Estimating the Ecological Impact and Carrying Capacity of White-Tailed Deer (Odocoileus virginianus) at Camp James A. Garfield Joint Military Training Center

by

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ABSTRACT

Anthropogenic habitat modification, predator extirpation, and reduced hunting pressure have pushed white-tailed deer (WTD; *Odocoileus virginianus*) populations to unprecedentedly high densities throughout much of eastern North America. Importantly, their selective foraging can depress the abundance of preferred native plant species, increase that of less nutritious ones, and facilitate exotic species invasion. However, few have researched areas where WTD densities have been maintained, for decades, at low levels. Moreover, scant data exists on canopy species regeneration across different-aged canopy gaps, in different habitats, and in areas of historically high and low WTD densities. Here, we ask: 1) across a range of canopy gap ages, does WTD density affect the number and relative cover of native and non-native plant species, in wet and dry habitats?, and 2) does vegetation structure differ in areas of historically low WTD density relative to areas where WTD are excluded via fenced exclosures? – here, an answer of 'no' suggests WTD are at or below their carrying capacity. This study took place in and outside of Camp James A. Garfield Joint Military Training Center (C-JAG, Portage Co., OH), which has maintained WTD densities 2-3 times lower than the surrounding areas, since 1955. Excluding WTD at C-JAG for one year did not result in different plant communities, suggesting C-JAG's aggressive WTD management has them at or below their carrying capacity. Relative to surrounding areas, canopy gaps at C-JAG generally harbored a more diverse and abundant assemblage of native species, especially in dry habitats, and lower levels of non-native species in both habitats. Canopy gap age did not affect any response variable, suggesting a low WTD density generally promotes native plant diversity, and reduces the incidence of exotic species, regardless of gap

successional stage. Given that energy transfer to higher trophic levels tends to be greater in areas of high native plant diversity, maintaining low WTD densities may facilitate the diversity and abundance of species at higher trophic levels. Lastly, without adequate WTD management, our forests will likely suffer continued native biodiversity loss, altered successional trajectories, and become increasingly dominated by exotic species.

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INTRODUCTION

The temperate deciduous forest biome in eastern North America historically harbored a relatively diverse canopy as well as numerous herbaceous understory species. The vast majority of this diversity resides in the understory (Spicer et al. 2020), which includes all herbaceous plants, as well as woody seedlings, saplings and shrubs. It is also in this layer where trees may recruit into the canopy (Webster et al. 2018). However, within the last century, this diversity has progressively declined, in part because of the introduction of non-native, invasive pests. Notable examples include emerald ash borer (*Agrilus planipennis*), hemlock woolly adelgid (*Adelges tsugae*), and chestnut blight (*Phytophthora cinnamomi*) (Orwig and Foster1998, Schlarbaum et al. 1998, Kizlinski et al. 2002, Poland and McCullough 2006). Native plant diversity has also been constrained through direct competition or chemical interference by non-native, invasive plants (Prati and Bossdorf 2009, Downey and Richardson 2016). That said, the biggest factor arguably driving this decline is the persistent high density of white-tailed deer (WTD; *Odocoileus virginianus*).

WTD is a large ungulate native to North America that selectively grazes on forbs and woody species (Warren 1997, Augustine and deCalesta 2003, Côté et al. 2004), and is estimated to have had pre-settlement densities as low as 3.1-4.2 deer km^{-2} (McCabe and McCabe 1997). For millennia, American Indians, gray wolf (*Canis lupus*) and mountain lion (*Felis concolor*) were important predators maintaining these numbers. Under this grazing regime, modest WTD browsing may reduce dominance by competitively superior species, foster recruitment of many species, notably browse-preferred or -tolerant species, and thereby maintain high canopy and herbaceous diversity

(Judzicz and Koch 1993, Côté et al. 2004). However, local extirpation of their major predators, unaggressive state-wide WTD management (Brown et al. 2000), and fragmentation of forests by agriculture and other human development have contributed to unprecedented WTD densities throughout large regions of eastern North America, with numbers approaching an order of magnitude higher that pre-settlement levels (Augustine and Jordan 1998, Russell et al. 2001, Pendergast et al. 2015).

According to Caughley (1981), WTD are considered overabundant if they: 1) threaten human life or livelihood, 2) reach population levels that increase rates of starvation or spread of disease, 3) reduce the abundance of economically or aesthetically important plant and animal species, and 4) negatively affect ecosystem function. Arguably, WTD meet each of these, given numerous instances of deer vehicle collisions, the spread of chronic wasting disease in WTD populations, reductions in native plant diversity in heavily browsed areas, and altered recruitment patterns of canopy species (Rooney 2003, Royo et al. 2010, Nuttle et al. 2013).

An immediate, well-established consequence of WTD overabundance is overbrowsing of the forest understory and a subsequent reduction in native plant diversity – if sustained for prolonged periods, this may result in long-term, irreversible biodiversity declines, even if herbivores are later reduced in abundance or even eliminated (Royo et al. 2010, Carson et al. 2014, Nuttle et al. 2014, Habeck and Schultz 2015). These legacy effects, or "ghosts of herbivore past," (Banta et al. 2005) occur when adult plants become locally extinct, no recruitment occurs, and the soil seed bank becomes depleted from sustained, herbivore-induced mortality of seedlings and saplings (Rooney and Dress 1997, Nuttle et al. 2011, 2014). Moreover, persistent browsing of saplings may cause a

decline in tree diversity as well, including homogenization of forest vertical structure and significant alteration of successional patterns (Seagle and Liang 2001, Schumacher and Carson 2013, Pendergast et al. 2016; Royo and Carson, in prep.).

While WTD are modestly generalistic, they nonetheless have well-established browsing preferences (Augustine and McNaughton 1998, Augustine and DeCalestra 2003, Côté et al. 2004, Begley-Miller et al. 2014). These preferences largely depend on species-specific defensive traits, which are categorized in terms of tolerance and resistance to herbivory (Martin et al. 2015). Species that are browse-tolerant, such as graminoids, can withstand repeated herbivory events due to their ability to regrow lost tissue (McNaughton 1983, Haukioja and Koricheva 2000). On the other hand, browse-resistant species produce secondary plant compounds including tannins, phenolic acids and flavonoids (Giertych et al. 2015), and contain structural compounds such as lignin (Augustine and McNaughton 1998). Lignin reduces plant wall digestibility while secondary plant compounds can be toxic or reduce digestibility in herbivores (Dostaler et al. 2011). Plants that are chemically defended are generally less palatable and tend to be avoided by deer, while less chemically defended plants are preferred and experience higher rates of herbivory. For example, species such as common greenbrier (*Smilax rotundifolia)*, great white trillium (*Trillium grandiflorum*) and Allegheny blackberry (*Rubus allegheniensis*) suffer high rates of WTD herbivory whereas Jack-in-the-pulpit (*Arisaema triphyllum*), white snakeroot (*Eupatorium rugosum*), and hay-scented fern (*Dennstaedia punctilobula*) are avoided (Augustine and Jordan 1998, de la Cretaz and Kelty 2002). As a result, species like oaks (*Quercus* spp.) have little to no regeneration in areas of high WTD density whereas black cherry (*Prunus serotina*), sugar maple (*Acer*

saccharum) and American beech (*Fagus grandifolia*) are generally abundant across size classes (Anderson and Katz 1992, Horsley et al. 2003).

This differential grazing pressure, if sustained, can cause marked, long-term shifts in the community composition of palatable herbaceous understory as well as recruiting canopy species (Kain et al. 2011, Bressette et al. 2012, Nuttle et al. 2013, Habeck and Schultz 2015). With sustained WTD browsing, the understory can become dominated by browse-tolerant species such as American beech (*Fagus grandifolia*) that can produce dense subcanopy thickets that exert strong competitive effects on other species growing in the understory (Long et al. 2007). Moreover, preferential browsing of forest herbs and shrubs can facilitate growth of native and exotic graminoid species (Wiegmann and Waller 2006), which can produce a thick layer of litter, reducing seedling emergence (Tremblay et al 2006). Taken together, WTD have potential to create alternate steady states of low forage diversity and productivity (de la Cretaz and Kelty 2002, Rooney and Waller 2008, Begley-Miller et al. 2014, Pendergast et al. 2016). Importantly, WTD tend to avoid chemically defended non-native species and prefer to browse on native species. This selective foraging of native plants facilitates non-native plant invasion by reducing native plant competition, limiting native seedling recruitment, and altering the ecological conditions under which they have evolved (Knight et al. 2009, Kalisz et al. 2014, Averill et al. 2017).

Forest canopy gaps, by increasing light levels at the forest floor, are the primary site of recruitment for many woody species, and tend to promote their diversity relative to closed canopy areas (Ashton and Larson 1996, McCarthy 2001, Schumann et al. 2003, Pedersen and Howard 2004, Muscolo et al. 2014). The effects are similar for herbaceous

species diversity as well (Kern et al. 2014). That said, the positive effects of gaps on diversity may be nullified by abundant WTD populations (Burton et al. 2020). Nuttle et al. (2013) implemented a three-factor experiment using fire, canopy gap size, and WTD exclosure as treatments, and found that browsing by WTD was the primary ecological filter regulating forest community composition of seedlings and saplings; with high WTD densities, this community was less diverse and importantly, did not resemble the composition of the canopy.

Overbrowsing-induced simplification of the forest understory as well as regenerating canopy species has direct and indirect consequences on the entire system. The top-down release of WTD from their natural predators has ultimately shifted forest communities to less palatable species of lower diversity for herbivores and their predators, resulting in lower diversity at higher trophic levels (Nuttle et al. 2011). These trophic cascades have been reported in several studies where intense overbrowsing has been linked to reduced diversity of understory songbirds (Chollet et al. 2016, Nuttel et al. 2011, Tymkiw et al 2016), negative impacts on arthropod communities, and altered nutrient cycling in forests (Bressette et al. 2012). Without WTD management, the prognosis for diversity in the temperate deciduous forest biome is one of simplification, in the forest understory as well as the canopy (Royo et al. 2010, Nuttle et al. 2013, Sabo et al. 2019).

Additionally, the progressive shift from a generally palatable to an unpalatable-dominated community has obvious ramifications to the ability of the environment to maintain a sustainable biomass of WTD. We define carrying capacity (K) as the maximum number (or biomass) of animals that can be sustained indefinitely in a defined

geographic area (see Edwards and Foyle 1955). Importantly, short- and long-term carrying capacities for large mammalian herbivores may differ substantially, and this is especially pronounced in systems where pre-reproductive plants are overgrazed for prolonged periods. For example, if contemporary canopy species that periodically produce large quantities of nutritious fruit (e.g., masting species like oaks, hickories and beech) have virtually all of their seeds and saplings consumed by herbivores (see Waller and Alverson 1997), the short-term *K* (e.g., decades to ~ 100 years) of that herbivore may be much higher than its long-term *K* (e.g., > 100 years). Indeed, if adults of these species die and are not replaced, *K* will be lowered. One key criterion in determining whether short- and long-term carrying capacities for a large mammalian herbivore are similar, or differ substantially, is to compare community composition of palatable and unpalatable species across life history stages (i.e., from seedling to reproductive adult). For example, if palatable species composition is over-represented in reproductive age classes, this suggest the system is moving toward a *K* lower than its current value (see Nuttle et al. 2013, Fig. 2).

We have the unique opportunity to study the consequences of WTD browsing on vegetation dynamics in areas with historically low and high WTD densities. Camp Garfield (C-JAG, see *Methods-Study sites* below), a large military facility, has maintained WTD densities at levels *at least* 50% lower than outside of it, if not lower, for over six decades. Given that similar habitats exist in and outside of C-JAG, it is possible to elucidate the impact of differing WTD densities on native and non-native species richness, including their abundance, in comparable habitats. Here, we ask: 1) After one year, do WTD exclosures at C-JAG result in greater species richness and abundance

relative to paired control plots, in wet and dry habitats?, 2) Do WTD densities differentially affect native and non-native species richness and abundance among habitat types?, and 3) Does high and low WTD abundance alter floral species composition across a ~10-year chronosequence in canopy gaps in wet and dry habitats?

METHODS

Study sites:

Camp James A. Garfield Joint Military Training Center (Camp Garfield or C-JAG) is a semi-porous fenced 21,683-acre military facility located in Portage and Trumbull County in Northeast Ohio. The area is located in the U.S. Ecoregion - Humid Temperate Domain - Hot Continental Division - Eastern Broadleaf Forest (Oceanic) Province - Erie/Ontario Drift and Lake Plain – Low Lime Drift Plain ecosystem land classification. Most of Camp Garfield is composed of post-successional agricultural lands, with the exception of a few areas of large mature forests and areas considered too wet to farm. Most plant communities at C-JAG are 75 years old or less.

The vegetated land is generally categorized as herb-, shrub- and tree-dominated. The tree-dominated areas are most widespread, covering approximately 14,397 acres, or 66% of the property. The Anderson classification system (Anderson 1976) was used to classify the plant communities at C-JAG. A total of 17 plant communities were identified, but this research will only be focused on four. These classified areas include Forest Oak-Maple-Tulip Tree, Woods Red Maple, Woods White Ash-Wild Black Cherry-Red Maple, and Forest Beech-Sugar Maple. Our present study focuses on two general habitat types, which we defined as either wet or dry forest. The wet forested

habitat type is characterized by a canopy largely comprised of pin oak (*Quercus palustris*) or swamp white oak (*Quercus bicolor*), hickory (*Carya sp*.), and beech (*Fagus grandifolia*), with an herbaceous layer dominated by New York fern (*Parathelypteris noveboracensis*). The dry forested habitat type is characterized by a canopy of red oak (*Quercus rubra*), black cherry (*Prunus serotina*), tulip poplar (*Liriodendron tulipifera*), beech, hickory, and maples (*Acer sp*.), with the herbaceous layer of numerous forbs and graminoids.

White-tailed deer density estimates:

WTD herd size at C-JAG is estimated most years by using winter aerial survey, a late summer roadside survey, and post-hunt deer harvest reports. Camp Garfield has allowed annual hunts on the property since 1955 to control the WTD population. Their WTD numbers fluctuate annually but based on aerial surveys, the respective recent five- and ten-year density estimates are 5.8 and 7.6 deer/km^2. A very generalized estimate of WTD density for eastern North America was published by Walters et al. (2016), and data collected by state wildlife agencies from 2001-2005 suggest that WTD density in areas outside of C-JAG are between 5.8-11.6 deer/km^2. The Ohio Department of Natural Resources annually monitors trends that reflect changes in the size of deer populations in the state. These trends have been recorded from 2004-2019 and indicate that deer populations in Ohio have been steadily increasing since 2014 (ODNR 2019). I currently do not have accurate estimates of WTD density outside of C-JAG but based on observations of plant community assemblages inside and outside of C-JAG, along with

the information that WTD populations have been increasing, I estimate their density to be at least two times higher outside of C-JAG, if not higher.

White-tailed deer exclosures:

In summer 2019, nine canopy gaps, which were created in 2017, were identified using timber harvest maps and satellite imagery of C-JAG. In each canopy gap, two 10x5-meter paired plots were randomly assigned to either a deer exclosure treatment, which consisted of a two-meter-tall plastic mesh fence, or an unfenced control. Each of the paired exclosure and control plots were subdivided into three 3x3-meter subplots. In late summer-early fall 2019, we recorded the species identity of all herbaceous and woody species as well as their relative cover. The relative cover of moss, bare ground and slash in the plots were also recorded. These plots were revisited in late summer 2020 and surveyed again using the same procedure. Percent cover was assessed by visually estimating the amount of area covered by individual species in each 3x3-meter subplot. Combined species coverage was typically greater than 100%, and all plots were relativized to 100% to calculate the relative cover for each species.

Assessing canopy gap age:

In summer 2020, canopy gaps were identified in state and local parks in Mahoning and Trumbull county, Ohio, that had wet and dry habitats comparable to those of C-JAG. Once a gap was found, a GPS coordinate was recorded, and the same vegetation surveys as described above were performed. The GPS coordinate was entered into ArC-JAGIS Pro along with satellite images of that location. Satellite images ranging from 2009 to 2019 were used for each GPS location to visually determine the approximate age of the

gap (e.g., if a canopy gap was evident in 2010 but not in 2009, we assumed it occurred in the most recent year). The satellite imagery was obtained from www.EarthExplorer.usgs.gov from the National Agriculture Imagery Program (NAIP). In total, there were 27 canopy gaps surveyed in summer and fall 2020, six in Boardman and Millcreek park, one in Poland Municipal Forest, five in Mosquito Lake State Park, five in Hitchcock Woods, three in Kyle Woods State Nature Preserve, and an additional seven inside C-JAG. The additional plots in C-JAG were in different portions of the property and did not have a fenced treatment plot.

Data analysis:

An analysis of covariance (ANCOVA) was performed on all canopy gap chronosequence data, collected in and outside of C-JAG in 2020. Our five dependent variables were total species richness, native and non-native species richness, and native and non-native relative cover. The independent variables were habitat type (n=2 levels, dry or wet) and deer density (n=2, high or low), with gap age as the covariate. Separate ANCOVAs were performed on each of the dependent variables. If a significant interaction was found, a post-hoc Scheffe one-way analysis of variance (ANOVA) was performed. The one-way ANOVA was performed by entering each dependent variable with combination as the independent variable. The independent variables, deer density and habitat type, were merged into one independent variable labeled "combination".

A repeated measures ANOVA was performed on data collected in 2019 and 2020 in our paired exclosure and control plots (C-JAG), with year as the repeated measure. The dependent variables were the same as above. The independent variables were

included two levels of habitat type (dry or wet) and two levels of plot treatment (exclosure or control). For all analyses, type 1 error was set at $\alpha = 0.05$.

RESULTS

Paired exclosure and control plots across habitat type and years:

The repeated measures ANOVA resulted in a significant decline in total species richness from 2019 (16.33 species per plot ±7.79 SD) to 2020 (13.72±7.49 SD) ($F_{1,14}$=5.5, p=0.035, partial η^2=0.902). Non-native species richness also declined (2019: 1.96±1.36 SD; 2020: 1.30±1.10 SD) ($F_{1,14}$= 9.4, p=0.008, η^2=0.402), but native species relative cover increased (2019: 0.77±0.15 SD; 2020: 0.85±0.14 SD) ($F_{1,14}$=5.5, p=0.034, η^2=0.283). Non-native species relative cover did not differ among years (p=0.996), nor did native species richness (p=0.221). A less intense sampling effort in 2020 is likely the cause of some metrics having lower values in 2020. Importantly, the main effect of plot treatment was not significant for all five variables from 2019 to 2020 ($p \geq 0.158$), indicating that all types of diversity, including their relative cover, did not differ between paired exclosure and control plots among years. No interactions were found between plot treatment, habitat type, and years for all five dependent variables ($p \geq 0.118$).

The main effect for habitat type was significant for total species richness, which nearly tripled in species number in dry (20.98±3.75 SD) relative to wet habitats (7.58±2.81 SD) ($F_{1,14}$=128.4, p<0.001, partial η^2=0.902). Native species richness was 160% higher in dry (15.7±3.35 SD) relative to wet (6.02±1.94 SD) habitats ($F_{1,14}$=85.0, p<0.001, partial η^2=0.859). Non-native species richness was more than four times higher in dry (2.47±0.91 SD) relative to wet (0.585±0.58 SD) habitats ($F_{1,14}$=36.2, p<0.001, partial η^2=0.721). Native species relative cover was 36% higher in wet (0.94±0.05 SD)

relative to dry (0.69±0.08 SD) habitats ($F_{1,14}$=103.3, p<0.001, partial η^2=0.881). Non-native relative cover was nearly four times higher in dry (0.11±0.08 SD) relative to wet (0.03±0.04 SD) habitats ($F_{1,14}$=7.4, p=0.017, partial η^2=0.345).

Effects of gap age in and outside of Camp Garfield:

For total species richness, ANCOVA analysis revealed a significant interaction between WTD density and habitat type, with gap age as a covariate ($F_{1,31}$=21.1, p<0.001, partial η^2=0.405). ANOVA found significant differences between treatment combinations as well ($F_{3,32}$=11.5, p<0.001). A Scheffe post-hoc test found that low WTD density in dry habitats (15.33±3.43 SD) had between 35 to 110% higher total species richness than any other treatment combination (Fig. 1, p≤0.001), the latter of which did not differ when compared to each other (p>0.074).

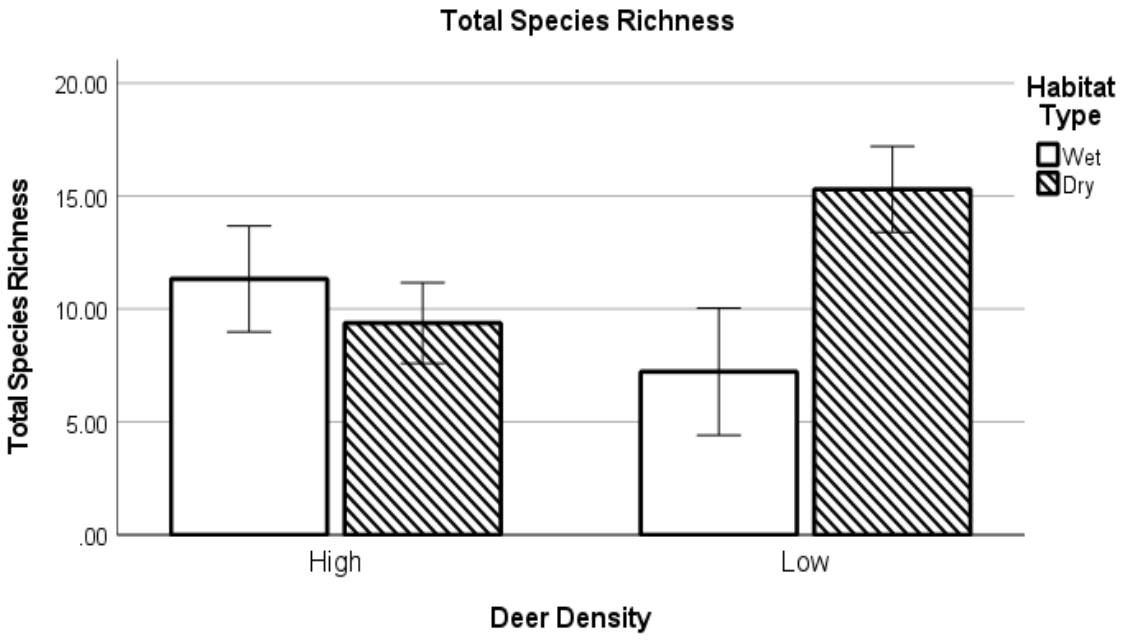

Figure 1. Effects of deer density and habitat type on total species richness (Error bars = 95% CIs)

The ANCOVA for native species richness resulted in a significant interaction between WTD density and habitat type on native species richness, with gap age as a covariate ($F_{1,31}$=14.4, p=<0.001, partial η^2=0.317). The ANOVA showed a statistically significant difference between groups as well ($F_{3,32}$=13.6, p<0.001). A Scheffe post-hoc test showed that low WTD density in dry habitats (11.48±2.92 SD) had approximately twice as many native species compared to other treatment combinations (Fig. 2, p≤0.002), the latter of which did not differ compared to each other (p>0.910).

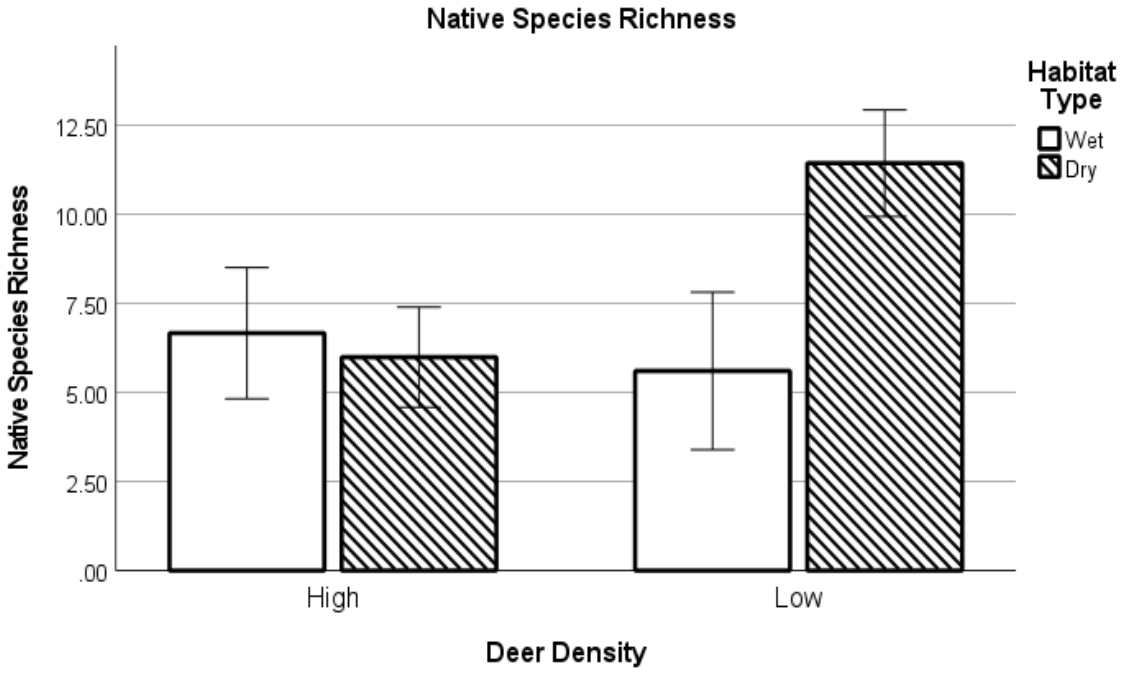

Figure 2. Effects of deer density and habitat type on native species richness (Error bars = 95% CIs)

The ANCOVA for non-native species richness found a significant interaction between WTD density and habitat type, with gap age as a covariate ($F_{1,31}$=9.3, p=0.005, partial η^2=0.230). The ANOVA found a significant difference between treatment combinations as well ($F_{3,32}$=4.8, p=0.007). A Scheffe post-hoc test showed that high WTD density in wet habitats (2.95±1.04 SD) had nearly two to six times higher non-native species richness than any other treatment combination (Fig. 3, p≤0.008), the latter of which did not differ compared to each other (p≥0.158).

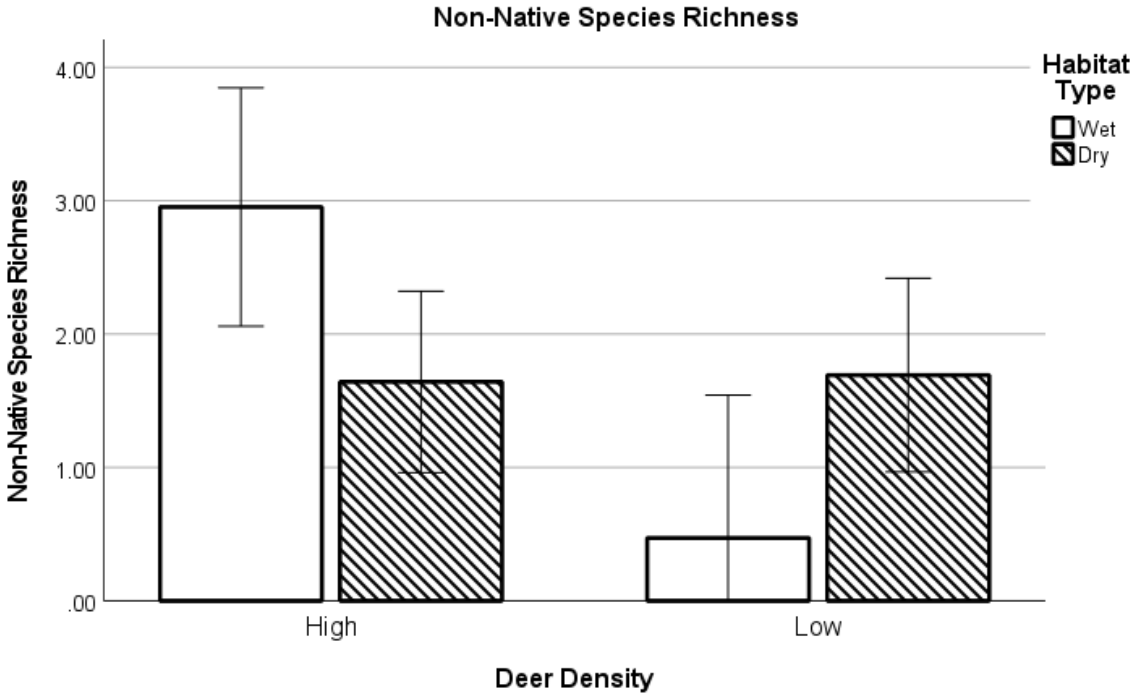

Figure 3. Effects of deer density and habitat type on non-native species richness (Error bars = 95% CIs)

Using gap age as a covariate, native species relative cover was 110% higher in low relative to high WTD density areas (Fig. 4, $F_{1,31}=27.4$, $p<0.001$, partial $\eta^2=0.47$). Habitat type and treatment interactions were not significant ($F_{1,31}\leq 2.4$, $p\leq 0.13$, partial $\eta^2\leq 0.073$).

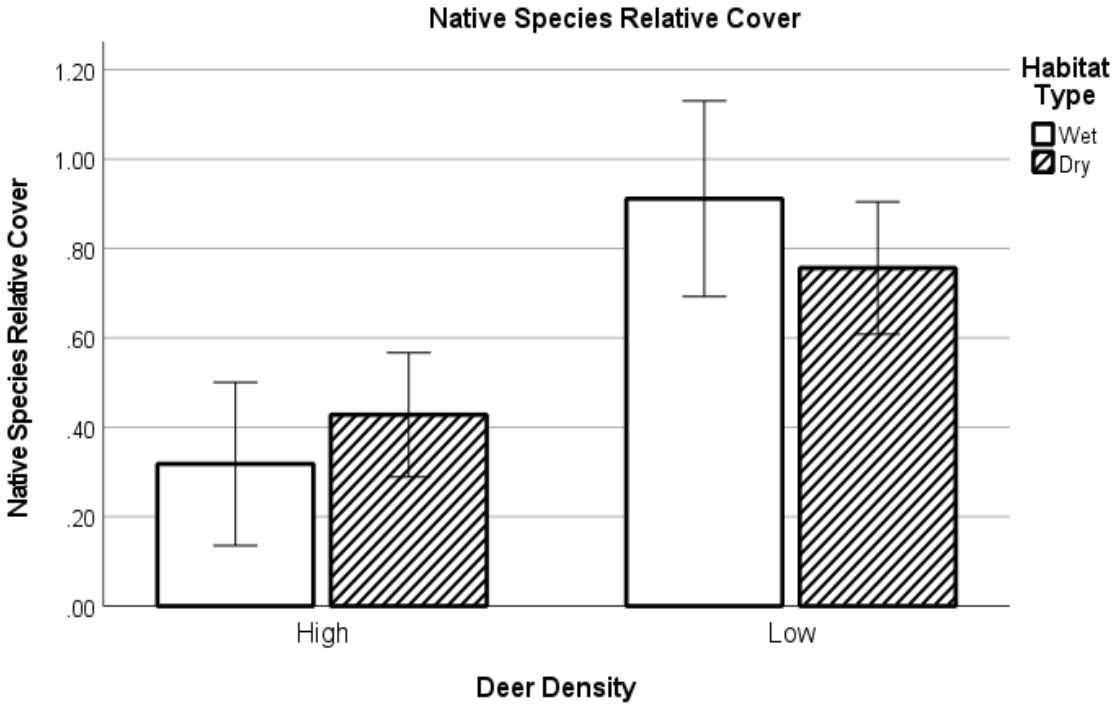

Figure 4. Effects of deer density and habitat type on native species relative cover (Error bars = 95% CIs)

Non-native species relative cover was nearly an order of magnitude higher in areas of high relative to low WTD density (Fig. 5, $F_{1,31}$=15.9, p=<0.001, partial η^2=0.34). Habitat type and interactions among treatment combinations were not significant ($F_{1,31}\leq$ 1.4, p≤0.25, partial $\eta^2\leq$0.042).

