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Floristic Dynamics of Appalachian Pine-Oak Forests Over a Prescribed Fire Chronosequence

Michael A. Marsh

**Thesis submitted to the College of Agriculture, Forestry, and Consumer Sciences
at West Virginia University
in partial fulfillment of the requirements
for the degree of**

**Master of Science
in
Forestry**

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Division of Forestry**

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ABSTRACT

Floristic Dynamics of Appalachian Pine-Oak Forests Over a Prescribed Fire Chronosequence

Michael A. Marsh

Vegetation dynamics after prescribed fire were modeled on three mountains in the George Washington National Forest representing a chronosequence of conditions since burning: pre-burn, and 1, 2 and 12 years post-treatment. Vegetation structure was more affected by environmental and spatial (burn intensity) gradients than by time since burning. Significant fire effects occurred on southwest aspects and upper slopes, especially among the sapling and shrub strata. Pine and oak regeneration abundance was not affected by fire but shade tolerant tree seedlings decreased, and shade intolerant seedlings increased in importance as a result. Percent cover and richness of herbaceous species increased, partly due to the post-fire germination and growth of various forbs and graminoids. Fire did not affect the abundance of exotic invasive species, but its effects on *Ailanthus altissima* were inconclusive due to its presence prior to burning and appearance in unburned areas. Low overstory mortality and prolific sprouting of ericaceous shrubs suggests that understory vegetation effects from single burns are temporary and multiple burns may be necessary to increase pine and oak regeneration importance.

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CHAPTER 1: LITERATURE REVIEW

Vegetation-Site Relationships of Appalachian Pine-Oak Forests

General Silvical Characteristics

Historically, Appalachian pine-oak stands consisting of table mountain pine (*Pinus pungens* Lamb.), pitch pine (*Pinus rigida* Mill.), Virginia pine (*Pinus virginiana* Mill.), chestnut oak (*Quercus prinus* L.), and scarlet oak (*Quercus coccinea* Muenchh.) have been confined to dry, rocky, infertile portions of the landscape (Racine 1966, Zoebel 1969, Murphy and Nowacki 1997, Williams 1998). A few silvical characteristics that allow these species to colonize and persist on these inhospitable sites include: being intolerant of shade (except chestnut oak, which is intermediate in shade tolerance), the ability to germinate on dry mineral soil or over thin litter layers, site-adapted rooting habits (i.e. the ability to root in underdeveloped soil, rock crevices, or as in the case of the oaks, the development of an extensive root system), thick bark, and superior growth rates relative to other species in these harsh environments (Carter and Snow 1990, Della-Bianca 1990, Johnson 1990, Little and Garrett 1990, McQuilkin 1990). Table mountain pine and pitch pine also possess serotinous cones that release seed after intense heat from a fire or the sun (Della-Bianca 1990, Little and Garrett 1990, Williams and Johnson 1992).

Overstory Compositional Patterns

Throughout the Appalachian region, many studies have inferred that changes in elevation, aspect, and topographic position produce a complex moisture gradient that greatly influences vegetational patterns across the landscape. In general, the drought tolerant species of Appalachian pine-hardwood stands are typically located on more xeric sites (e.g., upper slopes, ridges, noses, and southern aspects), and mesophytic hardwoods (e.g., tulip poplar [*Liriodendron* *tulipifera* L.]) have a greater presence on mesic lower slopes and flats (Cantlon 1953, Whittaker 1956, Hack and Goodlett 1960, Day and Monk 1974, McEvoy et al. 1980, Golden 1981, Harrison et al. 1989, Stephenson and Mills 1999). Other studies show that edaphic factors such as soil organic matter, texture, fertility, pH, temperature, and parent material change along with topography, elevation, and aspect (Mowbray and Oosting 1968, Hutchins et al. 1976, Golden 1981, Stephenson 1982, Hicks and Frank 1984, Whitney 1991, McCay et al. 1997, Newell and Peet 1998, Elliott et al. 1999a, Stephenson and Mills 1999, Desta et al. 2004). These factors are also important in determining forest composition. While the dominant tree species found in Appalachian pine-oak stands are able to flourish elsewhere, the rapid growth of other hardwood species during stand initiation usually limits or precludes their representation on more mesic and fertile environments (Zoebel 1969, Carter and Snow 1990, Della-Bianca 1990, Johnson 1990, Little and Garret 1990, McQuilkin 1990, Williams 1998).

The Herbaceous Stratum

Herbaceous plant cover, species composition, and diversity have also been shown to change along moisture and fertility gradients (Beals and Cope 1964, Davidson and Buell 1967, Bell 1974, Adams and Anderson 1980, Hicks and Chabot 1985, pgs.258-260, Hutchinson et al. 1999). While aspect has been shown to greatly influence herb cover, composition, and diversity (Cantlon 1953, Siccama et al. 1970, Hutchins et al. 1976, Lieffers and Larkin-Lieffers 1987, Huebner et al. 1995, Olivero and Hix 1998, Small and McCarthy 2002a, 2002b), other environmental factors such as slope position (Glenn-Lewin 1975, Bridge and Johnson 2000, Small and McCarthy 2002a) or elevation (Siccama et al. 1970, Gilliam and Turrill 1993) affect herb distribution patterns as well.

The characteristics of the overstory trees, their spatial distribution, and canopy stratification modify the environmental conditions present in the understory, thus dictating the composition and distributional patterns of plants that are able to survive there. Stand age (Brewer 1980, Whitney and Foster 1988, Olivero and Hix 1998, Goebel et al. 1999) or stage of stand development (Moir 1964, Auclair and Goff 1971, Oliver and Larson 1996, pgs.148-159, 261-263), composition (i.e. hardwoods versus conifers, or certain species such as aspen [*Populus* tremuloides Michx.] or hemlock [*Tsuga canadensis* (L.) Carrière]; Auclair and Goff 1971, Glenn-Lewin 1975, Hicks 1980, Beatty 1984, Crozier and Boerner 1984, Berger and Puettmann 2000) and canopy structure (Berger and Puettmann 2000; Barkman 1992) all influence herb abundance and diversity. In a similar manner, decreases in stand basal area (Gilliam and Turrill 1993, Hutchinson et al. 1999) and decreases in canopy cover from mesic to xeric sites (Cantlon 1953, Whittaker 1956, Siccama et al. 1970) and with increasing elevation (Whittaker 1956, Siccama et al. 1970) are positively correlated with the percent cover, richness, and diversity of the herb layer. The amount of solar radiation reaching the understory may be the causal agent for this phenomenon (Kittredge 1948, pgs. 48-51, Whittaker 1956, Core 1966, pg. 72, Hicks and Chabot 1985, pg. 260).

Although the amount and types of light reaching the understory may greatly affect the abundance and distribution of herbaceous plants, adequate moisture still remains a vital requirement (e.g., Anderson et al. 1969). While most of these aforementioned studies note that many species of herbs encountered had an affinity for either mesic or xeric sites, a change in the predominant life form of the herb stratum takes place along the moisture gradient. Herbaceous plants may be abundant on more mesic portions of the landscape, but tree seedlings and shrubs such as blueberries (*Vaccinium spp*.), black huckleberry (*Gaylussacia baccata* (Wang.) K.

Koch), and mountain laurel (*Kalmia latifolia* L.) eventually control the understory on drier sites (Whittaker 1956, Hutchinson et al. 1999). The virtual dominance of the understory of xeric sites by ericaceous plants is well known (Carvell and Tryon 1959, Reiners 1965, 1967, Monk et al. 1985, Lipscomb and Nilsen 1990, Matlack et al. 1993), and has been shown to correspond with low herb species richness (Buell and Cantlon 1950, McIntosh 1959, Mowbray and Oosting 1968, Glenn-Lewin 1975), and cover (Whittaker 1956, McEvoy et al. 1980).

Most studies have documented changes in herbaceous plant cover, richness, and diversity across landscape-scale environmental gradients, yet microsite conditions also influence the characteristics of the herbaceous plant stratum. The microtopography of the site (e.g., "pit and mound" topography; Falinski 1978, Thompson 1980, Beatty 1984), down woody debris (Thompson 1980), leaf litter (Beatty and Sholes 1988), or the presence of rocks (Bratton 1976) can all affect herb layer abundance and composition. The inverse relationship between percent rock cover and herbaceous plant cover (Stephenson and Mills 1999), diversity, and richness (Hurst 1994), or the positive correlation between percent slope and rock cover in conjunction with the negative correlation between percent slope and herb cover (Harrison et al. 1989), have been widely observed.

Fire Behavior

Fire as a Management Tool

Over the past few decades, foresters have embraced using prescribed fire as part of silvicultural systems for many forest types (Van Lear 2000). Helms (1998) defines prescribed fire (or prescribed burning as it is also known) as the controlled use of fire under conditions that permit its containment to a predetermined area which will produce a specified intensity of heat and rate of spread required to satisfy certain planned management objectives. These objectives may include: site preparation goals (e.g., reducing the leaf litter and exposing mineral soil, kill unwanted vegetation), the destruction of suitable habitat for insects and diseases, hazardous fuel reduction, and many others (Van Lear and Waldrop 1989, Wade 1989, Nyland 2002). Generally, prescribed fire attempts to mimic periodic fires that occurred across the landscape throughout the millennia. Through artificially reproducing these historical fire regimes, land managers hope to achieve favorable ecological or economic management objectives (Nyland 2002).

Prescribed fire has been used extensively in southern pine forests to manipulate stand structure (i.e. remove less desirable vegetation) and as a method of site preparation for pine regeneration (Crow 1973, Wade 1989), but it is gaining popularity in mixed hardwood stands to enhance the regeneration of oak species (*Quercus spp.*; e.g., Barnes and Van Lear 1998, Brose et al. 1999). Recently, there has been much interest in using prescribed fire to restore Appalachian pine-oak stands to the species historically present in this forest type (Welch and Waldrop 2001). But, in contrast, "fell and burn treatments" (where all of the stems of a pine-oak stand are felled, the slash is burned, and shortleaf or white pines are planted) are common throughout the southern Appalachians to restore productivity to these areas (Phillips and Abercrombie 1987).

Fires in the Appalachian Region

In general, both prescribed fires and wildfires have a tendency to follow or be affected by topographic features (e.g., ridges, steep slopes, different aspects, and elevation; Brown and Davis 1973, pgs. 183-216, National Wildfire Coordinating Group 1994). Topography may affect fire behavior and intensity (defined as the upward heat pulse from a fire; Van Lear and Waldrop 1989), but the firing technique (i.e. head fire vs. backing fire); type of fuels present, their distribution, amount, and moisture content; and the climate and weather conditions at the time of the fire (e.g., temperature, relative humidity, wind patterns) also influence it as well (Albini 1976, Nelson 1980, Van Lear and Waldrop 1989, Wade 1989, Christensen 1993, Swift et al. 1993, National Wildfire Coordinating Group 1994).

Fire behavior, intensity, and temperature (often used as a surrogate variable to describe fire intensity) are largely heterogeneous because all causal agents vary in time and space. There are many studies from various regions describing fire behavior (e.g., Heywood 1938, Whittaker 1961, Smith and James 1978, Hobbs and Gimingham 1984, Gibson et al. 1990, Grabner et al. 2001). However, studies of fire behavior in the Appalachian region are few. In most Appalachian fire studies, prescribed burning creates a "mosaic" pattern of effects on vegetation, coarse woody debris, and the litter layers (Franklin et al. 1997, Clinton et al. 1998, Vose et al. 1999, Hutchinson 2004, Hubbard et al. 2004, Iverson et al. 2004a). However, more uniform burn patterns have been documented in "fell-and-burn" treatments due to the pattern of fuel distribution in these areas (Swift et al. 1993). Appendix A; Table A1 summarizes the major descriptive characteristics of these prescribed fires. Regardless, methods and techniques for monitoring fire behavior are still in the preliminary stages of development (i.e. most studies in Appalachian pine-oak stands haven't made direct measurement of the prescribed fire itself). Consequently, post-burning measurements of variables such as bark scorch height and the extent of stand mortality have been used to characterize fire behavior (e.g., Regelbrugge and Smith 1994, Waldrop and Brose 1999).

Fire as a Disturbance Agent in Appalachian Pine-Oak Stands

Introduction

The interaction of historical fire regimes (or their suppression) with topographic and edaphic factors affects the landscape scale abundance and distribution of vegetation (Romme and Knight 1981, Harmon et al. 1983, Niering and Lowe 1984, Oliver and Larson 1996, p. 183-193, Bekker and Taylor 2001). In the Appalachians, fires of natural and anthropogenic origin have been part of the disturbance regime for centuries, undoubtedly altering forest composition and structure (Pyne 1982, pgs. 236-237, Van Lear and Waldrop 1989, Delcourt and Delcourt 1997). In fact, it is these periodic fires that may be largely responsible for the perpetuation of oak species (Lorimer 1984, Abrams 1992, Delcourt and Delcourt 1998, Brose et al. 2001), table mountain pine, pitch pine, and pine-oak mixtures in the region (Zoebel 1969, Barden and Woods 1976, Bratton and Meier 1998, Williams 1998) on all but the most xeric sites.

Reconstruction of Stand Disturbance History

Researchers have found much evidence supporting the role of periodic fires in the regeneration and maintenance of mixed Appalachian pine-oak stands. Fires associated with land clearing practices of the late 1800s and the early 1900s may have reduced site quality on more mesic sites. Through colonizing these degraded areas, table mountain pine and pitch pine were able to expand their range (Williams 1998). The presence of soil charcoal particles in stands dominated by table mountain pine, pitch pine, and shortleaf pine (*Pinus echinata* Mill.) indicates the historical presence of fire in these stands (Harmon 1982, Welch 1999). According to a few dendrochronological studies, periodic fires occurred every twelve years on average (Harmon 1982), or as frequently as one (Sutherland et al. 1995) to three times per decade (Brose et al.

2002) in pine-oak stands located on south and western facing slopes. These documented fires were "minor disturbances" (Oliver and Larson 1996, pgs. 95, 159-164) because there were surviving residual trees and new cohorts of table mountain pine (Sutherland et al. 1995, Brose et al. 2002), pitch pine, and chestnut oak established episodically in response to these relatively frequent fires until the implementation of fire suppression policies (Brose et al. 2002). Other studies in pine-oak stands (Barden 1976, Bratton and Meier 1998, Harrod and White 1999) and oak stands (Mikan et al. 1994, Shumway et al. 2001, Schuler and McClain 2003) throughout the Appalachians have also observed the lack of pine or oak recruitment coincident with the effective exclusion of fire from the landscape.

Consequences of Fire Suppression

In the absence of fire, certain shrub and tree species were able to become competitive in Appalachian pine-oak stands. However, it is these changes in stand structure and composition that may have led to the decline of this forest type. Brose et al. (2002) and Harrod and White (1999) concluded that the establishment of mountain laurel, red maple (*Acer rubrum* L.), and white pine (*Pinus strobus* L.) coincides with the arrival of chestnut blight (*Cryphonectria parasitica* (Murr.) Barr) and the implementation of wildfire control policies. The successful colonization of these plants appears to be related to the virtual cessation of pine and oak regeneration in these fire-suppressed stands. In the pitch pine stands studied by Waterman et al. (1995), the presence of mountain laurel did not affect initial seedling recruitment. However, the growth of smaller seedlings was suppressed. The development of a thick understory of mountain laurel can effectively prevent desirable regeneration establishment due to dense low shade (Monk et al. 1985, Clinton et al. 1993, Waterman et al. 1995, Moser et al. 1996). Limited light in the understory has also likely led to decreases in herbaceous plant cover and richness in these stands (Harrod et al. 2000).

The establishment of tree species like red maple, black gum (*Nyssa sylvatica* Marsh.), and white pine in Appalachian pine-oak stands has also adversely affected pine and oak regeneration. These species have been observed dominating the advance regeneration and the sapling size class in pine (Hunter and Swisher 1983, Williams and Johnson 1990, Waterman et al. 1995, Harrod et al. 1998) and oak dominated (Arthur et al. 1998, Harrod et al. 1998, Harrod and White 1999, Harrod et al. 2000, Rhoads 2002, Abella and Shelburne 2003) stands. As a result of the dense low shade produced by these colonizing trees and the build up of leaf litter on the forest floor, pine regeneration has all but diminished (Williams et al. 1990, Williams and Johnson 1990, 1992). The effect of competing understory vegetation has been speculated to limit oak regeneration as well (Loftis 1990, Lorimer 1994, Lorimer et al. 1994).

While non-oak or pine tree species may dominate the understory strata in Appalachian pine-oak stands, they have ascended to the overstory over time, causing increases in canopy density and species richness (Harrod et al. 1998, Harrod and White 1999, Harrod et al. 2000). The cumulative effects of droughts and southern pine beetle (*Dendroctonus frontalis* Zimmerman) attack (Vose et al. 1997; Smith 1991) along with competition from an increasing hardwood component (Hunter and Swisher 1983, Vose et al. 1997; Smith 1991) has likely led to the decline of the overstory pine component in these stands. The compositional shift of stands dominated by oaks on xeric sites has been widely documented as well (Harrod et al. 1998, Elliott et al. 1999a, Harrod and White 1999, Harrod et al. 2000). As a result, the maintenance of this forest type under current disturbance regimes is questionable. Because of growing concerns over the ecological implications of the loss of Appalachian pine-oak stands from the landscape, land managers are attempting to restore fire via prescribed burning to these waning ecosystems (Welch and Waldrop 2001).

Fires in Appalachian Pine-Oak Stands and Their Effects

Effects of Fire on Stand Structure and Composition

The general effect of fire on residual stand structure has been the focus of a few studies. The extent of individual tree mortality following all types of fire is related to fire intensity and pre-burn stand structure (i.e. higher fire resistance with increasing tree size and species adaptations to fire like thickness of bark; McCarty and Sims 1935, Harmon 1984, Hengst and Dawson 1994). In general, both prescribed fires and wildfires can be classified as “minor” or “major” (stand replacing) disturbances (Oliver and Larson 1996, pgs. 145-164) depending on the characteristics of the residual stand.

Low intensity fires in Appalachian pine-oak stands tend to have major impacts on understory and midstory structure and composition, where extensive mortality can result. High mortality has been observed among trees <25 cm D.B.H. (Elliot et al. 1999b, Welch et al. 2000) or smaller (Groeschl et al. 1992, Arthur et al. 1998, Harrod et al. 1998, Waldrop and Brose 1999, Harrod et al. 2000), following a fire, but the effect of low intensity fire on canopy structure and composition is minimal (Regelbrugge and Smith 1994). Significant decreases in basal area may result from these minor disturbances, but the overstory is left fairly intact (Groeschl et al. 1992, Arthur et al. 1998, Harrod et al. 1998, Welch et al. 2000). While low intensity fires may allocate more growing space to the surviving overstory trees, new cohorts are generally excluded (Oliver and Larson 1996, pgs. 159-164).

In contrast, higher intensity fires have greater canopy tree mortality rates and can be stand replacing events (or "major disturbances"; Oliver and Larson 1996, pg. 95). In general, mortality rates of overstory trees are positively related to fire intensity (Regelbrugge and Smith 1994, Waldrop and Brose 1999). Documented mortality rates of canopy trees range from a low of 30% (Elliot et al. 1999b, Harrod et al. 2000), to very high mortality rates (≥90%; Barden and Woods 1976, Groeschl et al. 1992, Waldrop and Brose 1999). Intense fires cause decreases in canopy species richness because only the most fire resistant species (e.g., pitch pine, table mountain pine, and species of oak) tend to survive these events and all species experience relatively high mortality rates (Groeschl et al. 1992, Harrod et al. 1998, Elliott et al. 1999b, Waldrop and Brose 1999, Welch et al. 2000, Harrod et al. 2000). Appendix A; Table A2 summarizes the observed effects of fire on stand structure in pine-oak stands.

Herbaceous Plant Response

In stands dominated by pine or oak species, herbaceous species richness and cover have been found to increase over time after both prescribed fire (Buell and Cantlon 1953, Hodgkins 1958, Cushwa and Cooper 1966, McGee et al. 1995, Arthur et al. 1998, Kuddes-Fischer and Arthur 2002), and wildfire (Groeschl et al. 1992, Harrod et al. 2000). Cover amounts may be lower than pre-burn levels the first growing season after a burn (Welch et al. 2000), but recover or exceed pre-burn levels in two years (Groeschl et al. 1992, Elliot et al. 1999, Harrod et al. 2000). Maximum herbaceous plant cover 1 to 8 years after a wildfire was shown to correlate positively with elevation, percent basal area killed, and post fire canopy opening (Harrod et al. 2000).

Increases in post-fire herb layer species diversity and evenness indices were also documented (Groeschl et al. 1992, Elliot et al. 1999). Furthermore, Clinton et al. (1993) reports that diversity and evenness indices of understory herbs were greater 13 years after felling and burning a pine-hardwood stand than in adjacent, untreated, reference stands.

Shrub Response

Many studies recommend prescribed fire as an effective tool for temporarily reducing understory mountain laurel of pine-oak stands and other forest types. Because of resprouting, this shrub is not eliminated from the understory, but its shading effects on the forest floor are reduced for at least one growing season (Hooper 1969, Clinton et al. 1993, Vose et al. 1993, Moser et al. 1996, Elliot et al. 1999b, Waldrop and Brose 1999).

Effects on Tree Regeneration

Fire severity influences tree regeneration structure, stand development patterns and site quality. Fires of lower intensity and severity may not significantly alter the forest floor and soil, thus favoring the regeneration of trees that are able to resprout. However, very severe fires may require external seed sources because of their drastic effects (Oliver and Larson 1996, pgs. 128-130). Therefore, the effects of fire on the ground environment along with factors such as pre- and post-burn vegetational composition and structure, silvical characteristics (e.g., reproductive characteristics and resistance to fire) of the species present, the spatial distribution of the fire, and the environmental gradients on the disturbed site all interact to influence successional pathways following fire (Shafi and Yarranton 1973, Harmon 1980, Kessell and Fischer 1981, Williamson and Black 1981, Harmon et al. 1983, Oliver and Larson 1996, pgs. 94-107, 128-130, Turner et al. 1997, Elliott et al. 1999b, Nyland 1998).

Although many of the sapling-sized, thinner barked hardwood species (e.g., red maple and black gum) are easily killed by fire, fire suppression has allowed many of these trees to grow to fire resistant sizes (Harmon 1984). However, like mountain laurel, those hardwood tree species that are "top-killed" (only the above ground portion of the plant is killed) by fire are capable of resprouting (Regelbrugge and Smith 1994). Species such as red maple (Huntley and McGee 1981, Arthur et al. 1998), striped maple (*Acer pensylvanicum* L.), flowering dogwood (*Cornus florida* L.; Wendel and Smith 1986), hickory (*Carya* spp. Nutt.; Barnes and Van Lear 1998), blackgum, sassafras (*Sassafras albidum* (Nutt.) Nees), and serviceberry (*Amelanchier arborea* (Michx. f.) Fern.; Kuddes-Fischer and Arthur 2002) all resprout vigorously after fire, leading to increases in understory stem density and species richness (Elliott et al. 1999b, Waldrop and Brose 1999, Welch et al. 2000). Furthermore, the regeneration of these species by seed along with yellow poplar, black locust (*Robinia pseudoacacia* L.), and white pine can increase following prescribed fire as well (Shearin et al. 1972, Wendel and Smith 1986, Barnes and Van Lear 1998, Blankenship and Arthur 1999, Elliott et al. 1999b, Kuddes-Fischer and Arthur 2002, Franklin et al. 2003, Markwith and Parker 2003, Elliott et al. 2004, Vandermast et al. 2004).

While the propagules of competing tree species may be enhanced, many researchers have suggested that fire may be a necessary event for the successful regeneration of the pine and oak species characteristic of Appalachian pine-oak stands. The role of fire in creating favorable environmental conditions for pine regeneration is well documented (e.g., Chapman 1952, Zoebel 1969, Van Lear and Waldrop 1989, Williams and Johnson 1992). Fire causes the opening of serotinous cones, reduces the litter layer and exposes mineral soil, controls competing midstory and understory vegetation, and can reduce overstory density increasing light in the understory. Several studies have documented the relative enhancement of table mountain pine or pitch pine regeneration after a prescribed burn (Boerner 1981, Vose et al. 1997, Elliott et al. 1999b, Waldrop and Brose 1999, Welch et al. 2000), or wildfire (Barden and Woods 1976, Groeschl et al. 1992, 1993). Microsite characteristics such as soil moisture (as described by a topographic moisture index) and post fire litter layer depth have been shown to correlate significantly with pine seedling density (Harrod et al. 2000). However, the studies of Waldrop and Brose (1999) and Waldrop et al. (1999) have demonstrated the ability of table mountain pine seedlings to root in relatively thick litter and duff depths.

Similarly, numerous studies have investigated using prescribed fire as a tool to encourage oak reproduction. In general, single fires (Johnson 1974, Nyland et al. 1982, Wendel and Smith 1986, Arthur et al. 1998, Kuddes-Fischer and Arthur 2002, Gilbert et al. 2003, Iverson et al. 2004b), infrequent fires (McGee et al. 1995), or low intensity fires (Franklin et al. 2003, Hutchinson 2004) all have failed to greatly enhance oak regeneration. In contrast, Elliott et al. (1999b, 2004) report the enhancement of oak regeneration and Barnes and Van Lear (1998) observed increases in the number of oak rootstocks and the root-to-shoot ratios of these oak sprouts after a single spring fire. Periodic fires have been shown to favor oak regeneration by taking advantage of oak's resistance to fire (i.e. its sprouting ability; Keetch 1944, Carvell and Tryon 1961, Barnes and Van Lear 1998) and reducing competing vegetation (Kruger and Reich 1997b, Arthur et al. 1998, Barnes and Van Lear 1998, Clatterbuck 1998, Dey and Hartman 2004). However, the results of periodic fires aimed at enhancing oak regeneration have not always been successful (Hutchinson 2004).

While the condition of the ground environment following fire is crucial in dictating which tree species will regenerate, the creation of sufficient growing space is undoubtedly a necessary requirement for the successful regeneration of pine-oak stands (sensu Oliver and Larson 1996, pgs. 89-90, 190-192). The failure of lower intensity fires to sufficiently reduce the density of the overstory and competing vegetation (i.e. resprouting hardwoods and shrubs) has been speculated to limit the successful establishment and development of pine (Barden and Woods 1976, Groeschl et al. 1992, 1993, Elliot et al. 1999, Waldrop and Brose 1999, Harrod et al. 2000, Welch et al. 2000) and oak regeneration (Moser et al. 1996, Arthur et al. 1998, Kuddes-Fischer and Arthur 2002, Franklin et al. 2003, Hutchinson 2004). While most studies suggest a direct relationship between fire intensity (and thus overstory mortality) and pine reproduction (Barden and Woods 1976, Groeschl et al. 1992, 1993, Randles et al. 2002), Waldrop and Brose (1999) observed the lowest pine seedling densities at the most intense burn areas, leading them to recommend fires of medium-high intensity. They suggested that fires of this intensity sufficiently reduced interfering vegetation, canopy cover, and the litter layer for pine regeneration and still ensured a seed source in the stand. It should be noted, however, that in their study, medium-high intensity fires still had very high (96%) overstory tree mortality rates.

Similarly, oak may not regenerate without the allocation of adequate growing space to the forest floor. Studies from various regions note that oak regeneration was enhanced where prescribed fire resulted in extensive overstory mortality (Moser et al. 1996) or after a prescribed fire following the partial removal of the overstory (Kruger and Reich 1997a, Brose and Van Lear 1998).

Post-Fire Stand Development

The long-term effects of treating Appalachian pine-oak stands with prescribed fire are unknown because none of the current published studies describe the effects of prescribed fire and stand development beyond two years following treatment. However, a few researchers have observed the long-term effects of wildfire and "fell-and-burn" treatments in this forest type. Therefore these studies may be indicative of the long-term effects on stand development following prescribed burning.

Studies documenting the effects of wildfires on pine-oak stands suggest that while low intensity fires did little to change species composition and initiate pine reproduction, severely burned areas now support a mixed pine-oak community dominated by hard pine species and various species of oak (e.g., chestnut and scarlet oaks; Barden and Woods 1976, Harrod et al. 1998). Comparable to wildfires, "fell-and-burn" treatments have also led to the creation of a pine-hardwood community, even though other species of pine are planted afterward (Vose et al. 1997).

Even after successful stand establishment by fire, periodic burns may be needed to tend these stands. Canopy tree density, composition, and herbaceous plant cover and richness were observed to be comparable to pre-burn stand conditions around 18 years after wildfire. These changes in stand structure and composition over a relatively short period of time suggest frequent fire return intervals in these pine-hardwood stands for their maintenance (Harrod et al. 1998, 2000). Periodic burning in pine (Randles et al. 2002) and oak stands (Kruger and Reich 1997b, Arthur et al. 1998, Barnes and Van Lear 1998, Clatterbuck 1998, Dey and Hartman 2004) has been shown to reduce undesirable trees and shrubs in the understory.

Exotic Invasive Plant Species

Exotic Invasive Plants and Disturbance

Williams (1998) wrote that abundance and distribution of table mountain pine-pitch pine stands might be further reduced by exotic invasive plant species (EIPS). EIPS are problematic in many ecosystems because of the adverse economic and ecological consequences of their invasion (Mack et al. 2000, Miller 2003). Some form of disturbance is thought to be a pre-requisite for the invasion of non-native plant species (Mack 1989, Vitousek 1990, Burgess et al. 1991, D'Antonio 1993, Pyle 1995, Binggeli 1996, Burke and Grime 1996, Stapanian et al. 1998, Debinski and Holt 2000, Larson 2003), although the available evidence suggests that it may not always be necessary (Barden 1987, Tyser and Worley 1992, Stapanian et al. 1998, Ellsworth et al. 2004). Regardless, the relationship between fire and invasion by non-native plants is not well understood; variable and often contradictory results across different ecosystems have been reported. In the grasslands of the western U.S., intensive burning and grazing practices of the early twentieth century may have damaged the native flora so much that exotic plants were able to invade (Yensen 1981). In the ponderosa pine (*Pinus ponderosa* P. & C. Lawson) dominated coniferous forests of the same region, wildfires (Crawford et al. 2001, Griffis et al. 2001, Keeley et al. 2003) and silvicultural treatment by prescribed burning (Keeley et al. 2003) or a combination of thinning and prescribed fire (Griffis et al. 2001) all increased the richness of exotic plants. Similar restoration treatments have also led to the establishment of the exotic tree ailanthus (*Ailanthus altissima* (Mill.) Swingle) in Ohio oak forests (Hutchinson et al. 2004). However, contradictory results have been reported in both of these forest types following fire (Laughlin et al. 2004, Hutchinson et al. 2005). Repeat burning has been shown to reduce the number of exotic plants present in an Iowa tallgrass prairie (Dornbush 2004) and increase native species diversity and a floristic quality index (which places greater value on "conservative" native species) in an Illinois oak forest (Wilhelm and Masters 1994). Alvar woodlands in Canada treated with a single prescribed fire were associated with fewer EIPS than adjacent areas disturbed by heavy equipment (i.e. a bulldozer; Catling et al. 2003). Still, studies of this nature are limited to a few distinct forest types and it is likely the relationship between prescribed fire and colonization by EIPS will be site and species specific (Hutchinson 2004). Clearly, further knowledge must be gained before any meaningful conclusions can be stated about prescribed fire's ability to predispose an area to invasion by exotic plants.

Prescribed Fire for Controlling EIPS

Regardless of what pathway of invasion taken, prescribed fire has been tested as a method of controlling or eradicating EIPS. Many studies have been conducted to determine the utility of prescribed fire in controlling garlic mustard (*Alliaria petiolata* (Bieb.) Cavara & Grande). While fire may temporarily reduce its cover, repeat burning or other methods of control (e.g., herbicides) are needed to exhaust the seed bank of this weed because its population recovers following a single fire (Nuzzo 1991, Schwartz and Heim 1996, Luken and Shea 2000).

Other studies testing prescribed fire's ability to eradicate EIPS have achieved somewhat mixed results. For example, Kline (1983) reports that spring and fall burns were unsuccessful in controlling white sweet clover (*Melilotus alba* Medikus) in a restored tallgrass prairie in Wisconsin. Two successive early spring burns with two years of no treatment in between and mowing treatments proved to be the most successful methods of controlling this invasive plant. In contrast, repeat burning has failed to control glossy buckthorn (*Rhamnus frangula* L.) in an Illinois prairie. In fact, prescribed fire greatly increased the number of stems of this invasive shrub due to resprouting stems and rootstocks (Post and McCloskey 1990). Still, the effects of fire on many EIPS are currently unknown or not well documented. For example, ailanthus has been observed invading closed canopy forests and canopy gaps (Ingo 1995, Knapp and Canham 2000), although it is usually observed in disturbed and/or urbanized areas (Clarkson 1966, Berger 1993, Call and Nilsen 2003, Huebner 2003). However, whether fire affects its distribution and abundance is still limited to one study (Hutchinson et al. 2004).

Study Introduction

The forest plan for the George Washington National Forest (GWNF) allows the use of prescribed fire to manage areas unsuitable for timber production (infertile sites, steep, rocky slopes, non-commercial species mixtures, or Appalachian pine-oak stands in general; U.S.D.A. Forest Service 1993). The objectives of these purposely-set fires are to reduce hazardous fuels, understory tree and shrub density, and to stimulate the growth and fruiting of herbaceous plants and shrubs (e.g., *Vaccinium spp*. and *Gaylussacia baccata*) to provide forage for various species of wildlife. The land managers of the GWNF typically conduct prescribed burning operations during the spring because the moisture content of the fuels reduces potential fire severity. Social constraints, such as popular fall recreational hunting (C. Waggy, T. Slater, and R. Tennyson, GWNF Dry River Ranger District, personal communication) also favor spring burning.

Although prescribed fire is widely used on the GWNF, its land managers lack quantitative information on the effects of these large-scale stand restoration burns to help guide their management efforts. The objective of this study is to evaluate the effects of these prescribed fires on stand structure, tree regeneration, and herbaceous plants in Appalachian pine-oak stands. Specifically, the hypotheses being tested in this study are: (1) prescribed fire will significantly alter the structure and composition of the sapling and overstory strata (i.e. only those species resistant to fire will persist), but the effects will be more pronounced in the understory, (2) fire will enhance pine and oak regeneration, and (3) increases in cover and the diversity of the herbaceous plant strata will be observed, but this response will be due, in part, to the invasion of exotic species. A chronosequence of three similar sites was used to track and evaluate the changes in stand structure and vegetational composition following silvicultural treatment via prescribed burning.

CHAPTER 2: METHODS AND RESULTS

Introduction

Appalachian pine-oak stands consisting of table mountain pine (*Pinus pungens* Lamb.), pitch pine (*Pinus rigida* Mill.), Virginia pine (*Pinus virginiana* Mill.), chestnut oak (*Quercus prinus* L.), and scarlet oak (*Quercus coccinea* Muenchh.) are most common on dry, rocky, infertile portions of the landscape (e.g., southwest facing slopes, ridges, noses; Cantlon 1953, Whittaker 1956, Hack and Goodlett 1960, Racine 1966, Zoebel 1969, Day and Monk 1974, McEvoy et al. 1980, Golden 1981, Harrison et al. 1989, Murphy and Nowacki 1997, Williams 1998, Stephenson and Mills 1999) because of their tolerance of such environmental conditions (Zoebel 1969, Carter and Snow 1990, Della-Bianca 1990, Johnson 1990, Little and Garret 1990, McQuilkin 1990, Williams 1998). Periodic fires of natural and anthropogenic origin were part of the historical disturbance regime in the Appalachians until the early 1900s (Pyne 1982, pgs. 236-237, Van Lear and Waldrop 1989, Delcourt and Delcourt 1997). There is evidence that these fires may be responsible for the perpetuation of oak species (Lorimer 1984, Abrams 1992, Delcourt and Delcourt 1998, Brose et al. 2001), and table mountain pine, pitch pine, and pine-oak mixtures in the region (Zoebel 1969, Barden and Woods 1976, Bratton and Meier 1998, Williams 1998) on all but the most xeric sites.

In the absence of fire, shrubs such as mountain laurel (*Kalmia latifolia* L.) and shade tolerant trees like red maple (*Acer rubrum* L.) became established in forest understories previously dominated by oak (Lorimer 1984, Abrams 1992, Lorimer 1994, Elliott et al. 1999a, Brose et al. 2001) and pine-oak mixtures (Hunter and Swisher 1983, Bratton and Meier 1998, Williams 1998, Brose et al. 2002). The dense low shade produced by these colonizing understory shrubs and trees creates unfavorable conditions for pine (Williams et al. 1990, Williams and Johnson 1990, 1992) and oak regeneration (Loftis 1990, Lorimer 1994, Lorimer et al. 1994). Over time, species like red maple have grown to the overstory, resulting in increased stand-level canopy density and species richness in pine-oak (Harrod et al. 1998, Harrod and White 1999, Harrod et al. 2000) and oak stands (Harrod et al. 1998, Elliott et al. 1999a, Harrod and White 1999, Harrod et al. 2000). As a result of these structural changes and the subsequent lack of pine or oak replacement, the maintenance of this forest type under current disturbance regimes is questionable.

Because there is evidence that periodic burning was an important disturbance in this and many other ecosystems, it is intuitive that the reintroduction of fire be considered in restoration efforts (Parsons et al. 1986, Allen et al. 2002). While prescribed fire is becoming more popular to restore oak (Brose and Van Lear 1998, Brose et al. 2001) and pine-oak (Elliott et al. 1999b, Welch and Waldrop 2001) forest communities, its success record is inconsistent. Long-term fire effects in pine-oak forests are limited to studies of wildfires (Barden and Woods 1976, Harrod et al. 1998, 2000) and have not been widely documented.

The forest plan for the George Washington National Forest (GWNF) allows the use of prescribed fire to manage areas unsuitable for timber production (infertile sites, steep, rocky slopes, non-commercial species mixtures, or Appalachian pine-oak stands in general; U.S.D.A. Forest Service 1993). The objectives of these fires are to reduce hazardous fuels, understory tree and shrub density, and to stimulate the growth and fruiting of plants in the herbaceous stratum valuable for wildlife forage (e.g., *Vaccinium spp*., *Gaylussacia baccata*, and various grasses). The land managers of the GWNF typically conduct prescribed burning operations during the spring because the high moisture content of fuels reduces potential fire severity. Social constraints, such as local fall recreational hunting (C. Waggy, T. Slater, and R. Tennyson, GWNF Dry River Ranger District, personal communication) also favor spring burning.

Although prescribed fire is widely used on the GWNF, its land managers lack quantitative information on the effects of these large-scale restoration burns to help guide their management efforts. The objective of this study is to evaluate the effects of these prescribed fires on stand structure, tree regeneration, and herbaceous plants in Appalachian pine-oak stands. Specifically, the hypotheses being tested in this study are: (1) prescribed fire will significantly alter the structure and composition of the sapling and overstory strata (i.e. only fire resistant species will survive), but the effects will be more pronounced in the understory, (2) fire will enhance pine and oak regeneration, and (3) increases in cover and the diversity of the herbaceous plant strata will be observed, but this response will be due, in part, to the invasion of exotic species as other studies have observed (Crawford et al. 2001; Griffis et al. 2001, Keeley et al. 2003). A chronosequence of three similar sites was used to track and evaluate the changes in stand structure and vegetational composition following silvicultural treatment via prescribed burning.

Methods

Study Area Description

The study was conducted on the Dry River Ranger District of the George Washington National Forest (GWNF) near Brandywine, West Virginia U.S.A. (38° 37' N, 79° 14' W; Appendix B; Figure B1). This area is located within the ridge and valley province and in the "rain-shadow" of the Allegheny Mountains, which gives it a climate that is much drier than the rest of the state (Core 1966); average annual precipitation is 82 cm, the average temperature is

10.9° Celsius (C) with a growing season of approximately 144 days (Estepp 1992). Braun (1950) characterized the vegetation of this area as being part of the former oak-chestnut forest type.

The proactive prescribed burning program of the GWNF permitted this study to investigate the vegetational dynamics on three similar, adjacent sites representing a chronosequence of time since prescribed fire (Appendix B; Figure B2); Brushy Knob (147.7 ha, treated in March of 1992), Heavener Mountain (459.3 ha, treated in March of 2003), and Dunkle Knob (313.6 ha, treated in March of 2004). All of Brushy Knob (BK) and Dunkle Knob (DK) were included in this study, but roughly half of Heavener Mountain (HM) was omitted due to the failure of the prescribed fire to catch and burn over the northern half and also because of logistical considerations. Each of these three sites have highly dissected "nose and hollow" topographical patterns typical of the region with percent slope generally ranging from 6 to 70 %, and elevations from 573 m to 848 m above sea level. Predominant soil types belong to the Berks-Weikert association, which are loamy-skeletal, mixed, mesic Dystrochrepts formed from acidic shale, siltstone, or sandstone bedrock. These soils are generally infertile, droughty, and shallow with frequent rock outcroppings (Estepp 1992).

The U.S. Forest Service purchased DK and BK in 1923 and HM in 1935. All three sites were undisturbed by fire since acquisition until their respective prescribed fires were conducted. HM did have a small (approximately .8 ha) wildfire in 1996 that occurred near (but outside of) the study boundary. Part of the northeast section of DK was logged in the late 1960s and patchy timber harvesting occurred on all three mountains in the 1970s and the early 1980s but was generally restricted to the coves and more mesic slopes. Following a few of these harvests, white pine was direct seeded by helicopter on HM and planted on DK (C. Waggy, GWNF Dry River Ranger District, personal communication).

Prescribed Fires

BK was burned on March 9, 1992. Air temperatures ranged from 10°-16° Celsius (C) and relative humidity (RH) from 20-30 percent. Winds were from the northwest and northeast, and ranged in velocity from less than 16 kilometers per hour (Km/H) to 32 Km/H. Drip torches were used to ignite five equidistant and consecutive strip head fires from the top of the knob to the bottom. Firing began around 1030 hours and continued on to 1700 hours, and the area was allowed to burn itself out (generally, these stand restoration burns are out by the next day with a few smoldering "hotspots" that can last a couple of days; C.Waggy, Dry River Ranger District, GWNF, personal communication).

The HM prescribed fire was conducted on March 25, 2003. Air temperatures ranged from 18°-27° C and RH from 32-50 percent. Winds were primarily from the southwest (but shifted from the southeast later in the afternoon) at a speed of 1.6-9 Km/H. The interior of the site was ignited in a northeast-southwest pattern from the top of the mountain to the bottom by a helicopter dropping delayed aerial ignition devices and areas adjacent to roads and fire lines were ignited by drip torch. Ignition began at 1010 hours, was completed at 1700 hours, and the prescribed fire was allowed to burn itself out. As noted earlier, a large portion of Heavener Mountain failed to burn at all; therefore roughly half of this site was omitted from the study.

DK was treated with prescribed fire on March 29, 2004. Air temperatures ranged from 11°-21° C and RH from 29 to 76 percent. Winds were primarily from the northwest and southeast at a speed of 2-10 Km/H. The interior of the area was ignited in a northeast-southwest pattern from the top of this burn unit to the bottom by a helicopter dropping delayed aerial ignition devices. Areas bordering roads and fire lines were ignited with a drip torch. Hand ignition began at 1130 hours with aerial ignition commencing shortly after (1145 hours). All firing was completed at 1700 hours and the fire was allowed to burn itself out.

Experimental Design

Each burn unit (site) was stratified by aspect (northeast versus southwest) and elevation (lower slopes versus upper slopes) within their respective boundaries (roads and cut fire lines served as boundaries for treatment and this study, but see above for study boundary on HM; Appendix B; Figures B3, B4, and B5). For the purposes of this study, aspect was categorized by arbitrarily drawing a line on a topographic map of each site with an azimuth of 135° from the northwest end of each site through its peak to the other side (the southeast end) splitting it into two halves. Southwest aspects were then defined as those portions of the site occurring within the 135-315° azimuth range (from the apex of each site), and the northeast aspects included those portions in the 0-135° and the 315-360° range. Upper and lower slopes were then defined as being above or below the 732 m contour line (roughly halfway up each mountain) respectively, further dividing each site into four sections (northeast aspect-lower elevation, northeast aspect-upper elevation, southwest aspect-lower elevation, and southwest aspect-upper elevation). A 61 by 61 meter grid oriented with the four cardinal directions was then overlaid on the resulting map and the grid intersections in each aspect/slope position combination (section) were then systematically numbered. Nine sample points per section were selected using a random number table for a total of 36 per site (see Appendix B; Figures B3, B4, and B5 for site specific sample point layout).

Each sample point was established in the field by hand compass and pacing from prominent land marks (e.g., curves in the access road or fire line) and previously established plot centers. Once a sample point was located it was verified with a hand held Global Positioning System (GPS) unit. If a sample point fell within 31 m of a road or cut fire line or on top of a rock outcrop it was moved to a more suitable location using a random azimuth and distance. The sample point was then recorded as a waypoint on the GPS unit and marked in the field with a piece of steel rebar driven into the ground and flagging to aid in future relocation. Slope aspect and percent slope were measured at each sampling point and its slope position (i.e. lower, mid, upper slopes or ridge or cove) and surface topography shape (straight, concave, convex, straight/concave, straight/convex; Parker 1982) were noted.

A nested plot design centered at each sample point was used to sample the vegetation on all three sites (Appendix B; Figure B6). Data were collected on all three areas during June and July of 2003 (one growing season following prescribed fire on HM, twelve growing seasons after treatment on BK, and one growing season before treatment on DK), and during these same months in 2004 on HM (two growing seasons after treatment) and DK (one growing season following prescribed fire). BK was not sampled again during 2004 because it was expected that there would be no or very few vegetational changes on this site between 2003 and 2004 since thirteen growing seasons (in 2004) had passed after treatment.

Vegetation Sampling: Overstory Plots

Circular .05 ha plots were used to measure overstory trees (all trees ≥12.7 cm at diameter breast high, DBH, 1.37m). Each living tree within the overstory plot was measured by species, DBH (to the nearest .1 cm), and assigned to one of six height classes (<0.5 m, 0.5 to 1 m, 1 to

1.37 m, 1.37 to 6 m, 6 to 15 m, and ≥15 m) and a crown class following the Kraft Crown Classification system (Smith et al. 1997, pg. 29). The total heights of two trees in dominant or codominant canopy positions in each overstory plot were also measured using a clinometer. Snags were identified to species (where possible) and height class, and classified as being <25.4 cm or ≥25.4 cm at DBH.

Understory/Shrub Plots

Circular .01 ha plots were nested in the .05 ha plot and used to sample understory saplings (all trees 2.54 cm ≤ DBH ≥ 12.7 cm) and all shrubs and vines (e.g., *Vitis spp.*). All understory trees were measured to species, DBH, and height class, as described above. All shrubs and vines ≥1.37 m tall within this plot were identified by species and counted by the number of distinct individuals present (i.e. in the case of clonal shrubs such as mountain laurel and witch hazel (*Hamamelis virginiana* L.) that have multiple stems arising from the same rootstock, only the number of distinct rootstocks were counted).

In order to account for the potential effect of reduced canopy cover (fire damage) on microsites, spherical crown densiometer readings were taken to estimate percent canopy cover on DK in 2003 and 2004 and HM in 2004. Five densiometer measurements were taken at each sample point; one at the center of the overstory and sapling plots and one at each of the four regeneration/herb plots. The measurement at the center of the overstory plot was taken facing downhill while all of the rest were done facing plot center.

Because the 2003 inventory of HM occurred during the first growing season post burn, some trees that were damaged by the prescribed fire showed reduced vigor as evidenced by sparse crowns. However, these trees were still classified as "alive" if they had any green foliage.

These fire-damaged trees in the sapling and overstory plots were assigned one of three vigor class ratings the following year (2004) based on their condition; 1-normal vigor and crown condition, 2-low vigor and stressed crown condition (e.g. epicormic branching, and sparse, damaged crowns), and 3- dead trees. All trees on HM that were inventoried as alive in 2003, but were found to be dead or of low vigor (vigor class 2) in 2004 were assumed to have been vigor class 2 trees in 2003. In a similar manner, all trees meeting vigor class 1 criteria in 2004 were assumed to have been the same vigor the previous year. All trees measured as alive on BK and DK in 2003 were assumed to meet vigor class 1 specifications as well. All overstory trees were also given a foliage transparency rating (an estimate of the amount of skylight visible through the main portion of the crown) consistent with U.S.F.S. Forest Inventory and Analysis (F.I.A.) protocol to asses the extent of fire damage (U.S.D.A. Forest Service 1999).

Herbaceous Stratum

At 12.056 m from the center of the overstory plot in each of the four cardinal directions, circular 1 m^2 plots were used to measure tree regeneration (all trees <2.54 cm DBH) and herbaceous plant cover. All tree regeneration present was identified by species and characterized by origin (seedling or sprout), and height class as above. The number of individuals present for each species/origin/height class combination was tallied (multiple sprouts arising from the same rootstock and sprout clump were counted as one sprout) and the percent cover of the plot occupied was estimated ocularly. All percent cover observations of less than 0.5 percent were recorded as being less than 0.5 percent.

All herbaceous plants (including all shrubs such as *Vaccinium spp.* or *Kalmia latifolia*), in these plots were identified to species and percent cover was estimated. Unknown herbaceous plants were collected from outside of the plot and pressed for later identification by Dr. Cindy Huebner at the U.S.D.A. Forest Service Northeastern Research Station in Morgantown, W.V. and, to a lesser extent, M.A. Marsh at West Virginia University (also in Morgantown, W.V.). Voucher specimens from the West Virginia University herbarium and both Strausbaugh and Core (1977) and Gleason and Cronquist (1991) were used in plant identification, but botanical nomenclature follows the later manual and common names of all tree species were used in the results and discussion sections for the ease of reporting and reading. For some samples of tree regeneration and herbaceous plants (e.g. *Pinus spp.* or *Carex spp.*), the distinguishing characteristics between certain species were not present (e.g., reproductive structures) or the plant was too underdeveloped to positively identify so taxonomic classification to only the family or genus level was possible. In some cases, positive identification of a particular specimen could not be accomplished, so these “unknown” species were classified to the furthest taxonomic level that could be achieved with confidence. Estimates of the percent ground cover of moss/lichen, rock, bare ground, dead wood, living wood, and litter were also taken, and litter layer (Oi) depth was measured at the west end of each plot.

Fire Behavior

To better characterize fire behavior in these stand restoration burns, five sample points on the southwestern aspect of DK had their surface fuels inventoried pre- and post-burn and the prescribed fire itself was monitored using a network of thermocouple probes (see Appendix B; Figure B7 for location of fire monitoring plots). These sample points were selected due to logistical considerations and the expectation that the prescribed fire would be the most intense on the southwest aspect. All fuels (leaf litter, 1, 10, 100, and 1000 hour fuels) were inventoried during early March of 2004 (when the lack of snow cover permitted) following the methods of Brown (1974) and Brown et al. (1982) in a series of transects and litter samples located at each sample point (see Appendix B; Figure B8 for fuel transect locations at a sample point). At the corners and at the center of this 9.14 m^2 fuel sampling plot, thermocouple probes and HOBO® data loggers (Onset Computer Corporation, Bourne M.A.) were buried just below the surface in a manner similar to that of Iverson et al. (2004) and set to record time and fire temperature at four second intervals the morning before the DK prescribed fire. All data loggers were collected and fuel transects were remeasured immediately following treatment.

Data Analyses

All calculations and data analyses were conducted using the SAS system (SAS Institute Inc. 2004). Although all three treatments produced a highly heterogeneous burn environment and variable fire intensities (ranging from stand-replacing fires on dry slopes and ridges to unburned in some coves within the DK burn unit), all data were kept in their respective sections because the intent of the experiment was to generate average values of fire effects for each burn unit and it was thought that any fire-intensity/vegetation interactions would be accounted for by the stratified experimental design and subsequent multivariate statistical analyses (e.g., mixed model ANCOVA and ordinations). Summary statistics calculated for tree species (using those individuals meeting both vigor class 1 and 2 specifications) for each distinct understory and overstory plot including basal area (m^2/ha), stems per hectare, relative basal area, relative density, and importance values (IV), where:

$$Tree\ Species\ IV = \frac{Relative\ Density + Relative\ Basal\ Area}{2}$$

All IV's for all strata were then multiplied by 100 for the ease interpreting the final summary statistics, but were kept in their decimal form (i.e. a species IV ranges from 0 to 1 as calculated above) in subsequent multivariate analyses so a wider array of transformations (e.g., an arc sine square root transformation) could be used to improve normality. Species basal area, stems per hectare, and IV were then averaged by each of the nine plots per distinct section (stems per hectare for shrub species were calculated this way as well). Tree species were also grouped according to their shade tolerance (intolerant vs. tolerant), but genera of specific interest (i.e. *Pinus*, *Quercus*, and *Carya*) were kept separate (see Appendix B; Table B1 for tree species groups), and these stand structure statistics were then recalculated as above.

In the herbaceous stratum, all percent cover observations of less than 0.5 were given an arbitrary value of 0.25 percent for the purposes of analysis. For each distinct 1 m^2 tree regeneration/herbaceous plant plot, summary statistics for tree regeneration (species, origin, and height class distinct as well as by species only) include stems per hectare, relative density, relative percent cover (of tree regeneration only), and IVs were calculated as:

$$Tree\ Regeneration\ IV = \frac{Relative\ Density + Relative\ Percent\ Cover}{2}$$

However, only these statistics by species (i.e. lumped origin and height class) are reported and all subsequent analyses used these data because there was generally only one predominant height class (height class 1) out of all species and site/year combinations, and most origin distinct analyses tended to contradict any species-specific patterns of recruitment or mortality (e.g., a decrease in seedlings of a given species was offset by an increase in sprouts). The effect of origin on any given species was further explored by calculating the percentage of sprouts; any species-origin patterns appeared to be confined to the heavy seeded oaks and hickories and their tendency for being mostly of sprout origin before prescribed fire on DK adds further justification to pooling these data.

In a similar manner, relative percent cover of all herb and tree species were calculated from the sum total percent cover of both of these groups to produce a total herbaceous strata IV. If taxonomic classification of a particular vascular plant sample to at least the genus level was impossible, it was excluded from this herbaceous strata IV calculation (and all diversity indices discussed below) but included in average total percent cover calculations. These resulting values for each of the four $1m^2$ plots per sample point were averaged together first, then by the nine sample points per section. Average percent ground cover values and litter depth were calculated this way as well.

Tree regeneration and herbaceous plants were also assigned to species groups, and structural statistics for these data were recalculated as above. All tree regeneration was classified into the previously mentioned groups, and all vascular plant species occurring in the herbaceous strata were grouped by habit (shrubs and vines, ferns and forbs, graminoids, or trees) as well as by functional type (exotic species, exotic invasive species, native species, native invasive weed, or native weed; see Appendix B; Table B2 for herbaceous strata habit and functional type groups; Huebner 2004, C.D. Huebner, personal communication). Functional groups were defined based on a species original distribution and ecological function. All species were first classified as being indigenous (native) or non-indigenous (exotic) to the area using Gleason and Cronquist (1991). Those species fitting the characteristics of the other groups (native weed, native invasive weed, and exotic invasive) were further classified into their respective categories. Native weeds were defined as species that colonize and inhabit "waste" places or disturbed areas (thus, this group also includes pioneer or early successional species). Native invasive weeds were defined as native species with the ability to inhibit the growth or reproduction of other species, and conversely, exotic invasive species were defined as non-indigenous species meeting this criterion. If a species habit or functional type could not be positively identified, it was deleted from these data sets and all subsequent analyses.

Species richness (*S*), Shannon-Weiner's diversity index (*H′*), and evenness (*J′*) were calculated for all strata to examine changes in species diversity following prescribed fire. Shannon-Weiner's index (which incorporates both species richness and evenness of species abundance; Magurran 1988) was calculated as:

$$H' = -\sum pi \ln(pi)$$

Where *pi* is the proportion of total abundance of species *i*; *pi*=IV for overstory and understory trees as well as for the herbaceous stratum (i.e. IV= relative percent cover of both herbaceous plants and tree regeneration). Evenness (Pielou 1977) was calculated as:

$$J' = \frac{H'}{\ln(S)}$$

All diversity indices were calculated by distinct plot and averaged together as described above for each stratum.

Pre- and post-fire fuel loads on DK were calculated by plot for each distinct fuel classification level (Brown 1974, Brown et al. 1982; all English units were converted into metric equivalents) as well as for the sum total fuel loadings present and then averaged together. All data (temperature and the time of observation) captured by the data logger-thermocouple probe units were downloaded into spreadsheets for analysis (one data logger was destroyed by the prescribed fire and therefore excluded from all calculations). Following Iverson et al. (2004), maximum temperature and its observed time, temperature duration above 30º C (it was assumed that fire was the main factor influencing all observations above this arbitrary threshold), and a heat index (the cumulative summation of temperatures above 30º C or the integral under the temperature curve in a plot of time versus observed temperature) were calculated by logger-probe unit. These resulting values were then averaged together by plot and then all together. Estimates of fire rate of spread were also calculated using their methodology, except rescaled to the size of the monitoring plots utilized in this study; the time of maximum temperature (it was assumed that at this point, the prescribed fire is in the active combustion phase; Alexander 1982) of the center point in the square plot was used to generate estimates of fire spread from and to the adjacent corner monitoring units. In the case where the center data logger was destroyed or not the first, second, or third probe-logger unit to document the fire, rates of spread were calculated using the first registered maximum time as a starting point around the plot. Since fire spread may not follow an exact, linear path between two points in space or time, it is possible that the fire could cross two or more data logger-temperature probe units at or near the same time and generate an unrealistic rate of spread. To avoid this methodological error, a 1-minute unit time threshold for the fire to travel between two successive data collection units was set, thereby yielding more conservative estimates from these data (Iverson et al. 2004).

Paired t-tests were used to compare fuel loads on DK pre- and post-fire except for leaf litter (a two sample t-test was used due to the destructive sampling procedure for this fuel classification) as well as changes in the structure and diversity of each stratum on HM and DK between 2003 and 2004. The mean values from the four 1 m^2 plots per overstory plot were used as the experimental unit for all analyses involving tree regeneration and herbaceous strata data, while each distinct overstory, sapling, or shrub plot were used as the experimental unit for these strata (i.e., paired t-tests for each stratum by section all have a n=9). However, comparing these two sites with each other and BK necessitated the use of a chronosequence approach (or "space for time" substitution; Pickett 1989), its assumptions, and alternative statistical techniques. Various studies documenting stand development patterns of forests across North America using chronosequences (e.g., Oliver et al. 1985, Aplet et al. 1988, Clatterbuck and Hodges 1988, Brashears et al. 2004, Harper et al. 2005) have assumed that all sites had similar stand structures before disturbance, and although the stand initiating disturbance occurred at different times for each site, the subsequent developmental patterns will all parallel each other. However, the presence of many confounding variables limits the application of this approach (Pickett 1989, Bakker et al. 1996). For example, in this study different weather patterns affected the behavior of each respective prescribed fire and differences in stand structure between all sites before and after timber harvesting could affect vegetation growth response. Regardless, examination of these three sites as a "chronosequence" will provide land managers with information from landscape-scale prescribed burning efforts, a relatively recent technique in eastern deciduous forests. Consequently, all results should be considered in the context of this imperfect "space-for-time" substitution.

Because of the spatial and temporal scale of these and other fire events, proper replication and randomization is difficult to achieve in fire ecology experiments (van Mantgem 2001). Although assessments covering scales smaller than that of an ecosystem generally have greater experimental control and more replicates (and thus are more statistically sound), they can also generate unrealistic and biased results inapplicable for large-scale management efforts (1998; Carpenter 1996, Hargrove and Pickering 1992, Oksanen 2001). Although each mountain was treated at a different time, and annual ambient conditions (e.g., weather patterns) can fluctuate, it was assumed that vegetation responses were primarily the product of prescribed fire (van Mantgem et al. 2001).

Due to the logistical impossibility of sampling more than one replicate of sites burned within the same year, the statistical problems of "psuedoreplication" in subsequent statistical analyses cannot be avoided (van Mantgem et al. 2001; Hurlbert 1984). However, the plots are considered statistical replicates within each aspect/slope position/prescribed fire scenario, which strengthens the inferences made from this experiment (van Mantgem 2001). Regardless, it should be noted that while the objective of this study is to evaluate the effectiveness of large-scale burns in restoring Appalachian pine-hardwood stands, this assessment is a case study of three similar burn units and variability in the results would certainly be encountered between different sites and geographic locations within the ridge and valley province.

Mixed model analysis of covariance of the structural parameters, composition (using the aforementioned species groups), and diversity indices for all strata (excluding shrub plot data) were conducted using the MIXED procedure with SAS software (SAS Institute Inc. 2004). Prior to all analyses, all data were tested for normality (Proc UNIVARIATE; SAS Institute Inc. 2004) and transformed with square root, log (base 10), or arcsine square root transformations when necessary. Plot (nested within each site/year combination) was considered as a random effect while all other variables (site/time since burning, hereafter referred to as "site/year", aspect, slope position, and species group) were considered as fixed effects. The amount of overhead shade, inferred by plot-level measures of total basal area (m^2/ha) was used as a covariate for herb layer and regeneration mixed models; only overstory basal area was used as a covariate in analyzing sapling strata data and regular mixed model analysis of variance was used for overstory data. The following is the ANCOVA model used for all structural parameters (e.g., basal area, percent cover, *H'*):

$$y_{ijklm} = \mu + \alpha_i + \tau_j + \gamma_k + \delta_l + t_{ijklm} + \lambda_{ijklm} + \varepsilon_{ijklm}$$

Where:

y_{ijklm} = the response for the ith site/year, jth level of aspect, and the kth level of slope position

μ = the overall mean

α_i = the effect of the ith level of site/year

τ_j = the effect of the jth level aspect

γ_k = the effect of the kth level of slope position

t_{ijkl} = the random effect due to the experimental unit (plot)

λ_{ijkl} = the effect of the covariate (basal area, m^2/ha)

ε_{ijkl} = a random effect due to sampling

All mixed models involving species groups used the following model:

$$y_{ijklm} = \mu + \alpha_i + \tau_j + \gamma_k + \delta_l + t_{ijklm} + \lambda_{ijklm} + \varepsilon_{ijklm}$$

Where:

y_{ijklm} = the response (importance value or percent cover) for the ith species group set at the jth site/year, kth level of aspect, and the lth level of slope position

μ = the overall mean

α_i = the effect of the ith level of species

τ_j = the effect of the jth level site/year

γ_k = the effect of the kth level of aspect

δ_l = the effect of the lth level of slope position

t_{ijklm} = the random effect due to the experimental unit (plot)

λ_{ijklm} = the effect of the covariate (basal area, m^2/ha)

ε_{ijklm} = a random effect due to sampling

An ANCOVA was used to test whether the slopes for each group equaled zero. If the slopes were different from zero then equal or unequal slope models were fit to the data and all nonsignificant variables and interactions were removed from the model. The regression equations for all models were derived and plotted as a function of the covariate (basal area) and the respective fixed effects of the particular model in question. Multiple comparison tests were accomplished through the use of estimated contrasts with the ESTIMATE statement and the DIFF option in the LSMEANS statement (i.e. all ANCOVA model effects were tested for significance at the mean value of basal area per hectare; SAS Institute Inc. 2004).

Because shrub distributions were irregular, the data exhibited extreme departures from normality that could not be improved with any transformation and thus were analyzed with a generalized linear model assuming a Poisson probability distribution and chi square tests using the GENMOD procedure (SAS Institute Inc. 2004). Similar to preceding analyses, total basal area per hectare was used as a continuous variable. Separate analyses were conducted for total shrub clones per hectare and species-specific abundance (i.e. separate models were fit for each species). Due to the uncommon observations of a few shrub strata species, only species-distinct models were fit for the most common species encountered.

Although multivariate ordination techniques were not considered by van Mantgem et al. (2001) as a way to strengthen the inferences made from fire ecology studies, these types of analyses can provide further insight into stand development and compositional patterns following fire (e.g., Johnson 1981, Ducey et al. 1996, Blake and Schuette 2000, Hutchinson

2004, MacKenzie et al. 2004, Rydgren et al. 2004, Hutchinson et al. 2005) in addition to more traditional statistical tests. Prior to any multivariate ordination analyses, overstory and sapling data were combined because the patchiness of sapling species distributions made the application of the randomization procedures and the calculation of most distance measures essential to many ordination techniques impossible for sapling data alone. All species IV for the lumped overstory and sapling strata and the herbaceous stratum were arcsine square root transformed prior to analysis.

Nonmetric multidimensional scaling (NMS) ordination and blocked multiple response permutation procedures (MRBP; McCune and Mefford 1999) based on species IV were used to track the composition and dynamics of the overstory and herbaceous strata on all sites. NMS is an iterative ordination technique well suited for ecological applications (Clarke 1993) and MRBP is a nonparametric multivariate test of differences between *a priori* groups (based on analysis of a distance matrix) recommended for randomized block experimental designs (Mielke 1984, McCune et al. 2002). NMS was conducted for both strata using the Sorensen distance measure using 60 runs of real data along with 50 runs of randomized data (with a maximum of 200 iterations for each run) for a Monte Carlo test of significance that similar results could have been produced only by chance (p=0.0196 for both overstory and herbaceous plant strata respectively). Following a significant Monte Carlo test, a 3-dimensional solution was chosen for the final iterative ordination for both strata where the starting point used in the final run was the best ending point in the preliminary analysis. For each ordination axis, coefficients of determination (R^2) were calculated as a proportion of the variation explained in the reduced matrix relative to the original matrix. In contrast to other ordination techniques, axis order in NMS does not correlate to the relative importance of each axis. A secondary matrix of plot level data including measured aspect (transformed following Beers et al. 1966), percent slope, slope position (e.g., ridge, cove, etc.), slope configuration (e.g., straight, convex, concave; Parker 1982), *S*, *H′*, *J′* of the respective strata, and total basal area (m^2/ha) were used to aid in the interpretation of ordination results. Relative percent ground cover data (also arcsine square root transformed) and total percent vascular plant cover were also included in this secondary matrix for herbaceous strata ordinations.

MRBP was conducted for all strata using the Euclidean (Pythagorean) distance measure (the same distance measure used for NMS should be used, but the Sorensen distance measure is incompatible with MRBP; McCune et al. 2002) and site/year as the grouping variable and aspect/slope position combination as the blocking variable. Median alignment was used so that the subsequent analysis emphasized differences among groups within blocks (McCune et al. 2002). MRBP and its parent method, multiple response permutation procedures (MRPP), both produce four statistics, the first being δ (the weighted mean within group distance, not reported). A test statistic T (the observed minus the expected δ divided by the square root of the expected δ; the smaller the value of T, the stronger the separation between groups) and its associated p value (the probability of getting a smaller or equal δ by chance) are then calculated. Finally, the chance-corrected within group agreement A is produced where $A = 1$ all sample units are identical within groups, A=0 when heterogeneity within groups is equal to the that expected by chance, and A <0 when more heterogeneity within groups is present (McCune et al. 2002). Subsequent MRPP analyses with the Sorenson distance measure were also used to further explore differences in species composition between sites and years as well as between different environmental conditions (e.g., northeast versus southwest aspects and lower and upper slope positions).

Results

Fire Behavior/Fuels on DK

Fire behavior across the subset of plots where data logger-probe units were placed on the southwest aspect of DK was highly variable (Table 1), likely resulting in part from the type, amount, and random distribution of fuels across the southwest aspect on DK before the prescribed fire (Table 2). The overall average maximum temperature was 148.3 ± 32.8º Celsius (C), but the average maximum temperatures observed at the plot level fluctuated from a low of 74.6 ± 6.0º C to a high of 249.2 ± 48.5º C with an overall absolute maximum temperature of 418º C. Calculated rates of fire spread ranged from 0.4 to 6.0 m/minute with an average of 2.3 ± 1.3 m/minute. The wide fluctuation of duration times and heat indices reported from all plots also suggest a very heterogeneous burn and subsequent effects (Table 1).

Total fuel loadings decreased significantly from 33.15 ± 6.69 metric tons/ha to 24.30 ± 5.85 metric tons/ha (p=0.0052). All fuel classification levels decreased from the prescribed fire, but one-hour fuels were the only distinct fuel classification to significantly decrease (from 0.57 ± 0.06 metric tons/ha to 0.21 ± 0.05 metric tons/ha; p=0.016) as a result.

Effects of Fire on Vegetation Structure

<u>Overstory</u>

Pre-burn overstory on DK was composed mostly of chestnut oak, table mountain pine, red oak, Virginia pine, hickory, and, to a lesser extent, various other oak species (e.g., black oak (*Quercus velutina* Lam.), and scarlet oak) and pitch pine (Tables 3, 4). One year after prescribed fire, mortality was generally low and appeared to follow the gradients of elevation and, to a certain extent, aspect. Average mortality was highest on the SW-U section, where 5% of the overstory trees and 5.5% of the basal area were killed, lowest on the SW-L section (1.2% and 1.1% average mortality of trees and basal area respectively). Average mortality was intermediate on the NE aspects where 2.5% of the trees and 2.4% of the basal area died on the NE-L section, and 4.6% stem and 2.8% basal area mortality was observed on the NE-U section. However, none of these decreases were significant among species or species groups (Tables 3, 4). As a result of the relatively unaltered species composition or abundance, H', J', or S changed nominally or (as in the case of the SW-L section) remained the same following prescribed fire on DK (Table 3). Pre- and post-burn canopy cover was highly variable but generally higher on the NE aspects and lower slopes (Table 5). Canopy cover was significantly reduced only on the SW-U section of DK (p=0.049).

Overstory composition on HM one year post-burn was very similar to DK, with the exception of the greater presence of white pine on the NE-L section (Tables 3, 4). Similar to DK, the upper elevation sections on HM had the greatest mortality, but this site from one year to two years post burn generally exhibited greater overstory mortality than that of DK pre- to one year post-burn. The NE-U section had the greatest mortality out of all of the four sections on HM (9.1% of the number of stems present and 8.5% of the basal area), partially because of the marginally significant decrease in black oak basal area (from 3.73 ± 1.44 m^2/ha to 2.95 ± 1.25 m^2/ha, p=0.049; Table 3). In contrast, the SW-U section had lower, but statistically significant, mortality rates; an average of 6.2% of the number of stems (p=0.017) and 5% of the basal area (p=0.037) present on this section died between 2003 and 2004. On the NE-L section, 5% of the trees and 2.8% of the basal area died compared to the 4.3% tree and 2.4% basal area mortality on the SW-L section. However, *H′*, *J′*, or *S* of the overstory remained unchanged on HM from one year to two years post burn (Table 3). Canopy cover two years post burn had a negative relationship with overstory mortality (Table 5).

