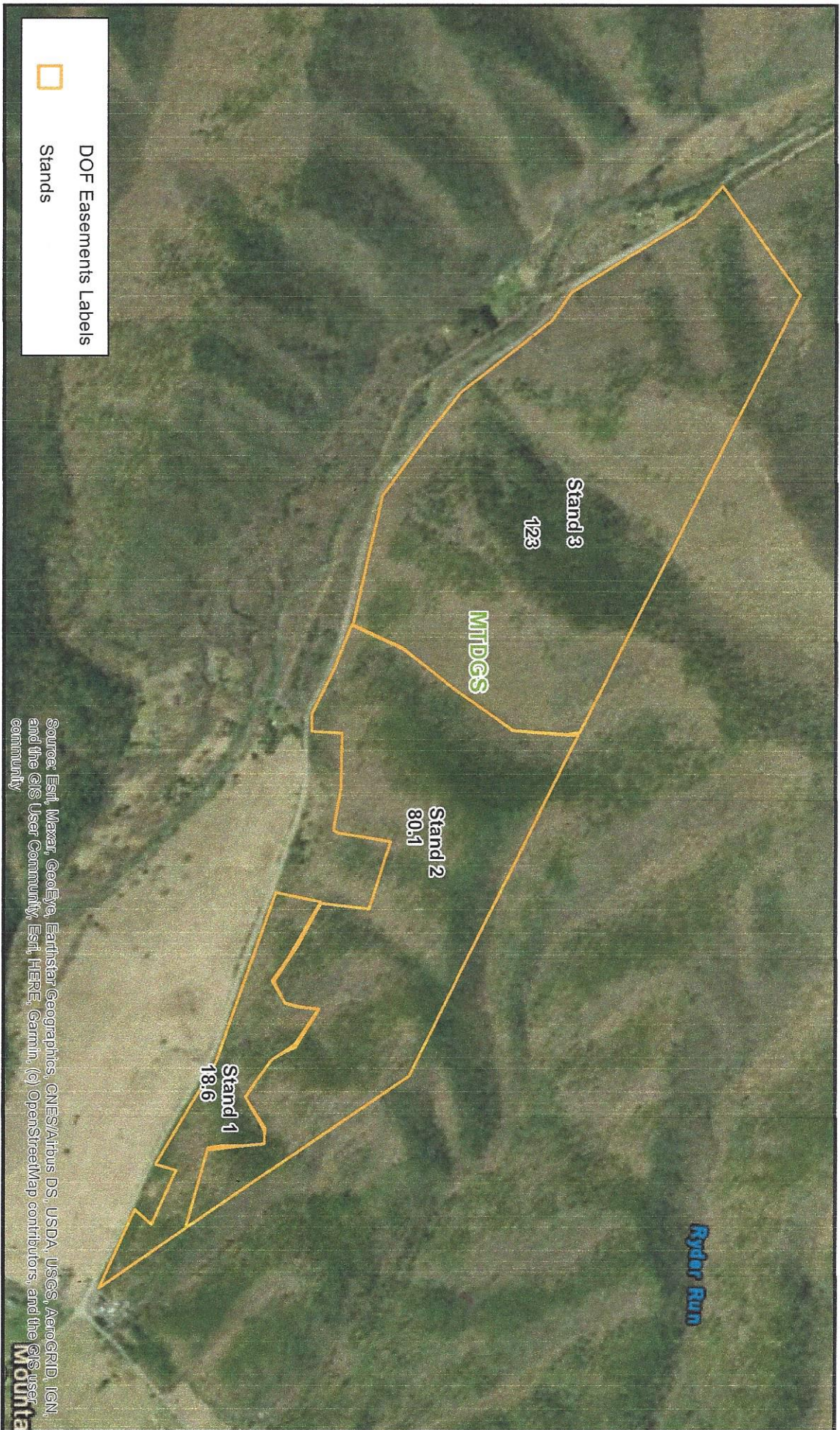




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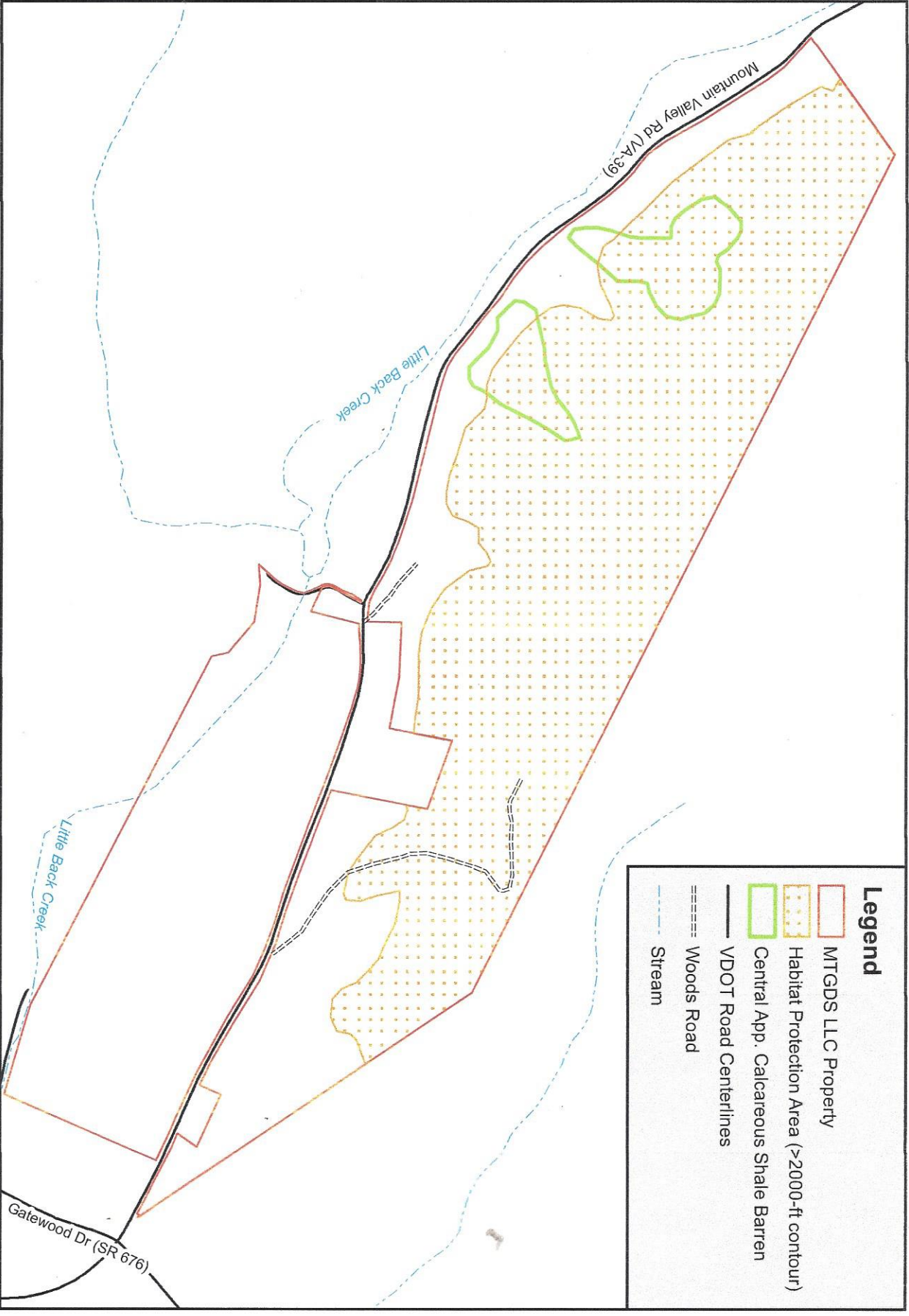


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

While VDOF has attempted to ensure that the features shown on this map are accurate, VDOF did not perform survey work or otherwise verify information provided to it in preparing this map and all features and acreages shown are approximate. VDOF expressly disclaims all warranties of any type concerning this map, and any use of the map assumes you understand and agree with this disclaimer.



MTGDS LLC Property Habitat Protection Area & Shale Barren Areas



Legend

- MTGDS LLC Property
- Habitat Protection Area (>2000-ft contour)
- Central App. Calcareous Shale Barren
- VDOT Road Centerlines
- Woods Road
- Stream

Map Produced: 9/8/2020 by A. Fotinos
 This map is for general reference purposes only and is not to be construed as a survey.