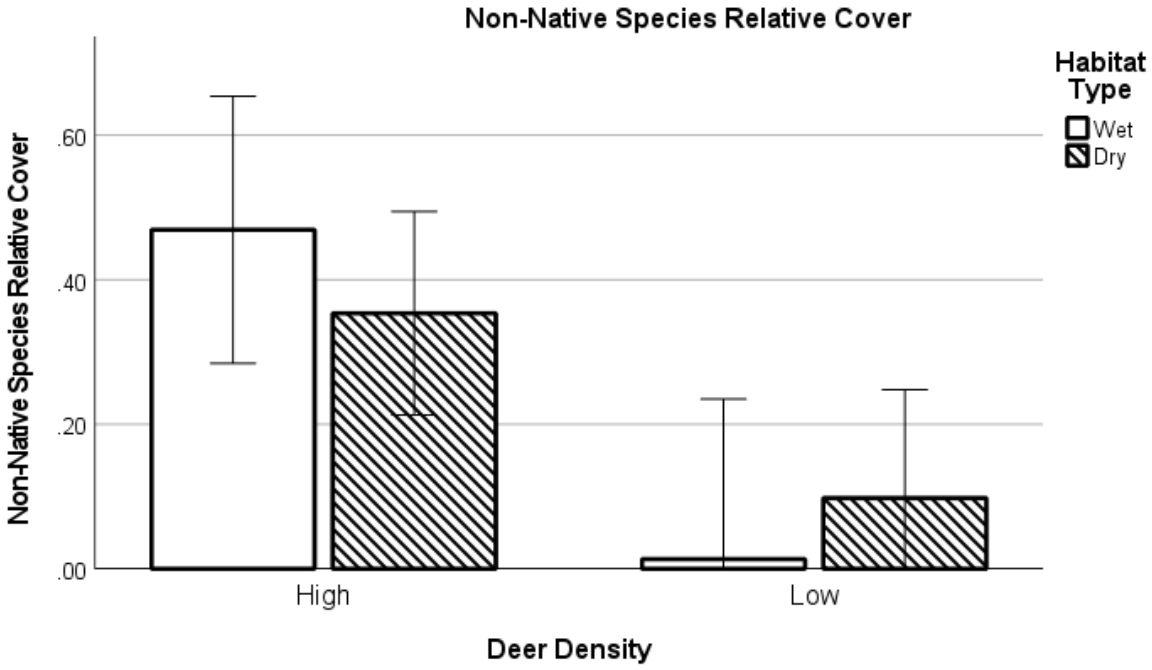

Figure 5. Effects of deer density and habitat type on non-native species relative cover (Error bars = 95% CIs)

DISCUSSION

Effects of WTD, habitat, and gap age on native and non-native species

Numerous forces are driving biodiversity declines in the temperate deciduous forest biome, including loss of habitat, climate change, and invasion by non-native species (Hansen et al. 2001, Keane and Crawley 2002, Vellend 2003, Poland and McCullough 2006). In an uncommon but nonetheless growing issue, a native species, white-tailed deer (WTD; *Odocoileus virginianus*), is a factor contributing to this decline (Augustine and McNaughton 1998, Russell et al 2001, Seagle and Liang 2001, Côté et al. 2004, Nuttle et al. 2013, Sabo et al. 2017). Because canopy gaps are the primary site of recruitment for many canopy species, and their increased light levels generally contribute to higher herbaceous diversity as well (Collins and Pickett 1987, Pedersen and Howard 2004, Muscolo et al. 2014, Nuzzo et al. 2017, Sabo et al. 2019; but see Habeck and Schultz 2015), studying their dynamics in different habitats, and in areas of low and high WTD abundance, may elucidate broad WTD effects on biodiversity across spatiotemporal scales. Importantly, by studying a chronosequence of successional patterns in different-aged canopy gaps, the long-term biodiversity consequences of different WTD densities may be resolved in several ecological contexts.

Here, we found that, regardless of canopy gap age, a low abundance of WTD contributed to greater total species richness, but only in drier habitats (Fig. 1). Moreover, this positive effect of low WTD abundance on plant species richness was driven primarily by their positive effect on native plant species richness, with about two times more native species found in dry sites with low WTD abundance relative to the other treatment combinations. This suggests that management which lowers WTD numbers is

likely to promote native plant diversity across a range of successional ages in canopy gaps (also see Nuttle et al. 2011), particularly in drier environs. We note that the converse is also likely true, that is, without increased WTD management efforts, native plant diversity may not appreciably change across a range of gap ages in dry sites. For canopy species in particular, future studies in this system should compare the compositional similarities of the seedling-sapling layer with that of the canopy; if similarities emerge, this suggests diversity may continue to recruit into the canopy layer under low WTD densities, at least in drier areas (see Nuttle et al. 2013, Fig. 2).

What is currently not known is whether the regional species pool of native species is higher at Camp Garfield (C-JAG), an area which has maintained WTD densities at least levels 50% lower than outside of it, for ~six decades. If C-JAG indeed harbors more native species capable of colonizing gaps relative to sites outside of C-JAG, this likely represents a well-established ecological legacy of decades of WTD overbrowsing, which reduces recruitment and ultimately, propagules available to colonize and establish in gaps. Regardless, a low WTD abundance fosters higher native richness in dry habitats.

Importantly, WTD abundance was the only significant effect on the relative cover of native species, with twice the abundance of native compared to non-native species in areas of low WTD density (Fig. 4). Although richness was higher only in drier sites with low WTD abundance, both wet and dry habitats were dominated by native species. Given that energy transfer to higher trophic levels tends to be large in areas of high native plant diversity (Ehrlich and Raven, 1964, Nuttle et al. 2011, Bressette et al. 2012), maintaining low WTD densities may facilitate the diversity and/or abundance of species

at higher trophic levels, even if wet habitats have lower native diversity relative to those that are dry.

WTD are known to facilitate non-native plant invasions, either by dispersing their seeds or alleviating competition by native species through their selective grazing (Knight et al. 2009, Kalisz et al. 2014, Averill et al. 2017, Blossey and Gorchov 2017). Indeed, we found that high WTD abundance was positively associated with more non-native plant species, but only in wet habitats (Fig. 3). This is surprising, given that the horticulture industry largely specializes in the sale of light-loving, ruderal, non-native species of mesic to dry environs (Martin et al. 2009), and proximity to suburbia, and thus, likely non-native propagule sources (Flory and Clay 2006), is closer in the areas sampled outside of C-JAG. In other words, the regional species pool of non-native species is likely higher, and closer, to our gaps with more WTD. That said, it is likely that, although C-JAG is largely protected from development, many decades of exotic invasion has resulted in a near ubiquitous distribution of them.

Non-native species richness is but one metric of their potential effect on ecosystem processes, and their relative cover is arguably more important. We found that areas of high WTD abundance were associated with three to five times more non-native plant relative cover than in areas of low WTD abundance (Fig. 5), regardless of gap age. This suggests that maintaining high levels of WTD may contribute to dominance of forest understory by exotic species. Given that few native herbivores consume exotic plants (see above), dominance by them likely truncates energy flow, which may lead to a lower abundance and diversity at higher trophic levels (Nuttle et al. 2011, Bressette et al. 2012).

Carrying capacity of WTD at C-JAG (paired exclosure-control plots)

Given selective grazing by WTD (Augustine and McNaughton 1998, Horsley et al. 2003, Pendergast et al. 2016), a progressive shift in plant communities from those dominated by generally palatable native species to unpalatable ones (e.g., invasive exotics, some native species) has obvious ramifications to the ability of the environment to maintain a particular biomass of WTD. We define carrying capacity (*K*) as the maximum number (or biomass) of animals that can be sustained indefinitely in a defined geographic area (see Edwards and Foyle 1955). Importantly, short- and long-term carrying capacities for WTD may differ substantially, and this is especially pronounced in systems where pre-reproductive plants are overgrazed for prolonged periods. For example, if contemporary canopy species that periodically produce large quantities of nutritious fruit (e.g., masting species like oaks, hickories and beech) have virtually all of their seeds and saplings consumed by herbivores (see Waller and Alverson 1997), the short-term *K* (e.g., decades to ~100 years) of that herbivore may be much higher than its long-term *K* (e.g., >100 years). Indeed, if adults of these species die and are not replaced, *K* will eventually be lowered. One key criterion in determining whether short- and long-term carrying capacities for a large mammalian herbivore are similar, or differ substantially, is to compare community composition of palatable and unpalatable species across life history stages (i.e., from seedling to reproductive adult). For example, if palatable species are proportionately more abundant in reproductive classes relative to the understory, this ecological signature suggest the system is moving toward a carrying capacity lower than its current value (see Nuttle et al. 2013, Fig. 2).

While we did not compare seedling, sapling and canopy community structure, and thus cannot currently prognosticate on long-term compositional change in these important vegetation layers, our exclosure study at C-JAG nonetheless revealed that after one year, there was no difference in community composition for any of our metrics between paired exclosure and control plots. This suggests that the 5.8 – 7.6 WTD/km^2 that have been maintained at C-JAG for at least the last 5-10 years (based on aerial surveys), and probably for the last ~60 years, are likely at or below their *K* at C-JAG. If WTD were above *K*, we would expect patterns of native and exotic species composition similar to that observed outside of C-JAG, and this was not found. We note that while effects of WTD exclosure on vegetation structure may occur in less than one year, this is still a short period in which to see marked WTD effects.

There have been numerous studies that have manipulated the WTD abundance within enclosures, with mixed results. Horsley et al. (2006) assessed the impact of 4,8,15, and 25 deer/km^2 and determined that after 10 years, a threshold of WTD density for negative impacts on forest vegetation was >8 deer/km^2. Tremblay et al. (2006) used densities of 0, 7.5, 15, 27 and 52 deer/km^2 and found suppressed reproduction and growth after 3 years at approximately >15 deer/km^2 – the major difference in these studies was the amount of time that areas were exposed to reduced deer densities. Our study will continue for at least the next two years, and it will be interesting to see if these trends remain, or if the effects of WTD exclusion manifest themselves on future plant community dynamics.

Future directions

While valuable information on the effects of differing WTD densities on the vegetation dynamics was gleaned, in different habitats, and across a chronosequence of canopy gap succession, still more could be done to resolve other issues. The following are recommended for future studies:

1. Analysis of woody and herbaceous species should be done separately across treatment combinations, as their dynamics may differ.
2. A comprehensive analysis should be done of the abundance and diversity of the canopy surrounding gaps, and these should be compared with local seedling and sapling assemblages across treatment combinations to assess potential differences. For example, if the woody understory is of lower diversity relative to the canopy, this suggests future canopy composition may be lower than what is currently present (see Nuttle et al. 2013).
3. An under- and overstory sampling of similar-aged *closed* canopy forest should be done across treatment combinations to assess vegetation dynamics in these areas as well. Although fall flora may not differ, it is plausible that low WTD density areas may have higher native diversity and abundance in the spring flora.
4. The same sampling scheme should be done in spring in all of our fall sampled gaps, as most of the diversity is found in the herbaceous understory (Spicer et al. 2020), and their dynamics may differ from that of the fall flora.

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APPENDIX 1

Table A1 C-JAG Site 1 (Camp Garfield, 41.217083, -81.110028) at dry enclosures (E) and Control (C) from 2020.

Plot	Sub plot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Epilobium coloratum*	yes	3	0.024	1	1		0.024	
E	1	*Fragaria virginiana*	yes	3	0.024	1	1		0.024	
E	1	*Fraxinus spp.*	yes	10	0.081	1	1		0.081	
E	1	*Impatiens capensis*	yes	3	0.024	1	1		0.024	
E	1	*Oxalis*	yes	2	0.016	1	1		0.016	
E	1	*Poa*	no	20	0.161	1		1		0.1613
E	1	*Quercus Rubra*	yes	3	0.024	1	1		0.024	
E	1	*Rhamnus frangula*	no	20	0.161	1		1		0.1613
E	1	*Rosa multiflora*	no	10	0.081	1		1		0.0806
E	1	*Rubis allegheniensis*	yes	30	0.242	1	1		0.242	
E	1	*Rubis idaeus*	yes	3	0.024	1	1		0.024	
E	1	*Rush 1*	yes	2	0.016	1	1		0.016	
E	1	*Slash*	3	5	0.040	1				
E	1	*Symphyotrichum lateriflorum*	yes	2	0.016	1	1		0.016	
E	1	*Toxicodendron radicans*	yes	5	0.040	1	1		0.040	
E	1	*Vitis sp.*	yes	3	0.024	1	1		0.024	
				124	**1.000**	**16**	**12**	**3**	**0.556**	**0.4032**
E	2	*Epilobium coloratum*	yes	10	0.063	1	1		0.063	
E	2	*Fragaria virginiana*	yes	2	0.013	1	1		0.013	
E	2	*Fraxinus spp.*	yes	5	0.031	1	1		0.031	
E	2	*Impatiens capensis*	yes	20	0.126	1	1		0.126	
E	2	*Oxalis*	yes	3	0.019	1	1		0.019	
E	2	*Persicaria sagittata*	yes	3	0.019	1	1		0.019	
E	2	*Poa*	no	5	0.031	1		1		0.0314
E	2	*Rhamnus frangula*	no	10	0.063	1		1		0.0629
E	2	*Rosa multiflora*	no	5	0.031	1		1		0.0314
E	2	*Rubis allegheniensis*	yes	70	0.440	1	1		0.440	
E	2	*Rush 1*	yes	8	0.050	1	1		0.050	
E	2	*Thelypteris noveboracensis*	yes	5	0.031	1	1		0.031	
E	2	*Toxicodendron radicans*	yes	10	0.063	1	1		0.063	
E	2	*Vitis sp.*	yes	3	0.019	1	1		0.019	
				159	**1.000**	**14**	**11**	**3**	**0.874**	**0.1258**
E	3	*Acer rubrum*	yes	2	0.017	1	1		0.017	
E	3	*Epilobium coloratum*	yes	3	0.026	1	1		0.026	
E	3	*Fragaria virginiana*	yes	2	0.017	1	1		0.017	
E	3	*Fraxinus spp.*	yes	5	0.043	1	1		0.043	
E	3	*Impatiens capensis*	yes	2	0.017	1	1		0.017	
E	3	*Oxalis*	yes	3	0.026	1	1		0.026	
E	3	*Poa*	no	10	0.086	1		1		0.0862
E	3	*Quercus Rubra*	yes	3	0.026	1	1		0.026	
E	3	*Rhamnus frangula*	no	8	0.069	1		1		0.069
E	3	*Rosa multiflora*	no	30	0.259	1		1		0.2586
E	3	*Rubis allegheniensis*	yes	40	0.345	1	1		0.345	
E	3	*Rush 1*	yes	2	0.017	1	1		0.017	
E	3	*Slash*	3	3	0.026	1				
E	3	*Vitis sp.*	yes	3	0.026	1	1		0.026	
				116	**1.000**	**14**	**10**	**3**	**0.560**	**0.4138**

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	1	*Epilobium coloratum*	yes	4	0.023	1	1		0.023	
C	1	*Fraxinus spp.*	yes	8	0.047	1	1		0.047	
C	1	*Impatiens capensis*	yes	3	0.017	1	1		0.017	
C	1	*Moss*	3	4	0.023	1				
C	1	*Persicaria virginiana*	yes	2	0.012	1	1		0.012	
C	1	*Poa*	no	40	0.233	1		1		0.233
C	1	*Quercus Rubra*	yes	5	0.029	1	1		0.029	
C	1	*Rhamnus frangula*	no	20	0.116	1		1		0.116
C	1	*Rosa multiflora*	no	3	0.017	1		1		0.017
C	1	*Rubis allegheniensis*	yes	30	0.174	1	1		0.174	
C	1	*Rubis idaeus*	yes	30	0.174	1	1		0.174	
C	1	*Slash*	3	4	0.023	1				
C	1	*Solidago flexicaulis*	yes	6	0.035	1	1		0.035	
C	1	*Thelypteris noveboracensis*	yes	10	0.058	1	1		0.058	
C	1	*Toxicodendron radicans*	yes	3	0.017	1	1		0.017	
				172	**1.000**	**15**	**10**	**3**	**0.587**	**0.366**
C	2	*Bareground*	3	5	0.037	1				
C	2	*Epilobium coloratum*	yes	3	0.022	1	1		0.022	
C	2	*Fragaria virginiana*	yes	10	0.074	1	1		0.074	
C	2	*Fraxinus spp.*	yes	5	0.037	1	1		0.037	
C	2	*Impatiens capensis*	yes	3	0.022	1	1		0.022	
C	2	*Moss*	3	4	0.030	1				
C	2	*Persicaria virginiana*	yes	2	0.015	1	1		0.015	
C	2	*Poa*	no	25	0.185	1		1		0.185
C	2	*Quercus Rubra*	yes	2	0.015	1	1		0.015	
C	2	*Rhamnus frangula*	no	15	0.111	1		1		0.111
C	2	*Rosa multiflora*	no	3	0.022	1		1		0.022
C	2	*Rubis allegheniensis*	yes	30	0.222	1	1		0.222	
C	2	*Rubis idaeus*	yes	6	0.044	1	1		0.044	
C	2	*Slash*	3	6	0.044	1				
C	2	*Solidago flexicaulis*	yes	3	0.022	1	1		0.022	
C	2	*Thelypteris noveboracensis*	yes	10	0.074	1	1		0.074	
C	2	*Toxicodendron radicans*	yes	3	0.022	1	1		0.022	
				135	**1.000**	**17**	**11**	**3**	**0.570**	**0.319**
C	3	*Acer rubrum*	yes	3	0.021	1	1		0.021	
C	3	*Bare ground*	3	3	0.021	1				
C	3	*Carya spp.*	yes	2	0.014	1	1		0.014	
C	3	*Epilobium coloratum*	yes	3	0.021	1	1		0.021	
C	3	*Fragaria virginiana*	yes	8	0.056	1	1		0.056	
C	3	*Fraxinus spp.*	yes	6	0.042	1	1		0.042	
C	3	*Impatiens capensis*	yes	5	0.035	1	1		0.035	
C	3	*Moss*	3	3	0.021	1				
C	3	*Oxalis*	yes	2	0.014	1	1		0.014	
C	3	*Persicaria virginiana*	yes	2	0.014	1	1		0.014	
C	3	*Poa*	no	9	0.063	1		1		0.063
C	3	*Quercus rubra*	yes	8	0.056	1	1		0.056	
C	3	*Rhamnus frangula*	no	15	0.105	1		1		0.105
C	3	*Rosa multiflora*	no	5	0.035	1		1		0.035
C	3	*Rubis allegheniensis*	yes	40	0.280	1	1		0.280	
C	3	*Rubis idaeus*	yes	10	0.070	1	1		0.070	
C	3	*Slash*	3	5	0.035	1				
C	3	*Solidago flexicaulis*	yes	3	0.021	1	1		0.021	
C	3	*Thelypteris noveboracensis*	yes	8	0.056	1	1		0.056	
C	3	*Toxicodendron radicans*	yes	3	0.021	1	1		0.021	
				143	**1.000**	**20**	**14**	**3**	**0.720**	**0.203**

Table A2 C-JAG Site 2 (Camp Garfield, 41.218278, -81.107472) at dry enclosures (E) and Control (C) from 2020.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Acer rubrum*	yes	3	0.024	1	1		0.024	
E	1	*Bare ground*	3	10	0.079	1				
E	1	*Carya spp.*	yes	8	0.063	1	1		0.063	
E	1	*Doellingeria umbellata*	yes	20	0.159	1	1		0.159	
E	1	*Fragaria virginiana*	yes	5	0.040	1	1		0.040	
E	1	*Mitchella repens*	yes	5	0.040	1	1		0.040	
E	1	*Moss*	3	3	0.024	1				
E	1	*Oxalis*	yes	3	0.024	1	1		0.024	
E	1	*Poa*	no	10	0.079	1		1		0.079
E	1	*Quercus Rubra*	yes	15	0.119	1	1		0.119	
E	1	*Rhamnus frangula*	no	5	0.040	1		1		0.040
E	1	*Rosa multiflora*	no	20	0.159	1		1		0.159
E	1	*Slash*	3	8	0.063	1				
E	1	*Symphyotrichum lateriflorum*	yes	3	0.024	1	1		0.024	
E	1	*Toxicodendron radicans*	yes	3	0.024	1	1		0.024	
E	1	*Ulmus spp.*	yes	5	0.040	1	1		0.040	
				126	**1.000**	**16**	**10**	**3**	**0.556**	**0.278**
E	2	*Acer rubrum*	yes	5	0.040	1	1		0.040	
E	2	*Bare ground*	3	8	0.064	1				
E	2	*Carya spp.*	yes	8	0.064	1	1		0.064	
E	2	*Doellingeria umbellata*	yes	5	0.040	1	1		0.040	
E	2	*Fragaria virginiana*	yes	5	0.040	1	1		0.040	
E	2	*Mitchella repens*	yes	7	0.056	1	1		0.056	
E	2	*Moss*	3	5	0.040	1				
E	2	*Oxalis*	yes	3	0.024	1	1		0.024	
E	2	*Poa*	no	8	0.064	1		1		0.064
E	2	*Quercus Rubra*	yes	30	0.240	1	1		0.240	
E	2	*Rhamnus frangula*	no	10	0.080	1		1		0.080
E	2	*Rosa multiflora*	no	5	0.040	1		1		0.040
E	2	*Rubis allegheniensis*	yes	3	0.024	1	1		0.024	
E	2	*Slash*	3	5	0.040	1				
E	2	*Symphyotrichum lateriflorum*	yes	2	0.016	1	1		0.016	
E	2	*Toxicodendron radicans*	yes	5	0.040	1	1		0.040	
E	2	*Ulmus spp.*	yes	8	0.064	1	1		0.064	
E	2	*Vitis sp.*	yes	3	0.024	1	1		0.024	
				125	**1.000**	**18**	**12**	**3**	**0.672**	**0.184**
E	3	*Acer rubrum*	yes	5	0.038	1	1		0.038	
E	3	*Bare ground*	3	3	0.023	1				
E	3	*Carya spp.*	yes	5	0.038	1	1		0.038	
E	3	*Cornus florida*	yes	3	0.023	1	1		0.023	
E	3	*Doellingeria umbellata*	yes	8	0.060	1	1		0.060	
E	3	*Fragaria virginiana*	yes	5	0.038	1	1		0.038	
E	3	*Fraxinus spp.*	yes	10	0.075	1	1		0.075	
E	3	*Mitchella repens*	yes	3	0.023	1	1		0.023	
E	3	*Moss*	3	3	0.023	1				
E	3	*Oxalis*	yes	2	0.015	1	1		0.015	
E	3	*Poa*	no	8	0.060	1		1		0.060
E	3	*Quercus Rubra*	yes	40	0.301	1	1		0.301	
E	3	*Rhamnus frangula*	no	6	0.045	1		1		0.045
E	3	*Rosa multiflora*	no	10	0.075	1		1		0.075
E	3	*Rubis allegheniensis*	yes	3	0.023	1	1		0.023	
E	3	*Rubis idaeus*	yes	5	0.038	1	1		0.038	
E	3	*Slash*	3	6	0.045	1				

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	3	*Solidago lancifolia*	yes	2	0.015	1	1		0.015	
E	3	*Symphyotrichum lateriflorum*	yes	1	0.008	1	1		0.008	
E	3	*Toxicodendron radicans*	yes	3	0.023	1	1		0.023	
E	3	*Vitis sp.*	yes	2	0.015	1	1		0.015	
-	-	-		**133**	**1.000**	**21**	**15**	**3**	**0.729**	**0.180**
C	1	*Bare ground*	3	15	0.149	1				
C	1	*Carya spp.*	yes	6	0.059	1	1		0.059	
C	1	*Cornus florida*	yes	5	0.050	1	1		0.050	
C	1	*Doellingeria umbellata*	yes	3	0.030	1	1		0.030	
C	1	*Fragaria virginiana*	yes	3	0.030	1	1		0.030	
C	1	*Fraxinus spp.*	yes	8	0.079	1	1		0.079	
C	1	*Moss*	3	3	0.030	1				
C	1	*Populus spp.*	yes	5	0.050	1	1		0.050	
C	1	*Quercus Rubra*	yes	20	0.198	1	1		0.198	
C	1	*Rhamnus frangula*	no	8	0.079	1		1		0.079
C	1	*Slash*	3	5	0.050	1				
C	1	*Symphyotrichum lateriflorum*	yes	3	0.030	1	1		0.030	
C	1	*Toxicodendron radicans*	yes	5	0.050	1	1		0.050	
C	1	*Ulmus spp.*	yes	10	0.099	1	1		0.099	
C	1	*Vitis sp.*	yes	2	0.020	1	1		0.020	
				101	**1.000**	**15**	**11**	**1**	**0.693**	**0.079**
C	2	*Bare ground*	3	10	0.116	1				
C	2	*Carya spp.*	yes	5	0.058	1	1		0.058	
C	2	*Cornus florida*	yes	2	0.023	1	1		0.023	
C	2	*Doellingeria umbellata*	yes	3	0.035	1	1		0.035	
C	2	*Fragaria virginiana*	yes	10	0.116	1	1		0.116	
C	2	*Fraxinus spp.*	yes	5	0.058	1	1		0.058	
C	2	*Moss*	3	5	0.058	1				
C	2	*Populus spp.*	yes	2	0.023	1	1		0.023	
C	2	*Quercus rubra*	yes	8	0.093	1	1		0.093	
C	2	*Rhamnus frangula*	no	6	0.070	1		1		0.070
C	2	*Slash*	3	8	0.093	1				
C	2	*Symphyotrichum lateriflorum*	yes	8	0.093	1	1		0.093	
C	2	*Toxicodendron radicans*	yes	2	0.023	1	1		0.023	
C	2	*Ulmus spp.*	yes	10	0.116	1	1		0.116	
C	2	*Vitis sp.*	yes	2	0.023	1	1		0.023	
				86	**1.000**	**15**	**11**	**1**	**0.663**	**0.070**
C	3	*Bare ground*	3	10	0.143	1				
C	3	*Carya spp.*	yes	5	0.071	1	1		0.071	
C	3	*Cornus florida*	yes	1	0.014	1	1		0.014	
C	3	*Doellingeria umbellata*	yes	8	0.114	1	1		0.114	
C	3	*Fragaria virginiana*	yes	8	0.114	1	1		0.114	
C	3	*Fraxinus spp.*	yes	3	0.043	1	1		0.043	
C	3	*Mitchella repens*	yes	4	0.057	1	1		0.057	
C	3	*Moss*	3	3	0.043	1				
C	3	*Oxalis*	yes	3	0.043	1	1		0.043	
C	3	*Populus spp.*	yes	4	0.057	1	1		0.057	
C	3	*Quercus Rubra*	yes	5	0.071	1	1		0.071	
C	3	*Rhamnus frangula*	no	4	0.057	1		1		0.057
C	3	*Slash*	3	3	0.043	1				
C	3	*Symphyotrichum lateriflorum*	yes	3	0.043	1	1		0.043	
C	3	*Toxicodendron radicans*	yes	5	0.071	1	1		0.071	
C	3	*Vitis sp.*	yes	1	0.014	1	1		0.014	
				70	**1.000**	**16**	**12**	**1**	**0.714**	**0.057**

