

SPERRYVILLE TRAIL STUDY

INVASIVE SPECIES MANAGEMENT PLAN

Sperryville, Virginia

WSSI #32181.01

October 3, 2022

Prepared for:
Sperryville Community Alliance

Prepared by:



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CONTENT OUTLINE

Non-Native Invasive Species (NNI) Management Plan Narrative: The plan narrative describes in detail the background, goals, invasive species found, removal methods, and restoration guidance.

NNI Management Plan: The plan delineates the existing trail system of the Sperryville Trail Network plus 10-feet to either side of the corridor; and up to 25 feet outside the existing trail corridor in areas where the existing trail is within 25 feet of the Thornton River. Including these buffer areas as well as the trail itself is essential to promote a sustainable river corridor. Three focus areas are also outlined to prioritize NNI treatment areas to spearhead the project.

Invasive Species Management Matrix: The matrix includes data on the 40 invasive plant species inventoried on site. They are sorted based on three priority ratings. Photos are provided for a quick identification tool and management strategies are options explained through chemical and mechanical techniques. The management schedule is subdivided by early, mid, and late-season treatments and color-coded based on treatment type.

Native Riparian Species Matrix: The matrix provides a list of recommended native plant species to be installed followed by NNI treatments in riparian areas. It is grouped by species type to promote varying vegetative layers. Growing conditions are provided to increase success rates by using “right plant, right place” principles, as well as expected size and spacing requirements.

Native Upland Meadow Species Matrix: The matrix provides a list of recommended native plant species to be installed followed by NNI treatments in upland meadow areas. It is grouped by species type to promote varying vegetative layers. Growing conditions are provided to increase success rates by using “right plant, right place” principles, as well as expected size and spacing requirements.

NNI MANAGEMENT PLAN NARRATIVE

BACKGROUND

Non-native invasive (NNI) vegetation presents a unique and pernicious management challenge in any area. NNIs have a remarkable ability to outcompete native species in the landscape by monopolizing space, sunlight, and nutrients. They reproduce rapidly, spreading by seed, roots, or rhizomes. This ability to quickly dominate large swaths of land makes them highly threatening to native ecosystems.

The goal of the Sperryville Trail Network NNI management plan is to promote a healthy riparian corridor along the Thornton River through the implementation of recommended management strategies and guidelines. For the purposes of this management plan, health of the riparian corridor can be defined by water quality and biodiversity of vegetation.

A key objective to meeting this goal is to preserve and enhance the tree canopy along the riparian corridor. Currently, NNI vines are threatening the tree canopy that provides shade for the Thornton River. Maintaining this shade is vital for keeping low water temperatures and high dissolved oxygen levels to ensure good water quality for the trout that inhabit the river.

A second objective of the management plan is to promote biodiversity of native species along the trail corridor. The long-term management of non-native invasive (NNI) vegetation and restoration of native plant communities along the Sperryville Trail Network can provide both ecological uplift and aesthetic enhancement. Much in the same way as a healthy body is able to withstand disease, a healthy, biodiverse ecosystem is more resilient to NNI infestations.

FOCUS AREAS

Attempting an immediate, wholesale removal effort across the entire, roughly 4.5 acre area would be overwhelming. Instead, following strategic guidelines informed by the Sperryville Community Alliance's vision for the trail can help partition the project into manageable, efficient tasks.

To simplify and prioritize the effort, the management plan establishes focus areas. Identifying focus areas for NNI areas shown on the plan were selected because they exhibit high infestations of NNI vegetation, are highly visible to the public, likely to receive substantial foot traffic, and may incorporate culturally significant features. As the Sperryville Trail Network matures, other focus areas should be established to protect valuable or interesting components of the trails. Controlling NNIs in these areas will enhance the aesthetic and ecological function of the trail network, drawing in users with a more welcoming appearance and exemplifying a healthy riparian corridor.

- **Focus Area A** includes the first stretch of the trail network, a linear segment in historic downtown Sperryville, between the Before & After Café and the US Highway 522 spur that connects Lee Highway to Main Street.

- **Focus Area B** represents a secondary entry point from historic downtown Sperryville, linking directly to the public sidewalk that connects Main Street and Water Street. This area is characterized by a footbridge over the Thornton River, inviting pedestrians onto the trail.
- **Focus Area C** is located adjacent to the main parking area for the River District, which is an eastern destination for the main pedestrian route. This area is expected to receive heavy traffic, especially as public events take place in the adjacent green space.

PRIORITY SPECIES

There are over 40 invasive species present along the trail (inventoried in the NNI Matrix), which have been sorted into three priority rating groups.

