

SAVAGE RIVER STATE FOREST ANNUAL WORK PLAN

FISCAL YEAR 2020



The mark of
responsible forestry



SUSTAINABLE FORESTRY INITIATIVE

Good for you. Good for our forests.®

SFI-00050



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**Savage River State Forest
FY-20
Annual Work Plan**



**Savage River State Forest
FY-20 Annual Work Plan**

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I. State Forest Overview

Savage River State Forest is approximately 55,155 acres in size and is situated in the northeastern quadrant of Garrett County in Western Maryland. It is a second growth mixed hardwood forest dominated by mixed oak species, sugar and red maple, black cherry, hickory and ash. Owing to high rainfall and certain topographic features, Savage River State Forest contains many excellent quality growing sites stocked with superior quality trees. The forest contains approximately 2,800 acres of conifer plantations that were established in the 1940's following state acquisition. Red pine is the dominant tree species within these plantations but other conifers include white pine, Norway spruce, larch, and Scotch pine. These plantations were established as nurse crops to rehabilitate abandoned and depleted farm fields, with the long-term goal of conversion back to native hardwoods as appropriate.

Savage River State Forest has been intensively managed over the past nine decades. Forest harvest and grooming operations are undertaken to thin overstocked stands, to effectively deal with public safety concerns, to harvest mature or diseased/dying trees, to improve habitat for certain wildlife species, to assist and provide for certain research needs, to address aesthetic concerns and to increase the proportion of age/height diversity of forested stands.

II. Annual Work Plan Summary

The FY-2020 Annual Work Plan for Savage River State Forest was formulated in 2018. It contains projects to be undertaken in the areas of Special Projects, Maintenance and Operations, Recreation, Watershed Protection, Ecosystem Restoration / Protection, and Wildlife Management. In addition to the routine operations and management of the State Forest, the FY-20 Annual Work Plan for Savage River State Forest details seven land management projects that will be the focus of the State Forest management staff for FY-20. All projects and proposals within this Plan have been developed to meet one or more of the Land Management Guidelines and Objectives outlined in the Savage River State Forest Sustainable Management Plan including:

***Forest Economy:** management activities intended to maintain an economically sustainable forest and contribute to the local economy through providing forest-related employment and products.*

***Forest Conservation:** management activities with a purpose to protect significant or unique natural communities and elements of biological diversity, including Ecologically Significant Areas, High Conservation Value Forests and old growth Forests. Old growth forest management serves to restore and/or enhance old growth forest structure and function.*

***Water Quality:** management activities designed to protect or improve ecological functions in protecting or enhancing water quality.*

***Wildlife Habitat:** management activities with a purpose to maintain and enhance the ecological needs of the diversity of wildlife species and habitat types.*

Recreation and Cultural Heritage: management activities with a purpose to maintain and enhance areas that serve as visual, public camping, designated trails, and other high public use areas.

A. Special Management Projects Include:

1. Continued Development of the Certified, State Forest Sustainable Forest Management Plan - with special focus on addressing items identified as in need of improvement as a result of the 2018 FSC/SFI Certification Audits.

2. Forest Stand Delineation, Inventory and Monitoring – Completion of the project to re-inventory and redefine stands on the entire forest. This critical project will continue in FY-20. To date, 100% of the data collection in harvestable stands is completed. Areas of HCVF including wildlands, ecologically significant areas, old growth, old growth ecosystem management areas and areas that preclude timber harvest operations will be inventoried secondarily to the harvestable areas. The project will allow a thorough analysis of this complete data set from which further management plans will be derived. Inventory work will continue in the form of follow-up monitoring protocols associated with the initial inventory and certification requirements.

3. Non-Native Invasive Species (NNIS) Inventory and Control Work - The Sustainable Forest Management Plan calls for various responses to NNIS and the Forest Inventory Project has allowed for a broad view of the problem forest wide.

B. Land Management Projects Include:

1. Continuation of the ecosystem restoration project involving control of invasive and exotic plants forest wide.

2. Continuation of the ecosystem restoration efforts involving control of invasive, exotic forest pests, particularly the Hemlock wooly adelgid.

3. 7 Silvicultural projects including:

5 Intermediate Harvests on 174 acres and 2 Regeneration Harvests on 86 acres.

4. Establishment of an American Chestnut nursery to allow for the continued efforts to develop a permanent solution to the chestnut blight issue and restore the species as a major component of the forest landscape.

Forest harvest operations are undertaken to utilize mature and dead/dying/diseased trees; to thin overstocked stands; to improve and diversify wildlife habitat; to effectively correct public safety concerns and issues; to reduce the forests vulnerability to insect attack, disease or wildfire hazard; to facilitate certain approved research needs; to improve certain aesthetic aspects of an area; and to improve the proportions of age class and species diversity within stands and management blocks. This forest has been intensively managed since its inception, utilizing both even and uneven-aged techniques via selective removals and regeneration harvests. Early records

indicate that as cut over land was acquired, foresters culled the forest, removing the poorly formed and damaged timber left behind in the wake of the cut and run practices employed by early timber speculators. By removing these undesirable trees, newly forming seedlings were released from competition and were thus cultured into the future growing stock of trees that we enjoy today. The benefits of this work have been significant including improved wildlife habitat diversity, improved forest health and more abundant mast production, improved utilization of gypsy moth damaged trees, reduced forest fire hazard, and the considerable financial contribution of management to the state and local economies as well as to those employed in the forest products industry.

The FY-20 Annual Work Plan outlines eight harvests on 260 acres, producing a harvest of approximately 1,200,000 board feet of sawtimber and accounting for an estimated \$260,000 worth of raw wood products entering local markets. Much of the silvicultural work laid out in this work plan is focused on initiating seedling development to better ensure regeneration successes in future harvests. Much of the value of the harvests in the work plan will be directed back into the forest providing the essential investment in pre-harvest cultural work that will safeguard the long term sustainable management of these important forest resources. The cultural operations and management projects outlined within the FY-20 Annual Work Plan are selected to provide significant contributions to the sustainability of forest resources found within the State Forest and the ecosystems associated with it.

III. General Location Map for FY-20 Land Management Project Proposals

Approximately 260 Acres

Map Key

- | | |
|---|---|
| <i>1. Compartment 1 Stands 19, 22</i> | <i>29-acre Conifer Thinning</i> |
| <i>2. Compartment 4 Stands 24-26, 50</i> | <i>52-acre Hardwood Thinning</i> |
| <i>3. Compartment 11 Stands 6, 64, 69, 70, 94</i> | <i>77-acre Hardwood Thinning</i> |
| <i>4. Compartment 15 Stand 36</i> | <i>20-acre Hardwood Thinning</i> |
| <i>5. Compartment 17 Stands 33, 36</i> | <i>23-acre Hardwood Thinning</i> |
| <i>6. Compartment 29 Stands 14, 18</i> | <i>26-acre Conifer Thinning and Hardwood Liberation</i> |
| <i>7. Compartment 77 Stands 12, 13</i> | <i>33-acre Hardwood Regeneration</i> |

IV. Special Projects - Forest Resource Management and Planning

A. Continued Development of the Certified State Forest Sustainable Forest Management Plan.

Beginning in 2011, the Forest Service began revising the long term sustainable management plans for all three of the State Forests in the Western Region. The initial framework follows the sustainable management plan format established for the State of Maryland's Chesapeake Forest on the Eastern shore. The Department's goal is to have the updated sustainable forest management plans receive dual third party certification under both the Forest Stewardship Councils (FSC) and Sustainable Forestry Initiatives (SFI) standards and guidelines.

Throughout the course of the last seven years, broad resource assessments have been carried out identifying the various management units and features located on the forests including identification and mapping of High Conservation Value Forest Areas (HCVF), much of which was formerly identified as the State Forests "Special Management Zone". Within the HCVF are located a broad range of Ecologically Significant Areas (ESA). These areas typically contain rare, threatened or endangered species and their critical habitats. By spring of 2011 initial drafts of the Forest's Sustainable Management Plan were developed and shared with stakeholders for initial comment and review. The plans were submitted to both the FSC and SFI organizations in the spring of 2011, at which point audits have been completed on all three of the western state forests. Following the audits, draft plans and audit findings were presented to the State Forests Citizen Advisory Committees for review and comments. The Draft Sustainable Management Plans were made available for public comment fall of 2011. Revisions and updates to the Sustainable Management Plan are currently underway and are scheduled to be completed by April of 2019.

Each year the State Forests Management Program is audited for compliance to the standards set forth by the Certifying Organizations. Any shortcomings in the programs identified during the audits are identified in a Corrective Action Reports (CARs) and/or observations identified as being in need of improvement in order to be "certified" as sustainably managed forest lands under the internationally recognized FSC and SFI standards. These corrective actions vary from simple formal documentation of routine practices, to more complex policy and procedure development involving various stakeholders and partners. The program requires that all of these items be addressed before the next annual audit, with some needing more immediate attention. A minor corrective action request was issued by FSC in regard to appropriate trademark use as well as an observation related to incidental information within the work plans that was outdated. Both issues were easily corrected to the satisfaction of the auditing body. SFI identified three Opportunities for Improvement regarding annual work plan activities and their status, trademark usage and overall climate change awareness as it relates to impacts on the forest landscape and its subsequent management (See Appendix 1 for brief summary of audit findings). State Forest staff time and field operations are adjusted and redirected to assist in addressing any Corrective Action items in the course of the next year.

B. Forest Stand Delineation, Inventory and Monitoring

A critical part of developing long term sustainable management plans is the availability of up-to-date forest inventory data. Initial stand data collection has been completed on the harvestable areas of the forest using the SILVAH Inventory System developed by the US Forest Service which incorporates intense surveys of both the overstory and understory to assist in the formulation of appropriate silvicultural prescriptions in specific forest types. The demand for this important data set is increasingly evident as special projects evolving out of demands placed by Forest Certification Standards utilize this data set for project planning including the Annual Work Plan and the Non-Native Invasive Species Inventory.

What had historically been carried out on a 10-year interval offering a snap shot in time view of the forest, has evolved into an annual sampling approach that gives a more frequent look at overall forest condition throughout the years. This approach will allow a much closer watch on developing forest conditions and allows for more rapid and timely responses. This approach is especially valuable in light of the numerous and frequent introductions of foreign insects, diseases, and invasive plants that can rapidly disrupt forest systems. The initial Stand Delineation and Inventory Project will be continued as a Forest Monitoring program as required under certification in order to allow for documented observations of changing conditions throughout the forest. Program focus will include: monitoring of developing regeneration sites allowing for the timely response to the investment in intensive silvicultural work such as herbicide control of invasive and interfering plants and prescribed fire; NNIS monitoring and control work; silvicultural results with respect to management objectives and outcomes and recreation/visitor impacts, etc.

V. Maintenance and Operations

Aside from the detailed cultural work planned for the State Forests, the following is a partial list of projects that are often on-going from year to year and are an integral part of State Forest operations: Routine maintenance projects include building repair and maintenance, vehicle maintenance, mowing at the office facility, snow removal, repair and replacement of fire rings and tables at the camp sites, brush hogging trails, and repair of road surfaces.

A. Maintenance and Management of Roads and Trails

There are approximately 107 miles of trail and hardened road surface on the forest and approximately 1/3 of the mileage is maintained each year. Maintenance in these areas includes brush hogging, mowing, and rehabilitation of road surfaces. Herbicide usage has been integrated into the road maintenance regime in order to control growth in areas where mechanical control methods are not feasible (i.e. steep slopes, narrow paths, rocky areas). The use of herbicide along forest roadways can also reduce operational costs for the maintenance staff by controlling unwanted vegetation along these travel corridors for several years, when applied properly.

B. Boundary Line Maintenance

Savage River State Forest currently has 336 miles of boundary line, including interior lines, exterior lines and road frontage. Boundary maintenance is critical to the management of all

public lands. In order to keep up with this effort, State Forest staff maintain approximately 60 miles of line each year. In addition to routine marking and painting, considerable effort is spent on researching, relocating, or establishing missing and/or new line, as well as addressing boundary conflicts. As conflicts arise, every effort is made to resolve the issue in a timely and professional manner. Often, this work leads to the need for a licensed surveyor and legal recourse in order to resolve the issue. With the assistance of Land Planning and Acquisition staff, a minimum of five miles of previously unpainted and/or missing boundary line are to be reestablished until the entire forest boundary is demarcated.

C. Campground Operation and Maintenance

There are 71 primitive camp sites that are maintained on a regular schedule throughout the year. Major campsite maintenance coincides with major holidays, the end of winter and at the traditional end of the camping in late summer/early fall. The campsites are also frequented during the white-tailed deer firearms seasons in the fall and winter, during spring turkey season in early spring and during the opening weekend of trout season in late winter/early spring. Maintenance and operation of these primitive campsites includes: managing group site reservations; maintenance of information / bulletin boards; camper contacts to insure policies are understood; self-registration fee collections and deposits; weekly site inspection and cleaning; hazardous tree evaluation and removals; grass mowing (typically the week before the summer holidays and otherwise as needed); maintenance and replacement of picnic tables, lantern posts, and fire rings; and site impact monitoring.

D. Rifle Range Maintenance and Management

There is a 100-yard shooting range on the forest that is open to the public year round located at 3250 New Germany Road. Maintenance is ongoing and includes replacing backstops as well as the backstop stands, trash clean-up, mowing and weed eating around the facility, plowing the entrance road, restocking range permits, collecting range fees and posting range closures when necessary. Prior to and during the various hunting seasons, range use increases appreciably resulting in more frequent maintenance visits. Typically, at the conclusion of spring turkey season, the backstops and stands from the previous year are replaced, depending on the severity of damage.

The shooting range is open daily from 8 a.m. to dusk and offers hunters an ideal location to sight in weapons. The range features ten stations with distances ranging from 25 to 100 yards. Hunters can pay the \$5.00 daily fee at the range using envelopes provided. The annual pass costing \$25 and the family pass costing \$50 are available at the Forest Headquarters Office. Rules and regulations are posted at the range, with the only restrictions being no fully automatic weapons and no clay pigeons.

VI. Recreation

A. Recreation Opportunities (See Figure 2 p. 12)

1. Hiking, Biking and Horseback Riding Trails

Savage River State Forest has over 70 miles of trails open to hikers, mountain bikers and horseback riders of any ability. Not all trails are open to all recreational pursuits and it is recommended that before engaging in any activities visit or contact the state forest headquarters to become aware of any trail restrictions. A backpacking permit must be obtained at the forest headquarters or at any of the self-registration areas. Trail guides featuring a topographic map and trail descriptions can be purchased at the forest headquarters.

2. Off Road Vehicles

Snowmobile and off-road vehicle operators can enjoy many miles of scenic trail along the Meadow Mountain Trail, East Shale Road, Margraff Plantation, Negro Mountain Trail and the newly constructed St. John's Rock ORV Trail. Unlike the aforementioned trails, the St. John's Rock ORV Trail is the first trail on Department lands ever designed specifically for ORV enthusiasts. Features include a multi-site primitive campground designed to support ORV riders, children's riding trails within the campground, technical spur loops and hare scramble style trail sections for all terrain vehicles and motorcycles, a full-size rock crawl area for jeeps and four-wheel drive vehicles and miles of forest access roads for all purpose riding opportunities. The total trail system is approximately 13 miles in length with varying challenges for riders of all skill levels. The trail officially opened to the public on July 23, 2017. Usage statistics for the inaugural year can be found in Appendix 1.

Be sure to display a current Department of Natural Resources ORV permit, available at the forest headquarters or online at www.dnr.maryland.gov.

3. Hunting

Hunting is permitted throughout the forest except where posted with safety zone signs. The 55,000 acres of Savage River State Forest includes two state park areas (New Germany and Big Run) where hunting is prohibited. The forest boundaries are marked with yellow paint on trees - a yellow bar as you enter the forest and a yellow dot as you exit the forest. Hunting on or crossing private land within or near the State Forest requires the written permission of the land owner. Parking is permitted along roadways as long as traffic is not blocked. Hunters must have a valid Maryland Hunting License and should refer to the current Hunting & Trapping guide for season dates and specific regulations.

Several access roads are opened every fall to accommodate hunters. These gated roads are opened prior to squirrel season in September and remain open through January 31. A copy of the road-opening schedule is available in the Forest Headquarters Office. Opened roads can be used by all hunters and allow for vehicular traffic. Due to the nature of these roads, the use of four-wheel drive is recommended. Handicapped hunter access roads are also available. More details about handicapped accessibility appear in this brochure and on the current road-opening schedule.

*Hunter Safety Classes, required for the purchase of a license, are taught periodically through the Department of Natural Resources. These classes are usually offered in the county at one of the local State Parks.

4. Trapping

Trapping is permitted both on land and in the water. A permit can be issued for trapping on Savage River State Forest at the Regional DNR Wildlife Office in Flintstone. Trappers are required to obtain a certificate of trapper education from the Department of Natural Resources. Trapper education courses are held statewide. Refer to the current Hunting & Trapping Guide for complete regulations. A valid hunting license is required when applying for a trapping permit.

5. Fishing

Anglers with a Freshwater Fishing License have the opportunity to catch multiple species of fish in the Savage River Reservoir including walleye, large-mouth bass, smallmouth bass, yellow perch, bluegill and several trout species. Anglers with a trout stamp can fish the Savage River for wild brook trout and stocked brown and rainbow trout. Tributaries of the Savage River, including Middle Fork, Poplar Lick and Blue Lick to name a few, provide a unique backcountry fishing experience for native brook trout that is unsurpassed in the region. The majority of the Savage River watershed is within the Zero Creel Limit Area for brook trout and can only be fished with artificial flies and lures. For regulations, creel limits and special management areas consult the Maryland Freshwater Sportfishing Guide or contact the Western Maryland Fisheries Office at (301) 334-8218.

6. Boating/Paddling

The Savage River Reservoir provides excellent boating and paddling opportunities. Three public boat launches offer convenient access at Dry Run Road, Big Run State Park and ¼ mile north of the dam breast on Savage River Road. Gasoline engines are prohibited on the reservoir. Recreational whitewater releases occur periodically throughout the year on Savage River below the dam that are sponsored and coordinated by the Upper Potomac River Commission, Savage River State Forest, Garrett College Adventuresports Institute, Verso-Luke Mill and several commercial boating outfitters. The events are at no cost to the participants, but donations are accepted to cover the cost of shuttle services and on site restroom facilities.

7. Winter Recreation

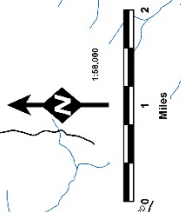
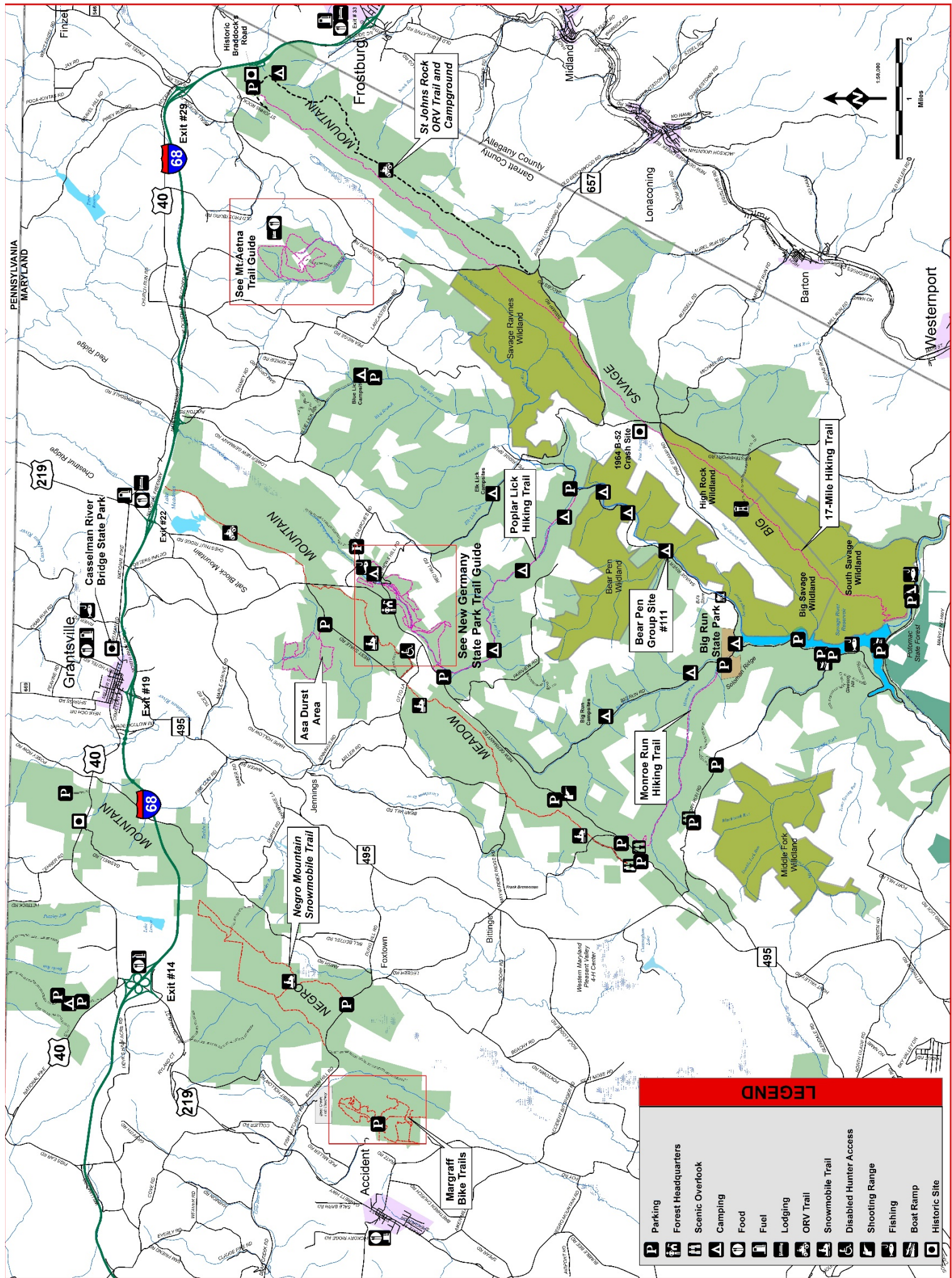
Cross-country skiers and snowshoers of all abilities can enjoy a winter wonderland on the New Germany and Mount Aetna trails. The Asa Durst Trails are recommended for a backcountry snowshoe experience. Snowshoers must be careful to walk beside and not on cross-country tracks as it disrupts them.

8. Geocaching

Currently, 28 geocaches are located throughout Savage River State Forest for those interested in testing their navigational and tracking skills. All geocaches must be reviewed and approved by the staff before being placed anywhere on the forest. Applications and general rules for geocache placement are available at the state forest headquarters.

9. Maps

Brochures and maps are available at the Savage River State Forest Headquarters Office located at 127 Headquarters Lane, Grantsville, Maryland 21536.



LEGEND

	Parking
	Forest Headquarters
	Scenic Overlook
	Camping
	Food
	Fuel
	Lodging
	ORV Trail
	Snowmobile Trail
	Disabled Hunter Access
	Shooting Range
	Fishing
	Boat Ramp
	Historic Site

See Mt. Aetna Trail Guide

St. Johns Rock ORV Trail and Campground

See New Germany State Park Trail Guide

Asa Durst Area

Negro Mountain Snowmobile Trail

Accident

Margraff Bike Trails

Poplar Lick Hiking Trail

Monroe Run Hiking Trail

Bear Pen Group Site #111

17-Mile Hiking Trail

High Rock Wilderness

Big Run State Park

Big Savage Wilderness

South Savage Wilderness

Middle Fork Wilderness

Savage Ravines Wilderness

Bear Pen Wilderness

Big Run Campsites

Western Maryland 4-H Center

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Bittinger

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B. Recreation Proposals

National Recreation Trails Grant Requests: To Enhance Recreation and Trails Opportunities for Visitors of Public Land.

Savage River State Forest has submitted one National Recreation Trails Grant Request to fund enhancements to various recreation trails on the forest:

1. St. John Rock Road, ORV Trail Maintenance – \$37,500

This project will provide seasonal maintenance personnel (2) to maintain the newly developed 13-mile long St. John Rock Road and Red Dog Road ORV Trail. Hiring these seasonal employees will benefit trail users by maintaining the surface of the trail and providing a safety backup on weekends. Operating the ORV trail will require regular maintenance and upkeep. The grant will fund five elements of trail upkeep including:

- 1) Maintenance of water control devices.
- 2) Monitoring use and providing public outreach.
- 3) Clean up of litter and debris.
- 4) Providing protection to environmentally sensitive areas adjacent to the trail
- 5) Maintaining closure of existing illegal trails and deterring new trails from being developed.

Campground and Rock Crawl

Pack It In, Pack It Out
 NO LEASHES AT ALL TIMES ON LEASHES ARE REQUIRED IN CAMPING AREA

Sites 1-4: 40' by 40'
 Sites 5-8: 20' by 20'
 Quiet Hours: 11:00 pm to 6:00 am
 Check-In: 3:00 pm
 Check-Out: 1:00 pm

White Oak Loop

OPEN TO

CLOSED TO

Approximately 1.3 Miles

SHARE THE ROAD

Red Oak Loop

OPEN TO

CLOSED TO

Approximately 2.0 Miles

St. Johns Rock Off Road Vehicle Trail and Campground

St. John's Rock/Red Dog Road
 OPEN TO

White Oak Loop
 1.3 Miles

Kid's Loop

Red Oak Loop
 2.0 Miles

Sasafraas Scramble
 Two Sections: 1.25 Miles

Red Maple Scramble
 Two Sections: .41 Miles

Chestnut Oak Scramble
 .50 Miles

Trail End

Legend:
 St. Johns Rock/Red Dog Road
 Picnic Area
 17 Mile Hiking Trail
 State Forest Boundary
 Garrett/Allegheny County Line

All Scramble Sections:
 OPEN TO

CLOSED TO

Scale: 0, 0.25, 0.5, 1 Miles
 Scale: 0, 125, 250 Meters

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2. Meadow Mountain Trail Construction (Continental Divide Loop Trail)

In fiscal year 2011, the forest was asked to participate in a large bike trail effort that would begin in Pennsylvania, travel along Meadow Mountain Trail, cross the University of Maryland 4-H property and continue south into Oakland, MD and then travel north through the Youghiogheny Wild and Scenic Corridor back into Pennsylvania. This project is currently referred to as the Continental Divide Loop Trail which is being spearheaded by Garrett Trails, a non-profit volunteer group dedicated to the development of sustainable trails that provide access to the economic, historic and environmental resources of Garrett County.

The southern section of the bike trail from State Route 495 to Frank Brenneman Road was completed in mid-2016. Funding was secured to continue construction of the trail northward beginning at Frank Brenneman Road and ending at New Germany Road just south of West Shale Road following existing forest access roads. Groundbreaking occurred in July 2017 and this phase of construction extended from Frank Brenneman Road to Otto Lane adding approximately 7.5 miles of resurfaced trail to the ongoing project.

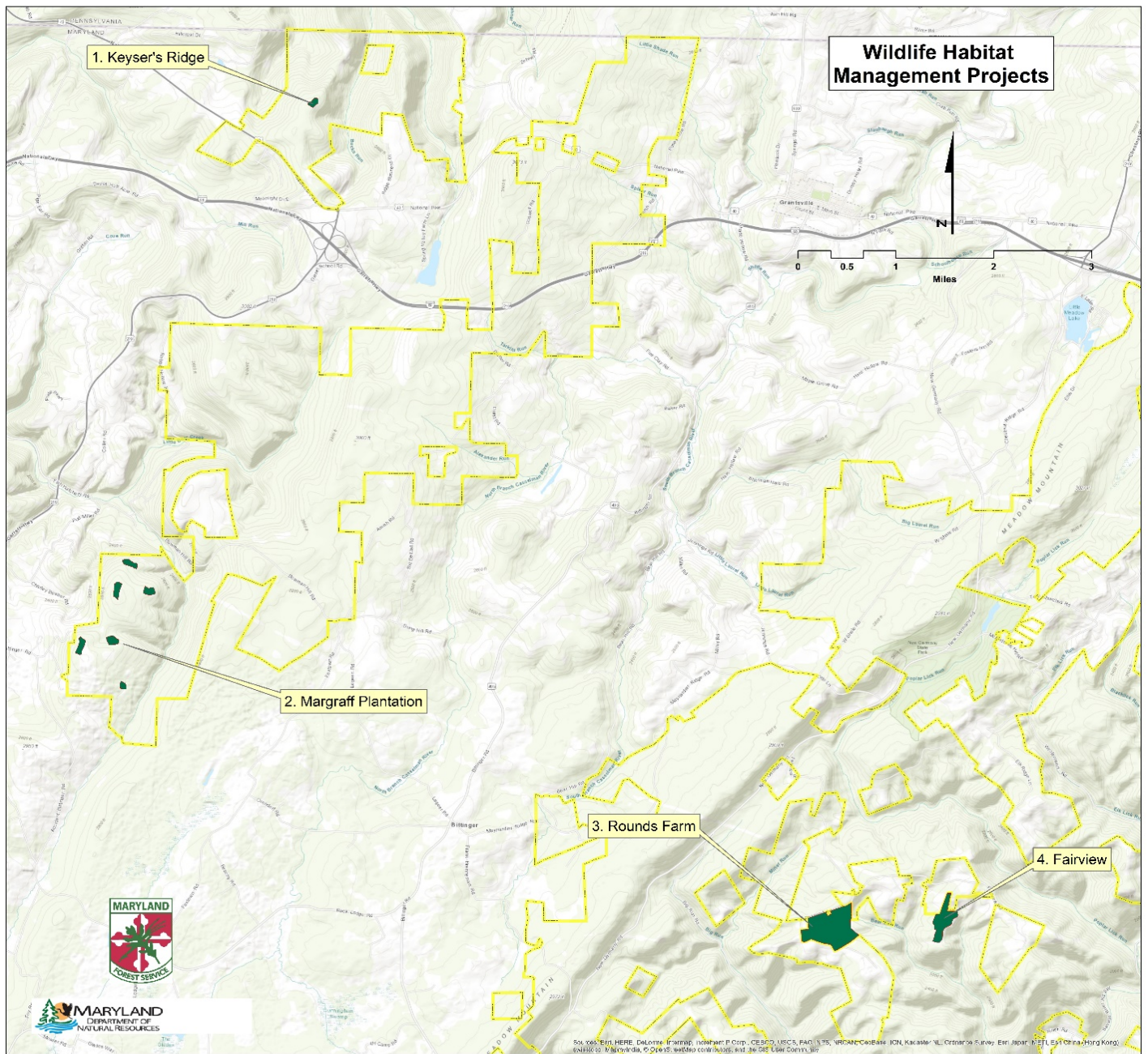
Grant funds have been made available from the Maryland State Highway Administration Recreational Trail Program and the Appalachian Regional Commission Area Development Funds to complete the final 3-mile phase of the project that extends from the southern end of West Shale Road to New Germany Road. Approximately \$400,000 dollars will be used to construct the trail, stabilize the trail surface with aggregate, install split rail fencing at the trail head as well as interpretive signage along the riding route, mobilization/demobilization of construction equipment and contingency costs. Upon completion of the project, a total of over 10 miles of new riding trail surface will be available for visitor recreational opportunities. To complement the new construction, three interpretive panels have been placed along the trail to educate trail users about the rich history of Garrett County, particularly the Native Americans that inhabited the land from the Paleoindian Period until the 17th Century.

