

# Athens 2006 Prescribed Burning Project

## (Athens Unit)

Nelsonville Quad, T10N R14W  
Sections 29, 33-36, FR17-18, and FR33-36  
T10N R14W, Dover Township, Athens County  
39.4300°N, -82.1561°W (NAD27)

## Botanical Biological Evaluation



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## PROJECT SUMMARY

The proposed prescribed burn project includes a total of 2,052 acres on National Forest System land and some adjacent private property, and implementation is planned over the next 10 years with a 3-6 year burn interval per burn unit. The first burns are planned for spring 2007. The objectives of the burns are to improve oak/hickory habitat and reduce hazard fuel loads.

The primary impacts from this project will be the soil disturbance created from fireline construction and prescribed burning, and the potential for change in understory composition and cover. Past use of dozers for fireline construction on three wildfires on the Ironton district and Ohio University research on prescribed burning have shown that these two activities increase the spread, germination and survivability of Japanese stiltgrass (*Microstegium vimineum*). Japanese stiltgrass and other aggressive non-native invasive species (NNIS) exist within the proposed project and along portions of the proposed firelines; the implementation of this project will increase Japanese stiltgrass in the project area. **Under Executive Order 13112, 'Federal agencies whose action may affect the status of invasive species shall not authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless the agency had determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species'**. If mitigations to control populations of stiltgrass before and after prescribed burns are included as part of the project design, then Wayne National Forest will retain or decrease current stiltgrass populations sizes and not cause the spread of this species within the Bailey Burn areas.

### *Federally-listed Species*

The implementation of the Athens 2006 Prescribed Burning Project will have **no impact** on Virginia spiraea or northern monkshood due to a lack of potential habitat for either species. The project is **not likely to adversely affect** running buffalo clover or small whorled pogonia, because while potential habitat is present, no individuals of either species were found during 2002 and 2006 surveys.

### *Regional Forester Sensitive Species (RFSS)*

The implementation of the project **may impact individuals or habitat, but is not likely to cause a trend toward federal listing** for sparse-lobed grape fern, lined sedge, umbrella magnolia, rock skullcap, butternut, featherbells, large marsh St. John's wort and pigeon grape. Implementing prescribed fires in the project is likely to have **beneficial impacts** on the fire adapted species known within the area: juniper sedge and yellow gentian, as well as potential habitat for Carolina thistle, butterfly pea and yellow-fringed orchid.

### *Avoidance and Minimization Measures*

- To reduce the likelihood introductions and invasions of NNIS, *all* equipment shall be cleaned of *all* vegetation debris and soil before entering the project area. Equipment cleaning can be done at any commercial car wash facility or other

facility with a high-powered water hose. Inspection of the rigs should be done on-site by the contract administrator.

- Use handline whenever possible to reduce NNIS spread, especially in known locations of NNIS such as Japanese stiltgrass.
- Rake berms created by mechanical fireline construction back across the fireline to reintroduce native plant seed and help prevent NNIS germination.
- Plant native seed along mechanical constructed lines to compete with NNIS. Consult with Forest Botanist on a seed mix for the area.
- Monitor and treat Japanese stiltgrass infestations in the project area for the first three years after project implementation. If burning is to occur in the fall, treat stiltgrass BEFORE project implementation.
- Create ATV barriers to prevent illegal off-trail use in areas where ATV use is currently occurring, or where high visibility will likely invite ATV use.
- If any federally-listed or RFS species are found prior to or during project implementation, activity will be halted until a botanist or ecologist can determine the potential impacts of the project to the rare species found and appropriate mitigation measures.

## **INTRODUCTION**

The Forest Service (USFS) proposes to implement prescribed burning on 2,052 acres of the Athens Ranger District of the Wayne National Forest, Athens County, Ohio. The purpose of this action is to utilize the benefits of fire to achieve desired natural resource conditions, while minimizing the fire danger to adjacent lands from hazardous fuel accumulations. The need for this action has two components. The first is to use prescribed fire to promote the health and rejuvenation of hickory/oak communities and tallgrass prairie. The second is to provide better protection to adjacent residences and structures, as well as wildlife and plant habitat from the threat of future wildfires, which could be severe under current hazardous fuel levels on NFS lands.

This proposal is an update for the 2003 Athens Prescribed Burning Decision to increase the burn intervals and includes an additional 729 acres (Upper Bailey and Buffalo Beats Research Natural Area) not covered in the original documentation. The purpose of increasing the burn interval for the original project areas, and including more acres in the burning program, is to begin moving this piece of the Historic Forest Management Area toward a condition with large diameter, widely-spaced trees and plenty of light reaching the forest floor. Characteristics indicating frequent fires that molded the oak-hickory forests on upland slopes. The open nature of the forest could provide suitable habitat for species including yellow gentian, juniper sedge and other open forest, fire-adapted species.

This Biological Evaluation (BE) is prepared in accordance with direction provided in Forest Service Manual (FSM) 2672.42 and Section 7 of the Endangered Species Act (ESA). The purpose of this document is to determine the likely effects of this proposed project and the no-action alternative on Federally-listed threatened and endangered species and Regional Forester sensitive species (RFSS). The list of Federally-listed species addressed in this BE was developed in consultation with the U.S. Fish and Wildlife Service (USFWS 2006) (USFS 2006a). Species designated as RFSS on the Wayne NF were determined through coordination with the USFWS, the Ohio Department of Natural Resources, and other taxonomic experts. Risk evaluations have been completed for all RFSS and for all species proposed for RFSS designation. This evaluation is to ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant species, or contribute to trends toward Federal listing of any species.

### **Consultation History**

The Forest Service entered into and completed formal consultation with the USFWS in 2005 during the revision of the Wayne NF Land and Resource Management Plan (2006 Forest Plan; USFS 2006a). A Biological Assessment was prepared by the Forest Service (USFS 2005), and a Programmatic Biological Opinion (PBO) was prepared by the USFWS (USFWS 2005) for two species, the Indiana bat and running buffalo clover. The monitoring requirements outlined in the PBO were incorporated into the 2006 Forest Plan (Appendix D).

## **PROPOSED PROJECT**

Two alternatives exist for the project: (A) the proposed action alternative, and (B) the no-action alternative.

**ALTERNATIVE A (Proposed Action)** – *Prescribed Fire on 2,052 acres with 3-6 year burn intervals over the next 10 years*

The proposed project is to prescribe burn ca. 2,052 acres in the Baileys/ Utah Ridge area and Buffalo Beats RNA. Treatment units would include: Buffalo Beats, Upper Bailey, Big Bailey, and Middle Bailey/ Utah Ridge. The proposed treatments for these units are summarized in Table 1; the burn unit locations are shown in Figure 1 of the wildlife BE.

We will focus on the following objectives:

1. Use available management tools to reduce forest density in both young and mature stands. The tool available to us in the next 5-year horizon is prescribed burning. Selection harvest should follow in 5-15 years. Fire will help prepare a seedbed for oak and hickory regeneration to increase both quantity and size of seedlings, control midstory species (maple and beech) that compete with oak and hickory, and select for long-lived fire tolerant species in the canopy.
2. Utilize the existing transportation system and natural breaks to minimize new fireline construction impacts from the proposed activity.
3. Reduce fuel build-up to protect private land and improvements.
4. Adaptively manage Buffalo Beats RNA to (1) maintain the integrity of the existing tall grass prairie community by minimizing the threat of invasion from woody and non-native species habitat, and (2) expand and maintain the size of the prairie at the full extent of the clay lens in both the northern and southern prairie sites. Burn intervals will be established by reviewing conditions in the RNA and determining on a year-to-year basis when another fire is needed.