- **Priority 1** species are those which must be removed urgently. Large populations of these highly invasive plants are actively threatening the existing tree canopy, which is vital to the habitat quality of the river and adjacent areas, as well as user enjoyment of the trail. Vining NNIs make up most of this species group, as they have been observed climbing the trees, smothering their leaves, and weighing down limbs. Tree-of-heaven (*Ailanthus altissima*) is included in the Priority 1 group because it grows very quickly, forming colonies that displace and chemically inhibit the growth of native trees. Colonies have been observed at multiple locations along the trail.
- **Priority 2** species are also highly invasive and have been observed at significant densities on site. They should be managed as soon as possible. These species are predominantly trees, shrubs, and vines with potential to spread rapidly. Most Priority 2 NNIs are not actively threatening the existing tree canopy, but they will if left unchecked. Some of the vining species like sweet autumn clematis (*Clematis terniflora*) and mile-a-minute (*Persicaria perfoliata*) are currently growing in small, isolated populations but may threaten trees similarly to the Priority 1 NNI vines once they expand. NNI trees and shrubs like Norway maple (*Acer platanoides*) and forsythia (*Forsythia* sp.) spread rapidly, preventing the growth of native tree seedlings. Once mature native trees begin to die off, there will be no understory to replace them and Priority 2 NNIs could overtake the site. Other Priority 2 species like garlic mustard (*Alliaria petiolata*) and Japanese knotweed (*Reynoutria japonica*), are unlikely to destroy native trees but colonize so aggressively that they quickly displace or strangle native forbs, in addition to suppressing native understory development.
- **Priority 3** species consist mainly of herbaceous NNIs that are currently found growing on the ground plane in smaller, isolated populations. They generally do not pose a significant threat to the existing tree canopy. Some woody species like butterfly bush (*Buddleia davidii*) and sweet cherry (*Prunus avium*) are included in this group because only a few individuals were found but they have the potential to spread. Priority 3 species can quickly overtake large patches, displacing native forbs and grasses, especially in canopy gaps where they receive ample sunlight. They should be managed when possible, but not as urgently as the species in priority groups 1 and 2.

CONTROL METHODS

There are a variety of methods for removing NNIs including mechanical, chemical, and biological controls. Biological controls generally consist of introducing another organism to control an unwanted species. Given the nature of this site, biological controls are not recommended based on the species inventory and infestations noted in the field. Therefore, this plan will focus on mechanical and chemical control methods.

MECHANICAL CONTROLS

- **Hand-pulling** is the most viable means of mechanical removal for most species. This method is time intensive due to the large infestations of NNIs and the need to remove all extirpated plants from the site for disposal. When removing NNIs by hand, it is vital to dig out all rhizomes and/or root systems, because many of these plants are capable of regenerating from small leftover pieces. Even when all plant material is removed from the site, NNI seeds remain in the soil and resprout in subsequent years. More hand-pulling is required for the resprouts.
- **Repeated mowing or cutting** is an appropriate control method for some species. The vegetation may die back after repeated mowing or cutting over the course of several years. This is a labor-intensive control method with a low success rate in wooded areas given the naturalized setting of the plants. It is effective for meadow areas to prevent establishment of woody invasive species. Given the size of this project area, this method is not recommended as a large-scale control method for the riparian buffer, but it is recommended for the open meadow areas near pen druid brewery.
- **Smothering** is another means of mechanical control that involves covering small invasive groundcovers with a tarp, dark plastic, or thick mulch layer to block sunlight. Generally, an area would be mowed prior to the placement of the tarp or mulch. The tarp is applied and left in place for the entire growing season. Mulch can be left in place and allowed to biodegrade. This control method is only recommended for small, localized areas that are entirely comprised of NNI species. With this method there is no way to preserve native species smothered by the tarp or mulch.

CHEMICAL CONTROLS

Herbicide use is the most efficient means of NNI control. Targeted herbicide application is less time intensive and more effective in removal than mechanical methods. Because the project area is adjacent to the Thornton River, the use of water-safe products and application techniques which do not pose risk to native or stocked trout or other aquatic species such as amphibians and insects, or pose genetic risks to wildlife are required (maintaining water quality is higher priority than invasive species management). Two of the most common herbicide chemical compounds are glyphosate and triclopyr. Rodeo® (glyphosate-based) and Garlon®3a (triclopyr-based) are two readily available products, safe for use near water, that can be applied to targeted vegetation in several ways as discussed below. The NNI matrix includes a schedule window of time recommended for treating each species throughout the year.

- **Foliar herbicide application** is an effective way to control small NNI species in a targeted manner. Herbicide is generally applied using a backpack or hand-held sprayer with a shielded applicator wand for careful aim. This is the recommended treatment method for NNI herbaceous groundcovers, low vines, and shrubs. For species with thick or waxy leaves (e.g. English ivy), the use of a trimmer to scarify the leaves first can result in better absorption of the herbicide.
- **Hack-n-squirt treatment** can be used on larger woody plants. It is one of the safest, most efficient, cost-effective, and targeted control methods. Using an axe, deep cuts are made into the xylem of the plant. Then herbicide is squirted directly into the cuts. Similarly, herbicide can be injected into drilled holes in the trunk.
- **Cut stem treatment** involves mechanically cutting the woody stem of a plant and painting/spraying the stump with herbicide. For proper herbicide absorption, it is important to treat the stump immediately after cutting the stem to prevent the stump from sealing itself. This practice is recommended for any woody plant that is too large to treat with foliar herbicide application.

TECHNIQUES TO AVOID

Over spraying: Be sure to follow the manufacturer's directions for applications. The use of too much herbicide or too frequent uses likely will not affect the invasive plant but will negatively affect the environment by chemicals leaching into the soil, into the stream, or onto native species. Targeted use following the labels' instructions is advised.