VIRGINIA FOREST STEWARDSHIP MANAGEMENT PLAN

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STAND DATA SUMMARY

| Parcel | Forest Type | Acres | Year Estab. | Age | Site Index | Avg. DBH | Stocking/ Density | Stand Quality | Annual Growth | Other Important Stand Attributes (nat. regen., invasive plants, etc.) |
|--------|---|-------|--------------------------|-----|------------|----------|----------------------|---------------|---------------|--|
| 1 | Upland mixed hardwood and pine | 18 | Natural regen. | 70+ | 75 | 14" | 100 trees/acre | Fair to good | Slow | A few invasive shrubs, minimal undergrowth. |
| 2 | Upland dry site with hardwoods and pine species | 80 | Natural regen. | 75+ | 55 | 12" | 80-95 trees/acre | Poor to fair | Slow | A few invasive shrubs identified, more understory growth and thinner canopy cover |
| 3 | Upland dry site with hardwoods and pine species | 123 | Natural establi-shipment | 75+ | 45-65 | 14" | 90-100 trees/acre | Fair to good | Slow | Very few invasive shrubs located, thicker canopy cover and less mid and understory growth than stand 2 |
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Virginia Forest Stewardship Management Plan

ABOUT THIS PLAN

This Forest Stewardship Plan was developed to help guide you in the active management of the natural resources on your property. The plan is based upon the objectives you identified as being important to you. All of the management recommendations are for your consideration. The stand data table figures in this plan are for planning purposes ONLY and not intended for making economic decisions where more detailed information would be required.

PRIMARY GOALS THAT YOU IDENTIFIED FOR MANAGING THE PROPERTY

1. Maintain and improve forest health conditions across the landscape
2. Improve wildlife habitat conditions across the property
3. Protect rare and sensitive plant communities located on the property
4. Insure soil stability is maintained for improved water quality
5. Manage timber in non-protected areas for potential revenue

INTRODUCTION STREAMS OF REVENUE OF NON-TIMBER PRODUCTS

This multiple-use forest management plan covers the examination of approximately 220 acres of forestland in Bath County, Virginia. The management recommendations, given on the following pages, were developed for each specific parcel on your property. Boundaries and acres are only estimates derived from aerial photographs. The tract map is located in the plastic folder at the front of this book, allowing you to see the map as you read through your plan.

By having this plan developed, your property is now eligible to become a certified Tree Farm through the American Forest Foundation's Tree Farm System. It also qualifies as a Natural Resources Conservation Service's Conservation Activity Plan #106. Contact your local VDOF Forester to learn more about the benefits of these two programs.

TRACT LOCATION

North side of Rt. 39 just West of Mountain Grove

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PROPERTY OVERVIEW

This property, which will be referred to as the “Mountain Grove Tract” throughout this Stewardship plan is located along the Northern edge of Rt. 39, just west of the town of Mountain Grove. The maximum elevation of this property is approximately 2640 feet above sea level. The property consists of mostly southern facing aspects along “Flag Knob” on Little Mountain. The property has several finger ridges mostly oriented north to south with steep hollows between the small ridges. These smaller in size rolling ridges give the landscape a unique makeup of diverse topography and aspect. Most of the property is fairly steep with very little level ground. The general soil quality can be described as ranging from poor in quality along the several of the southern facing ridges to good along the Southeast property line. This property also has the largest documented Central Appalachian Calcareous Shale Barren in the state of Virginia. This is a globally rare natural community that is known to support many extremely rare species. More information regarding this area can be found in the stands section of this plan.

The property is encumbered by an open space easement that is held by the Virginia Department of Forestry. Recommendation for each stand in this plan have been made with careful consideration of the language and requirements of the VDOF held open space easement. Before any timber cutting activity, large or small in size, the landowner will need to refer to the easement deed and communicate with VDOF to ensure all requirements of the easement have been met.

The easement includes a provision requiring rare species survey work prior to timber harvest. This language in the easement reads: ***“The [Forest Stewardship Management Plan] shall acknowledge the globally rare Shale Barren natural community and the Habitat Protection Area...and shall provide guidance to avoid or minimize impacts to the Shale Barren and rare species habitat, to include, but not limited to the following: avoid logging and other disturbance within the Shale Barren natural communities, work with DCR-NHP botanists or a qualified consultant to identify and mark locations of rare species prior to timber harvest, minimizing impact to any such locations, and control invasive species after timber harvest.”***

As a condition of the open space easement all Best Management Practices (as specified in the Virginia's Forestry Best Management Practices for Water Quality, Technical Guide) are mandatory. A written pre-harvest plan, prior to any timber harvest, is one of the required best management practices. Pre-harvest plans should be submitted to VDOF no later than 30 days before harvesting begins.

