 15 to 50 percent of the surface area.

Several small spring seeps originate on the north side of [Mgmt. Unit #2](#) along Route 117. The surrounding overstory vegetation is dominated by tulip-poplar, beech, black birch, and black oak. Water quality is excellent as indicated by the crystal-clear spring flow. This vegetation extends more than 100 feet from the springs' edge. Aquatic life is mostly limited to invertebrates due to the size and origination points of these springs.

Other springs similar to those discussed above originate elsewhere on the property. They share similar characteristics to those described above. Management activities should include provisions to substantially limit or totally exclude overstory removal from all riparian corridors. Equipment should not enter within 100 feet of the riparian corridor. Trails should be located outside the riparian corridors whenever possible.

FISH, WILDLIFE and BIODIVERSITY

Fish & Wildlife

The creation of complex habitat structures including species diversity and vertical structure is highly desirable at Gov Dick. Cerulean Warbler habitat requirements appear to be in line with the desired composition and structure of several management units in this plan. Contact the local Cerulean Warbler biologist to find out more about habitat requirements and determine the suitability for Gov Dick Park to host a demonstration site for this species. Below is a publication outlining the requirements of this species.

Forest Management Recommendations

Foresters can use silviculture to develop stands that are favorable for Cerulean Warblers while consistent with sustainable forest management goals of promoting oak regeneration. Recommendations include:

- Harvest in forested regions with greater than 70 percent forest cover at the six mile scale and in Cerulean Warbler focal areas.
- Shelterwood harvests with RBA levels of 40-90ft² (50-60ft² optimal) per acre of dominant/co-dominant crown classes generally result in increased Cerulean Warbler density and intermediate levels of nest success (Figure 1). Complete overstory removal during the final stage of a shelterwood harvest will reduce numbers of mature forest bird species. Retain residual canopy until adjacent habitat has been enhanced with shelterwood or other harvest types and colonized by Cerulean Warblers.
- Where feasible, favor white oak, chestnut oak, hickories, sugar maple, and cucumber magnolia (preferred nest and forage trees) in the residual stand and do not retain red maple or oak of the red oak group. Retain the largest diameter individuals of the preferred species as residual trees. Retain some grape vines when possible, as they provide nest material and additional cover from predators.
- Creation canopy openings using crown thinning or shelterwood seed cut methods to provide favorable canopy structure.
- Plan a series of adjacent shelterwood cuts so that Cerulean Warbler habitat is available nearby when one stand is ready for an overstory removal. Presence of favorable regeneration conditions in each stand should drive timing of treatments for that stand. Maintaining white and chestnut oak dominance in the residual stand is a primary consideration; presence of sufficient advance regeneration of white and chestnut oaks are important considerations in management. Presence of Cerulean Warblers should drive timing and location of treatments on the landscape.
- Presence of dense understory vegetation is beneficial to Cerulean Warblers; understory condition should be considered during pre-harvest inventories, especially in areas of high deer density.
- Modified even-age regeneration that leave some large-diameter residual stems (10-30 sq ft/acre of dominate/co-dominate crown classes) in a harvest unit may in time lead to the development of multi-aged stands (Figure 2) favored by Cerulean Warblers. Such stands achieve more complex canopy structure earlier in their development than similar single-aged stands and will provide productive habitat for Golden-winged Warblers in areas where the two species overlap.
- Crop-tree release can accelerate development of crop-trees on higher quality sites. The practice is typically applied in 15 to 20 year-old stands. It can allow for earlier canopy differentiation by accelerating growth of dominant stems.



Figure 1: Shelterwood harvest (4 yrs post harvest) with approximately 45 sq. feet RBA; Jim Sheehan.



Figure 2: Modified even-age regeneration stand with approximately 20 sq. feet RBA; Than Boves.

Associated Species

Other species will benefit from habitat management for Cerulean Warblers. Heavy (20-30 sq. ft. RBA of dominate/co-dominate crown classes) and medium intensity harvests (50-60 sq. ft. RBA of dominate/co-dominate crown classes) increased abundance and diversity of shrub-nesting species including Hooded Warbler, Indigo Bunting, Yellow-breasted Chat, Kentucky Warbler, and Eastern Towhee. Certain canopy-nesting species such as Bluegray Gnatcatcher generally increased in abundance at medium levels of canopy removal. Such harvesting can enhance habitat for Golden-winged Warblers, Chestnut-sided Warblers, Field Sparrow, and many species of forest-dwelling bats.

For More Information

Cerulean Warbler Management Guidelines for Enhancing Breeding Habitat in Appalachian Hardwood Forests, www.amjv.org

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State and Federal threatened or endangered species -plants or animals-PNDI Search Conducted and Results *This section to be updated pending final approval of draft.*

The Pennsylvania Natural Heritage Program (PNHP) is a partnership between The Department of Conservation and Natural Resources, The Nature Conservancy, and The Western Pennsylvania Conservancy. It conducts inventories and collects data regarding Pennsylvania's native biological diversity. The information is stored in an integrated data management system consisting of maps, manuals, and computer files, and is known as the Pennsylvania Natural Diversity Inventory (PNDI). "Biota of Special Concern" in Pennsylvania are those classified as Endangered, Threatened, or Rare as listed by the Department of Conservation and Natural Resources, PA Game Commission, PA Fish and Boat Commission, U.S. Fish and Wildlife Service and species recommended by the PA Biological Survey.¹

An Internet database search of the PNDI conducted by PA State Service Forester Paul Troutman on September 12, 2003 found the following potential conflicts that may impact the natural resource recommendations described in this plan:

- 2 potential conflicts with ecological resources of special concern reported by the PA Fish and Boat Commission;
- 2 potential conflicts with the Federally Listed Species of Special Concern of the U.S. Fish and Wildlife Service; and
- 5 potential plant conflicts reported by the Department of Conservation and Natural Resources, Bureau of Forestry:
 - a. *Dryopteris clintoniana* – Clinton's Wood Fern. Found in wet, swampy woods in shade or sun. Classifications: N, PT.
 - b. *Magnolia virginiana* – Sweet Bay Magnolia. Grows in swampy places and along streams. A large shrub to mid-sized tree. Classifications: PT & PT.
 - c. *Poa paludigena* – Bog Bluegrass. Classifications: PT, PR.
 - d. *Scutellaria serrata* – Showy skullcap. Grows in somewhat dry but rich open woods, thickets, and clearings. Classifications: PX, PE.
 - e. *Trillium cerium* – Nodding Trillium. Grows in rich moist woods and swamps, blooming between April and June. Classifications: N, TU.

Pennsylvania Native Plant Status Codes and Definitions:

PE Pennsylvania Endangered - Plant species which are in danger of extinction throughout most of their natural range within this Commonwealth, if critical habitat is not maintained or if the species is greatly exploited by man. This classification shall also include any populations of plant species that have been classified as Pennsylvania Extirpated, but which subsequently are found to exist in this Commonwealth.

PT Pennsylvania Threatened - Plant species which may become endangered throughout most or all of their natural range within this Commonwealth, if critical habitat is not

¹ The PNHP website homepage at <http://www.dcnr.state.pa.us/forestry/pndi/index.aspx>

maintained to prevent their future decline, or if the species is greatly exploited by man.

PR Pennsylvania Rare - Plant species that are uncommon within this Commonwealth. All species of the native wild plants classified as Disjunct, Endemic, Limit of Range and Restricted are included within the Pennsylvania Rare classification.

Disjunct: Significantly separated from their main area of distribution

Endemic: Confined to a specialized habitat.

Limit of Range: At or near the periphery of their natural distribution

Restricted: Found in specialized habitats or habitats infrequent in Pennsylvania.

PX Pennsylvania Extirpated - Plant species believed by the Department to be extinct within this Commonwealth. These plants may or may not be in existence outside the Commonwealth.

PV Pennsylvania Vulnerable - Plant species which are in danger of population decline within Commonwealth because of their beauty, economic value, use as a cultivar, or other factors which indicate that persons may seek to remove these species from their native habitats.

TU Tentatively Undetermined - A classification of plant species which are believed to be in danger of population decline, but which cannot presently be included within another classification due to taxonomic uncertainties, limited evidence within historical records, or insufficient data.

N No current legal status exists, but is under review for future listing.

Prior to implementing many of the projects recommended in this plan, specific information, including the PNDI search results, must be forwarded to certain government officials. Follow the procedures detailed in [Appendix ___](#). Allow 30 days for completion of the project review request.

MANAGEMENT OF FOREST RESOURCES

Protection from Pests

Deer: Hunting is not permitted at Gov Dick and cannot be permitted due to legal restrictions imposed by Clarence Schock's original trust documents. The lack of hunting coupled with hunting pressures from neighboring State Game Lands and protectionism from adjacent communities has created an unusually large deer herd to persist on the property. Excessive deer populations and the accompanying severity of browsing have caused native flora to be drastically altered. The natural regenerative capabilities of the forest have been suppressed for many decades. Native plant communities can no longer restore themselves to a natural balance when under sustained influence of excessive deer browsing. Desirable tree regeneration is virtually absent from this property even though stocking levels favor seedling establishment in several stands. Attempts to regenerate the forest to oaks, poplar, sugar maple or other high-risk trees (i.e., tree species favored by deer for food) should be protected by deer enclosure fencing or individual tree shelters.

Invasive Plants: Even more troublesome perhaps is the introduction of exotic invasive (non-native) flora and fauna. Once inoculated into the woodland environment invasives proliferate. Ailanthus, mile-a-minute weed, garlic mustard, Japanese stiltgrass and Japanese barberry appear to be the most troublesome invasive species at this time.