Improper disposal: Removing invasive plants from the site is important to prevent regrowth. It is not recommended to use them in compost because some parts of the plants can grow back. Instead, use a trash bag or waste disposal container and check all roots, seeds, and plant fragments are properly disposed.

RECOMMENDATIONS

Prioritization: We recommend beginning the NNI removal process within the established focus areas as shown on the plan and then expanding outward. To further help prioritize our effort, we recommend concentrating on the removal of Priority 1 species first before tackling Priority 2 & 3 species. Given limited time and/or budgets, removal of Priority 1 species will contribute the most toward achieving the goal. Below is a useful guide to help with treatment decision-making.

NNI TREATMENT DECISION-MAKING TABLE

		IS THIS A FOCUS AREA?	
		YES	NO
NNI SPECIES PRIORITY	PRIORITY 3	LOW PRIORITY	LOWEST PRIORITY
	PRIORITY 2	HIGH PRIORITY	LOW PRIORITY
	PRIORITY 1	HIGHEST PRIORITY	HIGH PRIORITY

Fig. 1: Table comparing focus area to NNI species priority to guide decision making.

Manageable work areas: We also recommend dividing the site into manageable pieces. Dividing the site into 50'-100' segments along the trail will help ensure that a thorough treatment of NNI target species has been achieved before proceeding to the next location. For convenience of removal activity monitoring, we have shown tick marks along the trail to help visualize these segments.

Certified herbicide applicator: Herbicide should be applied by a certified applicator who is aware of the weather conditions, application methods, and target species appropriate for the site.

Treatment timing: Treatments can occur within the specified windows shown in the NNI Matrix. However, we recommend treating as early in the growing season as possible to prevent the maturation and dispersal of seeds in the late summer and fall. If NNI species are allowed to reproduce and add to the existing seed bank, those seeds will exacerbate the problem in subsequent years.

Follow-up monitoring & treatments: After the initial removal of vegetation, invasive species will likely germinate from the existing seed bank due to the sudden availability of sunlight and nutrients. Therefore, we recommend that cleared areas be monitored on a regular basis (i.e. monthly) and subsequently treated on an as-needed basis to prevent reestablishment of NNI species. Most sites that are heavily infested by NNI species will require multiple growing seasons of treatment before exhausting the seedbank and trying to reestablish native vegetation. If native vegetation is planted prior to successfully managing the invasive species infestation, the native vegetation is typically lost, or large amounts of resources are allocated for its protection.

COMMON PITFALLS

Planting before NNI species are adequately controlled: Planting too soon before NNI species are controlled will likely result in significant NNI competition against newly planted vegetation. This will likely result in the demise of the desirable species.

Hand-pulling species without removing entire root system: Many NNI species spread via rhizomes. When pulled, root fragments persist in the soil and readily sprout, effectively multiplying the presence of the species. Proper herbicide application is more efficient in affecting the entire root system of the target species.

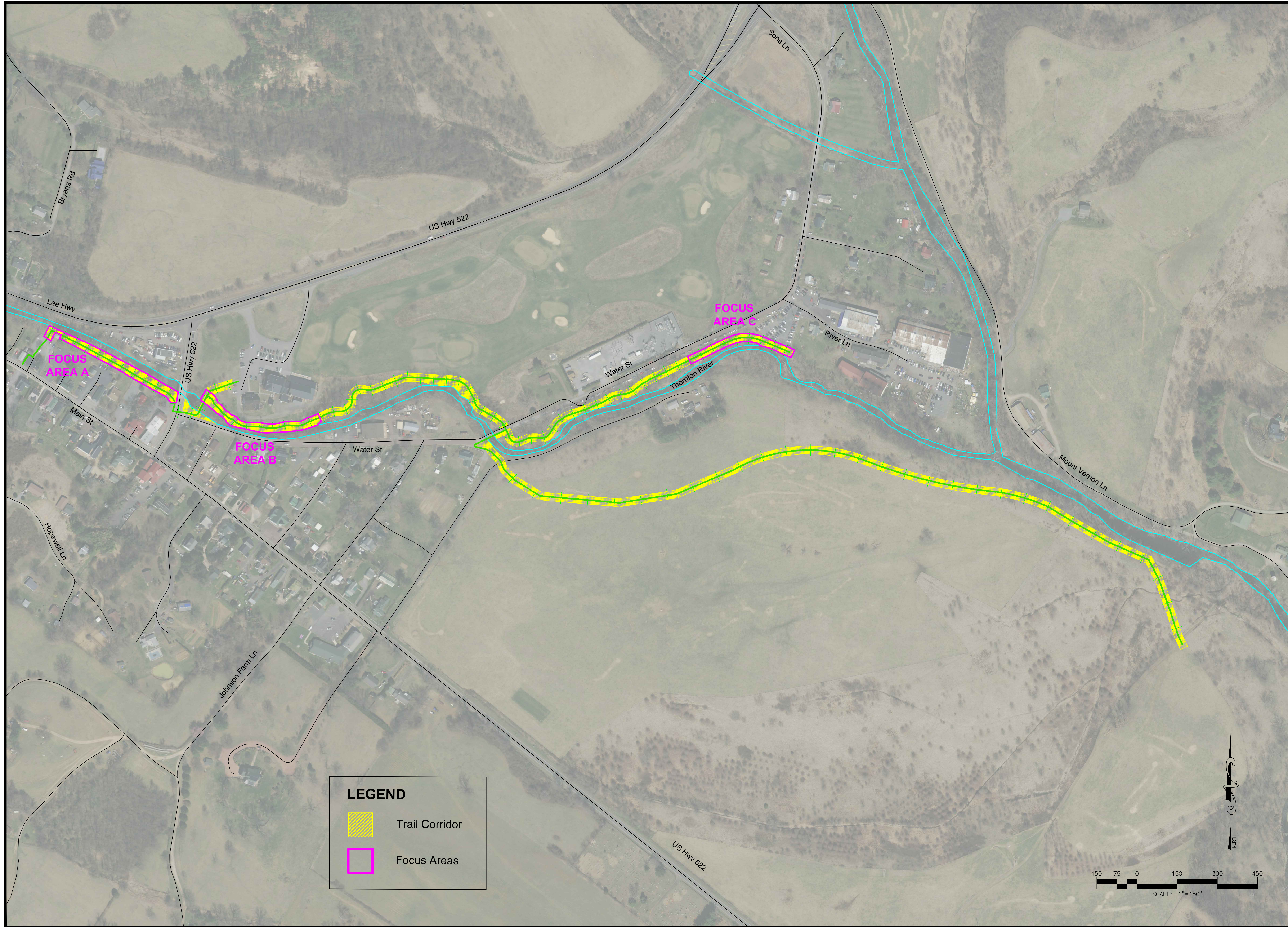
Removing NNI species after fruits or seeds have matured: Many NNI species reach reproductive maturity in the late summer or fall. Mechanical removal of NNI species after fruits or seeds have matured can result in significant seed dispersal across a broad area of previously unaffected vegetation. NNI removal efforts and treatments should be scheduled minimize unintentional seed dispersal.