At first glance, BK twelve years following prescribed fire appeared to have an overstory structure comparable to that of HM and DK in both 2003 and 2004 (Tables 3,4). However, mixed model ANOVA indicated that differences exist for structural parameters between each site/year combination and time since burning is not the only influence on the overstory stratum (Appendix C; Table C1). The overall mean overstory pre-burn basal area and stems per hectare on DK were significantly different from their respective value after treatment, but not from any other site/year combinations (Table 6). On HM one and two years post-treatment, basal area and stems per hectare differed from each other as well. Across all site/year combinations, the NE aspects supported a higher basal area than the SW aspects (22.70 ± 0.92 m^2/ha versus 18.77 ± 0.79 m^2/ha; p=0.016), and the L slope positions had significantly more stems per hectare (406.67 ± 16.68) than the U slopes (350.00 ± 12.25; p=0.040).

Overstory *H′* did not differ among variables tested in the ANOVA model, but *J′* and *S* were affected by site/year (Appendix C; Table C1). *J′* significantly increased and *S* decreased from one to two years post-fire on HM, while *S* on pre-burn DK was significantly higher than post-burn DK and BK (Table 6). Although average *S* changed across the chronosequence, grouping each overstory species into one of the five tree species groups may mask any species-site/year effects because this interaction was not significant in the species group importance value model even though species group itself and its subsequent interactions with aspect and slope position all were (Appendix C; Table C1). Regardless of site/year, the oak species group was the most important group in the overstory stratum followed by the pines (Figure 1A). The oaks also had higher importance on upper slopes while the shade intolerant species group was more important on lower slope positions (Figure 1B). Alternatively, the pines and the shade tolerant species were more important on the SW and NE aspects respectively (Figure 1C).

Sapling Stratum

The most abundant species in the sapling stratum on DK were the hickories, Virginia pine, chestnut oak, red oak, and various shade tolerant species (primarily red maple, striped maple, and black gum; Tables 7, 8). On DK, 19.6% of the saplings on both slope positions on the NE sections died, while 19% and 10.2% reductions in sapling basal area occurred on the NE-L and the NE-U sections respectively. Stems per hectare significantly decreased by 24.2% on the SW-L section (p=0.037), but sapling basal area only decreased by 12%. Average total stems per hectare decreased 48% (p=0.052) and basal area declined 38% (p=0.079) on the SW-U section. Similarly, H', J', and S did not differ significantly on the NE aspects between pre- and post-fire, but H' (p=0.034) and S (p=0.017) declined on the SW-L section due to the elimination of several relatively uncommon species (e.g., white ash [*Fraxinus americana* L.], black oak, table mountain pine, and pitch pine). S declined on the SW-U section (p=0.013) due to the eradication of uncommon species, which increased the importance of the hickories (p=0.034), as well as a decreased H' (p=0.0147) on this section. J' did not differ following treatment on both slope positions on the SW aspect.

Average stems per hectare on HM decreased 21% (p=0.023) and basal area decreased 11% (p=0.0372) on the NE-L section. Decreases on the NE-U section were not significant and averaged 18% for stems per hectare and 5% for basal area. A significant reduction of 19% of the trees (*p*=0.040) occurred on the SW-L section, while 16.5% (*p*=0.005) of the stems and almost 9% (*p*=0.040) of the basal area died between 2003 and 2004 on the SW-U section. Despite this relatively high mortality from one to two years post-treatment, there were no significant species or species group mortality patterns. Average *S* per sapling plot decreased (*p*=0.035) on the SW-L section, but *H′*, *J′*, or *S* did not change in the sapling stratum anywhere else on HM.

Similar to the overstory, ANCOVA did not show any species group X site/year interactions (Appendix C; Table C2). Sapling basal area on pre-burn DK differed from all other site/year combinations except HM one year post-burn (which significantly decreased the following year; Table 9). Total stems per hectare in the sapling stratum on pre-burn DK differed from all other site/year scenarios and declined on HM between years as well as from DK post burn (Table 9).

Site/year was the only significant effect indicated by mixed model ANOVA for *H′*, *J′*, and *S* (Appendix C; Table C2). *H′*, *S*, and *J′* on pre-burn DK differed from all other site/year combinations, except that *J′* did not differ from HM one year post-burn (Table 9). Once again, environmental factors (i.e. slope position and overstory basal area) influenced species group composition (Figure 2A, B). In contrast to the overstory, the hickory and shade tolerant species groups share dominance of the sapling stratum along with the oaks. The shade intolerant and pine species group are of lesser importance in this stratum probably because of their high mortality in the understory (Figure 2A). The pines in the sapling stratum (mostly Virginia pine) were more prominent on lower slope positions, but are displaced by the hickories on the upper slopes (Figure 2B). No other species group showed any correlation of importance with a particular slope position.

NMS Ordination-Combined Overstory and Sapling Strata

Further insight to the distributional patterns and dynamics of both the sapling and overstory strata, as well as the corroboration of previous results, was gained through NMS ordination, MRBP, and MRPP. The final stress and instability for the three dimensional solution were 16.65 and 0.0001 respectively, and the proportion of the variance in the original distance matrix accounted for by this final ordination was 28.4% for the first axis, 33.7% for the second, and 18.9% for the third (i.e. a cumulative R^2=81.0%). The first axis was most correlated with aspect measured at the plot level (azimuth; r=0.506), slope configuration (r=0.450), and topographic position (r=0.402) and thus represented a moisture gradient from xeric to more mesic areas (Table 10, Figure 3). The second axis was most negatively correlated with H' (r=-0.518) and S (r=-0.496), but most positively correlated with % slope (r=0.311).

Interpretation of species IV correlations with the ordination axes provided additional understanding on their silvical characteristics and distributional patterns across the landscape on all three sites (Table 11). Axis 1 (the topographical moisture gradient) was most negatively correlated with the xeric pine species table mountain pine (r=-0.648), pitch pine (r=-0.513), and Virginia pine (r=-0.511) and most positively correlated with the more mesophytic hardwoods red oak (r=0.657) and red maple (r=0.480). On the other hand, the positive correlation of red oak (r=0.657), Virginia pine (r=0.548), and table mountain pine (r=0.301) with axis 2 suggests that those species generally were inventoried in less diverse plots on steeper slopes and the negative correlation of red maple (r=-0.544), black oak (r=-0.538), and black gum (r=-0.507) with this axis suggests that these species occurred in more diverse plots on more level terrain (Table 11).

MRPP analysis indicated differences in overstory and sapling species composition with aspect (T=-7.063, A=0.012, p=<0.001) and slope position (T=-5.00, A=0.009, p=<0.001) across all site/year combinations. Although there is no clear separation of plots by site/year in the ordination diagram (Figure 3), the between year plot movement on DK and HM suggests that plots located in more xeric areas generally had a vegetation change from fire (Figure 4) even though most moved very little if at all. The interaction of environmental factors and prescribed fire is also supported by the results of MRBP, which found that overstory and sapling strata species composition together differed by site/year when aspect and slope position were considered (T=-2.329, A=0.053, p=0.018). This same analysis also shows a between year difference on HM (T=-2.260, A=0.267, p=0.034), but not on DK (T=1.407, A=-0.075, p=0.933). These results are contradictory to ANCOVA and ANOVA analyses which indicated no temporal differences when overstory and sapling strata were separate and species arranged by groups.

Overstory and sapling species composition of areas where timber harvesting occurred differed from unharvested areas (MRPP; T=-20.931, A=0.031, p=<0.001), and when harvesting history is used as an ordination overlay (Figure 5), the distribution of harvested plots were concentrated in the right quadrants of the ordination diagram (i.e. the mesic lower slopes and coves). Although it is expected that the plots in more mesic sites would generally be more species rich and diverse than those located on xeric sites, it is unknown what effect these harvests had on species composition, richness, and diversity.

Shrub Stratum

Before prescribed fire, the shrub stratum on DK was dominated by mountain laurel, scrub oak (*Quercus ilicifolia* Wangenh.), grape vines (*Vitis spp.* L.), and witch hazel (*Hamamelis virginiana* L.; Table 12). However, the high standard errors support the field observation that the distribution of these shrubs was spotty. Average total shrub mortality was high and ranged from 67% on the SW-U section, 78% on the NE-L section, to over 90% on the NE-U and SW-L sections (Table 12). All species decreased on all sections following treatment, but the only statistically significant decreases occurred on the NE-L section for mountain laurel (p=0.031) and total shrub clones per hectare (p=0.043).

Most of the mountain laurel and scrub oak were dead the first growing season post-burn on HM (Table 12), apparently as a result of the 2003 fire. Although there were no statistically significant changes from one- to two-years post-treatment, this stratum is still in a state of flux; a couple of species (grape vines on the NE-L section and witch hazel on the SW-L section) disappeared from this stratum while the number of scrub oak stems increased on the SW-U section due to resprouting.

Twelve years post-treatment, BK appeared to have a shrub stratum similar to DK before prescribed fire (Table 12), and the results of Poisson regression (Appendix C; Table C3) confirm this observation for total shrub abundance (Table 13). However, average shrub clones decreased temporally on DK and HM and also differed by site. Witch hazel and scrub oak also decreased in abundance immediately after prescribed fire, but the densities of these species on BK did not differ from pre-burn DK. In contrast, mountain laurel and grape vine both declined after treatment; however, the abundance of the later species did not differ on DK between 2003-04. Mountain laurel was the only species correlated with environmental factors (Appendix C; Table C3); this species was more abundant on NE aspects (96.67 ± 40.21 stems/ha) than on SW aspects (27.78 ± 17.24 stems/ha; χ^2 test, p=0.0001).

Effects of Fire on the Herbaceous Stratum

Tree Regeneration

Prior to treatment on DK, the shade tolerant species (e.g., red and striped maple, serviceberry) composed the majority of the tree regeneration present at all aspect and slope position combinations (Table 14, 15; see Appendix B; Table B1 for tree regeneration species groups). Although this species group was the most abundant, it decreased in number and importance following prescribed fire. Red maple abundance decreased 61% (p=0.040) on the NE-L section and its importance value was reduced (p=0.022) on the SW-L section (Table 14). Striped maple stems were reduced by 75% (p=0.030) on the NE-U section, which decreased its importance value (p=0.002) as well. The importance value of striped maple also decreased on the SW-U section (p=0.032), due to a reduction in the average percent cover of this species. These changes, in conjunction with other shade tolerant species, caused this species group to decline in number (p=0.024) and importance (p<0.001) on the NE-U section and in percent cover (p=0.014) on the SW-U section (Table 15).

Stem densities of the pine and oak species groups did not change significantly following prescribed fire on DK (Table 14, 15). Surprisingly, the number of pine seedlings averaged 94%, 86%, and 50% decreases on the SW-L, SW-U, and NE-L sections respectively, but an average increase of 300% was observed on the NE-U section (Table 15). Oak stem abundance on the NE-U section also increased by 23% with decreases on all other sections. Small increases in hickory stem density and percent cover combined with the diminished importance of pine regeneration increased the importance value of hickory (p=0.027) on the SW-L section.

Unlike all other tree regeneration groups, the shade intolerant species group tended to increase in number and dominance all around DK after burning (Table 14, 15). Average increases in stems per hectare (156%; p=0.040), percent cover (89%; p=0.045), and importance value (325%; p=0.005) occurred on the NE-U section, and increases in stems per hectare (p=0.022) as well as importance value (p=0.024) were documented on the SW-U section (Table 15). The post-burn invasion of species like black locust, sassafras, yellow poplar, and ailanthus are, in part, responsible for these increases. Ailanthus increased exponentially in number (p=0.032) and in importance value (p=0.007) on the NE-U section, and appeared on both slope positions on the SW aspect as well. It should be noted, however, that its seedlings also appeared in plots that failed to burn within this unit.

Tree regeneration on HM one year post-burn was composed primarily of shade tolerant species (Table 14, 15) except on the NE-L and the SW-U. However, by the second year on the NE-L section, average percent cover of this species group increased 109% (p=0.038; Table 15). Hickory numbers increased 225% (p=0.017), resulting in a 40% decrease in shade intolerant species importance value (p=0.034) in conjunction with the vast mortality of yellow poplar seedlings between years (Table 15). There were no significant tree regeneration responses on the NE-U section but the disappearance of pine regeneration and the appearance of an ailanthus seedling in 2004 are both noteworthy findings (Table 14). The SW-L section did not have any significant regeneration responses either, but the hickories and shade intolerant species increased in average number by 86% and 400% respectively, though these increases are spatially concentrated in a few specific plots and shade tolerant species dominate the tree regeneration on this section as well (Table 15).

In contrast, regeneration on the SW-U section of HM is less spatially variable. One year post-burn, the oak, pine, and shade tolerant species groups all have comparable importance values (Table 15). Although somewhat diminished by the second year, the increase in the number and cover of oak stems on this section (most of which are of sprout origin; Table 14) appears to have allowed this species group to maintain its importance in the regeneration stratum. The pines increased in importance value by 31% through increases in stem number (25%) and cover (100%), though none were significant (Table 15). However, between 2003 and 2004, many of the new germinant *Pinus spp.* seedlings developed enough so that identification to species (e.g., table mountain, pitch, or Virginia pine) could be made but only Virginia pine significantly increased in number (p=0.035; Table 14). Big-toothed aspen (*Poplulus grandidentata* Michx.) increased dramatically on several plots on the SW-U section (Table 14).

Tree regeneration on BK twelve years post-burning is somewhat similar to DK and HM, with the shade tolerant species group having highest importance on all four aspect/slope position combinations on BK (Table 14, 15). In fact, mixed model ANCOVA of regeneration data (Appendix C; Table C4) establishes shade tolerant species as the most important group regardless of site/year and environmental factors, followed by oaks, then the equally abundant hickories, shade intolerants, and pines (Figure 6). However, species group importance value also differed with site/year and site/year X total basal area (Appendix C; Table C4, Figure 7A-E, Figure 8A-E). The importance value for the hickories was significantly higher on DK in 2004 than on HM, but did not differ elsewhere (Figure 7A). The shade intolerant species group on pre-burn DK and BK was lower in importance than on DK post-burn and HM both years (Figure 7B). Although the importance value of oak on BK was significantly higher than any other site/year except HM immediately after prescribed fire (Figure 7C), the oaks did not show any other response to prescribed fire and the pines' importance value (Figure 7D) did not differ between any site/year. In addition, the shade tolerant species group (Figure 7E) was significantly higher on DK before burning than on any other site/year.

Modeling tree regeneration as a function of site/year and total basal area provided additional information on tree regeneration trends following prescribed fire (Figure 8A-E, model information is provided in Appendix C; Table C5) but all models should be interpreted cautiously due to their general poor performance. The hickories did not respond significantly to changes in basal area on all site/year combinations, but their importance value tended to have a positive relationship with basal area on DK (both years) and HM two years post-burning (Figure 8A). Shade intolerant species importance in the regeneration had a weak negative relationship with basal area on all site/year combinations, except on HM one year post-fire (p=0.001), likely due to the germination of sassafras and yellow poplar from the seed bank (Figure 8B). The oaks exhibited an inverse relationship between importance value and basal area on HM one and two years post-burning and a positive relationship everywhere else, but the slopes of each regression model were non-significant (Figure 8C). However, an inverse relationship between species group importance value and total basal area was evident in the pines (Figure 8D). This trend was the strongest on BK (p=0.0002), and HM one (p=0.036) and two (p=0.013) years following prescribed fire. As expected from previous analyses, the shade tolerant species dominate tree regeneration everywhere except at lower basal areas on HM both years (p=0.025 and p=0.002 respectively) and on BK (p<0.001; Figure 8E).

Complete Herbaceous Stratum

Including tree species, 276 distinct taxa in total were inventoried in the herbaceous layer across all three sites in 2003 and 2004 (Appendix B; Table B2). Of this total, 58% (159) were classified to species, 7% (20) could be identified to genus or Carex tribe with an additional 5% (14) classified further to between two species (e.g., *Carex pensylvanica/lucorum*) and 8% (24) possessed features similar to a distinct species but lacked the distinguishing characteristic(s) to positively identify to that taxonomic level with confidence. The rest (59) could not be identified. All but one specimen could not have its habit identified, thus 158 ferns and forbs, 60 graminiods, 27 shrubs and vines, and 30 tree species were included in habit grouping analyses. Similarly, 66 specimens could not be classified by functional type and therefore these analyses included 6 exotics, 8 exotic invasives, 162 natives, 5 native invasive weeds, and 29 native weedy species.

On DK, total percent cover of the herbaceous stratum per 1 m^2 plot significantly increased on the NE-U (p=0.009) and the SW-U (p=0.014) sections following prescribed fire (Table 16). H' and J' remained unchanged on all sections, but average S increased on the SW-U section (p=0.041).

Total percent cover increased on the NE-U (p=0.027), SW-L (p=0.021), and SW-U (p=0.001) sections of HM from one to two years after burning (Table 16). H' remained the same between 2003 and 2004 even though J' decreased on the SW-L section (p=0.016) and average S significantly increased on every section (p<0.05 for all sections).

The herbaceous stratum on BK was similar to DK and HM in some aspects (Appendix C; Table C6). Average total percent cover on pre-burn DK and HM one year post fire were lower than on DK the following year, all of which were significantly lower than observed on HM two years and BK twelve years post-burn (Figure 9). Average total percent cover was significantly higher on the NE aspects than the SW aspects overall (Figure 9). Across all site/year combinations, average percent cover generally decreased with increasing basal area (Figure 10; linear regression model parameters are presented in Appendix C; Table C7), but this relationship was only significant on HM in 2003 (p=0.039) and 2004 (p<0.0001).

H' of the herbaceous stratum was influenced by the interaction of site/year and slope position, but was generally the lowest on the upper slope positions of HM one-year and BK twelve years post-burn (Figure 11). J' also responded to slope position (with the lower elevations of all site/year combinations being more even than the upper) and site/year, but every site/year combination did not differ from pre-burn DK (Figure 12A). However, the J' of the herbaceous stratum on HM one-year post-burn was significantly higher than all other site(s)/year(s). Average S per 1 m^2 on pre-burn DK was significantly higher after treatment on this site and on HM two years post-burn (Figure 12B). Both DK one year and HM two years after burning had higher small-scale species richness than HM one year post-burn, but only HM two years after treatment was significantly higher than BK twelve years after prescribed fire.

Prior to prescribed fire on DK, the dominant species habit group on every section was the shrubs and vines with species of blueberries (*Vaccinium pallidum* and *Vaccinium stamineum*) and, to a lesser extent, black huckleberry (*Gaylussacia baccata*) composed the vast majority of this group (Table 17, species specific data are presented in Appendix C; Tables C8, C9). On DK post-burn, no other habit group significantly increased in mean percent cover except the shrubs and vines on the NE-U section (p=0.045). However, on this section, the relative importance of ferns and forbs increased 18% (p=0.015) and that of trees decreased 43% (p=0.010). Ferns and forbs also exhibited increases in importance value on the SW-L (48%; p=0.023) and on the SW-

U (111%; *p*=0.006) sections largely through non-significant increases in percent cover (especially on the latter section; Table 17).

The post-burn cover or importance value of exotic and exotic invasive species did not change significantly anywhere on DK following prescribed fire (Table 18). Native species percent cover increased 43% (*p*=0.009) on the NE-U section (partially resulting from the resprouting of ericaceous shrubs such as the blueberries) and the importance of native weeds decreased 40% (*p*=0.035) on this section as well. The only other significant change in functional type groups on DK was the exponential increase in the percent cover (*p*=0.022) and the importance value (*p*=0.016) of native invasive weeds on the SW-U section resulting from the extensive germination of buried grape vine (*Vitis spp.*) seeds and resprouting of fire-damaged vines on this section (Appendix C; Table C8).

On HM the shrubs and vines habit group had the highest percent cover and importance value one and two years after burning except on the NE-L section in 2004 (Table 17). On this section, increases in the percent cover of the trees (*p*=0.010), as well as the other habit groups have somewhat diminished the importance of shrubs and vines in the herbaceous layer. This phenomenon is more noticeable on the NE-U section; even though shrubs and vines increased in percent cover by 40% (*p*=0.012), their importance value decreased 20% (*p*=0.019) due in part to the 45% increase in importance of ferns and forbs (*p*=0.041). The ferns and forbs habit group also increased in importance by 50% (*p*=0.046) on the SW-L section and the trees (*p*=0.035) and the shrubs and vines (*p*=0.041) increased in percent cover as well. However, the shrubs and vines were able to maintain their relative importance unlike the NE-U section. The most noticeable changes in the herb layer on HM occurred on the SW-U section, where all species groups increased significantly in percent cover. Like the NE-U section, the importance value of the shrubs and vines decreased (p=0.036) here as well.

Exotic and exotic invasive species did not significantly increase in percent cover or importance value between 2003 and 2004 on any section on HM (Table 18). However, the native group increased in percent cover on all sections and was the dominant functional group on HM for both years. Native invasive weeds decreased in importance on the NE-U section by 61% (p=0.026) due to increases in the percent cover of all of the other groups, and native weeds increased in percent cover on the SW-U section by 410% (p=0.044).

Similar to DK and HM, shrubs and vines were the dominant species group throughout BK twelve years after burning, especially on the NE aspects (Table 17). The native species group dominated the functional groups on all sections of this site as well (Table 18). Mixed model ANCOVA of herbaceous stratum data (Appendix C; Table C10) corroborated these observations and provided insight on each species group abundance with increasing time since prescribed fire. Regardless of site/year combination and environmental influences, the shrubs and vines habit group had the highest percent cover and importance value out of all four groups, followed by the ferns and forbs and tree groups, and then the graminoids (Figure 13A, B). However, when aspect is taken into consideration, the shrubs and vines habit group has a significantly higher percent cover and importance value on the NE aspects than the SW aspects (Figure 14A, B). Overall, the graminoids habit group has a significantly higher importance value on the SW aspects. No other herbaceous stratum habit group responded significantly to aspect alone or slope position either (Figure 14A, B).

Out of the five functional type groupings, the native group had the highest percent cover (Figure 15A) and importance value (Figure 15B) overall, followed by (in descending order of both percent cover and importance value) the native weeds, native invasive weeds, exotic invasives, and exotic functional groups. Aspect also affected these groupings; the native group had higher percent cover on the NE aspects than the SW aspects (Figure 16A), but a lower importance value on the NE aspect (Figure 16B). Native weeds also had a higher percent cover on the NE aspect (Figure 16A) as well as importance value (Figure 16B). The exotic invasives were the only other functional type group to respond to aspect. The importance value of this group was significantly higher on the NE aspects than the SW aspects overall (Figure 16B).

Average percent cover and importance value of most habit groupings differed by site/year and subsequently was influenced by basal area (Appendix C; Table C10). Percent cover of ferns and forbs was the highest on HM in 2004, followed by DK post-burn and then BK twelve years after treatment (Figure 17A). Fern and forb cover on pre-burn DK did not differ from BK or HM one year post-treatment. However, post-burn DK and HM two years after burning had the highest fern and forb importance values along with HM one-year following prescribed fire, but this latter site/year combination did not differ from pre-burn DK or BK twelve years after treatment (Figure 17B). The graminoids habit group had a significantly higher percent cover on HM two years post-burn, but no other site/year differed from each other (Figure 17C). The percent cover of shrubs and vines on all site/year combinations did not differ from DK before burning (except on BK in 2003), but increased on HM from one to two years post-burn (Figure 17E). Likewise, percent tree cover on pre-burn DK only differed on BK, but significantly increased on HM between 2003 and 2004 (Figure 17G). Average importance values for the graminoids, shrubs and vines, and trees did not differ between all site/year combinations (Figures 17D, F, H).

Regression models testing the interactions of fire and plot basal area on herbaceous community dynamics (in Figure 18A-H, information on all models are presented in Appendix C; Tables C11, C12) support the previous results that the shrubs and vines habit group was the most abundant regardless of site, burn history, and basal area. Ferns and forbs percent cover had a negative relationship with basal area, but this trend was only significant on HM two years after burning (p=0.001; Figure 18A) and the importance value of this group was unresponsive across all site/year combinations (Figure 18B). Percent cover of the graminoids had a negative relationship with basal area on HM two years after burning (p<0.0001; Figure 18C) and its importance followed this same trend on HM in 2003 (p=0.048) and in 2004 (p=0.004; Figure 18D). Shrubs and vines percent cover increased with decreasing basal area on HM one (p=0.029) and two (p=0.0002) years after burning (Figure 18E) even though the importance value of this group was uninfluenced by basal area (Figure 18F). Percent cover of trees had a direct relationship with basal area on BK (p=0.042; Figure 18G), and this same trend was evident for the importance value of this group on HM one (p<0.0001) and two (p=0.001) years post-burn and on BK (p=0.038; Figure 18H).

Functional type percent cover and importance value also differed among site/year combinations as well as interacted with basal area (Appendix C; Table C10). Unlike other groups, percent cover and importance value of the exotics group did not differ with site/year; even though both have a trend of being the highest on HM two years post-burn (Figure 19A, B), their values were relatively low throughout all site/year combinations. The percent cover of exotic invasives throughout all site(s)/year(s) did not differ from that observed on pre-burn DK although post-burn DK supported a higher value than HM one year or BK twelve years after prescribed fire (Figure 19C). Similarly, their average importance value on every site/year scenario did not differ from that on pre-burn DK with the exception of BK, which was significantly lower than any other site at any time, but the importance value of this functional group on DK after treatment was also higher than that of HM in both years (Figure 19D). Percent cover of the native functional type group was significantly different on every site/year combination, with BK twelve years after prescribed fire supporting the highest cover of this group (Figure 19E). The importance value of the native group on BK was significantly higher than on pre-burn DK or HM one year after fire but did not differ elsewhere (Figure 19F). Although native invasive weed percent cover fluctuated, no differences were found between all site/year combinations (Figure 19G), but its average importance value was significantly higher on DK and HM one year after burning than on pre-burn DK (Figure 19H). However, the importance value of this functional group on HM decreased between years and HM two years after prescribed fire did not differ from that of pre- or post-burn DK (Figure 19H). Native weed average percent cover was significantly higher on HM two years post-burn than anywhere else at any time (Figure 19I), but its importance value was significantly lower on DK post-burn and on BK than the other site/year combinations (Figure 19J).

In a similar manner to the habit regression models, functional group regression models established the native functional group as the most abundant on all site/year combinations (Figure 20A-J, regression model parameters are presented in Appendix C; Table C13, C14). The percent cover and importance values of the exotic (Figure 20A, B) and exotic invasive (Figure 20C, D) did not respond to basal area across all site/year combinations, with the exception of exotic invasive importance value, which had a direct relationship with basal area (p=0.004; Figure 20D). Percent cover of natives had a negative relationship with basal area on HM one and two years after burning (p=0.002 and p<0.0001 respectively; Figure 20E), and the importance value of this group followed the same trend on HM one year post-burn (*p*=0.003; Figure 20F). Percent cover and importance value of native invasive weeds were unaffected by basal area on all sites and times since burning (Figure 20G, H). Native weed percent cover responded negatively to basal area on HM two years after burning (*p*=0.006; Figure 20I) and its importance value had a positive relationship with basal area on HM in 2003 (*p*<0.0001) and 2004 (*p*=0.020), and on BK (*p*=0.041; Figure 20J). However, native weed importance had a positive relationship with basal area on pre-burn DK (*p*=0.029).

<u>NMS Ordination: Herbaceous Stratum</u>

NMS ordination of herbaceous stratum data produced a three-dimensional solution with a final stress value of 18.76 and a final instability of 0.00009. The proportion of the variance in the original distance matrix accounted for by the ordination axes were 20.4% for the first axis, 29.5% for the second axis, and 25.4% for the third axis, yielding a cumulative R^2 of 75.2% (Figure 21). Axis 2 was most negatively correlated with total vascular plant percent cover (*r*=-0.351) and most positively correlated with *H′* (*r*=0.470), *J′* (*r*=0.450), topographic position (*r*=0.389), and slope configuration (*r*=0.348; Table 19). Axis 3 was most negatively correlated with azimuth measured at the plot level (*r*=-0.469), slope configuration (*r*=-0.341), and total basal area per hectare (*r*=-0.328) and was most positively correlated with percent cover of bare ground (*r*=0.320). *Vaccinium pallidum* (*r*=-0.641), *Vaccinium stamineum* (*r*=-0.454), *Quercus ilicifolia* (*r*=-0.431), and *Gaylussacia baccata* (*r*=-0.398) were the species most negatively correlated with Axis 2 (suggesting that these species occurred on plots with higher total percent cover, but lower *H'* and *J′* on ridges and convex slopes), while *Eupatorium rugosum* (*r*=0.587), *Vitis spp.* (*r*=0.503), *Viola sororia* (*r*=0.395), *Amphicarpea bracteata* (*r*=0.382), and *Erechtites hieraciifolia* (*r*=0.381) were most positively correlated with this axis (Table 20).

Axis 2 also represents a gradient of species reproductive strategies, as those species negatively correlated with this axis are more likely to regenerate by resprouting following fire and conversely, those species positively correlated with this axis reproduce mostly by seed. The species most negatively correlated with Axis 3 were *Acer pensylvanicum* (*r*=-0.644), *Hamamelis virginiana* (*r*=-0.522), *Eupatorium rugosum* (*r*=-0.404), and *Ostrya virginiana* (*r*=-0.374), and thus these species were more associated with more mesic plots having northeasterly azimuths while those species positively correlated with this axis like *Carex pensylvanica/lucorum* (*r*=0.527), *Vaccinium pallidum* (*r*=0.445), *Paronychia fastigiata* (*r*=0.395), and *Danthonia spicata* (*r*=0.372), were more important in drier plots with southwestern azimuths (Table 20, Figure 21).

Given these dominant moisture related axes of azimuth and topographic position, plot groupings in the resulting ordination consequently appear to be primarily driven by these environmental gradients (Figure 21). As it was expected, MRPP found species composition to differ with aspect (T=-9.111, A=0.009, p=<0.0001) and slope position (T=-7.809, A=0.008, p=<0.0001), as well as these two classification variables combined (T=-10.507, A=0.018, p=<0.0001) overall, but when species composition on every site/year combination is assessed in the context of these environmental gradients through MRBP, no significant differences are found (T=0.190, A=-0.004, p=0.555). However, individual plot movement through species-space between 2003 and 2004 on DK and HM was, in general, toward the upper right quadrant of the ordination diagram (Figure 22). Or said another way, from pre- to post-burn on DK and from one to two years post-burn on HM the herbaceous stratum plots generally became more diverse and even from the invasion of species reproducing from seed like various graminoids (e.g., *Danthonia spicata*, *Carex pensylvanica/lucorum*), forbs (e.g., *Erechtites hieraciifolia*, *Eupatorium rugosum*), and grape vines. The results of additional MRBP analyses suggest that these trends were more noticeable on HM one to two years post burn (T=-1.966, A=0.126, p=0.044) than on DK (T=-0.575, A=0.024, p=0.282).

Discussion

Fire Behavior/Fuels

Effects of Fire on Vegetation Structure

Although the generalizations and inferences that can be made about the behavior of the DK prescribed fire are limited, it is clear that heterogeneity in fire behavior and its subsequent effects on vegetation dynamics is influenced by many spatial and temporal variables (e.g., topography, fuel type, amount, distribution, and moisture, weather patterns immediately before and during burning; Vose et al. 1999). The average maximum temperature of 148.3 ± 32.8º C across the 5 sample plots on the southwest aspect of DK is comparable to the 152º C average maximum temperature observed by Iverson et al (2004) in Ohio oak forests, but greater than the average temperatures observed by Hubbard et al. (2004) and less than the average temperatures of Swift et al. (1993), Franklin et al. (1997), Clinton et al. (1998), and Vose et al. (1999) using various fire monitoring techniques (Appendix A; Table A1). With the possible exception of absolute maximum temperature (Iverson et al. 2004), some of the variation in observed fire behavior between this study and others is likely accounted for by the different methodologies used, but fuel characteristics and site factors probably have a greater influence.

Other studies of fire behavior reported that available surface fuels decreased following prescribed fire (Swift et al. 1993, Clinton et al. 1998, Vose et al. 1999, Hubbard et al. 2004), with leaf litter and duff layers providing most of the fuel consumed in mixed oak forests (Riccardi and McCarthy 2002). All fuel estimates were quite variable across the southwest aspect because of sampling intensity and failure to capture the random fuel distribution pattern (Riccardi and McCarthy 2003). The amount of pre- and post-fire leaf litter was particularly affected by the destructive nature of sampling this fuel (i.e. it was sampled near the fuel sampling plot following prescribed fire). As a result of the variability in the amount and distribution of the leaf litter layer, its post-burn quantity on one plot (DSWL01) was actually higher than its pre-burn estimate, which at least partially accounts for a nonsignificant decrease in this fuel. Overall, fire behavior and fuel consumption across the limited area of DK sampled were highly heterogeneous, similar to the findings of other studies across the Appalachian region (Franklin et al. 1997, Clinton et al. 1998, Vose et al. 1999, Hubbard et al. 2004, Iverson et al. 2004). Fire behavior and pre- and post-treatment fuel loadings would have been better estimated by a more intense sampling design but logistical considerations did not permit this study to implement one.

Overstory Stratum

The same topographical moisture gradients that affect tree species distribution also influence disturbances (Harmon et al. 1983, Oliver and Larson 1996). In this study, the highest overstory mortality between years on DK and HM occurred on the upper slope positions where fires were the most intense, similar to the mortality patterns observed by Elliott et al. (1999b). However, this stratum was left relatively intact on both sites as suggested by its low mortality.

Overstory mortality on each section of DK was generally lower than or comparable to other studies of low intensity prescribed fire (Arthur et al. 1998, Elliott et al. 1999b, Waldrop and Brose 1999, Welch et al. 2000) and wildfire (Barden and Woods 1976, Groeschl et al. 1992, Regelbrugge and Smith 1994, Harrod et al. 1998) in pine-oak stands (Appendix A; Table A2). HM generally had higher average overstory mortality than DK, but lower than second year mortality increases after wildfire in a table mountain pine-pitch pine forest (Groeschl et al. 1992). The greater overstory mortality on HM suggests that additional mortality resulting from the spring 2003 prescribed fire occurred before sampling began. However, many of the trees that died on HM were the fire-damaged, low vigor trees inventoried the first growing season after treatment, which is consistent with other observed second-year mortality responses (Regelbrugge and Smith 1994; Loomis 1973, Harmon 1984 but see Elliott et al. 1999b). Regardless, additional overstory mortality will likely occur in the subsequent years on both HM and DK as fire-stressed trees succumb to secondary pests and pathogens (Loomis 1973, Groeschl et al. 1992).

The relatively low average mortality on both DK and HM precluded any significant differences in overstory basal area or stem density with the exception of the SW-U section of HM (Table 4). However, contradictory results are obtained for these structural parameters for both sites when they are assessed as a whole (Table 6). Unlike other studies (e.g., Elliott et al. 1999b), there was no species or species-group mortality patterns on either DK or HM with the exception of the black oak basal area decrease on the NE-U section of HM. *S* declined overall on both DK and HM, similar to other prescribed fires (Elliott et al. 1999b, Welch et al. 2000). However, this reduction in canopy species richness did not affect *H′*, in contrast to the findings of Elliott et al. (1999b), but *J′* increased on HM. Canopy tree *S* on BK only differed from pre-burn DK by one species on average, but no other structural parameter or species group importance differed from DK or HM in either year. This lack of structural differences between BK twelve years after fire and all other site/year combinations is similar to the nominal changes in forest structure three to nine (Barden and Woods 1976) and eighteen years (Harrod et al. 1998, 2000) after "cool" wildfires in other xeric pine-oak forests in the Appalachians.

Sapling Stratum

Consistent with other studies in pine-oak stands (Groeschl et al. 1992, Arthur et al. 1998, Harrod et al. 1998, Waldrop and Brose 1999, Elliott et al. 1999b, Welch et al. 2000), the effects of fire were generally more noticeable in the sapling stratum. Although the highest overstory mortality occurred at the upper slope positions of DK, the prescribed fire generally burned more intensely on the SW aspects, which likely accounts for its higher sapling mortality as well as the significant decrease in stem density on the SW-L section. However, the effect of fire intensity generally appears to be less noticeable from one to two years post-burn on HM, but probably from mortality prior to this study. Regardless, all sections on HM still experienced relatively high between year mortality, and stem density significantly declined on every section except the NE-U, likely reflecting fire-damaged tree mortality.

Even though sapling basal area and stems per hectare declined between years, basal area on pre-burn DK did not differ from HM one year post-burn. BK had similar structural characteristics as all other site/year combinations except pre-burn DK, suggesting that the effects of prescribed fire on the sapling stratum last at least twelve years. In contrast to this study, Harrod et al. (2000) found that eight years after intense wildfire in xeric forests of the Great Smoky Mountains National Park, sapling stratum densities were comparable to their pre-burn values because of the initiation of a new cohort of pine and oak species. Barden and Woods (1976) and Vose et al. (1997) also reported similar results for intense wildfires and "fell-and-burn" treatments, respectively. However, the general lack of fire effects on the overstory of BK likely precluded the establishment of a new cohort of shade intolerant pine and oak species. In fact, the sapling stratum of BK is probably more structurally similar to "cool" wildfire stands (Barden and Woods 1976, Harrod et al. 1998, 2000), but there are intense burn areas from the 1992 fire where species of pine and oak are successfully regenerating on this site.

Given the minimal effects of prescribed fire on the overstory, the same vegetation patterns typical of the Appalachian region (e.g., Cantlon 1953, Whittaker 1956, Hack and Goodlett 1960, Hurst 1994, Stephenson and Mills 1999) were generally maintained on all sites (Figure 3). NMS ordination suggests that mortality in xeric areas of DK and HM was high because post-burn DK plots are in outlying positions of the upper and lower left quadrants of the ordination (Figure 4). The general plot movement along axis 1 was from the mesic (right) to drier (left) prescribed fire where enough pines and oaks survived to maintain stand characteristics along the moisture gradient (Groeschl et al. 1992, Regelbrugge and Smith 1994, Elliott et al. 1999b, Waldrop and Brose 1999). However, most plots on DK and HM changed very little (or not all) between 2003 and 2004.

Twelve years post-burn, most of the plots on BK appear to be in the drier areas of species space, although this distribution could be a sampling artifact (Figure 3). For example, the abundance of yellow poplar, yellow birch (*Betula alleghaniensis* Britton), sweet birch (*Betula lenta* L.), and eastern hemlock caused the plots grouping in the lower right quadrant of the ordination. Even on BK where some plots were located in fire-decimated areas, NMS ordination arranged these plots along an anticipated moisture gradient due to high oak (Harrod et al. 1998,

2000) or pine (Barden and Woods 1976, Harrod et al. 1998, 2000) abundance. This lack of separation of BK intense burn plots suggests strict site-influenced vegetation patterns similar to that documented by Liu et al. (1997) for longleaf pine (*Pinus palustris* Mill.) forests following prescribed fire.

The previous timber harvesting also influenced vegetation structure even though all harvesting activities were generally restricted to coves and lower slopes (Figure 5; C. Waggy, Dry River Ranger District, G.W.N.F., personal communication). For example, the overall DK pre-burn overstory basal area was still comparable to BK and lower than HM probably because of the greater extent of timber harvesting on DK. Field observations and diameter distributions (not shown) indicate that large diameter oaks were present in many of the plots located in coves and the more mesic lower slopes on HM and BK, but trees of this stature were not as prevalent on DK. The greater presence of white pine on the NE-L section of HM can also be explained by the direct seeding of this species after the 1970s' harvests.

In the absence of fire or other cultural practices, partial harvesting promotes the development of shade tolerant understories especially on high quality sites (e.g., Abrams and Nowacki 1992, Schuler 2004). However contrary to these and other studies (e.g., Crow 1988, Lorimer et al. 1994, Stephenson and Fortney 1998), oaks were one of the three most important species groups (along with the hickories and the shade tolerant species) in the sapling stratum over all site/year combinations. It is possible that oak did successfully regenerate following harvesting and that xeric conditions may slow or prevent oak replacement (Abrams 1992). The presence of oak in the understory could also be attributed to the tendency for chestnut oak to succeed table mountain pine-pitch pine stands in the absence of periodic fires on all but the harshest sites (Whittaker 1956, Zoebel 1969, Williams and Johnson 1990, Williams 1998). The presence of chestnut and white oak in the subcanopy layers of old-growth forests has also been documented (Rentch et al. 2003, McEwan et al. 2005) and has been observed in this study as well. With additional canopy disturbances, these species could grow into the overstory (Rentch et al. 2003).

Table mountain pine and pitch pine were generally rare or nonexistent in the sapling stratum (Hunter and Swisher 1983, Williams and Johnson 1990, but see Barden 1988). However, the secondary importance of the pines species group is because of the abundance of Virginia pine saplings. Virginia pine grows at lower elevations (Whittaker 1956) and colonizes disturbed areas (Carter and Snow 1990; Fenton and Bond 1964). Many stands of this species on HM, BK, and especially DK were located in old harvested areas as indicated by cut stumps (Figure 5; M.A. Marsh, personal observation). Although Virginia pine is intolerant of shade, and requires high light levels and bare mineral soil for successful germination and survival (Carter and Snow 1990), it has been observed growing into canopy gaps created by the southern pine beetle (*Dendroctonus frontalis* Zimmerman; Duncan and Linhoss 2005). Therefore, it may be able to survive in the understory on sites with fairly low stocking.

Shrub Stratum

A dense shrub stratum is important ecologically because its low shade influences tree regeneration growth (Clinton et al. 1994, Waterman et al. 1995, Beckage et al. 2000), and herbaceous plant diversity (Clinton et al. 1993, Ducey et al. 1996). Before prescribed fire on DK, the shrub stratum was composed of mountain laurel (McEvoy et al. 1980, Monk et al. 1985, Lipscomb and Nilsen 1990), and scrub oak (Reiners 1967, Hallisey and Wood 1976, Seischab and Bernard 1991) on more xeric sites, and grape vines and witch hazel in more mesic portions as suggested by field observations and NMS ordination of herbaceous stratum data (witch hazel was negatively correlated with axis 3 [r=-0.522], and grape vines were positively correlated with axis 3 [r=0.503]; Table 20). The number of plots where shrubs were inventoried was relatively small because of their clumped distributions, but all species tended to decrease following fire. The reduction of the shrub stratum is consistent with other studies of prescribed fire in pine-oak (Groeschl et al. 1992, Elliott et al. 1999b, Randles et al. 2002) and oak (Moser et al. 1996) stands.

The lack of significant decreases for witch hazel and grape vines on DK is probably due to the tendency for these species to grow in moister areas (e.g., coves and more mesic slopes) where the prescribed fire had lower impact. Conversely, mountain laurel and scrub oak may have shown more dramatic reductions because they were more prevalent on drier sites were the prescribed fire burned hotter. The fact that HM had less shrub clones than DK is likely because the HM prescribed fire was generally a more intense disturbance than the "cooler" and patchier DK fire. The lack of a significant difference in shrub stratum abundance between unburned DK and BK suggests that the absence of this stratum on post-burn DK and HM will likely be temporary due to resprouting rootstocks (Hooper 1969, Clinton et al. 1993, Vose et al. 1993, Moser et al. 1996, Elliot et al. 1999b).

Scrub oak sprouts on HM appear to be increasing by the second year. Hallisey and Wood (1976) also observed the rapid resprouting of scrub oak up to four growing seasons following prescribed fire, so it is expected that this species will continue to increase in the shrub stratum on HM and soon recover to pre-burn levels on DK. Witch hazel is also increasing in abundance but the post-fire sprouting of grape vines and mountain laurel is less evident (Hooper 1969). After twelve years post-fire on BK, mountain laurel abundance is still lower than pre-burn DK. These shrubs may not have achieved their pre-burn abundance because they are not tall enough to be inventoried. However, they are of measurable size in the herbaceous stratum on BK and may eventually effect the development of the herbaceous stratum (Appendix C; Table C8). This post-fire recovery pattern for mountain laurel has also been documented thirteen years following treatment and twenty-five year old intense wildfire stands in North Carolina (Vose et al. 1993; Clinton et al. 1993). Yet, these studies have suggested that this temporary reduction in the height of the shrub stratum may be long enough to allow species of pine and oak to regenerate and grow taller than the shrubs.

Herbaceous Stratum

Tree Regeneration

Other studies of prescribed fire (Vose et al. 1997, Elliott et al. 1999b, Waldrop and Brose 1999, Welch et al. 2000) or wildfire (Groeschl et al. 1992, 1993), have found that fire results in increases in pine regeneration. However, pine seedlings on DK had high mortality on every section except the NE-U section. Table mountain pine regeneration has been suggested to fail without fire because of the lack of a high light and bare mineral soil microsite for establishment (Williams and Johnson 1992). Williams et al. (1990) have also shown the detrimental effect of deep litter on pine seedling survival, but subsequent research indicates that their roots can penetrate thick duff layers (Waldrop and Brose 1999, Waldrop et al. 1999). However, these studies have only followed seedling survival up to one year. Harrod et al. (2000) have shown a negative correlation of pine seedling densities four years after wildfire with post-burn litter depth, which suggests a hot surface fire is important for pine seedling establishment. Regardless, there were significant increases in bare ground on every section of DK ($p<0.001$ for all, data not reported).

The amount of variability in cone and seed production of table mountain pine (McIntyre 1929, Gray et al. 2002), pitch pine, and Virginia pine is not definitive. Virginia pine and pitch produce good cone crops approximately every 3 years with dispersal in the late fall/early spring (Carter and Snow 1990, Little and Garrett 1990). However, dispersal is more irregular with pitch pine (especially serotinous cones) and with both serotinous and non-serotinous cones of table mountain pine (Della-Bianca 1990, Little and Garrett 1990). Weather patterns (e.g., drought) also affect seedling survival (Little and Garrett 1990, Williams et al. 1990, Elliott et al. 1999b).

Field observations indicate that the majority of pine seedling increases on DK were located in or adjacent to intensely burned pine dominated plots and/or plots on xeric, upper slopes. Regression models show a general increase of pine regeneration importance from low intensity burn areas/mesic sites (high basal area) to high intensity burn/xeric sites especially on BK. This result is consistent with findings from other studies (Barden and Woods 1976, Groeschl et al. 1992,Harrod et al. 1998), but Waldrop and Brose (1999) argued that fire does not have to completely remove the canopy for pine regeneration to be successful. The correlations of table mountain pine (r=0.306) and pine seedling (r=0.322) importance in the herbaceous layer with axis 3 of the herbaceous stratum NMS ordination suggests these species were more prevalent in xeric environments on all site/year combinations. Harrod et al. (2000) also reported a similar correlation of pine seedlings with xeric environments four years following wildfire. Regardless, the density of residual overstory and sapling strata will undoubtedly effect the subsequent survival of these pine cohorts on all site/year combinations (Elliott et al. 1999b, Waldrop and Brose 1999, Welch et al. 2000).

The ineffectiveness of single prescribed fires in enhancing oak regeneration has been well documented throughout the Appalachian region (Johnson 1974, Nyland et al. 1982, Wendel and Smith 1986, McGee et al. 1995, Arthur et al. 1998, Kuddes-Fischer and Arthur 2002, Franklin et al. 2003, Gilbert et al. 2003, Iverson et al. 2004b). However, single fires have improved oak reproduction, particularly where canopy openings were also created by the fire (Moser et al. 1996, Elliott et al. 1999b). Other studies have also documented the ability of prescribed fire to reduce competition from fire intolerant species (Reich et al. 1990, Kruger and Reich 1997a, Barnes and Van Lear 1998, Brose and Van Lear 1998), and stimulate prolific oak sprouting, especially where the fire was hotter (Moser et al. 1996). In this study, shade tolerant species still composed the majority of all tree reproduction regardless of site or time since prescribed fire because they can survive in shade and grow rapidly following burning (Wendel and Smith 1986, Arthur et al. 1998, Elliott et al. 1999b, Welch et al. 2000, Kuddes-Fischer and Arthur 2002). However, prescribed fire may not have to be an intense, stand-replacing disturbance to increase oak regeneration abundance. It has generally been accepted that increases in understory low shade resulting from fire suppression greatly contribute to the lack of oak regeneration (Lorimer 1994, Lorimer et al. 1994, Johnson et al. 2002). Even-aged silvicultural treatments aimed at maintaining oak have sought to increase understory light levels to increase the size of oak regeneration while suppressing the growth of faster growing species (e.g., yellow poplar) before the removal of the overstory (Loftis 1990, Johnson et al. 2002). Therefore, the reduction in the density of the shrub and sapling strata through prescribed fire may increase oak abundance and growth by reducing low shade detrimental to its survival (Lorimer et al. 1994, Dolan and Parker 2004, Wang et al. 2005).

Although this study did not quantify percent canopy cover or understory light levels on BK, the temporal effects of reduced understory density in conjunction with numerous oak sprouts found on intensively burned plots and the low importance of shade intolerant species on this site may have resulted in the higher oak importance on BK. It is possible that oak has a higher importance value on BK because it generally has a higher percent cover than any other site/year combination (with only 2 exceptions; Table 15) along with lower importance of shade intolerant and shade tolerant species. In contrast, McGee et al. (1995) reported no size increase in red oak regeneration relative to other species twelve years after prescribed fire. Differences in the relative shade tolerance between red oak and chestnut oak (the most common oak species in this study, it is also more shade tolerant than red oak; McQuilkin 1990) as well as regional differences may help explain these inconsistent results. Nevertheless, the less common and more shade intolerant oak species (scarlet and black oak) in this study may not be able to regenerate without intense canopy disturbances and the intermediate shade tolerant oaks (red and chestnut) generally are not able to survive in the understory. However, periodic burning may help improve the abundance and growth of chestnut oak (Arthur et al. 1998) and other oak species (Keetch 1944, Carvell and Tryon 1961, Barnes and Van Lear 1998) in the regeneration stratum, especially on low quality sites.

Like the oaks, the lack of hickory recruitment has also been attributed to altered disturbance regimes (Sork 1983, McCarthy 1994). Its increases in importance on DK and HM during 2004 due to resprouting stems and ability to survive in the sapling stratum (Smalley 1990) will likely maintain its presence in the post-fire landscape of all three sites. In contrast, the current abundance of shade intolerant regeneration will probably decrease under a closed canopy unless overstory mortality occurs. The post-fire invasion of species like yellow poplar (Vandermast et al. 2004; Barnes and Van Lear 1998; Shearin et al. 1972), black locust, sassafras (Elliott et al. 1999b, Kuddes-Fischer and Arthur 2002, Franklin et al. 2003, Markwith and Parker 2003, Elliott et al. 2004) and ailanthus all led to increases of the shade intolerant species groups on DK and HM. However, their importance value on BK twelve years after prescribed fire is diminished probably because of shade. Recent studies have suggested that forest management activities such as timber harvesting (Hutchinson et al. 2004, Kota 2005) and prescribed fire (Hutchinson et al. 2004) may facilitate the germination of ailanthus seed. However, ailanthus has also been observed invading undisturbed forests and canopy gaps (Ingo 1995, Knapp and Canham 2000), indicating this tree has a wide ecological plasticity characteristic of many exotic invasive species. In this study, field observations tend to corroborate the need for anthropogenic disturbances (e.g., access roads and timber harvesting) to move ailanthus seed. Overstory trees of this species are present in and around all three sites where timber-harvesting activities formerly occurred. However, disturbance may not be necessary for ailanthus germination and growth because there was an ailanthus seedling on the NE-U section of DK before prescribed fire and new seedlings in areas of this management unit that failed to burn. Field observations also suggest that while ailanthus seedlings were relatively abundant all over DK and HM in 2004, the sampling intensity was not sufficient to capture their true abundance. Although no formal vegetation sampling was conducted on BK during 2004, every plot was revisited to collect increment cores and only one ailanthus seedling was observed in the regeneration stratum. Given the fact that this study generally under-sampled every vegetational stratum, the failure of the experimental design to sufficiently sample this, and other exotic species (see below) suggests the need for future research to develop alternative sampling techniques to document the invasion and abundance of these unwanted species. Future inquiries should investigate the biotic (e.g., seeds present in the seed bank) and abiotic (e.g., climate) factors that triggered the initial widespread germination of ailanthus all over DK, and monitor vegetation dynamics on adjacent sites before they are treated with prescribed fire.

Combined Herbaceous Stratum

The herbaceous stratum was the most dynamic vegetation layer following prescribed fire. Most studies in pine-oaks stands have observed increases in total percent cover of herbaceous plants following prescribed fire (Buell and Cantlon 1953, Arthur et al. 1998, Elliott et al. 1999b, Kuddes-Fischer and Arthur 2002). In this study, percent cover increases on DK and HM generally coincided with those sections where fire intensity was the greatest. However, even though this negative relationship between overstory basal area and herbaceous percent cover has been documented for other pine-oak stands in the Appalachians (Harrod et al. 2000) as well as for mixed conifer forests of the western U.S. (Keeley et al. 2003), HM was the only site with significant increases in herbaceous plants with decreasing basal area. The lack of significance of this relationship on DK and BK can be attributed to the lower intensity prescribed fire on both sites and the subsequent canopy closure on BK even where the fire effects where more intense (Oliver and Larson 1996, Keeley et al. 2003).

While fire suppression in xeric pine-oak stands is thought to be correlated with low herbaceous cover (Harrod et al. 2000), the lack of a difference between pre-burn DK and HM one year post-burn is somewhat consistent with other studies that have also documented one-year post-burn reductions in percent cover (Elliott et al. 1999b, and Welch et al. 2000) with subsequent increases similar to that observed between years on HM (Groeschl et al. 1992, Elliott et al. 1999b, Harrod et al. 2000). The nonsignificant difference in percent cover between DK and HM one year after fire, and the fact that percent herbaceous cover increased from pre- to post-burn on DK could be related to fire characteristics. The less intense but more heterogeneous fire effects on DK may have resulted in greater biotic reserves through resprouting and buried seeds as well as seed movement from unburned areas that facilitated quicker recolonization and growth of the herbaceous stratum (Turner et al. 1997). Regardless of this spatial variability in fire effects and plot basal areas, herbaceous stratum percent cover was highest on BK and HM two years post-burn. Harrod et al. (2000) reported elevated percent cover values the first eight years following wildfire but a decline to pre-burn levels 18 years after. McGee et al. (1995) documented elevated herbaceous cover for 12 years after prescribed fire.

Overall, S increased on DK and HM, similar to the findings of other studies (Arthur et al. 1998, Elliott et al. 1999b, Welch et al. 2000, Kuddes-Fischer and Arthur 2002). The heterogeneity in herbaceous stratum structure between years on DK and HM may also account for the increases in S. However, S on BK only differed from HM two-years post-burn, contrary to other studies that have documented higher S for pine-oak and oak forests eight (Harrod et al. 1998) and 12 years (McGee et al. 1995) and post-burn respectively, relative to unburned areas. Vandermast et al. (2004) also observed depressed H' values after prescribed fire on middle and upper slope positions due to higher J' on lower slope positions after burning, but J' only differed from one to two years post-burn on HM. These results are contrary to the findings of Groeschl et al. (1992) and Elliott et al. (1999b), who reported greater H' following fire, and Clinton et al. (1993), who reported greater H' and J' of the herbaceous stratum after 13 years.

The primary effect of fire on all three sites appears to be a temporary decline in relative importance of the shrubs and vines habit group (specifically ericaceous shrubs like *Vaccinium pallidum*, *Vaccinium stamineum*, and *Gaylussacia baccata*). After prescribed fire on DK and HM, the ferns and forbs group increased its importance on the sections where prescribed fire was the most intense. In fact, the increases in the percent cover and importance of this group combined with increases of graminoids and trees decreased the importance of the shrubs and vines on the upper slopes. Fire typically results in increases of non-woody species in the herbaceous stratum (Gilliam and Christensen 1986, Arthur et al. 1998, Elliott et al. 1999b, Harrod et al. 2000, Kuddes-Fischer and Arthur 2002, Franklin et al. 2003, Hutchinson et al. 2005), even though surviving shrubs and woody vines resprouted vigorously in this study and others (Buell and Cantlon 1953, Reiners 1965, Matlack et al. 1993, Arthur et al. 1998, Elliott et al. 1999b, Kuddes-Fischer and Arthur 2002, Vandermast et al. 2004).

Generally, time since burning was negatively related to herbaceous cover and positively related to woody cover. On BK, woody species had their highest percent cover values and the trees had higher percent cover at higher basal areas. The comparable values of the ferns and forbs and graminoids on BK, to their respective pre-burn values on DK suggests that without recurring disturbance to keep the canopy open or alter the forest floor (e.g., expose bare soil), the increased abundance of these habit groups will be ephemeral (Smith and James 1978, Abrahamson 1984, Rego et al. 1991, Matlack et al. 1993, Harrod et al. 2000). This reversion to primarily woody growth forms and shade tolerant ferns (i.e. *Pteridium aquilinium*) has been observed 13-18 years following fire (Clinton et al. 1993, Harrod et al. 2000), but the converse has been documented as well (McGee et al. 1995).

Overall, the native group was the most abundant partly due to the inclusion of most herbaceous species (Appendix B; Table B2). Therefore, increases in the percent cover of this group on DK and HM were generally synonymous with increases in total percent cover, which subsequently influenced the importance of other groups. The increase of native invasive weed percent cover and importance value on the SW-U section due to the germination of buried grape vine (*Vitis spp.*) seeds following prescribed fire was also observed by Hutchinson et al. (2005).

Native weed cover increased on the SW-U section of HM due to the invasion of trees such as big-toothed aspen and herbaceous species such as *Acalypha virginica*, and *Erechtites hieraciifolia*, the latter a well known invader of disturbed areas where soil is exposed (Baskin and Baskin 1996), especially after fire (Groeschl et al. 1992, Harrod et al. 2000, Hutchinson et al. 2005). However, the overall percent cover of *Erechtites hieraciifolia* and the native weed group on HM two years after fire (especially at lower basal areas; Figure 20I) will likely soon diminish as suggested by their lower percent cover and importance value on BK (Figure 19I, J; Harrod et al. 2000). Still, the inclusion of several shade tolerant tree species in this group maintains its importance with increasing basal area on BK and HM one and two years after burning. The abundance of pine seedlings in this same group and associated species (e.g., *Hedeoma pulegioides*) may explain why the opposite relationship holds on pre-burn DK. The native invasive weeds had higher percent cover and importance on recently burned areas due in part to the germination of grape vines and black locust, but their respective values on BK suggest that this group will likely decline soon.

Exotic percent cover and importance were typically low and did not change significantly, except on HM two years post-burn due to the presence of *Verbascum spp*. and the non-native grass *Bromus japonicus*. The exotic invasive species group generally had its highest percent cover and importance on DK because of the presence of garlic mustard (*Alliaria petiolata*) and ailanthus, but the percent cover and importance of this group on pre-burn DK did not differ from other sites except for its lower importance on BK. However, the germination of ailanthus on DK caused the 2004 importance of exotic invasives to be higher than BK and HM, and the percent cover of this group to be higher than 2003 HM and BK. Fire has been shown to facilitate the invasion of undesirable exotics in western conifer forests (Crawford et al. 2001; Griffis et al. 2001, Keeley et al. 2003), but the opposite has been shown for eastern hardwood forests (Hutchinson et al. 2005). In this study, most exotic invasive species were present before burning on DK, and with the exception of ailanthus, none exhibited significant increases on any site. While prescribed fire may create favorable conditions for germination of exotic invasive plants, the lack of a seed source from relatively small local populations partially accounts for their post-fire scarcity (Glasgow and Matlack 2005).

Even though fire can alter plant population dynamics, the environmental gradients in conjunction with past timber harvests and road building may have contributed to the invasion and current distribution of at least two undesirable exotics, garlic mustard and ailanthus. Timber harvesting was concentrated on the lower slopes and on the northeast aspects, and field observations on all three sites (especially pre-burn DK) and ANCOVA (Figure 16B) indicated that these two species (and exotic invasives in general) appeared to be more important in these areas. Thus, it is likely that many exotic invasive species arrived because of earlier disturbances and are presently surviving on the mesic sites (Small and McCarthy 2002a, Huebner 2004). However, the drier conditions on the SW aspects and upper slopes may restrict their expansion (Howard et al. 2004, Gilbert and Lechowicz 2005). The documented reduced growth rate and reproduction of garlic mustard on drier habitats (Byers and Quinn 1998, Meekins and McCarthy

2001) corroborates field observations of this species growing only on mesic sites. Future spread of garlic mustard may be restricted by moisture gradients regardless of additional disturbances. However, ailanthus and other exotic invasive species may not have any site restrictions.

Similar to the overstory and sapling strata, the observed species patterns relative to aspect and slope positions (e.g., Huebner et al. 1995, Olivero and Hix 1998, Hutchinson et al. 1999, Small and McCarthy 2002a) were predictable regardless of fire history (Kirkman et al. 2001, Hutchinson et al. 2005). The greater percent cover of the native group on the NE aspects was related to the same pattern for shrubs and vines (Cantlon 1953) as well as total percent cover (Small and McCarthy 2002a). The percent cover and importance of the native weeds were higher on the NE aspects due to the combined effects of shade tolerant trees and various forbs. Graminoids were more important on SW aspects (Cantlon 1953, Small and McCarthy 2002a), which diminished shrub importance.

Pre- and post-burn composition did not differ on DK likely due to the resprouting of many herbaceous and ericaceous plants (Moore and Wein 1977, Abrahamson 1984, Rego et al. 1991, Matlack et al. 1993, McGee et al. 1995, Ducey et al. 1996). The addition of new species of graminoids and forbs resulted in differences in species composition between 2003-04 on HM. However, the lack of a distinct clustering of plots from any site suggests that any changes in post-fire flora were relatively minor. The primary species of ericaceous shrubs (*Vaccinium pallidum*, *Vaccinium stamineum*, and *Gaylussacia baccata*) on these three sites seem as suited to tolerate disturbances as well as the environmental extremes present through their woody growth form and rapid resprouting ability (Reiners l965, Abrahamson 1984, Rego et al. 1991, Matlack et al. 1993).

Sampling Limitations

The results of this study should be interpreted with caution because of the many confounding factors affecting the use of the "chronosequence" approach in conjunction with the statistical implications of pseudoreplication (Hulbert 1984). In addition, the small sample size relative to the landscape treated could have produced conservative overstory mortality estimates as well as other structural parameters. Although this study attempted to account for topographically-induced differences in vegetation by stratifying each site with "aspect" and "elevation" categories, it is likely that this blocking effect was too coarse due to the inclusion of southwest or northeast facing slopes in the "NE aspect" or the "SW aspect" as well as ridges and coves in each aspect-slope position scenario. For example, the results of Poisson regression imply that mountain laurel was more abundant on the NE aspects than the SW aspects. This inconsistency is likely a product of the inclusion of a few plots on pre-burn DK with many mountain laurel stems in them on the "NE aspect" although their plot level azimuths were predominantly southwest facing.

Thus, it is possible that these broad categories could have masked any specific stand type and/or topographical influence on fire intensity and average mortality rates or any other structural parameter when averaged together by section. Focusing on more distinct stand types within these burn units may have yielded different results for all strata. Also, this study did not attempt to classify any plots by a "fire intensity" category prior to analysis, which undoubtedly would have affected all structural parameter estimates (especially herbaceous stratum responses). In addition to fire intensity classifications used by other studies, sampling inconsistencies at least partially account for differing results. For example, Harrod et al. (1998, 2000) used a smaller minimum diameter of 0.5 cm to define the sapling stratum than this study (2.54 cm). However, this lower minimum diameter threshold may be more appropriate because many regenerating saplings of pine and oak less than 2.54 cm DBH were missed by the sapling plot design in intensely burn areas on BK and may have been under sampled in the four 1 m^2 herbaceous stratum plots.

This network of four small herbaceous stratum plots per overstory plot likely underestimated species richness as well (C.D. Huebner, personal observation). In addition to the failure of these plots to sufficiently sample ailanthus seedlings on DK, several exotic invasive plants (e.g., *Elaegnus umbellata*, *Lonicera spp*.) were present on these sites, but not inventoried in any plots either (M.A. Marsh, personal observation). Although it has been shown that larger plot sizes (e.g., 150-200 m^2) are needed to fully capture the true richness of this highly variable stratum (Small and McCarthy 2002b), alternative sampling techniques are likely needed to document the invasion and abundance of troublesome exotic invasive species across the landscape.

Conclusions/Management Implications

In general, these stand restoration burns produced a highly heterogeneous pattern of fire intensities and effects, characteristic of landscape-scale fires (Turner et al. 1997, Elliott et al. 1999b). However, the topographical gradients present appear to overshadow any influence of prescribed fire on vegetation structure. While past timber harvesting is likely responsible for some compositional and structural differences on all three sites, fire has generally not altered the overstory stratum as appreciably as the sapling stratum. The most noticeable vegetation effects occurred in the sapling/shrub and herbaceous strata. Without additional periodic prescribed fires, these changes will be temporary in duration due to resprouting shrubs. The developmental patterns of vegetation observed in this study suggest that prescribed fire applied at minimum intervals of 12 years may be effective in reducing the influence of midstory shrubs on subordinate strata as well as reducing sapling stratum density. The abundance of forbs and grasses in the herbaceous stratum relative to ericaceous plants will likely be maintained from similar fire return intervals.

In this study, exotic invasive plant abundance and importance were generally low on all sites and were unaffected by prescribed fire because of environmental constraints and a lack of seed source. The post-burn increase in ailanthus seedlings on DK cannot be attributed to prescribed fire alone due to the appearance of this tree in unburned areas. Regardless, land managers should work to prevent the initial invasion of exotic invasive species and remove them before treatment to guard against post-fire increases in their abundance.

Although prescribed fire tended to reduce the number of shade tolerant tree species, oak and pine regeneration were generally unresponsive to prescribed fire because of low overstory mortality. Periodic fires of higher intensity and uniformity will be required to establish adequate densities of pine and oak in addition to reducing populations competing species. Although an appropriate fire return interval of at least 12 years may be inferred from the results of this study, additional research is needed to identify the optimal timing of additional prescribed fires.

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Table 1. Fire behavior characteristics at a sub-set of sample points on Dunkle Knob (±SE).

Plot	Probes (*n*)	Temperature (º C) Avg. Max.	Temperature (º C) Max.	Heat Index[a] Avg.	Heat Index[a] Max.	Duration (min.) Avg.	Duration (min.) Max.	Rate of Spread (m/min.)
DSWL01	5	199.2 (31.5)	314	15794.0 (3439)	28776	15.4 (2.4)	23.3	6.0
DSWL04	5	97.6 (15.5)	153	7391.2 (929.9)	10124	8.6 (0.6)	9.5	1.4
DSWL05	4	121.0 (37.9)	226	25926.3 (5466.1)	36109	35.4 (5.6)	48.9	1.3
DSWU01	5	74.6 (6.0)	93	18266.6 (10634.0)	60576	9.7 (1.4)	14.8	0.4
DSWU03	5	249.2 (48.5)	418	43520.8 (29433.9)	161157	40.5 (28.2)	153.3	--[b]
Average	--	148.3 (32.8)	--	22179.8 (6100.3)	--	21.9 (6.7)	--	2.3 (1.3)

[a] The summation of all temperatures over 30º C taken at 4 second intervals, see methods section.
[b] Rate of spread at this plot is not reported or included in subsequent calculations due to an unrealistic estimate.

Table 2. Fuel loadings (metric tons per ha) on the SW section of Dunkle Knob pre- and post-burn. Average post-burn values denoted with a different letter are significantly different than their respective pre-burn values ($p<0.05$).

Plot	1 Hour Fuels		10-Hour Fuels		100-Hour Fuels		1000-Hour Fuels		Total Wood Volume	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
DSWL01	0.47	0.13	3.30	1.37	9.17	5.67	15.11	5.04	28.04	12.22
DSWL04	0.74	0.29	1.68	1.82	3.27	3.92	18.99	13.16	24.68	19.19
DSWL05	0.54	0.20	2.00	1.28	0.27	4.60	36.67	24.97	39.48	31.05
DSWU01	0.43	0.36	1.37	1.75	2.17	0.87	1.26	3.09	5.22	6.08
DSWU03	0.69	0.07	1.41	0.72	1.97	0.87	0.96	1.39	5.04	3.05
Average	.57	.21	1.95	1.39	3.37	3.12	14.60	9.53	20.49	14.31
(±SE)	(0.06)	(0.05)b	(0.35)a	(0.20)a	(1.53)a	(0.98)a	(6.60)a	(4.36)a	(6.73)a	(5.01)a

Plot	Leaf Litter		Total Fuels	
	Pre	Post	Pre	Post
DSWL01	11.21	12.93	39.25	25.15
DSWL04	10.29	7.42	34.97	26.61
DSWL05	14.62	13.36	54.09	44.41
DSWU01	13.14	8.09	18.36	14.17
DSWU03	14.06	8.14	19.10	11.19
Average	12.66	9.99	33.15	24.30
(±SE)	(0.83)a	(1.30)a	(6.69)a	(5.85)b

Table 3. Overstory summary statistics (±SE) for all three sites. Means within rows are significantly different ($p<0.05$) between years when followed by an asterisk (*).