Low shade and Interfering understory vegetation: In recent years, opportunistic native plant “invaders” such as spicebush, black birch and pawpaw (three species not favored as browse by deer) have expanded dramatically throughout Gov. Dick. Spicebush is present in moderate to heavy quantities over more than 70% of the total forestland area. Black birch, ranging in size from saplings (10 to 30 feet tall) to poletimber (4 to 11 inch dbh) is also present in substantial quantities throughout many areas of the property and especially in [Mgmt. Unit #2](#). More desirable species such as oaks, poplar, and white pine have little chance to germinate and grow due to the “low shade” created by these mid-story trees. Ground covers including spicebush, pawpaw, hayscented fern and stiltgrass have the ability to expand quickly after a disturbance that increases light on the forest floor. Regeneration efforts (even within deer exclosure fences) will likely result in an understory dominated by spicebush and black birch unless these species are removed from the site prior to harvest. Therefore, herbicide applications should be performed on all sites where a regeneration harvest is planned AND where significant quantities (i.e. greater than 30% ground cover) of interfering understory vegetation exist.

Invasive plants: Most invasive plants are found within 50 feet of an existing roads and trails. Few species of invasive plants (except those species with windborne seed) were found further than 400 feet from an existing trail (Japanese barberry is a notable exception). Therefore, it is likely that the primary mode of introduction into the interior of Gov. Dick is via the trail system. Horses, bikes, and foot traffic (to a lesser extent) are probable vectors for many species of invasive plants. Seeds are picked-up, carried to, and subsequently deposited along the trails of Gov. Dick. Exposed “bare-mineral-soil” and increased (if not abundant) levels of sunlight are often needed to germinate the seed. Once established, invasives tend to spread rapidly throughout the surrounding area. Many invasive plants are capable of overrunning and displacing native plant community’s entirely. Continual public utilization of the trail system, natural seed dissemination via migratory avian and mammalian populations, and windborne seed from nearby invasive plant populations are likely to prevent invasives from being totally eradicated at Gov. Dick. Therefore, diligently suppress invasive plant populations when conditions warrant their attention. The establishment of a healthier, more resilient forest ecosystem will greatly minimize the damaging effects of invasive plants.

Insects: Several hemlock trees were observed on the property and most were dead or nearly dead as a result of past hemlock woolly adelgid infestations. The few remnant Eastern hemlock trees are not likely to persist much longer. For more information on hemlock woolly adelgid go to the website www.fs.fed.us/na/morgantown/fhp/hwa/hwasite.html.

The property currently has no other forest insect or disease problems except for the **Emerald Ash Borer**. However, outbreaks of fall cankerworm recently occurred within twenty miles of this property, and gypsy moths infested the property 10 or more years ago. Therefore it is recommended that gypsy moth populations be monitored yearly. If a gypsy moth outbreak or other insect attack is suspected, contact your local service forester for further advice. Currently,

other than the **Emerald Ash Borer**, insect pests appear to have no significant impact on proposed management activities for Gov. Dick.

Reforestation and Afforestation

The majority of stands are now mature. Efforts to establish natural regeneration are prudent at this time and will require deer exclosure fencing for protection. Fenced areas should be planted with tree species that are absent, scarce or otherwise deemed desirable for their ability to enrich forest stand biodiversity. The introduction of shade tolerant species such as sugar maple, basswood, beech and white spruce are particularly desirable. Conifers including white pine and white spruce should be introduced anytime tree plantings are performed. All forest regeneration projects should specifically address the factors that limit desirable regeneration. Specifically, each regeneration harvest should address competing plants, deer and light... also known under the acronym “CDL”: The “Penn State Forest Science Fact Sheets: Regenerating Hardwood Forests Managing Competing Plants, Deer, and Light” is included below to explain this concept and stress its importance for all forest regeneration activities at Gov. Dick.

Forest Management Plan Implementation Constraints

Equipment limitations are severe in **Mgmt. Unit #5** due to boulder fields and extensive surface rock.

FOREST SCIENCE FACT SHEET SERIES

Regenerating Hardwood Forests: Managing Competing Plants, Deer, and Light

Forest regeneration, or regrowth, requires sufficient numbers of desirable tree seedlings to replace today's forest following harvest. Under many circumstances, regeneration is not easy. Competing plants, deer, and insufficient light on the forest floor can interfere with regeneration and, in the long run, may threaten forest sustainability.

In this fact sheet we look at how an understanding of competing plants, deer, and light can lead to successful forest regeneration and the sustainability of hardwood forests. It is our hope that, after reading this fact sheet, you will view your forest management role in a new way. We hope you will use these key concepts to ensure a future for your forest.

How Do We Benefit from a Healthy Forest?

We all benefit from a healthy, productive, viable forest. To name a few of the benefits, forests:

- Clean our air by using carbon dioxide and providing oxygen
- Protect and filter our water supplies
- Provide a home for countless plants and animals
- Make up a vital part of the economy
- Provide a major source of employment
- Supply the key ingredients for more than 5,000 products

Forests Are a Precious Natural Resource

We depend on forests for the quality of life we enjoy. We use them to sustain life as we know it. Wisdom tells us that future

SUSTAINABLE FORESTRY

is defined as managing our forest resources to meet the needs of the present without compromising the ability of future generations to meet their own needs.



Howard Nuenberger

As forests mature and people begin to conduct harvests, potential regeneration problems need to be identified. This mature forest clearly lacks regeneration.

generations, your children and theirs, will also use forests for these same benefits. The science of forestry was developed to "sustain" our forests.

Currently, with a maturing forest and increased harvest levels, "sustainable forestry" has become a necessary label. While many claim to practice forestry, only about half do so in a sustainable manner. The problem lies not in forest science but in its rampant misuse in name and practice.

How Are We Doing?

A comprehensive study in 1995 examined 85 randomly selected timber harvest sites in Pennsylvania. The study sought to determine whether or not our current harvesting practices are affecting timber sustainability. *It found that 47 percent of the harvests were unsustainable.*

PENNSTATE



Cooperative Extension
College of Agricultural Sciences

extension.psu.edu

What was wrong with these timber harvests? The concerns most often identified were:

- Failure to retain quality trees of desirable species
- Failure to establish adequate regeneration
- Failure to remove sufficient overstory to foster existing regeneration development
- Failure to control competing plants

Three of these concerns deal with problems in *regenerating* (or regrowing) our forests; harvests are occurring without adequate plans for tree replacement. Sustainable forestry requires that we focus on growing new trees, but we cannot practice sustainable forestry if we do not regenerate a healthy, young forest for future generations.

Recent U.S. Forest Service data from Pennsylvania's statewide forest inventory (2009) document regeneration problems. In forest stands where light conditions are adequate for regeneration development, just over 50 percent have adequate seedlings and saplings to regenerate the forest. This finding includes all tree species capable of growing into the forest canopy. When only commercially desirable species are considered, only 40 percent of these forest stands have adequate regeneration to replace the existing forest.

Many times, forest owners believe that by harvesting forests "selectively" they are addressing regeneration issues. This is not the case. The remaining trees often create too much shade, are of too low a quality, or are a less desirable species to warrant having been left for future harvests. Regenerating a forest is a process, not an event. That is, harvesting does not always lead to successful regeneration—it takes planning, care, and investment to ensure an adequately stocked forest for the future.

What Can You Do?

The challenge for each landowner is to continue using our forest resources without jeopardizing resource health or future. Landowners, loggers, and foresters all play key roles in achieving a successful timber harvest outcome. Each group has equal responsibility for creating healthy forests in the future.

For decades it has been obvious that there have been difficulties in achieving successful regeneration of fully stocked stands across Pennsylvania.

—Dr. James Finley, Penn State



David Jackson

This area has severe interfering fern cover. Desirable regeneration is not likely to develop until the ferns are controlled.

Combating the Regeneration Issue

Most regeneration of hardwood forests occurs naturally—that is, without planting trees—but many factors can affect forest regeneration. To regenerate naturally, the current forest must produce seedlings, stump sprouts, and root suckers that will become the next forest following a harvest or natural disturbance. The right conditions are necessary for forests to regenerate naturally. Unfortunately, the "right conditions" often are not met.

In this section we will look at three factors affecting forest regeneration and introduce practices to help make timber harvests sustainable. The three factors are *competing vegetation*, *deer impact*, and *light on the forest floor*. We abbreviate this "C-D-L." Following the practices outlined by this simple acronym will encourage healthy, new forests following timber harvests.

Competing Vegetation

Competing vegetation consists of plants that interfere with the germination and growth of desirable seedlings by casting dense shade across the forest floor. Some competing plants also provide cover for small mammals that feed on tree seeds and seedlings.

Several factors favor the development of competing vegetation. Many interfering plants tolerate shady understory conditions and are not typically browsed by deer. Some, such as Japanese barberry, are also *invasive*, meaning they spread rapidly and suppress native plant communities. Competing plants are similar to weeds in your garden—they interfere with the establishment and growth of your future crop. Undesirable trees and plants can take over a forest just as weeds can take over a garden.

The most common competing plants found in Pennsylvania include hayscented and New York ferns, some grasses, striped maple, American beech, mountain laurel, ironwood, and spicebush. Many other plants can also interfere with seedling growth and development. Only so much space, water, nutrient material, and sunlight are available for plant growth. Whether you are growing corn, grass, or trees, you must make choices about resource use.

The predominant challenge for sustainable forestry in Pennsylvania is prompt reforestation with desirable species.

— Dr. Susan Stout, USDA Forest Service



Mike Eskley

Hand application of herbicides is appropriate for small areas or when treating individual invasive or competing plants.



Howard Nuemberger

When competing plants cover extensive areas, herbicide treatments using track-mounted mist blowers are effective. Make applications prior to harvesting timber.

Competing vegetation can inhibit diverse and valuable forest regeneration as well as the establishment of desirable nonwoody plants, such as native wildflowers, forbs, and herbs. If competing plants are present and left untreated in an area you propose to harvest, they may become your next crop. Timber harvesting will increase light on the forest floor and magnify problems caused by competing plants. It is not uncommon in Pennsylvania to see forest understories covered with competing plants.

Often, successful forest regeneration depends on controlling competing vegetation. Extensive research and testing have provided low-risk and effective herbicide recommendations or "pre-

scriptions" for controlling most competing vegetation. Public and private forestry organizations across the state have experience with herbicide use for this purpose. Consult them for detailed prescriptions for dealing with your specific competing vegetation problem. For additional resources, visit the Penn State Extension Forest Vegetation Management website at fvm.cas.psu.edu.