Excessive ground disturbance: Effort should be taken to minimize any unnecessary soil disturbance. In infested areas, NNI seeds make up a significant portion of the existing seed bank. Given the opportunity when soil is disturbed, these seeds germinate quicker than most native species and easily out-compete native vegetation once established.

Lack of mulching for new plantings: Newly installed trees and shrubs should have a mulch ring installed to help prevent competition from NNI species and other weeds. The mulch layer should be a minimum of 2' in diameter and 3"-4" in depth.

NATIVE PLANT RESTORATION

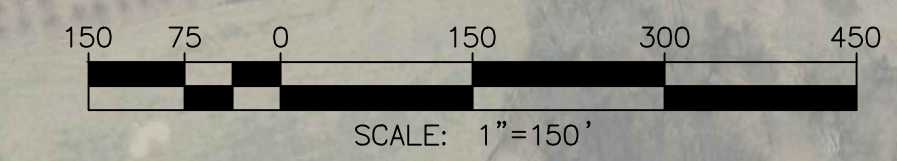
Depending on the density of NNI species, some areas may require restoration planting to restore native plant communities. This becomes critical when removal of large masses of NNI species results in more sunlight reaching the forest floor. This can quickly promote the colonization and proliferation of additional NNI species. A closed tree canopy is one of the best ways to slow the spread of invasive species. A restoration planting scheme comprised of native overstory and understory trees can restore the canopy while native shrubs and an herbaceous seed mix can help compete against the establishment of NNI species on the ground plane. Recommended plant species for the site are listed in the Native Riparian Species Matrix and Native Upland Meadow Species Matrix.



LEGEND

Trail Corridor

Focus Areas



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NNI MANAGEMENT PLAN

Prepared For:
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REVISIONS

No.	Date	Description	Rev. By	App. By

DATE: August 2022		SCALE: 1" = 150'	C.L.: N/A
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Horizontal Datum: VCS NAD 83
Vertical Datum: NAVD 88
Boundary and Topo Source:




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DMC	SEH	DMC

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1 of 1


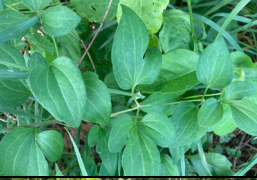
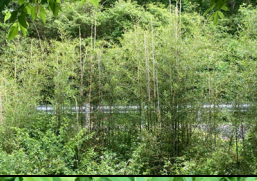