Dunkle Knob						
Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer rubrum	6.67 (4.71)	6.67 (4.71)	0.14 (0.10)	0.14 (0.10)	1.01 (0.71)	1.01 (0.71)
Acer saccharum	2.22 (2.22)	2.22 (2.22)	0.14 (0.14)	0.14 (0.14)	0.57 (0.57)	0.57 (0.57)
Betula lenta	2.22 (2.22)	2.22 (2.22)	0.30 (0.30)	0.30 (0.30)	0.96 (0.96)	0.96 (0.96)
Carya spp.[a]	22.22 (13.92)	22.22 (13.92)	0.58 (0.42)	0.58 (0.42)	3.84 (2.37)	3.84 (2.37)
Nyssa sylvatica	4.44 (2.94)	4.44 (2.94)	0.08 (0.06)	0.08 (0.06)	0.73 (0.48)	0.73 (0.48)
Pinus pungens	80.00 (53.95)	80.00 (53.95)	3.17 (1.61)	3.17 (1.61)	16.71 (9.47)	17.00 (9.73)
Pinus rigida	24.44 (15.91)	22.22 (13.92)	0.98 (0.71)	0.91 (0.64)	5.56 (3.68)	5.99 (4.06)
Pinus strobus	26.67 (12.91)	24.44 (13.24)	0.70 (0.38)	0.66 (0.39)	4.51 (2.10)	4.20 (2.15)
Pinus virginiana	6.67 (3.33)	4.44 (2.94)	0.50 (0.27)	0.26 (0.18)	2.01 (1.03)	1.16 (0.77)
Quercus alba	2.22 (2.22)	2.22 (2.22)	0.04 (0.04)	0.04 (0.04)	0.53 (0.53)	0.53 (0.53)
Quercus coccinea	20.00 (14.14)	17.78 (13.52)	0.80 (0.53)	0.70 (0.48)	4.94 (3.47)	4.75 (3.41)
Quercus prinus	166.67 (38.44)	164.44 (38.41)	12.01 (3.29)	11.9 (3.31)	42.86 (9.57)	43.41 (9.56)
Quercus rubra	46.67 (16.33)	46.67 (16.33)	2.95 (1.23)	2.95 (1.23)	10.73 (3.58)	10.73 (3.58)
Robinia psuedoacacia	2.22 (2.22)	2.22 (2.22)	0.04 (0.04)	0.04 (0.04)	0.38 (0.38)	0.47 (0.47)
Tsuga canadensis	24.44 (24.44)	24.44 (24.44)	0.94 (0.94)	0.94 (0.94)	4.68 (4.68)	4.68 (4.68)
Total	437.78 (29.52)	426.67 (30.18)	23.37 (2.66)	22.81 (2.79)	--	--
				H'	1.11 (0.13)	1.07 (0.14)
				J'	0.72 (0.05)	0.71 (0.05)
				S	4.78 (0.52)	4.56 (0.56)

Table 3., continued.

Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer pensylvanicum	4.44 (4.44)	4.44 (4.44)	0.07 (0.07)	0.07 (0.07)	0.82 (0.82)	0.82 (0.82)
Acer rubrum	31.11 (14.19)	28.89 (14.57)	0.65 (0.31)	0.62 (0.32)	8.33 (3.34)	8.08 (3.41)
Carya spp.[a]	64.44 (26.20)	62.22 (25.04)	1.69 (0.75)	1.66 (0.73)	11.07 (4.24)	10.87 (4.13)
Nyssa sylvatica	6.67 (3.33)	6.67 (3.33)	0.23 (0.12)	0.23 (0.12)	1.37 (0.70)	1.48 (0.75)
Ostrya virginiana	2.22 (2.22)	2.22 (2.22)	0.03 (0.03)	0.03 (0.03)	0.30 (0.30)	0.30 (0.30)
Pinus pungens	4.44 (4.44)	4.44 (4.44)	0.29 (0.29)	0.29 (0.29)	0.97 (0.97)	1.20 (1.20)
Pinus rigida	48.89 (46.44)	46.67 (44.22)	1.79 (1.71)	1.76 (1.69)	7.80 (7.35)	9.35 (8.91)
Pinus virginiana	22.22 (12.22)	22.22 (12.22)	0.49 (0.30)	0.49 (0.30)	3.52 (2.01)	3.56 (2.03)
Prunus serotina	2.22 (2.22)	2.22 (2.22)	0.07 (0.07)	0.07 (0.07)	0.61 (0.61)	0.61 (0.61)
Quercus alba	2.22 (2.22)	2.22 (2.22)	0.08 (0.08)	0.08 (0.08)	0.41 (0.41)	0.41 (0.41)
Quercus coccinea	26.67 (11.55)	17.78 (7.03)	1.20 (0.47)	0.94 (0.39)	9.30 (3.52)	8.13 (3.48)
Quercus prinus	97.78 (27.98)	95.56 (28.82)	9.63 (3.07)	9.49 (3.12)	33.33 (9.02)	32.99 (9.25)
Quercus rubra	31.11 (11.60)	31.11 (11.60)	0.89 (0.23)	0.89 (0.23)	10.17 (4.03)	10.19 (4.02)
Quercus velutina	6.67 (6.67)	6.67 (6.67)	0.35 (0.35)	0.35 (0.35)	2.33 (2.33)	2.33 (2.33)
Robinia psuedoacacia	20.00 (15.28)	20.00 (15.28)	0.41 (0.33)	0.41 (0.33)	5.77 (3.59)	5.77 (3.59)
Sassafras albidum	17.78 (12.22)	17.78 (12.22)	0.38 (0.25)	0.38 (0.25)	3.90 (2.63)	3.90 (2.63)
Total	388.89 (49.23)	371.11 (41.91)	18.24 (3.13)	17.75 (3.04)	--	--
				H'	1.34 (0.13)	1.29 (0.15)
				J'	0.78 (0.04)	0.77 (0.05)
				S	5.67 (0.53)	5.44 (0.56)

Table 3., continued.

Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer pensylvanicum	8.89 (8.89)	8.89 (8.89)	0.15 (0.15)	0.15 (0.15)	2.55 (2.55)	2.55 (2.55)
Amelanchier arborea	2.22 (2.22)	2.22 (2.22)	0.04 (0.04)	0.04 (0.04)	0.34 (0.34)	0.35 (0.35)
Carya spp.[a]	26.67 (12.47)	26.67 (12.47)	0.63 (0.32)	0.63 (0.32)	6.07 (3.08)	6.11 (3.10)
Pinus pungens	62.22 (32.57)	60.00 (31.8)	2.56 (1.21)	2.41 (1.13)	13.09 (6.12)	12.71 (5.93)
Pinus rigida	37.78 (26.13)	37.78 (26.13)	1.69 (1.19)	1.69 (1.19)	8.79 (5.84)	9.12 (6.14)
Pinus strobus	33.33 (19.72)	33.33 (19.72)	1.09 (0.79)	1.09 (0.79)	11.27 (8.44)	11.27 (8.44)
Pinus virginiana	82.22 (33.57)	82.22 (33.57)	3.11 (1.19)	3.11 (1.19)	18.20 (6.38)	18.27 (6.37)
Quercus alba	2.22 (2.22)	2.22 (2.22)	0.05 (0.05)	0.05 (0.05)	0.38 (0.38)	0.40 (0.40)
Quercus coccinea	8.89 (8.89)	8.89 (8.89)	0.13 (0.13)	0.13 (0.13)	2.49 (2.49)	2.49 (2.49)
Quercus prinus	88.89 (28.11)	86.67 (26.46)	5.17 (1.45)	5.13 (1.44)	26.35 (6.06)	26.24 (5.95)
Quercus rubra	8.89 (4.84)	8.89 (4.84)	0.26 (0.14)	0.26 (0.14)	1.70 (0.89)	1.71 (0.90)
Quercus velutina	8.89 (8.89)	8.89 (8.89)	0.42 (0.42)	0.42 (0.42)	3.28 (3.28)	3.28 (3.28)
Robinia psuedoacacia	15.56 (15.56)	15.56 (15.56)	0.52 (0.52)	0.52 (0.52)	5.50 (5.50)	5.50 (5.50)
Total	386.67 (62.45)	382.22 (61.41)	15.81 (2.50)	15.63 (2.45)	--	--
				H'	1.12 (0.16)	1.12 (0.16)
				J'	0.72 (0.10)	0.72 (0.10)
				S	4.44 (0.75)	4.44 (0.75)

Table 3., continued.

Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer pensylvanicum	2.22 (2.22)	2.22 (2.22)	0.03 (0.03)	0.03 (0.03)	0.39 (0.39)	0.39 (0.39)
Acer rubrum	6.67 (6.67)	6.67 (6.67)	0.18 (0.18)	0.18 (0.18)	2.83 (2.83)	2.83 (2.83)
Acer saccharum	2.22 (2.22)	2.22 (2.22)	0.06 (0.06)	0.06 (0.06)	0.53 (0.53)	0.53 (0.53)
Ailanthus altissima	2.22 (2.22)	2.22 (2.22)	0.09 (0.09)	0.09 (0.09)	0.56 (0.56)	0.56 (0.56)
Carya spp.[a]	64.44 (26.41)	62.22 (26.76)	1.83 (0.66)	1.78 (0.67)	11.14 (4.03)	11.39 (4.28)
Nyssa sylvatica	2.22 (2.22)	2.22 (2.22)	0.03 (0.03)	0.03 (0.03)	0.82 (0.82)	0.82 (0.82)
Ostrya virginiana	2.22 (2.22)	2.22 (2.22)	0.03 (0.03)	0.03 (0.03)	0.39 (0.39)	0.39 (0.39)
Pinus pungens	26.67 (12.02)	26.67 (12.02)	1.79 (0.81)	1.79 (0.81)	7.58 (3.38)	8.11 (3.71)
Pinus rigida	2.22 (2.22)	2.22 (2.22)	0.07 (0.07)	0.07 (0.07)	0.36 (0.36)	0.36 (0.36)
Pinus strobus	17.78 (17.78)	17.78 (17.78)	1.11 (1.11)	1.11 (1.11)	5.86 (5.86)	5.86 (5.86)
Pinus virginiana	77.78 (34.39)	75.56 (34.92)	2.83 (1.39)	2.75 (1.41)	14.05 (5.93)	14.53 (6.55)
Quercus coccinea	15.56 (9.30)	11.11 (8.89)	0.49 (0.27)	0.39 (0.26)	3.67 (2.23)	2.89 (2.12)
Quercus prinus	115.56 (22.55)	111.11 (23.36)	12.9 (3.43)	12.83 (3.46)	40.78 (7.55)	42.10 (8.37)
Quercus rubra	37.78 (10.77)	31.11 (7.54)	1.79 (0.93)	0.80 (0.21)	7.74 (2.22)	5.91 (1.35)
Quercus velutina	4.44 (2.94)	4.44 (2.94)	0.32 (0.21)	0.32 (0.21)	1.89 (1.37)	1.90 (1.37)
Robinia psuedoacacia	2.22 (2.22)	2.22 (2.22)	0.08 (0.08)	0.08 (0.08)	1.04 (1.04)	1.04 (1.04)
Sassafras albidum	2.22 (2.22)	2.22 (2.22)	0.04 (0.04)	0.04 (0.04)	0.40 (0.40)	0.40 (0.40)
Total	384.44 (42.66)	364.44 (36.78)	23.67 (2.98)	22.36 (2.58)	--	--
				H'	1.30 (0.10)a	1.23 (0.11)
				J'	0.78 (0.03)a	0.76 (0.03)
				S	5.44 (0.56)a	5.22 (0.60)

Table 3., continued.

Heavener Mountain						
Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer rubrum	35.56 (13.24)	35.56 (13.24)	1.10 (0.47)	1.10 (0.47)	5.97 (2.19)	6.11 (2.29)
Acer saccharum	2.22 (2.22)	2.22 (2.22)	0.12 (0.12)	0.12 (0.12)	0.51 (0.51)	0.51 (0.51)
Carya spp.[a]	64.44 (23.28)	62.22 (22.47)	2.66 (1.21)	2.56 (1.19)	12.96 (4.53)	12.72 (4.47)
Liriodendron tulipifera	4.44 (4.44)	4.44 (4.44)	0.26 (0.26)	0.26 (0.26)	0.88 (0.88)	0.88 (0.88)
Nyssa sylvatica	6.67 (3.33)	6.67 (3.33)	0.72 (0.53)	0.72 (0.53)	1.90 (1.09)	1.90 (1.09)
Pinus pungens	13.33 (13.33)	8.89 (8.89)	0.55 (0.55)	0.35 (0.35)	4.25 (4.25)	4.59 (4.59)
Pinus rigida	4.44 (2.94)	4.44 (2.94)	0.28 (0.22)	0.28 (0.22)	0.83 (0.55)	0.85 (0.56)
Pinus strobus	120.00 (72.65)	117.78 (72.38)	6.03 (3.26)	6.00 (3.26)	19.86 (9.23)	19.97 (9.34)
Pinus virginiana	4.44 (4.44)	0.00 (0.00)	0.24 (0.24)	0.00 (0.00)	1.59 (1.59)	0.00 (0.00)
Quercus alba	31.11 (15.67)	31.11 (15.67)	1.63 (1.07)	1.63 (1.07)	6.92 (3.52)	6.96 (3.52)
Quercus coccinea	13.33 (8.82)	13.33 (8.82)	0.71 (0.54)	0.71 (0.54)	2.22 (1.63)	2.23 (1.63)
Quercus prinus	75.56 (16.25)	71.11 (16.02)	8.78 (2.31)	8.71 (2.33)	25.74 (6.03)	27.74 (7.00)
Quercus rubra	55.56 (22.55)	51.11 (21.63)	3.59 (1.70)	3.47 (1.70)	13.19 (5.66)	12.35 (5.68)
Quercus velutina	8.89 (6.76)	8.89 (6.76)	0.46 (0.36)	0.46 (0.36)	2.85 (2.36)	2.87 (2.36)
Robinia psuedoacacia	2.22 (2.22)	2.22 (2.22)	0.07 (0.07)	0.07 (0.07)	0.34 (0.34)	0.34 (0.34)
Total	442.22 (60.87)	420.00 (63.68)	27.19 (2.86)	26.43 (3.20)	--	--
				H'	1.35 (0.11)	1.29 (0.13)
				J'	0.79 (0.05)	0.81 (0.05)
				S	5.56 (0.41)	5.33 (0.55)

Table 3., continued.

Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer pensylvanicum	2.22 (2.22)	2.22 (2.22)	0.03 (0.03)	0.03 (0.03)	0.46 (0.46)	0.46 (0.46)
Acer rubrum	4.44 (2.94)	4.44 (2.94)	0.06 (0.04)	0.06 (0.04)	0.79 (0.52)	0.79 (0.52)
Carya spp.[a]	82.22 (32.39)	80.00 (31.97)	2.15 (0.97)	2.11 (0.96)	15.25 (6.23)	16.15 (6.53)
Nyssa sylvatica	13.33 (9.43)	11.11 (7.54)	0.25 (0.18)	0.20 (0.14)	2.47 (1.64)	3.67 (2.67)
Ostrya virginiana	2.22 (2.22)	2.22 (2.22)	0.05 (0.05)	0.05 (0.05)	0.42 (0.42)	0.42 (0.42)
Pinus pungens	8.89 (4.84)	6.67 (4.71)	0.40 (0.22)	0.24 (0.19)	2.44 (1.39)	1.46 (1.15)
Pinus rigida	6.67 (3.33)	6.67 (3.33)	0.21 (0.12)	0.21 (0.12)	1.63 (0.83)	2.72 (1.59)
Pinus virginiana	13.33 (7.45)	11.11 (6.76)	0.91 (0.59)	0.80 (0.59)	3.76 (2.04)	3.71 (2.02)
Quercus alba	11.11 (11.11)	11.11 (11.11)	0.47 (0.47)	0.47 (0.47)	1.91 (1.91)	1.91 (1.91)
Quercus coccinea	13.33 (7.45)	13.33 (7.45)	0.92 (0.55)	0.92 (0.55)	3.26 (1.89)	3.75 (2.23)
Quercus prinus	84.44 (13.24)	73.33 (13.74)	8.61 (1.69)	7.68 (1.77)	29.48 (4.92)	29.63 (4.77)
Quercus rubra	51.11 (27.51)	48.89 (27.91)	6.53 (3.33)	6.48 (3.34)	19.84 (9.94)	19.37 (10.04)
Quercus velutina	55.56 (19.94)	44.44 (18.19)	3.73 (1.44)	2.95 (1.25)*	14.22 (4.87)	11.88 (4.51)
Robinia psuedoacacia	2.22 (2.22)	2.22 (2.22)	0.13 (0.13)	0.13 (0.13)	0.56 (0.56)	0.56 (0.56)
Sassafras albidum	2.22 (2.22)	2.22 (2.22)	0.05 (0.05)	0.05 (0.05)	0.42 (0.42)	0.42 (0.42)
Tilia americana	13.33 (13.33)	13.33 (13.33)	0.41 (0.41)	0.41 (0.41)	3.09 (3.09)	3.09 (3.09)
Total	366.67 (28.87)	333.33 (37.12)	24.90 (2.64)	22.79 (3.36)	--	--
				H'	1.28 (0.08)	1.25 (0.08)
				J'	0.80 (0.04)	0.81 (0.04)
				S	5.11 (0.42)	4.78 (0.43)

Table 3., continued.

Species	Stems per hectare		Basal area (m²/ha)		Importance Value	
HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer rubrum	11.11 (7.54)	11.11 (7.54)	0.21 (0.15)	0.21 (0.15)	1.87 (1.25)	1.87 (1.25)
Betula alleghaniensis	2.22 (2.22)	2.22 (2.22)	0.03 (0.03)	0.03 (0.03)	0.41 (0.41)	0.41 (0.41)
Carya spp.[a]	55.56 (20.49)	55.56 (20.49)	2.16 (1.22)	2.16 (1.22)	14.43 (7.68)	14.85 (7.72)
Fraxinus americana	4.44 (4.44)	4.44 (4.44)	0.27 (0.27)	0.27 (0.27)	1.84 (1.84)	2.11 (2.11)
Nyssa sylvatica	2.22 (2.22)	2.22 (2.22)	0.03 (0.03)	0.03 (0.03)	0.39 (0.39)	0.39 (0.39)
Pinus pungens	22.22 (15.44)	22.22 (15.44)	0.85 (0.54)	0.85 (0.54)	3.72 (2.11)	4.11 (2.35)
Pinus rigida	6.67 (6.67)	6.67 (6.67)	0.25 (0.25)	0.25 (0.25)	1.74 (1.74)	2.24 (2.24)
Pinus strobus	24.44 (19.94)	24.44 (19.94)	1.77 (1.67)	1.77 (1.67)	5.47 (4.87)	5.47 (4.87)
Pinus virginiana	124.44 (52.26)	122.22 (52.43)	4.34 (1.74)	4.25 (1.75)	22.28 (8.47)	22.61 (8.45)
Quercus alba	13.33 (9.43)	13.33 (9.43)	0.59 (0.41)	0.59 (0.41)	2.86 (1.92)	2.86 (1.92)
Quercus coccinea	6.67 (3.33)	6.67 (3.33)	0.78 (0.54)	0.78 (0.54)	2.19 (1.24)	2.19 (1.24)
Quercus prinus	102.22 (25.92)	91.11 (24.75)	6.45 (1.63)	6.19 (1.60)	29.28 (6.26)	28.38 (5.77)
Quercus rubra	22.22 (8.46)	20.00 (8.82)	1.99 (0.94)	1.90 (0.96)	8.87 (3.74)	8.39 (4.08)
Quercus velutina	11.11 (5.88)	8.89 (4.84)	1.11 (0.62)	1.05 (0.61)	4.65 (2.59)	4.12 (2.36)
Total	408.89 (61.20)	391.11 (65.50)	20.84 (2.68)	20.33 (2.82)	--	--
				H'	1.26 (0.14)	1.26 (0.13)
				J'	0.81 (0.04)	0.82 (0.04)
				S	5.00 (0.67)	4.89 (0.65)

Table 3., continued.

Species	Stems per hectare		Basal area (m²/ha)		Importance Value	
HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer rubrum	2.22 (2.22)	2.22 (2.22)	0.03 (0.03)	0.03 (0.03)	0.50 (0.50)	0.58 (0.58)
Carya spp.[a]	40.00 (21.60)	40.00 (21.6)	1.02 (0.65)	1.02 (0.65)	9.10 (4.91)	9.46 (4.90)
Fraxinus americana	2.22 (2.22)	2.22 (2.22)	0.04 (0.04)	0.04 (0.04)	0.60 (0.60)	0.60 (0.60)
Nyssa sylvatica	2.22 (2.22)	2.22 (2.22)	0.04 (0.04)	0.04 (0.04)	0.47 (0.47)	0.51 (0.51)
Pinus pungens	42.22 (29.33)	37.78 (25.26)	1.96 (1.29)	1.88 (1.22)	11.52 (6.98)	12.21 (7.11)
Pinus strobus	4.44 (2.94)	4.44 (2.94)	0.22 (0.15)	0.22 (0.15)	1.27 (0.85)	1.36 (0.92)
Pinus virginiana	68.89 (28.89)	64.44 (28.24)	2.60 (0.98)	2.28 (0.84)	20.80 (8.81)	20.20 (8.50)
Quercus coccinea	6.67 (6.67)	6.67 (6.67)	0.44 (0.44)	0.44 (0.44)	2.42 (2.42)	2.61 (2.61)
Quercus prinus	88.89 (21.63)	84.44 (21.29)	6.76 (1.44)	6.58 (1.44)	33.71 (6.96)	34.23 (6.86)
Quercus rubra	62.22 (21.46)	57.78 (20.40)	3.10 (1.23)	2.99 (1.21)	18.15 (6.11)	17.54 (5.84)
Quercus velutina	4.44 (4.44)	2.22 (2.22)	0.24 (0.24)	0.10 (0.10)	1.45 (1.45)	0.70 (0.70)
Total	324.44 (24.67)	304.44 (27.64)*	16.46 (1.28)	15.63 (1.38)*	--	--
				H'	1.07 (0.06)	1.08 (0.07)
				J'	0.80 (0.04)	0.81 (0.04)
				S	3.89 (0.26)	3.89 (0.26)

Table 3., continued.

Brushy Knob			
Species	Stems per hectare	Basal area (m^2/ha)	Importance Value
BK, NE-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	2.22 (2.22)	0.04 (0.04)	0.59 (0.59)
Acer rubrum	2.22 (2.22)	0.03 (0.03)	0.58 (0.58)
Carya spp.[a]	51.11 (27.51)	1.23 (0.64)	10.33 (5.53)
Cornus florida	2.22 (2.22)	0.03 (0.03)	0.32 (0.32)
Pinus pungens	55.56 (25.12)	2.56 (1.25)	10.47 (4.06)
Pinus rigida	91.11 (41.38)	2.95 (1.38)	14.81 (6.54)
Pinus strobus	8.89 (3.51)	0.22 (0.09)	1.66 (0.74)
Pinus virginiana	37.78 (12.67)	1.59 (0.69)	8.33 (3.10)
Quercus alba	4.44 (2.94)	0.16 (0.12)	0.93 (0.63)
Quercus coccinea	40.00 (30.55)	1.55 (1.17)	8.68 (6.97)
Quercus prinus	97.78 (14.70)	7.92 (2.16)	29.48 (6.05)
Quercus rubra	35.56 (14.44)	3.24 (1.54)	13.11 (5.68)
Robinia psuedoacacia	4.44 (2.94)	0.10 (0.07)	0.70 (0.47)
Total	433.33 (47.84)	21.62 (1.98)	--
		H′	1.32 (0.09)
		J′	0.81 (0.03)
		S	5.56 (0.58)

Table 3., continued.

Species	Stems per hectare	Basal area (m^2/ha)	Importance Value
BK, NE-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Carya spp.[a]	40 (15.99)	0.88 (0.35)	7.76 (2.67)
Pinus pungens	37.78 (23.91)	1.97 (1.21)	9.52 (5.77)
Pinus rigida	17.78 (9.69)	1.35 (0.93)	5.83 (3.70)
Quercus alba	24.44 (22.05)	1.32 (1.27)	5.99 (5.54)
Quercus prinus	166.67 (42.43)	12.63 (3.33)	52.41 (10.56)
Quercus rubra	35.56 (21.55)	2.08 (1.22)	10.32 (5.78)
Quercus velutina	24.44 (12.37)	1.28 (0.65)	6.05 (2.96)
Robinia psuedoacacia	8.89 (8.89)	0.38 (0.38)	2.12 (2.12)
Total	355.56 (54.14)	21.90 (2.92)	--
		H'	0.87 (0.18)
		J'	0.64 (0.11)
		S	3.33 (0.58)

Table 3., continued.

Species	Stems per hectare	Basal area (m^2/ha)	Importance Value
BK, SW-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Carya spp.[a]	33.33 (13.74)	0.94 (0.38)	6.40 (2.21)
Pinus pungens	22.22 (15.44)	1.07 (0.77)	5.55 (4.17)
Pinus rigida	2.22 (2.22)	0.07 (0.07)	0.83 (0.83)
Pinus strobus	15.56 (13.24)	1.07 (1.01)	4.07 (3.72)
Pinus virginiana	64.44 (32.79)	1.79 (0.85)	12.71 (6.53)
Quercus alba	13.33 (9.43)	0.88 (0.60)	3.25 (2.21)
Quercus prinus	128.89 (21.37)	8.38 (1.80)	44.62 (7.33)
Quercus rubra	31.11 (11.60)	2.16 (1.06)	13.49 (6.72)
Quercus velutina	26.67 (13.74)	1.69 (0.96)	9.08 (4.89)
Total	337.78 (47.07)	18.06 (2.03)	--
		H'	1.05 (0.13)
		J'	0.84 (0.03)
		S	3.78 (0.52)

Table 3., continued.

Species	Stems per hectare	Basal area (m^2/ha)	Importance Value
BK, SW-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	4.44 (4.44)	0.07 (0.07)	1.33 (1.33)
Acer rubrum	6.67 (4.71)	0.13 (0.10)	1.76 (1.37)
Carya spp.[a]	40.00 (17.64)	1.43 (0.67)	9.43 (4.16)
Nyssa sylvatica	13.33 (11.06)	0.24 (0.21)	2.08 (1.70)
Pinus pungens	44.44 (29.96)	2.04 (1.06)	15.80 (7.37)
Pinus virginiana	4.44 (2.94)	0.08 (0.06)	0.71 (0.47)
Quercus alba	8.89 (6.76)	0.78 (0.63)	3.05 (2.44)
Quercus prinus	75.56 (24.44)	5.61 (1.98)	28.46 (9.09)
Quercus rubra	71.11 (18.59)	6.36 (2.62)	27.73 (7.70)
Quercus velutina	37.78 (25.92)	2.18 (1.48)	9.65 (6.33)
Total	306.67 (42.03)	18.92 (3.01)	--
		H'	1.08 (0.12)
		J'	0.82 (0.04)
		S	4.11 (0.51)

[a] Includes *Carya ovata*, *C. glabra*, and *C. tomentosa*.

Table 4. Overstory species groups summary data (±SE) for all three sites. See Appendix B; Table B1 for tree species groups list. Means within rows followed by an asterisk (*) are significantly different between years (p<0.05).

Dunkle Knob						
Species Group	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	22.22 (13.92)	22.22 (13.92)	0.58 (0.42)	0.58 (0.42)	3.84 (2.37)	3.84 (2.37)
Shade Intolerants	31.11 (13.79)	28.89 (14.19)	1.05 (0.61)	1.00 (0.62)	5.84 (2.69)	5.63 (2.75)
Oaks	235.56 (48.62)	231.11 (48.78)	15.79 (4.17)	15.58 (4.20)	59.06 (11.75)	59.41 (11.74)
Pines	111.11 (55.99)	106.67 (55.68)	4.64 (1.80)	4.34 (1.74)	24.28 (10.37)	24.14 (10.54)
Shade Tolerants	37.78 (32.90)	37.78 (32.90)	1.31 (1.23)	1.31 (1.23)	6.98 (6.18)	6.98 (6.18)
Total	437.78 (29.52)	426.67 (30.18)	23.37 (2.66)	22.81 (2.79)	--	--
DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	64.44 (26.20)	62.22 (25.04)	1.69 (0.75)	1.66 (0.73)	11.07 (4.24)	10.87 (4.13)
Shade Intolerants	40.00 (27.28)	40.00 (27.28)	0.85 (0.58)	0.85 (0.58)	10.28 (5.90)	10.28 (5.90)
Oaks	164.44 (31.58)	153.33 (35.28)	12.14 (2.97)	11.74 (3.12)	55.55 (9.02)	54.05 (9.95)
Pines	75.56 (49.98)	73.33 (47.84)	2.58 (1.98)	2.55 (1.95)	12.28 (8.20)	14.12 (9.93)
Shade Tolerants	44.44 (16.92)	42.22 (17.14)	0.98 (0.33)	0.95 (0.33)	10.82 (3.67)	10.68 (3.70)
Total	388.89 (49.23)	371.11 (41.91)	18.24 (3.13)	17.75 (3.04)	--	--
DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	26.67 (12.47)	26.67 (12.47)	0.63 (0.32)	0.63 (0.32)	6.07 (3.08)	6.11 (3.10)
Shade Intolerants	48.89 (22.39)	48.89 (22.39)	1.61 (0.86)	1.61 (0.86)	16.77 (9.15)	16.77 (9.15)
Oaks	117.78 (30.08)	115.56 (28.44)	6.03 (1.49)	5.99 (1.47)	34.19 (5.81)	34.11 (5.70)
Pines	182.22 (65.19)	180.00 (64.20)	7.35 (2.46)	7.21 (2.36)	40.08 (11.59)	40.10 (11.53)
Shade Tolerants	11.11 (8.89)	11.11 (8.89)	0.19 (0.15)	0.19 (0.15)	2.89 (2.53)	2.91 (2.53)
Total	386.67 (62.45)	382.22 (61.41)	15.81 (2.50)	15.63 (2.45)	--	--

Table 4., continued.

Species Group	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	64.44 (26.41)	62.22 (26.76)	1.83 (0.66)	1.78 (0.67)	11.14 (4.03)	11.39 (4.28)
Shade Intolerants	24.44 (22.05)	24.44 (22.05)	1.32 (1.23)	1.32 (1.23)	7.86 (6.77)	7.86 (6.77)
Oaks	173.33 (23.09)	157.78 (22.47)	15.51 (3.82)	14.33 (3.41)	54.07 (8.11)	52.81 (8.63)
Pines	106.67 (45.46)	104.44 (46.04)	4.69 (2.10)	4.60 (2.12)	21.98 (8.81)	23.00 (9.78)
Shade Tolerants	15.56 (9.30)	15.56 (9.30)	0.33 (0.21)	0.33 (0.21)	4.94 (3.59)	4.94 (3.59)
Total	384.44 (42.66)	364.44 (36.78)	23.67 (2.98)	22.36 (2.58)	--	--

Heavener Mountain

Species Group	Stems per hectare		Basal area (m^2/ha)		Importance Value	
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	64.44 (23.28)	62.22 (22.47)	2.66 (1.21)	2.56 (1.19)	12.96 (4.53)	12.72 (4.47)
Shade Intolerants	126.67 (72.11)	124.44 (71.86)	6.36 (3.21)	6.33 (3.21)	21.08 (9.09)	21.19 (9.19)
Oaks	184.44 (30.51)	175.56 (30.69)	15.16 (3.43)	14.97 (3.47)	50.91 (8.79)	52.14 (8.83)
Pines	22.22 (17.46)	13.33 (8.82)	1.07 (0.78)	0.64 (0.38)	6.67 (5.76)	5.44 (4.51)
Shade Tolerants	44.44 (14.05)	44.44 (14.05)	1.94 (0.74)	1.94 (0.74)	8.38 (2.67)	8.52 (2.74)
Total	442.22 (60.87)	420.00 (63.68)	27.19 (2.86)	26.43 (3.20)	--	--

Table 4., continued.

Species Group	Stems per hectare		Basal area (m^2/ha)		Importance Value	
HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	82.22 (32.39)	80.00 (31.97)	2.15 (0.97)	2.11 (0.96)	15.25 (6.23)	16.15 (6.53)
Shade Intolerants	4.44 (4.44)	4.44 (4.44)	0.18 (0.18)	0.18 (0.18)	0.98 (0.98)	0.98 (0.98)
Oaks	215.56 (29.21)	191.11 (33.68)	20.26 (2.92)	18.51 (3.39)	68.71 (4.59)	66.55 (5.22)
Pines	28.89 (10.60)	24.44 (8.68)	1.52 (0.64)	1.25 (0.60)	7.82 (3.15)	7.89 (3.01)
Shade Tolerants	35.56 (15.91)	33.33 (15.28)	0.79 (0.43)	0.75 (0.42)	7.24 (3.47)	8.43 (3.88)
Total	366.67 (28.87)	333.33 (37.12)	24.90 (2.64)	22.79 (3.36)	--	--
HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	55.56 (20.49)	55.56 (20.49)	2.16 (1.22)	2.16 (1.22)	14.43 (7.68)	14.85 (7.72)
Shade Intolerants	31.11 (19.47)	31.11 (19.47)	2.08 (1.65)	2.08 (1.65)	7.72 (4.90)	7.99 (4.97)
Oaks	155.56 (22.55)	140.00 (24.72)	10.92 (1.91)	10.50 (1.98)	47.85 (7.90)	45.94 (8.00)
Pines	153.33 (61.28)	151.11 (61.11)	5.44 (2.09)	5.35 (2.08)	27.74 (9.85)	28.96 (10.17)
Shade Tolerants	13.33 (8.82)	13.33 (8.82)	0.24 (0.16)	0.24 (0.16)	2.26 (1.50)	2.26 (1.50)
Total	408.89 (61.20)	391.11 (65.50)	20.84 (2.68)	20.33 (2.82)	--	--
HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	40.00 (21.60)	40.00 (21.60)	1.02 (0.65)	1.02 (0.65)	9.10 (4.91)	9.46 (4.90)
Shade Intolerants	6.67 (3.33)	6.67 (3.33)	0.26 (0.14)	0.26 (0.14)	1.87 (0.94)	1.96 (1.00)
Oaks	162.22 (38.51)	151.11 (37.88)	10.54 (2.31)	10.11 (2.27)	55.73 (11.13)	55.08 (10.79)
Pines	111.11 (49.79)	102.22 (45.27)	4.56 (2.01)	4.16 (1.82)	32.32 (12.93)	32.41 (12.69)
Shade Tolerants	4.44 (2.94)	4.44 (2.94)	0.07 (0.05)	0.07 (0.05)	0.97 (0.65)	1.09 (0.72)
Total	324.44 (24.67)	304.44 (27.64)*	16.46 (1.28)	15.63 (1.38)*	--	--

Table 4., continued.

Brushy Knob			
Species Group	Stems per hectare	Basal area (m^2/ha)	Importance Value
BK, NE-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	51.11 (27.51)	1.23 (0.64)	10.33 (5.53)
Shade Intolerants	13.33 (4.71)	0.32 (0.12)	2.36 (0.89)
Oaks	177.78 (32.90)	12.87 (3.07)	52.20 (10.21)
Pines	184.44 (68.86)	7.10 (2.81)	33.61 (11.56)
Shade Tolerants	6.67 (4.71)	0.10 (0.08)	1.49 (1.17)
Total	433.33 (47.84)	21.62 (1.98)	--
BK, NE-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	40.00 (15.99)	0.88 (0.35)	7.76 (2.67)
Shade Intolerants	8.89 (8.89)	0.38 (0.38)	2.12 (2.12)
Oaks	251.11 (38.17)	17.31 (3.16)	74.76 (6.09)
Pines	55.56 (25.99)	3.32 (1.57)	15.36 (7.00)
Shade Tolerants	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total	355.56 (54.14)	21.90 (2.92)	--
BK, SW-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	33.33 (13.74)	0.94 (0.38)	6.40 (2.21)
Shade Intolerants	15.56 (13.24)	1.07 (1.01)	4.07 (3.72)
Oaks	200.00 (29.06)	13.12 (1.91)	70.44 (9.18)
Pines	88.89 (41.78)	2.94 (1.33)	19.09 (8.95)
Shade Tolerants	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total	337.78 (47.07)	18.06 (2.03)	--

Table 4., continued.

Species Group	Stems per hectare	Basal area (m^2/ha)	Importance Value
BK, SW-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	40.00 (17.64)	1.43 (0.67)	9.43 (4.16)
Shade Intolerants	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Oaks	193.33 (26.46)	14.94 (3.27)	68.89 (5.16)
Pines	48.89 (31.82)	2.12 (1.10)	16.51 (7.61)
Shade Tolerants	24.44 (13.24)	0.44 (0.24)	5.17 (2.96)
Total	306.67 (42.03)	18.92 (3.01)	--

Table 5. Percent canopy cover (±SE) as measured by a spherical crown densiometer on Dunkle Knob (pre- and post-burn) and Heavener Mountain (2 years post-burn). Means within rows followed by an asterisk (*) are significantly different (p<0.05) between years.

Dunkle Knob		
Section	% Canopy Cover	
	Pre-burn (2003)	Post-burn (2004)
DK, NE-L Section	90.32 (1.86)	87.03 (3.09)
DK, NE-U Section	90.19 (0.71)	79.35 (8.37)
DK, SW-L Section	83.85 (1.44)	80.95 (4.20)
DK, SW-U Section	88.90 (1.61)	82.06 (3.62)*

Heavener Mountain	
Section	% Canopy Cover
	Two Years Post-burn (2004)
HM, NE-L Section	81.87 (8.01)
HM, NE-U Section	71.71 (8.75)
HM, SW-L Section	77.86 (7.55)
HM, SW-U Section	75.89 (4.57)

Table 6. Mixed model ANOVA results for the effects of site/year, aspect, and slope position on the structural parameters of the overstory. Means within rows with different letter(s) are significantly different (p<0.05).

Variable	Site/Year				
	DK 0	DK 1	HM 1	HM 2	BK 12
Basal Area (m^2/ha)	20.27 (1.47)a	19.64 (1.40)b	22.35 (1.36)abc	21.30 (1.49)ab	20.13 (1.24)abc
Stems per Hectare	399.44 (23.00)a	386.11 (21.50)b	385.56 (23.75)abc	362.22 (25.67)ab	358.33 (24.25)abc
H'	1.22 (0.07)a	1.18 (0.07)a	1.24 (0.05)a	1.22 (0.05)a	1.08 (0.07)a
J'[a]	0.75 (0.03)a	0.74 (0.03)a	0.80 (0.02)ab	0.81 (0.02)a	0.78 (0.03)ab
S	5.08 (0.30)a	4.92 (0.30)b	4.89 (0.24)abc	4.72 (0.25)abd	4.19 (0.30)bcd

[a] An arc sine square root transformation was applied to these data prior to analysis.

Table 7. Sapling stratum summary statistics (±SE) for all three sites. Means within rows followed by an asterisk (*) are significantly different between years (p<0.05).

Dunkle Knob						
Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer rubrum	55.56 (55.56)	55.56 (55.56)	0.26 (0.26)	0.26 (0.26)	7.91 (7.91)	7.91 (7.91)
Amelanchier arborea	11.11 (11.11)	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	0.70 (0.70)	0.00 (0.00)
Carya spp.[a]	55.56 (29.40)	55.56 (29.40)	0.12 (0.07)	0.12 (0.07)	9.91 (5.27)	13.11 (7.65)
Cornus florida	55.56 (44.44)	55.56 (44.44)	0.12 (0.10)	0.12 (0.10)	6.61 (4.74)	9.29 (6.08)
Nyssa sylvatica	77.78 (66.20)	55.56 (44.44)	0.25 (0.23)	0.21 (0.19)	6.84 (5.16)	9.02 (6.29)
Pinus pungens	77.78 (57.20)	77.78 (57.20)	0.66 (0.47)	0.66 (0.47)	13.85 (10.96)	15.41 (11.25)
Pinus strobus	55.56 (29.40)	44.44 (29.40)	0.22 (0.14)	0.20 (0.15)	14.32 (8.48)	12.06 (8.64)
Pinus virginiana	88.89 (42.31)	66.67 (33.33)	0.21 (0.10)	0.19 (0.10)	20.81 (12.04)	24.26 (13.15)
Quercus prinus	33.33 (23.57)	33.33 (23.57)	0.15 (0.12)	0.15 (0.12)	6.80 (5.30)	6.80 (5.30)
Quercus rubra	22.22 (14.70)	0.00 (0.00)	0.26 (0.17)	0.00 (0.00)	6.94 (5.32)	0.00 (0.00)
Quercus velutina	22.22 (22.22)	11.11 (11.11)	0.13 (0.13)	0.10 (0.10)	2.19 (2.19)	2.14 (2.14)
Sassafras albidum	11.11 (11.11)	0.00 (0.00)	0.07 (0.07)	0.00 (0.00)	3.11 (3.11)	0.00 (0.00)
Total	566.67 (116.67)	455.56 (91.46)	2.48 (0.65)	2.01 (0.55)	--	--
				H'	0.78 (0.19)	0.62 (0.15)
				J'	0.68 (0.14)	0.68 (0.13)
				S	2.67 (0.55)	2.11 (0.39)

Table 7., continued.

Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer pensylvanicum	155.56 (80.12)	144.44 (76.58)	0.68 (0.35)	0.67 (0.34)	9.58 (4.91)	9.19 (4.69)
Acer rubrum	166.67 (101.38)	144.44 (100.15)	1.10 (0.74)	1.06 (0.74)	13.00 (6.63)	12.71 (6.50)
Carya spp.[a]	155.56 (88.37)	144.44 (88.37)	0.93 (0.57)	0.89 (0.58)	22.93 (13.91)	25.15 (13.92)
Cornus florida	22.22 (14.70)	22.22 (14.70)	0.05 (0.04)	0.05 (0.04)	1.28 (0.93)	1.28 (0.93)
Nyssa sylvatica	33.33 (23.57)	22.22 (22.22)	0.18 (0.14)	0.14 (0.14)	4.51 (3.60)	7.03 (7.03)
Ostrya virginiana	33.33 (33.33)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	1.69 (1.69)	0.00 (0.00)
Pinus strobus	11.11 (11.11)	11.11 (11.11)	0.01 (0.01)	0.01 (0.01)	4.80 (4.80)	4.80 (4.80)
Pinus virginiana	11.11 (11.11)	11.11 (11.11)	0.01 (0.01)	0.01 (0.01)	0.87 (0.87)	0.96 (0.96)
Prunus serotina	11.11 (11.11)	11.11 (11.11)	0.13 (0.13)	0.13 (0.13)	0.79 (0.79)	0.79 (0.79)
Quercus coccinea	33.33 (33.33)	11.11 (11.11)	0.15 (0.15)	0.08 (0.08)	3.21 (3.21)	7.29 (7.29)
Quercus prinus	188.89 (91.96)	144.44 (83.52)	0.42 (0.24)	0.38 (0.24)	14.67 (9.96)	13.10 (10.01)
Quercus rubra	133.33 (55.28)	100.00 (57.74)	0.55 (0.24)	0.37 (0.24)	15.49 (6.47)	11.13 (6.65)
Robinia psuedoacacia	22.22 (22.22)	22.22 (22.22)	0.22 (0.22)	0.22 (0.22)	2.34 (2.34)	2.43 (2.43)
Sassafras albidum	44.44 (33.79)	33.33 (33.33)	0.33 (0.30)	0.31 (0.31)	4.84 (4.11)	4.14 (4.14)
Total	1022.22 (205.33)	822.22 (223.47)	4.81 (1.15)	4.32 (1.24)	--	--
				H′	0.90 (0.21)	0.72 (0.17)
				J′	0.72 (0.12)	0.72 (0.12)
				S	3.33 (0.67)	2.67 (0.50)

Table 7., continued.

Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer pensylvanicum	133.33 (133.33)	122.22 (122.22)	0.40 (0.40)	0.39 (0.39)	11.11 (11.11)	12.50 (12.5)
Acer rubrum	33.33 (33.33)	33.33 (33.33)	0.08 (0.08)	0.08 (0.08)	1.03 (1.03)	1.16 (1.16)
Carya spp.[a]	188.89 (107.3)	166.67 (86.60)	0.74 (0.42)	0.70 (0.38)	14.37 (8.37)	18.19 (10.06)
Fraxinus americana	11.11 (11.11)	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.51 (0.51)	0.00 (0.00)
Ostrya virginiana	11.11 (11.11)	11.11 (11.11)	0.01 (0.01)	0.01 (0.01)	0.34 (0.34)	0.41 (0.41)
Pinus pungens	11.11 (11.11)	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.97 (0.97)	0.00 (0.00)
Pinus rigida	11.11 (11.11)	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.62 (0.62)	0.00 (0.00)
Pinus strobus	111.11 (77.18)	100.00 (78.17)	0.44 (0.33)	0.44 (0.33)	7.58 (4.57)	6.17 (5.08)
Pinus virginiana	511.11 (220.13)	388.89 (196.81)	1.37 (0.62)	1.19 (0.60)	34.14 (11.76)	31.69 (13.92)
Quercus alba	55.56 (44.44)	55.56 (44.44)	0.30 (0.25)	0.30 (0.25)	2.64 (2.05)	3.01 (2.30)
Quercus coccinea	66.67 (47.14)	44.44 (44.44)	0.30 (0.24)	0.24 (0.24)	4.32 (2.87)	2.22 (2.22)
Quercus prinus	155.56 (97.34)	133.33 (76.38)	0.70 (0.29)	0.69 (0.28)	13.35 (5.72)	19.44 (8.92)
Quercus rubra	100.00 (50.00)	55.56 (33.79)	0.37 (0.18)	0.19 (0.11)	5.00 (2.33)	3.55 (2.05)
Quercus velutina	11.11 (11.11)	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	0.85 (0.85)	0.00 (0.00)
Robinia psuedoacacia	100.00 (70.71)	33.33 (33.33)	0.25 (0.18)	0.18 (0.18)	3.16 (2.10)	1.65 (1.65)
Total	1511.11 (267.42)	1144.44 (265.68)*	5.00 (1.05)	4.40 (1.05)	--	--
				H'	0.95 (0.20)	0.68 (0.23)*
				J'	0.68 (0.10)	0.54 (0.14)
				S	3.89 (0.72)	2.89 (0.86)*

Table 7., continued.

Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer pensylvanicum	44.44 (33.79)	33.33 (33.33)	0.20 (0.19)	0.19 (0.19)	4.67 (3.09)	2.47 (2.47)
Acer rubrum	88.89 (58.79)	44.44 (44.44)	0.46 (0.31)	0.19 (0.19)	7.14 (4.94)	2.84 (2.84)
Amelanchier arborea	33.33 (23.57)	0.00 (0.00)	0.08 (0.07)	0.00 (0.00)	1.94 (1.59)	0.00 (0.00)
Carya spp.[a]	322.22 (157.04)	144.44 (33.79)	0.94 (0.50)	0.49 (0.19)	31.88 (8.92)	51.90 (13.98)*
Cornus florida	44.44 (33.79)	11.11 (11.11)	0.15 (0.14)	0.11 (0.11)	2.52 (1.94)	1.13 (1.13)
Ostrya virginiana	55.56 (44.44)	55.56 (44.44)	0.12 (0.09)	0.12 (0.09)	8.79 (7.46)	8.79 (7.46)
Pinus virginiana	66.67 (47.14)	0.00 (0.00)	0.11 (0.09)	0.00 (0.00)	4.09 (2.71)	0.00 (0.00)
Quercus alba	22.22 (14.70)	22.22 (14.70)	0.13 (0.09)	0.13 (0.09)	6.75 (5.80)	8.17 (7.14)
Quercus coccinea	11.11 (11.11)	11.11 (11.11)	0.03 (0.03)	0.03 (0.03)	1.44 (1.44)	4.12 (4.12)
Quercus prinus	111.11 (56.38)	88.89 (56.38)	0.47 (0.26)	0.39 (0.26)	11.44 (4.69)	9.43 (4.78)
Quercus rubra	66.67 (37.27)	44.44 (24.22)	0.27 (0.16)	0.20 (0.14)	10.37 (5.49)	9.38 (4.89)
Quercus velutina	11.11 (11.11)	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.88 (0.88)	0.00 (0.00)
Robinia psuedoacacia	11.11 (11.11)	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	6.33 (6.33)	0.00 (0.00)
Sassafras albidum	11.11 (11.11)	11.11 (11.11)	0.06 (0.06)	0.06 (0.06)	1.77 (1.77)	1.77 (1.77)
Total	900.00 (197.91)	466.67 (133.33)	3.05 (0.86)	1.93 (0.77)	--	--
				H'	1.08 (0.12)	0.68 (0.20)*
				J'	0.85 (0.04)	0.60 (0.15)
				S	3.67 (0.37)	2.56 (0.53)*

Table 7., continued.

Heavener Mountain						
Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer rubrum	111.11 (38.89)	77.78 (32.39)	0.52 (0.22)	0.45 (0.22)	27.95 (10.34)	30.97 (15.07)
Carya spp.[a]	44.44 (24.22)	22.22 (22.22)	0.24 (0.16)	0.15 (0.15)	26.24 (15.15)	10.62 (10.62)
Cornus florida	22.22 (14.70)	22.22 (14.70)	0.10 (0.07)	0.10 (0.07)	3.52 (2.28)	4.73 (2.99)
Nyssa sylvatica	88.89 (61.11)	77.78 (52.12)	0.25 (0.17)	0.24 (0.16)	11.06 (7.21)	13.80 (8.78)
Pinus strobus	55.56 (37.68)	44.44 (33.79)	0.46 (0.33)	0.41 (0.31)	14.32 (10.57)	19.87 (16.33)
Quercus prinus	11.11 (11.11)	11.11 (11.11)	0.08 (0.08)	0.08 (0.08)	6.91 (6.91)	8.06 (8.06)
Quercus rubra	22.22 (14.70)	22.22 (14.70)	0.10 (0.08)	0.10 (0.08)	6.24 (4.10)	7.56 (4.83)
Sassafras albidum	11.11 (11.11)	11.11 (11.11)	0.02 (0.02)	0.02 (0.02)	3.77 (3.77)	4.39 (4.39)
Total	366.67 (108.01)	288.89 (91.96)*	1.76 (0.50)	1.56 (0.47)*	--	--
				H'	0.60 (0.18)	0.48 (0.20)
				J'	0.59 (0.15)	0.42 (0.17)
				S	2.00 (0.50)	1.67 (0.55)

Table 7., continued.

Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer pensylvanicum	22.22 (22.22)	22.22 (22.22)	0.05 (0.05)	0.05 (0.05)	3.07 (3.07)	3.07 (3.07)
Acer rubrum	11.11 (11.11)	11.11 (11.11)	0.06 (0.06)	0.06 (0.06)	1.37 (1.37)	1.89 (1.89)
Carya spp.[a]	133.33 (47.14)	122.22 (40.06)	0.75 (0.24)	0.73 (0.23)	51.17 (15.91)	53.29 (16.29)
Nyssa sylvatica	33.33 (33.33)	33.33 (33.33)	0.19 (0.19)	0.19 (0.19)	11.11 (11.11)	11.11 (11.11)
Ostrya virginiana	11.11 (11.11)	11.11 (11.11)	0.03 (0.03)	0.03 (0.03)	4.08 (4.08)	4.08 (4.08)
Pinus strobus	66.67 (66.67)	22.22 (22.22)	0.17 (0.17)	0.11 (0.11)	5.75 (5.75)	3.68 (3.68)
Quercus alba	11.11 (11.11)	11.11 (11.11)	0.07 (0.07)	0.07 (0.07)	3.66 (3.66)	3.66 (3.66)
Quercus prinus	22.22 (14.70)	22.22 (14.70)	0.20 (0.13)	0.20 (0.13)	8.80 (7.03)	9.40 (7.13)
Quercus rubra	11.11 (11.11)	11.11 (11.11)	0.05 (0.05)	0.05 (0.05)	1.27 (1.27)	1.78 (1.78)
Quercus velutina	11.11 (11.11)	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	1.67 (1.67)	0.00 (0.00)
Tilia americana	33.33 (33.33)	33.33 (33.33)	0.26 (0.26)	0.26 (0.26)	8.04 (8.04)	8.04 (8.04)
Total	366.67 (92.80)	300.00 (55.28)	1.84 (0.29)	1.75 (0.24)	--	--
				H'	0.41 (0.15)	0.38 (0.18)
				J'	0.46 (0.15)	0.41 (0.16)
				S	1.89 (0.42)	1.78 (0.43)

Table 7., continued.

Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer rubrum	111.11 (80.70)	88.89 (77.18)	0.50 (0.34)	0.38 (0.30)	11.65 (8.07)	11.58 (8.50)
Acer saccharum	11.11 (11.11)	11.11 (11.11)	0.02 (0.02)	0.02 (0.02)	0.84 (0.84)	0.94 (0.94)
Carya spp.[a]	77.78 (36.43)	55.56 (29.40)	0.34 (0.15)	0.29 (0.15)	17.63 (9.02)	17.91 (10.09)
Cornus florida	33.33 (23.57)	33.33 (23.57)	0.17 (0.12)	0.17 (0.12)	7.94 (6.54)	8.94 (7.33)
Liriodendron tulipifera	11.11 (11.11)	11.11 (11.11)	0.08 (0.08)	0.08 (0.08)	1.49 (1.49)	1.68 (1.68)
Nyssa sylvatica	22.22 (14.70)	22.22 (14.70)	0.07 (0.06)	0.07 (0.06)	3.82 (2.69)	5.60 (3.67)
Ostrya virginiana	66.67 (66.67)	55.56 (55.56)	0.18 (0.18)	0.16 (0.16)	9.05 (9.05)	12.50 (12.50)
Pinus pungens	22.22 (22.22)	22.22 (22.22)	0.10 (0.10)	0.10 (0.10)	2.84 (2.84)	3.42 (3.42)
Pinus virginiana	100.00 (70.71)	100.00 (70.71)	0.52 (0.49)	0.52 (0.49)	10.82 (8.56)	13.35 (10.49)
Quercus alba	22.22 (22.22)	11.11 (11.11)	0.13 (0.13)	0.06 (0.06)	2.72 (2.72)	2.91 (2.91)
Quercus prinus	55.56 (24.22)	33.33 (16.67)	0.47 (0.20)	0.29 (0.15)	20.49 (11.26)	10.86 (6.06)
Quercus rubra	33.33 (16.67)	11.11 (11.11)	0.18 (0.10)	0.10 (0.10)	8.99 (5.99)	6.73 (6.73)
Quercus velutina	11.11 (11.11)	11.11 (11.11)	0.10 (0.10)	0.10 (0.10)	1.72 (1.72)	3.60 (3.60)
Total	577.78 (107.73)	466.67 (105.41)*	2.86 (0.54)	2.34 (0.55)	--	--
				H'	0.77 (0.15)	0.68 (0.17)
				J'	0.74 (0.10)	0.68 (0.14)
				S	2.78 (0.43)	2.33 (0.47)*

Table 7., continued.

Species	Stems per hectare		Basal area (m^2/ha)		Importance Value	
HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer rubrum	55.56 (44.44)	44.44 (44.44)	0.31 (0.27)	0.27 (0.27)	7.74 (5.14)	3.58 (3.58)
Amelanchier arborea	11.11 (11.11)	11.11 (11.11)	0.01 (0.01)	0.01 (0.01)	0.42 (0.42)	0.44 (0.44)
Carya spp.[a]	77.78 (36.43)	55.56 (33.79)	0.25 (0.17)	0.23 (0.17)	24.01 (14.42)	24.46 (14.44)
Nyssa sylvatica	144.44 (104.23)	122.22 (99.69)	0.69 (0.53)	0.65 (0.53)	13.17 (8.83)	13.00 (8.74)
Ostrya virginiana	177.78 (154.36)	177.78 (154.36)	0.34 (0.30)	0.34 (0.30)	9.95 (7.92)	10.81 (8.32)
Pinus pungens	22.22 (22.22)	22.22 (22.22)	0.09 (0.09)	0.09 (0.09)	3.79 (3.79)	5.21 (5.21)
Pinus rigida	11.11 (11.11)	11.11 (11.11)	0.12 (0.12)	0.12 (0.12)	6.95 (6.95)	11.11 (11.11)
Pinus strobus	11.11 (11.11)	11.11 (11.11)	0.02 (0.02)	0.02 (0.02)	0.61 (0.61)	0.63 (0.63)
Pinus virginiana	211.11 (158.50)	166.67 (133.33)	0.77 (0.73)	0.73 (0.71)	14.35 (10.57)	13.78 (10.36)
Quercus prinus	88.89 (35.14)	55.56 (24.22)	0.44 (0.19)	0.32 (0.14)	12.23 (5.16)	10.17 (4.21)
Quercus rubra	66.67 (47.14)	55.56 (37.68)	0.23 (0.21)	0.21 (0.18)	6.79 (5.91)	6.80 (5.82)
Total	877.78 (205.33)	733.33 (205.48)*	3.28 (0.80)	2.99 (0.82)*	--	--
				H'	0.62 (0.14)	0.54 (0.16)
				J'	0.62 (0.14)	0.53 (0.14)
				S	2.44 (0.41)	2.22 (0.36)

Table 7., continued.

Brushy Knob			
Species	Stems per hectare	Basal area (m^2/ha)	Importance Value
BK, NE-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer rubrum	11.11 (11.11)	0.09 (0.09)	4.15 (4.15)
Amelanchier arborea	22.22 (14.70)	0.05 (0.04)	4.01 (3.31)
Carya spp.[a]	111.11 (77.18)	0.60 (0.40)	18.43 (9.99)
Cornus florida	33.33 (23.57)	0.09 (0.06)	7.02 (5.57)
Nyssa sylvatica	22.22 (22.22)	0.14 (0.14)	2.58 (2.58)
Pinus pungens	33.33 (16.67)	0.20 (0.14)	5.49 (2.90)
Pinus rigida	44.44 (44.44)	0.30 (0.30)	5.40 (5.40)
Pinus virginiana	133.33 (98.60)	0.55 (0.44)	15.61 (10.95)
Quercus alba	11.11 (11.11)	0.11 (0.11)	2.37 (2.37)
Quercus coccinea	11.11 (11.11)	0.04 (0.04)	3.27 (3.27)
Quercus prinus	66.67 (55.28)	0.50 (0.39)	11.05 (8.78)
Quercus rubra	33.33 (23.57)	0.25 (0.17)	9.49 (7.10)
Robinia psuedoacacia	11.11 (11.11)	0.01 (0.01)	11.11 (11.11)
Total	544.44 (109.43)	2.93 (0.62)	--
		H'	0.72 (0.17)
		J'	0.68 (0.14)
		S	2.56 (0.41)

Table 7., continued.

Species	Stems per hectare	Basal area (m^2/ha)	Importance Value
BK, NE-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	11.11 (11.11)	0.01 (0.01)	2.64 (2.64)
Carya spp.[a]	66.67 (37.27)	0.42 (0.23)	21.16 (11.28)
Cornus florida	22.22 (22.22)	0.07 (0.07)	7.92 (7.92)
Nyssa sylvatica	22.22 (14.70)	0.12 (0.09)	5.02 (3.33)
Pinus pungens	11.11 (11.11)	0.01 (0.01)	1.11 (1.11)
Pinus rigida	11.11 (11.11)	0.06 (0.06)	2.24 (2.24)
Pinus virginiana	11.11 (11.11)	0.13 (0.13)	6.15 (6.15)
Quercus coccinea	55.56 (55.56)	0.08 (0.08)	7.73 (7.73)
Quercus prinus	44.44 (24.22)	0.42 (0.21)	25.29 (13.44)
Quercus rubra	11.11 (11.11)	0.05 (0.05)	4.58 (4.58)
Robinia psuedoacacia	77.78 (57.20)	0.19 (0.14)	16.16 (12.51)
Total	344.44 (80.12)	1.55 (0.32)	--
		H'	0.52 (0.14)
		J'	0.59 (0.15)
		S	1.89 (0.35)

Table 7., continued.

Species	Stems per hectare	Basal area (m^2/ha)	Importance Value
BK, SW-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer rubrum	88.89 (88.89)	0.08 (0.08)	11.11 (11.11)
Amelanchier arborea	11.11 (11.11)	0.02 (0.02)	0.68 (0.68)
Carya spp.[a]	144.44 (58.00)	0.64 (0.26)	35.04 (14.21)
Cornus florida	33.33 (33.33)	0.13 (0.13)	2.74 (2.74)
Nyssa sylvatica	11.11 (11.11)	0.09 (0.09)	11.11 (11.11)
Pinus pungens	22.22 (22.22)	0.20 (0.20)	3.51 (3.51)
Pinus virginiana	200.00 (123.60)	1.07 (0.76)	26.02 (14.13)
Quercus prinus	55.56 (33.79)	0.42 (0.23)	9.15 (5.02)
Quercus rubra	11.11 (11.11)	0.03 (0.03)	0.64 (0.64)
Total	577.78 (149.79)	2.68 (0.77)	--
		H'	0.38 (0.18)
		J'	0.34 (0.15)
		S	1.89 (0.42)

Table 7., continued.

Species	Stems per hectare	Basal area (m²/ha)	Importance Value
BK, SW-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	133.33 (133.33)	0.11 (0.11)	14.29 (14.29)
Carya spp.[a]	66.67 (55.28)	0.41 (0.33)	28.57 (18.44)
Nyssa sylvatica	44.44 (44.44)	0.35 (0.35)	11.61 (11.61)
Pinus pungens	55.56 (33.79)	0.18 (0.13)	12.11 (5.88)
Quercus prinus	44.44 (24.22)	0.13 (0.10)	8.00 (4.57)
Quercus rubra	88.89 (56.38)	0.20 (0.12)	17.78 (8.54)
Quercus velutina	11.11 (11.11)	0.01 (0.01)	1.36 (1.36)
Robinia psuedoacacia	33.33 (23.57)	0.03 (0.02)	6.29 (4.46)
Total	477.78 (153.46)	1.42 (0.44)	--
		H′	0.45 (0.19)
		J′	0.38 (0.16)
		S	1.78 (0.49)

[a] Includes *Carya ovata*, *C. glabra*, and *C. tomentosa*.

Table 8. Sapling species groups summary data (±SE) for all three sites. See Appendix B; Table B1 for tree species groups list. Means within rows followed by an asterisk (*) are significantly different between years (p<0.05).

Dunkle Knob						
Species Group	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	55.56 (29.40)	55.56 (29.40)	0.12 (0.07)	0.12 (0.07)	9.91 (5.27)	13.11 (7.65)
Shade Intolerants	66.67 (28.87)	44.44 (29.40)	0.30 (0.15)	0.20 (0.15)	17.43 (8.30)	12.06 (8.64)
Oaks	77.78 (36.43)	44.44 (24.22)	0.54 (0.27)	0.25 (0.14)	15.94 (6.88)	8.94 (5.34)
Pines	166.67 (57.74)	144.44 (55.56)	0.86 (0.45)	0.85 (0.45)	34.67 (13.52)	39.67 (13.89)
Shade Tolerants	200.00 (115.47)	166.67 (101.38)	0.65 (0.41)	0.59 (0.38)	22.06 (12.48)	26.22 (12.52)
Total	566.67 (116.67)	455.56 (91.46)	2.48 (0.65)	2.01 (0.55)	--	--

DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	155.56 (88.37)	144.44 (88.37)	0.93 (0.57)	0.89 (0.58)	22.93 (13.91)	25.15 (13.92)
Shade Intolerants	88.89 (35.14)	77.78 (36.43)	0.69 (0.35)	0.67 (0.35)	12.76 (5.68)	12.16 (5.84)
Oaks	355.56 (120.31)	255.56 (113.18)	1.12 (0.37)	0.83 (0.35)	33.38 (10.66)	31.52 (11.65)
Pines	11.11 (11.11)	11.11 (11.11)	0.01 (0.01)	0.01 (0.01)	0.87 (0.87)	0.96 (0.96)
Shade Tolerants	411.11 (171.14)	333.33 (176.38)	2.06 (0.99)	1.92 (1.00)	30.06 (10.40)	30.21 (12.80)
Total	1022.22 (205.33)	822.22 (223.47)	4.81 (1.15)	4.32 (1.24)	--	--

DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	188.89 (107.30)	166.67 (86.60)	0.74 (0.42)	0.70 (0.38)	14.37 (8.37)	18.19 (10.06)
Shade Intolerants	222.22 (96.86)	133.33 (89.75)	0.70 (0.40)	0.61 (0.41)	11.25 (4.61)	7.82 (5.44)
Oaks	388.89 (145.72)	288.89 (137.89)	1.69 (0.52)	1.42 (0.54)	26.16 (7.07)	28.22 (8.90)
Pines	533.33 (219.22)	388.89 (196.81)	1.39 (0.61)	1.19 (0.60)	35.73 (11.65)	31.69 (13.92)
Shade Tolerants	177.78 (132.05)	166.67 (121.34)	0.49 (0.40)	0.48 (0.39)	12.48 (10.99)	14.07 (12.33)
Total	1511.11 (267.42)	1144.44 (265.68)*	5.00 (1.05)	4.40 (1.05)	--	--

Table 8., continued.

Species Group	Stems per hectare		Basal area (m^2/ha)		Importance Value	
DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	322.22 (157.04)	144.44 (33.79)	0.94 (0.50)	0.49 (0.19)	31.88 (8.92)	51.90 (13.98)*
Shade Intolerants	22.22 (14.70)	11.11 (11.11)	0.08 (0.06)	0.06 (0.06)	8.10 (6.36)	1.77 (1.77)
Oaks	222.22 (90.95)	166.67 (68.72)	0.92 (0.39)	0.75 (0.37)	30.87 (10.57)	31.10 (9.62)
Pines	66.67 (47.14)	0.00 (0.00)	0.11 (0.09)	0.00 (0.00)	4.09 (2.71)	0.00 (0.00)
Shade Tolerants	266.67 (120.19)	144.44 (92.96)	1.01 (0.58)	0.62 (0.49)	25.06 (9.82)	15.23 (9.11)
Total	900.00 (197.91)	466.67 (133.33)	3.05 (0.86)	1.93 (0.77)	--	--

Heavener Mountain						
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	44.44 (24.22)	22.22 (22.22)	0.24 (0.16)	0.15 (0.15)	26.24 (15.15)	10.62 (10.62)
Shade Intolerants	66.67 (37.27)	55.56 (33.79)	0.48 (0.32)	0.44 (0.31)	18.08 (10.39)	24.27 (15.84)
Oaks	33.33 (23.57)	33.33 (23.57)	0.17 (0.12)	0.17 (0.12)	13.15 (10.41)	15.62 (12.06)
Pines	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Shade Tolerants	222.22 (95.42)	177.78 (84.62)	0.87 (0.38)	0.79 (0.38)	42.53 (13.63)	49.50 (17.82)
Total	366.67 (108.01)	288.89 (91.96)*	1.76 (0.50)	1.56 (0.47)*	--	--
HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	133.33 (47.14)	122.22 (40.06)	0.75 (0.24)	0.73 (0.23)	51.17 (15.91)	53.29 (16.29)
Shade Intolerants	66.67 (66.67)	22.22 (22.22)	0.17 (0.17)	0.11 (0.11)	5.75 (5.75)	3.68 (3.68)
Oaks	55.56 (24.22)	44.44 (24.22)	0.34 (0.16)	0.31 (0.17)	15.41 (7.39)	14.84 (7.91)
Pines	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Shade Tolerants	111.11 (58.79)	111.11 (58.79)	0.59 (0.33)	0.59 (0.33)	27.67 (14.24)	28.20 (14.18)
Total	366.67 (92.80)	300.00 (55.28)	1.84 (0.29)	1.75 (0.24)	--	--

Table 8., continued.

Species Group	Stems per hectare		Basal area (m^2/ha)		Importance Value	
HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	77.78 (36.43)	55.56 (29.40)	0.34 (0.15)	0.29 (0.15)	17.63 (9.02)	17.91 (10.09)
Shade Intolerants	11.11 (11.11)	11.11 (11.11)	0.08 (0.08)	0.08 (0.08)	1.49 (1.49)	1.68 (1.68)
Oaks	122.22 (36.43)	66.67 (28.87)	0.87 (0.26)	0.55 (0.23)	33.91 (13.27)	24.09 (12.63)
Pines	122.22 (81.27)	122.22 (81.27)	0.61 (0.49)	0.61 (0.49)	13.66 (9.40)	16.77 (11.44)
Shade Tolerants	244.44 (108.16)	211.11 (101.99)	0.96 (0.43)	0.81 (0.39)	33.30 (12.16)	39.55 (14.20)
Total	577.78 (107.73)	466.67 (105.41)*	2.86 (0.54)	2.34 (0.55)	--	--

HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	77.78 (36.43)	55.56 (33.79)	0.25 (0.17)	0.23 (0.17)	24.01 (14.42)	24.46 (14.44)
Shade Intolerants	11.11 (11.11)	11.11 (11.11)	0.02 (0.02)	0.02 (0.02)	0.61 (0.61)	0.63 (0.63)
Oaks	155.56 (64.79)	111.11 (45.47)	0.68 (0.33)	0.52 (0.28)	19.02 (9.08)	16.97 (8.34)
Pines	244.44 (163.39)	200.00 (136.42)	0.98 (0.73)	0.94 (0.70)	25.08 (12.8)	30.10 (15.15)
Shade Tolerants	388.89 (196.81)	355.56 (200.08)	1.35 (0.79)	1.27 (0.80)	31.28 (12.43)	27.84 (12.96)
Total	877.78 (205.33)	733.33 (205.48)*	3.28 (0.80)	2.99 (0.82)*	--	--

Table 8., continued.

Brushy Knob			
Species Group	Stems per hectare	Basal area (m^2/ha)	Importance Value
BK, NE-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	111.11 (77.18)	0.60 (0.40)	18.43 (9.99)
Shade Intolerants	11.11 (11.11)	0.01 (0.01)	11.11 (11.11)
Oaks	122.22 (59.58)	0.91 (0.47)	26.19 (11.2)
Pines	211.11 (114.8)	1.05 (0.56)	26.50 (12.73)
Shade Tolerants	88.89 (35.14)	0.37 (0.14)	17.76 (6.31)
Total	544.44 (109.43)	2.93 (0.62)	--
BK, NE-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	66.67 (37.27)	0.42 (0.23)	21.16 (11.28)
Shade Intolerants	77.78 (57.20)	0.19 (0.14)	16.16 (12.51)
Oaks	111.11 (53.86)	0.55 (0.20)	37.60 (12.74)
Pines	33.33 (16.67)	0.19 (0.14)	9.50 (6.12)
Shade Tolerants	55.56 (24.22)	0.20 (0.10)	15.57 (7.72)
Total	344.44 (80.12)	1.55 (0.32)	--
BK, SW-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	144.44 (58.00)	0.64 (0.26)	35.04 (14.21)
Shade Intolerants	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Oaks	66.67 (33.33)	0.44 (0.23)	9.79 (4.91)
Pines	222.22 (129.93)	1.28 (0.80)	29.53 (14.98)
Shade Tolerants	144.44 (92.96)	0.32 (0.17)	25.64 (14.45)
Total	577.78 (149.79)	2.68 (0.77)	--

Table 8., continued.