VII. Wildlife Habitat Management Projects

A. General Wildlife Habitat Maintenance

Approximately 26.5 acres of wildlife specific projects have been implemented throughout the state forest. These projects are located in the Margraff tract of Compartment 14 east of Accident, MD, Keyser's Ridge, the Nature Conservancy acquisition of Fairview Road and the "Rounds Farm" located off Pea Patch Road. General practices include liming and fertilizing as well as planting of cover and grain crops, where appropriate. Plantings include millet, oats, corn, turnips (*Brassica spp.*), warm season grasses, native wildflowers and clover (See Wildlife Habitat Management Projects map and summary, P.16).

Five acres of the Rounds Farm have been planted with sunflowers as part of an ongoing management strategy to increase mourning dove (*Zenaida macroura*) hunting opportunities by expanding upland feeding grounds. Prior plantings on the Rounds Farm and on the Margraff Plantation have provided positive results with hunters reporting successful outings in both areas. If the planting endeavor continues to be successful in attracting significant amounts of mourning doves as well as hunters, the plantings may be conducted on all wildlife habitat management units on the forest. Information is also available on the Maryland DNR Wildlife and Heritage Service web page: <http://dnr.maryland.gov/wildlife/Pages/default.aspx>.



<i>Area</i>	<i>Species Planted</i>	<i>Acres</i>	<i>Fertilizer</i>
<i>1. Keyser's Ridge</i>	<i>Clover mix</i>	<i>1</i>	<i>300 lbs 10-20-20</i>
<i>2. Margraff Plantation</i>	<i>Clover mix</i>	<i>1</i>	<i>500 lbs 19-19-19</i> <i>300 lbs 10-20-20</i>
	<i>Brassica mix</i>	<i>4</i>	
	<i>Millet mix</i>	<i>2</i>	
<i>3. Rounds Farm</i>	<i>Sunflowers</i>	<i>5</i>	<i>1500 lbs 19-19-19</i> <i>8 tons lime</i>
	<i>Corn</i>	<i>3</i>	
	<i>Brassica mix</i>	<i>2</i>	
	<i>Millet mix</i>	<i>2</i>	
	<i>Switch grass</i>	<i>4</i>	
<i>4. Fairview Road</i>	<i>Clover mix</i>	<i>1.5</i>	<i>500 lbs 10-20-20</i>
	<i>Brassica mix</i>	<i>1</i>	

Figure 4. Wildlife Habitat Management Project Areas and Applications

B. Feed a Bee Forage Grant

In 2017, the Bayer Crop Sciences Bee Care Program initiated the Feed a Bee forage initiative across all fifty states to promote the planting and maintaining of native wildflowers to benefit pollinators. In September 2017, the Maryland Forest Service requested \$5,000 to establish six acres of pollinator habitat within woodlands of the state forests. Target areas for the grant included log decks, field edges and retired agricultural fields. The area selected for the planting on Savage River State Forest was unique in the fact that it was the former site of a house and barn that occupied approximately one-half acre. The structures were present on the property when it was acquired as part of the state forest and were subsequently razed, providing an ideal stratum on which to cultivate wildflowers. Grant funds were awarded in January 2018 and the soil was prepared and seeded in June 2018 with ten pounds of Showy Northeast Native Wildflower and Grass Mix. The site will be monitored regularly with a commitment to maintain flowering success for at least three years with the intent of providing pollinator habitat indefinitely as well as determining what species and cultivating techniques provide the maximum benefit to the pollinators of the region and incorporate them into the overall management of the forest allowing for the perpetual development of this unique habitat.



Figure 5. Evolution of the Feed a Bee site from razed structure to wildflower planting.

VIII. Ecosystem Restoration / Protection Projects

A. Non-Native Invasive Species (NNIS) Control

Across the State, a biological invasion of non-native and invasive plants is spreading into fields, forests, wetlands and waterways. Referred to in a variety of ways including exotic, non-native, alien or non-indigenous, invasive plants impact native plant and animal communities by displacing native vegetation and disrupting habitats as they become established and spread over time. Early Detection and Rapid Response (EDRR) to control the spread of problematic species is important for the conservation of native flora and fauna. Control efforts often require considerable resources including labor, time and money.

As in many cases, the introduction of these widespread and invasive plants cannot be prevented. It is important to evaluate and plan control efforts in order that such efforts contribute meaningfully to the success of forest conservation plans. EDRR efforts targeting NNIS discovered during the forest wide inventory have been successful in identifying and controlling a number of NNIS populations. Species-specific management plans have been developed for two notable species including Japanese knotweed and Yellow Archangel (See Appendix 2 and 3).

The State Forest staff has treated and/or is monitoring several plant colonies or sites including: five tree-of-heaven sites, ten Japanese knotweed sites, two mile-a-minute weed sites and one yellow archangel site (See corresponding map for locations).

1. Japanese knotweed (*Fallopia japonica*). Several areas of Savage River State Forest have become infested with the invasive plant Japanese knotweed (*Fallopia japonica*). Seven treatment areas have been delineated and six of them will be treated and monitored to determine the most effective course of action for suppressing and ultimately eradicating the plant from these areas of the forest. Knotweed growth below the Savage River Reservoir has reached a critical level and will not be treated at this time due to the overwhelming investment that would be required to reach any reasonable level of control. As more effective treatment methods become available for large areas, this area will be reevaluated in regard to implementing a control plan.

The initial treatments occurred in the first week of June, 2011. Treatments in all areas of the forest involve a two-step process that includes both mechanical and chemical means of control. First, the knotweed is cut and allowed to grow back for 8 weeks, reaching only 2 to 4 feet in height. Second, the new growth is treated with a 2% solution of glyphosate as the active ingredient. Treatment of these areas has been repeated on a yearly basis and will continue until the plant has been eradicated from the target areas.

2. Yellow archangel (*Lamium galeobdolon*). Dry Run, a tributary of the Savage River and Savage River Reservoir has been infested with the aggressively growing, non-native invasive perennial, yellow archangel (*Lamium galeobdolon*). The infestation of the area most likely originated from a private residence which was abandoned and the once maintained yard area was neglected, allowing the plant to escape to the adjacent property. After establishing a colony at the head of the watershed, the plant quickly enveloped the drainage from the private residence to the high water mark of the Savage River Reservoir, encompassing nearly 15 acres of forest land.

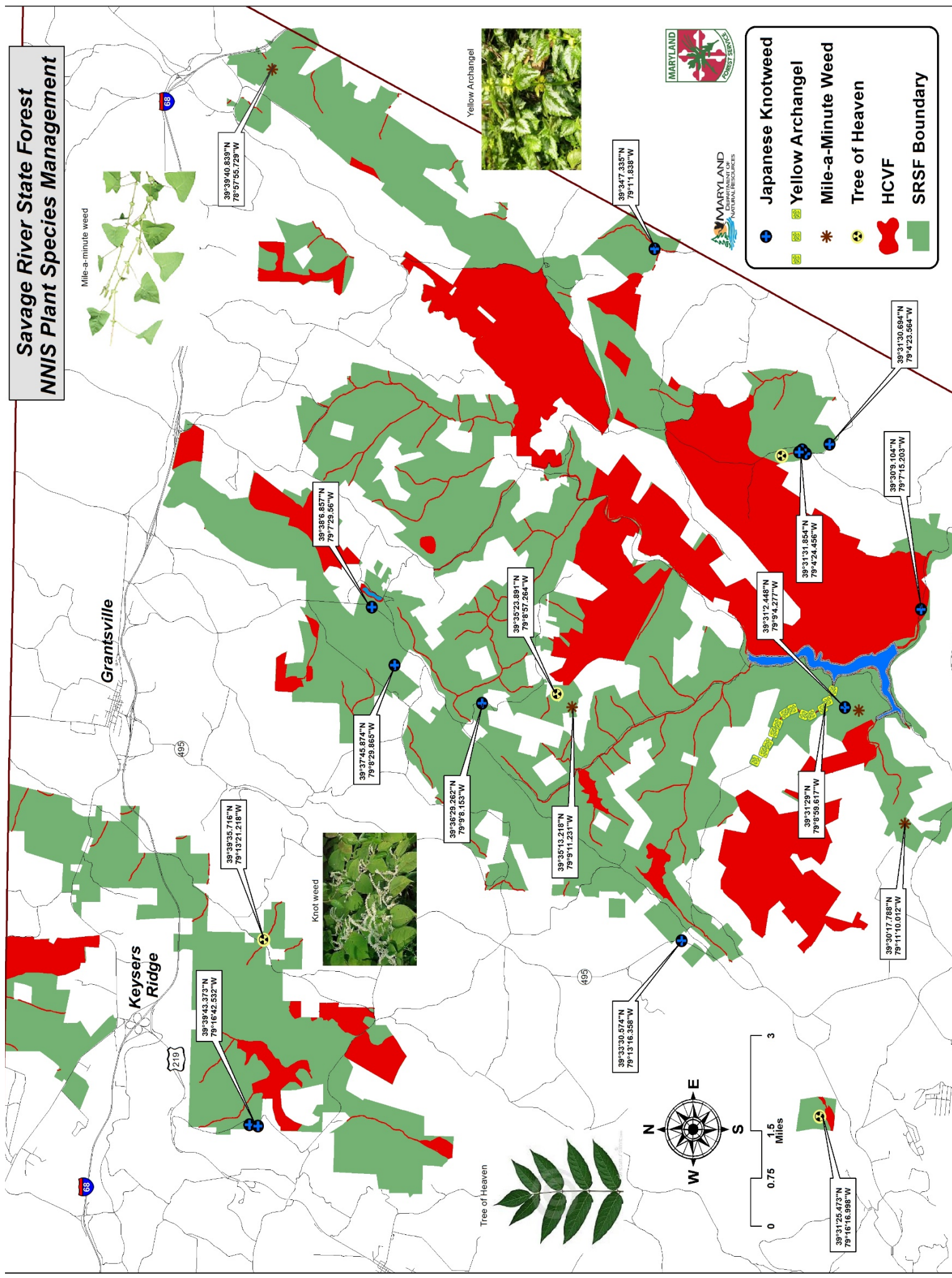
The plant grows quickly and out-competes native vegetation for resources. Yellow archangel spreads in several ways; by seed, by stem fragments, and by rooting at the nodes of the stem. This makes the plant very difficult to control and requires multiple applications of herbicide and diligent monitoring to limit the spread of the plant in natural forest environments. There is no projected end date for the herbicide treatments due to the persistent nature of this plant and efforts will be made annually until the spread of the plant is contained or the plant is eradicated. Recent late season snowfalls and above average rainfall have limited any attempts to control the species. Successful eradication of this plant is anticipated given the relatively confined area of infestation. Site monitoring will continue after the eradication of the plant for at least 5 years.

3. Mile-a-Minute Weed (*Persicaria perfoliata*) A small patch of mile-a-minute weed (*Persicaria perfoliata*), another aggressive non-native invasive, was discovered in Compartment 29A. The area was treated in FY 19 with a 2% glyphosate solution, but a field survey revealed that the initial treatment was unsuccessful. Herbicide treatment of triclopyr was applied for two consecutive years and monitoring of the site will continue into FY 20 and beyond until the plant has been eradicated. A previously discovered patch of mile-a-minute weed in Compartment 38 near the St. Johns Rock ORV Trail that was seemingly removed during the

excavation for the trail campground reemerged and has been treated. Monitoring of the area will continue and the site will be treated as necessary in order to eradicate this plant from the site.

4. Tree-of-Heaven (*Ailanthus altissima*) Individual stems of the exotic invasive tree-of-heaven have been identified in several areas of the forest. Control measures including both mechanical and chemical have been implemented to remove this species from the limited areas in which it is present. These plant colonies are now part of our long term monitoring program, with follow-up treatments planned as necessary in the interest of preventing these species from establishing themselves in the otherwise natural forest communities in which they were found.

Savage River State Forest NNIS Plant Species Management



Grantsville

Keyseers Ridge

Yellow Archangel



Knot weed



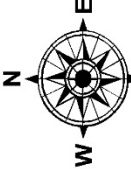
Tree of Heaven



MARYLAND DEPARTMENT OF NATURAL RESOURCES

MARYLAND FOREST SERVICE

- + Japanese Knotweed
- Yellow Archangel
- * Mile-a-Minute Weed
- ☠ Tree of Heaven
- + HCVF
- SRSF Boundary



39°39'40.839"N
78°57'55.729"W

39°34'7.335"N
79°1'1.838"W

39°38'6.857"N
79°7'29.56"W

39°35'23.891"N
79°8'57.264"W

39°31'2.448"N
79°9'4.277"W

39°31'31.854"N
79°4'24.456"W

39°30'9.104"N
79°7'15.203"W

39°31'30.694"N
79°4'23.564"W

39°37'45.874"N
79°8'29.865"W

39°36'29.262"N
79°9'9.153"W

39°35'13.218"N
79°9'11.231"W

39°31'29"N
79°5'58.617"W

39°30'17.788"N
79°11'10.012"W

39°39'35.716"N
78°13'21.218"W

39°38'43.372"N
79°16'42.532"W

39°33'30.574"N
79°13'16.358"W

39°31'25.473"N
79°16'16.988"W

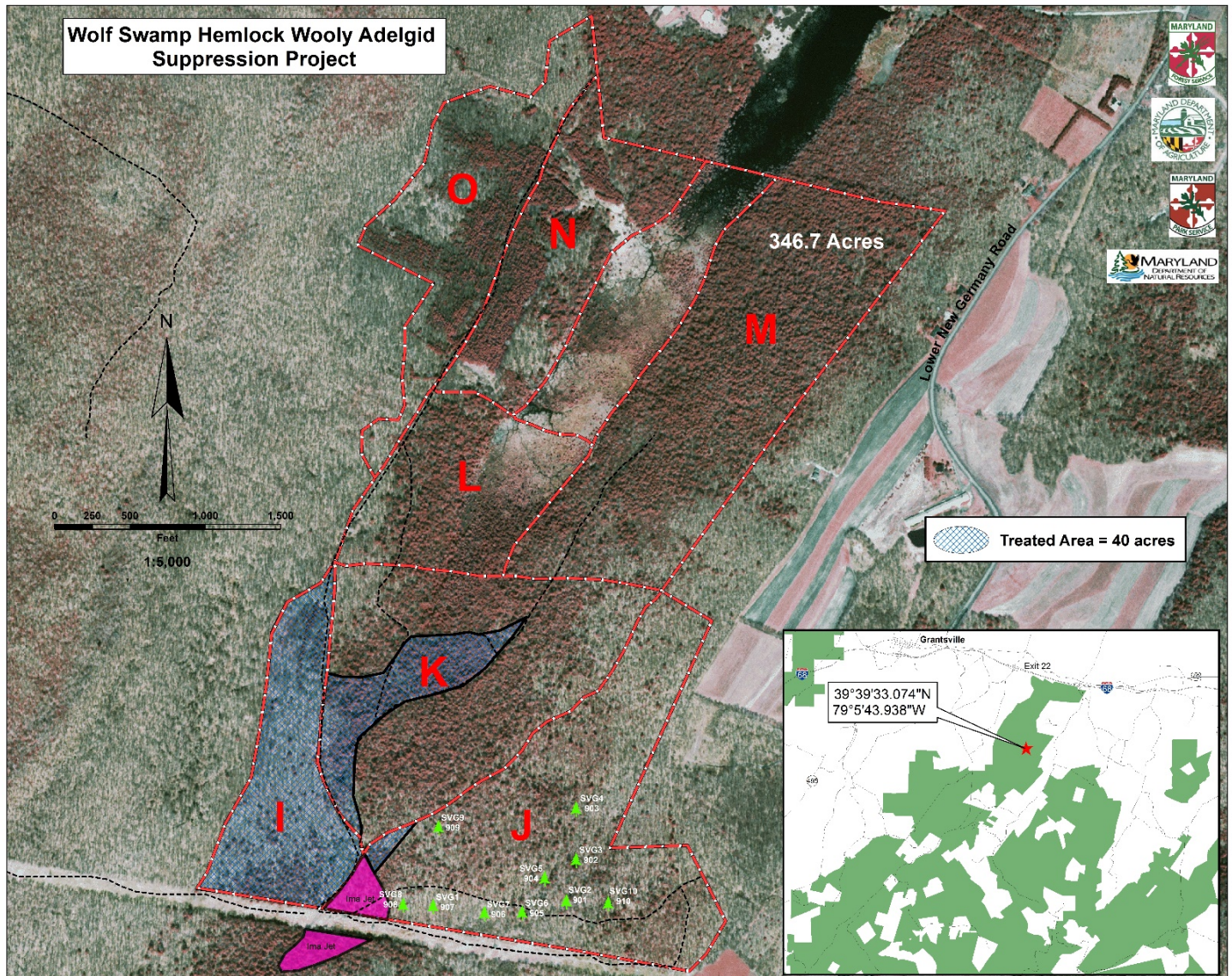
Mile-a-minute weed



B. Wolf Swamp Hemlock Woolly Adelgid (*Adelges tsugae*) Treatment

Hemlock Woolly Adelgid has been identified as a significant forest pest on the State Forest. As part of a State Wide HWA Management Plan developed to address the impact of the pest, an aggressive management effort is being made to protect what have been identified as high priority Hemlock stands.

In an ongoing, cooperative effort with Maryland Department of Agriculture, and the Maryland State Park Services/Maryland Conservation Corps and the State Forest, 284 acres of the Wolf Swamp ESA have been treated with soil drench/soil injection and individual tree injection treatments of Imidacloprid based HWA insecticide. Planning has begun to continue the treatment regime to include an additional 346 acres of the ESA located north of the initial treatment project. In October 2017, 2,486 trees were treated and an additional 1,678 trees were treated in May 2018. This undertaking began in October 2015, and will continue as resources are available or the area is fully treated.



C. Compartment 29A American Chestnut Orchard Proposal

Project Description:

The Maryland Chapter of the American Chestnut Foundation seeks permission to establish a germplasm orchard on the Rounds Farm off Pea Patch Road in Compartment 29A of Savage River State Forest to preserve chestnut germplasm from regionally adapted trees from Garrett and Allegany counties. The Chapter manages a number of orchards, but none contain significant representation of trees adapted to the particular climactic conditions of far western Maryland. Future efforts to restore the chestnut in those counties through the Chapter's backcross breeding program will be substantially more effective if the trees in the program are based on local genetic resources.

Seeds for the trees in the orchard will be collected from wild American chestnuts found on both private and public property in the two counties. The Chapter and other organizations will hand pollinate the trees and plant the resulting seeds in the orchard. The Chapter will also be responsible for maintaining the orchard, monitoring and culling trees, and re-planting as necessary and for all associated costs. If possible, State Forest assistance in preparing the site (i.e., drilling holes for fence posts) and mowing (3-4 times per year) would be welcome. The orchard will contain approximately 100 trees. Trees which survive to maturity will be incorporated into the Chapter's backcross breeding program

General Site Conditions:

The proposed orchard would cover approximately one-half of an acre at a site to be agreed with the State Forest. The orchard would be surrounded by an 8' high, deer-proof fence, with a 12' entrance gate for vehicles and person. The Chapter may need to make soil amendments at the site to improve growing conditions. These amendments could include: 1) planting daikon (aka Japanese) radishes in the rows to increase soil nitrogen levels, serve as a shade block to prevent weeds, and increase organic matter in the soil when the radishes die back and decompose over the winter; 2) the addition of minerals (e.g., calcium) depending on the results of a soil survey at the orchard site to improve its suitability for chestnuts. Mineral amendments would be applied by a licensed applicator.

In addition, to prepare the rows, the Chapter would have a licensed applicator spray the future rows with an herbicide (Round-Up) prior to tilling, making soil amendments and planting. The Chapter would also spot treat other points after the fence is erected to prevent the re-emergence of woody shrubs. To keep the spaces in the rows between trees clear of weeds, the Chapter will either mulch, if available, or spray herbicide, once per year, in those spaces. The Chapter would also use herbicide along the fence line once per year to keep the fence clean (Yap, 2018).

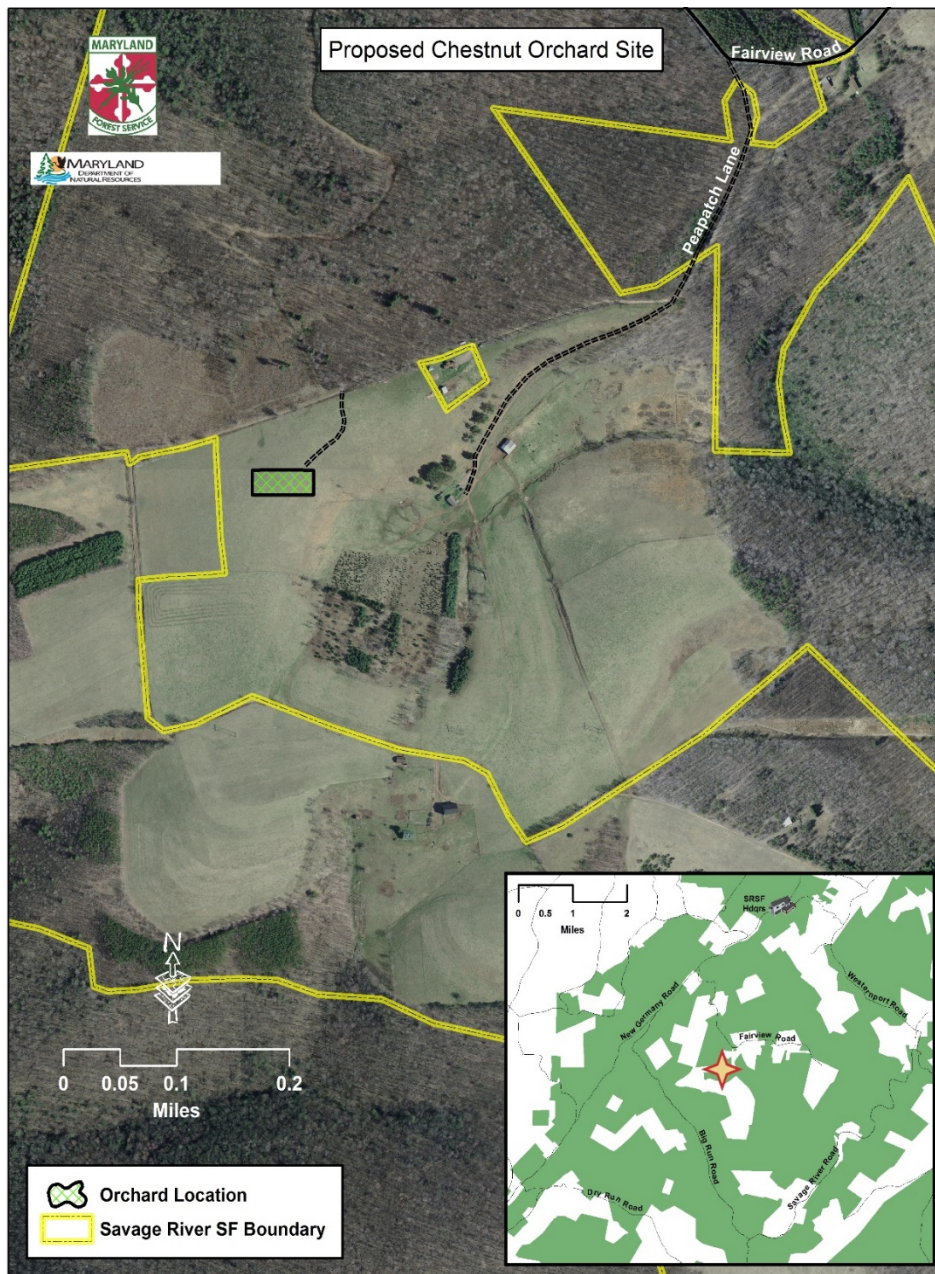


Figure 8. Approximate location of the proposed American Chestnut Orchard on the Rounds Farm in Compartment 29A.

IX. Monitoring and Research Projects

A. Monitoring

1. Silvicultural Activities

All silvicultural operations taking place on Savage River State Forest will be monitored on a weekly basis, and more frequently when adverse weather conditions arise to ensure that all Best Management Practices specifications are being followed. Regeneration harvests will be monitored five and ten years after harvest. Non-native invasive species will be monitored yearly and herbicide treatment regimens will be implemented as necessary to eradicate these species from the forest ecosystem. Management documents outlining specific treatments and monitoring schedules have been drafted for the individual species.

2. Casselman River Watershed Brook Trout Population Monitoring

In fiscal year 2011, the Bureau of Mines division of the Maryland Department of the Environment formally submitted a proposal to treat the pH impairment in the headwaters of the Casselman River Drainage that involved constructing leach beds as well as designating sites on the state forest to deposit limestone sand into the tributaries of the river. Construction of the project began in 2012 and upon completion four leach beds and nine sand dumps sites were established, all within Savage River State Forest (See Map p.27). Between July 31, 2018 and August 7, 2018 Maryland Fisheries Service conducted an initial electrofishing sampling at each of the sites and the informal survey results are presented here, which reflect the success of the treatment regime in improving and in some cases, restoring brook trout populations throughout the watershed. (All subsequent information regarding monitoring courtesy of Alan Klotz, Western Region 1 Fisheries Manager, 2018).

North Branch Casselman River at Foxtown Road sand dump site on 7/31/18.

Acting on a tip from Jaron and Eric – we sampled right at the sand dump site. In only 96 seconds of electrofishing effort – we collected nine adult brook trout ranging in size from 145 mm (5.7 inches) to 275 mm (10.8 inches). The Catch per Unit Effort (CPUE) was 338 brook trout per hour of electrofishing, but I would like to get landowner permission to do a more thorough sample at this site. **This was the first time we collected brook trout in this stream.** Water temperature was very cold at 15.6 °C. Creek chubs were also present.



North Branch Casselman River Brook Trout 2018.

Alexander Run on 7/31/18.

This stream was previously fishless due to acidic conditions. Ron Klauda (retired DNR biologist) conducted a bio-assay study in this stream in 1991 using brook trout and mottled sculpins. All mottled sculpins and 95% of the brook trout died within eight days during the test. I didn't really have any expectations of collecting any fish – I couldn't have been more wrong! We walked downstream from Amish Road to the Savage River State Forest boundary and conducted a qualitative electrofishing survey heading back upstream. Results were incredible! We collected 18 adult brook trout and 60 young of year brook (YOY) trout in 1200 seconds of electrofishing effort for a CPUE of 234 brook trout per hour! No other fish species collected. Stream temperature was cold at 15.8° C, and conductivity was low at 58.1 uS/cm.



Alexander Run adult brook trout, 7/31/18.

Tarkiln Run, 7/6/18

MBSS data showed one brook trout was collected in a 1997 survey. We found the stream to be fishless in 2014. We sampled from the confluence with the North Branch Casselman River upstream about 200 meters this year (not really expecting to collect any fish). Again I was wrong! We collected 17 brook trout in 600 seconds of effort (CPUE = 102 brook trout per hour), ranging from YOY to 11 inches! We also collected mottled sculpins, creek chubs, and a longnose dace – these fish are less tolerant to acidic conditions than brook trout. Temperature was cold at 16.4° C, and conductivity was 129.3 uS/cm.



Tarkiln Run 11-inch brook trout, 7/6/18.

Upper Big Laurel Run, 8/7/18

We did extensive electrofishing surveys in upper Big Laurel Run downstream of West Shale Road in 2008 and found this stream reach to be fishless. Since 2008, this stretch of the stream is now being treated with limestone sand dumps and an alkaline producing leach bed along West Shale Road. We sampled downstream of the treatment areas where the Aza Durst trail crosses the stream on Savage River State Forest. Results were incredible – an adult brook trout population was estimated at 408 per mile with a YOY population estimate at 751 per mile for a combined number of 1,158 brook trout per mile. In 2008 it was ZERO brook trout per mile! No other fish species were collected this year.



Upper Big Laurel Run brook trout, 8/7/18.

Long-term Monitoring Stations

The Big Laurel Run, Little Laurel Run, Spiker Run, and the South Branch Casselman River stations were also surveyed in 2018, with varying results.

Big Laurel Run, 8/7/18

Big Laurel Run near the lower Savage River State Forest boundary continues to support a brook trout population along with abundant numbers of mottled sculpins, blacknose dace, creek chubs, and white suckers. This year's estimate was 451 adult trout per mile and 773 YOY trout per mile for a combined total of 1,224 brook trout per mile. These estimates are 1.6x greater for adult brook trout and 1.3x greater for YOY brook trout compared to the 2008 baseline study. Associated fish species also showed increases since 2008.

Little Laurel Run, 7/26/18

Station also located within the Savage River State Forest, with an estimated 837 adult brook trout per mile and 730 YOY brook trout per mile for a combined total of 1,567 brook trout per mile. This represents a 2.8x increase in adult numbers and 3.4x increase in YOY numbers since 2008. No other fish species collected.

We do have a monitoring station downstream about a mile on a private property (Leo Miller Farm) on a separate project. Working with the Forest Service, we conducted a livestock exclusion fencing project and tree planting along Little Laurel Run in 2016. Brook trout are present (322 per mile - all age classes) along with abundant numbers of mottled sculpins, white suckers, creek chubs and blacknose dace. The riparian zone is looking great; many of the trees are taller than six feet.



Little Laurel Run trees and brook trout on the Leo Miller Farm project site.

Spiker Run, 7/24/18

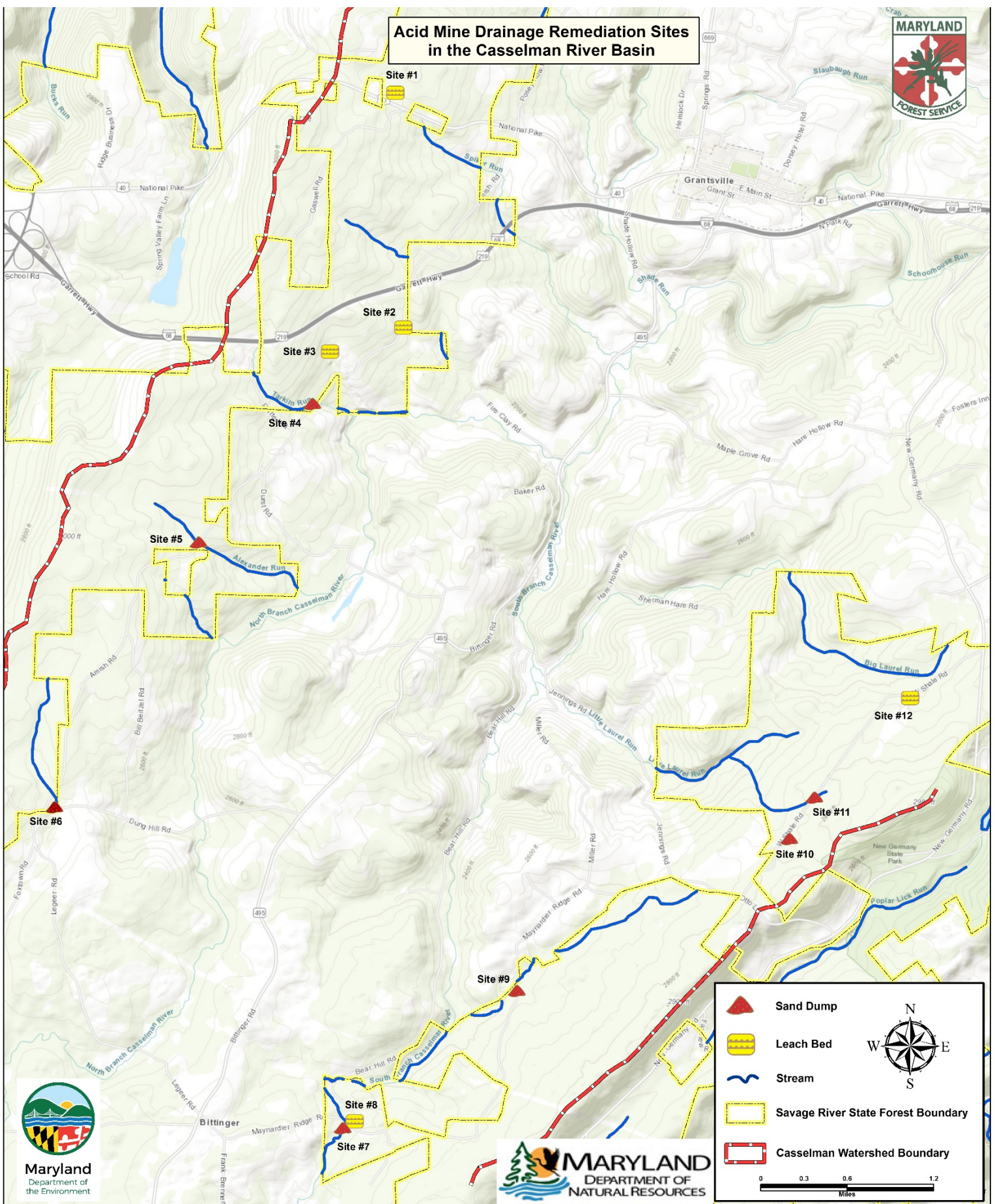
Now the not-so-good news - Spiker Run had a moderate number of adult brook trout at 300 per mile, and a low number of YOY at 64 per mile. Adult numbers are 1.6x greater than 2008, but much lower than that observed in the 2014 and 2016 surveys. YOY numbers are 2.5x less than 2008, and continue to show a decrease since 2014. Mottled sculpins, blacknose dace, and creek chubs that are less tolerant to acidity are still present. This stream is close to Rt. 68 so high salinity values may worth being investigated.