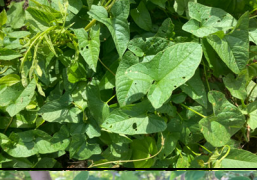

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SPERRYVILLE TRAIL NETWORK INVASIVE SPECIES MANAGEMENT MATRIX

PHOTO	COMMON NAME	SCIENTIFIC NAME	PRIORITY RATING	MANAGEMENT	MANAGEMENT SCHEDULE			
					WINTER	SPRING	SUMMER	FALL
	FORSYTHIA	FORSYTHIA SP.	2	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE OR PAINTED ON CUT STUMPS. SPRAY RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	MIMOSA TREE	ALBIZIA JULIBRISSIN	2	CHEMICAL - TRICLOPYR - INJECTION, HACK-N-SQUIRT, OR SPRAY CUT STUMPS. SPRAY FOLIAGE OF RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	SIBERIAN ELM	ULMUS PUMILA	2	CHEMICAL - TRICLOPYR - INJECTION, HACK-N-SQUIRT, OR SPRAY CUT STUMPS. SPRAY FOLIAGE OF RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	BRADFORD PEAR	PYRUS CALLERYANA	2	CHEMICAL - TRICLOPYR - INJECTION, HACK-N-SQUIRT, OR SPRAY CUT STUMPS. SPRAY FOLIAGE OF RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	NORWAY MAPLE	ACER PLATANOIDES	2	CHEMICAL - TRICLOPYR - INJECTION, HACK-N-SQUIRT, OR SPRAY CUT STUMPS. SPRAY FOLIAGE OF RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	WINGED EUONYMUS	EUONYMUS ALATUS	2	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE OR PAINTED ON CUT STUMPS. SPRAY RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	WINEBERRY	RUBUS PHOENICOLASIUS	2	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE. SPRAY RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	WHITE POPLAR	POPULUS ALBA	2	CHEMICAL - TRICLOPYR - INJECTION, HACK-N-SQUIRT, OR SPRAY CUT STUMPS. SPRAY FOLIAGE OF RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	JAPANESE KNOTWEED	REYNOUTRIA JAPONICA	2	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE. SPRAY RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█





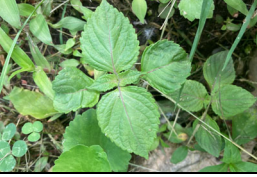



 CHEMICAL TREATMENT
 CHEMICAL/MECHANICAL
 MECHANICAL TREATMENT

SPERRYVILLE TRAIL NETWORK INVASIVE SPECIES MANAGEMENT MATRIX

PHOTO	COMMON NAME	SCIENTIFIC NAME	PRIORITY RATING	MANAGEMENT	MANAGEMENT SCHEDULE			
					WINTER	SPRING	SUMMER	FALL
	PRIVET	LIGUSTRUM SP.	2	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE OR PAINTED ON CUT STUMPS. SPRAY RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	SWEET AUTUMN CLEMATIS	CLEMATIS TERNIFLORA	2	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	BAMBOOS	PHYLLOSTACHYS SPP.	3	CHEMICAL - CONCENTRATED GLYPHOSATE APPLIED TO CUT STEMS. MECHANICAL - CUTTING/MOWING REPEATEDLY TO REMOVE RESPROUT.	█	█	█	█
	JAPANESE STILTGRASS	MICROSTEGIUM VIMINEUM	3	CHEMICAL - GLYPHOSATE WILL KILL BUT DIFFICULT TO AVOID NATIVES. IMAZAMETH, FLUAZIFOP, OR SETHOXYDIM WILL KILL BUT NOT HARM MANY DESIREABLE NATIVE SPECIES. MECHANICAL - CAN BE HAND PULLED IN SMALL AREAS. MOW LATE IN GROWING SEASON BEFORE SEEDS MATURE. MAY TAKE MANY YEARS BEFORE SEED BANK IS EXHAUSTED.	█	█	█	█
	CORYDALIS INCISA	INCISED FUMEWORT	3	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	DOCK LEAF	RUMEX OBTUSIFOLIUS	3	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	MUGWORT	ARTEMISIA VULGARIS	3	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	FIELD BINDWEED	CONVOLVULUS ARVENSIS	3	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.	█	█	█	█
	PAPER MULBERRY	BROUSSONETIA PAPYRIFERA	3	CHEMICAL - TRICLOPYR - INJECTION, HACK-N-SQUIRT, OR SPRAY CUT STUMPS. SPRAY FOLIAGE OF RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS.	█	█	█	█

 CHEMICAL TREATMENT
 CHEMICAL/MECHANICAL
 MECHANICAL TREATMENT

SPERRYVILLE TRAIL NETWORK INVASIVE SPECIES MANAGEMENT MATRIX

PHOTO	COMMON NAME	SCIENTIFIC NAME	PRIORITY RATING	MANAGEMENT	MANAGEMENT SCHEDULE															
					WINTER	SPRING	SUMMER	FALL												
	LAMB'S QUARTERS	CHENOPODIUM ALBUM	3	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.																
	ASIATIC DAYFLOWER	COMMELINA COMMUNIS	3	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.																
	COMMON CHICKWEED	STELLARIA MEDIA	3	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE. MECHANICAL - HAND PULL SMALL PLANTS AND REMOVE FROM SITE.																
	JOHNSON GRASS	SORGHUM HALEPENSE	3	CHEMICAL - GLYPHOSATE OR TRICLOPYR - SPRAYED ON FOLIAGE. SPRAY RESPROUTS. MECHANICAL - HAND PULL SMALL PLANTS (WITH RHIZOMES) AND REMOVE FROM SITE.																
	BEEFSTEAK PLANT	PERILLA FRUTESCENS	3	CHEMICAL - GLYPHOSATE APPLICATION IN LATE SUMMER. MECHANICAL - CAN BE HAND PULLED IN SMALL AREAS.																
						CHEMICAL TREATMENT														
						CHEMICAL & MECHANICAL														
						MECHANICAL TREATMENT														

