SAVAGE RIVER STATE FOREST
ANNUAL WORK PLAN

FISCAL YEAR 2022

Prepared: _____ _____
(Forest Manager) Date

Reviewed: _____ _____
(Regional Forester) Date

Approved: _____ _____
(Environmental Specialist) Date

Savage River State Forest
FY-22
Annual Work Plan

Savage River State Forest
FY-22 Annual Work Plan

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-2022 Annual Work Plan for Savage River State Forest was formulated in 2020. 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-22 Annual Work Plan for Savage River State Forest details six land management projects that will be the focus of the State Forest management staff for FY-22. 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 2019 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-22. 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. 6 Silvicultural projects including:
4 Intermediate Harvests on 169 acres and 2 Regeneration Harvests on 124 acres.

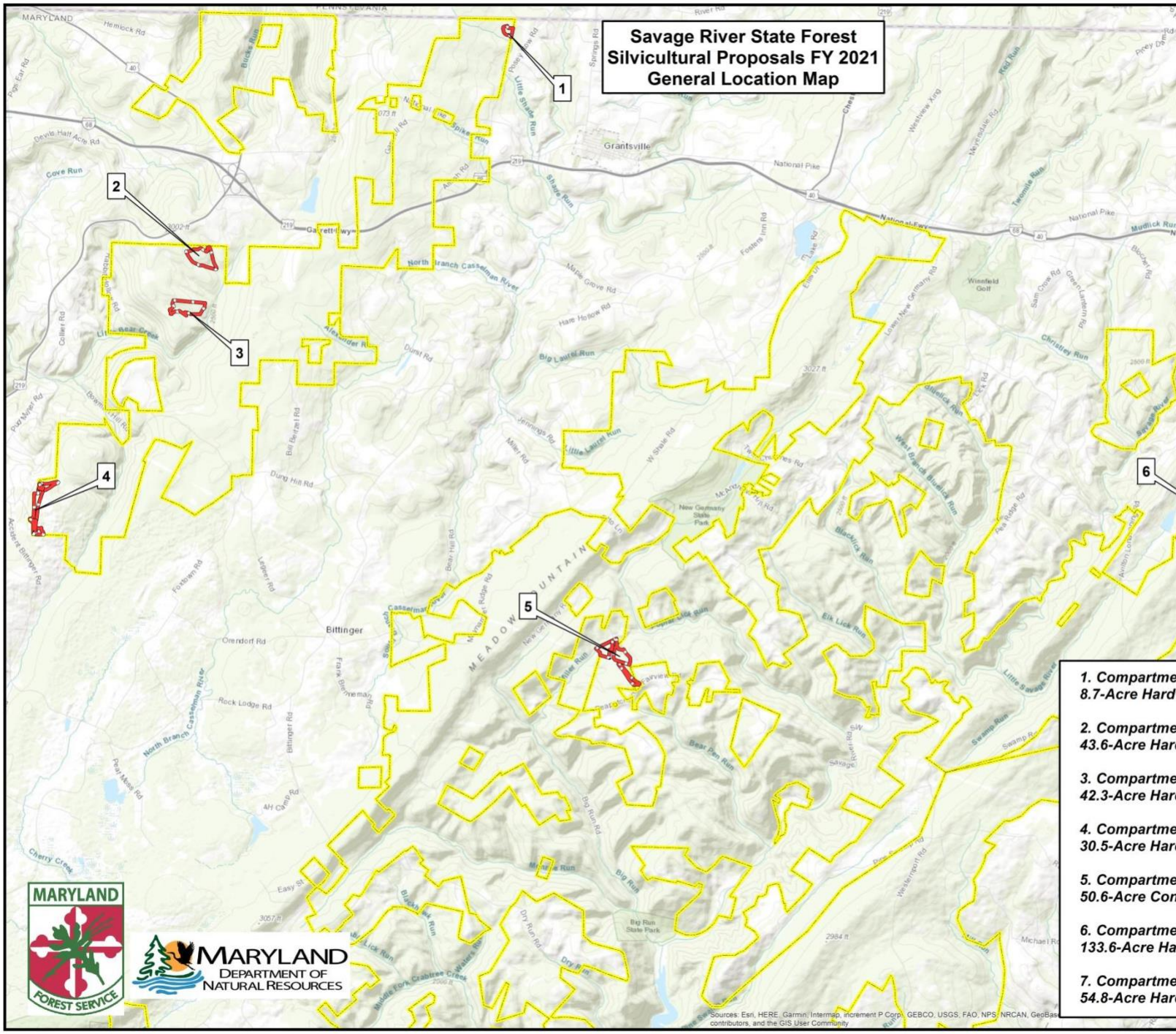
Forest harvest operations are undertaken to utilize mature and dead/dying/diseased trees; to thin overstocked stands; to improve and diversify wildlife habitat; to effectively correct public safety concerns and issues; to reduce the forests vulnerability to insect attack, disease or wildfire hazard; 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 is enjoyed 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-22 Annual Work Plan outlines 6 harvests on 293 acres, producing a harvest of approximately 1,200,000 board feet of sawtimber and accounting for an estimated $300,000 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-22 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.

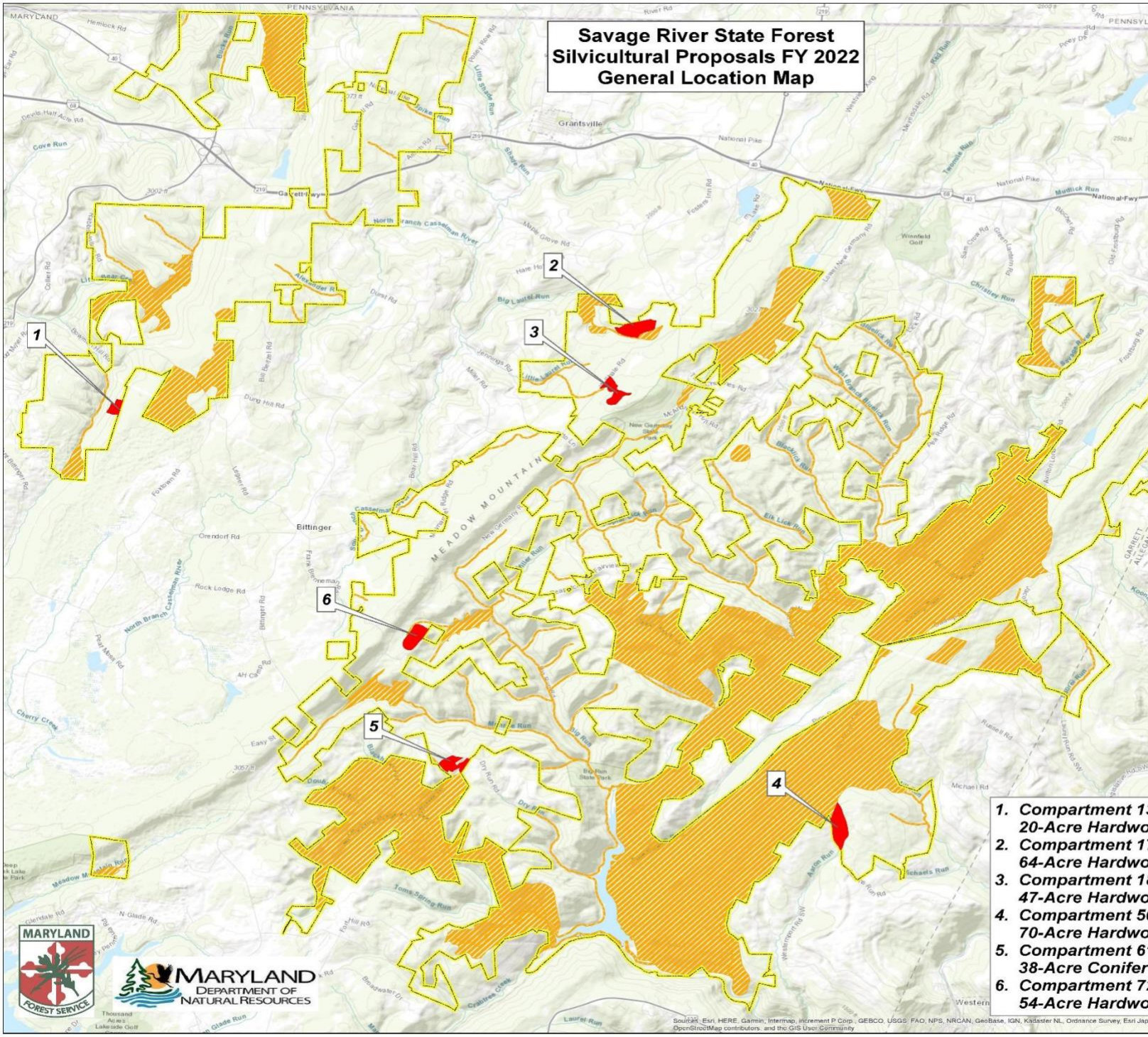
III. General Location Map for FY-22 Land Management Project Proposals

Approximately 293 Acres



Map Key

1. Compartment 13 Stands 10, 11 & 17	*20-Acre Hardwood Thinning*
2. Compartment 17 Stands 53 - 60	*64-Acre Hardwood Thinning*
3. Compartment 18 Stands 26, 28 & 31	*47-Acre Hardwood Thinning*
4. Compartment 50 Stand 1	*70-Acre Hardwood Regeneration*
5. Compartment 61 Stand 1	*38-Acre Conifer Thinning*
6. Compartment 72 Stand 13	*54-Acre Hardwood Regeneration*


Savage River State Forest
Silvicultural Proposals FY 2022
General Location Map
1
2
3
4
5
6
MARYLAND
PENNSYLVANIA
Grantsville
Bittinger
MEADOW MOUNTAIN
1. Compartment 13
20-Acre Hardwo
2. Compartment 1
64-Acre Hardwo
3. Compartment 1
47-Acre Hardwo
4. Compartment 5
70-Acre Hardwo
5. Compartment 6
38-Acre Conifer
6. Compartment 7
54-Acre Hardwo
MARYLAND FOREST SERVICE
MARYLAND DEPARTMENT OF NATURAL RESOURCES

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 were completed in 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 SFI in regard to leaking equipment on a harvest site and the apparent absence of safety equipment. A corrective action plan was formulated that would add the items to the BMP checklist and confirmation of compliance would be done during each site visit by Forest Service Staff or agents.

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

G. **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 second year of operation 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 goecaches are located throughout Savage River State Forest for those interested in testing their navigational and tracking skills. All geocaches must 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.

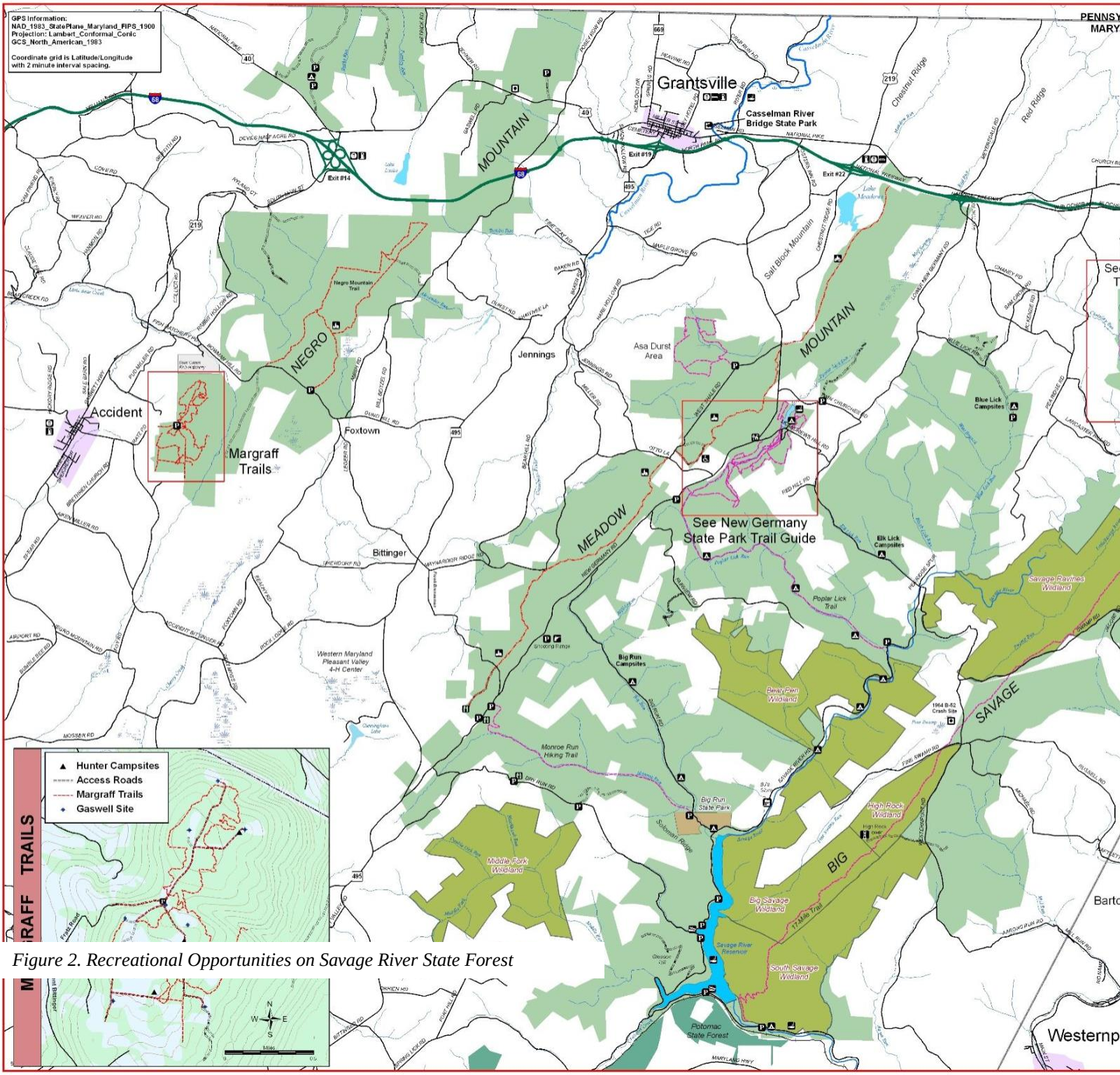


Figure 2. Recreational Opportunities on Savage River State Forest

H. Recreation Proposals

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

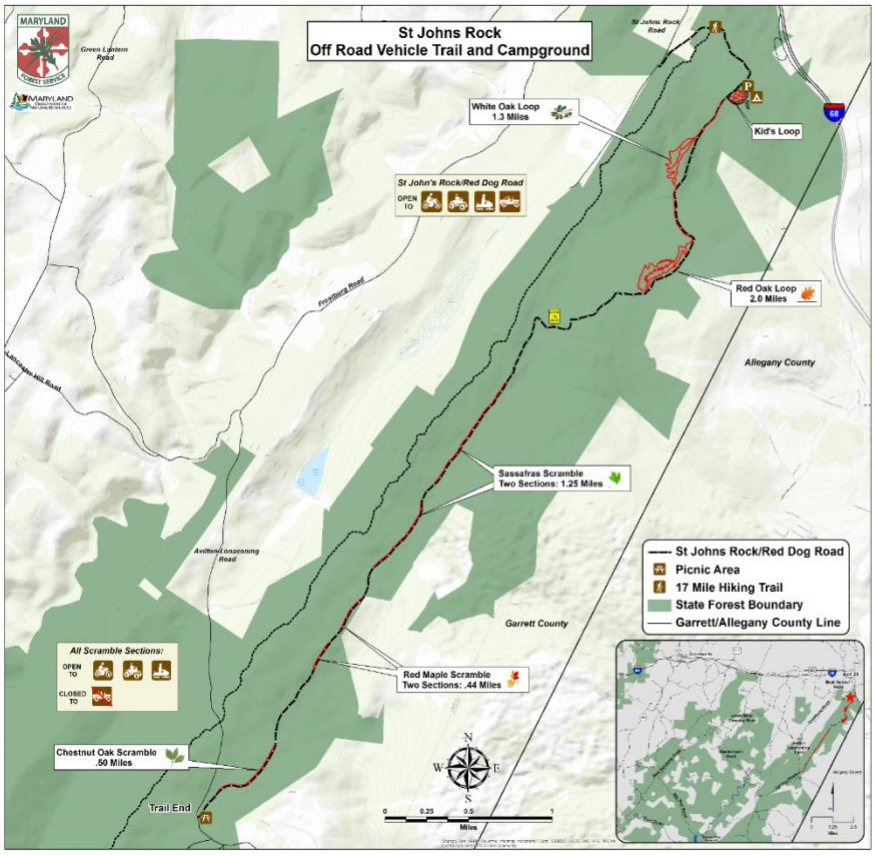
Savage River State Forest has submitted one National Recreation Trails Grant Request to fund enhancements to various recreation trails on the forest:

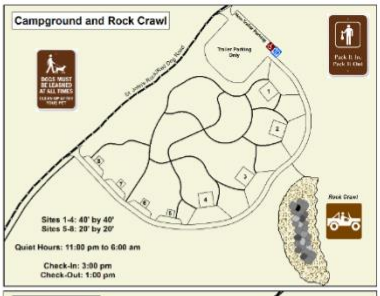
1. St. John Rock Road, ORV Trail Maintenance – $37,500

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.





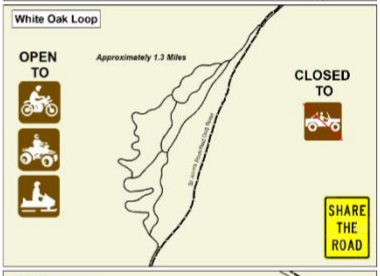


Figure 3. St. John's Rock ORV Trail brochure

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 Paleo-Indian Period until the 17th Century.

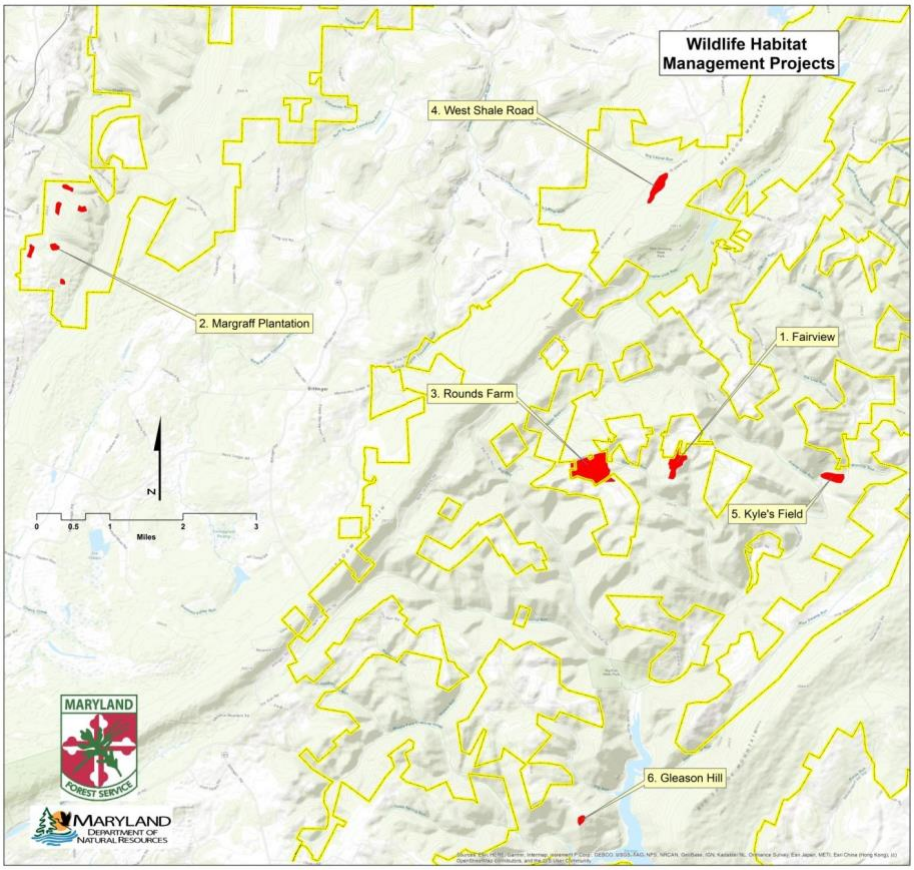
Phase III of the Meadow Mountain Trail resurfacing project was completed in November 2020 and the entirety of the trail system is now complete. Some initial inquiry and planning has been done on capping the trail surface with rock dust to serve as a smoother riding experience and also possibly installing some “rider-friendly” gates that don’t require trail users to stop and get off their bikes. We will continue to work with Garrett Trails on this project and continue to improve the trail system on the state forest as time and funding are available.

VII. Wildlife Habitat Management Projects

A. General Wildlife Habitat Maintenance

Approximately 38.5 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, the Nature Conservancy acquisition of Fairview Road, the "Rounds Farm" located off Pea Patch Road, West Shale Road, "Kyle's Field" off Savage River Road and Gleason Hill. General practices include liming and fertilizing as well as planting of cover and grain crops, where appropriate. Plantings include millet, peas, corn, turnips (*Brassica spp*.), warm season grasses, native wildflowers and clover (See Wildlife Habitat Management Projects map and summary, p. 14).

As part of the Mentored Hunt Program, a stocked pheasant hunt will take place on the Horse Farm property, West Shale Wildlife Area and Margraff Plantation in late November. This is a do-it-yourself hunting opportunity for junior license holders, apprentice license holders and lapsed hunters. A random lottery drawing will take place and all successful applicants will receive a packet of information with maps and other helpful information. More information is also available on the Maryland DNR Wildlife and Heritage Service web page: http://dnr.maryland.gov/wildlife/Pages/ hunt_trap/Mentored-Hunt-Program.aspx.



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 (*Lamiastrum 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 (*Lamiastrum 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.

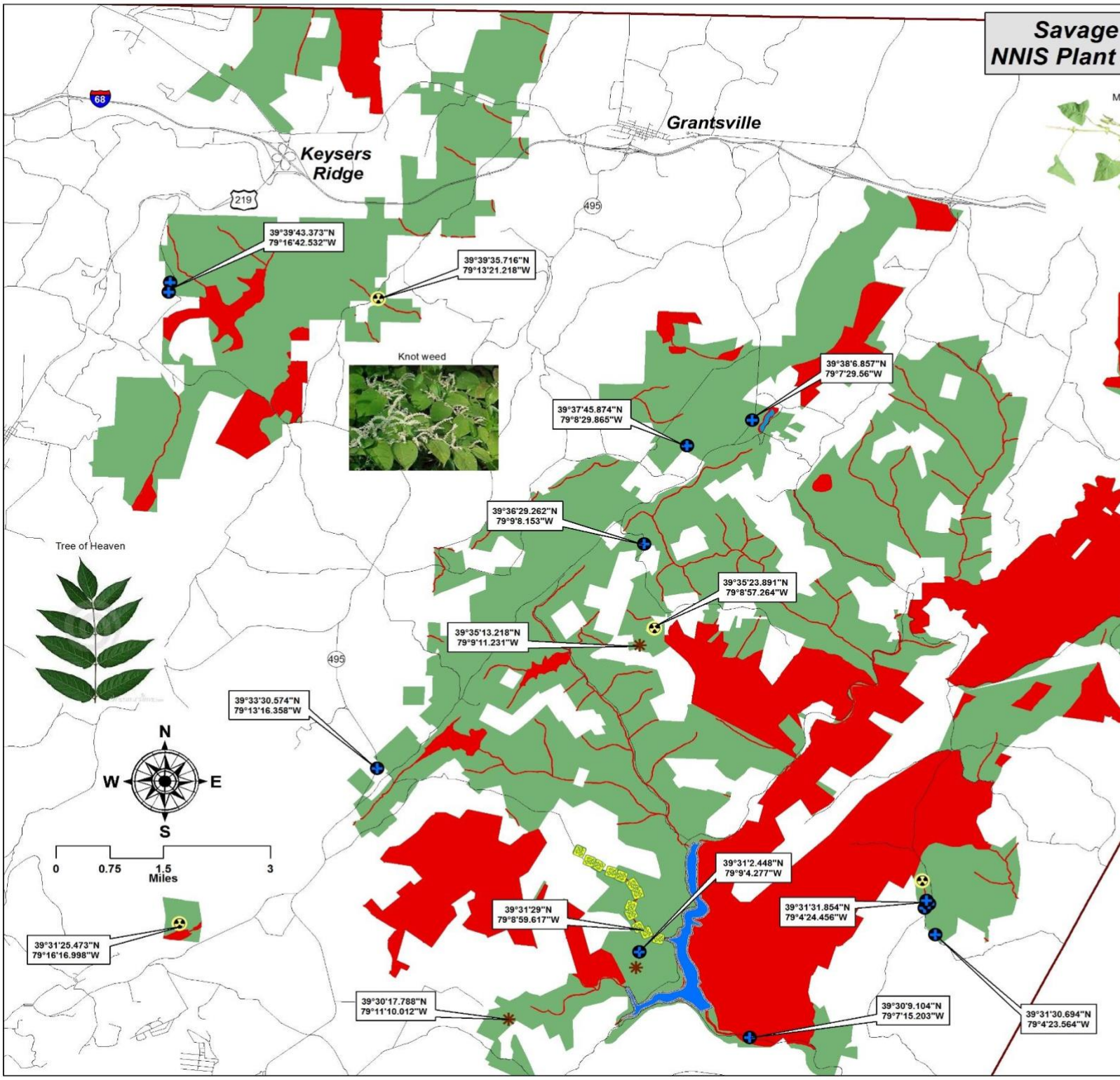


Figure 6. Map of NNIS treatment areas on Savage River State Forest

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 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.

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 an ongoing 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. 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/mi^2. 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).

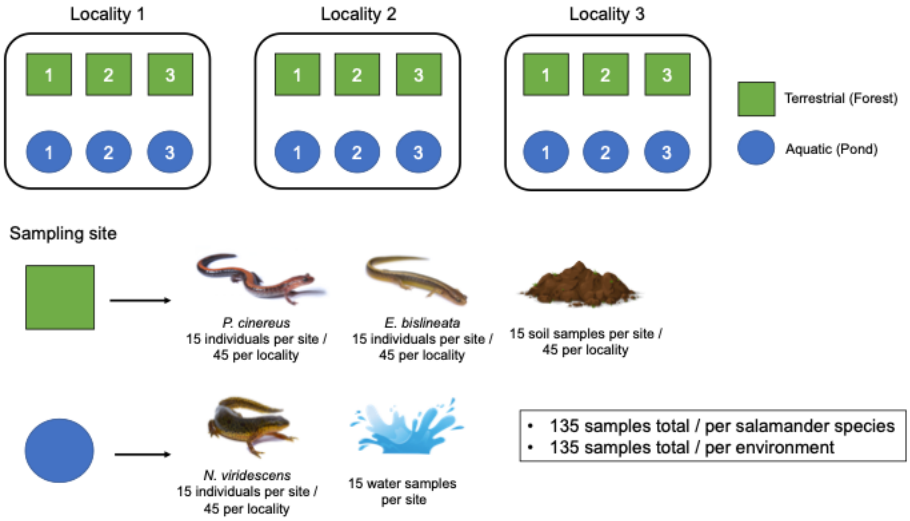
4. Late Successional Forest Management Project. The Nature Conservancy.

The MD/DC Chapter of The Nature Conservancy is collaborating with Maryland Forest Service and the Maryland Wildlife and Heritage Service to implement a "Late-successional Forest Management Project" in western Maryland. The long-term goal of this project is to demonstrate the potential of using Structural Complexity Enhancement (SCE) methods to accelerate the development of late-successional characteristics in western MD forests. Young- to-mid successional forests lack the structural complexity present in diverse, late-successional forests. However, "maintain and enhance species and structural diversity" is one of the climate adaptation strategies which would enhance climate resilience at landscape-scale. TNC will partner with Northern Institute of Applied Climate Science (NIACS), to use their Forest Adaptation Resources as a guide in developing this project.
TNC, in consultation with DNR resource professionals, have identified two treatment sites, plus a reference site (a designated old-growth area) at Savage River State Forest (SRSF) to implement this project. The two treatment sites are located in between a wildland and an Ecologically Significant Area (ESA). There are "confirmed old growth sites" within the OGEMA, that are limited in size and connectivity. Hence, applying this type of silvicultural treatments with primary objectives of fostering old-growth conditions, would enhance old growth ecosystem functionality, which is a recommended action in the Sustainable Forest Management Plan for SRSF.

SCE is the use of a combination of silvicultural techniques to promote structural complexity in forest ecosystems including creating multi-layered canopies, increasing the number of snags and coarse woody debris, and increasing the number of large living trees. This complexity in vegetation structure and age-class distribution has a direct effect on the biological diversity in a forested system. At landscape scale, late-successional forests are a necessary element of landscape diversity, which enhances climate resilience. Recent studies have suggested that forests managed with SCE treatments have the potential to increase carbon storage and provide additional climate change mitigation benefits.The proposed project is part of a larger initiative to demonstrate different SCE treatments to foresters and landowners. In consultation with DNR resource professionals, TNC will develop communication materials such as pamphlets, infographics, videos and presentations to disseminate the learning outcomes of the project. In addition, field tours and workshops will be organized for foresters and landowners to promote understanding of SCE techniques as an option in forest management. Landowner adaptation of SCE will have a positive effect on the natural resources of Maryland by improving late-successional wildlife habitat and landscape diversity. Enhanced climate resilience of the landscape and improved ecosystem services will have numerous benefits to the natural environment and the citizens of the state.

5. Salamander Sampling for Chytrid Disease - National Zoo & Conservation Biology Institute.

In October 2019 sampling commenced on a salamander collection project outlined below. Several steams and seepages within the state forest were surveyed to find the best potential sites for inclusion in the project.