Table A3 C-JAG Site 3 (Camp Garfield, 41.221972, -81.102056) at dry enclosures (E) and Control (C) from 2020.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Acer rubrum*	yes	3	0.022	1	1		0.022	
E	1	*Bare ground*	3	10	0.075	1				
E	1	*Carex 3*	yes	1	0.007	1	1		0.007	
E	1	*Carex 4*	yes	30	0.224	1	1		0.224	
E	1	*Carya spp.*	yes	3	0.022	1	1		0.022	
E	1	*Cornus florida*	yes	1	0.007	1	1		0.007	
E	1	*Dryopteris*	yes	2	0.015	1	1		0.015	
E	1	*Epilobium coloratum*	yes	2	0.015	1	1		0.015	
E	1	*Fagus grandifolia*	yes	15	0.112	1	1		0.112	
E	1	*Fragaria virginiana*	yes	2	0.015	1	1		0.015	
E	1	*Impatiens capensis*	yes	5	0.037	1	1		0.037	
E	1	*Microstegium vimineum*	no	1	0.007	1		1		0.007
E	1	*Mitchella repens*	yes	2	0.015	1	1		0.015	
E	1	*Moss*	3	2	0.015	1				
E	1	*Nyssa sylvatica*	yes	2	0.015	1	1		0.015	
E	1	*Oxalis*	yes	2	0.015	1	1		0.015	
E	1	*Phytolacca decandra*	yes	1	0.007	1	1		0.007	
E	1	*Prunella vulgaris*	yes	2	0.015	1	1		0.015	
E	1	*Rubis allegheniensis*	yes	5	0.037	1	1		0.037	
E	1	*Rubis idaeus*	yes	20	0.149	1	1		0.149	
E	1	*Slash*	3	5	0.037	1				
E	1	*Solidago graminifolia*	yes	1	0.007	1	1		0.007	
E	1	*Solidago lancifolia*	yes	3	0.022	1	1		0.022	
E	1	*Symphyotrichum ericoides*	yes	4	0.030	1	1		0.030	
E	1	*Symphyotrichum lateriflorum*	yes	2	0.015	1	1		0.015	
E	1	*Taraxacum*	yes	4	0.030	1	1		0.030	
E	1	*Toxicodendron radicans*	yes	3	0.022	1	1		0.022	
E	1	*Vitis sp.*	yes	1	0.007	1	1		0.007	
				134	**1.000**	**28**	**24**	**1**	**0.866**	**0.007**
E	2	*Acer rubrum*	yes	5	0.033	1	1		0.033	
E	2	*Bare ground*	3	15	0.099	1				
E	2	*Carex 3*	yes	2	0.013	1	1		0.013	
E	2	*Carex 4*	yes	20	0.132	1	1		0.132	
E	2	*Carya spp.*	yes	1	0.007	1	1		0.007	
E	2	*Cornus florida*	yes	5	0.033	1	1		0.033	
E	2	*Dryopteris*	yes	3	0.020	1	1		0.020	
E	2	*Fagus grandifolia*	yes	1	0.007	1	1		0.007	
E	2	*Fragaria virginiana*	yes	2	0.013	1	1		0.013	
E	2	*Hypericum*	yes	8	0.053	1	1		0.053	
E	2	*Impatiens capensis*	yes	5	0.033	1	1		0.033	
E	2	*Microstegium vimineum*	no	2	0.013	1		1		0.013
E	2	*Mitchella repens*	yes	1	0.007	1	1		0.007	
E	2	*Moss*	3	8	0.053	1				
E	2	*Oxalis*	yes	2	0.013	1	1		0.013	
E	2	*Prunella vulgaris*	yes	2	0.013	1	1		0.013	
E	2	*Rubis allegheniensis*	yes	30	0.197	1	1		0.197	
E	2	*Rubis idaeus*	yes	20	0.132	1	1		0.132	
E	2	*Slash*	3	8	0.053	1				
E	2	*Solidago graminifolia*	yes	2	0.013	1	1		0.013	
E	2	*Symphyotrichum lateriflorum*	yes	3	0.020	1	1		0.020	
E	2	*Taraxacum*	yes	2	0.013	1	1		0.013	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	2	*Toxicodendron radicans*	yes	2	0.013	1	1		0.013	
E	2	*Vitis sp.*	yes	3	0.020	1	1		0.020	
				152	**1.000**	**24**	**20**	**1**	**0.783**	**0.013**
E	3	*Acer rubrum*	yes	4	0.031	1	1		0.031	
E	3	*Bare ground*	3	40	0.305	1				
E	3	*Carex 3*	yes	2	0.015	1	1		0.015	
E	3	*Carex 4*	yes	10	0.076	1	1		0.076	
E	3	*Carya spp.*	yes	1	0.008	1	1		0.008	
E	3	*Cornus florida*	yes	1	0.008	1	1		0.008	
E	3	*Dryopteris*	yes	1	0.008	1	1		0.008	
E	3	*Fagus grandifolia*	yes	15	0.115	1	1		0.115	
E	3	*Fragaria virginiana*	yes	5	0.038	1	1		0.038	
E	3	*Hypericum*	yes	2	0.015	1	1		0.015	
E	3	*Impatiens capensis*	yes	2	0.015	1	1		0.015	
E	3	*Mentha arvensis*	yes	8	0.061	1	1		0.061	
E	3	*Microstegium vimineum*	no	3	0.023	1		1		0.023
E	3	*Mitchella repens*	yes	2	0.015	1	1		0.015	
E	3	*Moss*	3	5	0.038	1				
E	3	*Oxalis*	yes	3	0.023	1	1		0.023	
E	3	*Prunella vulgaris*	yes	1	0.008	1	1		0.008	
E	3	*Rhamnus frangula*	no	3	0.023	1		1		0.023
E	3	*Rubis allegheniensis*	yes	5	0.038	1	1		0.038	
E	3	*Rubis idaeus*	yes	3	0.023	1	1		0.023	
E	3	*Slash*	3	8	0.061	1				
E	3	*Solidago graminifolia*	yes	1	0.008	1	1		0.008	
E	3	*Symphyotrichum lateriflorum*	yes	1	0.008	1	1		0.008	
E	3	*Taraxacum*	yes	2	0.015	1	1		0.015	
E	3	*Toxicodendron radicans*	yes	1	0.008	1	1		0.008	
E	3	*Vitis sp.*	yes	2	0.015	1	1		0.015	
				131	**1.000**	**26**	**21**	**2**	**0.550**	**0.046**
C	1	*Acer rubrum*	yes	8	0.055	1	1		0.055	
C	1	*Bare ground*	3	5	0.034	1				
C	1	*Carex 4*	yes	10	0.069	1	1		0.069	
C	1	*Carpinus caroliniana*	yes	2	0.014	1	1		0.014	
C	1	*Carya spp.*	yes	5	0.034	1	1		0.034	
C	1	*Fragaria virginiana*	yes	2	0.014	1	1		0.014	
C	1	*Fraxinus spp.*	yes	8	0.055	1	1		0.055	
C	1	*Lindera benzoin*	yes	3	0.021	1	1		0.021	
C	1	*Mitchella repens*	yes	3	0.021	1	1		0.021	
C	1	*Oxalis*	yes	3	0.021	1	1		0.021	
C	1	*Rubis allegheniensis*	yes	70	0.483	1	1		0.483	
C	1	*Rubis idaeus*	yes	20	0.138	1	1		0.138	
C	1	*Slash*	yes	4	0.028	1	1		0.028	
C	1	*Veronica officinalis*	no	2	0.014	1		1		0.014
				145	**1.000**	**14**	**12**	**1**	**0.952**	**0.014**
C	2	*Acer rubrum*	yes	5	0.036	1	1		0.036	
C	2	*Carex 4*	yes	5	0.036	1	1		0.036	
C	2	*Dryopteris*	yes	5	0.036	1	1		0.036	
C	2	*Epilobium coloratum*	yes	2	0.014	1	1		0.014	
C	2	*Fagus grandifolia*	yes	8	0.057	1	1		0.057	
C	2	*Fragaria virginiana*	yes	3	0.021	1	1		0.021	
C	2	*Lindera benzoin*	yes	1	0.007	1	1		0.007	
C	2	*Phytolacca decandra*	yes	8	0.057	1	1		0.057	
C	2	*Quercus Rubra*	yes	3	0.021	1	1		0.021	
C	2	*Rubis allegheniensis*	yes	80	0.571	1	1		0.571	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	2	*Rubis idaeus*	yes	10	0.071	1	1		0.071	
C	2	*Slash*	3	2	0.014	1				
C	2	*Solidago lancifolia*	yes	4	0.029	1	1		0.029	
C	2	*Symphyotrichum lateriflorum*	yes	3	0.021	1	1		0.021	
C	2	*Veronica officinalis*	no	1	0.007	1		1		0.007
				140	**1.000**	**15**	**13**	**1**	**0.979**	**0.007**
C	3	*Acer rubrum*	yes	8	0.058	1	1		0.058	
C	3	*Carex 4*	yes	8	0.058	1	1		0.058	
C	3	*Dryopteris*	yes	10	0.073	1	1		0.073	
C	3	*Fragaria virginiana*	yes	1	0.007	1	1		0.007	
C	3	*Phytolacca decandra*	yes	5	0.036	1	1		0.036	
C	3	*Poa*	no	3	0.022	1		1		0.022
C	3	*Rubis allegheniensis*	yes	90	0.657	1	1		0.657	
C	3	*Rubis idaeus*	yes	10	0.073	1	1		0.073	
C	3	*Slash*	3	1	0.007	1				
C	3	*Veronica officinalis*	no	1	0.007	1		1		0.007
				137	**1.000**	**10**	**7**	**2**	**0.964**	**0.029**

Table A4 C-JAG Site 4 (Camp Garfield, 41.221556, -81.105361) at dry enclosures (E) and Control (C) from 2020.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Acer rubrum*	yes	6	0.034	1	1		0.034	
E	1	*Bare ground*	3	8	0.045	1				
E	1	*Carex 4*	yes	8	0.045	1	1		0.045	
E	1	*Carya spp.*	yes	3	0.017	1	1		0.017	
E	1	*Fragaria virginiana*	yes	8	0.045	1	1		0.045	
E	1	*Fraxinus spp.*	yes	15	0.084	1	1		0.084	
E	1	*Hypericum*	yes	3	0.017	1	1		0.017	
E	1	*Liriodendron tulipifera*	yes	10	0.056	1	1		0.056	
E	1	*Microstegium vimineum*	no	5	0.028	1		1		0.028
E	1	*Moss*	3	8	0.045	1				
E	1	*Parthenocissus quinquefolia*	yes	3	0.017	1	1		0.017	
E	1	*Poa*	no	10	0.056	1		1		0.056
E	1	*Prunus serotina*	yes	5	0.028	1	1		0.028	
E	1	*Quercus Rubra*	yes	12	0.067	1	1		0.067	
E	1	*Rhamnus frangula*	no	8	0.045	1		1		0.045
E	1	*Rubis allegheniensis*	yes	15	0.084	1	1		0.084	
E	1	*Slash*	3	20	0.112	1				
E	1	*Solidago graminifolia*	yes	1	0.006	1	1		0.006	
E	1	*Symphyotrichum ericoides*	yes	12	0.067	1	1		0.067	
E	1	*Symphyotrichum lateriflorum*	yes	2	0.011	1	1		0.011	
E	1	*Toxicodendron radicans*	yes	3	0.017	1	1		0.017	
E	1	*Ulmus spp.*	yes	2	0.011	1	1		0.011	
E	1	*Viburnum cassinoides*	yes	2	0.011	1	1		0.011	
E	1	*Vitis sp.*	yes	8	0.045	1	1		0.045	
E	1	*Woody unknown*	3	1	0.006	1				
				178	**1.000**	**25**	**18**	**3**	**0.663**	**0.129**
E	2	*Acer rubrum*	yes	5	0.028	1	1		0.028	
E	2	*Acer rubrum stump sprouts*	yes	8	0.045	1	1		0.045	
E	2	*Bare ground*	3	10	0.056	1				
E	2	*Carex 3*	yes	2	0.011	1	1		0.011	
E	2	*Carex 4*	yes	5	0.028	1	1		0.028	
E	2	*Carya spp.*	yes	8	0.045	1	1		0.045	
E	2	*Cornus florida*	yes	1	0.006	1	1		0.006	
E	2	*Dryopteris*	yes	5	0.028	1	1		0.028	
E	2	*Fragaria virginiana*	yes	12	0.068	1	1		0.068	
E	2	*Liriodendron tulipifera*	yes	2	0.011	1	1		0.011	
E	2	*Moss*	3	5	0.028	1				
E	2	*Prunus serotina*	yes	5	0.028	1	1		0.028	
E	2	*Quercus Rubra*	yes	2	0.011	1	1		0.011	
E	2	*Rhamnus frangula*	no	5	0.028	1		1		0.028
E	2	*Rubis allegheniensis*	yes	70	0.395	1	1		0.395	
E	2	*Slash*	3	4	0.023	1				
E	2	*Symphyotrichum ericoides*	yes	4	0.023	1	1		0.023	
E	2	*Toxicodendron radicans*	yes	5	0.028	1	1		0.028	
E	2	*Ulmus spp.*	yes	15	0.085	1	1		0.085	
E	2	*Viburnum cassinoides*	yes	1	0.006	1	1		0.006	
E	2	*Vitis sp.*	yes	2	0.011	1	1		0.011	
E	2	*Woody unknown*	3	1	0.006	1				
				177	**1.000**	**22**	**17**	**1**	**0.859**	**0.028**
E	3	*Acer rubrum*	yes	8	0.064	1	1		0.064	
E	3	*Bare ground*	3	30	0.240	1				
E	3	*Carex 3*	yes	1	0.008	1	1		0.008	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	3	*Carex 4*	yes	8	0.064	1	1		0.064	
E	3	*Carya spp.*	yes	1	0.008	1	1		0.008	
E	3	*Fragaria virginiana*	yes	4	0.032	1	1		0.032	
E	3	*Liriodendron tulipifera*	yes	4	0.032	1	1		0.032	
E	3	*Mitchella repens*	yes	3	0.024	1	1		0.024	
E	3	*Moss*	3	5	0.040	1				
E	3	*Prunus serotina*	yes	5	0.040	1	1		0.040	
E	3	*Quercus Rubra*	yes	8	0.064	1	1		0.064	
E	3	*Rhamnus frangula*	no	4	0.032	1		1		0.032
E	3	*Rubis allegheniensis*	yes	10	0.080	1	1		0.080	
E	3	*Sassafras albidum*	yes	1	0.008	1	1		0.008	
E	3	*Slash*	3	10	0.080	1				
E	3	*Symphyotrichum ericoides*	yes	2	0.016	1	1		0.016	
E	3	*Toxicodendron radicans*	yes	2	0.016	1	1		0.016	
E	3	*Ulmus spp.*	yes	15	0.120	1	1		0.120	
E	3	*Viburnum cassinoides*	yes	1	0.008	1	1		0.008	
E	3	*Vitis sp.*	yes	1	0.008	1	1		0.008	
E	3	*Woody unknown*	3	2	0.016	1				
				125	**1.000**	**21**	**16**	**1**	**0.592**	**0.032**
C	1	*Acer rubrum*	yes	1	0.008	1	1		0.008	
C	1	*Bare ground*	3	40	0.305	1				
C	1	*Carex 3*	yes	2	0.015	1	1		0.015	
C	1	*Carex 4*	yes	1	0.008	1	1		0.008	
C	1	*Carpinus caroliniana*	yes	5	0.038	1	1		0.038	
C	1	*Carya spp.*	yes	3	0.023	1	1		0.023	
C	1	*Dryopteris*	yes	2	0.015	1	1		0.015	
C	1	*Fraxinus spp.*	yes	8	0.061	1	1		0.061	
C	1	*Lindera benzoin*	yes	1	0.008	1	1		0.008	
C	1	*Liriodendron tulipifera*	yes	2	0.015	1	1		0.015	
C	1	*Moss*	3	3	0.023	1				
C	1	*Oxalis*	yes	1	0.008	1	1		0.008	
C	1	*Prunus serotina*	yes	2	0.015	1	1		0.015	
C	1	*Quercus Rubra*	yes	12	0.092	1	1		0.092	
C	1	*Rhamnus frangula*	no	3	0.023	1		1		0.023
C	1	*Rubis allegheniensis*	yes	10	0.076	1	1		0.076	
C	1	*Slash*	3	3	0.023	1				
C	1	*Solidago spp.*	yes	2	0.015	1	1		0.015	
C	1	*Thelypteris noveboracensis*	yes	25	0.191	1	1		0.191	
C	1	*Toxicodendron radicans*	yes	2	0.015	1	1		0.015	
C	1	*Veronica officinalis*	no	2	0.015	1		1		0.015
C	1	*Vitis sp.*	yes	1	0.008	1	1		0.008	
				131	**1.000**	**22**	**17**	**2**	**0.611**	**0.038**
C	2	*Acer rubrum*	yes	5	0.040	1	1		0.040	
C	2	*Bare ground*	3	10	0.079	1				
C	2	*Carex 3*	yes	8	0.063	1	1		0.063	
C	2	*Carex 4*	yes	5	0.040	1	1		0.040	
C	2	*Carpinus caroliniana*	yes	15	0.119	1	1		0.119	
C	2	*Carya spp.*	yes	3	0.024	1	1		0.024	
C	2	*Dryopteris*	yes	5	0.040	1	1		0.040	
C	2	*Fraxinus spp.*	yes	20	0.159	1	1		0.159	
C	2	*Lindera benzoin*	yes	3	0.024	1	1		0.024	
C	2	*Liriodendron tulipifera*	yes	1	0.008	1	1		0.008	
C	2	*Moss*	3	4	0.032	1				
C	2	*Oxalis*	yes	2	0.016	1	1		0.016	
C	2	*Prunus serotina*	yes	5	0.040	1	1		0.040	
C	2	*Quercus Rubra*	yes	12	0.095	1	1		0.095	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	2	*Rhamnus frangula*	no	9	0.071	1		1		0.071
C	2	*Rubis allegheniensis*	yes	5	0.040	1	1		0.040	
C	2	*Slash*	3	2	0.016	1				
C	2	*Solidago spp.*	yes	2	0.016	1	1		0.016	
C	2	*Thelypteris noveboracensis*	yes	2	0.016	1	1		0.016	
C	2	*Toxicodendron radicans*	yes	5	0.040	1	1		0.040	
C	2	*Veronica officinalis*	no	1	0.008	1		1		0.008
C	2	*Vitis sp.*	yes	2	0.016	1	1		0.016	
				126	**1.000**	**22**	**17**	**2**	**0.794**	**0.079**
C	3	*Bare ground*	3	15	0.142	1				
C	3	*Carex 3*	yes	6	0.057	1	1		0.057	
C	3	*Carex 4*	yes	5	0.047	1	1		0.047	
C	3	*Carpinus caroliniana*	yes	3	0.028	1	1		0.028	
C	3	*Carya spp.*	yes	3	0.028	1	1		0.028	
C	3	*Fraxinus spp.*	yes	30	0.283	1	1		0.283	
C	3	*Liriodendron tulipifera*	yes	5	0.047	1	1		0.047	
C	3	*Moss*	3	5	0.047	1				
C	3	*Oxalis*	yes	1	0.009	1	1		0.009	
C	3	*Prunus serotina*	yes	2	0.019	1	1		0.019	
C	3	*Quercus Rubra*	yes	7	0.066	1	1		0.066	
C	3	*Rhamnus frangula*	no	10	0.094	1		1		0.094
C	3	*Rubis allegheniensis*	yes	5	0.047	1	1		0.047	
C	3	*Slash*	3	2	0.019	1				
C	3	*Solidago spp.*	yes	1	0.009	1	1		0.009	
C	3	*Thelypteris noveboracensis*	yes	1	0.009	1	1		0.009	
C	3	*Toxicodendron radicans*	yes	2	0.019	1	1		0.019	
C	3	*Veronica officinalis*	no	1	0.009	1		1		0.009
C	3	*Vitis sp.*	yes	2	0.019	1	1		0.019	
				106	**1.000**	**19**	**14**	**2**	**0.689**	**0.104**

Table A5 C-JAG Site 5 (Camp Garfield, 41.220389, -81.108583) at dry enclosures (E) and Control (C) from 2020.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Acer rubrum*	yes	2	0.012	1	1		0.012	
E	1	*Acer rubrum stump sprouts*	yes	1	0.006	1	1		0.006	
E	1	*Bare ground*	3	15	0.092	1				
E	1	*Carex 1*	yes	30	0.184	1	1		0.184	
E	1	*Carex 3*	yes	3	0.018	1	1		0.018	
E	1	*Epilobium coloratum*	yes	1	0.006	1	1		0.006	
E	1	*Fagus grandifolia*	yes	5	0.031	1	1		0.031	
E	1	*Fragaria virginiana*	yes	2	0.012	1	1		0.012	
E	1	*Galium*	yes	2	0.012	1	1		0.012	
E	1	*Liriodendron tulipifera*	yes	15	0.092	1	1		0.092	
E	1	*Microstegium vimineum*	no	3	0.018	1		1		0.018
E	1	*Mimulus alatus*	yes	2	0.012	1	1		0.012	
E	1	*Moss*	3	2	0.012	1				
E	1	*Oxalis*	yes	2	0.012	1	1		0.012	
E	1	*Prunus serotina*	yes	2	0.012	1	1		0.012	
E	1	*Quercus Rubra*	yes	20	0.123	1	1		0.123	
E	1	*Rhamnus frangula*	no	4	0.025	1		1		0.025
E	1	*Rubis allegheniensis*	yes	20	0.123	1	1		0.123	
E	1	*Slash*	3	8	0.049	1				
E	1	*Solidago spp.*	yes	1	0.006	1	1		0.006	
E	1	*Solidago flexicaulis*	yes	3	0.018	1	1		0.018	
E	1	*Symphyotrichum lateriflorum*	yes	5	0.031	1	1		0.031	
E	1	*Taraxacum*	yes	1	0.006	1	1		0.006	
E	1	*Toxicodendron radicans*	yes	2	0.012	1	1		0.012	
E	1	*Veronica officinalis*	no	10	0.061	1		1		0.061
E	1	*Vitis sp.*	yes	2	0.012	1	1		0.012	
				163	**1.000**	**26**	**20**	**3**	**0.742**	**0.104**
E	2	*Acer rubrum*	yes	1	0.007	1	1		0.007	
E	2	*Acer rubrum stump sprouts*	yes	1	0.007	1	1		0.007	
E	2	*Bare ground*	3	5	0.037	1				
E	2	*Carex 1*	yes	8	0.059	1	1		0.059	
E	2	*Carex 3*	yes	1	0.007	1	1		0.007	
E	2	*Carex 4*	yes	10	0.074	1	1		0.074	
E	2	*Carya spp.*	yes	2	0.015	1	1		0.015	
E	2	*Doellingeria umbellata*	yes	3	0.022	1	1		0.022	
E	2	*Epilobium coloratum*	yes	2	0.015	1	1		0.015	
E	2	*Fragaria virginiana*	yes	9	0.067	1	1		0.067	
E	2	*Galium*	yes	5	0.037	1	1		0.037	
E	2	*Liriodendron tulipifera*	yes	12	0.089	1	1		0.089	
E	2	*Mitchella repens*	yes	2	0.015	1	1		0.015	
E	2	*Moss*	3	2	0.015	1				
E	2	*Potentilla*	yes	3	0.022	1	1		0.022	
E	2	*Poa*	no	6	0.044	1		1		0.044
E	2	*Prunus serotina*	yes	1	0.007	1	1		0.007	
E	2	*Quercus Rubra*	yes	10	0.074	1	1		0.074	
E	2	*Rhamnus frangula*	no	5	0.037	1		1		0.037
E	2	*Rubis allegheniensis*	yes	20	0.148	1	1		0.148	
E	2	*Rubis idaeus*	yes	3	0.022	1	1		0.022	
E	2	*Rush*	yes	3	0.022	1	1		0.022	
E	2	*Solidago lancifolia*	yes	2	0.015	1	1		0.015	
E	2	*Symphyotrichum lateriflorum*	yes	4	0.030	1	1		0.030	
E	2	*Thelypteris noveboracensis*	yes	8	0.059	1	1		0.059	
E	2	*Toxicodendron radicans*	yes	3	0.022	1	1		0.022	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	2	*Veronica officinalis*	no	2	0.015	1		1		0.015
E	2	*Vitis sp.*	yes	2	0.015	1	1		0.015	
				135	**1.000**	**28**	**23**	**3**	**0.852**	**0.096**
E	3	*Acer rubrum*	yes	5	0.030	1	1		0.030	
E	3	*Bare ground*	3	15	0.091	1				
E	3	*Carex 3*	yes	8	0.048	1	1		0.048	
E	3	*Carex 4*	yes	3	0.018	1	1		0.018	
E	3	*Carya spp.*	yes	5	0.030	1	1		0.030	
E	3	*Cornus florida*	yes	2	0.012	1	1		0.012	
E	3	*Doellingeria umbellata*	yes	5	0.030	1	1		0.030	
E	3	*Epilobium coloratum*	yes	2	0.012	1	1		0.012	
E	3	*Fagus grandifolia*	yes	2	0.012	1	1		0.012	
E	3	*Fragaria virginiana*	yes	10	0.061	1	1		0.061	
E	3	*Galium*	yes	2	0.012	1	1		0.012	
E	3	*Liriodendron tulipifera*	yes	20	0.121	1	1		0.121	
E	3	*Mitchella repens*	yes	2	0.012	1	1		0.012	
E	3	*Moss*	3	5	0.030	1				
E	3	*Oxalis*	yes	1	0.006	1	1		0.006	
E	3	*Panicum*	no	1	0.006	1		1		0.006
E	3	*Poa*	no	2	0.012	1		1		0.012
E	3	*Quercus Rubra*	yes	10	0.061	1	1		0.061	
E	3	*Rhamnus frangula*	no	5	0.030	1		1		0.030
E	3	*Rubis allegheniensis*	yes	40	0.242	1	1		0.242	
E	3	*Slash*	3	8	0.048	1				
E	3	*Symphyotrichum lateriflorum*	yes	5	0.030	1	1		0.030	
E	3	*Toxicodendron radicans*	yes	1	0.006	1	1		0.006	
E	3	*Viola sagittata*	yes	1	0.006	1	1		0.006	
E	3	*Vitis sp.*	yes	5	0.030	1	1		0.030	
				165	**1.000**	**25**	**19**	**3**	**0.782**	**0.048**
C	1	*Acer rubrum*	yes	5	0.030	1	1		0.030	
C	1	*Aster simplex*	yes	3	0.018	1	1		0.018	
C	1	*Bare ground*	3	5	0.030	1				
C	1	*Carex 3*	yes	8	0.048	1	1		0.048	
C	1	*Carex 4*	yes	15	0.091	1	1		0.091	
C	1	*Fagus grandifolia*	yes	1	0.006	1	1		0.006	
C	1	*Fragaria virginiana*	yes	2	0.012	1	1		0.012	
C	1	*Liriodendron tulipifera*	yes	15	0.091	1	1		0.091	
C	1	*Mitchella repens*	yes	2	0.012	1	1		0.012	
C	1	*Moss*	yes	2	0.012	1	1		0.012	
C	1	*Oxalis*	yes	2	0.012	1	1		0.012	
C	1	*Parthenocissus quinquefolia*	yes	2	0.012	1	1		0.012	
C	1	*Potentilla*	yes	1	0.006	1	1		0.006	
C	1	*Quercus Rubra*	yes	3	0.018	1	1		0.018	
C	1	*Rubis allegheniensis*	yes	70	0.424	1	1		0.424	
C	1	*Rubis idaeus*	yes	5	0.030	1	1		0.030	
C	1	*Solidago lancifolia*	yes	2	0.012	1	1		0.012	
C	1	*Symphyotrichum ericoides*	yes	1	0.006	1	1		0.006	
C	1	*Symphyotrichum lateriflorum*	yes	5	0.030	1	1		0.030	
C	1	*Symphyotrichum puniceum*	yes	2	0.012	1	1		0.012	
C	1	*Toxicodendron radicans*	yes	2	0.012	1	1		0.012	
C	1	*Veronica officinalis*	no	10	0.061	1		1		0.061
C	1	*Vitis sp.*	yes	2	0.012	1	1		0.012	
				165	**1.000**	**23**	**21**	**1**	**0.909**	**0.061**
C	2	*Acer rubrum*	yes	1	0.009	1	1		0.009	
C	2	*Bare ground*	3	20	0.185	1				
C	2	*Carex 1*	yes	6	0.056	1	1		0.056	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	2	*Carex 3*	yes	3	0.028	1	1		0.028	
C	2	*Carex 4*	yes	30	0.278	1	1		0.278	
C	2	*Epilobium coloratum*	yes	1	0.009	1	1		0.009	
C	2	*Fagus grandifolia*	yes	5	0.046	1	1		0.046	
C	2	*Fraxinus spp.*	yes	3	0.028	1	1		0.028	
C	2	*Liriodendron tulipifera*	yes	10	0.093	1	1		0.093	
C	2	*Mitchella repens*	yes	3	0.028	1	1		0.028	
C	2	*Moss*	3	1	0.009	1				
C	2	*Prunella vulgaris*	yes	2	0.019	1	1		0.019	
C	2	*Quercus Rubra*	yes	8	0.074	1	1		0.074	
C	2	*Rhamnus frangula*	no	1	0.009	1		1		0.009
C	2	*Solidago flexicaulis*	yes	3	0.028	1	1		0.028	
C	2	*Symphyotrichum ericoides*	yes	1	0.009	1	1		0.009	
C	2	*Symphyotrichum lateriflorum*	yes	1	0.009	1	1		0.009	
C	2	*Taraxacum*	yes	2	0.019	1	1		0.019	
C	2	*Toxicodendron radicans*	yes	2	0.019	1	1		0.019	
C	2	*Veronica officinalis*	no	2	0.019	1		1		0.019
C	2	*Vitis sp.*	yes	3	0.028	1	1		0.028	
				108	**1.000**	**21**	**17**	**2**	**0.778**	**0.028**
C	3	*Acer rubrum*	yes	2	0.034	1	1		0.034	
C	3	*Bare ground*	3	15	0.259	1				
C	3	*Carex 3*	yes	2	0.034	1	1		0.034	
C	3	*Carex 4*	yes	10	0.172	1	1		0.172	
C	3	*Epilobium coloratum*	yes	1	0.017	1	1		0.017	
C	3	*Fagus grandifolia*	yes	1	0.017	1	1		0.017	
C	3	*Liriodendron tulipifera*	yes	5	0.086	1	1		0.086	
C	3	*Mitchella repens*	yes	4	0.069	1	1		0.069	
C	3	*Moss*	3	3	0.052	1				
C	3	*Quercus Rubra*	yes	4	0.069	1	1		0.069	
C	3	*Solidago flexicaulis*	yes	2	0.034	1	1		0.034	
C	3	*Symphyotrichum ericoides*	yes	2	0.034	1	1		0.034	
C	3	*Symphyotrichum lateriflorum*	yes	1	0.017	1	1		0.017	
C	3	*Toxicodendron radicans*	yes	1	0.017	1	1		0.017	
C	3	*Vitis sp.*	yes	5	0.086	1	1		0.086	
				58	**1.000**	**15**	**13**	**0**	**0.690**	**0.000**

Table A6 C-JAG Site 6 (Camp Garfield, 41.180194, -81.133917) at wet enclosures (E) and Control (C) from 2020.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Rubis allegheniensis*	yes	80	0.533	1	1		0.533	
E	1	*Rush*	yes	10	0.067	1	1		0.067	
E	1	*Thelypteris noveboracensis*	yes	60	0.400	1	1		0.400	
				150	**1.000**	**3**	**3**	**0**	**1.000**	**0.000**
E	2	*Carya spp.*	yes	2	0.010	1	1		0.010	
E	2	*Lindera benzoin*	yes	40	0.193	1	1		0.193	
E	2	*Rubis allegheniensis*	yes	90	0.435	1	1		0.435	
E	2	*Thelypteris noveboracensis*	yes	70	0.338	1	1		0.338	
E	2	*Vitis sp.*	yes	5	0.024	1	1		0.024	
				207	**1.000**	**5**	**5**	**0**	**1.000**	**0.000**
E	3	*Rosa multiflora*	no	5	0.029	1		1		0.029
E	3	*Rubis allegheniensis*	yes	90	0.514	1	1		0.514	
E	3	*Thelypteris noveboracensis*	yes	80	0.457	1	1		0.457	
				175	**1.000**	**3**	**2**	**1**	**0.971**	**0.029**
C	1	*Carex 1*	yes	5	0.046	1	1		0.046	
C	1	*Fragaria virginiana*	yes	2	0.018	1	1		0.018	
C	1	*Rubis allegheniensis*	yes	10	0.092	1	1		0.092	
C	1	*Slash*	3	2	0.018	1				
C	1	*Thelypteris noveboracensis*	yes	90	0.826	1	1		0.826	
				109	**1.000**	**5**	**4**	**0**	**0.982**	**0.000**
C	2	*Carex 1*	yes	8	0.071	1	1		0.071	
C	2	*Lindera benzoin*	yes	5	0.044	1	1		0.044	
C	2	*Rubis allegheniensis*	yes	8	0.071	1	1		0.071	
C	2	*Rush*	yes	2	0.018	1	1		0.018	
C	2	*Thelypteris noveboracensis*	yes	90	0.796	1	1		0.796	
				113	**1.000**	**5**	**5**	**0**	**1.000**	**0.000**
C	3	*Fraxinus spp.*	yes	5	0.046	1	1		0.046	
C	3	*Lindera benzoin*	yes	3	0.028	1	1		0.028	
C	3	*Rubis allegheniensis*	yes	8	0.074	1	1		0.074	
C	3	*Slash*	3	2	0.019	1				
C	3	*Thelypteris noveboracensis*	yes	90	0.833	1	1		0.833	
				108	**1.000**	**5**	**4**	**0**	**0.981**	**0.000**