SPERRYVILLE TRAIL NETWORK - NATIVE RIPARIAN SPECIES MATRIX

SPECIES TYPE	COMMON NAME	SCIENTIFIC NAME	SUNLIGHT REQUIREMENTS	MOISTURE REQUIREMENTS	DROUGHT TOLERANCE	FLOOD TOLERANCE	NATIONAL WETLAND INDICATOR STATUS (EMP)	HEIGHT	SPREAD
OVERSTORY TREES	BITTERNUT HICKORY	CARYA CORDIFORMIS	SUN, PART SHADE, SHADE	MOIST	HIGH	LOW	FACU	60-80'	30-50'
	BLACK GUM	NYSSA SYLVATICA	SUN, PART SHADE, SHADE	MOIST	HIGH	MEDIUM	FAC	30-60'	20-30'
	AMERICAN SYCAMORE	PLATANUS OCCIDENTALIS	SUN, PART SHADE, SHADE	MOIST	MEDIUM	HIGH	FACW	75-100'	75-100'
	WHITE OAK	QUERCUS ALBA	SUN, PART SHADE, SHADE	DRY, MOIST	HIGH	LOW	FACU	60-100'	50-90'
	SOUTHERN RED OAK	QUERCUS FALCATA	PART SHADE	DRY	MEDIUM	MEDIUM	FACU	60-100'	50-60'
	BLACKJACK OAK	QUERCUS MARILANDICA	PART SHADE	DRY	MEDIUM	LOW	UPL	30-50'	25-35'
	PIN OAK	QUERCUS PALUSTRIS	SUN, PART SHADE, SHADE	MOIST, WET	HIGH	MEDIUM	FACW	60-70'	25-45'
NORTHERN RED OAK	QUERCUS RUBRA	SUN, PART SHADE	DRY, MOIST	MEDIUM	LOW	FACU	65-100'	50-75'	
UNDERSTORY TREES	BOXELDER MAPLE	ACER NEGUNDO	SUN	MOIST	HIGH	HIGH	FAC	35-50'	25-45'
	RED MAPLE	ACER RUBRUM	SUN, PART SHADE	MOIST	LOW	HIGH	FAC	40-60'	25-40'
	COMMON SERVICEBERRY	AMELANCHIER ARBOREA	SUN, PART SHADE, SHADE	DRY	MEDIUM	MEDIUM	FAC	15-25'	10-20'
	PAWPAW	ASIMINA TRILOBA	SUN, PART SHADE, SHADE	MOIST	MEDIUM	HIGH	FAC	10-40'	10-40'
	AMERICAN HORNBEAM	CARPINUS CAROLINIANA	PART SHADE, SHADE	MOIST	MEDIUM	HIGH	FAC	20-30'	20-35'
	EASTERN REDBUD	CERCIS CANADENSIS	PART SHADE, SHADE	MOIST	HIGH	LOW	FACU	20-30'	15-35'
	COMMON PERSIMMON	DIOSPYROS VIRGINIANA	SUN, PART SHADE	DRY, MOIST	MEDIUM	MEDIUM	FAC	35-60'	25-35'
SASSAFRAS	SASSAFRAS ALBIDUM	SUN, PART SHADE	MOIST	MEDIUM	LOW	FACU	30-60'	25-40'	
SHRUBS	AMERICAN HAZELNUT	CORYLUS AMERICANA	PART SHADE, SHADE	DRY, MOIST	HIGH	LOW	FACU	10-15'	8-12'
	AMERICAN WITCHHAZEL	HAMAMELIS VIRGINIANA	PART SHADE, SHADE	MOIST	MEDIUM	MEDIUM	FACU	20-30'	15-25'
	COMMON WINTERBERRY	ILEX VERTICILLATA	SUN, PART SHADE, SHADE	DRY, MOIST, WET	MEDIUM	MEDIUM	FACW	6-12'	6-12'
	NORTHERN SPICEBUSH	LINDERA BENZOIN	SUN, PART SHADE, SHADE	DRY, MOIST, WET	MEDIUM	LOW	FAC	8-15'	6-15'
	SOUTHERN ARROWWOOD	VIBURNUM DENTATUM	SUN, PART SHADE, SHADE	DRY, MOIST, WET	MEDIUM	MEDIUM	FAC	6-10'	6-10'
	NORTHERN LOWBUSH BLUEBERRY	VACCINIUM ANGUSTIFOLIUM	SUN, PART SHADE, SHADE	DRY, MOIST	HIGH	LOW	FACU	1-2'	1-3'
	BLACKHAW	VIBURNUM PRUNIFOLIUM	PART SHADE	MOIST	MEDIUM	MEDIUM	FACU	12-15'	6-12'
FERNS	HAY-SCENTED FERN	DENNSTAEDTIA PUNCTILOBULA	PART SHADE, SHADE	MOIST	LOW	LOW	FACU	1.5-2'	2-3'
	SENSITIVE FERN	ONOCLEA SENSIBILIS	PART SHADE, SHADE	MOIST, WET	LOW	MEDIUM	FACW	3-4'	3-4'
	CINNAMON FERN	OSMUNDASTRUM CINNAMOMEUM	SUN, PART SHADE, SHADE	MOIST, WET	MEDIUM	MEDIUM	FACW	3-4'	3-4'
	CHRISTMAS FERN	POLYSTICHUM ACROSTICHOIDES	PART SHADE, SHADE	MOIST	HIGH	LOW	FACU	1-2'	1-2'