If you are reluctant to use herbicides, mechanical control of competing vegetation works in some cases. Typically, mechanical methods such as cutting or pulling are not as effective as herbicides and are ineffective at controlling nonwoody plants like fern and grass. Mechanical removal generally involves having the harvesting operator break off or cut competing seedlings and saplings. With this method, the competing plants will likely resprout; however, they may no longer have a height advantage over desirable seedlings.

To sustain our forests, competing vegetation problems need to be recognized and treated before harvesting timber. Dealing with competing vegetation before harvest is important because after harvest:

- Logging slash can impede access
- Increased light will cause competing plants to flourish
- Desirable species may be more easily harmed by herbicide treatments
- Costs for controlling competing plants are typically higher

Deer Impact

Through selective feeding, deer have the ability to broadly affect forest plant communities. Specifically, they can reduce tree seedling numbers, seed availability, species composition, and seedling height. They can also affect herbaceous plant composition as they browse on some species and ignore others.

In many areas, deer have reduced seedling numbers, shifted tree species composition to less desirable species, and slowed the growth of surviving seedlings. Research has shown that when the deer population density exceeds what the land can support, forest regeneration suffers. In regions of the state where decades of overbrowsing have severely depleted the habitat, even relatively few deer can have significant effects.

In many parts of Pennsylvania, deer numbers have adversely affected habitat. In fact, many state residents have never seen a healthy forest understory unaffected by deer. Habitat repeatedly damaged by overbrowsing continues to decline, losing its ability to support additional deer. In many areas, poor habitat conditions limit deer numbers more than hunting does. The only way to increase the number of deer land can support is to temporarily reduce deer numbers still further and allow the habitat to recover. When the habitat improves, deer managers can gradually allow deer numbers to increase until a balance is reached between desired habitat conditions and deer populations.

Deer have taste preferences; some plants are highly preferred while others are hardly touched. By selectively browsing

Attempting to raise more deer than the land can support has been the greatest mistake in the history of wildlife management in Pennsylvania.

—Dr. Gary Alt, Pennsylvania Game Commission (retired)

preferred species, deer have the ability to completely change the species found in forest understories. Selective browsing can greatly reduce or eliminate preferred species or those not resilient to browsing and favors less preferred, more resilient species. Deer food preferences vary by region and season, but, in general, deer prefer oak, maple, ash, and yellow poplar over species such as beech, birch, and cherry. Deer, on average, consume 4 to 8 pounds of browse per day for seven months of the year. Clearly, the state's deer herd has a tremendous potential to influence what grows (or doesn't grow) in the forest.

Landowners can use several indicators to assess whether deer impact in their forest is high or low. Indicators of high deer impact include severely browsed or hedged seedlings, obvious browse lines, and forest floors dominated by species that deer do not prefer or species that are resilient to browsing. Deer do not readily eat ferns, striped maple, beech, ironwood, mountain laurel, blueberry, or spicebush.

There is strong evidence that the expansion of understory fern in forests across Pennsylvania results from deer overbrowsing, which removes plants that would normally compete with ferns. Forests with a dense fern carpet are the result of high deer impact over many years. Research has shown that fern density increases as deer impact increases. Unfortunately, after fern cover dominates the understory, the forest's ability to support deer declines. A severely damaged forest may appear to have no deer at all. Likely, a few deer will continue to suppress desirable tree species. The cycle of browsing and poor habitat is difficult to break.

If you recognize that deer impact on your forest is high, you should take steps to reduce populations even if a timber harvest is not planned for the immediate future. Consider harvesting additional antlerless deer. The Pennsylvania Game Commission's Deer Management Assistance Program (DMAP) helps landowners meet their forest management goals. DMAP allows hunters to harvest additional antlerless deer from a property during the regular hunting seasons.

Although hunting is by far the most practical means of reducing deer impact, other tools include fencing, seedling protectors, and deer repellents. Areas with low deer impact will support healthy, diverse understories, preparing the forest for future replacement following planned timber harvests or natural disturbances.



Gary Alt

Forest regeneration inside versus outside a fence. Research demonstrates that high deer impact inhibits forest regeneration.



David Jackson

Note the "browse line," where deer have eaten the preferred palatable vegetation from ground level to a height of 5 feet. Browse lines are an indication of high deer impact.

In 85 percent of the problem areas, simply excluding deer made the difference.

—Dr. David Marquis, USDA Forest Service (retired)

Light on the Forest Floor

The amount of sunlight reaching the forest floor plays a key role in determining which tree seedling species will germinate and grow. Tree species have different requirements for sunlight, a factor referred to as *shade tolerance*. Shade tolerance describes the light level at which a species is best able to germinate and grow. Foresters generally separate trees into three shade-tolerance classes: intolerant, intermediate, and tolerant.

Examining the shade-tolerance classes of three valuable timber species, we find they fall into three different shade-tolerance classes: black cherry, intolerant; northern red oak, intermediate; and sugar maple, tolerant (see Table 1). Understanding the shade-tolerance characteristics of desirable species forms the basis for developing harvest prescriptions.

Table 1. Shade tolerance for common Pennsylvania trees.

SPECIES	SHADE TOLERANCE
Black cherry	Intolerant
White ash	Intolerant
Hickory	Intolerant
Yellow poplar	Intolerant
Northern red oak	Intermediate
White oak	Intermediate
Basswood	Tolerant
Red maple	Tolerant
Sugar maple	Very tolerant
American beech	Very tolerant

For example, if a forest is managed for shade intolerant and intermediates such as yellow poplar, white ash, black cherry, and oak, you have to increase the amount of light across the forest floor to stimulate seed germination and seedling growth. Harvesting activities *must* consider shade tolerances of the species for which you are managing.

Foresters have developed harvesting systems that create openings to mimic natural disturbances. These systems regenerate diverse, healthy forests. Harvesting systems used in Pennsylvania to create light conditions for shade-intolerant and intermediate species include group selection, shelterwood, and clearcutting.

Group selection cuts create small openings across a forest with the intent of establishing regeneration in each opening. This method harvests all trees larger than 2 inches in diameter in groups ranging in size from 1 to 4 acres scattered across a property. Openings less than one acre will not provide adequate sunlight for shade-intolerant tree species. By scheduling group selection harvests at 10- to 20-year intervals, landowners can produce periodic income and encourage habitat diversity. This harvesting system is desirable for aesthetic reasons since it retains areas of large, mature trees and the openings created are relatively small. The harvested groups are large enough to encourage the regeneration of shade-intolerant tree species in the center and more shade-tolerant tree species along the edges.

Shelterwood cuts occur in two stages. The first stage leaves a prescribed number of desirable trees per acre to drop seed and provide conditions (partial shade, cooler temperatures, and higher moisture) conducive for seedling development. The residual trees provide an environment best suited for intolerant and intermediate tree seedling growth and development. Once regeneration is well established, the remaining overstory trees are harvested and the new forest grows in full sunlight. The timing of the final harvest is critical. The regeneration should be tall enough (greater than 5 feet) to be above the deer's reach but not so large (greater than 10 feet) as to be significantly damaged during final harvest when remaining overstory trees are removed.

Clearcutting should be practiced only where adequate forest regeneration is already present on the forest floor. This is called advanced regeneration. The next forest is already in place and simply needs more light. In areas with high deer impact, adequate advanced regeneration is difficult to achieve. It is often necessary to have at least one desirable seedling per square foot (40,000 desirable seedlings per acre or more).

What Are the Costs?

Managing C-D-L certainly involves investments of thought, money, and time. However, it is necessary to *address all three components* when planning a sustainable harvest. In most cases, failing to make the necessary investment for managing the interactions of competing vegetation, deer, and light will lead to inadequate desirable regeneration after a timber harvest. Regeneration failures on a large scale would devastate our forests and threaten many of the benefits we depend on every day.

When we discuss the costs of C-D-L and other efforts that help sustain our forests, we have to consider the costs of not using sustainable methods. Treating competing vegetation, managing deer impacts, and meticulously controlling light can be costly, but how does that compare to the degradation or loss of our forests' vitality?

If you control competing vegetation, reduce deer impacts, and take into consideration the light requirements of the species you are trying to regenerate, you will be successful in establishing and sustaining new forests.

—Mr. David Jackson, Penn State Extension

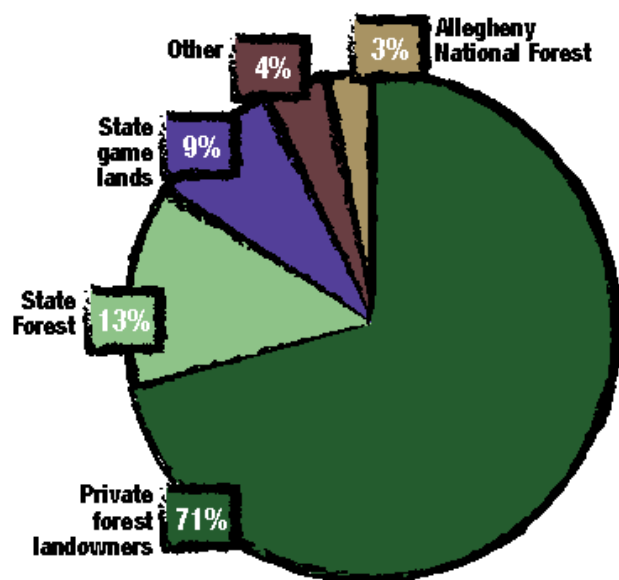
Putting It into Practice

C-D-L practices have become central to managing our public forests. Deer exclosures are common in state and national forests as well as state game lands. Herbicide treatments, clearcuts, shelterwoods, and other forest management practices that address C-D-L are also common. Unfortunately, the sustainable forest management practices used by public agencies are not occurring in many private forests. This is cause for concern.