X. Silvicultural Proposals

COMPARTMENT 13 – Stands 10, 11 & 17 **FY-22**

Description / Resource Impact Assessment

Location: This proposal is located approximately 1 mile south of Bowman Hill Road in Compartment 13 in stands 10, 11 & 17. The harvest area is approximately 1 mile down the state forest access road known as "Bowman Hill South" along the east side of the road. The access road entrance is approximately 1.5 miles northwest of the intersection of Bowman Hill Road with Foxtown Road.

Forest Community Type and Condition: This 20-acre site contains a large sawtimber mixed oak stand that is approximately 100 years old with an average merchantable diameter of 18.7 inches. The overstory consists of northern red oak (58%), red maple (16%), chestnut oak (7%) and eastern hemlock (5%). The stocking in this stand is at 98% relative density with a basal area of 182 ft^2/acre. Overall regeneration is lacking due to the mature condition of the overstory and lack of canopy gaps allowing sunlight to reach the forest floor. The lack of desirable regeneration is also due in part 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 majority of the site containing some form of significant interference. This interference coupled with the tight canopy of the mature overstory trees is significantly hindering regeneration establishment on the site. Tall woody interference occupies approximately 69% of the stand consisting primarily of sweet birch and witch-hazel. Low woody interference occupies approximately 38% of the site, consisting primarily of striped maple and witch-hazel. Rhizomatous ferns and grass occupy only a minimal area of the stand (12%) due to the low levels of sunlight reaching the forest floor. Non-native invasive species were not observed within the 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 shift in species composition dominated by undesirable tree species. Field evaluations of the site estimated deer browse impact to be moderate. Monitoring of deer browse impacts will coincide with regeneration inventories 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 area has not been harvested since acquisition. The adjacent stand to the north was regenerated in 2016 while the small stand across the access road was thinned at the same time. The large stand to the south, along the boundary line was thinned in 1998 while the stand to the south and along the access road was regenerated in 1992. No evidence of forest fire was observed during the stand inventory.

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 does not directly border any areas that have been designated as High Conservation Value Forest. The closest area of concern would be the stream buffer on Bear Creek which will not be impacted by this proposal.

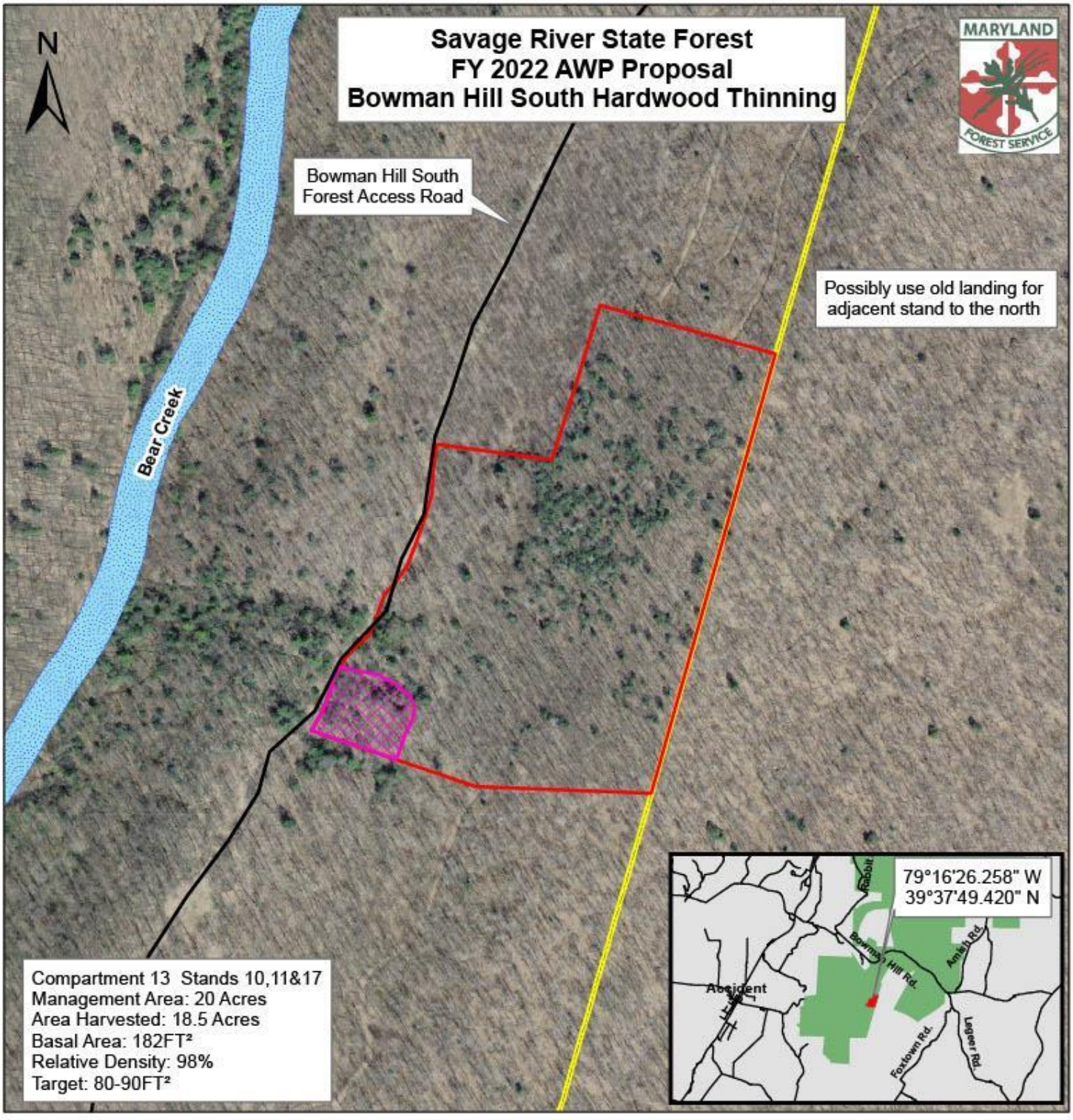
Water Resources: This stand drains west into Bear Creek within the Youghiogheny River Watershed. The proposed silvicultural treatments will be outside of all HCVF and stream buffer areas. No heavy equipment will be permitted within the protective riparian buffers of any streams or associated wetlands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

Soil Resources: The predominant soil type of the site falls in the Dekalb-Calvin-Lehew very stony loams, 15 to 25 percent slopes (DcD). This soil type is predominant on the mid to lower slopes and gives way to Stony Land, Steep (SrF) on the upper slopes. The soils are composed mainly of sandstone with some shale and siltstone found throughout. These soils are moderately deep and well drained with moderate equipment limitations primarily associated with slope. The site has good productivity for woodland management, with a site index of 65-75 for upland oaks. The productivity of the site will be protected by minimizing the haul roads and skid trails 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 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 90 ft^2 of basal area per acre and reducing the residual basal area to 80-90 ft^2. Removals will be concentrated on undesirable growing stock in the small to medium sawtimber size class coupled with mature individual trees that will afford large canopy gaps and facilitate regeneration establishment in the understory. Estimated yield for the thinning is approximately 8,000 board feet per acre. Residual trees will benefit from the improved spacing post-harvest with increased vigor, growth rates and overall stand health. Retention will favor small and medium sawtimber trees of superior form and health to facilitate seedling establishment of the future stand. Post-harvest monitoring will be conducted to determine if acceptable levels of desirable regeneration have naturally established within the stand and determine the next silvicultural treatment for the stand. The long-term goal for the site is to have a desirable cohort of regeneration occupying the site when a final removal harvest is conducted to release the regeneration as the new stand of trees.



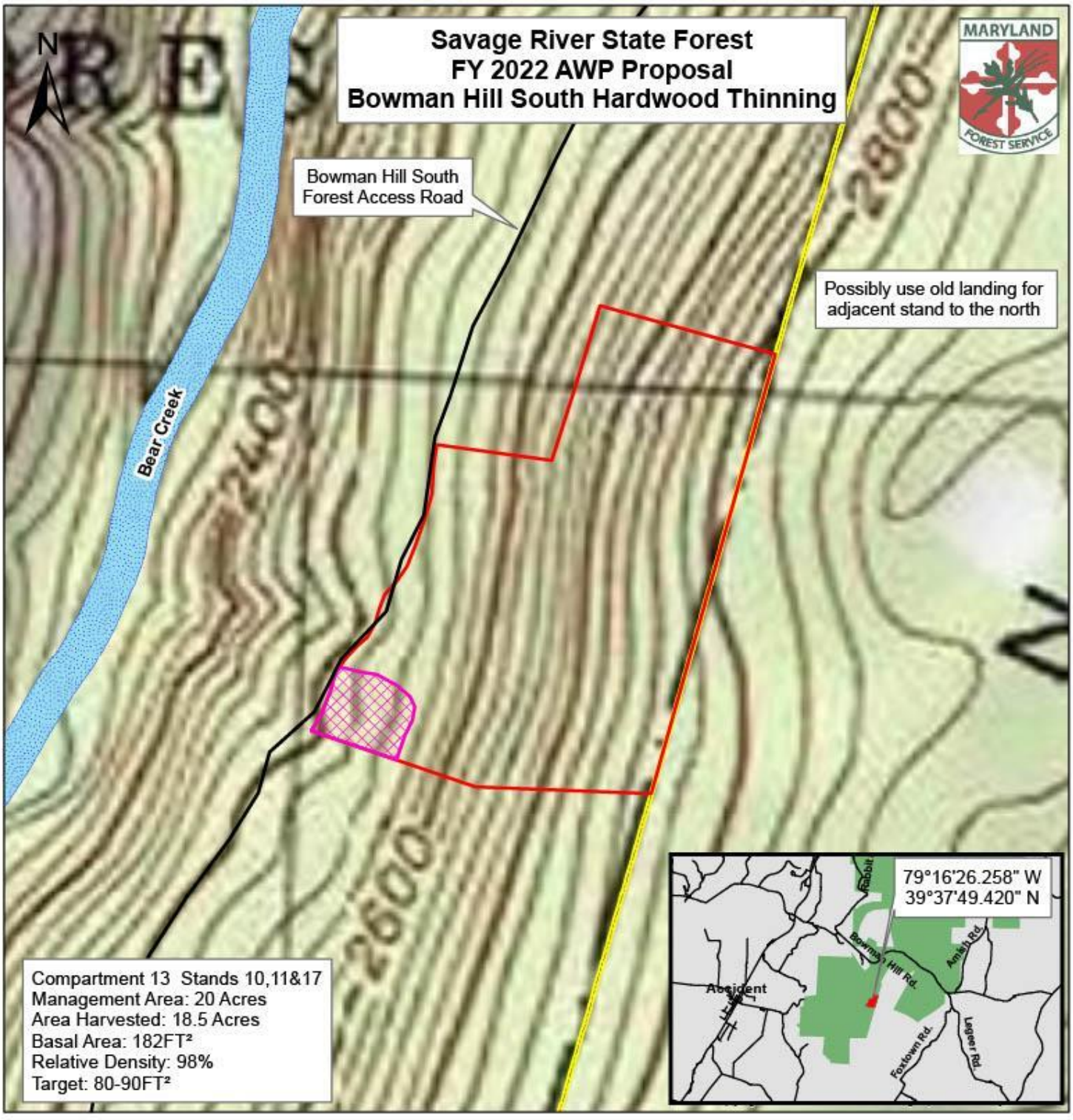
- Harvest Area
- Buffer
- Forest Roads
- Savage River SF Boundary
- Old Growth Ecosystem Area
- Ecologically Significant Areas
- Old Growth
- SRSF Wildlands
- Streams and 50' Buffers
- Wetlands of State Concern

1 inch = 333 feet

1:4,000

0 100 200 400 600 800 Feet

MARYLAND DEPARTMENT OF NATURAL RESOURCES



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1:4,000

0 100 200 400 600 800 Feet

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Description / Resource Impact Assessment

Location: This proposal is located 0.5 miles west of New Germany Road in Compartment 17 in stands 53-60. The harvest area lies directly south of the newly acquired "Horse Farm" property, which will serve as the haul road location and access to the harvest. The access to the "Horse Farm" is directly west of the intersection of New Germany Road and Chestnut Ridge Road.

Forest Community Type and Condition: This 64-acre site contains a medium sawtimber mixed hardwood stand that is approximately 82 years old with an average diameter of 15.1 inches. The overstory consists of northern red oak (36%), red maple (34%), black cherry (9%) and eastern hemlock (8%). The stocking in this stand is at 99% relative density with a basal area of 173 ft^2/acre. Overall regeneration is lacking due to the mature condition of the overstory and lack of canopy gaps allowing sunlight to reach the forest floor. The lack of desirable regeneration is also due in part 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 majority of the site containing some form of significant interference. This interference coupled with the tight canopy of the mature overstory trees is significantly hindering regeneration establishment on the site. Tall woody interference occupies approximately 41% of the stand, consisting primarily of striped maple and sweet birch. Low woody interference occupies approximately 38% of the site, consisting primarily of striped maple and witch-hazel. Rhizomatous ferns were recorded at elevated levels across 50% of the stand while grass was not noted to be of any concern. Non-native invasive species were not observed within the 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 shift in species composition dominated by undesirable tree species. Field evaluations 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 area has not been harvested since state acquisition. The stand directly to the south and across Laurel Run was marked for a thinning and sold in 2019, but has not yet been harvested. No evidence of fire was observed during the stand inventory, while some mortality from gypsy moth defoliation in the early 2000s was noted to have occurred.

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 on the Little Laurel Run ESA and the 50-foot streamside management zone along Laurel Run itself. Protection of these critical areas is addressed in the subsequent section regarding water resources.