Species Group	Stems per hectare	Basal area (m^2/ha)	Importance Value
BK, SW-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	66.67 (55.28)	0.41 (0.33)	28.57 (18.44)
Shade Intolerants	33.33 (23.57)	0.03 (0.02)	6.29 (4.46)
Oaks	144.44 (76.58)	0.34 (0.21)	27.14 (11.06)
Pines	55.56 (33.79)	0.18 (0.13)	12.11 (5.88)
Shade Tolerants	177.78 (135.17)	0.46 (0.36)	25.89 (16.84)
Total	477.78 (153.46)	1.42 (0.44)	--

Table 9. Sapling stratum structural parameter mixed model ANCOVA results. Means within rows with different letter(s) are significantly different (p<0.05) following adjustment to the mean value of the covariate, overstory basal area (m^2/ha) where necessary.

Variable	Site/Year				
	DK 0	DK 1	HM 1	HM 2	BK 12
Basal Area (m^2/ha)[a,b]	3.83 (0.49)a	3.16 (0.49)b	2.44 (0.29)abc	2.16 (0.28)bd	2.15 (0.29)bcd
Stems per Hectare[c]	1000.00 (113.11)a	722.22 (103.44)b	547.22 (74.05)bc	447.22 (68.02)d	486.11 (62.51)bcd
H'	0.93 (0.09)a	0.68 (0.09)b	0.60 (0.07)b	0.52 (0.09)b	0.52 (0.08)b
J'	0.73 (0.05)a	0.63 (0.07)b	0.61 (0.07)abc	0.51 (0.08)bd	0.50 (0.07)bcd
S	3.39 (0.29)a	2.56 (0.29)b	2.28 (0.22)b	2.00 (0.23)b	2.03 (0.21)b

[a] A $\log_{10}$ transformation was applied to these data prior to analysis.
[b] Tests for significance were made at the mean value of overstory basal area per hectare.
[c] A square root transformation applied to these data prior to analysis.

Table 10. Environmental variable correlations (Pearson correlation coefficients) with combined overstory and sapling nonmetric multidimensional scaling ordination axes.

Variable	Axis 1	Axis 2	Axis 3
Percent slope	0.151	0.311	0.024
Azimuth[a]	0.506	-0.100	-0.101
Topographic position	0.402	-0.270	0.118
Slope configuration	0.450	-0.187	0.075
S	0.241	-0.496	-0.022
H′	0.245	-0.518	-0.070
J′	0.141	-0.254	-0.011
Basal area (m^2/ha)	0.243	-0.204	-0.065

[a] Transformed following Beers et al. (1966).

Table 11. Matrix of combined overstory and sapling tree species importance value correlations (Pearson correlation coefficients) with final nonmetric multidimensional scaling ordination axes.

Species	Axis 1	Axis 2	Axis 3
Acer pensylvanicum	0.378	0.067	0.425
Acer rubrum	0.480	-0.544	0.299
Acer saccharum	0.240	-0.203	-0.092
Ailanthus altissima	0.148	0.055	-0.080
Amelanchier arborea	-0.091	0.004	-0.062
Betula alleghaniensis	0.034	-0.163	0.027
Betula lenta	0.142	-0.222	-0.221
Carya spp.[a]	0.102	-0.174	-0.773
Cornus florida	0.184	-0.145	0.034
Fraxinus americana	-0.065	0.068	-0.231
Liriodendron tulipifera	0.196	-0.205	-0.018
Nyssa sylvatica	-0.114	-0.507	0.168
Ostrya virginiana	0.256	0.188	-0.018
Pinus pungens	-0.648	0.301	0.283
Pinus rigida	-0.513	-0.088	0.214
Pinus strobus	0.291	-0.326	0.032
Pinus virginiana	-0.511	0.548	-0.339
Prunus serotina	0.170	-0.070	0.129
Quercus alba	0.149	-0.478	-0.138
Quercus coccinea	-0.153	-0.437	0.280
Quercus prinus	-0.055	0.226	-0.069
Quercus rubra	0.657	0.333	0.075
Quercus velutina	-0.145	-0.538	-0.172
Robinia psuedoacacia	0.210	0.046	0.405
Sassafras albidum	0.354	-0.070	0.126
Tilia americana	0.157	0.134	0.120
Tsuga canadensis	0.142	-0.222	-0.221

[a]Includes *Carya ovata*, *C. glabra*, and *C. tomentosa*.

Table 12. Shrub stratum stems per hectare (≥1.37m tall, ±SE) on all three sites. Means within rows followed by an asterisk (*) are significantly different (p<0.05).

Dunkle Knob		
Species	Stems per hectare	
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)
Hamamelis virginiana	111.11 (99.23)	100.00 (100.00)
Kalmia latifolia	400.00 (148.14)	33.33 (23.57)*
Quercus ilicifolia	133.33 (89.75)	0.00 (0.00)
Vitis spp.	22.22 (14.70)	11.11 (11.11)
Total	666.67 (246.08)	144.44 (132.40)*
DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)
Hamamelis virginiana	22.22 (14.70)	11.11 (11.11)
Kalmia latifolia	433.33 (350.40)	22.22 (22.22)
Parthenocissus quinquefolia	11.11 (11.11)	11.11 (11.11)
Vitis spp.	100.00 (66.67)	11.11 (11.11)
Total	566.67 (347.21)	55.56 (37.68)
DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)
Hamamelis virginiana	22.22 (22.22)	0.00 (0.00)
Kalmia latifolia	122.22 (122.22)	0.00 (0.00)
Quercus ilicifolia	166.67 (86.60)	22.22 (22.22)
Smilax rotundifolia	433.33 (433.33)	33.33 (33.33)
Viburnum prunifolium	11.11 (11.11)	11.11 (11.11)
Vitis spp.	22.22 (22.22)	0.00 (0.00)
Total	777.78 (496.59)	66.67 (55.28)
DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)
Hamamelis virginiana	88.89 (67.59)	22.22 (22.22)
Quercus ilicifolia	11.11 (11.11)	0.00 (0.00)
Vitis spp.	166.67 (121.34)	66.67 (55.28)
Total	266.67 (187.08)	88.89 (77.18)

Table 12., continued.

Heavener Mountain		
Species	Stems per hectare	
HM, NE-L Section	One year post-burn (2003)	Two years post-burn (2004)
Hamamelis virginiana	11.11 (11.11)	11.11 (11.11)
Vitis spp.	11.11 (11.11)	0.00 (0.00)
Total	22.22 (22.22)	11.11 (11.11)
HM, NE-U Section	One year post-burn (2003)	Two years post-burn (2004)
Kalmia latifolia	11.11 (11.11)	11.11 (11.11)
Total	11.11 (11.11)	11.11 (11.11)
HM, SW-L Section	One year post-burn (2003)	Two years post-burn (2004)
Hamamelis virginiana	33.33 (33.33)	0.00 (0.00)
Total	33.33 (33.33)	0.00 (0.00)
HM, SW-U Section	One year post-burn (2003)	Two years post-burn (2004)
Kalmia latifolia	11.11 (11.11)	11.11 (11.11)
Quercus ilicifolia	0.00 (0.00)	44.44 (33.79)
Total	11.11 (11.11)	55.56 (37.68)

Table 12., continued.

Brushy Knob	
Species	Stems per hectare
BK, NE-L Section	12 years post-burn (2003)
Hamamelis virginiana	133.33 (89.75)
Quercus ilicifolia	388.89 (261.64)
Total	522.22 (252.09)
BK, NE-U Section	12 years post-burn (2003)
Hamamelis virginiana	122.22 (84.62)
Kalmia latifolia	55.56 (37.68)
Quercus ilicifolia	144.44 (111.94)
Total	322.22 (171.41)
BK, SW-L Section	12 years post-burn (2003)
Hamamelis virginiana	100.00 (60.09)
Kalmia latifolia	122.22 (122.22)
Quercus ilicifolia	55.56 (37.68)
Smilax rotundifolia	44.44 (44.44)
Vitis spp.	11.11 (11.11)
Total	333.33 (213.44)
BK, SW-U Section	12 years post-burn (2003)
Hamamelis virginiana	166.67 (89.75)
Kalmia latifolia	11.11 (11.11)
Quercus ilicifolia	122.22 (81.27)
Total	300.00 (101.38)

Table 13. Shrub stratum Poisson modeling results for site/year. All data were log_{10} transformed prior to analysis. Means within rows with different letter(s) are significantly different (χ^2 test, p<0.05).

Species	Stems/ha by Site/Year				
	DK 0	DK 1	HM 1	HM 2	BK 12
Hamamelis virginiana	61.11 (30.15)a	33.33 (25.51)ab	11.11 (8.71)b	2.78 (2.78)b	130.56 (39.40)a
Kalmia latifolia[a]	238.89 (100.42)a	13.89 (8.12)b	5.56 (3.87)b	5.56 (3.87)b	47.22 (31.74)b
Parthenocissus quinquefolia[b]	2.78 (2.78)	2.78 (2.78)	--	--	--
Quercus ilicifolia[a]	77.78 (32.39)a	5.56 (5.56)b	0.00 (0.00)b	11.11 (8.71)b	177.78 (74.44)a
Smilax rotundifolia[b]	108.33 (108.33)	8.33 (8.33)	--	--	--
Viburnum prunifolium[b]	2.78 (2.78)	2.78 (2.78)	--	--	--
Vitis spp.	77.78 (35.21)a	22.22 (14.43)ab	2.78 (2.78)b	0.00 (0.00)b	2.78 (2.78)b
Total[a]	569.44 (165.75)a	88.89 (40.39)b	19.44 (10.40)c	19.44 (10.40)c	369.44 (93.42)a

[a] Tests for significance were made at the mean value of basal area per hectare.
[b] These species were excluded from any species-specific analysis due to their scarce observations, but were included in the total shrubs per site/year analysis.

Table 14. Tree regeneration summary statistics (±SE) for all three sites. Means within rows followed by an asterisk (*) are significantly different between years (p<0.05). See Appendix C; Table C8 for percent cover data.

Dunkle Knob						
Species	Stems per hectare		Importance Value		% Sprouts	
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer pensylvanicum	3333.33 (1816.21)	277.78 (277.78)	12.52 (8.05)	2.78 (2.78)	0	0
Acer rubrum	7777.78 (2373.33)	3055.56 (1429.95)*	25.76 (8.83)	15.28 (6.81)	11	55
Amelanchier arborea	3333.33 (1816.21)	7222.22 (2959.34)	9.58 (5.74)	25.15 (7.30)	58	58
Carya spp.[a]	1111.11 (605.40)	1111.11 (605.40)	7.75 (5.47)	7.99 (4.32)	25	100
Cornus florida	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	2.78 (2.78)	0	0
Liriodendron tulipifera	0.00 (0.00)	1944.44 (1367.90)	0.00 (0.00)	2.44 (1.36)	0	0
Nyssa sylvatica	555.56 (367.47)	1944.44 (1429.95)	4.63 (3.70)	6.15 (4.50)	100	86
Ostrya virginiana	555.56 (555.56)	277.78 (277.78)	3.69 (3.69)	2.78 (2.78)	0	0
Pinus pungens	277.78 (277.78)	0.00 (0.00)	2.78 (2.78)	0.00 (0.00)	0	0
Pinus spp.	1666.67 (1381.93)	1111.11 (605.40)	12.35 (9.62)	18.06 (11.62)	0	0
Pinus virginiana	833.33 (589.26)	277.78 (277.78)	4.76 (3.39)	3.34 (3.34)	0	0
Quercus prinus	2222.22 (1136.85)	1944.44 (1084.76)	5.44 (2.88)	8.65 (5.41)	63	100
Quercus rubra	555.56 (555.56)	277.78 (277.78)	1.67 (1.67)	1.85 (1.85)	100	100
Quercus spp.	277.78 (277.78)	0.00 (0.00)	2.78 (2.78)	0.00 (0.00)	100	0
Quercus velutina	555.56 (555.56)	0.00 (0.00)	6.31 (6.31)	0.00 (0.00)	50	0
Robinia psuedoacacia	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	0.64 (0.64)	0	0
Sassafras albidum	0.00 (0.00)	1111.11 (844.83)	0.00 (0.00)	2.12 (1.42)	0	0
Total	23055.56 (4365.62)	21111.11 (5790.18)	--	--	--	--

Table 14., continued.

Species	Stems per hectare		Importance Value		% Sprouts	
DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer pensylvanicum	54722.22 (20157.56)	13611.11 (6361.66)*	47.34 (8.55)	20.28 (9.91)*	0	4
Acer rubrum	8611.11 (3611.11)	3055.56 (1234.47)	12.42 (6.46)	7.63 (2.91)	0	45
Ailanthus altissima	277.78 (277.78)	6388.89 (2433.53)*	0.23 (0.23)	14.78 (4.06)*	0	0
Amelanchier arborea	1388.89 (605.40)	555.56 (367.47)	4.61 (3.30)	2.90 (2.77)	20	50
Carya spp.[a]	1388.89 (844.83)	1388.89 (734.93)	5.28 (2.65)	5.93 (3.08)	60	100
Nyssa sylvatica	555.56 (367.47)	4722.22 (4722.22)	0.81 (0.58)	4.32 (4.32)	0	100
Ostrya virginiana	4166.67 (2825.97)	2500.00 (1250.00)	9.89 (6.40)	6.60 (4.00)	0	22
Pinus spp.	277.78 (277.78)	1111.11 (844.83)	0.24 (0.24)	5.47 (5.22)	0	0
Pinus strobus	833.33 (833.33)	0.00 (0.00)	0.66 (0.66)	0.00 (0.00)	0	0
Prunus serotina	1944.44 (1367.90)	833.33 (833.33)	2.48 (1.46)	0.52 (0.52)	0	100
Quercus coccinea	555.56 (555.56)	0.00 (0.00)	2.20 (2.20)	0.00 (0.00)	100	0
Quercus prinus	1944.44 (809.85)	3611.11 (2045.96)	7.51 (3.67)	10.79 (5.43)	14	100
Quercus rubra	555.56 (367.47)	833.33 (589.26)	1.60 (1.18)	3.74 (2.50)	50	100
Quercus velutina	555.56 (555.56)	0.00 (0.00)	0.49 (0.49)	0.00 (0.00)	0	0
Sassafras albidum	4444.44 (3836.45)	11944.44 (7485.84)	4.25 (3.09)	17.04 (7.52)	13	14
Total	82222.22 (21137.14)	50555.56 (9426.04)	--	--	--	--

Table 14., continued.

Species	Stems per hectare		Importance Value		% Sprouts	
DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer pensylvanicum	32500.00 (31879.77)	18888.89 (18888.89)	7.40 (7.17)	6.35 (6.35)	0	0
Acer rubrum	21944.44 (12365.79)	12777.78 (8502.90)	27.69 (10.80)	17.83 (9.90)*	3	17
Ailanthus altissima	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	0.56 (0.56)	0	0
Amelanchier arborea	11666.67 (6123.72)	9166.67 (4350.13)	14.27 (4.82)	22.93 (7.52)	12	42
Carya spp.[a]	2222.22 (651.45)	3611.11 (1111.11)	9.69 (4.39)	19.02 (6.76)*	38	92
Crataegus spp.	277.78 (277.78)	833.33 (416.67)	1.02 (1.02)	4.34 (3.65)	0	67
Nyssa sylvatica	0.00 (0.00)	555.56 (555.56)	0.00 (0.00)	1.09 (1.09)	0	0
Ostrya virginiana	17222.22 (15407.91)	12222.22 (12222.22)	9.47 (4.84)	4.65 (4.65)	3	0
Pinus pungens	277.78 (277.78)	0.00 (0.00)	5.56 (5.56)	0.00 (0.00)	0	0
Pinus rigida	277.78 (277.78)	0.00 (0.00)	0.29 (0.29)	0.00 (0.00)	0	0
Pinus spp.	3611.11 (2045.96)	277.78 (277.78)	8.36 (5.46)	0.80 (0.80)	0	0
Pinus virginiana	833.33 (833.33)	0.00 (0.00)	3.41 (3.41)	0.00 (0.00)	0	0
Prunus serotina	555.56 (555.56)	0.00 (0.00)	2.78 (2.78)	0.00 (0.00)	0	0
Quercus prinus	277.78 (277.78)	277.78 (277.78)	0.62 (0.62)	0.61 (0.61)	100	100
Quercus rubra	833.33 (833.33)	1111.11 (844.83)	2.20 (2.20)	4.44 (2.94)	100	100
Quercus velutina	1111.11 (734.93)	555.56 (555.56)	5.83 (4.23)	4.23 (4.23)	50	100
Robinia psuedoacacia	277.78 (277.78)	1111.11 (844.83)	1.16 (1.16)	10.19 (7.58)	100	50
Sassafras albidum	277.78 (277.78)	833.33 (416.67)	0.27 (0.27)	2.98 (1.89)	0	0
Total	94166.67 (43598.95)	62500.00 (29712.16)	--	--	--	--

Table 14., continued.

Species	Stems per hectare		Importance Value		% Sprouts	
DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer pensylvanicum	26111.11 (14000.94)	7222.22 (5391.68)	22.95 (7.63)	5.69 (3.76)*	0	12
Acer rubrum	555.56 (555.56)	0.00 (0.00)	0.93 (0.93)	0.00 (0.00)	0	0
Ailanthus altissima	0.00 (0.00)	833.33 (589.26)	0.00 (0.00)	2.04 (1.35)	0	0
Amelanchier arborea	3055.56 (1234.47)	1111.11 (605.40)	9.50 (5.30)	7.15 (5.55)	55	25
Carya spp.[a]	1944.44 (694.44)	2222.22 (773.30)	12.50 (4.89)	25.93 (8.91)	57	100
Crataegus spp.	277.78 (277.78)	555.56 (367.47)	1.16 (1.16)	6.75 (5.53)	0	100
Ostrya virginiana	36388.89 (22333.92)	14722.22 (9740.06)	12.55 (7.23)	12.73 (8.44)	0	2
Pinus pungens	277.78 (277.78)	0.00 (0.00)	1.32 (1.32)	0.00 (0.00)	0	0
Pinus spp.	1666.67 (931.69)	277.78 (277.78)	6.96 (6.09)	0.45 (0.45)	0	0
Quercus prinus	4722.22 (1929.51)	4166.67 (2429.56)	17.95 (7.68)	14.55 (5.98)	76	100
Quercus rubra	1388.89 (605.40)	833.33 (589.26)	7.38 (3.48)	9.26 (6.28)	80	100
Quercus spp.	277.78 (277.78)	277.78 (277.78)	0.26 (0.26)	1.85 (1.85)	100	100
Quercus velutina	1111.11 (844.83)	833.33 (833.33)	1.91 (1.30)	1.76 (1.76)	50	100
Robinia psuedoacacia	277.78 (277.78)	1111.11 (605.40)	2.78 (2.78)	8.27 (4.82)	100	25
Sassafras albidum	1388.89 (941.99)	1388.89 (605.40)	1.87 (1.31)	3.58 (1.91)	20	40
Total	79444.44 (33384.80)	35555.56 (13780.13)	--	--	--	--

Table 14., continued.

Heavener Mountain						
Species	Stems per hectare		Importance Value		% Sprouts	
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer pensylvanicum	277.78 (277.78)	833.33 (589.26)	0.27 (0.27)	1.27 (0.86)	0	0
Acer rubrum	20277.78 (8654.68)	26944.44 (12428.81)	25.94 (8.81)	33.30 (9.88)	3	13
Amelanchier arborea	555.56 (367.47)	833.33 (589.26)	1.30 (0.93)	1.04 (0.76)	100	67
Carya spp.[a]	1111.11 (605.40)	3611.11 (1324.92)*	3.08 (1.70)	12.57 (5.26)	75	62
Fraxinus americana	277.78 (277.78)	277.78 (277.78)	1.50 (1.50)	3.24 (3.24)	100	100
Liriodendron tulipifera	11666.67 (7761.64)	4722.22 (2777.78)	22.95 (11.64)	10.34 (5.79)	0	0
Nyssa sylvatica	555.56 (555.56)	2777.78 (1280.49)	0.86 (0.86)	7.63 (3.65)	100	40
Pinus pungens	0.00 (0.00)	1666.67 (1178.51)	0.00 (0.00)	4.58 (3.12)	0	0
Pinus spp.	1944.44 (1944.44)	0.00 (0.00)	8.33 (8.33)	0.00 (0.00)	0	0
Pinus virginiana	0.00 (0.00)	555.56 (555.56)	0.00 (0.00)	3.75 (3.75)	0	0
Prunus serotina	277.78 (277.78)	833.33 (833.33)	0.66 (0.66)	1.16 (1.16)	0	33
Quercus prinus	555.56 (367.47)	833.33 (416.67)	1.74 (1.15)	1.77 (0.91)	100	100
Quercus rubra	1111.11 (734.93)	833.33 (589.26)	4.34 (3.01)	1.52 (1.03)	50	67
Quercus spp.	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	0.81 (0.81)	0	100
Quercus velutina	833.33 (416.67)	277.78 (277.78)	2.40 (1.23)	0.75 (0.75)	100	100
Robinia psuedoacacia	277.78 (277.78)	0.00 (0.00)	1.39 (1.39)	0.00 (0.00)	0	0
Sassafras albidum	6388.89 (2829.38)	6666.67 (2763.85)	25.24 (10.32)	16.26 (5.94)	0	0
Total	46111.11 (11622.77)	51944.44 (14929.10)	--	--	--	--

Table 14., continued.

Species	Stems per hectare		Importance Value		% Sprouts	
HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer pensylvanicum	24166.67 (13559.28)	18611.11 (10937.89)	29.05 (12.67)	26.47 (11.83)	2	3
Acer rubrum	2222.22 (972.22)	3611.11 (2209.16)	10.78 (4.59)	11.25 (6.37)	75	69
Acer saccharum	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	0.19 (0.19)	0	0
Ailanthus altissima	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	0.93 (0.93)	0	0
Amelanchier arborea	277.78 (277.78)	277.78 (277.78)	0.66 (0.66)	0.81 (0.81)	100	100
Betula lenta	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	0.13 (0.13)	0	0
Carya spp.[a]	2500.00 (1666.67)	3888.89 (1959.27)	8.13 (4.91)	14.19 (6.43)	89	79
Liriodendron tulipifera	555.56 (367.47)	0.00 (0.00)	2.25 (1.84)	0.00 (0.00)	0	0
Nyssa sylvatica	833.33 (833.33)	4166.67 (3864.01)	3.94 (3.94)	6.92 (6.72)	100	73
Ostrya virginiana	1666.67 (1178.51)	1666.67 (1381.93)	1.77 (1.18)	2.55 (1.70)	0	0
Pinus spp.	555.56 (555.56)	0.00 (0.00)	2.16 (2.16)	0.00 (0.00)	0	0
Quercus alba	0.00 (0.00)	2500.00 (1666.67)	0.00 (0.00)	9.35 (7.29)	0	100
Quercus coccinea	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	0.99 (0.99)	0	100
Quercus prinus	2500.00 (1020.62)	4166.67 (1909.41)	6.55 (2.91)	8.73 (3.40)	89	100
Quercus rubra	1388.89 (941.99)	1111.11 (1111.11)	3.68 (2.45)	2.13 (2.13)	100	100
Quercus spp.	277.78 (277.78)	0.00 (0.00)	3.70 (3.70)	0.00 (0.00)	0	0
Quercus velutina	833.33 (589.26)	0.00 (0.00)	11.92 (11.04)	0.00 (0.00)	100	0
Robinia psuedoacacia	1666.67 (1102.40)	1111.11 (844.83)	5.99 (3.24)	3.64 (2.58)	50	25
Sassafras albidum	4444.44 (3083.83)	5277.78 (2616.87)	9.42 (5.98)	11.74 (4.99)	13	21
Total	43888.89 (12069.76)	47500.00 (9973.92)	--	--	--	--

Table 14., continued.

Species	Stems per hectare		Importance Value		% Sprouts	
HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer pensylvanicum	277.78 (277.78)	277.78 (277.78)	0.64 (0.64)	1.78 (1.78)	0	0
Acer rubrum	12500.00 (5636.56)	7500.00 (4228.70)	33.19 (8.89)	24.38 (6.96)	22	22
Acer saccharum	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	0.57 (0.57)	0	0
Amelanchier arborea	1944.44 (910.76)	2222.22 (878.41)	9.31 (4.59)	12.31 (5.94)	100	50
Betula alleghaniensis	0.00 (0.00)	1388.89 (1388.89)	0.00 (0.00)	2.63 (2.63)	0	0
Carya spp.[a]	1944.44 (1162.03)	3611.11 (1672.44)	9.93 (5.76)	16.28 (6.54)	57	69
Cornus florida	0.00 (0.00)	833.33 (416.67)	0.00 (0.00)	2.54 (1.63)	0	0
Crataegus spp.	833.33 (833.33)	555.56 (555.56)	5.56 (5.56)	2.03 (2.03)	0	100
Liriodendron tulipifera	0.00 (0.00)	1388.89 (844.83)	0.00 (0.00)	5.84 (3.01)	0	0
Nyssa sylvatica	0.00 (0.00)	1388.89 (941.99)	0.00 (0.00)	6.29 (4.22)	0	60
Ostrya virginiana	3611.11 (3611.11)	1944.44 (1944.44)	9.95 (9.95)	3.77 (3.77)	8	14
Pinus pungens	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	0.93 (0.93)	0	0
Pinus rigida	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	0.93 (0.93)	0	0
Pinus spp.	3333.33 (1954.34)	0.00 (0.00)	15.65 (10.81)	0.00 (0.00)	0	0
Pinus strobus	277.78 (277.78)	0.00 (0.00)	2.78 (2.78)	0.00 (0.00)	0	0
Pinus virginiana	0.00 (0.00)	1388.89 (734.93)	0.00 (0.00)	6.04 (3.41)	0	0
Populus grandidentata	0.00 (0.00)	1666.67 (1666.67)	0.00 (0.00)	7.55 (7.55)	0	0
Quercus prinus	833.33 (589.26)	833.33 (589.26)	1.89 (1.33)	1.88 (1.44)	100	100
Quercus rubra	277.78 (277.78)	0.00 (0.00)	2.78 (2.78)	0.00 (0.00)	0	0
Robinia psuedoacacia	555.56 (555.56)	277.78 (277.78)	2.78 (2.78)	0.89 (0.89)	100	0
Sassafras albidum	277.78 (277.78)	833.33 (416.67)	5.56 (5.56)	3.37 (1.93)	0	0
Total	26666.67 (6909.63)	26944.44 (5904.00)	--	--	--	--

Table 14., continued.

Species	Stems per hectare		Importance Value		% Sprouts	
HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer pensylvanicum	555.56 (555.56)	277.78 (277.78)	3.13 (3.13)	0.26 (0.26)	0	0
Amelanchier arborea	3055.56 (3055.56)	2777.78 (1637.48)	6.25 (6.25)	4.93 (2.72)	100	50
Carya spp.[a]	0.00 (0.00)	1111.11 (605.40)	0.00 (0.00)	5.31 (2.83)	0	50
Crataegus spp.	0.00 (0.00)	277.78 (277.78)	0.00 (0.00)	0.66 (0.66)	0	100
Nyssa sylvatica	0.00 (0.00)	555.56 (555.56)	0.00 (0.00)	3.29 (3.29)	0	100
Ostrya virginiana	20555.56 (19635.47)	12222.22 (11299.62)	24.52 (16.06)	23.60 (14.16)	8	20
Pinus pungens	0.00 (0.00)	1388.89 (1111.11)	0.00 (0.00)	7.75 (6.34)	0	0
Pinus spp.	2222.22 (1469.86)	277.78 (277.78)	20.83 (14.00)	2.78 (2.78)	0	0
Pinus virginiana	0.00 (0.00)	1111.11 (439.21)*	0.00 (0.00)	16.71 (11.02)	0	0
Populus grandidentata	0.00 (0.00)	1388.89 (941.99)	0.00 (0.00)	5.56 (3.67)	0	0
Quercus coccinea	0.00 (0.00)	555.56 (555.56)	0.00 (0.00)	2.78 (2.78)	0	50
Quercus prinus	1111.11 (439.21)	833.33 (589.26)	11.41 (6.34)	0.87 (0.67)	100	100
Quercus rubra	277.78 (277.78)	833.33 (416.67)	6.25 (6.25)	10.68 (6.18)	100	100
Quercus velutina	833.33 (589.26)	1111.11 (605.40)	15.63 (12.44)	6.30 (3.93)	100	100
Robinia psuedoacacia	277.78 (277.78)	555.56 (555.56)	2.08 (2.08)	5.09 (5.09)	0	0
Sassafras albidum	1111.11 (844.83)	1111.11 (734.93)	9.90 (7.79)	3.44 (2.42)	0	0
Total	30000.00 (19043.99)	26388.89 (10533.60)	--	--	--	--

Table 14., continued.

Brushy Knob			
Species	Stems per hectare	Importance Value	% Sprouts
BK, NE-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	4444.44 (3194.44)	14.20 (9.40)	0
Acer rubrum	8611.11 (4604.33)	14.08 (5.42)	10
Amelanchier arborea	3888.89 (3007.83)	10.51 (5.93)	14
Carya spp.[a]	1666.67 (589.26)	8.77 (3.48)	50
Cornus florida	277.78 (277.78)	1.47 (1.47)	0
Crataegus spp.	277.78 (277.78)	0.86 (0.86)	0
Nyssa sylvatica	277.78 (277.78)	1.16 (1.16)	0
Ostrya virginiana	555.56 (555.56)	1.62 (1.62)	0
Pinus pungens	2222.22 (1346.58)	7.27 (3.85)	0
Pinus spp.	833.33 (416.67)	3.27 (1.92)	0
Prunus serotina	277.78 (277.78)	1.30 (1.30)	0
Quercus coccinea	555.56 (555.56)	1.73 (1.73)	0
Quercus prinus	7222.22 (2808.85)	30.57 (8.97)	65
Quercus rubra	555.56 (367.47)	3.19 (2.14)	0
Total	31666.67 (5921.95)	--	--

Table 14., continued.

Species	Stems per hectare	Importance Value	% Sprouts
BK, NE-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	19444.44 (6505.58)	42.39 (12.05)	6
Acer rubrum	2222.22 (1409.57)	3.99 (2.08)	38
Amelanchier arborea	1944.44 (1162.03)	12.23 (8.01)	29
Carya spp.[a]	555.56 (367.47)	2.34 (1.57)	50
Crataegus spp.	277.78 (277.78)	3.70 (3.70)	100
Pinus rigida	555.56 (555.56)	5.56 (5.56)	100
Pinus spp.	555.56 (555.56)	0.79 (0.79)	0
Quercus alba	555.56 (555.56)	2.19 (2.19)	50
Quercus prinus	2777.78 (1136.85)	9.19 (3.39)	60
Quercus rubra	555.56 (367.47)	2.66 (1.76)	100
Quercus velutina	1111.11 (605.40)	8.00 (4.45)	75
Robinia psuedoacacia	277.78 (277.78)	1.39 (1.39)	0
Sassafras albidum	277.78 (277.78)	5.56 (5.56)	0
Total	31111.11 (7419.84)	--	--

Table 14., continued.

Species	Stems per hectare	Importance Value	% Sprouts
BK, SW-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	1111.11 (1111.11)	0.62 (0.62)	0
Acer rubrum	7500.00 (5384.52)	9.96 (5.38)	0
Amelanchier arborea	555.56 (555.56)	0.44 (0.44)	0
Carya spp.[a]	1388.89 (844.83)	10.97 (6.45)	40
Cornus florida	2222.22 (2222.22)	2.28 (2.28)	100
Crataegus spp.	555.56 (367.47)	4.89 (3.75)	50
Nyssa sylvatica	555.56 (367.47)	1.94 (1.37)	0
Ostrya virginiana	11944.44 (11944.44)	7.15 (7.15)	0
Pinus pungens	555.56 (367.47)	4.86 (3.74)	0
Pinus spp.	3055.56 (1601.74)	19.72 (9.58)	0
Pinus virginiana	277.78 (277.78)	2.78 (2.78)	0
Quercus alba	1388.89 (1388.89)	3.30 (3.30)	20
Quercus prinus	1944.44 (1084.76)	11.84 (6.43)	71
Quercus rubra	555.56 (367.47)	4.95 (3.43)	0
Quercus velutina	1111.11 (734.93)	5.97 (4.01)	0
Sassafras albidum	833.33 (589.26)	2.76 (2.13)	67
Tilia americana	277.78 (277.78)	5.56 (5.56)	0
Total	35833.33 (17721.81)	--	--

Table 14., continued.

Species	Stems per hectare	Importance Value	% Sprouts
BK, SW-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	3611.11 (1619.71)	21.43 (10.14)	8
Acer rubrum	833.33 (589.26)	8.33 (5.89)	33
Amelanchier arborea	277.78 (277.78)	0.93 (0.93)	0
Carya spp.[a]	1111.11 (439.21)	7.32 (4.11)	25
Nyssa sylvatica	555.56 (555.56)	1.39 (1.39)	0
Ostrya virginiana	277.78 (277.78)	1.41 (1.41)	0
Pinus pungens	555.56 (367.47)	5.79 (4.02)	0
Pinus spp.	2777.78 (1409.57)	21.16 (11.72)	0
Quercus prinus	4444.44 (2115.49)	17.54 (7.22)	50
Quercus rubra	555.56 (367.47)	2.62 (1.81)	50
Quercus velutina	833.33 (589.26)	7.48 (6.39)	0
Robinia psuedoacacia	555.56 (367.47)	3.22 (2.38)	50
Sassafras albidum	277.78 (277.78)	1.39 (1.39)	100
Total	16666.67 (3173.24)	--	--

[a] Includes *Carya ovata*, *C. glabra*, and *C. tomentosa*.

Table 15. Tree regeneration species groups summary data (±SE) for all three sites. See Appendix B; Table B1 for tree species groups list. Means within rows followed by an asterisk (*) are significantly different between years (p<0.05).

Dunkle Knob						
Species Group	Stems per hectare		% Cover		Importance Value	
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	1111.11 (605.40)	1111.11 (605.40)	0.04 (0.03)	0.06 (0.04)	7.75 (5.47)	7.99 (4.32)
Shade Intolerants	0.00 (0.00)	3333.33 (1559.02)	0.00 (0.00)	0.06 (0.03)	0.00 (0.00)	5.21 (2.48)
Oaks	3611.11 (1324.92)	2222.22 (1057.75)	0.24 (0.11)	0.18 (0.10)	16.20 (6.72)	10.50 (5.35)
Pines	2777.78 (1637.48)	1388.89 (734.93)	0.87 (0.56)	0.17 (0.14)	19.88 (11.95)	21.40 (13.15)
Shade Tolerants	15555.56 (4141.13)	13055.56 (4483.34)	0.53 (0.12)	0.75 (0.34)	56.17 (9.99)	54.91 (10.65)
Total	23055.56 (4365.62)	21111.11 (5790.18)	1.68 (0.61)	1.22 (0.34)	--	--

DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	1388.89 (844.83)	1388.89 (734.93)	0.06 (0.03)	0.11 (0.06)	5.28 (2.65)	5.93 (3.08)
Shade Intolerants	7500.00 (6277.72)	19166.67 (9601.43)*	0.28 (0.25)	0.53 (0.34)*	7.61 (4.94)	32.34 (8.53)*
Oaks	3611.11 (1672.44)	4444.44 (2311.57)	0.35 (0.21)	0.28 (0.13)	11.80 (5.24)	14.54 (6.97)
Pines	277.78 (277.78)	1111.11 (844.83)	0.01 (0.01)	0.02 (0.01)	0.24 (0.24)	5.47 (5.22)
Shade Tolerants	69444.44 (19684.04)	24444.44 (7392.49)*	0.88 (0.17)	0.79 (0.34)	75.07 (5.52)	41.72 (9.08)*
Total	82222.22 (21137.14)	50555.56 (9426.04)	1.57 (0.36)	1.72 (0.45)	--	--

Table 15., continued.

Species Group	Stems per hectare		% Cover		Importance Value	
DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	2222.22 (651.45)	3611.11 (1111.11)	0.23 (0.08)	0.30 (0.11)	9.69 (4.39)	19.02 (6.76)*
Shade Intolerants	1111.11 (605.40)	2222.22 (773.30)	0.03 (0.02)	0.27 (0.23)	4.21 (2.84)	13.72 (7.20)
Oaks	2222.22 (1210.81)	1944.44 (1162.03)	0.13 (0.07)	0.13 (0.08)	8.65 (4.66)	9.28 (4.90)
Pines	5000.00 (2635.23)	277.78 (277.78)	1.20 (1.13)	0.01 (0.01)	17.61 (7.84)	0.80 (0.80)
Shade Tolerants	83611.11 (45036.85)	54444.44 (30341.74)	1.23 (0.57)	0.93 (0.51)	59.84 (10.24)	57.18 (10.37)
Total	94166.67 (43598.95)	62500.00 (29712.16)	2.82 (1.37)	1.63 (0.48)	--	--
DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Hickories	1944.44 (694.44)	2222.22 (773.30)	0.15 (0.06)	0.54 (0.25)	12.50 (4.89)	25.93 (8.91)
Shade Intolerants	1666.67 (931.69)	3333.33 (1102.40)*	0.05 (0.03)	0.47 (0.21)	4.64 (2.85)	13.89 (5.43)*
Oaks	7500.00 (2732.27)	6111.11 (2919.97)	0.51 (0.16)	1.90 (1.60)	27.50 (7.73)	27.42 (8.25)
Pines	1944.44 (1162.03)	277.78 (277.78)	0.08 (0.06)	0.01 (0.01)	8.28 (7.40)	0.45 (0.45)
Shade Tolerants	66388.89 (34367.07)	23611.11 (14861.11)	0.67 (0.29)	0.41 (0.22)*	47.08 (11.96)	32.31 (12.98)
Total	79444.44 (33384.80)	35555.56 (13780.13)	1.45 (0.24)	3.33 (1.49)	--	--

Table 15., continued.

Heavener Mountain						
Species Group	Stems per hectare		% Cover		Importance Value	
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	1111.11 (605.40)	3611.11 (1324.92)*	0.03 (0.02)	0.24 (0.11)	3.08 (1.70)	12.57 (5.26)
Shade Intolerants	18888.89 (7084.69)	12500.00 (3061.86)	0.37 (0.11)	0.47 (0.12)	51.74 (11.03)	31.00 (5.28)*
Oaks	2500.00 (721.69)	2222.22 (773.30)	0.16 (0.08)	0.13 (0.07)	8.48 (2.88)	4.86 (1.88)
Pines	1944.44 (1944.44)	2222.22 (1689.66)	0.02 (0.02)	0.03 (0.02)	8.33 (8.33)	8.33 (5.89)
Shade Tolerants	21666.67 (8994.60)	31388.89 (12930.85)	0.33 (0.11)	0.69 (0.22)*	28.36 (9.60)	43.24 (9.99)
Total	46111.11 (11622.77)	51944.44 (14929.10)	0.91 (0.16)	1.56 (0.26)*	--	--
HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	2500.00 (1666.67)	3888.89 (1959.27)	0.19 (0.14)	1.27 (0.92)	8.13 (4.91)	14.19 (6.43)
Shade Intolerants	6666.67 (3333.33)	6944.44 (3327.54)	0.53 (0.23)	1.20 (0.67)	17.65 (7.56)	16.43 (7.27)
Oaks	5000.00 (1250.00)	8055.56 (2311.57)	0.53 (0.23)	3.01 (1.57)	25.86 (10.18)	21.19 (7.07)
Pines	555.56 (555.56)	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	2.16 (2.16)	0.00 (0.00)
Shade Tolerants	29166.67 (14092.95)	28611.11 (12098.49)	1.11 (0.69)	1.79 (0.91)	46.20 (12.06)	48.19 (12.45)
Total	43888.89 (12069.76)	47500.00 (9973.92)	2.36 (0.60)	7.28 (2.27)	--	--

Table 15., continued.

Species Group	Stems per hectare		% Cover		Importance Value	
HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	1944.44 (1162.03)	3611.11 (1672.44)	0.05 (0.03)	0.11 (0.05)	9.93 (5.76)	16.28 (6.54)
Shade Intolerants	1111.11 (605.40)	5555.56 (2910.05)	0.03 (0.02)	0.31 (0.19)	11.11 (6.05)	20.28 (8.67)
Oaks	1111.11 (844.83)	833.33 (589.26)	0.03 (0.03)	0.04 (0.03)	4.66 (4.00)	1.88 (1.44)
Pines	3333.33 (1954.34)	1944.44 (1162.03)	0.06 (0.03)	0.05 (0.03)	15.65 (10.81)	7.89 (4.19)
Shade Tolerants	19166.67 (6495.19)	15000.00 (4859.13)	0.33 (0.13)	0.87 (0.36)	58.65 (13.33)	53.68 (7.75)
Total	26666.67 (6909.63)	26944.44 (5904.00)	0.49 (0.14)	1.38 (0.43)*	--	--
HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hickories	0.00 (0.00)	1111.11 (605.40)	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	5.31 (2.83)
Shade Intolerants	1388.89 (941.99)	3055.56 (1001.54)	0.03 (0.02)	0.32 (0.23)	11.98 (8.31)	14.08 (5.39)
Oaks	2222.22 (773.3)	3333.33 (1381.93)	0.15 (0.06)	0.69 (0.32)	33.29 (15.34)	20.63 (8.18)
Pines	2222.22 (1469.86)	2777.78 (1583.58)	0.03 (0.02)	0.06 (0.03)	20.83 (14.00)	27.24 (13.29)
Shade Tolerants	24166.67 (19494.48)	16111.11 (11273.98)	0.20 (0.16)	0.74 (0.55)	33.90 (16.73)	32.73 (13.51)
Total	30000.00 (19043.99)	26388.89 (10533.60)	0.41 (0.16)	1.84 (0.64)*	--	--

Table 15., continued.

Brushy Knob			
Species Group	Stems per hectare	% Cover	Importance Value
BK, NE-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	1666.67 (589.26)	0.26 (0.11)	8.77 (3.48)
Shade Intolerants	277.78 (277.78)	0.03 (0.03)	1.30 (1.30)
Oaks	8333.33 (2667.97)	3.42 (2.40)	35.49 (8.91)
Pines	3055.56 (1655.05)	0.05 (0.02)	10.54 (5.36)
Shade Tolerants	18333.33 (6718.55)	2.47 (1.95)	43.90 (9.88)
Total	31666.67 (5921.95)	6.22 (2.89)	--
BK, NE-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	555.56 (367.47)	0.11 (0.08)	2.34 (1.57)
Shade Intolerants	555.56 (367.47)	0.13 (0.12)	6.94 (5.56)
Oaks	5000.00 (1863.39)	1.10 (0.52)	22.05 (8.83)
Pines	1111.11 (734.93)	0.01 (0.01)	6.35 (5.51)
Shade Tolerants	23888.89 (7313.79)	2.70 (1.52)	62.31 (12.23)
Total	31111.11 (7419.84)	4.06 (1.67)	--
BK, SW-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	1388.89 (844.83)	0.30 (0.21)	10.97 (6.45)
Shade Intolerants	833.33 (589.26)	0.17 (0.17)	2.76 (2.13)
Oaks	5000.00 (1863.39)	1.13 (0.82)	26.06 (7.78)
Pines	3888.89 (1959.27)	0.08 (0.04)	27.36 (11.53)
Shade Tolerants	24722.22 (18733.53)	0.67 (0.39)	32.85 (10.74)
Total	35833.33 (17721.81)	2.36 (1.09)	--

Table 15., continued.

Species Group	Stems per hectare	% Cover	Importance Value
BK, SW-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Hickories	1111.11 (439.21)	0.32 (0.27)	7.32 (4.11)
Shade Intolerants	833.33 (416.67)	0.15 (0.09)	4.61 (2.54)
Oaks	5833.33 (2393.57)	1.55 (0.60)	27.65 (9.64)
Pines	3333.33 (1559.02)	0.13 (0.07)	26.94 (12.85)
Shade Tolerants	5555.56 (1546.60)	1.62 (1.42)	33.48 (10.18)
Total	16666.67 (3173.24)	3.77 (1.36)	--

Table 16. Herbaceous stratum summary statistics (± SE) per 1 m^2 plot. Means within rows followed by an asterisk (*) are significantly different between years (p<0.05).

Dunkle Knob								
Section	% Cover		*H′*		*J′*		*S*	
	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
DK, NE-L	13.59 (3.85)	14.80 (3.50)	1.00 (0.10)	1.03 (0.11)	0.67 (0.06)	0.59 (0.06)	4.67 (0.53)	5.56 (0.49)
DK, NE-U	9.92 (1.46)	16.37 (2.54)*	1.32 (0.17)	1.31 (0.13)	0.66 (0.06)	0.64 (0.03)	7.53 (0.94)	8.33 (1.04)
DK, SW-L	11.34 (2.73)	12.13 (2.37)	1.22 (0.16)	1.28 (0.18)	0.66 (0.05)	0.63 (0.05)	6.58 (0.83)	7.89 (1.22)
DK, SW-U	9.04 (1.06)	14.72 (2.46)*	1.21 (0.08)	1.41 (0.15)	0.66 (0.03)	0.67 (0.05)	6.25 (0.51)	8.42 (0.95)*

Heavener Mountain								
Section	% Cover		*H′*		*J′*		*S*	
	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
HM, NE-L	4.23 (0.85)	12.70 (4.97)	1.48 (0.10)	1.52 (0.10)	0.81 (0.05)	0.75 (0.05)	6.47 (0.42)	7.97 (0.58)*
HM, NE-U	11.06 (1.11)	27.38 (6.18)*	1.01 (0.08)	1.13 (0.11)	0.63 (0.03)	0.60 (0.04)	5.53 (0.53)	7.11 (0.83)*
HM, SW-L	6.52 (1.02)	18.71 (4.65)*	1.24 (0.09)	1.40 (0.18)	0.77 (0.04)	0.65 (0.07)*	5.58 (0.38)	9.28 (1.43)*
HM, SW-U	7.92 (1.23)	21.19 (2.89)*	1.09 (0.11)	1.16 (0.10)	0.64 (0.04)	0.58 (0.02)	5.58 (0.55)	8.19 (1.04)*

Brushy Knob				
Section	% Cover	*H′*	*J′*	*S*
	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)	12 Years Post-burn (2003)
BK, NE-L	24.81 (5.78)	1.26 (0.11)	0.67 (0.04)	6.86 (0.64)
BK, NE-U	27.04 (3.10)	0.97 (0.09)	0.53 (0.04)	6.67 (0.83)
BK, SW-L	15.24 (4.14)	1.29 (0.13)	0.66 (0.04)	7.28 (1.14)
BK, SW-U	16.51 (3.45)	1.01 (0.14)	0.57 (0.07)	5.94 (0.87)

Table 17. Herbaceous stratum habit summary statistics (± SE). See Appendix B; Table B2 for species habit groupings list. Means within rows followed by an asterisk (*) are significantly different between years (p<0.05).

Dunkle Knob				
Habit Group	% Cover		Importance Value	
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Ferns and Forbs	0.74 (0.25)	1.42 (0.80)	12.73 (3.38)	16.21 (4.40)
Graminoids	0.30 (0.11)	0.35 (0.09)	6.13 (2.33)	5.41 (1.80)
Shrubs and Vines	10.86 (3.80)	11.79 (3.04)	59.17 (9.12)	59.03 (8.48)
Trees	1.68 (0.61)	1.22 (0.34)	21.98 (6.29)	19.35 (7.49)
Total	13.58 (3.85)	14.78 (3.50)	--	--
DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Ferns and Forbs	2.60 (1.17)	5.87 (2.74)	23.75 (6.99)	28.99 (8.13)*
Graminoids	0.67 (0.26)	1.06 (0.36)	7.34 (2.91)	7.35 (2.65)
Shrubs and Vines	5.06 (1.74)	7.69 (1.97)*	44.09 (10.97)	49.65 (10.04)
Trees	1.58 (0.36)	1.73 (0.45)	24.82 (5.75)	14.01 (3.32)*
Total	9.91 (1.46)	16.35 (2.53)*	--	--
DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Ferns and Forbs	1.71 (0.72)	3.49 (1.75)	14.22 (4.07)	21.11 (5.72)*
Graminoids	1.88 (0.68)	1.77 (0.68)	18.55 (4.30)	15.95 (3.24)
Shrubs and Vines	4.92 (1.61)	5.24 (1.54)	44.42 (8.79)	45.17 (9.70)
Trees	2.82 (1.37)	1.63 (0.48)	22.81 (5.44)	17.76 (4.85)
Total	11.32 (2.73)	12.13 (2.36)	--	--
DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Ferns and Forbs	0.96 (0.26)	4.11 (1.52)	15.02 (2.92)	31.71 (7.02)*
Graminoids	1.00 (0.45)	0.99 (0.33)	17.10 (7.49)	13.83 (6.07)
Shrubs and Vines	5.62 (1.43)	6.25 (1.82)	40.93 (9.42)	37.64 (7.95)
Trees	1.45 (0.24)	3.33 (1.49)	26.95 (5.96)	16.82 (3.70)
Total	9.03 (1.06)	14.68 (2.45)*	--	--

Table 17., continued.

Heavener Mountain				
Habit Group	% Cover		Importance Value	
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Ferns and Forbs	0.87 (0.11)	5.17 (2.26)	27.84 (5.21)	34.59 (6.85)
Graminoids	0.43 (0.08)	1.85 (0.95)	10.50 (2.00)	11.14 (1.44)
Shrubs and Vines	2.02 (0.88)	4.13 (2.07)	34.86 (6.27)	27.83 (3.42)
Trees	0.91 (0.16)	1.56 (0.26)*	26.80 (4.09)	26.44 (5.89)
Total	4.23 (0.85)	12.69 (4.97)	--	--
HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Ferns and Forbs	1.01 (0.35)	5.53 (2.25)	13.15 (3.82)	19.13 (4.25)*
Graminoids	0.78 (0.42)	2.98 (1.55)	4.51 (1.91)	6.71 (2.74)
Shrubs and Vines	6.90 (1.04)	11.58 (2.02)*	56.10 (8.17)	44.51 (8.65)*
Trees	2.37 (0.60)	7.28 (2.27)	26.24 (6.58)	29.66 (7.55)
Total	11.05 (1.11)	27.37 (6.18)*	--	--
HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Ferns and Forbs	1.26 (0.54)	5.28 (2.79)	19.45 (4.99)	29.12 (8.00)*
Graminoids	1.26 (0.50)	3.08 (1.61)	18.23 (5.63)	12.30 (3.90)
Shrubs and Vines	3.49 (1.12)	8.94 (2.93)*	46.59 (8.28)	44.91 (11.39)
Trees	0.50 (0.14)	1.38 (0.43)*	15.73 (3.45)	13.67 (4.73)
Total	6.52 (1.02)	18.69 (4.65)*	--	--
HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Ferns and Forbs	1.27 (0.39)	4.19 (0.70)*	18.93 (4.20)	20.50 (3.64)
Graminoids	1.08 (0.32)	3.64 (1.11)*	19.41 (7.06)	23.00 (8.21)
Shrubs and Vines	5.15 (1.07)	11.51 (2.14)*	56.19 (8.33)	47.50 (7.32)*
Trees	0.41 (0.16)	1.84 (0.64)*	5.48 (1.58)	9.00 (2.93)
Total	7.91 (1.23)	21.18 (2.89)*	--	--

Table 17., continued.

Brushy Knob		
Habit Group	% Cover	Importance Value
BK, NE-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Ferns and Forbs	1.80 (0.43)	18.60 (6.33)
Graminoids	0.58 (0.26)	6.13 (3.24)
Shrubs and Vines	16.20 (5.13)	56.22 (8.85)
Trees	6.22 (2.89)	19.04 (4.78)
Total	24.81 (5.77)	--
BK, NE-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Ferns and Forbs	1.13 (0.38)	7.33 (3.03)
Graminoids	0.83 (0.20)	4.73 (2.13)
Shrubs and Vines	21.03 (2.92)	71.40 (6.17)
Trees	4.06 (1.67)	16.53 (5.11)
Total	27.04 (3.10)	--
BK, SW-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Ferns and Forbs	2.13 (0.68)	28.73 (7.91)
Graminoids	1.29 (0.35)	19.55 (6.76)
Shrubs and Vines	9.42 (4.10)	39.63 (10.11)
Trees	2.36 (1.09)	12.09 (2.76)
Total	15.21 (4.15)	--
BK, SW-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Ferns and Forbs	1.32 (0.38)	12.89 (3.31)
Graminoids	1.36 (0.44)	19.32 (7.78)
Shrubs and Vines	10.05 (2.73)	44.24 (9.84)
Trees	3.77 (1.36)	23.55 (8.04)
Total	16.50 (3.45)	--

Table 18. Herbaceous stratum functional type summary statistics. See Appendix B; Table B2 for species functional groupings list. Means within rows followed by different letters are significantly different between years (*p*<0.05).

Dunkle Knob				
Functional Group	% Cover		Importance Value	
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Exotic	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Exotic Invasive	0.05 (0.04)	0.16 (0.12)	1.55 (1.03)	3.00 (2.14)
Native	11.87 (3.81)	13.05 (3.19)	77.71 (6.51)	80.69 (4.93)
Native Invasive Weed	0.31 (0.29)	1.01 (0.86)	3.84 (2.20)	6.23 (2.79)
Native Weed	1.20 (0.58)	0.42 (0.16)	16.9 (5.73)	10.07 (4.77)
Total	13.43 (3.86)	14.65 (3.47)	--	--
DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Exotic	0.01 (0.01)	0.04 (0.03)	0.14 (0.14)	0.22 (0.15)
Exotic Invasive	1.05 (0.65)	1.19 (0.61)	6.27 (2.84)	6.56 (2.74)
Native	7.00 (1.57)	12.41 (1.73)*	68.62 (9.81)	74.77 (6.69)
Native Invasive Weed	0.15 (0.08)	0.40 (0.12)	1.61 (0.68)	4.34 (1.65)
Native Weed	1.55 (0.56)	1.89 (0.84)	23.35 (7.13)	14.11 (4.10)*
Total	9.75 (1.46)	15.93 (2.33)*	--	--
DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Exotic	0.01 (0.01)	0.02 (0.01)	0.05 (0.05)	0.16 (0.12)
Exotic Invasive	0.17 (0.15)	0.31 (0.27)	0.90 (0.61)	1.11 (0.74)
Native	7.77 (1.46)	9.73 (1.67)	78.21 (5.28)	82.27 (5.23)
Native Invasive Weed	0.63 (0.38)	0.70 (0.32)	4.79 (2.38)	9.26 (4.48)
Native Weed	2.52 (1.28)	1.22 (0.69)	16.05 (4.95)	7.20 (3.13)
Total	11.09 (2.74)	11.98 (2.38)	--	--
DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Exotic	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.09 (0.07)
Exotic Invasive	0.15 (0.09)	0.53 (0.28)	2.21 (0.97)	5.12 (2.62)
Native	8.02 (1.22)	11.77 (2.58)	80.52 (5.75)	77.73 (6.04)
Native Invasive Weed	0.09 (0.04)	0.65 (0.22)*	2.32 (1.15)	6.15 (1.85)*
Native Weed	0.64 (0.22)	1.23 (0.46)	14.94 (5.21)	10.91 (3.63)
Total	8.90 (1.08)	14.18 (2.39)*	--	--

Table 18., continued.

Heavener Mountain				
Functional Group	% Cover		Importance Value	
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Exotic	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.07 (0.05)
Exotic Invasive	0.02 (0.01)	0.06 (0.04)	0.46 (0.35)	0.46 (0.26)
Native	2.95 (0.93)	8.26 (3.00)*	60.29 (5.11)	67.59 (4.08)
Native Invasive Weed	0.35 (0.09)	0.35 (0.08)	14.47 (3.00)	6.87 (2.24)
Native Weed	0.75 (0.19)	3.87 (2.05)	24.77 (4.86)	25.02 (4.16)
Total	4.07 (0.86)	12.56 (4.96)	--	--
HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Exotic	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Exotic Invasive	0.17 (0.11)	1.57 (1.06)	1.32 (0.88)	3.50 (1.80)
Native	8.38 (1.19)	20.48 (4.34)*	66.78 (6.98)	71.24 (6.36)
Native Invasive Weed	0.91 (0.35)	1.34 (0.56)	11.54 (3.79)	4.42 (1.53)*
Native Weed	1.46 (0.71)	3.51 (1.11)	20.36 (7.82)	20.84 (7.54)
Total	10.91 (1.09)	26.90 (6.14)*	--	--
HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Exotic	0.22 (0.22)	0.48 (0.44)	1.11 (1.11)	1.67 (1.28)
Exotic Invasive	0.17 (0.17)	0.19 (0.19)	1.27 (1.27)	0.68 (0.58)
Native	5.25 (0.95)	14.99 (3.49)*	79.28 (4.37)	82.06 (4.44)
Native Invasive Weed	0.21 (0.08)	0.40 (0.22)	7.78 (3.82)	4.73 (2.01)
Native Weed	0.38 (0.11)	2.35 (1.07)	10.55 (1.85)	10.87 (2.47)
Total	6.23 (0.97)	18.41 (4.56)*	--	--
HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Exotic	0.00 (0.00)	0.09 (0.07)	0.00 (0.00)	0.30 (0.25)
Exotic Invasive	0.01 (0.01)	0.11 (0.07)	0.12 (0.12)	0.50 (0.36)
Native	7.18 (1.25)	18.27 (2.40)*	89.63 (1.40)	89.38 (2.60)
Native Invasive Weed	0.13 (0.03)	0.52 (0.26)	3.84 (1.08)	2.87 (1.48)
Native Weed	0.38 (0.13)	1.94 (0.59)*	6.42 (1.42)	6.95 (1.75)
Total	7.71 (1.26)	20.94 (2.96)*	--	--

Table 18., continued.

Brushy Knob		
Functional Group	% Cover	Importance Value
BK, NE-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Exotic	0.00 (0.00)	0.00 (0.00)
Exotic Invasive	0.05 (0.02)	0.68 (0.39)
Native	23.31 (5.85)	88.94 (4.08)
Native Invasive Weed	0.30 (0.12)	1.76 (0.57)
Native Weed	0.64 (0.23)	8.62 (4.34)
Total	24.30 (5.83)	--
BK, NE-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Exotic	0.01 (0.01)	0.01 (0.01)
Exotic Invasive	0.03 (0.01)	0.14 (0.06)
Native	23.58 (2.70)	86.89 (4.17)
Native Invasive Weed	0.13 (0.05)	0.72 (0.29)
Native Weed	3.14 (1.47)	12.23 (4.25)
Total	26.98 (3.08)	--
BK, SW-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Exotic	0.02 (0.01)	0.18 (0.13)
Exotic Invasive	0.02 (0.02)	0.22 (0.22)
Native	13.99 (4.01)	91.04 (2.21)
Native Invasive Weed	0.24 (0.20)	1.00 (0.51)
Native Weed	0.67 (0.23)	7.57 (1.92)
Total	14.95 (4.20)	--
BK, SW-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Exotic	0.04 (0.03)	0.61 (0.52)
Exotic Invasive	0.01 (0.01)	0.15 (0.15)
Native	14.01 (3.87)	80.57 (9.04)
Native Invasive Weed	0.43 (0.31)	4.05 (2.97)
Native Weed	1.88 (1.44)	14.63 (9.16)
Total	16.36 (3.41)	--

Table 19. Environmental variable Pearson correlation coefficients with herbaceous stratum nonmetric multidimensional scaling ordination axes.

Variable	Axis 1	Axis 2	Axis 3
Moss and lichen % cover[a]	0.121	-0.047	-0.086
Rock % cover[a]	0.110	0.323	-0.009
Living wood % cover[a]	0.110	-0.014	0.050
Dead wood % cover[a]	-0.141	0.318	-0.219
Bare ground % cover[a]	0.085	0.116	0.320
Litter % cover[a]	-0.085	-0.262	-0.117
Litter depth	-0.083	-0.017	-0.225
Total vascular plant % cover	-0.152	-0.351	0.122
H'	0.166	0.470	-0.115
J'	0.013	0.450	-0.233
S	0.225	0.289	0.058
Basal area (m^2/ha)	-0.097	0.104	-0.328
Percent slope	0.290	0.129	-0.032
Slope configuration	-0.089	0.348	-0.341
Azimuth[b]	-0.032	0.267	-0.469
Topographic position	-0.143	0.389	-0.286

[a] An arcsine square root transformation was applied to these data prior to analysis.
[b] Transformed following Beers et al. (1966).

Table 20. Matrix of herbaceous stratum species importance value Pearson correlation coefficients with final nonmetric multidimensional scaling ordination axes.

Species	Axis 1	Axis 2	Axis 3
Acalypha rhomboidea	0.141	0.187	-0.146
Acalypha virginica	0.161	0.273	-0.147
Acer pensylvanicum	0.294	0.256	-0.644
Acer rubrum	-0.368	0.206	-0.311
Acer saccharum	0.002	0.152	-0.100
Ailanthus altissima	0.031	0.164	-0.147
Alliaria petiolata	0.088	0.257	-0.245
Allium cf. *cernuum*	0.212	-0.058	0.079
Allium sp.	-0.021	-0.019	0.110
Ambrosia artemisiifolia	0.104	0.198	-0.002
Amelanchier arborea	0.072	-0.093	0.061
Amphicarpaea bracteata	-0.029	0.382	-0.071
Anemonella thalictroides	0.063	0.132	0.070
Antennaria plantaginifolia	0.134	-0.068	0.129
Antennaria sp.	-0.021	-0.019	0.110
Antennaria virginica	0.350	-0.089	0.245
Arabis canadensis	0.034	0.073	0.040
Arabis laevigata	0.017	0.221	-0.157
Aristolochia serpentaria	0.022	-0.058	-0.004
Asclepias quadrifolia	0.078	-0.059	0.012
Asplenium platyneuron	0.310	0.317	-0.003
Aster cf. *schreberi*	-0.148	0.153	-0.039
Aster cordifolius	0.050	0.022	0.052
Aster divaricatus	-0.055	0.028	-0.083
Aster divaricatus/cordifolius	0.186	0.123	-0.064
Aster linariifolius	-0.010	-0.118	0.009
Aster sp.	-0.035	0.033	0.022
Aster undulatus	-0.015	0.028	0.047
Aureolaria laevigata	0.042	-0.177	0.031
Aureolaria virginica	-0.044	-0.070	0.043
Betula alleghaniensis	-0.038	0.164	-0.025
Betula lenta	0.067	0.022	-0.150
Brachyelytrum erectum	-0.170	0.150	-0.147
Bromus cf. *latiglumis*	-0.051	-0.049	-0.052
Bromus ciliatus	0.103	0.059	-0.018
Bromus japonicus	0.110	0.131	0.019
Bromus latiglumis	0.048	0.114	-0.053
Bromus pubescens	0.047	0.168	0.008
Bromus racemosus	0.131	0.100	-0.055
Campanula divaricata	-0.079	0.074	0.086

Table 20., continued.

Species	Axis 1	Axis 2	Axis 3
Cardamine parviflora	-0.046	0.091	0.038
Carex cephalophora	-0.049	0.248	0.112
Carex cf. *communis*	0.025	0.093	-0.040
Carex cf. *digitalis*	0.086	-0.012	-0.128
Carex cf. *laxiflora*	-0.047	0.180	-0.101
Carex cf. *swanii/virescens/aestivalis*	-0.125	0.124	-0.132
Carex communis	0.031	0.058	-0.092
Carex complanata var. *hirsuta*	-0.123	0.085	-0.065
Carex digitalis	0.043	0.100	-0.188
Carex laxiflora	0.089	0.157	-0.091
Carex lucorum	0.036	-0.079	-0.074
Carex pensylvanica	0.064	0.171	0.191
Carex pensylvanica/lucorum	0.541	-0.029	0.527
Carex sp.	0.100	-0.008	-0.188
Carex sp. (Laxiflorae)	0.093	0.166	-0.158
Carex sp. (Montanae)	-0.087	-0.030	0.002
Carex willdenowii	0.042	0.075	-0.030
Carya spp.	0.147	0.087	0.173
Ceanothus americanus	0.032	0.213	0.068
Cerastium brachypetalum/vulgatum	0.131	0.100	-0.055
Cercis canadensis	0.062	0.121	0.026
Chimaphila maculata	-0.083	0.026	-0.041
Conopholis americana	0.103	0.059	-0.018
Convolvulus sp.	0.148	0.156	-0.067
Cornus florida	-0.082	-0.076	-0.056
Corydalis cf. *sempervirens*	0.070	0.108	-0.159
Crataegus spp.	-0.015	-0.017	0.106
Cunila origanoides	0.154	-0.056	0.098
Danthonia compressa	0.059	0.034	0.108
Danthonia sp.	0.204	0.062	0.210
Danthonia spicata	0.404	-0.063	0.372
Dennstaedtia punctilobula	-0.029	-0.064	0.042
Deschampsia flexuosa	0.201	-0.065	0.053
Dioscorea quaternata/villosa	-0.118	0.205	-0.292
Draba ramosissima	0.172	0.103	0.154
Dryopteris carthusiana	0.024	0.001	-0.066
Dryopteris cf. *intermedia*	-0.039	0.039	0.050
Dryopteris intermedia	-0.162	0.231	-0.019
Dryopteris marginalis	0.213	0.258	-0.334
Elymus histrix	0.167	0.147	-0.035
Epigaea repens	0.009	-0.098	0.022
Erechtites hieraciifolia	-0.003	0.381	0.003
Eupatorium purpureum	-0.124	-0.022	0.145

Table 20., continued.

Species	Axis 1	Axis 2	Axis 3
Eupatorium rugosum	0.199	0.587	-0.404
Festuca arundinacea	0.056	-0.004	0.068
Festuca subverticillata	0.233	0.217	-0.066
Fraxinus americana	-0.030	0.239	-0.108
Galium cf. *concinnum*	0.077	0.102	-0.135
Galium circaezans	0.073	0.268	-0.237
Galium concinnum	0.080	0.125	-0.229
Galium lanceolatum	0.075	0.126	-0.084
Galium triflorum	0.176	0.202	-0.145
Gaultheria procumbens	-0.161	-0.173	0.032
Gaylussacia baccata	-0.481	-0.398	-0.054
Gnaphalium obtusifolium	0.169	0.044	0.154
Gnaphalium purpureum	-0.051	-0.002	0.023
Hamamelis virginiana	-0.073	0.153	-0.522
Hedeoma pulegioides	0.207	0.020	0.069
Hedyotis cf. *caerulea*	0.161	-0.069	0.038
Hedyotis longifolia	0.247	0.104	0.139
Hedyotis longifolia/nutalliana	0.037	0.016	-0.044
Hedyotis nutalliana	0.121	-0.050	-0.026
Helianthus spp.	0.070	0.108	-0.159
Hepatica americana	-0.009	0.108	-0.143
Heuchera americana	0.127	-0.034	-0.048
Hieracium caespitosum/aurantiacum/traillii	0.099	-0.048	0.159
Hieracium cf. *caespitosum/floribundum*	0.121	0.188	0.172
Hieracium cf. *traillii*	0.010	-0.091	0.050
Hieracium sp.	0.171	0.109	0.162
Hieracium traillii	0.161	0.104	0.099
Hieracium venosum	-0.034	-0.091	0.119
Hypoxis hirsuta	-0.035	0.064	-0.048
Juncus tenuis	0.175	0.058	-0.078
Kalmia latifolia	-0.391	-0.329	-0.055
Krigia biflora	-0.021	-0.019	0.110
Lactuca sp.	-0.021	-0.019	0.110
Lespedeza cf. *intermedia/violacea*	0.097	-0.073	0.093
Lespedeza procumbens	-0.034	0.084	0.110
Liriodendron tulipifera	-0.053	0.236	-0.125
Lysimachia quadrifolia	0.039	-0.048	0.044
Melampyrum lineare	0.043	-0.068	0.020
Menziesia pilosa	-0.115	-0.055	0.007
Mitchella repens	-0.175	0.147	-0.137
Monotropa uniflora	-0.071	-0.073	-0.061
Muhlenbergia schreberi	0.035	0.131	-0.123
Muhlenbergia sobolifera	-0.043	0.021	-0.044

Table 20., continued.

Species	Axis 1	Axis 2	Axis 3
Nyssa sylvatica	-0.247	0.117	-0.179
Ostrya virginiana	0.269	0.213	-0.374
Panicum boscii	-0.037	0.257	0.208
Panicum cf. *depauperatum*	-0.058	0.009	0.111
Panicum commutatum	-0.046	0.157	-0.031
Panicum depauperatum	0.093	-0.169	0.116
Panicum depauperatum/linearifolium	0.055	-0.063	0.185
Panicum dichotomum	-0.008	-0.158	0.020
Panicum linearifolium	0.022	-0.115	0.299
Panicum sp.	-0.193	0.080	0.119
Paronychia canadensis	0.090	0.180	0.026
Paronychia fastigiata	0.246	0.013	0.395
Parthenocissus quinquefolia	-0.031	0.182	-0.201
Phlox buckleyi	0.021	0.006	0.095
Phlox subulata	0.238	-0.031	0.204
Phytolacca americana	0.007	0.284	-0.012
Pinus pungens	0.176	-0.115	0.306
Pinus rigida	-0.061	-0.136	0.039
Pinus spp.	0.156	-0.186	0.322
Pinus strobus	-0.083	0.166	-0.141
Pinus virginiana	-0.041	-0.153	0.149
Poa cf. *compressa*	0.112	-0.010	-0.095
Poa cf. *trivialis*	0.048	0.114	-0.053
Poa compressa	0.167	0.064	-0.019
Poa sylvestris	0.014	0.056	0.108
Polygonatum biflorum	-0.075	-0.044	0.052
Polygonum convolvulus/scandens	0.353	0.341	-0.045
Polygonum scandens	0.048	0.114	-0.053
Polypodium virginianum	-0.070	-0.121	-0.096
Polystichum acrostichoides	-0.014	0.163	-0.135
Populus grandidentata	-0.031	-0.082	0.081
Potentilla simplex/canadensis	0.287	-0.128	0.250
Prenanthes alba	-0.225	0.168	-0.102
Prenanthes sp.	-0.088	0.089	-0.048
Prunus serotina	-0.108	0.121	-0.054
Pteridium aquilinum	-0.167	-0.184	0.081
Pycnanthemum pycnanthemoides	0.068	0.098	0.064
Pyrola cf. *elliptica*	0.165	0.009	0.109
Quercus alba	-0.034	-0.006	0.045
Quercus coccinea	-0.004	0.001	-0.003
Quercus ilicifolia	0.015	-0.431	0.334
Quercus prinus	-0.081	-0.330	-0.055
Quercus rubra	0.223	-0.094	0.122

Table 20., continued.

