NORTHWEST ARKANSAS NATIVE PLANTS FOR CARBON REMOVAL

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Woody Species

Plants with large amounts of woody biomass are ideal for aboveground carbon sequestration and storage (Nowak 1993; Nowak and Crane 2000, 2002; McPherson et al. 2005). For trees, this includes native species with more than one of the following characteristics:

- Naturally long-lived so that carbon will be stored for a longer period
- Producing large quantities of woody biomass so that more carbon will be stored than would be in a species that produces less woody biomass (Nowak 1993; Nowak and Crane 2000, 2002; McPherson et al. 2005)
- Fast growth rate so that more carbon can be sequestered in a shorter amount of time than a slower-growing species (Enquist 2002)
- Large crowns and/or large leaf sizes so that photosynthetic activity and removal of carbon from the atmosphere would be optimized

A list of tree species that meet one or more of the above criteria and that are native to Benton, Madison, and Washington Counties are listed in Table 1 below.

Table 1. Native Tree Species for Optimal Carbon Removal

Scientific Name	Common Name
Acer negundo	boxelder
Acer rubrum	red maple
Acer saccharinum	silver maple
Acer saccharum	sugar maple
Betula nigra	river birch
Carya cordiformis	bitternut hickory
Carya glabra	pignut Hickory
Carya illinoinensis	pecan
Carya ovata	shagbark hickory
Quercus falcata	southern red oak
Quercus imbricaria	shingle oak
Quercus macrocarpa	bur oak
Quercus marilandica	blackjack oak
Quercus michauxii	swamp chestnut oak
Quercus muehlenbergii	chinquapin oak
Quercus nigra	water oak
Quercus palustris	pin oak
Quercus phellos	willow oak

Carya texana	black hickory
Carya tomentosa	mockernut hickory
Fagus grandifolia	beech
Juglans nigra	black walnut
Liquidambar styraciflua	sweetgum
Liriodendron tulipifera	tulip poplar
Nyssa sylvatica	black gum
Pinus echinata	shortleaf pine
Platanus occidentalis	American sycamore
Quercus alba	white oak
Quercus rubra	northern red oak
Quercus shumardii	Shumard oak
Quercus stellata	post oak
Quercus velutina	black oak
Salix nigra	black willow
Taxodium distichum	bald cypress
Ulmus americana	American elm
Ulmus rubra	slippery elm
Ulmus serotina	September elm

Herbaceous Species

Prairies are landscapes dominated by nonwoody herbaceous vegetation; grasslands contain approximately 12 percent of the world's terrestrial carbon stocks mostly occurring as belowground biomass. The fibrous root systems of most prairie vegetation species can extend several meters below the surface, often making up between 60-80 percent of the biomass carbon in these ecosystems (Ontl and Janowiak 2017). The soils beneath upland prairies can sequester more carbon than what is found in both the aboveground biomass and belowground soils of upland forests, combined. Soil carbon in prairie ecosystems appears to be related to plant biodiversity and the species richness of these landscapes (Chen et al. 2018; Yang et al. 2019; Pastore et al. 2021).

Herbaceous species that provide optimal carbon sequestration and storage include the following characteristics:

- Long-lived perennial species can store carbon for a longer period and can sequester more carbon over time than short-lived species,
- Fibrous root systems will sequester a greater amount of carbon into the soil than species with tap root systems.
- Deep root systems will sequester carbon deeper into the soil than shorter root systems.

Grasses

Warm-season grasses can sequester a significantly greater amount of carbon into their belowground biomass than cool-season grasses because of their higher rates of photosynthesis and efficient water use (Fornara and Tilman 2008; Spiesman et al. 2018). A list of perennial warm season grass species that are native to Benton, Madison, and Washington Counties are listed in Table 2 below.

