

Botanical Resources

Introduction

The inventory and monitoring items presented here are parts of ongoing efforts to protect the Threatened, Endangered, and Sensitive (TES) plant species on the Forest and to build on our knowledge of their habitats on the Monongahela National Forest. Also covered in this report are non-native invasive species (NNIS) of plants. NNIS have been recognized at the national level as one of the four major threats to the ecological sustainability of NFS lands.

2008 Program Accomplishments

SURVEYS

Contract Surveys - Contract surveys were conducted on 7,167 acres in the Upper Greenbrier North Vegetation Management Project area. These surveys were made in areas proposed for active management in the near future. Two sensitive plant species, blunt-lobed grape fern (*Botrychium lanceolatum*) and long-stalked holly (*Ilex collina*), were located in several locations. Also, the newly-described species, Shriver's frilly orchid (*Platanthera shriveri*), was found at two locations within the project area. This species is considered very rare and is likely to go on the Forest's sensitive species list once its global abundance ranking has been formulated. The surveys also located five high-priority nonnative invasive plants: crown vetch (*Securigera varia*), Japanese barberry (*Berberis thunbergii*), Morrow's honeysuckle (*Lonicera morrowii*), hairy chess (*Bromus commutatus*), and Japanese stiltgrass (*Microstegium vimineum*). Extensive infestations of Japanese barberry and Morrow's honeysuckle were found.

In addition to locating TES or NNIS plants, the contract required that a check list of plants encountered in the survey areas be filled out. This list was not meant to be quantitative and it may not be all-inclusive. However, the list does serve as a general overall depiction of the herbaceous component of the surveyed areas and may be helpful in designing projects or looking for specific habitat for other plants or animals. The results could also be used for determining indicator species, and could provide clearance documentation in the event that new species are added to the TES lists.

Forest In-house Surveys - Every year, areas proposed for active management are not included in the contracted survey areas. Generally these areas are associated with small projects, or they are added to a large project after award of the TES survey contract, or they are areas for which funding is not available for contract surveys. In 2008, these areas were reviewed for TES plant individuals or potential habitat by the Forest's botany technician. The Forest Ecologist also surveyed a few areas. Table BT-1 displays the areas covered by forest personnel in 2008.

Table BT-1. Acres of In-house Surveys for TES and NNIS in 2008

Location/Project Name	Acres	TES plants Found	High Priority NNIS Plants Found
NNIS EA surveys – various sites Forest-wide	Unknown	Appalachian blue violet, rock skullcap, running buffalo clover, shale barren wild buckwheat, turgid gay feather, Virginia Mountain pimpernel	garlic mustard, Japanese stiltgrass, tree of heaven, Japanese barberry, crown vetch, reed canary grass
Potomac District range allotments	790	Butternut, white alumroot	tree of heaven, garlic mustard, Japanese barberry, common privet, bush honeysuckles, Japanese honeysuckle, Japanese stiltgrass, princess tree, common periwinkle
Berry Energy pipeline	Unknown	None	Japanese stiltgrass, garlic mustard
Gauley Mountain Trail	0.5	None	None

NEW SITES FOUND

Three of the TES plant occurrences found in 2008 represent new populations of these species:

- Shriver's frilly orchid in the Upper Greenbrier project area
- Appalachian blue violet (*Viola appalachiensis*) near a wildlife opening in the Five Lick area of the Cheat District (NNIS project)
- White alumroot (*Heuchera alba*) in the Alvin Shreve range allotment on the Potomac District

The remaining species were previously known to occur in the vicinity of these project areas, so these new micro-sites likely are part of the populations that were already known to exist.

NNIS TREATED

Garlic mustard (*Alliaria petiolata*) was noted during site monitoring of the Gaudineer Scenic Area/Virgin Spruce stand. Forest employees removed garlic mustard by hand-pulling from the parking area, adjacent to the trail, and in some canopy gaps along the trail where garlic mustard was spotted from the trail. The gross area treated was estimated at 8 acres, although the infestation was spotty within this area. This was a follow-up treatment to hand-pulling that was done in 2004, 2005, 2006, and 2007. Garlic mustard also was pulled from two small patches on nearby roadsides. Removal of garlic mustard from these areas was estimated at near 100 percent.