Species	Axis 1	Axis 2	Axis 3
Quercus sp.	0.027	-0.039	-0.001
Quercus velutina	-0.122	-0.154	0.083
Rhododendron cf. *periclymenoides*	-0.028	-0.097	-0.103
Rhododendron sp.	-0.002	0.023	-0.223
Rhus aromatica	-0.014	0.190	0.062
Robinia psuedoacacia	0.027	0.030	0.026
Rosa carolina	-0.064	0.018	-0.019
Rosa carolina/acicularis	-0.002	-0.101	0.106
Rubus cf. *flagellaris/recurvicaulis/enslensii*	-0.037	-0.017	0.084
Rubus cf. *idaeus*	-0.038	0.164	-0.025
Rubus sp.	-0.017	0.164	-0.011
Sassafras albidum	-0.279	0.285	-0.224
Saxifraga cf. *caroliniana*	0.180	0.111	0.133
Saxifraga virginiensis	0.036	-0.079	-0.074
Scutellaria ovata	0.139	0.054	0.143
Sedum ternatum	0.170	0.122	0.030
Silene stellata	0.125	0.135	-0.086
Smilacina racemosa	-0.256	-0.074	-0.118
Smilax rotundifolia	-0.224	-0.020	-0.157
Solidago caesia	0.060	0.066	-0.021
Solidago cf. *curtisii*	0.131	0.052	0.076
Solidago cf. *flexicaulis*	0.031	0.106	0.036
Solidago cf. *roanensis*	0.062	-0.012	0.042
Solidago rugosa/canadensis	0.049	0.059	0.086
Solidago sp.	0.137	0.108	0.132
Sorghastrum nutans	-0.003	-0.078	0.069
Sphenopholis nitida	0.115	0.040	0.001
Spiraea betulifolia var. *corymbosa*	0.048	-0.153	0.003
Taenidia integerrima	-0.041	-0.004	0.059
Tephrosia virginiana	-0.003	-0.078	0.069
Tilia americana	0.031	0.106	0.036
Triodanis perfoliata	0.130	0.162	0.049
Uvularia perfoliata	-0.047	0.248	-0.215
Uvularia sessilifolia	-0.169	0.139	-0.188
Vaccinium pallidum	-0.401	-0.641	0.445
Vaccinium stamineum	0.158	-0.454	-0.113
Verbascum sp.	0.151	0.169	0.132
Veronica officinalis	0.062	0.121	0.026
Viburnum acerifolium	-0.076	-0.143	0.074
Viburnum cf. *prunifolium*	0.045	0.071	-0.029
Viburnum prunifolium	0.112	0.042	0.029
Vicia cf. *cracca/caroliniana*	0.259	0.222	-0.003
Vicia cracca	0.068	0.098	0.064

Table 20., continued.

Species	Axis 1	Axis 2	Axis 3
Viola pedata	0.186	-0.142	0.113
Viola sororia	-0.036	0.395	-0.144
Viola spp.	-0.107	0.062	0.008
Vitis spp.	-0.257	0.503	-0.081
Woodsia obtusa	-0.070	0.055	0.046

Figure 1. Overstory mixed model ANCOVA results of (A) species group composition, (B) species group X slope position, and (C) species group X aspect. All data were square root transformed prior to analysis. Means with different letter(s) are significantly different (*p*<0.05).

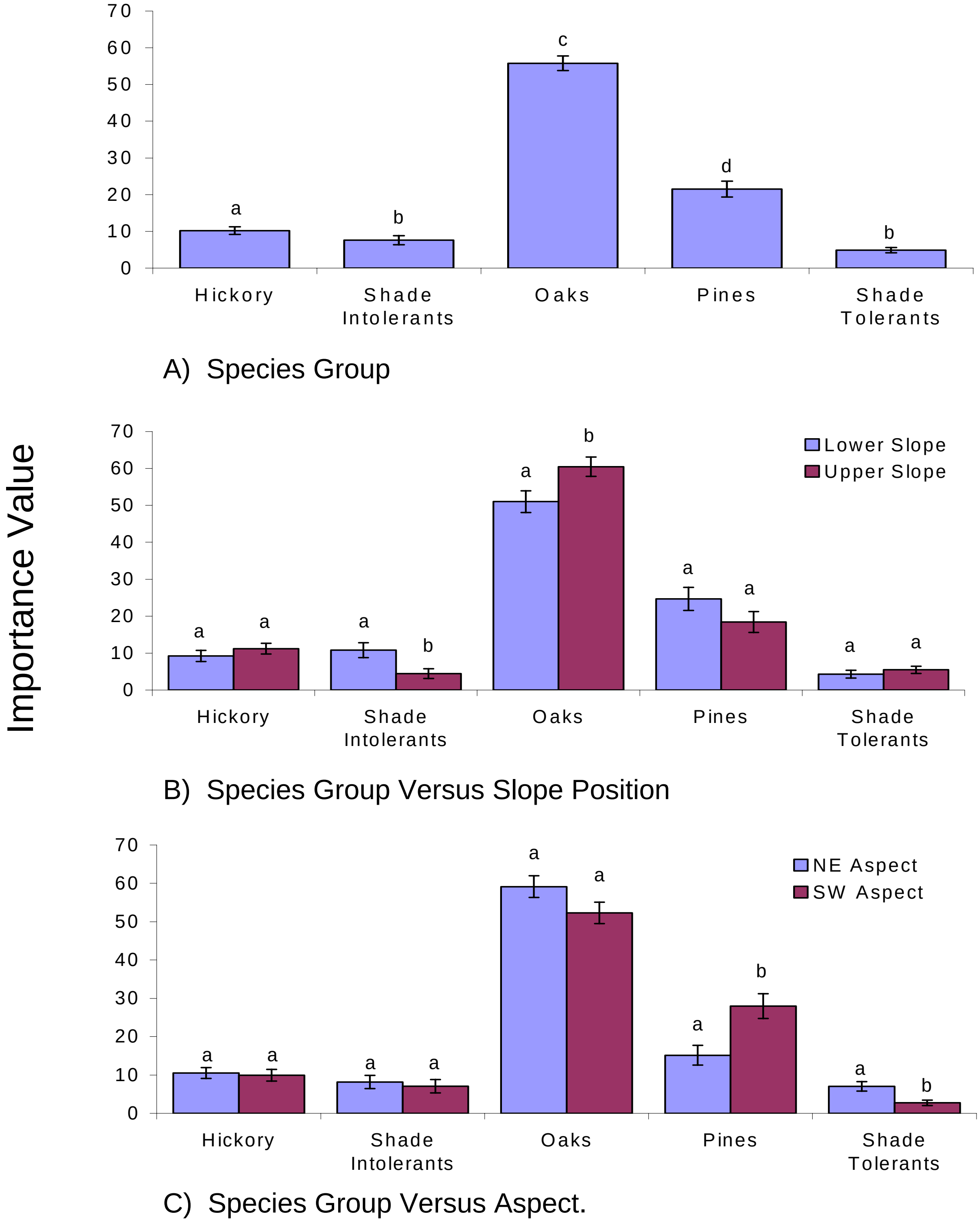


Figure 2. Sapling stratum mixed model ANCOVA results of (A) species group composition and (B) species group X slope position. Means with different letter(s) are significantly different (p<0.05) following square root transformation and adjustment to the mean value of the covariate, overstory basal area (m^2/ha).

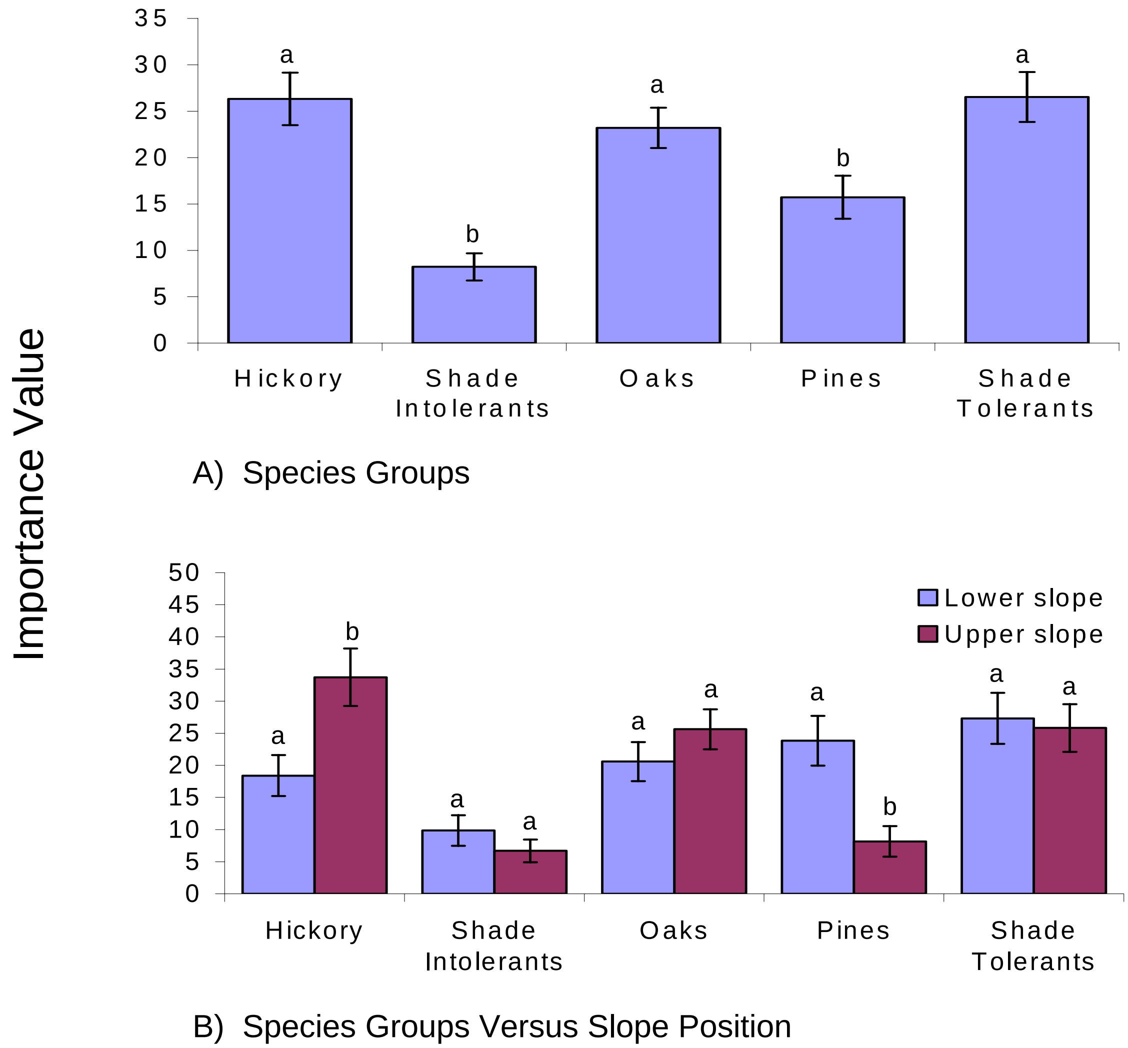


Figure 3. Nonmetric multidimensional scaling ordination of lumped overstory and sapling inventory plots by site and year. The vectors radiating from the center of the ordination diagram indicate the correlations of azimuth, slope configuration, species richness (*S*), and Shannon-Wiener's diversity index (*H'*) with the ordination axes.

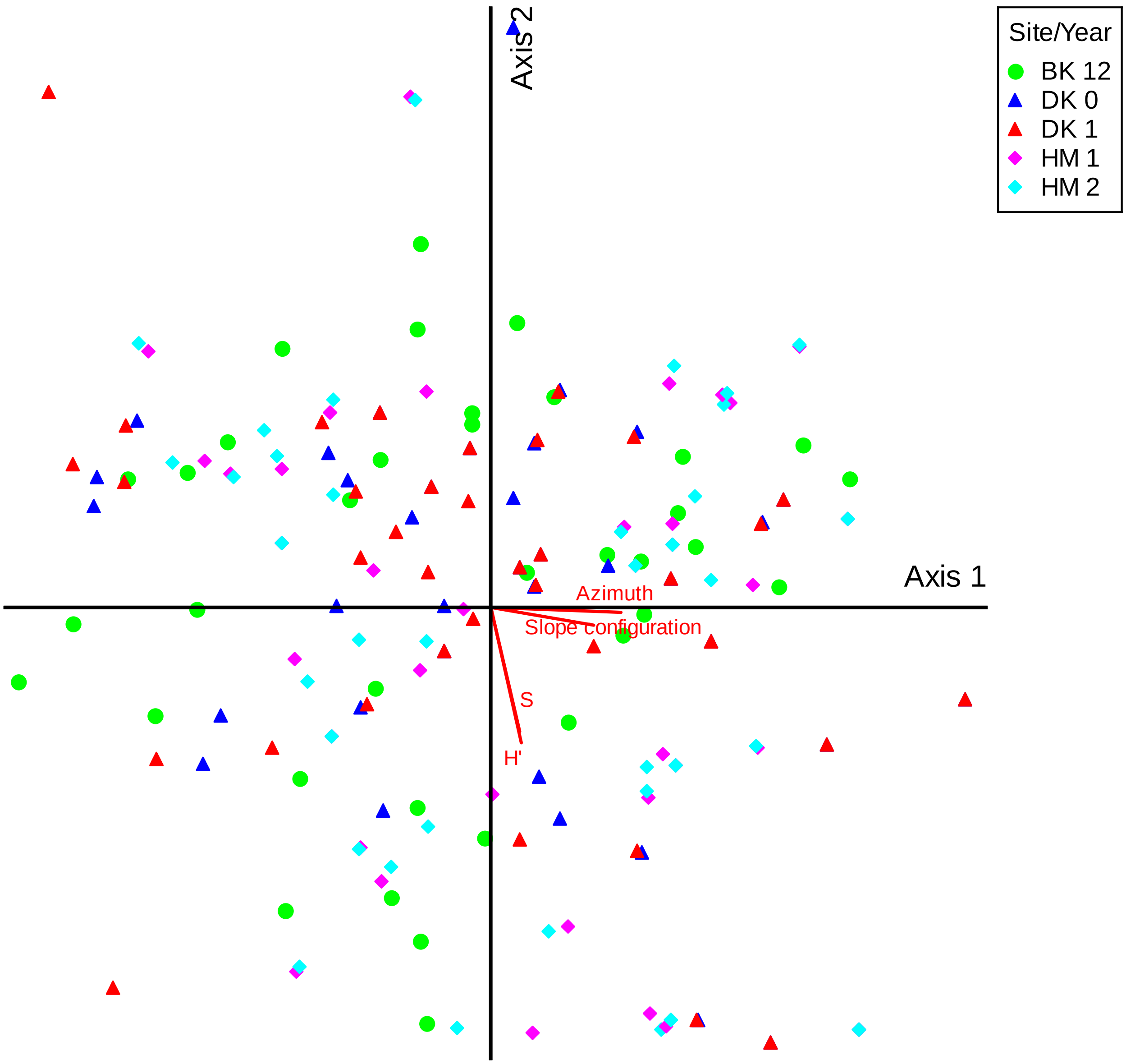


Figure 4. Nonmetric multidimensional scaling ordination of lumped overstory and sapling inventory plots by site and year showing trajectories of plots on DK (pre- and post-burn) and HM (one and two years post burn) through species space.

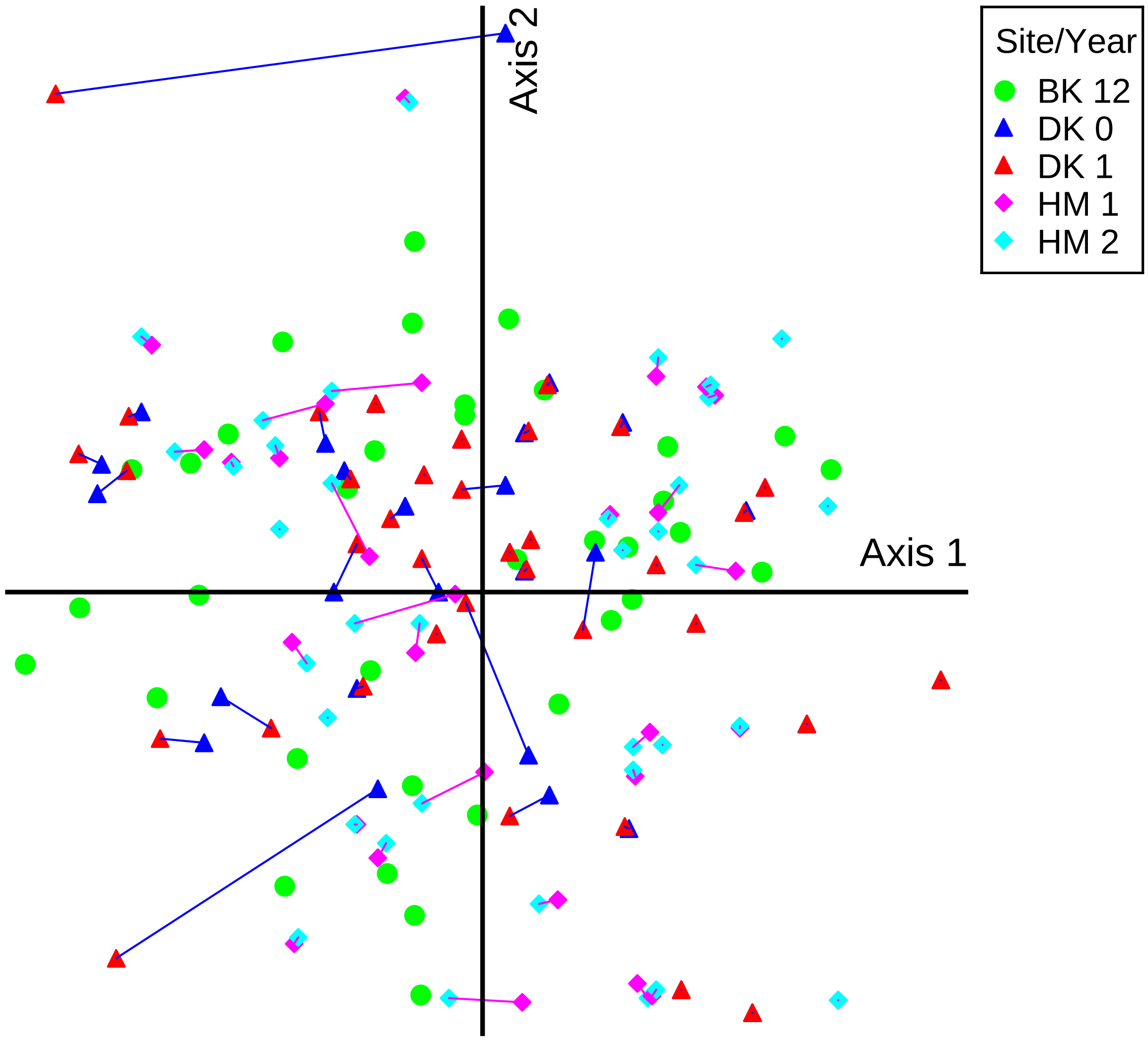


Figure 5. Nonmetric multidimensional scaling ordination of lumped overstory and sapling inventory plots by timber harvesting history. The vectors radiating from the center of the ordination diagram indicate the correlations of azimuth, slope configuration, species richness (*S*), and Shannon-Wiener's diversity index (*H'*) with the ordination axes.

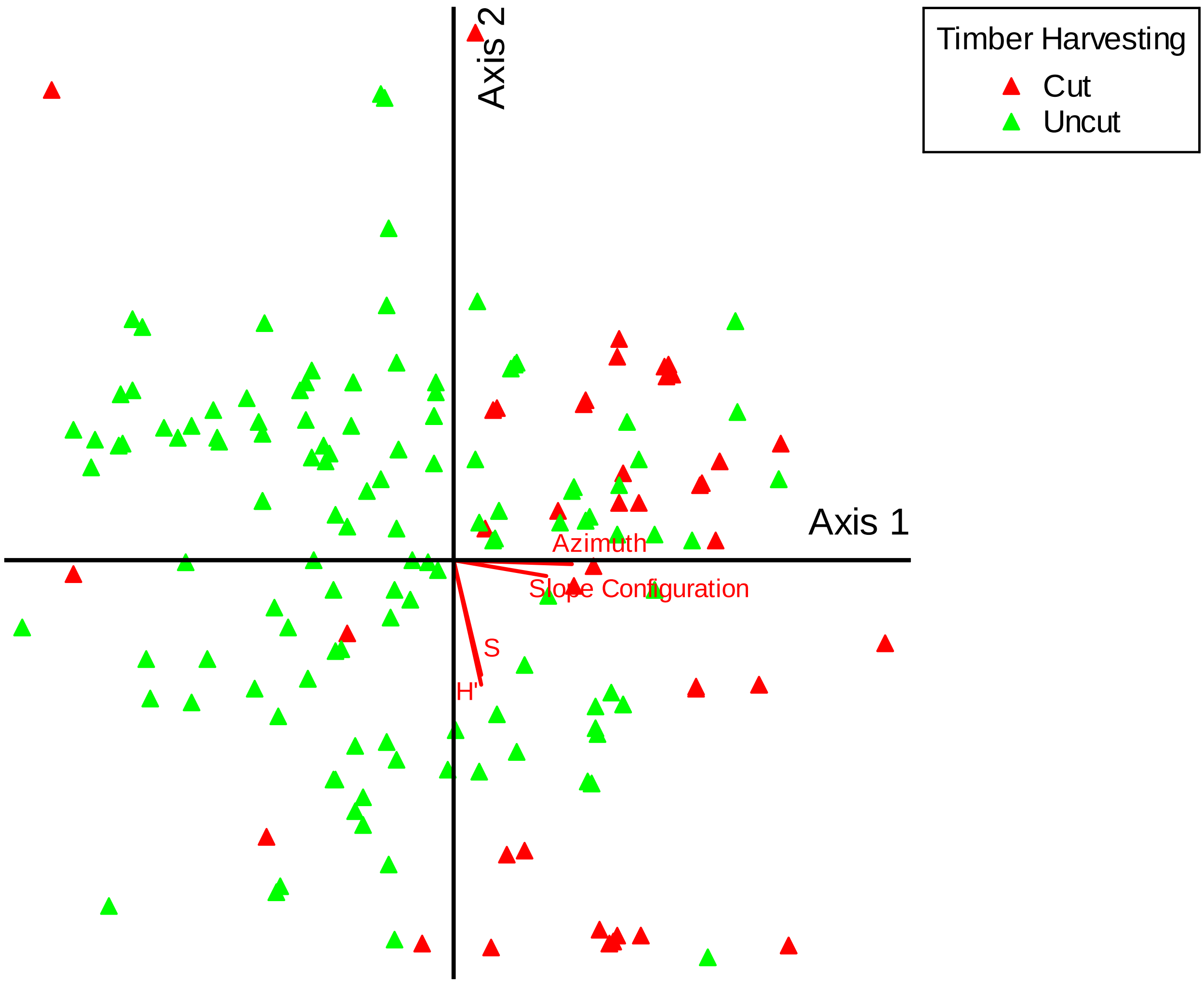


Figure 6. Mixed model ANCOVA results of tree regeneration species group average importance values across all site/year combinations. All data were arc sine square root transformed prior to analysis. Means with the same letter(s) are not significantly different (p<0.05) following adjustment to the average value of the covariate, basal area per hectare (m^2/ha).

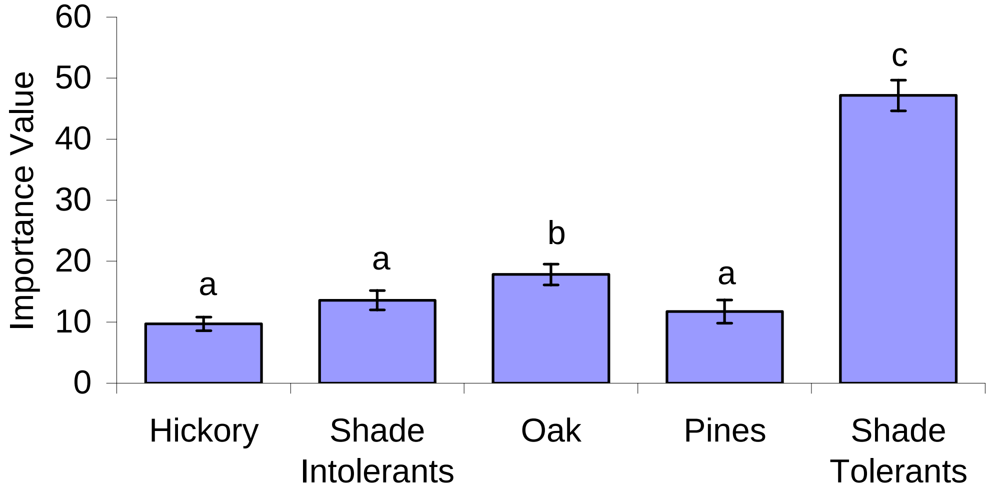


Figure 7 A-E. Mixed model ANCOVA results of tree regeneration species group average importance values by site/year. All data were arc sine square root transformed prior to analysis. Means with the same letter(s) are not significantly different (p<0.05) following adjustment to the average value of the covariate, basal area per hectare (m^2/ha).

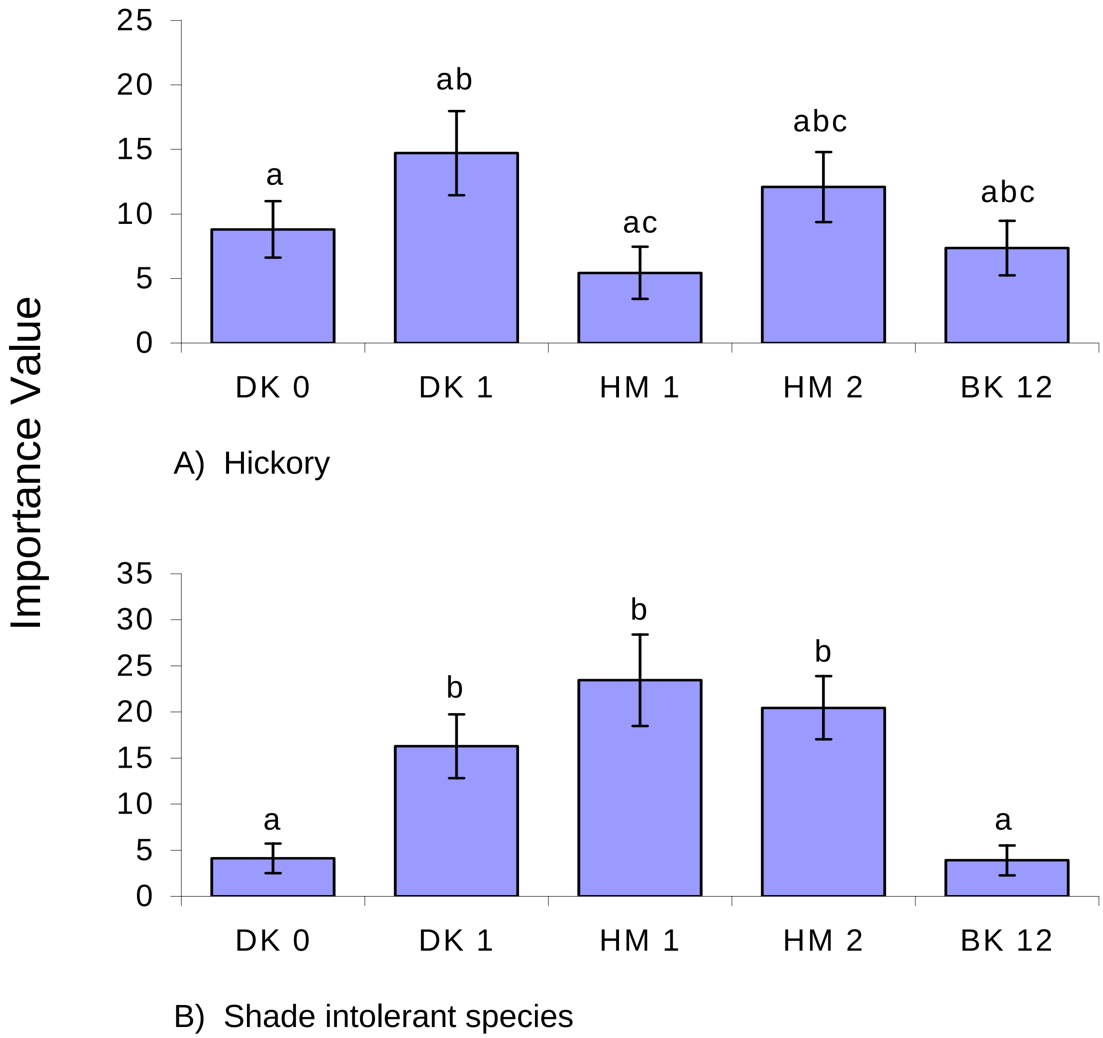
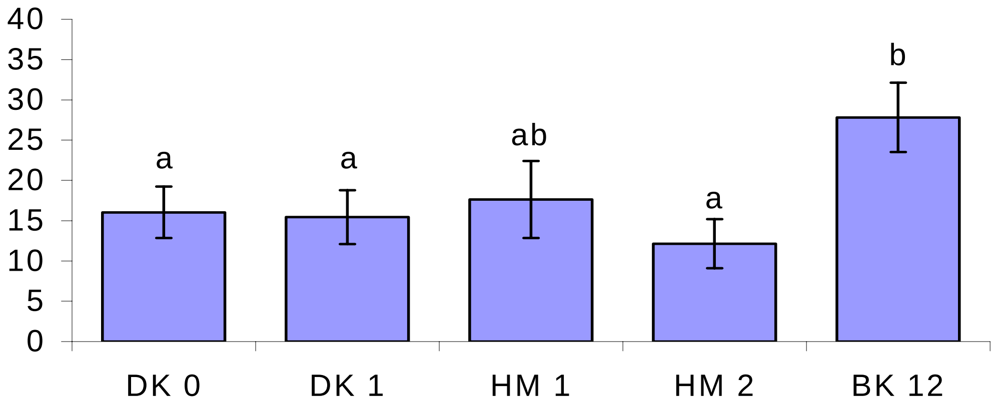
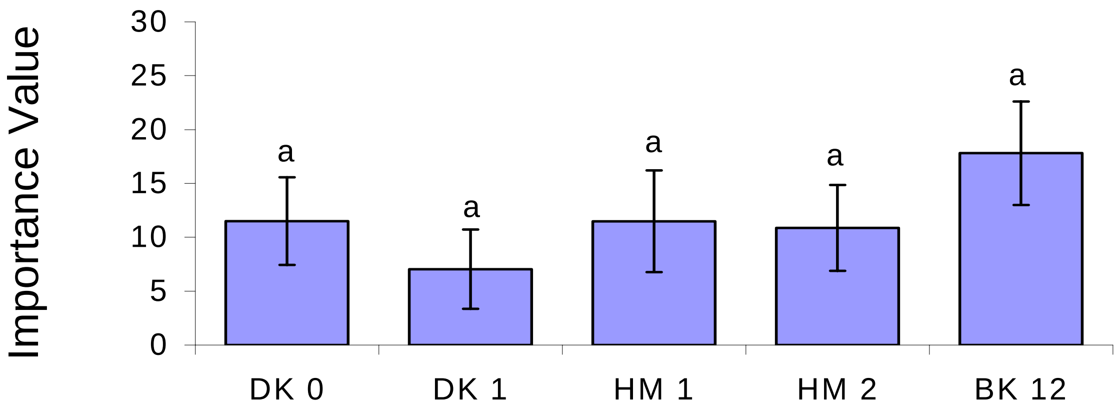


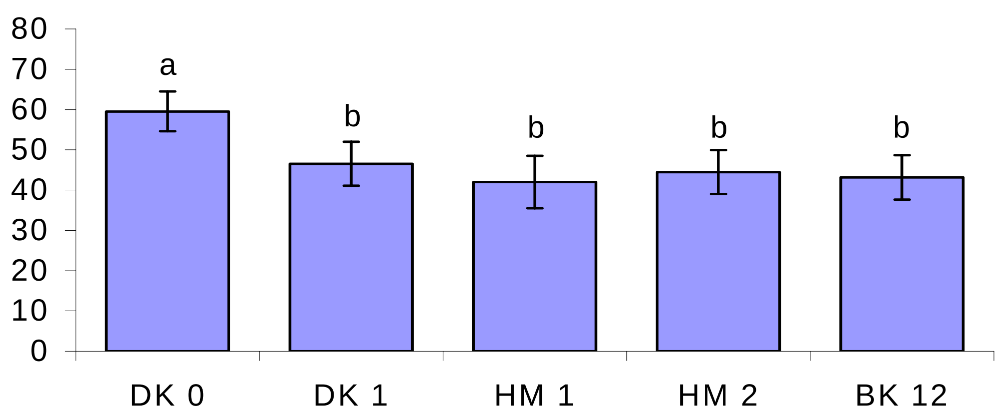
Figure 7., continued.



C) Oaks



D) Pines



E) Shade tolerant species

Figure 8 A-E. Tree regeneration species groups importance value linear regression models by site/year. See Appendix C; Table C5 for regression coefficients.

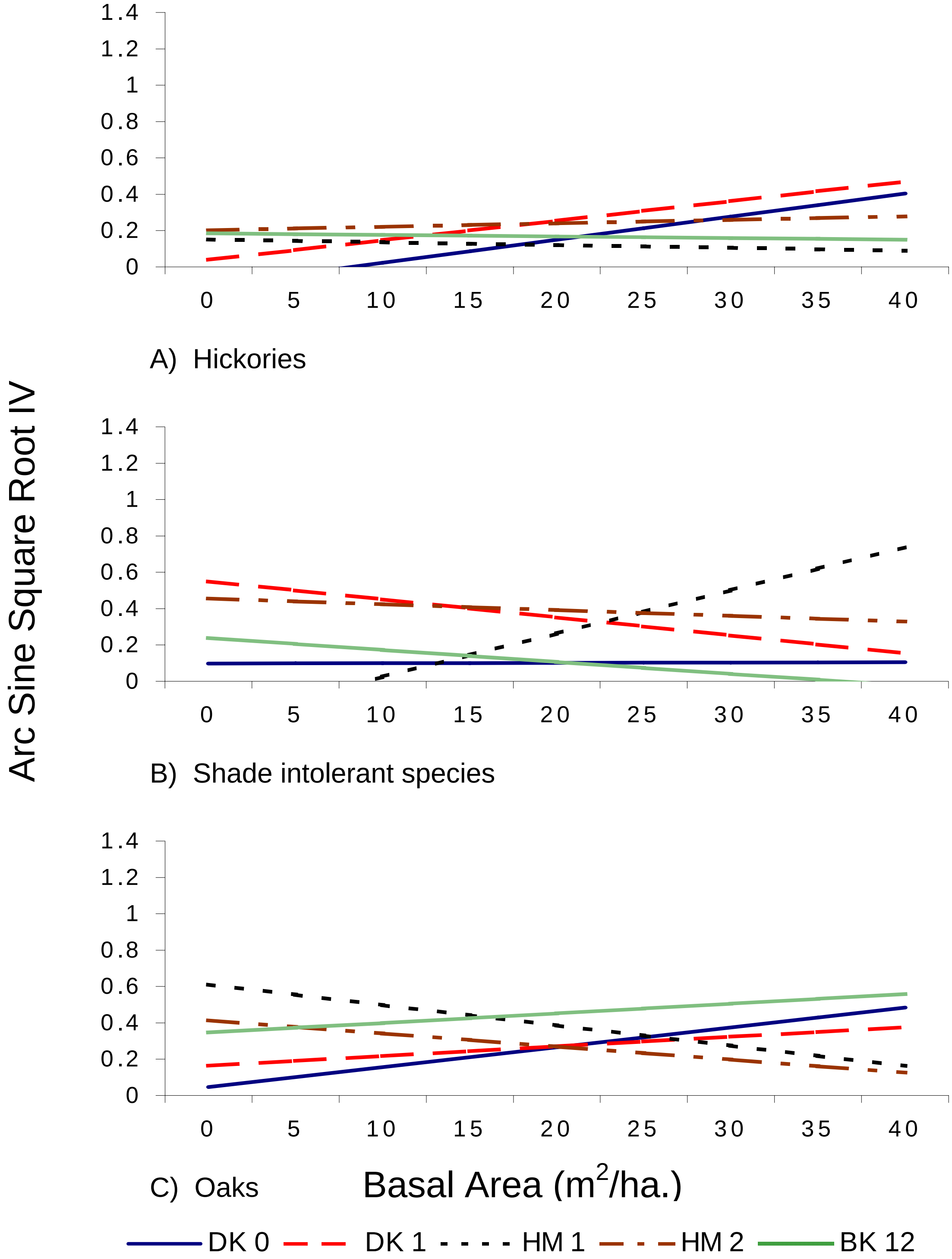


Figure 8., continued.

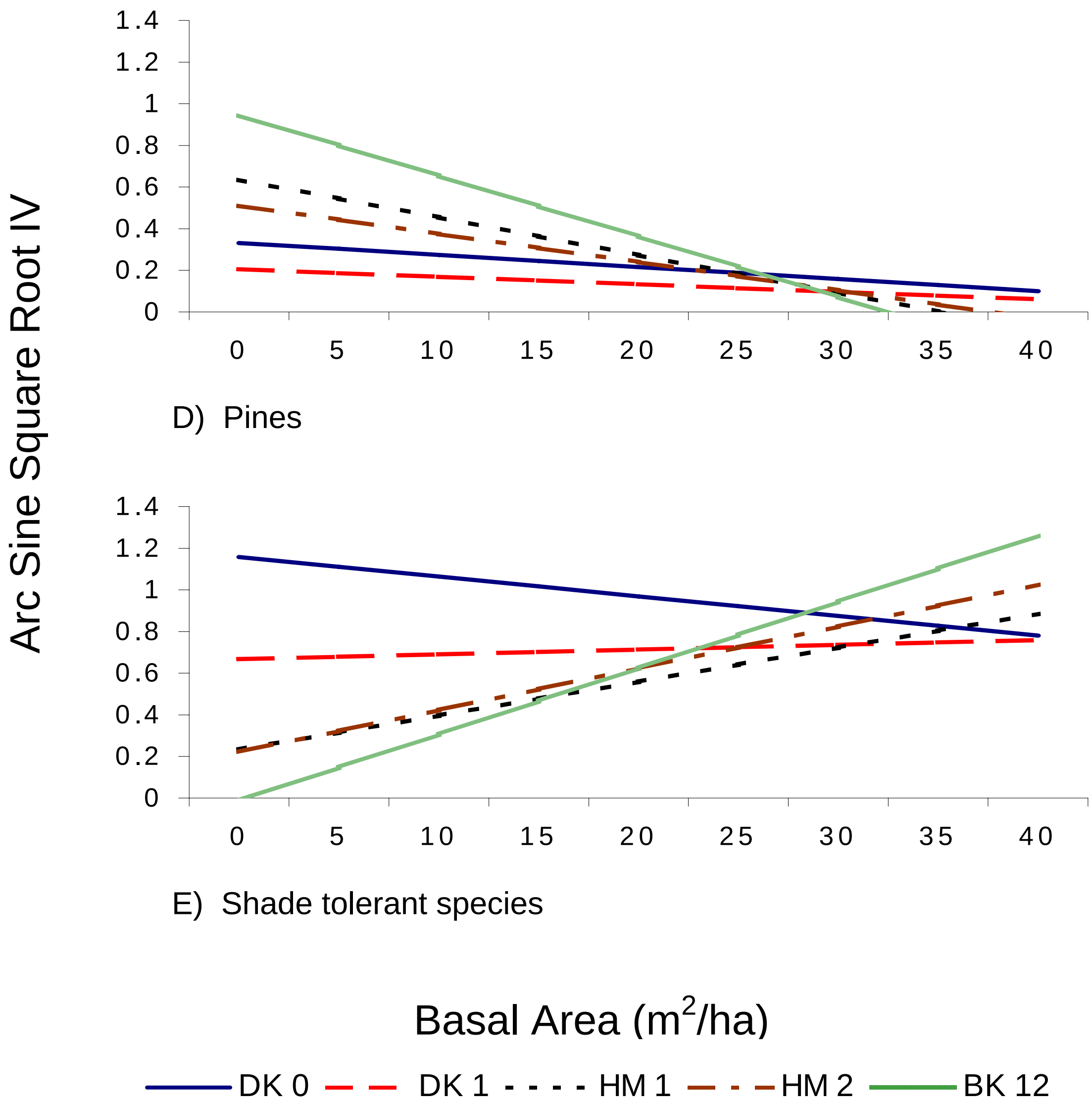


Figure 9. Mixed model ANCOVA results of total herbaceous stratum cover by site/year and aspect. All data were square root transformed prior to analysis. Means with the same letter are not significantly different (p<0.05) following adjustment to the average value of the covariate, basal area per hectare (m^2/ha).

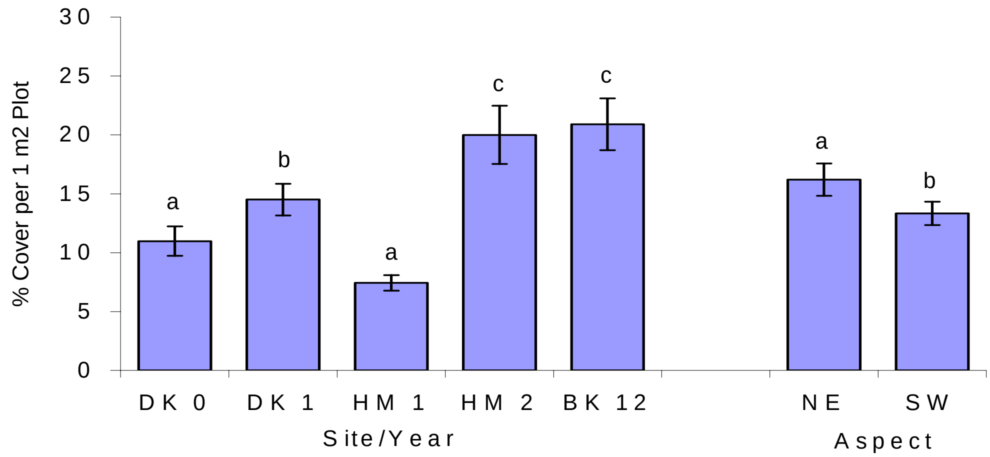


Figure 10. Total herbaceous stratum percent cover linear regression models as a function of site/year and basal area (m^2/ha). See Appendix C; Table C7 for regression coefficients.

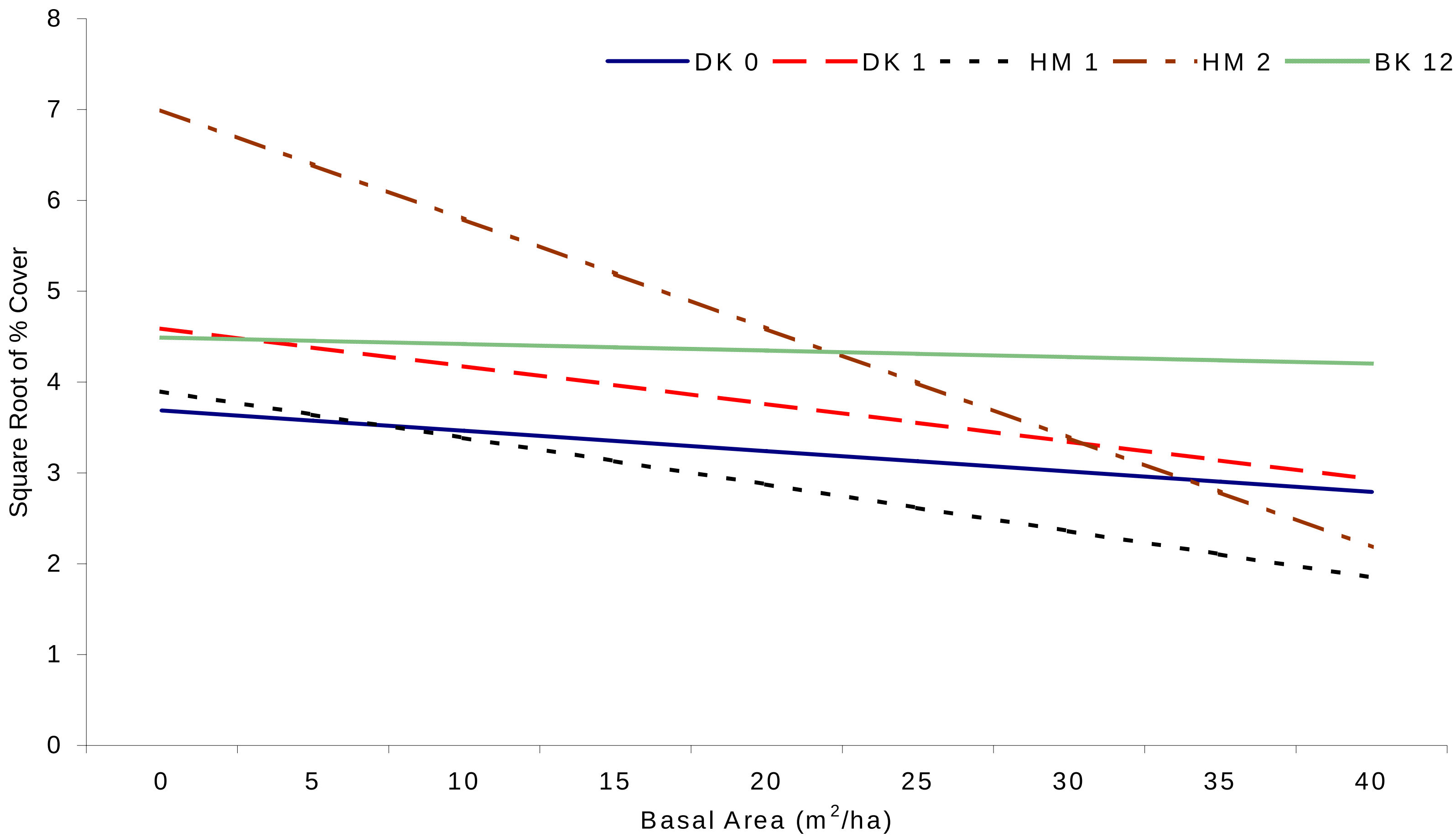


Figure 11. Herbaceous stratum Shannon-Weiner's diversity index (*H′*) mixed model ANOVA results. Means with the same letter(s) are not significantly different (p<0.05).

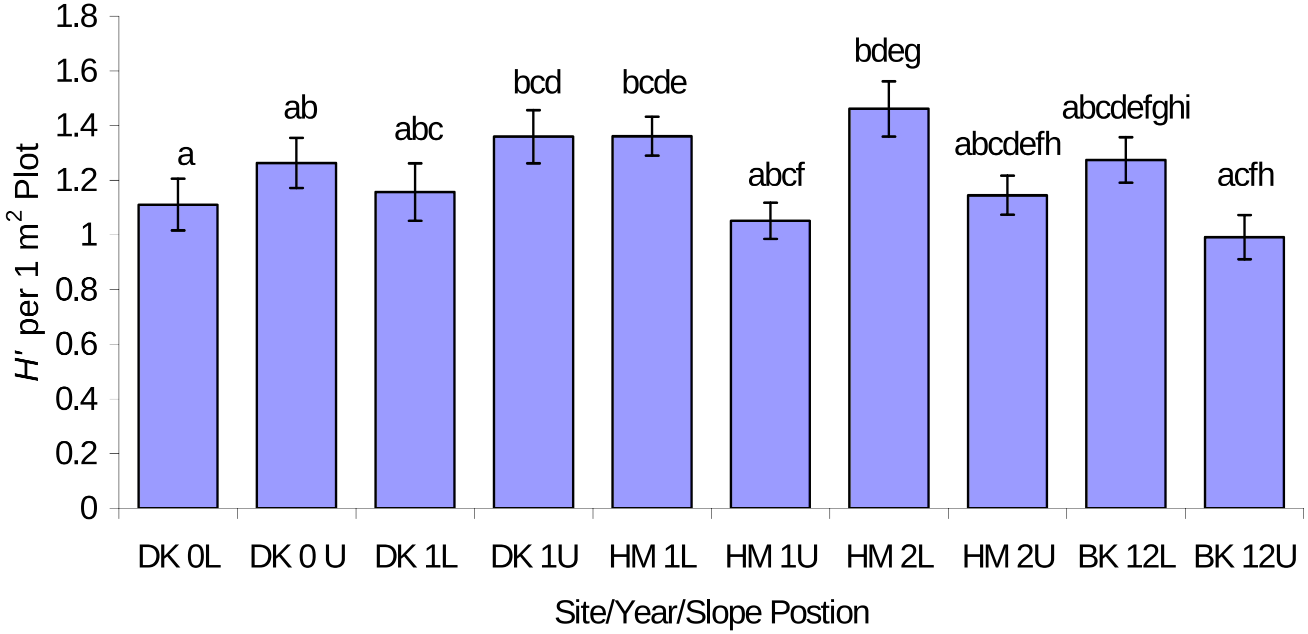
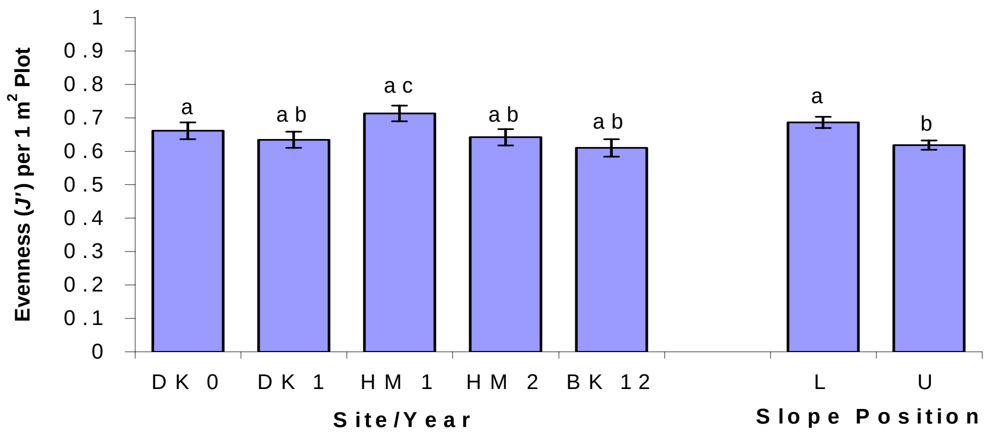
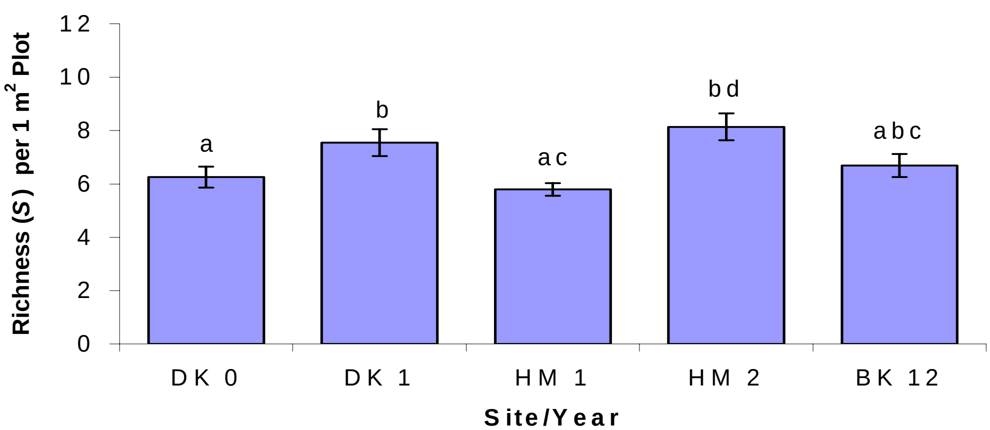


Figure 12. Herbaceous stratum *J′* (A) and *S* (B) mixed model ANOVA results. All *S* data were square root transformed prior to analysis. Means with the same letter(s) are not significantly different (p<0.05).

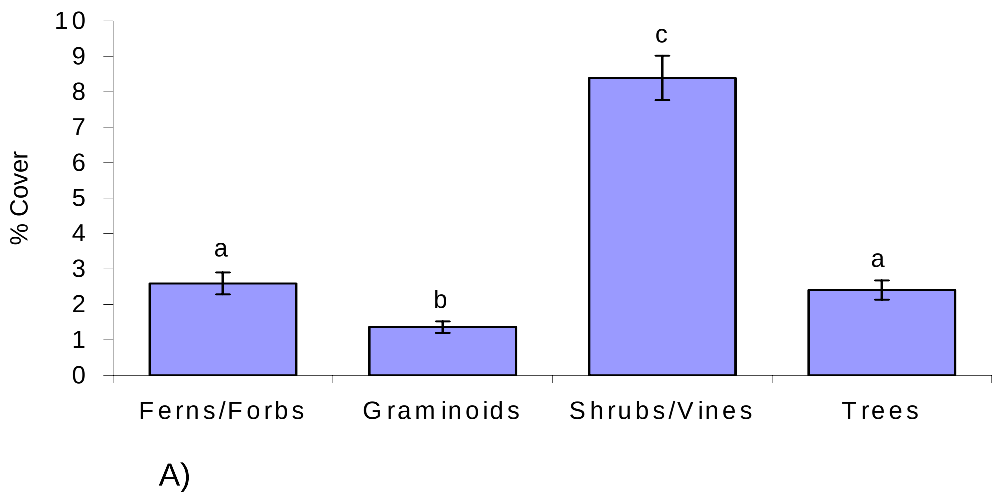


A)



B)

Figure 13. Mixed model ANCOVA results of herbaceous stratum habit average percent cover (A) and importance value (B). All percent cover and importance value data were $\log_{10}$ and square root transformed respectively, prior to analysis. Means with the same letter(s) are not significantly different (p<0.05) following adjustment to the average value of the covariate, basal area per hectare (m^2/ha).



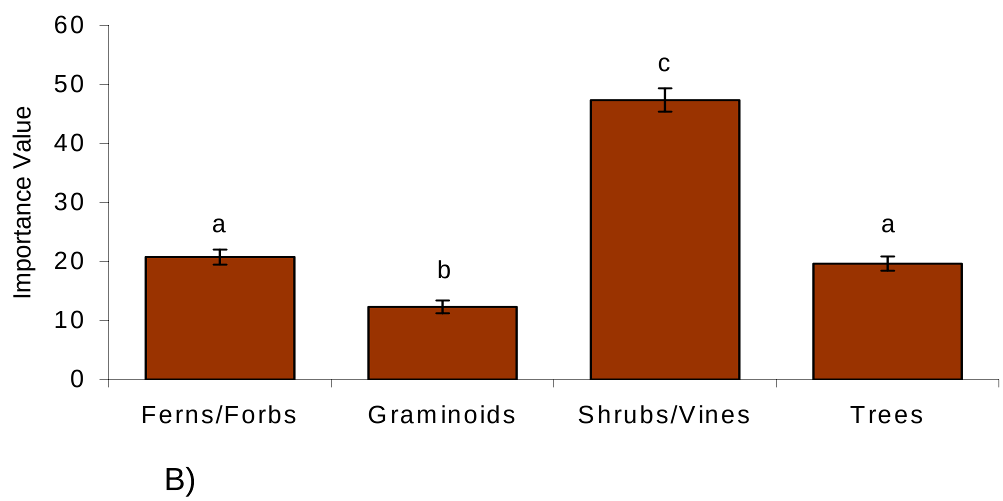
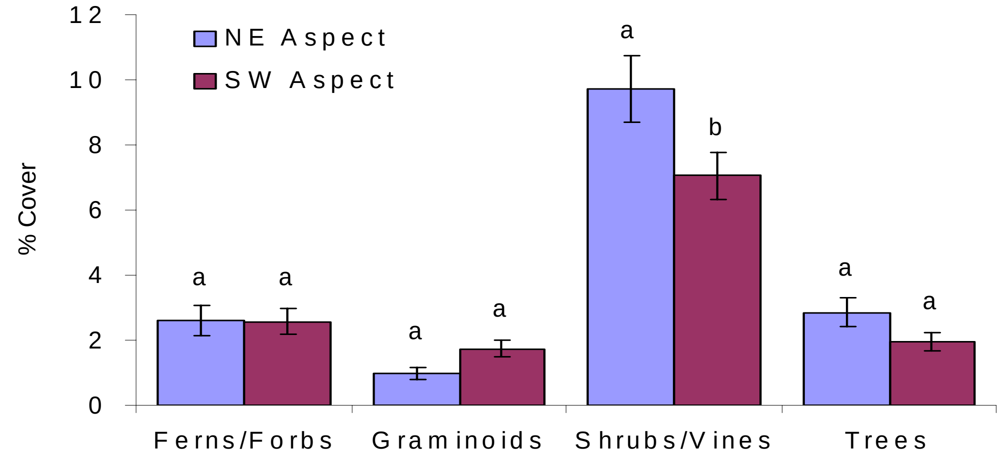
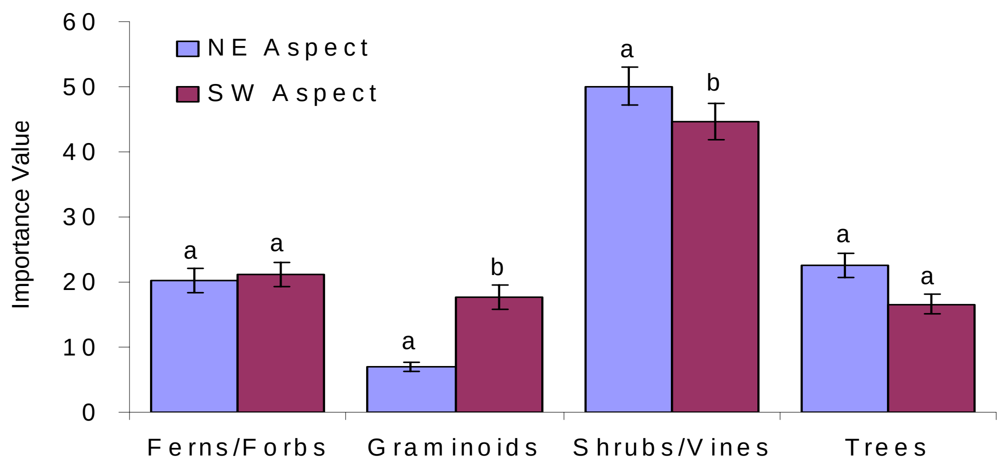


Figure 14. Mixed model ANCOVA results of herbaceous stratum habit average percent cover (A) and importance value (B) on northeast versus southwest aspects. All percent cover and importance value data were $\log_{10}$ and square root transformed respectively, prior to analysis. Means with the same letter(s) are not significantly different (p<0.05) following adjustment to the average value of the covariate, basal area per hectare (m^2/ha).



A)



B)

Figure 15. Mixed model ANCOVA results of herbaceous stratum functional type average percent cover (A) and importance value (B). All data were square root transformed prior to analysis. Means with the same letter(s) are not significantly different (p<0.05) following adjustment to the average value of the covariate, basal area per hectare (m^2/ha).

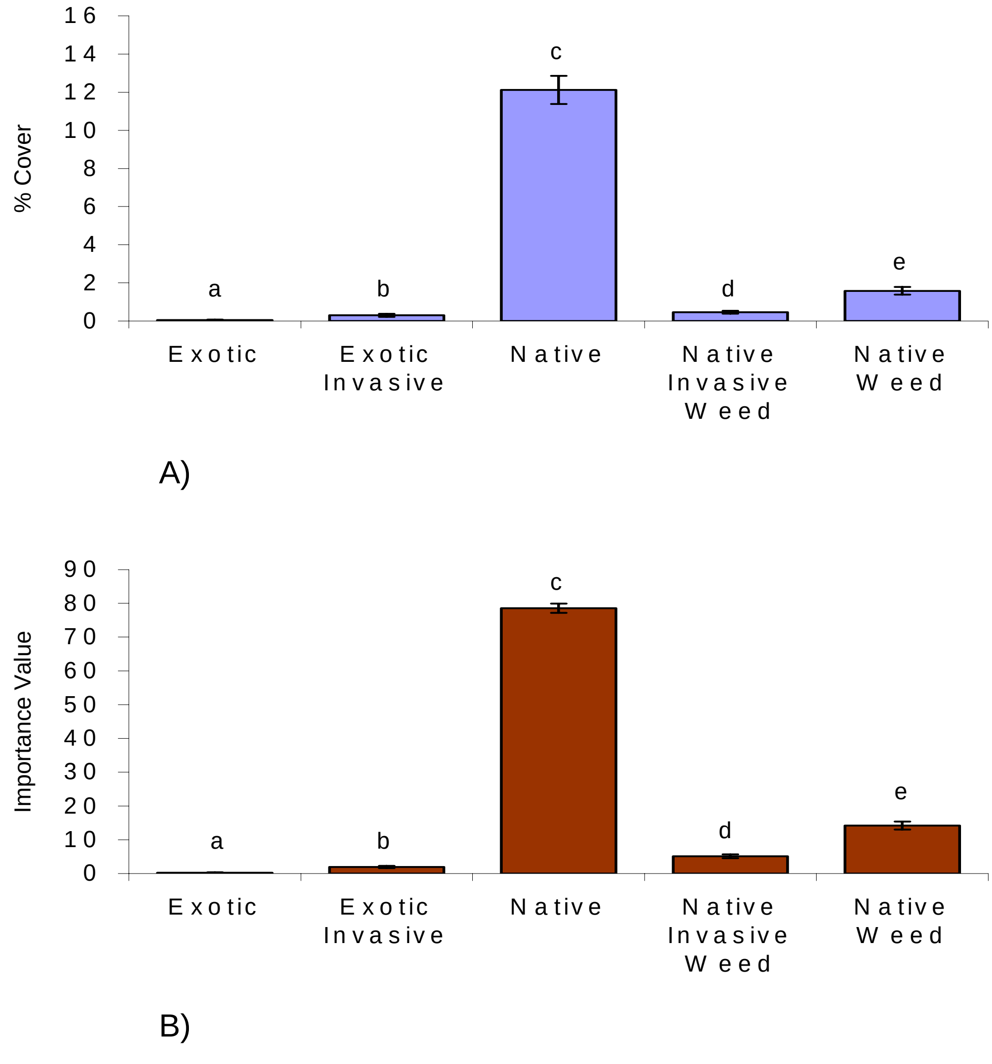
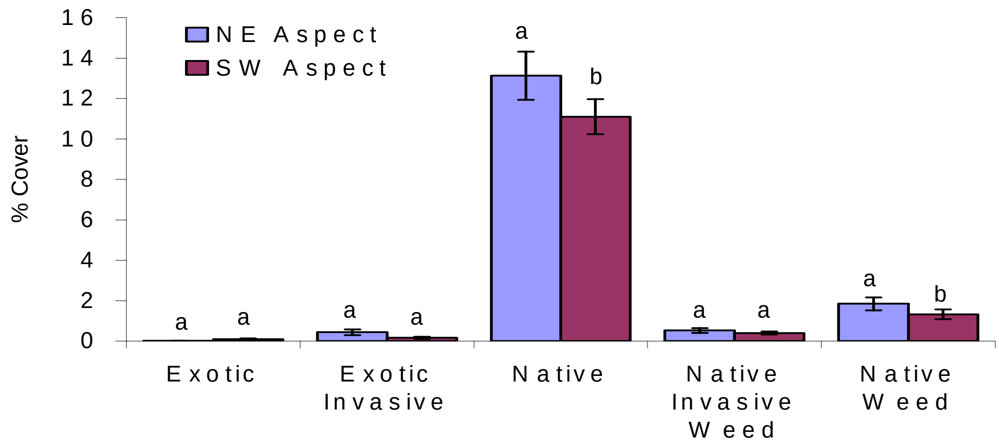
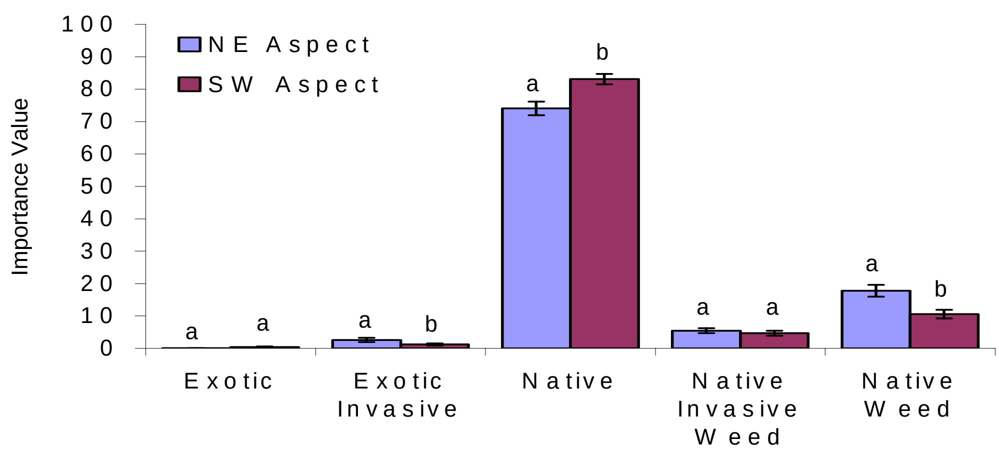


Figure 16. Mixed model ANCOVA results of herbaceous stratum functional type average percent cover (A) and importance value (B) on northeast versus southwest aspects. All data were square root transformed prior to analysis. Means with the same letter(s) are not significantly different (p<0.05) following adjustment to the average value of the covariate, basal area per hectare (m^2/ha).



A)



B)

Figure 17 A-H. Herbaceous stratum habit percent cover and importance value mixed model ANCOVA results by site/year. Percent cover and IV data were log (base 10) and square root transformed respectively, prior to analysis. Means with the same letter(s) are not significantly different (p<0.05) following adjustment to the average value of the covariate, basal area (m^2/ha).

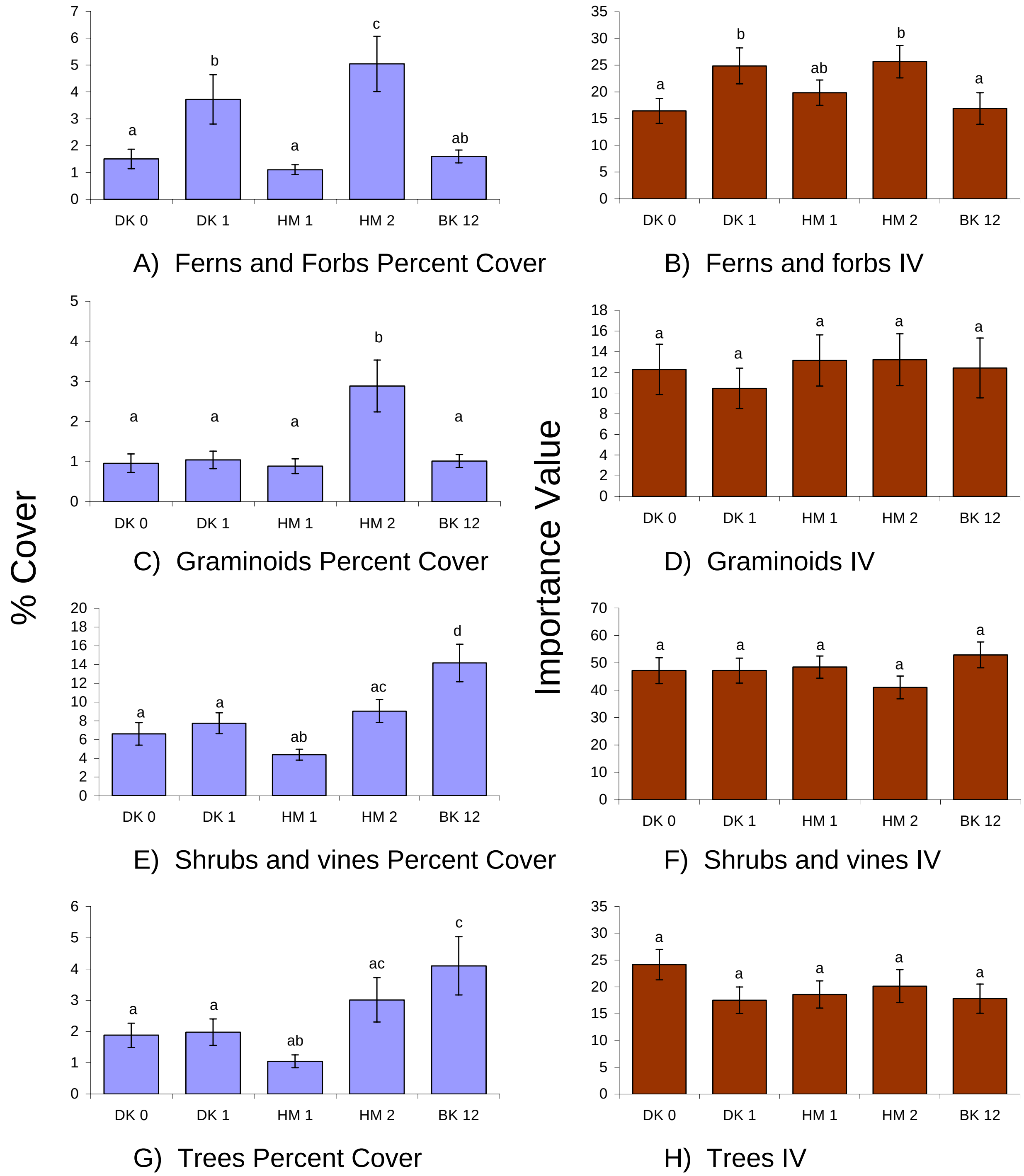


Figure 18 A-H. Herbaceous stratum habit linear regression models for percent cover and importance value. See Appendix C; Tables C11 and C12 for percent cover and IV regression model coefficients respectively.