Table 1: Proposed Action Summary for 2006 Athens Prescribed Burning Project for Buffalo Beats, Upper Bailey, Big Bailey, Middle Bailey, and Utah Ridge Burn Units.

Burn Unit	Acres	Past Burning	Expected Burn Frequency Over Next 10 Years	Proposal
Buffalo Beats	17	1987 1996 1998	3	Prescribed fire would be conducted most likely in February and March, but could occur Sept to May, if appropriate burn conditions were present. Fires would be conducted on an adaptive burn rotation (with 3 to 6-year intervals) that maintains the prairie and suppresses encroaching woody vegetation. Timing of burns will be determined in coordination with a Forest botanist or ecologist.
Upper Bailey	712	None	3	These units would be burned in whole or in parts, depending on fire conditions. Logical breaks in the treatment unit would be used, including existing roads and trails. Prescribed fire would most likely
Big Bailey A	67	Spring	2	

B	120	2004		be conducted between March and April and would be mosaic in nature. However, the burn may be done Sept to May, if appropriate burn conditions are present. The treatment units would be burned on a 3- to 6-year rotation.
C	112			
D	66			
<b>Total</b>	<b>365</b>			
Middle Bailey & Utah Ridge			2	
1-A	131	Spring		
1-B	178	2005		
1-C	146			
1-D	59			
1-E	193			
1-F	128			
1-G	122			
<b>Total</b>	<b>957</b>	Spring 2006		
Total acres in this analysis: <b>2052</b>				

See the Wildlife BE Figure 1 for a detailed map of the burn areas addressed in this report.

General activities in preparation for and execution of prescribed fires would include fireline construction, hazard tree mitigation, prescribed fire ignition, and mop-up. Fireline for Buffalo Beats construction would involve the removal of vegetation to bare mineral soil using hand tools and power tools (e.g., leaf blowers & chainsaws) along previously used firelines. Firelines in the Baileys and Utah Ridge units would involve the removal of vegetation to bare mineral soil using hand and power tools, brushhogs, and dozers. For the Big Bailey and Middle Bailey/Utah Ridge firelines were cleared in 2004, 2005 and 2006; additional burns in these areas will involve revisiting the previous burn lines and removing fuels and vegetation to bare mineral soil again. Existing county and township roads would be used as existing firelines where possible and would require little, if any, preparation. Existing Forest roads, oil and gas access roads, and trails will be (or have already been) used in most other areas (see Figure 1 for fireline types and a mileage table). Firelines would typically be 3 to 4 ft in width for handlines and 8 ft wide for brushhog and dozer lines, and would be rehabilitated upon completion of burning activities, as determined by FS specialists following post-burn analyses and pre-existing non-native invasive plant concerns. Hazard tree mitigation would involve the removal of hazardous trees on or directly adjacent to firelines. These hazard trees would be cut and left in place on-site. A drop tank would be established at Utah Ridge Pond to draw water if needed to put out the fire. Prescribed fire ignition would most commonly be accomplished with drip torches that contain a mix of gasoline and diesel fuel, although in the future, some areas could be burned using heli-torch ignition. Finally, mop-up would involve hand and power tools to ensure prescribed fires are out and a source of ignition is not left behind to start an unwanted fire after activities are complete. ATVs would be used for access to areas within treatment units prior to and during prescribed fires. Temporary ATV access points and trails would be rendered inconspicuous by raking leaf litter over exposed ground, and/or piling debris at entry

points, so as to discourage prolonged, illegal ATV use post-project completion. Dependent on non-native invasive species (NNIS) potential, some of these areas would be seeded with native seed before covering to facilitate native plant competition with NNIS.

Prior to each prescribed fire, a prescribed burn plan would be developed that takes into consideration factors as weather conditions, humidity, fuel loadings, and fuel burn rates at a given moisture content. All the burn prescriptions must be met before a particular prescribed fire could be ignited. Burning pattern and behavior is based on moisture in the fuel. Burns are planned for a mosaic pattern based on moisture content. Mosaic burns will result along moist areas, such as north slopes and streams, that would not normally burn even during some of the driest spring weather. Thus, the natural mosaic burn patterns are unlikely to burn in vegetation areas that are not fire adapted. Flame lengths will be variable – from 1 to 7 ft. If a prescribed fire burns out of prescription or weather conditions change during the fire, FS personnel would implement a contingency plan, which would include total suppression. Class C Foam (non-phosphorous, biodegradable) would be applied to all fire lines and around oil and gas structures, as needed. Foam would not be employed within 100 feet of surface water resources.

The spring fire season for the Wayne NF is between February and May, and the fall fire season is between September and December. Prescribed fires in Buffalo Beats would primarily be conducted in February and March, while fires in the Baileys and Utah Ridge units would be conducted in March and April. These months are generally the driest and coldest months and, as such, present the most favorable weather conditions for prescribed fire. We propose to burn Upper Bailey and as many of the 2003 burn units as possible in the spring of 2007. The burning interval for all units in this decision is ca. every 3 to 6 years. This is a change from the 8-10 year interval used in the 2003 Athens Prescribed Burning decision, which does not allow reburn or treatment of a larger area with cumulative burns to meet desired ecological and hazardous fuel reduction objectives.

There are some oil and gas holdings in the Upper Bailey unit. Each well will be protected based on the topography and fuel conditions surrounding it. Each well will be topped off with brine to remove any gas fumes. Some wells or tank batteries will have a check line, some a wet line, some may need no special protections.

Standards and guidelines (S&G) presented in the 2006 Forest Plan are incorporated into the proposed action and proposed burn plan.

**Applicable S&G in the 2006 Forest Plan include:**

- (GFW-WLF-2) When using prescribed fire as a management tool, encourage mosaic pattern burning.
- (SFW-WSH-6) Ensure that seed mixes or cultivated plants used to restore disturbed areas on NFS land contain no species on the Forest's NNIS list...
- (GFW-WSH-7) When restoring disturbed areas, prevent NNIS plant invasion or spread...

- (GFW-WSH-8) When stabilizing disturbed areas, give priority to stabilizing areas that are discharging soil in to watercourses...
- (GFW-FIRE-6) Include smoke management and mitigation in all prescribed burning plans...
- (GFW-FIRE-8) Allow growth of existing on-site vegetation to revegetate soils disturbed by constructed firelines.
- (GFW-FIRE-11) Cut or remove as necessary standing dead trees that constitute a safety hazard...
- (GFW-FIRE-12) Implement adequate erosion control measures on all constructed fire lines...

**ALTERNATIVE B (No Action) – No prescribed fire**

The Wayne NF would not pursue the prescribed burning project, and succession of the forest and hazardous fuel buildup would both proceed at natural rates.

Field visits to the Upper Bailey and Buffalo Beats areas occurred throughout the summer of 2006. The Middle Bailey/Utah Ridge and Big Bailey sites were visited during the initial NEPA process in 2002.

**SITE DESCRIPTION**

The project area consists of 5 burn units, including Buffalo Beats RNA, Upper Bailey, Big Bailey, Middle Bailey, and Utah Ridge. The proposed project areas, located in Dover Township in northwestern Athens County, are shown in Figure 1. There are small parcels of private land included in the Upper Bailey unit that will be burned along with the NFS land with the landowners' consent. All areas primarily consist of oak-hickory forests. Some maintained wildlife openings exist throughout the areas. One recreation area in the Upper Bailey unit is Utah Ridge Pond, which is surrounded on 2 sides by mature white pine. Other small ponds are scattered throughout the units. Several perennial streams are located in the project area, including Big, Middle, and West Bailey Runs. Some of these are impacted by acid mine drainage resulting from past underground mining activities in the area, while others are relatively healthy and host a variety of wildlife species, including beaver, whose activities have created wetland habitat in many of the bottomlands around the perennial streams. Big Bailey Wetland is located just southeast of the Big Bailey burn units. Oil and gas wells are scattered throughout the project areas.