South Branch Casselman River, 8/7/18

This is another stream that has me stumped – adult brook trout were estimated at only 150 per mile and YOY at 215 per mile. This is a 3.9x decrease in adult numbers and a 2.8x decrease in YOY numbers since the 2016 survey. Other fish species present were mottled sculpins, common shiners, creek chubs, river chubs, blacknose dace, longnose dace – these fish are sensitive to acidic conditions. So I don't have an answer why the brook trout numbers were so down this year, other than “natural variation”.

The application of sand-sized limestone and the alkaline producing leach beds in acidified streams in the Casselman River Watershed has been very successful in restoring brook trout populations. The goal of increasing brook trout densities, increasing the number of stream miles inhabited by brook trout and increasing recreational brook trout fishing opportunities has been achieved. I will provide a formal report on these data, and we will continue to monitor these streams on a bi-annual basis.

Acid Mine Drainage Remediation Sites in the Casselman River Basin



	Sand Dump	
	Leach Bed	
	Stream	
	Savage River State Forest Boundary	
	Casselman Watershed Boundary	

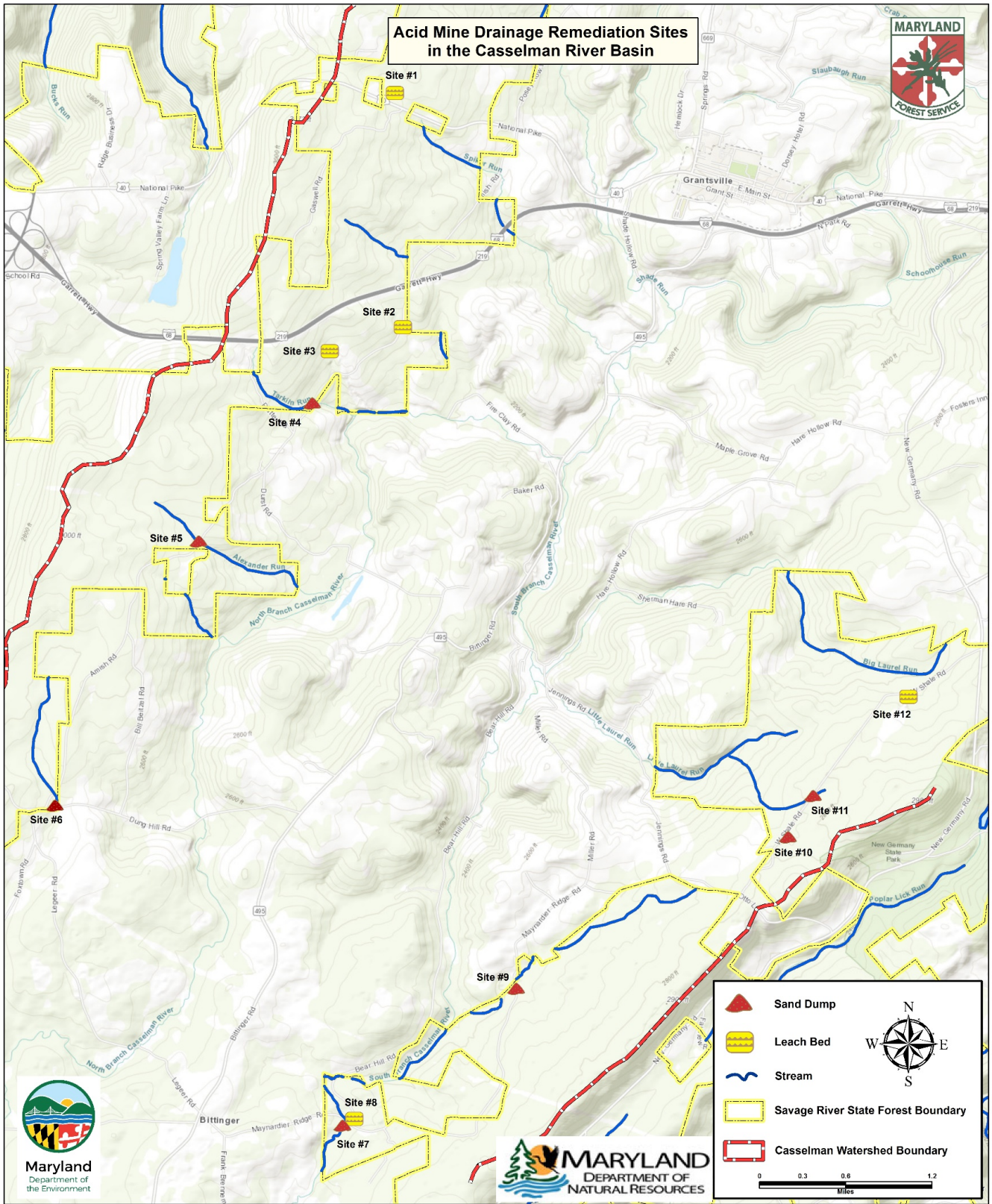


Figure 9. Sand dump and leach bed locations for the Casselman Basin AMD Remediations Project

3. St. Johns Rock ORV Trail Educational Monitoring

Introduction

In an effort to support the demand for off road vehicle (ORV) riding areas, the Maryland Department of Natural Resources (MD DNR) initiated the establishment of a special management area, with a small network of trails specifically designed and built to accommodate ORV trail riding, at the St. John's Rock - Red Dog Road area of Savage River State Forest (SRSF) in northeastern Garrett County, Maryland. Following a lengthy design phase, construction on the trail system began in October 2016 and was completed the following summer. The trail was opened to the public on 21 July 2017. (All subsequent information regarding monitoring courtesy of Kevin Dodge).

The St. John's Rock ORV trail consists of technical spurs, single-track scrambles, a rock crawl area, and campsites to accommodate ORV users. The main trail, which totals approximately 10.5 km, was constructed along an old, unpaved logging road accessed via St. John's Rock Road and Red Dog Road.

To ensure that the trails would be maintained and enjoyed without significant degradation to the surrounding environment, interested parties requested that a monitoring and education program be developed to provide objective measures that would help inform management practices and serve as a basis for educating recreational users, community members and decision makers about the real impacts of this type of use. It was hoped that this pilot project would generate actionable science-based data that would lead to successful state-wide management practices and policy on future ORV trail projects. A committee, composed of Wade Dorsey, SRSF former Forest Manager of SRSF; Ken Kyler, Maryland OHV Alliance; Steve Storck, West Virginia University Tech Adventures Recreation Management program; and Kevin Dodge, Garrett College Natural Resources and Wildlife Technology (GC NRWT) program, met several times to establish a framework for the monitoring project. The committee solicited input from pertinent experts in the MD DNR to identify key organisms, resources, and impacts to be monitored, and the following list was compiled:

- breeding birds
- amphibians and reptiles
- mammals
- water quality (sediment, chemistry, streambed morphology)
- pollution (litter, oil/fuel spills, human waste)
- trail degradation (trail erosion [linear and lateral], mud development, rutting, washboard development, trail widening/multiple tread development, rogue trail creation, horizontal trail tread displacement)

The GC NRWT program was then contracted to design and implement the monitoring program.

Methods

The purpose of this monitoring program was to “establish monitoring methodologies and baseline data to inform management decisions and user education resources that support operation of a sustainable network of ORV trails at the St. John’s Rock-Red Dog Road area of Savage River State Forest ... to specifically assess environmental impacts of trail use on surrounding resources including vegetation, wildlife and waterways as well as identify trail degradation patterns.”

In spring 2016, two GC NRWT students (Josiah Freese and Robert Mulligan, both rising sophomores) were chosen to work as technicians on the project, based on their knowledge of wildlife and plants and their demonstrated potential for the ability to competently accomplish the tasks required for the project. Work on the project was begun following the end of the spring semester in May 2016.

It was quickly determined that the proposed list of organisms, resources, and impacts to be monitored was far more comprehensive than what could reasonably be accomplished by two technicians during a three month field season. As a result, the scope of the project was modified. Following consultation with colleagues at Frostburg State University and the MD DNR Wildlife and Heritage Service, a sampling design was developed to monitor potential impacts of the trail on birds, reptiles and amphibians, and vegetation. Data were collected during the summers of 2016 and 2017.

Overall survey point layout

The St. John’s Rock ORV trail is located on the southeast-facing slope of Big Savage Mountain. The dominant forest type is mixed hardwood with age classes ranging from the stand initiation stage to the stem exclusion stage. Several first order streams are scattered along the length of the trail. SRSF staff provided GIS layers for aerial photography and the proposed trail footprint. Thirty-two pairs of monitoring points were established along and adjacent to the proposed trail for a total of 64 points along the entire length of the trail from the campsite area to its junction with Avilton-Lonaconing Road (see Figure 1). The point pairs were spaced at 250 m straight line intervals along the road. The first point pair began 100m below the campsite area at the north end of the road. One point of each pair was placed directly on the road and designated as M (middle). The other point alternated upslope or downslope from the road in reference to the topography of Big Savage Mountain to allow for comparison of data collected near the trail where any impacts of disturbance from the trail might be expected to be observed versus away from the trail where the impact of the trail might be expected to be less evident. Upslope was defined as 304°, and downslope was defined as 124° (roughly perpendicular to the overall trend line of Big Savage Mountain). The distant points were placed 250 m from the road or disturbance (proposed trail segment) and designated as U (upslope) or L (downslope). The slope position of the first distant point was designated as upslope (1U) by flipping a coin. All point layout and trend line estimation was completed in GIS using ESRI ArcMap and located in the field using GPS units. The closest tree to the GIS point was flagged and tagged as the point center. These coordinates were then input into the GIS.

Bird Surveys

Bird point counts were conducted at each of the 64 monitoring points. Point pairs were surveyed in groups of 6 (3 point pairs per each of the 2 technicians; 12 points total) or 8 (4 point pairs per each of the 2 technicians; 16 points total) per day. Given suitable weather conditions, a complete survey of all 64 points took five days. For example, the first survey sequence consisted of point pairs 1-6 (day 1), point pairs 7-12 (day 2), point pairs 13-18 (day 3), point pairs 19-24 (day 4), and point pairs 25-32 (day 5). The order in which the point pairs were surveyed was reversed during each survey sequence (i.e., survey sequence 1: point pairs 1-36; survey sequence 2: point pairs 36-1, etc.). The set of 3 or 4 point pairs surveyed by each technician was switched on successive survey sequences so that each point was surveyed an equal number of times by each technician. Four survey sequences were conducted during each field season.

Bird point counts began on 1 June and ended in mid-July each summer. Each morning, the first point count was conducted at the distant (U or L) point of the pair, and counts were conducted each morning in a sequence of U or L, M, M, U or L, M, U or L, etc. (distant, road, road, distant, road, distant, etc.). The first count each morning began at sunrise, and subsequent counts that morning were begun as soon as the technician arrived at each successive point. Counts were completed each morning by 1000. Counts were not conducted during rain or fog events or at wind speeds ≥ 3 on the Beaufort scale.

Before the start of each point count, point number, date, time, wind, weather, and observer were recorded. Wind speed was measured using the Beaufort Scale, and weather conditions were assigned using National Weather Service codes. If weather or wind conditions changed during the survey, a note was made on the data sheet. During each point count, all birds detected by sight or sound during a 0-10 minute period were identified to species and sex (if possible) and recorded. The 10 minute survey period was divided into two 5 minute intervals. During the 5-10 minute period, only newly detected birds were recorded. All birds seen or heard were recorded as M (male, as determined visually or by song) or O (other -- female or unknown sex, as determined visually or by sound). Distance to each bird detected was recorded as <50 m or ≥ 50 m from the point. Birds flying overhead were recorded as a flyover. Birds that were detected during the survey but that could not be identified were recorded as U (unknown), along with notes describing its appearance and/or sound. All data were recorded on a standardized data sheet (see Figure 2).

Reptile and Amphibian Surveys

Reptiles and amphibians were monitored using cover board surveys at each monitoring point, as well as through mortality surveys along the road and trail system.

Reptile and amphibian cover board surveys – To assess reptile and amphibian populations, a pair of cover boards was placed at each of the 64 monitoring points, one 30 m upslope (304°) and one 30 m downslope (124°) from the point, for a total of 128 cover boards. Cover boards were 0.61 X 0.61 m in size and constructed using 1.27 cm thick untreated plywood. Cover boards were placed in July 2016. Before each cover board was placed into

position, all leaf litter was removed so that the cover board was in direct contact with mineral soil.

Each cover board was checked once each month during the 2017 field season, starting the first week of June, July, and August. The order in which cover boards were checked was reversed each round (1-32 in June, 32-1 in July, 1-32 in August). In June and July, cover boards were checked starting at 1000 (following completion of that morning's bird survey). In August, cover boards were checked at various times during the day. Species, total length and snout-to-vent length (measured to the nearest 0.1 centimeter), and weight (measured to the nearest 0.1 gram using a 10 g Pesola scale) were recorded for each individual encountered under each cover board. All data were recorded on a standardized data sheet (see Figure 3).

Reptile and amphibian road and trail mortality surveys – Mortality of reptiles and amphibians on the road and trail system attributable to vehicle (passenger vehicle, construction vehicle, and ORV) traffic was determined using walking visual surveys. To survey for mortality along the main road in both 2016 and 2017, two technicians walked side-by-side from the gate on the north end of the road to the gate on the south end of the road. The same procedure was followed for mortality surveys along the newly created ORV trail system in 2017. Each dead reptile and amphibian encountered was identified to species, and the location of each individual was collected using a GPS. Similarly, any live reptile or amphibian observed crossing the road during the survey was also identified, and the individual's location was collected using a GPS. Live reptiles and amphibians encountered crossing the road or trail were moved off the road or trail in the direction in which they were headed.

The 2016 main road reptile and amphibian mortality survey was conducted on 12-13 July. Three main road and ORV trail mortality surveys were conducted in 2017. These surveys occurred at the beginning (Monday and Tuesday) of the last week of May, June, and July (30-31 May, 26-27 June, and 31 July - 1 August). The entire trail system was surveyed on Monday and the main road was surveyed on Tuesday. These days were chosen to follow what was expected to be higher use of the site over a weekend. The trail system was searched first to minimize potential loss of specimens due to removal by scavengers.

Vegetation Surveys

Vegetation was measured at each of the 64 monitoring points using 3 0.04 ha circular plots (designated as subplots), one located 50 m upslope (304°) from the point (subplot 1), one centered on the point (subplot 0), and one located 50 m downslope (124°) from the point (subplot 3), for a total of 192 points. (Vegetation data were initially collected on 2 additional subplots, one 50 m along the slope to the northeast [subplot 2] and another 50 m along the slope to the southwest [subplot 4], but it was quickly determined that the time required to collect vegetation data on all 5 subplots exceeded the time available for data collection during the summer field season.) The centers of subplots 1 and 3 were initially established in GIS, then located in the field using GPS units. The closest tree to the GIS point was flagged and tagged as the subplot center. These coordinates were then input into the GIS. Vegetation data were collected from late July through August during each field season.

At each subplot, percent cover, seedling and sapling count, and tree species and snag by size class count data were collected, as follows:

Percent cover data – To determine percent cover of vegetation and other variables at different heights, 20 samples were collected from 5 points located at 2.5 m intervals along each of 4 lines oriented in the 4 cardinal directions from the center of the subplot. At each point, the presence or absence of ground cover, herbaceous cover, low shrub cover, seedling cover, tall shrub cover, sapling cover, and canopy cover were recorded (see Figure 4). Looking down through a sighting tube with crosshairs, ground cover category (leaf litter, rock, bare soil, moss, exposed root, coarse woody debris [CWD] 10-30 cm, or CWD >30 cm) was determined. Only 1 ground cover option was possible per point unless CWD was elevated above the forest floor, in which case the category of ground cover below the CWD was also recorded. The presence and species of any herbaceous vegetation was also recorded (see Figure 5). All goldenrods were recorded as *Solidago* and all smartweeds were recorded as *Polygonum*. Wintergreen (*Gaultheria procumbens*), partridgeberry (*Mitchella repens*), and bristly dewberry (*Rubus hispidus*) were classified as herbaceous plants. Any woody vegetation < 1.5 m in height observed through the tube was identified to species and classified as a seedling if it was a tree species, or otherwise as a low shrub (see Figure 6). Looking up through the sighting tube, any woody plant between 1.5-3 m tall observed through the tube was identified to species and classified as a sapling if it was a tree species, or otherwise as a tall shrub (see Figure 7). The presence of any vegetation ≥ 3 m in height was recorded as canopy. If vegetation occurred 3-6 m in height, it was recorded as canopy 3-6 m, and if vegetation occurred >6 m in height, it was recorded as canopy >6 m. The presence of coniferous vegetation ≥ 3 m in height was recorded as coniferous canopy, and the presence of deciduous vegetation ≥ 3 m in height was recorded as deciduous canopy (see Figure 4).

Seedling and sapling count data – Tree species regeneration was assessed in 1 m radius circles centered on points located 5 m from the center of the subplot along each of the 4 lines oriented in the 4 cardinal directions from the subplot center. A string 1 m in length was attached to a reach stick, and with the stick held in position at the center point, the rope was moved in a circle. Each individual seedling (tree species <1.5 m in height) and sapling (tree species 1.5-3 m in height) within the 1 meter radius circle was identified to species and tallied (see Figure 8).

Tree species and snag by size class count data – The distribution of numbers of individuals of each tree species, as well as of snags, among different size classes at each subplot was determined using a 0.04 ha circular plot surrounding the tree at the center of each subplot. An 11.3 m length rope was tied to the center tree to define the circular plot. All trees occurring within the 11.3 m radius circle, including the center tree, were identified, measured with a reach stick, assigned to the appropriate 10 cm dbh (diameter at breast height [1.37 m above the ground]) size class (0-10 cm, 10-20 cm, 20-30 cm, 30-40 cm, 40-50 cm, 50-60 cm, 60-70 cm, 70-80 cm, 80-90 cm, and >90 cm), and tallied. Trees >90 cm dbh were measured using a diameter tape, and the dbh was recorded. Snags were similarly measured, assigned to a size class, and tallied (see Figure 9).

Invasive plant surveys

To track the occurrence and potential spread of invasive plants, potentially invasive non-native woody and herbaceous plant species were surveyed along the road and ORV trail system. Plants surveyed included those listed by the Mid-Atlantic Early Detection Network (MAEDN) (<https://www.eddmaps.org/midatlantic/>) and the MD DNR Wildlife and Heritage Service's Statewide Eyes initiative (http://dnr.maryland.gov/wildlife/Pages/statewide_eyes.aspx), as well as a host of other species commonly considered to be invasive (e.g., bush honeysuckles [*Lonicera* spp.], bull thistle [*Cirsium vulgare*], colt's-foot [*Tussilago farfara*], crown vetch [*Securigera varia*], and Japanese stiltgrass [*Microstegium vimineum*]).

Invasive woody plant mapping – All locations of invasive woody plant species along the main road and the ORV trail were recorded using walking visual surveys. Surveys were conducted along the main road in 2016 and 2017. Two technicians walked side-by-side from the gate on the north end of the road to the gate on the south end of the road visually searching for woody invasive plants. All woody invasive plants observed from the road were identified to species, and their location was collected using a GPS. If an extensive patch was encountered, several points were taken to delineate the patch. Surveys were conducted on the main road on 12-13 July in 2016. In 2017, the same procedure was employed on both the main road and the newly constructed ORV trails from 20-29 June.

Invasive herbaceous plant surveys -- The distribution and coverage of invasive herbaceous vegetation was assessed using point intercept sampling in 400 m² (0.04 hectare) plots established along the main road at each of the 32 middle (roadside) monitoring points. The north end of each plot was determined by stretching a perpendicular line across the road from the monitoring point. A stake was placed along the perpendicular line in the center of the road, and a second stake was placed in the middle of the road 40 m southward from the initial stake along a second perpendicular line. Flags were placed on each side of the road at 3 and 5 m from the center stake along each perpendicular line. These 3 and 5 m flags were used as the endpoints for 4 transects running parallel to the road. On each transect, a 100 m measuring tape was stretched between the start and end flags. Beginning at the start flag, points were sampled at 4 m intervals (0, 4, 8...36 m) for a total of 10 points per transect and 40 points per plot. At each point, all individuals of each invasive herbaceous species coming into contact with a pole placed vertically at that point were tallied. All data were recorded on a standardized data sheet (see Figure 10).

In addition, in cooperation with Kerrie Kyde, Invasive Plant Ecologist (now retired) with the MD DNR Wildlife and Heritage Service, an invasive plant survey was conducted at each monitoring point using the MAEDN protocol and app. In each of the 32 invasive plant survey plots, technicians walked the plot from end to end, visually noting each herbaceous invasive species within the plot. For each species, the estimated percent ground cover value relative to the total plot area was ranked as low (0-5%), medium (5-15%), or high (>15%). Data, including coordinates of the top center stake, were submitted using the MAEDN app.

Invasive herbaceous plant surveys were conducted from 14-26 July in 2016 and from 24-27 July in 2017.

Additional information recorded

GPS locations were collected each year and input into the GIS for every eastern hog-nosed snake (*Heterodon platirhinos*) and timber rattlesnake (*Crotalus horridus*) that was encountered by the technicians. It was noted if an individual was encountered more than once at a particular point. Individuals were photographed, and estimated total length and color/pattern were recorded in the daily log.

Two yellow-fringed orchid (*Platanthera ciliaris*) plants were encountered in the study area in August 2016, and 29 plants were found in August 2017. This species is ranked S2 and Threatened in Maryland. This observation constitutes the first non-historical record of the species in Garrett County. Each individual plant's location was determined using GPS and input into the GIS.

Results

Hours worked

2016 -- 1128.75 hours (562.25 for Josiah Freese, 566.50 for Robert Mulligan) were spent working on the project during the 2016 field season. Additional hours were spent during the fall and winter working on data entry.

2017 -- 1042 hours (508 for Josiah Freese, 534 for Robert Mulligan) were spent working on the project during the 2017 field season. The two technicians, along with two other Garrett College students (Francesca Gullion and Kara Kyle) worked additional hours on data entry and report preparation during the following fall, winter, spring, and summer.

Data

All data, both GIS and tabular, collected for the project are stored on the thumb drive accompanying this report and will be provided to the MD DNR Forest Service Western Region office.

Frostburg State University graduate student research

Concurrent with our fieldwork in 2017, 3 graduate students in the Biology Department of Frostburg State University (FSU) conducted fieldwork focusing on the impact of the ORV trail on different taxonomic groups in the study area: Erin Thady (mammals), Emily Harlan (birds), and Sabrina Edwards (reptiles and amphibians). At this date, one thesis (Thady) has been completed; the other two are in progress. Completed theses are or will be available at FSU.

Conclusions and recommendations

Because construction of the ORV trail was delayed and didn't begin until after the end of the 2016 field season, and wasn't completed until the latter portion of the 2017 field season, no conclusions can be drawn as to the impact of the construction of the trail or of trail use itself on

the birds, the reptiles and amphibians, the native vegetation, and the non-native, invasive vegetation of the site. The information we collected, therefore, constitutes a pre-construction data set which can serve as baseline data against which data collected after one or more years of trail use can be compared and from which potential future impacts can be determined.

As discussed above, it quickly became apparent at the start of this effort that the scope of the project as outlined in the proposal required far more resources than were allocated to the project. Given the time and manpower available based on the terms of this grant, we had to scale back our level of data collection. We are confident, however, that the data we collected provide an accurate and valuable snapshot of the conditions of the site prior to the opening of the trail for ORV activity. Similar data could be collected in the future to determine what impacts, if any, have occurred at the site due to ORV activity.

Our experience indicates that a comprehensive monitoring program assessing the potential impacts of an ORV trail on the surrounding environment requires a substantial investment of resources – personnel, time, and funding. It is unlikely that, given the current fiscal situation facing the MD DNR Forest Service, such an ambitious effort will be funded in the near future. Unless additional grant funds are solicited and received, and/or a significant proportion of the dollars raised through the collection of user fees is allocated to a monitoring effort and is sufficient to fund that effort, a simpler, more basic monitoring program may be more realistic and may have to suffice. Just the same, we believe that such an effort could still yield valuable information regarding potential ecological impacts of ORV activity on the forest.

A proposed basic monitoring program

Seasonal staff, hired as technicians to oversee the ORV trail during the summer months, would be trained to collect basic ecological data and would perform simple monitoring tasks as a part of their everyday work activities. Two technicians would be sufficient. The following information could be collected:

Trail degradation – At the beginning of the season, and once per month through the season, technicians would walk all portions of the road and trail and note any physical impacts (e.g., trail erosion, mud development, rutting, washboard development, trail widening, and rogue trail creation). Locations where any such impact is found would be collected using a GPS.

Invasive plants – In July, technicians would walk the entire length of the trail and, using GPS, collect locations of all invasive woody plant species. In addition, at each of the 32 middle (roadside) monitoring points, technicians would walk for 40 m southward, estimating (using the MAEDN procedures outlined above) the relative coverage (low [0-5%], medium [5-15%], and high [>15%]) of each invasive herbaceous plant species observed within 5 m of the midline of the trail.

Reptile and amphibian road and trail mortality – Once every 2 weeks, technicians would walk the entire length of the trail system, visually searching for dead reptiles and amphibians. Each dead reptile and amphibian encountered would be identified to species, and the location of each individual would be collected using a GPS.

Water quality – To assess potential impacts of ORV activity on water quality, once every month, technicians would perform a basic rapid biological assessment (see <https://www3.epa.gov/region1/npdes/merrimackstation/pdfs/ar/AR-1164.pdf> for suggested methods) of the benthic macroinvertebrates in Koontz, Staub, and the two branches of Winebrenner Run. These surveys would be conducted 25 and 50 m downstream from the lowest point where the trail crosses each stream. For instance, the total number of members of the orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Tricoptera (caddisflies) in a standardized kick net sample would be noted, as would the proportion of all benthic macroinvertebrates composed of these orders.

We believe this information would provide a reasonable, basic assessment of any degradation of the trail and of impacts of ORV activity on the surrounding forest, and could be easily collected by technicians with appropriate training without compromising their other responsibilities. These data would then be passed on to the SRSF office. The GC NRWT program would be happy to help SRSF interpret the data and compare it to that collected in previous years. We would also be happy to help train the technicians.

In the (unlikely) event that additional funding becomes available, a more comprehensive monitoring program could be pursued, even if only at an interval of several years. For instance, bird surveys could be repeated every 3 or 5 years and compared to the baseline data.

In summary, we believe it is important to continue to monitor the St. John's Rock ORV trail to ensure that ORV riders are able to enjoy the trail without creating a significant negative impact on the surrounding environment. We believe we developed a solid monitoring protocol that could help SRSF and MD DNR determine if the ORV trail is being operated in an ecologically sustainable fashion. In hindsight, we recognize that such a comprehensive monitoring program is probably not feasible given current and projected funding. We encourage MD DNR and SRSF to implement a simplified monitoring program, such as that outlined above, so that the ecological integrity of the surrounding forest is maintained and any concerns regarding the compromise of that integrity can be addressed.

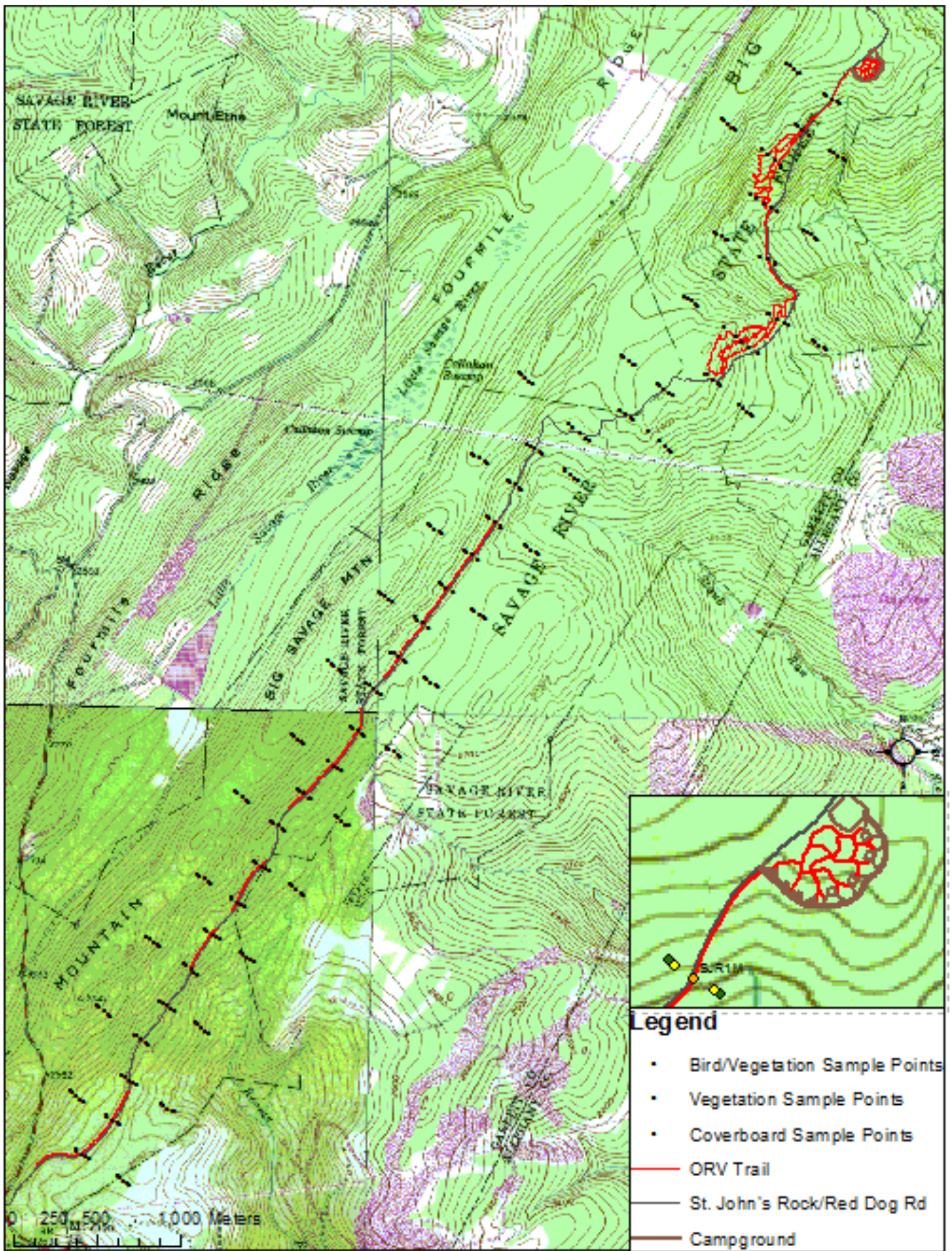


Figure 10. St. John's Rock ORV trail monitoring plot layout.