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STAND 1

Descriptions and Recommendations: Manage invasive plant species. Continue to monitor forest health and consider timer stand improvement that will help the mature timber.

| | |
|----------------------------------|--|
| Acres: | 18 |
| Forest Type: | Mature mixed hardwood |
| Species Present: | White Oak, Scarlet Oak, Black Oak, Chestnut Oak, White Pine, Virginia Pine, Hickory, Red Bud, Dogwood, Basswood, Tulip Poplar, Red Maple |
| Age: | * |
| Stand History: | No recent management. Stand appears to be naturally regenerated and influenced by heavy disturbance that likely occurred in the mid 1900s. |
| Size: | Few white pine and mixed oaks are greater than 16" DBH, but the majority of the stand is 9-12" DBH. |
| Tree Quality: | There are a few nice white oaks and white pines, but most of the stand is undersized and seems to have poor form. |
| Stocking/Density: | 85-100 square feet of basal area |
| Growth Rate & Vigor: | Most of the timber is growing very slowly. Although the site index indicates white oak should grow well, most of the timber appears to be growing very slowly. Most trees appear to be healthy, but several white oaks have small crowns and signs of epicormic sprouts. |
| Site Quality & Soils: | Shelocta Berks complex soil. This stand has the highest soil site index on the property. Site index for White Oak is approximately 75. |
| Aspect & Topography: | Southern facing aspect with a topography ranging from 8%-35% slope. |
| Water Resources: | There are no water resources located within this stand. |
| Invasive Species: | A few Autumn Olive |
| Wildlife Habitat: | Mature oak and hickory trees produce hard mast for wildlife species to feed on. Closed canopy keeps the amount of herbaceous ground cover and advanced hardwood regeneration to a minimum. |

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| | |
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| Recreation/Aesthetics: | Hunting for game species feeding on hard mast. |
| Cultural Resources: | No known cultural resources in this stand |
| T&E Species Present: | No T&E species were observed during my property visit. Prior to any commercial operation, a rare species survey will need to be completed, as required by the language of the conservation easement. |
| Fire Risk: | Moderate fire risk. Any fire that burns in this stand will likely be moderate intensity due to fuel type and loading. |
| Unique Natural Features: | High quality soils allow for greater diversity of species composition when compared to the remainder of the property. |
| Recommendations: | My main recommendation for this stand is to control the invasive plant species that are located within the forested stand. If these invasive plants are left untreated, the native plant species will have a hard time competing for space in the understory, especially as the canopy begins to open up allow more sunlight to reach the forested floor. This will lead to a lack of biodiversity and cause greater issues for management in the future. Below is information regarding the management of Autumn Olive and other invasive shrubs. |

Recommended Herbicide treatments for *Elaeagnus umbellata* (Autumn Olive) control (and other woody shrub invasive species)

Readily Available Herbicides:

Tordon K – (picloram) – foliar or cut stump method

Remedy – (triclopyr) – foliar, cut stump, basal bark application

Roundup – (glyphosate) – foliar and cut stump

Crossbow – (2,4 D) – foliar and basal bark application

Restricted Use Herbicides:

Garlon 3A – (triclopyr) – foliar, hack & squirt, cut stump

Garlon 4 – (triclopyr) – basal bark application

- Consult herbicide label or results of studies for Autumn Olive control to determine the best months for application to achieve maximum control. It is best to treat these shrubs prior to producing seeds, which typically happens around late August/early September.
- **The label is the law, so follow all directions and safety precautions.**
- All Autumn olive shrubs have the ability to produce seed. Every shrub in an infected stand will need to be treated in order to reach future desired stand composition.

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Herbicide Application methods:

1. Foliar – chemical is usually mixed with water and applied to the foliage of sprouts and small trees where the foliage can easily be reached with a backpack or ATV sprayer. Spot spraying individual plants only.
2. Cut stump – The targeted shrubs are cut down and the fresh stump is painted with the herbicide to kill the roots and prevent stump sprouting. Herbicide needs to be applied to freshly cut stumps as soon as possible to prevent the wound from “sealing.” It is recommended that each stump be treated within 5 minutes of being cut.

Note: Broadcast application of pesticides, including herbicides, except hand/spot application of herbicides to control invasive species, is prohibited within the HPA and shale barrens.