The proposed prescribed fire treatment areas consist of two predominant vegetation communities: prairie and mixed-oak/oak-hickory forest. Buffalo Beats RNA consists of 2 distinct sections, a northern and southern clay lens that historically contained vegetation other than forest over much of their history. Fire-adapted prairie forbs and grasses, dominated by big bluestem (*Andropogon gerardii*), proliferate here, especially after management activities in the 1980s and 90s opened up the surrounding canopy somewhat. Buffalo Beats is one of two know locations of the Regional Forester Sensitive Species yellow gentian (*Gentiana alba*) and the only population of the RFSS juniper sedge (*Carex juniperorum*) on the Athens Ranger District. Rattlesnake master (*Eryngium*

*yuccifolium*), a state threatened species, is known in Buffalo Beats. More detailed vegetation information can be found in the establishment report for the RNA.

The mixed-oak forest stands in the Baileys/ Utah Ridge area consist of canopy trees, including white oak (*Quercus alba*), scarlet oak (*Q. coccinea*), chestnut oak (*Q. prinus*), Northern red oak (*Q. rubra*), black oak (*Q. velutina*), pignut hickory (*Carya glabra*), and shagbark hickory (*C. ovata*). Many of the forest stands have high densities of red maple (*Acer rubrum*), sugar maple (*A. saccharum*), and yellow poplar (*Liriodendron tulipifera*). Woody vegetation of the understory includes blueberries (*Vaccinium* spp.), hop hornbeam (*Ostrya virginiana*), musclewood (*Carpinus caroliniana*), sassafras (*Sassafras albidum*), dogwood (*Cornus florida*), vibrunums (*Viburnum dentata*, *V. prunifolium*, *V. acerifolium*), spicebush (*Lindera benzoin*), greenbriars (*Smilax* spp.) and blackberry (*Rubus* spp.). Herbaceous vegetation in the understory includes spotted wintergreen (*Chimaphila maculata*), Solomon’s seal species (*Polygonatum* spp.), smooth false foxglove (*Aureolaria flava*), Canada lily (*Lilium canadense*), sedges (*Carex* spp.), and whorled loosestrife (*Lysimachia quadrifolia*). In more open areas (e.g. roadsides and forest edges), there are small isolated populations of prairie species such as big bluestem, little bluestem (*Schizymachium scoparium*) and rattlesnake master.

Invasive species in the mixed-oak forest communities include: Amur honeysuckle (*Lonicera maackii*), Tatarian honeysuckle (*L. tatarica*), Morrow honeysuckle (*L. morrowi*), multiflora rose (*Rosa multiflora*), Japanese honeysuckle (*L. japonica*), Japanese stiltgrass (*Microstegium vimineum*), autumn olive (*Eleagnus umbellata*), crown vetch (*Coronilla varia*), Chinese lespedeza (*Lespedeza cuneata*), Japanese barberry (*Berberis thunbergii*), tree-of-heaven (*Ailanthus altissima*), Oriental bittersweet (*Celastrus orbiculatus*) and garlic mustard (*Alliaria petiolata*). Japanese stiltgrass is the species with the heaviest infestation in the area and is common along many of the interior trails, previous firelines and old roads proposed for future fireline construction.

**SPECIES KNOWN TO OCCUR OR THEIR HABITAT**

**Federally Threatened or Endangered Species**

According to the US Fish and Wildlife Service (2005), The Wayne National Forest comprises part of the potential range of four Federally Threatened or Endangered species (Table 1). Those species with no suitable habitat in the project area are assumed to be unaffected by the proposed action, and therefore, will not be carried forward in the analysis.

<b>Table 1. Federally Endangered and Threatened Species for the Wayne National Forest.</b>				
<b>Species</b>	<b>Status</b>	<b>Required Habitat</b>	<b>Suitable Habitat Present?</b>	<b>Determination</b>
Northern wild ( <i>Aconitum noveboracense</i> )	Threatened	Moist cliffs w/ cold air drainage	NO	No effect
Small whorled pogonia ( <i>Isotria medeoloides</i> )	Threatened	Open second growth hardwoods	YES	Not likely to adversely affect

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Virginia spiraea ( <i>Spiraea virginiana</i> )	Threatened	Damp, rocky banks; streambeds	NO	No effect
Running buffalo clover ( <i>Trifolium stoloniferum</i> )	Endangered	Moist, semi-shaded, disturbed woods	YES	Not likely to adversely affect

**Small whorled pogonia (*Isotria medeoloides*)**

***Biology, Habitat and Distribution***

Small whorled pogonia is an herbaceous perennial from the orchid family (Orchidaceae) that flowers from mid-May to mid-June. It is believed to be self-pollinating, although vegetative reproduction occurs occasionally. This shallow-rooted species grows on gently sloping (0-30 percent) highly acidic and nutrient poor soils, with thick leaf litter and decaying material, and a sparse understory (USFWS 1992a). Habitats include dry, rocky, wooded slopes to moist slopes in mid-successional forests. Semi-permanent breaks in the forest canopy created by streams, and old logging roads encourage pogonia growth. Evidence of human disturbance (old homesteads, selective cutting) is often present at known population sites. This species cannot tolerate full sun or competition with invasive plants.

Small, isolated populations occur irregularly from Maine, south to Georgia and west to southern Ontario, Michigan, Missouri and Illinois (McCormac 1992). This rare orchid is known from three locations in Ohio, one in Shawnee State Forest in Scioto County, and two in Hocking County. Plants associated with these local populations include: witch hazel (*Hamamelis virginiana*), striped maple (*Acer pensylvanica*), serviceberry (*Amelanchier arborea*), partridgeberry (*Mitchella repens*), Indian cucumber root (*Medeola virginiana*), large whorled pogonia (*Isotria verticillata*), rattlesnake plantain (*Goodyera pubescens*), and New York fern (*Thelypteris noveboracensis*).

***Survey Efforts***

Surveys for this orchid were completed on Wayne NF land on the Ironton or Athens Ranger Districts in June/July of 1997, May 2003, spring and early summer of 2004, 2005 and 2006. Survey efforts were focused primarily in areas of potential habitat. Surveys also occur on an individual case basis for proposed projects in areas with suitable habitat. To date, no individual has been found on Wayne NF land.

***Threats and Limiting Factors***

The two primary threats to the small whorled pogonia are habitat destruction and over collection (USFWS 1992a). Other potential hazards include canopy closure through succession and full sun exposure from logging (McCormack 1992).

***Direct and Indirect Effects***

No individuals of small whorled pogonia were found and burns would occur primarily during the species dormant season, so no direct impacts are expected to occur from implementation of this project. The closest known population of small whorled pogonia is 22 miles west of the project area. Indirect effects to potential habitat could occur through the change in understory plant composition, especially if disturbance from the fire and fireline construction allow the introduction of new non-native invasive species (NNIS) or the spread of current NNIS, such as Japanese stiltgrass, along the firelines. Three past wildfires (Binion, Red Bud and County Line) on the Ironton District have resulted in spreading of Japanese stiltgrass along firelines by large equipment (dozers) used for construction (C. Kirschbaum, per. comm.). Likewise, research at Ohio University has shown that prescribed burning significantly increases the germination and seedling survival of Japanese stiltgrass through the removal of litter (Glasgow and Matlack, 2005). Use of dozers and large equipment to create firelines will spread Japanese stiltgrass to infest areas where it currently does not exist in the project area.