B. Research Projects *(Full write-ups of each project are available at the State Forest Office)*

1. Chestnut Blight: Evaluating the potential of “Super Donor” strains of *Cryphonectria parasitica* to control chestnut blight infections. West Virginia University.

Researchers from West Virginia University are continuing a study involving chestnut blight (*Cryphonectria parasitica*) and the organisms that inhabit the resulting cankers. The purpose of this experimentation is to release two “Super Donor” strains of *C. parasitica* that have the unique ability to transmit the disease controlling hypoviruses to virulent strains regardless of their vegetative compatibility type.

The “Super Donor” strains were constructed using a Cre-lox system and classical mating. Cre-lox recombination is a site-specific recombinase technology, used to carry out deletions and insertions at specific sites in the DNA of cells. No foreign genes were incorporated and the absence of any selectable marker verified. This modification resulted in the elimination of most genes that control vegetative compatibility thereby allowing hypovirus transmission among incompatible strains (MacDonald and Nuss, 2016).

The initial release of the virus was conducted in mid July 2016. A second APHIS permit for additional introductions of the virus to the original study area of Russell Road as well as an additional site located of Jacobs Road in Compartment 42 was applied for in May 2017 and treatments commenced in July and August of 2017. An on-site review was conducted by APHIS risk assessment personnel on August 9, 2018 to ensure that all standards of protocol for such a release were adhered to throughout all phases of the ongoing study. All aspects of the field trials were within acceptable tolerances and the current research permit for both projects will be extended through 2019.

2. Eastern Hemlock: Target-tree Release to Improve the Sustainability of Eastern Hemlock (*Tsuga canadensis*) in the Southern Appalachian Mountains. US Forest Service Southern Research Station and North Carolina State University.

This ongoing project will develop and validate a silvicultural tool that improves the health and sustainability of eastern hemlock, an ecologically keystone species in the southern Appalachians threatened by HWA. Individual or small clusters of "target" trees (i.e., suppressed or intermediate eastern hemlocks with moderate to good crown health) will be released by removing or girdling other stems competing for sunlight directly above and adjacent to the target trees. Increased sunlight is expected to improve hemlock crown health via improved carbon balance, enhanced foliage production, and reduced HWA settlement rates relative to unreleased trees. Treatments will be replicated at a number of southern Appalachian sites and will evaluate release by girdling versus felling and variations on the size of the resulting canopy gap.

Operationally, the tool is expected to prolong hemlock health and survival and increase the efficacy of existing HWA management tools (e.g. biological and chemical control) when integrated with them (Jetton, Robert M., Mayfield, Albert E., Keyser, Tara, and Rhea, James 2017). The project will involve fifteen treatment sites; 10 located in the northern end of Wolf Swamp in Compartment 16 and five located along an unnamed tributary of Elk Lick Run in Compartment 26. Post treatment data collection was completed on all sites in March 2018 and again in July 2018 involving hemlock health at one year, adelgid density, vegetation

measurements and data analysis. Follow up data collection and analysis is scheduled for Fall 2018 and will continue through the Fall of 2019.

3. American Chestnut: Genetic Diversity in the North American Endangered Species, *Castanea dentata*. University of Guelph, Ontario, Canada.

The restoration of genetic diversity in forest trees has become the subject of models exploring distributional changes after serious population declines (Burke 2012). The variability conserved within a population is particularly important at loci that confer higher fitness in the face of these changing environments. Several ecological models suggest that the periphery of a species' natural range will not provide an environment as suitable as that near the center (Chhatre and Rajora 2014). Notably, the central-marginal hypothesis predicts that there is evidence of reduced genetic diversity, effective population size and density factors along the margins of a species range (Eckert et al. 2008). The marginal populations may also be at higher risk for extirpation due to fragmentation and isolation from the larger gene pool found in central populations (Van Drunen et al. 2017). Therefore, the use of genetic markers such as microsatellites, as tools for analyzing a range of population structure models, will facilitate the long-term goal of maintaining diverse forest tree populations (Chhatre and Rajora 2014).

A North American species whose populations might be limited by genetic factors is American chestnut [*Castanea dentata* (Marsh.) Borkh]. *Castanea dentata* was once a canopy-dominant tree species that reigned the deciduous forests of eastern North America, from Maine and Ontario, west to Michigan and south to Mississippi and Georgia (Dalglish et al. 2015). In Ontario, at the Northern tip of its range, the tree is considered endangered under the provincial *Endangered Species Act, 2007*. Its rarity is attributed to the introduction of chestnut blight (*Cryphonectria parasitica*) to the eastern United-States at the turn of the 20th century, which devastated populations of the North American hallmark species (Dalglish et al. 2015). The infectious fungus was introduced to the eastern United-States from China and it spread quickly across the tree's natural range, reducing its populations to 1-10% of its original size (Van Drunen et al. 2017). Previous studies indicate that the trees seem to have retained a degree of genetic variation however a lack of comprehensive studies is limiting current recovery strategies (Dalglish et al. 2015).

Little is known in regards to the current genetic variation, the occurrence of a genetic bottleneck event and whether natural populations have retained a distinct spatial structure within the Canadian range. With the genetic attributes of this tree acting as constraints to resistance, signs of recovery are rarely seen. However, surveys show the presence of infrequent blight free trees and healing cankers in Canadian populations which may be an indicator of greater genetic diversity or more incidences of hybridization than previously thought (Van Drunen et al. 2017). The possibility for hybridization with other *Castanea* species in the wild has not been studied thus far. Therefore, this raises the question as to whether the population contains genomic material from more resistant species similar to the current backcross breeding programs in organizations such as the Canadian Chestnut Council and the American Chestnut Foundation.

The sampling in the United-States will be done according to a transect drawn North to South from the Niagara border of Canada and the United-States towards the centre of the *Castanea dentata* range intersecting Allegheny National Forest, Monongahela National Forest and the George Jefferson and Washington National Forests (Figure 1). Using GIS coordinates of known trees provided by the American Chestnut Foundation, populations will be selected based

on their distribution along this transect. The transect will be divided into 3-4 sampling sectors with one sector each to be located at the North and South ends. The additional sector(s) will be located closer to the center of the transect and will be chosen depending on the distribution of trees along the transect. The Northern Sector will be in Canada, and the remaining sectors will extend southward, into the United States. Each sector will include 2 populations each with 20-30 trees in order to have a replicate within each sector. This will result in a total of 6-8 populations and 120-240 trees. Young leaves adjacent to shoot tips will be chosen for analysis to ensure high DNA quality and yield. From each tree included in the study, two leaves will be harvested using an ethanol sterilized pruning pole and placed in individual paper envelopes containing silica beads to dry and preserve them prior to DNA extraction. Genetic diversity will be assessed for each population included in the study, as well as within each sampling sector. The data obtained from microsatellite analysis will be translated to discrete traits such as allelic diversity and genotypic richness.

This research will aid in the recovery of American chestnut populations in Canada by increasing knowledge that is directly useful to the establishment of genebanks. Additionally, results from this study may help reveal resistant genotypes and whether hybridization is the reason that some trees look healthy. Current measures of genetic composition, structure and hybridization will provide information on the dynamics of genetic drift and selection in central versus marginal *Castanea dentata* populations of a tree that has broad evolutionary and conservation management significance (Stoltz, 2018).

4. Bobcat: Population Estimate and Structure of Bobcats (Lynx rufus) in Western Maryland. University of Delaware Department of Wildlife Ecology.

Currently, bobcats are the most widely distributed native felid throughout the continental United States. However, this distribution was threatened in the late 19th century. During this time, several states observed a drastically lowered population or full extirpation. Due to forest regeneration and a well-regulated harvest, bobcats have recovered much of their historic range. Currently, bobcats are seen regularly throughout Garrett and Allegany counties and are becoming more common in counties to the east. However, the estimated population size of the species has not been documented. Preliminary results from a predator camera survey performed in western Maryland estimated bobcat density ranged from 0.08-0.20 bobcats/mi². Land managers require a better understanding of the current population of bobcats in the region.

A hair-snare survey will be implemented targeting bobcats in 3 study areas within 2 counties of Maryland. These study areas will be focused on public land in the forms of: Potomac State Forest, Savage River State Forest, and Green Ridge State Forest. We will place 20 hair snares at each of the 3 study areas, totaling 60 for the region. Each snare will be active for 60 days from mid-December to mid-February. The snares will be placed at a rate of 1 snare per 3km in habitat most likely to be occupied by a resident bobcat, based on previous literature. At each of the 60 snares we will place a game camera to monitor the snare. The camera data will give researchers a better understanding of the efficiency of the snares. The hair collected during the 60-day survey will be analyzed at the genetics laboratory to determine: species, sex, individual, and relatedness among individuals. Using a capture-mark-recapture model, we will determine a density of bobcats in the region. Additionally, camera data will be analyzed as a separate capture-mark-recapture study to estimate bobcat density. Bobcat density estimates

based on camera data will be compared to estimates based on hair-snare data to determine if camera surveys could function as a viable cost-efficient alternative to estimate bobcat density.

The objectives of this research include estimating the bobcat population size, determining the sex ratio of the species and comparing the efficiency of camera surveys to hair-snare surveys to estimate bobcat densities. This research will provide baseline information about the population size and structure of bobcats in western Maryland. Additionally, this study will improve efficiency of field methodologies. The Maryland Department of Natural Resources lacks data on the current population size and structure of bobcats in the region. This research will estimate the abundance and population dynamic of bobcats to aid state managers in understanding the ecology within western Maryland (Ness, 2018).

X. Silvicultural Proposals

COMPARTMENT 1 – Stands 19 and 22

FY-20

Description/Resource Impact Assessment

Location: This proposal is located along the north side of State Route 40 in Compartments 1 and 2 in Stands 19 and 22. The access road entrance is located approximately ½ mile west of the Route 40 / Route 219 intersection at Keyser's Ridge.

Forest Community Type and Condition: This 29-acre site consist of two management units that contain overstocked mixed mature conifer stands that are approximately 70 years old with an average merchantable diameter of 16.4 and 16.2 inches respectively. Stand 19 covers 23 acres and is dominated by Norway spruce (49%) and red pine (39%) with a minimal component of red maple (7%) and black cherry (3%). The stocking in this stand is at 89% relative density with a basal area of 155 ft²/acre. Stand 22 at six acres in size, is similar in composition with Norway spruce occupying the largest portion of the canopy (54%), followed by red pine (38%) and black cherry representing a limited hardwood component (8%). Stocking levels are at 95% relative density with a basal area of 173 ft²/acre. Desirable regeneration and overall plant diversity is scarce in the understory due to the thick duff layer and the dense overcrowded canopy as well as the interfering elements that are listed below.

Interfering Elements: Interfering understory plant competition is sufficient to cause significant interference with regeneration efforts in Stand 19 with 78% of the site containing some form of significant interference. Tall woody interference is found throughout 52% of the stand and is dominated by sweet birch and striped maple. Problematic levels of ferns and grasses are found on 37% of site. Non-native invasive species (NNIS) were not found in this stand during the inventory. Vegetative interference in Stand 22 occupies 67% of the site, primarily in the form of problematic ferns. Tall woody interference is relatively low, with striped maple as the principal species found on 17% of the site. Non-native invasive species were not observed during the inventory. Stand regeneration is not the primary silvicultural focus for these stands and no effort will be made to control the interfering vegetation present in the stand at this time.

Historic Conditions: State Forest records show Stand 19 was last thinned in 1983, followed by Stand 22 in 1984. No evidence of fire was observed during the recon and there is no indication of significant forest pests at this time.

Rare, Threatened and Endangered Species: At this time, the Forest Manager knows of no rare, threatened or endangered species on the site that would be impacted by the silvicultural prescription.

Habitats and Species of Management Concern: The conifer plantation component of the forest landscape was implemented in an effort to rehabilitate overused and misused tracts of agricultural and mine land by serving as a nurse crop that would foster the reestablishment of native species and would subsequently be harvested in its entirety. Forest management priorities have not adhered to this strategy allowing the conifer stands to reach maturity and in the process,

creating a unique habitat niche for a suite of species. However, in the absence of any silvicultural work being implemented, the planted conifer stands persist in a severely overstocked condition, some to the point of stagnation and decline. In an ongoing effort to maintain the conifer component of the forest, commercial thinnings will be implemented in order to reduce high stocking densities leading to increased health, vigor and growth in residual stands. Where appropriate, final harvests will be applied to stands in accelerated states of decline followed by occupation of the site by native hardwoods or artificial regeneration with suitable species.

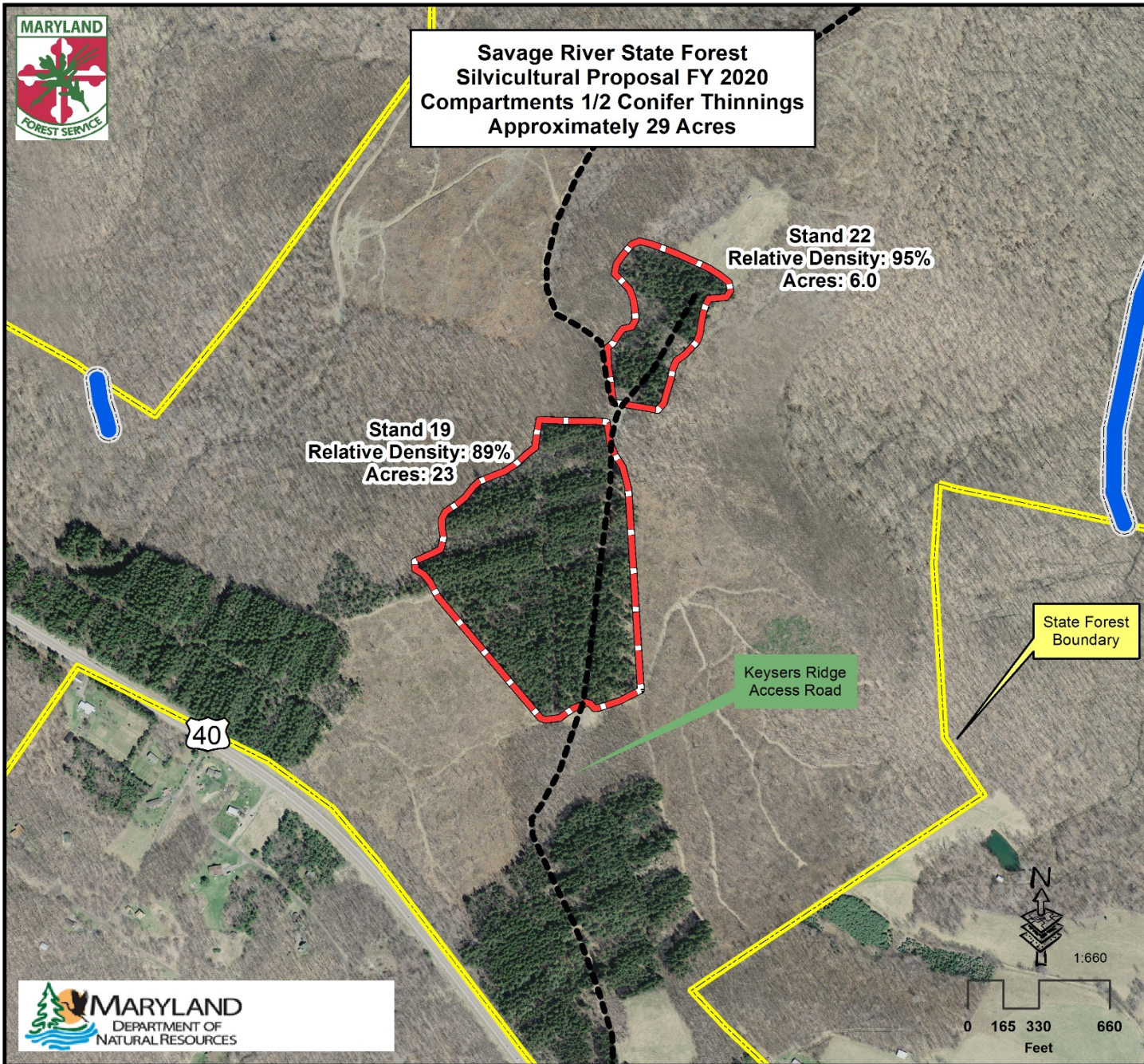
Water Resources: Stands 19 and 22 drain to the west into the western branch of Puzzley Run and to the east into Bucks Run, both flowing within the Youghiogheny River Watershed. The proposed silvicultural treatments will be outside of all HCVF and stream buffer areas. No heavy equipment will be permitted within the protective riparian buffers of any streams or associated wetlands per the requirements set forth in the State Forests Sustainable Forest Management Plan.

Soil Resources: The dominant underlying soil type of Stand 19 is Ungers, Calvin and Lehw channery loams (UcB). This soil type is generally moderately deep over bedrock and well drained. Degree of slope ranges from 0-10% throughout the site. Equipment limits range from slight to moderate for slopes exceeding 15% and severe for slopes over 35%. Hazard of erosion is slight. The site has good productivity for woodland management, with a site index of 65-75 for upland oaks. Stand 22 is underlain with Ungers, Gilpin and Calvin channery loams (UnB). The soil is well drained with slopes ranging from 0-10% throughout the site and is potentially highly erodible creating moderate equipment limitations. High site indices are associated with this soil type, ranging from 75-85 for upland oaks.

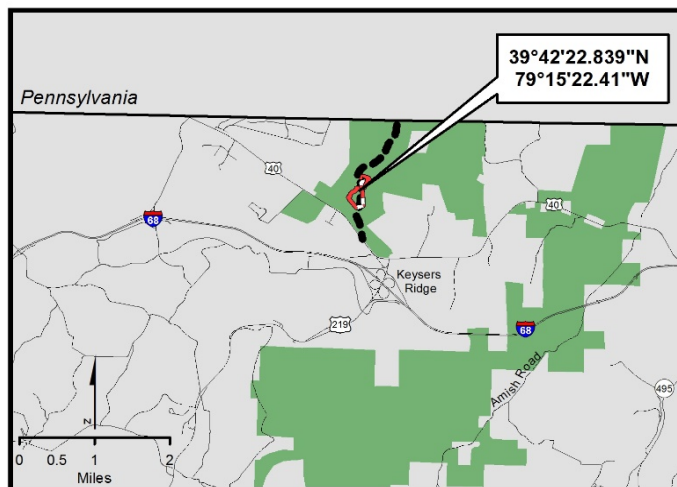
Recreation Resources: No developed recreational resources are located within the stand. The access road for the stand is primarily utilized for hunting access. Hunting opportunities may be disrupted for the duration of the harvest activities and access to the site may be limited depending on the timing of the harvest.

Management and Silvicultural Recommendations

The planned silvicultural treatment for this site is a commercial thinning. The objective of this thinning is simply to reduce stocking levels in order to lessen competition among the remaining trees thereby, increasing the health, vigor and growth rate of the residual stand as well as maintaining the conifer component on the forest landscape. Approximately 1/3 of the basal area in each stand will be removed reducing the basal area to approximately 100 ft² /acre for Stand 19 and 155 ft² /acre in Stand 22. Relative density will be reduced to 60% in both stands. Removals will focus on unacceptable growing stock as well as select trees that have reached maturity. Harvest volumes anticipated from removals will be approximately 7,000 board feet/acre.

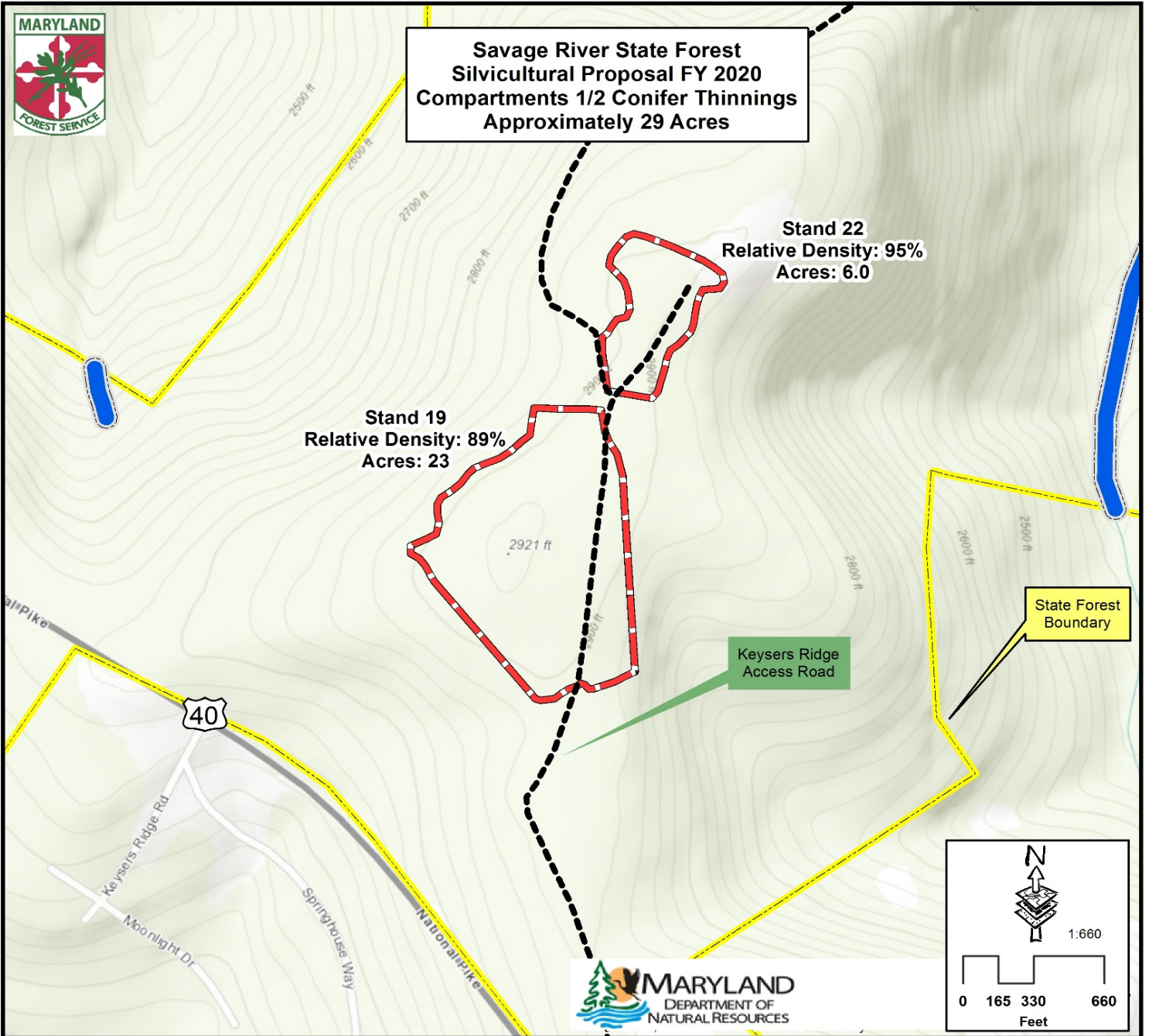


- Wildlands**
- Ecologically Significant Area**
- Old Growth**
- Old Growth Ecosystem Area**
- Wetland of State Concern**
- Streams and 50' Buffers**

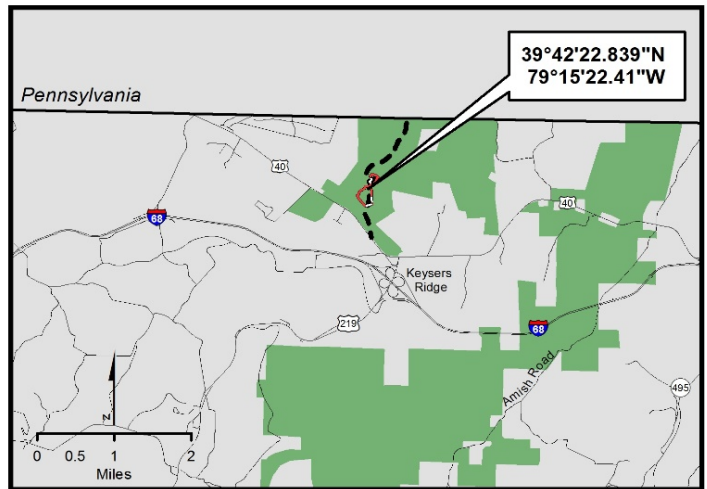




**Savage River State Forest
Silvicultural Proposal FY 2020
Compartments 1/2 Conifer Thinnings
Approximately 29 Acres**



- Wildlands**
- Ecologically Significant Area**
- Old Growth**
- Old Growth Ecosystem Area**
- Wetland of State Concern**
- Streams and 50' Buffers**



Description/Resource Impact Assessment

Location: This site is accessible via a forest access road located on the western side of Posey Row Road, approximately 0.5 miles north of the intersection of State Route 40 and Posey Row Road.

Forest Community Type and Condition: This 52-acre site contains a medium sawtimber mixed oak stand that is approximately 85 years old, with an average merchantable diameter of 14.8 inches. The overstory consists of northern red maple (35%), red oak (30%), dead timber (15%) and black birch (10%). This stand has a relative density of 73% and has an average basal area of 145 ft²/acre. Overall oak regeneration occupies 6% of the site, all of which is considered competitive and total established desirable regeneration is found on 11% of the management unit. This lack of desirable regeneration is in part due to the presence of the interfering elements explained in the following section.

Interfering Elements: Interfering understory plant competition is sufficient to cause complications in desirable regeneration efforts with the entire site containing some form of significant interference. Tall woody interference occupies approximately 97% of the stand consisting primarily of black birch and striped maple. Low woody interference occupies approximately 67% of the site, with witch hazel and striped maple making up the majority. Problematic levels of ferns occupy 42% of the stand. Non-native invasive species (NNIS) were not observed within this stand.

In addition to interfering vegetation, the presence of white-tailed deer can have a negative influence on the regeneration success of the stand. Overbrowsing can facilitate failure of desirable seedling establishment and in extreme cases a shift in species composition dominated by undesirable tree species. Field evaluation of the site estimated deer browse impact to be moderate. Monitoring of deer browse impacts will coincide with regeneration surveys to determine if additional measures need to be implemented to reduce deer herbivory and increase the likelihood of regeneration establishment on the site.

Historic Conditions: State Forest records indicate that the proposal site had been previously thinned in 1989. The stand located to the north adjacent to Little Shade Run had been regenerated in 1989. No evidence of fire was observed during the stand inventory. Significant mortality among oak species due to effects from recent gypsy moth defoliations, approximately 25% of the total basal area, was observed at the time of the reconnaissance.

Rare, Threatened and Endangered Species: No rare, threatened or endangered species have been identified on the site that would be impacted by the silvicultural prescription.

Habitats and Species of Management Concern: The management proposal borders the High Conservation Value Forest that is located within the fifty-foot no cut riparian buffer of Little Shade Run. Protection of this critical area is addressed in the subsequent section regarding water resources.

Water Resources: This stand drains north into Little Shade Run of the Casselman River, within the Youghiogheny River Watershed. The proposed silvicultural treatments will be outside of all HC VF and stream buffer areas. No heavy equipment will be permitted within the protective riparian buffers of any streams or associated wetlands per the requirements set forth in the State Forest Sustainable Forest Management Plan.

Soil Resources: The dominant soil type of the site is categorized as Cookport and Ernest very stony silt loams, 8 to 25 percent slopes (CuD). Abundant stones are found on and in the soil, mainly composed of sandstone, drainage ranges from poor to well-drained and water moves slowly through the subsoil. Equipment limitations are moderate due to the water table being close to soil surface in late winter and early spring. The site has high productivity for woodland management, with a site index of 75-85 for upland oaks. The productivity of the site will be protected by minimizing the haul roads and skid trails as per the Department's Best Management Practices and rutting guidelines.

Recreation Resources: No developed recreational resources are located within the stand. The access road for the stand is primarily utilized for hunting access. Hunting opportunities may be disrupted for the duration of the harvest activities and access to the site may be limited depending on the timing of the harvest.

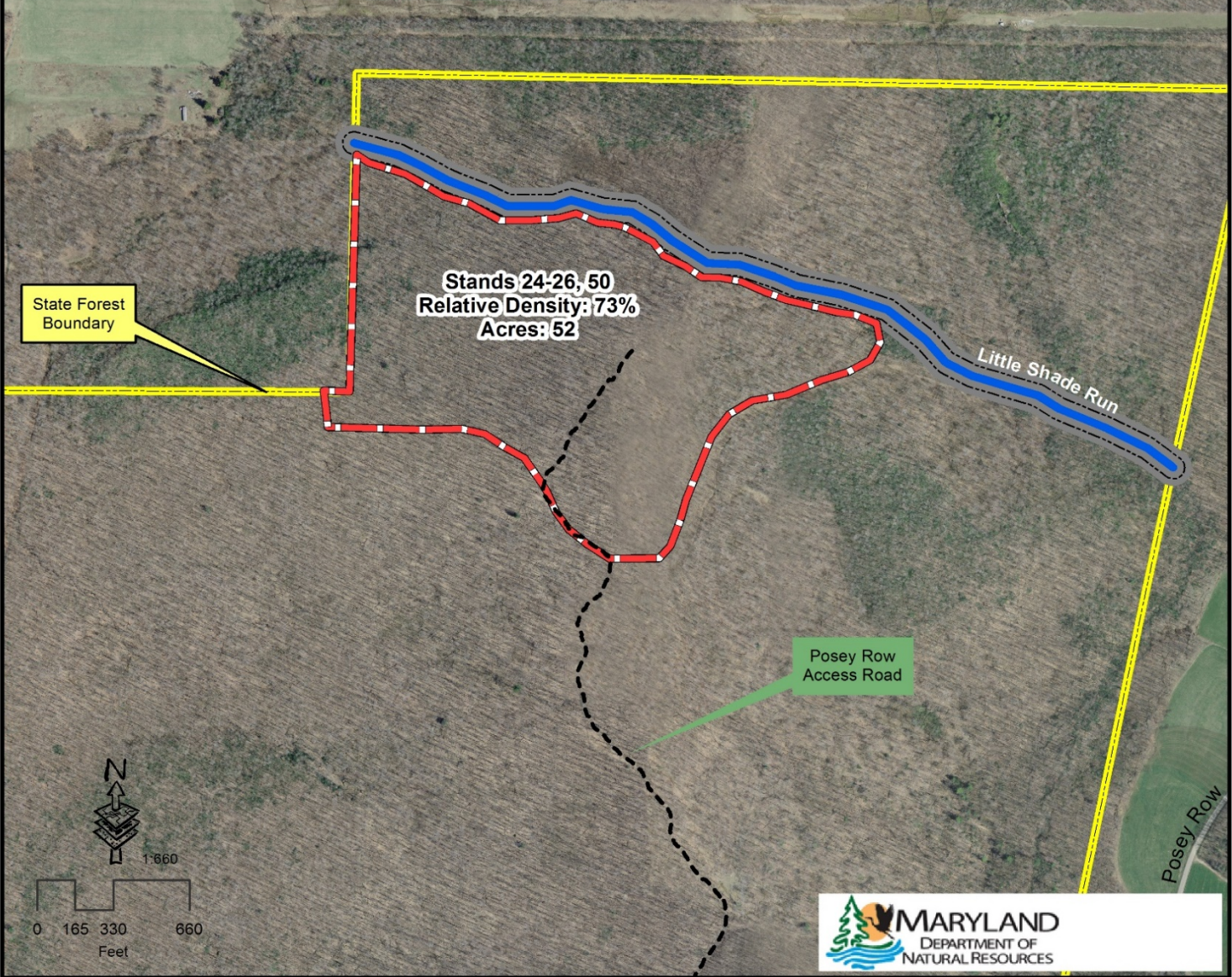
Management and Silvicultural Recommendations

Levels of acceptable growing stock within this stand are inadequate to warrant further management and the stand will be regenerated. Approximately 2/3 of the basal area consists of unacceptable growing stock and dead trees. The percentage of acceptable growing stock in the stand is not adequate enough to provide a future stand of desirable quality. Given these factors, this stand will be regenerated using a clear cut with variable retention. All trees greater than 4" DBH will be harvested, excepting 4-8 dominant or co-dominant trees per acre selected for mast production/seed sources, a component of standing dead wood to provide potential nesting habitat, hunting perches and food sources for various wildlife species and all hemlock and white pine specimens of acceptable quality.