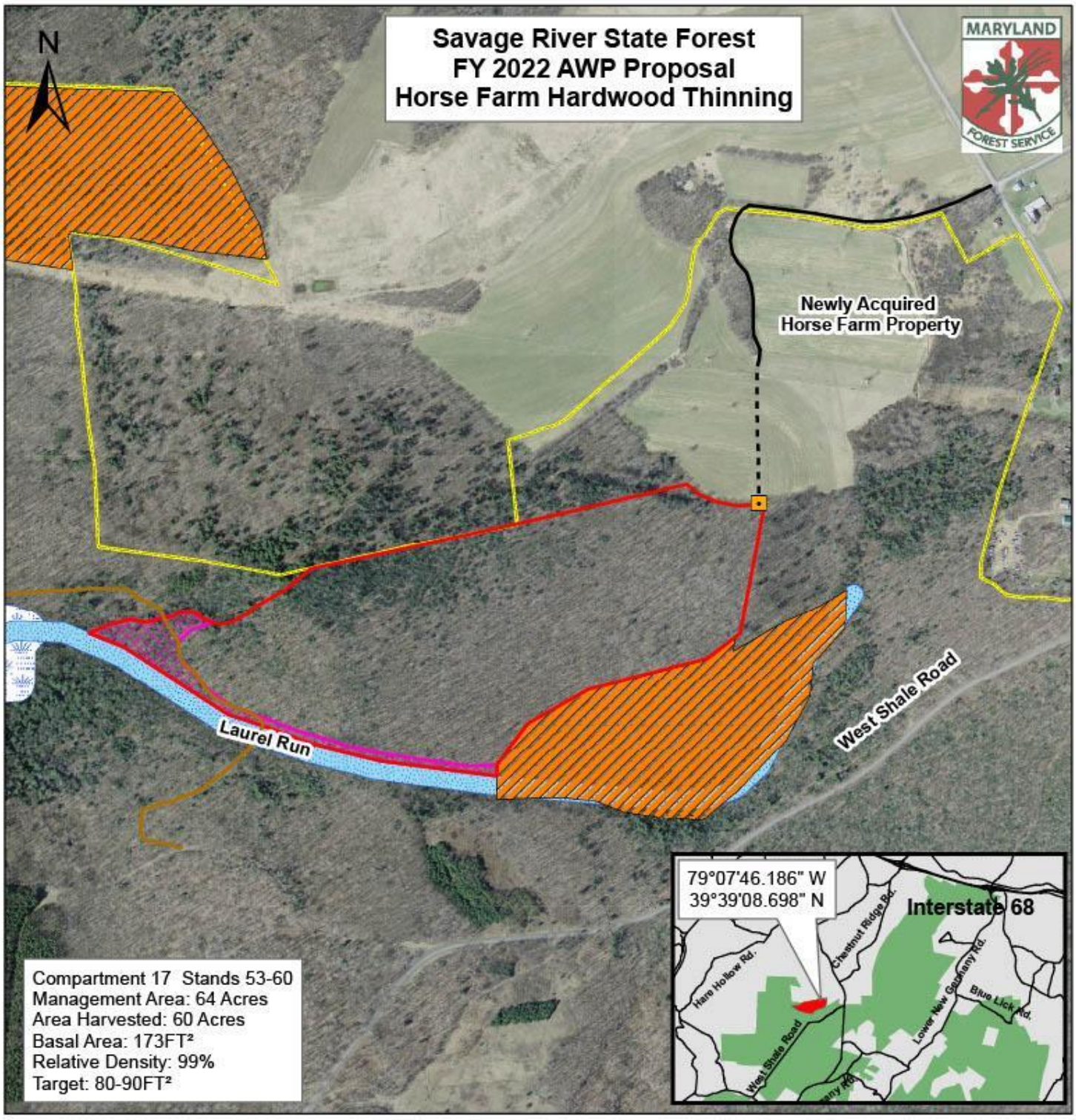
Water Resources: The stand drains south into Big Laurel Run, a tributary of the Cassellman River and included within the Youghiogheny River Watershed. The proposed silvicultural treatments will be outside of all HCVF and stream buffer areas. No heavy equipment will be permitted within the protective riparian buffers of any streams or associated wetlands per the requirements set forth in the State Forest Sustainable Forest Management Plan.

Soil Resources: The predominant soil type of the site falls in the Cookport and Ernest very stony silt loams, 0 to 8 percent slopes (CuB). The soils are composed primarily of sandstone with some seems of shale and siltstone throughout. The soils are moderately deep over bedrock and moderately well drained with slight equipment limitations due to the presence of large (10 inch plus) stones on the surface or shallow in the soil profile. The site has very good 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 per the Department's Best Management Practices and rutting guidelines.

Recreation Resources: No developed recreational resources are located within the stand; however, the Asa Durst Hiking Trail is located along the southwest corner of the proposal. It was determined that the trail would serve as a good break for the sale extent and impacts would be minimized by doing so. Informational signage will be posted at the time of the harvest to warn trail users of the activity and where to expect the harvest activities along the trail.

Management and Silvicultural Recommendation:

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 80 ft^2 of basal area per acre and reducing the residual basal area to 80-90 ft^2. Removals will be concentrated on undesirable growing stock in the small to medium sawtimber size class coupled with mature individual trees that will afford large canopy gaps and facilitate regeneration establishment in the understory. Estimated yield for the thinning is approximately 4,500 board feet per acre. Residual trees will benefit from the improved spacing post-harvest with increased vigor, growth rates and overall stand health. Retention will favor small and medium sawtimber trees of superior form and health to facilitate seedling establishment of the future stand. It was noted during the inventory that approximately 10% of the stand was stocked with saplings of desirable species, so trees targeted for removal will also favor the release of these currently suppressed saplings to increase in crown classification following the harvest. Post-harvest monitoring will be conducted to determine if acceptable levels of desirable regeneration have naturally established within the stand and determine the next silvicultural treatment for the stand. The current fern levels are somewhat concerning, but it was noted that there is a cohort of new and established desirable regeneration currently present in the understory. At this time it is unwise to treat the ferns and risk losing the young seedlings in the process. Following the harvest, the regeneration numbers and response will be evaluated along with a reassessment of the fern condition to determine if chemical treatment of the fern is warranted. The long-term goal for the site is to have a desirable cohort of regeneration occupying the site when a final removal harvest is conducted to release the regeneration as the new stand of trees.



- Landing
- Asa Durst Trails
- Haul Road
- Access Road
- Harvest Area
- Buffer
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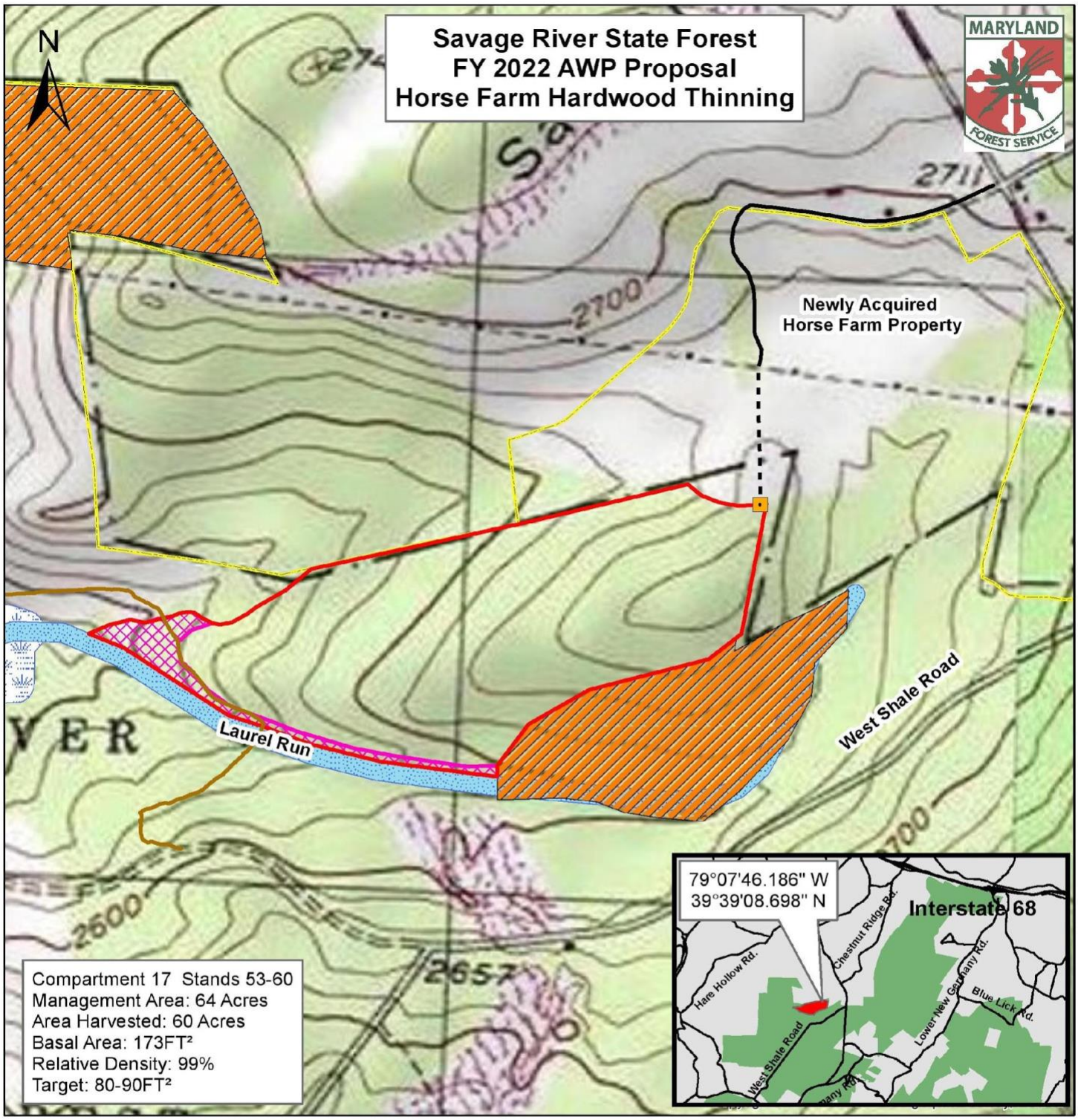
- Old Growth Ecosystem Area
- Ecologically Significant Areas
- Old Growth
- SRSF Wildlands
- Streams and 50' Buffers
- Wetlands of State Concern

1 inch = 667 feet

1:8,000

0 200 400 800 1,200 1,600 Feet

MARYLAND DEPARTMENT OF NATURAL RESOURCES



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1:8,000

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MARYLAND DEPARTMENT OF NATURAL RESOURCES

Description / Resource Assessment

Location: This proposal is located along the east side of West Shale Road in Compartment 18 in stands 26, 28 and 31. The harvest area is approximately 1.5 miles southwest of the intersection of West Shale Road and New Germany Road.

Forest Community Type and Condition: This 47-acre site contains a medium sawtimber mixed oak stand that is approximately 76 years old with an average merchantable diameter of 13.5 inches. The overstory consists of northern red oak (40%), red maple (34%), sweet birch (12%), black cherry (6%) and white oak (6%). The stocking in this stand is at 90% relative density with a basal area of 148 ft^2/acre. Overall, oak regeneration occupies approximately 5% of the site in the form of competitive stems and saplings while the total established desirable regeneration is 22% for the entire 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 majority of the site containing some form of significant interference. This interference coupled with the tight canopy of the currently overstocked stand is significantly hindering regeneration establishment on the site. Tall woody interference occupies approximately 97 % of the stand, consisting primarily of sweet birch and witch-hazel. Low woody interference occupies approximately 70% of the site, consisting primarily of witch-hazel and mountain laurel. Rhizomatous ferns were found throughout approximately 42% of the stand while grass was not noted to be of any concern. Non-native invasive species were not observed within the 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 shift in species composition dominated by undesirable tree species. Field evaluations 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 part of the proposal area received a thinning in 1970 while the remaining section was thinned in 1974. The adjacent stand to the north was regenerated in 2002 while a large stand to the southwest was thinned in 2006. No evidence of fire was observed during the stand inventory but some remnants of gypsy moth killed oak trees from the early 2000's remain within the stand.

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 does not directly contain any areas designated as HCVF. The northwestern corner of the proposal borders on an apparent man-made pond that drains into an un-named tributary of Laurel Run. It was also noted during the inventory that several small seeps and drains are found along the northeastern

boundary of the proposal. This area will be excluded from any harvesting and machinery will not be permitted within the buffer area.

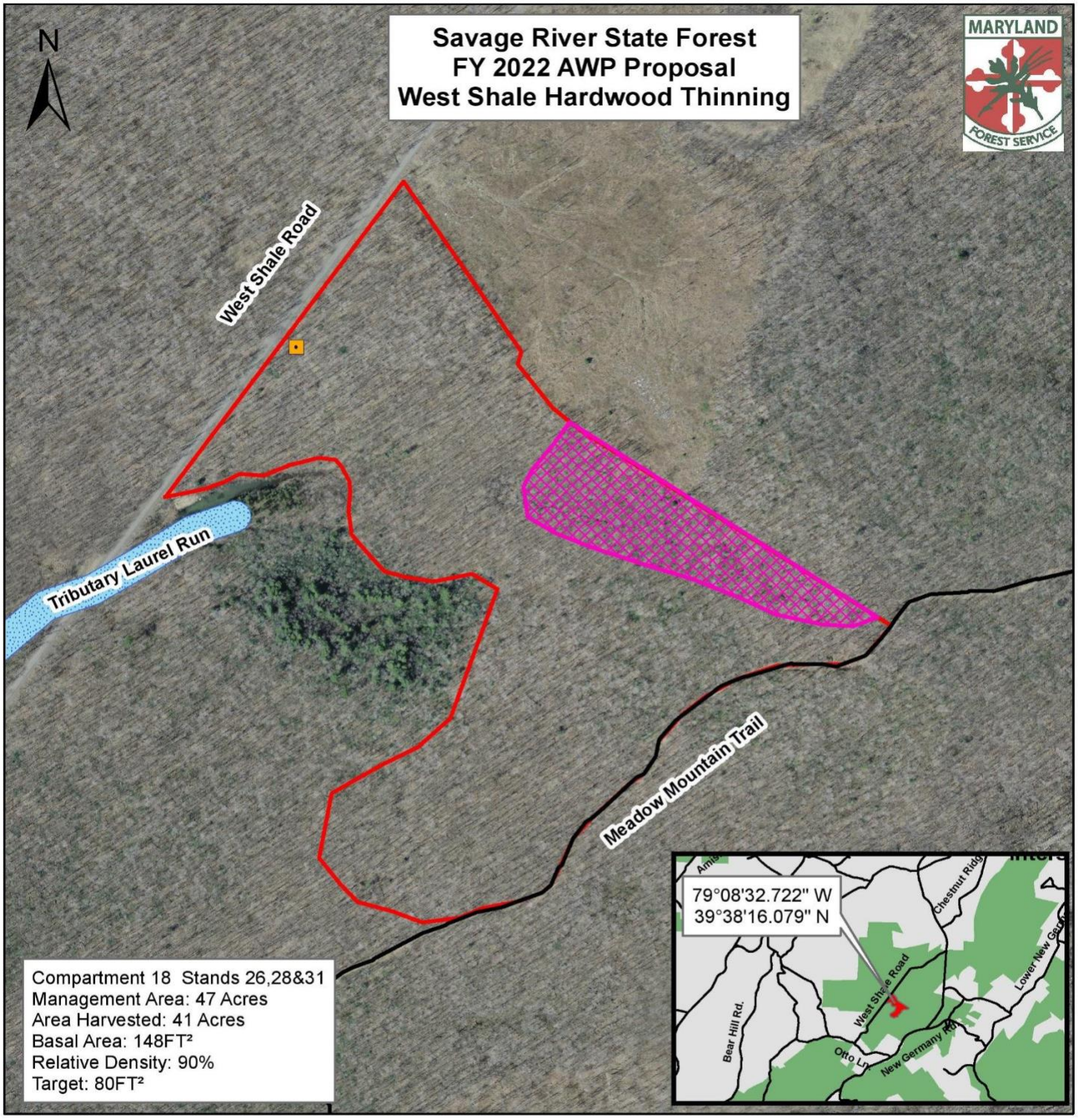
Water Resources: The stand drains northeast into an un-named tributary of Laurel Run, which drains into the Cassellman River and contained within the Youghiogheny River Watershed. The proposed silvicultural treatments will be outside of all HCVF and stream buffer areas. No heavy equipment will be permitted 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: The predominant soil type is mapped as Cookport and Ernest very stoney silt loams, 0 to 8 percent slopes (CuB). These soils are composed primarily of sandstone with some seems of shale and siltstone throughout. The soils are moderately deep over bedrock and moderately well drained with slight equipment limitations due to the presence of large (10 inch plus) stones on the surface or shallow in the soil profile. The site has very good 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 per the Department's Best Management Practices and rutting guidelines.