Table A7 C-JAG Site 7 (Camp Garfield, 41.181694, -81.134694) at wet enclosures (E) and Control (C) from 2020.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Carex 4*	yes	5	0.036	1	1		0.036	
E	1	*Fagus grandifolia*	yes	2	0.014	1	1		0.014	
E	1	*Fraxinus spp.*	yes	2	0.014	1	1		0.014	
E	1	*Liriodendron tulipifera*	yes	3	0.022	1	1		0.022	
E	1	*Poa*	no	9	0.065	1		1		0.065
E	1	*Quercus Rubra*	yes	8	0.058	1	1		0.058	
E	1	*Rubis allegheniensis*	yes	40	0.288	1	1		0.288	
E	1	*Thelypteris noveboracensis*	yes	70	0.504	1	1		0.504	
				139	**1.000**	**8**	**7**	**1**	**0.935**	**0.065**
E	2	*Carpinus caroliniana*	yes	10	0.083	1	1		0.083	
E	2	*Lindera benzoin*	yes	10	0.083	1	1		0.083	
E	2	*Quercus Rubra*	yes	5	0.042	1	1		0.042	
E	2	*Rubis allegheniensis*	yes	5	0.042	1	1		0.042	
E	2	*Thelypteris noveboracensis*	yes	90	0.750	1	1		0.750	
				120	**1.000**	**5**	**5**	**0**	**1.000**	**0.000**
E	3	*Quercus Rubra*	yes	8	0.078	1	1		0.078	
E	3	*Rubis allegheniensis*	yes	5	0.049	1	1		0.049	
E	3	*Thelypteris noveboracensis*	yes	90	0.874	1	1		0.874	
				103	**1.000**	**3**	**3**	**0**	**1.000**	**0.000**
C	1	*Carex 1*	yes	50	0.472	1	1		0.472	
C	1	*Lindera benzoin*	yes	8	0.075	1	1		0.075	
C	1	*Liriodendron tulipifera*	yes	1	0.009	1	1		0.009	
C	1	*Poa*	no	4	0.038	1		1		0.038
C	1	*Slash*	3	3	0.028	1				
C	1	*Thelypteris noveboracensis*	yes	40	0.377	1	1		0.377	
				106	**1.000**	**6**	**4**	**1**	**0.934**	**0.038**
C	2	*Lindera benzoin*	yes	2	0.020	1	1		0.020	
C	2	*Liriodendron tulipifera*	yes	2	0.020	1	1		0.020	
C	2	*Rubis allegheniensis*	yes	10	0.100	1	1		0.100	
C	2	*Rubis idaeus*	yes	5	0.050	1	1		0.050	
C	2	*Sassafras albidum*	yes	1	0.010	1	1		0.010	
C	2	*Thelypteris noveboracensis*	yes	80	0.800	1	1		0.800	
				100	**1.000**	**6**	**6**	**0**	**1.000**	**0.000**
C	3	*Bare ground*	3	10	0.095	1				
C	3	*Carex 1*	yes	3	0.029	1	1		0.029	
C	3	*Lindera benzoin*	yes	1	0.010	1	1		0.010	
C	3	*Poa*	no	2	0.019	1		1		0.019
C	3	*Rubis allegheniensis*	yes	5	0.048	1	1		0.048	
C	3	*Sassafras albidum*	yes	4	0.038	1	1		0.038	
C	3	*Thelypteris noveboracensis*	yes	80	0.762	1	1		0.762	
				105	**1.000**	**7**	**5**	**1**	**0.886**	**0.019**

Table A8 C-JAG Site 8 (Camp Garfield, 41.179889, -81.13675) at wet enclosures (E) and Control (C) from 2020.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Bare ground*	3	2	0.015	1				
E	1	*Carex 1*	yes	10	0.073	1	1		0.073	
E	1	*Epilobium coloratum*	yes	2	0.015	1	1		0.015	
E	1	*Fagus grandifolia*	yes	3	0.022	1	1		0.022	
E	1	*Fragaria virginiana*	yes	2	0.015	1	1		0.015	
E	1	*Impatiens capensis*	yes	20	0.146	1	1		0.146	
E	1	*Moss*	3	1	0.007	1				
E	1	*Onoclea sensibilis*	yes	15	0.109	1	1		0.109	
E	1	*Rubis allegheniensis*	yes	2	0.015	1	1		0.015	
E	1	*Rush*	yes	5	0.036	1	1		0.036	
E	1	*Solidago spp.*	yes	3	0.022	1	1		0.022	
E	1	*Symphyotrichum lateriflorum*	yes	2	0.015	1	1		0.015	
E	1	*Thelypteris noveboracensis*	yes	70	0.511	1	1		0.511	
				137	**1.000**	**13**	**11**	**0**	**0.978**	**0.000**
E	2	*Bare ground*	3	2	0.013	1				
E	2	*Carex 1*	yes	70	0.452	1	1		0.452	
E	2	*Carya spp.*	yes	2	0.013	1	1		0.013	
E	2	*Fraxinus spp.*	yes	5	0.032	1	1		0.032	
E	2	*Impatiens capensis*	yes	3	0.019	1	1		0.019	
E	2	*Onoclea sensibilis*	yes	10	0.065	1	1		0.065	
E	2	*Oxalis*	yes	1	0.006	1	1		0.006	
E	2	*Rubis allegheniensis*	yes	5	0.032	1	1		0.032	
E	2	*Rush*	yes	5	0.032	1	1		0.032	
E	2	*Thelypteris noveboracensis*	yes	50	0.323	1	1		0.323	
E	2	*Toxicodendron radicans*	yes	2	0.013	1	1		0.013	
				155	**1.000**	**11**	**10**	**0**	**0.987**	**0.000**
E	3	*Carex 1*	yes	80	0.588	1	1		0.588	
E	3	*Fraxinus spp.*	yes	8	0.059	1	1		0.059	
E	3	*Impatiens capensis*	yes	5	0.037	1	1		0.037	
E	3	*Rubis allegheniensis*	yes	15	0.110	1	1		0.110	
E	3	*Rush*	yes	5	0.037	1	1		0.037	
E	3	*Thelypteris noveboracensis*	yes	20	0.147	1	1		0.147	
E	3	*Toxicodendron radicans*	yes	3	0.022	1	1		0.022	
				136	**1.000**	**7**	**7**	**0**	**1.000**	**0.000**
C	1	*Bare ground*	3	5	0.050	1				
C	1	*Fagus grandifolia*	yes	2	0.020	1	1		0.020	
C	1	*Slash*	3	3	0.030	1				
C	1	*Thelypteris noveboracensis*	yes	90	0.900	1	1		0.900	
				100	**1.000**	**4**	**2**	**0**	**0.920**	**0.000**
C	2	*Acer rubrum*	yes	1	0.009	1	1		0.009	
C	2	*Carex 1*	yes	10	0.085	1	1		0.085	
C	2	*Fagus grandifolia*	yes	8	0.068	1	1		0.068	
C	2	*Fraxinus spp.*	yes	6	0.051	1	1		0.051	
C	2	*Persicaria virginiana*	yes	2	0.017	1	1		0.017	
C	2	*Rubis allegheniensis*	yes	10	0.085	1	1		0.085	
C	2	*Thelypteris noveboracensis*	yes	80	0.684	1	1		0.684	
				117	**1.000**	**7**	**7**	**0**	**1.000**	**0.000**
C	3	*Acer rubrum*	yes	2	0.016	1	1		0.016	
C	3	*Bare ground*	3	8	0.063	1				
C	3	*Fagus grandifolia*	yes	15	0.119	1	1		0.119	
C	3	*Mitchella repens*	yes	2	0.016	1	1		0.016	
C	3	*Persicaria virginiana*	yes	8	0.063	1	1		0.063	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	3	*Quercus Rubra*	yes	3	0.024	1	1		0.024	
C	3	*Rubis allegheniensis*	yes	5	0.040	1	1		0.040	
C	3	*Slash*	3	5	0.040	1				
C	3	*Solidago spp.*	yes	8	0.063	1	1		0.063	
C	3	*Thelypteris noveboracensis*	yes	70	0.556	1	1		0.556	
				126	**1.000**	**10**	**8**	**0**	**0.897**	**0.000**

Table A9 C-JAG Site 9 (Camp Garfield, 41.182556, -81.135139) at wet enclosures (E) and Control (C) from 2020.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Carex 1*	yes	20	0.097	1	1		0.097	
E	1	*Epilobium coloratum*	yes	3	0.015	1	1		0.015	
E	1	*Hypericum*	yes	3	0.015	1	1		0.015	
E	1	*Lindera benzoin*	yes	70	0.340	1	1		0.340	
E	1	*Rubis allegheniensis*	yes	80	0.388	1	1		0.388	
E	1	*Thelypteris noveboracensis*	yes	20	0.097	1	1		0.097	
E	1	*Crataegus sp.*	yes	10	0.049	1	1		0.049	
				206	**1.000**	**7**	**7**	**0**	**1.000**	**0.000**
E	2	*Epilobium coloratum*	yes	8	0.063	1	1		0.063	
E	2	*Lindera benzoin*	yes	5	0.039	1	1		0.039	
E	2	*Persicaria sagittata*	yes	30	0.236	1	1		0.236	
E	2	*Poa*	no	10	0.079	1		1		0.079
E	2	*Rosa multiflora*	no	10	0.079	1		1		0.079
E	2	*Rubis allegheniensis*	yes	10	0.079	1	1		0.079	
E	2	*Solidago flexicaulis*	yes	4	0.031	1	1		0.031	
E	2	*Thelypteris noveboracensis*	yes	50	0.394	1	1		0.394	
				127	**1.000**	**8**	**6**	**2**	**0.843**	**0.157**
E	3	*Fraxinus spp.*	yes	10	0.042	1	1		0.042	
E	3	*Lindera benzoin*	yes	50	0.210	1	1		0.210	
E	3	*Oxalis*	yes	3	0.013	1	1		0.013	
E	3	*Persicaria sagittata*	yes	30	0.126	1	1		0.126	
E	3	*Persicaria virginiana*	yes	2	0.008	1	1		0.008	
E	3	*Poa*	no	20	0.084	1		1		0.084
E	3	*Rosa multiflora*	no	3	0.013	1		1		0.013
E	3	*Rubis allegheniensis*	yes	70	0.294	1	1		0.294	
E	3	*Thelypteris noveboracensis*	yes	50	0.210	1	1		0.210	
				238	**1.000**	**9**	**7**	**2**	**0.903**	**0.097**
C	1	*Fraxinus spp.*	yes	8	0.076	1	1		0.076	
C	1	*Lindera benzoin*	yes	3	0.029	1	1		0.029	
C	1	*Liriodendron tulipifera*	yes	3	0.029	1	1		0.029	
C	1	*Onoclea sensibilis*	yes	5	0.048	1	1		0.048	
C	1	*Quercus Rubra*	yes	1	0.010	1	1		0.010	
C	1	*Rubis allegheniensis*	yes	5	0.048	1	1		0.048	
C	1	*Thelypteris noveboracensis*	yes	80	0.762	1	1		0.762	
				105	**1.000**	**7**	**7**	**0**	**1.000**	**0.000**
C	2	*Carex 1*	yes	8	0.069	1	1		0.069	
C	2	*Fraxinus spp.*	yes	8	0.069	1	1		0.069	
C	2	*Lindera benzoin*	yes	3	0.026	1	1		0.026	
C	2	*Onoclea sensibilis*	yes	3	0.026	1	1		0.026	
C	2	*Persicaria virginiana*	yes	3	0.026	1	1		0.026	
C	2	*Poa*	no	8	0.069	1		1		0.069
C	2	*Rubis allegheniensis*	yes	3	0.026	1	1		0.026	
C	2	*Thelypteris noveboracensis*	yes	80	0.690	1	1		0.690	
				116	**1.000**	**8**	**7**	**1**	**0.931**	**0.069**
C	3	*Lindera benzoin*	yes	5	0.047	1	1		0.047	
C	3	*Onoclea sensibilis*	yes	2	0.019	1	1		0.019	
C	3	*Persicaria virginiana*	yes	3	0.028	1	1		0.028	
C	3	*Rubis allegheniensis*	yes	3	0.028	1	1		0.028	
C	3	*Slash*	3	3	0.028	1				
C	3	*Thelypteris noveboracensis*	yes	90	0.849	1	1		0.849	
				106	**1.000**	**6**	**5**	**0**	**0.972**	**0.000**

Table A10 C-JAG Site 1 (Camp Garfield, 41.217083, -81.110028) at dry enclosures (E) and Control (C) from 2019.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Arisaema triphyllum*	yes	1	0.006	1	1		0.006	
E	1	*Bare ground*	3	15	0.091	1				
E	1	*Carex 1*	yes	50	0.305	1	1		0.305	
E	1	*Carya spp.*	yes	1	0.006	1	1		0.006	
E	1	*Cornus florida*	yes	1	0.006	1	1		0.006	
E	1	*Epilobium coloratum*	yes	1	0.006	1	1		0.006	
E	1	*Fraxinus spp.*	yes	10	0.061	1	1		0.061	
E	1	*Impatiens capensis*	yes	10	0.061	1	1		0.061	
E	1	*Moss*	3	1	0.006	1				
E	1	*Oxalis*	yes	1	0.006	1	1		0.006	
E	1	*Panicum*	no	2	0.012	1		1		0.012
E	1	*Potentilla*	yes	3	0.018	1	1		0.018	
E	1	*Quercus Rubra*	yes	2	0.012	1	1		0.012	
E	1	*Rhamnus frangula*	no	4	0.024	1		1		0.024
E	1	*Rosa multiflora*	no	5	0.030	1		1		0.030
E	1	*Rubis allegheniensis*	yes	40	0.244	1	1		0.244	
E	1	*Rubis idaeus*	yes	1	0.006	1	1		0.006	
E	1	*Slash*	3	5	0.030	1				
E	1	*Solidago spp.*	yes	2	0.012	1	1		0.012	
E	1	*Symphyotrichum ericoides*	yes	1	0.006	1	1		0.006	
E	1	*Symphyotrichum lateriflorum*	yes	4	0.024	1	1		0.024	
E	1	*Thelypteris noveboracensis*	yes	1	0.006	1	1		0.006	
E	1	*Toxicodendron radicans*	yes	1	0.006	1	1		0.006	
E	1	*Veronica officinalis*	no	1	0.006	1		1		0.006
E	1	*Vitis sp.*	yes	1	0.006	1	1		0.006	
				164	**1.000**	**25**	**18**	**4**	**0.799**	**0.073**
E	2	*Ambrosia trifida*	yes	3	0.017	1	1		0.017	
E	2	*Bare ground*	3	5	0.029	1				
E	2	*Carex 1*	yes	80	0.460	1	1		0.460	
E	2	*Impatiens capensis*	yes	8	0.046	1	1		0.046	
E	2	*Moss*	3	1	0.006	1				
E	2	*Oxalis*	yes	1	0.006	1	1		0.006	
E	2	*Panicum*	no	4	0.023	1		1		0.023
E	2	*Persicaria sagittata*	yes	2	0.011	1	1		0.011	
E	2	*Phytolacca decandra*	yes	1	0.006	1	1		0.006	
E	2	*Potentilla*	yes	1	0.006	1	1		0.006	
E	2	*Quercus Rubra*	yes	2	0.011	1	1		0.011	
E	2	*Rhamnus frangula*	no	10	0.057	1		1		0.057
E	2	*Rubis allegheniensis*	yes	30	0.172	1	1		0.172	
E	2	*Rubis idaeus*	yes	2	0.011	1	1		0.011	
E	2	*Rush 1*	yes	5	0.029	1	1		0.029	
E	2	*Rush 2*	yes	2	0.011	1	1		0.011	
E	2	*Slash*	3	1	0.006	1				
E	2	*Solidago spp.*	yes	6	0.034	1	1		0.034	
E	2	*Symphyotrichum ericoides*	yes	4	0.023	1	1		0.023	
E	2	*Thelypteris noveboracensis*	yes	2	0.011	1	1		0.011	
E	2	*Toxicodendron radicans*	yes	1	0.006	1	1		0.006	
E	2	*Ulmus spp.*	yes	2	0.011	1	1		0.011	
E	2	*Vitis sp.*	yes	1	0.006	1	1		0.006	
				174	**1.000**	**23**	**18**	**2**	**0.879**	**0.080**
E	3	*Bare ground*	3	15	0.094	1				
E	3	*Carex 1*	yes	35	0.220	1	1		0.220	
E	3	*Carya spp.*	yes	1	0.006	1	1		0.006	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	3	*Cornus florida*	yes	2	0.013	1	1		0.013	
E	3	*Epilobium ciliatum*	yes	1	0.006	1	1		0.006	
E	3	*Erigeron*	yes	1	0.006	1	1		0.006	
E	3	*Fraxinus spp.*	yes	4	0.025	1	1		0.025	
E	3	*Impatiens capensis*	yes	2	0.013	1	1		0.013	
E	3	*Mimulus alatus*	yes	8	0.050	1	1		0.050	
E	3	*Panicum*	no	8	0.050	1		1		0.050
E	3	*Potentilla*	yes	3	0.019	1	1		0.019	
E	3	*Prunus serotina*	yes	1	0.006	1	1		0.006	
E	3	*Quercus Rubra*	yes	5	0.031	1	1		0.031	
E	3	*Rhamnus frangula*	no	8	0.050	1		1		0.050
E	3	*Rosa multiflora*	no	25	0.157	1		1		0.157
E	3	*Rubis allegheniensis*	yes	30	0.189	1	1		0.189	
E	3	*Solidago spp.*	yes	1	0.006	1	1		0.006	
E	3	*Symphyotrichum ericoides*	yes	1	0.006	1	1		0.006	
E	3	*Thelypteris noveboracensis*	yes	5	0.031	1	1		0.031	
E	3	*Veronica officinalis*	no	2	0.013	1		1		0.013
E	3	*Vitis sp.*	yes	1	0.006	1	1		0.006	
				159	**1.000**	**21**	**16**	**4**	**0.635**	**0.270**
C	1	*Bare ground*	3	10	0.070	1				
C	1	*Carex 1*	yes	40	0.280	1	1		0.280	
C	1	*Carex 2*	yes	2	0.014	1	1		0.014	
C	1	*Dryopteris*	yes	4	0.028	1	1		0.028	
C	1	*Fraxinus spp.*	yes	5	0.035	1	1		0.035	
C	1	*Impatiens capensis*	yes	10	0.070	1	1		0.070	
C	1	*Mimulus alatus*	yes	4	0.028	1	1		0.028	
C	1	*Oxalis*	yes	2	0.014	1	1		0.014	
C	1	*Moss*	3	5	0.035	1				
C	1	*Panicum*	no	8	0.056	1		1		0.056
C	1	*Pilea*	yes	3	0.021	1	1		0.021	
C	1	*Poa*	no	1	0.007	1		1		0.007
C	1	*Quercus Rubra*	yes	1	0.007	1	1		0.007	
C	1	*Rhamnus frangula*	no	5	0.035	1		1		0.035
C	1	*Rosa multiflora*	no	3	0.021	1		1		0.021
C	1	*Rubis allegheniensis*	yes	10	0.070	1	1		0.070	
C	1	*Rubis idaeus*	yes	10	0.070	1	1		0.070	
C	1	*Rush 1*	yes	2	0.014	1	1		0.014	
C	1	*Slash*	3	5	0.035	1				
C	1	*Solidago spp.*	yes	2	0.014	1	1		0.014	
C	1	*Spiraea tomentosa*	yes	1	0.007	1	1		0.007	
C	1	*Symphyotrichum lateriflorum*	yes	6	0.042	1	1		0.042	
C	1	*Thelypteris noveboracensis*	yes	2	0.014	1	1		0.014	
C	1	*Woody unknown*	3	2	0.014	1				
				143	**1.000**	**24**	**16**	**4**	**0.727**	**0.119**
C	2	*Bare ground*	3	10	0.070	1				
C	2	*Carex 1*	yes	25	0.176	1	1		0.176	
C	2	*Carex 3*	yes	1	0.007	1	1		0.007	
C	2	*Carya spp.*	yes	2	0.014	1	1		0.014	
C	2	*Fraxinus spp.*	yes	10	0.070	1	1		0.070	
C	2	*Impatiens capensis*	yes	10	0.070	1	1		0.070	
C	2	*Mimulus alatus*	yes	8	0.056	1	1		0.056	
C	2	*Moss*	3	3	0.021	1				
C	2	*Oxalis*	yes	2	0.014	1	1		0.014	
C	2	*Panicum*	no	3	0.021	1		1		0.021
C	2	*Potentilla*	yes	5	0.035	1	1		0.035	
C	2	*Poa*	no	1	0.007	1		1		0.007

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	2	*Rhamnus frangula*	no	5	0.035	1		1		0.035
C	2	*Rubis allegheniensis*	yes	10	0.070	1	1		0.070	
C	2	*Rush 1*	yes	3	0.021	1	1		0.021	
C	2	*Slash*	3	15	0.106	1				
C	2	*Euthamia graminifolia*	yes	2	0.014	1	1		0.014	
C	2	*Solidago spp.*	yes	3	0.021	1	1		0.021	
C	2	*Spiraea tomentosa*	yes	2	0.014	1	1		0.014	
C	2	*Symphyotrichum lateriflorum*	yes	5	0.035	1	1		0.035	
C	2	*Taraxacum*	yes	1	0.007	1	1		0.007	
C	2	*Thelypteris noveboracensis*	yes	15	0.106	1	1		0.106	
C	2	*Viburnum cassinoides*	yes	1	0.007	1	1		0.007	
				142	**1.000**	**23**	**17**	**3**	**0.739**	**0.063**
C	3	*Acer rubrum*	yes	2	0.017	1	1		0.017	
C	3	*Aster simplex*	yes	1	0.009	1	1		0.009	
C	3	*Bare ground*	3	20	0.174	1				
C	3	*Carex 2*	yes	5	0.043	1	1		0.043	
C	3	*Carya spp.*	yes	1	0.009	1	1		0.009	
C	3	*Dryopteris*	yes	3	0.026	1	1		0.026	
C	3	*Fragaria virginiana*	yes	5	0.043	1	1		0.043	
C	3	*Fraxinus spp.*	yes	8	0.070	1	1		0.070	
C	3	*Lobelia inflata*	yes	1	0.009	1	1		0.009	
C	3	*Moss*	3	1	0.009	1				
C	3	*Oxalis*	yes	2	0.017	1	1		0.017	
C	3	*Panicum*	no	5	0.043	1		1		0.043
C	3	*Potentilla*	yes	4	0.035	1	1		0.035	
C	3	*Quercus Rubra*	yes	3	0.026	1	1		0.026	
C	3	*Rhamnus frangula*	no	8	0.070	1		1		0.070
C	3	*Rubis allegheniensis*	yes	25	0.217	1	1		0.217	
C	3	*Rubis idaeus*	yes	4	0.035	1	1		0.035	
C	3	*Slash*	3	8	0.070	1				
C	3	*Solanum dulcamara*	no	1	0.009	1		1		0.009
C	3	*Solidago spp.*	yes	1	0.009	1	1		0.009	
C	3	*Spiraea tomentosa*	yes	3	0.026	1	1		0.026	
C	3	*Taraxacum*	yes	1	0.009	1	1		0.009	
C	3	*Thelypteris noveboracensis*	yes	2	0.017	1	1		0.017	
C	3	*Viburnum cassinoides*	yes	1	0.009	1	1		0.009	
				115	**1.000**	**24**	**18**	**3**	**0.626**	**0.122**

Table A11 C-JAG Site 2 (Camp Garfield, 41.218278, -81.107472) at dry enclosures (E) and Control (C) from 2019.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Acer rubrum*	yes	1	0.009	1	1		0.009	
E	1	*Bare ground*	3	17	0.152	1				
E	1	*Carex 4*	yes	6	0.054	1	1		0.054	
E	1	*Carpinus caroliniana*	yes	5	0.045	1	1		0.045	
E	1	*Carya spp.*	yes	2	0.018	1	1		0.018	
E	1	*Doellingeria umbellata*	yes	10	0.090	1	1		0.090	
E	1	*Fragaria virginiana*	yes	2	0.018	1	1		0.018	
E	1	*Fraxinus spp.*	yes	3	0.027	1	1		0.027	
E	1	*Moss*	3	0.5	0.004	1				
E	1	*Oxalis*	yes	1	0.009	1	1		0.009	
E	1	*Potentilla*	no	3	0.027	1		1		0.027
E	1	*Poa*	no	6	0.054	1		1		0.054
E	1	*Quercus Rubra*	yes	15	0.135	1	1		0.135	
E	1	*Rhamnus frangula*	no	10	0.090	1		1		0.090
E	1	*Rosa multiflora*	no	10	0.090	1		1		0.090
E	1	*Rubis allegheniensis*	yes	6	0.054	1	1		0.054	
E	1	*Slash*	3	8	0.072	1				
E	1	*Solidago 2*	yes	1	0.009	1	1		0.009	
E	1	*Symphyotrichum lateriflorum*	yes	1	0.009	1	1		0.009	
E	1	*Veronica officinalis*	no	4	0.036	1		1		0.036
				111.5	**1.000**	**20**	**12**	**5**	**0.475**	**0.296**
E	2	*Acer rubrum*	yes	0.5	0.004	1	1		0.004	
E	2	*Bare ground*	3	12	0.094	1				
E	2	*Carex 3*	yes	1	0.008	1	1		0.008	
E	2	*Carex 4*	yes	1	0.008	1	1		0.008	
E	2	*Carpinus caroliniana*	yes	10	0.079	1	1		0.079	
E	2	*Carya spp.*	yes	4	0.031	1	1		0.031	
E	2	*Doellingeria umbellata*	yes	20	0.157	1	1		0.157	
E	2	*Dorment woody*	3	1	0.008	1				
E	2	*Fraxinus spp.*	yes	15	0.118	1	1		0.118	
E	2	*Moss*	3	2	0.016	1				
E	2	*Narrow Leaf Buckthorn*	no	1	0.008	1		1		0.008
E	2	*Oxalis*	yes	0.5	0.004	1	1		0.004	
E	2	*Potentilla*	yes	2	0.016	1	1		0.016	
E	2	*Poa*	no	0.5	0.004	1		1		0.004
E	2	*Prunus serotina*	yes	25	0.197	1	1		0.197	
E	2	*Rhamnus frangula*	no	8	0.063	1		1		0.063
E	2	*Rosa multiflora*	no	5	0.039	1		1		0.039
E	2	*Rubis allegheniensis*	yes	7	0.055	1	1		0.055	
E	2	*Slash*	3	10	0.079	1				
E	2	*Solidago 2*	yes	1	0.008	1	1		0.008	
E	2	*Veronica officinalis*	no	0.5	0.004	1		1		0.004
				127	**1.000**	**21**	**12**	**5**	**0.685**	**0.118**
E	3	*Bare ground*	3	16	0.115	1				
E	3	*Carex 4*	yes	4	0.029	1	1		0.029	
E	3	*Cornus florida*	yes	2	0.014	1	1		0.014	
E	3	*Doellingeria umbellata*	yes	17	0.122	1	1		0.122	
E	3	*Dorment woody*	3	1	0.007	1				
E	3	*Fragaria virginiana*	yes	0.5	0.004	1	1		0.004	
E	3	*Fraxinus spp.*	yes	9	0.065	1	1		0.065	
E	3	*Galium*	yes	0.5	0.004	1	1		0.004	
E	3	*Lobelia inflata*	yes	3	0.022	1	1		0.022	
E	3	*Moss*	3	3	0.022	1				

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	3	*Oxalis*	yes	3	0.022	1	1		0.022	
E	3	*Panicum*	no	3	0.022	1		1		0.022
E	3	*Potentilla*	yes	1	0.007	1	1		0.007	
E	3	*Poa*	no	0.5	0.004	1		1		0.004
E	3	*Quercus Rubra*	yes	40	0.287	1	1		0.287	
E	3	*Rhamnus frangula*	no	4	0.029	1		1		0.029
E	3	*Rosa multiflora*	no	10	0.072	1		1		0.072
E	3	*Rubis allegheniensis*	yes	3	0.022	1	1		0.022	
E	3	*Rubis idaeus*	yes	1	0.007	1	1		0.007	
E	3	*Slash*	3	8	0.057	1				
E	3	*Symphyotrichum ericoides*	yes	1	0.007	1	1		0.007	
E	3	*Symphyotrichum lateriflorum*	yes	3	0.022	1	1		0.022	
E	3	*Toxicodendron radicans*	yes	3	0.022	1	1		0.022	
E	3	*Veronica officinalis*	no	2	0.014	1		1		0.014
E	3	*Viburnum lentago*	yes	1	0.007	1	1		0.007	
				139.5	**1.000**	**25**	**16**	**5**	**0.659**	**0.140**
C	1	*Acer rubrum*	yes	2	0.014	1	1		0.014	
C	1	*Bare ground*	3	30	0.216	1				
C	1	*Carex 3*	yes	3	0.022	1	1		0.022	
C	1	*Carex 4*	yes	9	0.065	1	1		0.065	
C	1	*Carpinus caroliniana*	yes	10	0.072	1	1		0.072	
C	1	*Doellingeria umbellata*	yes	9	0.065	1	1		0.065	
C	1	*Fagus grandifolia*	yes	2	0.014	1	1		0.014	
C	1	*Fragaria virginiana*	yes	0.5	0.004	1	1		0.004	
C	1	*Fraxinus spp.*	yes	4	0.029	1	1		0.029	
C	1	*Lobelia inflata*	yes	3	0.022	1	1		0.022	
C	1	*Microstegium vimineum*	no	1	0.007	1		1		0.007
C	1	*Moss*	3	1	0.007	1				
C	1	*Oxalis*	yes	2	0.014	1	1		0.014	
C	1	*Populus spp.*	yes	3	0.022	1	1		0.022	
C	1	*Potentilla*	yes	19	0.137	1	1		0.137	
C	1	*Quercus Rubra*	yes	8	0.058	1	1		0.058	
C	1	*Rhamnus frangula*	no	10	0.072	1		1		0.072
C	1	*Rubis allegheniensis*	yes	5	0.036	1	1		0.036	
C	1	*Rush 1*	yes	1	0.007	1	1		0.007	
C	1	*Slash*	3	3	0.022	1				
C	1	*Symphyotrichum lateriflorum*	yes	7	0.050	1	1		0.050	
C	1	*Toxicodendron radicans*	yes	2	0.014	1	1		0.014	
C	1	*Viburnum cassinoides*	yes	1	0.007	1	1		0.007	
C	1	*Vitis sp.*	yes	0.5	0.004	1	1		0.004	
C	1	*Woody unknown*	3	3	0.022	1				
				139	**1.000**	**25**	**19**	**2**	**0.655**	**0.079**
C	2	*Acer rubrum*	yes	1	0.008	1	1		0.008	
C	2	*Bare ground*	3	30	0.253	1				
C	2	*Carex 4*	yes	0.5	0.004	1	1		0.004	
C	2	*Carpinus caroliniana*	yes	5	0.042	1	1		0.042	
C	2	*Carya spp.*	yes	2	0.017	1	1		0.017	
C	2	*Doellingeria umbellata*	yes	8	0.068	1	1		0.068	
C	2	*Fraxinus spp.*	yes	4	0.034	1	1		0.034	
C	2	*Galium*	yes	0.5	0.004	1	1		0.004	
C	2	*Lobelia inflata*	yes	2	0.017	1	1		0.017	
C	2	*Ludwigia alternifolia*	yes	2	0.017	1	1		0.017	
C	2	*Moss*	3	2	0.017	1				
C	2	*Oxalis*	yes	19	0.160	1	1		0.160	
C	2	*Potentilla*	yes	5	0.042	1	1		0.042	
C	2	*Poa*	no	5	0.042	1		1		0.042