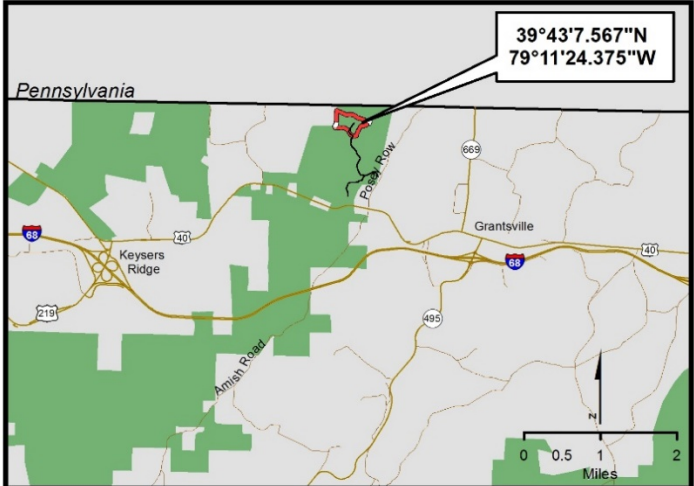
Contract specifications will require high slash to remain on the harvest site in order to deter from deer browsing on developing seedlings and stump sprouts. Harvest yields will be approximately 7,000-7,500 board ft/acre. Post-harvest monitoring will be conducted to determine if additional silvicultural work, i.e. herbicide applications, will be required to facilitate the establishment of a desirable cohort that will fully occupy the site.

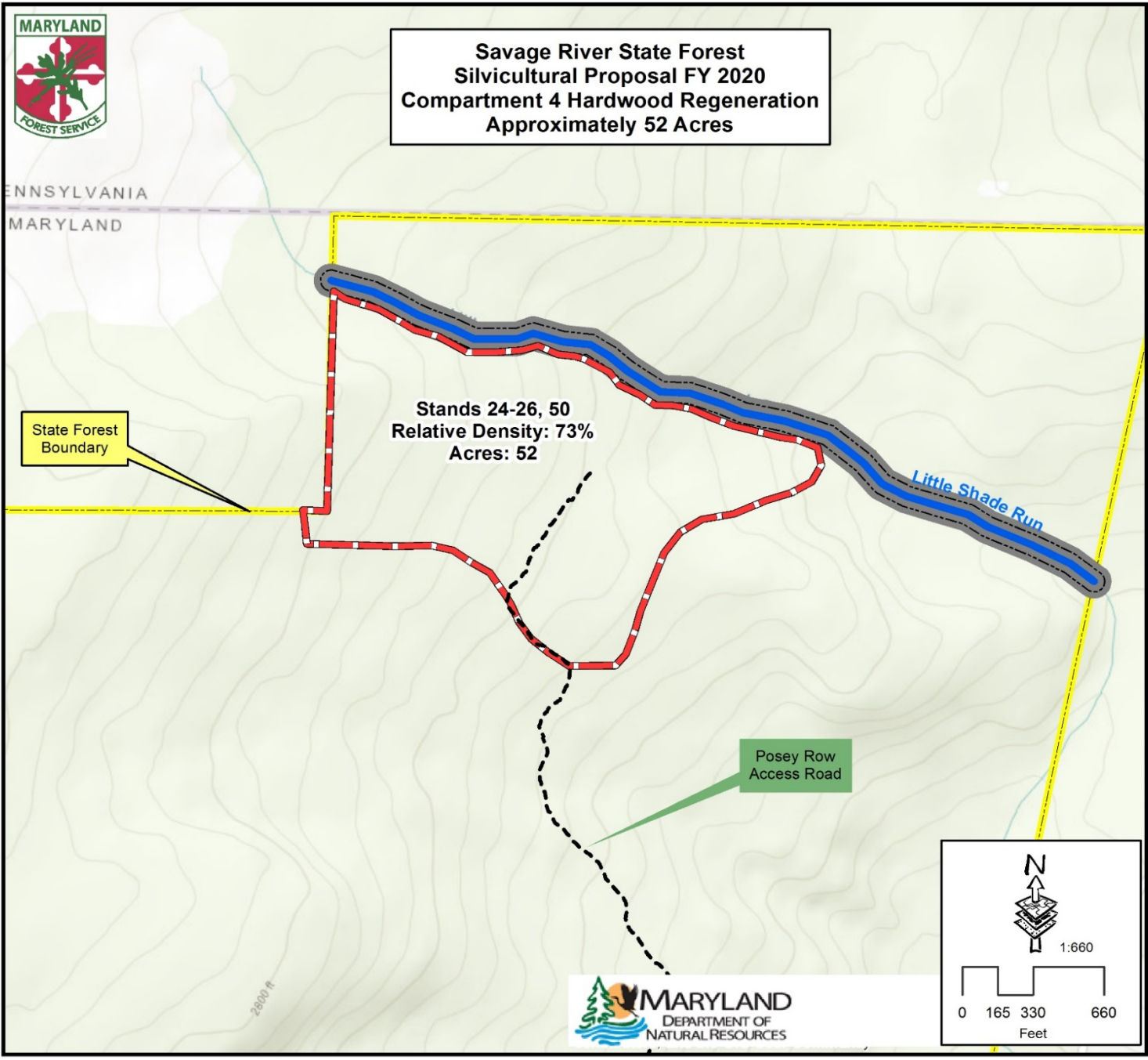


**Savage River State Forest
Silvicultural Proposal FY 2020
Compartment 4 Hardwood Regeneration
Approximately 52 Acres**

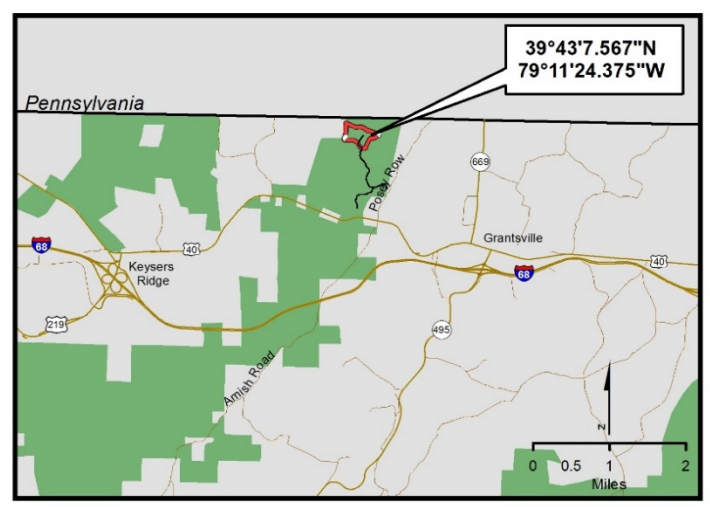


-  **Wildlands**
-  **Ecologically Significant Area**
-  **Old Growth**
-  **Old Growth Ecosystem Area**
-  **Wetland of State Concern**
-  **Streams and 50' Buffers**





- Wildlands**
- Ecologically Significant Area**
- Old Growth**
- Old Growth Ecosystem Area**
- Wetland of State Concern**
- Streams and 50' Buffers**



Description/Resource Impact Assessment

Location: This area is located approximately .40 miles north of the junction of Bowman Hill Road and the forest access road that serves as Negro Mountain Trail in Compartment 10 which is situated 1.5 miles west of the intersection of Bowman Hill Road and Amish Road and 1.2 miles east of the intersection of Bowman Hill Road and Rabbit Hollow Road.

Forest Community Type and Condition: This 3-acre proposal is composed of two plantation sites - Stand 19 covering 1.7 acres and Stand 20 at 1.3 acres in size. Both stands consist of overstocked and suppressed mixed conifers that are approximately 58 years old. Stand 19 has an average merchantable diameter of 10.6 inches and similarly Stand 20 has an average merchantable diameter of 10.7 inches. The overstory of each stand is dominated by Eastern white pine (67% and 72%) with a small component of red pine (10% and 6%). Stand 19 has a developing canopy component of various hardwood species including northern red oak (11%), black cherry (6%) and red maple (6%). Stand 20 has a similar hardwood component with the presence of black cherry (5%) and yellow poplar (5%) found in the understory and in any light gaps in the stand. These stands are greatly overstocked at 130% relative density and 158% relative density respectively. Stand 19 averages 180 ft² of BA/acre and Stand 20 averages 210 ft². Desirable established and competitive hardwood regeneration was found on 95% of the data plots in Stand 19 and 100% of the plots in Stand 20.

Interfering Elements: Interfering understory competition was found across 100% of the data points in both stands. Tall woody interference occupies approximately 100% of Stand 19 and Stand 20, is comprised primarily of hawthorn, witch hazel and striped maple. Low woody interference occupies approximately 50% of both sites, with American beech and striped maple being the dominant species. Non-native invasive species (NNIS) were not observed during the stand inventory.

Historic Conditions: State Forest records show no silvicultural activity for these two stands. A regeneration harvest was conducted in the adjacent stand to the east in 1983 and the stand that borders both sites to the west is currently undergoing a thinning operation. No evidence of fire was observed during the recon. No sign of significant insect infestation was observed at time of recon, but the overcrowded condition of the stand has led to poor form of the individual trees and the suppressed trees have suffered weather damage and will be more vulnerable to insect attack and disease outbreaks.

Rare, Threatened and Endangered Species: No rare, threatened or endangered species have been identified on the site that would be impacted by the silvicultural prescription.

Habitats and Species of Management Concern: The stands are located in close proximity to the southern limits of the Little Bear Creek ESA. This ESA was established to conserve and protect the Northern Hardwood and Hemlock forests associated with spring seep plant communities that show a more neutral or slightly basic water chemistry and the excellent

populations of salamanders associated with springs and small seeps. Harvesting activities will occur beyond the designated ESA boundary and will not affect the integrity of the area.

Water Resources: The stands drain north and east into the headwaters of Little Bear Creek within the Youghiogheny River Watershed. The proposed silvicultural treatments will be outside of all HCVF and stream buffer areas. No heavy equipment will be permitted within the protective riparian buffers of any streams or associated wetlands per the requirements set forth in the State Forests Sustainable Forest Management Plan.

Soil Resources: Underlying soils are mapped as ‘DeKalb – Calvin-Lehew very stony loams’. These soils are generally moderately deep and well drained with inclusions of some poorly drained soils. Degree of slope ranges from 0-25% throughout the site. Equipment limits range from slight to moderate, where slopes exceed 15%. Hazard of erosion is slight to moderate. The site has good productivity for woodland management, with a site index of 65-75 for upland oaks.

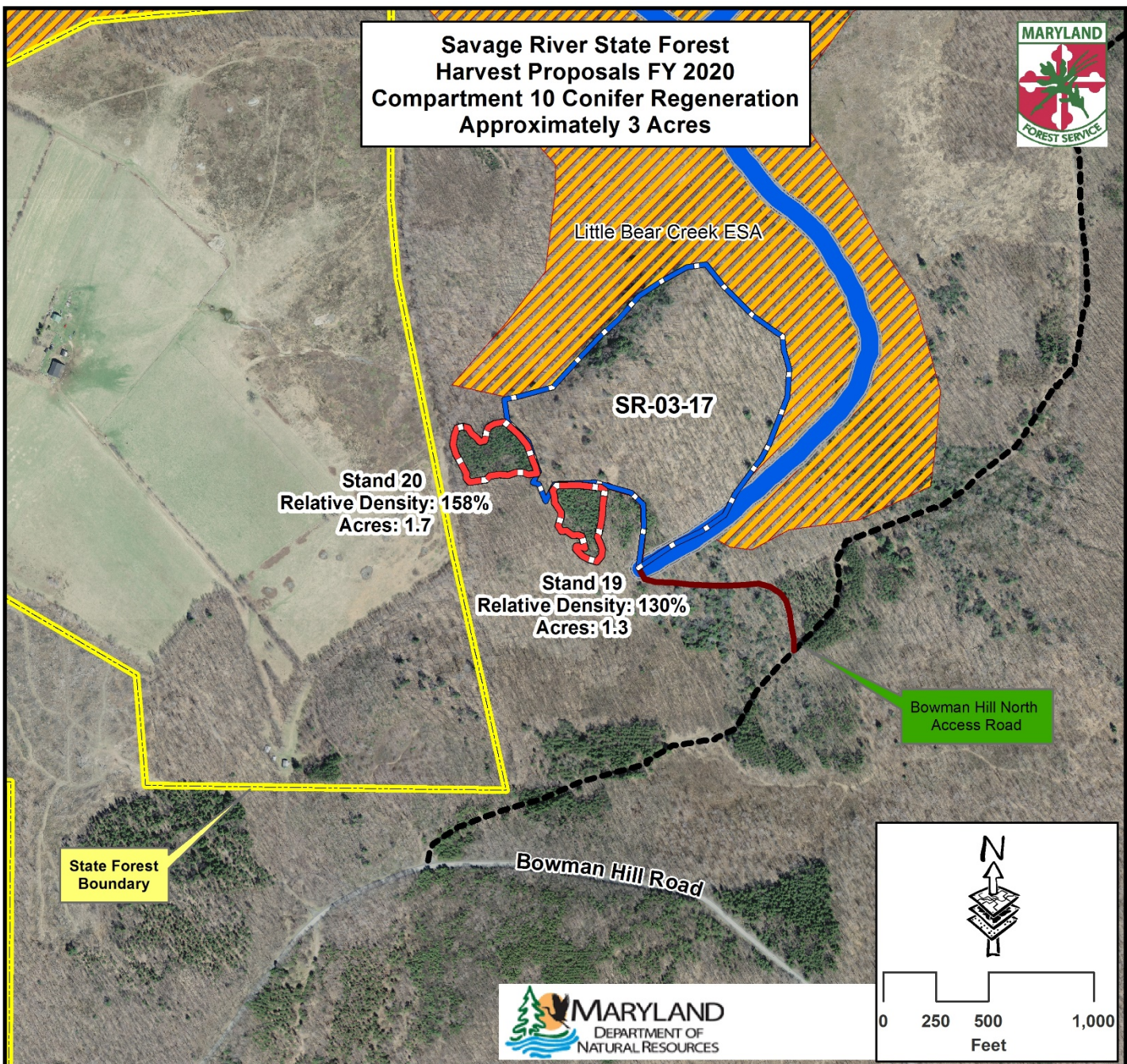
Recreation Resources: No developed recreational resources are located within the stands. The Bowman Hill north access road that will be utilized as a haul road also serves as part of the Negro Mountain Snowmobile Trail. Access to the trail may be limited and/or suspended for the duration of the harvest and hunting opportunities within the stands may be disrupted.







Management and Silvicultural Recommendations

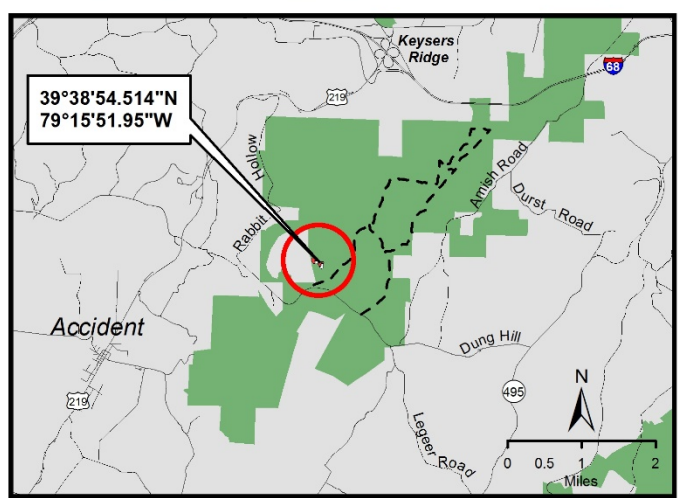
Given the overstocked conditions of both stands and the overall poor quality and growth form of the individual trees as well as the significant damage inflicted on the stands by recent weather events, the recommended prescription for both stands is a regeneration harvest. The stands will be regenerated via the clearcut method with variable retention. All conifers will be removed and the established hardwood components of the stands will serve as retention and expedite the process of converting both sites back to native hardwood species compositions. Approximately 26 cords/acre will be harvested from the sites.

The small size of this proposal limits its marketability as a stand-alone harvest. Logistically, considering the amount of roadwork needed to reach the proposal sites and the associated harvesting costs, which would outweigh any returns, the stands become essentially unmanageable. In order to efficiently utilize the resource, this harvest will be pulled forward into FY-19 and the sale of the forest products will be negotiated with the timber operator who is currently harvesting SR-03-17, a 22-acre hardwood thinning which abuts both conifer stands.

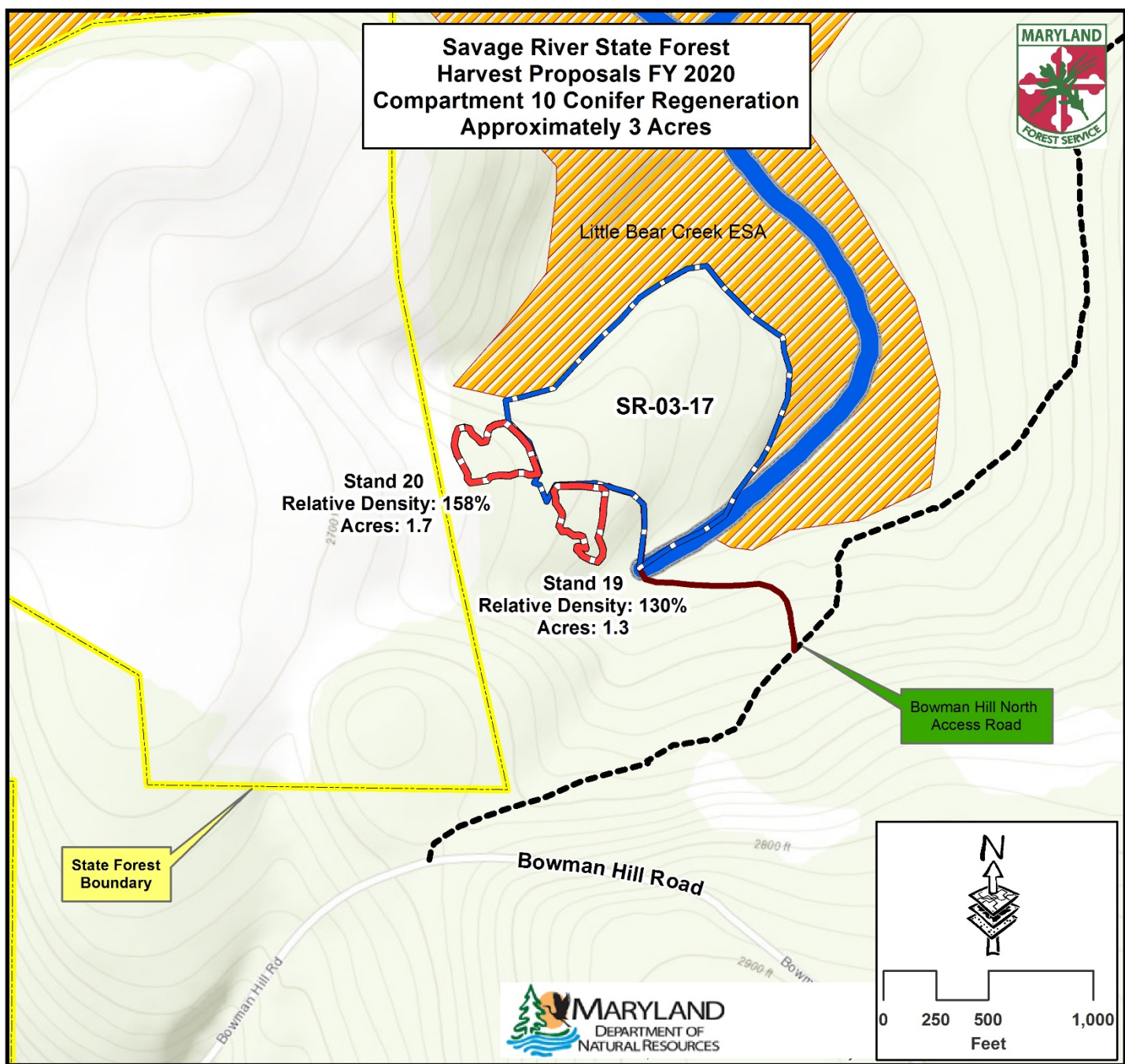
**Savage River State Forest
Harvest Proposals FY 2020
Compartment 10 Conifer Regeneration
Approximately 3 Acres**



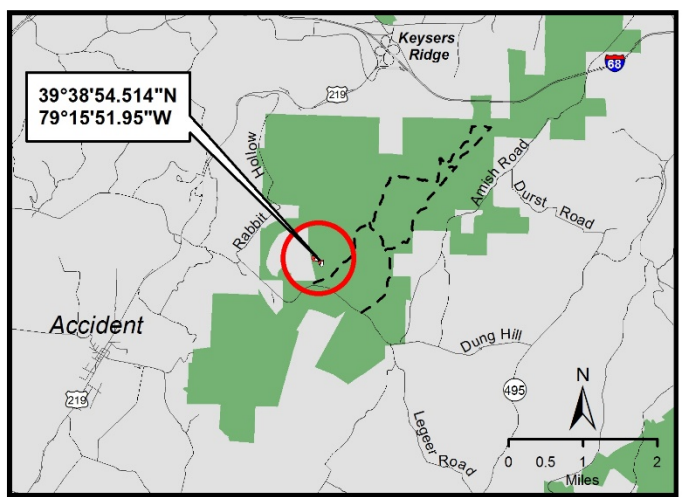
-  Wildlands
-  ESA
-  Old Growth
-  Old Growth Ecosystem Area
-  Wetland of State Concern
-  Streams and 50' Buffer



**Savage River State Forest
Harvest Proposals FY 2020
Compartment 10 Conifer Regeneration
Approximately 3 Acres**



- Wildlands
- ESA
- Old Growth
- Old Growth Ecosystem Area
- Wetland of State Concern
- Streams and 50' Buffer



Description/Resource Impact Assessment

Location: This 77-acre harvest proposal is situated approximately one mile south of State Route 219 along an existing forest access road within Compartment 11. The access road entrance is located approximately 1.6 miles south of the intersection of State Routes 219 and 40 at Keyser's Ridge on the southern side of State Route 219 adjacent to a commercial storage center.

Forest Community Type and Condition: This management unit is composed of a 92-year-old medium sawtimber stand with an average basal area of 146.5ft² and an average merchantable diameter of 16.0 inches. The over story is dominated by northern red oak (32%), red maple (27%) and chestnut oak (21%). This stand is overstocked with the relative density at 96% of the average maximum stocking. Competitive desirable regeneration, represented by competitive oak and desirable saplings, is found on 9% of the stand. Desirable regeneration present in this stand is lacking, in part due to the presence of the interfering elements explained in the following section.

Interfering Elements: Understory plant competition is sufficient to cause interference with regeneration efforts, with 99% of the site containing some form of significant vegetative interference. Tall woody interference occupies approximately 78% of the stand and consists primarily of black birch and black gum. Low woody interference occupies approximately 86% of site with the majority being green briar. Interfering fern levels were found on 17% of the proposal area and do not currently pose a significant impediment to regeneration establishment. Non-native and invasive species were not found within the stands. This stand has not reached maturity and therefore, regenerating the stand is not the primary silvicultural focus and no efforts will be initiated to control the aforementioned interfering vegetation at this time. Non-native and invasive species will be controlled via appropriate methods where practical.

Historic Conditions: Records indicate that no silvicultural activities have occurred within the management unit during state ownership. Two stands adjacent to the proposal on the eastern boundary were regenerated in 2008. Neither evidence of fire nor any sign of significant insect infestation was observed during the inventory of the stands.

Rare, Threatened and Endangered Species: No rare, threatened or endangered species have been identified on the site that would be impacted by the silvicultural prescription.

Habitats and Species of Management Concern: The southern portion of the silvicultural proposal borders the Little Bear Creek ESA. This area includes exceptional examples of northern hardwood and hemlock forest types, spring seep communities and robust populations of numerous salamander species that occupy the habitat niche associated with small streams and seeps. All harvest activities will occur beyond the limits of ecologically significant area and input from Wildlife and Heritage personnel will be solicited in order to accurately locate the ESA boundary ensuring that the integrity of the unique area is not compromised.

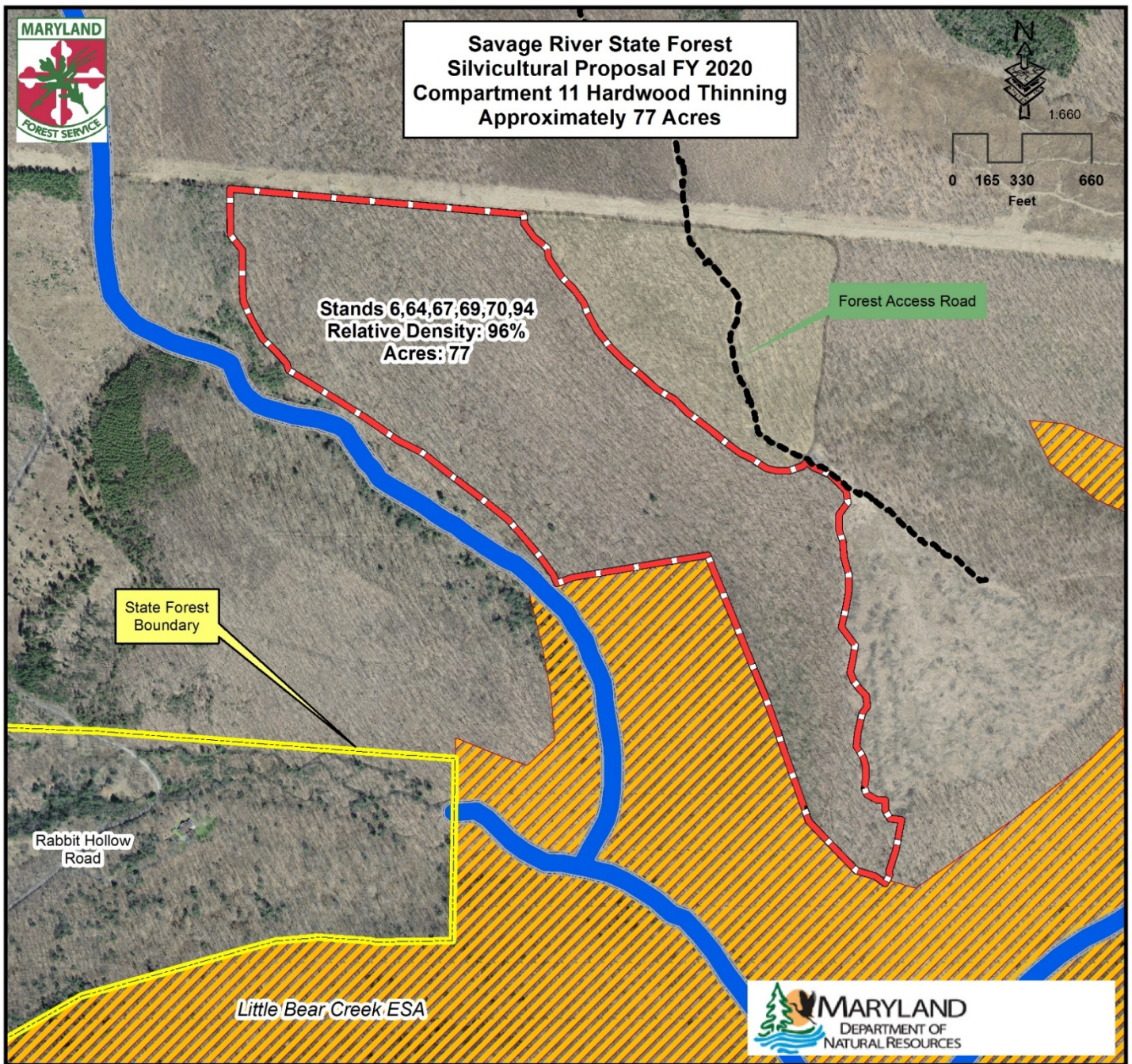
Water Resources: The stands drain south into an unnamed tributary of the Little Bear Creek within the Youghiogheny River Watershed. The proposed silvicultural treatments will be outside of all HCVF and stream buffer areas. No heavy equipment will be permitted within the protective riparian buffers of any streams or associated wetlands per the requirements set forth in the State Forest Sustainable Forest Management Plan.







Soil Resources: Underlying soil type is mapped as Stony land, steep (SrF). This soil is generally moderately deep over bedrock and well drained. Degree of slope ranges from 0-35% throughout the site. Equipment limits range from slight to moderate, moderate to severe on slopes over 35%. Hazard of erosion is slight to moderate on steeper slopes. The site has good productivity for woodland management, with a site index of 65-75 for upland oaks on south aspects. This soil type provides excellent watershed protection and habitat for wildlife. The productivity of the site will be protected by minimizing the haul roads and skid trails as per the Department's Best Management Practices and rutting guidelines.

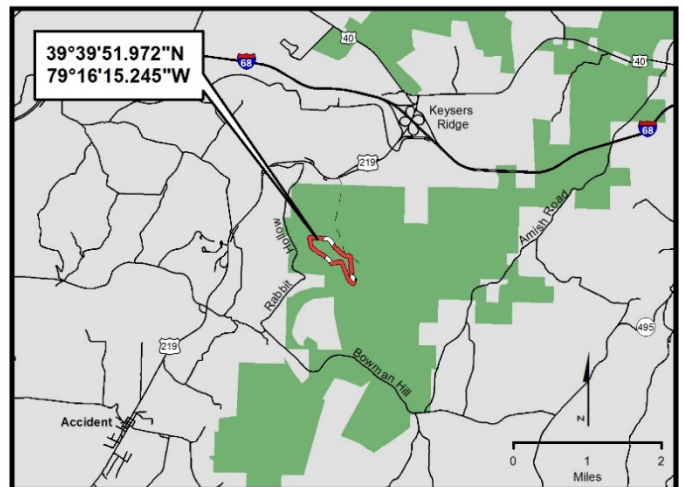
Recreational Resources: This particular area of the forest offers no developed recreational resources. The primary recreational activity performed within this area is hunting. Recreational opportunities may be disrupted for the duration of the harvest activities and access to the site may be limited depending on the timing of the harvest.