Recreation Resources: No developed recreational resources are located within the stand; however, the Meadow Mountain Trail serves as the eastern sale boundary. The trail will not be utilized for the removal of the timber as the landing will be along West Shale Road. Impact to the trail should be minimal as the harvest does not cross over the trail and no equipment of trucks will be permitted access to the trail for the harvest. As a precaution, there will be informational signs posted along the trail to warn users of the harvest activity once the contractor has commenced work on the site.

Management and Silvicultural Recommendation:

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 60 ft^2 of basal area and reducing the residual basal area to 80-90 ft^2. Removals will be concentrated on undesirable growing stock in the small to medium sawtimber size class coupled with mature individual trees that will afford large canopy gaps and facilitate regeneration establishment in the understory. Estimated yield for the thinning is 3,000-3,500 board feet per acre. Residual trees will benefit from the improved spacing post-harvest with increased vigor, growth rates and overall stand health. Retention will favor small and medium sawtimber trees of superior form and health to facilitate seedling establishment of the future stand. It was noted during the inventory that approximately 17% of the stand was stocked with saplings of desirable species, so trees targeted for removal will also favor release of these saplings to increase in crown classification following the harvest. Post-harvest monitoring will be conducted to determine if acceptable levels of desirable regeneration have naturally established within the stand and determine the next silvicultural treatment for the stand. Though woody interference levels are currently high it is hopeful that much of the tall woody interference will be eliminated during the harvest. The low woody interference in the form of mountain laurel is attributable to the site and there is not much that can be done to alter its presence in the stand. Through harvesting activities the low woody interference should be disturbed enough to facilitate establishment of desirable seedlings. Following the harvest, the regeneration numbers and response will be evaluated along with a reassessment of woody interference to determine if a secondary treatment is needed.



- Landing
- Forest Roads
- Buffer
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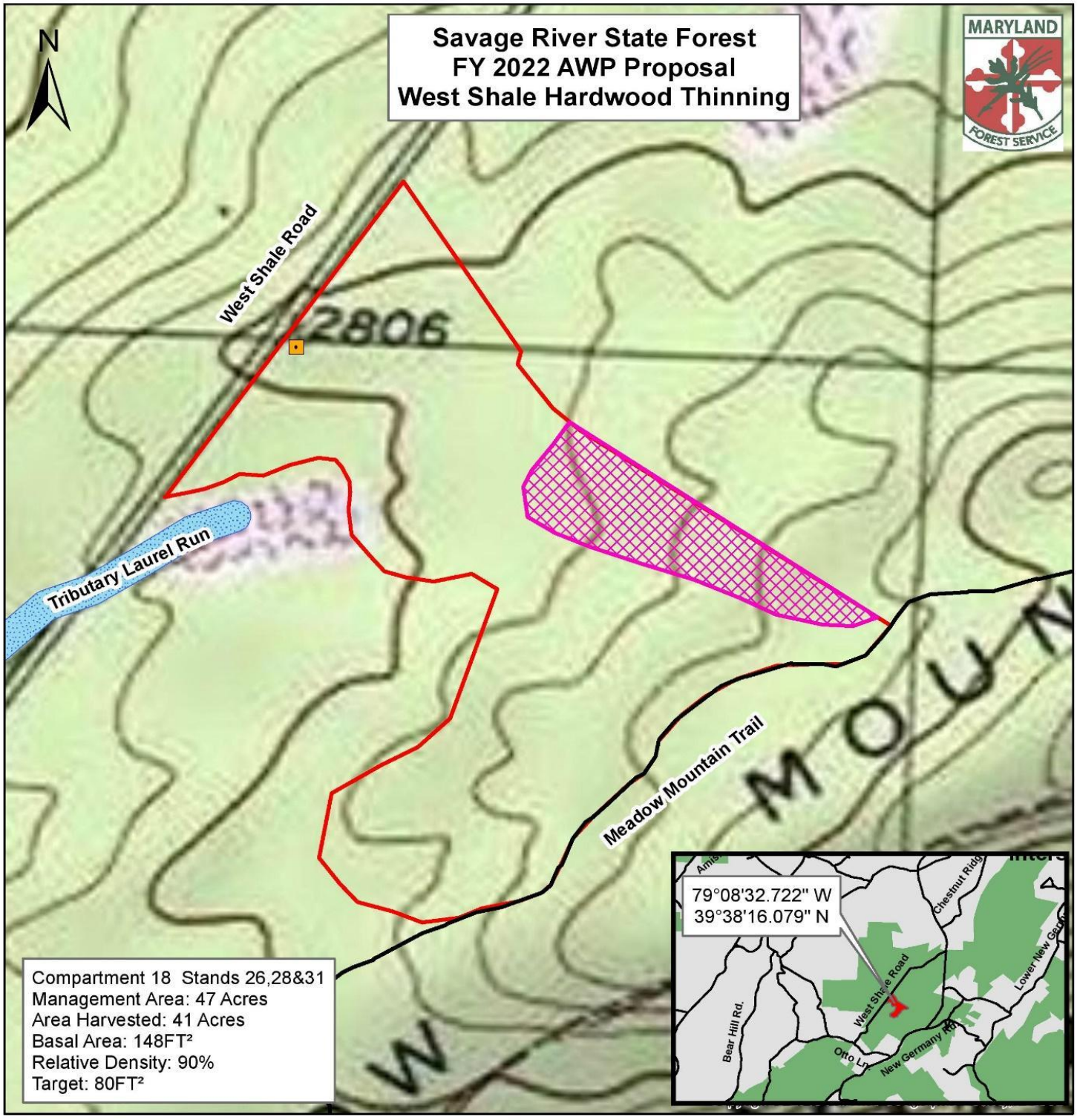
- Savage River SF Boundary
- Old Growth Ecosystem Area
- Ecologically Significant Areas
- Old Growth
- SRSF Wildlands
- Streams and 50' Buffers
- Wetlands of State Concern

1 inch = 417 feet

1:5,000

0 125 250 500 750 1,000 Feet

MARYLAND DEPARTMENT OF NATURAL RESOURCES


Savage River State Forest
FY 2022 AWP Proposal
West Shale Hardwood Thinning
MARYLAND
FOREST SERVICE
N
West Shale Road
2806
Tributary Laurel Run
Meadow Mountain Trail
79°08'32.722" W
39°38'16.079" N
Compartment 18 Stands 26,28&31
Management Area: 47 Acres
Area Harvested: 41 Acres
Basal Area: 148FT²
Relative Density: 90%
Target: 80FT²
Landing
Forest Roads
Buffer
Harvest Area
Savage River SF Boundary
Old Growth Ecosystem Area
Ecologically Significant Areas
Old Growth
SRSF Wildlands
Streams and 50' Buffers
Wetlands of State Concern
1 inch = 417 feet
1:5,000
0 125 250 500 750 1,000
Feet
MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Description / Resource Impact Assessment

Location: This proposal is located along the west side of Westernport Road in Compartment 50 stand 1. The harvest area is located immediately north of the intersection of Westernport Road and Aaron's Run Road.

Forest Community Type and Condition: This 70-acre site contains a medium sawtimber mixed hardwood stand that is approximately 88 years old with an average merchantable diameter of 14.8 inches. The overstory consists of red maple (21%), sugar maple (19%), black cherry (16%), northern red oak (8%), white ash (8%) and hickory (6%). The stocking in this stand is at 74% relative density with a basal area of 127 ft^2/acre. Overall established regeneration occupies 26% of the site with most of that regeneration in the form of maple and hickory saplings. This stand also has a good cohort of pole size red and sugar maple that will be targeted for release in the silvicultural prescription.

Interfering Elements: Interfering understory plant competition is sufficient to cause complications in desirable regeneration efforts with the majority of the site containing some form of significant interference. Tall woody interference occupies approximately 58% of the site, consisting primarily of witch-hazel. Low woody interference occupies approximately 76% of the site also attributed primarily to witch-hazel. Rhizomatous ferns and grass were found to be hindering on approximately 15% of the site but primarily attributable to the proximity of the county road. Several invasive species were also noted in the inventory and again attributable to the proximity of the county road. These invasive populations will be monitored and treated as necessary.

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 shift in species composition dominated by undesirable tree species. Field evaluations 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. The competitive and sapling stage regeneration currently present is already far enough along that deer impact is unlikely.

Historic Conditions: State Forest records indicate that the proposal area was thinned in 1992. Several small pine stands on the opposite side of Westernport Road were regenerated in the early 2000's and allowed to revert to native hardwoods. No evidence of forest fire was observed during the stand inventory.

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: Contained within the management proposal is a section of the 50-foot streamside management zone on Aaron Run. Protection of this critical area is addressed in the subsequent section regarding water resources. The management proposal is also bordered on the northern end by the High Rock Wildlands. Special care will be taken to ensure that this area of HCVF is protected and undisturbed by the silvicultural treatment.

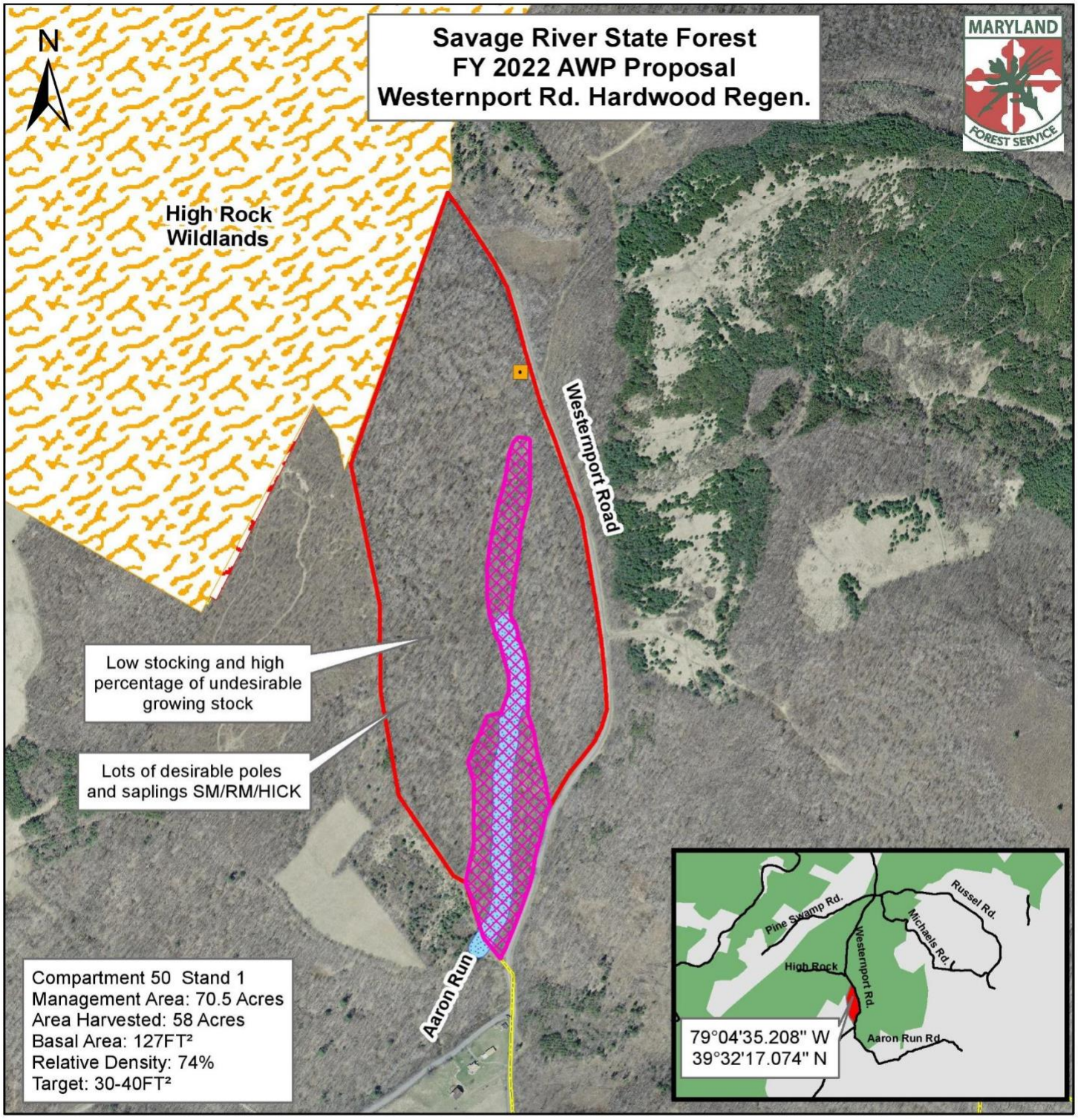
Water Resources: The stand drains south into Aaron Run, a tributary of the Savage River Watershed. The proposed silvicultural treatments will be outside of all HCVF and stream buffer areas. No heavy equipment will be permitted within the protective riparian buffers of any streams or associated wetlands per the requirements set forth in the State Forest Sustainable Forest Management Plan.

Soil Resources: The predominant soil type of the site is mapped as Cookport and Ernest very stony silt loams, 8 to 25 percent slopes (CuD). These soils are composed primarily of sandstone with some seems of shale and siltstone throughout. The soils are moderately deep over bedrock and moderately well drained with slight equipment limitations due to the presence of large (10 inch plus) stones on the surface or shallow in the soil profile. The site has very good 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 per the Department's Best Management Practices and rutting guidelines.

Recreation Resources: No developed recreational resources are located within the management proposal. The primary recreational activity for the area is hunting access. Hunting opportunities may be disrupted for the duration of the harvest and access to the site may be limited depending on the timing of the harvest.

Management and Silvicultural Recommendation:

The proposed silvicultural treatment for this site is a commercial thinning that will resemble an overstory removal and release the pole size trees of acceptable growing stock along with saplings and advanced regeneration currently present to constitute the next stand. The harvest should yield approximately 4,000 board feet per acre while retaining 50-60 ft^2/acre. Of the 127 ft^2 of basal area currently present, approximately 40 ft^2 is undesirable growing stock that needs removed. The 87 ft^2 remaining is composed primarily of maple and hickory poles in the 8-12 inch size class that should be retained in the harvest and some scattered larger diameter sawlogs. By removing the undesirable stems along with scattered large sawtimber trees the result will be the release of 50-60 ft^2/acre of pole size trees along with saplings and competitive regeneration in the understory to compose the next stand. The witch-hazel interference in this stand was noted to be a current concern but should be reevaluated following the harvest to see if it continues to pose as a serious concern to regeneration.