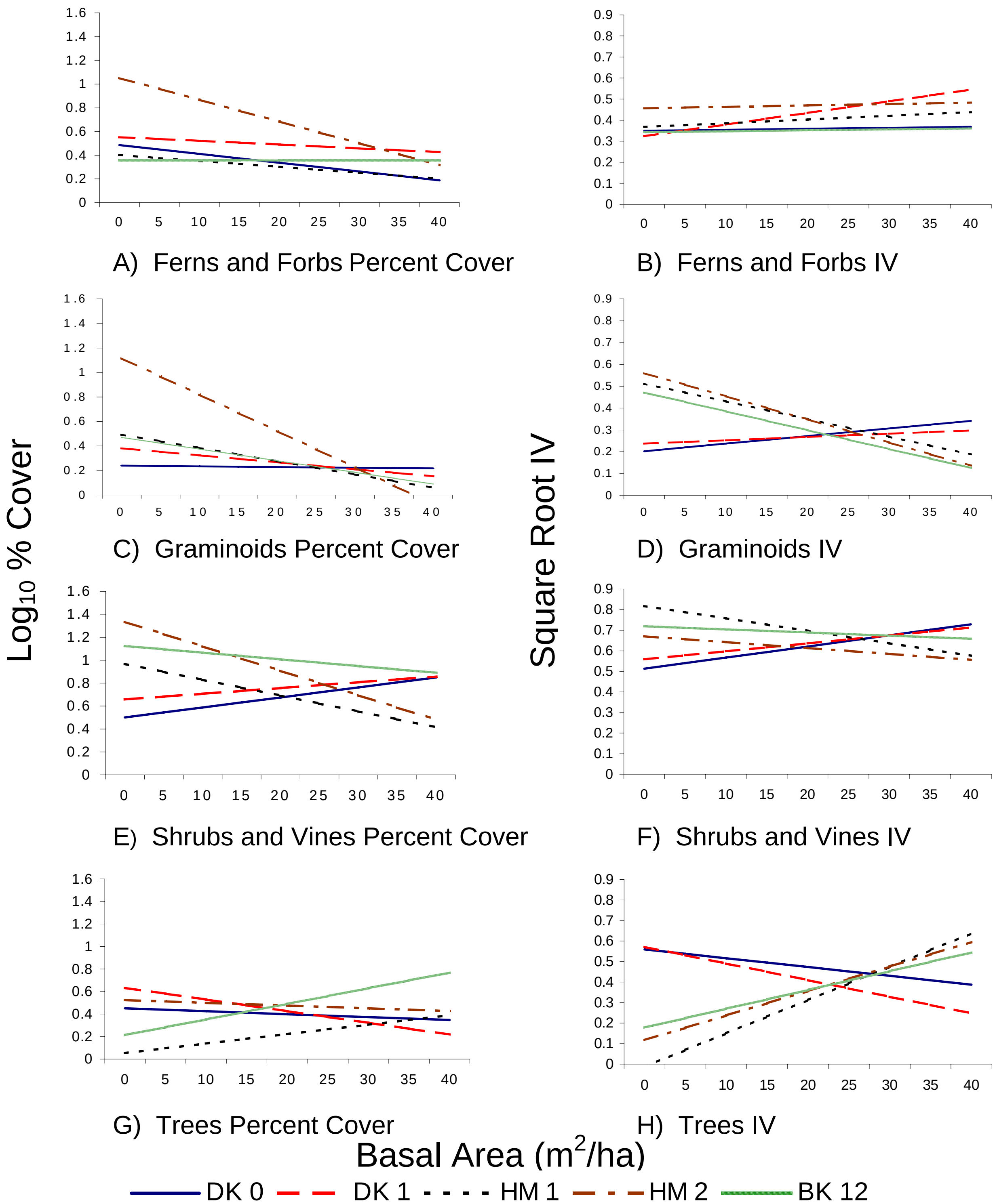


Figure 19 A-J. Herbaceous stratum functional type percent cover and importance value mixed model ANCOVA results. All data were square root transformed prior to analysis. Means with the same letter(s) are not significantly different (p<0.05) following adjustment to the average value of the covariate, basal area per hectare (m^2/ha).

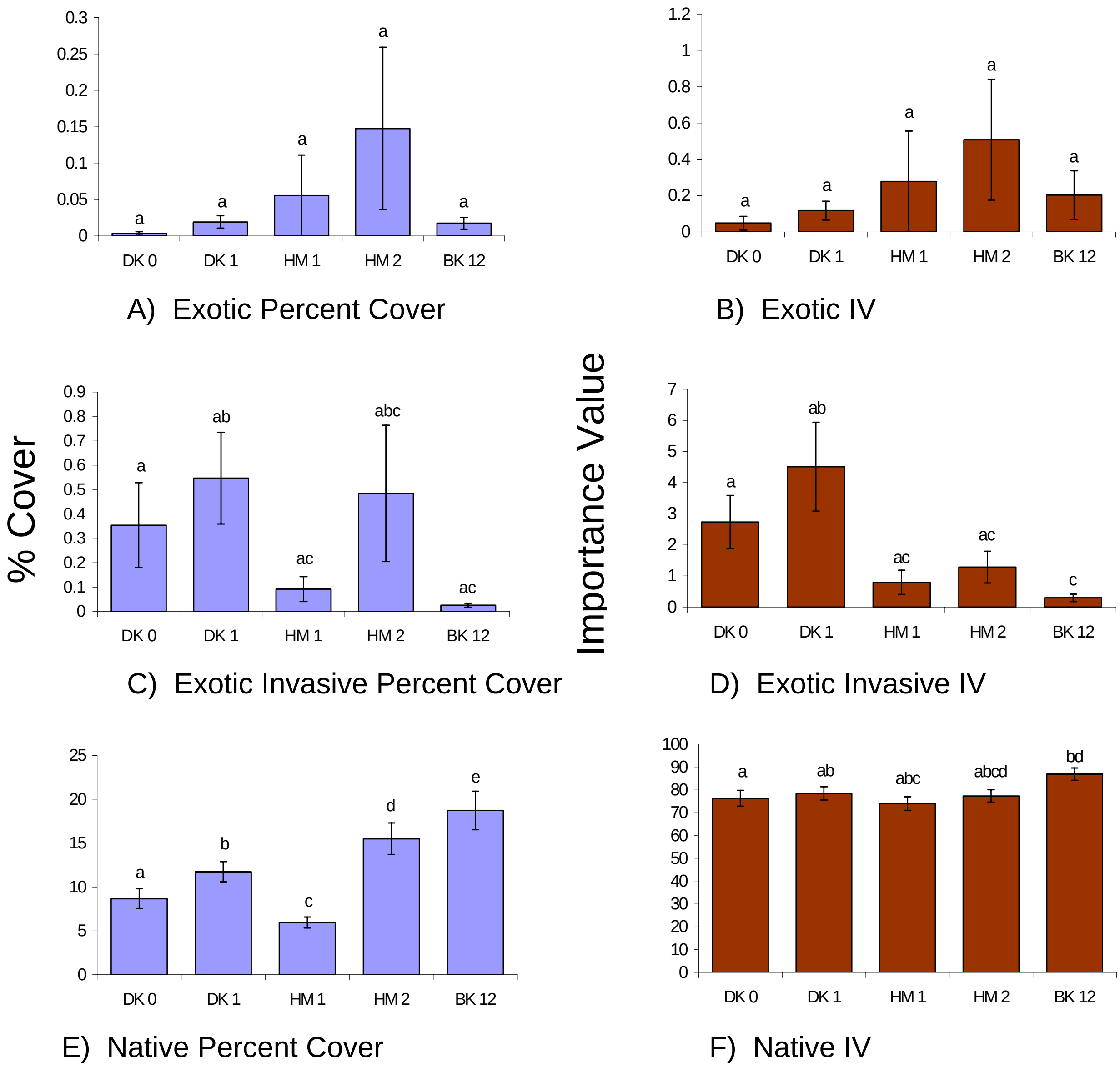


Figure 19., continued.

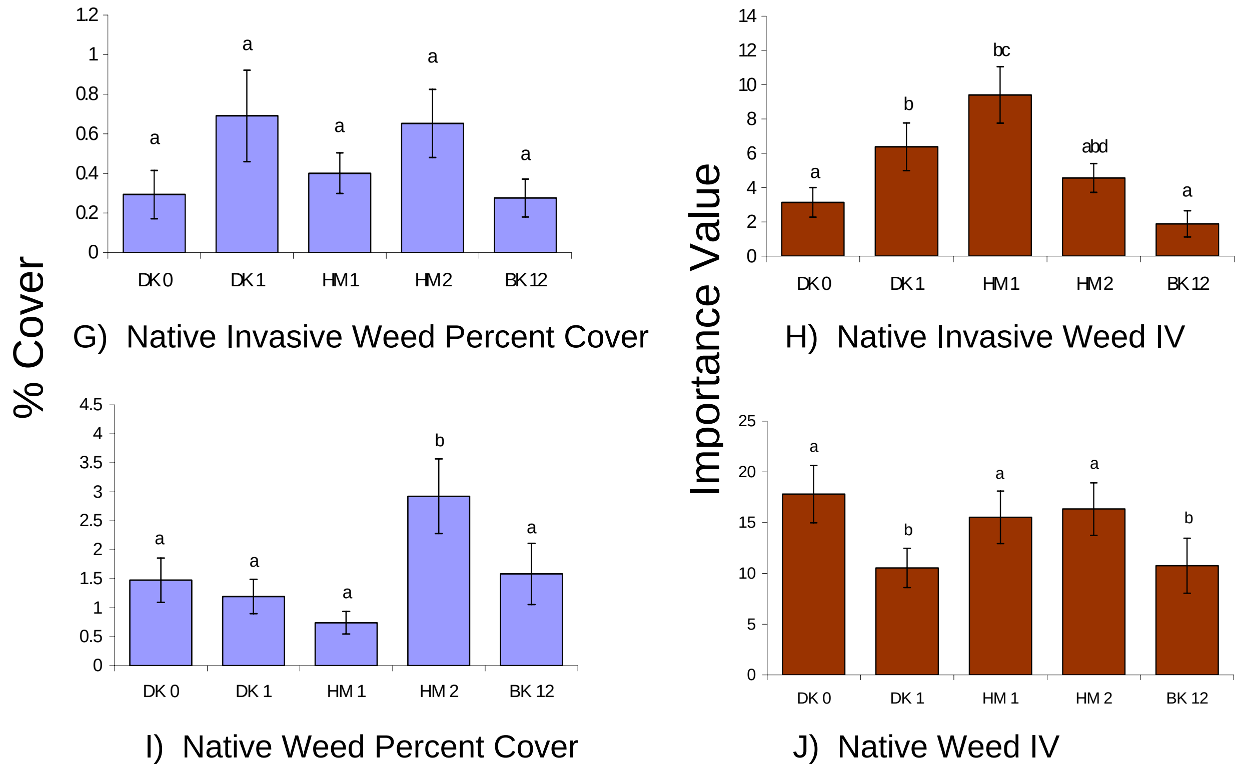


Figure 20 A-J. Herbaceous stratum functional type linear regression models for percent cover and importance value. See Appendix C; Tables C13 and C14 for percent cover and IV regression model coefficients respectively.

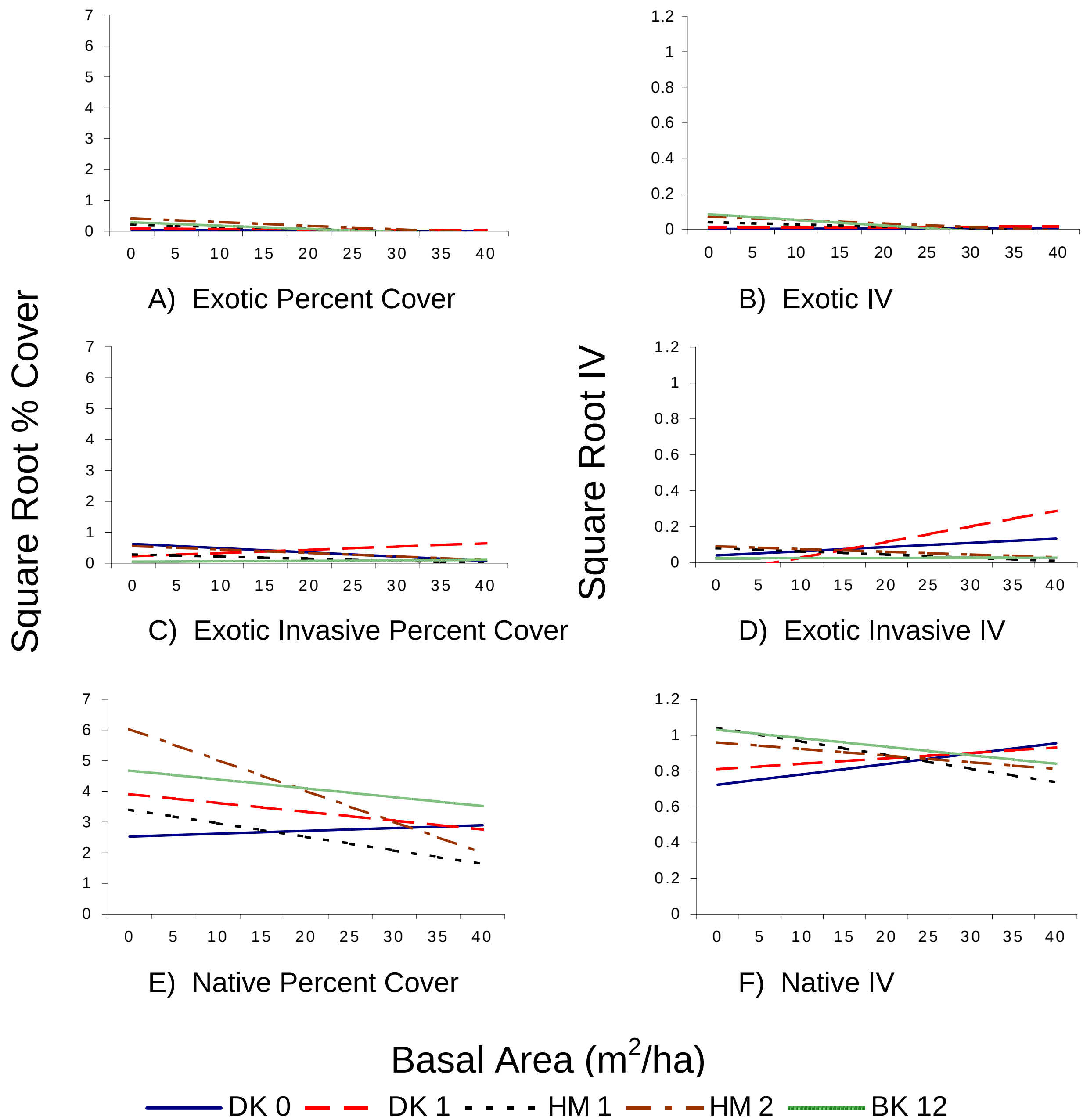


Figure 20., continued.

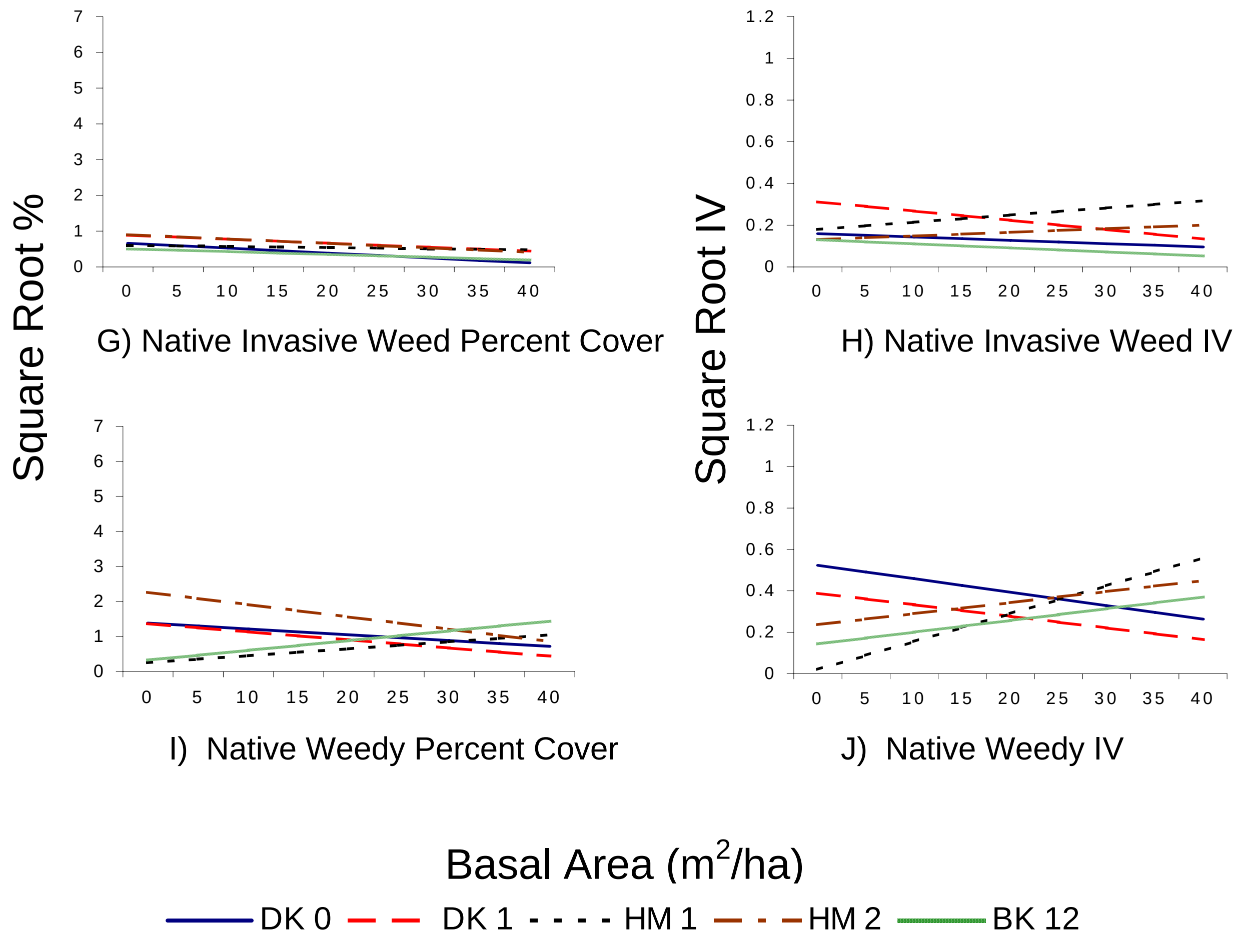


Figure 21. Nonmetric multidimensional scaling ordination of herbaceous stratum inventory plots by site and year using species importance value. The correlation of azimuth, Shannon-Wiener's diversity index (*H′*), and evenness (*J′*) with the ordination axes are represented by their respective vectors.

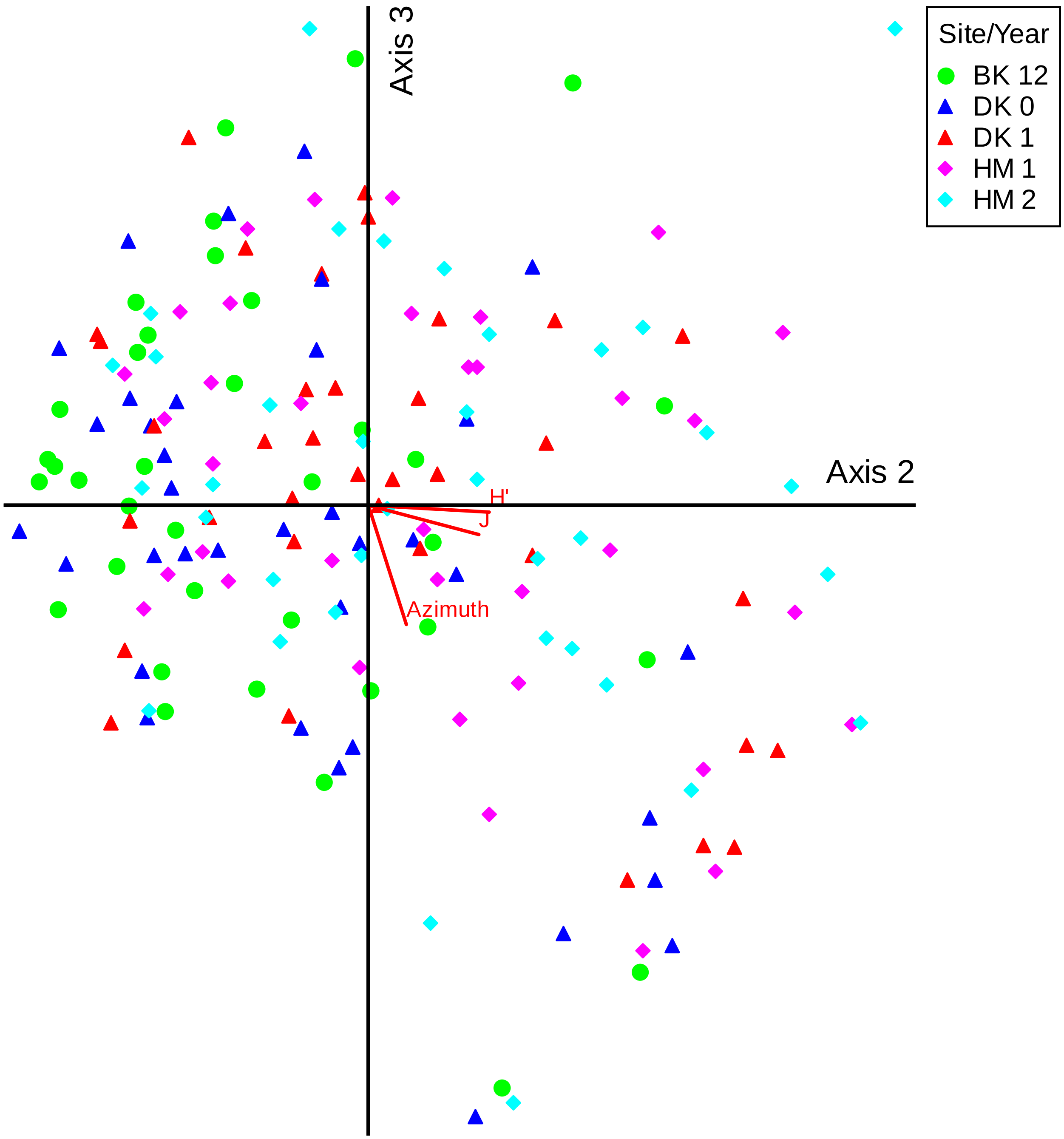
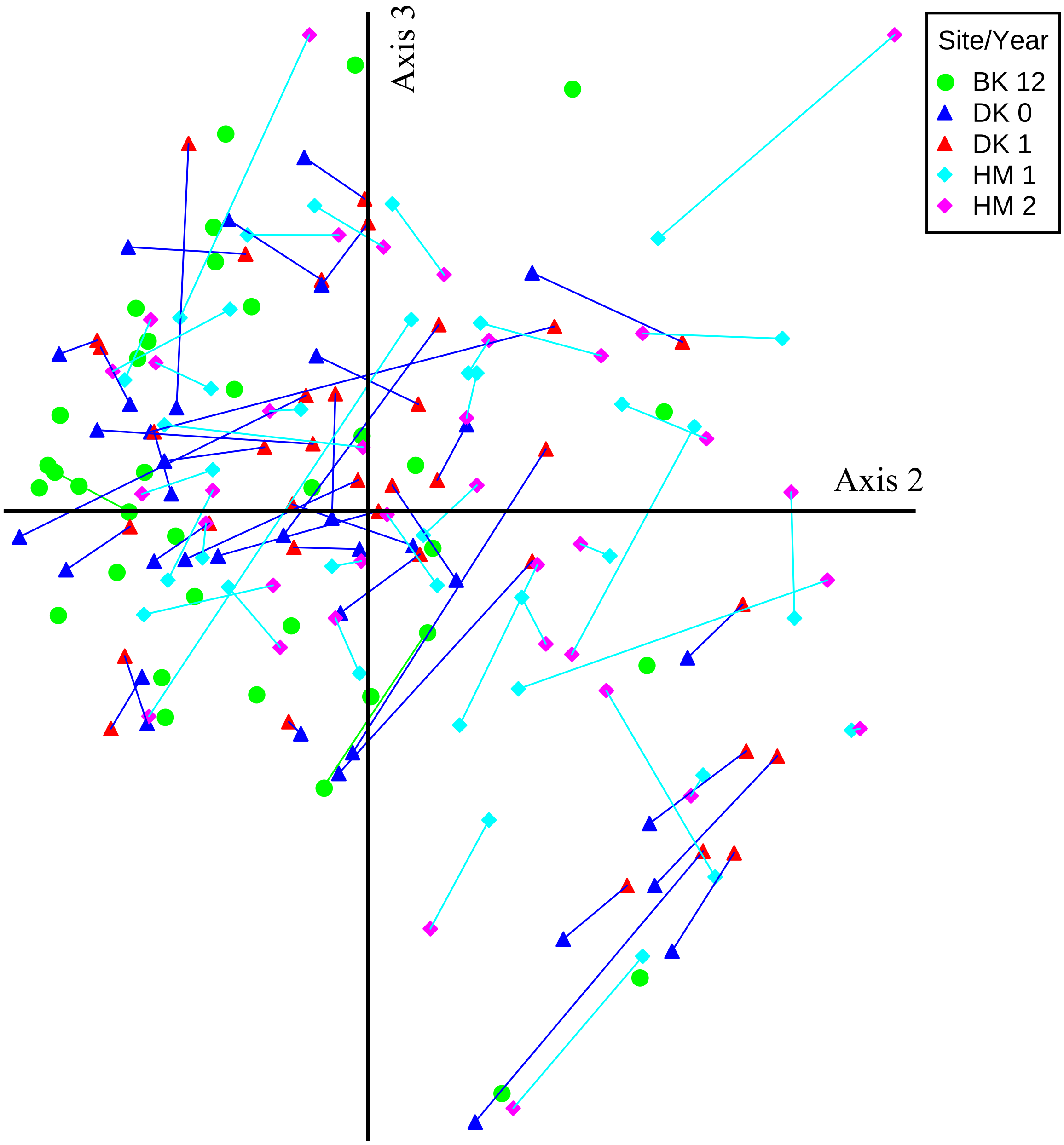


Figure 22. Nonmetric multidimensional scaling ordination of herbaceous stratum inventory plots by site/year using species importance value showing their trajectory through species space on DK from pre-and-post-burn and on HM of between and one- and two-years post-burn.



APPENDIX A: LITERATURE REVIEW

Table A1. Prescribed Fire Characteristics From Studies Conducted in the Appalachian Region

Source	Location	Forest Type	Method of Recording Temp.	Mean Fire Temp. (°C)	Temp. Range (°C)	Rate of Spread ($m*min^{-1}$)	Decreased Litter Layer (O_1)	Decreased Coarse Woody Debris	Topographic Effect on Fire Behavior
Hutchinson 2004[a]	Ohio	Oak	P[b]	112.8	81.3-155.7	--[c]	Yes	--	Yes
Iverson et al. 2004a	Ohio	Oak	TC[f], P	117[b], 152[f]	92.5-427	6.2-11.3	Yes	No	Yes
Hubbard et al. 2004	Tennessee, Georgia	Oak-Pine	P	96	70-344	1.8-18[d]	Yes	Yes	Yes, but not statistically significant
Clinton et al. 1998	North Carolina	White Pine-Oak	P	197	52-704	1.8-3.0[e], .3[d]	Yes	Yes	--
Franklin et al. 1997	Illinois	Oak-Maple	TC[f]	226.4	52-250	.3[d], 6.0[e]	--	--	Yes
Franklin et al. 1997	Illinois	Oak	TC[g]	189.6	52-250	.2[d], 3.5[e]	--	--	Yes
Swift et al. 1993	North Carolina	Pine-Oak	TC, P	--	630-812	--	Yes	Yes	Yes
Vose et al. 1999	North Carolina	Pine-Oak	P	--	52->804	--	Yes	Yes	Yes

[a] Fires conducted in 1996 only, [b] Temperature sensitive paint, [c] Not reported, [d] Backing fires, [e] Head Fires, [f] Thermocouples

Table A2. The Effects of Fire on Stand Structure in Appalachian Pine-Oak Stands.

Source	Location	Fire Type (s)	Species Composition	Number of Stands Sampled[a]	Range of Reported Basal Area (m^2/ha)				% Canopy Tree Mortality	Decrease in Canopy Species Richness?
					Pre-burn	*Pinus*[b] Only	Post-burn	*Pinus*[b] Only		
Barden and Woods 1976	Tennessee, North Carolina	Wildfires	Pine-Oak	12 (3)	4-32	5-30.4	0-23.5	.5-23	6-100%	DFI[e]
Wendel and Smith 1986	West Virginia	Prescribed Fire	Oak-Hickory	1	20.67	0	16.76	0	20%	--
Groeschl et al. 1992	Virginia	Wildfire	Pine-Oak	3 (3)	--[c]	--	.4-14.1	--	40-98%	DFI
Regelbrugge and Smith 1994	Virginia	Wildfire	Mixed Oak	4 (2)	26.1-26.2	--	8.4-24.0	--	15-81%	DFI
Arthur et al. 1998[d]	Kentucky	Prescribed Fire	Pine-Oak	2	--	--	21.8-28.8	.5-4.31	5-20%	No
Harrod et al. 1998, 2000	Tennessee	Wildfires	Pine-Oak	3 (3)	12.5-25	--	2.4-23.3	--	0-85%	DFI
Elliott et al. 1999b	North Carolina	Prescribed Fire	Pine-Oak	3 (3)	26.84	12.45	19.05	9.67	0-31%	DFI
Waldrop and Brose 1999	Georgia	Prescribed Fire	Pine-Oak	3 (4)	23.4-34.5	6.2-10.9	1-22.7	0-6	5-99%	--
Welch et al. 2000	Virginia, North Carolina	Prescribed Fire	Pine-Oak	3	19.7-29.1	11.3-21.0	15.7-25.0	9.6-19.1	47-73%	Yes

[a] Where applicable, values in parenthesis are the number of fire intensity levels the authors used to classified post-fire stands (unburned controls included)
[b] *Pinus* section Dipoxylon only, except Arthur et al. (1998)
[c] Not reported
[d] Only single prescribed fires are included in this table
[e] Depending on fire intensity, where “hotter” fires decreased species richness

APPENDIX B: METHODS-TABLES

Table B1. Tree species groupings list.

Species	Species Group
Acer pensylvanicum	Shade Tolerants
Acer rubrum	Shade Tolerants
Acer saccharum	Shade Tolerants
Ailanthus altissima	Shade Intolerants
Amelanchier arborea	Shade Tolerants
Betula alleghaniensis	Shade Intolerants
Betula lenta	Shade Intolerants
Carya spp.[a]	Hickories
Cornus florida	Shade Tolerants
Crataegus spp.	Shade Tolerants
Fraxinus americana	Shade Intolerants
Liriodendron tulipifera	Shade Intolerants
Nyssa sylvatica	Shade Tolerants
Ostrya virginiana	Shade Tolerants
Pinus pungens	Pines
Pinus rigida	Pines
Pinus spp.	Pines
Pinus strobus	Shade Intolerants
Pinus virginiana	Pines
Populus grandidentata	Shade Intolerants
Prunus serotina	Shade Intolerants
Quercus alba	Oaks
Quercus coccinea	Oaks
Quercus prinus	Oaks
Quercus rubra	Oaks
Quercus spp.	Oaks
Quercus velutina	Oaks
Robinia psuedoacacia	Shade Intolerants
Sassafras albidum	Shade Intolerants
Tilia americana	Shade Tolerants

[a] Includes *Carya ovata*, *C. glabra*, and *C. tomentosa*.

Table B2. Herbaceous stratum habit and functional type groupings species list.

Species	Habit Group	Functional Type Group
Acalypha rhomboidea	Ferns and Forbs	Native Weed
Acalypha virginica	Ferns and Forbs	Native Weed
Acer pensylvanicum	Trees	Native Weed
Acer rubrum	Trees	Native Weed
Acer saccharum	Trees	Native
Ailanthus altissima	Trees	Exotic Invasive
Alliaria petiolata	Ferns and Forbs	Exotic Invasive
Allium cf. *cernuum*	Ferns and Forbs	Native
Allium sp.	Ferns and Forbs	--[a]
Ambrosia artemisiifolia	Ferns and Forbs	Native Weed
Amelanchier arborea	Trees	Native
Amphicarpaea bracteata	Ferns and Forbs	Native
Anemonella thalictroides	Ferns and Forbs	Native
Antennaria plantaginifolia	Ferns and Forbs	Native
Antennaria sp.	Ferns and Forbs	Native
Antennaria virginica	Ferns and Forbs	Native
Arabis canadensis	Ferns and Forbs	Native
Arabis laevigata	Ferns and Forbs	Native
Aristolochia serpentaria	Ferns and Forbs	Native
Asclepias quadrifolia	Ferns and Forbs	Native
Asplenium platyneuron	Ferns and Forbs	Native
Aster cf. *schreberi*	Ferns and Forbs	Native
Aster cordifolius	Ferns and Forbs	Native
Aster divaricatus	Ferns and Forbs	Native
Aster divaricatus/cordifolius	Ferns and Forbs	Native
Aster linariifolius	Ferns and Forbs	Native
Aster sp.	Ferns and Forbs	--
Aster undulatus	Ferns and Forbs	Native
Aureolaria laevigata	Ferns and Forbs	Native
Aureolaria virginica	Ferns and Forbs	Native
Betula alleghaniensis	Trees	Native Weed
Betula lenta	Trees	Native Weed
Brachyelytrum erectum	Graminoids	Native
Bromus cf. *latiglumis*	Graminoids	Native
Bromus ciliatus	Graminoids	Native
Bromus japonicus	Graminoids	Exotic
Bromus latiglumis	Graminoids	Native
Bromus pubescens	Graminoids	Native
Bromus racemosus	Graminoids	Exotic
Campanula divaricata	Ferns and Forbs	Native
Cardamine parviflora	Ferns and Forbs	Native

Table B2., continued.

Species	Habit Group	Functional Type Group
Carex cephalophora	Graminoids	Native
Carex cf. *communis*	Graminoids	Native
Carex cf. *digitalis*	Graminoids	Native
Carex cf. *laxiflora*	Graminoids	Native
Carex cf. *swanii/virescens/aestivalis*	Graminoids	Native
Carex communis	Graminoids	Native
Carex complanata var. *hirsuta*	Graminoids	Native
Carex digitalis	Graminoids	Native
Carex laxiflora	Graminoids	Native
Carex lucorum	Graminoids	Native
Carex pensylvanica	Graminoids	Native
Carex pensylvanica/lucorum	Graminoids	Native
Carex sp.	Graminoids	Native
Carex sp. (Laxiflorae)	Graminoids	Native
Carex sp. (Montanae)	Graminoids	Native
Carex willdenowii	Graminoids	Native
Carya spp.	Trees	Native
Ceanothus americanus	Ferns and Forbs	Native
Cerastium brachypetalum/vulgatum	Ferns and Forbs	Exotic
Cercis canadensis	Shrubs and Vines	Native
cf. *Actaea sp.*	Ferns and Forbs	--
cf. *Agrostis perennans*	Graminoids	--
cf. *Andropogon virginicus*	Graminoids	--
cf. *Arabis glabra*	Ferns and Forbs	--
cf. *Aralia nudicaulis*	Ferns and Forbs	--
cf. *Aristolochia serpentaria/macrophylla*	Ferns and Forbs	--
cf. *Aster divaricatus/cordifolius*	Ferns and Forbs	--
cf. *Asteraceae*	Ferns and Forbs	--
cf. *Bromus ciliatus*	Graminoids	--
cf. *Bromus pubescens*	Graminoids	--
cf. *Bromus sp.*	Graminoids	--
cf. *Campanula divaricata*	Ferns and Forbs	--
cf. *Campanula rapunculoides*	Ferns and Forbs	--
cf. *Ceanothus americanus*	Ferns and Forbs	--
cf. *Cerastium arvense*	Ferns and Forbs	--
cf. *Cercis canadensis*	Shrubs and Vines	--
cf. *Cimicifuga racemosa*	Ferns and Forbs	--
cf. *Cirsium sp.*	Ferns and Forbs	--
cf. *Conyza canadensis*	Ferns and Forbs	--
cf. *Crepis/Prenanthes sp.*	Ferns and Forbs	--
cf. *Cynoglossum officinale*	Ferns and Forbs	--
cf. *Erechtites hieraciifolia*	Ferns and Forbs	--
cf. *Festuca subverticillata*	Graminoids	--

Table B2., continued.

Species	Habit Group	Functional Type Group
cf. *Festuca subverticillata/Vulpia octoflora*	Graminoids	--
cf. *Helianthus sp.*	Ferns and Forbs	--
cf. *Lathyrus tuberosus*	Ferns and Forbs	--
cf. *Lonicera japonica*	Shrubs and Vines	--
cf. *Lonicera* x *bella*	Shrubs and Vines	--
cf. *Lysimachia sp.*	Ferns and Forbs	--
cf. *Muhlenbergia schreberi/frondosa*	Graminoids	--
cf. *Panicum sp.*	Graminoids	--
cf. *Parnassia sp.*	Ferns and Forbs	--
cf. *Poa compressa*	Graminoids	--
cf. *Poa sylvestris*	Graminoids	--
cf. *Poa/Agrostis sp.*	Graminoids	--
cf. *Prenanthes serpentaria*	Ferns and Forbs	--
cf. *Prenanthes sp.*	Ferns and Forbs	--
cf. *Rubus sp.*	Shrubs and Vines	--
cf. *Saxifraga caroliniana*	Ferns and Forbs	--
cf. *Scutellaria serrata*	Ferns and Forbs	--
cf. *Senecio anonymus*	Ferns and Forbs	--
cf. *Senecio aureus*	Ferns and Forbs	--
cf. *Senecio obovatus*	Ferns and Forbs	--
cf. *Silphium trifoliatum/Parthenium integrifolium*	Ferns and Forbs	--
cf. *Solidago arguta/speciosa*	Ferns and Forbs	--
cf. *Solidago puberula*	Ferns and Forbs	--
cf. *Solidago roanensis*	Ferns and Forbs	--
cf. *Solidago rugosa/canadensis*	Ferns and Forbs	--
cf. *Solidago sp.*	Ferns and Forbs	--
cf. Unknown *Asteraceae*	Ferns and Forbs	--
cf. Unknown *Lamiaceae*	Ferns and Forbs	--
cf. *Verbascum blattaria*	Ferns and Forbs	--
cf. *Veronica officinalis*	Ferns and Forbs	--
Chimaphila maculata	Ferns and Forbs	Native
Conopholis americana	Ferns and Forbs	Native
Convolvulus sp.	Ferns and Forbs	Exotic
Cornus florida	Trees	Native
Corydalis cf. *sempervirens*	Ferns and Forbs	Native
Crataegus spp.	Trees	Native Weed
Cunila origanoides	Ferns and Forbs	Native
Danthonia compressa	Graminoids	Native
Danthonia sp.	Graminoids	Native
Danthonia spicata	Graminoids	Native
Dennstaedtia punctilobula	Ferns and Forbs	Native Invasive Weed
Deschampsia flexuosa	Graminoids	Native

Table B2., continued.

Species	Habit Group	Functional Type Group
Dioscorea quaternata/villosa	Ferns and Forbs	Native
Draba ramosissima	Ferns and Forbs	Native
Dryopteris carthusiana	Ferns and Forbs	Native
Dryopteris cf. *intermedia*	Ferns and Forbs	Native
Dryopteris intermedia	Ferns and Forbs	Native
Dryopteris marginalis	Ferns and Forbs	Native
Elymus histrix	Graminoids	Native
Epigaea repens	Ferns and Forbs	Native
Erechtites hieraciifolia	Ferns and Forbs	Native Weed
Eupatorium purpureum	Ferns and Forbs	Native Weed
Eupatorium rugosum	Ferns and Forbs	Native
Festuca arundinacea	Graminoids	Exotic Invasive
Festuca subverticillata	Graminoids	Native
Fraxinus americana	Trees	Native
Galium cf. *concinnum*	Ferns and Forbs	Native
Galium circaezans	Ferns and Forbs	Native
Galium concinnum	Ferns and Forbs	Native
Galium lanceolatum	Ferns and Forbs	Native
Galium triflorum	Ferns and Forbs	Native
Gaultheria procumbens	Shrubs and Vines	Native
Gaylussacia baccata	Shrubs and Vines	Native
Gnaphalium obtusifolium	Ferns and Forbs	Native Weed
Gnaphalium purpureum	Ferns and Forbs	Native Weed
Hamamelis virginiana	Shrubs and Vines	Native
Hedeoma pulegioides	Ferns and Forbs	Native Weed
Hedyotis cf. *caerulea*	Ferns and Forbs	Native
Hedyotis longifolia	Ferns and Forbs	Native
Hedyotis longifolia/nutalliana	Ferns and Forbs	Native
Hedyotis nutalliana	Ferns and Forbs	Native
Helianthus sp.	Ferns and Forbs	--
Hepatica americana	Ferns and Forbs	Native
Heuchera americana	Ferns and Forbs	Native
Hieracium caespitosum/aurantiacum/traillii	Ferns and Forbs	--
Hieracium cf. *caespitosum/floribundum*	Ferns and Forbs	--
Hieracium cf. *traillii*	Ferns and Forbs	Native
Hieracium sp.	Ferns and Forbs	--
Hieracium traillii	Ferns and Forbs	Native
Hieracium venosum	Ferns and Forbs	Native
Hypoxis hirsuta	Ferns and Forbs	Native
Juncus tenuis	Graminoids	Native Weed
Kalmia latifolia	Shrubs and Vines	Native
Krigia biflora	Ferns and Forbs	Native
Lactuca sp.	Ferns and Forbs	Native Weed

Table B2., continued.

Species	Habit Group	Functional Type Group
Lespedeza cf. *intermedia/violacea*	Ferns and Forbs	Native
Lespedeza procumbens	Ferns and Forbs	Native
Liriodendron tulipifera	Trees	Native Weed
Lysimachia quadrifolia	Ferns and Forbs	Native
Melampyrum lineare	Ferns and Forbs	Native
Menziesia pilosa	Ferns and Forbs	Native
Mitchella repens	Ferns and Forbs	Native
Monotropa uniflora	Ferns and Forbs	Native
Muhlenbergia schreberi	Graminoids	Native Weed
Muhlenbergia sobolifera	Graminoids	Native
Nyssa sylvatica	Trees	Native
Ostrya virginiana	Trees	Native
Panicum boscii	Graminoids	Native
Panicum cf. *depauperatum*	Graminoids	Native
Panicum commutatum	Graminoids	Native
Panicum depauperatum	Graminoids	Native
Panicum depauperatum/linearifolium	Graminoids	Native
Panicum dichotomum	Graminoids	Native
Panicum linearifolium	Graminoids	Native
Panicum sp.	Graminoids	Native
Paronychia canadensis	Ferns and Forbs	Native
Paronychia fastigiata	Ferns and Forbs	Native
Parthenocissus quinquefolia	Shrubs and Vines	Native
Phlox buckleyi	Ferns and Forbs	Native
Phlox subulata	Ferns and Forbs	Native
Phytolacca americana	Ferns and Forbs	Native Weed
Pinus pungens	Trees	Native Weed
Pinus rigida	Trees	Native Weed
Pinus spp.	Trees	Native Weed
Pinus strobus	Trees	Native
Pinus virginiana	Trees	Native Weed
Poa cf. *compressa*	Graminoids	Exotic Invasive
Poa cf. *trivialis*	Graminoids	Exotic Invasive
Poa compressa	Graminoids	Exotic Invasive
Poa sylvestris	Graminoids	Native
Polygonatum biflorum	Ferns and Forbs	Native
Polygonum convolvulus/scandens	Ferns and Forbs	Native Weed
Polygonum scandens	Ferns and Forbs	Native Weed
Polypodium virginianum	Ferns and Forbs	Native
Polystichum acrostichoides	Ferns and Forbs	Native
Populus grandidentata	Trees	Native Weed
Potentilla simplex/canadensis	Ferns and Forbs	Native
Prenanthes alba	Ferns and Forbs	Native

Table B2., continued.

Species	Habit Group	Functional Type Group
Prenanthes sp.	Ferns and Forbs	Native
Prunus serotina	Trees	Native Weed
Pteridium aquilinum	Ferns and Forbs	Native Invasive Weed
Pycnanthemum pycnanthemoides	Ferns and Forbs	Native
Pyrola cf. *elliptica*	Ferns and Forbs	Native
Quercus alba	Trees	Native
Quercus coccinea	Trees	Native
Quercus ilicifolia	Shrubs and Vines	Native
Quercus prinus	Trees	Native
Quercus rubra	Trees	Native
Quercus spp.	Trees	Native
Quercus velutina	Trees	Native
Rhododendron cf. *periclymenoides*	Shrubs and Vines	Native
Rhododendron sp.	Shrubs and Vines	Native
Rhus aromatica	Shrubs and Vines	Native
Robinia psuedoacacia	Trees	Native Invasive Weed
Rosa carolina	Shrubs and Vines	Native
Rosa carolina/acicularis	Shrubs and Vines	Native
Rubus cf. *flagellaris/recurvicaulis/enslensii*	Shrubs and Vines	Native
Rubus cf. *idaeus*	Shrubs and Vines	Native Weed
Rubus sp.	Shrubs and Vines	Native
Sassafras albidum	Trees	Native Weed
Saxifraga cf. *caroliniana*	Ferns and Forbs	Native
Saxifraga virginiensis	Ferns and Forbs	Native
Scutellaria ovata	Ferns and Forbs	Native
Sedum ternatum	Ferns and Forbs	Native
Silene stellata	Ferns and Forbs	Native
Smilacina racemosa	Ferns and Forbs	Native
Smilax rotundifolia	Shrubs and Vines	Native Invasive Weed
Solidago caesia	Ferns and Forbs	Native
Solidago cf. *curtisii*	Ferns and Forbs	Native
Solidago cf. *flexicaulis*	Ferns and Forbs	Native
Solidago cf. *roanensis*	Ferns and Forbs	Native
Solidago rugosa/canadensis	Ferns and Forbs	Native Weed
Solidago sp.	Ferns and Forbs	--
Sorghastrum nutans	Graminoids	Native
Sphenopholis nitida	Graminoids	Native
Spiraea betulifolia var. *corymbosa*	Shrubs and Vines	Native
Taenidia integerrima	Ferns and Forbs	Native
Tephrosia virginiana	Ferns and Forbs	Native
Tilia americana	Trees	Native
Triodanis perfoliata	Ferns and Forbs	Native
Unknown Aster/Solidago	Ferns and Forbs	--

Table B2., continued.

Species	Habit Group	Functional Type Group
Unknown Asteraceae	Ferns and Forbs	--
Unknown Dicot	--	--
Unknown Fern	Ferns and Forbs	--
Unknown Monocot	Ferns and Forbs	--
Unknown Poaceae	Graminoids	--
Uvularia perfoliata	Ferns and Forbs	Native
Uvularia sessilifolia	Ferns and Forbs	Native
Vaccinium pallidum	Shrubs and Vines	Native
Vaccinium stamineum	Shrubs and Vines	Native
Verbascum sp.	Ferns and Forbs	Exotic
Veronica officinalis	Ferns and Forbs	Exotic
Viburnum acerifolium	Shrubs and Vines	Native
Viburnum cf. *prunifolium*	Shrubs and Vines	Native
Viburnum prunifolium	Shrubs and Vines	Native
Vicia cf. *cracca/caroliniana*	Ferns and Forbs	Exotic Invasive
Vicia cracca	Ferns and Forbs	Exotic Invasive
Viola pedata	Ferns and Forbs	Native
Viola sororia	Ferns and Forbs	Native
Viola sp.	Ferns and Forbs	Native
Vitis spp.	Shrubs and Vines	Native Invasive Weed
Woodsia obtusa	Ferns and Forbs	Native

[a] A species was excluded from groups and the subsequent calculations when its habit or ecological function could not be positively identified.

APPENDIX B: METHODS-FIGURES

Figure B1. Location of the George Washington National Forest and Brandywine, West Virginia.

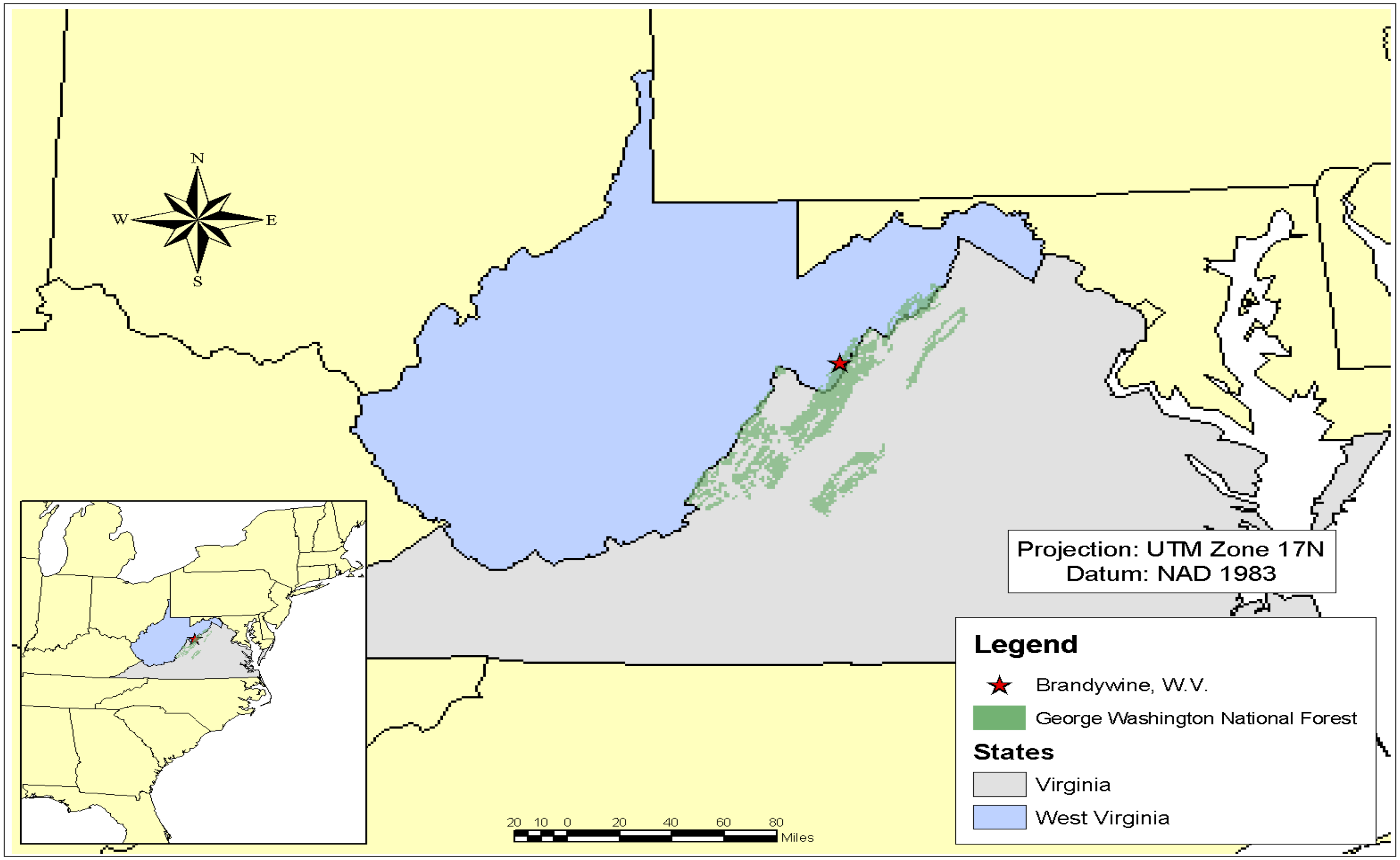


Figure B2. Brushy Knob, Heavener Mountain, and Dunkle Knob

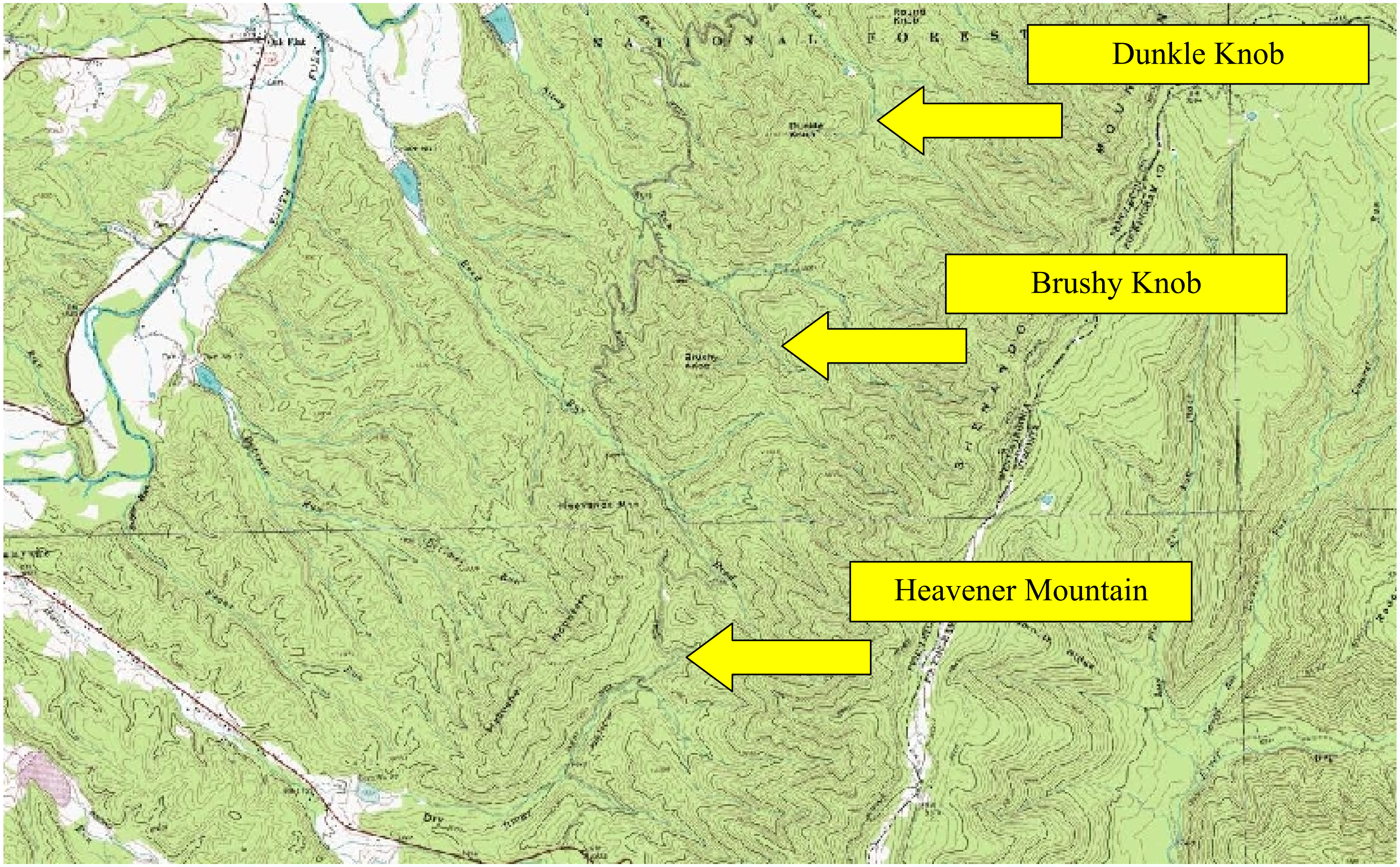


Figure B3. Sample Point Layout on Brushy Knob

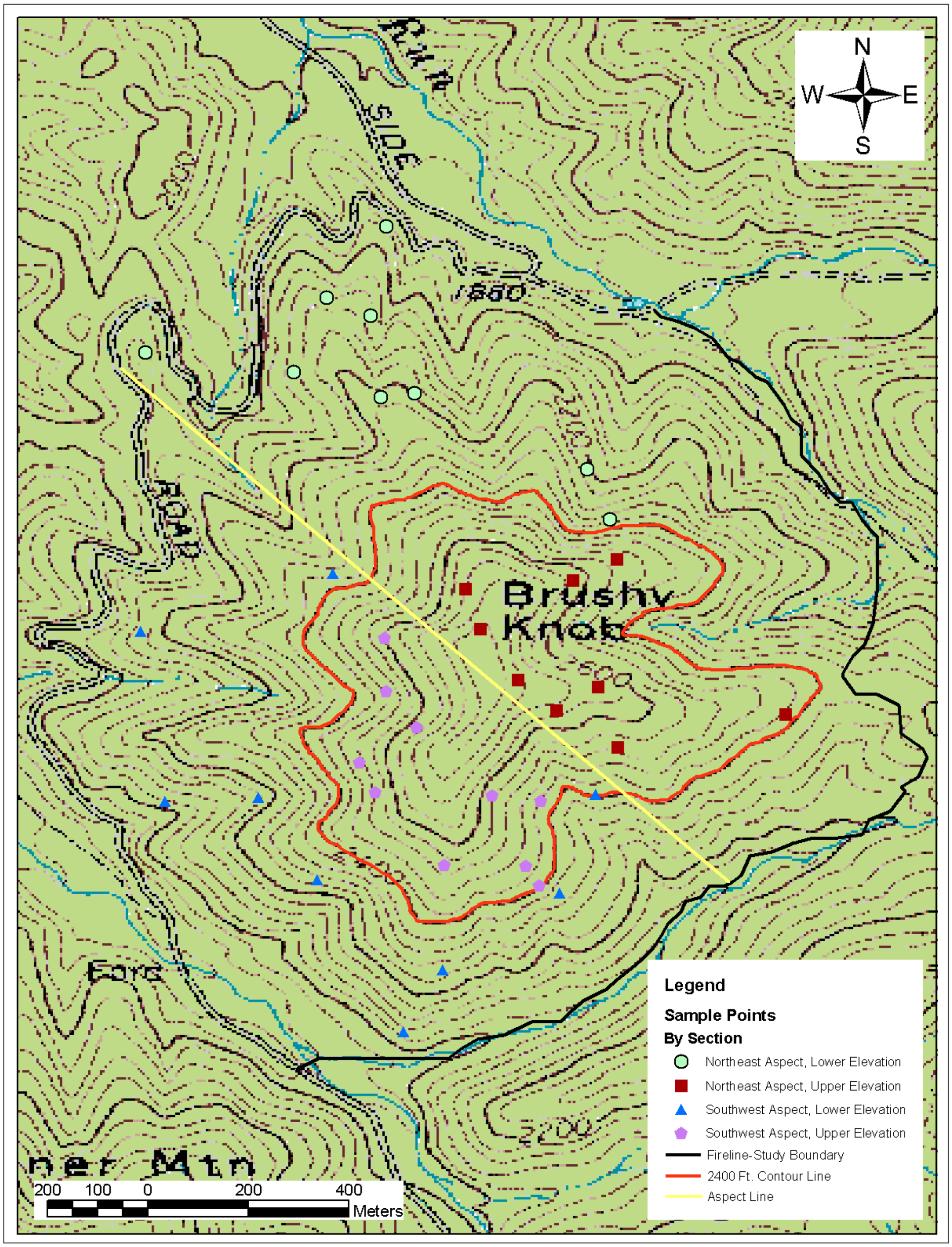


Figure B4. Sample Point Layout on Heavener Mountain

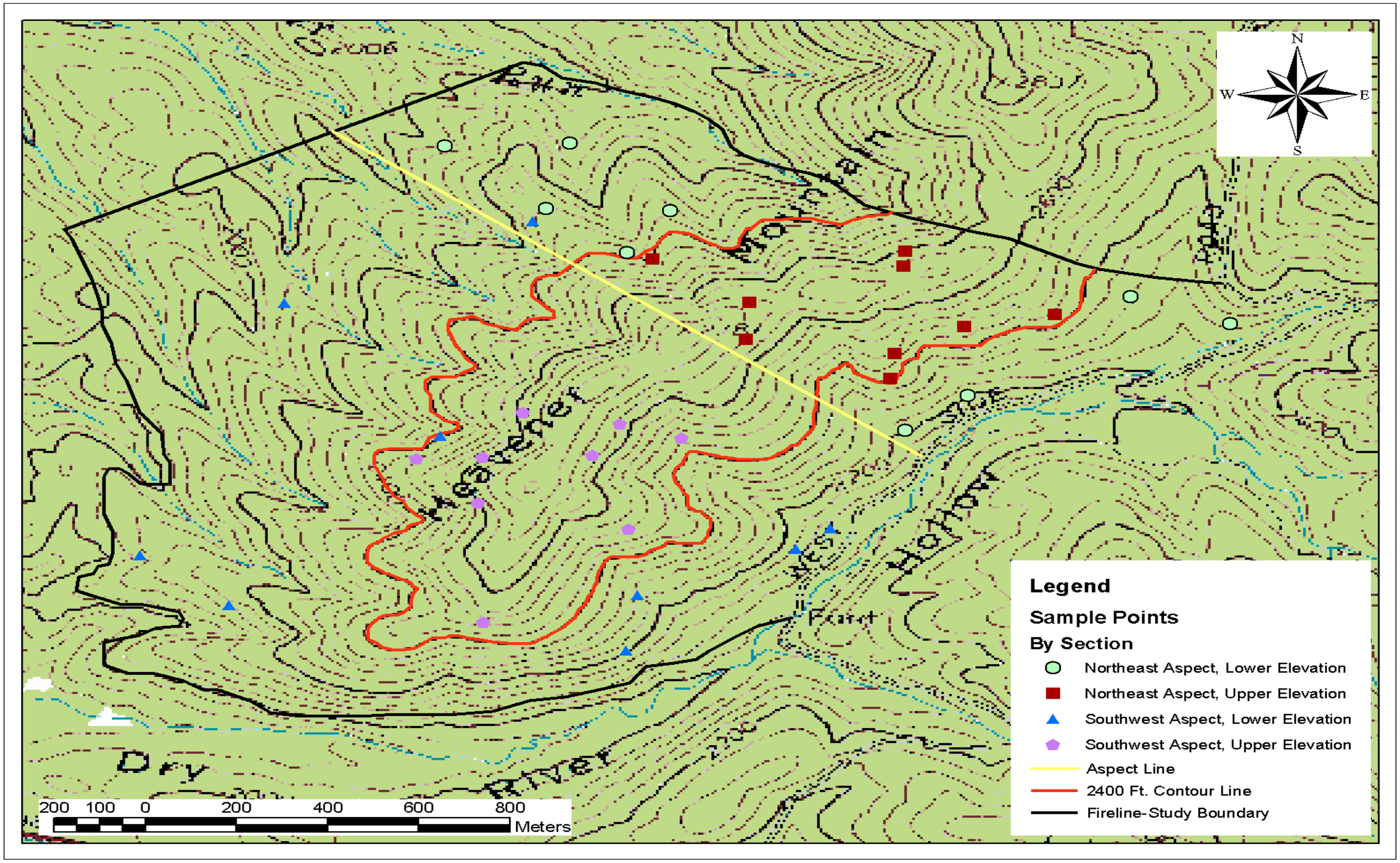


Figure B5. Sample Point Layout on Dunkle Knob

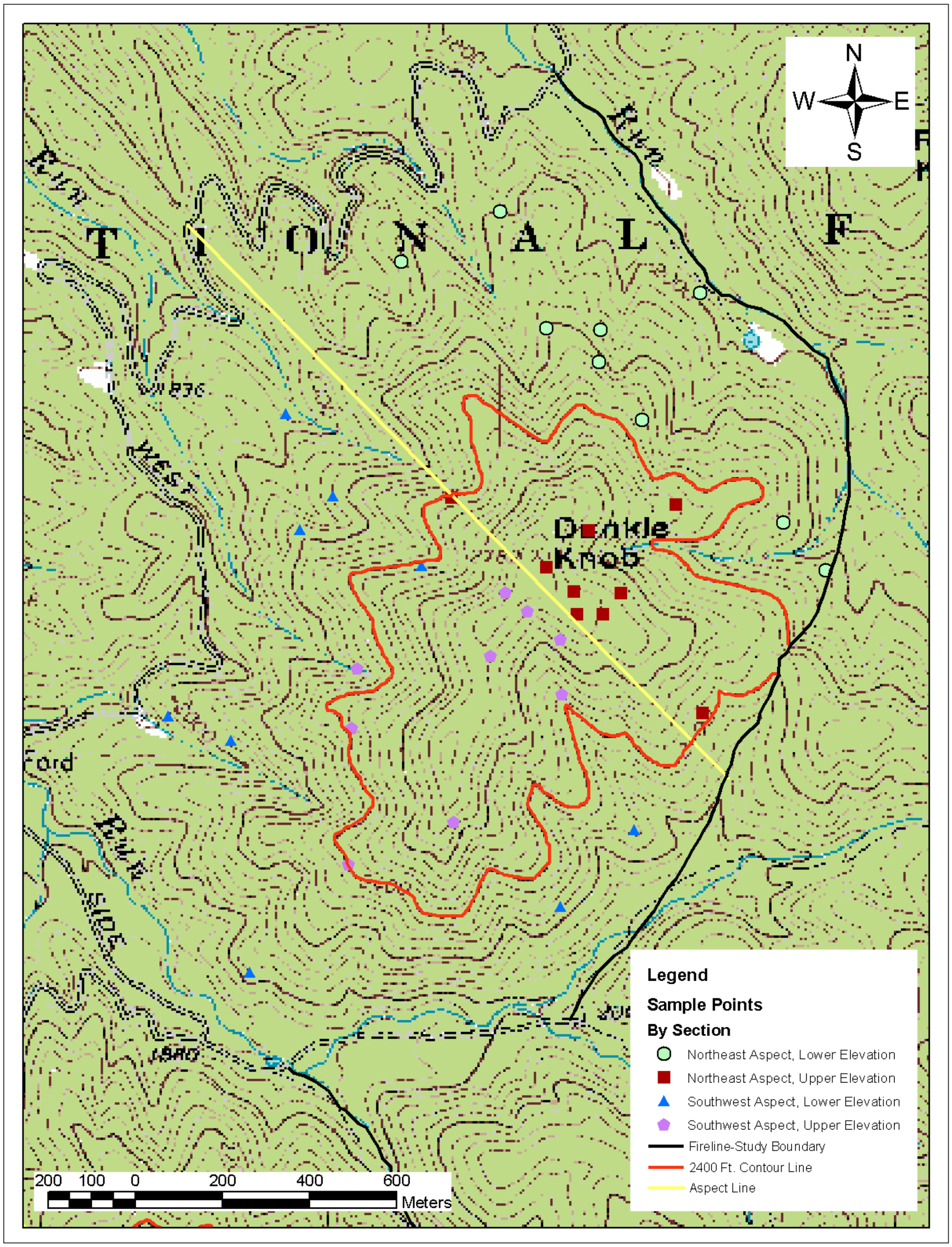
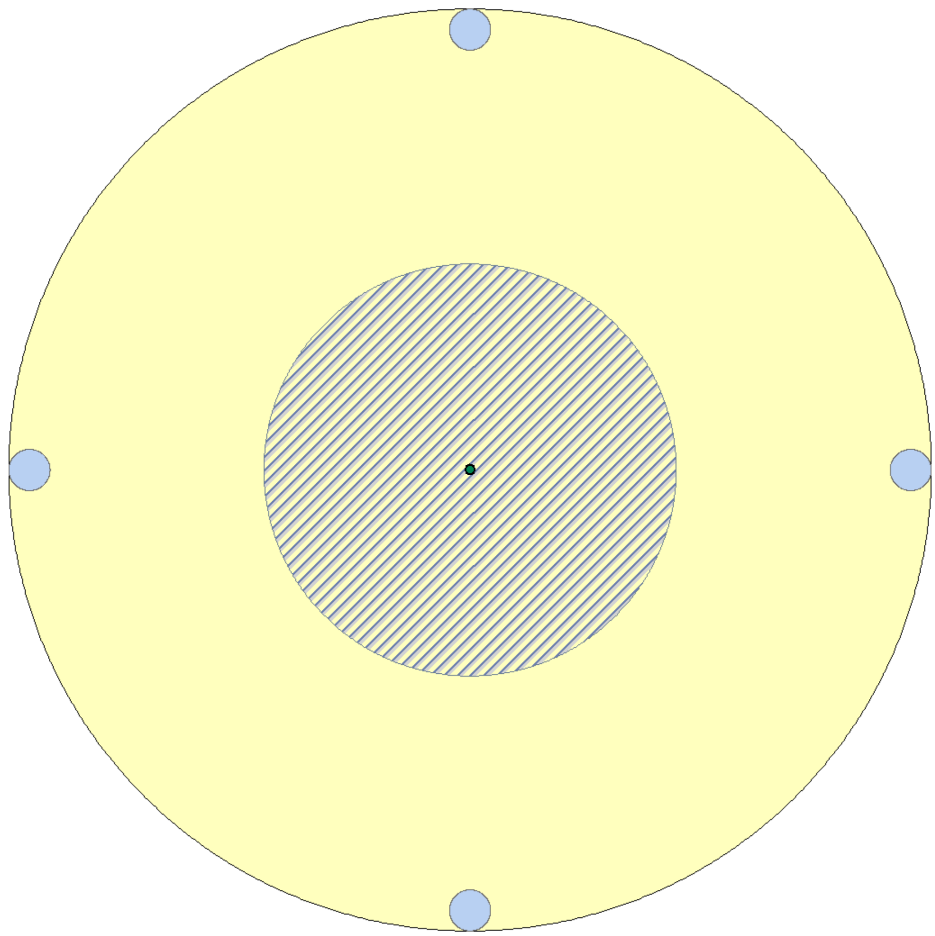


Figure B6. Plot Layout Around A Sample Point



Plot	Size (Sq. Meters)
Herbaceous Plant/Tree Regeneration	1
Understory/Shrub	100
Overstory Trees	500

Figure B7. Fire Behavior Monitoring Plots on Dunkle Knob

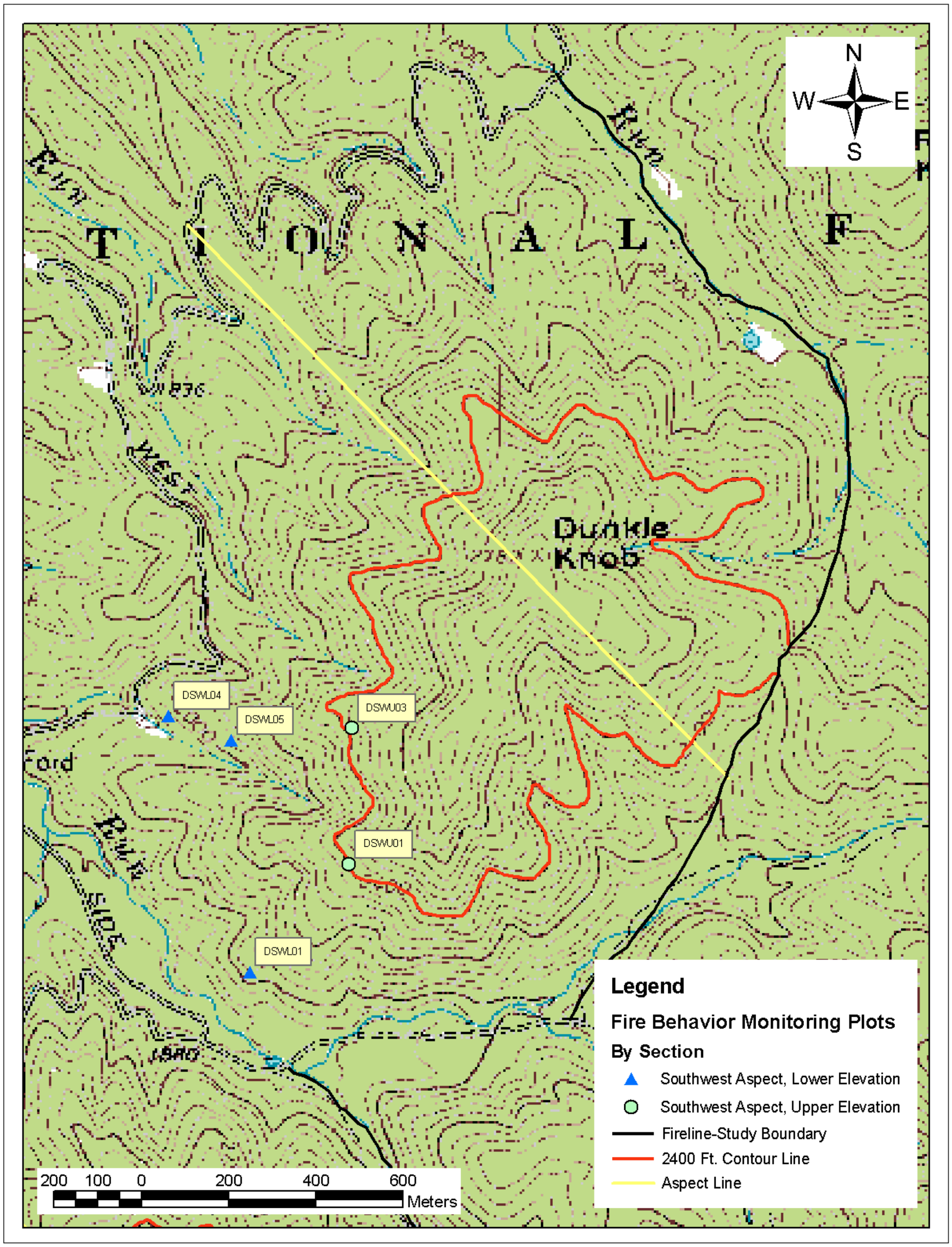
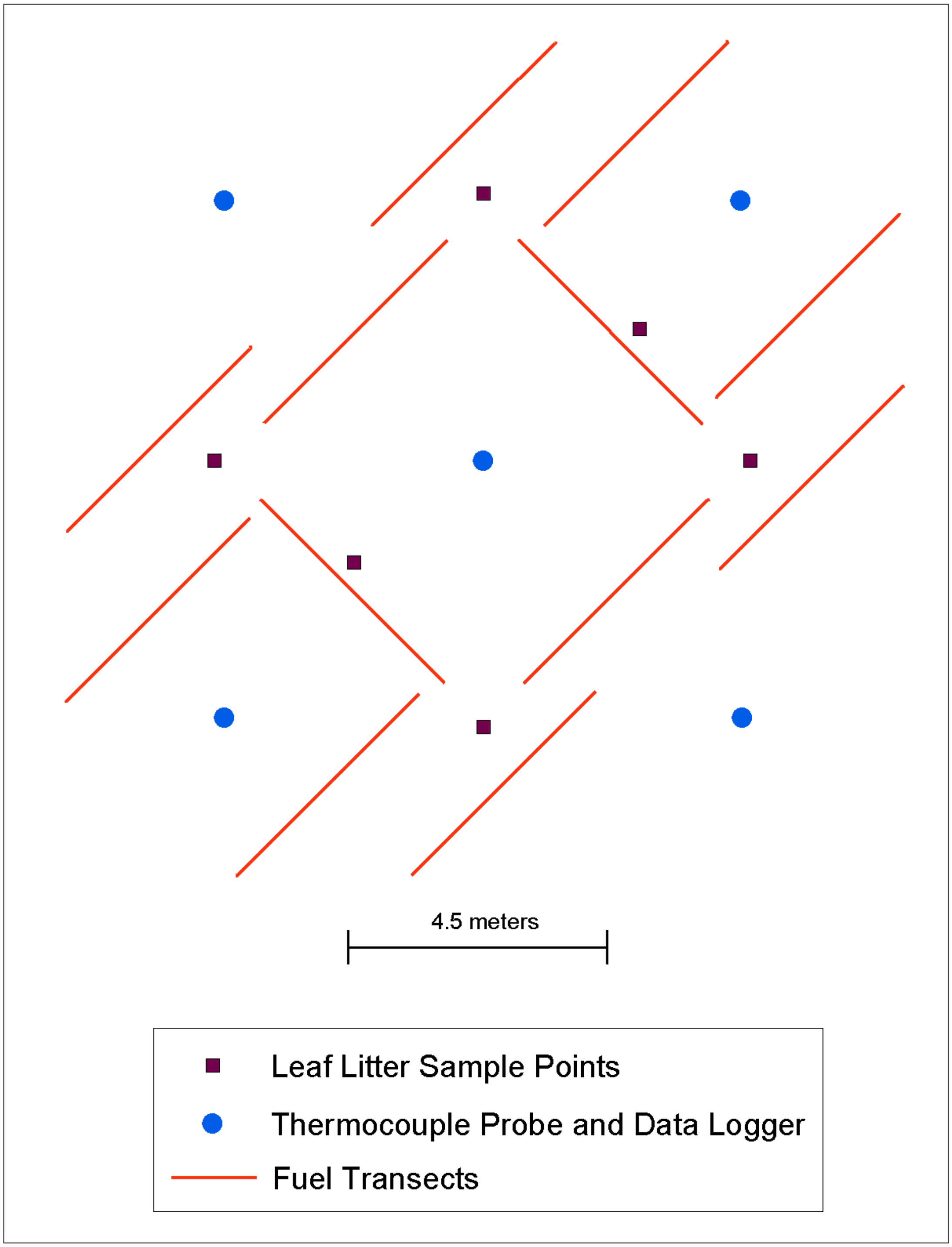


Figure B8. Layout of Fuel Transects and Thermocouple Probes at Fire Behavior Monitoring Plots



APPENDIX C: RESULTS

Table C1. Summary statistics of mixed model analysis of variance (ANOVA) for the effects of site/year, aspect, slope position, species group on the structural parameters of the overstory stratum.