Pennsylvania has vast forest resources—17 million acres. The amount of public forestland is actually small compared to the amount of forestland owned by private citizens (see Figure 1). Every day, private forest landowners make decisions that affect future forest values. Critical among these decisions is the need to ensure that we are regenerating hardwood forests. The 1995 Pennsylvania study revealing that 47 percent of private forest harvests are not sustainable is a benchmark for the future. If forest owners manage forest resources to meet today's needs without compromising the needs of future generations, all harvest sites will be sustainable. In this way, we will:

- Retain quality trees of desirable species
- Establish adequate regeneration
- Remove sufficient overstory to foster existing regeneration development

Figure 1. Pennsylvania forestland ownership chart.



Source: DCNR Bureau of Forestry



David Jackson

A sustainably managed forest. The competing vegetation on this site was treated with an herbicide before harvest. Immediately following harvest, the deer fence was erected. This shelterwood harvest left a good seed source and allowed the proper amount of light to reach the forest floor. Within a few years, a healthy, new forest will regenerate on this site and a subsequent harvest will remove the overstory trees.

Because of our dependence on forest products for the quality of life we enjoy, we will continue to use our forests and harvesting in Pennsylvania's private forests will likely continue. It is vital that every timber harvest proceed with the advice of a professional forester and be part of an overall forest management plan. The plan will provide custom guidelines to follow, guidelines that will certainly address C-D-L and other sustainable forestry considerations. Remember to plan! Remember to invest! Remember C-D-L. *Regenerate hardwood forests.*

Prepared by David R. Jackson, extension educator; Michael T. Wolf, former associate extension educator; and James Finley, professor of forest resources.

The authors wish to thank Joseph A. Harding, director, Penn State Forest Lands, for developing the "easy-to-remember" C-D-L acronym, sharing his insight into the C-D-L system of forest regeneration, and providing editorial comments; and Susan L. Stout, research project leader, Warren Forest Sciences Laboratory, USDA Forest Service, for research efforts and editorial comments.



An OUTREACH program of the College of Agricultural Sciences

Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

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STAND LEVEL INFORMATION

Management Unit Number 1

Name: *Roads and Trails*

Acres: 184

Objective:

The existing trail system is the “life-blood” of all activities at Gov. Dick. All public use activities require at least some use of the trails. In fact, the vast majority of all activities; hiking, biking, horseback-riding, and nature studies are accomplished via use of the trails or within 100 feet of the existing trail surfaces. There are obvious exceptions to this statement but the fact remains that the vast majority of all impact (arguably all of which are negative) placed upon the environment by visitor of the park is through the trail system. Therefore, it is imperative that management strategies are *pro-active rather than reactive* to potential environmental problems caused by the public's use of the trail system.

Summary of Inventory:

The acreage included in Management Unit #1 is defined as the cumulative area contained within a 100 ft wide corridor that lies along all “routes of travel” at Gov. Dick. This land area is not in addition to the acreage found in other management units but rather a portion of each of the other management units. An extensive network of roads and trails make up about 15.2 miles or 184 acres of transportation corridors through Gov. Dick.

Approximately 23 acres of ground surface area is comprised of roads (4.0 miles) and trails (10.6 miles) which together account for less than 2% of the total acreage of the property. Most of the roads are surfaced with crushed stone; the trails are unimproved and constructed only of native soil material. Dirt trails average 6 to 12 feet in width (i.e. cleared vegetation width) and cover approximately 12.9 acres of land. Gravel and paved roads average 15 to 25 feet in width and cover approximately 10.1 acres of land. The trail system at Gov. Dick can be accessed via 14 (approx.) points of entry.

The regionally known Horseshoe Trail traverses the property in an east-west direction. The trail follows or parallels much of the ridgeline inclusive of Gov. Dick Hill. This trail provides a continuous recreational corridor that extends across a multitude of land use types in southeastern Pennsylvania.

Management Recommendations:

Summary of Management Activities

- Systematically reduce invasive plant population by mechanical and/or chemical control methods.
- Implement cultural controls primarily by replacing invasive plants with desirable grasses (as temporary cover), and introducing shade tolerant trees and shrubs.

- Begin planning for the eventual replacement of trees over 34" DBH (or other large trees "soon-to-be-lost") by underplanting 10-15 shade tolerant trees and protecting with deer fencing. Remove invasive plants and interfering understory vegetation as necessary to assure successful replacement of the overstory tree.
- Maintain erosion control structures throughout the trail system. Install new erosion control structures as needed to minimize trail degradation.
- Remove trees that reside on or within 10 feet of the traveled surface of all trails.
- Remove trees 38" DBH or over if "replacement" trees are established prior to removal.
- Establish a demonstration site near the Schock Tower House Foundation Site based on Gov Dicks' historical participation in the charcoal production industry.

Details of Management Activities

- 1.) **Trail Corridor Management:** Improve aesthetic and reduce vectoring of invasive plants into interior woodland environments by protecting, reserving, and improving a 100 foot wide transportation corridor along all trails.\
- 2.) **Parking Facilities:** Parking facilities are generally *inadequate* relative to the volume of users in all areas except the newly established **Environmental Center** located off Pinch Road. Improved parking facilities should be considered for additional parking facilities on Route 117 and Route 72.
- 3.) **Vistas:** Several scenic overlooks can be created to increase the enjoyment and appreciation felt by hikers, mountain bikers, and horseback riders. Numerous rock outcrops along the ridgeline of Gov. Dick Hill and several lesser "benches" at lower elevations provide ample opportunities to overlook the woodlands below. Several possible vista locations have been marked on the map. Most vista locations are intended to overlook interior woodland environments and not to overview the countryside. Therefore, do not clear trees from the vista. Encourage vista use by constructing short "spur" trails to their location from nearby existing trails. Name each vista location and post at appropriate spur intersection. Visitor familiarity is enhanced when place names can be referenced to locations they visited at Gov. Dick.
- 4.) **Environmental Corridor:** Encourage use of the new **Environmental Center** by constructing a paved and stoned roadway (similar to the **Environmental Center** access road) that leads from the **Environmental Center** to main road leading to the Observation Tower. This section of road should provide many points of interest and act as an Environmental "porthole" into the various physical, ecological, geological and cultural interest points available at Gov. Dick. Various displays of can be created and presented in a natural, aesthetically pleasing arrangement along this "information corridor". Semi-private park bench arrangements (casual circular arrangements) can be created on short spur trails adjacent to the information corridor. These semi-private meeting places will encourage small groups of people to enter into discussions of leisure or educational content. Environmental games can be designed to encourage thought through competition. The possibilities of invoking meaningful

thought along this education corridor are endless.

- 5.) **Public Education along Roads and Trails:** [Mgmt. Unit #1](#) has a high potential to influence and educate the public. Something as simple as labeling a large black oak allows for the identification of a tree species. This is a simple yet fundamental step that begins the process of environmental education. Expand on this concept to provide opportunities for the public to learn, enjoy, and become environmentally aware of our natural resources.
 - a. Encourage public participation of special interest groups to participate in educational workshops. A volunteer task force can be charged with the responsibility to identify naturally occurring points-of-interest, design suitable educational “displays” and construct said display at appropriate points along the trail system. Do not however, proliferate, over stimulate or otherwise “clutter” the natural surrounding with “things” that are unappealing. Upon first glance at such a ‘display” intrigue and genuine interest should be invoked. Employ local chapters of amateur and professional “nature” groups in the development of historic, cultural, geological, or physical points of interest. The Audubon Society, American Chestnut Foundation, Wild Turkey Federation, Boy Scouts of America, et.al would be good candidates for such a task.
 - b. Establish a demonstration site near the Schock Tower House Foundation Site based on Gov Dicks’ historical participation in the charcoal production industry. A pre-existing charcoal hearth site can be found very near the foundation of this noted landmark. Contact Gary Gilmore, PA DCNR Woodland Stewardship Coordinator to ask for assistance in this endeavor (contact info is on title pages of this document). Mr. Gilmore is an expert on this subject matter and has expressed interest in assisting with this endeavor.
 - c. Other themes may include rock outcrops and their geologic origin, small gauge rail lines and their significance, or a timber harvest site that offers a pictorial timeline depicting successional stages of forest development (to be added to indefinitely).
- 6.) **Invasive Plant Mitigation along Roads and Trails:** Most invasive plants are found within 100 feet of an existing trail. Few species of invasive plants were found further than 400 feet from an existing trail (ailanthus and Japanese barberry are a notable exceptions). Therefore, it is likely that the primary mode of introduction into the interior of Gov. Dick is via the trail system. Horses, bikes, and foot traffic (to a lesser extent) are probable vectors for many species of invasive plants. Seeds are picked-up, carried to, and subsequently deposited along the trails of Gov. Dick. Continual public utilization of the trail system, natural seed dissemination via migratory avian and mammalian populations, and windborne seed from nearby invasive plant populations are likely to prevent invasives from ever being totally eradicated at Gov. Dick. Therefore, diligently suppress Invasive plant population when management practices warrant their attention. The establishment of a healthier, more resilient forest ecosystem will go far to suppress the damaging effects of invasive plants.
 - a. The key to controlling most invasive plants is to reduce the amount of exposed mineral soil and sunlight found on the forest floor. Desirable herbaceous and

woody understory vegetation, a healthy leaf litter layer and an abundance of woody debris are all factors that we can manage to reduce the amount of exposed soil in the forest.