Landing
Buffer
Harvest Area
Savage River SF Boundary

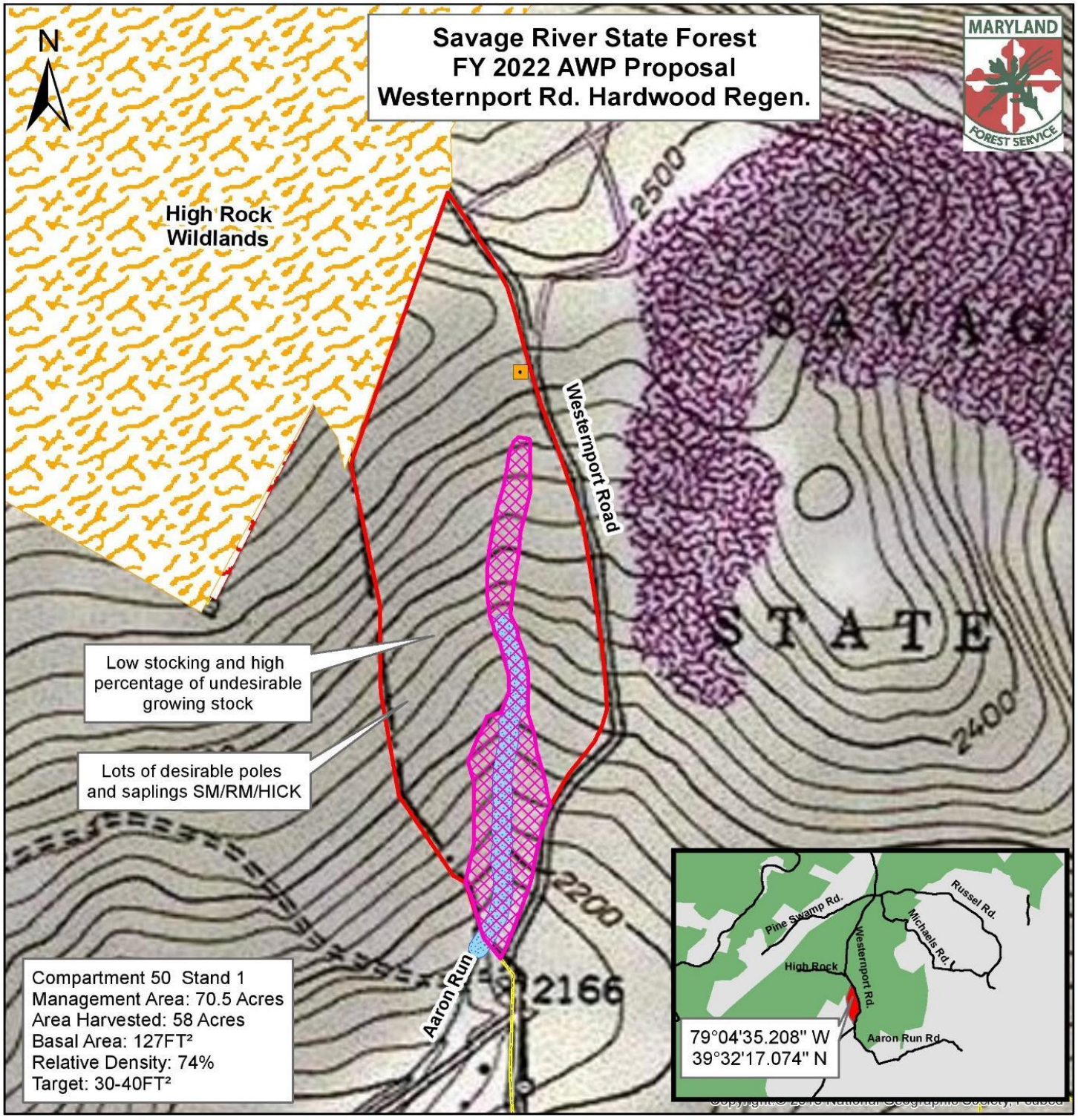
Old Growth Ecosystem Area
Ecologically Significant Areas
Old Growth
SRSF Wildlands
Streams and 50' Buffers
Wetlands of State Concern

1 inch = 667 feet

1:8,000

0 200 400 800 1,200 1,600 Feet

MARYLAND DEPARTMENT OF NATURAL RESOURCES



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0 200 400 800 1,200 1,600 Feet

MARYLAND DEPARTMENT OF NATURAL RESOURCES

COMPARTMENT 61 – Stand 1 **FY-22**

Description / Resource Assessment

Location: This proposal is located along the south side of Dry Run Road in Compartment 61 stand 1. The harvest area is located approximately 1.75 miles east of the intersection of Dry Run Road with Blackhawk School Road. Landing location will be at the former loading sites from previous thinning.

Forest Community Type and Condition: This 38-acre site contains a small sawtimber mixed conifer stand that is approximately 73 years old with and average merchantable diameter of 10.9 inches. The overstory consists of white pine (36%) and red pine (35%) with some scattered hardwood throughout. The overall stocking of the stand is at 87% relative density with a basal area of 143 ft^2/acre. These numbers are locally skewed as the stand received a partial thinning in 1998 and some small sections have much higher stocking than the numbers show across the entire stand. Overall regeneration is at good levels in the previous thinning with good counts of both conifer and desirable hardwood competitive regeneration and saplings. The unthinned sections are lacking regeneration due to a tight canopy and little sunlight reaching the forest floor.

Interfering Elements: Interfering understory plant competition is relatively low within this stand and most surrounding native hardwood stands. The areas that received previous thinning have a well established cohort of regeneration while the unthinned areas are lacking primarily due to high stocking levels. Tall woody interference occupies only 39% of the site, consisting primarily of striped maple and witch-hazel. Low woody interference occupies only 30% of the stand primarily in the form of green briar and small shrubs. Rhizomatous ferns were found to be an issue on approximately 11% of the site, primarily in two semi open areas near the northern end of the stand (presumed bug spots or areas of mortality that were cut hard during the thinning). Grass was found to be an issue across 6% of the stand, primarily near the county road. Japanese stilt grass and Japanese barberry were noted invasive plants within the stand and attributable to the proximity of the county road.

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 the failure of desirable seedling establishment and in extreme cases shift in species composition dominated by undesirable tree species. Field evaluations 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 part of the proposal area received a thinning in 1998. The adjacent hardwood stand to the west was regenerated in 2005, while the hardwood stand to the north (on the opposite side of the county road) was regenerated in 2013. No evidence of forest fire was observed during the inventory.

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 unit does not contain any elements of HCVF; however, the western extent of the area borders on the 50-foot streamside

management zone on Waters Run. Protection of this critical area is addressed in the subsequent section regarding water resources. The management proposal is also in close proximity to the northern extent of the Middle Fork Wildlands. Special care will be taken to ensure that this area of HCVF is protected and undisturbed by the silvicultural treatment.

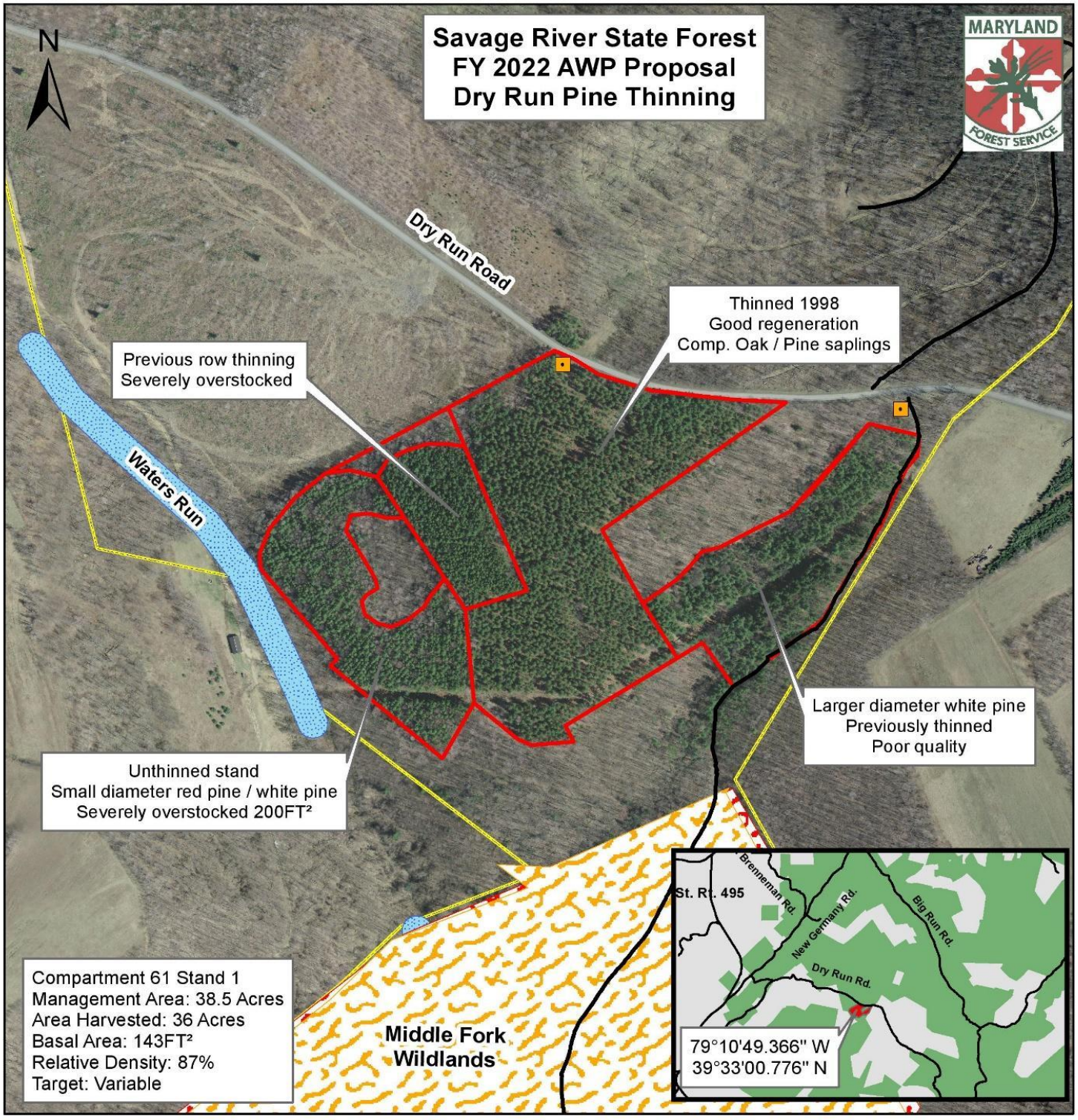
Water Resources: The stand drains west into Waters Run, a tributary of the Savage River Watershed. The proposed silvicultural treatments will be outside of all HCVF and stream buffer areas. No heavy equipment will be permitted within the protective riparian buffers of any steams or associated wetlands per the requirements set forth in the State Forest Sustainable Forest Management Plan.

Soil Resources: The predominant soil type for this site is mapped as Gilpin Channery silt loams, various slopes (GnC). These soils are composed primarily of shale and siltstone with some beds of sandstone contained throughout. The soils are moderately deep, medium textured and well drained with moderate equipment limitations primarily associated with slope. The site has very good productivity for woodland management, with a site index of 75-85 for upland oaks and good suitability for red pine establishment on sites greater than 2,000 feet elevation. The productivity of the site will be protected by minimizing the haul roads and skid trails per the Department's Best Management Practices and rutting guidelines.

Recreation Resources: No developed recreational resources are located within the management proposal. The primary recreational activity for the area is hunting access. Hunting opportunities may be disrupted for the duration of the harvest and access to the site may be limited depending on the timing of the harvest.

Management and Silvicultural Recommendation:

The proposed silvicultural treatment for this site is a commercial thinning because the stand is overstocked and there is competitive regeneration and saplings present in much of the understory that should be released. The target basal area will be variable across the site due to the partial harvest in 1998. The unthinned areas have a current basal area over 200 ft^2 and the best course of action will be to target the larger diameter stems along with unacceptable growing stock to open up the canopy and hopefully get some response from the retained stems and allow for regeneration establishment in the understory. Target retention in these untinned pockets will be 100-120 ft^2/acre of stems in the 8-10 inch size class. Given current market conditions for pine pulpwood, it is not advantageous to attempt to include a large volume of small diameter stems and the goal will be to release these trees to increase in diameter for future harvest when they are merchantable. The stand that was thinned in 1998 has a current basal area of 150-160 ft^2/acre and the target for the thinning will be to remove 60ft^2 leaving the remaining stand stocked at 80-90 ft^2/acre. The trees in this stand responded well to the previous thinning and the average merchantable diameter is 14-16 inches. The previous thinning also served well to establish regeneration and saplings in the understory. The canopy is now closing and beginning to restrict available sunlight to this cohort of trees so the goal will be to thin the canopy again and allow these stems to increase in crown classification while also establishing some new seedlings on the forest floor. Estimated yield from the thinning is 2,500 board feet per acre across the site.