### *Cumulative Effects*

The WNF proclamation boundary encompasses 853,531 acres in 12 southeastern Ohio counties. There are 238,053 acres of NFS lands within the WNF proclamation boundary; the remaining lands are private or state-owned lands. The cumulative effects to small whorled pogonia are based on the boundaries of the Athens Unit. There are approximately 268,828 acres of land within the proclamation boundary of the Athens Unit. Currently, the Athens Unit comprises about 71,044 acres (26.5 %) of NFS land within the proclamation boundary. The State of Ohio governs about 4,005 acres and the remainder of the land, 193,779 acres (72 %), is in private or other public ownership.

The Monday Creek Watershed, one of the main watersheds in the Athens Unit draining roughly 10 percent of the Hocking River system, continues to suffer from residual impacts, especially those caused by past mining activities, such as acid mine drainage, which affects water quality throughout. Presently, watershed restoration projects aimed at improving water quality in the Monday Creek Watershed on the Wayne NF and adjacent lands have occurred or are scheduled to occur on the Athens Unit. Those projects include actions, such as contouring and capping coal waste sites (i.e., gob piles), steel slag water treatments, dosers, and other acid mine drainage remediation activities. Past watershed restoration projects in the Monday Creek Watershed since 2001 implemented under the 1988 Forest Plan include 13 projects affecting ca. 81 acres. Planned projects by the Wayne NF in Monday Creek Watershed for 2006 through 2008 include 16 areas and ca. 97 acres. The Army Corps of Engineers has also proposed ca. 178 treatments on ca. 235 acres in and around NFS lands in the next 4 to 5 years. Some of these combined actions may have an effect on pogonia habitat. Few of these projects, if any, are permanently converting forested habitat to non-forested habitat, which would have a greater effect on the orchid. Thus, only short-term alteration of habitat is likely to occur.

The Biological Assessment (Appendix F1) for the 2006 Forest Plan details anticipated effects of other activities that are or will be implemented in the foreseeable future under the 2006 Forest Plan. Activities that may result in a permanent loss of pogonia habitat

include permanent road and trail construction, recreation facilities and parking lot construction, surface mining, and oil/gas well development. These activities are expected to affect up to 2,088 acres (0.87%) of Forest-wide NFS land over the next decade. Activities that may result in alteration of habitat include timber harvests, crop tree release, prescribed fire, temporary roads/ trails/ and log landings, mechanical fuels reduction, development of permanent openings, utility corridor development, closure of mine features, and AMD treatments. These activities are expected to affect up to 101,992 acres (42.8%) of Forest-wide NFS land over the next decade; however, many of these activities could improve habitat over the short- and long-term.

The Gore-Greendale Diverse Forest project is planned for the Athens Unit (ca. 11 miles from the proposed burn area). The project is in the planning stages now for implementation over the next 1 to 6 years and includes timber management, prescribed fire, and non-native invasive species control on ca. 4,800 acres of NFS land. Little, if any, forested habitat will be permanently altered and disturbances will likely be short-term. An addition to the Monday Creek off-road vehicle trail (ca. 2 mi south of the project area in and around the Monkey Hollow subwatershed) was recently completed, in which 2 miles of new trail were created and another 4 miles of lease roads were reconstructed for trail use. Such conversions of habitat are relatively limited and linear, creating permanent breaks in the overstory canopy that could benefit future habitat. Special use permits are considered on an on-going basis but with no regularity and in unforeseeable locations across the Athens Unit.

Development outside the scope of the 2006 Forest Plan affecting the Wayne NF may contribute to the loss of potential habitat in the future. Ohio Department of Transportation (ODOT) has proposed a route for a new Nelsonville Bypass. It has been estimated this route will permanently convert up to 768 acres of forested public and private land to highway, interchanges, and associated rights-of-way (USFS 2005). Potential habitat for the orchid will be converted by this project. Tree clearing operations have already begun.

Development on non-NFS land in the Monday Creek Watershed in the future may potentially include timber harvest projects, oil and gas extraction, residential development, business development around the Nelsonville bypass interchanges, and other similar actions. These activities may permanently convert suitable habitat to other uses.

#### ALTERNATIVE B (NO ACTION)

Over the past 100 years, fire suppression efforts within the area have resulted in an accumulation of hazardous fuels. Fire suppression has also resulted in a decline in the health and viability of fire-adapted plant species that rely on periodic wildfire to promote and sustain the vegetation communities in which they reside. The oak-hickory and prairie vegetation communities within the proposed project areas have been affected in the absence of fire.

Under the no-action alternative, the existing oak-hickory communities within the Baileys and Utah Ridge project areas would be overtaken by red maple, sugar maple, beech, and other late-successional, mixed-mesophytic, and shade-tolerant species over the long-term, and the number of fire-adapted species (e.g. yellow gentian, big and little bluestem) would decline. Research has implicated the absence of fire in the widespread encroachment and abundance of shade-tolerant and fire-sensitive species in the understory of oak forests in the eastern United States (Hutchinson and Sutherford, 2000; Van Lear et al., 2000). Without fire, these species would eventually become established in the understory, and change the composition of the forest vegetation layers over the long-term. While some species may remain unaffected by this long-term change, other species would be adversely affected, experiencing a loss of habitat or a decrease in habitat quality. Potential habitat for the pogonia may be reduced or eliminated over the long-term, due to an increase in the density of the overstory.

Lack of prescribed fire would increase the potential for and severity of future wildfires within the project areas due to the accumulation of hazardous fuels. Such wildfires would result in major changes in canopy cover in the project areas through loss of forested habitat, providing a more open canopy, resulting in increased solar radiation to suitable habitat. Most wildfires occur during the dormant season for the orchid, so not direct impacts to any plants would occur, however suppression activities for wildfires on the Ironton District have resulted in the introduction and spread of NNIS, such as Japanese stiltgrass that degrade potential habitat.

#### ALTERNATIVE A (PROPOSED ACTION)

The proposed prescribed burn area is ca. 2,052 acres, ca. 1.2% of the total land in the analysis area, or 4.6% of NFS land, will be affected by prescribed fire over the next 10 years, and this amount of area will be spread out in time. Prescribed fire and wildfire may improve orchid habitat by maintaining oak-hickory forests and maintaining open forest mid- and understories. Prescribed fire also reduces the size and intensity of wildfires and thus the disturbance to the area. The proposed project would not result in any short-term overstory canopy changes within the forested project areas; the number of forested acres would remain the same. However, forest species composition may change as a result of the proposed project. Pogonias may respond to this depending on results, increased generation of understory growth would increase competition, however removal of woody understory growth would increase light and potentially increase habitat potential. Negative impacts to potential habitat would be the spread of NNIS by fire's removal of leaf litter and mechanical fireline construction.

Other prescribed fire projects being planned on the Athens Unit of the Wayne NF over the next several years include:

- Gore-Greendale Diverse Forest Project (3-5 year burn interval) = 660 acres
- Kern/ Peabody Tract (3-8 year burn interval) = 575 acres;

Cumulative effects to the potential small whorled pogonia habitat through the implementation of the Bailey Prescribed Burns are expected to be nominal and insignificant in relation to the activities that are currently occurring and expected to occur

within the analysis area over the next 10 years, if efforts are made to control NNIS spread during project implementation. If no NNIS control/prevention measures are taken, the potential habitat along the firelines is likely to be degraded in the short-term. Over the long-term NNIS such as stiltgrass would likely continue to spread into the forest interior from the fire control lines.