Garlic mustard was pulled from two small patches along Forest Road 1560 on the west side of Cheat Mountain. The Forest is trying to eradicate these patches because they threaten prime habitat for running buffalo clover. Removal of garlic mustard was estimated at near 100 percent.

Forest employees also pulled garlic mustard from an infestation covering about an acre at the Camp Pocahontas 4-H Camp on the Greenbrier District. Due to insufficient manpower, only about 0.1 acre was pulled completely.

Canada thistle (*Cirsium arvense*) was treated with herbicide in the Allegheny Battlefield grazing allotment. The total area of the allotment is approximately 170 acres, and treatment was scattered throughout the allotment. Treatment was estimated to be 95 percent effective.

The Forest attempted to control seed production of Japanese stiltgrass by mowing 31 miles of infested roads on the Cheat District. Follow-up monitoring determined that the stiltgrass was not mowed short enough. Most of the stiltgrass flowered and seeded despite the mowing, although the Forest estimated that seed production may have been reduced by up to 50 percent.

SUPPORT TO CONSERVATION ASSESSMENTS, RESEARCH, ETC.

During FY 2007, the Forest provided authorizations for the following botany and ecology-related research activities:

- A genetics study of ginseng (*Panax quinquefolius*) conducted by the U.S. Geological Survey,
- A genetics study of bunchberry (*Cornus canadensis*) conducted by West Virginia University,
- Dendrochronology research on ancient red cedars (*Juniperus virginiana*) in the limestone glades of the Smoke Hole area of the Forest, conducted by West Virginia University,
- Effects of the hemlock wooly adelgid (*Adelges tsugae*) on forest stands, conducted by Virginia Tech University,
- Collection of botanical specimens to allow updating the *Manual of Vascular Plants of the Northeastern United States and Adjacent Canada*, conducted by the New York Botanical Garden,
- Native plant propagation experiments conducted jointly by the Natural Resources Conservation Service and the Forest, and
- Modeling of red spruce restoration opportunities in light of climate change projections, conducted by West Virginia University.

The Forest completed its cooperative agreement with West Virginia University to develop a geospatial database containing information from the original warrant surveys that were conducted on the Forest during the 1930s. Among the data included were the witness tree records for all of the survey corners. The database will make this early data on vegetation of the Forest more accessible to the Forest Ecology staff and to researchers.

The Forest also completed its cooperative agreement with The Nature Conservancy to prepare a conservation assessment for the limestone glades and barrens communities in the Smoke Hole area of the Forest. The conservation assessment is now available to the Forest and others with an interest in the management and conservation of mid-Appalachian limestone glades and barrens.

Monitoring and Evaluation

2006 FOREST PLAN MONITORING ITEMS FOR BOTANICAL RESOURCES

The 2006 Forest Plan monitoring chapter (Chapter IV) contains three monitoring items related to TES plants and NNIS plants:

Item 39 - To what extent is Forest management contributing to the conservation of sensitive species and maintaining or restoring their habitat conditions?

Item 38 - To what extent is Forest management contributing to the protection and recovery of threatened and endangered species?

Item 37 - Are non-native invasive plants located and treated to prevent or limit further spread?

The Forest Ecologist provided planning input for threatened, endangered, and sensitive plants for every project on the Forest that went through the NEPA process during FY 2008, including Categorical Exclusions, Environmental Assessments, and Environmental Impact Statements. Where TES plants were present, the Ecologist recommended project design criteria to protect these occurrences from adverse effects. Therefore, projects on the Forest are being designed to contribute to the conservation of sensitive species and the protection and recovery of threatened and endangered species. However, the Forest did not have the personnel or funding available to conduct implementation and effectiveness monitoring on TES protection measures for projects that were implemented in FY 2008. Therefore, the first two monitoring questions cannot be completely answered.