- b. However, bare mineral soil will always be present on and near the trails so management activities should concentrate on reducing the amount of sunlight that reaches the forest floor and planting temporary “grasses” in troublesome areas that seem to have persistent invasive plant populations. This author has noted that areas that have increased levels of light and have been planted with shade tolerant grasses, seeded and properly limed, fertilized and mulched have been highly successful in precluding invasive plants from becoming re-established at Gov. Dick.
 - c. Maintain a 100 foot wide “minimal-harvest” corridor along all existing roads and trails. Encourage “total-shading” of the forest floor along these corridors to reduce the likelihood that invasive plant will germinate and grow. Plant indigenous shade-tolerant species to encourage uneven-aged management opportunities in future stands. Include sugar maple, red spruce, American beech, white spruce, dogwood, redbud, and serviceberry in those species to be planted. A site fully occupied with desirable vegetation is much less likely to become occupied with invasive plants
- 7.) **Underplant Large Old Trees:** Plan for the eventual loss and subsequent replacement of trees over 34” DBH (or other large “soon-to-be-lost” trees) by underplanting each individual specimen with 10-15 shade tolerant trees. Protect all seedlings with deer fencing. Remove invasive plants and interfering understory vegetation as necessary to assure successful replacement of the overstory tree. Gradually remove all trees within 5 feet of the traveled surface of all primary trails. Remove trees 38” DBH or over if “replacement” trees are established prior to removal. This practice is optional and on an as-needed basis.
- 8.) **Water Control Structures:** Maintain erosion control structures throughout the trail system. Install new erosion control structures as needed to minimize trail degradation due to erosion.
- 9.) **Park Benches along Trails:** Set park benches at various locations along the trail system. Ideally the benches should be set off the trail far enough to allow unobstructed use of the trails and adequate room for bikes and horses to remain off-trail. A hitching rail and/or bike rack will add greatly to the appeal of the site. Clear and maintain only as much space as necessary to accommodate the facilities heretofore mentioned. Locate park benches only where drainage is excellent and the presence of standing water is never at question. Always locate on slightly sloping ground. Locate near intersections of trails whenever possible. Do not overpopulate the trail system with benches; rather locate sparingly within a 10-minute walk of existing parking areas. This strategy will help accommodate the elderly or handicapped individuals by providing resting facilities within a mild walk of their vehicles. Try to incorporate several cultural, geologic, or physical points of interest at each park bench. Even tree identification plaques will peak many people's interest.
- 10.) **Trail Maintenance & Improvement:** The trails at Gov. Dick have extraordinary amounts of traffic from hikers, mountain bikers, and horseback riders. Several

sections of trail channel storm water run-off down their length creating moderate soil erosion problems on sloped areas. Sustained heavy use of these trails without the benefit of proper drainage will result in excess soil erosion. Soil erosion caused by rainwater runoff will further compound the situation through “trenching” of the existing trails. Trenching has already occurred in some places. Trenching greatly accelerates the erosion process thereby degrading the quality and usefulness of the trail section. Trenching cannot easily be corrected in most cases. Therefore, rerouting of the affected trail segments is often required. The abandoned portion of trenched trail must be “healed in” with copious amount of dead woody material to slow water runoff on the affected area. Over an extended period of time, the accumulation of leaf litter and other decaying organic matter will return the affected site to a more stable state where vegetation can begin to grow. Evidence of trenching is readily apparent on many of the steeper slopes that lack appropriate water diversion devices. Drainage structures should be installed and maintained throughout the entire trail system of Gov. Dick. Proper trail location, proper drainage, and proper levels of impact are key factors to the successful maintenance of existing trails. Therefore, install water-bars with turnouts, box culverts or similar devices to divert water run-off from trail surfaces.

- 11.) **Trails for Special or Restricted Use:** All trails at Gov. Dick are not able to sustain heavy-use traffic such as that from horseback-riders and bike traffic. Hydric soils, steep terrain, excessive rockiness, seasonally wet or weeping grounds, spring seeps and riparian area are all valid reasons to designate certain trail segments as low-impact, “Foot Travel Only” areas. Handicapped accessible trails segments may also be defined and improved for this purpose. Consider suitable trail segments that are easily accessible via well established and safe parking areas.
- 12.) **New Fire Lane to East Slope of Gov. Dick Hill:** Build a new section of road from the herbaceous opening located at the old radar site (See Map symbol 12c) down along the eastern slope of Gov. Dick Hill to the western side of the proposed shelterwood and fence site. Further field reconnaissance is needed to determine the exact route of this trail due to large obstructions along or near this proposed route. Build road sufficient for truck traffic, but minimize disturbance to overstory trees. Follow all recommendations found in *Invasive Plant Mitigation along Roads and Trails* (see #6, above). Maximize the amount of shade on this newly established fire road by planting shade-tolerant trees. This road will provide emergency access to the heart of the south-facing slope of Gov. Dick Hill. The road can be constructed during the shelterwood harvest scheduled for. The steepest part of the newly constructed trail road can be partially retired with waterbars and used for emergency purposes only or can be maintained as an improved trail. If the fire road is maintained for trail use it should be classified as “Foot Travel Only” similar to other nearby sections of trail. Follow all other guidelines for trail maintenance as established elsewhere for this management unit.
- 13.) **Encourage Shade-Tolerant Plant Species:** Shade tolerant plant species area elemental to perpetually maintaining aesthetic appeal along the trail corridors at Gov. Dick. Shade tolerant species are able to create and sustain interesting and highly

quality vertical structuring within the forest. Therefore, encourage the establishment of shade-tolerant species along the various portions of the trail system “perpetually” over time. This is an ongoing project that should not end. Proceed as follows: Select opportunistic sites (areas of increased sunlight) along existing trails to plant shade tolerant woody plant. Include both conifer and hardwood species. Include both overstory and understory species that are native and “colorful”. Include species such as red spruce, white spruce, sugar maple, Eastern hophornbeam, American hornbeam, American beech, American holly, basswood, mountain laurel, serviceberry, dogwood and other species of similar shade tolerance. Study their particular soil type requirements and natural plant associations to determine the best species mixes to plant. Remove interfering understory vegetation via herbicides wherever encountered. **See Reference Manual Section G.** Most species will require fencing (plastic mesh or wire mesh) or individual tree shelters to protection from deer browse damage. Plant only short, discrete sections of trail up to 100 feet in length and within 100 feet of the trails edge in this manner. Monitor the progress of the plantings over time to assure that these plantings persist. This is an ongoing project that can be enhanced greatly by forming a “planting committee” to design projects, select appropriate locations and species to plant, and ultimately prepare, plant, and protect the planted sites. Input from the Audubon Society and other interest groups would make the projects more interesting. The key to a successful planting program is not to become overwhelmed with work, but rather to build a legacy “plant-by-plant” that contributes to the greater good of the park.

Management Unit Number 2

Name: *Mature Mixed Oak*

Acres: 225

Forest Type: Mixed Oak

Site Index:..... 67 for Red Oak

Objective:

- Initiate the establishment of oak regeneration - reduce the negative impacts caused by competing vegetation and invasives; high deer population levels, and inadequate light levels that are impeding the development of advance regeneration within the stand.
- Enhance stand biodiversity

Current Description:

Dominant Species: CO, BO, BB, RO

Basal Area: 152 sq.ft.

Stocking: 120%

Dominant and Co-Dominant Trees:

Average Medial Diameter: 16.7"

Class: Large sawtimber

Limiting Factor to Regeneration CDL:

Competing Vegetation: ☒

Deer: ☒

Light: ☒

Invasive Species:

☐ Populations significantly present -- requiring control before increasing light levels on the forest floor.

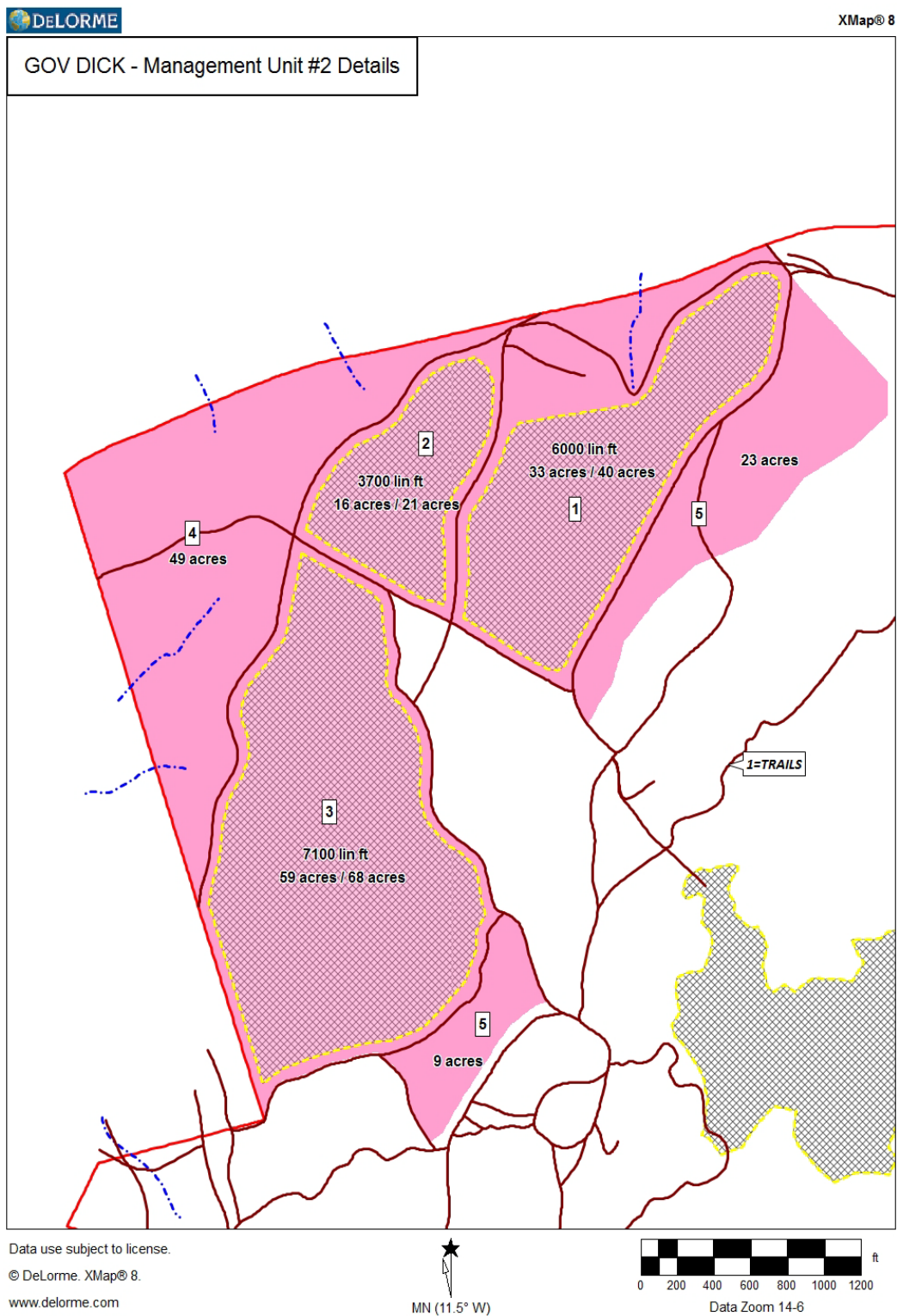
☒ Trace populations in the stand or nearby invasive plant populations exist -- Their presence may indicate that a problematic seed bank exists. Monitor stand closely after any management activity occurs that causes disturbance to soils and/or increases light levels on the forest floor (e.g. timber harvest activities).