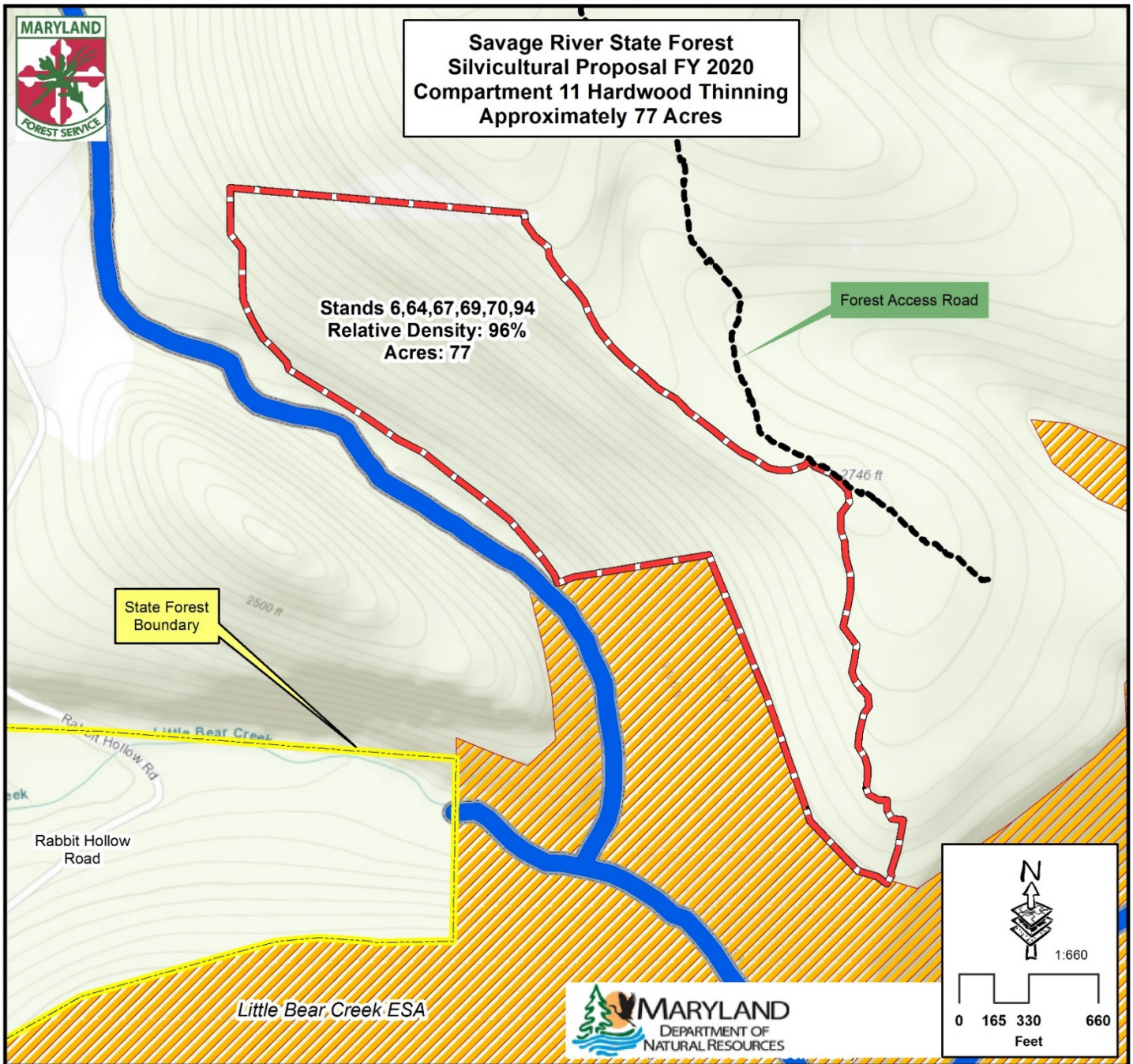
Management and Silvicultural Recommendations







The proposed silvicultural treatment for this site is a commercial thinning given that competitive regeneration is lacking and the stand is overstocked. A crown thinning will be implemented, removing approximately 50 ft² of basal area/acre and reducing the residual relative stand density to approximately 63%. Removals will be concentrated on the unacceptable growing stock in the small and medium sawtimber categories as well as individual trees that have reached maturity, yielding approximately 3,000 – 3,500 board feet/acre. Residual trees will benefit from the improved spacing with increased vigor, growth rates and overall stand health. Retention will favor trees with superior form as well as seed sources for establishing desirable regeneration in the future stand. Post-harvest monitoring will be conducted to determine if acceptable levels of desirable regeneration have naturally established within the stand or if further silvicultural activities including herbicide treatment of interfering vegetation or multi-stage shelterwood implementations will be necessary to ensure that a desirable regeneration cohort will fully occupy the site when a final removal harvest is conducted.

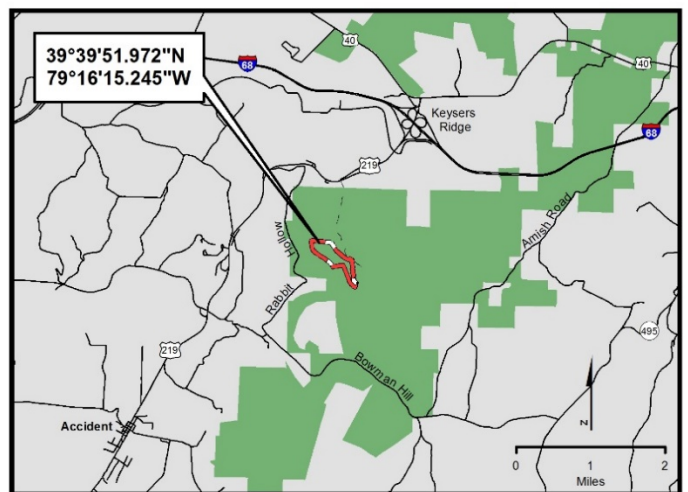


-  **Wildlands**
-  **Ecologically Significant Area**
-  **Old Growth**
-  **Old Growth Ecosystem Area**
-  **Wetland of State Concern**
-  **Streams and 50' Buffers**





-  **Wildlands**
-  **Ecologically Significant Area**
-  **Old Growth**
-  **Old Growth Ecosystem Area**
-  **Wetland of State Concern**
-  **Streams and 50' Buffers**



Description/Resource Impact Assessment

Location: This 20-acre harvest proposal is situated adjacent to the East Shale Road ORV Trail approximately 1.8 miles north of the intersection with New Germany Road and approximately 1.0 mile south from the terminus of Ellis Drive.

Forest Community Type and Condition: This site contains a medium sawtimber mixed oak stand that is approximately 95 years old, with an average merchantable diameter of 14.6 inches and an estimated net live growing stock of 12,013 board feet/acre. The overstory consists of northern red oak (53%), red maple (22%), white oak (13%) and chestnut oak (4%). The stand is overstocked with a relative density of 97% and the average basal area of the stand is 139 ft²/acre. Sufficient oak regeneration is lacking throughout the stand, occupying only 4% of the inventory area. Desirable saplings were found on 25% of the harvest proposal area.

Interfering Elements: Tall woody interference, composed mainly of black birch and striped maple, occupies approximately 50% of the stand. Low woody interference occupies approximately 36% of the site with the majority being mountain laurel that is found along the eastern boundary of the harvest proposal and is a minimal regeneration inhibitor throughout the majority of the stand. Non-native invasive species were not found on site. Problematic ferns species were found within the site, but in relatively small abundance (25%) and do not currently represent a significant impediment to desirable regeneration establishment.

This stand is located in close proximity to agricultural lands, which attract significant numbers of white-tailed deer to area leading to browsing of desirable regeneration. Overbrowsing can facilitate failure of desirable seedling establishment and in extreme cases a shift in species composition dominated by undesirable tree species. Field evaluation of the site estimated deer browse impact to be high. Monitoring of deer browse impacts will coincide with regeneration surveys to determine if additional measures need to be implemented to reduce deer herbivory and increase the likelihood of regeneration establishment on the site.

Historic Conditions: State Forest records indicate that no silvicultural work has been done within this stand since 1965. The hardwood stand adjacent to the proposal on the south was thinned in 2016. No evidence of fire was observed and no signs of significant insect infestations or diseases were recorded at the time of data collection.

Rare, Threatened and Endangered Species: No rare, threatened or endangered species were discovered within the management unit that would be impacted by the silvicultural proposal.

Habitats and Species of Management Concern: No habitats or species of management concern or any species that would be impacted by the silvicultural prescription were discovered during the proposal review process.

Water Resources: This stand drains northwest into Meadow Run, a tributary of the Casselman River within the Youghiogheny River Watershed. The proposed silvicultural treatments will be outside of all HCVF and stream buffer areas. No heavy equipment will be permitted within the

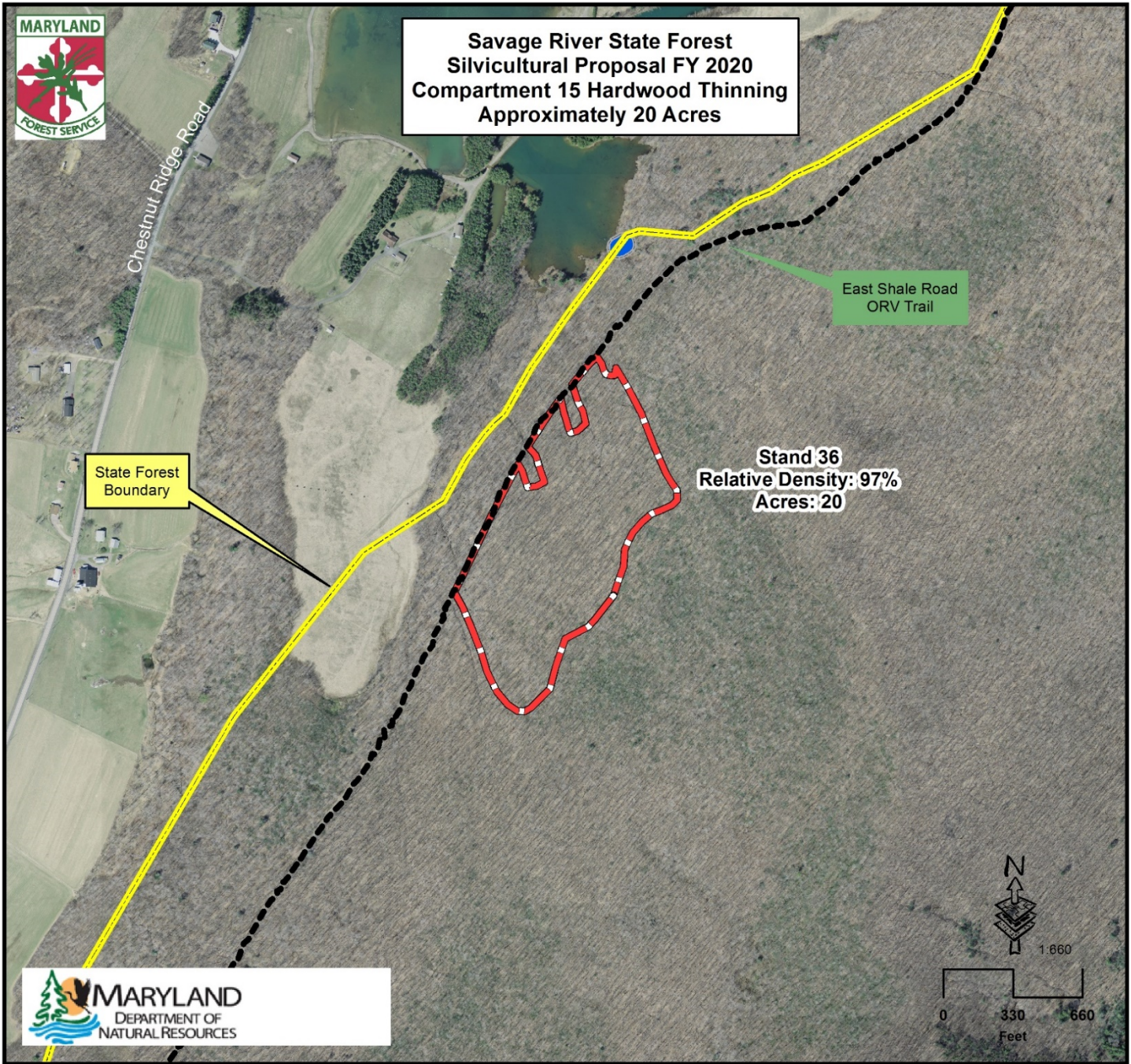
protective riparian buffers of any streams or associated wetlands per the requirements set forth in the State Forests Sustainable Forest Management Plan.







Soil Resources Underlying soils are mapped as Cookport and Ernest very stony silt loams (CuB). These soils are generally moderately deep and well drained with inclusions of some poorly drained soils. Degree of slope ranges from 0-8% throughout the site. Equipment limits are moderate due to the water table being fairly close to the soil surface late in winter and early spring. The soil type has the potential to be highly erodible. The site has very good productivity for woodland management, with a site index of 75-85 for upland oaks. Overall productivity of the site will be protected by minimizing the haul roads and skid trails as per the Department's Best Management Practices and rutting guidelines.

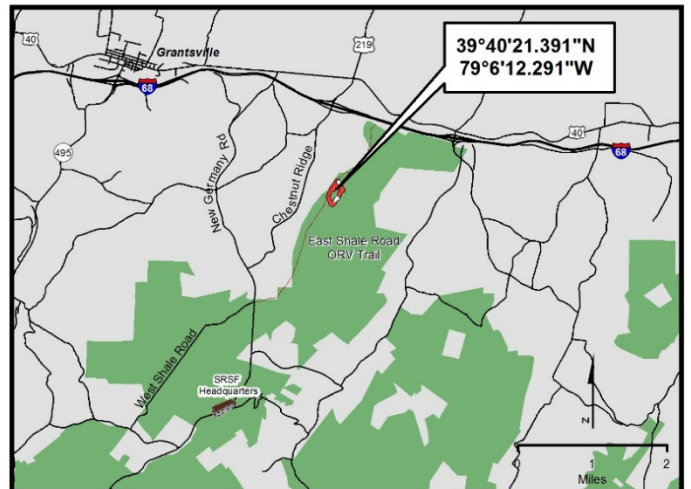
Recreational Resources: The forest access road that will be utilized as a haul road for the timber harvest also serves the East Shale Road ORV Trail. Access to the trail may be limited and/or suspended for the duration of the harvest depending on the layout and the timing of the cutting. Hunting is also a popular activity in this area as the forest road provides a multitude of access points into the state forest. Opportunities to hunt the area may also be limited or disrupted as log trucks and heavy equipment enter/exit the area.

Management and Silvicultural Recommendations

This stand is nearing maturity, but desirable regeneration is not sufficient enough to warrant a regeneration harvest. Therefore, the recommended prescription for this stand is a commercial thinning. Thinning the stand will reduce the stocking levels thereby reducing competition and will provide more growing space for the higher quality trees. Removals will focus on unacceptable growing stock and the crown thinning will reduce the average basal area to 90 ft²/acre and the relative density to 63%, yielding approximately 4,500-5,000 board feet/acre. After harvest completion, the stand will be monitored for acceptable levels of desirable seedling establishment. If necessary, further silvicultural treatments including shelterwood harvests and herbicide applications may be implemented to facilitate the occupation of the site by desirable species, permitting a final harvest of the overstory to be conducted.

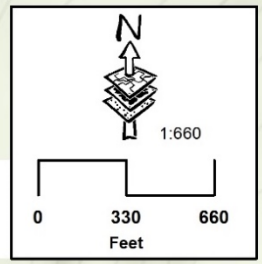
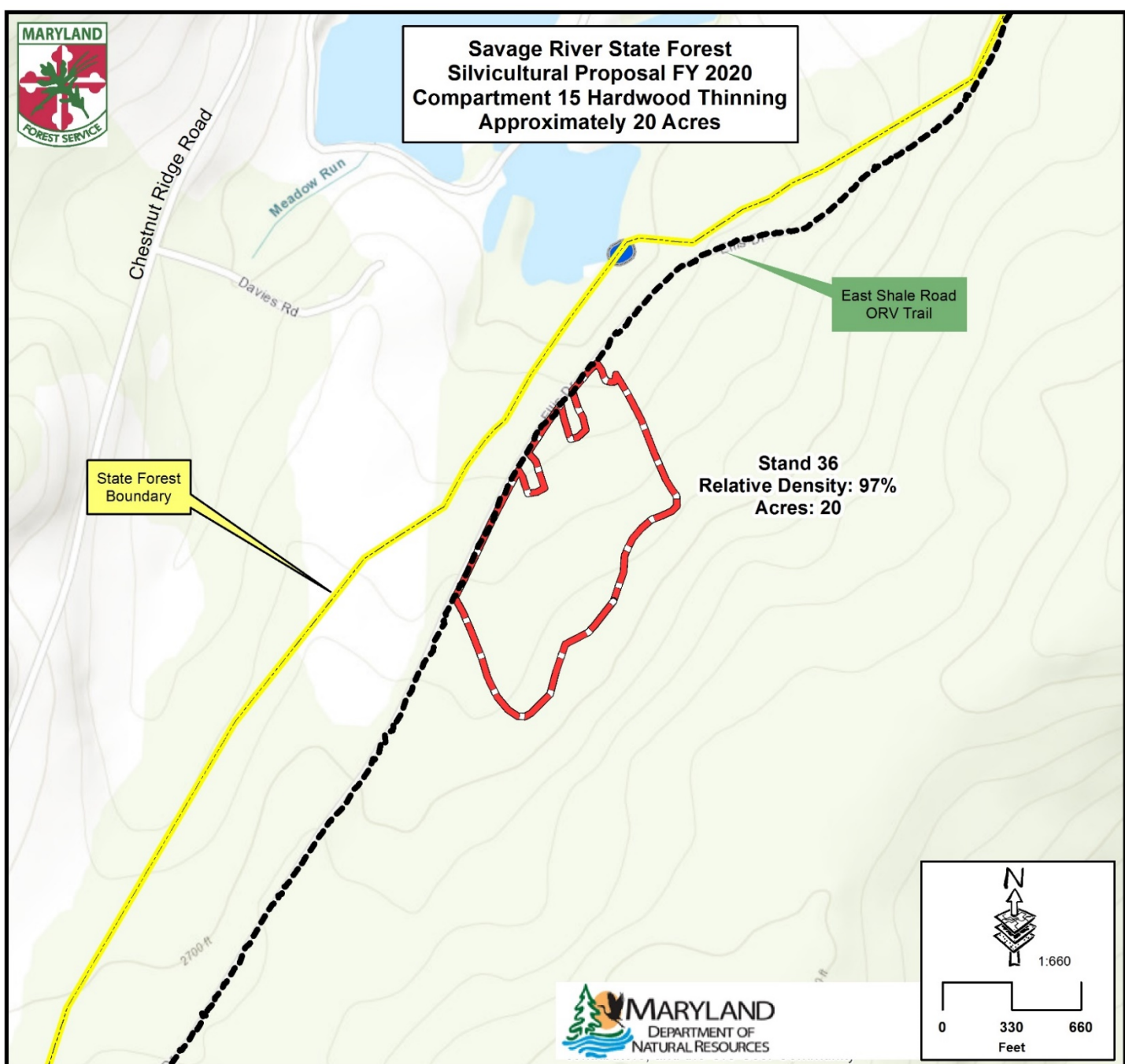


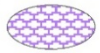





-  **Wildlands**
-  **Ecologically Significant Area**
-  **Old Growth**
-  **Old Growth Ecosystem Area**
-  **Wetland of State Concern**
-  **Streams and 50' Buffers**

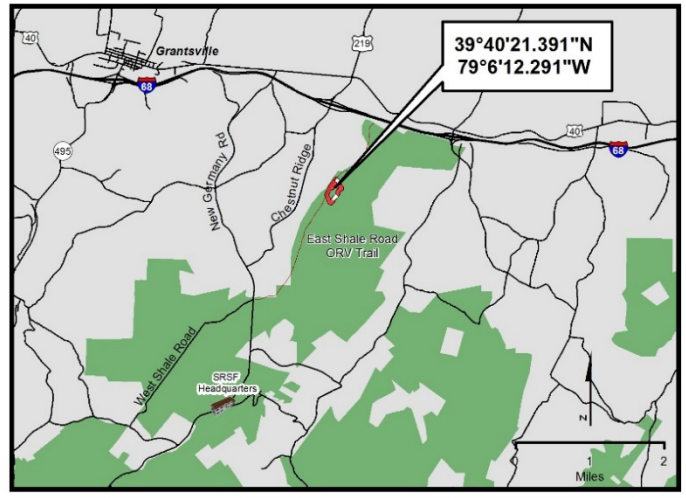




**Savage River State Forest
Silvicultural Proposal FY 2020
Compartment 15 Hardwood Thinning
Approximately 20 Acres**



-  **Wildlands**
-  **Ecologically Significant Area**
-  **Old Growth**
-  **Old Growth Ecosystem Area**
-  **Wetland of State Concern**
-  **Streams and 50' Buffers**



Description/Resource Impact Assessment

Location: This harvest proposal is accessible off West Shale Road in the area of the state forest commonly referred to as the Asa Durst Homestead located approximately 1.5 miles west of the intersection of New Germany Road and West Shale Road.

Forest Community Type and Condition: This 23-acre site contains a medium sawtimber mixed oak stand that is approximately 80 years old with an average merchantable diameter of 13.6 inches and an estimated standing growing stock of 11,300 board feet/acre. The main overstory is composed of red maple (39%), northern red oak (33%), black cherry (12%) and black gum (5%). The remainder of the stand composition contains hemlock, sugar maple, white oak and chestnut oak in minor quantities. This stand is overstocked at 96% relative density and the average basal area of the stand is 163 ft²/acre. Twenty-two percent of the stand contains desirable saplings and total oak regeneration occupies 13% of the site.

Interfering Elements: The entire harvest site contains some form of interfering vegetation. Tall woody interference is problematic across the whole stand, primarily composed of witch hazel and black birch. Low woody interference occupies 72% of the stand and populations of problematic ferns are found on 34% of the site. Stand regeneration is not the primary silvicultural focus for the stand and no effort will be made to control the aforementioned interfering vegetation at this time. Several non-native species were identified during the data collection process including multi-flora rose, garlic mustard and Japanese spirea. Herbicide applications will be administered, where practical, to prevent the potential spread of these deleterious species within the stand and into adjacent forestland.

In addition to interfering vegetation, the presence of white-tailed deer can have a negative influence on the regeneration success of the stand. Over browsing can facilitate failure of desirable seedling establishment and in extreme cases a shift in species composition dominated by undesirable tree species. Field evaluation of the site estimated deer browse impact to be moderate. Monitoring of deer browse impacts will coincide with regeneration surveys to determine if additional measures need to be implemented to reduce deer herbivory and increase the likelihood of regeneration establishment on the site.

Historic Conditions: State Forest records indicate that this stand was thinned in 1987. The stand immediately to the east of the proposal was strip mined and replanted with pitch/loblolly pine hybrids to serve as nurse crops. No evidence of fire or insect pest activity was observed in the harvest proposal area.

Rare, Threatened and Endangered Species: No rare, threatened or endangered species have been found on the site that would be impacted by the silvicultural prescription.

Habitats and Species of Management Concern: The harvest proposal lies approximately 600 feet from the Big Laurel Run Ecologically Significant Area, which provides habitat for a State Threatened plant and two State Rare plant as well as an archetypal northern hardwood forest

community. All proposed silvicultural activities will occur outside the designated boundaries of this particular HCVF and will have no impact upon its present condition.

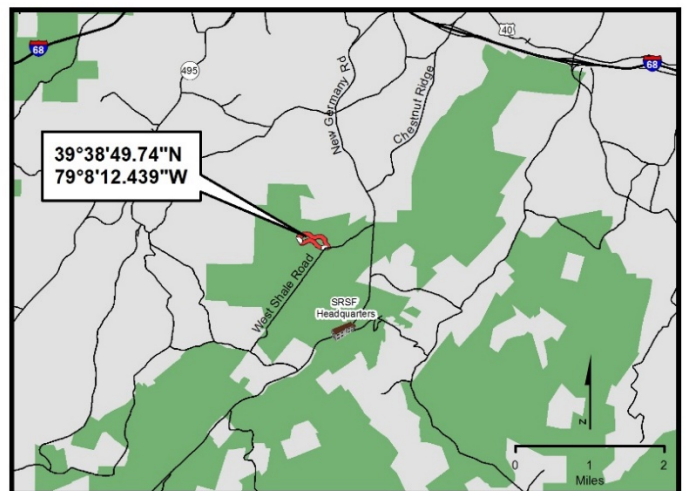
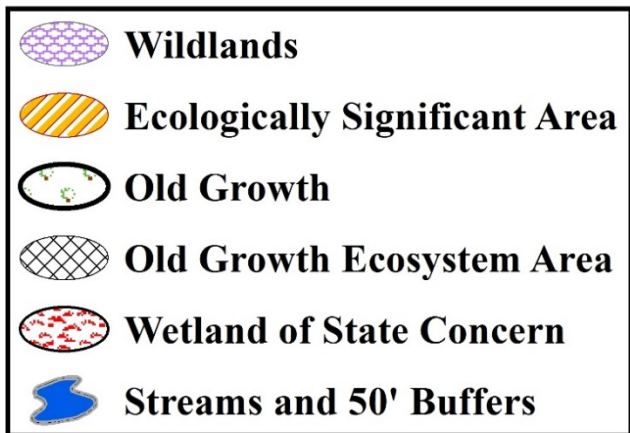
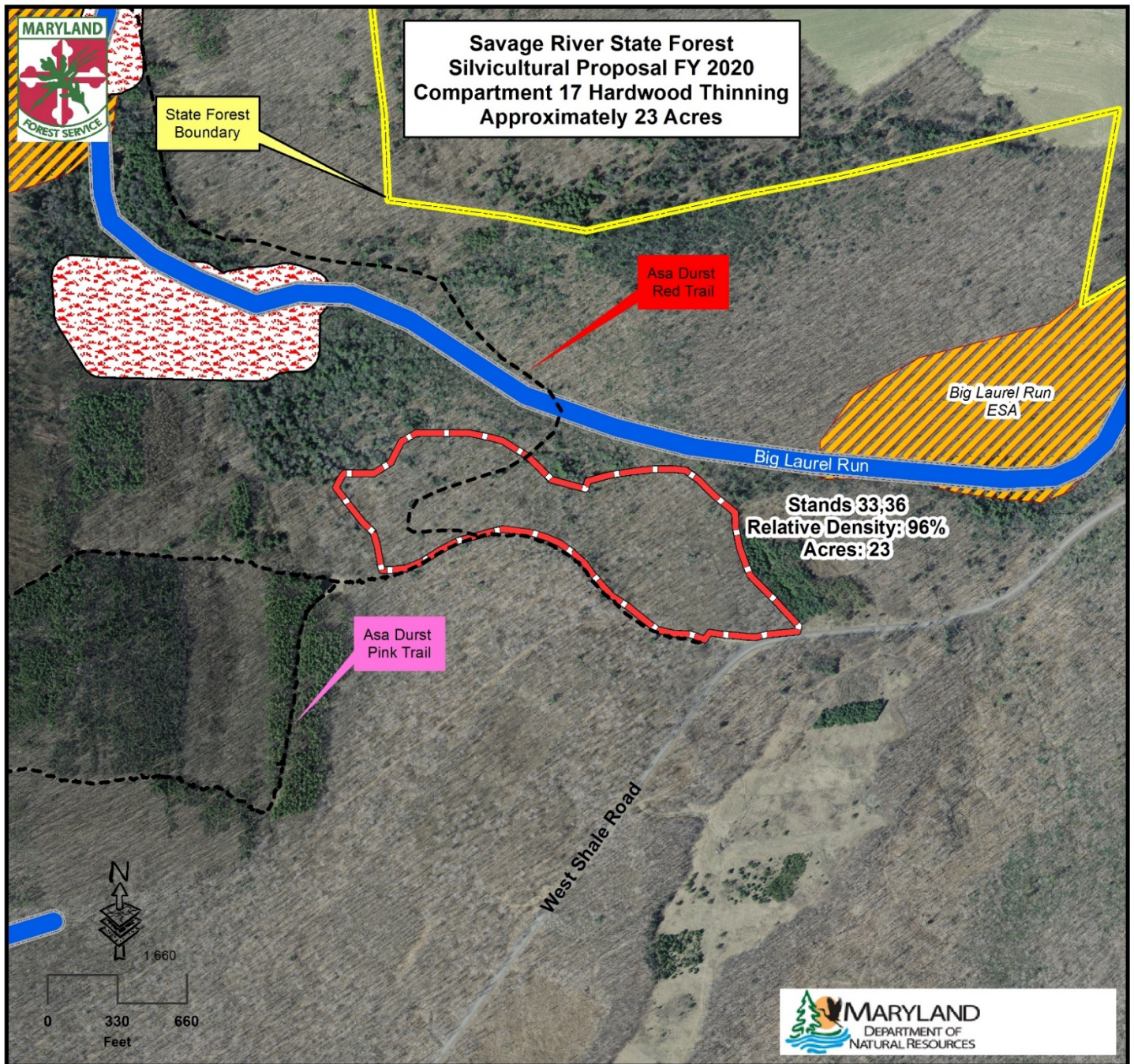
Water Resources: This stand drains north into Big Laurel Run, a tributary to the Casselman River within the Youghiogheny River Watershed. Also, a fifteen-acre wetland of state concern is located approximately 550 feet northwest of the harvest site. The proposed silvicultural treatments will be outside of all HCVF stream buffers and designated wetland areas. No heavy equipment will be permitted within the protective riparian buffers of any streams or associated wetlands per the requirements set forth in the State Forests Sustainable Forest Management Plan.