SPERRYVILLE TRAIL NETWORK - NATIVE RIPARIAN SPECIES MATRIX

SPECIES TYPE	COMMON NAME	SCIENTIFIC NAME	SUNLIGHT REQUIREMENTS	MOISTURE REQUIREMENTS	DROUGHT TOLERANCE	FLOOD TOLERANCE	NATIONAL WETLAND INDICATOR STATUS (EMP)	HEIGHT	SPREAD
GRASSES, RUSHES, & SEDGES	PENNSYLVANIA SEDGE	CAREX PENSYLVANICA	SUN, PART SHADE, SHADE	DRY, MOIST	MEDIUM	MEDIUM	NI	0.5-1.5'	1-2'
	SQUARROSE SEDGE	CAREX SQUARROSA	SUN, PART SHADE, SHADE	MOIST, WET	MEDIUM	HIGH	FACW	1-2.5'	1-2'
	FOX SEDGE	CAREX VULPINOIDEA	SUN	MOIST, WET	LOW	HIGH	OBL	2-4'	1-2'
	SWEET WOODREED	CINNA ARUNDINACEA	SUN, PART SHADE	MOIST	LOW	MEDIUM	FACW	2-5'	1-2'
	BEAKED PANICGRASS	COLEATAENIA ANCEPS	SUN	MOIST	HIGH	MEDIUM	FAC	2-4'	2-3'
	DEER TONGUE GRASS	DICHANTHELIUM CLANDESTINUM	SUN	WET	MEDIUM	LOW	FAC	2-4'	1-2'
	RIVERBANK WILD RYE	ELYMUS RIPARIUS	PART SHADE, SHADE	MOIST	MEDIUM	HIGH	FACW	3-5'	2-3'
	VIRGINIA WILD RYE	ELYMUS VIRGINICUS	PART SHADE	MOIST	MEDIUM	HIGH	FACW	2-4'	1-2'
	PATH RUSH	JUNCUS TENUIS	SUN, PART SHADE	MOIST	MEDIUM	MEDIUM	FAC	0.5-2'	0.5-2'
	RICE CUT GRASS	LEERSIA ORYZOIDES	PART SHADE	WET	MEDIUM	HIGH	OBL	3-5'	2-4'
FALL PANICGRASS	PANICUM DICHOTOMIFLORUM	SUN	DRY, MOIST	MEDIUM	MEDIUM	FACW	2-3'	1-2'	
FORBS	HARVEST LICE	AGRIMONIA PARVIFLORA	SUN, PART SHADE	MOIST	MEDIUM	LOW	FACW	4-6'	1.5-2'
	SWAMP MILKWEED	ASCLEPIAS INCARNATA	SUN, PART SHADE	MOIST, WET	LOW	MEDIUM	OBL	2-4'	2-3'
	BEGGAR TICKS	BIDENS FRONDOSA	SUN, PART SHADE	MOIST	MEDIUM	MEDIUM	FACW	2-5'	2-4'
	PARTRIDGE PEA	CHAMAECRISTATA FASCICULATA	SUN, PART SHADE	DRY, MOIST	HIGH	LOW	FACU	1-3'	1-2'
	BLUE MISTFLOWER	CONOCLINUM COELESTINUM	SUN, PART SHADE	MOIST	LOW	LOW	FAC	1.5-3'	1.5-3'
	BONESET	EUPATORIUM PERFOLIATUM	SUN, PART SHADE, SHADE	MOIST, WET	LOW	LOW	FACW	4-6'	3-4'
	SWEET JOE-PYE WEED	EUTROCHIUM PURPUREUM	SUN, PART SHADE, SHADE	MOIST	LOW	MEDIUM	FAC	5-7'	2-4'
	CARDINAL FLOWER	LOBELIA CARDINALIS	SUN, PART SHADE, SHADE	MOIST, WET	LOW	MEDIUM	FACW	3-5'	1-2'
	FOXGLOVE BEARDTONGUE	PENSTEMON DIGITALIS	SUN, PART SHADE	DRY, MOIST, WET	MEDIUM	LOW	FAC	3-5'	1.5-2'
	BLACK-EYED SUSAN	RUDBECKIA HIRTA	SUN	DRY, MOIST	HIGH	LOW	FACU	2-3'	1-2'
	WILD SENNA	SENNA HEBECARPA	SUN, PART SHADE	MOIST	MEDIUM	MEDIUM	FAC	3-6'	2-3'
	WRINKLE-LEAF GOLDENROD	SOLIDAGO RUGOSA	SUN	WET	MEDIUM	MEDIUM	FAC	3-5'	1.5-2.5'
	HAIRY WHITE OLDFIELD ASTER	SYMPHYOTRICHUM PILOSUM	SUN, PART SHADE	DRY, MOIST	MEDIUM	LOW	FAC	2-4'	2-4'
	WINGSTEM	VERBESINA ALTERNIFOLIA	SUN	MOIST	MEDIUM	LOW	FAC	4-8'	2-6'
NEW YORK IRONWEED	VERNONIA NOVEBORACENSIS	MON	MOIST	MEDIUM	LOW	FACW	4-7'	3-4'	