☐ Invasive populations are not likely to have significant impact beyond that of native-aggressive vegetation (e.g. fern, spicebush, pawpaw). Control invasives while controlling other interfering understory vegetation.

☐ N/A

Invasive Species Present: Japanese barberry, Japanese stiltgrass, ailanthus, garlic mustard, multiflora rose, and elaeagnus.

Summary of Management Activities:



Stand Prescription Chart

Stand #	Map Location #	Sequence	CDL Component	Practice Description	Acres to treat	Fence Perimeter (lin.ft)	NRCS	
							Practice Code	Scenario #
2	1 and 2	1	L	Low Shade Removal	48		647	6
	1	2	D	Fence	33	6,000	382	50
	1	3	C	Herbicide fern, spicebush, pawpaw, invasives before planting	40		490	5
	1	4		Planting : conifers and shade-tolerant species (200 seedlings/acre)	8			
	1	5	L	Mast Tree Release	33			
	2 and 3	1	L	Low Shade Removal	48		647	6
	2	2	D	Fence	16	3,700	382	50
	2	3	C	Herbicide fern, spicebush, pawpaw, invasives before planting	21		490	5
	2	4		Planting : conifers and shade-tolerant species (200 seedlings/acre)	4			
	2	5	L	Mast Tree Release	16			
	3 and 4	1	L	Low Shade Removal	48		647	6
	3	2	D	Fence	59	7,100	382	50
	3	3	C	Herbicide fern, spicebush, pawpaw, invasives before planting	68		490	5
	3	4		Planting : conifers and shade-tolerant species (200 seedlings/acre)	13			
	3	5	L	Mast Tree Release including group selections around White Pine	59			
	4 and 5	1	L	Low Shade Removal	48		647	6
				Fence - evaluate need for fence one growing season after the				
	4	2	D	completion of pervious fences		?	382	50
	4	3	C	Herbicide fern, spicebush, pawpaw, invasives before planting	49		490	5
	4	4	L	Mast Tree Release including group selections around White Pine	49			
	5	1	L	Low Shade Removal	18		647	6

SILVAH has recommended a Fence, Site Prep. Burn or Herbicide, Monitor Acorns, Re-inventory.

Seedlings are too scarce at this time. Wait for an acorn crop and re-inventory 2-5 years later. This prescription is appropriate for stands that are between large acorn crops and not affected by shade, but interfering vegetation is a problem and a fence is required to exclude deer. Such stands have an adequate seed source but are lacking oak regeneration. The Deer Impact Index is greater than 3, stocking of interfering vegetation is greater than 30 percent, and stocking of thick duff is 30 percent or less. These stands need time for an acorn crop to occur and for subsequent seedling establishment so it is best not to intervene at this time. Depending on the viability of burning the stand, conduct one or more prescribed fires or apply herbicides per the instructions in the Site Prep Burn or Herbicide descriptions. If using fire, conduct one or more burns according to instructions in the Site Prep Burn description. If applying herbicide, use one or more of the methods described in the Herbicide description. Construct a fence per the instructions in the Fencing description. It is important that these treatments are applied within the same year. Monitor acorn crops and inventory the stand 2 to 5 years after a good acorn crop has established a cohort of new oak seedlings to determine the next treatment.

Additional treatments:

- Apply a site-prep burn when conditions are appropriate, or treat the undesirable understory plants with an application of herbicide during the appropriate part of the growing season. This type of prescribed fire prepares an oak stand for eventual oak seedling establishment after a future acorn crop. The objective is to reduce dense understory shade and litter loadings so that a larger proportion of an acorn crop successfully germinates and becomes seedlings. Burning can be done in the dormant season (fall or early spring) or growing season (late spring) and at any intensity. However, high-intensity fires (flame lengths greater than 2 feet) in the late spring decrease dense understory shade more quickly than low intensity fires in the fall or early spring. Generally, multiple fires spread over several years are necessary to reduce dense understory shade to a level that improves the survival and growth of new oak seedlings. Do not burn if an acorn crop has just fallen or if new oak seedlings from a recent acorn crop are needed to help regenerate the stand as fire kills acorns and small oak seedlings (Auchmoody and Smith 1993). Please refer to the silvicultural guide for details about implementing this prescription.
- Current deer levels will likely prevent regeneration developing into a new stand. Fencing is recommended to protect seedlings from deer. A fence can be constructed either before or after treatment. If fencing is constructed after treatment, fencing should be done as soon as possible.

Additional Details:

- Remove low shade - by cutting/mowing all black birch and red maple understory trees 2 to 11 inch DBH. Complete 48 acres each year for 4 consecutive years. Remove low shade inside both inside and outside each planned fence perimeter and within the designated project area(s)
- Construct one fence per year for 3 years. Construct each fence one to two growing seasons after low shade removal has been completed in each of three locations.
- Apply herbicide to target species both inside and outside of each planned fence immediately before or immediately after the construction of each fence, herbicide application will be dependent on which growing season best matches the timing of the planned fence completion date.
- Plant conifers and shade tolerant species within each fence upon its completion. Fall planting is preferred but spring planting is acceptable. 200 seedlings/acre should be planted on approx 25% of the available area within each fence.
- Allow white pine to naturally reproduce by increasing light levels on the forest floor. This can be accomplished by culling or harvesting groups of trees adjacent to the white pine. Select 1 of the best white pine specimen trees on each acre to create a ¼ acre opening in the forest opening. If several likely candidates can be found per acre intersperse mast tree release technique as well. Be conservative with group selections since different areas of white pine can be regenerated at varying intervals in the future. This practice is an important concept since it will take advantage of existing conifers to naturally

increase the amount of low conifer cover on the property. Plan to increase the size of these openings as seedlings become established in the future.

Stand 2 Desired Future Stand Condition

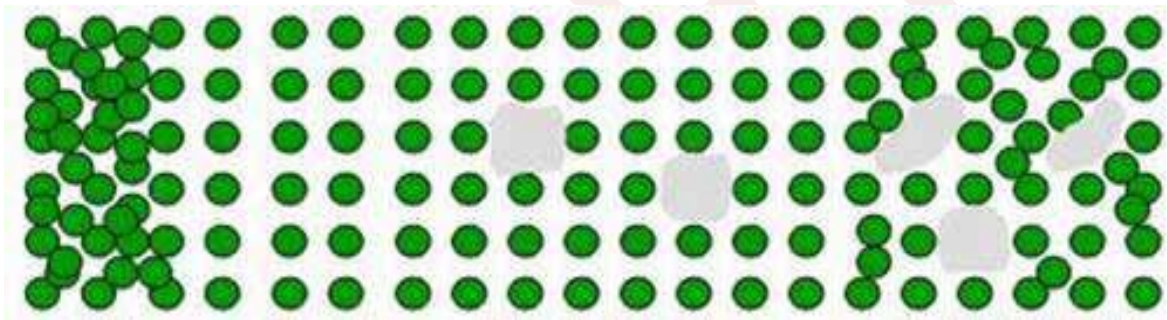
Desired future forest type: Mixed Oak with planted conifers and shade tolerant species, reduce basal area to (esp. site, size classes, and stocking)

Desired species to naturally regenerate: All Oaks

Desired species to plant (if applicable): White pine, white spruce, sugar maple, basswood.

Bird's eye view of desired future forest stand (check one):

- | | | | |
|--|--|---|--|
| ☐ Wild
stand -
Some
Wildlife | ☐ Evenly
spaced -
Maximizes
growth | ☐ Evenly spaced
with openings
Growth +
Regeneration | ☒ Variable density
spaced with openings
Some growth + Wildlife +
Regeneration |
|--|--|---|--|



Desired stand structure (check one):

- | | | |
|---|---|--|
| ☐ One Canopy Layer | ☐ Two Canopy Layer | ☒ Three Canopy Layer |
|---|---|--|



Management Unit Number 3

Name: *Black Birch Saplings*

Acres: 28
Area: 28.0
Effective age: 50.8
Site index: 67 for BO
Forest type: Allegheny hardwood
Size class: small poletimber
Relative density: 76.8
Remarks: Without residuals included

Narrative Summary and Analysis (2016 inventory data)

This Allegheny hardwood stand is dominated by Black Birch, Black Cherry and Misc Comm. Species which together comprise 88 percent of the basal area.

This is a small poletimber stand, with average medial diameter of 7.2 inches. Sapling trees too small to be merchantable represent a significant proportion of stand stocking and should be included in any thinnings.

If this stand is managed under an even-age silvicultural system, the several species groups will mature at markedly different times. The average time to maturity (MDM = 18 inches) is 53 years. Effective stand age is about 51 years.

If this stand is managed under an all-age silvicultural system, the distribution of diameters, proportion of sawtimber, and density of shade-tolerant species would make it difficult to apply selection cutting.

Relative stand density is 77 percent of the average maximum stocking expected in undisturbed stands of similar size and species composition. This density is in the optimum range for best individual tree growth. At this relative density, growth rate of the biggest trees is probably excellent, while growth rate of the medium and smaller-sized trees is probably good and mortality due to crowding low.

Thinning to provide more growing space for the better stems is not necessary at this time.