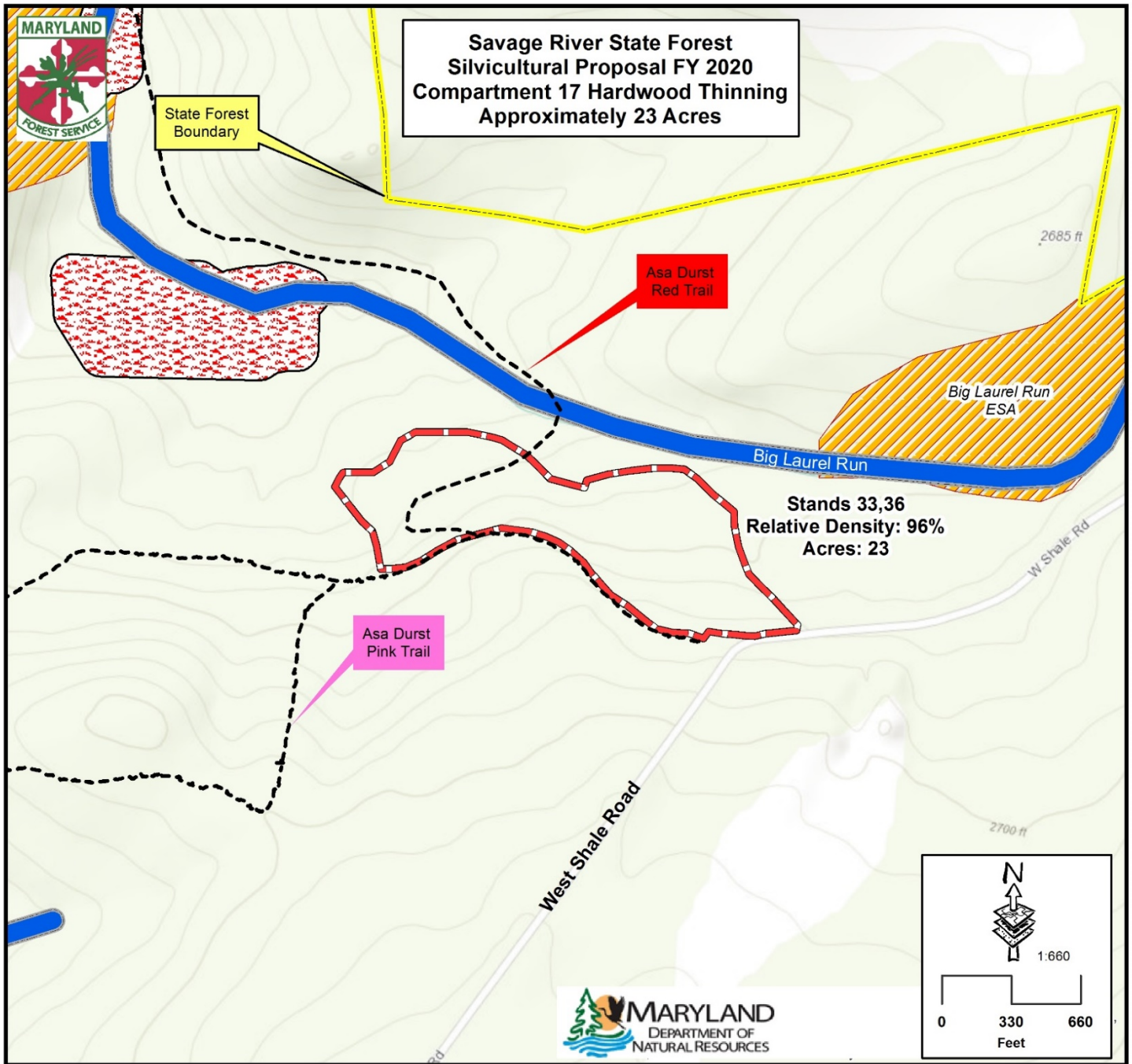
Soil Resources: The harvest site is underlain with soils designated as Cookport and Ernest very silt loams, 0 to 25% percent slopes (CuB and CuD). Abundant stones are found on and in the soil, mainly composed of sandstone, drainage ranges from poor to well-drained and water moves slowly through the subsoil. Equipment limitations are moderate due to the water table being close to soil surface in late winter and early spring. The site has high productivity for woodland management, with a site index of 75-85 for upland oaks. The productivity of the site will be protected by minimizing the haul roads and skid trails as per the Department's Best Management Practices and rutting guidelines.







Recreation Resources: The forest access road that will be utilized as a haul road for the timber harvest serves as part of the Asa Durst Red Trail that is used to access the Pink Trail and a section of the Red Trail crosses the western portion of the harvest proposal. Access to the trail may be limited and/or suspended for the duration of the harvest depending on the timing of the cutting. Contract stipulations will require that all logging debris will removed from the trail surface prior to harvest close out. Hunting is also a popular activity in this area as the forest road provides a multitude of access points into the state forest. Opportunities to hunt the area may also be limited or disrupted as log trucks and heavy equipment enter/exit the area.

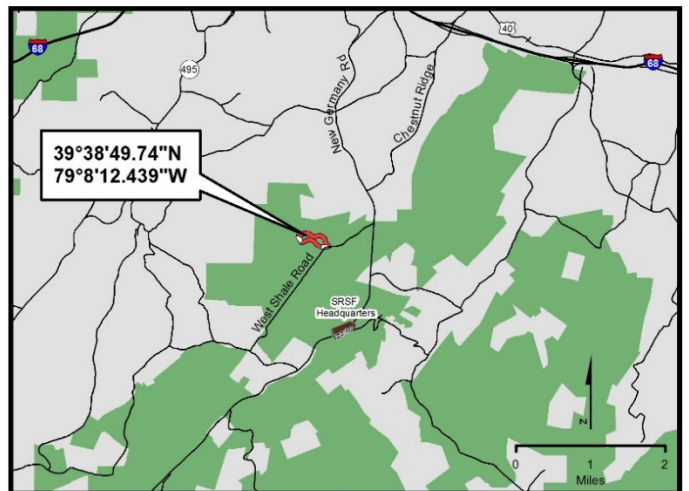
Management and Silvicultural Recommendations

The planned silvicultural treatment for this site is a thinning. The objective of this thinning is simply to reduce stocking levels in order to lessen competition among the remaining trees thereby, increasing the health, vigor and growth rate of the residual stand. The canopy gaps created by the thinning will provide more light to the present oak regeneration aiding it in reaching a successive cohort. The thinning will be carried out as a crown thinning; reducing the basal area to approximately 100 - 110 ft² /acre and relative density to 62%. Unacceptable growing stock will be the primary focus of removals along with select individual stems that have reached maturity. Retention will favor trees with superior form and seed sources for developing regeneration in the future stand. The harvest will yield approximately 3,500 board feet/acre. After harvest completion, the stand will be monitored for acceptable levels of desirable seedling establishment. If necessary, further silvicultural treatments including shelterwood harvests and herbicide applications may be implemented to facilitate the occupation of the site by desirable species, permitting a final harvest of the overstory to be conducted.





-  **Wildlands**
-  **Ecologically Significant Area**
-  **Old Growth**
-  **Old Growth Ecosystem Area**
-  **Wetland of State Concern**
-  **Streams and 50' Buffers**



Description/Resource Impact Assessment

Location: This harvest proposal is accessible via an existing forest road on Fairview Road located approximately 2.6 miles southeast of the intersection of Fairview Road and New Germany Road.

Forest Community Type and Condition: This harvest proposal is composed of two separate small sawtimber conifer stands that are approximately two acres and twenty-five acres respectively. Stand 14 is comprised primarily of eastern white pine (73%) interspersed with hardwood species including black birch (17%), black cherry (7%) and red maple (3%). Total basal area for the stand is 200 ft²/acre with a relative density of 132% and an average merchantable diameter is 13.8 inches. Stand 18 also contains a significant proportion of white pine (56%) as well as a Norway spruce and (15%) and red pine component (2%). Minimal quantities of hardwood species including black birch (11%), red maple (7%) and black cherry (6%) are found within the stand. Relative density is 106% of the optimum for growth with an average basal area of 167 ft²/acre. Average merchantable diameter for the stand is 14.3 inches. Also included in this proposal is a one-acre portion of Stand 11 that contains a suppressed pulpwood/small-sawtimber red pine component that will be harvested to liberate advanced hardwood regeneration that is present in the understory. Desirable regeneration and overall plant diversity is scarce in the understories due to the thick duff layers and the dense overcrowded canopies as well as the interfering elements that are listed below.

Interfering Elements: Interfering understory plant competition is sufficient enough throughout both stands to impede regeneration efforts with 100% of the plots in Stand 14 containing some form of significant interference and 95% in Stand 18. Tall woody interference, consisting primarily of striped maple and sweet birch is found throughout the entireties of both stands. Low woody interference is less problematic, occupying only 25% of Stand 14 and 9% of Stand 18. Fern interference is not a contributing factor to regeneration absence in Stand 14. Conversely, 45% of the surveyed area of Stand 18 contained significant fern interference. Japanese spirea was observed in all three proposal areas as well as along the forest access road. In order to control the spread of this and other non-native invasive species into adjacent woodlands, herbicide applications will be implemented where practical.

Historic Conditions: State Forest records show that both stands were thinned in 1972. No evidence of fire was observed within the stand. No signs of significant insect infestations or disease were observed during the assessment of the stand.

Rare, Threatened and Endangered Species: No rare, threatened or endangered species, or species that would be impacted by the silvicultural prescription were discovered on the site.

Habitats and Species of Management Concern: The conifer plantation component of the forest landscape was implemented in an effort to rehabilitate overused and misused tracts of agricultural and mine land by serving as a nurse crop that would foster the reestablishment of native species and would subsequently be harvested in its entirety. Forest management priorities

have not adhered to this strategy allowing the conifer stands to reach maturity and in the process, creating a unique habitat niche for a suite of species. However, in the absence of any silvicultural work being implemented, the planted conifer stands persist in a severely overstocked condition, some to the point of stagnation and decline. In an ongoing effort to maintain the conifer component of the forest, commercial thinnings will be implemented in order to reduce high stocking densities leading to increased health, vigor and growth in residual stands. Where appropriate, final harvests will be applied to stands in accelerated states of decline followed by occupation of the site by native hardwoods or artificial regeneration with suitable species.

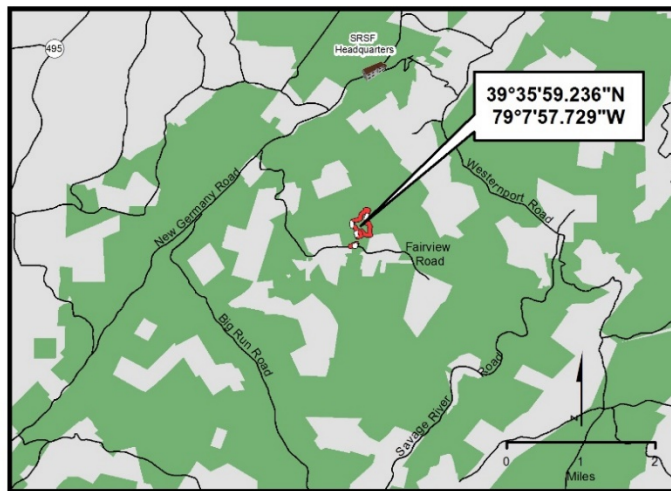
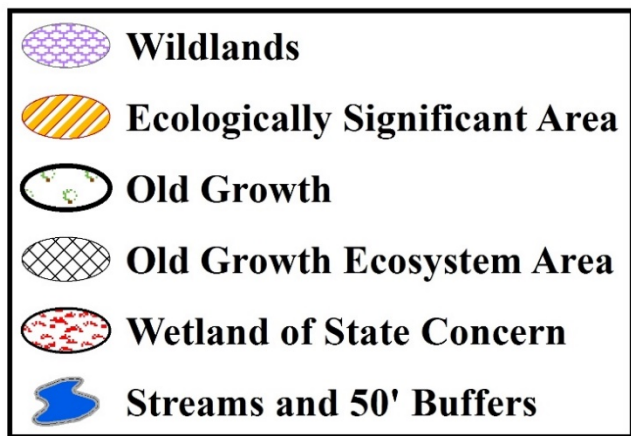
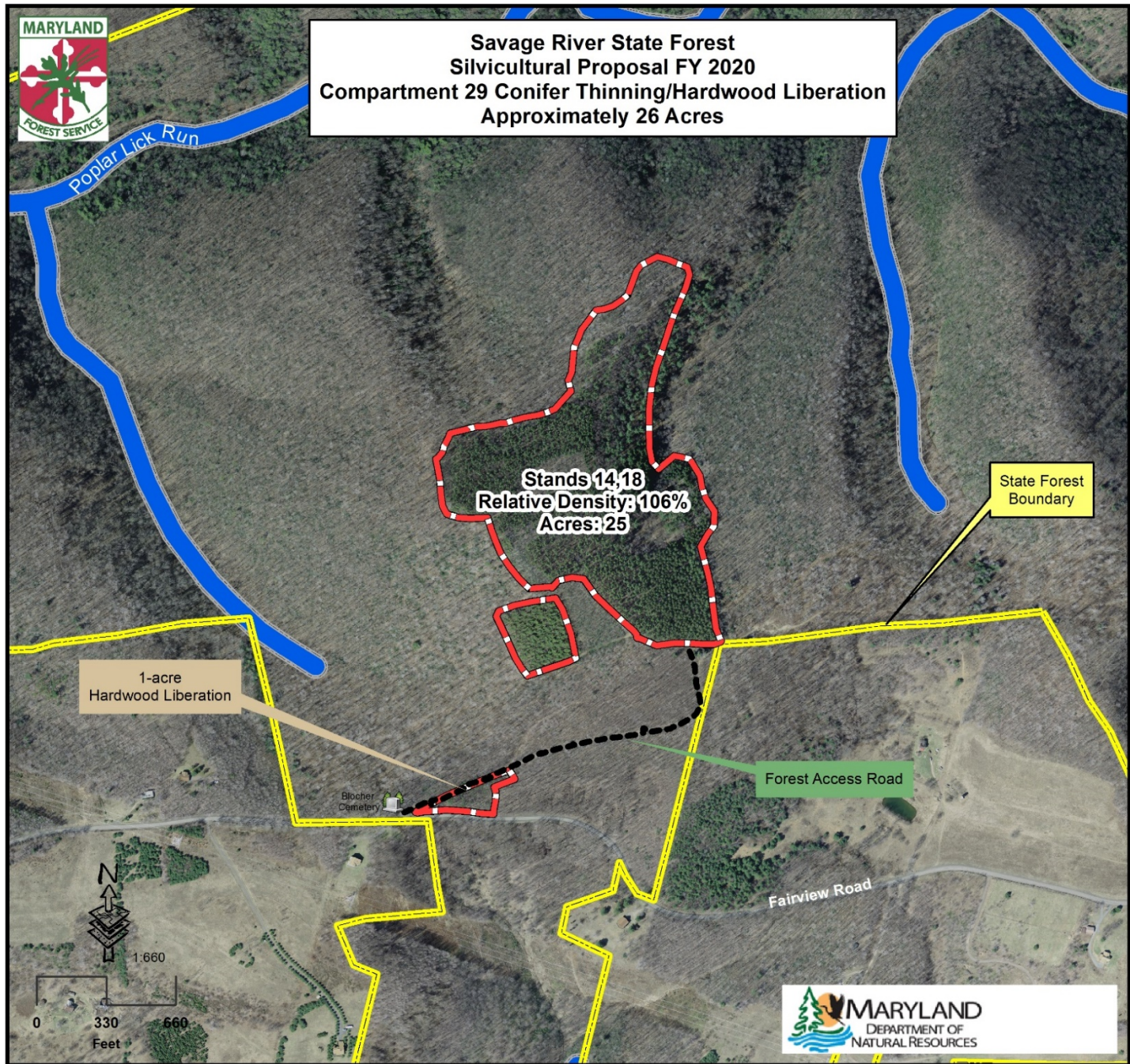
Water Resources: Stands 14 and 18 drain north into an unnamed tributary of Poplar Lick Run and Stand 11 drains south into Bear Pen Run, both of which are within the Savage River Watershed. The proposed silvicultural treatments will be outside of all HCWF and stream buffer areas. No heavy equipment will be permitted within the protective riparian buffers of any streams or associated wetlands per the requirements set forth in the State Forests Sustainable Forest Management Plan.

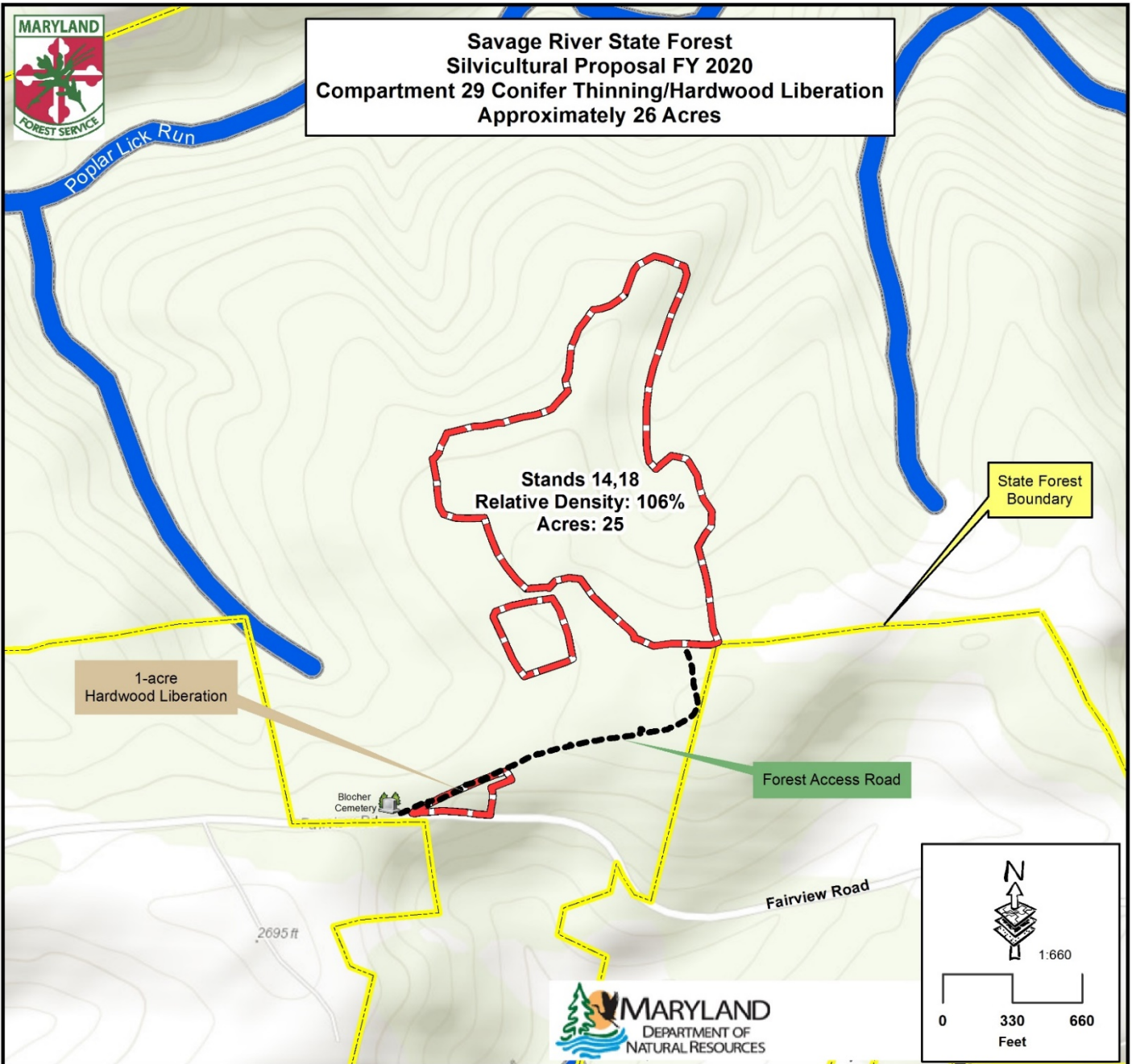
Soil Resources: Dominant underlying soils are mapped as Ungers, Calvin and Lehew channery loams, 0 to 10 percent slopes (UcB). This soil is moderately deep over bedrock and well drained. Equipment limitations are slight as the soil type is classified as not highly erodible land and is considered to be of statewide importance as farmland. The site has good productivity for woodland management with a site index range of 65-75 for upland oaks. The productivity of the site will be protected by minimizing the haul roads and skid trails as per the Department's Best Management Practices and rutting guidelines.







Recreation Resources: Hunting is the primary recreation activity in this area and the forest road provides a multitude of access points into the state forest. Opportunities to hunt the area may be limited or disrupted for the duration of the timber harvest.

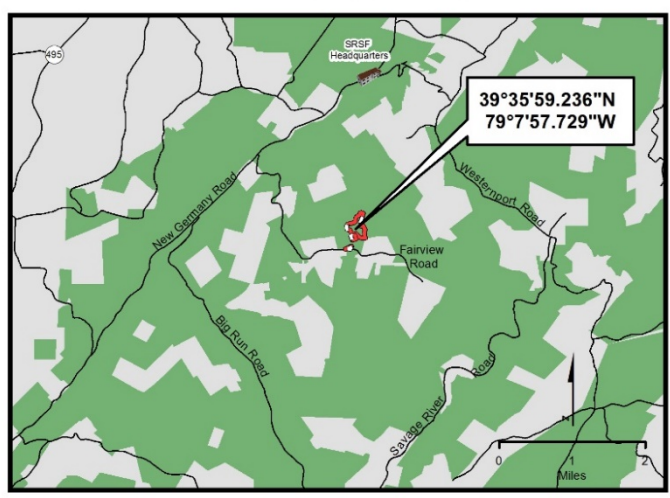
Management and Silvicultural Recommendations

The planned silvicultural treatment for this site is a commercial thinning. The objective of this thinning is simply to reduce stocking levels in order to lessen competition among the remaining trees thereby, increasing the health, vigor and growth rate of the residual stand as well as maintaining the conifer component on the forest landscape. Approximately 1/3 of the basal area in each stand will be removed reducing the basal area to approximately 130 ft²/acre for Stand 14 and 110 ft²/acre in Stand 18. Removals will focus on unacceptable growing stock as well as select trees that have reached maturity. Harvest volumes anticipated from removals will be approximately 7,200 board feet/acre and 4,000 board feet/acre respectively. Abundant desirable advanced hardwood regeneration is present in the understory and mid canopy of the small red pine stand within Stand 11 and a liberation harvest will be implemented to allow the native hardwood cohort to occupy the site.





-  **Wildlands**
-  **Ecologically Significant Area**
-  **Old Growth**
-  **Old Growth Ecosystem Area**
-  **Wetland of State Concern**
-  **Streams and 50' Buffers**



Description/Resource Impact Assessment

Location: This 33-acre proposal is situated north of Glendale Road, accessible via an existing forest road located 1.8 miles west of the intersection of Glendale Road and State Route 495.

Forest Community Type and Condition: This site contains an 80-year-old small sawtimber mixed upland hardwood stand with an average merchantable diameter of 12.7 inches. Red maple is the dominant overstory species (41%) followed by northern red oak (16%), black cherry (12%) and hickory (6%). This stand is stocked at 64% relative density with an average basal area of 99.5 ft²/acre and an estimated volume of 5,170 board feet/acre. Approximately 59% (58.6 ft²/acre) of the present stand is categorized as unacceptable growing stock. Oak regeneration from all cohorts occupies approximately 5% of the management unit and saplings of desirable species occupy 18% of the proposal area.

Interfering Elements: Striped maple and witch hazel are present as tall woody interference on 82% of the stand and low woody interference is represented by black birch and witch hazel on 39% of the management unit. Grass and fern populations do not currently contribute to regeneration issues, occupying 14% and 23% of the harvest site respectively. Several non-native invasive species including Japanese stilt grass, Japanese barberry and multiflora rose were discovered during the inventory and will be treated with appropriate herbicide applications, where practical, to prevent the potential spread of these deleterious species within the stand and into adjacent forestland.

In addition to interfering vegetation, the presence of white-tailed deer can have a negative influence on the regeneration success of the stand. Overbrowsing can facilitate failure of desirable seedling establishment and in extreme cases a shift in species composition dominated by undesirable tree species. Field evaluation of the site estimated deer browse impact to be high. Monitoring of deer browse impacts will coincide with regeneration surveys to determine if additional measures need to be implemented to reduce deer herbivory and increase the likelihood of regeneration establishment on the site.

Historic Conditions This stand was heavily thinned in 1998. The stand adjacent to the southern boundary of the proposal was thinned in 2014. No evidence of recent fire activity or sign of significant insect infestation was observed within the stand.

Rare, Threatened and Endangered Species: No rare, threatened or endangered species were discovered on the site.

Habitats and Species of Management Concern: At this time no habitats or species of management concern have been identified on the site.

Water Resources: Drainage from the site is southward into Meadow Mountain Run within the Youghiogheny River watershed. The proposed silvicultural treatment will be outside of all HC VF stream buffer areas. No heavy equipment will be permitted within the protective riparian

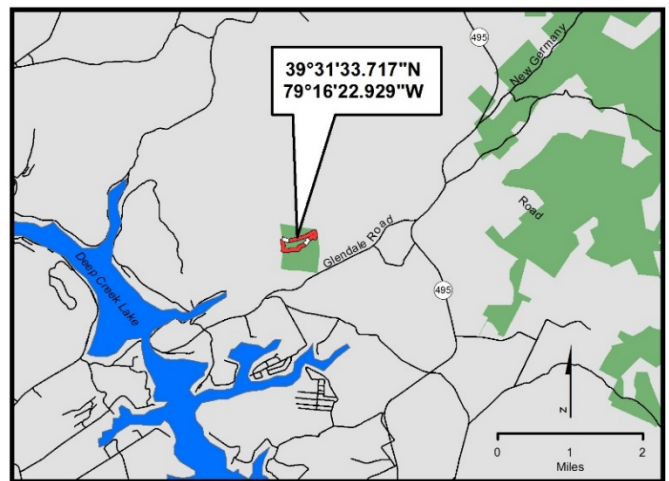
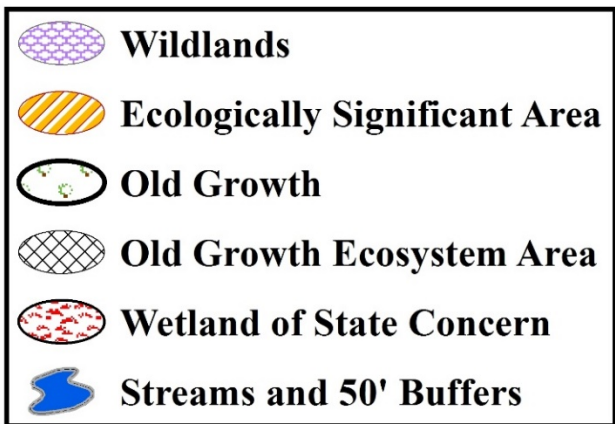
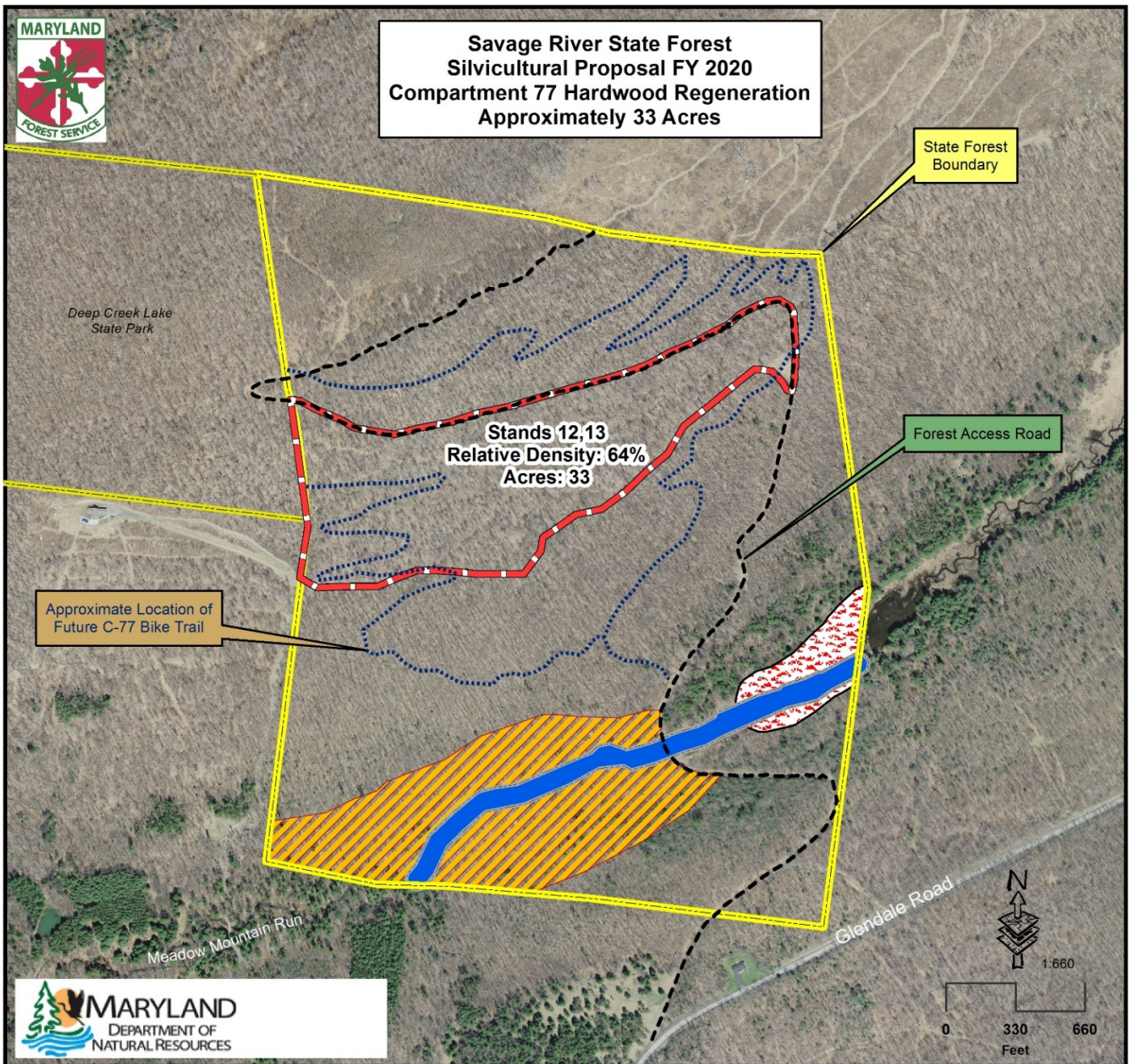
buffers of any streams or associated wetlands per the requirements set forth in the State Forests Sustainable Forest Management Plan.