The Forest, working in conjunction with the Northern Research Station, set up a monitoring protocol and collected baseline data for rock skullcap (*Scutellaria saxatilis*) in the Ramshorn prescribed fire project area. This baseline data, along with data to be collected in future years as the burning program gets underway, will enable the Forest to answer the sensitive species monitoring question for the Ramshorn project.

The program accomplishments listed above demonstrate that the Forest conducted some treatment to limit the spread of NNIS plants in FY 2008, and that effectiveness monitoring was conducted on these small-scale treatments. This activity addressed only a small fraction of the infestations of high priority NNIS on the Forest. Currently the Forest is limited in its capacity to treat NNIS due to lack of NEPA decision coverage on most of the sites in need of treatment. In FY 2008 the Forest made substantial progress in preparing a Forest-wide NEPA analysis of high priority NNIS treatment needs, so control activity should increase in future years.

In addition to the monitoring questions addressing TES and NNIS plants, the Forest Plan monitoring chapter contains the following items related to other forest vegetation:

Item 34 - To what extent is the Forest providing a range of vegetative communities that address diverse public interests and needs while contributing to ecosystem sustainability and biological diversity?

Item 35 - To what extent are Forest management, natural disturbances, and subsequent recovery processes changing vegetation composition and structure?

Item 36 - To what extent is the Forest meeting vegetation composition and age class objectives and desired conditions for MPs 3.0, 4.1, and 6.1?

These monitoring questions are jointly addressed by the Silviculture and Ecology staffs because they include elements related to tree vegetation as well as understory vegetation and ecological structure and function. For most projects, the Forest did not have funding or personnel available for monitoring the botany and ecology-related parts of these items in FY 2008. A small amount of baseline botanical and ecological data was collected in one of the savannas to be included in the Ramshorn burn project.

Evaluation, Conclusions, and Recommendations

A few new TES species observations were made, and design features were incorporated into project planning to protect other known locations. NNIS continue to be a growing concern on the Forest, as populations are found in many of the places surveyed or monitored. Effective monitoring of TES and NNIS plants is a difficult challenge due to inadequate staffing and budgets.

Recommendations:

1. Running buffalo clover sites on the Forest that have been monitored by Fernow Experimental Forest personnel should be monitored by Forest personnel in future years.
2. Monitoring of the TES plants in the Lower Williams, Hogback, Shock Run, White Sulphur, and Ramshorn project areas should occur during and after timber sale and prescribed fire activity to check for effectiveness of design criteria and mitigation.
3. TES plant sites in the Upper Williams timber sale areas should be monitored to determine whether design features in these sales adequately protected the TES plant occurrences.
4. Baseline botanical and ecological monitoring should be implemented for the White Sulphur Springs prescribed burn project. Such monitoring will help determine the extent to which the objectives of the burn are met, as well as address concerns about increases in NNIS and possible damage to non-fire-adapted community inclusions within the burn blocks.
5. The small amount of baseline botanical and ecological data collected for the Ramshorn burn project should be supplemented with additional baseline data to provide greater statistical precision and increase the potential for detecting any changes that occur.
6. NNIS control efforts that are part of the design of the Hogback and Lower Williams projects should be monitored for implementation and effectiveness.
7. NNIS monitoring should be conducted on ongoing and recently closed timber sales to determine whether these sales contributed to the spread of high priority NNIS.
8. Garlic mustard control at the Gaudineer Scenic Area/NNL and Forest Road 1560 should continue.

9. Completion of the Forest-wide NNIS NEPA process should be a high priority because it is a prerequisite for increasing control efforts in the future.
10. Additional NNIS inventory should be conducted across the Forest to allow better prioritization of control efforts. Inventory should be conducted in a systematic fashion and should concentrate on high probability establishment sites (roads, utility corridors, trails, recent timber harvests) and high value ecosystems that have not been surveyed in recent years.
11. The Forest should make a concerted effort to collect new TES and NNIS data in the appropriate corporate databases. Legacy data should be cleaned up and entered as time allows.