Table 2. Warm Season Perennial Grass Species Native to Northwest Arkansas

Scientific Name	Common Name
Agrostis perennans	upland bentgrass
Andropogon gerardii	big bluestem
Andropogon glomeratus	bushy bluestem
Andropogon gyrans	Elliott's bluestem
Andropogon ternarius	splitbeard bluestem
Andropogon virginicus	broomsedge bluestem
Aristida purpurascens	arrowfeather threeawn
Bothriochloa laguroides	silver beard grass
Bouteloua curtipendula	sideoats grama
Chasmanthium sessiliflorum	longleaf woodoats
Chloris verticillata	windmillgrass
Coelorachis cylindrica	Carolina jointgrass
Digitaria cognata	fall witch grass
Eragrostis hirsuta	bigtop lovegrass
Eragrostis intermedia	plains lovegrass
Eragrostis spectabilis	purple love grass
Gymnopogon ambiguus	bearded skeletongrass

Scientific Name	Common Name
Panicum capillare	witchgrass
Panicum flexile	wiry panicgrass
Panicum philadelphicum	Philadelphia panicgrass
Panicum rigidulum	redtop panicgrass
Panicum virgatum	switchgrass
Paspalum boscianum	bull crown grass
Paspalum distichum	knotgrass
Paspalum floridanum	Florida paspalum
Paspalum laeve	field paspalum
Paspalum pubiflorum	four-rowed bead grass
Paspalum setaceum	hairy beadgrass
Saccharum alopecuroides	silver plumegrass
Schedonnardus paniculatus	tumblegrass
Schizachyrium scoparium	little bluestem
Setaria parviflora	bristlegrass
Sorghastrum nutans	Indiangrass
Spartina pectinata	prairie cordgrass

Leptochloa fusca	bearded sprangletop
Muhlenbergia capillaris	hairawn muhly
Muhlenbergia schreberi	nimblewill
Muhlenbergia sobolifera	rock muhly
Muhlenbergia sylvatica	woodland muhly
Panicum anceps	beaked panicgrass
Panicum brachyanthum	prairie panicgrass

Sporobolus clandestinus	rough dropseed
Sporobolus compositus	tall dropseed
Sporobolus cryptandrus	sand dropseed
Tridens flavus	purpletop
Tridens strictus	longspike tridens
Tripsacum dactyloides	eastern gamagrass

Legumes

Growing warm-season grasses in combination with legumes that sequester atmospheric nitrogen have been shown to increase the rate of capture and storage of carbon into the soil (Yang et al. 2019). A list of legume species that are native to Benton, Madison, and Washington Counties are listed in Table 3 below.

Table 3. Legume Species Native to Northwest Arkansas

Scientific Name	Common Name
Acaciella angustissima	prairie acacia
Amphicarpaea bracteata	American hog-peanut
Apios americana	American groundnut
Astragalus canadensis	Canadian milkvetch
Astragalus crassicarpus	ground plum
Astragalus distortus	Ozark milkvetch
Astragalus nuttallianus	smallflower milkvetch
Chamaecrista fasciculata	partridge pea

Scientific Name	Common Name
Desmodium paniculatum	panicled-leaf tick-trefoil
Desmodium perplexum	perplexed tick-trefoil
Desmodium rotundifolium	round-leaved trailing tick-trefoil
Desmodium sessilifolium	sessileleaf tick-trefoil
Galactia volubilis	downy milkpea
Lathyrus venosus	veiny pea
Orbexilum pedunculatum	Sampson's snakeroot
Phaseolus polystachios	thicket bean

Chamaecrista nictitans	sensitive partridge pea
Clitoria mariana	butterfly pea
Dalea candida	white prairie clover
Dalea purpurea	purple prairie clover
Desmanthus illinoensis	Illinois bundleflower
Desmodium canescens	hoary ticktrefoil
Desmodium ciliare	hairy small-leaved tick-trefoil
Desmodium cuspidatum	large-bracted tick-trefoil
Desmodium illinoense	Illinois tick-trefoil
Desmodium laevigatum	smooth tick-trefoil
Desmodium marilandicum	smooth small-leaved tick-trefoil
Desmodium nuttallii	Nuttall's tick-trefoil
Desmodium obtusum	stiff tick-trefoil

Rhynchosia latifolia	prairie snoutbean
Senna marilandica	wild senna
Senna obtusifolia	American sicklepod
Strophostyles helvola	annual sand bean
Strophostyles leiosperma	slickseed fuzzybean
Strophostyles umbellata	pink fuzzybean
Stylosanthes biflora	pencil flower
Tephrosia virginiana	goat's rue
Trifolium carolinianum	Carolina clover
Trifolium reflexum	buffalo clover
Vicia caroliniana	wood vetch
Vicia minutiflora	smallflower vetch
Wisteria frutescens	American wisteria

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