### ***Determination***

**Alternative 1:** The implementation of this project is **not likely to adversely affect** small whorled pogonia because:

- The species was not found in the area during 2002 and 2006 surveys
- Avoidance and minimization measures (see below) to control NNIS spread, particularly Japanese stiltgrass, would protect potential habitat for the species.

**Alternative 2:** The no action alternative is **not likely to adversely affect** small whorled pogonia since:

- No evidence of the species was found during 2002 or 2006 surveys
- No fireline construction would occur to speed the spread NNIS and degrade potential habitat
- Current populations of Japanese stiltgrass would continue to spread at natural rate, with not avoidance and minimization measures these areas may or may not be treated for NNIS on the district, depending on their overall priority.

### ***Avoidance and Minimization Measures***

- Clean all equipment to be used prior to entry of the project to prevent introduction of new NNIS.
- Use handline whenever possible to reduce NNIS spread, especially in known locations of NNIS such as Japanese stiltgrass.
- Rake berms created by mechanical fireline construction back across the fireline to reintroduce native plant seed.
- Plant native seed along mechanical constructed lines to compete with NNIS.
- Monitor and treat Japanese stiltgrass infestations for the first three years after project implementation. If burning is to occur in the fall, treat stiltgrass BEFORE project implementation.
- If any evidence of the small whorled pogonia is seen prior or during project implementation all activities will be halted until a Forest Botanist can look at the area and determine mitigations needed to protect the species.

### **Running Buffalo Clover (*Trifolium stoloniferum*)**

#### ***Biology, Habitat and Distribution***

Running buffalo clover is a stoloniferous perennial herb in the Pea family (Fabaceae) that reproduces both vegetatively and by seed. It flowers from April to June. Running buffalo clover can be found in a wide range of mesic, semi-shaded habitats, that experience periodic, moderate disturbance for prolonged periods (e.g. mowing, trampling or grazing). However, it cannot tolerate full-sun, dense shade or severe disturbance

(Cusick 1989). Historically, the species was associated with large herbivores, such as bison, which created habitat along travel corridors and served as seed dispersal mechanisms (USFWS 1989).

Historically, running buffalo clover was found from West Virginia to Kansas, however current extant populations only occur in Indiana, Kentucky, Ohio, Missouri and West Virginia. Most known populations are found near soils derived from limestone parent material: Kentucky populations occur on Ordovician limestones and calcareous shales (Campbell et al. 1988), West Virginia populations at the Fernow Experimental Forest grow on soils derived from limestone parent materials (Madarish and Schuler 2002), and Ohio populations are found around limestone-underlain regions of the southwest part of the state and Lawrence county.

Associated species with Ohio running buffalo clover populations include: black walnut (*Juglans nigra*), American elm (*Ulmus americana*), tree-of-heaven (*Ailanthus altissima*), hackberry (*Celtis occidentalis*), basswood (*Tilia americana*), garlic mustard (*Alliaria petiolata*), Virginia wild rye (*Elymus virginicus*), gill-over-the-ground (*Glechoma hederacea*), yellow wood sorrel (*Oxalis stricta*) and white clover (*Trifolium repens*). In West Virginia, associated species include hog peanut (*Amphicarpaea bracteata*), white snakeroot (*Eupatorium rugosum*), and panic-grasses (*Panicum* spp) (Madarish and Schuler 2002).

### ***Survey Efforts***

Surveys for running buffalo clover were completed on Wayne NF land on the Ironton or Athens Ranger Districts in May 1996, May 2003, spring and early summer of 2004, 2005 and 2006. Survey efforts were focused primarily along streams, trails, old roads and other areas of potential habitat. Surveys also occur on an individual case basis for proposed projects in areas with suitable habitat. To date, only one population of running buffalo clover is known to exist on Forest Service lands (Lawrence County, Ironton Ranger District).

### ***Threats and Limiting Factors***

Threats to Running buffalo clover include habitat destruction (for road construction, ATV use, etc.), reduced light from canopy closure, competition with non-native invasive plant species, over-grazing, and decline of large herbivores that facilitate seed dispersal and habitat disturbance (USFS 2001).

### ***Direct and Indirect Effects***

No individuals of running buffalo clover were found however potential habitat does exist within the proposed project area. Soils in the area are primarily from sandstone, siltstone, shale and limestone (SCS 1985). Burns would occur primarily during the species dormant season. The closest known population of the clover is over 50 miles south of the project area. Indirect effects to potential habitat could occur through the change in understory plant composition, especially if disturbance from the fire and fireline construction allow the introduction of new non-native invasive species (NNIS) or the spread of existing NNIS, such as Japanese stiltgrass, along the firelines which could

degrade habitat and compete for resources with native species trying to establish in the area. Three past wildfires (Binion, Red Bud and County Line) on the Ironton District have resulted in spreading of Japanese stiltgrass along firelines by large equipment (dozers) used for fireline construction (C. Kirschbaum, per. comm.). Likewise, research at Ohio University has shown that prescribed burning significantly increases the germination and seedling survival of Japanese stiltgrass through the removal of litter (Glasgow and Matlack, 2005). Use of dozers and large equipment to create firelines will spread Japanese stiltgrass to infest areas where it currently does not exist.

### *Cumulative Effects*

Cumulative Effects are similar to those listed for small whorled pogonia.

### *Determination*

**Alternative 1:** The implementation of this project is **not likely to adversely affect** running buffalo clover because:

- No plants of the species were found in the area during 2006 spring/summer surveys or previous 2002 surveys

**Alternative 2:** The no action alternative is **not likely to adversely affect** running buffalo clover since:

- No evidence of the species was found during 2002 or 2006 surveys
- No fireline construction would occur to spread NNIS

### *Avoidance and Minimization Measures*

- Use the same measures as those for the small whorled pogonia for prevention, treatment and monitoring of NNIS in the project area, especially along constructed firelines.
- If any evidence of the running buffalo clover is seen prior or during project implementation all activities will be halted until a Forest Botanist can look at the area and determine mitigations needed to protect the species.

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## Regional Forester Sensitive Species (RFSS)

There are twenty-two RFSS (Table 2) (USFS 2006b). Suitable habitat may exist in the project area for 13 RFSS. None of the remaining RFS species were considered in this impact assessment, because, either there is no suitable habitat for the species in the project area, or the species has a well-known distribution that does not include the project area.