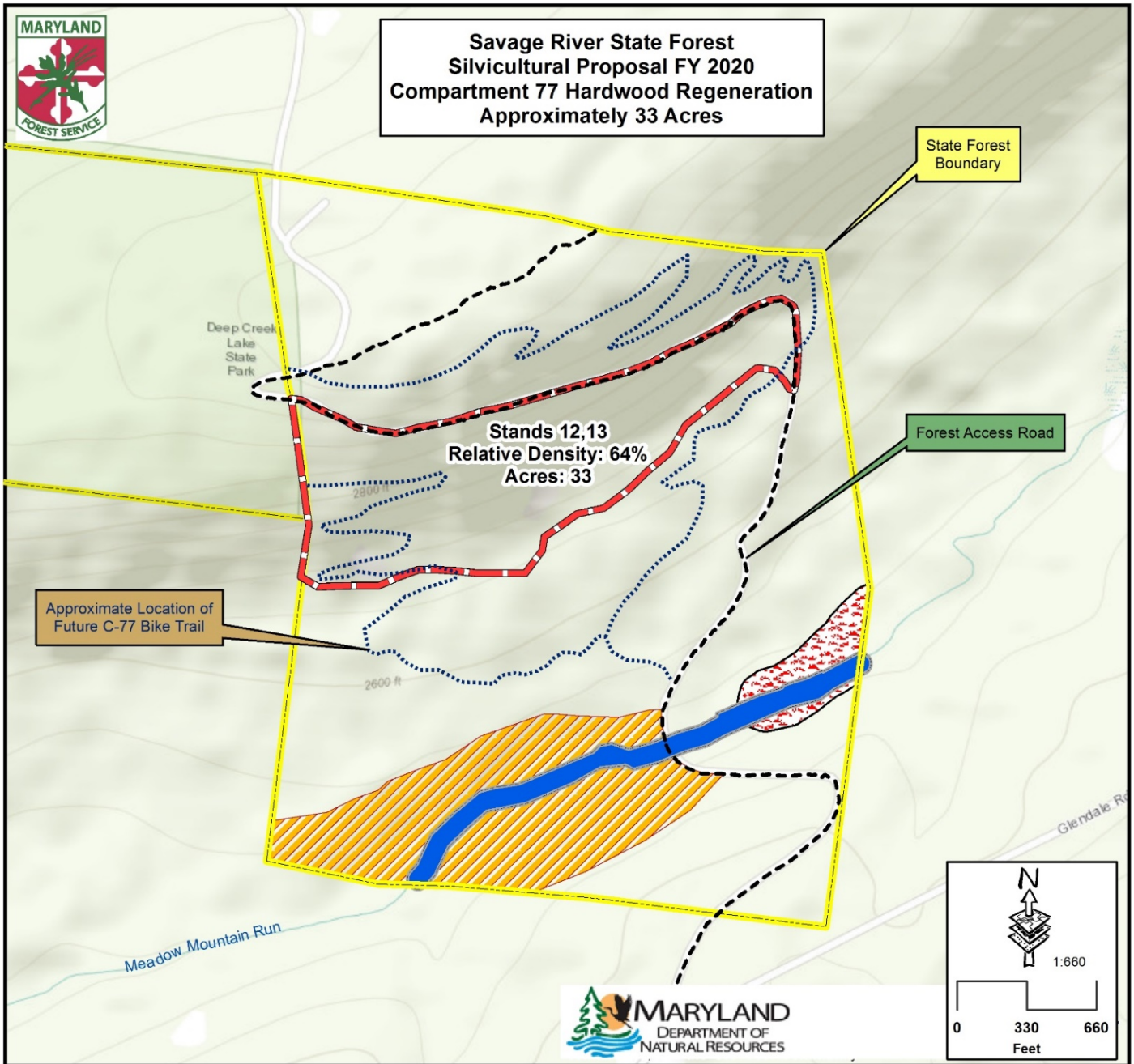
Soil Resources: Underlying soil type is mapped as Stony land, steep (SrF). This soil is generally moderately deep over bedrock and well drained. Degree of slope ranges from 0-35% throughout the site. Equipment limits range from slight to moderate, moderate to severe on slopes over 35%. Hazard of erosion is slight to moderate on steeper slopes. The site has good productivity for woodland management, with a site index of 65-75 for upland oaks on south aspects. This soil type provides excellent watershed protection and habitat for wildlife. The productivity of the site will be protected by minimizing the haul roads and skid trails as per the Department's Best Management Practices and rutting guidelines.







Recreation Resources: No developed recreational resources are currently found within the management unit. Designs for approximately 3.66 miles of singletrack bike trail, designated C-77, have been approved for implementation beginning in September 2018. Besides biking, the main recreational activity performed within this area is hunting. Also, snowmobile traffic originating from Deep Creek State Park may occasionally occur on the forest access road. Opportunities for recreation may be limited or disrupted for the duration of the timber harvest.

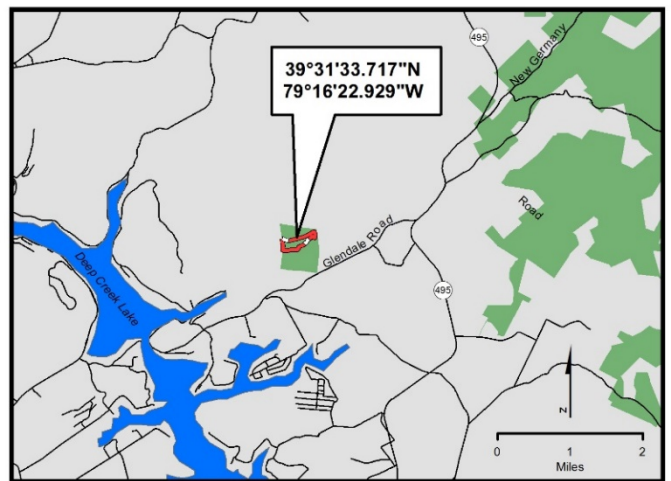
Management and Silvicultural Recommendations

Tree selection criteria employed in the previous thinning that occurred in 1998 resulted in a residual stand that lacks adequate stocking of acceptable trees to provide a future stand of desirable quality and further management of the stand in its present condition is not warranted. Given these factors, this stand will be regenerated using a clear cut with variable retention. All trees greater than four inches DBH will be harvested and retention will focus on four to eight dominant or co-dominant trees per acre selected for mast production/seed sources or wildlife habitat elements including cavities, den trees and nesting sites. Harvest volumes will total approximately 5,170 board feet/acre and Contract specifications will require high slash to remain on the harvest site in order to deter deer browsing on developing seedlings and stump sprouts.





-  **Wildlands**
-  **Ecologically Significant Area**
-  **Old Growth**
-  **Old Growth Ecosystem Area**
-  **Wetland of State Concern**
-  **Streams and 50' Buffers**



XI. Operational Management and Budget Summary

- A. Introduction
- B. Funding Sources
- C. Operational Cost

Submitted Budget Request

The submitted annual budget for Savage River State Forest totals \$646,235.00. Of that amount, \$383,018.00 goes to fund classified salaries and benefits for four employees; \$92,597.00 funds four contractual employees and \$170,620.00 for forest operations. Savage River has generated revenue that greatly exceeded its cost of operation for many years. The majority of revenue is obtained from the sale of forest products. Successful marketing in selling a mix of species and grades of wood products that the market most demands has contributed to substantial revenue generation over the years.

Operational Management

A. Introduction

This section of the plan is designed to cover the annual cost and revenues associated with the operational management of Savage River State Forest (SRSF). It is the Department's intent that all revenues generated from SRSF will be used to pay for the management and operation of the Forest. The numbers expressed in this section are only estimates and averages of annual expenses and revenues. These numbers will fluctuate each year based on management prescriptions, economic conditions and public use of the forest.

The following information is a breakdown of Revenues and Operational costs associated with SRSF. These figures are only estimates that are based on projected revenues and operational expenses. Yearly changes in timber markets and weather conditions can severely affect revenues. Operational expenses will vary from year to year and the numbers below are based on the budget request submitted for FY-2019.

B. SRSF Funding Sources: Estimated - \$646,235

State Forests in Maryland are funded from several sources. The first source is the revenue generated by the forests. These funds are deposited in the Department of Natural Resources Forest or Park Reserve Fund and must be appropriated by the General Assembly through the annual budgeting process before being spent. The state forest budget is prepared approximately one year before the beginning of the fiscal year in which it will be spent. The budget then goes through the legislative approval/review process along with all other state operating budgets. Once adopted, the budget goes into effect July 1st, the first day of the fiscal year. Revenue generated by the state forest is designated special fund revenue. There may be special funds provided from the Department of Natural Resources Forest or Park Reserve Fund

that are not generated by this particular forest or there may be a lesser amount of special funds shown in the budget than was generated on this specific forest.

Another source of funding for the state forest is Recreational Trail Grants. These grants are competitive and are generally limited to \$80,000 per year per grant. The source of this funding is the Federal Department of Transportation administered through the Maryland Department of Transportation, State Highway Administration. These funds are designated as reimbursable funds. Savage River State Forest has requested Recreational Trail Grant funds in the amount of \$30,000.00 for personnel to maintain the newly developed 13-mile long St. John's Rock ORV Trail.

C. Operational Cost: Estimated Annual Expenses - \$646,235

Operational expenses are those costs paid directly out of the Savage River State Forest operational budget. The Forest Manager prepares a proposed operational budget for the forest based on instructions provided approximately one year in advance of the fiscal year. The FY-2020 budget proposal was prepared in August of 2018.

- *Classified Salaries, Wages and Benefits: \$383,018*

This cost is associated with Special Funds which are state tax revenues provided annually. These funds are used to pay the salaries of the Maryland classified employees responsible for the management, operation and maintenance of the State Forest.

- *Contractual Staffing: \$92,597*

This cost is associated with contractual staffing associated with operations of the state forest. Contractual personnel are responsible for conducting work outlined in the annual work plan, managing the daily activities on the forest, including boundary line work, maintenance of trails, forest roads, maintaining primitive campsites, a public shooting range, overlooks, wildlife habitat areas, and implementing all maintenance, recreational, silviculture and ecosystem restoration projects.

- *Land Operation Costs: \$170,620*

This includes expenses for office and field equipment, vehicles, gates, gravel, signs, boundary paint, roadwork contracts and construction, trash removal from illegal dumping, boundary line work & surveying, tree planting, site preparation, control of invasive species, non-commercial thinning and other forest management practices. These costs vary greatly from year to year based on the activities identified in the Annual Work Plan.

D. Summary

This is the general breakdown on Revenues and Operational Costs associated with the Savage River State Forest. As described, these figures will vary from year to year. A more detailed picture on revenues and operational cost will be reviewed quarterly as the actual picture develops within implementation of Annual Work Plan and as operating budgets are approved

XII. Appendices

Appendix 1: St. John's Rock ORV Trail Usage Totals for Year One: July 23, 2017 to July 23, 2018

StartDate	Customers	Transactions	DailyUse	Camping	Revenue (\$)
7/23/2017	4	4	5	0	45
7/24/2017	3	3	3	0	27
7/28/2017	3	3	4	1	60
7/29/2017	6	7	7	1	96
7/30/2017	8	8	9	0	81
7/31/2017	3	3	4	0	36
8/2/2017	1	1	3	0	27
8/4/2017	1	1	1	0	9
8/5/2017	3	3	4	0	36
8/6/2017	1	1	1	0	9
8/11/2017	1	1	2	0	18
8/12/2017	6	6	6	0	54
8/13/2017	4	4	5	0	45
8/14/2017	1	1	2	0	18
8/15/2017	1	1	1	0	9
8/16/2017	1	1	1	0	9
8/17/2017	1	1	2	0	18
8/20/2017	2	2	3	0	27
8/23/2017	1	1	1	0	9
8/24/2017	1	1	2	0	18
8/25/2017	2	2	4	1	48
8/26/2017	2	2	3	0	27
8/27/2017	1	1	1	0	9
9/1/2017	3	3	6	1	204
9/2/2017	3	3	7	1	172
9/3/2017	1	1	1	0	9
9/4/2017	2	3	3	0	27
9/9/2017	3	3	4	0	36
9/16/2017	3	3	5	1	57
9/17/2017	1	1	2	1	30
9/22/2017	1	1	2	1	42
9/23/2017	3	3	4	1	48
9/24/2017	1	1	1	0	9
9/29/2017	1	1	4	1	0
10/1/2017	1	1	2	0	18
10/2/2017	1	1	2	0	18

10/6/2017	1	1	2	1	78
10/7/2017	3	3	6	2	138
10/14/2017	1	1	2	0	18
10/20/2017	1	1	1	0	9
10/21/2017	4	4	7	2	114
10/22/2017	1	1	2	1	60
10/27/2017	1	1	4	1	100
10/28/2017	1	1	2	0	18
10/29/2017	1	1	3	0	27
11/4/2017	1	1	1	0	9
11/10/2017	1	1	2	0	18
11/11/2017	1	1	2	1	48
11/21/2017	1	1	1	0	18
11/24/2017	2	2	5	1	59
11/25/2017	1	1	1	0	9
11/26/2017	2	2	3	0	27
12/3/2017	1	1	1	0	9
12/8/2017	1	1	1	0	9
12/15/2017	1	1	2	1	30
12/26/2017	1	1	2	0	18
12/28/2017	1	1	2	0	18
1/6/2018	1	1	1	0	9
1/15/2018	1	1	3	0	27
1/20/2018	1	1	1	0	9
1/27/2018	2	2	4	0	36
2/10/2018	1	1	2	0	18
2/17/2018	1	1	1	0	9
2/19/2018	2	2	2	0	18
2/24/2018	1	1	1	0	0
2/27/2018	1	2	4	0	0
2/28/2018	1	1	4	1	0
3/3/2018	1	1	1	0	9
3/5/2018	1	1	2	1	30
3/11/2018	1	2	5	0	0
3/18/2018	1	1	1	0	9
3/23/2018	1	1	1	0	9
3/24/2018	1	2	2	0	18
3/30/2018	1	1	2	1	120
3/31/2018	4	4	6	0	54
4/1/2018	1	1	1	0	9
4/13/2018	2	2	5	1	59

4/14/2018	1	1	4	1	86
4/20/2018	1	1	1	0	9
4/22/2018	3	4	7	0	63
4/23/2018	1	1	1	0	9
4/26/2018	1	1	1	0	9
4/28/2018	3	3	3	0	36
4/29/2018	1	1	2	0	18
5/2/2018	1	1	1	0	9
5/4/2018	3	4	7	1	105
5/5/2018	3	3	5	0	45
5/8/2018	1	1	1	0	9
5/12/2018	2	2	3	0	27
5/14/2018	1	1	1	0	9
5/18/2018	1	1	2	1	78
5/25/2018	1	1	4	1	186
5/26/2018	2	2	5	1	129
5/28/2018	1	1	1	0	9
6/1/2018	1	1	1	0	9
6/2/2018	2	2	3	1	87
6/3/2018	1	1	5	0	45
6/7/2018	1	1	1	0	9
6/15/2018	2	2	2	0	36
6/22/2018	1	1	1	0	9
6/24/2018	1	1	2	0	18
6/30/2018	4	4	4	0	36
7/3/2018	1	1	2	1	30
7/6/2018	1	1	2	0	18
7/7/2018	3	3	6	0	54
7/8/2018	2	2	4	0	36
7/14/2018	2	2	2	0	18
7/15/2018	1	1	1	0	9
7/16/2018	3	3	4	0	36
7/20/2018	2	2	2	0	18
7/21/2018	1	1	2	0	18
7/22/2018	2	2	3	0	27
Total	193	200	314	31	4031

Average Daily Use Year 1 0.860273973 People/day
 Average Daily Revenue 11.04383562 Dollars/day
 Average Campers 0.08 Campers/day

Appendix 2: Yellow Archangel Management Plan

*Savage River State Forest Non-Native Invasive Plant Management: Yellow Archangel (*Lamium galeobdolon*)*

Compartments 54 and 55; Dry Run Road

Description:

Dry Run, a tributary of the Savage River and Savage River Reservoir has been infested with the aggressively growing, non-native invasive perennial yellow archangel (*Lamium galeobdolon*). The infestation of the area most likely originated from a private residence which was abandoned and the once maintained yard area was neglected, allowing the plant to escape to the adjacent property. After establishing a colony at the head of the watershed, the plant quickly enveloped the drainage from the private residence to the high water mark of the Savage River Reservoir, encompassing nearly 15 acres of forest land (See Invasive Species Management Map, p.20).

The plant grows quickly and out-competes native vegetation for resources. Yellow archangel spreads in several ways; by seed, by stem fragments, and by rooting at the nodes of the stem. This makes the plant very difficult to control and requires multiple applications of herbicide and diligent monitoring to limit the spread of the plant in natural forest environments. There is no projected end date for the herbicide treatments due to the persistent nature of this plant and efforts will be made annually, weather permitting, until the spread of the plant is contained or the plant is eradicated. Site monitoring will continue after the eradication of the plant for at least 5 years.

Treatment:

Ideal herbicide application time for this species occurs in March when the plant is beginning to grow and native plants are dormant. Weather conditions, particularly snow, have precluded the application of treatment in recent years. Approximately one acre of the drainage was treated from the bridge at the intersection of Savage River Road and Dry Run Road north for nearly 600' in length and 75' in width using a glyphosate based herbicide. All herbicide applications are conducted by registered employees working under the license of a certified applicator (Permit No. 30914-77618; Categories 2 and 6). The next treatment is scheduled for late March to early April of 2019 depending on weather conditions.

Treatment Schedule	
Monitoring	Chemical
April – September (Annually)	Early March to April (Annually)

Appendix 3: Japanese Knotweed Management Plan

Savage River State Forest Invasive Plant Management: Japanese Knotweed (*Fallopia japonica*)

Description:

Several areas of Savage River State Forest have become infested with the invasive plant Japanese knotweed (*Fallopia japonica*). The number of treatment areas that have been delineated (See Invasive Species Management Map, p.19) continues to grow and those of manageable size will be treated and monitored to determine the most effective course of action for suppressing and ultimately eradicating the plant from these areas of the forest. Knotweed growth near the Savage River Reservoir has reached a critical level and will not be treated at this time due to the overwhelming investment that would be required to reach any reasonable level of control. As more effective treatment methods become available for large areas, this area will be reevaluated in regard to implementing a control plan.

Japanese knotweed is a fast-growing, herbaceous, rhizomatous perennial that forms dense patches and shades out all nearby native species. The plant originated in East Asia and was imported as an ornamental in the late 1800's. Also called Mexican bamboo, fleece flower, hu zhang, the plant can grow to heights of greater than 10 feet and can inhabit almost any terrestrial environment whether shaded or in full sunlight. It is difficult to control due to the massive number of seeds that are produced and the rhizomatous adaptation of the plant. Multiple applications of mechanical and chemical control as well as diligent monitoring will be necessary to control the spread of the plant in natural forest environments. There is no projected end date for the herbicide treatments due to the persistent nature of this plant and efforts will be made annually until the spread of the plant is contained or eradicated from the identified areas.

Treatment:

The initial treatments occurred in the first week of June, 2011 at campsite 171 on Rabbit Hollow Road and on Fairview Road approximately one mile from the intersection with New Germany Road. Both locations have small populations of knotweed. Treatments in all areas of the forest involve a two-step process that includes both mechanical and chemical means of control.

First, the knotweed is cut and allowed to grow back for 8 weeks, reaching only 2 to 4 feet in height. Second, the new growth is treated with a 2% solution of glyphosate as the active ingredient. Treatment of these two areas has been repeated on a yearly basis and other areas of infestation that are considered manageable are added to the treatment regime as they are discovered.

Several new areas have been added to the management plan including three patches adjacent to Route 495, just north of the intersection with New Germany Road, two patches located on Westernport and Aaron's Run Road, just south of the High Rock Tower, one small patch adjacent to the Handicapped Hunter Road on West Shale Road and a large occurrence along New Germany Road located approximately one mile north of the state forest headquarters. Product application is/was conducted by registered employees working under the license of a certified applicator permit (Permit No. 30914-77618; Categories 2 and 6). The next scheduled mechanical treatment will occur June 1, 2019 followed by the herbicide treatment on July 27, 2019.

Treatment Schedule		
Monitoring	Mechanical	Chemical
March – June 2018	June 1, 2018	July 27, 2018
March – June 2018	June 1, 2019	July 27, 2019
March – June 2019	June 1, 2020*	July 27, 2020*
March – June 2020	June 1, 2021*	July 27, 2021*
March – June 2021	June 1, 2022*	July 27, 2022*
March – June 2022	As needed	As needed

* Treatment schedules may be altered/eliminated depending on the efficacy of the previous treatment applications.

Appendix 4: 10-Year Timber Harvest Summary Table

<i>Fiscal Year</i>	<i>Planned Harvest</i>	<i>Bd. Ft. Vol. Harvested</i>	<i>Gross value</i>
2009	1,500,000 BD FT	1,714,735	\$411,485.00
2010	1,200,000 BD FT	1,244,076	\$241,781.00
2011	750,000 BD FT	850,561	\$176,000.00
2012	382,000 BD FT	144,349	\$26,834.50
2013	488,000 BD FT	863,049	\$161,910.00
2014	1,020,000 BD FT	521,526	\$72,689.77
2015	1,020,000 BD FT	1,286,994	\$275,126.44
2016	1,000,000 BD FT	941,285	\$225,796.59
2017	1,200,000 BD FT	853,347	\$248,487.50
2018	1,200,000 BD FT	1,152,074	\$205,100.00*

**All bids for the final harvest of FY-18 were rejected and the rebid value will be reflected in the FY-19 gross value.*

Appendix 5: 2018 FSC Audit Action Plan

Maryland Department of Natural Resources Forest Service

2017.05.15

Forest Stewardship Council Audit 2018

Corrective Action Plan

2018.1

Observation

Non-Conformity (or Background/Justification in the case of Observations):

Management plans have some incidental information that is out of date. Several incidental, non-critical statements should be cleaned up in the updated/revised forest management plans.

Corrective Action Request (or Observation):

The management plan is kept up to date. It is reviewed on an ongoing basis and is updated whenever necessary to incorporate the results of monitoring or new scientific and technical information, as well as to respond to changing environmental, social and economic circumstances. At a minimum, a full revision occurs every 10 years.

2018.2

Minor CAR

Non-Conformity (or Background/Justification in the case of Observations):

The current timber dale contract template and associated Addenda used by MD DNR do not use the appropriate trademark symbol. Document ID is DNR/FS-352, Rev.ppc: 12/16.

Corrective Action Request (or Observation):

The use of the FSC “checkmark and tree” logo is directly accompanied by the appropriate trademark symbols ® or TM (in superscript font). The appropriate symbol also accompanies the first use of “FSC” and “Forest Stewardship Council” in any text.



Appendix 6: 2018 SFI Audit Action Plan

Maryland Department of Natural Resources Forest Service

2017.05.15



Sustainable Forestry Initiative Audit 2018

Corrective Action Plan

Three opportunities for improvement (OFI) were identified in the 2018 audit:

1. There is an Opportunity for Improvement in the management plans to accurately describe the status (ongoing vs. completed) of all activities; some completed activities are described as planned or pending. SFI indicator 1.1.1 requires “Forest management planning at a level appropriate to the size and scale of the operation.
2. There is an Opportunity for Improvement in the use of the trademark symbol (TM) in documents when first using the initials SFI. SFI Section 5- Rules for the Use of SFI On-Product Labels and Off-Product Marks provides required and recommended practices for the use of the SFI logo and other trademarked items.
3. There is an Opportunity for Improvement regarding the awareness of predicted climate change patterns and the impacts to wildlife and biodiversity. SFI Indicator 10.3.2 requires a “Program Participants are knowledgeable about climate change impacts on wildlife, wildlife habitats and conservation of biological diversity through international, national, regional or local programs.”

Appendix 7: Interdisciplinary Team Review and Comments

Maryland Department of Natural Resources State Forests

Savage River State Forest

FY-20 Annual Work Plan

ID Team Review

Scheduled for Thursday, September 27, 2018



ID Team Members: Paul Busam (MDE), Alan Klotz (Fisheries), Scott Campbell (SRSF), Luke Mongrain (Parks), Ed Thompson (WHS), George Eberling (MFS), John Wilson (LAP), Mike Friend (NRP), Sean Nolan (SRSF), Jack Perdue (MFS)

Overview / Discussion of FY 2020 Work Plan:

No requests for site visits were submitted by the ID Team for any of the silvicultural proposals resulting in no formal review being conducted.



Appendix 8: Citizens Advisory Committee Review and Comments

Savage River State Forest

Citizens Advisory Committee AWP FY-20 Review

December 6, 2018

Attendance

Scott Campbell, Sean Nolan, George Eberling, Kevin Dodge, Russell Leonard, Jim Minogue, Mike Minnick, Mark Diehl and Steve Green.

The Citizens Advisory Committee was welcomed to Savage River State Forest at 6:00pm. Topics of discussion were left to the discretion of the group and similar to previous meetings, the primary focus was on the St. John's Rock ORV Trail. Usage statistics for the first full year of the trail were reviewed and discussed. The minimal usage of the trail was disheartening to the group and members offered solutions for the future management of the facility that all echoed the similar sentiment that the operation of the trail should not continue in its current configuration and the trail camping area should be available to all forest visitors, not just those using ATVs. Kevin concluded the trail discussion with an overview of the recently completed environmental impact study, which is included in the monitoring section of this annual work plan.

Following the ORV trail discussion, a brief overview of ongoing research projects on the forest was presented. Of particular interest were the topics of American chestnut and chestnut blight. Mike Minnick, a member of the Garrett County Forestry Board, provided the group with the particulars of the chestnut breeding program that is being conducted on five sites throughout Garrett County using trees that escaped the blight and are genetically 100% American chestnut specimens and have produced 52 seedlings. The inordinate amount of rain that occurred this year did not allow for the pollination of any trees and efforts will be renewed next year. The state forest will also be contributing to this effort with a small chestnut orchard being established on the Rounds Farm that will be monitored monthly.

Invasive species were discussed, including hemlock woolly adelgid and the success of biocontrol methods that have been implemented on the forest, the current threat of gypsy moth to the landscape and the arrival of the lanternfly in Maryland and its potential impact on the forest.

A review of each silvicultural proposal in the FY-20 AWP was conducted. In regard to the proposed harvest on Compartment 77, it was suggested that the access road be improved to the intersection with Deep Creek State Park property to improve the biking experience on the road. The CAC members noted that none of the proposals had any elements that may be considered controversial, reflecting the policies and procedures adopted through the process of third party certification and the strict adherence to these standards in the land management strategy for Savage River State Forest. In response to an inquiry about harvest site selection, a summary of the SILVAH data collection protocols was presented to the group describing the types of information that forms the basis for management decisions.

The topic of recreation was brought up by Steve Green, who suggested that recreational opportunities and their value should be featured at greater length and should be more prominent

in the annual work plan. This would reflect the state forest's efforts to meet the needs of a diverse user base, not just the commercial harvesting of timber. It was noted that trying to make everyone happy was beyond the realm of possibility, but the effort should be made nonetheless. The suggestion was made to include recreation numbers from camping, hiking, etc. in the plan to show visitors trends in particular activities. This discussion segued into the overall economic value of the forest and as we move forward green space will only become more valuable. Members were informed that the write up for the economic impact survey that was conducted last fiscal year is being finalized, both as a general indicator of the value of all the western state forests as well as an evaluation specific to SRSF.

Similar to last year, members of committee suggested that a spring meeting would be appropriate to allow for field visits to not only the current proposals, but to review and comment on harvests that have been completed in the last several years to illustrate how forest management has evolved in the face of certification as well as in a change in personnel. Ideally, the committee would favor a meeting to occur after the certification audit at the end of April, possibly early May. The logistics will be discussed in the coming months and an appropriate date will be set for the meeting. CAC members also noted that they would like to be informed of the certification audit schedule so that they could attend the proceedings if their schedules allowed.

Closing notes: Savage River State Forest staff thanked the CAC members for attending and the meeting was adjourned at approximately 8:30 pm.

Appendix 9: Public Comments

• Dear Mr. Perdue,

It was with great interest that I reviewed the Green Ridge, Savage River and Potomac/Garrett State Forest plans for fiscal year 2020. My interest is primarily that of a Maryland resident who also happens to be a Ruffed Grouse and Woodcock hunter. The three plans amount to over 200 pages of documentation and I was pleased with the effort to enhance wildlife habitat that I found in each plan.

It is my understanding that forest conservation is facing the important challenges of unhealthy forest management practices, habitat loss and declining wildlife populations. Overcoming these challenges to forest conservation, and ensuring that protecting, restoring and creating early successional forests that provide habitat for ruffed grouse, woodcock and songbirds must be an important focus for the Maryland Department of Natural Resources.

Habitat management is essential to the future of grouse and woodcock hunting. Left unmanaged, even the best habitat will outgrow its ability to provide grouse and woodcock with food, cover and protection from predators – and populations will decline.

These factors combined with a general misunderstanding of the benefits of active forest management can generate negative public opinion about forest products and natural resources industries. While so-called "old growth" forests are both visually and emotionally appealing, they are no friends to wildlife, whether they be ruffed grouse, woodcock, whitetail deer, golden-winged warblers or the dozens of species of other songbirds and other forest creatures that rely on young forest habitats.

I would encourage the Forest Managers at Green Ridge, Savage River and Potomac/Garrett State Forests to continue to reach out to the Ruffed Grouse Society (RGS) for assistance in successional management practices. The RGS can provide technical and financial assistance to public land management agencies to assist in the management of the lands they control for early successional wildlife, including grouse and woodcock habitat.

Please feel free to contact me should you have any questions with what I have written.

Sincerely,
Bill
Sidney W. Beddow II
817 St Anne Drive
Street, MD 21154
410-937-0190

• *Hello Jack,*

I support the work that I have seen in Green Ridge and Savage River State Forests in recent years in creating mixed sustainable successional forest areas. I have enjoyed the diversity of bird and wildlife seen in these areas as a result of this good work. Please do continue to provide this service. As a grouse and woodcock hunter, I look forward to seeing these birds increase in numbers, after witnessing what appeared to be a decline over the course of my 40 years of hunting them. I understand more clearly as time has passed that diversity in our state forests is key to the overall health of our valued state lands.

Thanks for your good work.

*Rick Gwynn
Frederick Md.*

• Good afternoon~ I just wanted to comment on the work plan for 2020. We are a powersports dealer in Frederick, Maryland and more than half of our business comes from ORV sales and service. We are very happy to see Maryland working on keeping Maryland off-road riders in Maryland and hopefully bring off-road riders from other states to spend money in our state.

We would love to see a sustainable trail system reopened at Green Ridge and expanded mileage at St. John's Rock. It would also be great to see Wolf Den Run open to ORV's as soon as possible. I have been a nature conservationist my entire life and I can attest that ORV's and nature conservation can coexist, and in fact, grow the awareness and education of nature conservation.

We do a lot of organized events at trail systems in WV, PA and VA. Our riders spend a lot of money on gas, hotels, food etc. in other states. It would be great to see that money spent in Maryland. If you ever need anything from us at JT Motorsports, please let us know.

Sincerely,

Phil Burleson
Office 301-846-4318 x 102
Mobile 301-509-1532
phil@jtmotorsports.net

• *Increase number of MD riding trails. Reopen green ridge and expand St. John's rock and the old Kitzmiller property.*
Rob.

• Hello,

Mr. Perdue, with all due respect please fund sustainable trails for Green Ridge and increase trail mileage at St. Johns Rock. I find these getaways a great deal of stress relief for myself and my family.

Thanks,
Charles Singer.

• Hello Mr. Perdue,

I am a resident of the mid-Atlantic and regularly recreate in Maryland's excellent state forest system. I am also a forestry professional in Northern Virginia.

Please see these short comments on the plans put forth by your department:

1. Green Ridge: This plan looks good. I recommend changing the recommendation for replanting under "watershed improvement projects" from "non-invasive" to "native", to avoid confusion.

2. Savage River: This plan looks good, and the scientific research noted is admirable, and I will look out for the results. It is also great to see the return of brook trout. One thing to note is that it would be great to see some of the existing conifer stands be converted to hardwood stands, for greater wildlife value, and aesthetics. Especially given some of the apparent difficulties with regrowing the stands, this may be a more desirable long-term outcome, with merchantable hardwood, if managed correctly.

3. Potomac-Garrett: Use the model of hardwood forest regeneration from this plan in the Savage River Plan.

4. Chesapeake Forest: I am very concerned with the focus of converting mixed hardwood/pine forests to primarily pine stands. This will have a negative impact on a wide variety of wildlife that calls these forests home. While pine is obviously a part of the Chesapeake forest, forest management from the state should focus on improving the habitat of the forest, even within silvicultural management. Some of the previously overstocked loblolly pines should be selectively harvested and begin to transition back to a more valuable ecosystem of mixed pine/hardwood

Thank you for the opportunity to comment.

Sincerely,

Vincent Verweij

• *Mr. Perdue,*

Please significantly increase the amount of ORV access at St. Johns Rock by increasing the trail mileage.

Please also revisit Green Ridge for the sustainable trails. You now have funding via the Titling Tax to spend the money to design sustainable trails.

Thanks,

James

• Hi Jack,

I am affiliated with three Maryland off-road motorcycle clubs whose members are very interested in seeing the development of sustainable trails back at Green Ridge State Forest. We are also very interested in the increase of trail mileage at St. Johns Rock!! What you have done there so far is very promising for families seeking a legal venue to pursue their off-road riding hobby.

Thanks again!
Jeffrey R Shaw

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