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	2	*Quercus Rubra*	yes	5	0.042	1	1		0.042	
C	2	*Rhamnus frangula*	no	5	0.042	1		1		0.042
C	2	*Rubis allegheniensis*	yes	1	0.008	1	1		0.008	
C	2	*Rubis idaeus*	yes	0.5	0.004	1	1		0.004	
C	2	*Slash*	3	8	0.068	1				
C	2	*Symphyotrichum lateriflorum*	yes	6	0.051	1	1		0.051	
C	2	*Toxicodendron radicans*	yes	2	0.017	1	1		0.017	
C	2	*Veronica officinalis*	no	2	0.017	1		1		0.017
C	2	*Woody unknown*	3	3	0.025	1				
				118.5	**1.000**	**23**	**16**	**3**	**0.536**	**0.101**
C	3	*Bare ground*	3	20	0.214	1				
C	3	*Carex 1*	yes	3	0.032	1	1		0.032	
C	3	*Carex 4*	yes	3	0.032	1	1		0.032	
C	3	*Carpinus caroliniana*	yes	4	0.043	1	1		0.043	
C	3	*Doellingeria umbellata*	yes	14	0.150	1	1		0.150	
C	3	*Eupatorium perfoliatum*	yes	1	0.011	1	1		0.011	
C	3	*Fraxinus spp.*	yes	1	0.011	1	1		0.011	
C	3	*Lobelia inflata*	yes	9	0.096	1	1		0.096	
C	3	*Lonicera spp.*	no	1	0.011	1		1		0.011
C	3	*Moss*	3	0.5	0.005	1				
C	3	*Oxalis*	yes	0.5	0.005	1	1		0.005	
C	3	*Populus spp.*	yes	1	0.011	1	1		0.011	
C	3	*Potentilla*	yes	0.5	0.005	1	1		0.005	
C	3	*Poa*	no	3	0.032	1		1		0.032
C	3	*Quercus Rubra*	yes	2	0.021	1	1		0.021	
C	3	*Rhamnus frangula*	no	2	0.021	1		1		0.021
C	3	*Rubis allegheniensis*	yes	5	0.053	1	1		0.053	
C	3	*Rubis idaeus*	yes	5	0.053	1	1		0.053	
C	3	*Rush 1*	yes	0.5	0.005	1	1		0.005	
C	3	*Slash*	3	4	0.043	1				
C	3	*Solidago lancifolia*	yes	2	0.021	1	1		0.021	
C	3	*Sorghastrum nutans*	yes	0.5	0.005	1	1		0.005	
C	3	*Symphyotrichum lateriflorum*	yes	5	0.053	1	1		0.053	
C	3	*Toxicodendron radicans*	yes	4	0.043	1	1		0.043	
C	3	*Viola sagittata*	yes	1	0.011	1	1		0.011	
C	3	*Woody unknown*	3	1	0.011	1				
				93.5	**1.000**	**26**	**19**	**3**	**0.663**	**0.064**

Table A12 C-JAG Site 3 (Camp Garfield, 41.221972, -81.102056) at dry enclosures (E) and Control (C) from 2019.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	1	*Acer rubrum*	yes	3	0.033	1	1		0.033	
C	1	*Bare ground*	3	1	0.011	1				
C	1	*Carex 1*	yes	1	0.011	1	1		0.011	
C	1	*Carex 3*	yes	10	0.109	1	1		0.109	
C	1	*Carex 4*	yes	3	0.033	1	1		0.033	
C	1	*Fagus grandifolia*	yes	1	0.011	1	1		0.011	
C	1	*Fraxinus spp.*	yes	1	0.011	1	1		0.011	
C	1	*Liriodendron tulipifera*	yes	10	0.109	1	1		0.109	
C	1	*Moss*	3	2	0.022	1				
C	1	*Oxalis*	yes	1	0.011	1	1		0.011	
C	1	*Parthenocissus quinquefolia*	yes	3	0.033	1	1		0.033	
C	1	*Potentilla*	yes	1	0.011	1	1		0.011	
C	1	*Quercus Rubra*	yes	5	0.054	1	1		0.054	
C	1	*Rubis allegheniensis*	yes	20	0.217	1	1		0.217	
C	1	*Rubis idaeus*	yes	2	0.022	1	1		0.022	
C	1	*Rush 2*	yes	2	0.022	1	1		0.022	
C	1	*Slash*	3	10	0.109	1				
C	1	*Solidago spp.*	yes	2	0.022	1	1		0.022	
C	1	*Symphyotrichum lateriflorum*	yes	2	0.022	1	1		0.022	
C	1	*Thelypteris noveboracensis*	yes	1	0.011	1	1		0.011	
C	1	*Veronica officinalis*	no	5	0.054	1		1		0.054
C	1	*Vitis sp.*	yes	3	0.033	1	1		0.033	
C	1	*Woody unknown*	3	3	0.033	1				
				92	**1.000**	**23**	**18**	**1**	**0.772**	**0.054**
C	2	*Acer rubrum*	yes	1	0.008	1	1		0.008	
C	2	*Bare ground*	3	25	0.202	1				
C	2	*Carex 1*	yes	7	0.056	1	1		0.056	
C	2	*Carex 3*	yes	1	0.008	1	1		0.008	
C	2	*Carex 4*	yes	30	0.242	1	1		0.242	
C	2	*Epilobium coloratum*	yes	1	0.008	1	1		0.008	
C	2	*Fraxinus spp.*	yes	2	0.016	1	1		0.016	
C	2	*Liriodendron tulipifera*	yes	6	0.048	1	1		0.048	
C	2	*Moss*	3	1	0.008	1				
C	2	*Potentilla*	yes	2	0.016	1	1		0.016	
C	2	*Quercus Rubra*	yes	8	0.065	1	1		0.065	
C	2	*Rhamnus frangula*	no	3	0.024	1		1		0.024
C	2	*Rosa multiflora*	no	1	0.008	1		1		0.008
C	2	*Rubis allegheniensis*	yes	10	0.081	1	1		0.081	
C	2	*Rubis idaeus*	yes	2	0.016	1	1		0.016	
C	2	*Rush 1*	yes	2	0.016	1	1		0.016	
C	2	*Rush 2*	yes	5	0.040	1	1		0.040	
C	2	*Slash*	3	8	0.065	1				
C	2	*Solidago spp.*	yes	1	0.008	1	1		0.008	
C	2	*Solidago flexicaulis*	yes	1	0.008	1	1		0.008	
C	2	*Symphyotrichum lateriflorum*	yes	2	0.016	1	1		0.016	
C	2	*Thelypteris noveboracensis*	yes	3	0.024	1	1		0.024	
C	2	*Vitis sp.*	yes	2	0.016	1	1		0.016	
				124	**1.000**	**23**	**18**	**2**	**0.694**	**0.032**
C	3	*Acer rubrum*	yes	1	0.007	1	1		0.007	
C	3	*Bare ground*	3	60	0.411	1				
C	3	*Carex 1*	yes	5	0.034	1	1		0.034	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	3	*Carpinus caroliniana*	yes	5	0.034	1	1		0.034	
C	3	*Epilobium coloratum*	yes	1	0.007	1	1		0.007	
C	3	*Fagus grandifolia*	yes	1	0.007	1	1		0.007	
C	3	*Fraxinus spp.*	yes	5	0.034	1	1		0.034	
C	3	*Geum aleppicum*	yes	1	0.007	1	1		0.007	
C	3	*Liriodendron tulipifera*	yes	5	0.034	1	1		0.034	
C	3	*Mitchella repens*	yes	2	0.014	1	1		0.014	
C	3	*Oxalis*	yes	1	0.007	1	1		0.007	
C	3	*Panicum*	no	1	0.007	1		1		0.007
C	3	*Persicaria virginiana*	yes	1	0.007	1	1		0.007	
C	3	*Potentilla*	yes	5	0.034	1	1		0.034	
C	3	*Poa*	no	2	0.014	1		1		0.014
C	3	*Quercus Rubra*	yes	8	0.055	1	1		0.055	
C	3	*Rhamnus frangula*	no	1	0.007	1		1		0.007
C	3	*Rubis allegheniensis*	yes	8	0.055	1	1		0.055	
C	3	*Rubis idaeus*	yes	1	0.007	1	1		0.007	
C	3	*Rush 2*	yes	1	0.007	1	1		0.007	
C	3	*Solidago spp.*	yes	2	0.014	1	1		0.014	
C	3	*Symphyotrichum lateriflorum*	yes	3	0.021	1	1		0.021	
C	3	*Veronica officinalis*	no	5	0.034	1		1		0.034
C	3	*Vitis sp.*	yes	1	0.007	1	1		0.007	
				146	**1.000**	**25**	**20**	**4**	**0.527**	**0.062**

Table A13 C-JAG Site 4 (Camp Garfield, 41.221556, -81.105361) at dry enclosures (E) and Control (C) from 2019.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Acer rubrum*	yes	8	0.082	1	1		0.082	
E	1	*Bare ground*	3	55	0.567	1				
E	1	*Carex 4*	yes	5	0.052	1	1		0.052	
E	1	*Fraxinus spp.*	yes	2	0.021	1	1		0.021	
E	1	*Liriodendron tulipifera*	yes	1	0.010	1	1		0.010	
E	1	*Moss*	3	1	0.010	1				
E	1	*Prunus serotina*	yes	3	0.031	1	1		0.031	
E	1	*Quercus Rubra*	yes	4	0.041	1	1		0.041	
E	1	*Rhamnus frangula*	no	2	0.021	1		1		0.021
E	1	*Rubis allegheniensis*	yes	10	0.103	1	1		0.103	
E	1	*Rubis idaeus*	yes	1	0.010	1	1		0.010	
E	1	*Slash*	3	1	0.010	1				
E	1	*Toxicodendron radicans*	yes	1	0.010	1	1		0.010	
E	1	*Viburnum dentatum*	yes	2	0.021	1	1		0.021	
E	1	*Vitis sp.*	yes	1	0.010	1	1		0.010	
				97	**1.000**	**15**	**11**	**1**	**0.392**	**0.021**
E	2	*Acer rubrum*	yes	4	0.029	1	1		0.029	
E	2	*Acer rubrum stump sprouts*	yes	7	0.050	1	1		0.050	
E	2	*Bare ground*	3	6	0.043	1				
E	2	*Carex 4*	yes	3	0.022	1	1		0.022	
E	2	*Cottonwood-like unknown*	3	1	0.007	1				
E	2	*Fraxinus spp.*	yes	10	0.072	1	1		0.072	
E	2	*Liriodendron tulipifera*	yes	0.5	0.004	1	1		0.004	
E	2	*Moss*	3	0.5	0.004	1				
E	2	*Panicum*	no	3	0.022	1		1		0.022
E	2	*Potentilla*	yes	8	0.058	1	1		0.058	
E	2	*Rhamnus frangula*	no	6	0.043	1		1		0.043
E	2	*Rubis allegheniensis*	yes	60	0.432	1	1		0.432	
E	2	*Rubis idaeus*	yes	3	0.022	1	1		0.022	
E	2	*Slash*	3	20	0.144	1				
E	2	*Toxicodendron radicans*	yes	1	0.007	1	1		0.007	
E	2	*Ulmus spp.*	yes	5	0.036	1	1		0.036	
E	2	*Vitis sp.*	yes	1	0.007	1	1		0.007	
				139	**1.000**	**17**	**11**	**2**	**0.737**	**0.065**
E	3	*Acer rubrum*	yes	3	0.029	1	1		0.029	
E	3	*Arisaema triphyllum*	yes	1	0.010	1	1		0.010	
E	3	*Carex 4*	yes	8	0.076	1	1		0.076	
E	3	*Carya spp.*	yes	4	0.038	1	1		0.038	
E	3	*Fraxinus spp.*	yes	15	0.143	1	1		0.143	
E	3	*Liriodendron tulipifera*	yes	4	0.038	1	1		0.038	
E	3	*Moss*	3	1	0.010	1				
E	3	*Panicum*	no	3	0.029	1		1		0.029
E	3	*Potentilla*	yes	4	0.038	1	1		0.038	
E	3	*Prunus serotina*	yes	2	0.019	1	1		0.019	
E	3	*Quercus Rubra*	yes	5	0.048	1	1		0.048	
E	3	*Rhamnus frangula*	no	7	0.067	1		1		0.067
E	3	*Rubis allegheniensis*	yes	25	0.238	1	1		0.238	
E	3	*Slash*	3	12	0.114	1				
E	3	*Solidago spp.*	yes	1	0.010	1	1		0.010	
E	3	*Symphyotrichum ericoides*	yes	6	0.057	1	1		0.057	
E	3	*Toxicodendron radicans*	yes	1	0.010	1	1		0.010	
E	3	*Vitis sp.*	yes	3	0.029	1	1		0.029	
				105	**1.000**	**18**	**14**	**2**	**0.781**	**0.095**
C	1	*Acer rubrum*	yes	3	0.021	1	1		0.021	
C	1	*Bare ground*	3	20	0.140	1				
C	1	*Carex 1*	yes	2	0.014	1	1		0.014	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	1	*Carex 4*	yes	4	0.028	1	1		0.028	
C	1	*Cottonwood-like unknown*	3	1	0.007	1				
C	1	*Fagus grandifolia*	yes	3	0.021	1	1		0.021	
C	1	*Fraxinus spp.*	yes	10	0.070	1	1		0.070	
C	1	*Lindera benzoin*	yes	5	0.035	1	1		0.035	
C	1	*Liriodendron tulipifera*	yes	2	0.014	1	1		0.014	
C	1	*Moss*	3	1	0.007	1				
C	1	*Prunus serotina*	yes	1	0.007	1	1		0.007	
C	1	*Quercus Rubra*	yes	15	0.105	1	1		0.105	
C	1	*Rhamnus frangula*	no	4	0.028	1		1		0.028
C	1	*Rubis allegheniensis*	yes	15	0.105	1	1		0.105	
C	1	*Slash*	3	3	0.021	1				
C	1	*Solidago spp.*	yes	1	0.007	1	1		0.007	
C	1	*Thelypteris noveboracensis*	yes	50	0.350	1	1		0.350	
C	1	*Ulmus spp.*	yes	3	0.021	1	1		0.021	
				143	**1.000**	**18**	**13**	**1**	**0.797**	**0.028**
C	2	*Acer rubrum*	yes	6	0.042	1	1		0.042	
C	2	*Bare ground*	3	15	0.104	1				
C	2	*Carex 1*	yes	10	0.069	1	1		0.069	
C	2	*Carex 4*	yes	6	0.042	1	1		0.042	
C	2	*Carya spp.*	yes	5	0.035	1	1		0.035	
C	2	*Cornus florida*	yes	1	0.007	1	1		0.007	
C	2	*Fraxinus spp.*	yes	30	0.208	1	1		0.208	
C	2	*Lindera benzoin*	yes	2	0.014	1	1		0.014	
C	2	*Liriodendron tulipifera*	yes	4	0.028	1	1		0.028	
C	2	*Moss*	3	2	0.014	1				
C	2	*Poa*	no	5	0.035	1		1		0.035
C	2	*Prunus serotina*	yes	1	0.007	1	1		0.007	
C	2	*Quercus Rubra*	yes	10	0.069	1	1		0.069	
C	2	*Rhamnus frangula*	no	2	0.014	1		1		0.014
C	2	*Rubis allegheniensis*	yes	25	0.173	1	1		0.173	
C	2	*Slash*	3	5	0.035	1				
C	2	*Solidago spp.*	yes	1	0.007	1	1		0.007	
C	2	*Thelypteris noveboracensis*	yes	6	0.042	1	1		0.042	
C	2	*Toxicodendron radicans*	yes	0.5	0.003	1	1		0.003	
C	2	*Trifolium pratense*	no	1	0.007	1		1		0.007
C	2	*Ulmus spp.*	yes	5	0.035	1	1		0.035	
C	2	*Vitis sp.*	yes	2	0.014	1	1		0.014	
				144.5	**1.000**	**22**	**16**	**3**	**0.792**	**0.055**
C	3	*Acer rubrum*	yes	5	0.040	1	1		0.040	
C	3	*Bare ground*	3	35	0.279	1				
C	3	*Carya spp.*	yes	1	0.008	1	1		0.008	
C	3	*Dipsacus fullonum*	no	1	0.008	1		1		0.008
C	3	*Fraxinus spp.*	yes	30	0.239	1	1		0.239	
C	3	*Lindera benzoin*	yes	5	0.040	1	1		0.040	
C	3	*Liriodendron tulipifera*	yes	4	0.032	1	1		0.032	
C	3	*Moss*	3	5	0.040	1				
C	3	*Prunus serotina*	yes	3	0.024	1	1		0.024	
C	3	*Quercus Rubra*	yes	10	0.080	1	1		0.080	
C	3	*Rhamnus frangula*	no	4	0.032	1		1		0.032
C	3	*Rubis allegheniensis*	yes	8	0.064	1	1		0.064	
C	3	*Slash*	yes	6	0.048	1	1		0.048	
C	3	*Thelypteris noveboracensis*	yes	5	0.040	1	1		0.040	
C	3	*Ulmus spp.*	yes	3	0.024	1	1		0.024	
C	3	*Vitis sp.*	yes	0.5	0.004	1	1		0.004	
				125.5	**1.000**	**16**	**12**	**2**	**0.641**	**0.040**

Table A14 C-JAR Site 5 (Camp Garfield, 41.220389, -81.108583) at dry enclosures (E) and Control (C) from 2019.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Acer rubrum*	yes	3	0.021	1	1		0.021	
E	1	*Bare ground*	3	20	0.143	1				
E	1	*Carex 4*	yes	15	0.107	1	1		0.107	
E	1	*Epilobium coloratum*	yes	1	0.007	1	1		0.007	
E	1	*Fagus grandifolia*	yes	17	0.121	1	1		0.121	
E	1	*Fragaria virginiana*	yes	1	0.007	1	1		0.007	
E	1	*Fraxinus spp.*	yes	5	0.036	1	1		0.036	
E	1	*Galium*	yes	2	0.014	1	1		0.014	
E	1	*Impatiens capensis*	yes	10	0.071	1	1		0.071	
E	1	*Microstegium vimineum*	no	3	0.021	1		1		0.021
E	1	*Moss*	3	1	0.007	1				
E	1	*Nyssa sylvatica*	yes	1	0.007	1	1		0.007	
E	1	*Oxalis*	yes	2	0.014	1	1		0.014	
E	1	*Phytolacca decandra*	yes	2	0.014	1	1		0.014	
E	1	*Poa*	no	15	0.107	1		1		0.107
E	1	*Rubis allegheniensis*	yes	5	0.036	1	1		0.036	
E	1	*Rubis idaeus*	yes	12	0.086	1	1		0.086	
E	1	*Slash*	3	3	0.021	1				
E	1	*Solidago spp.*	yes	5	0.036	1	1		0.036	
E	1	*Symphyotrichum lateriflorum*	yes	3	0.021	1	1		0.021	
E	1	*Ulmus spp.*	yes	5	0.036	1	1		0.036	
E	1	*Veronica officinalis*	no	6	0.043	1		1		0.043
E	1	*Vitis sp.*	yes	3	0.021	1	1		0.021	
				140	**1.000**	**23**	**17**	**3**	**0.657**	**0.171**
E	2	*Acer rubrum*	yes	2	0.012	1	1		0.012	
E	2	*Bare ground*	3	10	0.060	1				
E	2	*Carex 4*	yes	30	0.179	1	1		0.179	
E	2	*Fagus grandifolia*	yes	5	0.030	1	1		0.030	
E	2	*Fragaria virginiana*	yes	3	0.018	1	1		0.018	
E	2	*Fraxinus spp.*	yes	7	0.042	1	1		0.042	
E	2	*Geum aleppicum*	yes	1	0.006	1	1		0.006	
E	2	*Hypericum*	yes	5	0.030	1	1		0.030	
E	2	*Impatiens capensis*	yes	25	0.149	1	1		0.149	
E	2	*Moss*	3	4	0.024	1				
E	2	*Poa*	no	18	0.107	1		1		0.107
E	2	*Rubis allegheniensis*	yes	15	0.090	1	1		0.090	
E	2	*Rubis idaeus*	yes	25	0.149	1	1		0.149	
E	2	*Slash*	3	8	0.048	1				
E	2	*Solidago spp.*	yes	2	0.012	1	1		0.012	
E	2	*Symphyotrichum ericoides*	yes	1	0.006	1	1		0.006	
E	2	*Symphyotrichum lateriflorum*	yes	4	0.024	1	1		0.024	
E	2	*Thelypteris noveboracensis*	yes	1	0.006	1	1		0.006	
E	2	*Verbena*	yes	1	0.006	1	1		0.006	
E	2	*Vitis sp.*	yes	0.5	0.003	1	1		0.003	
				167.5	**1.000**	**20**	**16**	**1**	**0.761**	**0.107**
E	3	*Acer rubrum*	yes	1	0.008	1	1		0.008	
E	3	*Acer saccharum*	yes	2	0.017	1	1		0.017	
E	3	*Bare ground*	3	45	0.381	1				
E	3	*Carex 4*	yes	10	0.085	1	1		0.085	
E	3	*Carya spp.*	yes	1	0.008	1	1		0.008	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	3	*Epifagus virginiana*	yes	0.5	0.004	1	1		0.004	
E	3	*Epilobium coloratum*	yes	1	0.008	1	1		0.008	
E	3	*Fagus grandifolia*	yes	6	0.051	1	1		0.051	
E	3	*Fragaria virginiana*	yes	1	0.008	1	1		0.008	
E	3	*Hypericum*	yes	2	0.017	1	1		0.017	
E	3	*Impatiens capensis*	yes	5	0.042	1	1		0.042	
E	3	*Mentha arvensis*	yes	3	0.025	1	1		0.025	
E	3	*Microstegium vimineum*	no	4	0.034	1		1		0.034
E	3	*Moss*	3	2	0.017	1				
E	3	*Oxalis*	yes	0.5	0.004	1	1		0.004	
E	3	*Poa*	no	4	0.034	1		1		0.034
E	3	*Rubis allegheniensis*	yes	10	0.085	1	1		0.085	
E	3	*Rubis idaeus*	yes	5	0.042	1	1		0.042	
E	3	*Slash*	3	9	0.076	1				
E	3	*Thelypteris noveboracensis*	yes	0.5	0.004	1	1		0.004	
E	3	*Toxicodendron radicans*	yes	0.5	0.004	1	1		0.004	
E	3	*Veronica officinalis*	no	2	0.017	1		1		0.017
E	3	*Vitis sp.*	yes	1	0.008	1	1		0.008	
				118	**1.000**	**24**	**18**	**3**	**0.441**	**0.085**
C	1	*Acer rubrum*	yes	5	0.050	1	1		0.050	
C	1	*Acer saccharum*	yes	3	0.030	1	1		0.030	
C	1	*Bare ground*	3	25	0.251	1				
C	1	*Carex 4*	yes	8	0.080	1	1		0.080	
C	1	*Cornus racemosa*	yes	1	0.010	1	1		0.010	
C	1	*Doellingeria umbellata*	yes	2	0.020	1	1		0.020	
C	1	*Fragaria virginiana*	yes	5	0.050	1	1		0.050	
C	1	*Fraxinus spp.*	yes	8	0.080	1	1		0.080	
C	1	*Geum aleppicum*	yes	3	0.030	1	1		0.030	
C	1	*Liriodendron tulipifera*	yes	2	0.020	1	1		0.020	
C	1	*Lonicera spp.*	no	1	0.010	1		1		0.010
C	1	*Mentha arvensis*	yes	4	0.040	1	1		0.040	
C	1	*Microstegium vimineum*	no	3	0.030	1		1		0.030
C	1	*Moss*	3	1	0.010	1				
C	1	*Onoclea sensibilis*	yes	0.5	0.005	1	1		0.005	
C	1	*Oxalis*	yes	2	0.020	1	1		0.020	
C	1	*Potentilla*	yes	1	0.010	1	1		0.010	
C	1	*Rhamnus frangula*	no	2	0.020	1		1		0.020
C	1	*Rubis allegheniensis*	yes	15	0.151	1	1		0.151	
C	1	*Rubis idaeus*	yes	5	0.050	1	1		0.050	
C	1	*Slash*	3	1	0.010	1				
C	1	*Ulmus spp.*	yes	1	0.010	1	1		0.010	
C	1	*Vitis sp.*	yes	1	0.010	1	1		0.010	
				99.5	**1.000**	**23**	**17**	**3**	**0.668**	**0.060**
C	2	*Acer rubrum*	yes	5	0.036	1	1		0.036	
C	2	*Acer saccharum*	yes	3	0.022	1	1		0.022	
C	2	*Agrimonia*	yes	4	0.029	1	1		0.029	
C	2	*Bare ground*	3	25	0.182	1				
C	2	*Carex 3*	yes	15	0.109	1	1		0.109	
C	2	*Cornus racemosa*	yes	1	0.007	1	1		0.007	
C	2	*Epilobium coloratum*	yes	2	0.015	1	1		0.015	
C	2	*Fragaria virginiana*	yes	5	0.036	1	1		0.036	
C	2	*Fraxinus spp.*	yes	6	0.044	1	1		0.044	
C	2	*Geum aleppicum*	yes	1	0.007	1	1		0.007	
C	2	*Lindera benzoin*	yes	6	0.044	1	1		0.044	
C	2	*Liriodendron tulipifera*	yes	1	0.007	1	1		0.007	
C	2	*Lobelia inflata*	yes	3	0.022	1	1		0.022	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	2	*Mentha arvensis*	yes	3	0.022	1	1		0.022	
C	2	*Microstegium vimineum*	no	8	0.058	1		1		0.058
C	2	*Moss*	3	3	0.022	1				
C	2	*Oxalis*	yes	1	0.007	1	1		0.007	
C	2	*Potentilla*	yes	3	0.022	1	1		0.022	
C	2	*Quercus Rubra*	yes	2	0.015	1	1		0.015	
C	2	*Rhamnus frangula*	no	2	0.015	1		1		0.015
C	2	*Rubis allegheniensis*	yes	7	0.051	1	1		0.051	
C	2	*Rubis idaeus*	yes	12	0.088	1	1		0.088	
C	2	*Rush 1*	yes	3	0.022	1	1		0.022	
C	2	*Slash*	3	8	0.058	1				
C	2	*Solidago spp.*	yes	1	0.007	1	1		0.007	
C	2	*Taraxacum*	yes	1	0.007	1	1		0.007	
C	2	*Ulmus spp.*	yes	1	0.007	1	1		0.007	
C	2	*Vitis sp.*	yes	4	0.029	1	1		0.029	
				137	**1.000**	**29**	**23**	**3**	**0.657**	**0.080**
C	3	*Acer rubrum*	yes	4	0.024	1	1		0.024	
C	3	*Acer saccharum*	yes	10	0.061	1	1		0.061	
C	3	*Bare ground*	3	10	0.061	1				
C	3	*Carex 3*	yes	15	0.091	1	1		0.091	
C	3	*Carya spp.*	yes	3	0.018	1	1		0.018	
C	3	*Cottonwood-like unknown*	3	1	0.006	1				
C	3	*Epilobium coloratum*	yes	1	0.006	1	1		0.006	
C	3	*Fragaria virginiana*	yes	5	0.030	1	1		0.030	
C	3	*Fraxinus spp.*	yes	8	0.049	1	1		0.049	
C	3	*Geum aleppicum*	yes	2	0.012	1	1		0.012	
C	3	*Hypericum*	yes	1	0.006	1	1		0.006	
C	3	*Lobelia inflata*	yes	1	0.006	1	1		0.006	
C	3	*Mentha arvensis*	yes	0.5	0.003	1	1		0.003	
C	3	*Microstegium vimineum*	no	3	0.018	1		1		0.018
C	3	*Moss*	3	3	0.018	1				
C	3	*Oxalis*	yes	4	0.024	1	1		0.024	
C	3	*Poa*	no	15	0.091	1		1		0.091
C	3	*Quercus Rubra*	yes	4	0.024	1	1		0.024	
C	3	*Rhamnus frangula*	no	4	0.024	1		1		0.024
C	3	*Rubis allegheniensis*	yes	40	0.243	1	1		0.243	
C	3	*Rubis idaeus*	yes	10	0.061	1	1		0.061	
C	3	*Slash*	3	4	0.024	1				
C	3	*Solidago spp.*	yes	3	0.018	1	1		0.018	
C	3	*Symphyotrichum lateriflorum*	yes	3	0.018	1	1		0.018	
C	3	*Thelypteris noveboracensis*	yes	4	0.024	1	1		0.024	
C	3	*Ulmus spp.*	yes	1	0.006	1	1		0.006	
C	3	*Vitis sp.*	yes	3	0.018	1	1		0.018	
C	3	*Woody unknown*	3	2	0.012	1				
				164.5	**1.000**	**28**	**20**	**3**	**0.745**	**0.134**