<b>Table 2:</b> Regional Forester Sensitive Species list for the Wayne National forest.			
<b>Species</b>	<b>Required Habitat</b>	<b>Suitable Habitat Present?</b>	<b>Determination</b>
<b>Mature Woodland Species</b>			
Sparse-lobed grape fern <i>Botrychium biternatum</i>	moist, low woods, ravines, thickets and edges	Yes	May impact individuals but no likely to cause a trend toward federal listing
Lined sedge <i>Carex striatula</i>	variety of light levels in dry to mesic woods	Yes	May impact individuals but no likely to cause a trend toward federal listing
Umbrella magnolia <i>Magnolia tripetala</i>	rich woods; mesic ravines and coves	Yes	May impact individuals but no likely to cause a trend toward federal listing
Rock skullcap <i>Scutellaria saxatilis</i>	Moist banks/woods; dry slopes & openings	Yes	May impact individuals but no likely to cause a trend toward federal listing
<b>Semi-Open Woodland Species</b>			
Striped gentian <i>Gentiana villosa</i>	open woods and pinelands; shady places	No, not known in surrounding Cty	No impact
Dwarf iris <i>Iris verna</i>	open oak woods, dry open ridgetops	No, not known in surrounding Cty	No impact
Butternut <i>Juglans cinerea</i>	moist woods and fields; riverbanks	Yes	May impact individuals but no likely to cause a trend toward federal listing
Blue scorpion-weed <i>Phacelia ranunculacea</i>	dry or moist woods; sandy fields, streambanks	No, not known in surrounding Cty	No impact
Pinxter flower <i>Rhododendron nudiflorum</i>	moist or dry woods, bogs & shrubby borders	No, not known in surrounding Cty	No impact
<b>Open Woodland, Fire Adapted Species</b>			
Juniper sedge <i>Carex juniperorum</i>	filtered light; second growth forest	Yes, known to occur in project area	Beneficial impacts
Yellow gentian <i>Gentiana alba</i>	moist meadows/prairies; open woods; edges	Yes, known to occur in project area	Beneficial impacts
Carolina thistle <i>Cirsium carolinianum</i>	open/semi-open woods, bluffs, ravines, thickets	Yes	Beneficial impacts
Butterfly pea <i>Clitoria mariana</i>	open/semi-open woods, barrens, prairie borders	Yes	Beneficial impacts
Yellow-fringed orchid <i>Platanthera ciliaris</i>	wet, sandy bogs & meadows, fields & woods	Yes	Beneficial impacts
Tuberclad nut-rush <i>Scleria oligantha</i>	oak barrens; dolomite/limestone based soils	No, not known in surrounding Cty	No impact
Tall nut-rush <i>Scleria triglomerata</i>	open oak woods and oak barrens	No, not known in surrounding Cty	No impact
<b>Open Habitat Species</b>			
Pale straw sedge <i>Carex albolutescens</i>	mesic fields, borders, ditches, prairies, fens, bogs	No, not known in surrounding Cty	No impact
Smooth beardtongue <i>Penstemon laevigatus</i>	Fields, open woods, roadsides	No, not known in surrounding Cty	No impact
Yellow crownbeard <i>Verbesina occidentalis</i>	open woods, borders, thickets, fields, roadsides	No, not known in surrounding Cty	No impact
Featherbells <i>Stenanthium gramineum</i>	open, moist woods; fields, meadows, powerlines	Yes	May impact individuals but no likely to cause a trend toward federal listing

<b>Riparian species</b>			
L.Marsh St John's wort <i>Triadenum tubulosum</i>	riparian floodplains, banks, seeps, wetlands	<b>Yes</b>	<b>May impact individuals but no likely to cause a trend toward federal listing</b>
Pigeon grape <i>Vitis cinerea</i>	moist, alluvial soils; low thickets, streambanks	<b>Yes</b>	<b>May impact individuals but no likely to cause a trend toward federal listing</b>

## **Mature woodland species**

### **Sparse-lobed grape fern (*Botrychium biternatum*)**

Sparse-lobed grape fern is a perennial, evergreen fern in the Ophioglossaceae family that emerges in late spring, producing spores in July and August. It occurs in a variety of moist, shaded situations including low woods, mesic ravines, wooded floodplains and thickets (Cusick 1982); it seems to prefer semi-shaded edge habitat. This fern occurs in Connecticut and from Pennsylvania south to Florida and west to Illinois, Missouri, Oklahoma and Texas. Populations within the Wayne National Forest proclamation boundaries include four occurrences in Lawrence County, outside the proclamation boundary it occurs in Monroe, Hocking, Scioto and Adams Counties. Threats to this species include soil compaction and drying of habitat from removal of vegetation (Cusick 1982), introduction of non-native species, logging and overgrazing by wildlife (McCartney and Goodwin 2003).

### **Lined sedge (*Carex striatula*)**

Lined sedge is a tufted perennial in the sedge family (Cyperaceae) that flowers in early spring and sets fruit by May or June. It typically occurs in dry to mesic woods with a mature forest canopy; however, populations may increase quickly under temporary canopy openings that allow some sunlight to reach the forest floor. It will not tolerate full sun, or very dense shade (NatureServe 2004). This sedge's range spans from Texas and Oklahoma north to New York and east to the Atlantic Ocean (Nature Serve 2004). In southern Ohio, it is known to occur in Lawrence and Scioto Counties (McCartney and Swiezynski 2003). Threats to the species are unknown but may include clearing of woods and the introduction of non-native invasive species. Selective cutting and maintenance of openings in the canopy could be beneficial to lined sedge populations (McCartney and Swiezynski 2003; Cusick 1981; NatureServe 2004).

### **Rock skullcap (*Scutellaria saxatilis*)**

Rock skullcap is an herbaceous perennial in the mint family (Lamiaceae) that flowers from June to September. It occurs in semi-shaded woods, slopes, cliffs, and along streams. Most Ohio collections are from dry woods, with occasional ones from moist areas near streams. This species occupies a range from New Jersey west to Indiana, south to Alabama and Arkansas, east to Georgia, the Carolinas and Virginia. Populations within the Wayne National Forest proclamation boundaries include Lawrence, Gallia and Monroe Counties. Other occurrences outside proclamation boundaries include Adams, Jefferson, Meigs, Scioto, Vinton and Washington Counties. Potential threats to the species are believed to include exposure to sunlight after overstory canopy loss, burning

and competition from non-native invasive plant species (Spooner 1983a; McCartney and Goodwin 2003; NatureServe 2004).

### ***Umbrella magnolia (*Magnolia tripetala*)***

Umbrella magnolia is a small tree (up to 15 m) in the magnolia family (Magnoliaceae) that flowers in late May. Typical habitat for this species is mesic shaded ravines and coves in the Appalachian Highlands. It occupies a wide, somewhat disjunct range with two main population centers: the Appalachians and the Ozarks. Populations exist from Massachusetts and New York, west to Indiana, south to Mississippi and Florida, as well as in Oklahoma, Missouri and Arkansas. In Ohio, umbrella magnolia occurs in four counties along the more rugged western border of the Unglaciated Allegheny Plateau (Hocking, Vinton, Jackson, and Scioto Counties), conforming to preglacial Teays River drainage lines and its major tributaries (Spooner and Schneider 1994; NatureServe 2004; Braun 1961). Threats to the species include opening the canopy through logging and the introduction of non-native invasive species (McCartney and Swiezynski 2003)

### ***Direct, Indirect and Cumulative Effects***

None of these species are known to occur in the project area, but there is potential habitat that exists. No direct impacts are expected since no individuals are known, however indirect impacts could impact potential habitat through the removal of overstory or midstory canopy cover and a reduction of litter cover on the ground. The potential spread of non-native invasive species that could degrade potential habitat or directly compete for resources with native species could have negative impacts on native plant establishment. Cumulative impacts are similar to those described for small whorled pogonia

### ***Determination***

**Alternative 1:** The no action alternative would have **no impact** on these species since:

- No individuals are known to occur within the area.
- While NNIS would not necessarily be treated in the area and would likely continue to spread at their natural rate; firelines would not be constructed that would have the potential to increase their spread.

**Alternative 2:** The implementation of this project **may impact habitat but is not likely to cause a trend toward federal listing** since:

- No individuals are known to occur within the area
- While fireline construction will spread NNIS and degrade potential habitat, adherence to the avoidance and minimization measures should be effective in retaining or reducing current NNIS populations.

### ***Avoidance and Minimization Measures***

- Use the same measures as those for the small whorled pogonia for prevention, treatment and monitoring of NNIS in the project area, especially along constructed firelines.
- If any evidence of these species are seen prior or during project implementation all activities will be halted until a Forest Botanist can look at the area and determine mitigations needed to protect the species.