Total growing stock amounts to 96 sq. ft. of basal area per acre. Net total volume in all trees, to a 4-inch top, is 11.7 cords per acre; if divided into pulpwood and sawtimber, the net merchantable volume is 10.5 cords of pulp wood and 758.8 board feet of sawtimber (International 1/4 inch log rule). The total stand value is estimated to be about 21 dollars per acre.

Trees of acceptable quality for future growing stock provide a fully stocked stand by themselves. Non-commercial saplings and poles represent 40 sq. ft. of basal area and may need to be

treated prior to final harvest cutting.

MANAGEMENT RECOMMENDATIONS:

SILVAH has recommended a Defer Cutting (low relative density).

The stand is not yet mature (53 years to maturity) and the user does not wish to begin regeneration now. The relative density is 76.8% which is below the 80% threshold considered necessary for a partial cut. Immature or all-aged stands that are within or below the optimum range of stand density do not need any sort of partial cutting. In such a stand, the best prescription is to leave the stand alone for 10 or 15 years, and then re-examine it to see what treatment is appropriate at that time.

Management Unit #4

Name: *Transitional Hardwoods*

Acres: 39

Invasive plant control may occur. No other treatments scheduled at this time...Stand descriptions to be included in final documents

DRAFT

Management Unit #5

Name: *South Slope – Primitive Areas*

Acres: 409

Forest Type: Tulip poplar, beech, maple

Site Index: 90 for tulip polar

Current Description:

Dominant Species: TP, BB, WO, HIC

Basal Area: 125

Stocking: 61%

Dominant and Co-Dominant Trees:

Average Diameter: 21.2"

Class: Large sawtimber

Limiting Factor to Regeneration CDL:

Competing Vegetation: ☒

Deer: ☒

Light: ☒

Invasive Species:

- ☒ Abundant enough to require control before increasing light levels on the forest floor.
- ☐ Nearby invasive plant populations have likely contributed to the seedbank. Measures to control invasives are likely soon after light levels are increased on the forest floor.
- ☐ Invasive populations are not likely to have significant impact beyond that of native-aggressive vegetation (e.g. fern, spicebush, pawpaw). Control invasives while controlling other interfering understory vegetation.
- ☐ N/A

Invasive Species Present: Japanese stiltgrass, Mile-a-minute, Japanese barberry, multiflora rose, garlic mustard, ailanthus, and Norway maple.

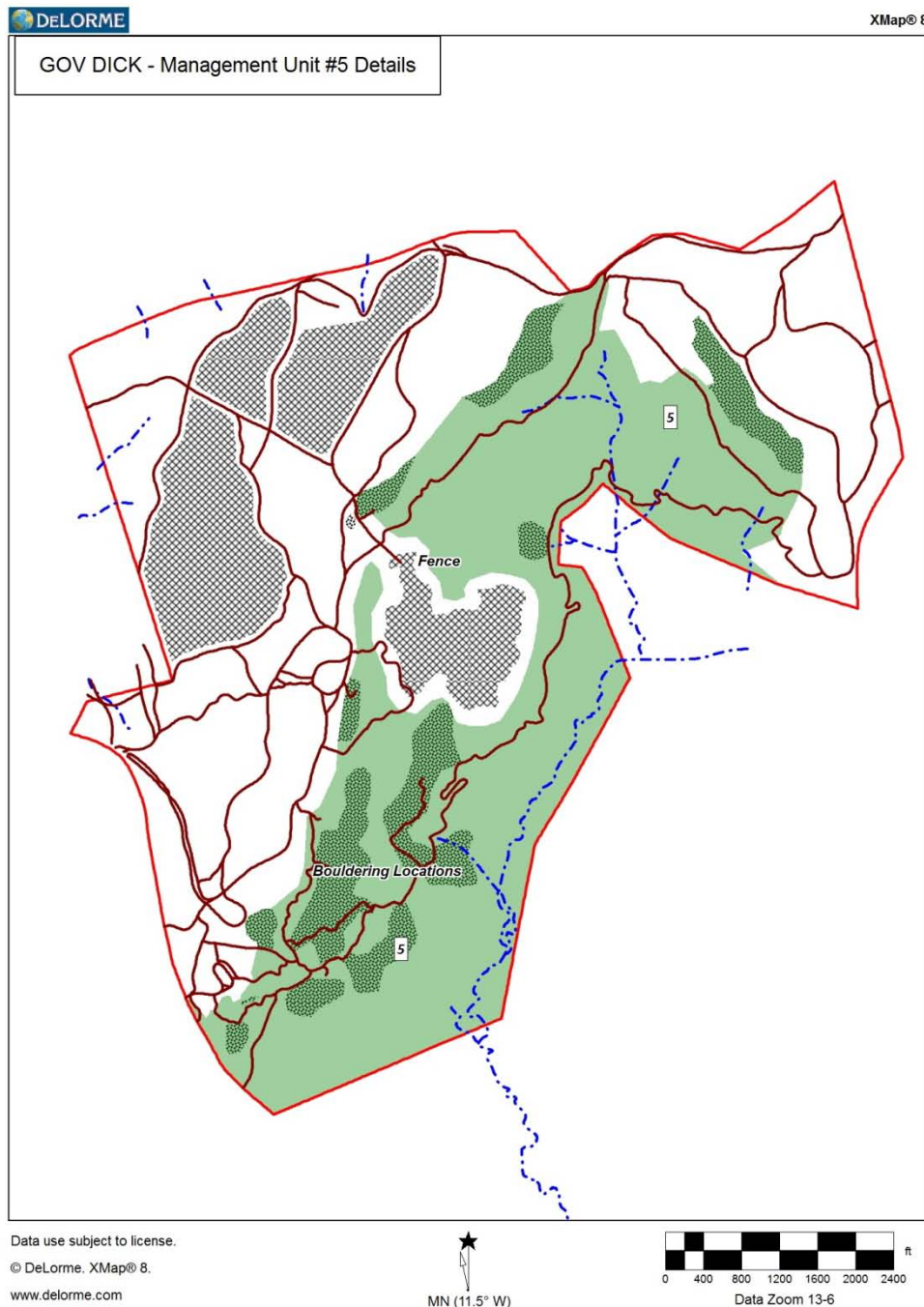
SUMMARY OF INVENTORY:

This management unit contains large areas of continuous rock outcroppings. Rock, boulders, and "rubble land" cover 100% of the ground surface on approx. 200 acres of this Mgmt Unit. At least 85 acres of this area is suitable for prime "Bouldering" activities (see attached map for details). The rocks and steep terrain make it impossible for modern equipment to traverse the terrain. These rubble lands also tend to have many downed trees of various sizes indicating that windthrow due to shallow rooting is common.

Management Recommendations:

First, consult with local Cerulean Warbler habitat specialist to determine the suitability for this site to be considered for a Cerulean Warbler habitat demonstration site. Proceed if conditions are favorable.

Standard recommendation do not apply to most of this unit as a whole because of severe equipment limitation caused by surface rock. Reconnaissance of the terrain indicates that only about 32 acres of land can follow all guideline as defined in a standard SILVAH prescription. As such the following prescription only applies to the proposed fence area defined on the map below



SILVAH has recommended Herbicide, Fence and Artificial Regeneration for this area.

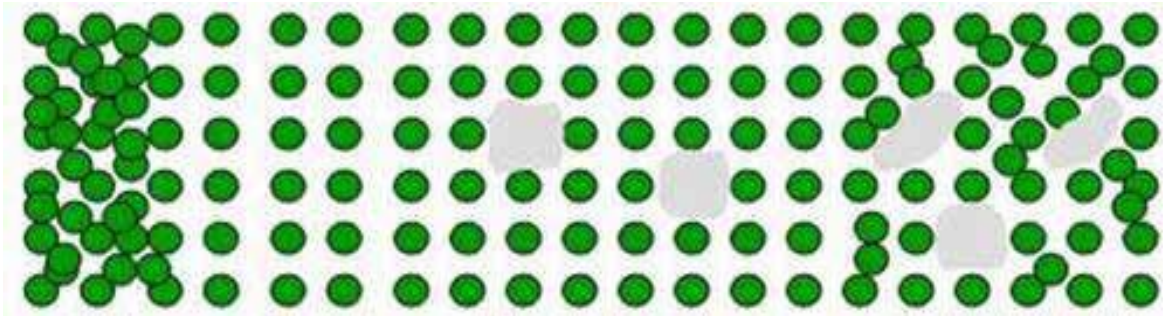
A Shelterwood sequence, which would normally be recommended here, may not work because relative density is already low and competitive regeneration is lacking; further reductions in density probably won't help. A Shelterwood sequence, which would normally be recommended here, may not work because relative density is already low and competitive regeneration is lacking; further reductions in density probably won't help. Identify long-term residuals and islands with complex vertical structure. Retain these through the final overstory removal. Favor species (yellow poplar, white oak, black oak, northern red oak and chestnut oak) with high wildlife value for retention and planting.

Additional treatments:

- Competitive regeneration is lacking, probably due to overbrowsing by deer and high levels of interfering understory vegetation and invasive species.
- Herbicide interfering understory vegetation and invasive species and plant with shade tolerant tree species as time, labor, and resource allow.
- Current deer levels will likely prevent regeneration developing into a new stand. Fencing is recommended to protect seedlings from deer. A fence can be constructed either before or after treatment. If fencing is constructed after treatment, fencing should be done as soon as possible.
- **Plant Conifer Thicket:** Plant one 2-acres site with white spruce. Plant seedlings randomly, vary spacing from 6 to 10 feet to create groupings of dense coniferous cover.
- **Plant Scattered Patches of Conifers:** Plant scattered patches of white spruce and white pine over 10% of the remaining area within the fence perimeter. Plant these trees in groups of 20 to 60 seedlings. Plant seedlings randomly, vary spacing from 6 to 18 feet to create groupings of dense coniferous cover and areas of relatively sparse coniferous cover.
- **Plant Hardwoods:** Plant 1000 sugar maple seedlings as individuals and small groupings over some of the remaining area. Intermingle along edges of conifer plantings.