Table A15 C-JAR Site 6 (Camp Garfield, 41.180194, -81.133917) at wet enclosures (E) and Control (C) from 2019.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Bare ground*	3	1	0.008	1				
E	1	*Carex 4*	yes	10	0.076	1	1		0.076	
E	1	*Panicum*	no	3	0.023	1		1		0.023
E	1	*Rhamnus frangula*	no	4	0.030	1		1		0.030
E	1	*Rubis allegheniensis*	yes	20	0.152	1	1		0.152	
E	1	*Rush 1*	yes	10	0.076	1	1		0.076	
E	1	*Slash*	3	2	0.015	1				
E	1	*Thelypteris noveboracensis*	yes	80	0.606	1	1		0.606	
E	1	*Vitis sp.*	yes	2	0.015	1	1		0.015	
				132	**1.000**	**9**	**5**	**2**	**0.924**	**0.053**
E	2	*Lindera benzoin*	yes	8	0.068	1	1		0.068	
E	2	*Rubis allegheniensis*	yes	15	0.128	1	1		0.128	
E	2	*Rush 1*	yes	4	0.034	1	1		0.034	
E	2	*Thelypteris noveboracensis*	yes	90	0.769	1	1		0.769	
				117	**1.000**	**4**	**4**	**0**	**1.000**	**0.000**
E	3	*Carex 4*	yes	12	0.084	1	1		0.084	
E	3	*Rubis allegheniensis*	yes	30	0.210	1	1		0.210	
E	3	*Rush 1*	yes	8	0.056	1	1		0.056	
E	3	*Thelypteris noveboracensis*	yes	90	0.629	1	1		0.629	
E	3	*Vitis sp.*	yes	3	0.021	1	1		0.021	
				143	**1.000**	**5**	**5**	**0**	**1.000**	**0.000**
C	1	*Carex 4*	yes	2	0.018	1	1		0.018	
C	1	*Panicum*	no	4	0.035	1		1		0.035
C	1	*Rubis allegheniensis*	yes	15	0.132	1	1		0.132	
C	1	*Rush 1*	yes	3	0.026	1	1		0.026	
C	1	*Thelypteris noveboracensis*	yes	90	0.789	1	1		0.789	
				114	**1.000**	**5**	**4**	**1**	**0.965**	**0.035**
C	2	*Carex 4*	yes	5	0.044	1	1		0.044	
C	2	*Panicum*	no	8	0.070	1		1		0.070
C	2	*Rubis allegheniensis*	yes	8	0.070	1	1		0.070	
C	2	*Rush 1*	yes	3	0.026	1	1		0.026	
C	2	*Thelypteris noveboracensis*	yes	90	0.789	1	1		0.789	
				114	**1.000**	**5**	**4**	**1**	**0.930**	**0.070**
C	3	*Bare ground*	3	2	0.019	1				
C	3	*Carex 4*	yes	3	0.028	1	1		0.028	
C	3	*Fraxinus spp.*	yes	3	0.028	1	1		0.028	
C	3	*Panicum*	no	3	0.028	1		1		0.028
C	3	*Rubis allegheniensis*	yes	7	0.065	1	1		0.065	
C	3	*Thelypteris noveboracensis*	yes	90	0.833	1	1		0.833	
				108	**1.000**	**6**	**4**	**1**	**0.954**	**0.028**

Table A16 C-JAR Site 7 (Camp Garfield, 41.181694, -81.134694) at wet enclosures (E) and Control (C) from 2019.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Cornus florida*	yes	2	0.015	1	1		0.015	
E	1	*Fagus grandifolia*	yes	2	0.015	1	1		0.015	
E	1	*Fraxinus spp.*	yes	2	0.015	1	1		0.015	
E	1	*Liriodendron tulipifera*	yes	5	0.038	1	1		0.038	
E	1	*Moss*	3	1	0.008	1				
E	1	*Quercus Rubra*	yes	8	0.060	1	1		0.060	
E	1	*Rubis allegheniensis*	yes	10	0.075	1	1		0.075	
E	1	*Rubis idaeus*	yes	3	0.023	1	1		0.023	
E	1	*Thelypteris noveboracensis*	yes	90	0.677	1	1		0.677	
				123	**1.000**	**9**	**8**	**0**	**0.917**	**0.000**
E	2	*Lindera benzoin*	yes	7	0.062	1	1		0.062	
E	2	*Quercus Rubra*	yes	4	0.035	1	1		0.035	
E	2	*Rubis allegheniensis*	yes	5	0.044	1	1		0.044	
E	2	*Thelypteris noveboracensis*	yes	95	0.841	1	1		0.841	
E	2	*Viburnum cassinoides*	yes	2	0.018	1	1		0.018	
				113	**1.000**	**5**	**5**	**0**	**1.000**	**0.000**
E	3	*Carpinus caroliniana*	yes	1	0.009	1	1		0.009	
E	3	*Quercus Rubra*	yes	9	0.084	1	1		0.084	
E	3	*Rubis allegheniensis*	yes	2	0.019	1	1		0.019	
E	3	*Thelypteris noveboracensis*	yes	95	0.884	1	1		0.884	
E	3	*Vitis sp.*	yes	0.5	0.005	1	1		0.005	
				107.5	**1.000**	**5**	**5**	**0**	**1.000**	**0.000**
C	1	*Carex 1*	yes	4	0.045	1	1		0.045	
C	1	*Carex 4*	yes	30	0.337	1	1		0.337	
C	1	*Fagus grandifolia*	yes	5	0.056	1	1		0.056	
C	1	*Lindera benzoin*	yes	7	0.079	1	1		0.079	
C	1	*Liriodendron tulipifera*	yes	2	0.022	1	1		0.022	
C	1	*Moss*	3	1	0.011	1				
C	1	*Panicum*	no	10	0.112	1		1		0.112
C	1	*Rubis allegheniensis*	yes	2	0.022	1	1		0.022	
C	1	*Rush 1*	yes	3	0.034	1	1		0.034	
C	1	*Slash*	3	5	0.056	1				
C	1	*Thelypteris noveboracensis*	yes	20	0.225	1	1		0.225	
				89	**1.000**	**11**	**8**	**1**	**0.820**	**0.112**
C	2	*Acer saccharum*	yes	1	0.009	1	1		0.009	
C	2	*Carex 4*	yes	4	0.038	1	1		0.038	
C	2	*Liriodendron tulipifera*	yes	2	0.019	1	1		0.019	
C	2	*Rubis allegheniensis*	yes	3	0.028	1	1		0.028	
C	2	*Rubis idaeus*	yes	4	0.038	1	1		0.038	
C	2	*Sassafras albidum*	yes	2	0.019	1	1		0.019	
C	2	*Thelypteris noveboracensis*	yes	90	0.849	1	1		0.849	
				106	**1.000**	**7**	**7**	**0**	**1.000**	**0.000**
C	3	*Carex 4*	yes	5	0.047	1	1		0.047	
C	3	*Rubis allegheniensis*	yes	2	0.019	1	1		0.019	
C	3	*Rubis idaeus*	yes	5	0.047	1	1		0.047	
C	3	*Sassafras albidum*	yes	5	0.047	1	1		0.047	
C	3	*Thelypteris noveboracensis*	yes	90	0.841	1	1		0.841	
				107	**1.000**	**5**	**5**	**0**	**1.000**	**0.000**

Table A17 C-JAR Site 8 (Camp Garfield, 41.179889, -81.13675) at wet enclosures (E) and Control (C) from 2019.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Bare ground*	3	5	0.039	1				
E	1	*Fraxinus spp.*	yes	10	0.078	1	1		0.078	
E	1	*Moss*	3	2	0.016	1				
E	1	*Onoclea sensibilis*	yes	15	0.117	1	1		0.117	
E	1	*Poa*	no	5	0.039	1		1		0.039
E	1	*Rubis allegheniensis*	yes	4	0.031	1	1		0.031	
E	1	*Rush 1*	yes	4	0.031	1	1		0.031	
E	1	*Solidago spp.*	yes	3	0.023	1	1		0.023	
E	1	*Thelypteris noveboracensis*	yes	80	0.625	1	1		0.625	
				128	**1.000**	**9**	**6**	**1**	**0.906**	**0.039**
E	2	*Bare ground*	3	2	0.018	1				
E	2	*Carex 1*	yes	5	0.045	1	1		0.045	
E	2	*Fraxinus spp.*	yes	5	0.045	1	1		0.045	
E	2	*Onoclea sensibilis*	yes	8	0.072	1	1		0.072	
E	2	*Poa*	no	20	0.180	1		1		0.180
E	2	*Rubis allegheniensis*	yes	4	0.036	1	1		0.036	
E	2	*Rush 1*	yes	10	0.090	1	1		0.090	
E	2	*Solidago spp.*	yes	4	0.036	1	1		0.036	
E	2	*Thelypteris noveboracensis*	yes	50	0.450	1	1		0.450	
E	2	*Toxicodendron radicans*	yes	3	0.027	1	1		0.027	
				111	**1.000**	**10**	**8**	**1**	**0.802**	**0.180**
E	3	*Carex 1*	yes	8	0.073	1	1		0.073	
E	3	*Epilobium coloratum*	yes	4	0.036	1	1		0.036	
E	3	*Impatiens capensis*	yes	3	0.027	1	1		0.027	
E	3	*Onoclea sensibilis*	yes	5	0.045	1	1		0.045	
E	3	*Potentilla*	yes	3	0.027	1	1		0.027	
E	3	*Poa*	no	8	0.073	1		1		0.073
E	3	*Rubis allegheniensis*	yes	4	0.036	1	1		0.036	
E	3	*Rush 1*	yes	11	0.100	1	1		0.100	
E	3	*Slash*	3	1	0.009	1				
E	3	*Thelypteris noveboracensis*	yes	60	0.545	1	1		0.545	
E	3	*Toxicodendron radicans*	yes	3	0.027	1	1		0.027	
				110	**1.000**	**11**	**9**	**1**	**0.918**	**0.073**
C	1	*Bare ground*	3	10	0.098	1				
C	1	*Rubis allegheniensis*	yes	2	0.020	1	1		0.020	
C	1	*Thelypteris noveboracensis*	yes	90	0.882	1	1		0.882	
				102	**1.000**	**3**	**2**	**0**	**0.902**	**0.000**
C	2	*Bare ground*	3	12	0.099	1				
C	2	*Carex 4*	yes	5	0.041	1	1		0.041	
C	2	*Fagus grandifolia*	yes	8	0.066	1	1		0.066	
C	2	*Fraxinus spp.*	yes	4	0.033	1	1		0.033	
C	2	*Quercus Rubra*	yes	2	0.017	1	1		0.017	
C	2	*Rubis allegheniensis*	yes	8	0.066	1	1		0.066	
C	2	*Slash*	3	2	0.017	1				
C	2	*Thelypteris noveboracensis*	yes	80	0.661	1	1		0.661	
				121	**1.000**	**8**	**6**	**0**	**0.884**	**0.000**
C	3	*Bare ground*	3	25	0.205	1				
C	3	*Fagus grandifolia*	yes	12	0.098	1	1		0.098	
C	3	*Rubis allegheniensis*	yes	10	0.082	1	1		0.082	
C	3	*Slash*	3	3	0.025	1				
C	3	*Thelypteris noveboracensis*	yes	70	0.574	1	1		0.574	
C	3	*Veronica officinalis*	no	2	0.016	1		1		0.016
				122	**1.000**	**6**	**3**	**1**	**0.754**	**0.016**

Table A18 C-JAR Site 9 (Camp Garfield, 41.182556, -81.135139) at wet enclosures (E) and Control (C) from 2019.

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
E	1	*Acer saccharum*	yes	2	0.010	1	1		0.010	
E	1	*Bare ground*	3	3	0.016	1				
E	1	*Carex 1*	yes	40	0.209	1	1		0.209	
E	1	*Cornus florida*	yes	7	0.037	1	1		0.037	
E	1	*Cyperus rotundus*	no	10	0.052	1		1		0.052
E	1	*Fagus grandifolia*	yes	2	0.010	1	1		0.010	
E	1	*Fraxinus spp.*	yes	3	0.016	1	1		0.016	
E	1	*Hypericum*	yes	3	0.016	1	1		0.016	
E	1	*Lindera benzoin*	yes	12	0.063	1	1		0.063	
E	1	*Liriodendron tulipifera*	yes	4	0.021	1	1		0.021	
E	1	*Moss*	3	1	0.005	1				
E	1	*Panicum*	no	10	0.052	1		1		0.052
E	1	*Rosa multiflora*	no	5	0.026	1		1		0.026
E	1	*Rubis allegheniensis*	yes	50	0.262	1	1		0.262	
E	1	*Rush 1*	yes	10	0.052	1	1		0.052	
E	1	*Slash*	3	2	0.010	1				
E	1	*Thelypteris noveboracensis*	yes	20	0.105	1	1		0.105	
E	1	*Vitis sp.*	yes	2	0.010	1	1		0.010	
E	1	*Woody unknown*	3	5	0.026	1				
				191	**1.000**	**19**	**12**	**3**	**0.812**	**0.131**
E	2	*Bare ground*	3	2	0.013	1				
E	2	*Carex 1*	yes	3	0.020	1	1		0.020	
E	2	*Cornus florida*	yes	3	0.020	1	1		0.020	
E	2	*Epilobium coloratum*	yes	3	0.020	1	1		0.020	
E	2	*Fraxinus spp.*	yes	2	0.013	1	1		0.013	
E	2	*Laportea canadensis*	yes	5	0.033	1	1		0.033	
E	2	*Moss*	3	1	0.007	1				
E	2	*Oxalis*	yes	3	0.020	1	1		0.020	
E	2	*Panicum*	no	6	0.040	1		1		0.040
E	2	*Persicaria sagittata*	yes	9	0.060	1	1		0.060	
E	2	*Rosa multiflora*	no	20	0.132	1		1		0.132
E	2	*Rubis allegheniensis*	yes	5	0.033	1	1		0.033	
E	2	*Rush 1*	yes	5	0.033	1	1		0.033	
E	2	*Slash*	3	3	0.020	1				
E	2	*Thelypteris noveboracensis*	yes	80	0.530	1	1		0.530	
E	2	*Woody unknown*	3	1	0.007	1				
				151	**1.000**	**16**	**10**	**2**	**0.781**	**0.172**
E	3	*Bare ground*	3	4	0.027	1				
E	3	*Lindera benzoin*	yes	20	0.134	1	1		0.134	
E	3	*Moss*	3	3	0.020	1				
E	3	*Oxalis*	yes	4	0.027	1	1		0.027	
E	3	*Panicum*	no	4	0.027	1		1		0.027
E	3	*Persicaria sagittata*	yes	5	0.034	1	1		0.034	
E	3	*Rosa multiflora*	no	2	0.013	1		1		0.013
E	3	*Rubis allegheniensis*	yes	40	0.268	1	1		0.268	
E	3	*Slash*	3	4	0.027	1				
E	3	*Thelypteris noveboracensis*	yes	60	0.403	1	1		0.403	
E	3	*Woody unknown*	3	3	0.020	1				
				149	**1.000**	**11**	**5**	**2**	**0.866**	**0.040**
C	1	*Bare ground*	3	1	0.008	1				
C	1	*Fraxinus spp.*	yes	10	0.076	1	1		0.076	
C	1	*Laportea canadensis*	yes	1	0.008	1	1		0.008	
C	1	*Lindera benzoin*	yes	3	0.023	1	1		0.023	

Plot	Splot	*Species*	Native?	% cover	Rel-cover	Stot	Snat	Snon	RCnat	Rcnon
C	1	*Liriodendron tulipifera*	yes	3	0.023	1	1		0.023	
C	1	*Onoclea sensibilis*	yes	6	0.045	1	1		0.045	
C	1	*Persicaria virginiana*	yes	5	0.038	1	1		0.038	
C	1	*Quercus Rubra*	yes	2	0.015	1	1		0.015	
C	1	*Rubis allegheniensis*	yes	10	0.076	1	1		0.076	
C	1	*Slash*	3	1	0.008	1				
C	1	*Thelypteris noveboracensis*	yes	90	0.682	1	1		0.682	
				132	**1.000**	**11**	**9**	**0**	**0.985**	**0.000**
C	2	*Acer rubrum*	yes	1	0.008	1	1		0.008	
C	2	*Bare ground*	3	3	0.023	1				
C	2	*Carex 1*	yes	10	0.078	1	1		0.078	
C	2	*Carex 4*	yes	5	0.039	1	1		0.039	
C	2	*Fagus grandifolia*	yes	4	0.031	1	1		0.031	
C	2	*Fraxinus spp.*	yes	12	0.093	1	1		0.093	
C	2	*Moss*	3	2	0.016	1				
C	2	*Onoclea sensibilis*	yes	3	0.023	1	1		0.023	
C	2	*Oxalis*	yes	2	0.016	1	1		0.016	
C	2	*Panicum*	no	5	0.039	1		1		0.039
C	2	*Persicaria virginiana*	yes	4	0.031	1	1		0.031	
C	2	*Rubis allegheniensis*	yes	13	0.101	1	1		0.101	
C	2	*Slash*	3	3	0.023	1				
C	2	*Thelypteris noveboracensis*	yes	60	0.465	1	1		0.465	
C	2	*Toxicodendron radicans*	yes	2	0.016	1	1		0.016	
				129	**1.000**	**15**	**11**	**1**	**0.899**	**0.039**
C	3	*Bare ground*	3	4	0.033	1				
C	3	*Fraxinus spp.*	yes	5	0.041	1	1		0.041	
C	3	*Moss*	3	1	0.008	1				
C	3	*Onoclea sensibilis*	yes	5	0.041	1	1		0.041	
C	3	*Panicum*	no	3	0.025	1		1		0.025
C	3	*Persicaria virginiana*	yes	3	0.025	1	1		0.025	
C	3	*Prunus serotina*	yes	8	0.066	1	1		0.066	
C	3	*Rubis allegheniensis*	yes	8	0.066	1	1		0.066	
C	3	*Slash*	3	4	0.033	1				
C	3	*Thelypteris noveboracensis*	yes	80	0.661	1	1		0.661	
				121	**1.000**	**10**	**6**	**1**	**0.901**	**0.025**

Appendix 2

2020 Vegetation in and outside of C-JAG

Table B1: Boardman 1 Wet, (41.048352, -80.682614)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	8.50	Bare ground	3	55	0.39	1				
1	8.50	Ligustrum sinense	no	15	0.106	1		1		0.1064
1	8.50	Berberis thunbergii	no	20	0.142	1		1		0.1418
1	8.50	Crataegus sp.	yes	20	0.142	1	1		0.142	
1	8.50	Euonymus alatus	no	8	0.057	1		1		0.0567
1	8.50	Solidago caesia	yes	3	0.021	1	1		0.021	
1	8.50	Parthenocissus quinquefolia	yes	3	0.021	1	1		0.021	
1	8.50	Toxicodendron radicans	yes	2	0.014	1	1		0.014	
1	8.50	Rosa multiflora	no	10	0.071	1		1		0.0709
1	8.50	Carya spp.	yes	3	0.021	1	1		0.021	
1	8.50	Persicaria virginiana	yes	1	0.007	1	1		0.007	
1	8.50	Symphyotrichum lateriflorum	yes	1	0.007	1	1		0.007	
				141	**1**	**12**	**7**	**4**	**0.234**	**0.3759**
2	8.50	Bareground	3	50	0.345	1				
2	8.50	Ligustrum sinense	no	30	0.207	1		1		0.2069
2	8.50	Crataegus sp.	yes	20	0.138	1	1		0.138	
2	8.50	Parthenocissus quinquefolia	yes	2	0.014	1	1		0.014	
2	8.50	Rosa multiflora	no	20	0.138	1		1		0.1379
2	8.50	Carya spp.	yes	5	0.034	1	1		0.034	
2	8.50	Lindera benzoin	yes	5	0.034	1	1		0.034	
2	8.50	Lonicera tatarica	no	10	0.069	1		1		0.069
2	8.50	Alliaria petiolata	no	1	0.007	1		1		0.0069
2	8.50	Rhamnus frangula	no	1	0.007	1		1		0.0069
2	8.50	Prunus serotina	yes	1	0.007	1	1		0.007	
				145	**1**	**11**	**5**	**5**	**0.228**	**0.4276**
3	8.50	Bareground	3	50	0.472	1				
3	8.50	Ligustrum sinense	no	50	0.472	1		1		0.4717
3	8.50	Thelypteris noveboracensis	yes	1	0.009	1	1		0.009	
3	8.50	Euonymus alatus	no	1	0.009	1		1		0.0094
3	8.50	Lonicera japonica	no	2	0.019	1		1		0.0189
3	8.50	Carya spp.	yes	1	0.009	1	1		0.009	
3	8.50	Alliaria petiolata	no	1	0.009	1		1		0.0094

Table B2: Boardman 2 Wet, (41.051484, -80.679577)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	6.50	Bareground	3	3	0.023	1				
1	6.50	Solidago altissima	yes	8	0.062	1	1		0.062	
1	6.50	Gypsophila	no	10	0.078	1		1		0.0775
1	6.50	Toxicodendron radicans	yes	3	0.023	1	1		0.023	
1	6.50	Thalictrum	yes	1	0.008	1	1		0.008	
1	6.50	Onoclea sensibilis	yes	2	0.016	1	1		0.016	
1	6.50	Boehmeria	yes	1	0.008	1	1		0.008	
1	6.50	Persicaria virginiana	yes	2	0.016	1	1		0.016	
1	6.50	Chelone	yes	1	0.008	1	1		0.008	
1	6.50	Galium	yes	2	0.016	1	1		0.016	
1	6.50	Geum	yes	1	0.008	1	1		0.008	
1	6.50	Veronica officinalis	no	20	0.155	1		1		0.155
1	6.50	Lonicera japonica	no	5	0.039	1		1		0.0388
1	6.50	Impatiens capensis	yes	5	0.039	1	1		0.039	
1	6.50	Ligustrum sinense	no	65	0.504	1		1		0.5039
				129	**1**	**15**	**10**	**4**	**0.202**	**0.7752**
2	6.50	Bareground	3	2	0.016	1				
2	6.50	Fraxinus spp.	yes	5	0.04	1	1		0.04	
2	6.50	Cornus sericea	yes	3	0.024	1	1		0.024	
2	6.50	Gypsophila	no	30	0.24	1		1		0.24
2	6.50	Acer rubrum	yes	1	0.008	1	1		0.008	
2	6.50	Boehmeria	yes	1	0.008	1	1		0.008	
2	6.50	Geum	yes	4	0.032	1	1		0.032	
2	6.50	Viburnum dentatum	yes	2	0.016	1	1		0.016	
2	6.50	Onoclea sensibilis	yes	2	0.016	1	1		0.016	
2	6.50	Hypericum	yes	1	0.008	1	1		0.008	
2	6.50	Alliaria petiolata	no	2	0.016	1		1		0.016
2	6.50	Symphyotrichum lateriflorum	yes	1	0.008	1	1		0.008	
2	6.50	Ligustrum sinense	no	70	0.56	1		1		0.56
2	6.50	Long leaf sedge	yes	1	0.008	1	1		0.008	
				125	**1**	**14**	**10**	**3**	**0.168**	**0.816**
3	6.50	Bareground	3	2	0.013	1				
3	6.50	Gypsophila	no	40	0.268	1		1		0.2685
3	6.50	Toxicodendron radicans	yes	2	0.013	1	1		0.013	
3	6.50	Geum	yes	8	0.054	1	1		0.054	
3	6.50	Onoclea sensibilis	yes	2	0.013	1	1		0.013	
3	6.50	Hypericum	yes	4	0.027	1	1		0.027	
3	6.50	Cornus sericea	yes	4	0.027	1	1		0.027	
3	6.50	Veronica officinalis	no	20	0.134	1		1		0.1342
3	6.50	Ligustrum sinense	no	50	0.336	1		1		0.3356
3	6.50	Rosa multiflora	no	10	0.067	1		1		0.0671
3	6.50	Boehmeria	yes	5	0.034	1	1		0.034	
3	6.50	Fraxinus spp.	yes	2	0.013	1	1		0.013	
				149	**1**	**12**	**7**	**4**	**0.181**	**0.8054**

Table B3, Boardman 3 Dry (41.075356, -80.689621)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	8.50	Bareground	3	91	0.91	1				
1	8.50	Acer saccharum	yes	1	0.01	1	1		0.01	
1	8.50	Prunus serotina	yes	5	0.05	1	1		0.05	
1	8.50	Conopholis	yes	2	0.02	1	1		0.02	
1	8.50	Myrrhis odorata	no	1	0.01	1		1		0.01
				100	**1**	**5**	**3**	**1**	**0.08**	**0.01**
2	8.50	Bareground	3	90	0.857	1				
2	8.50	Myrrhis odorata	no	2	0.019	1		1		0.019
2	8.50	Cornus alternifolia	yes	1	0.01	1	1		0.01	
2	8.50	Acer saccharum	yes	2	0.019	1	1		0.019	
2	8.50	Cimicifuga	yes	2	0.019	1	1		0.019	
2	8.50	Fagus grandifolia	yes	1	0.01	1	1		0.01	
2	8.50	Prunus serotina	yes	4	0.038	1	1		0.038	
2	8.50	Conopholis	yes	2	0.019	1	1		0.019	
2	8.50	Viola	yes	1	0.01	1	1		0.01	
				105	**1**	**9**	**7**	**1**	**0.124**	**0.019**
3	8.50	Bareground	3	85	0.817	1				
3	8.50	Acer saccharum	yes	10	0.096	1	1		0.096	
3	8.50	Cimicifuga	yes	5	0.048	1	1		0.048	
3	8.50	Prunus serotina	yes	3	0.029	1	1		0.029	
3	8.50	Viola	yes	1	0.01	1	1		0.01	
				104	**1**	**5**	**4**	**0**	**0.183**	**0**

Table B 4: Boardman 4 Dry (41.098301, -80.6829730)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	12	Bareground	3	25	0.234	1				
1	12	Viburnum cassinoides	yes	5	0.047	1	1		0.047	
1	12	Lonicera tatarica	no	3	0.028	1		1		0.028
1	12	Fraxinus spp.	yes	5	0.047	1	1		0.047	
1	12	Solidago caesia	yes	1	0.009	1	1		0.009	
1	12	Smilax	yes	3	0.028	1	1		0.028	
1	12	Agrimonia gryposepala	yes	1	0.009	1	1		0.009	
1	12	Myrrhis odorata	no	1	0.009	1		1		0.0093
1	12	Prunus serotina	yes	40	0.374	1	1		0.374	
1	12	Vitis sp.	yes	10	0.093	1	1		0.093	
1	12	Quercus alba	yes	1	0.009	1	1		0.009	
1	12	Galium	yes	12	0.112	1	1		0.112	
				107	**1**	**12**	**9**	**2**	**0.729**	**0.0374**
2	12	Bareground	3	3	0.013	1				
2	12	Lonicera tatarica	no	10	0.043	1		1		0.0433
2	12	Prunus serotina	yes	75	0.325	1	1		0.325	
2	12	Acer saccharum	yes	10	0.043	1	1		0.043	
2	12	Vitis sp.	yes	30	0.13	1	1		0.13	
2	12	Ligustrum sinense	no	3	0.013	1		1		0.013
2	12	Fraxinus spp.	yes	5	0.022	1	1		0.022	
2	12	Galium	yes	95	0.411	1	1		0.411	
				231	**1**	**8**	**5**	**2**	**0.931**	**0.0563**
3	12	Bareground	3	20	0.129	1				
3	12	Prunus serotina	yes	45	0.29	1	1		0.29	
3	12	Euonymus alatus	no	3	0.019	1		1		0.0194
3	12	Viburnum	yes	15	0.097	1	1		0.097	
3	12	Viburnum dentatum	yes	1	0.006	1	1		0.006	
3	12	Persicaria virginiana	yes	1	0.006	1	1		0.006	
3	12	Parthenocissus quinquefolia	yes	5	0.032	1	1		0.032	
3	12	Agrimonia gryposepala	no	5	0.032	1		1		0.0323
3	12	Galium	yes	20	0.129	1	1		0.129	
3	12	Fraxinus spp.	yes	8	0.052	1	1		0.052	
3	12	Toxicodendron radicans	yes	1	0.006	1	1		0.006	
3	12	Sambucus	yes	2	0.013	1	1		0.013	
3	12	Viola	yes	1	0.006	1	1		0.006	
3	12	Alliaria petiolata	no	3	0.019	1		1		0.0194
3	12	Vitis sp.	yes	15	0.097	1	1		0.097	
3	12	Lonicera tatarica	no	10	0.065	1		1		0.0645
				155	**1**	**16**	**11**	**4**	**0.735**	**0.1355**

Table B 5: Boardman 5 Dry (41.095055, -80.674947)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	6.50	Bareground	3	5	0.043	1				
1	6.50	Viburnum acerfolium	yes	25	0.216	1	1		0.216	
1	6.50	Acer saccharum	yes	30	0.259	1	1		0.259	
1	6.50	Prunus serotina	yes	40	0.345	1	1		0.345	
1	6.50	Solidago flexicaulis	yes	3	0.026	1	1		0.026	
1	6.50	Aster latifolia	yes	1	0.009	1	1		0.009	
1	6.50	Parthenocissus quinquefolia	yes	4	0.034	1	1		0.034	
1	6.50	Toxicodendron radicans	yes	5	0.043	1	1		0.043	
1	6.50	Fraxinus spp.	yes	3	0.026	1	1		0.026	
				116	**1**	**9**	**8**	**0**	**0.957**	**0**
2	6.50	Bareground	3	5	0.04	1				
2	6.50	Viburnum acerfolium	yes	20	0.159	1	1		0.159	
2	6.50	Acer saccharum	yes	20	0.159	1	1		0.159	
2	6.50	Prunus serotina	yes	60	0.476	1	1		0.476	
2	6.50	Vitis sp.	yes	2	0.016	1	1		0.016	
2	6.50	Solidago flexicaulis	yes	2	0.016	1	1		0.016	
2	6.50	Fraxinus spp.	yes	12	0.095	1	1		0.095	
2	6.50	Quercus velutina	yes	5	0.04	1	1		0.04	
				126	**1**	**8**	**7**	**0**	**0.96**	**0**
3	6.50	Bareground	3	3	0.029	1				
3	6.50	Viburnum acerfolium	yes	15	0.147	1	1		0.147	
3	6.50	Prunus serotina	yes	75	0.735	1	1		0.735	
3	6.50	Solidago flexicaulis	yes	2	0.02	1	1		0.02	
3	6.50	Toxicodendron radicans	yes	3	0.029	1	1		0.029	
3	6.50	Parthenocissus quinquefolia	yes	4	0.039	1	1		0.039	
`				**102**	**1**	**6**	**5**	**0**	**0.971**	**0**