## Semi-open woodland species

### Butternut (*Juglans cinerea*)

Butternut is a deciduous forest tree in the walnut family (Juglandaceae) that reaches approximately 30 meters in height, flowers in May, and fruits in October. Typical habitat for butternut is mesic ravine slopes of mixed hardwood stands, creek bottoms, and riverbanks. It occurs throughout the central and eastern United States and southeastern Canada: New Brunswick, Quebec, and southern Ontario, west to Michigan, Minnesota, and North Dakota, south to Iowa, Missouri, Tennessee, the Carolinas, Georgia, Mississippi, and Arkansas (NatureServe 2004). Butternut has been found in all Counties within the Wayne NF proclamation boundary, and there are approximately 25-30 records for this species on Wayne NF land.

The major threat to butternut throughout its entire range is its susceptibility to the canker-causing fungus *Sirococcus clavigignenti-juglandacearum*. This fungus disrupts nutrient flow through cambium areas, which generally kills the tree. Other threats include harvest of the remaining healthy trees for cabinet-making and other woodworking, as well as, overcrowding and over-shading (NatureServe 2004).

### *Direct, Indirect and Cumulative Effects*

No individuals were found or are known to occur in the proposed project area, however, the species is known to occur in the Athens and Hocking Counties. Since no individuals are known in the area, no direct impacts are expected. Indirect impacts of fire could include alterations in potential habitat through removal of litter, changing in light regimes and spreading on NNIS along firelines and surrounding forest.

### *Determination*

**Alternative 1:** The No Action alternative would have **no impact** on butternut since:

- No individuals are known to occur within the area.
- While NNIS would not necessarily be treated in the area and would likely continue to spread at their natural rate; firelines would not be constructed that would have the potential to increase their spread.

**Alternative 2:** The Proposed Action alternative **may impact habitat or individuals, but is not likely to cause a trend toward federal listing**, because:

- No individuals are known to occur within the area
- While fireline construction will spread NNIS and degrade potential habitat, adherence to the avoidance and minimization measures should be effective in retaining or reducing current NNIS populations.

### *Avoidance and Minimization Measures*

- The same mitigations as those for the small whorled pogonia, to prevent, treat and monitor NNIS within the project area.
- Do not cut any butternut trees during project implementation until consulting with a botanist or ecologist.

## Open Woodland, Fire Adapted Species

**Juniper sedge (*Carex juniperorum*)**

Juniper sedge is a recently described perennial (Catling et al. 1993) known to occur in Ohio, Kentucky, Virginia and Ontario (NatureServe 2004). It flowers and fruits from April to June (Catling et al. 1993) and is sometimes associated with eastern red cedar (*Juniperus virginiana*) (NatureServe 2004). This sedge grows on shallow, clayey soils derived from limestone and dolomite bedrock in open woodlands. Ohio populations have responded favorably to prescribed burning, and seem to thrive in open, sunny habitats. Two known populations occur within Wayne NF, one in an oak-hickory forest surrounding a prairie opening in Athens County, and one in a closed canopy oak woodland on a ridge top in Lawrence County. Both areas are managed with prescribed fire. Threats to local viability include fire suppression, soil compaction and shading from woody overgrowth (Cusick 1993).

**Yellow gentian (*Gentiana alba*)**

Yellow gentian is a perennial that flowers from August through October. Habitat for this species includes mesic prairies, savannas, grassy meadows and damp woods (Andreas 1981). It ranges from Ontario and Minnesota east to New Jersey, south to North Carolina and west to Nebraska and Arkansas. Two known populations are known on Wayne NF in Athens County. These occur along a roadside, and within a woodland prairie remnant community. Both areas contain prairie associate species such as, big and little bluestem (*Andropogon gerardii* and *Schizachyrium scoparium*), blazing star (*Liatris aspera*) and rattlesnake master (*Eryngium yuccifolium*). The prairie remnant population has responded favorably to prescribed fires. Threats to this species may include shading by woody overgrowth and fire suppression (Andreas 1981, NatureServe 2004, Dolan 2003).

**Carolina thistle (*Cirsium carolinianum*)**

Carolina thistle is a biennial herb in the sunflower family (Asteraceae) that flowers in May and June. It occurs in dry, open to semi-open areas often in acidic, sandy soils in upland woods, bluffs, ravines and thickets. Its range spans from Texas and Oklahoma east to Georgia and north to Ohio, Indiana and Illinois (NatureServe 2004). Occurrence on Forest Service lands occur in Lawrence and Athens Counties, with known populations outside the Forest proclamation boundary existing in Scioto, Adams and Vinton Counties (McCartney and Swiezynski 2003). All of the populations on the Wayne occur within fire managed areas. Threats to the species include over-shading by woody species and the introduction of non-native species (McCartney and Swiezynski 2003; Burns and Cusick 1983).

**Butterfly pea (*Clitoria mariana*)**

Butterfly pea is a perennial herb in the pea family (Fabaceae) that flowers from June through August. It inhabits a variety of habitats in open to semi-open areas with dry to moist soils, including upland woods, roadsides, prairie borders and barrens (Burns 1982a). It range occurs from New York south to Florida and west to Iowa, Kansas and Arizona (NatureServe 2004). Known occurrences on Wayne National Forest occur in Lawrence County. Threats to the species include over-shading by woody species, fire suppression and the introduction of non-native invasive species (McCartney and Goodwin 2003).

### **Yellow-fringed orchid (*Platanthera ciliaris*)**

Yellow-fringed orchid is an herbaceous perennial in the orchid family (Orchidaceae) that flowers from July to August. It grows in a variety of sunny, wet habitats in acidic, sandy soils of pastures, depressions, seepage areas, roadsides and open woods (Cusick and Burns 1983). It occurs from Florida to Texas, north to New Hampshire, and west to Michigan, Illinois, Missouri and Oklahoma (NatureServe 2004). Southern Ohio populations in mixed pine-hardwood forests have responded favorably to prescribed burns that increased sunlight penetration to the forest floors. Threats to the species include over-shading by woody species, alterations of water supply, soil compaction and over collection (Cusick and Burns 1983, NatureServe 2004).

### ***Direct, Indirect and Cumulative Effects***

Both the juniper sedge and the yellow gentian occur within the proposed project area. Past burning of their populations seems to have improved the populations (M. Ortt, pers. comm.). Likewise the other species are considered fire adapted and would benefit from burns that slow or prohibit woody succession of potential habitat. Since burning will occur during the plants dormant seasons, no direct mortality of reproducing individuals is expected. Potential indirect impacts to these species would be the introduction or spread of NNIS by fireline construction and other fire activities that could degrade potential habitat of directly compete with existing RFSS.

### ***Determination***

**Alternative 1:** The No Action alternative **may impact individuals, but is unlikely to cause a trend toward federal listing** because:

- Without the tool of fire to prevent woody succession, the areas with these RFSS and potential surrounding habitat would lose their open habitat. Over time this could cause the disappearance of these species in the area, however, other populations of the sedge and gentian are known on the Forest.

**Alternative 2:** The Proposed Action alternative would have **beneficial impacts** on these RFSS because:

- Fire will prevent the remnant prairie and other open areas from experiencing woody succession and maintain the habitat needed for these species to survive and perpetuate.
- Adherence to the avoidance and minimization measures will prevent known populations and future populations from the threats of NNIS like Japanese stiltgrass.

### ***Avoidance and Minimization Measures***

- The same mitigations as those for the small whorled pogonia, to prevent, treat and monitor NNIS within the project area.