Landings
Forest Roads
Harvest Area
Savage River SF Boundary

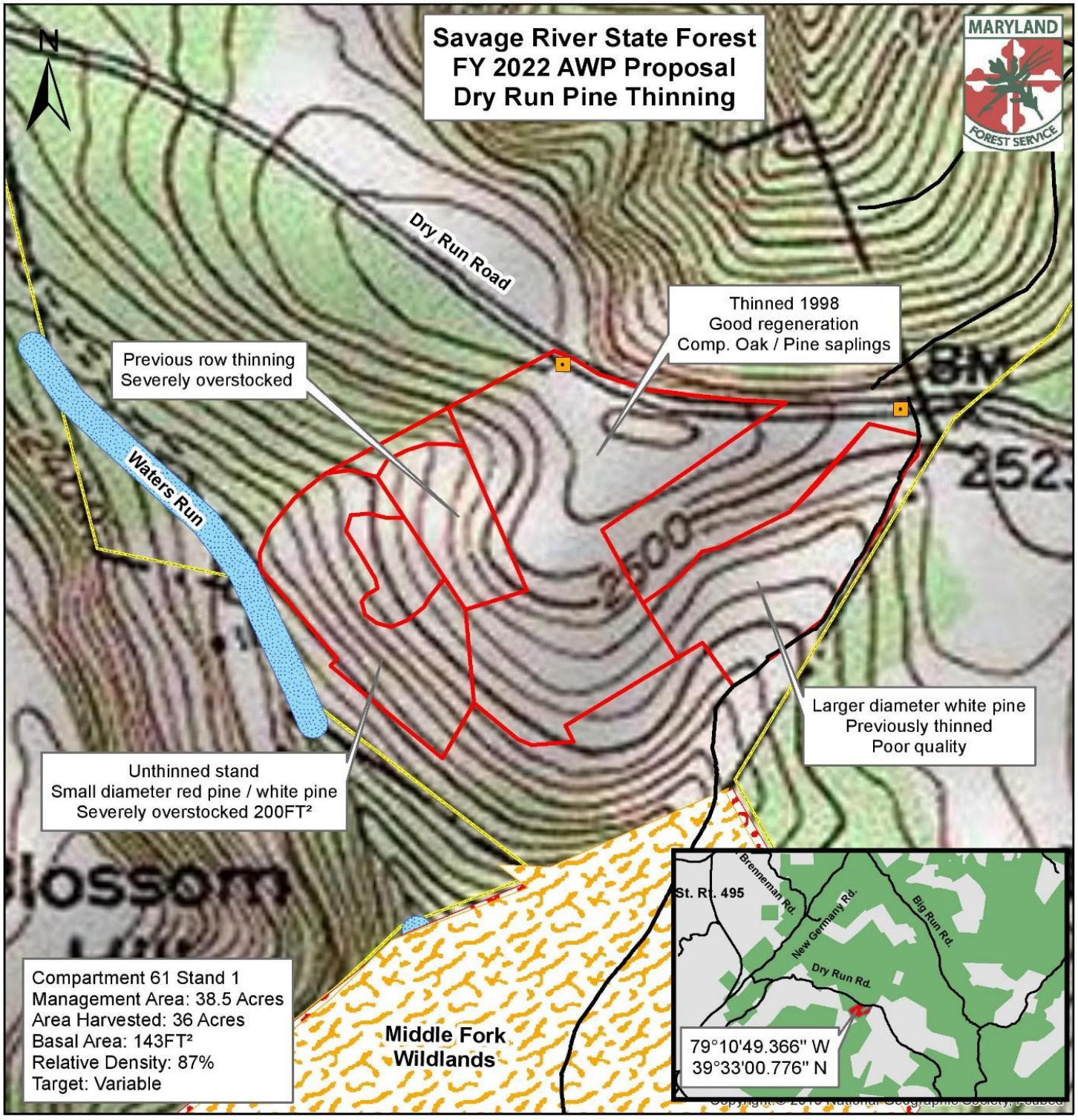
Old Growth Ecosystem Area
Ecologically Significant Areas
Old Growth
SRSF Wildlands
Streams and 50' Buffers
Wetlands of State Concern

1 inch = 441 feet

1:5,288

0 125 250 500 750 1,000 Feet

MARYLAND DEPARTMENT OF NATURAL RESOURCES



- Landings
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0 125 250 500 750 1,000 Feet

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Description / Resource Impact Assessment

Location: This proposal is located behind the Meadow Mountain Boy's Camp in Compartment 72 stand 13. The harvest area is approximately 0.5 miles down the forest access road on the east side of the Boy's Camp and borders the road along the north side. The state forest access road entrance is along the east side of New Germany Road approximately 2.25 miles northeast of the intersection of New Germany Road with State Route 495.

Forest Community Type and Condition: This 54-acre site contains a small sawtimber mixed oak stand that is approximately 73 years old with an average merchantable diameter of 10.9 inches. The overstory consists of northern red oak (27%), red maple (19%), blackgum (18%), sweet birch (15%) and chestnut oak (12%). The stocking in this stand is at 85% relative density with a basal area of 112 ft^2/acre. Overall, oak regeneration occupies 43% of the site, all of which is considered competitive and sapling stage regeneration. This level of desirable oak regeneration is what we work to achieve on our oak dominated sites and is a testament that the previous harvest of the stand served well to establish a new cohort of oak regeneration.

Interfering Elements: Interfering understory plant competition is sufficient to cause complications in desirable regeneration efforts with the majority of the site containing some form of significant interference. Tall woody interference occupies approximately 99% of the stand, consisting primarily of blackgum and sweet birch. Low woody interference occupies approximately 91% of the site, consisting primarily of mountain laurel. Rhizomatous ferns and grass were not found to be occupying the understory at any notable levels. The high percentage of tall woody interference can be attributed to the flourish of competitive and sapling stage regeneration that followed the thinning harvest. Though there are undesirable stems in the mix, there are also significant numbers of desirable stems across the site. The high level of mountain laurel interference is attributable to the dry nature of the site and is commonly found at such levels in similar stands across the forest.

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 shift in species composition dominated by undesirable tree species. Field evaluations of the site estimated deer browse impact to be moderate. Monitoring of deer browse impacts will coincide with regeneration inventories to determine if additional measures need to be implemented to reduce deer herbivory and increase the likelihood of regeneration establishment on the site. The competitive and sapling stage regeneration that is currently present is already far enough along that deer impact is unlikely.

Historic Conditions: State Forest records indicate that the proposal area was thinned in 1994. The adjoining stand to the east (bordering on the same state forest access road) was thinned in 2013 and several small stands bordering on New Germany Road were thinned in 2017. No evidence of forest fire was observed during the stand inventory.

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 on the 50-foot streamside management zone for an un-named tributary of Whiskey Hollow. It is

anticipated that an additional buffer will be placed on top of the 50-foot no-cut buffer due to the regeneration harvest prescription. The 50+2 slope protocol for regeneration harvests will be used in accordance with our state forest best management practices and certification standards.

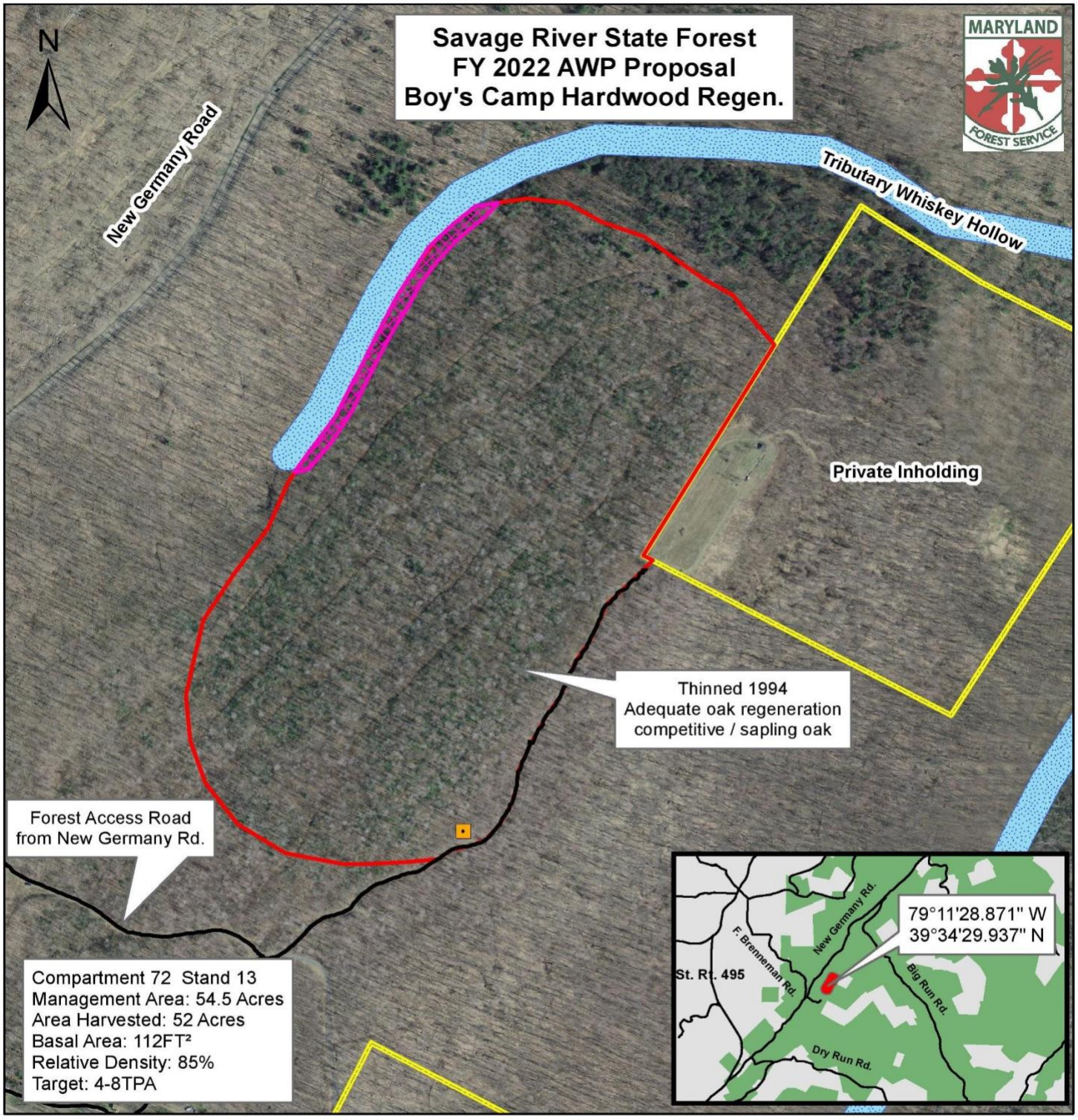
Water Resources: This stand drains northwest into an un-named tributary of Whiskey Hollow of the Savage River Watershed. The proposed silvicultural treatments will be outside of all HCVF and stream buffer areas. No heavy equipment will be permitted within the protective riparian buffers of any streams or associated wetlands per the requirements set forth in the State Forest Sustainable Forest Management Plan.

Soil Resources: The predominant soil type of the site falls in the Dekalb and Gilpin very stony loams (DgD). The soils are composed primarily of sandstone with some shale and siltstone in minute amounts. These soils are moderately deep and well drained with slight equipment limitations due to the presence of large (10 inch plus) stones on the surface or shallow under topsoil. The site has good productivity for woodland management, with a site index of 65-75 for upland oaks. The productivity of the site will be protected by minimizing the haul roads and skid trails 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 hunter access. Hunting opportunities may be disrupted for the duration of the harvest and access to the site may be limited depending on the time of the harvest. The road also serves as access to a private inholding within the state forest. The contractor will be advised that the road must remain open and passable to the private landowners and the road will be reclaimed to current condition or better following the harvest.

Management and Silvicultural Recommendation:

The proposed silvicultural treatment for this site is a regeneration harvest removing the majority of the overstory and releasing the advanced regeneration currently present. The harvest should remove 4,500-5,000 board feet per acre while retaining 4-8 trees per acre to serve as wildlife habitat and a supplemental seed source. The targeted trees to be retained will primarily be oak species of good form coupled with stems that have cavities and habitat potential. The low average diameter of the current stand can be attributed to the cohort of poles and saplings that resulted from the 1994 thinning. The current stand has adequate volume of sawtimber-size stems to facilitate a commercial harvest while releasing the advanced oak regeneration to dominate the next stand of trees. The current stand conditions also show that the percentage of undesirable growing stock is roughly 50% of the overstory, making a removal harvest the best choice in releasing the desirable advanced regeneration.



- Landing
- Harvest Area
- Buffer
- Forest Roads
- Savage River SF Boundary
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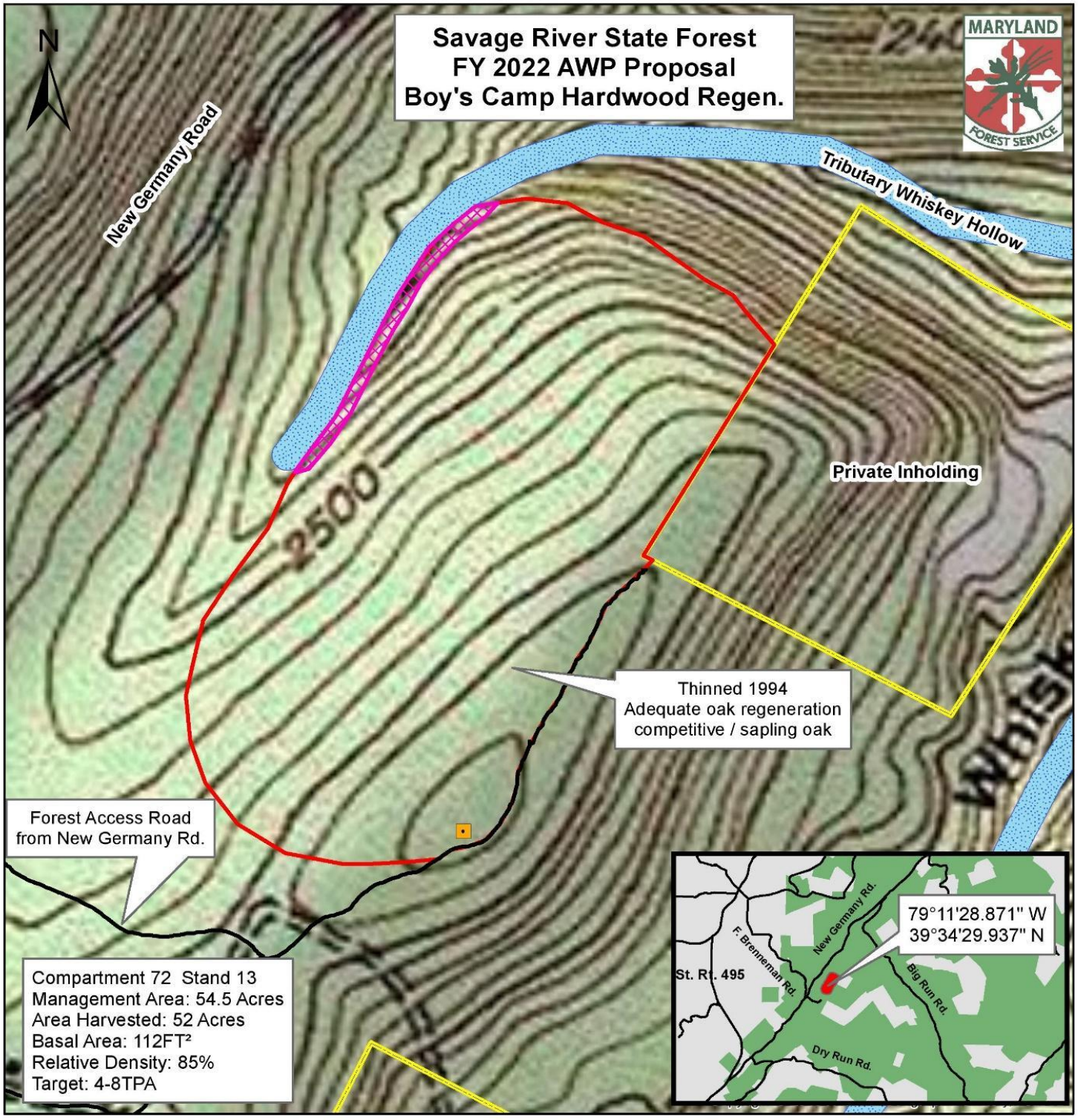
MARYLAND DEPARTMENT OF NATURAL RESOURCES


Savage River State Forest
FY 2022 AWP Proposal
Boy's Camp Hardwood Regen.
N
MARYLAND
FOREST SERVICE
New Germany Road
Tributary Whiskey Hollow
Private Inholding
2500
Thinned 1994
Adequate oak regeneration
competitive / sapling oak
Forest Access Road
from New Germany Rd.
Compartment 72 Stand 13
Management Area: 54.5 Acres
Area Harvested: 52 Acres
Basal Area: 112FT²
Relative Density: 85%
Target: 4-8TPA
79°11'28.871" W
39°34'29.937" N
New Germany Rd.
F. Brenneman Rd.
St. Rt. 495
Big Run Rd.
Dry Run Rd.
Landing
Harvest Area
Buffer
Forest Roads
Savage River SF Boundary
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Feet
MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

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 $582,120.00. Of that amount, $433,117 goes to fund classified salaries and benefits for four employees; $42,488.00 funds two contractual employees and $106,515 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 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-2119.