Dependant Variable	Source of Variation	Degrees of Freedom	F	*p*
Basal Area per Hectare	Site/Year	4,70	4.14	0.0046
	Aspect	1,70	6.16	0.0155
Stems per Hectare	Site/Year	4,70	6.16	0.0003
	Slope Position	1,70	4.39	0.0399
H'	No Significant Variables	--	--	--
J'^{a}	Site/Year	4,70	2.87	0.0294
S	Site/Year	4,70	3.29	0.0156
Species Group Importance Value[b]	Species Group	4,780	179.81	<0.0001
	Aspect X Species Group	5,780	5.05	0.0001
	Slope Position X Species Group	5,780	4.00	0.0014

[a] Arc sine square root transformed.
[b] Square root transformed.

Table C2. Summary statistics of mixed model analysis of covariance (ANCOVA) for the effects of site/year, aspect, slope position, species group, and overstory basal area (m^2/ha, the covariate) on the sapling stratum.

Dependant Variable	Source of Variation	Degrees of Freedom	F	*p*
Basal Area per Hectare[a]	Site/Year	5,66	27.78	<0.0001
	Basal Area X Site/Year	5,66	3.60	0.0061
Stems per Hectare[b]	Site/Year	5,69	36.32	<0.0001
	Basal Area	1,69	8.50	0.0048
H′	Site/Year	4,70	9.67	<0.0001
J′	Site/Year	4,70	3.28	0.0161
S	Site/Year	4,70	11.45	<0.0001
Species Group Importance Value[b]	Species Group	7,779	7.19	<0.0001
	Slope Position X Species Group	5,779	4.73	0.0003
	Basal Area X Species Group	5,779	6.22	<0.0001

[a] Log_{10} transformed
[b] Square root transformed

Table C3. Summary statistics of generalized linear model analysis with a Poisson probability distribution for the effects of site/year, aspect, slope position, and basal area (m^2/ha, the covariate) on the shrub stratum. All shrub stratum data were log_{10} transformed prior to analysis and separate models were fit for each species-distinct analysis.

Dependant Variable	Source of Variation	Degrees of Freedom	χ^2	*p*
Total Stems per Hectare	Site/Year	4	20.16	0.0005
	Basal Area X Site/Year	5	15.41	0.0088
Hamamelis virginiana stems/ha	Site/Year	4	26.72	<0.0001
Kalmia latifolia stems/ha	Site/Year	4	27.52	<0.0001
	Aspect	1	14.57	0.0001
	Basal Area	1	12.80	0.003
Quercus ilicifolia stems/ha	Site/Year	4	17.94	0.0013
	Basal Area	1	5.86	0.0155
Vitis spp. stems/ha	Site/Year	4	11.03	0.0263

Table C4. Summary statistics of mixed model analysis of covariance (ANCOVA) for the effects of site/year, aspect, slope position, species group, and basal area (m^2/ha, the covariate) on tree regeneration importance value.

Dependant Variable	Source of Variation	Degrees of Freedom	F	*p*
Importance Value[a]	Species Group	4,746	4.13	0.0026
	Site/Year X Species Group	20,746	2.37	0.0007
	Basal Area X Species Group	5,746	6.13	<0.0001
	Basal Area X Site/Year X Species Group	20,746	2.22	0.0017

[a] Arcsine square root transformed.

Table C5. Table of coefficients (± 1 SE) for tree regeneration species groups importance value linear regression models. All models take the form: $Arc\sin\sqrt{IV} = \beta_0 + \beta_1 * Basal\ Area\ (m^2/ha)$. See Appendix B; Table B1 for tree regeneration species groupings.

Species Group	Site/Year	Intercept Coefficient		Slope Coefficient		RMS[a]	R^2
		β_0	p	β_1	p		
Hickory	DK 0	-0.1042 (0.2109)	0.6215	0.01270 (0.008406)	0.1312	0.05269	0.13591
	DK 1	0.03914 (0.2011)	0.8457	0.01076 (0.008438)	0.2025	0.09592	0.05815
	HM 1	0.1511 (0.1894)	0.4254	-0.00151 (0.007268)	0.8357	0.04952	0.00315
	HM 2	0.2019 (0.1626)	0.2148	0.001908 (0.006468)	0.7681	0.08163	0.00385
	BK 12	0.1851 (0.1843)	0.3155	-0.00087 (0.007846)	0.9118	0.05807	0.00077
Intolerants	DK 0	0.09830 (0.2109)	0.6413	0.000169 (0.008406)	0.9840	0.03714	0.00004
	DK 1	0.5493 (0.2011)	0.0065	-0.00988 (0.008438)	0.2421	0.09413	0.05022
	HM 1	-0.2127 (0.1894)	0.2618	0.02379 (0.007268)	0.0011	0.15530	0.20027
	HM 2	0.4552 (0.1626)	0.0053	-0.00316 (0.006468)	0.6255	0.10321	0.00832
	BK 12	0.2383 (0.1843)	0.1963	-0.00657 (0.007846)	0.4029	0.03469	0.06835
Oaks	DK 0	0.04677 (0.2109)	0.8245	0.01092 (0.008406)	0.1942	0.09203	0.06241
	DK 1	0.1641 (0.2011)	0.4147	0.005298 (0.008438)	0.5303	0.10660	0.01325
	HM 1	0.6101 (0.1894)	0.0013	-0.01120 (0.007268)	0.1237	0.19494	0.04235
	HM 2	0.4133 (0.1626)	0.0112	-0.00719 (0.006468)	0.2665	0.08400	0.05069
	BK 12	0.3460 (0.1843)	0.0609	0.005310 (0.007846)	0.4988	0.14610	0.01125
Pines	DK 0	0.3319 (0.2109)	0.1160	-0.00578 (0.008406)	0.4921	0.12646	0.01339
	DK 1	0.2050 (0.2011)	0.3084	-0.00361 (0.008438)	0.6688	0.11680	0.00566
	HM 1	0.6348 (0.1894)	0.0008	-0.01808 (0.007268)	0.0131	0.16367	0.12068
	HM 2	0.5105 (0.1626)	0.0018	-0.01356 (0.006468)	0.0363	0.12994	0.10936
	BK 12	0.9446 (0.1843)	<0.0001	-0.02909 (0.007846)	0.0002	0.14096	0.26144
Tolerants	DK 0	1.1577 (0.2109)	<0.0001	-0.00944 (0.008406)	0.2374	0.15547	0.03162
	DK 1	0.6678 (0.2011)	0.0009	0.002287 (0.008438)	0.7864	0.20188	0.00132
	HM 1	0.2330 (0.1894)	0.2191	0.01630 (0.007268)	0.0252	0.30803	0.05595
	HM 2	0.2215 (0.1626)	0.1735	0.02009 (0.006468)	0.0020	0.18636	0.15819
	BK 12	-0.01182 (0.1843)	0.9489	0.03182 (0.007846)	<0.001	0.17030	0.25957

[a] Residual Mean Square

Table C6. Summary statistics of mixed model ANCOVA for the effects of site/year, aspect, slope position, and basal area (m^2/ha, the covariate) on the average total percent cover and diversity of the herbaceous stratum.

Dependant Variable	Source of Variation	Degrees of Freedom	F	*p*
Percent Cover[a]	Site/Year	4,66	13.71	<0.0001
	Aspect	1,66	7.19	0.0092
	Basal Area	1,66	15.51	0.0002
	Basal Area X Site/Year	4,66	6.15	0.0003
H'	Site/Year X Slope Position	9,68	2.64	0.0111
J'	Site/Year	4,70	3.72	0.0083
	Slope Position	1,70	8.21	0.0055
S[a]	Site/Year	4,70	12.95	<0.0001

[a] Square root transformed.

Table C7. Table of coefficients (± 1 SE) for total herbaceous stratum cover linear regression models. All models take the form: $\sqrt{\%\,Cover} = \beta_0 + \beta_1 * Basal\ Area\,(m^2/ha)$.

Site/Year	Intercept Coefficient		Slope Coefficient		RMS[a]	R^2
	β_0	p	β_1	p		
DK 0	3.6872 (0.6906)	<0.0001	-0.02240 (0.02743)	0.4171	1.127	0.022
DK 1	4.5877 (0.6588)	<0.0001	-0.04146 (0.02743)	0.1368	1.225	0.067
HM 1	3.8965 (0.6347)	<0.0001	-0.05123 (0.02431)	0.0389	0.481	0.273
HM 2	6.9906 (0.5453)	<0.0001	-0.1202 (0.02163)	<0.0001	1.666	0.429
BK 12	4.4893 (0.6291)	<0.0001	-0.00716 (0.02678)	0.7900	2.277	0.001

[a] Residual Mean Square

Table C8. Herbaceous stratum summary statistics (± SE) by species. Average total percent cover and diversity indices within rows followed by an asterisk (*) are significantly different between years ($p<0.05$). Those species whose importance value= -- where not included in diversity indices calculations because of the impossibility of positive identification. See Appendix C; Table C9 for uncommon species list by section and year.

Dunkle Knob				
Species	% Cover		Importance Value	
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acer pensylvanicum	0.08 (0.05)	0.01 (0.01)	4.74 (3.80)	1.39 (1.39)
Acer rubrum	0.23 (0.09)	0.15 (0.08)	4.93 (3.01)	1.72 (0.81)
Amelanchier arborea	0.15 (0.07)	0.17 (0.07)	1.18 (0.73)	2.27 (0.88)
Anemonella thalictroides	0.03 (0.03)	0.01 (0.01)	1.2 (1.20)	0.13 (0.13)
Antennaria plantaginifolia	0.02 (0.02)	0.01 (0.01)	0.86(0.86)	0.36 (0.36)
Antennaria virginica	0.01 (0.01)	0.01 (0.01)	0.79 (0.79)	0.31 (0.31)
Asplenium platyneuron	0.07 (0.04)	0.03 (0.02)	1.48 (0.84)	0.94 (0.50)
Aster cordifolius	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.10 (0.10)
Aureolaria laevigata	0.01 (0.01)	0.01 (0.01)	0.06 (0.06)	0.10 (0.10)
Aureolaria virginica	0.07 (0.07)	0.00 (0.00)	0.26 (0.26)	0.00 (0.00)
Carex digitalis	0.01 (0.01)	0.00 (0.00)	0.17 (0.12)	0.00 (0.00)
Carex pensylvanica/lucorum	0.06 (0.03)	0.06 (0.04)	1.22 (1.01)	1.58 (1.20)
Carex sp.	0.03 (0.02)	0.00 (0.00)	1.49 (0.91)	0.00 (0.00)
Carex sp. (Laxiflorae)	0.01 (0.01)	0.04 (0.02)	0.06 (0.06)	0.66 (0.43)
Carya spp.	0.04 (0.03)	0.06 (0.04)	0.47 (0.25)	0.74 (0.42)
Ceanothus americanus	0.00 (0.00)	0.05 (0.02)	0.00 (0.00)	1.44 (0.92)
cf. *Helianthus sp.*	0.01 (0.01)	0.00 (0.00)	--	--
cf. *Poa sylvestris*	0.04 (0.04)	0.08 (0.08)	--	--
cf. *Solidago arguta/speciosa*	0.01 (0.01)	0.00 (0.00)	--	--
cf. *Solidago roanensis*	0.00 (0.00)	0.02 (0.02)	--	--
Chimaphila maculata	0.01 (0.01)	0.04 (0.02)	0.15 (0.11)	1.72 (0.85)
Danthonia spicata	0.01 (0.01)	0.01 (0.01)	0.11 (0.11)	0.46 (0.33)
Deschampsia flexuosa	0.07 (0.07)	0.03 (0.03)	0.63 (0.63)	0.19 (0.19)
Dioscorea quaternata/villosa	0.01 (0.01)	0.01 (0.01)	0.38 (0.34)	0.49 (0.4)
Erechtites hieraciifolia	0.02 (0.02)	0.04 (0.02)	0.34 (0.34)	2.26 (1.76)
Galium circaezans	0.02 (0.01)	0.01 (0.01)	1.6 (1.38)	0.15 (0.15)
Gaultheria procumbens	0.01 (0.01)	0.01 (0.01)	0.09 (0.09)	0.26 (0.23)
Gaylussacia baccata	1.51 (1.31)	1.28 (0.99)	4.13 (3.07)	3.43 (2.68)
Hamamelis virginiana	0.25 (0.19)	0.24 (0.18)	2.18 (1.14)	1.94 (1.09)
Hedyotis longifolia/nutalliana	0.02 (0.02)	0.00 (0.00)	0.32 (0.32)	0.00 (0.00)
Hieracium venosum	0.07 (0.07)	0.01 (0.01)	0.54 (0.54)	0.13 (0.13)
Kalmia latifolia	2.51 (1.55)	1.44 (0.77)	9.06 (4.41)	5.61 (2.37)
Liriodendron tulipifera	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.77 (0.64)

Table C8., continued.

Species	% Cover		Importance Value	
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Nyssa sylvatica	0.06 (0.06)	0.41 (0.35)	0.95 (0.71)	4.18 (2.81)
Ostrya virginiana	0.01 (0.01)	0.01 (0.01)	2.26 (2.26)	2.78 (2.78)
Panicum depauperatum	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.06 (0.04)
Panicum depauperatum/linearifolium	0.00 (0.00)	0.05 (0.03)	0.00 (0.00)	1.10 (0.99)
Panicum sp.	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.09 (0.06)
Paronychia fastigiata	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	0.91 (0.91)
Pinus spp.	0.03 (0.02)	0.03 (0.02)	2.90 (2.77)	3.15 (2.75)
Pinus virginiana	0.83 (0.55)	0.14 (0.14)	3.90 (2.59)	0.45 (0.45)
Polypodium virginianum	0.03 (0.03)	0.03 (0.03)	0.40 (0.40)	0.26 (0.26)
Potentilla simplex/canadensis	0.01 (0.01)	0.01 (0.01)	0.40 (0.40)	0.44 (0.32)
Pteridium aquilinum	0.18 (0.18)	0.85 (0.85)	0.70 (0.70)	2.33 (2.33)
Quercus ilicifolia	0.94 (0.49)	1.35 (0.78)	3.11 (1.73)	3.32 (1.92)
Quercus prinus	0.11 (0.06)	0.17 (0.10)	1.18 (0.68)	1.37 (0.84)
Quercus rubra	0.01 (0.01)	0.01 (0.01)	0.28 (0.28)	0.09 (0.09)
Quercus velutina	0.11 (0.11)	0.00 (0.00)	0.36 (0.36)	0.00 (0.00)
Sassafras albidum	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.34 (0.24)
Saxifraga cf. *caroliniana*	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.35 (0.23)
Smilacina racemosa	0.01 (0.01)	0.01 (0.01)	0.05 (0.05)	0.07 (0.05)
Smilax rotundifolia	0.13 (0.11)	0.01 (0.01)	2.44 (2.07)	0.05 (0.05)
UK Dicot	0.01 (0.01)	0.01 (0.01)	--	--
UK *Poaceae*	0.06 (0.03)	0.03 (0.02)	--	--
Vaccinium pallidum	5.03 (1.28)	6.60 (1.90)	32.77 (5.67)	35.76 (7.90)
Vaccinium stamineum	0.39 (0.28)	0.70 (0.59)	5.71 (3.80)	5.82 (3.35)
Viburnum acerifolium	0.08 (0.07)	0.00 (0.00)	0.20 (0.14)	0.00 (0.00)
Vicia cf. *cracca/caroliniana*	0.05 (0.04)	0.16 (0.12)	1.55 (1.03)	3.00 (2.14)
Vitis sp.	0.01 (0.01)	0.15 (0.06)	0.69 (0.69)	3.79 (2.05)
Misc. Uncommon Species	0.08 (0.03)	0.08 (0.03)	1.69 (0.83)	1.16 (0.54)
Total	13.59 (3.85)	14.80 (3.50)		
		H'	1.00 (0.10)	1.03 (0.11)
		J'	0.67 (0.06)	0.59 (0.06)
		S	4.67 (0.53)	5.56 (0.49)

DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acalypha rhomboidea	0.19 (0.19)	0.00 (0.00)	1.57 (1.57)	0.00 (0.00)
Acalypha virginica	0.10 (0.10)	0.13 (0.1)	0.55 (0.55)	0.78 (0.48)
Acer pensylvanicum	0.65 (0.19)	0.28 (0.13)	12.06 (4.92)	3.86 (1.92)
Acer rubrum	0.13 (0.05)	0.19 (0.10)	5.21 (3.30)	1.54 (0.62)
Ailanthus altissima	0.01 (0.01)	0.09 (0.02)	0.05 (0.05)	0.85 (0.29)
Alliaria petiolata	0.96 (0.63)	0.74 (0.53)	4.83 (2.68)	3.00 (2.20)
Ambrosia artemisiifolia	0.00 (0.00)	0.25 (0.25)	0.00 (0.00)	0.85 (0.85)

Table C8., continued.

Species	% Cover		Importance Value	
DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Amelanchier arborea	0.03 (0.02)	0.01 (0.01)	0.34 (0.14)	0.12 (0.09)
Amphicarpaea bracteata	0.01 (0.01)	0.11 (0.11)	0.05 (0.05)	0.27 (0.27)
Anemonella thalictroides	0.01 (0.01)	0.03 (0.02)	0.33 (0.24)	0.32 (0.24)
Antennaria plantaginifolia	0.01 (0.01)	0.01 (0.01)	0.20 (0.15)	0.04 (0.04)
Asplenium platyneuron	0.10 (0.06)	0.13 (0.08)	2.07 (1.15)	1.49 (0.83)
Aster divaricatus/cordifolius	0.01 (0.01)	0.01 (0.01)	0.07 (0.07)	0.12 (0.12)
Bromus japonicus	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.17 (0.11)
Bromus pubescens	0.01 (0.01)	0.15 (0.15)	0.05 (0.05)	0.59 (0.59)
Carex digitalis	0.03 (0.02)	0.06 (0.06)	0.46 (0.37)	0.52 (0.47)
Carex pensylvanica/lucorum	0.15 (0.08)	0.24 (0.14)	1.64 (0.92)	1.84 (1.25)
Carex sp.	0.06 (0.04)	0.00 (0.00)	0.87 (0.59)	0.00 (0.00)
Carex sp. (Laxiflorae)	0.02 (0.01)	0.03 (0.02)	0.18 (0.12)	0.24 (0.19)
Carex willdenowii	0.01 (0.01)	0.03 (0.03)	0.19 (0.19)	0.18 (0.18)
Carya spp.	0.06 (0.03)	0.11 (0.06)	0.70 (0.37)	0.95 (0.48)
Ceanothus americanus	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.19 (0.19)
cf. *Bromus ciliatus*	0.01 (0.01)	0.03 (0.03)	--	--
cf. *Cynoglossum officinale*	0.00 (0.00)	0.21 (0.21)	--	--
cf. *Helianthus sp.*	0.00 (0.00)	0.01 (0.01)	--	--
cf. *Rubus sp.*	0.00 (0.00)	0.02 (0.01)	--	--
cf. *Senecio anonymus*	0.00 (0.00)	0.03 (0.02)	--	--
cf. UK *Asteraceae*	0.03 (0.03)	0.00 (0.00)	--	--
cf. *Verbascum blattaria*	0.03 (0.03)	0.00 (0.00)	--	--
Chimaphila maculata	0.02 (0.01)	0.03 (0.02)	0.25 (0.20)	0.22 (0.16)
Corydalis cf. *sempervirens*	0.01 (0.01)	0.00 (0.00)	0.07 (0.07)	0.00 (0.00)
Danthonia spicata	0.08 (0.07)	0.06 (0.04)	0.61 (0.51)	0.41 (0.33)
Deschampsia flexuosa	0.07 (0.06)	0.11 (0.07)	0.89 (0.70)	0.91 (0.64)
Dryopteris marginalis	0.10 (0.08)	0.12 (0.08)	1.49 (1.19)	1.66 (1.29)
Erechtites hieraciifolia	0.07 (0.03)	0.16 (0.12)	1.11 (0.33)	1.33 (0.59)
Eupatorium rugosum	0.45 (0.24)	2.42 (1.51)	4.51 (1.85)	8.90 (3.68)
Festuca subverticillata	0.03 (0.02)	0.08 (0.05)	0.29 (0.21)	0.53 (0.30)
Galium circaezans	0.05 (0.03)	0.18 (0.14)	0.68 (0.41)	1.38 (1.10)
Gaylussacia baccata	0.78 (0.66)	0.97 (0.79)	6.09 (4.53)	7.10 (5.44)
Hamamelis virginiana	0.10 (0.06)	0.04 (0.02)	1.79 (1.48)	1.23 (0.92)
Hedeoma pulegioides	0.01 (0.01)	0.06 (0.06)	0.10 (0.10)	0.24 (0.19)
Hedyotis longifolia	0.02 (0.01)	0.01 (0.01)	0.43 (0.24)	0.18 (0.18)
Helianthus sp.	0.01 (0.01)	0.00 (0.00)	0.21 (0.21)	0.00 (0.00)
Heuchera americana	0.01 (0.01)	0.01 (0.01)	0.14 (0.14)	0.06 (0.06)
Juncus tenuis	0.08 (0.08)	0.00 (0.00)	0.42 (0.42)	0.00 (0.00)
Kalmia latifolia	1.17 (1.11)	0.77 (0.76)	6.95 (5.81)	7.77 (5.40)
Lespedeza procumbens	0.01 (0.01)	0.02 (0.01)	0.20 (0.15)	0.12 (0.08)
Melampyrum lineare	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)	0.25 (0.25)

Table C8., continued.

Species	% Cover		Importance Value	
DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Pre-burn (2003)
Muhlenbergia schreberi	0.00 (0.00)	0.11 (0.11)	0.00 (0.00)	0.65 (0.65)
Nyssa sylvatica	0.01 (0.01)	0.25 (0.25)	0.24 (0.16)	1.25 (1.25)
Ostrya virginiana	0.06 (0.04)	0.05 (0.02)	0.85 (0.56)	0.43 (0.22)
Panicum commutatum	0.01 (0.01)	0.04 (0.02)	0.15 (0.15)	0.57 (0.46)
Panicum depauperatum/linearifolium	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.11 (0.07)
Panicum sp.	0.01 (0.01)	0.00 (0.00)	0.19 (0.19)	0.00 (0.00)
Paronychia canadensis	0.00 (0.00)	0.12 (0.08)	0.00 (0.00)	0.56 (0.31)
Paronychia fastigiata	0.01 (0.01)	0.01 (0.01)	0.10 (0.10)	0.03 (0.03)
Phytolacca americana	0.00 (0.00)	0.13 (0.12)	0.00 (0.00)	0.44 (0.32)
Pinus spp.	0.01 (0.01)	0.02 (0.01)	0.09 (0.09)	0.13 (0.09)
Pinus strobus	0.01 (0.01)	0.00 (0.00)	0.20 (0.20)	0.00 (0.00)
Polygonatum biflorum	0.02 (0.01)	0.01 (0.01)	0.20 (0.10)	0.08 (0.05)
Polygonum convolvulus/scandens	0.05 (0.04)	0.11 (0.07)	0.45 (0.32)	0.83 (0.69)
Potentilla simplex/canadensis	0.07 (0.04)	0.06 (0.03)	0.89 (0.57)	0.43 (0.22)
Prunus serotina	0.06 (0.05)	0.03 (0.03)	0.48 (0.29)	0.11 (0.11)
Quercus coccinea	0.17 (0.17)	0.00 (0.00)	1.70 (1.70)	0.00 (0.00)
Quercus ilicifolia	0.00 (0.00)	0.26 (0.26)	0.00 (0.00)	1.80 (1.80)
Quercus prinus	0.12 (0.05)	0.23 (0.12)	1.32 (0.62)	1.27 (0.75)
Quercus rubra	0.05 (0.03)	0.05 (0.04)	0.54 (0.36)	0.30 (0.22)
Quercus velutina	0.01 (0.01)	0.00 (0.00)	0.16 (0.16)	0.00 (0.00)
Rosa carolina	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.19 (0.19)
Rosa carolina/acicularis	0.01 (0.01)	0.00 (0.00)	0.09 (0.09)	0.00 (0.00)
Sassafras albidum	0.19 (0.18)	0.41 (0.30)	1.18 (0.79)	3.36 (1.68)
Saxifraga cf. *caroliniana*	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.17 (0.12)
Sedum ternatum	0.01 (0.01)	0.01 (0.01)	0.46 (0.46)	0.23 (0.23)
Smilacina racemosa	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.14 (0.11)
Solidago cf. *roanensis*	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	0.12 (0.12)
Sphenopholis nitida	0.03 (0.02)	0.00 (0.00)	0.65 (0.37)	0.00 (0.00)
Spiraea betulifolia var. *corymbosa*	0.01 (0.01)	0.01 (0.01)	0.03 (0.03)	0.04 (0.04)
UK *Asteraceae*	0.01 (0.01)	0.03 (0.02)	--	--
UK Dicot	0.01 (0.01)	0.01 (0.01)	--	--
UK *Poaceae*	0.02 (0.01)	0.04 (0.01)	--	--
Uvularia perfoliata	0.01 (0.01)	0.02 (0.02)	0.66 (0.55)	0.93 (0.93)
Vaccinium pallidum	1.88 (0.59)	3.54 (1.13)	19.49 (6.51)	19.24 (6.07)
Vaccinium stamineum	0.97 (0.59)	1.61 (1.01)	8.19 (4.85)	7.95 (4.74)
Vicia cf. *cracca/caroliniana*	0.07 (0.04)	0.35 (0.14)	1.30 (0.75)	2.64 (1.15)
Viola sororia	0.03 (0.02)	0.07 (0.04)	0.32 (0.18)	0.33 (0.15)
Vitis sp.	0.14 (0.09)	0.40 (0.12)	1.49 (0.70)	4.34 (1.65)
Misc. Uncommon Species	0.13 (0.05)	0.15 (0.05)	0.88 (0.37)	1.14 (0.43)
Total	9.92 (1.46)	16.37 (2.54)*	--	--

Table C8., continued.

DK, NE-U Section		Pre-burn (2003)	Post-burn (2004)
	H′	1.32 (0.17)	1.31 (0.13)
	J′	0.66 (0.06)	0.64 (0.03)
	S	7.53 (0.94)	8.33 (1.04)

Species	% Cover		Importance Value	
DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acalypha rhomboidea	0.03 (0.03)	0.00 (0.00)	0.43 (0.43)	0.00 (0.00)
Acalypha virginica	0.00 (0.00)	0.10 (0.10)	0.00 (0.00)	0.67 (0.67)
Acer pensylvanicum	0.38 (0.37)	0.32 (0.32)	3.83 (3.77)	1.55 (1.55)
Acer rubrum	0.33 (0.16)	0.16 (0.1)	2.68 (0.97)	2.18 (1.32)
Amelanchier arborea	0.20 (0.09)	0.18 (0.06)	1.88 (0.71)	1.79 (0.65)
Amphicarpaea bracteata	0.01 (0.01)	0.01 (0.01)	0.07 (0.07)	0.08 (0.08)
Antennaria plantaginifolia	0.12 (0.09)	0.12 (0.11)	1.16 (0.82)	0.45 (0.32)
Antennaria virginica	0.04 (0.03)	0.02 (0.01)	0.74 (0.56)	0.36 (0.26)
Arabis laevigata	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.20 (0.14)
Asplenium platyneuron	0.08 (0.04)	0.06 (0.03)	1.12 (0.66)	0.88 (0.47)
Aster cordifolius	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.08 (0.08)
Aster divaricatus/cordifolius	0.02 (0.01)	0.04 (0.03)	0.35 (0.28)	0.63 (0.58)
Carex laxiflora	0.04 (0.04)	0.10 (0.10)	0.79 (0.79)	0.63 (0.63)
Carex pensylvanica	0.00 (0.00)	0.07 (0.07)	0.00 (0.00)	0.23 (0.23)
Carex pensylvanica/lucorum	0.41 (0.18)	0.36 (0.15)	6.82 (3.39)	5.82 (2.75)
Carex sp.	0.02 (0.01)	0.00 (0.00)	0.30 (0.16)	0.00 (0.00)
Carex sp. (Laxiflorae)	0.08 (0.08)	0.01 (0.01)	0.83 (0.83)	0.21 (0.14)
Carex willdenowii	0.01 (0.01)	0.04 (0.04)	0.14 (0.14)	0.25 (0.25)
Carya spp.	0.23 (0.08)	0.30 (0.11)	2.18 (0.80)	3.20 (1.32)
Ceanothus americanus	0.00 (0.00)	0.05 (0.03)	0.00 (0.00)	0.62 (0.37)
cf. *Festuca subverticillata*	0.04 (0.04)	0.00 (0.00)	--	--
cf. *Helianthus sp.*	0.00 (0.00)	0.01 (0.01)	--	--
cf. *Panicum sp.*	0.00 (0.00)	0.03 (0.03)	--	--
cf. *Poa sylvestris*	0.03 (0.03)	0.03 (0.03)	--	--
cf. *Solidago roanensis*	0.00 (0.00)	0.01 (0.01)	--	--
cf. UK *Asteraceae*	0.10 (0.10)	0.00 (0.00)	--	--
Chimaphila maculata	0.01 (0.01)	0.03 (0.02)	0.32 (0.32)	0.51 (0.24)
Crataegus spp.	0.03 (0.03)	0.03 (0.02)	0.16 (0.16)	0.34 (0.17)
Danthonia spicata	0.25 (0.23)	0.24 (0.23)	1.07 (0.89)	0.89 (0.73)
Deschampsia flexuosa	0.12 (0.10)	0.16 (0.14)	2.11 (1.86)	2.22 (2.03)
Dioscorea quaternata/villosa	0.01 (0.01)	0.01 (0.01)	0.15 (0.15)	0.31 (0.31)
Dryopteris marginalis	0.10 (0.10)	0.36 (0.36)	0.77 (0.77)	1.57 (1.57)
Elymus histrix	0.03 (0.03)	0.02 (0.01)	0.20 (0.20)	0.06 (0.05)
Erechtites hieraciifolia	0.03 (0.02)	0.06 (0.03)	0.59 (0.36)	0.48 (0.20)

Table C8., continued.

Species	% Cover		Importance Value	
DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)	DK, SW-L Section	Pre-burn (2003)
Eupatorium rugosum	0.13 (0.12)	0.69 (0.58)	1.06 (0.84)	3.01 (2.02)
Festuca arundinacea	0.15 (0.15)	0.26 (0.26)	0.62 (0.62)	0.71 (0.71)
Festuca subverticillata	0.00 (0.00)	0.13 (0.13)	0.00 (0.00)	0.84 (0.84)
Galium lanceolatum	0.01 (0.01)	0.03 (0.03)	0.13 (0.13)	0.46 (0.46)
Galium triflorum	0.03 (0.03)	0.32 (0.32)	0.19 (0.19)	1.08 (1.08)
Gaylussacia baccata	0.28 (0.28)	0.11 (0.11)	0.69 (0.69)	0.93 (0.93)
Hamamelis virginiana	0.03 (0.03)	0.01 (0.01)	0.35 (0.24)	0.23 (0.23)
Hedeoma pulegioides	0.42 (0.42)	0.49 (0.49)	1.09 (1.09)	1.30 (1.30)
Hedyotis longifolia	0.01 (0.01)	0.01 (0.01)	0.13 (0.13)	0.24 (0.16)
Hedyotis nutalliana	0.02 (0.01)	0.01 (0.01)	0.18 (0.12)	0.04 (0.04)
Lespedeza procumbens	0.01 (0.01)	0.03 (0.03)	0.14 (0.14)	0.26 (0.26)
Nyssa sylvatica	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.17 (0.17)
Ostrya virginiana	0.30 (0.23)	0.22 (0.22)	4.67 (2.97)	1.29 (1.29)
Panicum boscii	0.33 (0.33)	0.11 (0.11)	2.42 (2.42)	1.93 (1.93)
Panicum commutatum	0.00 (0.00)	0.05 (0.04)	0.00 (0.00)	0.17 (0.13)
Panicum depauperatum	0.24 (0.22)	0.01 (0.01)	1.24 (0.79)	0.03 (0.03)
Panicum depauperatum/linearifolium	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.19 (0.13)
Panicum linearifolium	0.03 (0.03)	0.04 (0.02)	0.40 (0.40)	0.37 (0.2)
Panicum sp.	0.06 (0.04)	0.02 (0.02)	0.38 (0.25)	0.24 (0.24)
Paronychia canadensis	0.10 (0.10)	0.01 (0.01)	0.82 (0.82)	0.02 (0.02)
Pinus pungens	0.03 (0.03)	0.00 (0.00)	0.33 (0.33)	0.00 (0.00)
Pinus spp.	0.06 (0.03)	0.01 (0.01)	2.41 (2.07)	0.05 (0.05)
Pinus virginiana	1.11 (1.11)	0.00 (0.00)	3.62 (3.62)	0.00 (0.00)
Polygonatum biflorum	0.03 (0.02)	0.02 (0.01)	0.27 (0.18)	0.39 (0.26)
Polygonum convolvulus/scandens	0.06 (0.05)	0.03 (0.02)	0.60 (0.41)	0.32 (0.23)
Potentilla simplex/canadensis	0.19 (0.12)	0.63 (0.53)	1.36 (0.74)	2.66 (1.61)
Prenanthes alba	0.01 (0.01)	0.01 (0.01)	0.20 (0.20)	0.25 (0.25)
Prenanthes sp.	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.31 (0.31)
Prunus serotina	0.01 (0.01)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)
Quercus ilicifolia	0.05 (0.04)	0.12 (0.07)	0.18 (0.12)	3.43 (2.73)
Quercus prinus	0.02 (0.02)	0.02 (0.02)	0.34 (0.34)	0.40 (0.40)
Quercus rubra	0.03 (0.03)	0.07 (0.06)	0.77 (0.77)	0.76 (0.67)
Quercus velutina	0.07 (0.05)	0.04 (0.04)	0.98 (0.75)	1.19 (1.19)
Robinia psuedoacacia	0.01 (0.01)	0.24 (0.24)	0.10 (0.10)	4.90 (4.79)
Rubus cf. *flagellaris/recurvicaulis/enslensii*	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.76 (0.76)
Rubus sp.	0.01 (0.01)	0.00 (0.00)	0.20 (0.20)	0.00 (0.00)
Sassafras albidum	0.01 (0.01)	0.02 (0.01)	0.07 (0.07)	0.30 (0.20)
Saxifraga cf. *caroliniana*	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.39 (0.23)
Sedum ternatum	0.01 (0.01)	0.01 (0.01)	0.05 (0.05)	0.05 (0.05)
Silene stellata	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.10 (0.10)

Table C8., continued.

Species	% Cover		Importance Value	
DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Pre-burn (2003)
Smilacina racemosa	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.07 (0.07)
Smilax rotundifolia	0.41 (0.39)	0.32 (0.27)	2.12 (2.01)	1.41 (1.10)
Solidago caesia	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.48 (0.48)
Taenidia integerrima	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.20 (0.15)
UK *Asteraceae*	0.01 (0.01)	0.00 (0.00)	--	--
UK Dicot	0.03 (0.01)	0.01 (0.01)	--	--
UK *Poaceae*	0.03 (0.01)	0.04 (0.02)	--	--
Vaccinium pallidum	3.31 (1.19)	3.66 (1.16)	32.88 (8.03)	30.02 (8.43)
Vaccinium stamineum	0.59 (0.34)	0.79 (0.45)	5.39 (2.66)	5.47 (3.07)
Verbascum sp.	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.16 (0.12)
Viburnum prunifolium	0.01 (0.01)	0.03 (0.03)	0.31 (0.31)	0.34 (0.34)
Vicia cf. *cracca/caroliniana*	0.02 (0.01)	0.03 (0.02)	0.28 (0.15)	0.36 (0.23)
Viola sororia	0.02 (0.01)	0.03 (0.02)	0.34 (0.23)	0.50 (0.26)
Vitis sp.	0.21 (0.14)	0.14 (0.03)	2.57 (1.74)	2.95 (1.29)
Misc. Uncommon Species	0.10 (0.02)	0.08 (0.02)	1.21 (0.51)	2.06 (1.32)
Total	11.34 (2.73)	12.13 (2.37)	--	--
		H′	1.22 (0.16)	1.28 (0.18)
		J′	0.66 (0.05)	0.63 (0.05)
		S	6.58 (0.83)	7.89 (1.22)

DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Post-burn (2004)
Acalypha virginica	0.08 (0.08)	0.14 (0.13)	1.04 (1.04)	0.76 (0.73)
Acer pensylvanicum	0.28 (0.11)	0.18 (0.12)	8.20 (3.58)	2.19 (1.61)
Ailanthus altissima	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.21 (0.15)
Allium cf. *cernuum*	0.01 (0.01)	0.01 (0.01)	0.18 (0.12)	0.20 (0.17)
Ambrosia artemisiifolia	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.25 (0.25)
Amelanchier arborea	0.08 (0.04)	0.06 (0.04)	1.61 (0.90)	0.62 (0.38)
Amphicarpaea bracteata	0.04 (0.03)	0.16 (0.11)	0.74 (0.40)	1.44 (0.96)
Anemonella thalictroides	0.01 (0.01)	0.01 (0.01)	0.08 (0.08)	0.04 (0.04)
Antennaria plantaginifolia	0.03 (0.02)	0.02 (0.01)	0.47 (0.32)	0.18 (0.11)
Antennaria virginica	0.03 (0.03)	0.02 (0.01)	0.43 (0.43)	1.01 (0.75)
Asplenium platyneuron	0.01 (0.01)	0.01 (0.01)	0.11 (0.11)	0.33 (0.33)
Aster divaricatus/cordifolius	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.60 (0.40)
Aureolaria virginica	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.44 (0.44)
Bromus cf. *latiglumis*	0.06 (0.06)	0.00 (0.00)	0.65 (0.65)	0.00 (0.00)
Bromus pubescens	0.06 (0.06)	0.26 (0.26)	0.73 (0.73)	0.83 (0.83)
Carex cephalophora	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.05 (0.05)
Carex cf. *digitalis*	0.01 (0.01)	0.00 (0.00)	0.25 (0.17)	0.00 (0.00)
Carex cf. *laxiflora*	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.04 (0.04)
Carex pensylvanica/lucorum	0.47 (0.26)	0.24 (0.11)	8.35 (5.07)	8.75 (6.69)

Table C8., continued.

Species	% Cover		Importance Value	
DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Pre-burn (2003)
Carex sp.	0.04 (0.01)	0.00 (0.00)	1.31 (0.89)	0.00 (0.00)
Carex sp. (Laxiflorae)	0.01 (0.01)	0.03 (0.02)	0.11 (0.08)	0.29 (0.21)
Carex sp. (Montanae)	0.01 (0.01)	0.02 (0.01)	0.30 (0.30)	0.37 (0.25)
Carex willdenowii	0.01 (0.01)	0.01 (0.01)	0.33 (0.33)	0.26 (0.26)
Carya spp.	0.15 (0.06)	0.54 (0.25)	1.18 (0.40)	2.83 (1.41)
Ceanothus americanus	0.00 (0.00)	0.12 (0.04)	0.00 (0.00)	1.56 (0.55)
cf. *Bromus pubescens*	0.00 (0.00)	0.04 (0.03)	--	--
cf. *Helianthus sp.*	0.00 (0.00)	0.05 (0.02)	--	--
cf. *Poa sylvestris*	0.00 (0.00)	0.01 (0.01)	--	--
cf. *Rubus sp.*	0.00 (0.00)	0.01 (0.01)	--	--
cf. *Scutellaria serrata*	0.00 (0.00)	0.25 (0.25)	--	--
cf. *Senecio obovatus*	0.01 (0.01)	0.00 (0.00)	--	--
cf. *Solidago rugosa/canadensis*	0.02 (0.02)	0.00 (0.00)	--	--
cf. UK *Asteraceae*	0.01 (0.01)	0.00 (0.00)	--	--
Chimaphila maculata	0.03 (0.02)	0.04 (0.02)	0.22 (0.14)	0.76 (0.34)
Conopholis americana	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)	1.11 (1.11)
Crataegus spp.	0.01 (0.01)	0.05 (0.04)	0.03 (0.03)	0.29 (0.25)
Danthonia sp.	0.00 (0.00)	0.04 (0.03)	0.00 (0.00)	0.45 (0.32)
Danthonia spicata	0.03 (0.02)	0.01 (0.01)	1.38 (1.03)	0.26 (0.26)
Deschampsia flexuosa	0.01 (0.01)	0.00 (0.00)	0.21 (0.21)	0.00 (0.00)
Dioscorea quaternata/villosa	0.03 (0.03)	0.01 (0.01)	0.09 (0.09)	0.19 (0.15)
Dryopteris marginalis	0.01 (0.01)	0.06 (0.06)	0.14 (0.14)	0.58 (0.58)
Erechtites hieraciifolia	0.01 (0.01)	0.23 (0.09)	0.40 (0.28)	3.69 (0.98)
Eupatorium rugosum	0.08 (0.05)	1.25 (0.76)	1.43 (0.70)	3.93 (1.74)
Galium circaezans	0.03 (0.02)	0.01 (0.01)	0.95 (0.83)	0.01 (0.01)
Galium lanceolatum	0.01 (0.01)	0.06 (0.03)	0.23 (0.16)	1.61 (0.94)
Galium triflorum	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.15 (0.15)
Hamamelis virginiana	0.18 (0.15)	0.08 (0.08)	2.38 (1.69)	0.71 (0.71)
Hedeoma pulegioides	0.01 (0.01)	0.05 (0.03)	0.23 (0.16)	0.43 (0.18)
Hedyotis longifolia	0.03 (0.02)	0.01 (0.01)	0.91 (0.40)	0.39 (0.28)
Hieracium venosum	0.01 (0.01)	0.01 (0.01)	0.10 (0.10)	0.03 (0.03)
Lespedeza procumbens	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.13 (0.10)
Ostrya virginiana	0.29 (0.17)	0.12 (0.08)	5.39 (3.11)	1.45 (1.06)
Panicum boscii	0.17 (0.17)	0.18 (0.12)	2.08 (2.08)	0.91 (0.66)
Panicum sp.	0.02 (0.01)	0.01 (0.01)	0.45 (0.36)	0.06 (0.04)
Paronychia canadensis	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.13 (0.13)
Paronychia fastigiata	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.27 (0.26)
Parthenocissus quinquefolia	0.01 (0.01)	0.06 (0.06)	0.25 (0.25)	0.44 (0.44)
Phlox subulata	0.02 (0.02)	0.01 (0.01)	0.32 (0.32)	0.39 (0.39)
Phytolacca americana	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)	0.44 (0.44)
Pinus pungens	0.04 (0.04)	0.00 (0.00)	0.62 (0.62)	0.00 (0.00)

Table C8., continued.

Species	% Cover		Importance Value	
DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)	Pre-burn (2003)	Pre-burn (2003)
Pinus spp.	0.03 (0.02)	0.01 (0.01)	1.37 (1.12)	0.13 (0.13)
Poa compressa	0.02 (0.01)	0.05 (0.03)	0.36 (0.24)	0.81 (0.49)
Polygonatum biflorum	0.01 (0.01)	0.01 (0.01)	0.46 (0.35)	0.01 (0.01)
Polygonum convolvulus/scandens	0.10 (0.06)	0.39 (0.21)	2.11 (1.09)	1.99 (1.10)
Potentilla simplex/canadensis	0.04 (0.02)	0.06 (0.03)	0.69 (0.40)	1.30 (0.77)
Prenanthes alba	0.01 (0.01)	0.06 (0.06)	0.16 (0.16)	1.20 (1.20)
Quercus ilicifolia	0.79 (0.60)	0.90 (0.62)	4.73 (3.36)	5.59 (3.06)
Quercus prinus	0.35 (0.13)	1.51 (1.31)	5.34 (1.95)	4.66 (2.42)
Quercus rubra	0.09 (0.04)	0.31 (0.30)	1.28 (0.59)	1.55 (1.15)
Quercus velutina	0.06 (0.05)	0.07 (0.07)	0.70 (0.51)	0.31 (0.31)
Rhus aromatica	0.01 (0.01)	0.01 (0.01)	0.09 (0.09)	0.05 (0.05)
Robinia psuedoacacia	0.01 (0.01)	0.35 (0.19)	0.69 (0.69)	1.91 (0.99)
Rosa carolina	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.07 (0.07)
Rosa carolina/acicularis	0.03 (0.02)	0.08 (0.08)	0.32 (0.24)	0.31 (0.31)
Sassafras albidum	0.03 (0.02)	0.10 (0.08)	0.62 (0.47)	0.75 (0.48)
Saxifraga cf. *caroliniana*	0.01 (0.01)	0.04 (0.02)	0.06 (0.06)	0.34 (0.18)
Smilax rotundifolia	0.03 (0.03)	0.08 (0.08)	0.79 (0.79)	0.50 (0.50)
Solidago caesia	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.20 (0.15)
Solidago cf. *curtisii*	0.01 (0.01)	0.00 (0.00)	0.18 (0.18)	0.00 (0.00)
Solidago rugosa/canadensis	0.03 (0.03)	0.00 (0.00)	0.23 (0.23)	0.00 (0.00)
UK *Asteraceae*	0.00 (0.00)	0.09 (0.07)	--	--
UK Dicot	0.01 (0.01)	0.04 (0.02)	--	--
UK *Poaceae*	0.04 (0.04)	0.01 (0.01)	--	--
Uvularia sessilifolia	0.01 (0.01)	0.01 (0.01)	0.46 (0.32)	0.19 (0.19)
Vaccinium pallidum	1.77 (0.74)	2.03 (0.83)	17.07 (5.18)	14.97 (5.11)
Vaccinium stamineum	2.75 (1.05)	2.75 (1.19)	14.58 (5.08)	11.43 (5.03)
Verbascum sp.	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.09 (0.07)
Vicia cf. *cracca/caroliniana*	0.12 (0.09)	0.46 (0.25)	1.69 (0.89)	4.10 (2.25)
Viola sororia	0.00 (0.00)	0.06 (0.02)	0.00 (0.00)	0.34 (0.15)
Vitis sp.	0.04 (0.02)	0.22 (0.06)	0.84 (0.36)	3.74 (1.11)
Misc. Uncommon Species	0.11 (0.01)	0.11 (0.02)	1.32 (0.33)	1.39 (0.26)
Total	9.04 (1.06)	14.72 (2.46)*	--	--
		H′	1.21 (0.08)	1.41 (0.15)
		J′	0.66 (0.03)	0.67 (0.05)
		S	6.25 (0.51)	8.42 (0.95)*

Table C8., continued.

Heavener Mountain				
Species	% Cover		Importance Value	
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acalypha virginica	0.00 (0.00)	0.56 (0.55)	0.00 (0.00)	0.94 (0.84)
Acer pensylvanicum	0.01 (0.01)	0.04 (0.03)	0.12 (0.12)	0.47 (0.47)
Acer rubrum	0.29 (0.10)	0.47 (0.17)	9.97 (3.32)	9.69 (3.97)
Amelanchier arborea	0.01 (0.01)	0.01 (0.01)	0.37 (0.25)	0.18 (0.12)
Amphicarpaea bracteata	0.02 (0.01)	0.03 (0.02)	0.67 (0.55)	0.84 (0.72)
Arabis canadensis	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.28 (0.28)
Asplenium platyneuron	0.02 (0.02)	0.06 (0.06)	0.52 (0.52)	0.60 (0.60)
Aster cf. *schreberi*	0.03 (0.03)	0.00 (0.00)	1.35 (1.35)	0.00 (0.00)
Aster sp.	0.01 (0.01)	0.00 (0.00)	0.37 (0.37)	0.00 (0.00)
Aster undulatus	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	0.31 (0.31)
Carex digitalis	0.04 (0.04)	0.01 (0.01)	0.91 (0.91)	0.12 (0.12)
Carex laxiflora	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.25 (0.25)
Carex pensylvanica/lucorum	0.06 (0.03)	0.15 (0.12)	2.16 (1.49)	0.76 (0.42)
Carex sp.	0.01 (0.01)	0.00 (0.00)	0.37 (0.37)	0.00 (0.00)
Carex sp. (Laxiflorae)	0.03 (0.02)	0.13 (0.08)	0.83 (0.35)	2.01 (1.05)
Carex willdenowii	0.00 (0.00)	0.05 (0.03)	0.00 (0.00)	0.76 (0.50)
Carya spp.	0.03 (0.02)	0.24 (0.11)	0.70 (0.45)	4.01 (1.81)
Ceanothus americanus	0.01 (0.01)	0.02 (0.01)	0.49 (0.33)	0.47 (0.41)
cf. *Crepis/Prenanthes sp.*	0.02 (0.01)	0.00 (0.00)	--	--
cf. *Poa sylvestris*	0.01 (0.01)	0.00 (0.00)	--	--
cf. *Prenanthes serpentaria*	0.00 (0.00)	0.04 (0.03)	--	--
Chimaphila maculata	0.05 (0.03)	0.09 (0.03)	2.01 (1.44)	1.84 (1.14)
Danthonia compressa	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.02 (0.02)
Danthonia spicata	0.00 (0.00)	0.12 (0.10)	0.00 (0.00)	0.29 (0.26)
Dennstaedtia punctilobula	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)	0.11 (0.11)
Deschampsia flexuosa	0.02 (0.01)	0.11 (0.07)	0.18 (0.15)	0.21 (0.14)
Dioscorea quaternata/villosa	0.06 (0.04)	0.05 (0.03)	1.92 (1.37)	0.63 (0.36)
Dryopteris intermedia	0.04 (0.04)	0.01 (0.01)	2.22 (2.22)	0.87 (0.87)
Erechtites hieraciifolia	0.10 (0.03)	1.78 (1.16)	2.73 (0.95)	5.99 (3.16)
Eupatorium rugosum	0.12 (0.06)	1.15 (0.91)	4.01 (2.43)	9.35 (7.63)
Festuca subverticillata	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.08 (0.08)
Fraxinus americana	0.07 (0.07)	0.06 (0.06)	1.39 (1.39)	0.51 (0.51)
Galium circaezans	0.04 (0.02)	0.08 (0.05)	1.08 (0.70)	0.53 (0.29)
Galium concinnum	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.13 (0.13)
Hamamelis virginiana	0.02 (0.01)	0.11 (0.08)	0.92 (0.83)	1.14 (0.76)
Hedeoma pulegioides	0.01 (0.01)	0.56 (0.56)	0.12 (0.12)	0.85 (0.85)
Hedyotis longifolia	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	1.12 (0.66)
Hieracium sp.	0.02 (0.01)	0.01 (0.01)	0.24 (0.17)	0.03 (0.03)

Table C8., continued.

Species	% Cover		Importance Value	
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hypoxis hirsuta	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.51 (0.51)
Lespedeza procumbens	0.01 (0.01)	0.01 (0.01)	0.40 (0.40)	0.59 (0.55)
Liriodendron tulipifera	0.10 (0.05)	0.10 (0.05)	4.78 (2.56)	1.01 (0.63)
Nyssa sylvatica	0.02 (0.02)	0.17 (0.14)	0.52 (0.52)	3.66 (2.12)
Panicum boscii	0.01 (0.01)	0.19 (0.11)	0.12 (0.12)	2.02 (1.09)
Panicum commutatum	0.00 (0.00)	0.24 (0.24)	0.00 (0.00)	1.51 (1.27)
Panicum depauperatum/linearifolium	0.06 (0.05)	0.00 (0.00)	0.78 (0.70)	0.00 (0.00)
Panicum linearifolium	0.00 (0.00)	0.72 (0.69)	0.00 (0.00)	1.30 (1.24)
Panicum sp.	0.14 (0.07)	0.01 (0.01)	3.93 (1.98)	0.34 (0.34)
Paronychia canadensis	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.02 (0.02)
Paronychia fastigiata	0.04 (0.04)	0.06 (0.06)	0.72 (0.72)	0.09 (0.09)
Pinus pungens	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.04 (0.03)
Pinus spp.	0.02 (0.02)	0.00 (0.00)	0.48 (0.48)	0.00 (0.00)
Pinus virginiana	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.04 (0.04)
Polygonatum biflorum	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.48 (0.32)
Polygonum convolvulus/scandens	0.02 (0.01)	0.02 (0.01)	0.46 (0.31)	0.14 (0.09)
Potentilla simplex/canadensis	0.01 (0.01)	0.04 (0.03)	0.03 (0.03)	0.12 (0.08)
Prenanthes alba	0.01 (0.01)	0.03 (0.02)	0.34 (0.34)	0.59 (0.44)
Prenanthes sp.	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	1.39 (0.92)
Prunus serotina	0.01 (0.01)	0.02 (0.02)	0.21 (0.21)	0.52 (0.52)
Quercus ilicifolia	0.06 (0.06)	0.18 (0.14)	0.38 (0.38)	0.35 (0.27)
Quercus prinus	0.01 (0.01)	0.04 (0.03)	0.44 (0.39)	0.42 (0.25)
Quercus rubra	0.13 (0.08)	0.07 (0.05)	2.03 (1.48)	0.48 (0.40)
Quercus velutina	0.02 (0.01)	0.01 (0.01)	0.67 (0.43)	0.43 (0.43)
Rosa carolina	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.65 (0.55)
Rosa carolina/acicularis	0.03 (0.03)	0.00 (0.00)	0.36 (0.36)	0.00 (0.00)
Rubus sp.	0.01 (0.01)	0.05 (0.03)	0.14 (0.14)	0.39 (0.20)
Sassafras albidum	0.19 (0.09)	0.29 (0.12)	5.86 (2.35)	5.32 (2.01)
Saxifraga cf. *caroliniana*	0.01 (0.01)	0.01 (0.01)	0.21 (0.21)	0.14 (0.14)
Smilacina racemosa	0.01 (0.01)	0.03 (0.02)	0.23 (0.23)	0.68 (0.48)
Smilax rotundifolia	0.03 (0.02)	0.06 (0.06)	0.74 (0.50)	0.51 (0.51)
UK *Asteraceae*	0.03 (0.03)	0.00 (0.00)	--	--
UK *Poaceae*	0.04 (0.02)	0.04 (0.01)	--	--
Uvularia perfoliata	0.01 (0.01)	0.01 (0.01)	0.34 (0.34)	0.64 (0.45)
Uvularia sessilifolia	0.02 (0.01)	0.01 (0.01)	1.02 (0.74)	0.23 (0.23)
Vaccinium pallidum	1.37 (0.86)	3.22 (1.96)	18.26 (7.20)	16.75 (4.34)
Vaccinium stamineum	0.19 (0.13)	0.23 (0.16)	3.33 (1.86)	1.64 (1.13)
Verbascum sp.	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.07 (0.05)
Vicia cf. *cracca/caroliniana*	0.02 (0.01)	0.06 (0.04)	0.42 (0.32)	0.46 (0.26)
Viola sororia	0.09 (0.05)	0.14 (0.05)	2.42 (1.43)	3.53 (1.24)

Table C8., continued.

Species	% Cover		Importance Value	
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Viola sp.	0.02 (0.02)	0.00 (0.00)	0.76 (0.76)	0.00 (0.00)
Vitis sp.	0.32 (0.09)	0.24 (0.04)	12.71 (2.84)	6.25 (2.28)
Misc. Uncommon Species	0.04 (0.02)	0.09 (0.01)	1.27 (0.92)	1.32 (0.84)
Total	4.23 (0.85)	12.70 (4.97)	--	--
		H′	1.48 (0.10)	1.52 (0.10)
		J′	0.81 (0.05)	0.75 (0.05)
		S	6.47 (0.42)	7.97 (0.58)*

HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer pensylvanicum	0.92 (0.69)	0.88 (0.68)	12.98 (7.81)	12.48 (8.42)
Acer rubrum	0.13 (0.07)	0.31 (0.19)	0.87 (0.46)	1.84 (0.93)
Amelanchier arborea	0.01 (0.01)	0.03 (0.03)	0.02 (0.02)	0.09 (0.09)
Amphicarpaea bracteata	0.04 (0.04)	0.10 (0.10)	0.15 (0.15)	0.32 (0.31)
Asclepias quadrifolia	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	0.03 (0.03)
Asplenium platyneuron	0.02 (0.02)	0.01 (0.01)	0.35 (0.35)	0.15 (0.15)
Aster undulatus	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.04 (0.04)
Campanula divaricata	0.03 (0.03)	0.01 (0.01)	0.10 (0.10)	0.03 (0.03)
Carex cephalophora	0.03 (0.03)	0.49 (0.49)	0.30 (0.30)	0.73 (0.73)
Carex pensylvanica/lucorum	0.01 (0.01)	0.15 (0.11)	0.05 (0.05)	0.54 (0.43)
Carex sp.	0.02 (0.01)	0.00 (0.00)	0.30 (0.17)	0.00 (0.00)
Carex sp. (Montanae)	0.03 (0.02)	0.00 (0.00)	0.44 (0.27)	0.00 (0.00)
Carya spp.	0.19 (0.14)	1.27 (0.92)	1.01 (0.75)	2.72 (1.66)
Ceanothus americanus	0.00 (0.00)	0.07 (0.04)	0.00 (0.00)	0.25 (0.12)
cf. *Andropogon virginicus*	0.00 (0.00)	0.39 (0.39)	--	--
cf. *Aralia nudicaulis*	0.04 (0.04)	0.02 (0.02)	--	--
cf. *Bromus ciliatus*	0.00 (0.00)	0.04 (0.04)	--	--
cf. *Ceanothus americanus*	0.03 (0.02)	0.00 (0.00)	--	--
Chimaphila maculata	0.01 (0.01)	0.03 (0.01)	0.06 (0.06)	0.12 (0.05)
Danthonia spicata	0.00 (0.00)	0.12 (0.12)	0.00 (0.00)	0.23 (0.23)
Dioscorea quaternata/villosa	0.10 (0.07)	0.07 (0.04)	0.76 (0.50)	1.50 (1.04)
Erechtites hieraciifolia	0.10 (0.05)	1.65 (0.90)	3.70 (1.74)	4.60 (2.32)
Eupatorium rugosum	0.18 (0.17)	1.30 (0.87)	2.71 (2.24)	4.68 (3.71)
Festuca subverticillata	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.06 (0.04)
Galium concinnum	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.51 (0.51)
Gaylussacia baccata	1.22 (0.55)	2.44 (0.95)	7.97 (3.79)	6.49 (2.35)
Hamamelis virginiana	0.31 (0.23)	0.09 (0.05)	4.39 (2.88)	1.69 (1.04)
Hedyotis longifolia	0.01 (0.01)	0.01 (0.01)	0.16 (0.16)	0.25 (0.25)
Hieracium venosum	0.01 (0.01)	0.05 (0.04)	0.04 (0.04)	0.21 (0.17)

Table C8., continued.

Species	% Cover		Importance Value	
HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Kalmia latifolia	0.00 (0.00)	0.13 (0.08)	0.00 (0.00)	0.86 (0.77)
Lespedeza procumbens	0.01 (0.01)	0.06 (0.02)	0.06 (0.06)	0.18 (0.07)
Liriodendron tulipifera	0.01 (0.01)	0.00 (0.00)	0.09 (0.06)	0.00 (0.00)
Melampyrum lineare	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.07 (0.07)
Nyssa sylvatica	0.03 (0.03)	0.51 (0.50)	1.78 (1.78)	3.52 (3.45)
Ostrya virginiana	0.03 (0.02)	0.07 (0.06)	0.33 (0.25)	0.82 (0.56)
Panicum boscii	0.45 (0.38)	0.67 (0.46)	2.12 (1.48)	1.43 (0.96)
Panicum commutatum	0.00 (0.00)	0.58 (0.52)	0.00 (0.00)	1.33 (1.10)
Panicum depauperatum	0.03 (0.03)	0.02 (0.01)	0.10 (0.10)	0.15 (0.13)
Panicum depauperatum/linearifolium	0.13 (0.08)	0.00 (0.00)	0.70 (0.35)	0.00 (0.00)
Panicum linearifolium	0.00 (0.00)	0.42 (0.34)	0.00 (0.00)	0.93 (0.69)
Panicum sp.	0.03 (0.02)	0.01 (0.01)	0.28 (0.12)	0.10 (0.10)
Paronychia fastigiata	0.01 (0.01)	0.01 (0.01)	0.19 (0.19)	0.01 (0.01)
Phytolacca americana	0.00 (0.00)	0.05 (0.04)	0.00 (0.00)	0.17 (0.13)
Polygonum convolvulus/scandens	0.04 (0.03)	0.01 (0.01)	0.17 (0.12)	0.02 (0.02)
Potentilla simplex/canadensis	0.01 (0.01)	0.10 (0.10)	0.14 (0.14)	0.16 (0.12)
Quercus alba	0.00 (0.00)	1.13 (0.80)	0.00 (0.00)	1.61 (1.07)
Quercus prinus	0.24 (0.11)	1.85 (1.40)	2.31 (1.27)	3.37 (2.39)
Quercus rubra	0.05 (0.03)	0.03 (0.03)	0.35 (0.23)	0.19 (0.19)
Quercus velutina	0.24 (0.24)	0.00 (0.00)	2.12 (2.05)	0.00 (0.00)
Robinia psuedoacacia	0.26 (0.18)	0.57 (0.43)	2.02 (1.33)	1.45 (0.97)
Rosa carolina	0.00 (0.00)	0.05 (0.04)	0.00 (0.00)	0.27 (0.21)
Rosa carolina/acicularis	0.01 (0.01)	0.00 (0.00)	0.16 (0.16)	0.00 (0.00)
Sassafras albidum	0.25 (0.15)	0.62 (0.31)	2.49 (1.66)	1.70 (0.77)
Saxifraga cf. *caroliniana*	0.08 (0.07)	0.09 (0.08)	1.69 (1.63)	1.53 (1.51)
Scutellaria ovata	0.01 (0.01)	0.04 (0.04)	0.02 (0.02)	0.13 (0.13)
Smilacina racemosa	0.01 (0.01)	0.01 (0.01)	0.09 (0.09)	0.06 (0.06)
Smilax rotundifolia	0.28 (0.28)	0.21 (0.21)	1.92 (1.92)	1.17 (1.17)
Sphenopholis nitida	0.00 (0.00)	0.04 (0.03)	0.00 (0.00)	0.52 (0.50)
Spiraea betulifolia var. *corymbosa*	0.05 (0.05)	0.02 (0.02)	0.78 (0.78)	0.16 (0.16)
UK Dicot	0.01 (0.01)	0.01 (0.01)	--	--
UK *Poaceae*	0.03 (0.02)	0.00 (0.00)	--	--
Vaccinium pallidum	3.13 (0.81)	5.49 (1.22)	24.07 (6.08)	22.33 (6.83)
Vaccinium stamineum	1.53 (0.81)	2.58 (1.32)	9.97 (4.71)	10.08 (4.79)
Vicia cf. *cracca/caroliniana*	0.17 (0.11)	1.56 (1.06)	1.32 (0.88)	3.48 (1.80)
Viola sororia	0.06 (0.06)	0.17 (0.12)	0.62 (0.55)	0.47 (0.39)
Vitis sp.	0.37 (0.15)	0.56 (0.25)	7.61 (2.78)	1.80 (0.64)
Misc. Uncommon Species	0.05 (0.02)	0.09 (0.02)	0.16 (0.07)	0.35 (0.13)
Total	11.06 (1.11)	27.38 (6.18)*	--	--
		H'	1.01 (0.08)	1.13 (0.11)

Table C8., continued.

HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	One Year Post-burn (2003)
		J′	0.63 (0.03)	0.60 (0.04)
		S	5.53 (0.53)	7.11 (0.83)*

Species	% Cover		Importance Value	
HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acalypha rhomboidea	0.00 (0.00)	0.78 (0.78)	0.00 (0.00)	0.91 (0.91)
Acer pensylvanicum	0.01 (0.01)	0.07 (0.07)	0.35 (0.35)	0.26 (0.26)
Acer rubrum	0.19 (0.11)	0.38 (0.32)	5.55 (2.41)	1.99 (0.96)
Amelanchier arborea	0.07 (0.03)	0.24 (0.13)	1.64 (0.96)	0.93 (0.40)
Amphicarpaea bracteata	0.06 (0.04)	0.19 (0.10)	2.08 (1.84)	1.76 (0.87)
Anemonella thalictroides	0.03 (0.02)	0.02 (0.01)	0.60 (0.41)	0.17 (0.13)
Arabis laevigata	0.01 (0.01)	0.11 (0.11)	0.35 (0.35)	1.43 (1.33)
Asclepias quadrifolia	0.01 (0.01)	0.01 (0.01)	0.28 (0.28)	0.22 (0.22)
Asplenium platyneuron	0.06 (0.03)	0.10 (0.05)	1.25 (0.56)	0.67 (0.31)
Aster undulatus	0.01 (0.01)	0.01 (0.01)	0.13 (0.13)	0.08 (0.08)
Betula alleghaniensis	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)	0.37 (0.37)
Brachyelytrum erectum	0.11 (0.11)	0.04 (0.04)	2.21 (2.21)	0.76 (0.76)
Bromus cf. *latiglumis*	0.01 (0.01)	0.00 (0.00)	0.22 (0.22)	0.00 (0.00)
Bromus japonicus	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	0.33 (0.33)
Bromus pubescens	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.06 (0.06)
Cardamine parviflora	0.11 (0.11)	0.00 (0.00)	1.85 (1.85)	0.00 (0.00)
Carex cephalophora	0.18 (0.17)	0.03 (0.02)	1.56 (1.36)	0.24 (0.19)
Carex cf. *communis*	0.01 (0.01)	0.03 (0.03)	0.31 (0.31)	0.37 (0.37)
Carex cf. *laxiflora*	0.01 (0.01)	0.03 (0.03)	0.26 (0.26)	0.28 (0.28)
Carex cf. *swanii/virescens/aestivalis*	0.11 (0.11)	0.00 (0.00)	1.31 (1.31)	0.00 (0.00)
Carex complanata var. *hirsuta*	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.43 (0.43)
Carex digitalis	0.02 (0.02)	0.00 (0.00)	0.47 (0.47)	0.00 (0.00)
Carex pensylvanica	0.06 (0.03)	0.00 (0.00)	2.82 (2.22)	0.00 (0.00)
Carex pensylvanica/lucorum	0.00 (0.00)	0.16 (0.09)	0.00 (0.00)	1.10 (0.48)
Carex sp.	0.01 (0.01)	0.00 (0.00)	0.62 (0.62)	0.00 (0.00)
Carex sp. (Laxiflorae)	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.28 (0.19)
Carex willdenowii	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.19 (0.19)
Carya spp.	0.05 (0.03)	0.11 (0.05)	1.93 (1.14)	0.94 (0.49)
Ceanothus americanus	0.00 (0.00)	0.10 (0.05)	0.00 (0.00)	0.97 (0.57)
Cercis canadensis	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.08 (0.08)
cf. *Agrostis perennans*	0.03 (0.03)	0.00 (0.00)	--	--
cf. *Bromus pubescens*	0.00 (0.00)	0.01 (0.01)	--	--
cf. *Cercis canadensis*	0.01 (0.01)	0.00 (0.00)	--	--
cf. *Erechtites hieraciifolia*	0.03 (0.02)	0.00 (0.00)	--	--

Table C8., continued.

Species	% Cover		Importance Value	
HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
cf. *Festuca subverticillata*	0.20 (0.12)	0.00 (0.00)	--	--
cf. *Helianthus sp.*	0.00 (0.00)	0.07 (0.07)	--	--
cf. *Poa sylvestris*	0.00 (0.00)	0.10 (0.09)	--	--
cf. *Saxifraga caroliniana*	0.00 (0.00)	0.03 (0.03)	--	--
cf. *Senecio anonymus*	0.00 (0.00)	0.02 (0.02)	--	--
Chimaphila maculata	0.00 (0.00)	0.05 (0.02)	0.00 (0.00)	0.65 (0.33)
Cornus florida	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.33 (0.31)
Crataegus spp.	0.01 (0.01)	0.02 (0.02)	0.23 (0.23)	0.07 (0.07)
Danthonia spicata	0.01 (0.01)	0.07 (0.04)	0.56 (0.56)	0.29 (0.18)
Deschampsia flexuosa	0.02 (0.01)	0.01 (0.01)	0.23 (0.16)	0.08 (0.08)
Dioscorea quaternata/villosa	0.02 (0.01)	0.03 (0.02)	0.37 (0.29)	0.37 (0.25)
Draba ramosissima	0.00 (0.00)	0.10 (0.10)	0.00 (0.00)	2.09 (2.09)
Erechtites hieraciifolia	0.07 (0.04)	0.47 (0.26)	2.22 (1.01)	2.13 (0.93)
Eupatorium rugosum	0.11 (0.07)	1.35 (0.69)	2.33 (1.40)	5.90 (2.93)
Festuca subverticillata	0.00 (0.00)	0.08 (0.04)	0.00 (0.00)	0.50 (0.25)
Galium circaezans	0.02 (0.01)	0.02 (0.01)	0.31 (0.24)	0.17 (0.13)
Gaylussacia baccata	0.29 (0.29)	0.51 (0.51)	3.18 (3.18)	1.12 (1.12)
Hamamelis virginiana	0.19 (0.14)	0.62 (0.57)	4.57 (3.19)	2.91 (2.24)
Hedeoma pulegioides	0.00 (0.00)	0.14 (0.14)	0.00 (0.00)	0.16 (0.16)
Hedyotis longifolia	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.18 (0.16)
Hedyotis nutalliana	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.13 (0.10)
Hepatica americana	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.27 (0.25)
Hieracium cf. *traillii*	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.08 (0.08)
Kalmia latifolia	0.01 (0.01)	0.10 (0.10)	0.08 (0.08)	0.28 (0.28)
Lespedeza procumbens	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.16 (0.14)
Liriodendron tulipifera	0.00 (0.00)	0.09 (0.07)	0.00 (0.00)	1.42 (1.09)
Nyssa sylvatica	0.00 (0.00)	0.11 (0.10)	0.00 (0.00)	3.16 (2.28)
Ostrya virginiana	0.05 (0.05)	0.02 (0.02)	2.06 (2.06)	0.98 (0.98)
Panicum boscii	0.34 (0.23)	0.76 (0.54)	3.27 (2.40)	4.02 (2.83)
Panicum commutatum	0.00 (0.00)	0.85 (0.84)	0.00 (0.00)	1.05 (0.99)
Panicum linearifolium	0.00 (0.00)	0.72 (0.71)	0.00 (0.00)	1.98 (1.97)
Panicum sp.	0.13 (0.08)	0.02 (0.01)	2.61 (1.55)	0.17 (0.15)
Paronychia canadensis	0.11 (0.11)	0.00 (0.00)	1.46 (1.46)	0.00 (0.00)
Paronychia fastigiata	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.28 (0.24)
Phytolacca americana	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.69 (0.69)
Pinus spp.	0.06 (0.03)	0.00 (0.00)	1.19 (0.63)	0.00 (0.00)
Pinus virginiana	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.35 (0.22)
Polygonatum biflorum	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.94 (0.66)
Polygonum convolvulus/scandens	0.03 (0.02)	0.02 (0.02)	0.77 (0.65)	0.31 (0.31)
Polystichum acrostichoides	0.04 (0.04)	0.06 (0.06)	0.52 (0.52)	0.21 (0.21)

Table C8., continued.

Species	% Cover		Importance Value	
HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Populus grandidentata	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.18 (0.18)
Potentilla simplex/canadensis	0.04 (0.03)	0.29 (0.22)	0.54 (0.44)	0.90 (0.61)
Prenanthes alba	0.01 (0.01)	0.01 (0.01)	0.08 (0.08)	0.25 (0.25)
Quercus ilicifolia	0.42 (0.35)	1.31 (0.79)	2.96 (2.31)	4.47 (2.72)
Quercus prinus	0.03 (0.02)	0.04 (0.03)	0.76 (0.51)	0.61 (0.55)
Robinia psuedoacacia	0.01 (0.01)	0.03 (0.03)	1.39 (1.39)	0.65 (0.65)
Rubus cf. *idaeus*	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)	0.46 (0.46)
Rubus sp.	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.07 (0.06)
Sassafras albidum	0.01 (0.01)	0.06 (0.04)	0.19 (0.19)	1.38 (0.93)
Saxifraga cf. *caroliniana*	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.28 (0.15)
Scutellaria ovata	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.25 (0.25)
Sedum ternatum	0.00 (0.00)	0.07 (0.07)	0.00 (0.00)	0.40 (0.40)
Smilax rotundifolia	0.01 (0.01)	0.17 (0.12)	0.93 (0.93)	1.39 (0.86)
Solidago sp.	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.19 (0.19)
Sorghastrum nutans	0.00 (0.00)	0.07 (0.07)	0.00 (0.00)	0.14 (0.14)
Tephrosia virginiana	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.07 (0.07)
Triodanis perfoliata	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.04 (0.04)
UK Dicot	0.00 (0.00)	0.02 (0.01)	--	--
Uvularia perfoliata	0.01 (0.01)	0.02 (0.01)	0.08 (0.08)	0.11 (0.09)
Uvularia sessilifolia	0.02 (0.01)	0.01 (0.01)	1.31 (0.87)	0.40 (0.40)
Vaccinium pallidum	2.17 (0.99)	5.19 (2.14)	26.95 (7.73)	26.42 (9.46)
Vaccinium stamineum	0.19 (0.09)	0.73 (0.28)	2.05 (1.12)	5.33 (2.59)
Verbascum sp.	0.22 (0.22)	0.44 (0.43)	1.11 (1.11)	1.27 (1.22)
Vicia cf. *cracca/caroliniana*	0.17 (0.17)	0.19 (0.19)	1.27 (1.27)	0.58 (0.58)
Viola sororia	0.01 (0.01)	0.10 (0.05)	0.37 (0.37)	0.96 (0.53)
Vitis sp.	0.18 (0.07)	0.19 (0.08)	5.47 (1.73)	2.66 (1.06)
Misc. Uncommon Species	0.08 (0.02)	0.19 (0.04)	2.81 (1.95)	2.28 (1.21)
Total	6.52 (1.02)	18.71 (4.65)*	--	--
		H'	1.24 (0.09)	1.40 (0.18)
		J'	0.77 (0.04)	0.65 (0.07)*
		S	5.58 (0.38)	9.28 (1.43)*

HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acalypha virginica	0.00 (0.00)	0.33 (0.22)	0.00 (0.00)	1.03 (0.72)
Allium cf. *cernuum*	0.01 (0.01)	0.01 (0.01)	0.40 (0.40)	0.03 (0.02)
Amelanchier arborea	0.01 (0.01)	0.08 (0.06)	0.23 (0.23)	0.29 (0.24)
Anemonella thalictroides	0.01 (0.01)	0.01 (0.01)	0.07 (0.07)	0.05 (0.05)
Antennaria plantaginifolia	0.03 (0.03)	0.10 (0.10)	0.37 (0.37)	0.86 (0.86)

Table C8., continued.

Species	% Cover		Importance Value	
HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Antennaria sp.	0.01 (0.01)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)
Arabis laevigata	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.11 (0.07)
Asclepias quadrifolia	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.20 (0.20)
Asplenium platyneuron	0.07 (0.04)	0.03 (0.02)	1.04 (0.54)	0.43 (0.23)
Aster divaricatus/cordifolius	0.01 (0.01)	0.02 (0.02)	0.07 (0.07)	0.08 (0.08)
Aster undulatus	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.05 (0.05)
Bromus pubescens	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	0.05 (0.05)
Carex cephalophora	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.11 (0.06)
Carex cf. *communis*	0.03 (0.03)	0.00 (0.00)	0.27 (0.27)	0.00 (0.00)
Carex lucorum	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	0.13 (0.13)
Carex pensylvanica	0.13 (0.13)	0.43 (0.43)	1.71 (1.71)	8.52 (8.52)
Carex pensylvanica/lucorum	0.51 (0.32)	1.59 (1.13)	8.84 (6.80)	5.50 (3.49)
Carex sp.	0.02 (0.01)	0.00 (0.00)	0.64 (0.41)	0.00 (0.00)
Carex sp. (Laxiflorae)	0.02 (0.02)	0.05 (0.03)	0.21 (0.21)	0.52 (0.29)
Carya spp.	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.27 (0.14)
Ceanothus americanus	0.00 (0.00)	0.13 (0.08)	0.00 (0.00)	0.62 (0.33)
cf. *Agrostis perennans*	0.04 (0.04)	0.00 (0.00)	--	--
cf. *Bromus ciliatus*	0.03 (0.03)	0.00 (0.00)	--	--
cf. *Poa sylvestris*	0.07 (0.07)	0.08 (0.08)	--	--
cf. *Solidago puberula*	0.00 (0.00)	0.01 (0.01)	--	--
Chimaphila maculata	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.24 (0.12)
Crataegus spp.	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)
Cunila origanoides	0.01 (0.01)	0.03 (0.03)	0.12 (0.12)	0.12 (0.12)
Danthonia sp.	0.02 (0.01)	0.01 (0.01)	0.52 (0.46)	0.03 (0.03)
Danthonia spicata	0.01 (0.01)	0.16 (0.06)	0.79 (0.79)	1.39 (0.61)
Dennstaedtia punctilobula	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.03 (0.02)
Deschampsia flexuosa	0.01 (0.01)	0.01 (0.01)	0.14 (0.14)	0.10 (0.10)
Dioscorea quaternata/villosa	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.13 (0.13)
Dryopteris cf. *intermedia*	0.01 (0.01)	0.00 (0.00)	0.23 (0.23)	0.00 (0.00)
Dryopteris marginalis	0.15 (0.15)	0.00 (0.00)	1.83 (1.83)	0.00 (0.00)
Elymus histrix	0.00 (0.00)	0.07 (0.07)	0.00 (0.00)	0.15 (0.15)
Erechtites hieraciifolia	0.14 (0.07)	1.38 (0.63)	2.05 (0.79)	4.48 (1.78)
Eupatorium purpureum	0.05 (0.03)	0.00 (0.00)	0.54 (0.33)	0.00 (0.00)
Eupatorium rugosum	0.01 (0.01)	0.31 (0.22)	0.07 (0.07)	1.73 (1.39)
Gaylussacia baccata	0.17 (0.09)	0.43 (0.23)	1.89 (1.10)	2.42 (1.27)
Gnaphalium purpureum	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.03 (0.03)
Hamamelis virginiana	0.03 (0.03)	0.26 (0.25)	0.70 (0.58)	1.91 (1.81)
Hedyotis longifolia	0.21 (0.15)	0.05 (0.02)	2.26 (1.16)	0.36 (0.17)
Hedyotis nutalliana	0.01 (0.01)	0.08 (0.07)	0.40 (0.40)	1.20 (1.15)
Heuchera americana	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.22 (0.13)

Table C8., continued.

Species	% Cover		Importance Value	
HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
Hieracium cf. *caespitosum/floribundum*	0.00 (0.00)	0.09 (0.09)	0.00 (0.00)	1.49 (1.49)
Hieracium sp.	0.01 (0.01)	0.00 (0.00)	0.26 (0.26)	0.00 (0.00)
Hieracium traillii	0.04 (0.04)	0.00 (0.00)	0.99 (0.99)	0.00 (0.00)
Hieracium venosum	0.03 (0.02)	0.04 (0.03)	0.27 (0.21)	0.13 (0.09)
Kalmia latifolia	0.04 (0.04)	0.29 (0.29)	2.47 (2.47)	3.31 (3.31)
Lespedeza procumbens	0.01 (0.01)	0.02 (0.01)	0.14 (0.14)	0.08 (0.07)
Nyssa sylvatica	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)	0.33 (0.33)
Ostrya virginiana	0.18 (0.17)	0.58 (0.55)	1.74 (1.49)	2.66 (2.42)
Panicum boscii	0.07 (0.07)	0.06 (0.06)	0.69 (0.69)	0.24 (0.24)
Panicum commutatum	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.07 (0.04)
Panicum linearifolium	0.00 (0.00)	0.99 (0.66)	0.00 (0.00)	3.57 (1.91)
Panicum sp.	0.10 (0.02)	0.00 (0.00)	1.62 (0.43)	0.00 (0.00)
Paronychia canadensis	0.03 (0.03)	0.00 (0.00)	1.51 (1.51)	0.00 (0.00)
Paronychia fastigiata	0.10 (0.10)	0.50 (0.24)	1.34 (1.34)	1.71 (0.75)
Phlox buckleyi	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.05 (0.05)
Phytolacca americana	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.25 (0.25)
Pinus pungens	0.00 (0.00)	0.03 (0.02)	0.00 (0.00)	0.12 (0.11)
Pinus spp.	0.03 (0.02)	0.01 (0.01)	0.97 (0.67)	0.04 (0.04)
Pinus virginiana	0.00 (0.00)	0.03 (0.01)	0.00 (0.00)	0.29 (0.13)
Polygonatum biflorum	0.02 (0.01)	0.04 (0.03)	0.49 (0.29)	0.30 (0.17)
Polygonum convolvulus/scandens	0.13 (0.07)	0.03 (0.02)	1.24 (0.71)	0.13 (0.07)
Populus grandidentata	0.00 (0.00)	0.06 (0.04)	0.00 (0.00)	0.15 (0.12)
Potentilla simplex/canadensis	0.01 (0.01)	0.10 (0.07)	0.14 (0.14)	0.64 (0.49)
Quercus coccinea	0.00 (0.00)	0.13 (0.13)	0.00 (0.00)	1.43 (1.43)
Quercus ilicifolia	0.63 (0.39)	1.46 (0.97)	8.77 (3.96)	5.46 (3.62)
Quercus prinus	0.06 (0.03)	0.06 (0.04)	0.52 (0.21)	0.14 (0.10)
Quercus rubra	0.03 (0.03)	0.22 (0.14)	0.09 (0.09)	0.73 (0.40)
Quercus velutina	0.06 (0.04)	0.29 (0.16)	1.27 (0.85)	0.83 (0.47)
Robinia psuedoacacia	0.01 (0.01)	0.24 (0.24)	0.41 (0.41)	1.39 (1.39)
Rosa carolina	0.00 (0.00)	0.02 (0.01)	0.00 (0.00)	0.16 (0.13)
Rosa carolina/acicularis	0.31 (0.29)	0.00 (0.00)	1.62 (1.47)	0.00 (0.00)
Sassafras albidum	0.02 (0.01)	0.03 (0.02)	0.84 (0.55)	0.19 (0.13)
Scutellaria ovata	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.07 (0.07)
Sedum ternatum	0.03 (0.03)	0.05 (0.04)	0.34 (0.27)	0.29 (0.26)
Smilacina racemosa	0.01 (0.01)	0.03 (0.03)	0.37 (0.37)	0.18 (0.18)
Solidago caesia	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)	0.38 (0.38)
Sphenopholis nitida	0.00 (0.00)	0.05 (0.03)	0.00 (0.00)	0.30 (0.16)
Spiraea betulifolia var. *corymbosa*	0.01 (0.01)	0.08 (0.08)	0.21 (0.21)	0.40 (0.40)
UK *Asteraceae*	0.03 (0.02)	0.01 (0.01)	--	--
UK Dicot	0.01 (0.01)	0.01 (0.01)	--	--

Table C8., continued.

Species	% Cover		Importance Value	
HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)	One Year Post-burn (2003)	Two Years Post-burn (2004)
UK *Poaceae*	0.01 (0.01)	0.03 (0.02)	--	--
Uvularia sessilifolia	0.01 (0.01)	0.00 (0.00)	0.30 (0.28)	0.00 (0.00)
Vaccinium pallidum	3.51 (1.07)	6.81 (1.74)	34.57 (5.88)	28.47 (5.79)
Vaccinium stamineum	0.33 (0.20)	1.88 (1.14)	5.98 (3.41)	5.78 (3.20)
Verbascum sp.	0.00 (0.00)	0.08 (0.07)	0.00 (0.00)	0.28 (0.25)
Vicia cf. *cracca/caroliniana*	0.01 (0.01)	0.11 (0.07)	0.12 (0.12)	0.50 (0.36)
Viola sororia	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.03 (0.03)
Vitis sp.	0.13 (0.03)	0.27 (0.14)	3.43 (1.16)	1.46 (0.60)
Woodsia obtusa	0.00 (0.00)	0.22 (0.22)	0.00 (0.00)	1.85 (1.85)
Misc. Uncommon Species	0.10 (0.03)	0.10 (0.04)	1.84 (1.10)	0.66 (0.27)
Total	7.92 (1.23)	21.19 (2.89)*	--	--
		H′	1.09 (0.11)	1.16 (0.10)
		J′	0.64 (0.04)	0.58 (0.02)
		S	5.58 (0.55)	8.19 (1.04)*

Brushy Knob		
Species	% Cover	Importance Value
BK, NE-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	0.14 (0.10)	3.75 (3.14)
Acer rubrum	0.32 (0.15)	2.92 (1.64)
Amelanchier arborea	0.14 (0.08)	0.73 (0.37)
Antennaria plantaginifolia	0.11 (0.07)	0.92 (0.57)
Asclepias quadrifolia	0.03 (0.03)	0.74 (0.74)
Asplenium platyneuron	0.14 (0.08)	2.23 (1.41)
Aureolaria laevigata	0.02 (0.01)	0.04 (0.03)
Carex pensylvanica/lucorum	0.07 (0.02)	1.04 (0.41)
Carex sp. (Laxiflorae)	0.03 (0.02)	0.53 (0.35)
Carya spp.	0.26 (0.11)	1.48 (0.82)
Ceanothus americanus	0.01 (0.01)	0.25 (0.17)
cf. *Bromus sp.*	0.26 (0.23)	--
cf. *Silphium trifoliatum/Parthenium integrifolium*	0.19 (0.19)	--
Chimaphila maculata	0.08 (0.03)	0.78 (0.34)
Cornus florida	1.81 (1.81)	2.24 (2.24)
Crataegus spp.	0.06 (0.06)	0.16 (0.16)
Cunila origanoides	0.18 (0.10)	2.34 (1.52)
Danthonia spicata	0.08 (0.06)	1.67 (1.28)
Deschampsia flexuosa	0.04 (0.04)	0.69 (0.69)
Dioscorea quaternata/villosa	0.09 (0.06)	1.22 (0.91)

Table C8., continued.

Species	% Cover	Importance Value
BK, NE-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Dryopteris marginalis	0.18 (0.13)	2.18 (2.02)
Epigaea repens	0.11 (0.11)	0.20 (0.20)
Eupatorium rugosum	0.02 (0.01)	0.30 (0.27)
Galium circaezans	0.02 (0.02)	0.42 (0.42)
Gaultheria procumbens	0.05 (0.04)	0.17 (0.12)
Gaylussacia baccata	1.28 (0.73)	4.18 (2.59)
Hamamelis virginiana	1.19 (1.05)	6.87 (3.98)
Hedyotis longifolia	0.06 (0.05)	0.97 (0.80)
Hepatica americana	0.02 (0.01)	0.20 (0.18)
Kalmia latifolia	1.93 (1.61)	4.63 (3.37)
Lespedeza cf. *intermedia/violacea*	0.02 (0.02)	0.08 (0.08)
Lespedeza procumbens	0.01 (0.01)	0.27 (0.20)
Panicum depauperatum	0.03 (0.02)	0.13 (0.08)
Paronychia canadensis	0.01 (0.01)	0.29 (0.29)
Pinus pungens	0.03 (0.01)	0.33 (0.20)
Pinus spp.	0.02 (0.01)	0.29 (0.20)
Polygonatum biflorum	0.07 (0.06)	0.35 (0.24)
Polygonum convolvulus/scandens	0.05 (0.04)	1.05 (0.89)
Potentilla simplex/canadensis	0.04 (0.03)	0.53 (0.49)
Prunus serotina	0.03 (0.03)	0.11 (0.11)
Pteridium aquilinum	0.08 (0.08)	0.15 (0.15)
Quercus coccinea	0.01 (0.01)	0.09 (0.09)
Quercus ilicifolia	2.73 (1.60)	6.30 (3.74)
Quercus prinus	3.37 (2.40)	6.83 (2.66)
Quercus rubra	0.03 (0.03)	0.39 (0.30)
Saxifraga cf. *caroliniana*	0.03 (0.02)	0.54 (0.37)
Smilacina racemosa	0.03 (0.03)	0.36 (0.31)
Smilax rotundifolia	0.13 (0.09)	0.75 (0.50)
UK *Poaceae*	0.03 (0.02)	--
Vaccinium pallidum	7.13 (2.33)	27.10 (4.64)
Vaccinium stamineum	1.66 (0.76)	5.61 (1.49)
Vicia cf. *cracca/caroliniana*	0.05 (0.02)	0.68 (0.39)
Viola sororia	0.03 (0.02)	0.35 (0.24)
Vitis sp.	0.09 (0.04)	0.86 (0.35)
Misc. Uncommon Species	0.17 (0.06)	2.71 (1.26)
Total	24.81 (5.78)	--
	H'	1.26 (0.11)
	J'	0.67 (0.04)
	S	6.86 (0.64)

Table C8., continued.

Species	% Cover	Importance Value
BK, NE-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	2.16 (1.39)	6.77 (3.90)
Acer rubrum	0.48 (0.25)	1.51 (0.85)
Amelanchier arborea	0.06 (0.03)	0.34 (0.23)
Antennaria plantaginifolia	0.02 (0.01)	0.07 (0.05)
Asclepias quadrifolia	0.01 (0.01)	0.04 (0.04)
Aster divaricatus/cordifolius	0.02 (0.01)	0.07 (0.05)
Aster linariifolius	0.01 (0.01)	0.08 (0.08)
Aster undulatus	0.04 (0.04)	0.15 (0.15)
Bromus pubescens	0.01 (0.01)	0.10 (0.10)
Carex sp. (Laxiflorae)	0.10 (0.08)	2.17 (2.07)
Carya spp.	0.11 (0.08)	0.51 (0.35)
cf. *Bromus ciliatus*	0.11 (0.11)	--
Chimaphila maculata	0.06 (0.02)	0.70 (0.51)
Danthonia spicata	0.10 (0.04)	0.41 (0.20)
Deschampsia flexuosa	0.04 (0.04)	0.09 (0.09)
Dryopteris marginalis	0.01 (0.01)	0.07 (0.06)
Eupatorium rugosum	0.19 (0.10)	1.29 (0.53)
Gaultheria procumbens	0.05 (0.05)	0.22 (0.22)
Gaylussacia baccata	1.38 (0.99)	4.42 (3.19)
Hamamelis virginiana	0.50 (0.25)	1.87 (0.88)
Hedeoma pulegioides	0.28 (0.28)	2.29 (2.26)
Hedyotis longifolia	0.02 (0.01)	0.09 (0.05)
Hieracium sp.	0.01 (0.01)	0.04 (0.03)
Kalmia latifolia	1.51 (1.05)	3.65 (2.32)
Lespedeza procumbens	0.04 (0.04)	0.21 (0.21)
Melampyrum lineare	0.01 (0.01)	0.07 (0.05)
Panicum boscii	0.14 (0.12)	0.58 (0.52)
Panicum dichotomum	0.01 (0.01)	0.06 (0.04)
Panicum linearifolium	0.26 (0.13)	0.85 (0.43)
Paronychia canadensis	0.01 (0.01)	0.11 (0.11)
Parthenocissus quinquefolia	0.01 (0.01)	0.32 (0.30)
Polygonatum biflorum	0.02 (0.01)	0.09 (0.06)
Polygonum convolvulus/scandens	0.06 (0.06)	0.36 (0.36)
Potentilla simplex/canadensis	0.04 (0.02)	0.19 (0.08)
Pteridium aquilinum	0.06 (0.04)	0.16 (0.13)
Quercus alba	0.10 (0.10)	0.32 (0.32)
Quercus ilicifolia	1.62 (1.17)	4.92 (4.06)
Quercus prinus	0.63 (0.31)	4.39 (2.05)
Quercus rubra	0.02 (0.01)	0.12 (0.08)
Quercus velutina	0.35 (0.27)	1.50 (1.05)
Rhododendron cf. *periclymenoides*	0.03 (0.03)	0.04 (0.04)

Table C8., continued.

Species	% Cover	Importance Value
BK, NE-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Rosa carolina/acicularis	0.07 (0.04)	0.23 (0.12)
Sassafras albidum	0.13 (0.13)	0.83 (0.83)
Smilacina racemosa	0.02 (0.01)	0.04 (0.03)
Spiraea betulifolia var. *corymbosa*	0.04 (0.03)	0.17 (0.12)
UK *Poaceae*	0.01 (0.01)	--
Uvularia perfoliata	0.01 (0.01)	0.07 (0.05)
Uvularia sessilifolia	0.02 (0.01)	0.36 (0.30)
Vaccinium pallidum	10.19 (1.66)	39.04 (4.73)
Vaccinium stamineum	5.56 (1.88)	16.16 (5.67)
Vicia cf. *cracca/caroliniana*	0.03 (0.01)	0.14 (0.06)
Vitis sp.	0.06 (0.04)	0.47 (0.31)
Misc. Uncommon Species	0.17 (0.04)	1.22 (0.46)
Total	27.04 (3.10)	--
	H′	0.97 (0.09)
	J′	0.53 (0.04)
	S	6.67 (0.83)

BK, SW-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	0.01 (0.01)	0.13 (0.13)
Acer rubrum	0.15 (0.11)	1.14 (0.93)
Amphicarpaea bracteata	0.01 (0.01)	0.18 (0.18)
Antennaria plantaginifolia	0.24 (0.19)	2.05 (1.52)
Antennaria virginica	0.03 (0.03)	0.45 (0.36)
Asplenium platyneuron	0.08 (0.05)	3.90 (2.73)
Aster divaricatus/cordifolius	0.05 (0.05)	0.49 (0.49)
Aster sp.	0.01 (0.01)	0.17 (0.13)
Carex cf. *communis*	0.13 (0.13)	0.96 (0.96)
Carex pensylvanica/lucorum	0.60 (0.23)	10.22 (4.98)
Carex sp. (Laxiflorae)	0.05 (0.03)	0.39 (0.26)
Carya spp.	0.30 (0.21)	2.30 (1.71)
Ceanothus americanus	0.01 (0.01)	0.11 (0.08)
cf. *Campanula rapunculoides*	0.04 (0.04)	--
cf. *Festuca subverticillata*	0.02 (0.01)	--
cf. *Solidago sp.*	0.01 (0.01)	--
Chimaphila maculata	0.03 (0.02)	0.34 (0.18)
Cornus florida	0.33 (0.33)	0.61 (0.61)
Crataegus spp.	0.02 (0.01)	0.28 (0.25)
Cunila origanoides	0.10 (0.05)	1.13 (0.66)
Danthonia spicata	0.28 (0.12)	4.56 (1.71)
Dioscorea quaternata/villosa	0.09 (0.05)	0.58 (0.39)

Table C8., continued.

Species	% Cover	Importance Value
BK, SW-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Draba ramosissima	0.02 (0.02)	0.34 (0.34)
Erechtites hieraciifolia	0.02 (0.02)	0.87 (0.87)
Eupatorium rugosum	0.40 (0.23)	5.04 (3.10)
Galium circaezans	0.02 (0.01)	0.20 (0.13)
Gaylussacia baccata	0.54 (0.38)	2.62 (1.70)
Hamamelis virginiana	0.26 (0.13)	1.23 (0.85)
Hedeoma pulegioides	0.02 (0.01)	0.24 (0.16)
Hedyotis longifolia	0.02 (0.01)	0.23 (0.12)
Heuchera americana	0.02 (0.01)	0.22 (0.17)
Hieracium caespitosum/aurantiacum/traillii	0.04 (0.04)	1.94 (1.94)
Hieracium sp.	0.02 (0.01)	0.32 (0.23)
Hieracium venosum	0.01 (0.01)	0.25 (0.25)
Juncus tenuis	0.06 (0.06)	0.79 (0.79)
Kalmia latifolia	1.47 (1.40)	4.16 (3.48)
Lespedeza cf. *intermedia/violacea*	0.07 (0.05)	0.79 (0.71)
Lespedeza procumbens	0.01 (0.01)	0.81 (0.69)
Nyssa sylvatica	0.01 (0.01)	0.10 (0.07)
Ostrya virginiana	0.13 (0.13)	1.08 (1.08)
Panicum boscii	0.03 (0.03)	0.36 (0.36)
Panicum sp.	0.01 (0.01)	0.16 (0.11)
Paronychia fastigiata	0.09 (0.04)	2.15 (1.21)
Pinus pungens	0.01 (0.01)	0.18 (0.12)
Pinus spp.	0.06 (0.03)	1.59 (1.21)
Pinus virginiana	0.01 (0.01)	0.28 (0.28)
Polygonatum biflorum	0.03 (0.02)	0.30 (0.24)
Polygonum convolvulus/scandens	0.13 (0.11)	1.28 (1.04)
Potentilla simplex/canadensis	0.16 (0.09)	1.47 (0.67)
Quercus alba	0.13 (0.13)	0.60 (0.60)
Quercus ilicifolia	0.04 (0.04)	0.79 (0.79)
Quercus prinus	0.40 (0.33)	1.27 (0.76)
Quercus rubra	0.06 (0.04)	0.68 (0.53)
Quercus velutina	0.55 (0.50)	1.20 (1.05)
Sassafras albidum	0.17 (0.17)	0.58 (0.52)
Saxifraga cf. *caroliniana*	0.03 (0.02)	0.43 (0.19)
Scutellaria ovata	0.01 (0.01)	0.18 (0.12)
Sedum ternatum	0.06 (0.04)	0.43 (0.29)
Smilacina racemosa	0.01 (0.01)	0.04 (0.04)
Smilax rotundifolia	0.21 (0.21)	0.51 (0.51)
Solidago caesia	0.01 (0.01)	0.13 (0.13)
Solidago cf. *flexicaulis*	0.03 (0.03)	0.24 (0.24)
Tilia americana	0.01 (0.01)	0.24 (0.24)

Table C8., continued.

Species	% Cover	Importance Value
BK, SW-L Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
UK Dicot	0.03 (0.02)	--
UK *Poaceae*	0.05 (0.02)	--
Uvularia perfoliata	0.01 (0.01)	0.19 (0.13)
Vaccinium pallidum	4.94 (1.96)	21.17 (6.25)
Vaccinium stamineum	1.87 (1.13)	8.31 (4.01)
Viburnum acerifolium	0.04 (0.04)	0.11 (0.11)
Vicia cf. *cracca/caroliniana*	0.02 (0.02)	0.21 (0.21)
Viola sororia	0.05 (0.03)	0.51 (0.34)
Vitis sp.	0.03 (0.02)	0.45 (0.23)
Misc. Uncommon Species	0.16 (0.06)	2.74 (0.90)
Total	15.24 (4.14)	--
	H'	1.29 (0.13)
	J'	0.66 (0.04)
	S	7.28 (1.14)

BK, SW-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Acer pensylvanicum	1.48 (1.42)	9.57 (8.97)
Acer rubrum	0.12 (0.10)	1.11 (0.90)
Antennaria plantaginifolia	0.08 (0.07)	0.37 (0.30)
Antennaria virginica	0.10 (0.08)	0.63 (0.40)
Asplenium platyneuron	0.02 (0.01)	0.07 (0.06)
Carex pensylvanica/lucorum	0.87 (0.34)	10.60 (5.41)
Carex sp. (Laxiflorae)	0.04 (0.04)	0.18 (0.18)
Carya spp.	0.32 (0.27)	1.38 (1.03)
Ceanothus americanus	0.06 (0.06)	0.07 (0.07)
cf. *Senecio obovatus*	0.06 (0.06)	--
cf. *Solidago sp.*	0.03 (0.03)	--
Chimaphila maculata	0.04 (0.02)	0.30 (0.12)
Danthonia sp.	0.03 (0.03)	1.88 (1.88)
Danthonia spicata	0.22 (0.15)	5.01 (4.23)
Deschampsia flexuosa	0.07 (0.06)	0.31 (0.27)
Dryopteris marginalis	0.11 (0.08)	0.95 (0.77)
Erechtites hieraciifolia	0.03 (0.02)	0.44 (0.30)
Eupatorium rugosum	0.18 (0.11)	2.35 (1.68)
Gaylussacia baccata	2.13 (1.45)	5.69 (4.57)
Gnaphalium obtusifolium	0.01 (0.01)	0.28 (0.28)
Hamamelis virginiana	0.34 (0.22)	2.92 (1.90)
Hedeoma pulegioides	0.03 (0.02)	0.30 (0.23)
Hedyotis longifolia	0.01 (0.01)	0.20 (0.16)
Hedyotis longifolia/nutalliana	0.01 (0.01)	0.06 (0.06)

Table C8., continued.

Species	% Cover	Importance Value
BK, SW-U Section	12 Years Post-burn (2003)	12 Years Post-burn (2003)
Heuchera americana	0.04 (0.03)	0.42 (0.30)
Hieracium caespitosum/aurantiacum/traillii	0.02 (0.01)	0.26 (0.23)
Hieracium venosum	0.03 (0.03)	0.26 (0.26)
Panicum boscii	0.06 (0.06)	0.47 (0.39)
Panicum depauperatum/linearifolium	0.01 (0.01)	0.05 (0.05)
Panicum dichotomum	0.01 (0.01)	0.05 (0.05)
Paronychia fastigiata	0.08 (0.04)	2.09 (1.32)
Parthenocissus quinquefolia	0.01 (0.01)	0.08 (0.08)
Pinus pungens	0.08 (0.07)	0.62 (0.43)
Pinus spp.	0.06 (0.03)	1.48 (1.01)
Polygonatum biflorum	0.03 (0.03)	0.12 (0.08)
Polygonum convolvulus/scandens	0.06 (0.04)	0.66 (0.46)
Potentilla simplex/canadensis	0.15 (0.09)	0.67 (0.35)
Quercus ilicifolia	0.86 (0.80)	2.91 (2.56)
Quercus prinus	1.07 (0.53)	5.89 (3.38)
Quercus rubra	0.09 (0.08)	0.27 (0.23)
Quercus velutina	0.39 (0.32)	2.17 (1.69)
Robinia psuedoacacia	0.14 (0.09)	0.74 (0.49)
Sassafras albidum	0.01 (0.01)	0.08 (0.08)
Saxifraga cf. *caroliniana*	0.02 (0.01)	0.10 (0.07)
Scutellaria ovata	0.02 (0.02)	0.12 (0.12)
Smilax rotundifolia	0.24 (0.24)	2.43 (2.43)
Solidago caesia	0.01 (0.01)	0.21 (0.21)
Spiraea betulifolia var. *corymbosa*	0.04 (0.03)	0.09 (0.06)
UK *Poaceae*	0.01 (0.01)	--
Vaccinium pallidum	4.90 (1.64)	24.94 (8.87)
Vaccinium stamineum	1.42 (0.80)	4.44 (2.34)
Verbascum sp.	0.04 (0.03)	0.59 (0.49)
Viburnum acerifolium	0.06 (0.06)	0.07 (0.07)
Vitis sp.	0.06 (0.03)	0.86 (0.56)
Misc. Uncommon Species	0.11 (0.03)	2.16 (0.86)
Total	16.51 (3.45)	--
	H'	1.01 (0.14)
	J'	0.57 (0.07)
	S	5.94 (0.87)

Table C9. Uncommon herbaceous stratum species list. A species presence or absence in a particular year is denoted by "+" or a "—" respectively.

Dunkle Knob		
DK, NE-L Section	Pre-burn (2003)	Post-burn (2004)
Allium cf. *cernuum*	--	+
Asclepias quadrifolia	+	--
Carex sp. (Montanae)	--	+
cf. *Senecio aureus*	+	--
cf. *Senecio obovatus*	+	--
Cornus florida	--	+
Cunila origanoides	+	+
Danthonia sp.	--	+
Eupatorium rugosum	+	--
Festuca subverticillata	+	--
Hedyotis nutalliana	--	+
Heuchera americana	+	+
Monotropa uniflora	--	+
Pinus pungens	+	--
Polygonatum biflorum	+	+
Quercus sp.	+	--
Rhododendron cf. *periclymenoides*	--	+
Robinia psuedoacacia	--	+
Solidago sp.	+	--
UK *Asteraceae*	+	+

DK, NE-U Section	Pre-burn (2003)	Post-burn (2004)
Allium cf. *cernuum*	--	+
Arabis laevigata	--	+
Asclepias quadrifolia	--	+
Aureolaria laevigata	+	--
Bromus latiglumis	+	--
cf. *Asteraceae*	+	--
cf. *Bromus sp.*	+	--
cf. *Muhlenbergia schreberi/frondosa*	+	--
cf. *Parnassia sp.*	+	--
cf. *Poa compressa*	--	+
cf. *Poa/Agrostis*	--	+
cf. *Scutellaria serrata*	--	+
cf. *Senecio obovatus*	+	--
cf. *Veronica officinalis*	--	+
Danthonia compressa	+	--

Table C9., continued.

DK, NE-U Section, Continued	Pre-burn (2003)	Post-burn (2004)
Danthonia sp.	--	+
Epigaea repens	+	+
Hedyotis nutalliana	--	+
Hepatica americana	+	+
Hieracium caespitosum/aurantiacum/traillii	+	+
Panicum boscii	--	+
Parthenocissus quinquefolia	--	+
Poa cf. *trivialis*	+	--
Poa compressa	--	+
Polygonum scandens	+	--
Pyrola cf. *elliptica*	--	+
Rubus sp.	--	+
Smilax rotundifolia	+	--
Triodanis perfoliata	+	+
UK Fern	+	+
Uvularia sessilifolia	+	+
Verbascum sp.	+	+

DK, SW-L Section	Pre-burn (2003)	Post-burn (2004)
Ailanthus altissima	--	+
Allium cf. *cernuum*	+	+
Carex communis	--	+
cf. *Cerastium arvense*	+	--
Convolvulus sp.	+	--
Gnaphalium obtusifolium	+	--
Hedyotis cf. *caerulea*	+	--
Hepatica americana	+	+
Hieracium sp.	--	+
Paronychia fastigiata	--	+
Parthenocissus quinquefolia	+	+
Phlox subulata	+	+
Pinus rigida	+	--
Rosa carolina/acicularis	+	--
Sphenopholis nitida	--	+
UK *Aster/Solidago*	+	--
Uvularia sessilifolia	+	--
Viburnum cf. *prunifolium*	--	+
Viola pedata	+	+
Viola sp.	+	--

Table C9., continued.

DK, SW-U Section	Pre-burn (2003)	Post-burn (2004)
Acer rubrum	+	--
Arabis laevigata	--	+
Aster divaricatus	+	--
Aster sp.	+	--
Bromus ciliatus	--	+
cf. *Aster divaricatus/cordifolius*	+	--
cf. *Ceanothus americanus*	+	--
cf. *Festuca subverticillata*	+	+
cf. *Lathyrus tuberosus*	--	+
cf. *Lonicera japonica*	--	+
cf. *Lonicera* x *bella*	+	--
cf. UK *Lamiaceae*	--	+
Draba ramosissima	+	--
Elymus histrix	+	+
Galium cf. *concinnum*	+	--
Heuchera americana	--	+
Panicum depauperatum	+	--
Panicum depauperatum/linearifolium	--	+
Panicum linearifolium	--	+
Poa cf. *compressa*	+	--
Prenanthes sp.	--	+
Quercus sp.	+	+
Sedum ternatum	--	+
Smilacina racemosa	--	+
Triodanis perfoliata	+	--
Uvularia perfoliata	--	+
Viburnum acerifolium	+	--
Viola pedata	--	+
Viola sp.	+	--

Heavener Mountain		
HM, NE-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)
Carex cephalophora	+	--
Carex pensylvanica	--	+
cf. *Actaea sp.*	+	--
cf. *Aristolochia serpentaria/macrophylla*	--	+
cf. *Cimicifuga racemosa*	--	+
cf. *Cirsium sp.*	--	+
cf. *Conyza canadensis*	--	+

Table C9., continued.

HM, NE-L Section, Continued	One Year Post-burn (2003)	Two Years Post-burn (2004)
cf. *Poa compressa*	--	+
cf. *Senecio obovatus*	+	--
cf. *Solidago roanensis*	--	+
Gaultheria procumbens	--	+
Hepatica americana	+	+
Parthenocissus quinquefolia	--	+
Poa sylvestris	--	+
Quercus sp.	--	+
Rhus aromatica	--	+
Robinia psuedoacacia	+	--
UK Monocot	+	--

HM, NE-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer saccharum	--	+
Ailanthus altissima	--	+
Allium cf. *cernuum*	+	--
Antennaria plantaginifolia	--	+
Aristolochia serpentaria	--	+
Betula lenta	--	+
Carex communis	--	+
Carex digitalis	--	+
cf. *Campanula divaricata*	+	--
cf. *Conyza canadensis*	--	+
cf. *Poa sylvestris*	+	+
cf. *Senecio obovatus*	+	--
Menziesia pilosa	--	+
Pinus spp.	+	--
Poa sylvestris	--	+
Quercus coccinea	--	+
Quercus sp.	+	--
Taenidia integerrima	--	+
Triodanis perfoliata	+	--

HM, SW-L Section	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer saccharum	--	+
Ambrosia artemisiifolia	--	+
Antennaria virginica	+	+
Arabis canadensis	--	+
Aster cordifolius	--	+
Aster divaricatus	--	+

Table C9., continued.

HM, SW-L Section, Continued	One Year Post-burn (2003)	Two Years Post-burn (2004)
Aster divaricatus/cordifolius	--	+
Aster sp.	+	--
Aureolaria laevigata	--	+
Carex laxiflora	--	+
cf. *Conyza canadensis*	--	+
cf. *Prenanthes sp.*	--	+
cf. *Solidago puberula*	--	+
Convolvulus sp.	--	+
Danthonia compressa	--	+
Dennstaedtia punctilobula	--	+
Dryopteris intermedia	+	--
Dryopteris marginalis	--	+
Eupatorium purpureum	+	--
Gaultheria procumbens	+	+
Hedyotis longifolia/nutalliana	+	+
Hieracium caespitosum/aurantiacum/traillii	+	--
Mitchella repens	+	+
Parthenocissus quinquefolia	+	+
Pinus pungens	--	+
Pinus rigida	--	+
Pinus strobus	+	--
Pycnanthemum pycnanthemoides	--	+
Quercus rubra	+	--
UK Fern	--	+
Veronica officinalis	--	+
Viburnum cf. *prunifolium*	+	--
Vicia cracca	--	+
Woodsia obtusa	--	+

HM, SW-U Section	One Year Post-burn (2003)	Two Years Post-burn (2004)
Acer pensylvanicum	+	+
Allium sp.	+	--
Ambrosia artemisiifolia	--	+
Amphicarpaea bracteata	+	+
Arabis canadensis	--	+
Aster sp.	+	--
Bromus japonicus	--	+
Carex cf. *laxiflora*	+	--
cf. *Arabis glabra*	--	+
cf. *Rubus sp.*	+	--
cf. *Senecio anonymus*	--	+

Table C9., continued.

HM, SW-U Section, Continued	One Year Post-burn (2003)	Two Years Post-burn (2004)
Danthonia compressa	--	+
Draba ramosissima	--	+
Galium lanceolatum	+	+
Hepatica americana	+	+
Krigia biflora	+	--
Lactuca sp.	+	--
Monotropa uniflora	--	+
Panicum cf. *depauperatum*	+	--
Rubus sp.	--	+
Saxifraga cf. *caroliniana*	+	+
Saxifraga virginiensis	--	+
Solidago cf. *curtisii*	+	--
Viola sp.	+	--

Brushy Knob
BK, NE-L Section, 12 Years Post-burn (2003)
Anemonella thalictroides
Aster divaricatus
Carex sp.
cf. *Agrostis perennans*
cf. *Bromus ciliatus*
cf. *Lysimachia sp.*
cf. *Rubus sp.*
Dryopteris carthusiana
Festuca subverticillata
Hedyotis longifolia/nutalliana
Nyssa sylvatica
Ostrya virginiana
Panicum boscii
Panicum linearifolium
Paronychia fastigiata
Prenanthes alba
Rhododendron sp.
Rosa carolina/acicularis
Sedum ternatum
Sphenopholis nitida
Triodanis perfoliata
UK Dicot
Uvularia perfoliata
Uvularia sessilifolia

Table C9., continued.

BK, NE-U Section, 12 Years Post-burn (2003)
Allium cf. *cernuum*
Amphicarpaea bracteata
Aureolaria laevigata
Carex pensylvanica/lucorum
Ceanothus americanus
cf. *Bromus pubescens*
Crataegus spp.
Cunila origanoides
Dennstaedtia punctilobula
Erechtites hieraciifolia
Festuca subverticillata
Galium circaezans
Hedyotis longifolia/nutalliana
Juncus tenuis
Pinus rigida
Pinus spp.
Rhododendron sp.
Robinia psuedoacacia
Saxifraga cf. *caroliniana*
Sedum ternatum
Solidago sp.
Taenidia integerrima
Verbascum sp.
Viola pedata
Viola sororia

BK, SW-L Section, 12 Years Post-burn (2003)
Allium cf. *cernuum*
Ambrosia artemisiifolia
Amelanchier arborea
Bromus pubescens
Bromus racemosus
Carex sp.
Cerastium brachypetalum/vulgatum
cf. *Actaea sp.*
cf. *Agrostis perennans*
cf. *Ceanothus americanus*
cf. *Festuca subverticillata/Vulpia octoflora*
cf. *Helianthus sp.*
cf. *Rubus sp.*
cf. *Senecio obovatus*

Table C9., continued.

BK, SW-L Section, 12 Years Post-burn (2003) Continued
Deschampsia flexuosa
Hepatica americana
Panicum depauperatum
Panicum depauperatum/linearifolium
Panicum linearifolium
Pyrola cf. *elliptica*
Rubus sp.
UK *Asteraceae*
Verbascum sp.

BK, SW-U Section, 12 Years Post-burn (2003)
Amelanchier arborea
Amphicarpaea bracteata
Aureolaria laevigata
Carex sp.
cf. *Agrostis perennans*
cf. *Rubus sp.*
Lysimachia quadrifolia
Muhlenbergia sobolifera
Nyssa sylvatica
Ostrya virginiana
Panicum linearifolium
Solidago cf. *curtisii*
Solidago sp.
UK Dicot
Vicia cf. *cracca/caroliniana*
Viola sororia
Amelanchier arborea
Amphicarpaea bracteata
Aureolaria laevigata
Carex sp.
cf. *Agrostis perennans*
cf. *Rubus sp.*
Lysimachia quadrifolia
Muhlenbergia sobolifera
Nyssa sylvatica
Ostrya virginiana
Panicum linearifolium
Solidago cf. *curtisii*
Solidago sp.
UK Dicot
Vicia cf. *cracca/caroliniana*

Table C9., continued.

BK, SW-U Section, 12 Years Post-burn (2003)
Viola sororia

Table C10. Mixed model ANCOVA summary statistics of for the effects of site/year, aspect, slope position, and basal area (m^2/ha, the covariate) on the composition (based on habit and functional type groupings) of the herbaceous stratum.

Dependant Variable	Source of Variation	Degrees of Freedom	F	*p*
Habit Group IV [a]	Habit	3,573	13.04	<0.0001
	Site/Year X Habit	16,573	2.34	0.0023
	Aspect X Habit	4,573	6.36	<0.0001
	Basal Area X Site/Year X Habit	20,573	2.52	0.0003
Habit Group % Cover [b]	Habit	3,573	11.58	<0.0001
	Basal Area	1,573	11.29	0.0008
	Site/Year Habit	16,573	3.82	<0.0001
	Aspect X Habit	4,573	4.00	0.0033
	Basal Area X Site/Year X Habit	19,573	2.73	0.0001
Functional Type IV [a]	Functional Type	4,742	136.43	<0.0001
	Site/Year X Functional Type	20,742	2.60	0.0002
	Aspect X Functional Type	5,742	4.22	0.0009
	Basal Area X Site/Year X Functional Type	25,742	2.80	<0.0001
Functional Type % Cover [a]	Functional Type	4,742	108.01	<0.0001
	Site/Year X Functional Type	20,742	4.61	<0.0001
	Aspect X Functional Type	5,742	3.34	0.0054
	Basal Area	1,742	13.22	0.0003
	Basal Area X Site/Year X Functional Type	24,742	3.72	<0.0001

[a] Square root transformed.
[b] Log_{10} transformed.

Table C11. Table of coefficients (± 1 SE) for herbaceous stratum habit groups percent cover linear regression models. All models take the form: $Log_{10}\,(\%\ Cover) = \beta_0 + \beta_1 * Basal\ Area\,(m^2/ha)$. See Appendix B; Table B2 for habit groups species lists.

Species Group	Site/Year	Intercept Coefficient		Slope Coefficient		RMS[a]	R^2
		β_0	p	β_1	p		
Ferns and Forbs	DK 0	0.4855 (0.1827)	0.0081	-0.00745 (0.007281)	0.3067	0.06527	0.04186
	DK 1	0.5528 (0.1742)	0.0016	-0.00317 (0.007308)	0.6642	0.15262	0.00335
	HM 1	0.4008 (0.1641)	0.0149	-0.00497 (0.006298)	0.4307	0.03577	0.04531
	HM 2	1.0511 (0.1409)	<0.0001	-0.01837 (0.005605)	0.0011	0.10858	0.21239
	BK 12	0.3566 (0.1597)	0.0140	-0.00001 (0.006801)	0.9988	0.05100	0.0000
Graminoids	DK 0	0.2393 (0.1827)	0.1908	-0.00056 (0.007281)	0.9391	0.05067	0.00032
	DK 1	0.3807 (0.1742)	0.0292	-0.00569 (0.007308)	0.4364	0.04571	0.03485
	HM 1	0.4926 (0.1641)	0.0028	-0.01083 (0.006298)	0.0859	0.03378	0.19261
	HM 2	1.1161 (0.1409)	<0.0001	-0.02966 (0.005605)	<0.0001	0.06408	0.54361
	BK 12	0.4699 (0.1597)	0.0034	-0.00951 (0.006801)	0.1626	0.03615	0.12854
Shrubs and Vines	DK 0	0.5008 (0.1827)	0.0063	0.008724 (0.007281)	0.2313	0.16572	0.02305
	DK 1	0.6574 (0.1742)	0.0002	0.004989 (0.007308)	0.4951	0.19166	0.00658
	HM 1	0.9673 (0.1641)	<0.0001	-0.01382 (0.006298)	0.0286	0.09886	0.11720
	HM 2	1.3345 (0.1409)	<0.0001	-0.02133 (0.005605)	0.0002	0.15492	0.20307
	BK 12	1.1243 (0.1597)	<0.001	-0.00585 (0.006801)	0.3897	0.22376	0.00894
Trees	DK 0	0.4504 (0.1827)	0.0140	-0.00258 (0.007281)	0.7231	0.05101	0.00666
	DK 1	0.6326 (0.1742)	0.0003	-0.01036 (0.007308)	0.1570	0.05170	0.09572
	HM 1	0.05361 (0.1641)	0.7441	0.008404 (0.006298)	0.1826	0.03261	0.12954
	HM 2	0.5238 (0.1409)	0.0002	-0.00242 (0.005605)	0.6662	0.10067	0.00502
	BK 12	0.2138 (0.1597)	0.1813	0.01384 (0.006801)	0.0422	0.14087	0.07423

[a] Residual Mean Square

Table C12. Table of coefficients (± 1 SE) for herbaceous stratum habit groups importance value linear regression models. All models take the form: $\sqrt{IV} = \beta_0 + \beta_1 * Basal\ Area\ (m^2/ha)$. See Appendix B; Table B2 for habit groups species lists.

Species Group	Site/Year	Intercept Coefficient		Slope Coefficients		RMS[a]	R^2
		β_0	p	β_1	p		
Ferns and Forbs	DK 0	0.3493 (0.1183)	0.0033	0.000472 (0.004715)	0.9203	0.036215	0.00032
	DK 1	0.3243 (0.1128)	0.0042	0.005516 (0.004733)	0.2443	0.047133	0.03187
	HM 1	0.3684 (0.1062)	0.0006	0.001740 (0.004077)	0.6696	0.030548	0.00676
	HM 2	0.4571 (0.09121)	<0.0001	0.000654 (0.003628)	0.8570	0.035186	0.00105
	BK 12	0.3428 (0.1034)	0.0010	0.000450 (0.004401)	0.9186	0.047046	0.00025
Graminoids	DK 0	0.2025 (0.1183)	0.0874	0.003478 (0.004715)	0.4611	0.042566	0.01439
	DK 1	0.2375 (0.1128)	0.0357	0.001511 (0.004733)	0.7496	0.032299	0.00359
	HM 1	0.5115 (0.1062)	<0.0001	-0.00809 (0.004077)	0.0477	0.032435	0.12177
	HM 2	0.5599 (0.09121)	<0.0001	-0.01059 (0.003628)	0.0036	0.027499	0.26137
	BK 12	0.4715 (0.1034)	<0.0001	-0.00864 (0.004401)	0.0501	0.044769	0.08952
Shrubs and Vines	DK 0	0.5128 (0.1183)	<0.0001	0.005400 (0.004715)	0.2526	0.060018	0.02435
	DK 1	0.5589 (0.1128)	<0.0001	0.003860 (0.004733)	0.4151	0.055451	0.01352
	HM 1	0.8177 (0.1062)	<0.0001	-0.00603 (0.004077)	0.1398	0.037526	0.06243
	HM 2	0.6703 (0.09121)	<0.0001	-0.00285 (0.003628)	0.4318	0.047913	0.01450
	BK 12	0.7192 (0.1034)	<0.0001	-0.00152 (0.004401)	0.7302	0.062337	0.00218
Trees	DK 0	0.5594 (0.1183)	<0.0001	-0.00430 (0.004715)	0.3624	0.034637	0.02669
	DK 1	0.5712 (0.1128)	<0.0001	-0.00808 (0.004733)	0.0884	0.023615	0.12355
	HM 1	-0.01191 (0.1062)	0.9108	0.01623 (0.004077)	<0.0001	0.017169	0.51321
	HM 2	0.1178 (0.09121)	0.1969	0.01193 (0.003628)	0.0011	0.033402	0.26992
	BK 12	0.1787 (0.1034)	0.0845	0.009144 (0.004401)	0.0382	0.028834	0.14602

[a] Residual Mean Square

Table C13. Table of coefficients (± 1 SE) for herbaceous stratum functional type groups percent cover linear regression models. All models take the form: $\sqrt{\%\,Cover} = \beta_0 + \beta_1 * Basal\ Area\,(m^2/ha)$. See Appendix B; Table B2 for functional type groups species lists.

Species Group	Site/Year	Intercept Coefficient		Slope Coefficient		RMS[a]	R^2
		β_0	p	β_1	p		
Exotic	DK 0	0.03806 (0.4115)	0.9263	-0.00100 (0.01640)	0.9513	0.00352	0.01438
	DK 1	0.08516 (0.3924)	0.8282	-0.00135 (0.01646)	0.9346	0.01705	0.00542
	HM 1	0.2158 (0.3701)	0.5601	-0.00712 (0.01420)	0.6162	0.05523	0.05934
	HM 2	0.4143 (0.3177)	0.1927	-0.01182 (0.01264)	0.3497	0.12498	0.08841
	BK 12	0.2887 (0.3604)	0.4233	-0.01082 (0.01535)	0.4810	0.00906	0.43236
Exotic Invasive	DK 0	0.6220 (0.4115)	0.1311	-0.01365 (0.01640)	0.4056	0.275551	0.03358
	DK 1	0.2260 (0.3924)	0.5649	0.01048 (0.01646)	0.5246	0.34425	0.01601
	HM 1	0.2861 (0.3701)	0.4397	-0.00696 (0.01420)	0.6244	0.08189	0.03906
	HM 2	0.5562 (0.3177)	0.0804	-0.01124 (0.01264)	0.3739	0.41201	0.02592
	BK 12	0.04793 (0.3604)	0.8942	0.001551 (0.01535)	0.9195	0.02023	0.00696
Native	DK 0	2.5286 (0.4115)	<0.0001	0.009271 (0.01640)	0.5720	1.15043	0.00382
	DK 1	3.9087 (0.3924)	<0.0001	-0.02882 (0.01646)	0.0804	1.19195	0.03431
	HM 1	3.4025 (0.3701)	<0.0001	-0.04411 (0.01420)	0.0020	0.52140	0.20409
	HM 2	6.0292 (0.3177)	<0.0001	-0.1008 (0.01264)	<0.0001	1.30736	0.40275
	BK 12	4.6787 (0.3604)	<0.0001	-0.02898 (0.01535)	0.0594	2.55146	0.01904
Native Invasive Weed	DK 0	0.6620 (0.4115)	0.1081	-0.01376 (0.01640)	0.4015	0.18687	0.04948
	DK 1	0.8868 (0.3924)	0.0241	-0.01117 (0.01646)	0.4977	0.30245	0.02060
	HM 1	0.6014 (0.3701)	0.1046	-0.00306 (0.01420)	0.8297	0.13208	0.00485
	HM 2	0.9027 (0.3177)	0.0046	-0.01234 (0.01264)	0.3291	0.28043	0.04500
	BK 12	0.5030 (0.3604)	0.1632	-0.00776 (0.01535)	0.6132	0.17329	0.020080
Native Weed	DK 0	1.3806 (0.4115)	0.0008	-0.01657 (0.01640)	0.3127	0.53129	0.02586
	DK 1	1.3642 (0.3924)	0.0005	-0.02305 (0.01646)	0.1619	0.49064	0.05233
	HM 1	0.2530 (0.3701)	0.4944	0.01983 (0.01420)	0.1629	0.16641	0.13969
	HM 2	2.2598 (0.3177)	<0.0001	-0.03503 (0.01264)	0.0057	0.79783	0.11774
	BK 12	0.3292 (0.3604)	0.3613	0.02769 (0.01535)	0.0715	0.68215	0.06216

[a] Residual Mean Square

Table C14. Table of coefficients (± 1 SE) for herbaceous stratum functional type groups importance value linear regression models. All models take the form: $\sqrt{IV} = \beta_0 + \beta_1 * Basal\ Area\ (m^2/ha)$. See Appendix B; Table B2 for functional type groups species lists.

Species Group	Site/Year	Intercept Coefficient		Slope Coefficient		RMS[a]	R^2
		β_0	p	β_1	p		
Exotic	DK 0	0.000683 (0.07461)	0.9927	0.000179 (0.002974)	0.9519	0.000482	0.00340
	DK 1	0.01114 (0.07114)	0.8756	0.000095 (0.002985)	0.9747	0.001053	0.00044
	HM 1	0.03963 (0.06701)	0.5544	-0.00124 (0.002571)	0.6285	0.002753	0.03055
	HM 2	0.07283 (0.05753)	0.2059	-0.00199 (0.002288)	0.3845	0.004306	0.07390
	BK 12	0.08447 (0.06520)	0.1955	-0.00314 (0.002776)	0.2584	0.001340	0.30256
Exotic Invasive	DK 0	0.03958 (0.07461)	0.5959	0.002328 (0.002974)	0.4339	0.018980	0.01446
	DK 1	-0.05862 (0.07114)	0.4102	0.008659 (0.002985)	0.0038	0.023538	0.13972
	HM 1	0.07937 (0.06701)	0.2366	-0.00177 (0.002571)	0.4917	0.006832	0.03055
	HM 2	0.09016 (0.05753)	0.1175	-0.00152 (0.002288)	0.5077	0.010237	0.01921
	BK 12	0.02410 (0.06520)	0.7117	0.000063 (0.002776)	0.9820	0.002462	0.00010
Native	DK 0	0.7239 (0.07461)	<0.0001	0.005793 (0.002974)	0.0518	0.016317	0.09557
	DK 1	0.8109 (0.07114)	<0.0001	0.003026 (0.002985)	0.3111	0.010445	0.04279
	HM 1	1.0408 (0.06701)	<0.0001	-0.00758 (0.002571)	0.0033	0.009247	0.29921
	HM 2	0.9602 (0.05753)	<0.0001	-0.00369 (0.002288)	0.1070	0.009201	0.11378
	BK 12	1.0316 (0.06520)	<0.0001	-0.00477 (0.002776)	0.0864	0.011546	0.10410
Native Invasive Weed	DK 0	0.1592 (0.07461)	0.0331	-0.00159 (0.002974)	0.5924	0.017655	0.00730
	DK 1	0.3120 (0.07114)	<0.0001	-0.00445 (0.002985)	0.1361	0.019645	0.04889
	HM 1	0.1800 (0.06701)	0.0074	0.003426 (0.002571)	0.1831	0.024488	0.03189
	HM 2	0.1311 (0.05753)	0.0229	0.001741 (0.002288)	0.4471	0.016775	0.01544
	BK 12	0.1301 (0.06520)	0.0463	-0.00195 (0.002776)	0.4825	0.011747	0.01873
Native Weed	DK 0	0.5233 (0.07461)	<0.0001	-0.00650 (0.002974)	0.0292	0.044018	0.04700
	DK 1	0.3887 (0.07114)	<0.0001	-0.00560 (0.002985)	0.0613	0.037760	0.04063
	HM 1	0.02102 (0.06701)	0.7538	0.01347 (0.002571)	<0.0001	0.018545	0.40202
	HM 2	0.2369 (0.05753)	<0.0001	0.005324 (0.002288)	0.0203	0.031950	0.07147
	BK 12	0.1437 (0.06520)	0.0279	0.005672 (0.002776)	0.0414	0.034841	0.05164

[a] Residual Mean Square

CURRICULUM VITAE

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Education

M.S. (Forestry), West Virginia University, Morgantown, W.V., 2005. Thesis title: Floristic dynamics of Appalachian pine-oak forests over a prescribed fire chronosequence.

B.S. (Forest Resource Management, magna cum laude), State University of New York College of Environmental Science and Forestry, Syracuse, N.Y., 2003.

A.A.S. (Natural Resources Conservation, magna cum laude), Morrisville State College (State University of New York), Morrisville, N.Y., 2001.

Work Experience

Graduate Research Assistant, Division of Forestry, West Virginia University. May 2003 to August 2005.

- Leader of a field crew that collected data on herbaceous plant, tree regeneration, and tree mortality response to prescribed fire in areas on the George Washington National Forest for a research project funded by the U.S. Forest Service. Responsibilities also included all data analyses and reports.

Resident Caretaker, Westvaco Natural Resource Center, Division of Forestry, West Virginia University. May 2003 to August 2005.

- Responsible for all custodial work and some light maintenance at a conference facility located near Morgantown, W.V.

Forest Technician, SUNY-ESF Research Foundation, Syracuse, N.Y. May-August 2002.

- Member of a field crew that conducted forest inventory on land owned and administered by the New York City Department of Environmental Protection in the Catskill Mountains of N.Y.

Ski and Snowboard Technician, Holimont Ski Shop, Ellicottville, N.Y. December-March, 1998-2001.

- Assisted customers with ski and snowboard rentals and maintained and repaired such equipment.

Laborer, J.D. Northrup Construction. Inc., Ellicottville, N.Y. May-August, 1998-1999.

- Physical labor, operated and maintained small power equipment.

Other Knowledge, Skills, and Abilities

- GPS and GIS (ArcGIS and ArcView)
- Knowledge of all MS Office programs (Word, Excel, Access, Powerpoint)
- Statistical analysis with the SAS system
- Multivariate ordination analysis with PC-ORD software
- Forest inventory and silviculture
- Herbaceous plant taxonomy
- Strong writing and analytical skills

Honors and Activities

- Student Award of Merit, N.Y. State Chapter of the Society of American Foresters, 2001
- SILVAH Oak training, Fall 2004
- Membership in professional societies include the Society of American Foresters, Ecological Society of America, Southern Appalachian Botanical Society, and Xi Sigma Pi (Forestry Honorary Society)

Presentations

Marsh, M.A., M.A. Fajvan, C.D Huebner, and T.M. Schuler. 2005. The effects of timber harvesting and prescribed fire on invasive plant dynamics in the central Appalachians. Oral presentation at the 2005 USDA Interagency Forum on Gypsy Moth and Other Invasive Species, January 19, 2005, Annapolis, M.D.

Marsh, M.A., M.A. Fajvan, T.M. Schuler, and C.D. Huebner. 2005. Floristic dynamics of Appalachian pine-oak forests over a prescribed fire chronosequence. Poster presentation at the 9th annual W.V.U. Davis College of Agriculture, Forestry, and Consumer Sciences Graduate Student Research Conference, April 14, 2005, Morgantown, W.V.

References

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