Table B 6: Boardman 6 Dry (41.016822, -80.649786)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	3.50	Bareground	3	1	0.009	1				
1	3.50	Ostrya	yes	50	0.472	1	1		0.472	
1	3.50	Fagus grandifolia	yes	25	0.236	1	1		0.236	
1	3.50	Fraxinus spp.	yes	25	0.236	1	1		0.236	
1	3.50	Acer saccharum	yes	2	0.019	1	1		0.019	
1	3.50	Parthenocissus quinquefolia	yes	2	0.019	1	1		0.019	
1	3.50	Desmodium	yes	1	0.009	1	1		0.009	
				106	**1**	**7**	**6**	**0**	**0.991**	**0**
2	3.50	Bareground	3	2	0.02	1				
2	3.50	Fraxinus spp.	yes	45	0.441	1	1		0.441	
2	3.50	Fagus grandifolia	yes	45	0.441	1	1		0.441	
2	3.50	Quercus Rubra	yes	3	0.029	1	1		0.029	
2	3.50	Epifagus virginiana	yes	2	0.02	1	1		0.02	
2	3.50	Parthenocissus quinquefolia	yes	4	0.039	1	1		0.039	
2	3.50	Poa	no	1	0.01	1		1		0.0098
				102	**1**	**7**	**5**	**1**	**0.971**	**0.0098**
3	3.50	Bareground	3	3	0.027	1				
3	3.50	Ostrya	yes	8	0.073	1	1		0.073	
3	3.50	Fraxinus spp.	yes	15	0.136	1	1		0.136	
3	3.50	Fagus grandifolia	yes	80	0.727	1	1		0.727	
3	3.50	Epifagus virginiana	yes	2	0.018	1	1		0.018	
3	3.50	Poa	no	1	0.009	1		1		0.0091
3	3.50	Acer rubrum	yes	1	0.009	1	1		0.009	
				110	**1**	**7**	**5**	**1**	**0.964**	**0.0091**

Table B 7: Poland Forest Wet (41.009669, -80.620573)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	3.00	Bareground	3	20	0.185	1				
1	3.00	Slash	3	3	0.028	1				
1	3.00	Pilea	yes	60	0.556	1	1		0.556	
1	3.00	Polygonum pennsylvanicum	yes	5	0.046	1	1		0.046	
1	3.00	Persicaria virginiana	yes	1	0.009	1	1		0.009	
1	3.00	Geum	yes	2	0.019	1	1		0.019	
1	3.00	Symphoricarpos albus	yes	10	0.093	1	1		0.093	
1	3.00	Brassica	yes	1	0.009	1	1		0.009	
1	3.00	Aster latifolia	yes	1	0.009	1	1		0.009	
1	3.00	Alliaria petiolata	no	5	0.046	1		1		0.0463
				108	**1**	**10**	**7**	**1**	**0.741**	**0.0463**
2	3.00	Bareground	3	10	0.072	1				
2	3.00	Pilea	yes	80	0.576	1	1		0.576	
2	3.00	Poa	no	1	0.007	1		1		0.0072
2	3.00	Polygonum pennsylvanicum	yes	5	0.036	1	1		0.036	
2	3.00	Persicaria virginiana	yes	2	0.014	1	1		0.014	
2	3.00	Geum	yes	3	0.022	1	1		0.022	
2	3.00	Alliaria petiolata	no	25	0.18	1		1		0.1799
2	3.00	Verbesina	yes	2	0.014	1	1		0.014	
2	3.00	Boehmeria	yes	1	0.007	1	1		0.007	
2	3.00	Symphoricarpos albus	yes	10	0.072	1	1		0.072	
				139	**1**	**10**	**7**	**2**	**0.741**	**0.1871**
3	3.00	Bareground	3	3	0.027	1				
3	3.00	Pilea	yes	55	0.5	1	1		0.5	
3	3.00	Geum	yes	20	0.182	1	1		0.182	
3	3.00	Alliaria petiolata	no	20	0.182	1		1		0.1818
3	3.00	Aster latifolia	yes	3	0.027	1	1		0.027	
3	3.00	Boehmeria	yes	3	0.027	1	1		0.027	
3	3.00	Persicaria virginiana	yes	2	0.018	1	1		0.018	
3	3.00	Juncus	yes	2	0.018	1	1		0.018	
3	3.00	Sedge prostrate	yes	1	0.009	1	1		0.009	
3	3.00	Rumex crispus	no	1	0.009	1		1		0.0091
`				**110**	**1**	**10**	**7**	**2**	**0.782**	**0.1909**

Table B 8: Imagination Station Mosquito Lake Dry (41.308899, -80.748741)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	8.50	Acer rubrum	yes	1	0.007	1	1		0.007	
1	8.50	Bare ground	3	50	0.373	1				
1	8.50	Hypericum	yes	7	0.052	1	1		0.052	
1	8.50	Moss	3	1	0.007	1				
1	8.50	Persicaria virginiana	yes	1	0.007	1	1		0.007	
1	8.50	Prunus serotina	yes	20	0.149	1	1		0.149	
1	8.50	Quercus Rubra	yes	1	0.007	1	1		0.007	
1	8.50	Rosa multiflora	no	35	0.261	1		1		0.2612
1	8.50	Rubis allegheniensis	yes	7	0.052	1	1		0.052	
1	8.50	Slash	3	1	0.007	1				
1	8.50	Symphyotrichum lateriflorum	yes	3	0.022	1	1		0.022	
1	8.50	Toxicodendron radicans	yes	1	0.007	1	1		0.007	
1	8.50	Viburnum dentatum	yes	1	0.007	1	1		0.007	
1	8.50	Polygonum sp.	yes	5	0.037	1	1		0.037	
				134	**1**	**14**	**10**	**1**	**0.351**	**0.2612**
2	8.50	Bare ground	3	15	0.109	1				
2	8.50	Dryopteris	yes	2	0.014	1	1		0.014	
2	8.50	Fragaria virginiana	yes	4	0.029	1	1		0.029	
2	8.50	Hypericum	yes	1	0.007	1	1		0.007	
2	8.50	Lonicera spp.	no	30	0.217	1		1		0.2174
2	8.50	Moss	3	1	0.007	1				
2	8.50	Persicaria virginiana	yes	1	0.007	1	1		0.007	
2	8.50	Rosa multiflora	no	50	0.362	1		1		0.3623
2	8.50	Slash	3	1	0.007	1				
2	8.50	Solidago flexicaulis	yes	1	0.007	1	1		0.007	
2	8.50	Symphyotrichum lateriflorum	yes	2	0.014	1	1		0.014	
2	8.50	Ligustrum sinese	no	30	0.217	1		1		0.2174
				138	**1**	**12**	**6**	**3**	**0.08**	**0.7971**
3	8.50	Bare ground	3	13	0.098	1				
3	8.50	Fragaria virginiana	yes	3	0.023	1	1		0.023	
3	8.50	Fraxinus spp.	yes	2	0.015	1	1		0.015	
3	8.50	Hypericum	yes	5	0.038	1	1		0.038	
3	8.50	Microstegium vimineum	no	2	0.015	1		1		0.015
3	8.50	Moss	3	3	0.023	1				
3	8.50	Persicaria virginiana	yes	3	0.023	1	1		0.023	
3	8.50	Prunus serotina	yes	15	0.113	1	1		0.113	
3	8.50	Rosa multiflora	no	40	0.301	1		1		0.3008
3	8.50	Rubis allegheniensis	yes	5	0.038	1	1		0.038	
3	8.50	Slash	3	2	0.015	1				
3	8.50	Symphyotrichum lateriflorum	yes	5	0.038	1	1		0.038	
3	8.50	Viburnum dentatum	yes	2	0.015	1	1		0.015	
3	8.50	Ligustrum sinese	no	30	0.226	1		1		0.2256
3	8.50	Quercus palustris	yes	3	0.023	1	1		0.023	
`				**133**	**1**	**15**	**9**	**3**	**0.323**	**0.5414**

Table B 9: Boat Launch Mosquito Lake Dry (41.311076, -80.763851)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	4.50	Bare ground	3	10	0.075	1				
1	4.50	Dryopteris	yes	1	0.008	1	1		0.008	
1	4.50	Lindera benzoin	yes	8	0.06	1	1		0.06	
1	4.50	Lonicera spp.	no	50	0.376	1		1		0.3759
1	4.50	Moss	3	1	0.008	1				
1	4.50	Onoclea sensibilis	yes	3	0.023	1	1		0.023	
1	4.50	Rhamnus frangula	no	5	0.038	1		1		0.0376
1	4.50	Veronica officinalis	no	10	0.075	1		1		0.0752
1	4.50	Boehmeria cylindrica	yes	45	0.338	1	1		0.338	
				133	**1**	**9**	**4**	**3**	**0.429**	**0.4887**
2	4.50	Bare ground	3	18	0.17	1				
2	4.50	Dryopteris	yes	5	0.047	1	1		0.047	
2	4.50	Lonicera spp.	no	65	0.613	1		1		0.6132
2	4.50	Moss	3	1	0.009	1				
2	4.50	Rhamnus frangula	no	5	0.047	1		1		0.0472
2	4.50	Rubis allegheniensis	yes	8	0.075	1	1		0.075	
2	4.50	Slash	3	1	0.009	1				
2	4.50	Toxicodendron radicans	yes	3	0.028	1	1		0.028	
				106	**1**	**8**	**3**	**2**	**0.151**	**0.6604**
3	4.50	Bare ground	3	10	0.1	1				
3	4.50	Dryopteris	yes	7	0.07	1	1		0.07	
3	4.50	Lonicera spp.	no	80	0.8	1		1		0.8
3	4.50	Toxicodendron radicans	yes	2	0.02	1	1		0.02	
3	4.50	Veronica officinalis	no	1	0.01	1		1		0.01
`				**100**	**1**	**5**	**2**	**2**	**0.09**	**0.81**

Table B 10: Dead End Mosquito Lake Wet (41.331489, -80.767909)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	2.50	Fraxinus spp.	yes	5	0.033	1	1		0.033	
1	2.50	Lonicera spp.	no	100	0.662	1		1		0.6623
1	2.50	Panicum	no	5	0.033	1		1		0.0331
1	2.50	Slash	3	3	0.02	1				
1	2.50	Toxicodendron radicans	yes	10	0.066	1	1		0.066	
1	2.50	Veronica officinalis	no	8	0.053	1		1		0.053
1	2.50	Cornus sericea	yes	20	0.132	1	1		0.132	
				151	**1**	**7**	**3**	**3**	**0.232**	**0.7483**
2	2.50	Bare ground	3	8	0.049	1				
2	2.50	Geum aleppicum	yes	2	0.012	1	1		0.012	
2	2.50	Lonicera spp.	no	90	0.556	1		1		0.5556
2	2.50	Microstegium vimineum	no	10	0.062	1		1		0.0617
2	2.50	Moss	3	5	0.031	1				
2	2.50	Panicum	no	2	0.012	1		1		0.0123
2	2.50	Rhamnus frangula	no	30	0.185	1		1		0.1852
2	2.50	Slash	3	2	0.012	1				
2	2.50	Solidago spp.	yes	5	0.031	1	1		0.031	
2	2.50	Veronica officinalis	no	8	0.049	1		1		0.0494
				162	**1**	**10**	**2**	**5**	**0.043**	**0.8642**
3	2.50	Fraxinus spp.	yes	8	0.053	1	1		0.053	
3	2.50	Impatiens capensis	yes	3	0.02	1	1		0.02	
3	2.50	Lonicera spp.	no	100	0.667	1		1		0.6667
3	2.50	Moss	3	3	0.02	1				
3	2.50	Panicum	no	10	0.067	1		1		0.0667
3	2.50	Rhamnus frangula	no	5	0.033	1		1		0.0333
3	2.50	Slash	3	5	0.033	1				
3	2.50	Solidago spp.	yes	3	0.02	1	1		0.02	
3	2.50	Veronica officinalis	no	8	0.053	1		1		0.0533
3	2.50	Cornus sericea	yes	5	0.033	1	1		0.033	
`				**150**	**1**	**10**	**4**	**4**	**0.127**	**0.82**

Table B 11: Turkey Trail Mosquito Lake Dry (41.350533, -80.739641)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	10.00	Bare ground	3	5	0.038	1				
1	10.00	Fragaria virginiana	yes	2	0.015	1	1		0.015	
1	10.00	Panicum	no	10	0.075	1		1		0.0752
1	10.00	Parthenocissus quinquefolia	yes	5	0.038	1	1		0.038	
1	10.00	Rosa multiflora	no	65	0.489	1		1		0.4887
1	10.00	Rubis allegheniensis	yes	5	0.038	1	1		0.038	
1	10.00	Slash	3	10	0.075	1				
1	10.00	Toxicodendron radicans	yes	30	0.226	1	1		0.226	
1	10.00	Quercus palustris	yes	1	0.008	1	1		0.008	
				133	**1**	**9**	**5**	**2**	**0.323**	**0.5639**
2	10.00	Bare ground	3	10	0.07	1				
2	10.00	Carya spp.	yes	15	0.106	1	1		0.106	
2	10.00	Dryopteris	yes	3	0.021	1	1		0.021	
2	10.00	Lindera benzoin	yes	20	0.141	1	1		0.141	
2	10.00	Parthenocissus quinquefolia	yes	1	0.007	1	1		0.007	
2	10.00	Rosa multiflora	no	85	0.599	1		1		0.5986
2	10.00	Slash	3	5	0.035	1				
2	10.00	Toxicodendron radicans	yes	3	0.021	1	1		0.021	
				142	**1**	**8**	**5**	**1**	**0.296**	**0.5986**
3	10.00	Bare ground	3	50	0.495	1				
3	10.00	Carya spp.	yes	2	0.02	1	1		0.02	
3	10.00	Geum aleppicum	yes	1	0.01	1	1		0.01	
3	10.00	Parthenocissus quinquefolia	yes	8	0.079	1	1		0.079	
3	10.00	Prunus serotina	yes	1	0.01	1	1		0.01	
3	10.00	Rosa multiflora	no	35	0.347	1		1		0.3465
3	10.00	Toxicodendron radicans	yes	3	0.03	1	1		0.03	
3	10.00	Podophyllum peltatum	yes	1	0.01	1	1		0.01	
`				**101**	**1**	**8**	**6**	**1**	**0.158**	**0.3465**

Table B 12: Turkey Trail Bend Mosquito Lake Wet (41.347246, -80.742013)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	12.00	Bare ground	3	5	0.026	1				
1	12.00	Dryopteris	yes	1	0.005	1	1		0.005	
1	12.00	Impatiens capensis	yes	10	0.052	1	1		0.052	
1	12.00	Moss	3	75	0.387	1				
1	12.00	Poa	no	3	0.015	1		1		0.0155
1	12.00	Rosa multiflora	no	85	0.438	1		1		0.4381
1	12.00	Rubis allegheniensis	yes	10	0.052	1	1		0.052	
1	12.00	Alliaria petiolata	no	5	0.026	1		1		0.0258
				194	**1**	**8**	**3**	**3**	**0.108**	**0.4794**
2	12.00	Dryopteris	yes	4	0.025	1	1		0.025	
2	12.00	Geum aleppicum	yes	5	0.031	1	1		0.031	
2	12.00	Impatiens capensis	yes	5	0.031	1	1		0.031	
2	12.00	Moss	3	70	0.429	1				
2	12.00	Parthenocissus quinquefolia	yes	4	0.025	1	1		0.025	
2	12.00	Rosa multiflora	no	70	0.429	1		1		0.4294
2	12.00	Alliaria petiolata	no	5	0.031	1		1		0.0307
				163	**1**	**7**	**4**	**2**	**0.11**	**0.4601**
3	12.00	Dryopteris	yes	5	0.028	1	1		0.028	
3	12.00	Geum aleppicum	yes	2	0.011	1	1		0.011	
3	12.00	Impatiens capensis	yes	4	0.023	1	1		0.023	
3	12.00	Moss	3	70	0.398	1				
3	12.00	Persicaria virginiana	yes	1	0.006	1	1		0.006	
3	12.00	Poa	no	3	0.017	1		1		0.017
3	12.00	Rosa multiflora	no	80	0.455	1		1		0.4545
3	12.00	Rubis allegheniensis	yes	6	0.034	1	1		0.034	
3	12.00	Alliaria petiolata	no	5	0.028	1		1		0.0284
`				**176**	**1**	**9**	**5**	**3**	**0.102**	**0.5**

Table B 13: C-JAG, North of Smalley Rd Dry (41.224823, -80.987518)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	6.50	Bare ground	3	10	0.079	1				
1	6.50	Fragaria virginiana	yes	6	0.048	1	1		0.048	
1	6.50	Fraxinus spp.	yes	10	0.079	1	1		0.079	
1	6.50	Geum aleppicum	yes	12	0.095	1	1		0.095	
1	6.50	Microstegium vimineum	no	5	0.04	1		1		0.0397
1	6.50	Moss	3	3	0.024	1				
1	6.50	Panicum	no	10	0.079	1		1		0.0794
1	6.50	Rosa multiflora	no	20	0.159	1		1		0.1587
1	6.50	Solidago spp.	yes	6	0.048	1	1		0.048	
1	6.50	Symphyotrichum lateriflorum	yes	1	0.008	1	1		0.008	
1	6.50	Toxicodendron radicans	yes	5	0.04	1	1		0.04	
1	6.50	Viburnum cassinoides	yes	5	0.04	1	1		0.04	
1	6.50	Woody unknown	3	5	0.04	1				
1	6.50	Quercus palustris	yes	10	0.079	1	1		0.079	
1	6.50	Cornus sericea	yes	18	0.143	1	1		0.143	
				126	**1**	**15**	**9**	**3**	**0.579**	**0.2778**
2	6.50	Bare ground	3	1	0.011	1				
2	6.50	Fragaria virginiana	yes	10	0.106	1	1		0.106	
2	6.50	Geum aleppicum	yes	10	0.106	1	1		0.106	
2	6.50	Microstegium vimineum	no	10	0.106	1		1		0.1064
2	6.50	Moss	3	5	0.053	1				
2	6.50	Panicum	no	5	0.053	1		1		0.0532
2	6.50	Persicaria sagittata	yes	2	0.021	1	1		0.021	
2	6.50	Poa	no	4	0.043	1		1		0.0426
2	6.50	Slash	3	3	0.032	1				
2	6.50	Solidago spp.	yes	15	0.16	1	1		0.16	
2	6.50	Symphyotrichum lateriflorum	yes	7	0.074	1	1		0.074	
2	6.50	Viburnum cassinoides	yes	3	0.032	1	1		0.032	
2	6.50	Quercus palustris	yes	4	0.043	1	1		0.043	
2	6.50	Cornus sericea	yes	12	0.128	1	1		0.128	
2	6.50	Quercus bicolor	yes	3	0.032	1	1		0.032	
				94	**1**	**15**	**9**	**3**	**0.702**	**0.2021**
3	6.50	Bare ground	3	4	0.032	1				
3	6.50	Carex 1	yes	5	0.04	1	1		0.04	
3	6.50	Fragaria virginiana	yes	15	0.121	1	1		0.121	
3	6.50	Geum aleppicum	yes	10	0.081	1	1		0.081	
3	6.50	Microstegium vimineum	no	8	0.065	1		1		0.0645
3	6.50	Moss	3	3	0.024	1				
3	6.50	Panicum	no	5	0.04	1		1		0.0403
3	6.50	Poa	no	5	0.04	1		1		0.0403
3	6.50	Rhamnus frangula	no	8	0.065	1		1		0.0645
3	6.50	Slash	3	4	0.032	1				
3	6.50	Solidago spp.	yes	10	0.081	1	1		0.081	
3	6.50	Symphyotrichum lateriflorum	yes	12	0.097	1	1		0.097	
3	6.50	Ulmus spp.	yes	6	0.048	1	1		0.048	
3	6.50	Quercus palustris	yes	7	0.056	1	1		0.056	
3	6.50	Cornus sericea	yes	12	0.097	1	1		0.097	
3	6.50	Quercus bicolor	yes	10	0.081	1	1		0.081	
				124	**1**	**16**	**9**	**4**	**0.702**	**0.2097**

Table B 14: C-JAG, Far North of Smalley Rd Dry (41.22829, -80.991736)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	6.50	Bare ground	3	15	0.129	1				
1	6.50	Carpinus caroliniana	yes	2	0.017	1	1		0.017	
1	6.50	Dryopteris	yes	1	0.009	1	1		0.009	
1	6.50	Fraxinus spp.	yes	12	0.103	1	1		0.103	
1	6.50	Geum aleppicum	yes	4	0.034	1	1		0.034	
1	6.50	Impatiens capensis	yes	3	0.026	1	1		0.026	
1	6.50	Lindera benzoin	yes	6	0.052	1	1		0.052	
1	6.50	Microstegium vimineum	no	4	0.034	1		1		0.0345
1	6.50	Moss	3	7	0.06	1				
1	6.50	Panicum	no	2	0.017	1		1		0.0172
1	6.50	Persicaria virginiana	yes	3	0.026	1	1		0.026	
1	6.50	Slash	3	10	0.086	1				
1	6.50	Solidago spp.	yes	10	0.086	1	1		0.086	
1	6.50	Toxicodendron radicans	yes	18	0.155	1	1		0.155	
1	6.50	Viburnum cassinoides	yes	4	0.034	1	1		0.034	
1	6.50	Quercus palustris	yes	15	0.129	1	1		0.129	
				116	**1**	**16**	**11**	**2**	**0.672**	**0.0517**
2	6.50	Bare ground	3	12	0.125	1				
2	6.50	Carpinus caroliniana	yes	6	0.063	1	1		0.063	
2	6.50	Geum aleppicum	yes	8	0.083	1	1		0.083	
2	6.50	Microstegium vimineum	no	5	0.052	1		1		0.0521
2	6.50	Moss	3	5	0.052	1				
2	6.50	Panicum	no	3	0.031	1		1		0.0313
2	6.50	Persicaria virginiana	yes	8	0.083	1	1		0.083	
2	6.50	Rhamnus frangula	no	6	0.063	1		1		0.0625
2	6.50	Slash	3	3	0.031	1				
2	6.50	Symphyotrichum lateriflorum	yes	3	0.031	1	1		0.031	
2	6.50	Toxicodendron radicans	yes	15	0.156	1	1		0.156	
2	6.50	Viburnum cassinoides	yes	5	0.052	1	1		0.052	
2	6.50	Viola sagittata	yes	5	0.052	1	1		0.052	
2	6.50	Quercus palustris	yes	12	0.125	1	1		0.125	
				96	**1**	**14**	**8**	**3**	**0.646**	**0.1458**
3	6.50	Acer saccharum	yes	1	0.007	1	1		0.007	
3	6.50	Bare ground	3	10	0.074	1				
3	6.50	Carex 1	yes	2	0.015	1	1		0.015	
3	6.50	Carpinus caroliniana	yes	18	0.132	1	1		0.132	
3	6.50	Dryopteris	yes	1	0.007	1	1		0.007	
3	6.50	Fraxinus spp.	yes	6	0.044	1	1		0.044	
3	6.50	Geum aleppicum	yes	5	0.037	1	1		0.037	
3	6.50	Microstegium vimineum	no	10	0.074	1		1		0.0735
3	6.50	Moss	3	10	0.074	1				
3	6.50	Panicum	no	3	0.022	1		1		0.0221
3	6.50	Persicaria virginiana	yes	6	0.044	1	1		0.044	
3	6.50	Poa	no	2	0.015	1		1		0.0147
3	6.50	Slash	3	5	0.037	1				
3	6.50	Solidago spp.	yes	2	0.015	1	1		0.015	
3	6.50	Symphyotrichum lateriflorum	yes	6	0.044	1	1		0.044	
3	6.50	Toxicodendron radicans	yes	15	0.11	1	1		0.11	
3	6.50	Ulmus spp.	yes	6	0.044	1	1		0.044	
3	6.50	Viburnum cassinoides	yes	2	0.015	1	1		0.015	
3	6.50	Viola sagittata	yes	1	0.007	1	1		0.007	
3	6.50	Quercus palustris	yes	25	0.184	1	1		0.184	
				136	**1**	**20**	**14**	**3**	**0.706**	**0.1103**

Table B 15: C-JAG, Northwest of Smalley Rd Dry (41.227604, -80.993482)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	8.50	Acer saccharum	yes	2	0.017	1	1		0.017	
1	8.50	Carpinus caroliniana	yes	15	0.127	1	1		0.127	
1	8.50	Doellingeria umbellata	yes	30	0.254	1	1		0.254	
1	8.50	Dryopteris	yes	5	0.042	1	1		0.042	
1	8.50	Geum aleppicum	yes	2	0.017	1	1		0.017	
1	8.50	Liriodendron tulipifera	yes	5	0.042	1	1		0.042	
1	8.50	Moss	3	10	0.085	1				
1	8.50	Panicum	no	10	0.085	1		1		0.0847
1	8.50	Persicaria virginiana	yes	5	0.042	1	1		0.042	
1	8.50	Rhamnus frangula	no	8	0.068	1		1		0.0678
1	8.50	Rubis allegheniensis	yes	5	0.042	1	1		0.042	
1	8.50	Symphyotrichum lateriflorum	yes	5	0.042	1	1		0.042	
1	8.50	Symphyotrichum puniceum	yes	8	0.068	1	1		0.068	
1	8.50	Quercus palustris	yes	5	0.042	1	1		0.042	
1	8.50	Unknown mint	3	3	0.025	1				
				118	**1**	**15**	**11**	**2**	**0.737**	**0.1525**
2	8.50	Acer saccharum	yes	3	0.026	1	1		0.026	
2	8.50	Bare ground	3	6	0.053	1				
2	8.50	Doellingeria umbellata	yes	15	0.132	1	1		0.132	
2	8.50	Dryopteris	yes	5	0.044	1	1		0.044	
2	8.50	Fagus grandifolia	yes	3	0.026	1	1		0.026	
2	8.50	Geum aleppicum	yes	5	0.044	1	1		0.044	
2	8.50	Lindera benzoin	yes	10	0.088	1	1		0.088	
2	8.50	Liriodendron tulipifera	yes	7	0.061	1	1		0.061	
2	8.50	Moss	3	6	0.053	1				
2	8.50	Panicum	no	8	0.07	1		1		0.0702
2	8.50	Persicaria virginiana	yes	5	0.044	1	1		0.044	
2	8.50	Rubis allegheniensis	yes	8	0.07	1	1		0.07	
2	8.50	Rush	yes	3	0.026	1	1		0.026	
2	8.50	Symphyotrichum lateriflorum	yes	8	0.07	1	1		0.07	
2	8.50	Symphyotrichum puniceum	yes	10	0.088	1	1		0.088	
2	8.50	Quercus palustris	yes	9	0.079	1	1		0.079	
2	8.50	Unknown mint	3	3	0.026	1				
				114	**1**	**17**	**13**	**1**	**0.798**	**0.0702**
3	8.50	Acer saccharum	yes	4	0.032	1	1		0.032	
3	8.50	Bare ground	3	10	0.079	1				
3	8.50	Doellingeria umbellata	yes	30	0.238	1	1		0.238	
3	8.50	Dryopteris	yes	8	0.063	1	1		0.063	
3	8.50	Fragaria virginiana	yes	3	0.024	1	1		0.024	
3	8.50	Geum aleppicum	yes	8	0.063	1	1		0.063	
3	8.50	Liriodendron tulipifera	yes	2	0.016	1	1		0.016	
3	8.50	Moss	3	15	0.119	1				
3	8.50	Panicum	no	6	0.048	1		1		0.0476
3	8.50	Persicaria virginiana	yes	3	0.024	1	1		0.024	
3	8.50	Rubis allegheniensis	yes	5	0.04	1	1		0.04	
3	8.50	Rush	yes	3	0.024	1	1		0.024	
3	8.50	Symphyotrichum puniceum	yes	10	0.079	1	1		0.079	
3	8.50	Quercus palustris	yes	14	0.111	1	1		0.111	
3	8.50	Cornus sericea	yes	5	0.04	1	1		0.04	
				126	**1**	**15**	**12**	**1**	**0.754**	**0.0476**

Table B 16: C-JAG, Middle North of Smalley Rd Dry (41.226421, -80.995426)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	6.50	Acer saccharum	yes	10	0.072	1	1		0.072	
1	6.50	Bare ground	3	10	0.072	1				
1	6.50	Carya spp.	yes	5	0.036	1	1		0.036	
1	6.50	Fagus grandifolia	yes	5	0.036	1	1		0.036	
1	6.50	Fraxinus spp.	yes	10	0.072	1	1		0.072	
1	6.50	Geum aleppicum	yes	1	0.007	1	1		0.007	
1	6.50	Lindera benzoin	yes	60	0.435	1	1		0.435	
1	6.50	Liriodendron tulipifera	yes	10	0.072	1	1		0.072	
1	6.50	Moss	3	3	0.022	1				
1	6.50	Persicaria virginiana	yes	2	0.014	1	1		0.014	
1	6.50	Prunus serotina	yes	3	0.022	1	1		0.022	
1	6.50	Slash	3	2	0.014	1				
1	6.50	Ulmus spp.	yes	1	0.007	1	1		0.007	
1	6.50	Quercus palustris	yes	4	0.029	1	1		0.029	
1	6.50	Ribes	yes	12	0.087	1	1		0.087	
				138	**1**	**15**	**12**	**0**	**0.891**	**0**
2	6.50	Acer saccharum	yes	8	0.061	1	1		0.061	
2	6.50	Bare ground	yes	6	0.045	1	1		0.045	
2	6.50	Carex 3	yes	5	0.038	1	1		0.038	
2	6.50	Fraxinus spp.	yes	15	0.114	1	1		0.114	
2	6.50	Lindera benzoin	yes	45	0.341	1	1		0.341	
2	6.50	Oxalis	yes	3	0.023	1	1		0.023	
2	6.50	Poa	no	3	0.023	1		1		0.0227
2	6.50	Prunus serotina	yes	1	0.008	1	1		0.008	
2	6.50	Prunus pensylvanica	yes	1	0.008	1	1		0.008	
2	6.50	Rubis allegheniensis	yes	20	0.152	1	1		0.152	
2	6.50	Rubis idaeus	yes	3	0.023	1	1		0.023	
2	6.50	Thelypteris noveboracensis	yes	10	0.076	1	1		0.076	
2	6.50	Ulmus spp.	yes	1	0.008	1	1		0.008	
2	6.50	Ribes	yes	8	0.061	1	1		0.061	
2	6.50	Smilax	yes	3	0.023	1	1		0.023	
				132	**1**	**15**	**14**	**1**	**0.977**	**0.0227**
3	6.50	Acer saccharum	yes	10	0.092	1	1		0.092	
3	6.50	Fagus grandifolia	yes	10	0.092	1	1		0.092	
3	6.50	Fragaria virginiana	yes	40	0.367	1	1		0.367	
3	6.50	Fraxinus spp.	yes	6	0.055	1	1		0.055	
3	6.50	Lindera benzoin	yes	5	0.046	1	1		0.046	
3	6.50	Moss	3	3	0.028	1				
3	6.50	Nyssa sylvatica	yes	3	0.028	1	1		0.028	
3	6.50	Prunus serotina	yes	3	0.028	1	1		0.028	
3	6.50	Rubis allegheniensis	yes	15	0.138	1	1		0.138	
3	6.50	Slash	3	4	0.037	1				
3	6.50	Toxicodendron radicans	yes	2	0.018	1	1		0.018	
3	6.50	Smilax	yes	8	0.073	1	1		0.073	
				109	**1**	**12**	**10**	**0**	**0.936**	**0**