B. SRSF Funding Sources: Estimated - *$582,120*

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 - *$582,120*

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-2120 budget proposal was prepared in August of 2018.

▪ *Classified Salaries, Wages and Benefits: $433,117*

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: $42,488*

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: $106,515*

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 1, 2 & 3: July 1, 2017 to July 1, 2018, July 1, 2018 to July 1, 2019 and July 1, 2019 to July 1, 2020.

Year	Reservations	Daily Users	Camping	Revenue*
FY 2018	193	314	31	$4031.00
FY 2019	158	264	16	$3315.00
FY 2020	221	331	25	$4416.00

**Figures are gross amounts and do not factor employee wages.*

	FY 2018	FY 2019	FY2020
Average Daily Use (People/day)	0.86	0.77	0.91
Average Daily Revenue ($/Day)	$11.04	$9.69	$12.10
Average Camping #s (Reservations/day)	.08	.05	.07

Appendix 2: Yellow Archangel Management Plan

Savage River State Forest Non-Native Invasive Plant Management:
Yellow Archangel (*Lamiastrum 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 (*Lamiastrum 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 nearly all 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, 2021 followed by the herbicide treatment on July 27, 2021.

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.

Fiscal Year	*Planned Harvest*	*Bd. Ft. Vol. Harvested*	*Gross value*
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**

2019	**1,200,000 BD FT**	**1,406,680**	**$401,481.00**
2020	**1,200,000 BD FT**	**1,161,591**	**$304,172.62**

Appendix 4: 10-Year Timber Harvest Summary Table

Appendix 5: 2019 FSC Audit Action Plan
Maryland Department of Natural Resources Forest Service
Forest Stewardship Council Audit 2019

<u>2019.01</u> – Observation

FSC Indicator: 7.2.a

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

Although the Chesapeake / Pocomoke Forest Citizens Advisory Committee member has been recently established, there is an opportunity to continue efforts to seek input from indigenous people, including all MD State Forest regions, as the last formal outreach efforts were completed 5-6 years ago. The ecologist representative position on the Forest Citizens Advisory Committee recently became vacant. At the time of the audit the ecologist position remained open. This position represents conservation science representation.

Corrective Action Request (or Observation)

The forest owner or manager last had formal consultation with tribal representatives in identifying sites of current or traditional cultural, archeological, economic or religious significance approximately 5-6 years ago. Per interview, there is not a regularly scheduled interval to re-evaluate the MD DNR SF outreach efforts. There is an opportunity to continue efforts and seek input from indigenous people, including all MD State Forest regions.

***Issue* – Indigenous People Outreach**

<u>2019.02</u> – **Observation**

FSC Indicator: FSC FM US 6.3.e

Non-Conformity (or Background / Justification in the case of an Observation)

The current seed mix used for landings and roads has been previously chosen for its ability to quickly germinate and establish, however the mix used has been previously approved by state wildlife staff for food plots and elsewhere at the state level for erosion and sediment control plan process.

Corrective Action Request (or Observation)

While the seed mix used on landings and roads has been previously approved by state wildlife staff for food plots and elsewhere at the state level for the erosion and sediment control plan, there is an opportunity to improve the seed mixture species and ratios to include other native species. The current mix being applied on landings and roads is comprised of only non-native naturalized species.

Issue – **Site Seed Mix**

2019.03 – **Minor CAR**

FSC Indicator: FSC FM US 6.6.e

Non-Conformity (or Background / Justification in the case of an Observation)

Power Line ROWs over the state forest system are typically maintained by the power companies who do apply pesticides as a regular management activity. These areas have not been excised from the FMU and so management activities such as pesticide use must be reported. The quantity of pesticides used is not currently being reported to the MD DNR for these ROW areas.

Corrective Action Request (or Observation)

Reporting the volumes of pesticide use on power lines by the power companies is not currently being completed.

Issue – **Pesticide Reporting**

2019.04 – **Minor CAR**

FSC Indicator: 6.7.c

Hazardous materials and fuels are stored in leak-proof containers in designated storage areas that are outside of riparian management zones and away from other ecological sensitive features until they are used or transported to an approved off-site location for disposal. There is no evidence of persistent fluid leaks from equipment or of recent groundwater or surface water contamination.

Non-Conformity (or Background / Justification in the case of an Observation)

Dozer was leaking on the site to soil below the equipment. Some oil was observed on the soil below the skidder. Logger was not on site at the time of inspection. No apparent safety equipment (fire extinguishers or spill kits) observed on any of the 3 pieces of equipment on the site. Later interview stated that the fire extinguishers were behind the seats of the skidder and harvester (out of view). Recent BMP inspection conducted by forester with no issues.

Corrective Action Request (or Observation)

There is evidence of fluid leaks from the equipment. While this did not contaminate groundwater or surface water, these leaks from equipment on unattended machinery need to be corrected in order to prevent future issues.

Issue – **Fluid Leaks from Equipment**

2019.05 – **Observation**

FSC Indicator: 8.1.a

Non-Conformity (or Background / Justification in the case of an Observation)

The organization currently conducts BMP monitoring with checklists. Different BMP monitoring checklists are used in the Eastern Shore area and on the western state forests. One form uses an evaluation system with a ranking 1-5 (1=poor, 5=excellent) while the other form uses a "Yes/No/NA" system to evaluate the harvest operation.

Corrective Action Request (or Observation)

FME is using written BMP checklists for monitoring BMP effectiveness. Two separate forms are used with one noting BMP compliance with a rating of 1-5. Per interview and document

review, the ranking criteria is not clearly defined. FME could review the difference in criteria used in each region in efforts to help improve consistency for BMP monitoring effectiveness.
Issue – **BMP Monitoring Checklist**

Appendix 6: 2019 SFI Audit Action Plan
Maryland Department of Natural Resources Forest Service
Sustainable Forestry Initiative Audit 2019
Minor Nonconformance
SFI 11.1.4: Contractor education and training sufficient to their roles and responsibilities
Minor: This process is not fully effective
Evidence: Contract logger is a Maryland Master Logger but has issues with equipment leaking on site. Dozer was persistently leaking fluid onto soil beneath and some fluid was observed below the skidder. Logger was not on site, but no apparent safety equipment (fire extinguishers and spill kits) were observed on any of the 3 machines. A later interview stated that the fire extinguishers were behind the seats of the skidder and harvester (out of view). Recent BMP inspections completed by forester noted no issues.
Issue – **Fuel Leaks and Safety Equipment**

Opportunity for Improvement
SFI 2.1.1: Documented reforestation plans, including designation of all harvest areas for either natural, planted or direct seeded regeneration prompt reforestation, unless delayed for site-specific environmental or forest health considerations or legal requirements, through planting within two years or two planting seasons, or by planned natural regeneration methods within five years.
OFI: Regeneration criteria are forest-type specific. Confirmed that western state forests use Oak-Silvah for criteria and protocols for regeneration surveys. No regeneration delays were observed in the field. Although planting is rarely done, there is an opportunity for improvement in the regeneration criteria in order to achieve acceptable species and stocking levels for naturally regenerating stands in the eastern region
Issue: **Regeneration Criteria**

Opportunity for Improvement

SFI 2.2.5: Use of pesticides banned under the Stockholm convention and persistent organic pollutants

OFI: Although pesticides are currently checked against the FSC checklist, there is an opportunity to improve the chemical review process (both internally and with contractors) to ensure that current and future uses of pesticides banned under the Stockholm convention and persistent organic pollutants are not being used.

Issue: **Pesticide Use Reporting**

Opportunity for Improvement

SFI 3.1.3: Monitoring of overall best management practices implementation

OFI: The organization currently conducts BMP monitoring with written checklists. Different checklists are used on the eastern shore than those used on the western state forests. There is an opportunity to improve the criteria used to evaluate BMP motoring and create some conformity between the regions

Issue: **BMP Checklist Criteria**

Opportunity for Improvement

SFI 8.2.1: Program participants with forest management responsibilities on public lands shall confer with affected indigenous peoples with respect to sustainable forest management practices.

- ***a. Understand and respect traditional forest-related knowledge***
- ***b. Identify and protect spiritually, historically, or culturally important sites***
- ***c. Address the use non-timber forest products of value to indigenous peoples in areas where program participants have management responsibilities on public lands***
- ***d. Respond to indigenous peoples inquiries and concerns***

OFI: Although the Chesapeake / Pocomoke Forest Citizens Advisory Committee member has recently been established, there is an opportunity to continue efforts and seek input from indigenous people. The last formal outreach was completed 5-6 years ago and there is no regularly scheduled interval to re-evaluate the MD DNR SF outreach efforts.

Issue: **Indigenous Peoples Outreach**

Opportunity for Improvement

SFI 11.1.2: Assignment and understanding of roles and responsibilities for achieving SFI 2015-2019 Forest Management Standard objectives.

OFI: There is an opportunity to improve the assignment and understanding of roles and responsibilities as it relates to contract requirements (per review of the Stone Mountain Road contract #0217). Internal contractual documents were incomplete on one page of the contract. Per interview with multiple DNR staff, there were differing thought as to who was responsible for noting the official date and signature on the contract.

Issue: **Contract Coordination**

Opportunity for Improvement

SFI 11.1.3: Staff education and training sufficient to their roles and responsibilities

OFI: While the seed mix used on landings and roads has been previously approved by state wildlife staff for food plots and erosion control; there is an opportunity to improve staff

education and training as it relates to the seed mixture (species and ratios) currently being used on landings and roads.
Issue: **Site Seed Mix**

Opportunity for Improvement
SFI 15.1.2: System for collecting, reviewing and reporting information to management regarding progress in achieving SFI 2015-2019 Forest Management Standard objectives and performance measures.
OFI: Currently the document "Internal Review ISA-FIELD-CHECKLIST-ALL-SF" is used. There is an opportunity to consider using other foresters from different regions to help strengthen and improve current auditing processes.
Issue: **Internal Silvicultural Audit Integration**

Appendix 7: Interdisciplinary Team Review and Comments

Maryland Department of Natural Resources State Forests

Savage River State Forest
FY-22 Annual Work Plan
ID Team Review
In-person meeting not applicable – members provided electronic copy for review

ID Team Members: Paul Busam (MDE), Scott Boylan (MDE), Alan Klotz (Fisheries), Sean Nolan (SRSF), Erin Thomas (Parks), Dan Feller (WHS), George Eberling (MFS), Rick Latshaw (Wildlife), Mike Friend (NRP), Jack Perdue (MFS)

Overview / Discussion of FY 2022 Work Plan:
No requests for site visits were submitted by the ID Team for any of the silvicultural proposals, however a few comments and questions were received:

Heritage: Dan Feller
Boys Camp Hardwood Regeneration – *the occurrence of the state endangered Southern Water Shrew (Sorex palustris punctulatus) has been well documented in the Upper Big Run Watershed with the collection of a specimen and three separate observances over the last 15 years making this the best documented population in Maryland. It is strongly recommended that a minimum 100-foot no-cut buffer be provided from the stream in Whiskey Hollow and any associated springs or seeps. This modification would have a minimal reduction on the total proposed harvest area. Providing a minimum 100-foot wide buffer from the stream would protect the water shrew's habitat directly through retention of lower water temperatures and reduced sedimentation, providing requisite cool clear water and future coarse woody debris cover. Indirect benefits include allochthonous input from the production of leaf litter and woody debris*

from riparian trees, which are the primary energy source for the water shrew's prey: aquatic and riparian invertebrates, and the small fish that feed on them. As a semi-aquatic mammal, the water shrew is not entirely restricted to streams, springs, seeps or bogs, but will traverse, nest and occasionally forage in dryer areas nearby. Affording a minimum 100-foot forest buffer along each side of the stream should protect all aspects of the endangered species' habitat.

Dry Run Conifer Thinning – *Eliminating conifer plantations on the state forest is a mixed bag. While eradication of non-native species or altered genetic stock of planted native species is a positive management objective in most cases, maintaining conifer cover and increasing the conifer component of the forest to historic levels is important to a great variety of native species, including common game and RTE's. We should seriously consider the restoration of white pine and red spruce with local native genetic stock. A project with the state nursery perhaps? There will likely be further comment regarding this sale from Dave Brinker regarding goshawk and other concerns.*

West Shale Hardwood Thinning – *The proposed timber harvest is slightly within the West Shale Road ESA boundary where a small population of the state threatened Clinton Lilly (Clintonia borealis) was documented SSE of the old mined area. However, since we have been unable to verify the late 1980's record and a field visit confirmed that there are no RTE occurrences in the proposed sale area, we are not recommending any modification to the proposed hardwood thinning boundary. Care should be taken by the contractor to protect the scattered Eastern hemlock seedlings and saplings within the proposed sale area given the current threats to this species from HWA and the fact that they appeared to current be in good health. As this area is underlain by acidic soils there is reduced concern regarding invasive plant introduction into the adjoining ESA.*

Westernport Road Hardwood Regeneration – *Consider pretreatment of invasive plants along Westernport Road.*

Park Service: ***Erin Thomas / Luke Mongrain***

West Shale Hardwood Thinning – *Establish a buffer between the Meadow Mountain Trail and the harvest area instead of having the trail itself serve as the boundary. The same comment would apply to the trails at Asa Durst regarding the Horse Farm Hardwood Thinning. This would help minimize impact to trail users and protect the visitor experience.*

Freshwater Fisheries Program: ***Alan Klotz***

General Comment – *As proposed, all silvicultural projects will be conducted outside of the HCVF and 50 foot no-cut riparian zones along the streams within SRSF, so the Freshwaters Fisheries Program has no additional recommendations. However, we would support the Heritage Service's request for a 100' no cut buffer along the tributary to Whiskey Hollow to provide increased stream riparian zone habitat enhancement for the water shrew population.*

Appendix 8: Citizens Advisory Committee Review and Comments

Maryland Department of Natural Resources State Forests

Savage River State Forest
FY-22 Annual Work Plan
Citizen's Advisory Committee
In-person meeting not applicable – members provided electronic copy for review

Advisory Committee Members: Mark Diehl, Kevin Dodge, Mike Dreisbach, Steve Green, Rusty Leonard, Michael Minnick, Jim Minogue

Appendix 9: Public Comments

XII. Literature Cited

Jetton, Robert M., Mayfield, Albert E., Keyser, Tara, and Rhea, James 2017. *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.

MacDonald, William L. and Nuss, Donald L. 2016. *Evaluating the potential of "Super Donor" strains of Cryphonectria parasitica to control chestnut blight infections*. West Virginia University Research Proposal.

Ness, Eric. 2018. *Population Estimate and Structure of Bobcats in Western Maryland.* University of Delaware College of Agriculture and Natural Resources Department of Wildlife Ecology.