The timber in this stand has reached a mature state. The stand is still healthy but will need to be monitored for forest health outbreaks moving forward. If the landowner desires to cut some of the timber out of this stand it should be done so in a sound silvicultural manor. Often times a stand similar to this will be harvested by a practice known as “high grading.” Under this type of harvest, a logger will cut only the largest and most valuable trees and leave everything of lower value. This is a dangerous practice that lowers the quality of genetics found within the stand and hurts opportunities for future management. Any harvesting that is done should cut all of the lower quality timber for pulpwood along with the valuable saw timber quality trees.

Another active management practice that would be beneficial in this stand is Timber Stand Improvement, or “TSI.” TSI is a practice that removes genetically weak or undesired trees from a timber stand, which allows desired trees more space and resources for growth. This stand would greatly benefit from a TSI practice which removes the weak, suppressed, and undesirable trees from the stand. Undesired species that can be removed include Virginia and Pitch Pine, Red Maple, and even some of the Scarlet Oak. These species that are directly competing with more desired species such as White Oak should be removed from the stand. There are some small, suppressed White Oaks in this stand that are also unlikely to contribute to the long term future of the stand. These White Oaks have poor form, many knots along the trunk, and very thin canopies. These individuals should also be removed to allow more space for the desired trees to grow. More TSI information is available in the appendix section of this plan.

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STAND 2

Descriptions and Recommendations: Continue to monitor for forest health, manage invasive plant species as they are found, create canopy openings to increase woody and herbaceous ground cover for wildlife cover and browse.

| | |
|----------------------------------|--|
| Acres: | 80 |
| Forest Type: | Mixed pine and hardwood |
| Species Present: | Chestnut Oak, Scarlet Oak, Black Oak, White Oak, Bear Oak, Pitch Pine, Virginia Pine, White Pine, Hickory, Red Maple, Tulip Poplar, Basswood, Black Walnut, Red Bud, Dogwood, Yellow Birch |
| Age: | 75+ |
| Stand History: | Mature mixed timber along steep, rocky ridges with poor soil. Stand has likely always been forested and there are no signs of a timber operation for many decades. |
| Size: | Timber is mature with complete canopy closure. Most hardwoods have a DBH ranging from 9"-15" DBH. Some pockets of better timber have trees around 20" DBH. |
| Tree Quality: | Mostly poor quality timber. Some drainage areas have decent White Oak and even a few Black Walnut and Tulip Poplar. |
| Stocking/Density: | All naturally stocked. Average basal area ranges from 80-110 square feet/acre. |
| Growth Rate & Vigor: | Poor soil quality leads to slower than average growth rates. Stand is healthy with no signs of hardwood forest health concerns. Some of the White Pine is showing signs of damage from <i>Matsucoccus gallicolus</i> . |
| Site Quality & Soils: | Generally poor site index. Weikert-Rough Complex, Weiker-Berks-Rough complex, Shelocta-Berks Complex. |
| Aspect & Topography: | Mostly Southern aspect with Eastern and Western along the sides of the ridges. Steep to very steep, 35-80% slopes. |
| Water Resources: | Ephemeral drainages in between ridges. |
| Invasive Species: | Autumn Olive |
| Wildlife Habitat: | Oak and hickory producing mast, pine produces winter thermal cover and nesting for many bird species |

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| Recreation/Aesthetics: | Trail that runs to the top of a ridge is the only access into the property I was able to locate. Hunting and wildlife viewing. |
| Cultural Resources: | None observed |
| T&E Species Present: | See attached information |
| Fire Risk: | Moderate. Steep topography could allow a potential wildfire to spread rapidly and burn hot. |
| Unique Natural Features: | Mixed pine and hardwoods provides a diversified habitat for wildlife. Deep hollows have species diversity not found in other parts of the property (Walnut, Tulip Poplar). |

Recommendations: There were a few Autumn Olive shrubs found spread throughout this stand. The shrubs have not taken effective hold in the stand at this time and are very manageable in this state. I highly recommend treating these shrubs while they are low in numbers. It is much easier to treat this stand at this state, then to wait and start managing them once they have started to spread in higher populations. Please refer to the invasive management information provided in Stand 1 for treatment.