Table B 17: C-JAG, North of Smalley Rd South Fence Dry (41.224914, -80.993593)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	2.20	Bare ground	3	3	0.028	1				
1	2.20	Doellingeria umbellata	yes	6	0.055	1	1		0.055	
1	2.20	Dryopteris	yes	2	0.018	1	1		0.018	
1	2.20	Fragaria virginiana	yes	20	0.183	1	1		0.183	
1	2.20	Moss	3	2	0.018	1				
1	2.20	Rosa multiflora	no	25	0.229	1		1		0.2294
1	2.20	Rubis allegheniensis	yes	10	0.092	1	1		0.092	
1	2.20	Slash	3	1	0.009	1				
1	2.20	Toxicodendron radicans	yes	5	0.046	1	1		0.046	
1	2.20	Quercus palustris	yes	35	0.321	1	1		0.321	
				109	**1**	**10**	**6**	**1**	**0.716**	**0.2294**
2	2.20	Bare ground	3	5	0.03	1				
2	2.20	Carya spp.	yes	35	0.21	1	1		0.21	
2	2.20	Doellingeria umbellata	yes	6	0.036	1	1		0.036	
2	2.20	Dryopteris	yes	6	0.036	1	1		0.036	
2	2.20	Fragaria virginiana	yes	10	0.06	1	1		0.06	
2	2.20	Geum aleppicum	yes	3	0.018	1	1		0.018	
2	2.20	Moss	3	12	0.072	1				
2	2.20	Panicum	no	8	0.048	1		1		0.0479
2	2.20	Rubis allegheniensis	yes	8	0.048	1	1		0.048	
2	2.20	Solidago spp.	yes	3	0.018	1	1		0.018	
2	2.20	Toxicodendron radicans	yes	20	0.12	1	1		0.12	
2	2.20	Ulmus spp.	yes	1	0.006	1	1		0.006	
2	2.20	Quercus palustris	yes	50	0.299	1	1		0.299	
				167	**1**	**13**	**10**	**1**	**0.85**	**0.0479**
3	2.20	Bare ground	3	40	0.313	1				
3	2.20	Doellingeria umbellata	yes	5	0.039	1	1		0.039	
3	2.20	Moss	3	8	0.063	1				
3	2.20	Panicum	no	4	0.031	1		1		0.0313
3	2.20	Rosa multiflora	no	3	0.023	1		1		0.0234
3	2.20	Rubis allegheniensis	yes	6	0.047	1	1		0.047	
3	2.20	Slash	3	5	0.039	1				
3	2.20	Spiraea tomentosa	yes	5	0.039	1	1		0.039	
3	2.20	Toxicodendron radicans	yes	18	0.141	1	1		0.141	
3	2.20	Ulmus spp.	yes	2	0.016	1	1		0.016	
3	2.20	Viburnum cassinoides	yes	2	0.016	1	1		0.016	
3	2.20	Quercus palustris	yes	30	0.234	1	1		0.234	
`				**128**	**1**	**12**	**7**	**2**	**0.531**	**0.0547**

Table B 18: Hitchcock Woods 1 Dry (41.00386, -80.677185)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	10.50	Carex 4	yes	3	0.028	1	1		0.028	
1	10.50	Carya spp.	yes	4	0.037	1	1		0.037	
1	10.50	Microstegium vimineum	no	3	0.028	1		1		0.0275
1	10.50	Panicum	no	75	0.688	1		1		0.6881
1	10.50	Prunus serotina	yes	2	0.018	1	1		0.018	
1	10.50	Quercus Rubra	yes	2	0.018	1	1		0.018	
1	10.50	Rhamnus frangula	no	2	0.018	1		1		0.0183
1	10.50	Rosa multiflora	no	4	0.037	1		1		0.0367
1	10.50	Slash	3	5	0.046	1				
1	10.50	Solidago spp.	yes	1	0.009	1	1		0.009	
1	10.50	Symphyotrichum lateriflorum	yes	5	0.046	1	1		0.046	
1	10.50	Toxicodendron radicans	yes	2	0.018	1	1		0.018	
1	10.50	Veronica officinalis	no	1	0.009	1		1		0.0092
				109	**1**	**13**	**7**	**5**	**0.174**	**0.7798**
2	10.50	Bare ground	3	5	0.042	1				
2	10.50	Carex 4	yes	4	0.034	1	1		0.034	
2	10.50	Carya spp.	yes	6	0.05	1	1		0.05	
2	10.50	Fagus grandifolia	yes	1	0.008	1	1		0.008	
2	10.50	Microstegium vimineum	no	5	0.042	1		1		0.042
2	10.50	Panicum	no	70	0.588	1		1		0.5882
2	10.50	Quercus Rubra	yes	2	0.017	1	1		0.017	
2	10.50	Rhamnus frangula	no	3	0.025	1		1		0.0252
2	10.50	Rosa multiflora	no	2	0.017	1		1		0.0168
2	10.50	Slash	3	8	0.067	1				
2	10.50	Solidago spp.	yes	5	0.042	1	1		0.042	
2	10.50	Symphyotrichum lateriflorum	yes	2	0.017	1	1		0.017	
2	10.50	Toxicodendron radicans	yes	4	0.034	1	1		0.034	
2	10.50	Veronica officinalis	no	2	0.017	1		1		0.0168
				119	**1**	**14**	**7**	**5**	**0.202**	**0.6891**
3	10.50	Carya spp.	yes	3	0.027	1	1		0.027	
3	10.50	Fagus grandifolia	yes	1	0.009	1	1		0.009	
3	10.50	Microstegium vimineum	no	6	0.053	1		1		0.0531
3	10.50	Panicum	no	70	0.619	1		1		0.6195
3	10.50	Prunus serotina	yes	1	0.009	1	1		0.009	
3	10.50	Quercus Rubra	yes	3	0.027	1	1		0.027	
3	10.50	Rhamnus frangula	no	2	0.018	1		1		0.0177
3	10.50	Rosa multiflora	no	1	0.009	1		1		0.0088
3	10.50	Slash	3	10	0.088	1				
3	10.50	Solidago spp.	yes	5	0.044	1	1		0.044	
3	10.50	Symphyotrichum lateriflorum	yes	2	0.018	1	1		0.018	
3	10.50	Toxicodendron radicans	yes	4	0.035	1	1		0.035	
3	10.50	Veronica officinalis	no	2	0.018	1		1		0.0177
3	10.50	Pinus strobus	yes	3	0.027	1	1		0.027	
`				**113**	**1**	**14**	**8**	**5**	**0.195**	**0.7168**

Table B 19: C-JAG, Hella Pad Wet (41.205487, -80.997325)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	8.50	Bare ground	3	10	0.085	1				
1	8.50	Fraxinus spp.	yes	8	0.068	1	1		0.068	
1	8.50	Lindera benzoin	yes	70	0.593	1	1		0.593	
1	8.50	Moss	3	6	0.051	1				
1	8.50	Panicum	no	4	0.034	1		1		0.0339
1	8.50	Rubis allegheniensis	yes	3	0.025	1	1		0.025	
1	8.50	Slash	3	8	0.068	1				
1	8.50	Toxicodendron radicans	yes	3	0.025	1	1		0.025	
1	8.50	Viburnum cassinoides	yes	3	0.025	1	1		0.025	
1	8.50	Quercus palustris	yes	3	0.025	1	1		0.025	
				118	**1**	**10**	**6**	**1**	**0.763**	**0.0339**
2	8.50	Bare ground	3	8	0.077	1				
2	8.50	Fraxinus spp.	yes	7	0.067	1	1		0.067	
2	8.50	Lindera benzoin	yes	60	0.577	1	1		0.577	
2	8.50	Moss	3	8	0.077	1				
2	8.50	Panicum	no	4	0.038	1		1		0.0385
2	8.50	Quercus Rubra	yes	3	0.029	1	1		0.029	
2	8.50	Slash	3	8	0.077	1				
2	8.50	Viburnum cassinoides	yes	6	0.058	1	1		0.058	
				104	**1**	**8**	**4**	**1**	**0.731**	**0.0385**
3	8.50	Bare ground	3	10	0.075	1				
3	8.50	Cornus florida	yes	2	0.015	1	1		0.015	
3	8.50	Epifagus virginiana	yes	1	0.008	1	1		0.008	
3	8.50	Fraxinus spp.	yes	7	0.053	1	1		0.053	
3	8.50	Geum aleppicum	yes	1	0.008	1	1		0.008	
3	8.50	Lindera benzoin	yes	50	0.376	1	1		0.376	
3	8.50	Liriodendron tulipifera	yes	3	0.023	1	1		0.023	
3	8.50	Moss	3	4	0.03	1				
3	8.50	Panicum	no	15	0.113	1		1		0.1128
3	8.50	Quercus Rubra	yes	15	0.113	1	1		0.113	
3	8.50	Rubis allegheniensis	yes	4	0.03	1	1		0.03	
3	8.50	Slash	3	2	0.015	1				
3	8.50	Toxicodendron radicans	yes	3	0.023	1	1		0.023	
3	8.50	Viburnum cassinoides	yes	4	0.03	1	1		0.03	
3	8.50	Quercus palustris	yes	12	0.09	1	1		0.09	
`				**133**	**1**	**15**	**11**	**1**	**0.767**	**0.1128**

Table B 20: C-JAG, Hella Pad 2 Dry (41.20351, -80.996801)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	6.50	Cornus florida	yes	12	0.095	1	1		0.095	
1	6.50	Fraxinus spp.	yes	10	0.079	1	1		0.079	
1	6.50	Lindera benzoin	yes	20	0.159	1	1		0.159	
1	6.50	Liriodendron tulipifera	yes	35	0.278	1	1		0.278	
1	6.50	Prunus serotina	yes	30	0.238	1	1		0.238	
1	6.50	Rubis allegheniensis	yes	10	0.079	1	1		0.079	
1	6.50	Sassafras albidum	yes	3	0.024	1	1		0.024	
1	6.50	Slash	3	6	0.048	1				
				126	**1**	**8**	**7**	**0**	**0.952**	**0**
2	6.50	Fraxinus spp.	yes	20	0.105	1	1		0.105	
2	6.50	Liriodendron tulipifera	yes	40	0.211	1	1		0.211	
2	6.50	Prunus serotina	yes	30	0.158	1	1		0.158	
2	6.50	Quercus Rubra	yes	10	0.053	1	1		0.053	
2	6.50	Rosa multiflora	no	5	0.026	1		1		0.0263
2	6.50	Rubis allegheniensis	yes	10	0.053	1	1		0.053	
2	6.50	Viburnum cassinoides	yes	3	0.016	1	1		0.016	
2	6.50	Berberis thunbergii	no	60	0.316	1		1		0.3158
2	6.50	Quercus velutina	yes	12	0.063	1	1		0.063	
				190	**1**	**9**	**7**	**2**	**0.658**	**0.3421**
3	6.50	Fragaria virginiana	yes	5	0.039	1	1		0.039	
3	6.50	Liriodendron tulipifera	yes	40	0.313	1	1		0.313	
3	6.50	Prunus serotina	yes	40	0.313	1	1		0.313	
3	6.50	Rubis allegheniensis	yes	10	0.078	1	1		0.078	
3	6.50	Sassafras albidum	yes	4	0.031	1	1		0.031	
3	6.50	Solidago spp.	yes	2	0.016	1	1		0.016	
3	6.50	Thelypteris noveboracensis	yes	5	0.039	1	1		0.039	
3	6.50	Toxicodendron radicans	yes	10	0.078	1	1		0.078	
3	6.50	Viburnum cassinoides	yes	4	0.031	1	1		0.031	
3	6.50	Quercus velutina	yes	8	0.063	1	1		0.063	
`				**128**	**1**	**10**	**10**	**0**	**1**	**0**

Table B 21: Hitchcock Woods 2 Dry (41.003804, -80.678376)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	2.00	Carex 3	yes	8	0.08	1	1		0.08	
1	2.00	Poa	no	4	0.04	1		1		0.04
1	2.00	Panicum	no	20	0.2	1		1		0.2
1	2.00	Microstegium vimineum	no	45	0.45	1		1		0.45
1	2.00	Sporobolus heterolepis	yes	6	0.06	1	1		0.06	
1	2.00	Quercus palustris	yes	1	0.01	1	1		0.01	
1	2.00	Carpinus caroliniana	yes	1	0.01	1	1		0.01	
1	2.00	Carya spp.	yes	0.5	0.005	1	1		0.005	
1	2.00	Fagus grandifolia	yes	1	0.01	1	1		0.01	
1	2.00	Bare ground	3	6	0.06	1				
1	2.00	Juncus	yes	1	0.01	1	1		0.01	
1	2.00	Prunus serotina	yes	1	0.01	1	1		0.01	
1	2.00	Acer rubrum	yes	0.5	0.005	1	1		0.005	
1	2.00	Rhamnus frangula	no	0.5	0.005	1		1	0.005	
1	2.00	Geum	yes	0.5	0.005	1	1			0.005
1	2.00	Moss	3	4	0.04	1				
				100	**1**	**16**	**10**	**4**	**0.205**	**0.695**
2	2.00	Sporobolus heterolepis	yes	4	0.037	1	1		0.037	
2	2.00	Panicum	no	20	0.187	1		1		0.1869
2	2.00	Microstegium vimineum	no	70	0.654	1		1		0.6542
2	2.00	Polygonum sp.	yes	5	0.047	1	1		0.047	
2	2.00	Quercus palustris	yes	0.5	0.005	1	1		0.005	
2	2.00	Fagus grandifolia	yes	1	0.009	1	1		0.009	
2	2.00	Crataegus sp.	yes	1	0.009	1	1		0.009	
2	2.00	Ulmus spp.	yes	1	0.009	1	1		0.009	
2	2.00	Geum	yes	0.5	0.005	1	1		0.005	
2	2.00	Bare ground	3	2	0.019	1				
2	2.00	Slash	3	2	0.019	1				
				107	**1**	**11**	**7**	**2**	**0.121**	**0.8411**
3	2.00	Panicum	no	30	0.282	1		1		0.2817
3	2.00	Poa	no	30	0.282	1		1		0.2817
3	2.00	Microstegium vimineum	no	35	0.329	1		1		0.3286
3	2.00	Carex 3	yes	3	0.028	1	1		0.028	
3	2.00	Impatiens capensis	yes	1	0.009	1	1		0.009	
3	2.00	Fraxinus spp.	yes	0.5	0.005	1	1		0.005	
3	2.00	Carpinus caroliniana	yes	1	0.009	1	1		0.009	
3	2.00	Quercus palustris	yes	1	0.009	1	1		0.009	
3	2.00	Toxicodendron radicans	yes	0.5	0.005	1	1		0.005	
3	2.00	Carya spp.	yes	0.5	0.005	1	1		0.005	
3	2.00	Unknown herb	3	2	0.019	1				
3	2.00	Persicaria virginiana	yes	2	0.019	1	1		0.019	
`				**106.5**	**1**	**12**	**8**	**3**	**0.089**	**0.892**

Table B 21: Hitchcock Woods 3 Dry (41.00396, -80.678437)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	5.00	Bare ground	3	25	0.245	1				
1	5.00	Slash	3	8	0.078	1				
1	5.00	Fagus grandifolia	yes	1	0.01	1	1		0.01	
1	5.00	Scirpus	yes	5	0.049	1	1		0.049	
1	5.00	Microstegium vimineum	no	50	0.49	1		1		0.4902
1	5.00	Carex 3	yes	2	0.02	1	1		0.02	
1	5.00	Poa	no	1	0.01	1		1		0.0098
1	5.00	Panicum	no	10	0.098	1		1		0.098
				102	**1**	**8**	**3**	**3**	**0.078**	**0.598**
2	5.00	Slash	3	8	0.096	1				
2	5.00	Bare ground	3	25	0.299	1				
2	5.00	Microstegium vimineum	no	40	0.479	1		1		0.479
2	5.00	Carex 3	yes	1	0.012	1	1		0.012	
2	5.00	Toxicodendron radicans	yes	1	0.012	1	1		0.012	
2	5.00	Juncus	yes	6	0.072	1	1		0.072	
2	5.00	Carya spp.	yes	1	0.012	1	1		0.012	
2	5.00	Euonymus alatus	no	0.5	0.006	1		1		0.006
2	5.00	Ulmus spp.	yes	0.5	0.006	1	1		0.006	
2	5.00	Moss	3	0.5	0.006	1				
				83.5	**1**	**10**	**5**	**2**	**0.114**	**0.485**
3	5.00	Bare ground	3	8	0.071	1				
3	5.00	Microstegium vimineum	no	35	0.313	1		1		0.3125
3	5.00	Panicum	no	40	0.357	1		1		0.3571
3	5.00	Juncus	yes	20	0.179	1	1		0.179	
3	5.00	Quercus palustris	yes	1	0.009	1	1		0.009	
3	5.00	Persicaria virginiana	yes	1	0.009	1	1		0.009	
3	5.00	Carya spp.	yes	1	0.009	1	1		0.009	
3	5.00	Toxicodendron radicans	yes	1	0.009	1	1		0.009	
3	5.00	Carex 3	yes	1	0.009	1	1		0.009	
3	5.00	Moss	3	1	0.009	1				
3	5.00	Slash	3	3	0.027	1				
`				**112**	**1**	**11**	**6**	**2**	**0.223**	**0.6696**

Table B 21: Hitchcock Woods 4 Dry (41.003757, -80.680965)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	8.50	Carex 3	yes	15	0.133	1	1		0.133	
1	8.50	Thelypteris noveboracensis	yes	15	0.133	1	1		0.133	
1	8.50	Panicum	no	30	0.265	1		1		0.2655
1	8.50	Microstegium vimineum	no	20	0.177	1		1		0.177
1	8.50	Persicaria virginiana	yes	5	0.044	1	1		0.044	
1	8.50	Bare ground	3	1	0.009	1				
1	8.50	Moss	3	10	0.088	1				
1	8.50	Toxicodendron radicans	yes	2	0.018	1	1		0.018	
1	8.50	Sporobolus heterolepis	yes	15	0.133	1	1		0.133	
				113	**1**	**9**	**5**	**2**	**0.46**	**0.4425**
2	8.50	Fagus grandifolia	yes	8	0.069	1	1		0.069	
2	8.50	Thelypteris noveboracensis	yes	8	0.069	1	1		0.069	
2	8.50	Persicaria virginiana	yes	5	0.043	1	1		0.043	
2	8.50	Ulmus spp.	yes	3	0.026	1	1		0.026	
2	8.50	Panicum	no	65	0.56	1		1		0.5603
2	8.50	Microstegium vimineum	no	20	0.172	1		1		0.1724
2	8.50	Bare ground	3	2	0.017	1				
2	8.50	Moss	3	5	0.043	1				
				116	**1**	**8**	**4**	**2**	**0.207**	**0.7328**
3	8.50	Thelypteris noveboracensis	yes	25	0.191	1	1		0.191	
3	8.50	Panicum	no	60	0.458	1		1		0.458
3	8.50	Microstegium vimineum	no	20	0.153	1		1		0.1527
3	8.50	Moss	3	10	0.076	1				
3	8.50	Carex 1	yes	4	0.031	1	1		0.031	
3	8.50	Persicaria virginiana	yes	7	0.053	1	1		0.053	
3	8.50	Fagus grandifolia	yes	4	0.031	1	1		0.031	
3	8.50	Polygonum sp.	yes	1	0.008	1	1		0.008	
`				**131**	**1**	**8**	**5**	**2**	**0.313**	**0.6107**

Table B 22: Hitchcock Woods 5 Wet (41.004232, -80.681936)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	5.50	Viola sagittata	yes	1	0.009	1	1		0.009	
1	5.50	Microstegium vimineum	no	30	0.28	1		1		0.2804
1	5.50	Bare ground	3	35	0.327	1				
1	5.50	Fagus grandifolia	yes	6	0.056	1	1		0.056	
1	5.50	Liriodendron tulipifera	yes	1	0.009	1	1		0.009	
1	5.50	Thelypteris noveboracensis	yes	4	0.037	1	1		0.037	
1	5.50	Onoclea sensibilis	yes	4	0.037	1	1		0.037	
1	5.50	Acer saccharum	yes	1	0.009	1	1		0.009	
1	5.50	Acer rubrum	yes	1	0.009	1	1		0.009	
1	5.50	Slash	3	8	0.075	1				
1	5.50	Moss	3	6	0.056	1				
1	5.50	Fraxinus spp.	yes	2	0.019	1	1		0.019	
1	5.50	Panicum	no	8	0.075	1		1		0.0748
				107	**1**	**13**	**8**	**2**	**0.187**	**0.3551**
2	5.50	Microstegium vimineum	no	45	0.45	1		1		0.45
2	5.50	Carex 3	yes	10	0.1	1	1		0.1	
2	5.50	Persicaria virginiana	yes	3	0.03	1	1		0.03	
2	5.50	Liriodendron tulipifera	yes	3	0.03	1	1		0.03	
2	5.50	Panicum	no	15	0.15	1		1		0.15
2	5.50	Slash	3	6	0.06	1				
2	5.50	Moss	3	4	0.04	1				
2	5.50	Bare ground	3	10	0.1	1				
2	5.50	Thelypteris noveboracensis	yes	2	0.02	1	1		0.02	
2	5.50	Onoclea sensibilis	yes	1	0.01	1	1		0.01	
2	5.50	Acer saccharum	yes	1	0.01	1	1		0.01	
				100	**1**	**11**	**6**	**2**	**0.2**	**0.6**
3	5.50	Fagus grandifolia Stump sprouts	yes	25	0.325	1	1		0.325	
3	5.50	Carex 3	yes	6	0.078	1	1		0.078	
3	5.50	Microstegium vimineum	no	25	0.325	1		1		0.3247
3	5.50	Epifagus virginiana	yes	3	0.039	1	1		0.039	
3	5.50	Impatiens capensis	yes	2	0.026	1	1		0.026	
3	5.50	Viola sagittata	yes	3	0.039	1	1		0.039	
3	5.50	Rhamnus frangula	no	1	0.013	1		1		0.013
3	5.50	Carya spp.	yes	1	0.013	1	1		0.013	
3	5.50	Acer saccharum	yes	2	0.026	1	1		0.026	
3	5.50	Liriodendron tulipifera	yes	2	0.026	1	1		0.026	
3	5.50	Rubis allegheniensis	yes	2	0.026	1	1		0.026	
3	5.50	Vitus sp.	yes	1	0.013	1	1		0.013	
3	5.50	Fraxinus spp.	yes	1	0.013	1	1		0.013	
3	5.50	Geum	yes	1	0.013	1	1		0.013	
3	5.50	Thelypteris noveboracensis	yes	2	0.026	1	1		0.026	
`				**77**	**1**	**15**	**13**	**2**	**0.662**	**0.3377**

Table B 23: Arthur Kyle Woods 1 Wet (41.016629, -80.719031)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	4.50	Bare ground	3	35	0.207	1				
1	4.50	Lindera benzoin	yes	15	0.089	1	1		0.089	
1	4.50	Onoclea sensibilis	yes	4	0.024	1	1		0.024	
1	4.50	Ulmus spp.	yes	3	0.018	1	1		0.018	
1	4.50	Fraxinus spp.	yes	5	0.03	1	1		0.03	
1	4.50	Microstegium vimineum	no	25	0.148	1		1		0.1479
1	4.50	Acer saccharum	yes	60	0.355	1	1		0.355	
1	4.50	Viola sagittata	yes	5	0.03	1	1		0.03	
1	4.50	Persicaria virginiana	yes	2	0.012	1	1		0.012	
1	4.50	Geum	yes	1	0.006	1	1		0.006	
1	4.50	Parthenocissus quinquefolia	yes	4	0.024	1	1		0.024	
1	4.50	Felicia amoena	no	2	0.012	1		1		0.0118
1	4.50	Moss	3	6	0.036	1				
1	4.50	Slash	3	2	0.012	1				
				169	**1**	**14**	**9**	**2**	**0.586**	**0.1598**
2	4.50	Microstegium vimineum	no	50	0.318	1		1		0.3185
2	4.50	Bare ground	3	35	0.223	1				
2	4.50	Persicaria virginiana	yes	4	0.025	1	1		0.025	
2	4.50	Parthenocissus quinquefolia	yes	3	0.019	1	1		0.019	
2	4.50	Rubis allegheniensis	yes	3	0.019	1	1		0.019	
2	4.50	Smilax	yes	2	0.013	1	1		0.013	
2	4.50	Lindera benzoin	yes	8	0.051	1	1		0.051	
2	4.50	Fraxinus spp.	yes	5	0.032	1	1		0.032	
2	4.50	Geum	yes	3	0.019	1	1		0.019	
2	4.50	Felicia amoena	no	2	0.013	1		1		0.0127
2	4.50	Onoclea sensibilis	yes	1	0.006	1	1		0.006	
2	4.50	Viola sagittata	yes	1	0.006	1	1		0.006	
2	4.50	Acer saccharum	yes	30	0.191	1	1		0.191	
2	4.50	Slash	3	1	0.006	1				
2	4.50	Moss	3	6	0.038	1				
2	4.50	Toxicodendron radicans	yes	1	0.006	1	1		0.006	
2	4.50	Chamaenerion angustifolium	yes	2	0.013	1	1		0.013	
				157	**1**	**17**	**12**	**2**	**0.401**	**0.3312**
3	4.50	Unknown herb	3	3	0.017	1				
3	4.50	Impatiens capensis	yes	1	0.006	1	1		0.006	
3	4.50	Fraxinus spp.	yes	10	0.055	1	1		0.055	
3	4.50	Toxicodendron radicans	yes	8	0.044	1	1		0.044	
3	4.50	Smilax	yes	8	0.044	1	1		0.044	
3	4.50	Rubis allegheniensis	yes	6	0.033	1	1		0.033	
3	4.50	Acer saccharum	yes	75	0.414	1	1		0.414	
3	4.50	Agrimonia	yes	2	0.011	1	1		0.011	
3	4.50	Slash	3	8	0.044	1				
3	4.50	Geum	yes	2	0.011	1	1		0.011	
3	4.50	Viola sagittata	yes	2	0.011	1	1		0.011	
3	4.50	Felicia amoena	no	3	0.017	1		1		0.0166
3	4.50	Microstegium vimineum	no	4	0.022	1		1		0.0221
3	4.50	Poa	no	5	0.028	1		1		0.0276
3	4.50	Bare ground	3	40	0.221	1				
3	4.50	Moss	3	4	0.022	1				
`				**181**	**1**	**16**	**9**	**3**	**0.63**	**0.0663**

Table B 24: Arthur Kyle Woods 3 Dry (41.01633, -80.719482)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	13.00	Bare ground	3	95	0.43	1				
1	13.00	Moss	3	5	0.023	1				
1	13.00	Fagus grandifolia	yes	40	0.181	1	1		0.181	
1	13.00	Acer saccharum	yes	80	0.362	1	1		0.362	
1	13.00	Carya spp.	yes	1	0.005	1	1		0.005	
				221	**1**	**5**	**3**	**0**	**0.548**	**0**
2	13.00	Fraxinus spp.	yes	3	0.015	1	1		0.015	
2	13.00	Acer saccharum	yes	100	0.498	1	1		0.498	
2	13.00	Bare ground	3	93	0.463	1				
2	13.00	Moss	3	5	0.025	1				
				201	**1**	**4**	**2**	**0**	**0.512**	**0**
3	13.00	Acer saccharum	yes	100	0.909	1	1		0.909	
3	13.00	Fraxinus spp.	yes	7	0.064	1	1		0.064	
3	13.00	Lindera benzoin	yes	1	0.009	1	1		0.009	
3	13.00	Viola sagittata	yes	1	0.009	1	1		0.009	
3	13.00	Carya spp.	yes	1	0.009	1	1		0.009	
				110	**1**	**5**	**5**	**0**	**1**	**0**

Table B 25: Arthur Kyle Woods 4 Dry (41.018339, -80.721736)

Splot	Gap age	Species	Native?	%cover	Rel-cov	Stot	Snat	Snon	Rcnat	Rcnon
1	3.00	Acer saccharum	yes	1	0.01	1	1		0.01	
1	3.00	Fraxinus spp.	yes	17	0.173	1	1		0.173	
1	3.00	Chamaenerion angustifolium	yes	1	0.01	1	1		0.01	
1	3.00	Viola sagittata	yes	2	0.02	1	1		0.02	
1	3.00	Persicaria virginiana	yes	4	0.041	1	1		0.041	
1	3.00	Slash	3	10	0.102	1				
1	3.00	Toxicodendron radicans	yes	1	0.01	1	1		0.01	
1	3.00	Moss	3	4	0.041	1				
1	3.00	Bare ground	3	55	0.561	1				
1	3.00	Parthenocissus quinquefolia	yes	2	0.02	1	1		0.02	
1	3.00	Impatiens capensis	yes	1	0.01	1	1		0.01	
				98	**1**	**11**	**8**	**0**	**0.296**	**0**
2	3.00	Lindera benzoin	yes	15	0.17	1	1		0.17	
2	3.00	Fraxinus spp.	yes	15	0.17	1	1		0.17	
2	3.00	Quercus Rubra	yes	1	0.011	1	1		0.011	
2	3.00	Liriodendron tulipifera	yes	1	0.011	1	1		0.011	
2	3.00	Prunus serotina	yes	1	0.011	1	1		0.011	
2	3.00	Slash	3	8	0.091	1				
2	3.00	Moss	3	4	0.045	1				
2	3.00	Viola sagittata	yes	2	0.023	1	1		0.023	
2	3.00	Persicaria virginiana	yes	1	0.011	1	1		0.011	
2	3.00	Bare ground	3	40	0.455	1				
				88	**1**	**10**	**7**	**0**	**0.409**	**0**
3	3.00	Fraxinus spp.	yes	20	0.123	1	1		0.123	
3	3.00	Slash	3	5	0.031	1				
3	3.00	Bare ground	3	75	0.46	1				
3	3.00	Impatiens capensis	yes	0.5	0.003	1	1		0.003	
3	3.00	Persicaria virginiana	yes	0.5	0.003	1	1		0.003	
3	3.00	Viola sagittata	yes	1	0.006	1	1		0.006	
3	3.00	Quercus Rubra	yes	1	0.006	1	1		0.006	
3	3.00	Acer saccharum	yes	60	0.368	1	1		0.368	
				163	**1**	**8**	**6**	**0**	**0.509**	**0**

Appendix 3

C-JAG Exclosure and Control Canopy Gap Size

Site Number	Total Area m^2
1	645
2	660
3	683
4	592
5	318
6	533
7	1172
8	805
9	751