## **Open Habitat Species**

### **Featherbells (*Stenanthium gramineum*)**

Featherbells is a perennial herb in the lily family (Liliaceae) that flowers from June through September. It tends to occur in moist rocky woods and rich wooded slopes. It is frequent on acidic soils and typically in moist microhabitats and in open disturbed areas, such as powerline rights-of-way (McCartney and Swiezynski 2003; Schneider 1993). This species ranges from Texas, east to Florida and north to Pennsylvania, Ohio and Michigan (NatureServe 2004). Populations are known from Lawrence, Scioto, Gallia, Jackson, Adams, Pike and Athens Counties. Threats to the species include overgrowth by woody species, the introduction of non-native invasive species and deer browsing (Schneider 1993; McCartney and Swiezynski 2003).

### ***Direct, Indirect and Cumulative Effects***

No individuals were found or are known to occur in the proposed project area, however, the species is known to occur in Athens County. Since no individuals are known in the area, no direct impacts are expected. Indirect impacts of fire could include alterations in potential habitat through removal of litter, changing in light regimes and spreading on NNIS along firelines and surrounding forest.

### ***Determination***

**Alternative 1:** The No Action alternative would have **no impact** on featherbells since:

- No individuals are known to occur within the area.
- While NNIS would not necessarily be treated in the area and would likely continue to spread at their natural rate; firelines would not be constructed that would have the potential to increase their spread.

**Alternative 2:** The Proposed Action alternative **may impact potential habitat or individuals, but is not likely to cause a trend toward federal listing**, because:

- No individuals are known to occur within the area
- While fireline construction will spread NNIS and degrade potential habitat, adherence to the avoidance and minimization measures should be effective in retaining or reducing current NNIS populations.

### ***Avoidance and Minimization Measures***

- The same measures as those for the small whorled pogonia, to prevent, treat and monitor NNIS within the project area.

## **Riparian species**

### **Pigeon grape (*Vitis cinerea*)**

Pigeon grape is high-climbing vine that flowers in June and fruits from September to October. It potentially occupies a wide range from Florida to New Mexico, north to New York, and west to Wisconsin, Iowa, Nebraska, and Kansas. In the range of Wayne NF lands, it has been found in Jackson, Lawrence, and Scioto Counties (Cooperrider 1995; Natural Heritage Database 2000). This species typically grows in moist, open to semi-open habitats in alluvial soil of low woods, thickets, fencerows and stream banks (Burns 1982b; NatureServe 2004). Threats to pigeon grape include the felling of trees upon which the species grows.

### **Large Marsh St. John's wort (*Triadenum tubulosum*)**

This St. John's wort is a perennial herb that flowers during July and August. It inhabits swamp woods, buttonbush swamps, thickets and streambanks (Cusick 1994). Within southern Ohio it is found primarily in riparian floodplains, sandbars, streambanks and regularly inundated scour zones (McCartney and Goodwin 2003). It is believed that this species may follow the preglacial Teays River drainage lines and major tributaries in the Unglaciaded Allegheny Plateau. Its range stretches from Texas to Florida north to Illinois, Indiana and Ohio (NatureServe 2004). Within southern Ohio it is known to occur within Scioto, Gallia, Jackson, and Vinton counties. Threats to this species include alterations of drainage patterns and the introduction of non-native invasive species (Cusick 1994; McCartney and Goodwin 2003).

### ***Direct, Indirect and Cumulative Effects***

No individuals were found or are known to occur in the proposed project area, however, potential habitat does exist. Since no individuals are known in the area, no direct impacts are expected. Indirect impacts of fire could include alterations in potential habitat through removal of litter, changing in light regimes and spreading on NNIS along firelines and surrounding forest.

### ***Determination***

**Alternative 1:** The No Action alternative would have **no impact** on these species since:

- No individuals are known to occur within the area.
- While NNIS would not necessarily be treated in the area and would likely continue to spread at their natural rate; firelines would not be constructed that would have the potential to increase their spread.

**Alternative 2:** The Proposed Action alternative **may impact potential habitat or individuals, but is not likely to cause a trend toward federal listing**, because:

- No individuals are known to occur within the area
- While fireline construction will spread NNIS and degrade potential habitat, adherence to the avoidance and minimization measures should be effective in retaining or reducing current NNIS populations.

### ***Avoidance and Minimization Measures***

- The same measures as those for the small whorled pogonia, to prevent, treat and monitor NNIS within the project area.

## **PROJECT-WIDE IMPACTS**

### **Non-native Invasive Species (NNIS)**

Non-native invasive species pose a threat to plant and animal community health and diversity. Since exotic species, by definition, have been transplanted outside their original range, they often lack natural controls (e.g., disease, predators, parasites, or climate), which allows them to out compete and eventually replace more sensitive native species. Once NNIS become established, they are extremely difficult to eradicate, and the resulting change in community plant composition can alter ecosystem dynamics and functions over time. With any management activity that requires the use of heavy equipment brought in from off-site, or that disturbs the soil and increases sunlight exposure to the ground, there is a high risk of transporting and spreading NNIS into the

project area. If these NNIS were allowed to establish, they could easily compromise habitat quality, and thus jeopardize any existing or future populations of rare species in the project area.

Under **Executive Order 13112**, Federal agencies whose action may affect the status of invasive species “*shall not authorize, fund, or carry out action that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless the agency had determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species*’.

### ***Site Description***

Japanese stiltgrass, multiflora rose, Japanese honeysuckle, autumn olive, bush honeysuckle, Chinese lespedeza, crown vetch, garlic mustard, Japanese barberry, Oriental bittersweet, and tree-of-heaven. Many of these species occur primarily along the old road areas in the project where mechanical fireline is proposed to be constructed. Japanese stiltgrass is found throughout the project along the fireline areas, roadsides, oil and gas access roads and also is beginning to move down drainage points off of these areas.

### ***Direct, Indirect and Cumulative impacts***

A direct correlation with fireline construction and the spread of NNIS has been seen on the Ironton Ranger District. Three past wildfires (Binion, Red Bud and County Line) on the Ironton District have resulted in spreading of Japanese stiltgrass along mechanically constructed firelines (C. Kirschbaum, per. comm.). Likewise, research at Ohio University has shown that prescribed burning significantly increases the germination and seedling survival of Japanese stiltgrass through the removal of litter (Glasgow and Matlack, 2005). Use of dozers and large equipment to create firelines will spread Japanese stiltgrass and potentially other NNIS to infest areas currently uninfested. Indirect effects to potential habitat could occur through the change in understory plant composition, especially if disturbance from the fire and fireline construction allow the introduction of new non-native invasive species (NNIS) or the spread of current NNIS, such as Japanese stiltgrass, along the firelines. The spread of these NNIS will alter understory composition, cause increased competition with native plant species and potential alter soil chemistry and erosion potential.

Implementation of this project without incorporation of the proposed avoidance and minimization recommendations in the project design will knowingly spread NNIS in the project. Therefore, it is highly recommended that the project incorporate the avoidance and mitigation measures to protect known rare species within the project and to maintain or improve potential habitat for future native plant survival and establishment.

### ***Avoidance and Minimization Measures***

- To reduce the likelihood introductions and invasions of NNIS, *all* equipment shall be cleaned of *all* vegetation debris and soil before entering the project area. Equipment cleaning can be done at any commercial car wash facility or other facility with a high-powered water hose. Inspection of the rigs should be done on-site by the contract administrator.

- Use handline whenever possible to reduce NNIS spread, especially in known locations of NNIS such as Japanese stiltgrass.
- Rake berms created by mechanical fireline construction back across the fireline to reintroduce native plant seed and help prevent NNIS germination.
- Plant native seed along mechanical constructed lines to compete with NNIS. Consult with Forest Botanist on a seed mix for the area.
- Monitor and treat Japanese stiltgrass infestations in the project area for the first three years after project implementation. If burning is to occur in the fall, treat stiltgrass BEFORE project implementation.

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