SPERRYVILLE TRAIL NETWORK - NATIVE UPLAND MEADOW SPECIES MATRIX

SPECIES TYPE	COMMON NAME	SCIENTIFIC NAME	SUNLIGHT REQUIREMENTS	MOISTURE REQUIREMENTS	DROUGHT TOLERANCE	FLOOD TOLERANCE	NATIONAL WETLAND INDICATOR STATUS (EMP)	HEIGHT	SPREAD
GRASSES, RUSHES, & SEDGES	AUTUMN BENTGRASS	AGROSTIS PERENNANS	SUN, PART SHADE	DRY, MOIST, WET	LOW	MEDIUM	FACU	1-3'	1-2'
	BROOMSEDGE BLUESTEM	ANDROPOGON VIRGINICUS	PART SHADE	DRY, MOIST	HIGH	MEDIUM	FACU	2-5'	2-3'
	DEER TONGUE GRASS	DICHANTHELIUM CLANDESTINUM	SUN	MOIST, WET	HIGH	MEDIUM	FAC	1-3'	1-3'
	BOTTLEBRUSH GRASS	ELYMUS HYSTIX	SUN, PART SHADE, SHADE	DRY, MOIST	HIGH	MEDIUM	UPL	2.5-5'	1-2'
	VIRGINIA WILD RYE	ELYMUS VIRGINICUS	PART SHADE	MOIST	MEDIUM	HIGH	FACW	2-4'	1-2'
	PATH RUSH	JUNCUS TENUIS	SUN, PART SHADE	MOIST	MEDIUM	MEDIUM	FAC	0.5-2'	0.5-2'
	LITTLE BLUESTEM	SCHIZACHYRIUM SCOPARIUM	SUN	DRY, MOIST	HIGH	MEDIUM	FACU	2-4'	1.5-2'
	INDIANGRASS	SORGHASTRUM NUTANS	SUN, PART SHADE, SHADE	DRY, MOIST	MEDIUM	MEDIUM	FACU	3-5'	1-2'
FORBS	INDIANHEMP	APOCYNUM CANNABINUM	PART SHADE	MOIST	MEDIUM	MEDIUM	FACU	2-4'	1.5-2'
	COMMON MILKWEED	ASCLEPIAS SYRIACA	SUN	MOIST	MEDIUM	MEDIUM	FACU	2-5'	2-3'
	BUTTERFLY MILKWEED	ASCLEPIAS TUBEROSA	SUN	DRY, MOIST	HIGH	LOW	OBL	2-3'	1-3'
	SENSITIVE PARTRIDGE PEA	CHAMAECRISTA NICITANS	SUN	MOIST	MEDIUM	LOW	FACU	1-3'	1-3'
	LANCE-LEAVED COREOPSIS	COREOPSIS LANCEOLATA	SUN, PART SHADE, SHADE	DRY	MEDIUM	LOW	FACU	1-2'	1-1.5'
	BONESET	EUPATORIUM PERFOLIATUM	SUN, PART SHADE, SHADE	MOIST, WET	LOW	LOW	FACW	4-6'	3-4'
	OXEYE SUNFLOWER	HELIOPSIS HELIANTHOIDES	SUN, PART SHADE	DRY	MEDIUM	LOW	FACU	3-6'	2-4'
	SPOTTED ST. JOHNSWORT	HYPERICUM PUNCTATUM	SUN, PART SHADE	MOIST	MEDIUM	MEDIUM	FAC	2-3'	2-3'
	FOXGLOVE BEARDTONGUE	PENSTEMON DIGITALIS	SUN, PART SHADE	DRY, MOIST, WET	MEDIUM	LOW	FAC	3-5'	1.5-2'
	BLACK EYED SUSAN	RUDBECKIA HIRTA	SUN	DRY, MOIST	HIGH	LOW	FACU	2-3'	1-2'
	WILD SENNA	SENNA HEBECARPA	SUN, PART SHADE	MOIST	MEDIUM	MEDIUM	FAC	3-6'	2-3'
	EARLY GOLDENROD	SOLIDAGO JUNCEA	SUN, PART SHADE, SHADE	DRY, MOIST	MEDIUM	MEDIUM	UPL	2-5'	2-3'
	PURPLETOP	TRIDENS FLAVUS	PART SHADE	DRY	HIGH	MEDIUM	FACU	3-5'	2-3'
	WINGSTEM	VERBESINA ALTERNIFOLIA	SUN	MOIST	MEDIUM	LOW	FAC	4-8'	2-6'
GOLDEN ALEXANDER	ZIZIA AUREA	SUN, PART SHADE	MOIST	HIGH	MEDIUM	FAC	1.5-3'	1-2.5'	