Most of this property is covered by timber that is all relatively close to the same age. This homogenous forest cover lacks diversity and is not ideal for almost every species of wildlife. I recommend creating small gaps in the canopy to allow more sunlight to reach the forest floor. This can be accomplished by conducting a commercial timber operation, or on a much smaller scale by just a couple of people. If you are looking to do a small scale project that could potentially have a big impact on habitat conditions, identify small areas to open up the forest canopy, allow more sunlight to hit the forest floor. These temporary openings can be as small as 150'X150' or as large as an acre in size. This will cause an increase of herbaceous ground cover that wildlife can utilize for food and cover. I also recommend targeting areas that have oak regeneration already popping up in the understory. This will release these seedlings for growth and help establish the future of this oak forest. Note that more permanent or long-term openings, such as cleared areas for wildlife food plots, are permitted only below 2,000 feet on this property (see open space easement deed agreement).

If you are looking to conduct a commercial sized timber harvest, this property is a strong candidate for a heavy thinning harvest. There is a federal program called the Golden-Winged Warbler Fund that provides guidelines and incentive based funding for such practices. The Golden-Winged Warbler is a small songbird native to the Appalachian Mountain region that has seen a sharp decline in population (nearly a 66% drop) over the last 50 years. This songbird needs expansive forested landscape that includes early successional forest and shrubland patches for breeding grounds and nesting sites. This decline has been directly tied to the lack of fire and sustainable forestry practices that have led to a decline in habitat quality on a large scale. By creating habitat conditions that encourage populations of golden-winged warbler to

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use your property, you will also be creating ideal habitat conditions for other species of wildlife such as deer, bear, turkey, rabbit, and other game and non-game species. By leaving 15-25 trees/acre standing during a timber harvest, you will produce extremely valuable habitat conditions for a wide variety of wildlife species to utilize, while diversifying habitat conditions found on your property. I do not recommend cutting large sections of your forest at one time, but setting up multiple 5-20 acre sections for harvest is a great option on this landscape. I recommend leaving oak and hickory trees standing that will produce hard mast for wildlife, and provide a seed source for the future forest. I also recommended leaving some dead snags standing for cavity nesting species to utilize. Bats also rely on snags with loose bark and cavities for nesting in a forest setting. **Again, prior to any commercial harvest, the property's easement requires a plant survey to be conducted to look for rare species.**

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STAND 3

Descriptions and Recommendations: Protect the rare shale barren and surrounding forested buffer, manage any invasive plants that enter the stand, monitor for forest health concerns

| | |
|----------------------------------|--|
| Acres: | 123 |
| Forest Type: | Mixed upland pine and hardwood |
| Species Present: | Chestnut Oak, White Oak, Black Oak, Scarlet Oak, Northern Red Oak, White Pine, Pitch Pine, Virginia Pine, Red Maple, Red Bud, Dogwood, Tulip Poplar |
| Age: | 75+ |
| Stand History: | No signs of recent management |
| Size: | Mature pine and hardwood ranging from 9-14" DBH on upland poor sites, to 12-18" DBH on higher quality sites |
| Tree Quality: | Generally poor timber quality with some pockets of nice mixed oak and hickory. A few quality Tulip Poplar in lower lying areas. |
| Stocking/Density: | 80-110 square feet of basal area/acre |
| Growth Rate & Vigor: | Most of the timber is slow growing, but is healthy with good crown ratios. |
| Site Quality & Soils: | Poor to moderate |
| Aspect & Topography: | Mostly Eastern and Western facing aspects along the North to South oriented ridges. Slopes ranging from 20% along route 39 to 75% along the ridge lines. |
| Water Resources: | Drainages in the bottom of hollows |
| Invasive Species: | Autumn Olive was the only species observed |
| Wildlife Habitat: | Thermal cover provided by pines, hard mast provided by oak and hickory trees |
| Recreation/Aesthetics: | Very little easy access to this stand limits current recreational potential. |
| Cultural Resources: | Easement protected area. |
| T&E Species Present: | Survey will need to be completed. None observed during my field visit. |
| Fire Risk: | Moderate |

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Unique Natural Features: Central Appalachian Calcareous Shale Barren

Recommendations: Portions of this stand are protected under the easement held by the Virginia Department of Forestry. These areas identified as "Central Appalachian Calcareous Shale Barren" are identified in the open space easement deed and on maps accompanying this management plan.

It is highly recommended that this area is monitored for invasive plants and any invasive species that are identified are treated immediately. During my field visit, I only identified a few Autumn Olive shrubs along the ridge close to Rt.39, but be sure to continue to monitor this area for new invasive plants. Please treat the invasive following the guidelines in "Stand 1" of this plan.