Bird's eye view of desired future forest stand (check one):

- | | | | |
|---|---|--|---|
| ☐ Wild stand - Some Wildlife | ☐ Evenly spaced - Maximizes growth | ☐ Evenly spaced with openings Growth + Regeneration | ☒ Variable density spaced with openings Some growth + Wildlife + Regeneration |
|---|---|--|---|



Desired stand structure (check one):

- | | | |
|---|--|---|
| ☐ One Canopy Layer | ☒ Two Canopy Layer | ☐ Three Canopy Layer |
|---|--|---|



Management Unit #6

Name: *Forest Regeneration Projects*

Acres: 161

Invasive plant control may occur. Apply herbicides to reduce spicebush populations outside of the fence perimeters. The practice will allow natural regeneration (primarily tulip poplar) to become established in the understory. No other treatments scheduled at this time...Stand descriptions and further details will be included in final documents

DRAFT

Management Unit #7

Name: *Mature Black Birch*

Acres: 21
Effective age: 111.9
Site index: 67 for BO
Forest type: northern hardwood
Allegheny NF Forest type: Oak-hardwoods
Size class: large sawtimber
Relative density: 79.3
Remarks: Previous NAME: Old Rte 72.sil7

Narrative Summary and Analysis (2016 inventory data)

Nonnative invasive species have the potential to displace native vegetation, including desirable timber species. There was one invasive in the overstory (ailanthus), no invasives in the overstory, and seven that were found outside the plots (ailanthus, Japanese barberry, Japanese stiltgrass, garlic mustard, multiflora rose, Norway maple and Tatarian honeysuckle)

This northern hardwood stand is dominated by Black Birch, Black Oak, White Oak, Yellow-poplar and Beech which together comprise 88 percent of the basal area.

This is a large sawtimber stand, with average medial diameter of 17.4 inches.

If this stand is managed under an even-age silvicultural system, the several species groups will mature at markedly different times. The average time to maturity (MDM = 18 inches) is 4 years. The manager wishes to regenerate the stand now. Effective stand age is about 112 years.

If this stand is managed under an all-age silvicultural system, the distribution of diameters, proportion of sawtimber, and density of shade-tolerant species would make it difficult to apply selection cutting.

Relative stand density is 79 percent of the average maximum stocking expected in undisturbed stands of similar size and species composition. This density is in the optimum range for best individual tree growth. At this relative density, growth rate of the biggest trees is probably excellent, while growth rate of the medium and smaller-sized trees is probably good and mortality due to crowding low.

Thinning to provide more growing space for the better stems is not necessary at this time.

Total growing stock amounts to 120 sq. ft. of basal area per acre. Net total volume in all trees, to a 4-inch top, is 30.7 cords per acre; if divided into pulpwood and sawtimber, the net merchantable volume is 19.7 cords of pulp wood and 7386.9 board feet of sawtimber (International 1/4 inch log rule). The total stand value is estimated to be about 784 dollars per acre.

Trees of acceptable quality for future growing stock provide a fully stocked stand by themselves. Non-commercial saplings and poles represent 13 sq. ft. of basal area and may need to be treated prior to final harvest cutting.

Competitive regeneration of all types is insufficient; harvest cuttings at this time will not likely result in a satisfactory new stand.

Undesirable understory plants may interfere with development of regeneration. Undesirable plants in this stand include dense low woody cover, dense tall woody cover and dense fern cover. Treatment Description with Marking Instructions (2016)

Management Recommendations:

First, consult with local Cerulean Warbler habitat specialist to determine the suitability for this site to be considered for a Cerulean Warbler habitat demonstration site. Proceed if conditions are favorable.

Or wait 5 years before considering the SILVAH harvest sequence.

Herbicide and fence then again wait 3-5 years for advanced regeneration to become established before completing with the harvest sequence below. Timing should coincide with the dismantling of adjacent fences. Then follow as stated below.

SILVAH has recommended a Shelterwood Seed Cut - herbicide, fence.

Use a Two-cut Shelterwood sequence to increase competitive regeneration. The first (seed) cut should reduce relative stand density to 60 percent to provide for the establishment of a large number of additional advance seedlings, without allowing them to grow rapidly enough to become attractive to deer. The seed cut made now can be followed in 5 to 10 years by final overstory removal (assuming adequate competitive seedlings develop). A combination of high deer density and low seed production will probably make it difficult to get adequate competitive regeneration established. Protect the stand from deer browsing with a fence. Overstory density is low enough and seed supply sufficient for competitive regeneration to become established within 3 - 10 years. Fencing is recommended to protect seedlings from deer.

Additional treatments

- Treat the undesirable understory plants with an application of herbicide during the appropriate part of the growing season.
- Current deer levels will likely prevent regeneration developing into a new stand. Fencing is recommended to protect seedlings from deer. A fence can be constructed either before or after treatment. If fencing is constructed after treatment, fencing should be done as soon as possible.

Cut Guides

Reduce relative stand density to 60%. Within the size and quality constraints below, favor the best trees wherever possible. Try to preserve seed sources of scarce species if they are desired in the regeneration, and strive for uniform spacing among residuals whenever possible.

Cut 4 out of 5 trees in the pole size class.

Cut 1 out of 10 trees in the small sawtimber size class.

Cut a few (<10%) of the trees in the medium sawtimber size class.

Cut 1 out of 10 trees in the large sawtimber size class.

Leave Guides

Leave 94 sq.ft. of basal area per acre using the basal area distribution below.

Basal area distribution

Size class	Basal Area
+-----+	+-----+
Saplings	0
Pole	6
Small sawtimber	28
Medium sawtimber	45
Large sawtimber	15

Management Unit #8

Historical/Cultural and High Use Sites

Acres: 70

*Develop cultural points of interest and construct charcoal near Schock Tower House site.
Invasive plant control will be an ongoing endeavor. No other treatments scheduled at this
time...Stand descriptions to be included in final documents*

DRAFT

Management Unit Number 9

Name: *Environmental Center and Other Open Space*

Acres: 12

Forest Type: 02

Objective: [Mgmt. Unit #9](#) provides an outstanding opportunity to influence and educate the public.

SUMMARY OF INVENTORY:

Open space is found in three locations;

- The Environmental Center located off Pinch Road is surrounded by 4 acres of open space.
- A beautiful 5 acre meadow was recently created at the summit of Governor Dick Hill adjacent to the Observation Tower.
- The third location is at the old army radar station site (2000 ft north of the Observation Tower). Just a few years ago this 3 acre radar site harbored many herbaceous and woody invasive plants invasive plant species With assistance of the NRCS the site is well on its way to supporting a newly established meadow of warm season grasses.
- The Observation Tower itself provides a panoramic view of the horizon. Five counties are said to be visible from atop the Tower —Lebanon, Lancaster, Dauphin, York, and Berks. The best view is perhaps towards the south to southwest horizon. Gretna Springs Retirement Community can be seen near the base of the hill. Manheim, Lititz, and Lancaster are somewhat visible further out on the horizon. The Tower is a very popular destination during all seasons of the year. The view offered during the fall foliage season is particularly attractive and peak use probably occurs at this time of year. Bird watchers can also view migratory birds from atop the Tower in the spring and fall seasons. However, a protective safety “cage” affixed to the top of the observation deck creates an obstructed landscape when viewing through binoculars or camera lens.
- The trails leading to the Tower provides a brisk uphill walk from the well-used parking lot on Pinch Road (located east-southeast of the Tower). The shortest route (from parking lot to Tower) is about 2,400 feet in length and rises 262 feet in elevation along its course; average grade is 9% slope.

MANAGEMENT RECOMMENDATIONS:

- 1.) **Environmental Corridor:** Encourage use of the new **Environmental Center** by constructing a paved and stoned roadway (similar to the **Environmental Center** access road) that leads from the **Environmental Center** to main road leading to the Observation Tower. This section of road should provide many points of interest and act as an educational “porthole” into the various physical, ecological, geological and cultural interest points available at Gov. Dick. Various displays can be created and presented in a natural, aesthetically pleasing arrangement along this “information corridor”. Semi-private park bench arrangements (casual circular arrangements) can be created on short spur trails

adjacent to the information corridor. These semi-private meeting places will encourage small groups of people to enter into discussions of leisure or educational content. Environmental games can be designed to encourage thought through competition. The possibilities of invoking meaningful thought along this education corridor are endless. See [Reference Manual Section A](#).

American Chestnut: The American chestnut has great historical significance at Gov. Dick since it was undoubtedly an integral part of the day to day chores of Gov. Dick. The era of the charcoal hearths and the magnificent wood that fueled the dawn of the local iron industry is now a part of the folklore at Gov. Dick. Therefore, include a display for the American chestnut.

- 2.) **Trails for Special or Restricted Use:** The education corridor should be made handicapped accessible. Consider other suitable trail segments which are easily accessible via the well established and safe parking areas located at the ***Environmental Center***.
- 3.) **Boardwalk, Elevated Vista and Learning Trail behind Environmental Center:** A special note about the proposed vista site located approx. 1800 ft. northeast of the ***Environmental Center***. This is an excellent location to place a vista that will overlook the wooded forest below. The vista site is located at the top of a rock and boulder ridge. This is a perfect site to teach with little effort from the public. S
- 4.) **Encourage Public Involvement:** Seek public participation from special interest groups to participate in educational workshops. A workshop can be charged with the responsibility to identify naturally occurring points-of-interest or design suitable educational “displays” and construct said display at appropriate points along the trail system. The possibilities are endless. Do not however, proliferate, over stimulate, or otherwise “clutter” the natural surrounding with “things” that are unappealing. Upon first glance at such a display intrigue and genuine interest should be invoked. Employ local chapters of amateur and professional “nature” groups in the development of historic, cultural, geological, or physical points of interest. The Audubon Society, American Chestnut Foundation, Wild Turkey Federation, Boy Scouts of America, et.al. would be good candidates for such a task. Notable themes may include: charcoal hearth history and accompanying demonstration sites, rock outcrops and their geologic origin, small gauge rail lines and their significance, and timber harvest sites that offers a pictorial timeline depicting successional stages of forest development (to be added to indefinitely).